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:

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 April 29 of 2025, by and between Luren E. Dickinson, ("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 125 East 8th Street (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,
9. 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.

10. 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.

11. 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.

12. 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.

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

14. 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: Luren E. Dickinson

Name: Luren E. Dickinson

Title: Director Emeritus

Organization: Beaumont Library District

By: _____

Name: _____

Title: _____

Organization: _____

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.

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

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 April 30, 2025 before me, Sarah Buchel, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Luren E. Dickinson
Name(s) of Signer(s)

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.

SARAH BUCHEL
Notary Public - California
Riverside County
Commission # 2478893
My Comm. Expires Jan 8, 2028

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 Sarah Buchel
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

©2019 National Notary Association

City:

CITY OF BEAUMONT

a Municipal Corporation

Signature: _____

City Manager

ATTEST:

Signature: _____

City Clerk

APPROVED AS TO FORM:

Signature: _____

John Pinkney, City Attorney

APPROVED AS TO CONTENT:

Signature: _____ 5/14/25

Robert Vestal, Director of Engineering/Public Works

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 _____, 20___, 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)

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 _____, 20___, 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.

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WITNESS my hand and official seal.

Signature: _____ (Seal)

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County of Riverside)

On _____, 20___, 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.

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WITNESS my hand and official seal.

Signature: _____ (Seal)

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State of California)
County of Riverside)

On _____, 20___, 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

EXHIBIT "A"
Legal Description

PARCEL "A"

THAT CERTAIN REAL PROPERTY IN THE WEST HALF OF SECTION 10, TOWNSHIP 3 SOUTH, RANGE 1 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF BEAUMONT, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

LOTS 2, 4, 6, 8, 10 AND 12, BLOCK 72, AS PER AMENDED MAP OF THE TOWN OF BEAUMONT RECORDED IN BOOK 6, PAGES 16 AND 17 OF MAPS, RECORDS OF SAN BERNARDINO COUNTY, CALIFORNIA.

ALL LOTS BEING HELD TOGETHER AS ONE PARCEL.

CONTAINING AN AREA, MORE OR LESS, OF 1.322 ACRES (57,600 SQUARE FEET).

SUBJECT TO EASEMENTS, COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, RIGHTS, RIGHTS-OF-WAY, AND OTHER MATTERS OF RECORD, IF ANY.

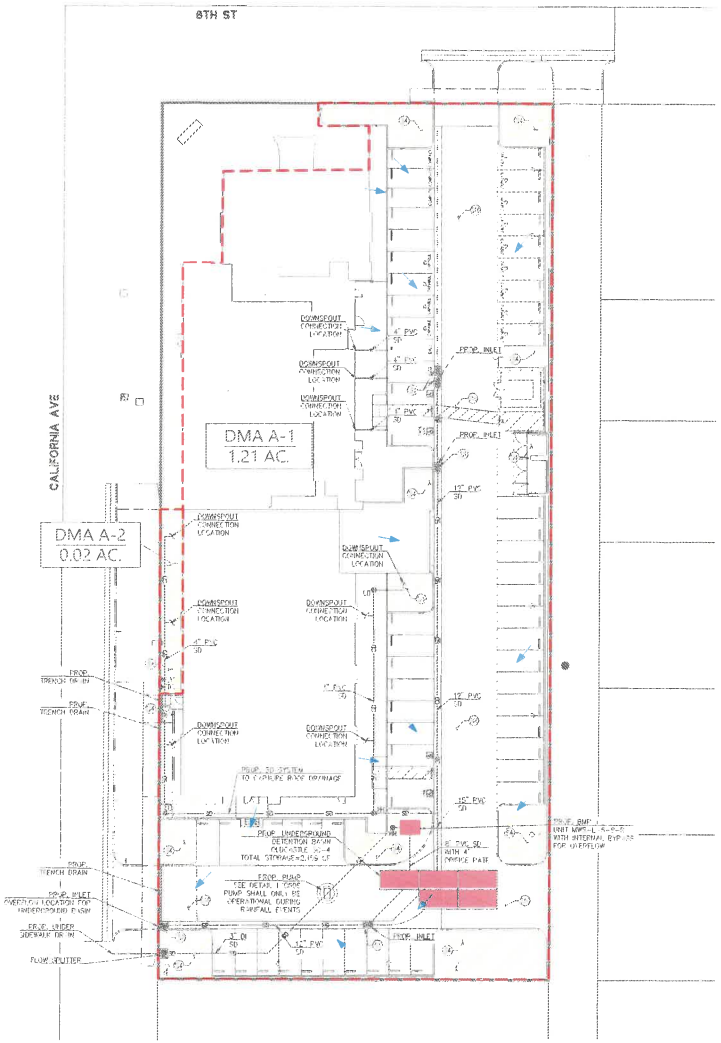
AS SHOWN ON THE ATTACHED EXHIBIT "B" AND BY THIS REFERENCE MADE A PART HEREOF.

THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE LAND SURVEYOR'S ACT.

Davis Thresh, P.L.S. No. 6868

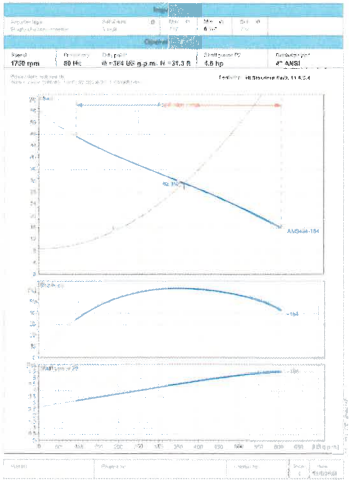
12/23/2024
Dated

EXHIBIT "B"
DIAGRAM OF PROPERTY



Performance Curve

AM834-1905.ST/C



LEGEND:

- PROPERTY LINE
- LIMIT OF WORK
- BMP DRAINAGE AREA BOUNDARY (DMA)
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- IMPERVIOUS AREA – CONCRETE, ASPHALT, BUILDING
- PERVIOUS AREA – LANDSCAPING
- BMP
- DIRECTION OF SURFACE FLOW
- DIRECTION OF PIPED FLOW
- DMA & ACREAGE
- CATCH BASIN

DMA SUMMARY:

DMA	AREA (AC)	SURFACE TYPE	BMP TYPE	IMPERVIOUS %	PERVIOUS %	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)
A-1	1.21	ASPHALT, CONCRETE, BUILDING, LANDSCAPING	DRAINS TO BMP 1	81.5%	8.5%	98,816	6,784
A-2	0.02	CONCRETE, LANDSCAPING	SELF-TREATING	0.0%	100.0%	0	870

BMP SUMMARY:

DMA	AREA (AC)	DESIGN CAPTURE VOLUME (CF)	DRAWDOWN TIME (HR)	BMP
A-1	1.21	3,081	24	MODULAR WETLAND SYSTEM - MWS-L-8-5-8

STRUCTURAL SOURCE CONTROL BMP NOTES

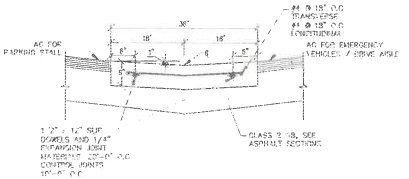
1. STORM DRAIN INLET - MARK ALL INLETS WITH WORDS "ONLY RAIN DOWN THE STORM DRAIN" OR SIMILAR
2. BUILDING DESIGN FEATURES TO DISCOURAGE ENTRY OF PESTS, APPLICABLE TO ALL PROPOSED BUILDINGS
3. LANDSCAPE DESIGN TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES. LANDSCAPE PALATE TO CONSIST OF PLANTS APPROPRIATE FOR SITE SOILS, SLOPES, CLIMATE (SUN, WIND, RAIN), AND LAND USE
4. ALL PLAZA GROUNDS AND PARKING LOTS TO BE SWEPT CLEAN REGULARLY TO PREVENT THE ACCUMULATION OF LITTER AND DEBRIS

NON-STRUCTURAL SOURCE CONTROL BMP NOTES

1. LANDSCAPE MANAGEMENT BMPS
2. BMP MAINTENANCE PER MANUFACTURER RECOMMENDATIONS
3. CATCH BASIN INSPECTION PROGRAM
4. VACUUM SWEEPING OF PRIVATE STREETS AND PARKING LOTS

THE FOLLOWING BMPS MAY BE APPLICABLE THROUGHOUT THE SITE AS NEEDED PER FORM 43-1 IN PROJECT WQMP FOR DETAILS

- N1 – EDUCATION OF PROPERTY OWNERS, TENANTS, AND OCCUPANTS ON STORMWATER BMPS
- N2 – ACTIVITY RESTRICTIONS
- N3 – LOCAL WATER QUALITY ORDINANCES
- N11 – LITTER CONTROL PROGRAM
- S12 – EMERGENCY RESPONSE
- S17 – COMPLY WITH ALL OTHER APPLICABLE NPDES PERMITS



CONCRETE V-GUTTER

N

GRAPHIC SCALE

DIGALERT — Call 2 Working Days Before You Dig 811

BENCHMARK:
A SCRIBED "X" AT THE TOP OF A CURB RAMP WITHIN THE SOUTHEAST CURB RETURN AT THE INTERSECTION OF ELEVENTH STREET WASTE AVENUE

ELEV. 1760.00, NAVD88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

DESIGN BY
DRAWN BY
CHECKED BY
DATE
AS SHOWN
SCALE
FOR REVIEW

BKF

REVIEWED BY: _____ CITY ENGINEER _____ DATE
RECOMMENDED BY: _____ PERSONAL ENGINEER _____ DATE
APPROVED BY: _____ CITY ENGINEER _____ DATE

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT

CITY OF BEAUMONT, CALIFORNIA

WQMP POST-CONSTRUCTION PLAN
BEAUMONT LIBRARY ADDITION & RENOVATION PROJECT
125 E 8TH ST, BEAUMONT, CA 92223

SHEET
--
OF --

Project Specific Water Quality Management Plan

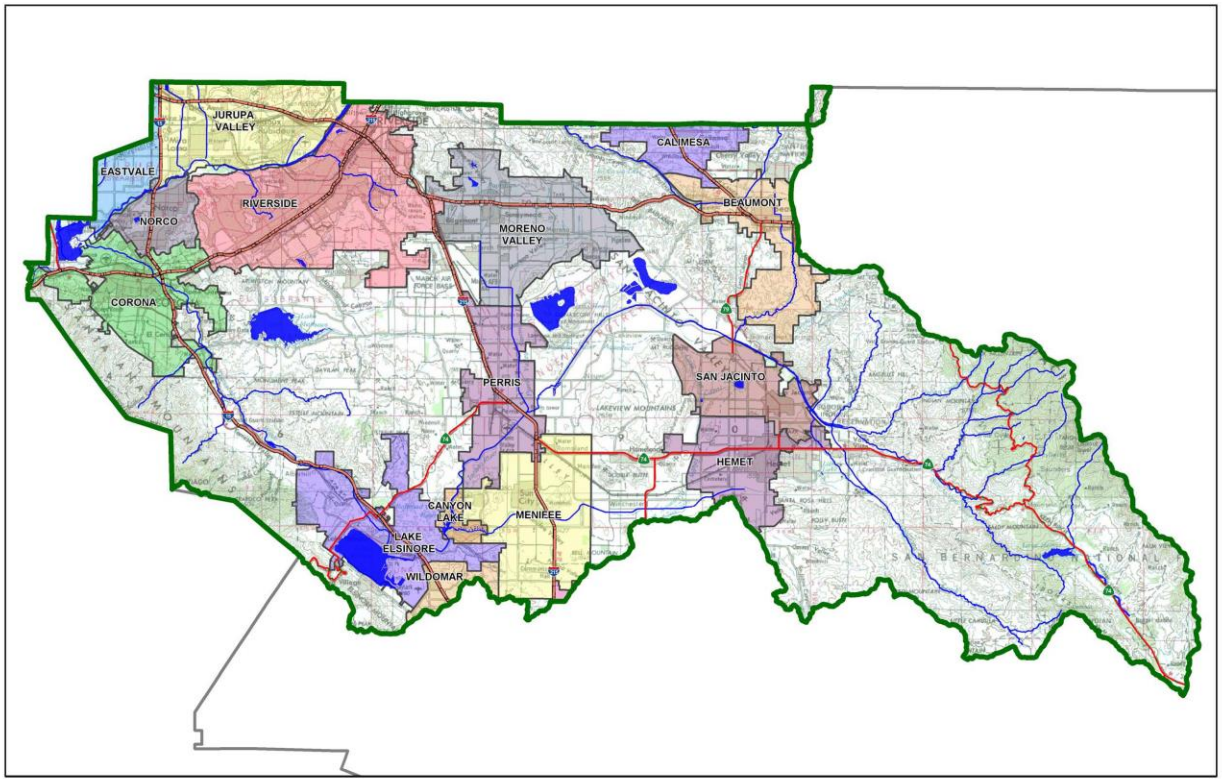
*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

No further comments
NV5
04/04/2025

Project Title: Beaumont Library Addition and Renovation Project

Development No: N/A

Design Review/Case No: PW2025-0164



Contact Information:

Prepared for:
Beaumont Library District
125 East 8th Street
Beaumont, CA 92223
(951) 845-1357

Prepared by:
BKF Engineers
4675 MacArthur Court, Suite 400
Newport Beach, CA 92660
(949) 526-8460

☐ **Preliminary**
☒ **Final**

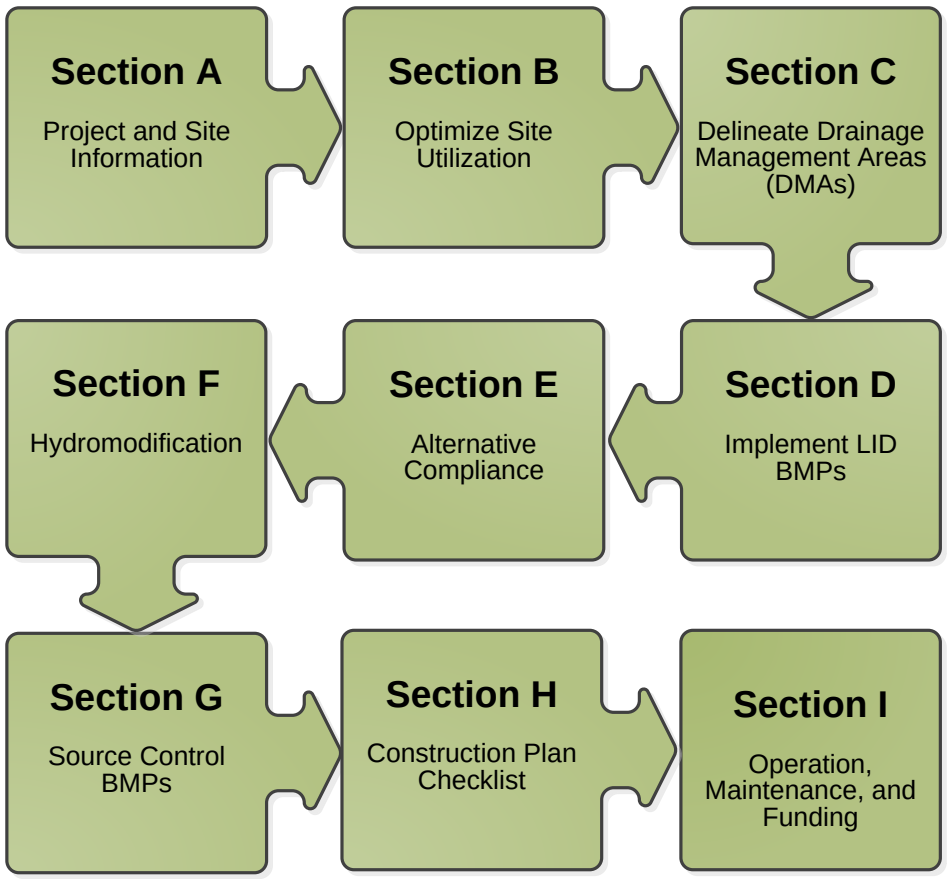
Original Date Prepared: 08/22/2024

Revision Date(s): 03/24/2025

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

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 Beaumont Library District by BKF Engineers for the Beaumont Library Addition and Renovation Project.

This WQMP is intended to comply with the requirements of City of Beaumont for R8-2010-0033 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Beaumont Water Quality Ordinance (Municipal Code Section 14.12.315).

"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."

Luren E. Dickinson — Owner's Signature

11-13-24 — Date

Luren E. Dickinson — Owner's Printed Name

Director — 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

11/12/2024 — Date

Daniel D. Villines — Preparer's Printed Name

Senior Project Manager — Preparer's Title/Position

Preparer's Licensure:

Table of Contents

Section A: Project and Site Information 6

A.1 Maps and Site Plans 7
A.2 Identify Receiving Waters 7
A.3 Additional Permits/Approvals required for the Project: 7

Section B: Optimize Site Utilization (LID Principles) 9

Section C: Delineate Drainage Management Areas (DMAs) 10

Section D: Implement LID BMPs 11

D.1 Infiltration Applicability 11
D.2 Harvest and Use Assessment 12
D.3 Bioretention and Biotreatment Assessment 14
D.4 Feasibility Assessment Summaries 15
D.5 LID BMP Sizing 15

Section E: Alternative Compliance (LID Waiver Program) 16

E.1 Identify Pollutants of Concern 17
E.2 Stormwater Credits 18
E.3 Sizing Criteria 18
E.4 Treatment Control BMP Selection 19

Section F: Hydromodification 20

F.1 Hydrologic Conditions of Concern (HCOC) Analysis 20
F.2 HCOC Mitigation 21

Section G: Source Control BMPs 22

Section H: Construction Plan Checklist 24

Section I: Operation, Maintenance and Funding 25

List of Tables

Table A.1 Identification of Receiving Waters 7
Table A.2 Other Applicable Permits 7
Table C.1 DMA Classifications 10
Table C.2 Type 'A', Self-Treating Areas 10
Table C.3 Type 'D', Areas Draining to BMPs 10
Table D.1 Infiltration Feasibility 11
Table D.2 LID Prioritization Summary Matrix 15
Table D.3 DCV Calculations for LID BMPs 15
Table E.1 Potential Pollutants by Land Use Type 17
Table E.2 Water Quality Credits 18
Table E.3 Treatment Control BMP Sizing 18
Table E.4 Treatment Control BMP Selection 19
Table F.1 Hydrologic Conditions of Concern Summary 20
Table G.1 Permanent and Operational Source Control Measures 22
Table H.1 Construction Plan Cross-reference 24

List of Appendices

Appendix 1: Maps and Site Plans .....
Appendix 2: Construction Plans .....
Appendix 3: Soils Information .....
Appendix 4: Historical Site Conditions .....
Appendix 5: LID Infeasibility .....
Appendix 6: BMP Design Details .....
Appendix 7: Hydromodification .....
Appendix 8: Source Control .....
Appendix 9: O&M .....
Appendix 10: Educational Materials .....

Section A: Project and Site Information

This project is known as the Beaumont Library Addition & Renovation, it is located at the southeast corner of N California Avenue and E 8th Street in Bakersfield, CA. The main design of project will renovate the existing Beaumont Library District building, which includes the historic Carnegie building (built in 1914 with 3,910 gross square feet) and its subsequent additions: a 1965 expansion and a 1981 Community Room, totaling 10,410 gross square feet. The renovation aims to meet current seismic, accessibility, and building code requirements. Additionally, a new single-story addition spanning 13,200 square feet will be constructed.

To accommodate these changes, the existing parking lot and landscape areas will be replaced and reconfigured. A new parking lot will be built south of the new library addition, with access points on N California Avenue and the alley between E 7th Street and E 8th Street. The project will be executed in two phases to ensure uninterrupted library operations during construction. The phasing plan may be adjusted in consultation with the Library to optimize operational efficiency and construction timelines.

PROJECT INFORMATION		
Type of Project:	Civic/Commercial	
Planning Area:	RSF	
Community Name:	Beaumont	
Development Name:	Beaumont Library Addition & Renovation Project	
PROJECT LOCATION		
Latitude & Longitude (DMS): 33°55'55.6", - 116°58' 51.4"		
Project Watershed and Sub-Watershed: Santa Ana River Watershed & San Timoteo Creek: Reach 3		
Gross Acres: 1.23 AC APN(s): 418-081-016, 418-081-002, 418-081-003, 418-081-004		
Map Book and Page No.: Map Book 6, Page No. 16 & 17		
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	Library, Parking Lot Area	
Proposed or Potential SIC Code(s)	8231, 7521	
Area of Impervious Project Footprint (SF)	53,589	
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	48,169	
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)	41,706	
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?	0.85	

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)

A.2 Identify Receiving Waters

In order of upstream to downstream, the receiving waters that the project site is tributary to are as follows. A map of the receiving waters is included 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
San Timoteo Creek Reach 3	None	GWR, REC1, REC2, WARM, WILD	N/A
San Timoteo Creek Reach 2	None	GWR, REC1, REC2, WARM, WILD	N/A
San Timoteo Creek Reach 1B	Indicator Bacteria	GWR, REC1, REC2, WARM, WILD	N/A
San Timoteo Creek Reach 1A	Indicator Bacteria	GWR, REC1, REC2, WARM, WILD	N/A
Santa Ana River Reach 5	None	AGR, GWR, MUN, RARE, REC, REC2, WARM, WILD	N/A
Santa Ana River Reach 4	None	GWR, REC1, REC2, WARM, WILD	N/A
Santa Ana River Reach 3	None	GWR, REC1, REC2, WARM, WILD	N/A
Prado Basin Management Zone	pH	RARE, REC1, REC2, WARM, WILD	N/A
Santa Ana River Reach 2	Indicator Bacteria	AGR, GWR, RARE, REC1, REC2, SPWN, WARM, WILD	21.5± Miles
Santa Ana River Reach 1	None	REC1, REC2, WARM, WIL	N/A
Tidal Prism	None	COMM, EST, MAR, RARE, REC1, REC2, WILD	N/A

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)* City of Beaumont Grading Permit	☐ Y	☐ N
City of Beaumont Building Permit	☐ Y	☐ N
City of Beaumont Conditional Use Permit	☐ Y	☐ N
City of Beaumont Design Review	☐ Y	☐ N
City of Beaumont Construction Permit	☐ 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)

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 – current conditions show no record of an existing storm drain line. Therefore, all existing water that lands onsite, either infiltrates through pervious areas or surface flows to the existing drainage flow. Current surface drainage flows from north-east to the south-west of the site towards California Avenue. In efforts of preserving the existing drainage patterns, proposed design will capture onsite flows direct them towards the south-west portion of the site where it will be treated through a modular wetland. After treatment, flows will be pumped back to surface level and flow towards California Avenue. Keeping existing drainage flows.

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

Yes – existing vegetation that is present on site is aimed at being protected. However, the adjacent on-site vegetation will be cleared and grubbed in an effort of adding the proposed parking lot. Additional landscaping areas will be proposed in an effort to increase pervious areas onsite.

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

Yes – natural infiltration capacity will be achieved by using the proposed landscaping as self-treating areas and by capturing and treating stormwater through an underground modular wetland.

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

Yes – since the existing site is an already developed area, the proposed design is set to expand on the existing library building. The project aims on minimizing as much as possible impervious areas while still adhering to the various development requirements necessary.

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

Yes – runoff that comes from impervious areas such as the parking lot, will be directed through a valley gutter and captured in catch basins. There will be a storm drain system below ground that will flow into a modular wetland, where water will be treated before being release subsurface. Other impervious areas, such as the walkway ways, will have runoff sloping towards adjacent landscape areas where water can infiltrate.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[12]	Area (Sq. Ft.)	DMA Type
A-1	Asphalt, Concrete, Building, Landscaping	52,930	Drains to BMP
A-2	Concrete, Landscaping	659	Self- treating

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
A-2	659	Landscaping	Sprinkler

Table C.3 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A-1	BMP 1

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

Geotechnical Report

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: DMA A-1 and DMA A-2		
…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

Not feasible based on calculations.

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: 0.07

Type of Landscaping (Conservation Design or Active Turf): Conservative 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: 1.15

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: 2.12

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: 2.44

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)
2.44	0.07

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: 40

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: 1.15

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: 176

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: 202.40

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)
202.40	40

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

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	
A-1	☐	☐	☐	☒	☐
	☐	☐	☐	☐	☐

D.5 LID BMP Sizing

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	*Enter BMP Name / Identifier Here* *MWS-L-6-8-R*		
	[A]		[B]	[C]	[A] x [C]			
A-1	*48,169*	*Asphalt or Concrete*	*1.00*	*0.89*	*42,966.7*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-1	*4,761*	*Landscaping*	*0.1*	*0.11*	*525.9*			
BMP 1	52,930				43,492.6	0.85	3,081	***See note below****

[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

***Contech's requirements for modular wetland systems downstream of detention systems requires their modular wetland units to be sized by two factors, the design capture volume and the drawdown time. The DCV of 3,081 cubic feet and a drawdown time of 24 hours (less than the maximum of 48 hours for a BMP) was provided to Contech. After providing this to Contech, they have confirmed that the unit MWS-L-6-8-R is capable of meeting these criteria. In addition, an 85th percentile 24-hr storm event hydrograph for the proposed condition was created using CivilD. The hydrograph shows the peak flow entering the modular wetlands unit during the 85th percentile storm event to be 0.11 CFS. The unit MWS-L-6-8-R has a typical treatment capacity of 0.147 cfs, exceeding the expected peak flow. The unit will also have an internal bypass system for large storm events with a peak flow capacity of 0.81 cfs. The calculations and BMP details can be found in Appendix 6.**

Section E: Alternative Compliance (LID Waiver Program)

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

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

- *Or* -

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

E.1 Identify Pollutants of Concern

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]
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]				
						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]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

[2] Cross Reference Table E.1 above to populate this column.

[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	6.16 Minutes	5.42 Minutes	14%
Volume (Cubic Feet)	9,636	11,020	14%

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

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

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

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

F.2 HCOC Mitigation

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

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

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

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

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

Storm water will be detained by an underground detention system (Oldcastle SC-4) in order to ensure the post-development peak flow is no greater than 110% of the pre-development 2-year peak flow. A summary of the peak flow mitigation provided is shown in the table below. All calculations are included in Appendix 7.

	2-year, 24-hour storm event		
	Pre-condition	**Post-condition**	**Post-condition after Detainment**
Peak Flow	0.364 CFS	0.416 CFS	0.378 CFS

Section G: Source Control BMPs

The following table identifies the potential sources of runoff pollutants for this project and specifies how they are addressed through permanent controls and operational BMPs:

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain 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 BMP fact sheet SC-44 "Drainage System Maintenance" in Appendix 10. ▪ 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."
Landscape/ Outdoor Pesticide Use	State that final landscape plans will accomplish all 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.	▪ 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.

	▪ 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.	
Sidewalks, and parking lots		▪ Sweep 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.
Refuse Areas	▪ Trash receptacles shall be emptied by trained personnel on a regular basis to maintain clean facilities ▪ Trash enclosures area shall be kept clean by sweeping on a regular basis. ▪ Trash enclosures shall be emptied by a qualified, contracted waste management company or the City of Beaumont. ▪ Signs will be posted on or near dumpsters with the words, “Do not dump hazardous materials here” or similar.	▪ Provide adequate number of receptacles ▪ Inspect receptacles regularly, and 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
Roofing, Gutters, & Trim	▪ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

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)
BMP 1	Modular Wetland MWS-L-6-8-R	C301, C606	33°55'53.9"N 116°58'51.1"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: City of Beaumont to provide maintenance.

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.

Appendix 1: Maps and Site Plans

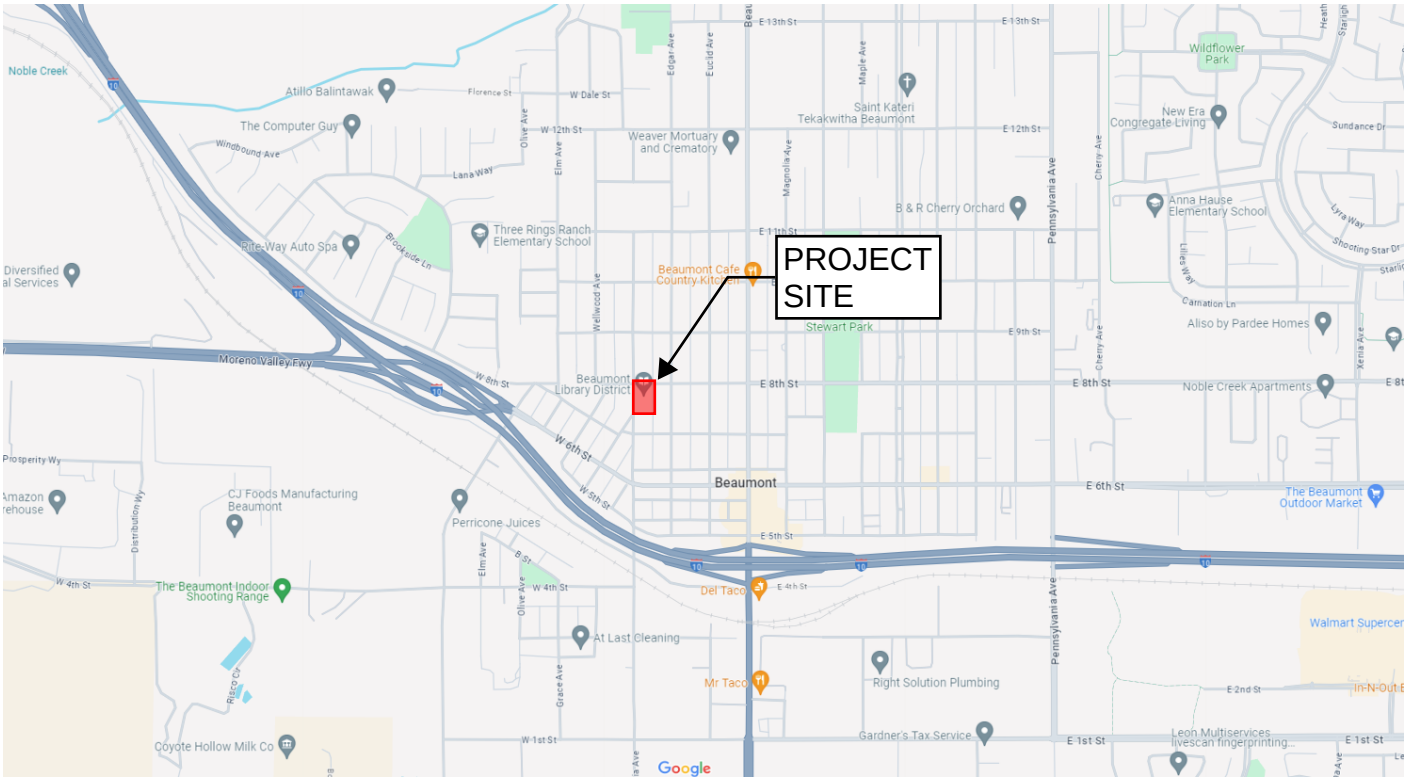
Location Map, WQMP Site Plan and Receiving Waters Map

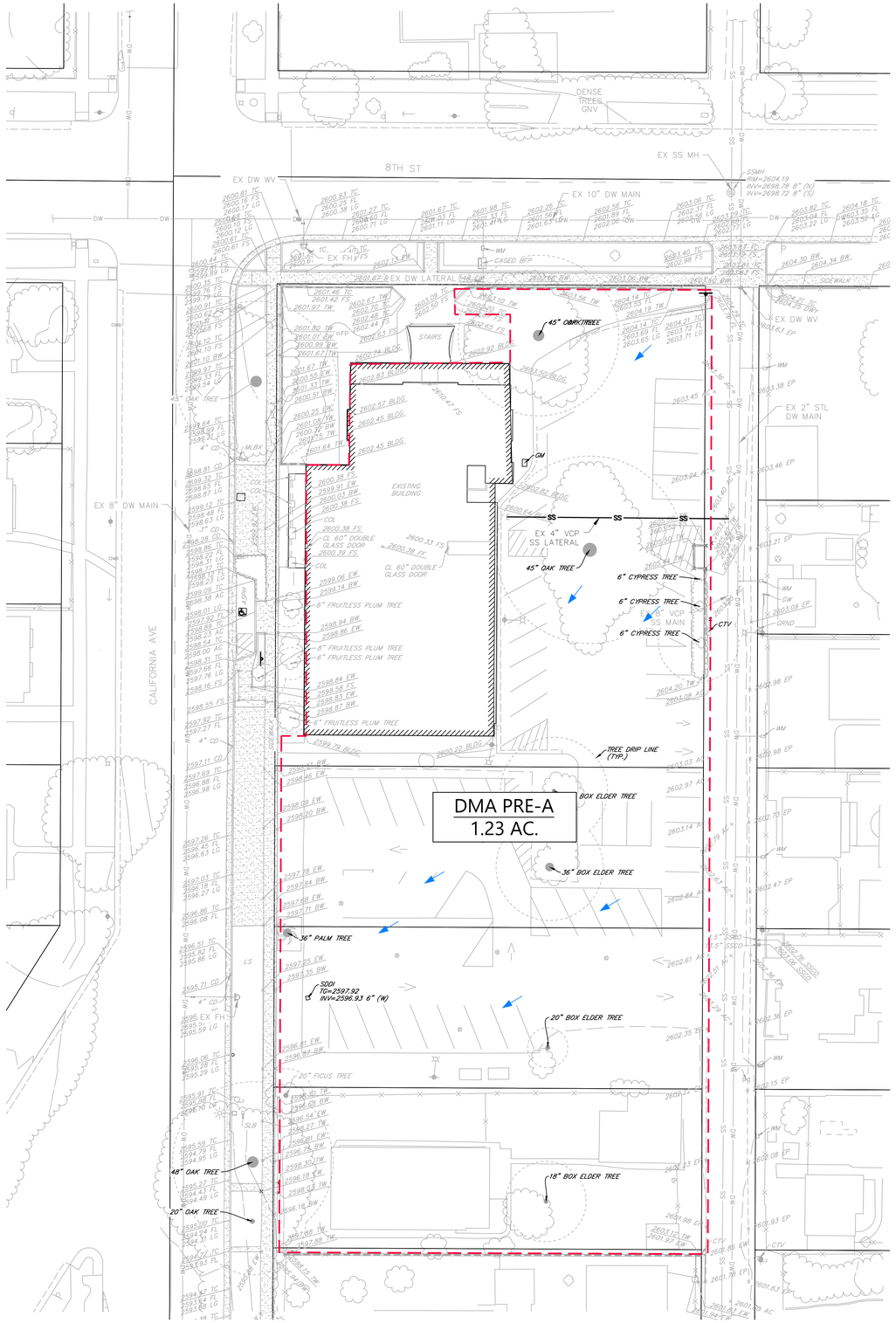
Vicinity Map

For

Beaumont Library Addition & Renovation Project

125 E. 8th St. Beaumont, CA 92223





LEGEND:

- BMP DRAINAGE AREA BOUNDARY (DMA)
- DIRECTION OF SURFACE FLOW
- DMA XX / ## AC. — DMA & ACREAGE

DMA	AREA (AC)	SURFACE TYPE	IMPERVIOUS %	PERVIOUS %	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)
PRE-A	1.23	ASPHALT, CONCRETE, BUILDING, LANDSCAPING,	77.8%	22.2%	41,706	11,883

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
A SCRIBED "X" AT THE TOP OF A CURB RAMP WITHIN THE SOUTHEAST CURB RETURN AT THE INTERSECTION OF ELEVENTH STREET MAPLE AVENUE.

ELEV. 100.00, TBM

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: AS SHOWN
DATE:
JOB NUMBER:

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

REGISTERED PROFESSIONAL ENGINEER
BRUCE W. KIRBY
No. C 42393
CIVIL
STATE OF CALIFORNIA

REVIEWED BY: _____ STAFF ENGINEER DATE: _____
RECOMMENDED BY: _____ PRINCIPAL ENGINEER DATE: _____
APPROVED BY: _____ CITY ENGINEER DATE: _____

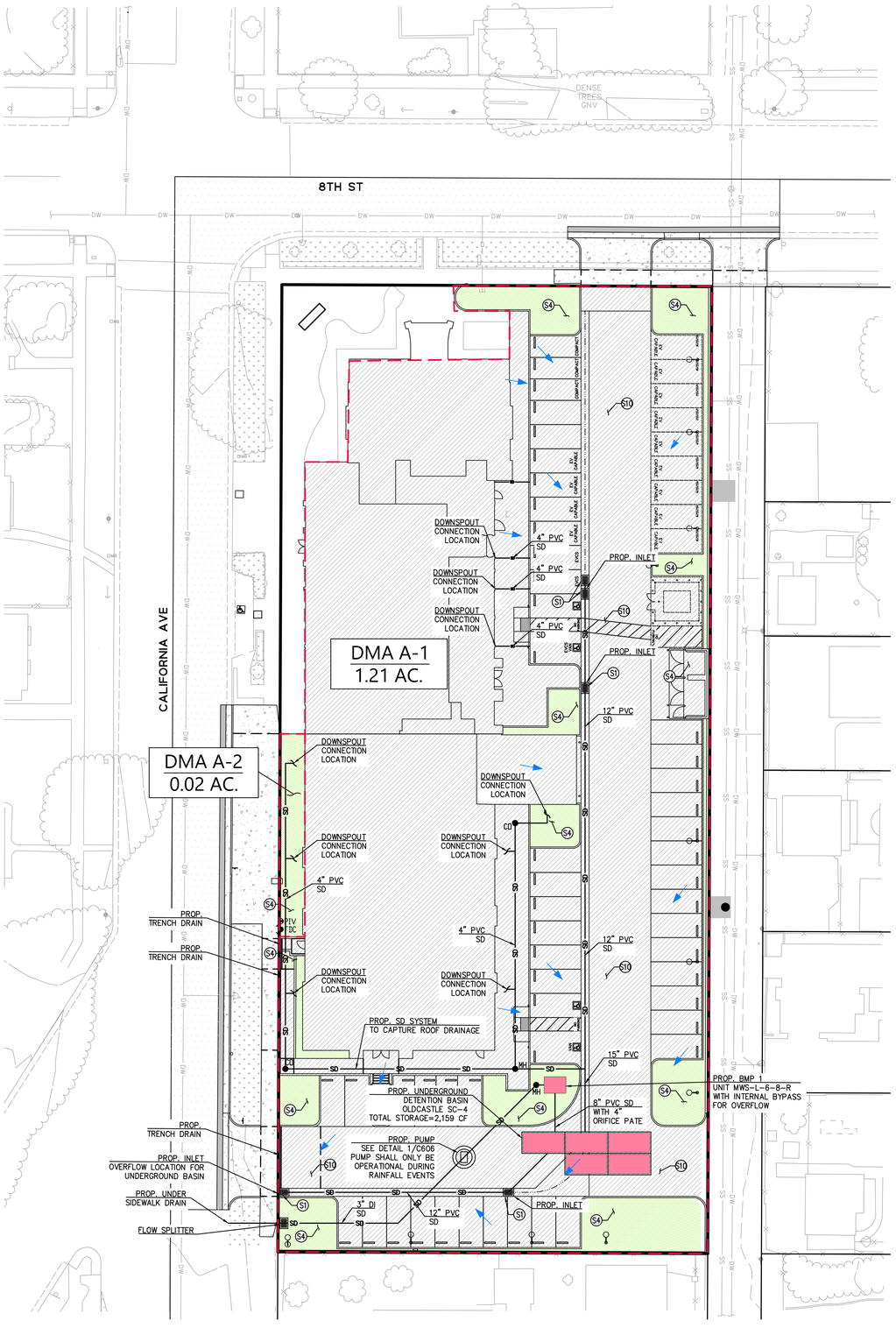
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550 E. 6TH ST
BEAUMONT, CA 92223
TEL: (951) 769-8520
FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA

WQMP PRE-CONSTRUCTION PLAN
BEAUMONT LIBRARY ADDITION & RENOVATION PROJECT
125 E 8TH ST, BEAUMONT, CA 92223

SHEET -

FILE NO:



Performance Curve

AMS434-190/5,5T/C

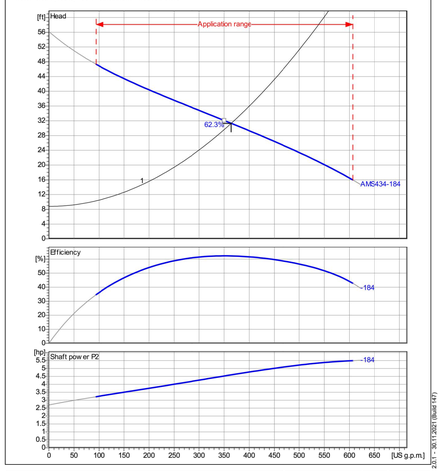
HOMA PUMPEN MIT SYSTEM

Impeller					
Impeller type: Single channel impeller	Solid size 3 inch	Ø:	Max. Ø: 7⅛"	Min. Ø: 6⁹⁄₁₆"	Sel. Ø: 7⅛"

Operating data				
Speed: 1750 rpm	Frequency: 60 Hz	Duty point: Q =364 US g.p.m. H =31.3 ft	Shaft power P2: 4.6 hp	Discharge port: 4" ANSI

Power data referred to:
Water, clean [100 %] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: HI Standard Sect. 11.6.5.4



2.01.-.3X1T2501 (Build 147)

Project	Project no.:	Created by:	Page: 2	Date: 12/5/2024

LEGEND:

- PROPERTY LINE
- LIMIT OF WORK
- BMP DRAINAGE AREA BOUNDARY (DMA)
- SD — EXISTING STORM DRAIN
- SD — PROPOSED STORM DRAIN
- IMPERVIOUS AREA – CONCRETE, ASPHALT, BUILDING
- PERVIOUS AREA – LANDSCAPING
- BMP
- DIRECTION OF SURFACE FLOW
- DIRECTION OF PIPED FLOW
- DMA XX / ## AC. — DMA & ACREAGE
- CATCH BASIN

DMA SUMMARY:

DMA	AREA (AC)	SURFACE TYPE	DMA TYPE	IMPERVIOUS %	PERVIOUS %	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)
A-1	1.21	ASPHALT, CONCRETE, BUILDING, LANDSCAPING,	DRAINS TO BMP 1	91.0%	9.0%	48,169	4,761
A-2	0.02	CONCRETE, LANDSCAPING,	SELF-TREATING	0.0%	100.0%	0	659

BMP SUMMARY:

DMA	AREA (AC)	DESIGN CAPTURE VOLUME (CF)	DRAWDOWN TIME (HRS)	BMP
A-1	1.21	3,081	24	MODULAR WETLAND - BMP 1 - MWS-L-6-8-R

STRUCTURAL SOURCE CONTROL BMP NOTES

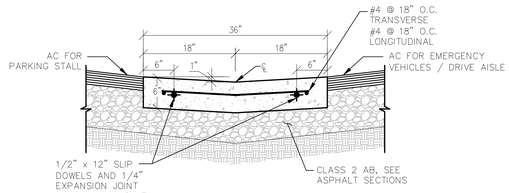
- (S1) STORM DRAIN INLET – MARK ALL INLETS WITH WORDS "ONLY RAIN DOWN THE STORM DRAIN" OR SIMILAR.
- (S3) BUILDING DESIGN FEATURES TO DISCOURAGE ENTRY OF PESTS. APPLICABLE TO ALL PROPOSED BUILDINGS.
- (S4) LANDSCAPE DESIGN TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES: LANDSCAPE PALATE TO CONSIST OF PLANTS APPROPRIATE FOR SITE SOILS, SLOPES, CLIMATE, SUN, WING, RAIN, AND LAND USE.
- (S10) ALL PLAZAS SIDEWALKS AND PARKING LOTS TO BE SWEPT CLEAN REGULARLY TO PREVENT THE ACCUMULATION OF LITTER AND DEBRIS.

NON-STRUCTURAL SOURCE CONTROL BMP NOTES

- (N3) LANDSCAPE MANAGEMENT BMPS
- (N4) BMP MAINTENANCE PER MANUFACTURER RECOMMENDATIONS
- (N14) CATCH BASIN INSPECTION PROGRAM
- (N15) VACUUM SWEEPING OF PRIVATE STREETS AND PARKING LOTS

THE FOLLOWING BMPS MAY BE APPLICABLE THROUGHOUT THE SITE AS NEEDED PER FORM 4.1-1 IN PROJECT WQMP FOR DETAILS.

- N1 – EDUCATION OF PROPERTY OWNERS, TENANTS, AND OCCUPANTS ON STORMWATER BMPS
- N2 – ACTIVITY RESTRICTIONS
- N6 – LOCAL WATER QUALITY ORDINANCES
- N11 – LITTER/DEBRIS CONTROL PROGRAM
- N12 – EMPLOYEE TRAINING
- N17 – COMPLY WITH ALL OTHER APPLICABLE NPDES PERMITS



CONCRETE V-GUTTER

NTS

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

DIGALERT Call 2 Working Days Before You Dig! 811

BENCHMARK:
A SCRIBED "X" AT THE TOP OF A CURB RAMP WITHIN THE SOUTHEAST CURB RETURN AT THE INTERSECTION OF ELEVENTH STREET MAPLE AVENUE.

ELEV. 100.00, TBM

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: AS SHOWN
DATE:
JOB NUMBER:

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

REGISTERED PROFESSIONAL ENGINEER BRUCE W. KIRBY No. C 42393 CIVIL STATE OF CALIFORNIA

REVIEWED BY: _____ STAFF ENGINEER DATE: _____
RECOMMENDED BY: _____ PRINCIPAL ENGINEER DATE: _____
APPROVED BY: _____ CITY ENGINEER DATE: _____

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550 E. 6TH ST
BEAUMONT, CA 92223
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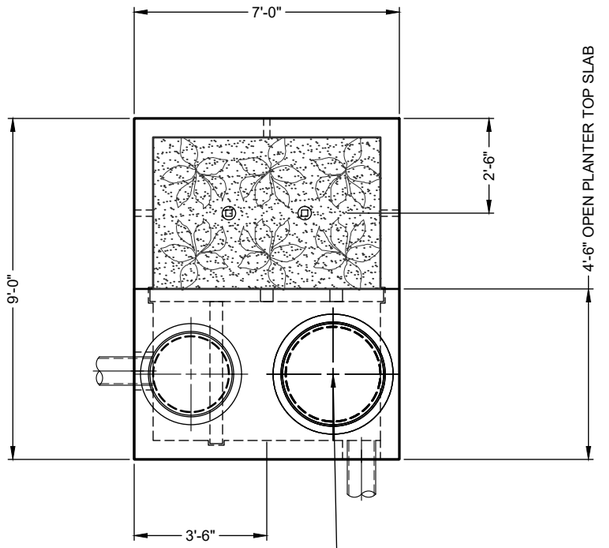
FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA

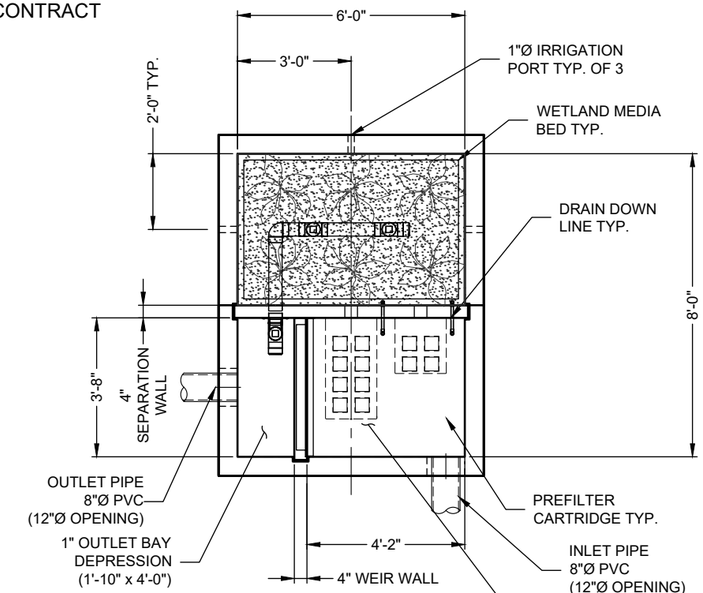
WQMP POST-CONSTRUCTION PLAN
BEAUMONT LIBRARY ADDITION & RENOVATION PROJECT
125 E 8TH ST, BEAUMONT, CA 92223

SHEET -
FILE NO:

THIS DOCUMENT IS FOR INFORMATIONAL PURPOSES
ONLY AND IS NOT A FINAL CONSTRUCTION CONTRACT



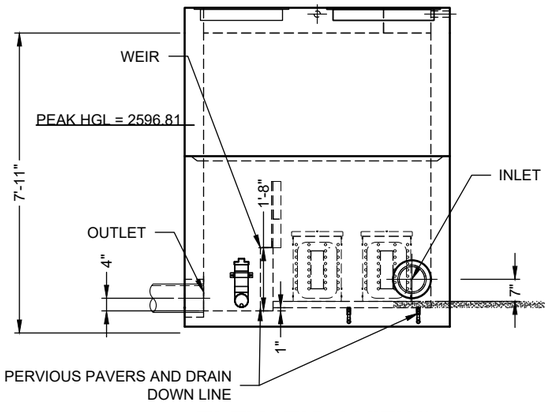
PLAN VIEW



PLAN VIEW
TOP SLAB NOT SHOWN

SITE DESIGN DATA	
WATER QUALITY VOLUME (CF)	3081.00
PEAK FLOWRATE (CFS)	0.81
DRAIN DOWN TIME (HRS)	24
MAXIMUM POLLUTANT DENSITY (PREFILTER) (GPM/SF)	2.1
PREFILTER LOADING RATE (GPM/SF)	0.63
WETLAND MEDIA LOADING RATE (GPM/SF)	0.26
MEDIA OPERATING HEAD (FT)	3.27
SURFACE LOADING	PEDESTRIAN
GROUNDWATER ELEVATION*	2591

STRUCTURE DETAILS	
NUMBER OF DELIVERED PIECES (DOES NOT INCLUDE GRADE RINGS/RISERS)	3
MAXIMUM FOOTPRINT	9.00' x 7.00'
DELIVERED HEAVIEST PICK*	15700 LB.
TOP SLAB	600 LB.
TOP SECTION	11400 LB.
BASE SECTION	15700 LB.



RIM ELEV. 2599+/-
TOP OF STRUCTURE ELEV. 2599.00

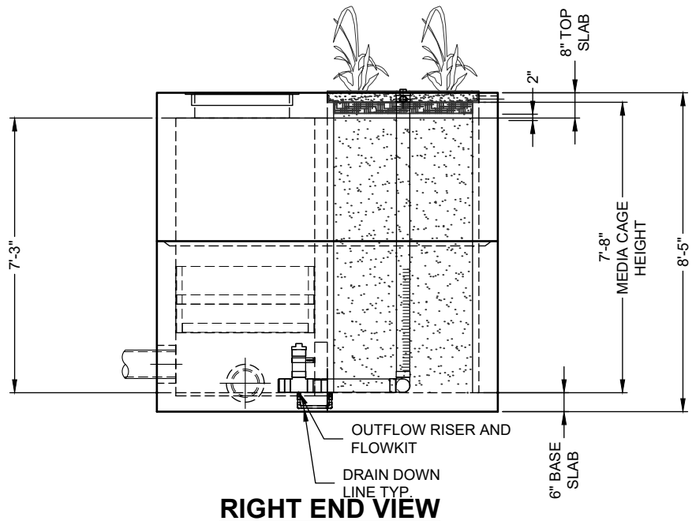
WEIR/TREATMENT HGL ELEV. 2594.42

INLET 1 INVERT ELEV. 2591.50

OUTLET 1 INVERT ELEV. 2591.00
OUTSIDE BOTTOM ELEV. 2590.58

*MEDIA CASTINGS, IF REQUIRED, NOT SHOWN

ELEVATION VIEW*



RIGHT END VIEW

RVRSD
6505 / 000000
LAYOUT 4
MWS-L-6-8-R
6.38 TS
1.21 TIW

I:\MERLIN\PROJECT\ACTIVE\811800\811819\811819-10-MODULAR WETLANDS\DRAWINGS\811819-10-MWSL0608OP-CONFAB.DWG 12/3/2024 3:57 PM

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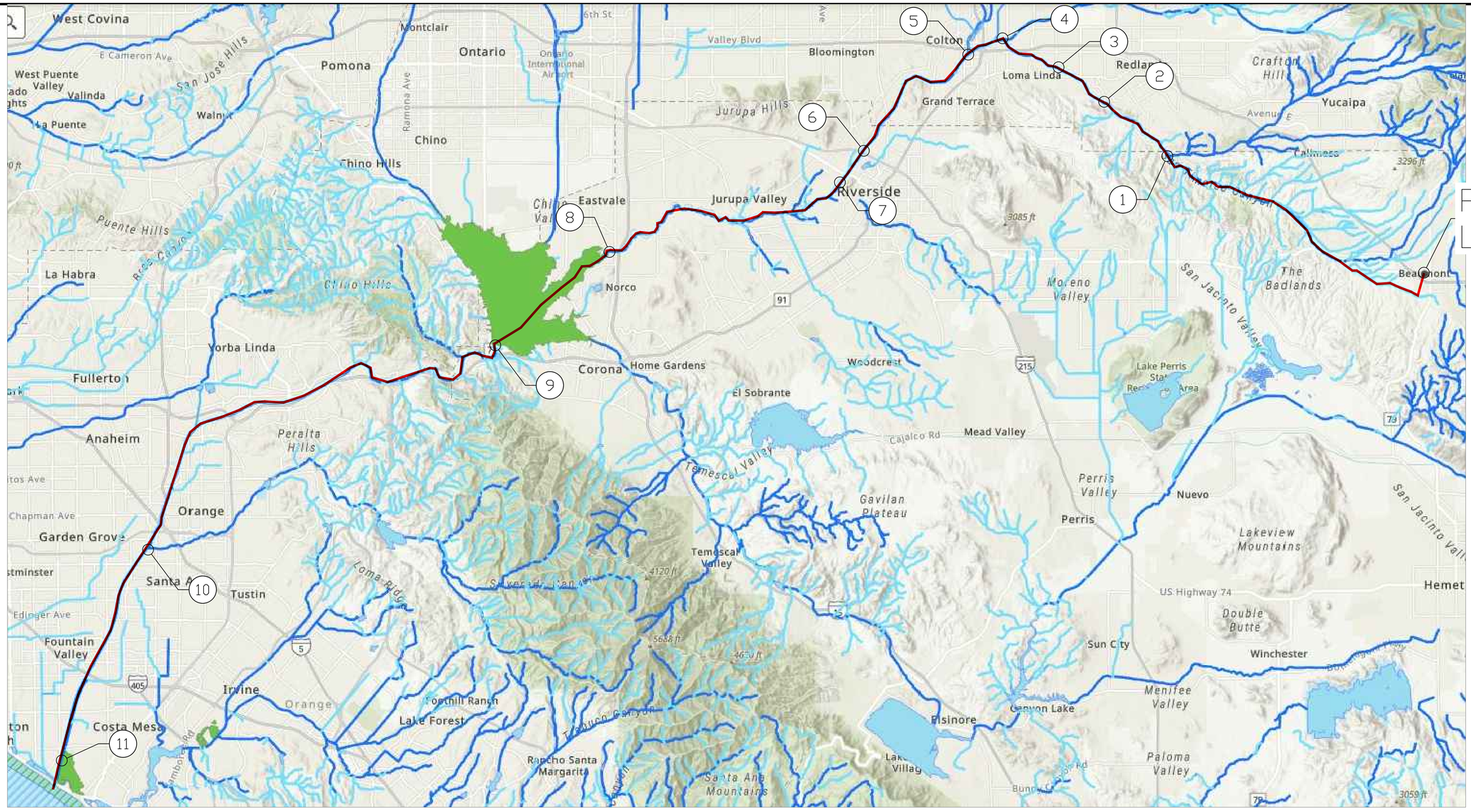
www.ContechES.com
6655 Wedgwood Road, Suite 130, Maple Grove, MN 55311
763-231-3705 763-416-1633 FAX

FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH
PROPOSAL
DRAWING

MODULAR WETLANDS MWSL0608OP - 811819-010
BEAUMONT LIBRARY ADDITION & RENOVATION
BEAUMONT, CA
SITE DESIGNATION: MWSL0608

PROJECT No.:	SEQ. No.:	DATE:
811819	010	08/27/24
DESIGNED: MCD	DRAWN: MCD	
CHECKED: MCD	APPROVED: MCD	
SHEET NO.: 1 OF 1		



REACH ATTRIBUTES AS DESIGNATED IN THE SANTA ANA BASIN PLAN

1. SAN TIMOTEO CREEK REACH 3
2. SAN TIMOTEO CREEK REACH 2
3. SAN TIMOTEO CREEK REACH 1B
4. SAN TIMOTEO CREEK REACH 1A
5. SANTA ANA RIVER REACH 5
6. SANTA ANA RIVER REACH 4
7. SANTA ANA RIVER REACH 3
8. PRADO BASIN MANAGEMENT ZONE
9. SANTA ANA RIVER REACH 2
10. SANTA ANA RIVER REACH 1
11. TIDAL PRISM

N

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

DIGALERT
Call 2 Working Days Before You Dig
811

BENCHMARK:
A SCRIBED "X" AT THE TOP OF A CURB RAMP WITHIN THE SOUTHEAST CURB RETURN AT THE INTERSECTION OF ELEVENTH STREET MAPLE AVENUE.

ELEV. 100.00, TBM

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: AS SHOWN
DATE:
JOB NUMBER:

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
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www.bkf.com

REGISTERED PROFESSIONAL ENGINEER
BRUCE W. KIRBY
No. C 42393
CIVIL
STATE OF CALIFORNIA

REVIEWED BY: _____ DATE: _____
STAFF ENGINEER

RECOMMENDED BY: _____ DATE: _____
PRINCIPAL ENGINEER

APPROVED BY: _____ DATE: _____
CITY ENGINEER

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

CITY OF BEAUMONT, CALIFORNIA

WQMP RECEIVING WATER EXHIBIT
BEAUMONT LIBRARY ADDITION & RENOVATION PROJECT
125 E 8TH ST, BEAUMONT, CA 92223

SHEET –

FILE NO:

\\BKF-NB\VOL4\2023\231608_BEAUMONT_LIBRARY_EXPANSION\DOC\05-DESIGN\REPORTS_CALCS\STORMWATER\WQMP\EXHIBITS\RECEIVING WATER EXHIBIT.DWG
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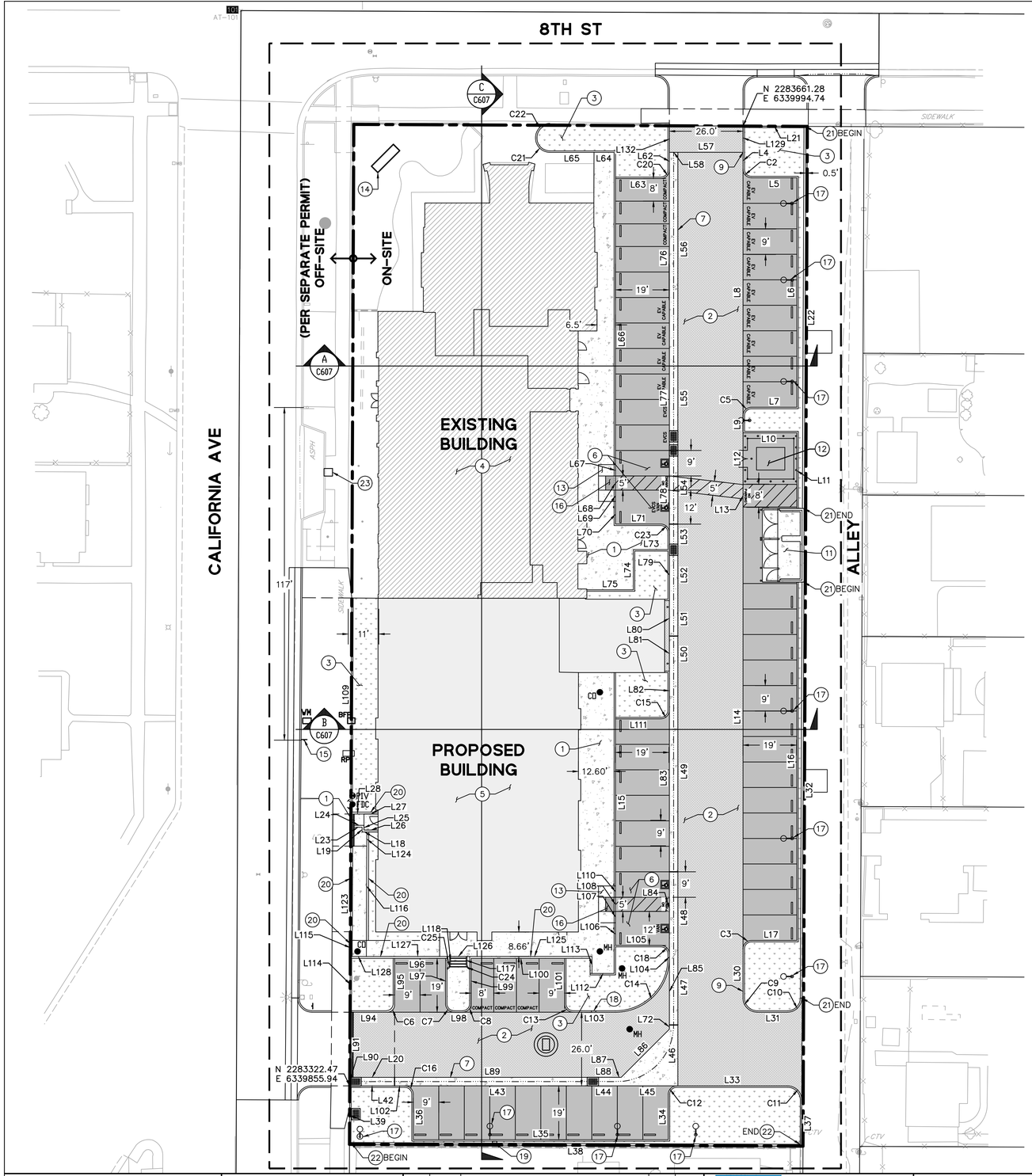
Appendix 2: Construction Plans

Grading and Drainage Plans



LEGEND:

- LIMIT OF WORK
- PROPERTY LINE
- CONCRETE
- ASPHALT FOR EMERGENCY VEHICLES / DRIVE AISLE
- ASPHALT FOR PARKING STALL
- PROPOSED BUILDING
- PROPOSED RENOVATED BUILDING
- LANDSCAPE AREA

SITE PLAN CONSTRUCTION NOTES:

1. CONSTRUCT PEDESTRIAN CONCRETE PER DETAIL 1/C-600
2. CONSTRUCT VEHICULAR ASPHALT PER DETAILS 2 AND 3 /C-600
3. CONSTRUCT LANDSCAPE AREA PER ARCHITECTURAL PLANS
4. PROPOSED RENOVATED BUILDING PER ARCHITECTURAL PLANS
5. PROPOSED BUILDING PER ARCHITECTURAL PLANS, BUILDING PAD PER DETAIL 9/C600
6. INSTALL ACCESSIBLE PARKING STALLS AND STRIPING PER DETAIL 5/C600
7. CONSTRUCT CONCRETE V-GUTTER PER DETAIL 4/C600
8. NOT USED
9. CONSTRUCT 6" CURB PER DETAIL 6/C-600
10. CONSTRUCT WHEEL STOP PER DETAIL 5/C602
11. PROPOSED TRASH ENCLOSURE, SEE ARCHITECTURAL AND STRUCTURAL PLANS
12. PROPOSED TRANSFORMER, SEE ELECTRICAL PLANS
13. CONSTRUCT CURB RAMP PER DETAIL 2/C602
14. INSTALL MONUMENT SIGN PER SEPARATE PERMIT
15. RELOCATED BUS STOP SIGN, SEE ARCHITECTURAL PLANS PER SEPARATE PERMIT
16. INSTALL TRUNCATED DOMES PER DETAIL 1/C603
17. INSTALL LIGHT POLES PER ARCHITECTURAL PLANS
18. CONSTRUCT 18" CURB CUT PER DETAIL 7/C600
19. MOUNT STORM DRAIN PUMP CONTROLLER CABINET TO SITE WALL PER ELECTRICAL AND STRUCTURAL PLANS
20. CONSTRUCT MASONRY RETAINING WALL PER DETAIL 1 & 2/C604
21. CONSTRUCT 3-FOOT SITE WALL, TYPE 3 PER DETAIL 4/C603 AND PER ARCHITECTURAL PLANS
22. CONSTRUCT 6-FOOT SITE WALL, TYPE 3 PER DETAIL 4/C603 AND PER ARCHITECTURAL PLANS
23. PROPOSED BOOK DROP PER SEPARATE PERMIT

SITE PLAN NOTES:

1. ALL DIMENSIONS ON THE PLANS ARE IN FEET OR DECIMALS THEREOF UNLESS SPECIFICALLY CALLED OUT AS FEET AND INCHES.
2. THIS IS NOT A STAKING PLAN BUT A CHECK AND VERIFICATION OF THE MAJOR DIMENSIONS AS SHOWN ON THE LANDSCAPE SITE PLAN.
3. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB, PROPERTY OR RIGHT-OF-WAY LINE, OR CENTER OF DRIVEWAYS.
4. THE CONSTRUCTION SURVEYOR IS RESPONSIBLE TO REPORT ANY AND ALL DISCREPANCIES TO ENGINEER PRIOR TO CONSTRUCTION.
5. SEE ARCHITECTURAL PLANS FOR ADDITIONAL DIMENSIONS.

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
DESCRIBED BY NATIONAL GEODETIC SURVEY. IN BEAUMONT, AT THE JUNCTION OF CALIFORNIA AVENUE AND FIFTH PLACE, 28.9 M (94.8 FT) WEST OF THE AVENUE CENTERLINE, 7.7 M (25.3 FT) SOUTH OF THE CENTERLINE OF FIFTH PLACE, 1.1 M (3.6 FT) NORTH OF A GUY WIRE, 0.79 M (2.6 FT) SOUTH OF A POWER POLE, 0.18 M (0.6 FT) EAST OF A WITNESS POST. THE MARK IS 0.6 METERS W FROM A SECOND WITNESS POST THE MARK IS ABOVE LEVEL WITH THE AVENUE.
ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER	1	REVISIONS	CITY	

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
BRUCE W. KIRBY
No. C 42393
CIVIL
STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

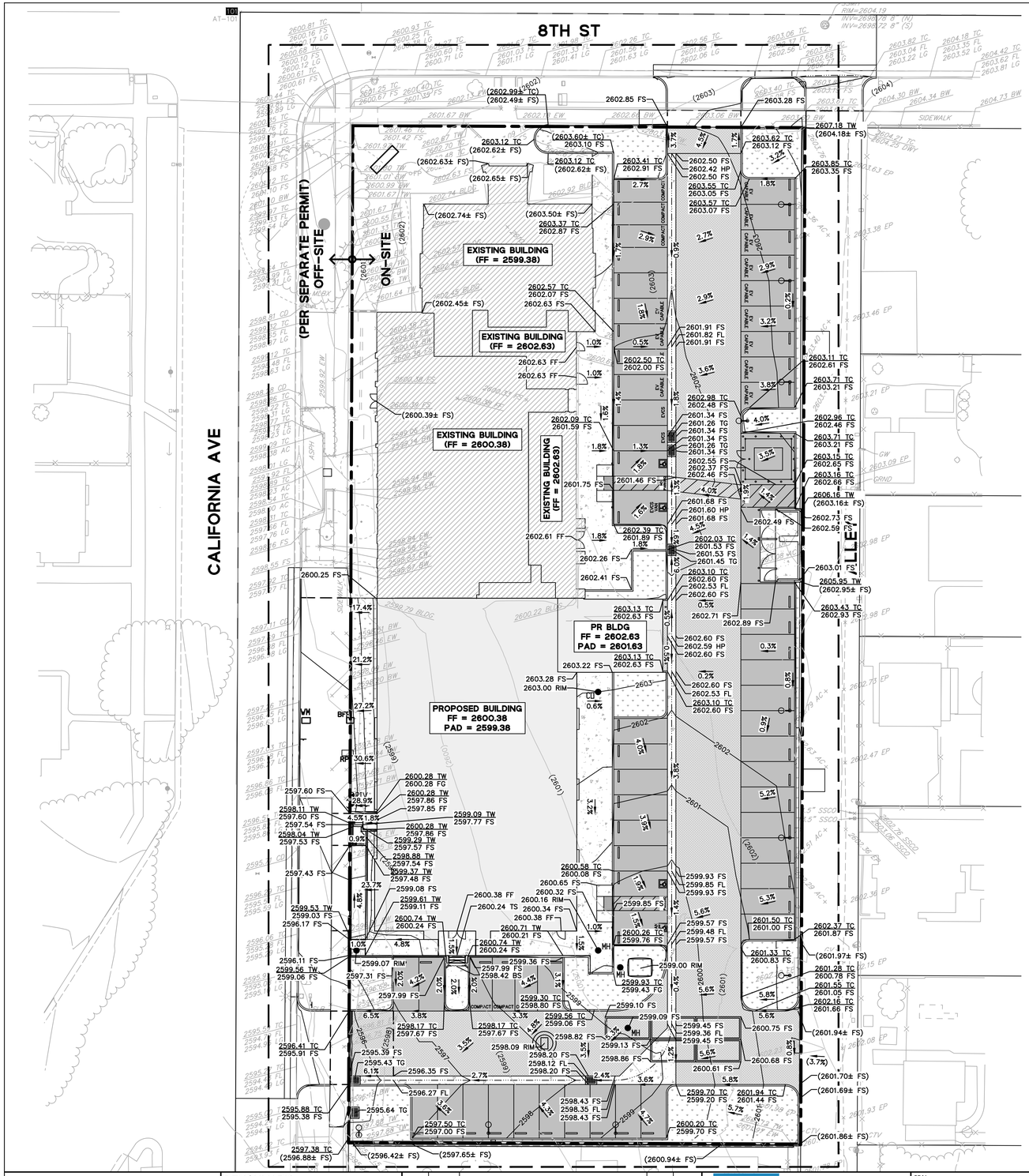
Approved By: _____ Date: _____
City Engineer/Director of Public Works

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
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

SITE IMPROVEMENT AND HORIZONTAL CONTROL PLAN

SHEET **C200**
OF 19 SHEETS
FILE NO:



LEGEND:

- LIMIT OF WORK
- PROPERTY LINE
- XXX EXISTING CONTOUR LINE
- XXX PROPOSED CONTOUR LINE
- GRADE BREAK
- CONCRETE
- ASPHALT FOR EMERGENCY VEHICLES / DRIVE AISLE
- ASPHALT FOR PARKING STALL
- PROPOSED BUILDING
- PROPOSED RENOVATED BUILDING
- LANDSCAPE AREA

GRADING NOTES:

1. ALL DESIGN ELEVATIONS SHOWN ON THE GRADING SHEETS ARE TO FINISHED GRADE, UNLESS OTHERWISE NOTED.
2. FOR WALKS IN ADA ACCESSIBLE AREAS, CROSS SLOPES SHOULD NOT EXCEED 2.0% GRADE.
3. ALL EXISTING UTILITY STRUCTURES WITHIN LIMIT OF WORK SHALL BE ADJUSTED TO GRADES SHOWN ON PLAN.
4. GRADING SHALL NOT EXCEED A 2:1 MAXIMUM SLOPE.
5. THE CODES IN EFFECT ARE:
   - 2022 CA BUILDING CODE
   - 2022 CA PLUMBING CODE
   - CITY OF BEAUMONT ORDINANCE NO. 1128, CHAPTER 17.11.040
6. SEE DETAIL 2/C604 FOR ELEVATION DETAIL – WALL ELEVATION
7. SEE DETAIL 8/C600 FOR ELEVATION DETAIL – FG AND FS AT BUILDING FACE
8. SEE DETAIL 9/C600 FOR BUILDING PAD SECTION

ABBREVIATIONS:

BS	BOTTOM OF STAIR
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOW LINE
LG	LIP OF GUTTER
RIM	TOP OF MANHOLE / CLEANOUT STRUCTURE
TC	TOP/FACE OF CURB
TS	TOP OF STAIRS
TW	TOP OF WALL

EARTHWORK QUANTITIES:

EARTHWORK	*QUANTITIES*
RAW CUT	*782 CY*
RAW FILL	*171 CY*
TOTAL EXPORT (RAW)	*612 CY*

THE ABOVE QUANTITIES DO NOT REFLECT ANY SHRINKAGE, SWELLING, SUBSIDENCE, STRIPPING LOSS, IMPORT/ EXPORT, DEMOLITION LOSSES, FOOTING OR UTILITY TRENCH SPOILS, OR ANY SPECIAL CONDITIONS THAT MAY BE SPECIFIED IN THE APPLICABLE GEOTECHNICAL REPORT(S). QUANTITIES ARE FOR REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING HIS OWN QUANTITIES FOR CONSTRUCTION AND CONTRACT PURPOSES. THE ABOVE QUANTITIES WERE CALCULATED TO FINISHED SURFACE ELEVATIONS AND DOES NOT REFLECT GRADING TO THE SUBGRADE.

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
DESCRIBED BY NATIONAL GEODETIC SURVEY. IN BEAUMONT, AT THE JUNCTION OF CALIFORNIA AVENUE AND FIFTH PLACE, 28.9 M (94.8 FT) WEST OF THE AVENUE CENTERLINE, 7.7 M (25.3 FT) SOUTH OF THE CENTERLINE OF FIFTH PLACE, 1.1 M (3.6 FT) NORTH OF A GUY WIRE, 0.79 M (2.6 FT) SOUTH OF A POWER POLE, 0.18 M (0.6 FT) EAST OF A WITNESS POST. THE MARK IS 0.6 METERS W FROM A SECOND WITNESS POST THE MARK IS ABOVE LEVEL WITH THE AVENUE.
ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER	1	REVISIONS	CITY	

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
BRUCE W. KIRBY
No. C 42393
CIVIL
STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

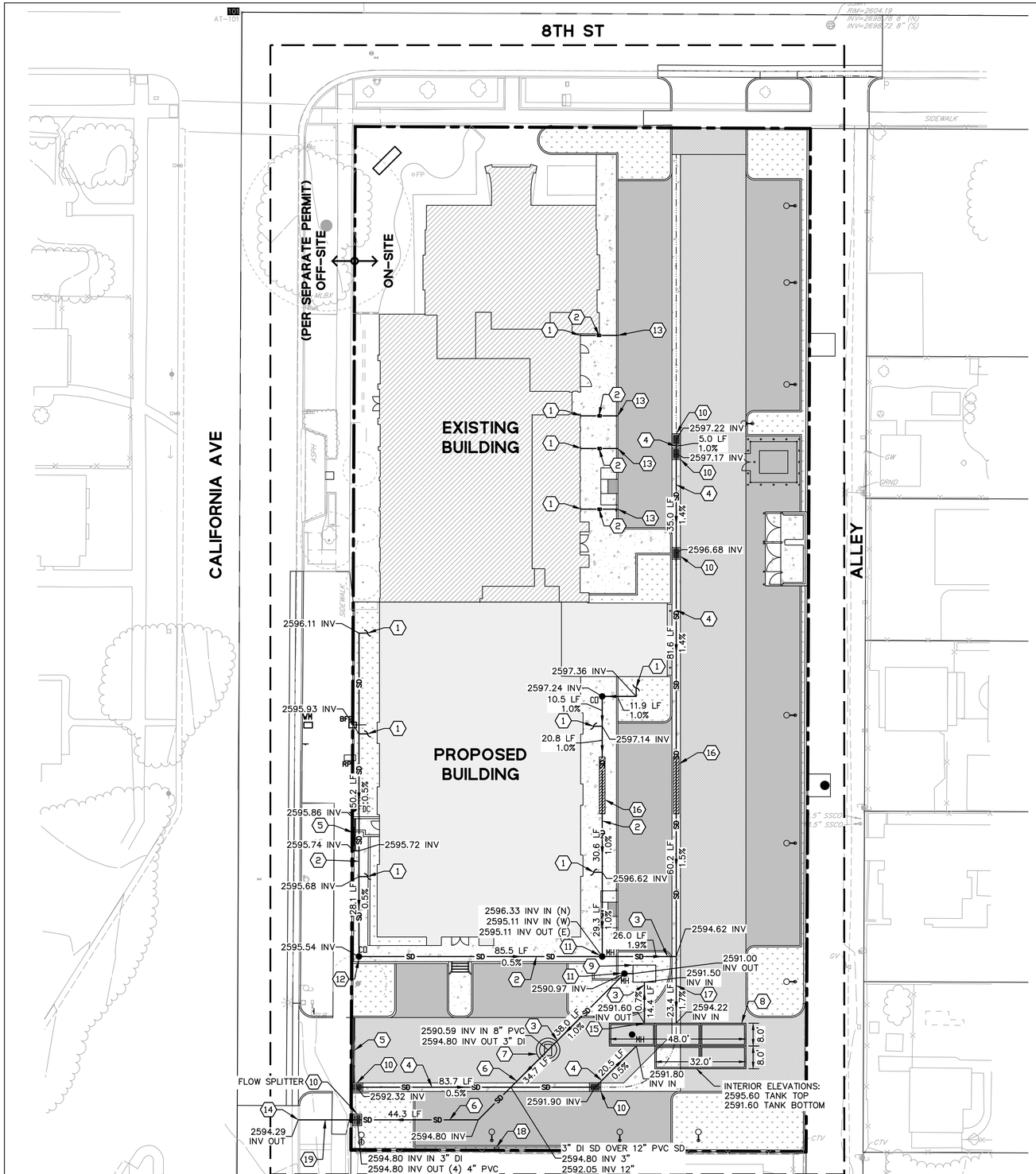
Approved By: _____ Date: _____
City Engineer/Director of Public Works

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
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

GRADING PLAN

SHEET C300
OF 19 SHEETS
FILE NO:



LEGEND:

- LIMIT OF WORK
- PROPERTY LINE
- CONCRETE
- ASPHALT FOR EMERGENCY VEHICLES / DRIVE AISLE
- ASPHALT FOR PARKING STALL
- PROPOSED BUILDING
- PROPOSED RENOVATED BUILDING
- LANDSCAPE AREA
- MH — STORM DRAIN MANHOLE
- CO — STORM DRAIN CLEANOUT
- DROP INLET
- UNDERGROUND DETENTION SYSTEM

DRAINAGE KEYNOTES:

1. PROPOSED ROOF DOWNSPOUT CONNECTION PER DETAIL 4/C602
2. INSTALL 4" SDR35 PVC STORM DRAIN LINE AND FITTINGS
3. INSTALL 8" SDR35 PVC STORM DRAIN LINE AND FITTINGS
4. INSTALL 12" SDR35 PVC STORM DRAIN LINE AND FITTINGS
5. CONSTRUCT 6" TRENCH DRAIN PER DETAIL 3/C601
6. INSTALL 3" DI STORM DRAIN FORCE MAIN
7. INSTALL PUMP STATION PER DETAIL 1/C606
8. INSTALL UNDERGROUND DETENTION SYSTEM PER DETAIL 1/C605
9. INSTALL MODULAR WETLAND SYSTEM PER DETAIL 2/C606
10. CONSTRUCT STORM DRAIN DROP INLET PER DETAIL 1/C601
11. INSTALL STORM DRAIN MANHOLE STRUCTURE PER DETAIL 1/C602
12. INSTALL STORM DRAIN CLEANOUT STRUCTURE PER DETAIL 2/C601
13. PROPOSED ROOF WATER LEADER CURB DRAIN PER DETAIL 3/C602
14. PROPOSED CURB DRAIN PER SEPARATE PERMIT
15. INSTALL ORIFICE RESTRICTOR PLATE PER DETAIL 3/C603
16. CONSTRUCT SLURRY CEMENT ENCASEMENT ALONG THE UTILITY, EXTENDING 10 LINEAR FEET ON BOTH SIDES OF THE CROSSING, PER DETAIL 2, SHEET C603
17. INSTALL 15" SDR35 PVC STORM DRAIN LINE AND FITTINGS
18. MOUNT STORM DRAIN PUMP CONTROLLER CABINET TO SITE WALL PER ELECTRICAL AND STRUCTURAL PLANS
19. INSTALL (4) 4" SDR35 PVC STORM DRAIN LINE AND FITTINGS PER SEPARATE PERMIT

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

DIGALERT — Call 2 Working Days Before You Dig 811

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ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER	1	REVISIONS	CITY	

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

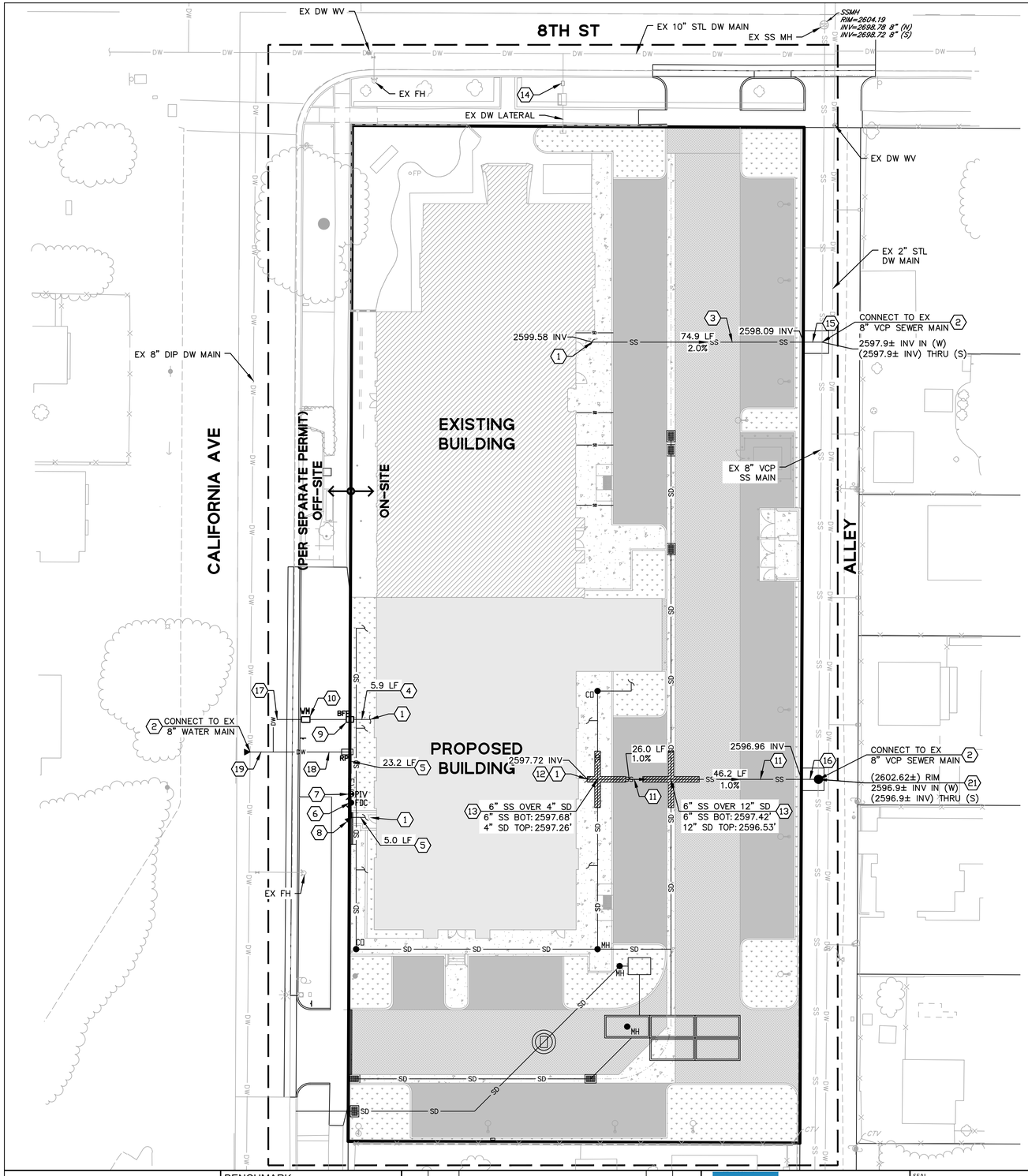
Approved By: _____ Date: _____
City Engineer/Director of Public Works

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
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DRAINAGE PLAN

SHEET C301
OF 19 SHEETS
FILE NO:



LEGEND:

- LIMIT OF WORK
- PROPERTY LINE
- SS — PROPOSED SANITARY SEWER LINE
- FW — PROPOSED FIRE WATER LINE
- DW — PROPOSED DOMESTIC WATER LINE
- SD — PROPOSED STORM DRAIN LINE
- SS — EXISTING SEWER LINE
- GAS — EXISTING GAS LINE
- DW — EXISTING DOMESTIC WATER LINE
- E — EXISTING ELECTRICAL LINE

UTILITY KEYNOTES:

1. PROPOSED UTILITY POINT OF CONNECTION TO BUILDING
2. CONNECT PROPOSED UTILITY LINE TO EXISTING UTILITY LINE PER SEPARATE PERMIT.
3. INSTALL 4" SDR35 PVC SEWER LINE AND FITTINGS.
4. INSTALL 2" COPPER DOMESTIC WATER LINE AND FITTINGS. SEE UTILITY NOTE 4.
5. INSTALL 4" DUCTILE IRON FIRE WATER LINE AND FITTINGS. SEE UTILITY NOTE 4.
6. INSTALL FIRE DEPARTMENT CONNECTION (FDC) PER DETAIL 6/SHEET C601.
7. INSTALL POST INDICATOR VALVE (PIV) PER DETAIL 4/SHEET C601.
8. CONSTRUCT THRUST BLOCK PER DETAIL 5/SHEET C601.
9. INSTALL 2" BACK-FLOW PREVENTION DEVICE PER SEPARATE PERMIT.
10. INSTALL 2" DOMESTIC WATER METER PER SEPARATE PERMIT.
11. INSTALL 6" SDR35 PVC SEWER LINE AND FITTINGS.
12. INSTALL 4" TO 6" REDUCER, NDS PART NO. 6P07 OR APPROVED EQUIVALENT.
13. CONSTRUCT SLURRY CEMENT ENCASEMENT ALONG THE UTILITY, EXTENDING 10 LINEAR FEET ON BOTH SIDES OF THE CROSSING, PER DETAIL 2/SHEET C603.
14. CONVERT EXISTING DOMESTIC WATER METER INTO A DEDICATED IRRIGATION METER PER SEPARATE PERMIT.
15. INSTALL 4" SDR35 PVC SEWER LINE AND FITTINGS PER SEPARATE PERMIT.
16. INSTALL 6" SDR35 PVC SEWER LINE AND FITTINGS PER SEPARATE PERMIT.
17. INSTALL 2" COPPER DOMESTIC WATER PIPE AND FITTINGS PER SEPARATE PERMIT.
18. INSTALL 4" DUCTILE IRON FIRE WATER PIPE AND FITTINGS PER SEPARATE PERMIT.
19. INSTALL 6" DUCTILE IRON FIRE WATER PIPE AND FITTINGS PER SEPARATE PERMIT.
20. INSTALL 4" REDUCED PRESSURE DOUBLE DETECTOR CHECK ASSEMBLY PER DETAIL 7/SHEET C601 PER SEPARATE PERMIT.
21. INSTALL SEWER MANHOLE PER SEPARATE PERMIT.

UTILITY NOTES:

1. UNDERGROUND UTILITIES OR STRUCTURES ARE SHOWN IN THEIR APPROXIMATE LOCATION. LOCATIONS MAY NOT HAVE BEEN VERIFIED IN THE FIELD AND NO GUARANTEE IS MADE TO THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN.
2. CONTRACTOR SHALL VERIFY ALL EX INV ELEVATIONS AND LATERAL LOCATIONS FOR STORM DRAIN AND SANITARY SEWER CONSTRUCTION PRIOR TO COMMENCEMENT OF ANY WORK. ALL WORK FOR STORM AND SANITARY SEWER INSTALLATION SHALL BEGIN AT THE DOWNSTREAM CONNECTION POINT. THIS WILL ALLOW FOR NECESSARY ADJUSTMENTS TO BE MADE PRIOR TO THE INSTALLATION OF THE ENTIRE LINE. IF THE CONTRACTOR FAILS TO BEGIN AT THE DOWNSTREAM CONNECTION POINT, AND WORKS UPSTREAM, THEY SHALL PROCEED AT THEIR OWN RISK AND BE RESPONSIBLE FOR ANY ADJUSTMENTS NECESSARY.
3. INSTALL PROPOSED UTILITY LINES PER CITY OF BEAUMONT PUBLIC WORKS DEPARTMENT PAVING RESTORATION AND TRENCH REPAIR DETAIL.
4. POLYETHYLENE ENCASEMENT TO BE PROVIDED, SEE GEOTECHNICAL REPORT FOR RECOMMENDATIONS.

N

GRAPHIC SCALE

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(IN FEET)
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BY	MARK	DESCRIPTION	APPR.	DATE
	1			

ENGINEER — REVISIONS — CITY

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03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRST — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
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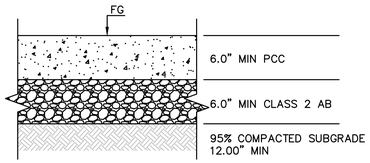
CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:

BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

UTILITY PLAN

SHEET **C400**
OF 19 SHEETS
FILE NO:



PAVEMENT SECTION DESIGN		
CLASSIFICATION	PCC (IN)	AB (IN)
PEDESTRIAN PAVEMENT	6	6

NOTES:

1. THIS SECTION TO BE USED IN LOCATIONS WHERE NEW CONCRETE PAVEMENT IS REQUIRED FOR PEDESTRIAN TRAFFIC, SUCH AS SIDEWALKS AND WALKWAYS.
2. SUBGRADE IS TO BE COMPACTED NATIVE SOIL AT 95% RELATIVE COMPACTION. KEEP THE MOISTURE CONTENT SLIGHTLY ABOVE OPTIMUM.
3. REFER TO ARCHITECTURAL PLANS FOR CONCRETE FINISHING, SCORE LINE & EXPANSION JOINT INFORMATION. PER GEOTECHNICAL REPORT, TRANSVERSE CONTROL JOINTS FOR DRIVEWAYS SHOULD BE SPACED NOT MORE THAN 10 FEET APART.
4. POSITIVE DRAINAGE SHOULD BE PROVIDED AWAY FROM ALL PAVEMENT AREAS TO PREVENT SEEPAGE OF SURFACE AND/OR SUBSURFACE WATER INTO THE PAVEMENT BASE AND/OR SUBGRADE
5. THE EXPANSION POTENTIAL OF THE SITE SOILS SHOULD BE VERIFIED AFTER GRADING. IF THE EXPANSION POTENTIAL OF MIXED SOIL IS FOUND TO BE ABOVE 20, CONVERSE RECOMMENDS MIXING ON-SITE SOIL USED FOR SUPPORT OF WALKWAYS AND PAVEMENTS WITH 5% CEMENT TO REDUCE EXPANSION POTENTIAL.
6. REFERENCED FROM PRELIMINARY GEOTECHNICAL REPORT PREPARED BY UNIVERSAL ENGINEERING SCIENCES ON FEBRUARY 2, 2024.

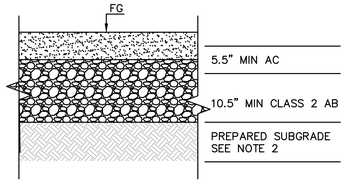
1 – PEDESTRIAN CONCRETE SECTION
NTS

PAVEMENT SECTION DESIGN			
CLASSIFICATION	TI-VALUE	AC (IN)	AB (IN)
VEHICULAR PAVEMENT FOR PARKING STALL	4.0	3.0	4.0

NOTES:

1. THIS SECTION TO BE USED IN LOCATIONS WHERE NEW ASPHALT PAVEMENT IS REQUIRED FOR VEHICULAR TRAFFIC.
2. SUBGRADE IS TO BE COMPACTED NATIVE SOIL AT 95% RELATIVE COMPACTION FOR 12.00" MIN. KEEP THE MOISTURE CONTENT SLIGHTLY ABOVE OPTIMUM.
3. POSITIVE DRAINAGE SHOULD BE PROVIDED AWAY FROM ALL PAVEMENT AREAS TO PREVENT SEEPAGE OF SURFACE AND/OR SUBSURFACE WATER INTO THE PAVEMENT BASE AND/OR SUBGRADE
4. THE EXPANSION POTENTIAL OF THE SITE SOILS SHOULD BE VERIFIED AFTER GRADING. IF THE EXPANSION POTENTIAL OF MIXED SOIL IS FOUND TO BE ABOVE 20, CONVERSE RECOMMENDS MIXING ON-SITE SOIL USED FOR SUPPORT OF WALKWAYS AND PAVEMENTS WITH 5% CEMENT TO REDUCE EXPANSION POTENTIAL.
5. REFERENCED FROM PRELIMINARY GEOTECHNICAL REPORT PREPARED BY UNIVERSAL ENGINEERING SCIENCES ON FEBRUARY 2, 2024.

2 – ASPHALT SECTION FOR PARKING STALL
NTS

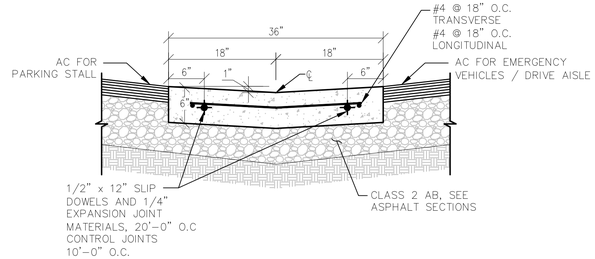


PAVEMENT SECTION DESIGN			
CLASSIFICATION	TI-VALUE	AC (IN)	AB (IN)
VEHICULAR PAVEMENT FOR EMERGENCY VEHICLES	8.0	5.5	10.5

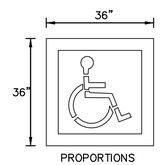
NOTES:

1. THIS SECTION TO BE USED IN LOCATIONS WHERE NEW ASPHALT PAVEMENT IS REQUIRED FOR VEHICULAR TRAFFIC SPECIFIC TO EMERGENCY VEHICLES.
2. SUBGRADE IS TO BE COMPACTED NATIVE SOIL AT 95% RELATIVE COMPACTION FOR 12.00" MIN. KEEP THE MOISTURE CONTENT SLIGHTLY ABOVE OPTIMUM.
3. POSITIVE DRAINAGE SHOULD BE PROVIDED AWAY FROM ALL PAVEMENT AREAS TO PREVENT SEEPAGE OF SURFACE AND/OR SUBSURFACE WATER INTO THE PAVEMENT BASE AND/OR SUBGRADE
4. THE EXPANSION POTENTIAL OF THE SITE SOILS SHOULD BE VERIFIED AFTER GRADING. IF THE EXPANSION POTENTIAL OF MIXED SOIL IS FOUND TO BE ABOVE 20, CONVERSE RECOMMENDS MIXING ON-SITE SOIL USED FOR SUPPORT OF WALKWAYS AND PAVEMENTS WITH 5% CEMENT TO REDUCE EXPANSION POTENTIAL.
5. REFERENCED FROM PRELIMINARY GEOTECHNICAL REPORT PREPARED BY UNIVERSAL ENGINEERING SCIENCES ON FEBRUARY 2, 2024.

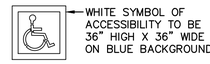
3 – ASPHALT SECTION FOR EMERGENCY VEHICLES
NTS



4 – CONCRETE V-GUTTER
NTS



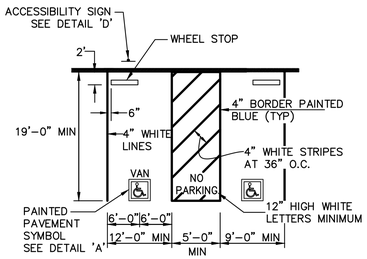
PROPORTIONS



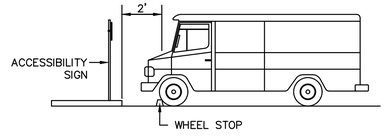
WHITE SYMBOL OF ACCESSIBILITY TO BE 36" HIGH X 36" WIDE ON BLUE BACKGROUND

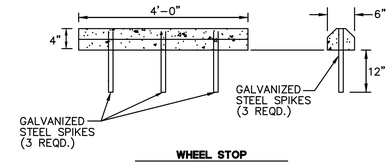
DISPLAY CONDITION

PAINTED PAVEMENT SYMBOL
DETAIL 'A'



PAINTED PAVEMENT STALL
VAN ACCESSIBLE PARKING STALL
DETAIL 'B'

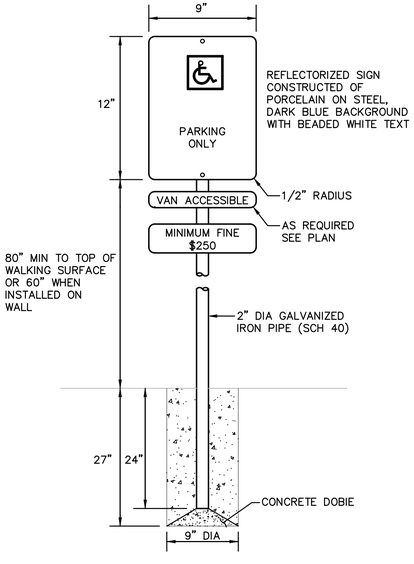




WHEEL STOP
DETAIL 'C'

NOTES:

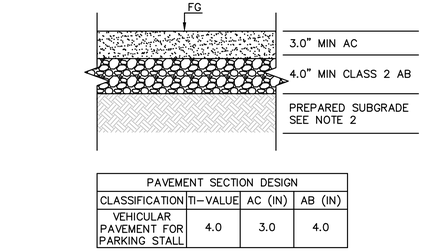
1. EACH PARKING SPACE RESERVED FOR PERSONS WITH DISABILITIES SHALL BE IDENTIFIED BY A REFLECTORIZED SIGN PERMANENTLY POSTED IMMEDIATELY ADJACENT TO AND VISIBLE FROM EACH STALL OR SPACE, CONSISTING OF A PROFILE VIEW OF A WHEELCHAIR OCCUPANT IN WHITE ON DARK BLUE BACKGROUND. THE SIGN SHALL NOT BE SMALLER THAN 70 SQUARE INCHES IN AREA AND WHEN IN A PATH OF TRAVEL, SHALL BE POSTED AT A MINIMUM HEIGHT OF 80 INCHES FROM THE BOTTOM OF THE SIGN TO THE PARKING SPACE FINISHED GRADE. SIGNS MAY ALSO BE CENTERED ON THE WALL AT THE INTERIOR OF THE PARKING SPACE AT A MINIMUM HEIGHT OF 36 INCHES FROM THE PARKING SPACE FINISHED GRADE, GROUND, OR SIDEWALK.
2. VAN STALLS TO BE LABELED ON PAVEMENT IN 12" HIGH LETTERS WITH WHITE PAINT AND BE DESIGNATED BY AN ADDITIONAL SIGN STATING "VAN ACCESSIBLE" MOUNTED BELOW THE REFLECTORIZED SIGN.



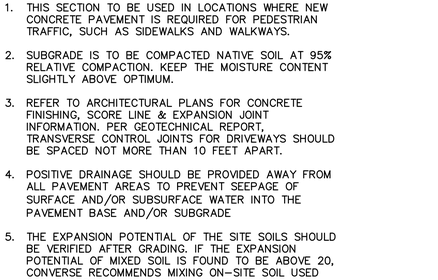
VAN ACCESSIBILITY SIGN
DETAIL 'D'

5 – AMERICANS WITH DISABILITIES ACT (ADA) VAN ACCESSIBLE PARKING STALL
NTS

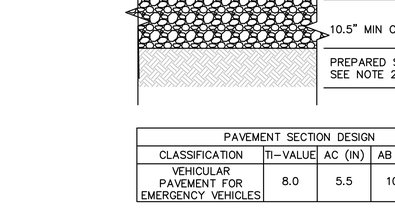
NTS



7 – 18" CURB CUT
NTS



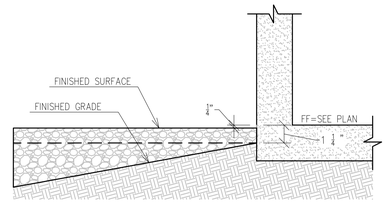
6 – 6" VERTICAL CURB
NTS



NOTES:

1. AGGREGATE BASE TO BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION.
2. SEE STRUCTURAL PLANS FOR FINAL DESIGN OF THE SLAB.
3. REFER TO THE GEOTECHNICAL ENGINEERING INVESTIGATION PREPARED BY UNIVERSAL ENGINEERING SCIENCES DATED FEBRUARY 2, 2024 FOR ADDITIONAL INFORMATION.

9 – BUILDING PAD
NTS



NOTE:
SEE PLANS FOR EXACT FINISHED SURFACE (FS) AND FINISHED GRADE (FG) ELEVATIONS.

8 – FG AND FS AT BUILDING FACE
NTS

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ELEV. 2579.30, NAVD 88

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	1			
ENGINEER		REVISIONS		CITY

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03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
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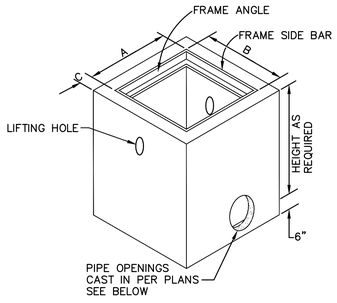
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DETAILS

SHEET **C600**
OF 19 SHEETS
FILE NO:



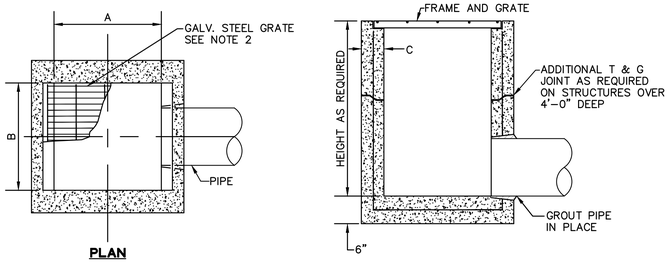
ISOMETRIC

DIMENSION TABLE

MODEL	A	B	C
DI243624F	24"	36"	6"

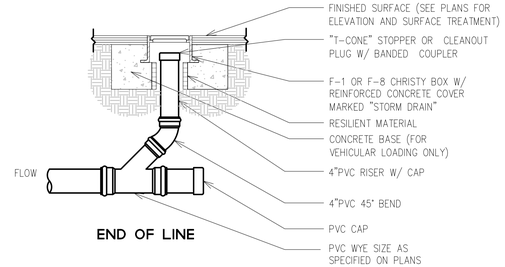
NOTES:

1. DROP INLET SHALL BE JENSEN PRECAST OR APPROVED EQUIVALENT.
2. FRAMES AND GRATES SHALL BE FOR H-20 LOADING AND HEEL PROOF.

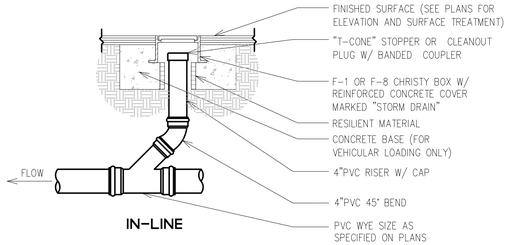


PLAN

1 – STORM DRAIN DROP INLET
NTS



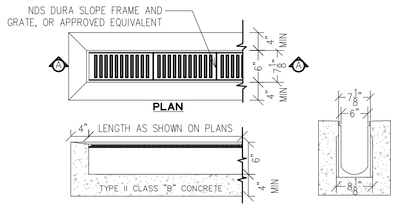
END OF LINE



IN-LINE

NOTE:
GLUED FITTINGS MAY BE SUBSTITUTED FOR GASKETED FITTINGS AT THE OPTION OF THE INSTALLATION CONTRACTOR.

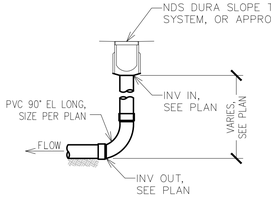
2 – STORM DRAIN CLEANOUT
NTS



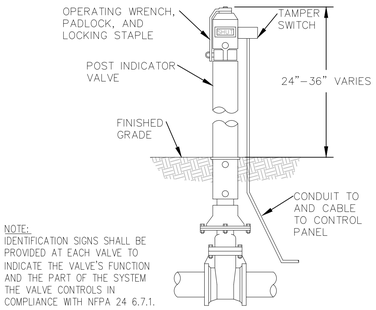
NOTES:

1. NDS DURA SLOPE TRENCH DRAIN SYSTEM, OR APPROVED EQUIVALENT.

3 – TRENCH DRAIN
NTS

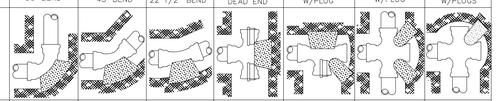


TRENCH DRAIN CONNECTION DETAIL



NOTE:
IDENTIFICATION SIGNS SHALL BE PROVIDED AT EACH VALVE TO INDICATE THE VALVE'S FUNCTION AND THE PART OF THE SYSTEM THE VALVE CONTROLS IN COMPLIANCE WITH NFPA 24 6.7.1.

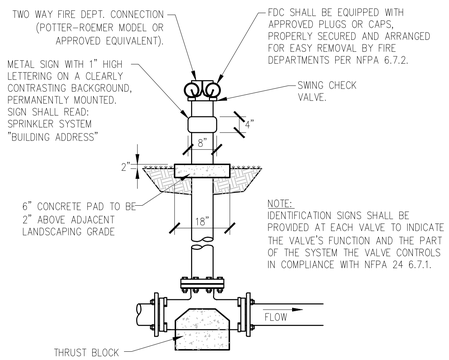
4 – POST INDICATOR VALVE
NTS

	REQUIRED BEARING AREA – TOTAL SQUARE FEET						
TYPE OF FITTING	90° BEND	45° BEND	11 1/4" OR 22 1/2" BEND	TEE OR DEAD END	TEE W/PLUG	CROSS W/PLUG	CROSS W/PLUGS
TYPICAL INSTALLATION							
SIZE OF PIPE 4"	2.5	1.0	0.5	2.5	2.5	2.5	2.5
SIZE OF PIPE 6"	6.0	2.0	0.5	6.0	6.0	6.0	6.0
SIZE OF PIPE 8"	10.5	3.0	1.0	10.5	10.5	10.5	10.5

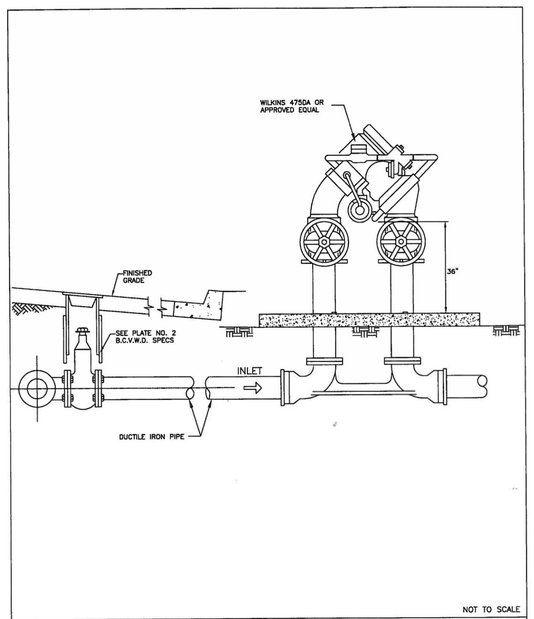
NOTES:

1. THRUST BLOCKS TO BE CONSTRUCTED OF CLASS "B" CONCRETE
2. THRUST BLOCK DESIGN BASED ON WATER PRESSURE OF 200 P.S.I. IN SOIL WITH 1,500 P.S.F. BEARING CAPACITY. INSTALLATIONS USING DIFFERENT PIPE, TEST PRESSURES, AND/OR SOIL TYPES SHOULD ADJUST AREAS ACCORDINGLY, SUBJECT TO APPROVAL OF ENGINEER.
3. BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
4. JOINTS AND FACE OF PLUGS TO BE KEPT CLEAR OF CONCRETE.
5. THRUST BLOCKS REQUIRED FOR ALL PRESSURIZED PIPES AT ALL BEND LOCATIONS

5 – THRUST BLOCK DETAILS
NTS



6 – FIRE DEPARTMENT CONNECTION
NTS



NOT TO SCALE

REVISED	PREPARED BY: BCVWD	DATE: 11-09	BEAUMONT CHERRY VALLEY WATER DISTRICT	
12/10	APPROVED: DISTRICT ENGINEER	DATE: 11/8/11	FIRE SERVICE METER ASSEMBLY W/WILKINS 475DA BACKFLOW	PLATE 7

FILE: K:\BCVWD_Projects\District_Projects\Standards\Plates

7 – DOUBLE CHECK DETECTOR ASSEMBLY
NTS

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:
DESCRIBED BY NATIONAL GEODETIC SURVEY. IN BEAUMONT, AT THE JUNCTION OF CALIFORNIA AVENUE AND FIFTH PLACE, 28.9 M (94.8 FT) WEST OF THE AVENUE CENTERLINE, 7.7 M (25.3 FT) SOUTH OF THE CENTERLINE OF FIFTH PLACE, 1.1 M (3.6 FT) NORTH OF A GUY WIRE, 0.79 M (2.6 FT) SOUTH OF A POWER POLE, 0.18 M (0.6 FT) EAST OF A WITNESS POST. THE MARK IS 0.6 METERS W FROM A SECOND WITNESS POST THE MARK IS ABOVE LEVEL WITH THE AVENUE.
ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

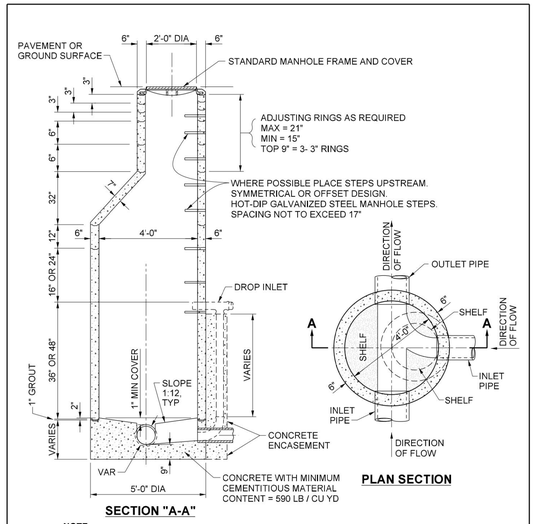
Reviewed By: _____ Staff Engineer — Date: _____
Recommended for Approval By: _____ Administrative Engineer — Date: _____
Approved By: _____ City Engineer/Director of Public Works — Date: _____

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
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DETAILS

SHEET **C601**
OF 19 SHEETS
FILE NO:



NOTE:
CHANNELS OF MANHOLE BOTTOMS TO BE FORMED IN CONCRETE, AND SIDE INLETS TO HAVE CHANNELS CURVED IN THE DIRECTION OF FLOW.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster 11/30/22

DIRECTOR OF TRANSPORTATION — DATE

MARK LANCASTER, P.E.

REVISION DESCRIPTION	MARK	DATE	APPROVED

REGISTERED PROFESSIONAL ENGINEER — MARK ALAN LANCASTER — C48048 — CIVIL — STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

PRE-CAST CONCRETE MANHOLE (ECCENTRIC)

STANDARD No. 606

1 – TYPICAL MANHOLE
NTS

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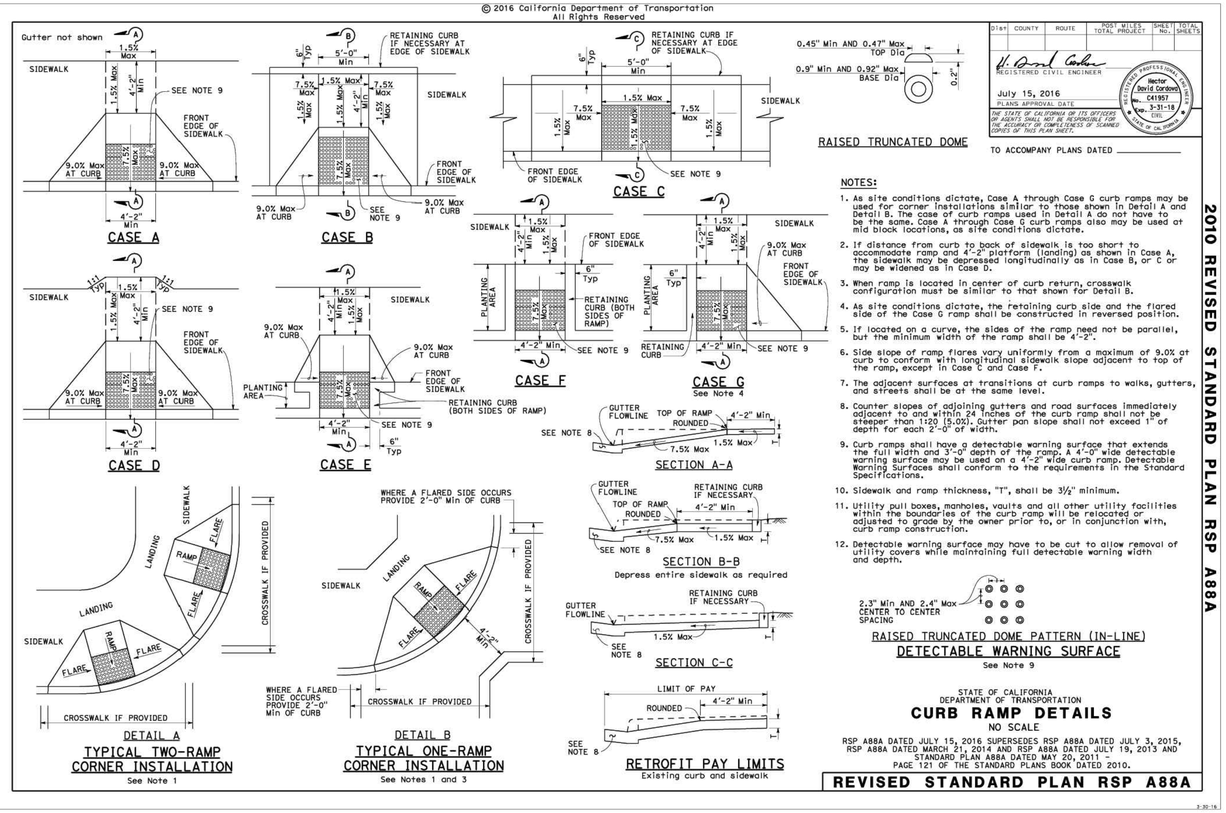


NOTES:

1. As site conditions dictate, Case A through Case G curb ramps may be used for corner installations similar to those shown in Detail A and Detail B. The case of curb ramps used in Detail A do not have to be the same. Case A through Case G curb ramps also may be used at mid block locations, as site conditions dictate.
2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'-2" platform (landing) as shown in Case A, the sidewalk may be depressed longitudinally as in Case B, or C or may be widened as in Case D.
3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for Detail B.
4. As site conditions dictate, the retaining curb side and the flared side of the Case G ramp shall be constructed in reversed position.
5. If located on a curve, the sides of the ramp need not be parallel, but the minimum width of the ramp shall be 4'-2".
6. Side slope of ramp flares vary uniformly from a maximum of 9.0% at curb to conform with longitudinal sidewalk slope adjacent to top of the ramp, except in Case C and Case F.
7. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.
8. Counter slopes of adjoining gutters and road surfaces immediately adjacent to and within 24 inches of the curb ramp shall not be steeper than 1:20 (5.0%). Gutter pan slope shall not exceed 1" of depth for each 2'-0" of width.
9. Curb ramps shall have a detectable warning surface that extends the full width and 3'-0" depth of the ramp. A 4'-0" wide detectable warning surface may be used on a 4'-2" wide curb ramp. Detectable Warning Surfaces shall conform to the requirements in the Standard Specifications.
10. Sidewalk and ramp thickness, "T", shall be 3½" minimum.
11. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
12. Detectable warning surface may have to be cut to allow removal of utility covers while maintaining full detectable warning width and depth.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL No. SHEETS

H. David Cordero
REGISTERED CIVIL ENGINEER
July 15, 2016
PLANS APPROVAL DATE
Hector David Cordero No. C41957 Exp. 3-31-18 CIVIL STATE OF CALIFORNIA
REGISTERED PROFESSIONAL ENGINEER
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR ACCURACY OR CORRECTNESS OF SCANNED COPIES OF THIS PLAN SHEET.
TO ACCOMPANY PLANS DATED

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CURB RAMP DETAILS

NO SCALE

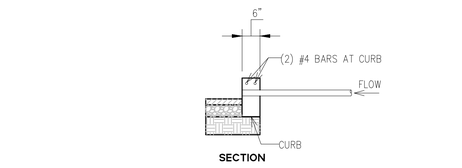
RSP A88A DATED JULY 15, 2016 SUPERSEDES RSP A88A DATED JULY 3, 2015, RSP A88A DATED MARCH 21, 2014 AND RSP A88A DATED JULY 19, 2013 AND STANDARD PLAN A88A DATED MAY 20, 2011 – PAGE 121 OF THE STANDARD PLANS BOOK DATED 2010.

REVISED STANDARD PLAN RSP A88A

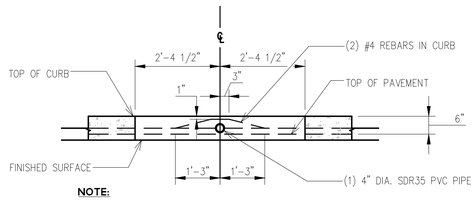
3-30-16

2010 REVISED STANDARD PLAN RSP A88A

2 – CURB RAMP
NTS

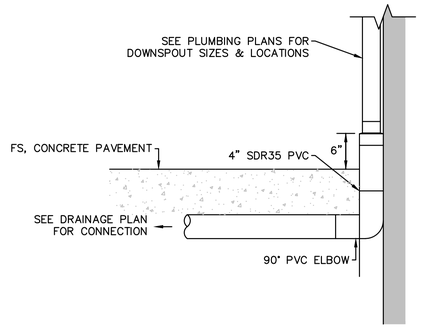


SECTION

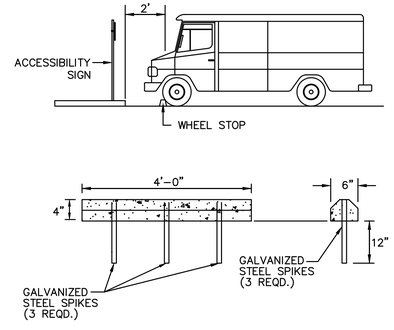


NOTE:
1. MATCH THE CENTERLINE TO THE PLAN LOCATION.

3 – ROOF WATER LEADER CURB DRAIN
NTS



4 – DOWNSPOUT CONNECTION
NTS



5 – CONCRETE WHEEL STOP
NTS

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:
DESCRIBED BY NATIONAL GEODETIC SURVEY. IN BEAUMONT, AT THE JUNCTION OF CALIFORNIA AVENUE AND FIFTH PLACE, 28.9 M (94.8 FT) WEST OF THE AVENUE CENTERLINE, 7.7 M (25.3 FT) SOUTH OF THE CENTERLINE OF FIFTH PLACE, 1.1 M (3.6 FT) NORTH OF A GUY WIRE, 0.79 M (2.6 FT) SOUTH OF A POWER POLE, 0.18 M (0.6 FT) EAST OF A WITNESS POST. THE MARK IS 0.6 METERS W FROM A SECOND WITNESS POST THE MARK IS ABOVE LEVEL WITH THE AVENUE.
ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
	1			

ENGINEER — REVISIONS — CITY

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK — DATE
R.C.E.

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
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Reviewed By: _____ Date: _____ Staff Engineer

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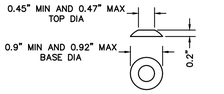
Approved By: _____ Date: _____ City Engineer/Director of Public Works

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

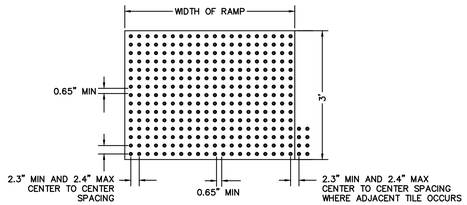
CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DETAILS

SHEET **C602**
OF 19 SHEETS
FILE NO:



RAISED TRUNCATED DOME

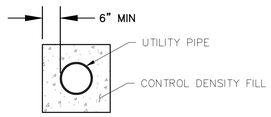


RAISED TRUNCATED DOME PATTERN

NOTES:

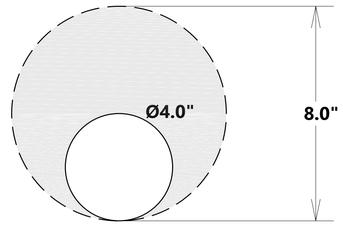
1. DETECTABLE WARNING SURFACE SHALL MEET SPECIFICATIONS PER CBC 11B-705.1
2. TRUNCATED DOMES SHALL ALIGN WITH THE RAMP IN THE DIRECTION OF TRAVEL.
3. AT CURB RAMPS, FRONT EDGE OF DETECTABLE WARNING SURFACE SHALL BE BETWEEN 6 AND 8 INCHES OF FACE OF CURB.
4. DETECTABLE WARNING SURFACES SHALL BE YELLOW AND APPROXIMATE FS 33538 OF SAE AMS-STD-595A.

1 – DETECTABLE WARNING SURFACE
NTS

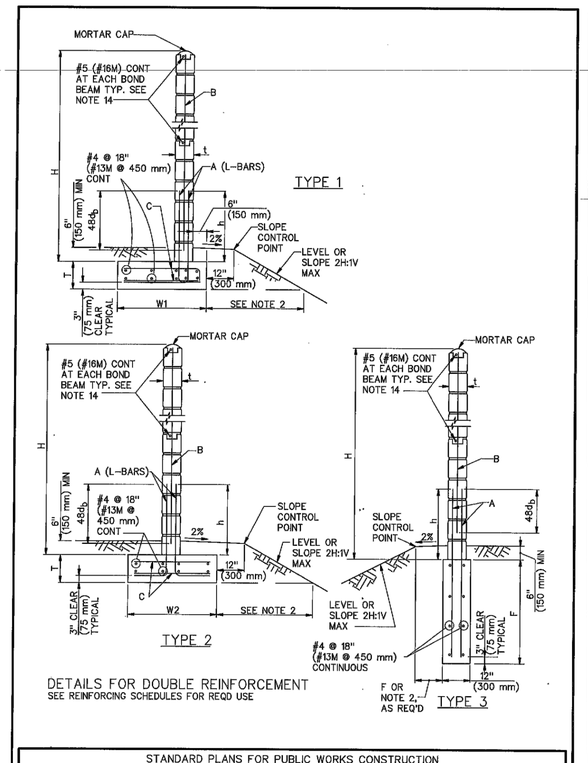


NOTE:
CONTROL DENSITY FILL PER EMWD SPECIFICATION SECTION 02252.

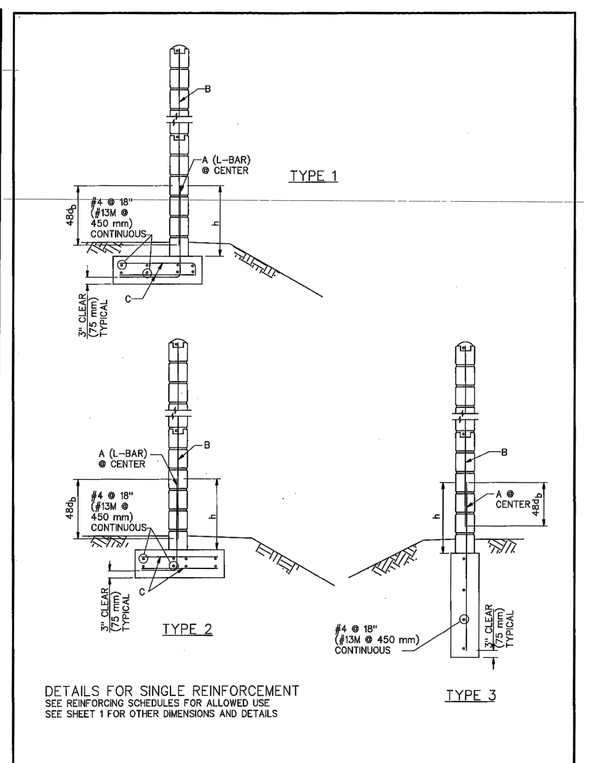
2 – SLURRY CEMENT ENCASEMENT
NTS



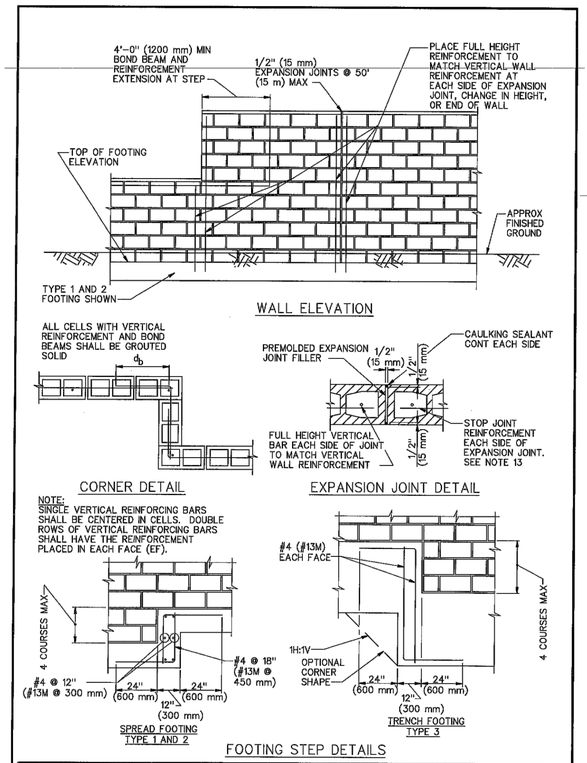
3 – ORIFICE RESTRICTOR PLATE
NTS



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1993 REV. 1995, 2005, 2006, 2015, 2021	REINFORCED CONCRETE BLOCK WALL USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN 601-5 SHEET 1 OF 6



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	
REINFORCED CONCRETE BLOCK WALL	STANDARD PLAN 601-5 SHEET 2 OF 6



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	
REINFORCED CONCRETE BLOCK WALL	STANDARD PLAN 601-5 SHEET 3 OF 6

LATERAL LOAD = 15 PSF (720 Pa)

STEM		FOOTING				REINFORCING BARS			
						CUTOFF	SPACING, O.C.		
H	t	T	W1 (TYPE 1)	W2 (TYPE 2)	F (TYPE 3)	h	A	B	C
6'-0" (1.8 m)	6" (150 mm)	12" (300 mm)	2'-3" (675 mm)	2'-3" (675 mm)	2'-9" (825 mm)	30" (750 mm)	#4 @ 48"* (#13M@1200*)	#4 @ 48" (#13M@1200)	#4 @ 48" (#13M@1200)
8'-0" (2.4 m)	8" (200 mm)	12" (300 mm)	2'-9" (825 mm)	2'-6" (750 mm)	3'-3" (975 mm)	30" (750 mm)	#4 @ 32"* (#13M@800*)	#4 @ 32" (#13M@800)	#4 @ 32" (#13M@800)
10'-0" (3.0 m)	8" (200 mm)	12" (300 mm)	3'-9" (1125 mm)	3'-0" (900 mm)	3'-9" (1125 mm)	30" (750 mm)	#4 @ 32"EF (#13M@800EF)	#4 @ 32" (#13M@800)	#4 @ 32" (#13M@800)

LATERAL LOAD = 20 PSF (960 Pa)

STEM		FOOTING				REINFORCING BARS			
						CUTOFF	SPACING, O.C.		
H	t	T	W1 (TYPE 1)	W2 (TYPE 2)	F (TYPE 3)	h	A	B	C
6'-0" (1.8 m)	6" (150 mm)	12" 300 mm	2'-9" (825 mm)	2'-6" (750 mm)	3'-3" (975 mm)	30" (750 mm)	#5 @ 32"* (#16M@800*)	#4 @ 32" (#13M@800)	#4 @ 32" (#13M@800)
8'-0" (2.4 m)	8" (200 mm)	12" 300 mm	3'-3" (975 mm)	3'-0" (900 mm)	3'-9" (1125 mm)	30" (750 mm)	#4 @ 32"EF (#13M@800EF)	#4 @ 32" (#13M@800)	#4 @ 32" (#13M@800)
10'-0" (3.0 m)	8" (200 mm)	12" 300 mm	4'-3" (1275 mm)	3'-6" (1050 mm)	4'-3" (1275 mm)	42" (1050 mm)	#5 @ 32"EF (#16M@800EF)	#4 @ 32" (#13M@800)	#5 @ 32" (#16M@800)

LATERAL LOAD = 25 PSF (1200 Pa)

STEM		FOOTING				REINFORCING BARS			
						CUTOFF	SPACING, O.C.		
H	t	T	W1 (TYPE 1)	W2 (TYPE 2)	F (TYPE 3)	h	A	B	C
6'-0" (1.8 m)	6" (150 mm)	12" (300 mm)	3'-0" (900 mm)	2'-9" (825 mm)	3'-6" (1050 mm)	30" (750 mm)	#5 @ 16"* (#16M@400*)	#4 @ 32" (#13M@800)	#4 @ 32" (#13M@800)
8'-0" (2.4 m)	8" (200 mm)	12" (300 mm)	3'-9" (1125 mm)	3'-3" (975 mm)	4'-0" (1200 mm)	30" (750 mm)	#4 @ 16"EF (#13M@400EF)	#4 @ 32" (#13M@800)	#4 @ 32" (#13M@800)
10'-0" (3.0 m)	8" (200 mm)	12" (300 mm)	4'-9" (1425 mm)	4'-0" (1200 mm)	4'-9" (1425 mm)	50" (1250 mm)	#5 @ 16"EF (#16M@400EF)	#4 @ 32" (#13M@800)	#5 @ 32" (#16M@800)

NOTES

1. SINGLE VERTICAL REINFORCING BARS SHALL BE CENTERED IN CELL.
2. * FOR SINGLE A-BARS IN FOUNDATION, SEE SHEET 2.
3. DOUBLE ROWS OF VERTICAL REINFORCING WHERE INDICATED SHALL BE PLACED AT EACH FACE (EF).

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	
REINFORCED CONCRETE BLOCK WALL	STANDARD PLAN 601-5 SHEET 4 OF 6

NOTES:

1. STANDARD PLAN 601-5 HAS 6 TOTAL PAGES THAT CAN BE FOUND IN THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION.

4 – SITE WALL
NTS

DIGALERT — Call 2 Working Days Before You Dig 811

BENCHMARK:
DESCRIBED BY NATIONAL GEODETIC SURVEY. IN BEAUMONT, AT THE JUNCTION OF CALIFORNIA AVENUE AND FIFTH PLACE, 28.9 M (94.8 FT) WEST OF THE AVENUE CENTERLINE, 7.7 M (25.3 FT) SOUTH OF THE CENTERLINE OF FIFTH PLACE, 1.1 M (3.6 FT) NORTH OF A GUY WIRE, 0.79 M (2.6 FT) SOUTH OF A POWER POLE, 0.18 M (0.6 FT) EAST OF A WITNESS POST. THE MARK IS 0.6 METERS W FROM A SECOND WITNESS POST THE MARK IS ABOVE LEVEL WITH THE AVENUE.
ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
	1			

ENGINEER — REVISIONS — CITY

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

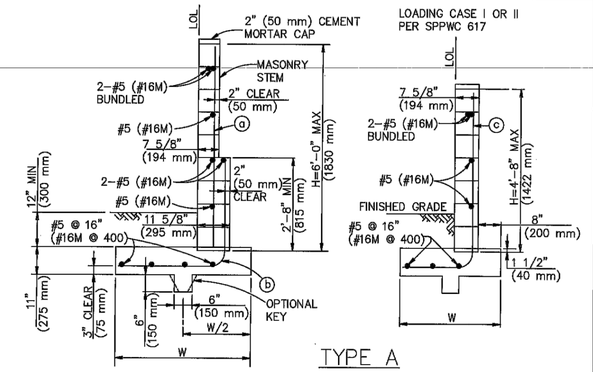
Approved By: _____ Date: _____
City Engineer/Director of Public Works

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

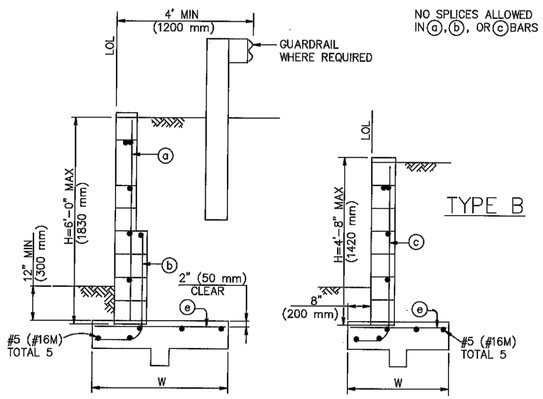
CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DETAILS

SHEET **C603**
OF 19 SHEETS
FILE NO:



TYPE A

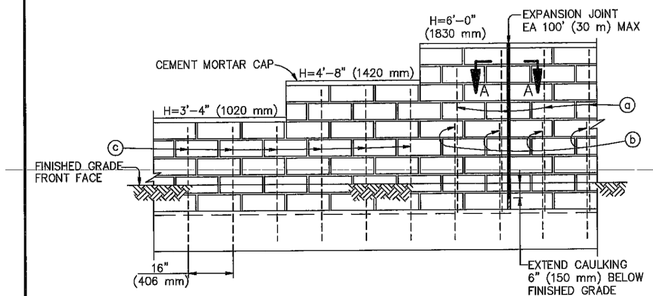


TYPE B

NO SPLICES ALLOWED IN ⓐ, ⓑ, OR ⓒ BARS

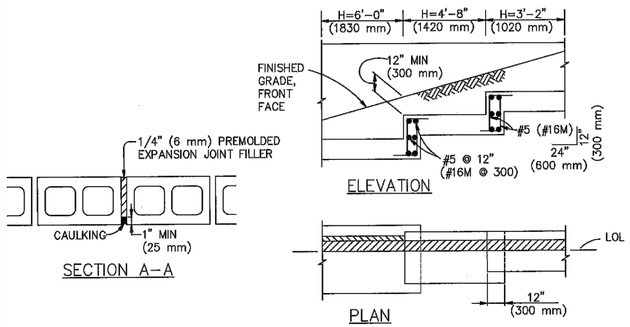
SIMILAR TO CALTRANS TYPE 6

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1933 REV. 1996, 2005, 2009	**MASONRY RETAINING WALL** USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN 618–3 SHEET 1 OF 3



OMIT MORTAR FROM VERTICAL JOINT IN FIRST COURSE ABOVE FINISHED GRADE AT 2'–8" (813 mm) CENTERS FOR WEEP HOLES. FILL ALL CELLS WITH GROUT.

ELEVATION



SECTION A–A

ELEVATION

PLAN

FOOTING STEP DETAILS

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
MASONRY RETAINING WALL		STANDARD PLAN 618–3 SHEET 2 OF 3

TYPE A WALL

DESIGN H	3'–4" (1020)	4'–0" (1220)	4'–8" (1420)	5'–4" (1630)	6'–0" (1830)
W	3'–2" (1000 mm)	3'–6" (1100)	3'–10" (1200)	4'–2" (1300)	4'–6" (1400)
ⓐ BARS	———	———	———	#5 @ 16" (#16M @ 406)	#5 @ 16" (#16M @ 406)
ⓑ BARS	———	———	———	#5 @ 16" (#16M @ 406)	#5 @ 16" (#16M @ 406)
ⓒ BARS	#5 @ 16" (#16M @ 406)	#5 @ 16" (#16M @ 406)	#5 @ 16" (#16M @ 406)	———	———

TYPE B WALL

DESIGN H	3'–4" (1020 mm)	4'–0" (1220)	4'–8" (1420)	5'–4" (1630)	6'–0" (1830)
W	2'–8" (850)	3'–0" (950)	3'–4" (1050)	3'–8" (1150)	4'–0" (1250)
ⓐ BARS	———	———	———	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)
ⓑ BARS	———	———	———	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)
ⓒ BARS	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)	———	———
ⓔ BARS	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)	#5 @ 15" (#16M @ 375)	#5 @ 12" (#16M @ 300)

DESIGN DATA (SEE SPPWC 617 FOR PCC, STEEL, AND OTHER SOIL DATA)

f'_m = 500 psi (3.5 MPa) f'_m = 1500 psi (10.5 MPa)

REQUIRED SOIL BEARING CAPACITY 2000 psf (95 kPa)

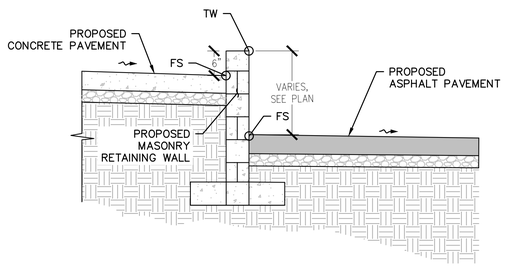
NOTES:

1. SEE SPPWC 617 FOR STANDARD WALL DETAILS.
2. METRIC REINFORCING BAR SPACING IS IN MILLIMETERS.

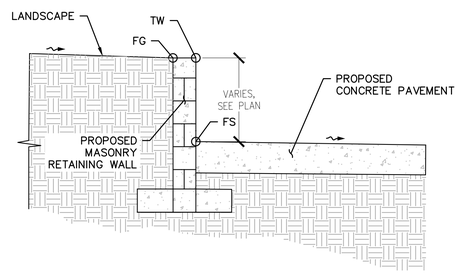
STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
MASONRY RETAINING WALL		STANDARD PLAN 618–3 SHEET 3 OF 3

1 – MASONRY RETAINING WALL

NTS



CONCRETE & ASPHALT
DETAIL A



LANDSCAPE & CONCRETE
DETAIL B

2 – WALL ELEVATION

NTS

DIGALERT Call 2 Working Days Before You Dig! 811

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ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

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NEWPORT BEACH, CA 92660
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www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

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

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
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550E. 6th St Beaumont, CA 92223
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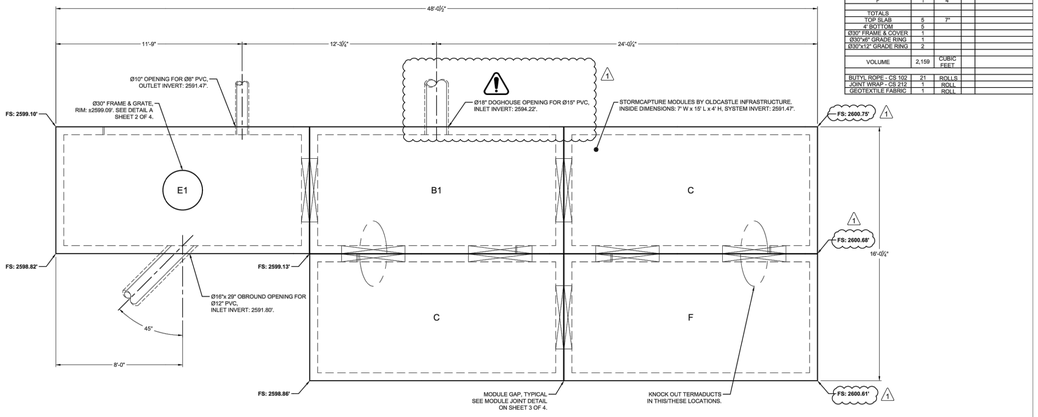
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DETAILS

SHEET **C604** OF 19 SHEETS
FILE NO:

LOWERED INLET IE FROM 2594.26' TO 2594.22' TO FIT PIPE WITHIN MODULE.



PLAN VIEW
SCALE: 1/4" = 1'-0"

BILL OF MATERIALS

TYPE	QTY	HEIGHT (STD)	NOTES
B1	1	4'	
C	2	4'	
E1	1	4'	
F	1	4'	
TOTALS			
TOP SLAB	5	7"	
4' BOTTOM	5		
Ø30" FRAME & COVER	1		
Ø30"x6" GRADE RING	1		
Ø30"x12" GRADE RING	2		
VOLUME	2,159	CUBIC FEET	
BUTYL WRAP - CS 102	21	ROLLS	
JOINT WRAP - CS 212	1	ROLL	
GEOTEXTILE FABRIC	1	ROLL	

DESIGN NOTES
1. LIVE LOADING CRITERIA:
   A. AASHTO HS-20-44 DESIGN TRUCK (WITH IMPACT AT 0.50FT MINIMUM COVER)
   B. LATERAL LIVE LOAD SURCHARGE: 80 PSF (TO 8.00FT DEPTH)
   C. NO LATERAL SURCHARGE(S) FROM ANY ADJACENT BUILDINGS, WALLS, FOUNDATIONS, OR ANY ADDITIONAL SITE ELEMENTS.
2. SOIL LOADING CRITERIA:
   A. SOIL COVER DEPTH: 0.50FT (MIN.) - 5.00FT (MAX.)
   B. SOIL UNIT WEIGHT: 120 PCF
   C. ASSUMED WATER TABLE ELEVATION: BELOW BOTTOM OF PRECAST
   D. REQUIRED ALLOWABLE BEARING PRESSURE: 2,500 PSF
   E. EQUIVALENT LATERAL FLUID PRESSURE, ACTIVE: 45 PCF (DRAINED)
   F. EQUIVALENT LATERAL FLUID PRESSURE, AT-REST: 60 PCF (DRAINED)
   G. EQUIVALENT LATERAL FLUID PRESSURE, PASSIVE: 150 PCF (DRAINED)
   H. ASSUMED COEFFICIENT OF FRICTION: 0.40
   I. SEISMIC LATERAL EARTH PRESSURES: 30.5H PCF (APPLIED AS INVERTED TRIANGLE)
3. STORMCAPTURE MODULE TYPE: DETENTION (SHORT-LIGHT).
4. CONCRETE (NORMAL WEIGHT):
   A. MIN. 28-DAY COMPRESSIVE STRENGTH: 6,000 PSI
   B. CEMENT: ASTM C150
5. STEEL REINFORCEMENT: ASTM A615 / A706 (GRADE 60), ASTM A1064 (GRADE 80)
6. REFERENCE STANDARDS: ASTM C913 & C890, ACI 318-14

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

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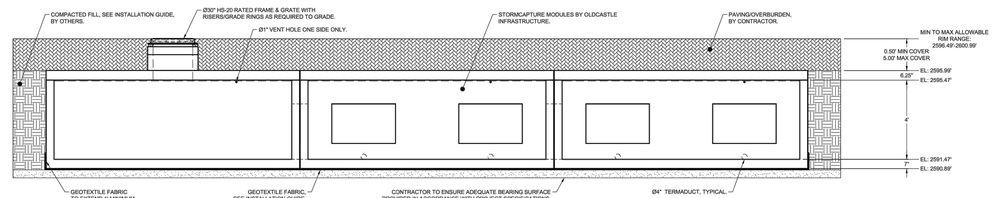
STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -
CERTIFIED:	
BKF Engineers	
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA	JOB NUMBER: 24-12022202
DATE: 1/10/24 | DTG: 070-FO | DRAWN: PPS | ENGINEER: HMF | CHECKED: HMF	SHEET NUMBER: S302167-3
DRAWING TITLE: SUBMITTAL DRAWING	SHEET: 1 OF 4

DateStorm Infiltration

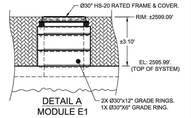
REVIEWING NOTES
1. THIS SYSTEM HAS BEEN DESIGNED PER THE DESIGN PARAMETERS SPECIFIED IN THE DESIGN NOTES. REVIEWING ENGINEER SHALL VERIFY THAT THESE PARAMETERS MEET OR EXCEED PROJECT SPECIFIC REQUIREMENTS. IF SITE CONDITIONS DIFFER FROM NOTED DESIGN PARAMETERS, REVIEWING ENGINEER SHALL NOTIFY OLDCASTLE FOR POTENTIAL REDESIGN AND/OR PRICING ADJUSTMENTS.
2. REVIEWING ENGINEER SHALL VERIFY ALL PIPE PENETRATION LOCATIONS, SIZES, AND INVERTS.
3. REVIEWING ENGINEER SHALL VERIFY ALL MANWAY ACCESS LOCATIONS AND RIM ELEVATIONS.
4. THIS SYSTEM IS DESIGNED FOR A GROUNDWATER TABLE ELEVATION PER DESIGN NOTE 2C, SHEET 1. REVIEWING ENGINEER SHALL VERIFY THAT THE DESIGN GROUNDWATER ELEVATION MEETS OR EXCEEDS SITE CONDITION REQUIREMENTS. NOTIFY OLDCASTLE IF SITE CONDITIONS VARY FROM WHAT HAS BEEN SPECIFIED FOR POTENTIAL SYSTEM DESIGN CHANGES AND/OR PRICING ADJUSTMENTS.
5. STORMCAPTURE MODULES ARE NOT WATERTIGHT. IF A WATERTIGHT SOLUTION IS REQUIRED, CONTACT OLDCASTLE FOR RECOMMENDATIONS. THE WATERTIGHT APPLICATION TO BE PROVIDED AND IMPLEMENTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE SELECTED WATERTIGHT SOLUTION PERFORMS AS SPECIFIED BY THE MANUFACTURER.
6. DESIGN OF THE STORMCAPTURE PRECAST MODULE SYSTEM ASSUMES NO ADJACENT BUILDING(S), WALL(S), OR STRUCTURAL FOUNDATION(S) WITHIN A 1:1 INFLUENCE LINE FROM THE BOTTOM EDGE OF ANY SYSTEM MODULE. ANY SITE ELEMENTS BEYOND THIS ZONE OF INFLUENCE ARE ASSUMED TO HAVE NO IMPACT ON THE SYSTEM AND EXERT ZERO LATERAL SURCHARGE ONTO THE MODULES. THE CONTRACTOR SHALL VERIFY THAT ANY ADJACENT BUILDING(S), WALL(S), OR STRUCTURAL FOUNDATION(S) DO NOT LIE WITHIN THIS INFLUENCE ZONE OR DO NOT SURCHARGE THE PRECAST MODULES.
7. WRITTEN APPROVAL OF SUBMITTAL DRAWINGS ALONG WITH SIGNED PURCHASE ORDER REQUIRED FOR BEGINNING OF PRODUCT FABRICATION. ANY SYSTEM MODIFICATION POST-APPROVAL MAY RESULT IN CHANGE ORDER(S) AND/OR POTENTIAL DELIVERY DELAYS.
8. ALL SAND FILTER MEDIA, DRAIN ROCK AGGREGATE, PIPE, AND FITTINGS PROVIDED BY CONTRACTOR.

WATERPROOFING TO BE PROVIDED BY OTHERS.



NOTE:
TERMADUCT INSERTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS ONLY (BY OTHERS).

TYPICAL ELEVATION
NTS



DETAIL A
MODULE E1
SCALE: 1/4" = 1'-0"

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

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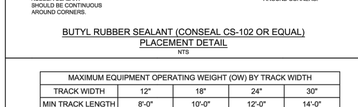
STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -
CERTIFIED:	
BKF Engineers	
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA	JOB NUMBER: 24-12022202
DATE: 1/10/24 | DTG: 070-FO | DRAWN: PPS | ENGINEER: HMF | CHECKED: HMF	SHEET NUMBER: S302167-3
DRAWING TITLE: SUBMITTAL DRAWING	SHEET: 2 OF 4

DateStorm Infiltration

INSTALLATION NOTES
1. UNDERGROUND PRECAST CONCRETE SYSTEM INSTALLATION SHALL BE PER ASTM C891, "STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES" AND PER OLDCASTLE.
2. MODULE SUBBASE OR SUBGRADE SHALL BE LEVEL/SCREEDED AND COMPACTED ADEQUATELY FOR REQUIRED BEARING CAPACITY PER DESIGN NOTE 2D, SHEET 1. CONTRACTOR AND/OR INSTALLING SUB-CONTRACTOR SHALL VERIFY THAT SOIL BEARING CONDITIONS MEET OR EXCEED DESIGN REQUIRED MINIMUMS PRIOR TO PLACEMENT AND INSTALLATION OF MODULES.
3. ANY CONSTRUCTION EQUIPMENT EXCEEDING NOTED DESIGN LOADING IS NOT PERMITTED OVER OR ADJACENT TO ANY MODULE WITHOUT FORMAL REVIEW AND WRITTEN APPROVAL BY OLDCASTLE ENGINEERING, ELSE PRODUCT WARRANTY MAY BE VOIDED. ANY DESIGN CONSTRAINT EXCEEDING THE DESIGN PARAMETERS NOTED ABOVE MAY REQUIRE CUSTOM STRUCTURAL DESIGN, SUBGRADE REVISIONS, AND/OR PRICING ADJUSTMENTS.
4. HEAVY VIBRATORY COMPACTION EQUIPMENT SHALL NOT BE OPERATED WITHIN 10 FEET OF MODULE EXTERIOR.
5. MINIMUM OF 0.50FT OF SOIL COVER REQUIRED FOR CONSTRUCTION EQUIPMENT OPERATION ON TOP OF SYSTEM. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND INSTALLING SUB-CONTRACTOR TO ENSURE THAT NO MODULES ARE DAMAGED DURING CONSTRUCTION.
6. UNLESS NOTED OTHERWISE, ALL PIPE SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR MAY MODIFY AT RISK ANY OLDCASTLE PRODUCT(S) IN THE FIELD OR AFTER DELIVERY WITHOUT FORMAL REVIEW AND WRITTEN APPROVAL BY OLDCASTLE ENGINEERING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT ANY PRODUCT MODIFICATIONS DO NOT INVALIDATE THE PRODUCT WARRANTY.
8. MODULE PLACEMENT FIELD TOLERANCES SHALL NOT EXCEED 3/4" BETWEEN ADJACENT MODULES. IF MODULE GAP EXCEEDS 3/4", CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS AND RESET MODULE(S) TO BRING WITHIN NOTED TOLERANCES.
9. CONTRACTOR IS RESPONSIBLE FOR PRODUCTS ONCE DELIVERED TO THE SITE. OLDCASTLE IS NOT RESPONSIBLE FOR OFFLOADING PRODUCTS, MAINTENANCE, AND INSTALLATION OF PRODUCTS ONCE THEY ARRIVE TO THE SITE.
10. CONTRACTOR SHALL INSTALL SYSTEM PER PROJECT WATERPROOFING AND SOILTIGHTNESS REQUIREMENTS. WATERPROOFING AND SOILTIGHTNESS INSTALLATION IS NOT BY OLDCASTLE AND OLDCASTLE WILL PROVIDE NO GUARANTEE FOR THIS COMPONENT OF SYSTEM INSTALLATION.

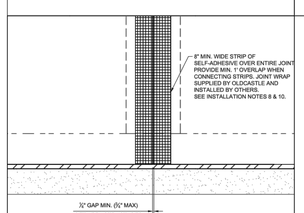
KEYWAYS MUST BE FREE OF DIRT, ROCKS, AND WATER. ROCKS AND DIRT PREVENT THE VAULT SECTIONS FROM SEATING AND SEALING PROPERLY. REMOVE ALL PROTECTIVE PAPER FROM RUBBER SEALANT MATERIAL. SPLICE RUBBER SEALANT MATERIAL WITH A "SIDE BY SIDE" JOINT, AWAY FROM CORNERS. CORNER SPLICING WILL NOT SEAL PROPERLY.



BUTYL RUBBER SEALANT (CONSEAL CS-102 OR EQUAL) PLACEMENT DETAIL
NTS

MAXIMUM EQUIPMENT OPERATING WEIGHT (OW) BY TRACK WIDTH				
TRACK WIDTH	12"	18"	24"	30"
MIN TRACK LENGTH	8'-0"	10'-0"	12'-0"	14'-0"
FILL DEPTH (FT)	OW (LBS)	OW (LBS)	OW (LBS)	OW (LBS)
0.5	35,000	45,000	52,500	54,500
1	35,000	45,000	56,000	60,500
2	35,000	45,000	56,000	64,000
3	76,000	78,500	83,500	88,000
4	94,000	100,000	106,000	113,000
5	100,000	116,000	132,000	149,000

NOTES:
A. IF CONSTRUCTION EQUIPMENT EXCEEDS THE ABOVE OPERATING WEIGHT LIMITS REFER TO INSTALLATION NOTE 3.
B. FOR WHEELED CONSTRUCTION EQUIPMENT LIMITS REFER TO INSTALLATION NOTE 3.
C. MINIMUM AXLE SPACING FOR ALL TRACK WIDTHS IS 6'-0".



MODULE JOINT DETAIL
SCALE: 1/2" = 1'-0"

TOP SLAB LIFTING DETAIL
N.T.S.

BOTTOM MODULE LIFTING DETAIL
N.T.S.

HEAVIEST PICK WEIGHT = 24,250 LBS

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

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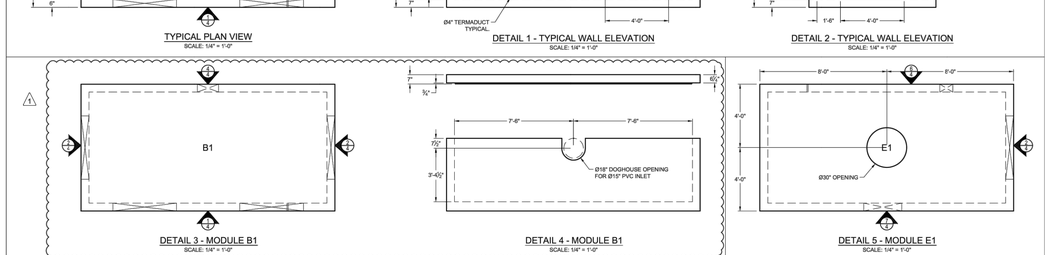
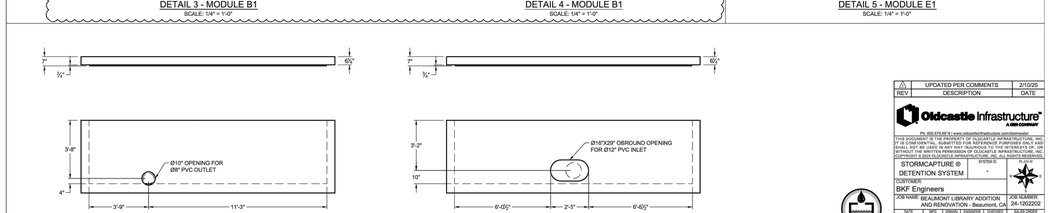
STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -
CERTIFIED:	
BKF Engineers	
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA	JOB NUMBER: 24-12022202
DATE: 1/10/24 | DTG: 070-FO | DRAWN: PPS | ENGINEER: HMF | CHECKED: HMF	SHEET NUMBER: S302167-3
DRAWING TITLE: SUBMITTAL DRAWING	SHEET: 3 OF 4

DateStorm Infiltration





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DateStorm Infiltration

NOTES:
1. OLDCASTLE STORMCAPTURE DETENTION SYSTEM PRODUCT OR APPROVED EQUIVALENT.

UNDERGROUND DETENTION SYSTEM

NTS

1
–

DIG ALERT
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BENCHMARK:
DESCRIBED BY NATIONAL GEODETIC SURVEY. IN BEAUMONT, AT THE JUNCTION OF CALIFORNIA AVENUE AND FIFTH PLACE, 28.9 M (94.8 FT) WEST OF THE AVENUE CENTERLINE, 7.7 M (25.3 FT) SOUTH OF THE CENTERLINE OF FIFTH PLACE, 1.1 M (3.6 FT) NORTH OF A GUY WIRE, 0.79 M (2.6 FT) SOUTH OF A POWER POLE, 0.18 M (0.6 FT) EAST OF A WITNESS POST. THE MARK IS 0.6 METERS W FROM A SECOND WITNESS POST THE MARK IS ABOVE LEVEL WITH THE AVENUE.
ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

Approved By: _____ Date: _____
City Engineer/Director of Public Works

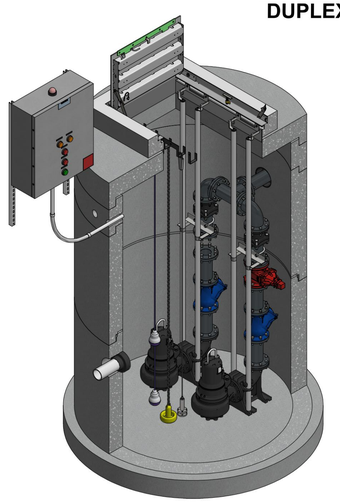
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St.
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

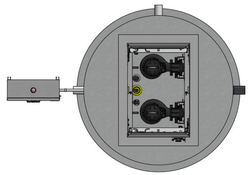
DETAILS

SHEET C605
OF 19 SHEETS
FILE NO:

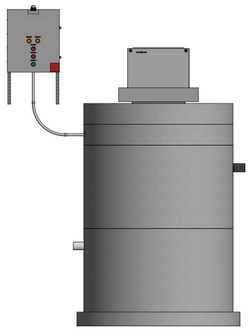
472-D SERIES STANDARD DUPLEX PUMP STATION



TOP LEFT ISOMETRIC VIEW w/ SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

472-D Series Standard.dgn

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DESCRIPTION: Beaumont Library Renovation
PART NUMBER: 472-D Series Standard
DRAWN BY: C.Purdie
CREATED:
MODIFIED: 02.11.25 T.Antonissen
REV:
SHEET: 1 OF 2

OPTIONAL VENT PIPING
SINGLE DOOR ACCESS HATCH w/ 30" x 48" CLEAR OPENING
(QTY 3) 3" CORE HOLES FOR ELECTRICAL CONDUIT "ELECTRICAL DESIGN BY OTHERS"
INLET PIPING TO BE INSTALLED, CORED & SEALED BY OTHERS
Ø6'-0" WET WELL I.D.
Ø7'-2" WET WELL O.D.
ANTI-FLOTATION COLLAR
"CONNECTION TO FORCE MAIN DESIGNED & INSTALLED BY OTHERS

PLAN VIEW
NOT TO SCALE

SEE NOTES #1 & #2
RIM - ELEV.
INLET INVERT / HIGH WATER LEVEL ALARM - ELEV. 91"
LAG PUMP ON - ELEV. 78"
LEAD PUMP ON - ELEV. 66"
PUMPS OFF - ELEV. 30"
LOW WATER LEVEL ALARM - ELEV. 20"
WET WELL FLOOR - ELEV. 0"
SEE NOTE #3
7.50'
15.72'
4.00'

PROFILE VIEW
NOT TO SCALE

BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
1	1	DUPLEX ALTERNATING CONTROL PANEL
2	1	30" X 48" ACCESS HATCH CAST INTO CONCRETE RISER
3	1	72IN DIA. JENSEN PRECAST CONCRETE MANHOLE BASE "HEIGHT VARIES"
4	2	72IN DIA. JENSEN PRECAST CONCRETE MANHOLE BARRELS "HEIGHT VARIES"
5	1	72IN DIA. JENSEN PRECAST CONCRETE MANHOLE FLAT TOP
6	2	UPPER GUIDE RAIL BRACKET 4IN
7	1	JMT FLOAT BRACKET 3-HOOK FORMED SS
8	10 LF	LF CHAIN 1/4IN 316SS
9	2	FLOAT SWITCH w/ 100' CABLE
10	1	PRESSURE TRANSDUCER 15PSI 100FT CABLE
11	1	ANCHOR 15LB PVC COATED
12	2	SUBMERSIBLE PUMP 4IN
13	2	AUTOCOUPLING ASSY 4IN
14	4	PIPE 4IN FLG X FLG DUCTILE IRON SPOOL
15	2	BALL CHECK VALVE 4IN
16	40 LF	LF PIPE 1-1/2IN SCH40 GUIDE RAIL 304SS
17	2	INTERMEDIATE GUIDE RAIL BRACKET
18	2	ISOLATION VALVE 4IN
19	3	PIPE 4IN FLG X PE DUCTILE IRON SPOOL *CUT TO LENGTH AS NEEDED*
20	2	RFCA 4IN W/ SS HARDWARE
21	1	FLEXIBLE PIPE CONNECTORS
22	2	90 DEG ELBOW 4IN DUCTILE IRON FLG
23	1	TEE 4IN DUCTILE IRON

PROJECT SPECIFIC INFORMATION	
FINISHED GRADE (FL)	2598.09
RIM ELEV. (FL)	2598.09
INLET ELEV. (FL)	2590.59
FORCE MAIN DISCHARGE ELEV. (FL)	2594.82
AVAILABLE POWER SUPPLY	120V ☐ 240V ☑ 480V ☐
AVAILABLE POWER PHASE	Single ☐ Three ☑

SYSTEM CHARACTERISTICS	
APPLICATION	SEWAGE ☐ STORM WATER ☑
DESIGN FLOW (gpm)	384
TOTAL DYNAMIC HEAD (FL)	31.3
STATIC HEAD (FL)	8.8
PUMP MAKE & MODEL	HOMA MMS434-184/8.57/C
PUMP MOTOR (Std / XP)	Standard ☑ XP/FM ☐
PUMP TYPE	Non-Clog ☑ Grinder ☐ Chopper ☐ Vortex ☐
PUMP RATED HP & CURRENT	5 SHP / 14.8A
ACCESS HATCH LOAD LEVEL	Pedestrian ☐ Incidental H-20 ☐ Parking Lot H-20 ☑ Full Traffic H-20 ☐

ADDITIONAL OPTIONS		
OPTION	YES	NO
CONTROL PANEL SS ENCLOSURE	☐	☑
CONTROL PANEL AC UNIT	☐	☑
CONTROL PANEL REMOTE ALARM MONITORING	☐	☑
AIR RELEASE/VACUUM VALVE	☐	☑
INTERIOR LINER	☐	☑
CONCRETE WATERPROOFING	☐	☑
VENT PIPE	☐	☑
ODOR CONTROL VALVE	☐	☑
LIFTING CRANE	☐	☑
GENERATOR RECEPTACLE	☐	☑

DESIGN NOTES / DISCLAIMERS:
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3. ALL FOUNDATION, SUBGRADE, AND BACKFILL DESIGNED BY OTHERS.

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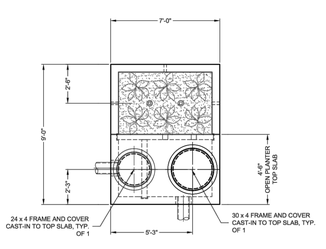
DESCRIPTION: Beaumont Library Renovation
PART NUMBER: 472-D Series Standard
DRAWN BY: C.Purdie
CREATED:
MODIFIED: 02.11.25 T.Antonissen
REV:
SHEET: 2 OF 2

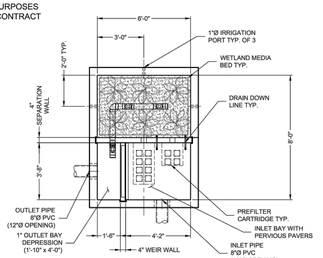
1 — STORM WATER PUMP STATION
NTS NTS

NOTES: 1. JENSEN PRODUCT OR APPROVED EQUIVALENT.

THIS DOCUMENT IS FOR INFORMATIONAL PURPOSES ONLY AND IS NOT A FINAL CONSTRUCTION CONTRACT



PLAN VIEW

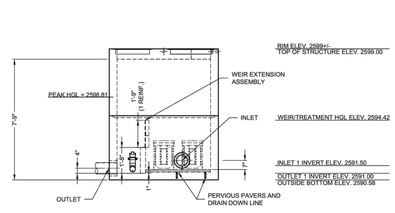


PLAN VIEW
TOP SLAB NOT SHOWN

SITE DESIGN DATA	
WATER QUALITY VOLUME (CF)	3081.00
DISCHARGE FLOW RATE (GPM)	16.01
PEAK FLOW RATE (CFS)	0.81
DRAIN DOWN TIME (HRS)	24
MAXIMUM POLLUTANT DENSITY (PREFILTER) (GPM/SF)	2.1
PREFILTER LOADING RATE (GPM/SF)	0.63
WETLAND MEDIA LOADING RATE (GPM/SF)	0.26
MEDIA OPERATING HEAD (FT)	3.27
SURFACE LOADING	PEDESTRIAN
GROUNDWATER ELEVATION*	2591

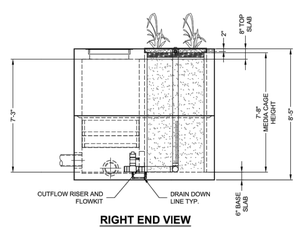
STRUCTURE DETAILS	
NUMBER OF DELIVERED PIECES (DOES NOT INCLUDE GRADE RINGS/RISERS)	2
MAXIMUM FOOTPRINT	9.00' x 7.00'
DELIVERED HEAVIEST PICK*	15700 LB.
TOP SECTION	11400 LB.
BASE SECTION	15700 LB.

*BASE SECTION SHIPPED WITH INTERNAL WALLS INSTALLED



ELEVATION VIEW*

*MEDIA CASTINGS, IF REQUIRED, NOT SHOWN



RIGHT END VIEW

RV/RSD
6505 / 000000
LAYOUT 4
MWSL-L-6-8-R
11.60 TS
1.21 TIW

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800-338-1122 513-645-7000 513-645-7993 FAX

WETLANDS
FOR FACTORY PRE-TREATMENT OF STORMWATER RUNOFF

CONTECH PROPOSAL DRAWING

MODULAR WETLANDS MWSL0608OP - 811819-010
BEAUMONT LIBRARY ADDITION & RENOVATION
BEAUMONT, CA
SITE DESIGNATION: MWSL0608

PROJECT No.	SEQ No.	DATE
811819	010	01/10/25
DESIGNED: MCD	DRAWN: MCD	
CHECKED: MDB	APPROVED: MCD	
SHEET NO.: 1 OF 1		

2 — MODULAR WETLAND SYSTEM
NTS

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BENCHMARK:
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ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
	1			

ENGINEER — REVISIONS — CITY

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SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BRUCE W. KIRBY — No. C 42393 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

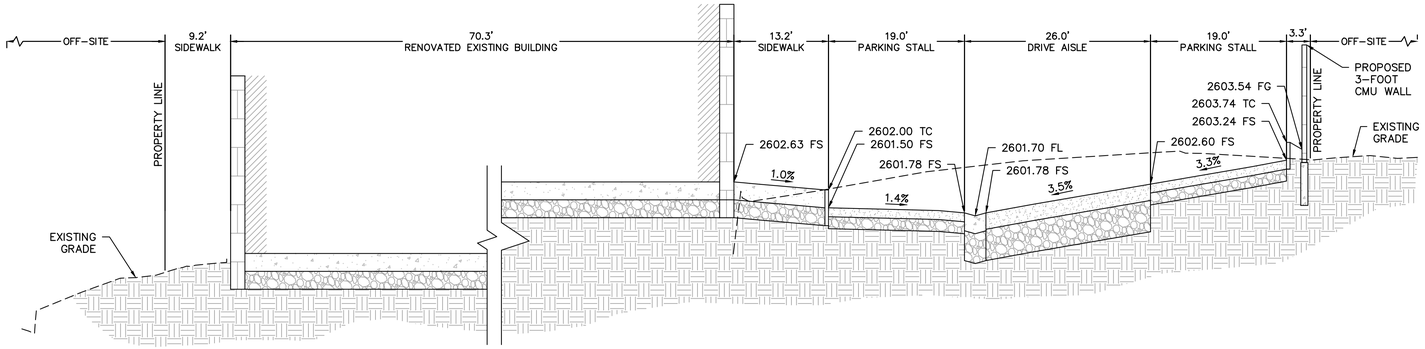
Approved By: _____ Date: _____
City Engineer/Director of Public Works

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

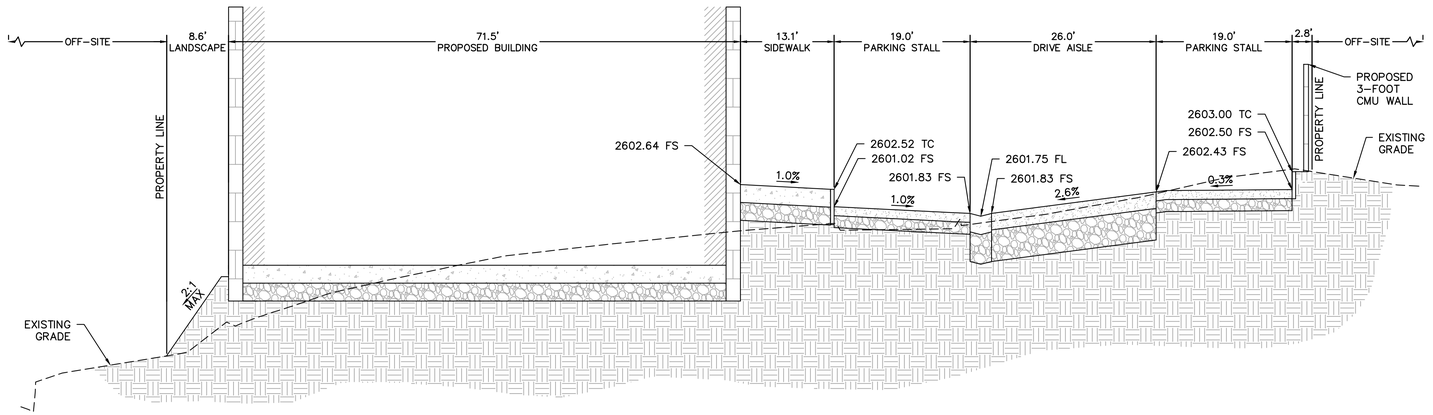
CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

DETAILS

SHEET C606
OF 19 SHEETS
FILE NO:



SECTION A-A
SCALE = NTS



SECTION B-B
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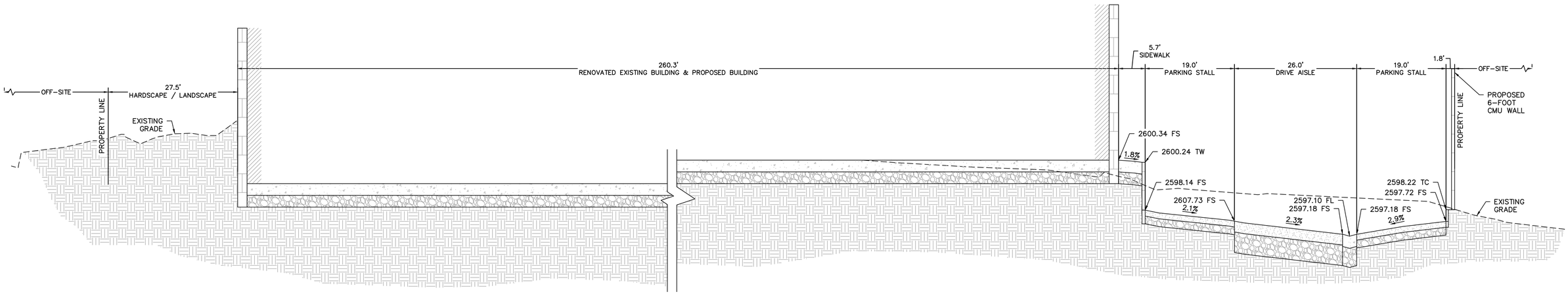

SECTION C-C
SCALE = NTS

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ELEV. 2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

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SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
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03/20/2025
ENGINEER OF WORK R.C.E. — DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
BRUCE W. KIRBY
No. C 42393
CIVIL
STATE OF CALIFORNIA

DESIGN BY: LV
DRAWN BY: LV
CHECKED BY: BK
SCALE: PER PLAN
DATE: 03/20/2025
JOB NUMBER:

PREPARED BY AT BKF ENGINEERS, A CALIFORNIA CORPORATION

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

Approved By: _____ Date: _____
City Engineer/Director of Public Works

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
GRADING PLANS FOR:
BEAUMONT LIBRARY RENOVATION & ADDITION
125 E 8TH ST, BEAUMONT CA 92223

SECTIONS

SHEET **C607** OF 19 SHEETS
FILE NO:

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Preliminary Geotechnical Engineering Investigation

Beaumont Library Renovations and Expansions
Beaumont Library District
125 East 8th Street,
Beaumont, CA 92223

Prepared for:
Beaumont Library District
125 East 8th Street,
Beaumont, California 92223

Prepared by:
Universal Engineering Sciences
16 Technology Drive, Suite 139
Irvine, CA 92618

February 2, 2024
Project No.: 4230.2300029.0000

Mr. Luren Dickinson
Director
Beaumont Library District
125 East 8th Street,
Beaumont, California 92223

Subject: Preliminary Geotechnical Engineering Investigation
Beaumont Library Renovations and Expansions
Beaumont Library District
125 East 8th Street,
Beaumont, CA 92223

Dear Mr. Dickinson:

Universal Engineering Sciences (UES) is pleased to submit the results of our preliminary geotechnical engineering investigation for the proposed expansion of the library via a new single-story building located at 125 East 8th Street, Beaumont, California, 92223. The purpose of this preliminary investigation was to evaluate the subsurface conditions at the site and to provide geotechnical engineering recommendations for the design and construction of the proposed development. This report includes a brief description of site conditions, the proposed development, discussions regarding field and laboratory investigation, subsurface conditions, engineering seismology, and geotechnical conclusions and recommendations for the design and construction of the proposed project.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
Universal Engineering Sciences

Dean Stanphill, P.E. G.E.
Principal

Blake Kissee
Staff Engineer

Distribution: Addressee (pdf by email)

Table of Contents

1. INTRODUCTION 1
2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT 1
3. SCOPE OF WORK 1
3.1. Literature Review 1
3.2. Field Investigation 2
3.3. Geotechnical Laboratory Testing 2
3.4. Engineering Analyses and Report Preparation 3
4. SITE GEOLOGY AND SUBSURFACE CONDITIONS 4
4.1. Regional Geologic Setting 4
4.2. Site-Specific Geologic and Soil Conditions 4
4.3. Groundwater 5
4.4. Geologic Hazards 5
4.4.1. Local and Regional Faulting 5
4.4.2. Surface Fault Rupture 6
4.4.3. Liquefaction and Seismic Settlement Potential 6
4.4.4. Landslides 7
4.4.5. Ground Subsidence 7
4.4.6. Flooding 8
4.4.7. Water Storage and Dam Inundation 8
4.4.8. Tsunamis and Seiches 9
4.5. Rippability 9
4.6. Caving Potential 9
4.7. Expansive Soils 9
4.8. Corrosive Soils 10
4.8.1. Sulfate Exposure 10
4.8.2. Ferrous Metals 10
5. GEOTECHNICAL ENGINEERING RECOMMENDATIONS 11
5.1. General Considerations 11
5.2. Seismic Design Parameters 11
5.3. Site Preparation and Earthwork 12
5.3.1. General Grading Recommendations 12
5.3.2. Grading Recommendations 13
5.3.3. Materials for Fill 13
5.3.4. Compacted Fill 13
5.3.5. Utility Trench Backfill and Compaction 14
5.3.6. Temporary Excavations 14
5.4. Foundation Recommendations 14
5.4.1. Foundation Recommendations 15
5.5. Pavement Design 16
5.5.1. Flexible Pavement Design 16
5.5.2. Portland Cement Concrete (PCC) Pavement Design 17

5.6. DRAINAGE CONTROL 17
6. DESIGN REVIEW AND CONSTRUCTION MONITORING 18
6.1. PLANS AND SPECIFICATIONS 18
6.2. CONSTRUCTION MONITORING 18
7. LIMITATIONS 18
8. SELECTED REFERENCES 20

Figures

Figure 1 – Site Vicinity Map
Figure 2 – Geologic Site Plan and Boring Location Map
Figure 3 – Regional Geologic Map
Figure 4 – Regional Faulting Map
Figure 5 – Regional Seismic Hazards Zone Map
Figure 6 – Seismic Events Map
Figure 7 – Subsidence Map
Figure 8 – FEMA Flood Hazard Map

Tables

Table 1 – 2022 California Building Code Design Parameters
Table 2 – Geotechnical Design Parameters for Foundation
Table 3 – Recommended Minimum HMA and Base Section Thicknesses
Table 4 – Recommended Minimum PCC and Base Section Thicknesses

Appendices

Appendix A – Field Exploration and Boring Logs
Appendix B – Laboratory Testing

1. INTRODUCTION

This report presents the results of our geotechnical engineering evaluation performed to aid in the design and development of a new single-story addition to the existing Beaumont Library, located at 125 E 8th Street, Beaumont, CA 92223 (see Figure 1 – Site Vicinity Map).

This report was prepared in accordance with the requirements of ASCE 7-16 and the 2022 California Building Code (CBC), and includes a brief description of the proposed development, a discussion regarding the current field exploration, laboratory testing results, a description of subsurface conditions, engineering seismology, and geological hazards, and provides geotechnical conclusions and recommendations. This report will also be subject to review under California Code of Regulations (CCR), Title 24, California Building Code (2022 CBC). Our exploration generally followed the guidelines presented in California Geological Survey (CGS) Note 48: Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings (November 2022).

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The approximate site coordinates are latitude 33.931821°N and longitude -116.981054°W and is located approximately 2599 feet to 2604 feet above Mean Sea Level (MSL) gradually sloping to the west. The Beaumont Library was constructed in 1914 by Andrew Carnegie and had received 2 major expansions since its construction. Once in 1965 and the other was in 1976. This expansion will take place in the south parking lot. The site is surrounded by the existing library building and smaller parking lot to the North, the southern parking lot entrance to the East, a single-family house to the south, and N California Ave to the West.

The new development comprises the construction of a new single-story addition to the existing Beaumont library with the approximate size not determined.

The new structural plan was not provided to us at the time of this writing. However, we assume the new development will consist of framed construction and shallow foundation systems. It is anticipated that the structure will be constructed near to the existing grade of the library and will have relatively light to moderate loads.

3. SCOPE OF WORK

UES's scope of services for this project consisted of the following tasks:

3.1. Literature Review

We reviewed readily available background data including geologic maps, topographic maps, and aerial photographs relevant to the subject site in preparation of this report. The list of documents reviewed is presented in the "References" section of this report.

3.2. Field Investigation

The subsurface conditions were explored on December 29th, 2023, and included drilling, logging, and sampling of 8 exploratory soil borings denoted as B-1 through B-8, using a truck mounted Diedrich D-70 Turbo drill rig equipped with 8-inch outside diameter hollow stem augers.

Borings B-3 through B-8 were drilled to a depth of 15 ft, whilst borings B-1 and B-2 were drilled to a depth of 50 ft and 30 ft. SPT (disturbed samples) were taken from borings B-1, 2, 4, and 7 at 5 ft intervals. California Modified Ring samples (undisturbed) being taken at borings B-3, 6, and 8 in 5 ft intervals as well. Disturbed soil samples were collected using a standard split-poon sampler (inside diameter 1⅜ inches) without liners Standard Penetration Tests (SPT) and driven ring samplers were advanced with a 140-pound hammer with a drop of 30 inches in general accordance with ASTM D1586. Field blow counts were recorded for every 6 inches of penetration.

Recovered cuttings from the soil borings and in-situ samples were logged by a UES professional engineer in general accordance with the visual-manual procedure for description and identification of soils, ASTM D2488 and prepared for subsequent reference and laboratory testing. The approximate locations of the borings are shown on Figure 2 – Geologic Site Plan and Boring Locations Map with detailed exploration information of the soil borings presented in Appendix A.

At the completion of drilling and sampling, all borings were backfilled with soil cuttings and patched with cold-patched asphalt in accordance with the County of Riverside standards.

3.3. Geotechnical Laboratory Testing

Laboratory tests were performed on selected samples obtained from the exploration in order to aid in the soil classification and to evaluate the engineering properties of the foundation soils. The following tests were performed:

- In-situ Moisture Content and Dry Density, ASTM D2937.
- Grain Size Distribution, ASTM C136 & D422
- Expansion Index, ASTM D4829.
- Consolidation, ASTM D2435.
- Direct Shear, ASTM D3080.
- Atterberg Limits, ASTM D4318
- Compaction Test using Modified Effort, ASTM D1557.
- Resistance and Expansion Pressure (R-Value), ASTM D2844.
- Corrosion Testing:
    - Minimum electrical resistivity and pH, CTM 643.
    - Sulphate Content, CTM 417.
    - Chloride Content, CTM 422.

Testing was performed in general accordance with applicable ASTM Standards and California Test Methods. Results of all laboratory tests are presented in Appendix B – Laboratory Testing. For ease of referral to the soil profile, please refer to the soil boring logs presented in Appendix A.

3.4. Engineering Analyses and Report Preparation

We compiled and analyzed the data collected from our site reconnaissance, subsurface evaluation, and laboratory testing, and prepared this report to present our conclusions and recommendations, including:

- Evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials.
- Site geology and geologic hazards, including site seismicity, liquefaction and seismic settlement potential, and preliminary recommendations for appropriate mitigation measures, if necessary.
- Evaluation of site-specific seismic design parameters in accordance with 2022 California Building Code.
- Evaluation of current and historic high groundwater conditions at the site and potential impact on the existing structures and site development.
- Recommendations for site grading for the planned improvements, including site and subgrade preparation, and fill and backfill conditioning and placement.
- Evaluation of project feasibility and suitability of on-site soils for foundation support.
- Evaluation of foundation design parameters including soil bearing capacity, lateral resistance, friction coefficient, settlement estimate and seismic considerations.
- Recommendations for trench excavations for buried utilities.
- An evaluation of the corrosion potential of the on-site soils to buried concrete and steel.
- Recommendations for ground improvement

4. SITE GEOLOGY AND SUBSURFACE CONDITIONS

4.1. Regional Geologic Setting

The site is generally located in the north central portion of the Peninsular Ranges Geomorphic province, (Figure 1 – Site Vicinity Map). The Peninsular Ranges province extends southeastward from the Santa Monica and San Gabriel mountains to beyond the Mexican border and is subdivided into several structural units, such as the Los Angeles Basin, the Santa Ana Mountains, the Orange County plain, and the California Continental Borderland blocks. The Peninsular Ranges province is generally characterized by northwest oriented valleys and mountain ranges bounded by major right lateral strike-slip fault zones. The San Andreas Fault zone constitutes the eastern provincial boundary, the Patton-Coronado Escarpment constitutes the western provincial boundary, while the San Jacinto, the Elsinore, and the Newport-Inglewood-Rose Canyon Fault zones are located within the center of the province.

Rocks of the Peninsular Ranges are typically Cretaceous igneous and marine sedimentary and Paleozoic to Mesozoic metasedimentary rocks. Tertiary marine and non-marine sedimentary and volcanic rock along with shallow to deep Quaternary sediment lies unconformably on either the Cretaceous sedimentary or the older basement rock.

Locally, the site is situated on the western end of the San Gorgonio Pass sitting north of Mt Eden and Mt. San Jacinto and south of the San Bernardino Mountains.

4.2. Site-Specific Geologic and Soil Conditions

Reference to available preliminary geologic maps of the general site area indicate that the site is underlain by middle-early Pleistocene Very Old Alluvium Fan deposit, (Map Symbol: Qof) and late-middle Pleistocene Old Alluvium Fan deposit, (Map Symbol: Qof). The alluvium fan material was encountered at all exploratory excavation locations to the maximum depth of exploration (approximately 50 feet bgs). Detailed descriptions and information concerning the geologic units encountered are provided in the following paragraphs and on the exploration logs in Appendix A. The subsurface geologic conditions are presented in Figure 3 – Regional Geologic Map.

Old fan deposits (Qof)

Late to middle Pleistocene surficial deposits. Slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon.

Very old fan deposits (Qvof)

Middle to early Pleistocene surficial deposits. Moderately to well-consolidated, highly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon.

4.3. Groundwater

Groundwater was not encountered during the field exploration to the maximum depth explored (approximately 50 feet below the existing grade). According to the Department Water Resources (DWR) Sustainable Groundwater Management Program (SGMA) and California Statewide Groundwater Elevation Monitoring (CASGEM) state monitoring wells 003S001W09C004S and 03S01W09C002S, located 2,597 ft to the southwest of the project site indicated a historic high groundwater is approximately 93 feet bgs. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations, or of activities by humans at this and nearby sites. Based on our findings, groundwater is not expected to impact the proposed development.

4.4. Geologic Hazards

As part of our report, we have commented on the potential for geologic hazards to be present at the subject site. Hazards may include but are not limited to the following:

4.4.1. Local and Regional Faulting

The United States Geological Survey (USGS), with support of multiple State Geological Surveys, and reviewed published work by various researchers, have developed a two-dimensional Quaternary Fault and Fold Database of faults and associated folds that are believed to be sources of earthquakes with magnitudes greater than 6.0 that have occurred during the Quaternary (the past 1.6 million years). The Southern California Earthquake Center (SCEC) has also released the SCEC Community Fault Model (Version 5.3, 2022), which is an object-oriented three-dimensional representation of 440 active fault surfaces in southern California and adjacent offshore basins.

Based on our review, the city of Beaumont is within the Beaumont Plain fault zone and San Gorgonio Pass fault zone (USGS/CGS).

The Beaumont Plain fault is located to the west and southwest of the City of Banning. It is comprised of a number of northwest-trending faults represented by the discontinuous northeast facing scarps. Detailed studies have not been conducted regarding the Beaumont Plain fault zone.

The San Gorgonio Pass fault zone is a series of north-dipping reverse and thrust faults connected by strike tear faults, resulting to a surface trace that appears like an irregular, saw-tooth. This east-west trending fault zone contains faults that were formed during the Pleistocene Epoch, of which some have been active in the later Holocene Epoch. The most recently active strands of faults occur at the base of the Banning Bench, in the central part of Banning. The Highland Scarp along the western edge of the city of Banning is considered an active segment of the San Gorgonio Pass fault zone. The attached regional fault locations with respect to the project site are presented in Figure 4 – Regional Faulting Map.

4.4.2. Surface Fault Rupture

California's Alquist-Priolo Earthquake Fault Zoning Act was signed into law in 1972, primarily to mitigate the hazards of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The Act requires the State Geologist to delineate "earthquake fault zones" that show evidence of Holocene surface displacement along one or more of their segments, and are clearly detectable by a trained geologist as a physical feature at or just below the ground surface. The boundary of an earthquake fault zone is generally about 500 feet from major active faults, and 200 to 300 feet from well-defined minor faults. The Act also requires counties and cities to withhold development permits for sites within earthquake fault zones until geologic investigations demonstrate that the sites are not threatened by surface displacement associated with future faulting. State law defines which types of development must be regulated, but local agencies could be more restrictive than state law.

The subject site is not located within a State of California designated Earthquake Zone of Required Investigation (EZRI; formerly known as a Special Studies Zone) shown in Figure 4. The closest EZRI to the site as designated by the California Geological Survey is the Banning fault, located approximately 5.54 kilometers (3.4 miles) to the northeast. However, a 4.3 regional moment magnitude earthquake, 2km (1.2 miles) to the southwest at a depth of 13.1 km (8.1 miles) did occur in January of 2010 on an unmapped fault (Figure 5 – Regional Seismic Hazards Zone Map). Also, the region is seismically active within the past several decades with many lower magnitude earthquakes. Therefore, we cannot rule out the risk for surface rupture at the subject site (see Figure 6 – Seismic Events Map).

4.4.3. Liquefaction and Seismic Settlement Potential

Liquefaction occurs when the pore pressures generated within a soil mass approach the effective overburden pressure. Liquefaction of soils may be caused by cyclic loading such as that imposed by ground shaking during earthquake ground vibrations greater than 0.2 g. The increase in pore pressure results in a loss of strength, and the soil then can undergo both horizontal and vertical movements, depending on the site conditions. Other phenomena associated with soil liquefaction include sand boils, ground oscillation, and loss of foundation bearing capacity. Liquefaction is generally known to occur in loose, saturated, relatively clean, fine-grained cohesionless soils at depths shallower than approximately 50 feet. Factors to consider in the evaluation of soil liquefaction potential include groundwater conditions, soil type, grain size distribution, relative density, degree of saturation, and both the intensity and duration of ground motion.

The current standard of practice, as outlined in the "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California" and "Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California" requires liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

A review of the California Geological Survey California Earthquake Hazards Zone Application (EQ Zapp) indicate the site is **not** identified as having a potential for liquefaction. Due to the depth of groundwater the potential for liquefaction is nil.

4.4.4. Landslides

Many factors contribute to slope failure, including slope height, slope steepness, shear strength and orientation of weak layers in the underlying geologic unit, as well as pore water pressures. While slope failures can occur on natural slopes, man-made slopes could also fail generally due to poor engineering or poor construction. Slope failures often occur as elements of interrelated natural hazards in which one event triggers a secondary event, such earthquake-induced land sliding, fire-flood sequences, or storm-induced mudflows. Mitigating risks associated with landslides and slope failures involves careful land planning and management in hillside. This generally includes land use zoning to restrict development in unstable areas, grading codes for earthwork construction, geologic and soil engineering investigation and review, construction of drainage structures, and where required, placement of warning systems. Other important factors are risk assessments (including susceptibility maps), a concerned local government, and an educated public.

Based on our review of the referenced geologic maps, literature, topographic maps, aerial photographs, and our subsurface evaluation, the project location has not been mapped for landslide hazard zones within CGS EZRI. Additionally due to the flat topography and surrounding areas, the potential for landslides is nil.

4.4.5. Ground Subsidence

Ground subsidence, the gradual settling or sinking of the ground surface with little or no horizontal movement, is generally associated with oil, gas or ground water extraction from below the ground surface in sediment filled valleys and floodplains. Evidence of regional subsidence on ground surface includes earth fissures, sinkholes or depressions, and disruption of surface drainage. Ground subsidence could cause damage to canals, levees, underground pipelines, wells, buildings, roads, railroads and other structures and improvements. Good management of local water supplies, including the reduction in local wells pumping, importing water and the use of artificial recharge has mitigated subsidence in affected areas.

In California, land subsidence—mostly from groundwater pumping—was first documented by the USGS in the early 20th century. Completion of State and Federal water projects that bring water from California's wet north to its dry south allowed some groundwater aquifers to recover, and subsidence decreased in these areas. Subsidence continues today, sometimes at high rates of more than 1 foot/year. Based on our review of California Water Science Center, Land Subsidence in California the project location is listed within a ground subsidence zone from ground water pumping see Figure 7 – Subsidence Map.

4.4.6. Flooding

Floods are natural, recurring events. They become hazardous only when man's encroachment onto floodplains results in modification of the landscape and building structures in the areas intended to convey excess water during flooding. Floodplains typically provide level ground and fertile soils suitable for agriculture, and access to water supplies and transportation routes. However, these benefits come with a price, as flooding is one of the most destructive natural hazards in the world. It is responsible for more deaths per year than any other geologic hazard. Further, the economic costs as measured in average annual flood losses (in dollars) have increased steadily over the last decades as development in floodplains has increased. Major flood events occurred in southern California in 1862, 1884, 1916, 1938, 1969, 1978, 1980, 1983, 1988, 1992, 1995, and 1998. As a result of floods, particularly in dense urbanized floodplains and alluvial fans, awareness of the potential for public and private losses has increased.

The Federal Emergency Management Agency (FEMA) has prepared flood insurance rate maps (FIRMs) for use in administering the National Flood Insurance Program. Based on our review of the FEMA (2008) flood map, the site lies within "ZONE X", with a reduced flood risk due to levee for the 0.2% annual chance (500-year) floodplain (see Figure 8 – FEMA Flood Hazard Map).

4.4.7. Water Storage and Dam Inundation

Strong ground shaking can cause structural damage to aboveground water storage tanks, which can result in seismically induced inundation. If tanks are not adequately braced and baffled, sloshing water can lift a water tank off its foundation. This may result in the tank's shell splitting, damage to the roof, and bulging the bottom. Movement can also shear off the pipes leading to the tank, and water may be released through the broken pipes. During southern California's 1992 Landers, 1992 Big Bear, and 1994 Northridge earthquakes these types of damage occurred. About 40 steel tanks were rendered non-functional during the Northridge earthquake. In the Santa Clarita area, a tank failed and inundated several houses below. Lessons learned from these earthquakes resulted in new standards for design of steel water tanks, which were adopted in 1994. The new tank design includes flexible joints at the inlet/outlet connections to accommodate movement in any direction.

Dam Inundation occurs when structural damage to a dam results in a flood. Structural damage to a dam can occur due to earthquakes, liquefaction, landslides, lateral spreading, water overflow and erosion, and design failure. A dam inundation map shows areas that would be susceptible to flooding in the event of dam failure. In 2017, the California Legislature passed a law requiring all state jurisdictional dams, except low hazard dams, to develop inundation maps and emergency action plans. DSOD approves inundation maps, and Cal OES approves emergency action plans. Based on review of the California Department of Water Resources Dam Breach Inundation Maps, the site is not located within an Approved Inundation Boundary for nearby dams. Review of USACE National Inventory of Dams indicate the site does not have a nearby dam for a potential inundation zone. The nearest dam, El Casco, is 7.1 miles to the northeast with a capacity of 143 acre feet. The downstream hazard for this dam is considered low.

4.4.8. Tsunamis and Seiches

Tsunamis are waves generated by massive landslides near or under sea water. Based on our review of the California Geologic Survey Tsunami Hazard Area Map, the site is not located with a State of California tsunami hazard area. The potential for the site to be adversely impacted by earthquake-induced tsunamis is considered low the distance of the site from the Pacific Ocean.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated The starting mechanism is typically seismically-induced and they cause sloshing of water contained in enclosed bodies of water including lakes, ponds, reservoirs, and swimming pools. This hazard is dependent upon the frequency of seismic waves, distance and direction from the epicenter, and site-specific design criteria of the enclosed body of water. Swimming pools and other small bodies of water are likely to incur minor damages in the event of seismically induced seiches. However, seiching could result in the failure of larger bodies of water, including water tanks, retention basins, recharge basins and other water storage structures, and could result in the inundation of land and structures downslope.

Based on our review of the California Department of Conservation's California Tsunami Maps, the project site's tsunami hazard is considered low due to the distance away from the Pacific Ocean. Large bodies of water are also not present near the project site. Therefore, we can consider the hazard for seiches to be low.

4.5. Rippability

Based on our subsurface exploration of the site, the near-surface materials should be generally excavatable with heavy-duty earthwork equipment in good working condition.

4.6. Caving Potential

In general, the near surface soil has a low potential for caving. We recommend that the geotechnical engineer should be notified immediately if severe caving conditions are encountered during excavations to provide further mitigation recommendations.

4.7. Expansive Soils

Expansive soils are those with significant amount of clay minerals that have the ability to give up water (shrink) or absorb water (swell). These minerals can undergo significant volumetric changes as a result of changes in moisture content. The upward pressures induced by the swelling of expansive soils can have significant harmful effects upon structures and other surface improvements. The on-site soils exhibited a "Low" to "Very Low" potential for expansion.

4.8. Corrosive Soils

The potential for the on-site materials to corrode buried steel and concrete improvements was evaluated. Laboratory testing was performed on representative soil samples to evaluate pH, minimum resistivity, and soluble chloride and sulfate contents. General recommendations to address the corrosion potential of the on-site soils are provided below. Imported fill materials, if used, should be tested to evaluate whether their corrosion potential is more severe than those assumed. Surface bulk sample test results show 44.5 mg/kg at 0.0045% by weight sulfates, 28.6 mg/kg at 0.0029% by weight chlorides, resistivity of 62,310 Ohm-cm recorded, 4,288 Ohm-cm minimum, and pH of 7.0.

4.8.1. Sulfate Exposure

Laboratory tests indicate that the potential of sulfate attack on concrete in contact with the on-site soils is “S0” exposure in accordance with ACI 318, Table 19.3.1.1. Based on the measured water-soluble sulfate results the exposure of buried concrete to sulfate attack should be considered “not a concern”, i.e., exposure class S0 per ACI 318, Table 19.3.1.1. Consequently, injurious sulfate attack is not a concern for concrete with a minimum 28-day compressive strength of 2,500 psi.

4.8.2. Ferrous Metals

The results of the laboratory chemical tests performed on a sample of native soil collected within the site indicate that the on-site soils may be corrosive to buried ferrous metals. Consequently, metal structures which will be in direct contact with the soil (i.e., underground metal conduits, pipelines, metal signposts, etc.) and/or near the soil (wrought iron fencing, etc.) may be subject to corrosion. The use of special coatings or cathodic protection around buried metal structures has been shown to be beneficial in reducing corrosion potential. Additional provisions may be required to address chloride contents of the soil per the 2022 CBC to protect the concrete reinforcement. The laboratory testing program performed for this project does not address the potential for corrosion to copper piping. In this regard, a corrosion engineer should be consulted to perform more detailed testing and develop appropriate mitigation measures (if necessary).

5. GEOTECHNICAL ENGINEERING RECOMMENDATIONS

5.1. General Considerations

Based on the results of our field exploration and engineering analyses, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided that the recommendations in this report are incorporated into the design plans and are implemented during construction.

The following is a summary of the geotechnical considerations for this project:

- Groundwater was not encountered during subsurface investigation at a depth around 50 feet below ground surface. Groundwater is not expected to impact the proposed development.

- The potential for landslides, flooding, tsunami, and seiches to impact the proposed improvement is considered low.

- The onsite near-surface native soils are expected to exhibit low to very low expansion potential.

- Based on laboratory testing, the onsite soils are expected to have a negligible potential for sulfate attack on concrete. These soils are also considered to have a potential for corrosion to buried uncoated metal conduits. Laboratory testing should be performed on the finish grade soils to verify the corrosivity characteristics.

Our geotechnical engineering analyses performed for this report were based on the earth materials encountered during the subsurface exploration for the site. If the design substantially changes, then our geotechnical engineering recommendations would be subject to revision based on our evaluation of the changes. The following sections present our conclusions and recommendations pertaining to the engineering design for this project.

5.2. Seismic Design Parameters

Our recommendations for seismic design parameters have been developed in accordance with 2022 CBC and ASCE 7-16 (ASCE, 2016) standards. The applicable site class is D with a risk category of III based on the results of our field investigation. Table 1 – 2022 California Building Code Design Parameters presents the seismic design parameters for the site in accordance with 2022 CBC.

Table 1
2022 California Building Code Design Parameters

Design Parameters	Value
Site Class	D
Mapped Spectral Acceleration Parameter at Period of 0.2-Second, S_s	1.778 g
Mapped Spectral Acceleration Parameter at Period 1-Second, S_1	0.605 g
Site Coefficient, F_a	1.0 g
Site Coefficient, F_v	1.70 g (see Note below)
Adjusted MCE_R Spectral Response Acceleration Parameter at Short Period, S_{MS}	1.778 g
1-Second Period Adjusted MCE_R[1] Spectral Response Acceleration Parameter, S_{M1}	1.029 g (see Note below)
Short Period Design Spectral Response Acceleration Parameter, S_{DS}	1.186 g
1-Second Period Design Spectral Response Acceleration Parameter, S_{D1}	0.686 g (see Note below)
Peak Ground Acceleration, PGA_M	0.795 g
Seismic Design Category (*SDC*)	D

Note: Since the seismic factor S_1 is greater than 0.2, site-specific ground motion hazard analysis may be required. The project structural engineer shall determine if an exemption can be applied in accordance with ASCE 7-16 Section 11.4.8. if an exemption applies, a long period coefficient (*Fv*) of 1.70 may be utilized for calculation of the seismic parameters.

5.3. Site Preparation and Earthwork

In general, earthwork should be performed in accordance with the recommendations presented in this report. UES should be contacted for questions regarding the recommendations or guidelines presented herein.

5.3.1. General Grading Recommendations

The intent of this section is to provide general information regarding the site grading. Site grading operations should conform with applicable local building and safety codes and to the rules and regulations of those governmental agencies having jurisdiction over the subject construction.

Site preparation should begin with the removal of utility lines, asphalt, concrete, vegetation, and other deleterious debris from areas to be graded. Trees and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the outside edges of the proposed excavation and fill areas. We recommend that unsuitable materials

such as organic matter or oversized material be selectively removed and disposed offsite. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed at a legal dump site away from the project area.

5.3.2. Grading Recommendations

New building

In order to create uniform bearing conditions for the proposed improvements and reduce the potential for sudden bearing capacity loss or differential settlements from liquefaction the UES recommends:

Existing on-site soils be over excavated to a minimum depth of one foot below proposed footings and slabs. This over excavation should extend 3 feet beyond exterior building lines.

After overexcavation, the surface exposed at the bottom of the excavation shall be scarified to a depth of 6 inches, moisture conditioned and compacted to at least 90% relative compaction in accordance with ASTM D 1557.

Pavement

No overexcavation is necessary for pavement areas. However, after the site is cut down to final subgrade elevations the exposed soils should be scarified 6 to 8 inches, brought to near optimum moisture content, and then compacted to at least 95 percent relative compaction based on the maximum dry density determined by ASTM D1557.

5.3.3. Materials for Fill

On-site soils are suitable to be reused for compaction effort. Soil material to be used as fill should not contain contaminated materials, rocks, or lumps over 4 inches in largest dimension, and not more than 40 percent larger than ¾ inch. Utility trench backfill material should not contain rocks or lumps over 3 inches in largest dimension. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or may be disposed offsite.

Any imported fill material should consist of granular soil having a “very low” expansion potential (that is, expansion index of 20 or less). Import material should also have low corrosion potential (that is, chloride content less than 500 parts per million [ppm], soluble sulfate content of less than 0.1 percent, and pH of 5.5 or higher). Materials to be used as fill should be evaluated by UES prior to importing or filling.

5.3.4. Compacted Fill

Compacted fill should be placed in horizontal lifts of approximately 6 to 8 inches in loose thickness. Prior to compaction, each lift should be watered or dried as needed to achieve near optimum moisture condition, mixed, and then compacted by mechanical methods, using sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other appropriate compacting rollers, to a relative compaction of 90 percent as evaluated by ASTM D1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved.

5.3.5. Utility Trench Backfill and Compaction

Utility installations and trench backfill should be performed in accordance with manufacturers' recommendations and the requirements of the local regulatory agency.

Generally, on-site soils, free of organic matter and oversized material, are considered suitable for general trench backfill. The backfill should be placed in thin layers not exceeding 12 inches and be compacted to a minimum of 90 percent relative compaction based on the maximum dry density determined by ASTM D1557.

5.3.6. Temporary Excavations

The on-site soils are not expected to pose unusual excavation difficulties; therefore, conventional earth-moving equipment may be used. Localized sloughing/raveling of exposed soil intervals should be anticipated because of the sandy nature of the on-site soils. All trench excavations should be performed in accordance with CalOSHA regulations. The on-site soils may be considered Type A soil, as defined by the current CalOSHA soil classification.

Unsurcharged excavations: Sides of temporary, unsurcharged excavations less than 20 feet deep should be sloped back at an inclination of 1.5(H):1(V) or flatter. Where space for sloped sides is not available, shoring will be necessary. Additional recommendations for the shoring system are provided in the temporary shoring section of this report.

For any configurations where the depth of the excavation plus the height of any nearby retaining wall or slope exceed 10 feet, a slope stability analysis shall be performed by the Geotechnical Engineer.

Stockpiled (excavated) materials should be placed no closer than 4 feet from the top of the trench, except in areas where an existing retaining wall is within 8 feet of the top of the trench where no stockpiling is allowed. A greater setback may be necessary when considering surcharge loads such as heavy vehicles, concrete trucks and cranes. UES should be advised of such heavy vehicle loadings so that specific setback requirements can be established for the used equipment. Alternatively, a shoring system may be designed to allow reduction in the setback distance.

Personnel from UES should observe the excavation progress so that appropriate modifications to the excavation design may be recommended, if necessary, due to conditions differing from the design assumptions.

5.4. Foundation Recommendations

The following recommendations are for preliminary design purposes only. These foundation recommendations should be reviewed after completion of rough grading of the building pad areas.

5.4.1. Foundation Recommendations

New Library Building

Footings for the new academic building can be founded on properly compacted fill as described herein. Accordingly, foundation design recommendations are presented in Table 2.

Table 2
Geotechnical Design Parameters for Spread Foundation

Design Parameters	Values
Bearing Material	• See "Foundation Preparation" section of this report.
Minimum Footing Dimensions	• At least 12 inches in width and at least 18 inches in depth.
Allowable Bearing Pressure	• An allowable bearing capacity of 2,000 psf may be used for the design of footing foundations. • The allowable bearing values may be increased by one-third for transient loads from wind or earthquake.
Estimated Static Settlement	• Less than 1-inch total static settlement with differential settlement estimated to be less than 0.5 inch over 30 feet. • The static settlement of the foundation system is expected to occur on initial application of loading.
Allowable Coefficient of Friction Below Footings	• 0.35
Unfactored Lateral Passive Resistance	• 350 pcf (equivalent fluid pressure) • Maximum allowable of 2,000 psf

As mentioned above, the structural building loads are not provided to us at this time and since the settlement criteria might control the design, the allowable bearing pressure for the slab-on-grade foundations will be revisited for the final design once loading data becomes available.

5.4.1.1. Concrete Slab-On-Grade

At minimum the building slab-on-grade should be at least 6 inches in thickness and should be reinforcement with a minimum of No.4 bars spaced at 18 inches on-center. Final design of the slab should be provided by the project structural engineer. All slabs should be underlain by 6 inches of aggregate base compacted to a minimum of 95 percent relative compaction based on the maximum dry density determined by ASTM D1557.

All concrete slabs-on-grade should be supported on vapor retarder. The design of the slab and the installation of the vapor retarder should comply with the most recent revisions of ASTM E1643

and ASTM E1745. The vapor retarder should comply with ASTM E1745 Class A requirements. At minimum, the vapor retarder should consists of 10 mil Stegowrap or equivalent.

Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. Sand above the vapor retarder is outside of UES purview and should be in accordance with the structural engineer's recommendation.

UES does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore, it is recommended that a qualified consultant be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure. Where dampness would be objectionable, it is recommended that the floor slabs should be waterproofed. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection for concrete slabs-on-grade.

The recommendations presented above are intended to reduce the potential for cracking of slabs; however, even with the incorporation of the recommendations presented herein, slabs may still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics.

5.5. Pavement Design

Recommendations for pavement design including asphalt concrete and Portland cement concrete pavements are provided below.

5.5.1. Flexible Pavement Design

Our pavement structural design is in accordance with Chapter 600 of the Caltrans Highway Design Manual, which is based on a relationship between the gravel equivalent (GE) of the pavement structural materials, the traffic index (TI), and the R-value of the underlying subgrade soil.

A laboratory R-value was obtained on a sample of the expected subgrade materials with a resulting value of 34. This R-value should be confirmed near the completion of rough grading and used for pavement design. On this basis, Table 3 provides recommended minimum thicknesses for hot mix asphalt (HMA) and aggregate base sections for different traffic indices.

Table 3
Recommended Minimum HMA and Base Section Thicknesses

Location	Parking Stalls	Drive Aisles
Traffic Index	**4.0**	**6.0**
HMA Thickness (in)	3.0	3.0
Aggregate Base Thickness (in)	4.0	7.0

Prior to construction of the pavement sections provided above, the subgrade for the proposed pavement should be moisture conditioned to a depth of 12 inches and compacted to achieve 95 percent. The aggregate base section should then be placed, moisture conditioned to near optimum moisture content and compacted to achieve 95 percent relative compaction. Asphalt concrete and Aggregate Base (AB) should conform to applicable State and Local Requirements.

A representative of UES should be onsite to observe and test the subgrade, base and HMA sections.

5.5.2. Portland Cement Concrete (PCC) Pavement Design

The minimum thicknesses for Portland Cement Concrete (PCC) pavement sections are presented in Table 4. PCC pavement section should be constructed on non-expansive engineered fill and underlain by Class 2 aggregate base compacted to at least 95 percent of the maximum dry density (ASTM D1557).

Table 4
Recommended Minimum PCC and Base Section Thicknesses

Category	ADTT[1]	Pavement Traffic Description	PCC Thickness (inches)	Aggregate Base Thickness (in)
A	0	Car parking areas and access lanes Autos and pickups only	6.0	6.0

Note: [1]Average Daily Truck Traffic

The above PCC pavement section is based on a minimum 28-day Modulus of Rupture (M-R) of 550 psi and a compressive strength of 3,600 psi. Transverse contraction joints should not be spaced more than 15 feet and should be cut to a depth of ¼ the thickness of the slab. Longitudinal joints should not be spaced more than 10 feet apart, however, are not necessary in the pavement adjacent to the curb and gutter section. Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into the pavement base and/or subgrade.

Additional PCC pavement design can be provided upon additional traffic information.

5.6. Drainage Control

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should always be maintained. All site drainage, with the exception of any required to be disposed of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices.

The proposed structure should be provided with roof drainage. Discharge from downspouts, roof drains and scuppers should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located

within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

6. DESIGN REVIEW AND CONSTRUCTION MONITORING

Geotechnical review of plans and specifications is of paramount importance in engineering practice. The poor performance of many structures has been attributed to inadequate geotechnical review of construction documents. Additionally, observation of excavations will be important to the performance of the proposed development. The following sections present our recommendations relative to the review of construction documents and the monitoring of construction activities.

6.1. Plans and Specifications

The design plans and specifications should be reviewed by UES prior to bidding and construction, as the geotechnical recommendations may need to be reevaluated in the light of the actual design configuration and loads. This review is necessary to evaluate whether the recommendations contained in this report and future reports have been properly incorporated into the project plans and specifications. Based on the work already performed, this office is best qualified to provide such review.

6.2. Construction Monitoring

Site preparation, removal of unsuitable soils, assessment of imported fill materials, fill placement, foundation installation, and other site grading operations should be observed and tested. The substrata exposed during the construction may differ from that encountered in the test excavations. Continuous observation by a representative of UES during construction allows for evaluation of the soil conditions as they are encountered and allows the opportunity to recommend appropriate revisions where necessary.

The project engineer should be notified prior to exposure of subgrades. It is critically important that the engineer be provided with an opportunity to observe all exposed subgrades prior to burial or covering.

7. LIMITATIONS

The recommendations and opinions expressed in this report are based on information obtained from our field exploration for the site. In the event that any of our recommendations conflict with recommendations provided by other design professionals, we should be contacted to aid in resolving the discrepancy.

Due to the limited nature of our field explorations, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation and laboratory testing can be performed upon request. It should be understood that conditions different from those anticipated in this report may be encountered during excavation operations, for example, the presence of unsuitable soil, and that additional effort may be required to mitigate them.

Site conditions, including groundwater elevation, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which UES has no control.

UES's recommendations for this site are, to a high degree, dependent upon appropriate quality control of foundation construction. Accordingly, the recommendations are made contingent upon the opportunity for UES to observe foundation excavations for the proposed construction. If parties other than UES are engaged to provide such services, such parties must be notified that they will be required to assume complete responsibility as the geotechnical engineer of record and the engineering geologist of record for the geotechnical phase of the project by concurring with the recommendations in this report and/or by providing alternative recommendations.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. UES should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report has been prepared for the exclusive use by the client and its agents for specific application to the proposed design and construction of the project described herein. Any party other than the client who wishes to use this report for an adjacent or nearby project, shall notify UES of such intended use. Land use, site conditions, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of this report and the nature of the project, UES may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or any other party will release UES from any liability resulting from the use of this report by any unauthorized party.

UES has endeavored to perform its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either expressed or implied, is made as to the conclusions and recommendations contained in this report.

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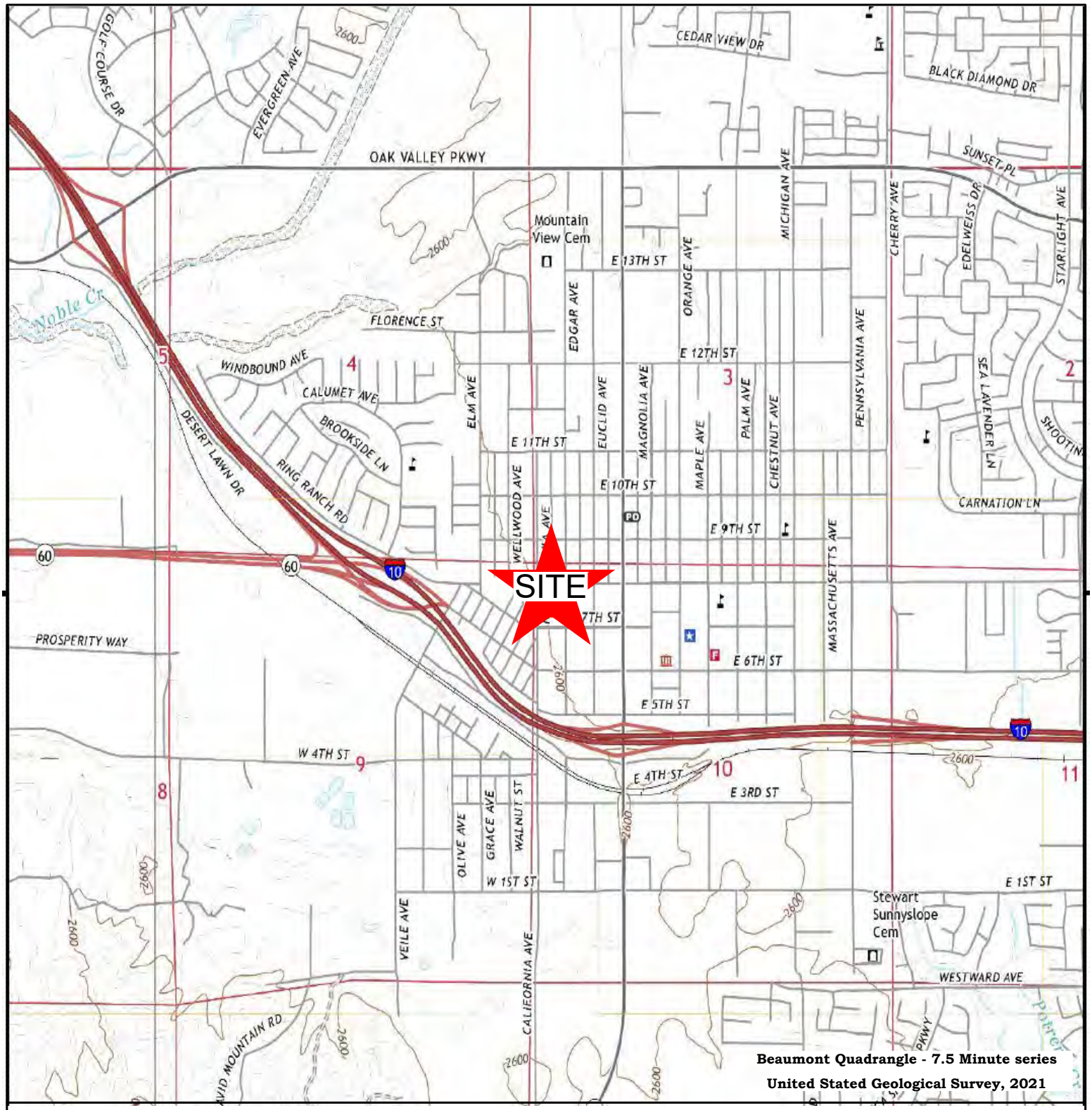
FIGURES



1500 0 1500 3000

(IN FEET)

N

UES

Site Vicinity Map

Beaumont Library Renovations & Expansions

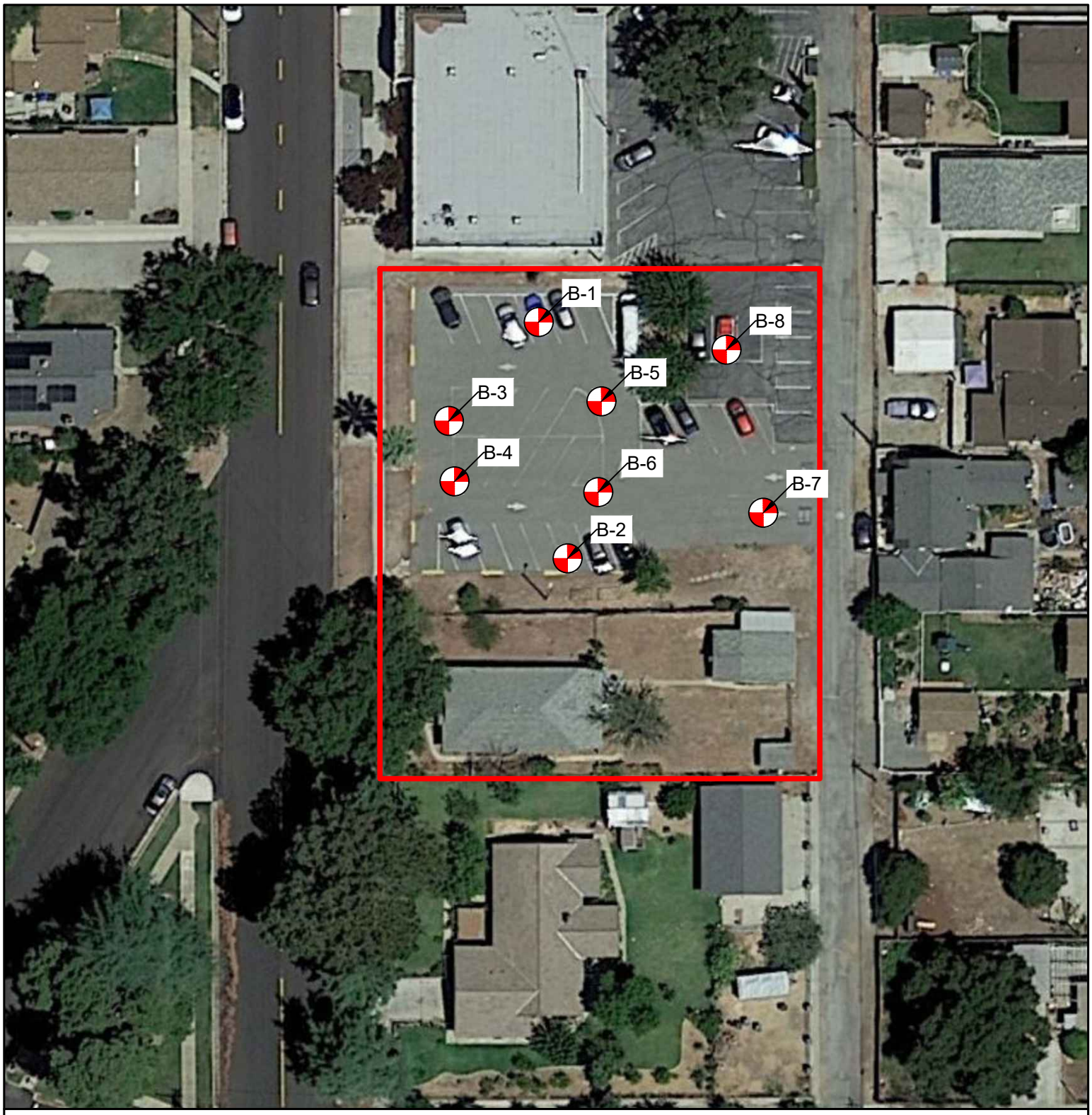
125 East 8th Street

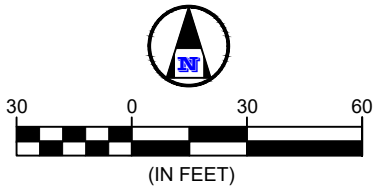
Beaumont, California

Date: 01-31-2024

Job No: 4230.2300029.0000

Figure 1





PROJECT BOUNDARY

BORING LOCATION

UES

Geologic Site Plan and Boring Location Plan

Beaumont Library Renovations & Expansions

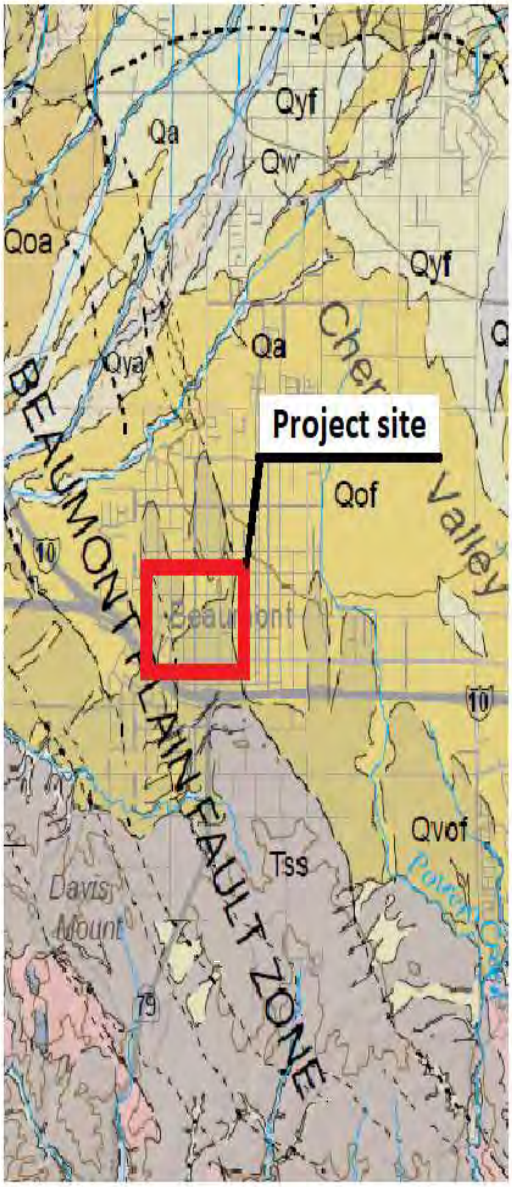
125 East 8th Street

Beaumont, California

Date:
02-01-2024

Job No:
4230.2300029.0000

Figure 2



Late Holocene (Surficial Deposits)

Qw — **Alluvial Wash Deposits** - unconsolidated sandy and gravelly sediment deposited in recently active channels of streams and rivers; may contain loose to moderately loose sand and silty sand

Qa — **Alluvial Valley Deposits** - unconsolidated clay, silt, sand, and gravel recently deposited parallel to localized stream valleys and/or spread more regionally onto alluvial flats of larger river valleys; sandy sediment generally more dominant than gravelly sediment

Holocene to Late Pleistocene (Surficial Deposits)

Qyf — **Young Alluvial Fan Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qya — **Young Alluvial Valley Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Late to Middle Pleistocene (Surficial Deposits)

Qof — **Old Alluvial Fan Deposits** - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qoa — **Old Alluvial Valley Deposits** - slightly to moderately consolidated, moderately dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Middle to Early Pleistocene (Surficial Deposits)

Qvof — **Very Old Alluvial Fan Deposits** - moderately to well-consolidated, highly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Tertiary (Bedrock)

Tss — **Coarse-grained Tertiary age formations** - primarily sandstone and conglomerate

Mesozoic and Older (Bedrock)

gr — **Granitic and other intrusive crystalline rocks of all ages**

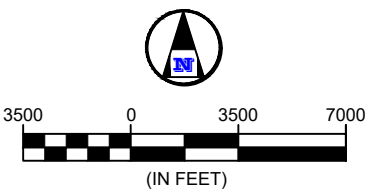
APPROXIMATE MEAN DECLINATION, 2012

Contact

Fault -- Includes strike-slip, normal, reverse, oblique, and unspecified slip

Stream

Road



Modified from Lancaster et al., 2012

Regional Geologic Map

Beaumont Library Renovations & Expansions

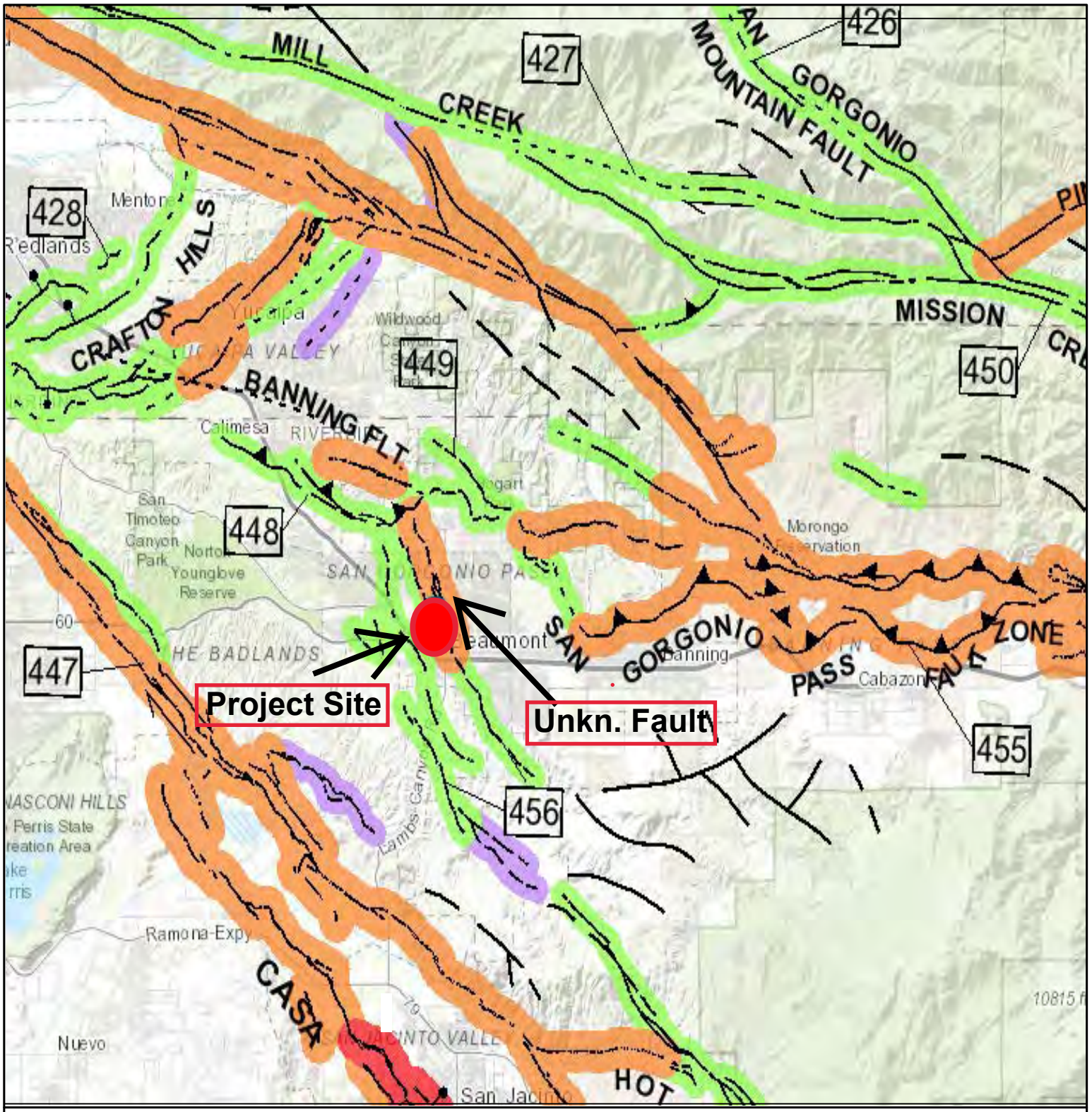
125 East 8th Street

Beaumont, California

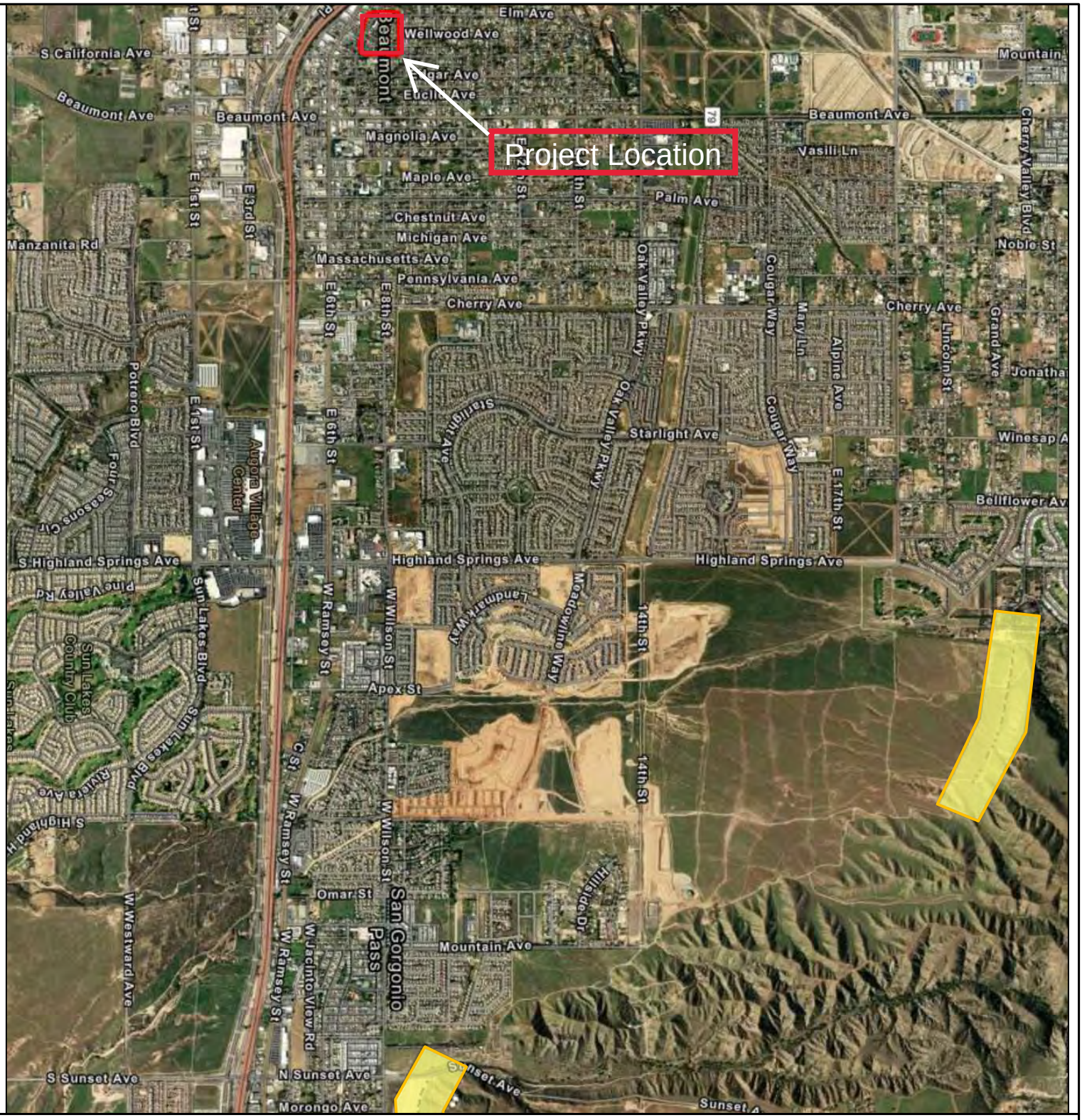
Date: 01-29-2024

Job No: 4230.2300029.0000

Figure 3



UES	Modified from Califorina Geologic Survey 2015 and Matti & Morton 1993	**Regional Faulting Map** **Beaumont Library Renovations & Expansions** **125 East 8th Street** **Beaumont, California**
		Date: 01-29-2024 **Job No:** 4230.2300029.0000 **Figure 4**



UES

Regional Seismic Hazards Zone Map

Beaumont Library Renovations & Expansions

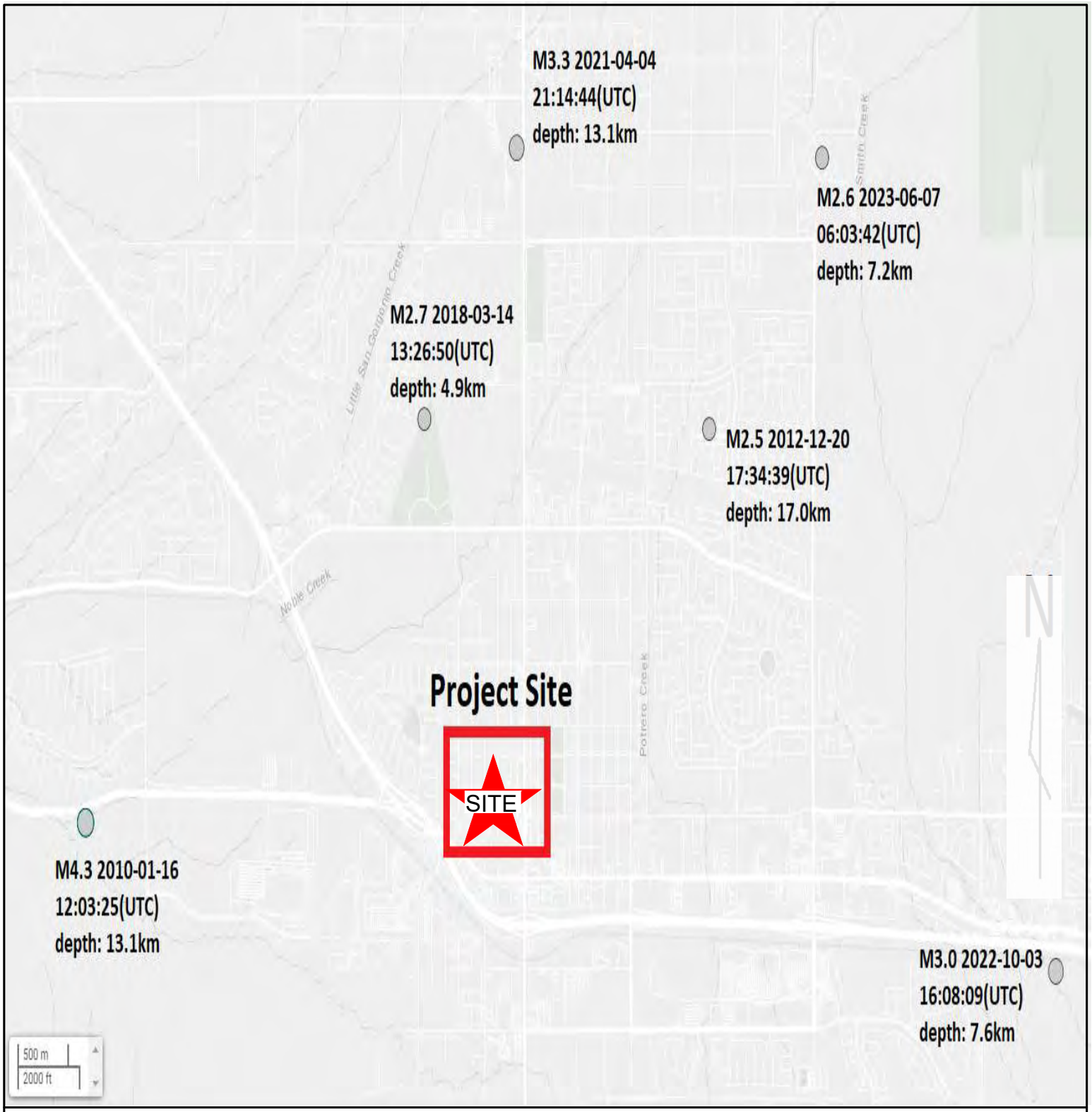
125 East 8th Street

Beaumont, California

Date:
02-01-2024

Job No:
4230.2300029.0000

Figure 5



UES

Seismic Activity Map

Beaumont Library Renovations & Expansions

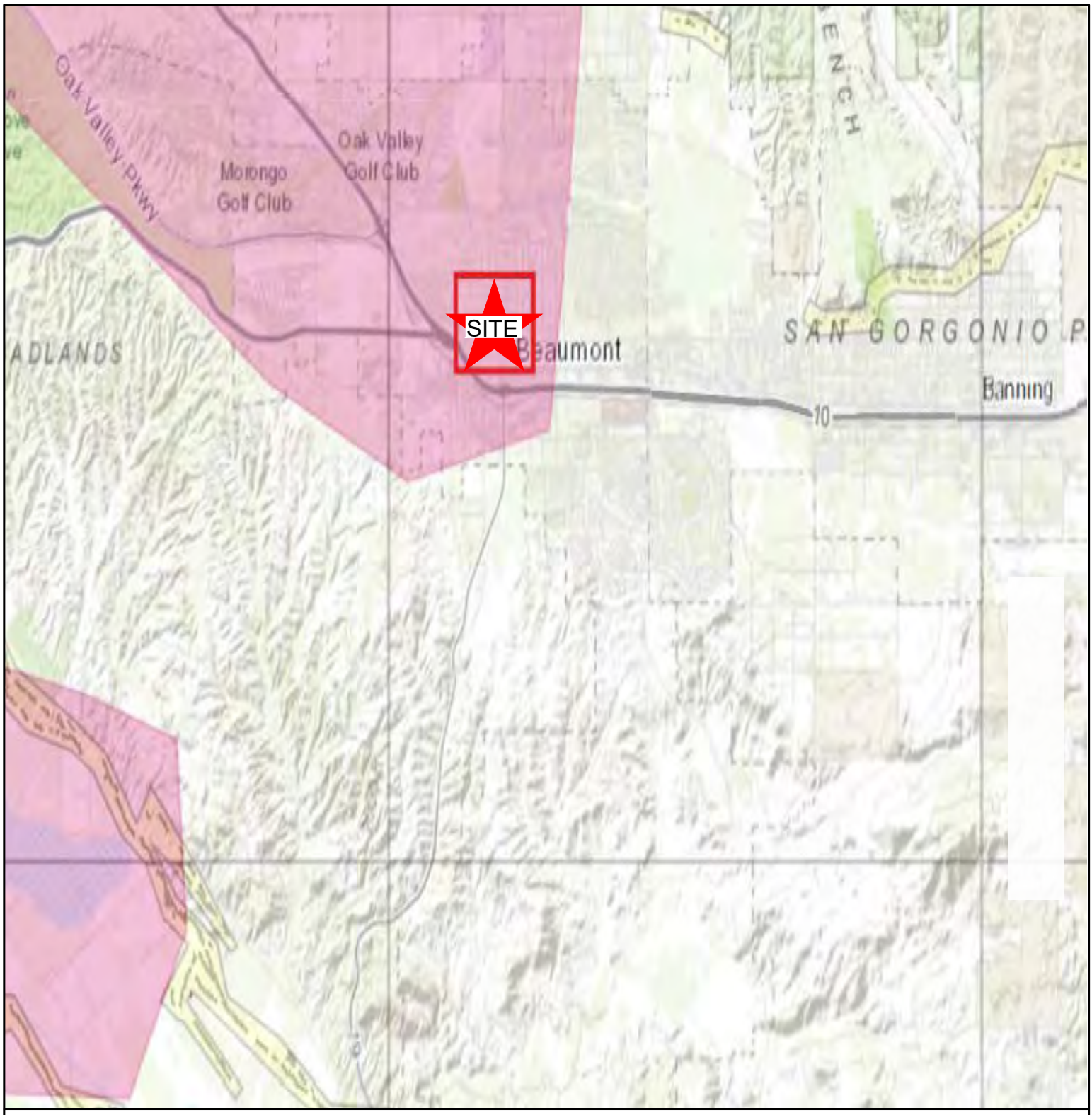
125 East 8th Street

Beaumont, California

Date: 01-31-2024

Job No: 4230.2300029.0000

Figure 6



LEGEND

Groundwater Pumping Cause of Subsidence

Alquist-Priolo Earthquake Fault Hazard Zone

3500 0 3500 7000

(IN FEET)

N

UES

Subsidence Map

Beaumont Library Renovations & Expansions

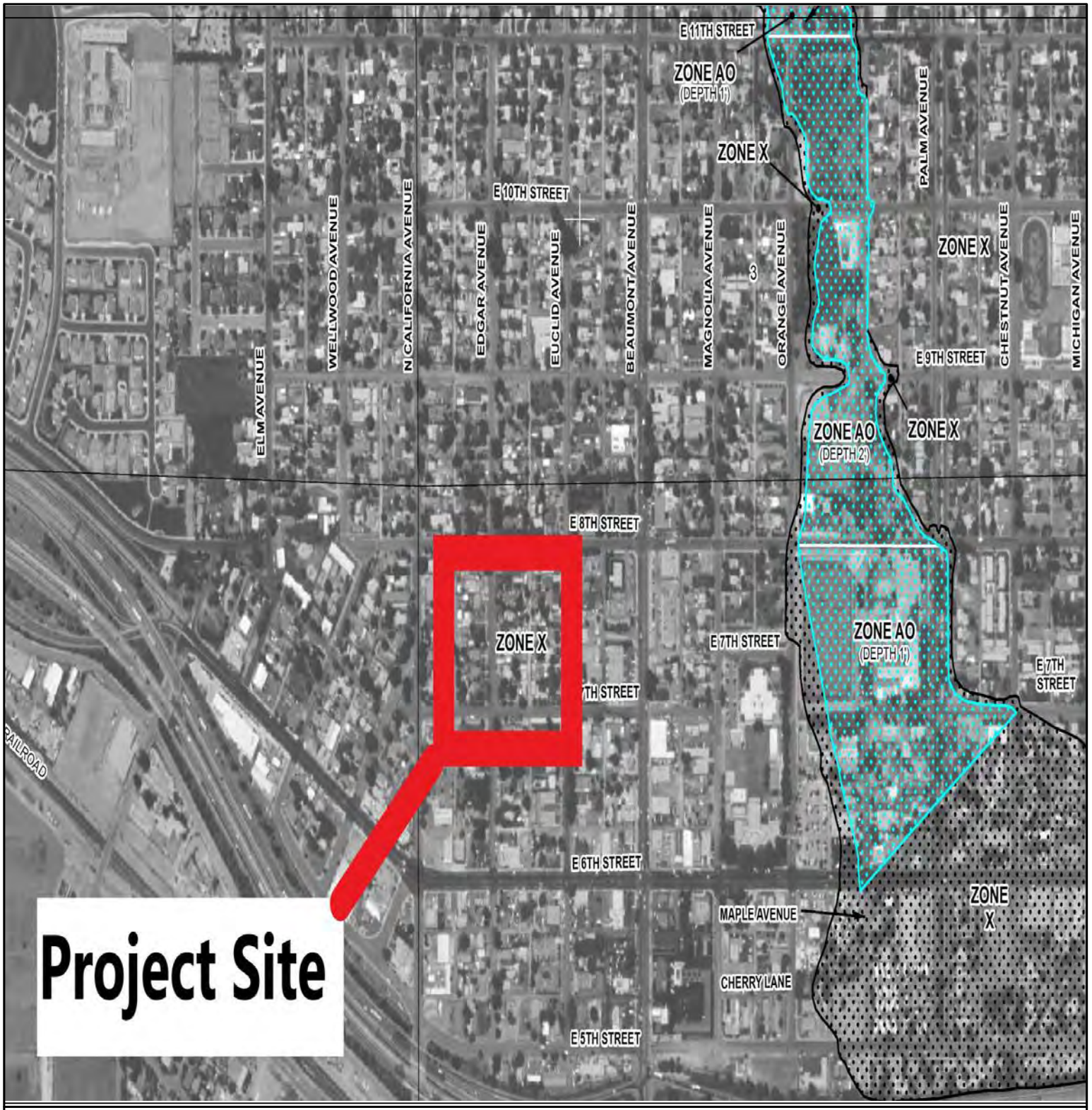
125 East 8th Street

Beaumont, California

Date: 02-01-2024

Job No: 4230.2300029.0000

Figure 7



UES

FEMA Flood Hazard Map Flood Zone X

Beaumont Library Renovations & Expansions

125 East 8th Street

Beaumont, California

Date:
01-29-2024

Job No:
4230.2300029.0000

Figure 8

APPENDIX A
Field Exploration and Boring Logs

Universal Engineering Sciences

BORING B-1

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2606 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0				SC	3" Asphalt, no base. moist (low), very fine-grained sand/silt red/brown color. low clay				2604
5	SPT 1	10-14-19 (33)		CL	@ 5 ft - Clay: dense, dry , F-m Sand Strng Brwn				2601
10	SPT 2	19-20-22 (42)		SC	@ 10 ft - Clayey Sand: F-m, trace coarse, DG (decomposed granite), fine gravel, dry Yell. brown color				2598
15	SPT 3	9-9-12 (21)		CL-ML	@ 15 ft - Silty Clay: Fine, dense, dry Yell. brown color				2595
20	SPT 4	6-7-10 (17)		ML	@ 20 ft - Silt: Fine, dry yell. brown color				2592
25	SPT 5	9-13-16 (29)		SM	@ 25 ft - Silty Sand: Fine, trace gravel, dry Brownish yell. color, some inclusions of weathered granitic rock				2589
30	SPT 6	15-18-22 (40)		SC	@ 30 ft - Clayey Sand: F-m, dense, dry Reddish yell. color				2586
35									2583
									2580
									2577
									2574

CLIENT Beaumont Library District **PROJECT NAME** Beaumont Library Renovations & Expansions

PROJECT NUMBER 4230.2300029.0000 **PROJECT LOCATION** 125 E 8th Street, Beaumont, Califorina 92223

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
35	SPT 7	14-16-16 (32)		SC	@ 35 ft - Clayey Sand: F- coarse, DG, gravel, dry Yell. brown color, increased inclusion of heavily weathered granitic rock				2568
40	SPT 8	15-18-19 (37)		ML	@ 40 ft - Silt: Fine, dry, soft Brown yell. color, very fine-grained material				2565
45	SPT 9	10-15-19 (34)		CL-ML	@ 45 ft - Silty Clay: Fine, dry Strong brown yell. color				2562
50	SPT 10	15-18-20 (38)		CL	@ 50 ft - Clay: Fine sand, firm, dense, dry Strong brwn color				2559
					- No Groundwater encountered - Backfilled with soil cuttings and cold-patched - Bottom of borehole at 52 ft				2556
									2553
									2550
									2547
									2544
									2541
									2538
									2535
									2532

GB MC SPT

Universal Engineering Sciences

BORING B-2

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2604 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0				SC	3" asphalt 1.5" of fill 0.5" of small-med concrete chunks. natural soils are rusty in color with some subangular rocks (1cm)				2601
5	SPT 1	7-8-8 (16)		SC	@ 5 ft - Clayey Sand: F-m, dense, dry Strong brwn color				2598
10	SPT 2	9-16-18 (34)		SC	@ 10 ft - Clayey Sand: Fine, (less Sand)				2595
15	SPT 3	6-7-9 (16)		SC-SM	@ 15 ft - Silty Clayey Sand: F - c, trace fine gravel, dry - moist Dark yell. brwm color				2592
20	SPT 4	6-8-8 (16)		SM	@ 20 ft - Silty Sand: Fine, moist Dark yell. brwn color				2589
25	SPT 5	9-16-18 (34)		SC-SM	@ 25 ft - Clayey Sand: F - m, dense, trace fine gravel, DG, dry Yell. red color, subangular gravel chunks, med - c sand				2586
30	SPT 6	10-14-16 (30)		SC	@ 30 ft - Clayey Sand: F - m, gravel, soft - med. dense, dry / Yell. brwn color				2583
					- No Groundwater encountered & Backfilled with soil cuttings and cold-patched - Bottom of borehole at 32 ft				2580
									2577
									2574
									2571

Universal Engineering Sciences

BORING B-3

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2603 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0					@ 0 -5 ft BULK: Strng brwn Clayey Sand 3" asphalt 0" base				2601
5	GB B-3			SC					2598
	MC 1	10-19-24 (43)		SC	@ 5 ft - Clayey Sand: f - m, dense, dry Strng brwn color				2595
10	MC 2	15-24-27 (51)		SC-SM	@ 10 ft - Clayey Sand: f - m, dense , dry trace silt Strng brown in color				2592
15	MC 3	15-21-24 (45)		SM	@ 15 ft - Silty Sand: f - coarse, trace clay, trace fine gravlel, dry Yell. brown color				2589
					- No Groundwater encountered - Backfilled with soil cuttings and cold-patched - Bottom of borehole at 16.5 ft				2586
									2583
									2580
									2577
									2574
									2571

Universal Engineering Sciences

BORING B-4

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2602 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0				SC	3" asphalt. Fill until 2'6"				2601
5	SPT 1	6-8-12 (20)		SC	@ 5 ft - Clayey Sand: Fine, dense, dry Strng brwn color, some subangular coarse material				2598
10	SPT 2	10-19-29 (48)		CL	@ 10 ft - Clay: F - m, firm, moist				2595
15	SPT 3	10-12-14 (26)		CL-ML	@ 15 ft - Silty Clay: Fine, moist Yell. brwn color				2592
					- No Groundwater encountered - Backfilled with soil cuttings and cold-patched - Bottom of borehole at 16.5 ft				2589
									2586
									2583
									2580
									2577
									2574
									2571
									2568

Universal Engineering Sciences

BORING B-5

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2606 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0				SC	3" asphalt 2' of hand augering to reach native soil before drilling Red brwn color				2604
5	SPT 1	12-14-16 (30)		SC	@ 5 ft - Clayey Sand: Fine, dense, dry Dark yell. brown color				2601
10	SPT 2	9-12-15 (27)		SC	@ 10 ft - same as 5 ft some coarse material made up from heavily weathered granite				2598
15	SPT 3	10-15-17 (32)		SC	@ 15 ft - Clayey Sand: F - m, fine gravel, dry - moist Yell. brwn color				2595
					- No Groundwater encountered - Backfilled with soil cuttings and cold-patched - Bottom of borehole at 16.5 ft				2592
									2589
									2586
									2583
									2580
									2577
									2574

Universal Engineering Sciences

BORING B-6

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2604 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0									
5	GB B-6			SC	@ 0-5 ft BULK - Clayey Sand: dry 3" asphalt 1'6" fill. dry with resistance to hand augering Strng brwn color				2601
10	MC	19-24-33 (57)		CL	@ 5 ft - Clay: Fine, dense, firm, moist Strng brwn color - low clay content, but enough to form clods				2598 2595
15	MC	25-29-25 (54)		CL	@ 10 ft - Clay: Fine, dense, firm Yell. brwn color - less clay				2592
	MC	12-18-22 (40)		ML	@ 15 ft - Silt: med., dense, dry Olive yell. color, no clay, but a lot of fines. silt, med-grained sand, dry				2589
					- No Groundwater encountered - Backfilled with soil cuttings and cold-patched - Bottom of borehole at 16.5 ft				2586 2583 2580 2577 2574 2571

Universal Engineering Sciences

BORING B-7

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2604 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0				CL	3" asphalt 1'6" of fill.				2601
5	SPT 1	8-12-15 (27)		CL	@ 5 ft - Clay: fine, dense, firm, Dark brwn color - low clay content, med-coarse grained sand w/ silt (fines)				2598
10	SPT 2	15-25-45 (70)		CL	@ 10 ft - Clay: Fine, dense Dark yell. brwn - sparse larger rocks.				2595
15	SPT 3	6-7-11 (18)		ML	@ 15 ft - Silt: Fine, soft, moist Yell. brwn				2592
					- No Groundwater encountered				2589
					- Backfilled with soil cuttings and cold-patched				2586
					- Bottom of borehole at 16.5 ft				2583
									2580
									2577
									2574
									2571

Universal Engineering Sciences

BORING B-8

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th Street, Beaumont, Califorina 92223
DATE STARTED 12/29/23 **COMPLETED** 12/29/23
GROUND ELEVATION 2607 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR 24/7 Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA 8"
AT TIME OF DRILLING ---
LOGGED BY RN **CHECKED BY** DS
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNTS blows/6" (bpf)	GRAPHIC LOG	USCS	Material Description (GB / MC / SPT)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	NOTES	Elevation (ft)
0									
5	GB B-8			SC	@ 0-5 ft BULK - Clayey Sand 3" asphalt. Dark yell. brown to Strng brwn colors - some larger subangular grains (1cm)				2604
10	MC 1	10-15-17 (32)		SC	@ 5 ft - Clayey Sand: F - m, dense, moist Strng brwn coor - Some clay content present in the spoils (trace clay)				2601 2598
15	MC 2	13-19-27 (46)		CL	@ 10 ft - Clay: Fine, trace coarse sand, dense, moist Strng brwn color				2595
	MC 3	10-13-17 (30)		SM	@ 15 ft - Silty Sand: F - m, trace coarse, DG, moist Dark yell. brwn color				2592
					- No Groundwater encountered - Backfilled with soil cuttings and cold-patched - Bottom of borehole at 16.5 ft				2589 2586 2583 2580 2577 2574

APPENDIX B
Laboratory Testing

Universal Engineering Sciences
16 Technology Dr, Ste 139
Irvine, CA. 92618
Telephone: 949-537-3222

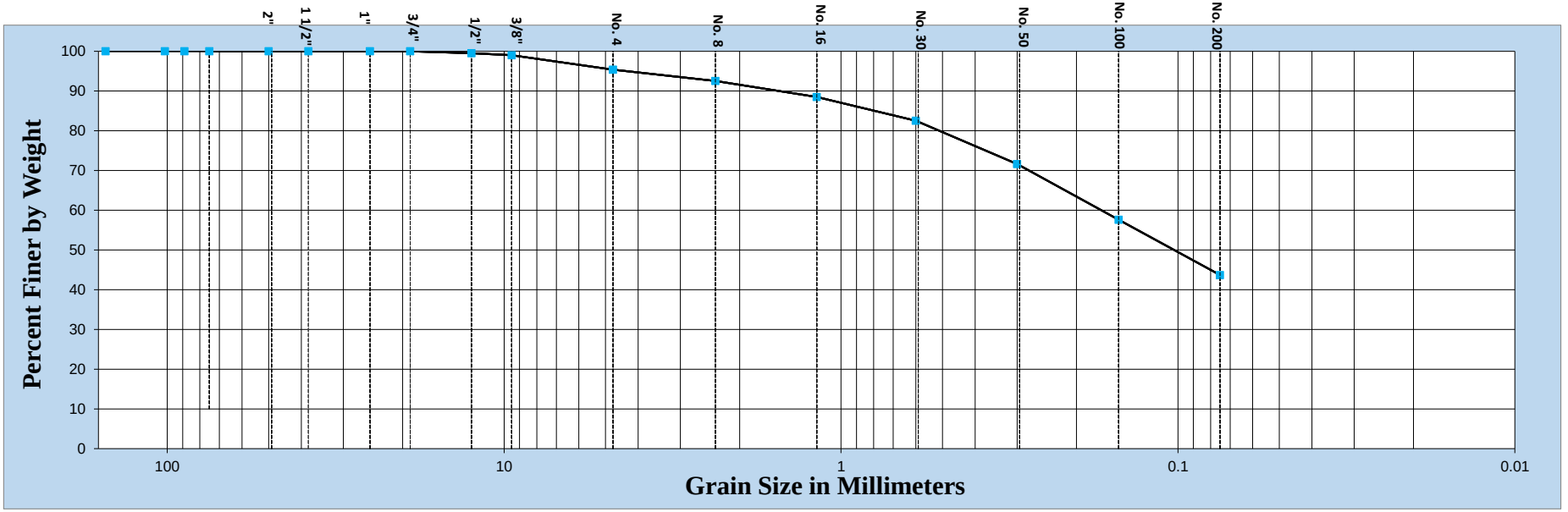
SUMMARY OF LABORATORY RESULTS

CLIENT Beaumont Library District
PROJECT NAME Beaumont Library Renovations & Expansions
PROJECT NUMBER 4230.2300029.0000
PROJECT LOCATION 125 E 8th St., Beaumont, CA 92223

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size(mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
B-1	5.0						SC	8.5			
B-1	10.0						CL	3.4			
B-1	15.0						SC	5.5			
B-1	20.0						CL-ML	5.7			
B-1	25.0						ML	3.2			
B-1	30.0						SM	7.0			
B-1	35.0						SC	5.0			
B-1	40.0						ML	9.3			
B-1	45.0						CL-ML	8.6			
B-1	50.0						CL	8.7			
B-2	5.0						SC	8.3			
B-2	10.0						SC	12.6			
B-2	15.0						SC-SM	7.1			
B-2	20.0						SM	7.9			
B-2	25.0						SC-SM	12.5			
B-2	30.0						SC	3.7			
B-3 BULK	0-5.0	24	15	9	12.7	43.7	SC	6.8			
B-3	5.0						SC	8.9	111.9		
B-3	10.0						SC-SM	7.3	119.5		
B-3	15.0						SM	3.6	112.2		
B-4	5.0						SC	9.0			
B-4	10.0						CL	10.2			
B-4	15.0						CL-ML	8.6			
B-5	5.0						SC	9.0			
B-5	10.0							9.0			
B-5	15.0							6.3			
B-6 BULK	0-5.0						SC	5.9			
B-6	5.0						CL	9.7	122.7		
B-6	10.0						CL	11.3	119.3		
B-6	15.0						ML	6.7	112.5		
B-7	5.0						CL	7.9			
B-7	10.0						CL	10.0			
B-7	15.0						ML	12.1			
B-8 BULK	0-5.0						SC	6.2			
B-8	5.0						SC	13.2	116.5		
B-8	10.0						CL	14.3	119.2		
B-8	15.0						SM	6.2	117.1		

Grain Size Distribution Curve and Classification Data

Job Number:	4230.2300029.0000	Sample ID:	B-3 BULK @ 0-5 ft.
Client:	Beaumont Library District	Date Received:	1/8/2024
Project Name:	Beaumont Library Renovations & Expansions	Sampled By:	BK
		Date Sampled:	12/29/2023
Material Source:	Boring 3	Tested By:	SE
Sample Location:	B-3 BULK @ 0-5 ft.	Test Method:	C136/D422



Sieve:	6"	4"	3 1/2"	3"	2.5"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#10	#16	#30	#40	#50	#100	#200
Percent Passing:										100	99	95	93	92	89	83	78	72	58	43.7

% Gravel:	4.6
% Sand:	51.7
% Silt & Clay:	43.7

Soil Classification: *Strong Brown Clayey Sand (SC)*

Reviewed by: SE

Date Reviewed: 1.14.24

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Expansion Index of Soils - D4829

Project Name:	**Beaumont Library Renovations & Expansions**	Date Sampled:	12/16/2023
Project No.:	**4230.2300029.0000**	Sampled By:	BK/DS
Boring No.:	B-2	Date Tested:	1/17/2024
Sample No.:	B-2 SPT Composite	Tested By:	SE
Depth (ft.):	5-10		
Sample Prep.:	Dry		
Description:	Strong Brown Clayey Sand (SC)		

Dry Weight of Soil + Cont. (g) *(M_t)*	950.1
Dry Weight of Soil (g)	950.1
Weight Soil Retained on #4 *(M_{cf})*	61.1
Percent Soil Retained on #4 *(M_{cf})*	6.4
Weight of Soil Passing *(M_p)*	889.0
Sieve Percent Passing #4	93.6%

MOLDED SPECIMEN	Before Test	AFTER TEST
Specimen Diameter (in.)	4.00	
Specimen Height (in.) *(H_i)*	1.00	
Wt. Comp. Soil + Ring (g) *(M_{sr})*	796.63	
Wt. of Ring (g)	370.60	
Specific Gravity (Assumed)	2.70	
Ring Factor	0.3014	
Wet Wt. of Soil + Cont. (g)	134.01	
Dry Wt. of Soil + Cont. (g)	124.11	
Wt. of Container (g)	0.00	
Water Content (%) *(w)*	8.0	17.9
Wet Density (pcf)	128.4	
Dry Density (pcf)	118.9	
Degree of Saturation (%) [S meas]	51.7	

SPECIMEN INUNDATION in distilled water for the period of 24h or expansion rate < 0.0002 in./h

Date	Time	Pressure (kPa)	Elapsed Time (min.)	Dial Reading
1/17/2024	0700	6.9	0	0.000
1/17/2024	0710	6.9	10	0.000
1/18/2024	0700	6.9	1440	0.0222

	22	**LOW**

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Expansion Index of Soils - D4829

Project Name:	**Beaumont Library Renovations & Expansions**	Date Sampled:	12/16/2023
Project No.:	**4230.2300029.0000**	Sampled By:	BK/DS
Boring No.:	B-8	Date Tested:	1/17/2024
Sample No.:	B-8 Bulk	Tested By:	SE
Depth (ft.):	0-5		
Sample Prep.:	Dry		
Description:	Strong Brown Clayey Sand (SC)		

Dry Weight of Soil + Cont. (g) *(M_t)*	13693.7
Dry Weight of Soil (g)	13693.7
Weight Soil Retained on #4 *(M_{cf})*	226.7
Percent Soil Retained on #4 *(M_{cf})*	1.7
Weight of Soil Passing *(M_p)*	13467.0
Sieve Percent Passing #4	98.3%

MOLDED SPECIMEN	Before Test	AFTER TEST
Specimen Diameter (in.)	4.00	
Specimen Height (in.) *(H_i)*	1.00	
Wt. Comp. Soil + Ring (g) *(M_{sr})*	798.41	
Wt. of Ring (g)	368.50	
Specific Gravity (Assumed)	2.70	
Ring Factor	0.3014	
Wet Wt. of Soil + Cont. (g)	124.20	
Dry Wt. of Soil + Cont. (g)	115.31	
Wt. of Container (g)	0.00	
Water Content (%) *(w)*	7.7	15.9
Wet Density (pcf)	129.6	
Dry Density (pcf)	120.3	
Degree of Saturation (%) [S meas]	52.0	

SPECIMEN INUNDATION in distilled water for the period of 24h or expansion rate < 0.0002 in./h

Date	Time	Pressure (kPa)	Elapsed Time (min.)	Dial Reading
1/17/2024	0700	6.9	0	0.000
1/17/2024	0710	6.9	10	0.000
1/18/2024	0700	6.9	1440	0.0111
			11	**VERY LOW**

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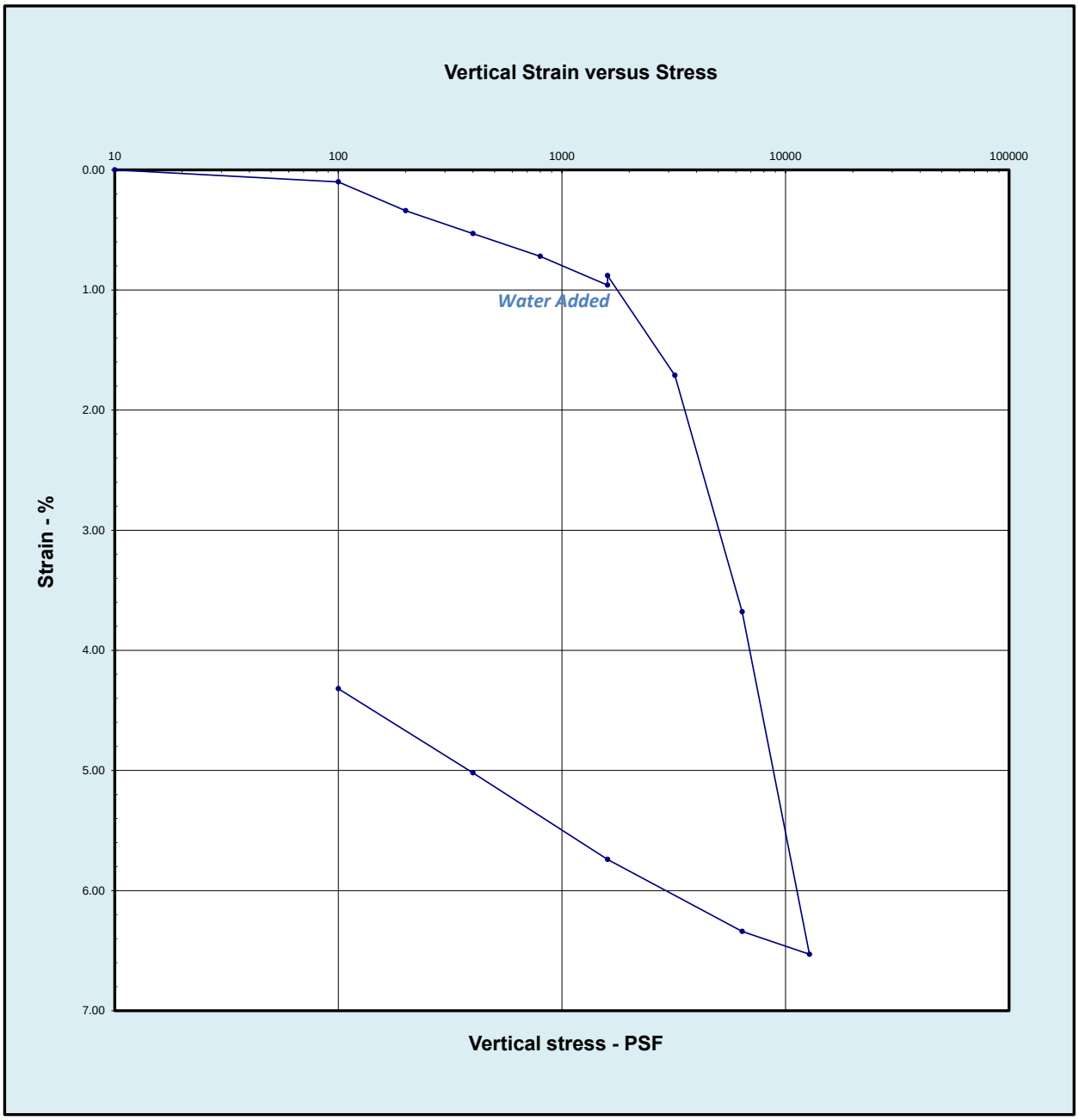
One Dimensional Consolidation

Job Number:	4230.2300029.0000
Client:	Beaumont Library District
Project Name:	Beaumont Library Renovations & Expansions
Permit Number:	---
Material Source	Boring 3
Sample Location:	B-3 @ 5 ft.

Sample ID	B-3 @ 5 ft.
Date Received	1/8/2024
Sampled By:	BK
Date Sampled:	12/29/2023
Tested By:	SE
Test Method and Procedure	D2435



Soil Classification	Strong Brown Clayey Sand (SC)
Dry Density	111.1 pcf
% Moisture	8.9%
Final % Moisture	18.1%

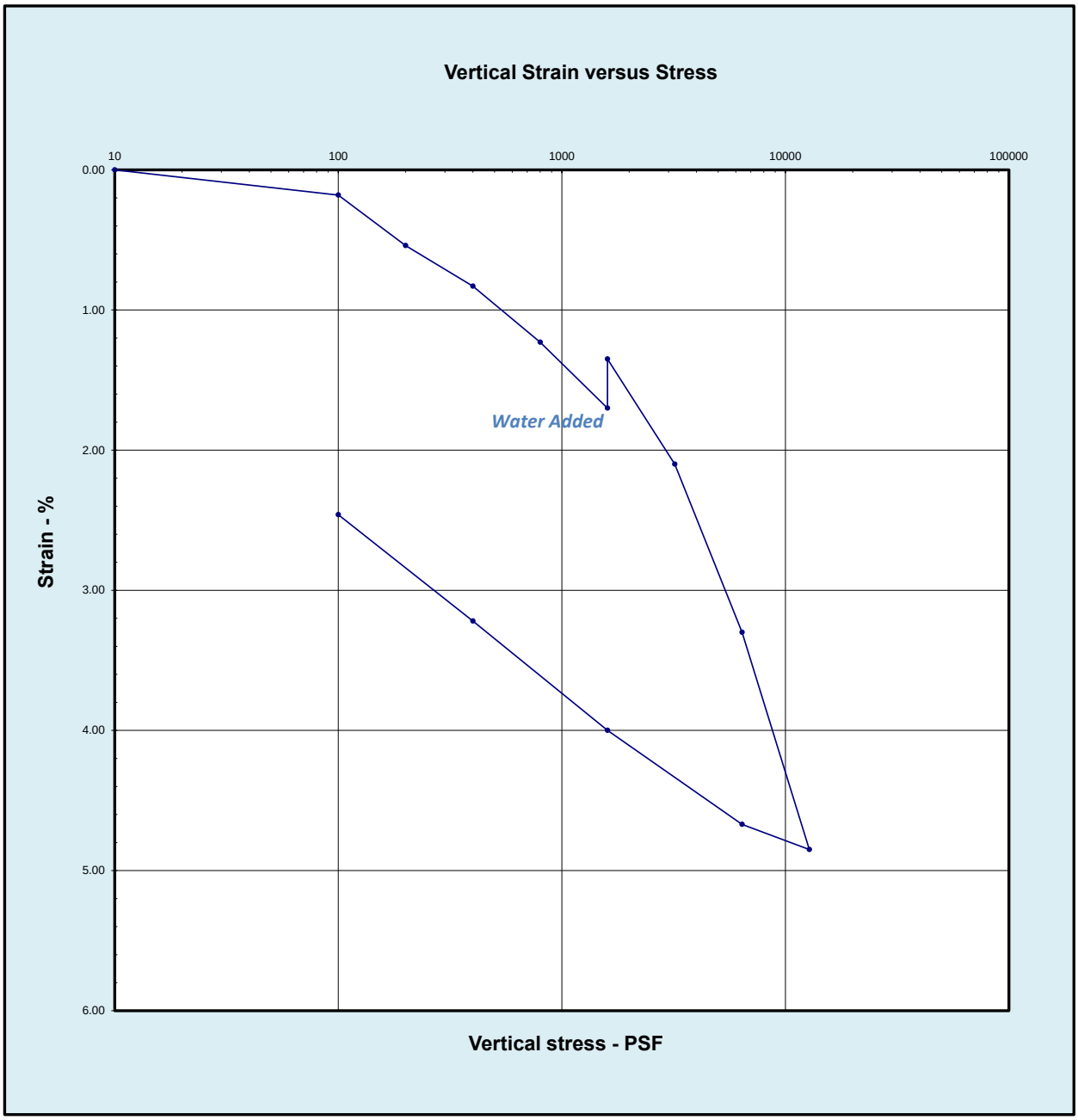
Reviewed by: SE

Date Reviewed: 1/17/2024

One Dimensional Consolidation

Job Number:	4230.2300029.0000
Client:	Beaumont Library District
Project Name:	Beaumont Library Renovations & Expansions
Permit Number:	---
Material Source	Boring 8
Sample Location:	B-8 @ 5 ft.

Sample ID	B-8 @ 5 ft.
Date Received	1/8/2024
Sampled By:	BK
Date Sampled:	12/29/2023
Tested By:	SE
Test Method and Procedure	D2435



Soil Classification	Strong Brown Clayey Sand (SC)
Dry Density	118.1 pcf
% Moisture	13.2%
Final % Moisture	17.4%

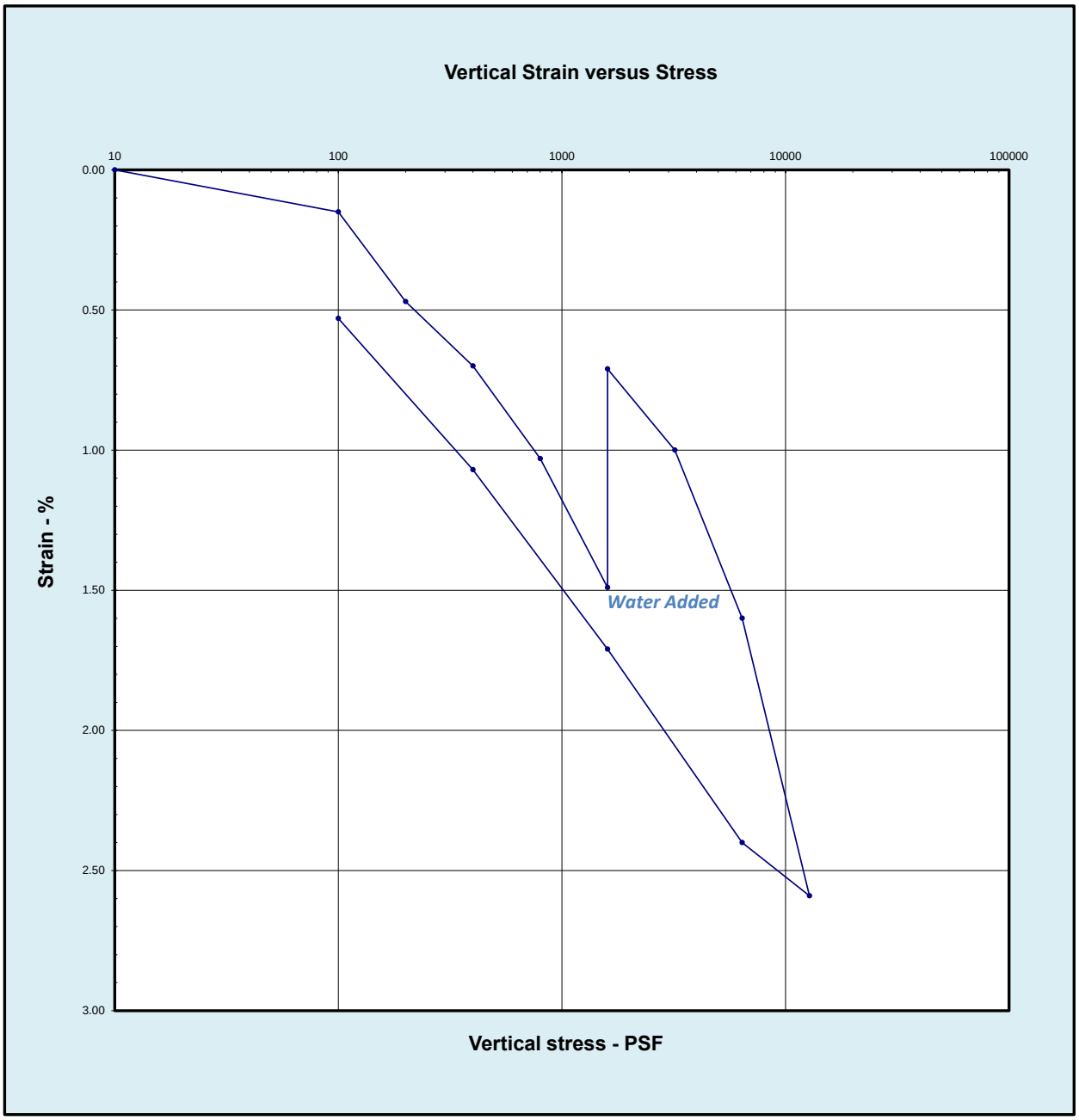
Reviewed by: SE

Date Reviewed: 1/17/2024

One Dimensional Consolidation

Job Number:	4230.2300029.0000
Client:	Beaumont Library District
Project Name:	Beaumont Library Renovations & Expansions
Permit Number:	---
Material Source	Boring 8
Sample Location:	B-8 @ 10 ft.

Sample ID	B-8 @ 10 ft.
Date Received	1/8/2024
Sampled By:	BK
Date Sampled:	12/29/2023
Tested By:	SE
Test Method and Procedure	D2435



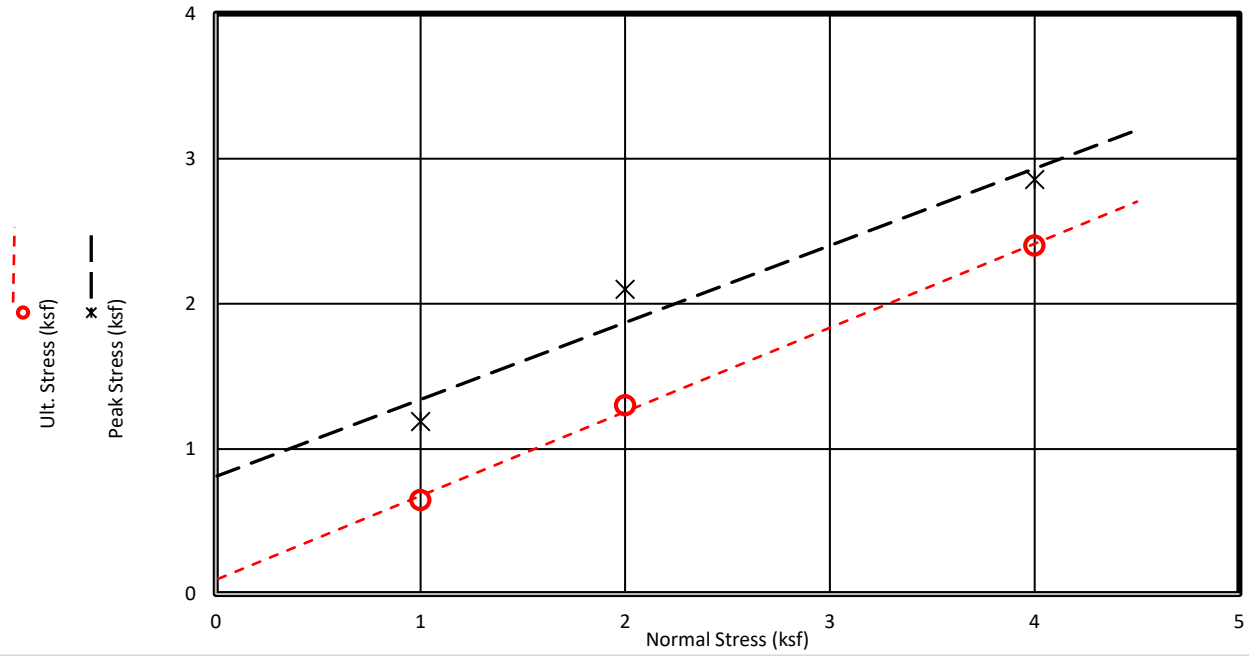
Soil Classification	Strong Brown Sandy Lean Clay (CL)
Dry Density	116.1 pcf
% Moisture	14.3%
Final % Moisture	17.4%

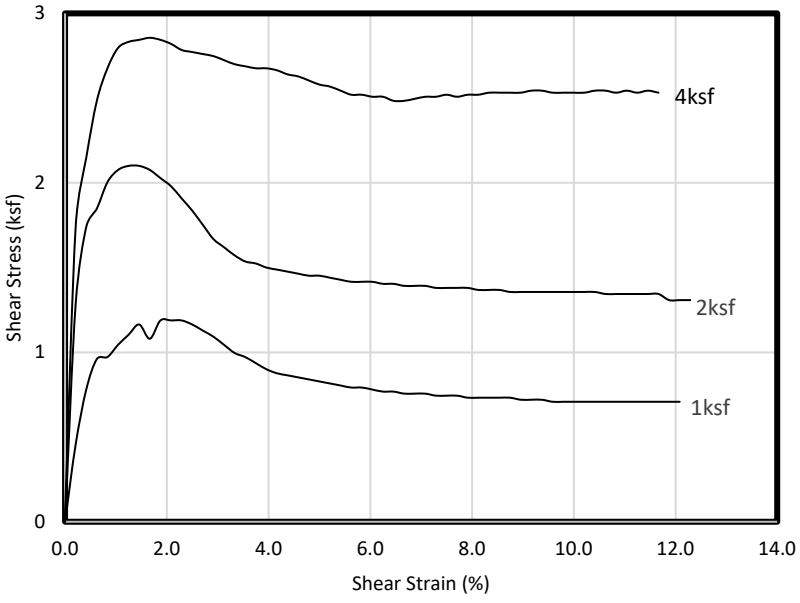
Reviewed by: SE

Date Reviewed: 1/17/2024

Direct Shear Test Results
ASTM D3080

Client:	Beaumont Library District	**Sampled By:**	BK	**Date:**	12/29/2023
Project Name:	Beaumont Library Renovations & Expansions	**Tested By:**	SE	**Date:**	1/15/2024
Project No:	4230.2300029.0000	**Checked By:**	SE	**Date:**	1/17/2024
Boring No.:	**B-8**				
Sample No.:	**Ring** **Depth (ft):** **5**	**Test Condition:**	Undisturbed/Saturated		
Sample Description:	Strong Brown Clayey Sand (SC)	**Sample Type:**	Ring		





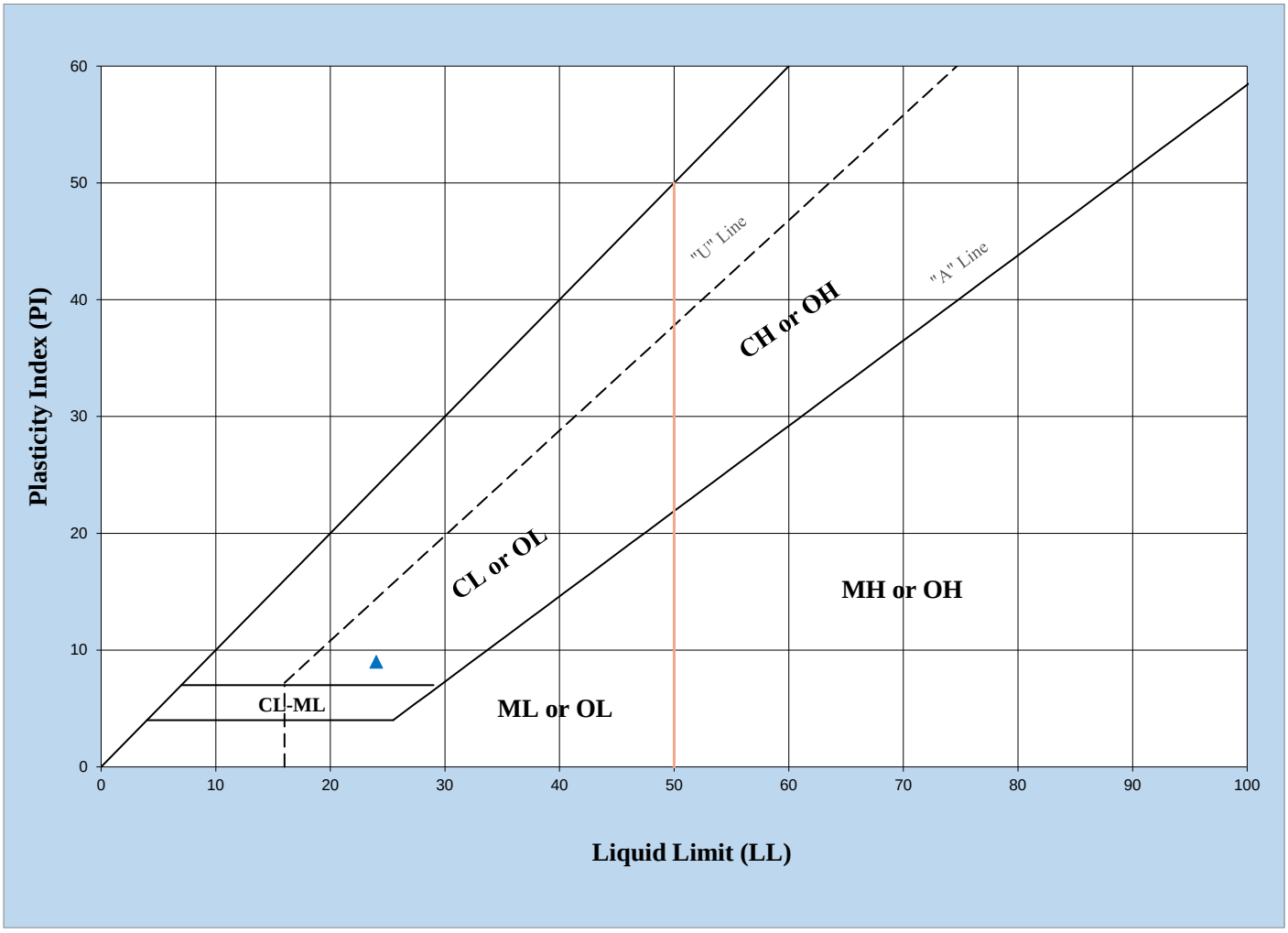
	Sample No.	1	2	3
Initial	Water Content (%)	13.2	13.2	13.2
	Dry Density (pcf)	122.8	118.1	118.0
	Saturation (%)	83.8	74.4	74.3
	Void Ratio	0.45	0.51	0.51
After Test	Water Content (%)	15.0	16.5	15.4
	Dry Density (pcf)			
	Saturation (%)	99.4	98.7	94.9
	Void Ratio	0.43	0.48	0.46
	Normal Stress (ksf)	**1**	**2**	**4**
	Peak Stress (ksf)	1.19	2.10	2.86
	Ult. Stress (ksf)	0.65	1.30	2.40
	Strain rate (in/min)	0.0010	0.0010	0.0010

	Peak	Ult.
C, (psf)	**810**	**100**
φ (degrees)	**27.9**	**30.1**

Atterberg Limits:
Liquid Limit, Plastic Limit, and Plasticity Index

Job Number:	4230.2300029.0000
Client:	Beaumont Library District
Project Name:	Beaumont Library Renovations & Expansions
Material Source:	Boring 3
Sample Location:	B-3 Bulk @ 0-5 ft.

Sample ID:	B-3 Bulk @ 0-5 ft.
Date Received:	1/8/2024
Sampled By:	BK
Date Sampled:	12/29/2023
Tested By:	SE
Test Method:	D4318



▲ Sample Point

LL: 24 PL: 15 PI: 9

Soil Classification

Strong Brown Clayey Sand (SC)		
Specimen Characteristics	**Specimen Preparation**	**Specimen Selection Process**
dry, fine-med, trace Fine Gravel	Dry (air-dried)	N/A

Reviewed By: SE

Date Reviewed: 1/14/24

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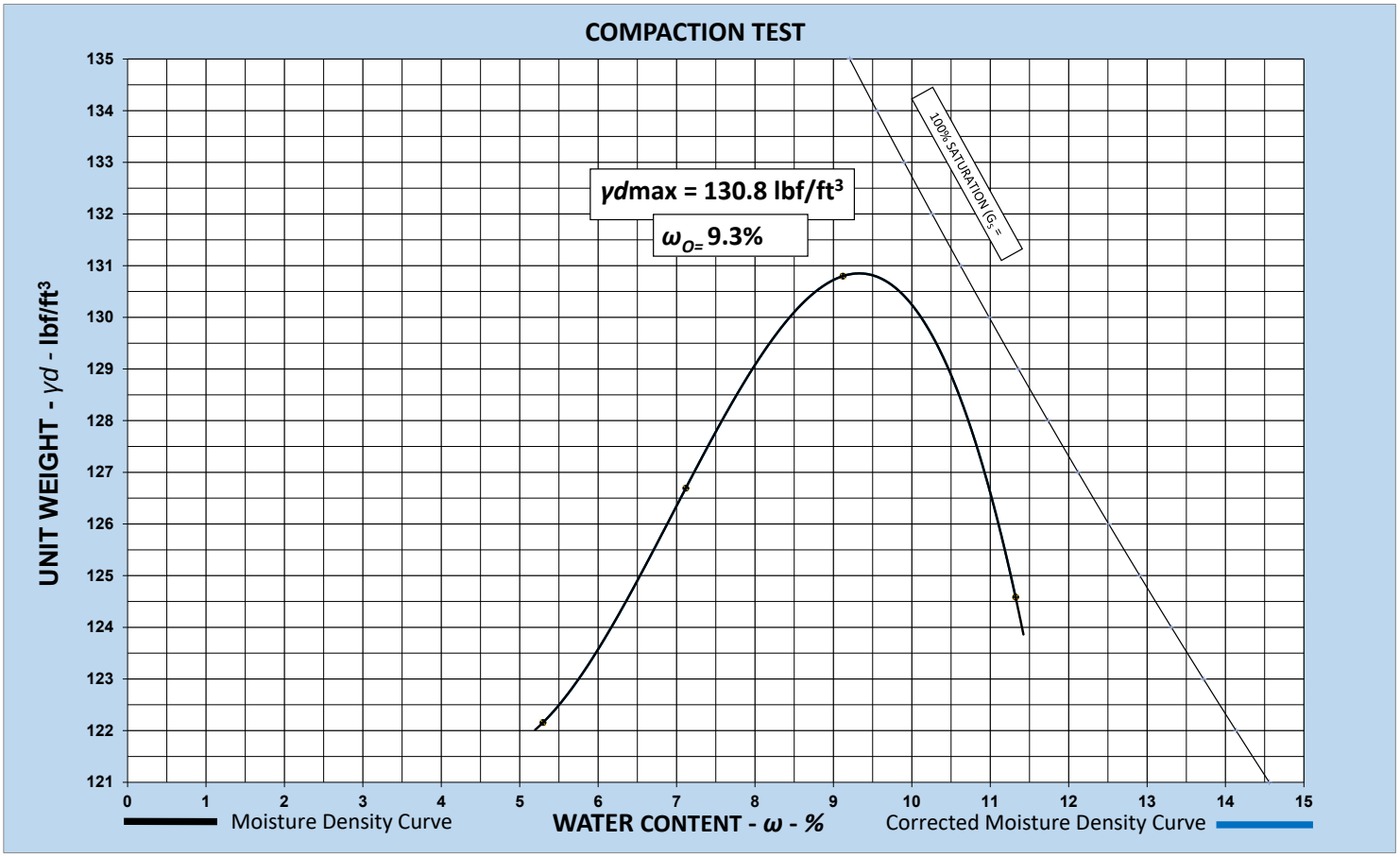
Laboratory Compaction Characteristics of Soil Using Modified Effort

Job Number:	4230.2300029.0000
Client:	Beaumont Library District
Project Name:	Beaumont Library Renovations & Expansions
Material Source:	Boring 8
Sample Location:	B-8 Bulk
Depth:	0-5'
Sample ID:	B-8 Bulk @ 0-5'

Date Received:	1/8/2024
Sampled By:	BK
Date Sampled:	12/29/2023
Tested By:	SE
Test Method:	ASTM D1557
Procedure:	A
Preparation Method:	Moist
Type of Rammer:	Mechanical



Maximum Dry Unit Weight	130.8 pcf
Optimum Water Content	9.3 %

Specific Gravity Used For Zero Air Voids Curve	2.70
Sieve Used	No. 4

% Fraction Retained	1.7
% Fraction Passing	98.3

USCS Description: Strong Brown Clayey Sand (SC)

Reviewed by: SE

Date Reviewed: 1/21/2024

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• ANALYSIS
• DESIGN

LaBelle • Marvin
PROFESSIONAL PAVEMENT ENGINEERING
A CALIFORNIA CORPORATION

• SOILS, ASPHALT TECHNOLOGY

January 16, 2024

Mr. Sean Emami
Universal Engineering Sciences
16 Technology Drive, Suite 139
Irvine, California 92618

Project No. 49748

Attention: Sean Emami
Testing of the bulk soil sample delivered to our laboratory on 1/10/2024 has been completed.

Reference:	**4230.2300019.0000**
Project:	**Beaumont Library Renovations & Expansions**
Sample:	**B-3 @ 0'-5', Bulk, 12/29/2023**

Data sheets are attached for your use and file. Any untested portion of the sample will be retained for a period of 60 days prior to disposal. The opportunity to be of service is sincerely appreciated and should you have any questions, kindly call.

Very truly yours,

Steven R. Marvin
RCE 30659

SRM:tw
Enclosure

2700 S. GRAND AVENUE • SANTA ANA, CA 92705-5404 • (714) 546-3468 • FAX (714) 546-5841
INFO@LABELLEMARVIN.COM

R - VALUE DATA SHEET

LaBelle Marvin

PROJECT No. 49748

DATE: 1/16/2024

BORING NO. B-3 @ 0'-5', Bulk, 12/29/2023

Beaumont Library Renovations & Expansions

P.N. 4230.2300019.0000

SAMPLE DESCRIPTION: Brown Silty Sand

R-VALUE TESTING DATA | CA TEST 301

	SPECIMEN ID		
	a	b	c
Mold ID Number	1	2	3
Water added, grams	60	41	34
Initial Test Water, %	13.2	11.3	10.6
Compact Gage Pressure,psi	40	185	300
Exudation Pressure, psi	200	473	582
Height Sample, Inches	2.62	2.51	2.46
Gross Weight Mold, grams	3114	3088	3090
Tare Weight Mold, grams	1949	1942	1952
Sample Wet Weight, grams	1165	1146	1138
Expansion, Inches x 10exp-4	0	5	55
Stability 2,000 lbs (160psi)	47 / 105	26 / 52	19 / 41
Turns Displacement	5.33	4.34	3.99
R-Value Uncorrected	20	54	65
R-Value Corrected	22	54	65
Dry Density, pcf	119.1	124.3	126.7

DESIGN CALCULATION DATA

Traffic Index	Assumed:	4.0	4.0	4.0
G.E. by Stability		0.80	0.47	0.36
G. E. by Expansion		0.00	0.17	1.83

Equilibrium R-Value	**34** by EXUDATION	Examined & Checked: 1 /16/ 24
REMARKS:	Gf = 1.25 0.0% Retained on the 3/4" Sieve.	REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN No. 30659 CIVIL STATE OF CALIFORNIA Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

LaBelle Marvin

R-VALUE GRAPHICAL PRESENTATION

PROJECT NO. 49748

DATE: 1 /16/ 24

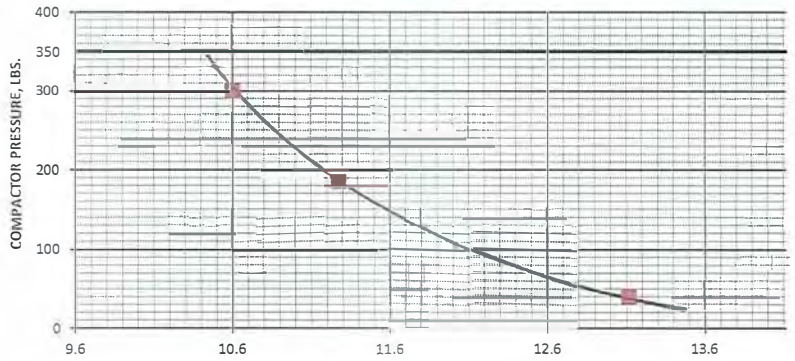
REMARKS:

BORING NO. B-3 @ 0'-5', Bulk, 12/29/2023

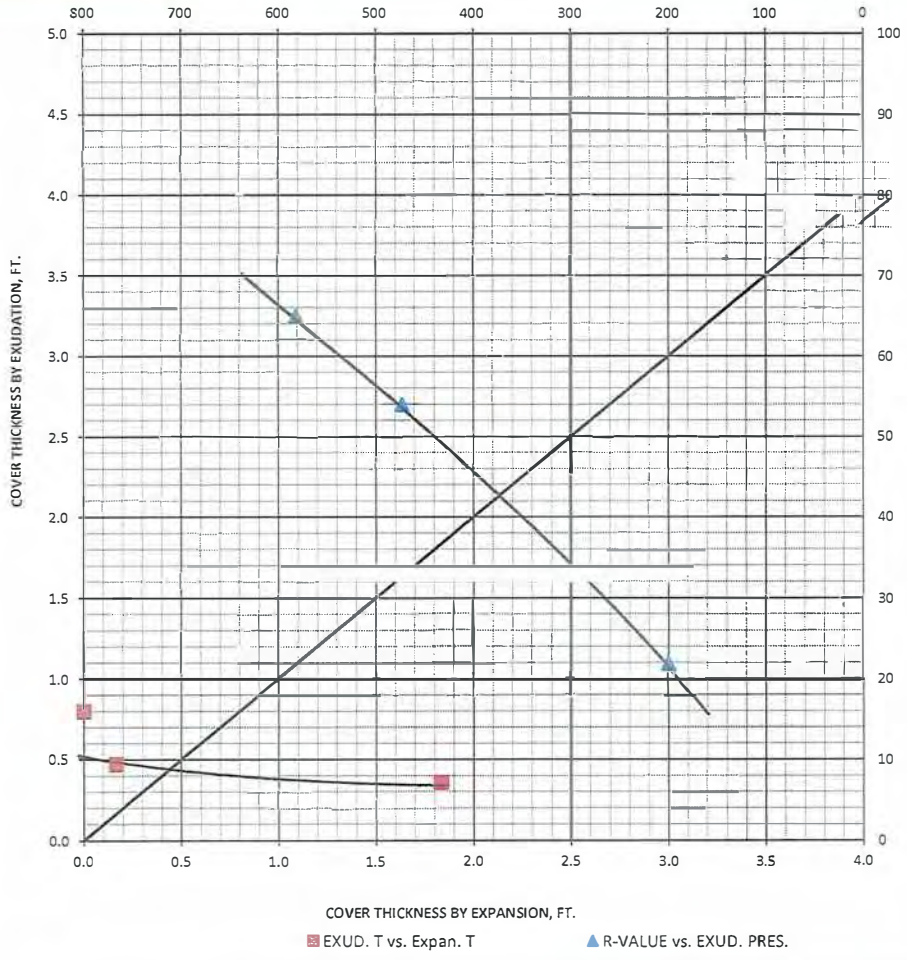
Beaumont Library R & E

P.N. 4230.2300019.0000

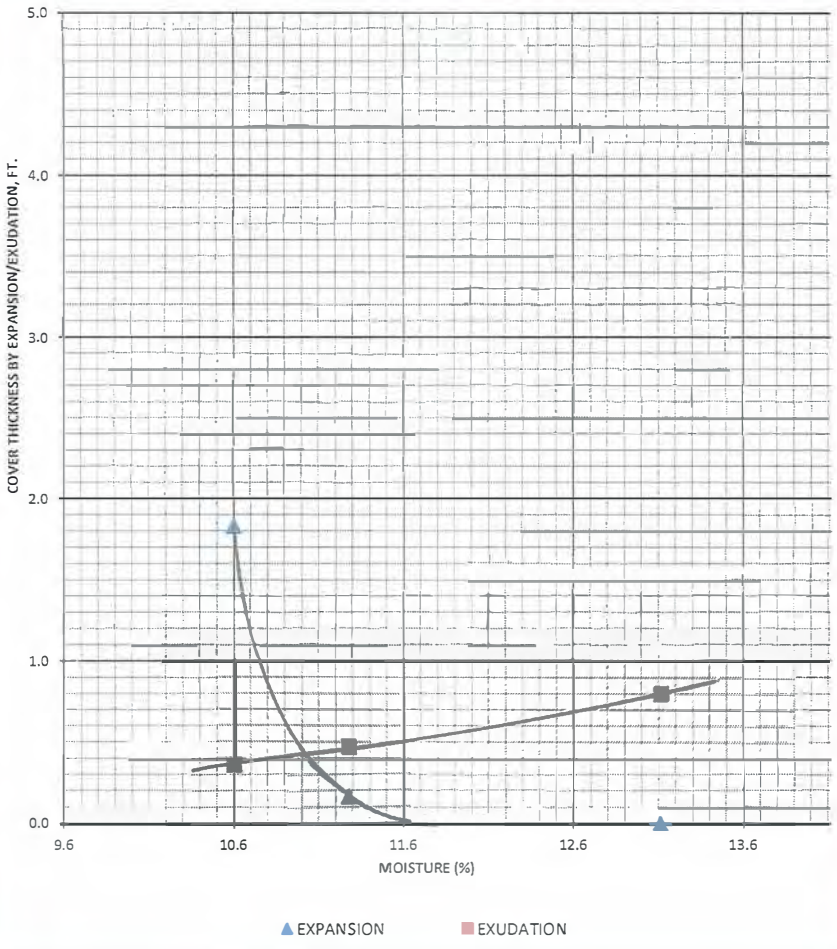
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %



Results Only Soil Testing for Beaumont Library Renovations & Expansions

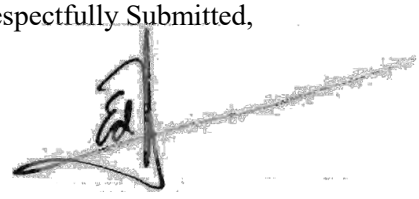
January 16, 2024

Prepared for:

Sean Emami
Universal Engineering Sciences
16 Technology Drive, #139
Irvine, CA 92618
semami@universalengineering.com

Project X Job#: S240115D
Client Job or PO#: 4230.2300029.0000

Respectfully Submitted,



Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

Soil Analysis Lab Results

Client: Universal Engineering Sciences
Job Name: Beaumont Library Renovations & Expansions
Client Job Number: 4230.2300029.0000
Project X Job Number: S240115D
January 16, 2024

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)	
B-3 bulk	0-5	44.5	0.0045	28.6	0.0029	62,310	4,288	7.0

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

Project X
Corrosion Engineering

Lab Request Sheet Chain of Custody

Phone: (213) 928-7213 · Fax (951) 226-[illegible] 720 · www.projectxcorrosion.com

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Project X Job Number: S240115D UES 4230.2300029.0000 Beaumont 1 Quad

IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.

Company Name:	UES	Contact Name:	Sean Emami
Phone No:	714 863 8517		
Mailing Address:	16 Technology Drive Suite 139 Irvine CA 92618	Contact Email:	semami@teamues.com
Accounting Contact:	Sean Emami	Invoice Email:	semami@teamues.com
Client Project No:	4230.2300029.0000	Project Name:	BEAUMONT LIBRARY R &E
P.O. #:			

(Business Days) Turn Around Time: 3-5 Day Standard (●) | 3 Day Guarantee 50% mark-up | 24 Hour RUSH 100% mark-up

For Corrosion Control Recommendations (350g soil sample):
NEED (1) Groundwater depth and
(2) Soil Sample Locations Map

FOR THERMAL RESISTIVITY PROVIDE (1,500g soil sample):
(1) Optimal Moisture %
(2) Dry Density{PCF}
(3) Desired Compaction
Date & Received By:

METHOD ANALYSIS REQUESTED (Please circle)

Default Method

350g Sample

*Req Min 3 Samples site map and groundwater info

1,500g Sample

Full Corrosion Series

Geo Quad

Reports

	SAMPLE ID - BORE # - Description	DEPTH (ft)	DATE COLLECTED	Geo Quad	Full Corrosion Series
1	B-3 BULK	0-5ft	12-29-23	● ● ● ●	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

132

June 27, 2024

Project No. 4230.2300029.0000

Lenna Von Alt, EIT
Project Engineer
BKF Engineers
4675 MacArthur Court, Suite 400
Newport Beach, CA 92660

Subject: **Historical Infiltration Rates Letter**

References:

1. "Preliminary Geotechnical Investigation – Beaumont Library Renovations and Expansions, Beaumont Library District, 125 East 8th Street, Beaumont, CA 92223", February 2nd, 2024, UES

Dear Ms. Von Alt,

This letter is in response to the conversation between Blake Kissee (UES), Dean Stanphill (UES), Pedro Espinet (tsk), and Vincent Holguin (C.W. Driver) regarding the infiltration testing to be performed in the Beaumont Carnegie Library rental property and the subsequent solution that was developed to address the requirements of BKF on April 2nd, 2024.

SOLUTION

Based on the historical infiltration rates and soil types observed at the Beaumont Carnegie Library, infiltration is deemed infeasible.

DISCUSSION

The requirements set forth by BKF regarding how the infiltration testing was to be performed in the desired locations set by BKF and at depths ranging from 40 to 50 feet were deemed unfeasible.

The primary soil classifications notated on the boring logs from the referenced geotechnical report were observed and compared against historical infiltration rates for similar soil types, respectively. Please see the table below:

Table 2: Historical Infiltration Rates based on Soil Type

Soil Type	Percolation Rate		Hydraulic Conductivity (cm/s)	Infiltration Rate
	in/hr.	min/in		in/day
Silty Sand	2.0	30	10^{-6}	1.8
Clayey Silt	0.2	300	10^{-7}	0.2

Based upon the soil types observed in the boring logs as well as the subsequent infiltration rates provided by Table 2, the subsurface materials for this project are between a Silty Sand and Clayey Silt. Thus, meaning that the historical infiltration rate for this project site is within a minimum and maximum range of 0.2 – 1.8 in/day.

We appreciate the opportunity to be of service on this project. Should you have any further questions or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully,
Universal Engineering Sciences

LICENSED PROFESSIONAL ENGINEER
DEAN R. STANPHILL
No. 2271
Exp. 12/31/24
GEOTECHNICAL
STATE OF CALIFORNIA

Dean Stanphill P.E.
Principal

Appendix 4: Historical Site Conditions

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

Not Applicable

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

TECHNICAL MEMORANDUM

Date: 11/01/2024

Deliver To:
City of Beaumont Public Works Department
550 E. 6th Street, Beaumont, CA 92223
Attn: Robert Vestal, Hugo Escobedo

From:
BKF Engineers
4675 MacArthur Court, Suite 400
Newport Beach, CA 92660

Subject: Beaumont Library Renovation & Addition project - Exploration of LID BMP Solutions

---

Background
On August 27, 2024 BKF Engineers submitted a preliminary WQMP and grading plan to the City's Public Works Department. BKF received comments from the City on September 10, 2024 stating concerns regarding the use of the proposed proprietary BMP system, a Modular Wetland System. After several coordination calls with the City, BKF was tasked to prepare a technical letter per the request of the Beaumont Public Works Department. Different LID BMP solutions have been explored and the feasibility of each is summarized below. Based on the MS4 Permit and the Santa Ana Watershed Region of Riverside County WQMP template, the four tiers of Implementing LID BMPs are as follows: Tier 1 - Infiltration Applicability, Tier 2 - Harvest and Use Assessment, Tier 3 - Bioretention and Biofiltration Assessment.

Tier 1
Infiltration BMP solutions such as dry wells and infiltration basins were initially considered, dependent on industry standard feasible infiltration rates (greater than 0.3 inches per hour). The Geotechnical Engineering Investigation dated February 2, 2024, written by UES, provided boring logs showing predominantly clay soils, but did not include percolation testing or infiltration rates.

Percolation tests at the proposed southern infiltration location were requested from the Geotechnical Engineer to perform two pilot borings down until a percolation layer is found which can range from 5 feet below the existing grade, and 10 feet above the ground water elevation. Per the Geotechnical Report, groundwater was not encountered during the field exploration to the maximum depth explored, approximately 50 feet below the existing grade. The percolation layer has the potential to be 40 to 50 feet below existing grade, which would require a drill rig. The location of proposed infiltration, would be at the low point of the site, which is the southern area where an existing residence is located. There were concerns regarding rig access to the two locations identified for pilot borings. A drill rig could not access the true location of the infiltration at the start of our design due to the residence, and therefore BMP historical infiltration data was used as stated in the letter prepared by the Geotechnical Engineer, UES, dated April 5, 2024. Percolation testing was deemed infeasible based on historical infiltration rates

of 1.8 inches per day for silty sand and 0.2 inches per day for clayey silt, therefore, design of drywells and infiltration basins were not further explored.

Tier 2

The harvest and use assessment deemed irrigation use, toilet use, and other non-potable use infeasible based on the following calculations as outlined in the preliminary WQMP, see Appendix A.

Irrigation Use Feasibility has been deemed infeasible because minimum required irrigated area is 2.44 acres and the available irrigated landscape is 0.07 acres. See calculation steps 1-5 in the WQMP, see Appendix A for steps followed and calculations.

Toilet Use Feasibility has been deemed infeasible because the minimum require toilet users daily is 202, and the project number of toilet users daily is 40. See calculation steps 1-5 in the WQMP, see Appendix A for steps followed and calculations.

Other Non-Potable Use Feasibility is not applicable as there are not other non-potable uses for stormwater runoff on the site like industrial use.

Tier 3

The design of bioretention and biofiltration basins, non-proprietary above grade systems, were explored such as biofiltration basins, and bioretention flow through planters.

The design capture volume (DCV) for the site based on an 85th percentile 24-hour storm event is 3,187 cubic feet, see Appendix B for calculations. The design capture volume is equivalent to the BMP volume.

In order to completely treat the DCV, a biofiltration basin would require a minimum surface area of 5,494 square feet, which represents the bottom of the basin (1,810 square feet), with 1.5 feet of combined ponding depth and freeboard, with 3 feet of soil filter media layer, and 4:1 side slopes. See Appendix C for calculations and basin section. The total basin footprint would affect 30+ parking stalls and a relocation of the trash enclosure. The biofiltration basin design would replace the proprietary Modular Wetland System unit because it is treating the entire DCV. This solution has drastic impacts to the project's onsite parking. The basin would be configured along a portion of the eastern and the entire southern perimeter of the site.

Additionally, the design of an above ground flow through planter was explored. Due to limited landscaping area adjacent to the proposed building, only two of the proposed roof drains on the west would be captured and treated. The bioretention flow through planter would require a minimum surface area of 1,771 square feet to treat the DCV, see Appendix D for calculations. The flow through planters are able to be installed on the western side of the library, however they would not be large enough to treat the entire design capture volume and would require the modular wetland system. The solution would not have enough impact to entirely eliminate the need for the Modular Wetland System unit.

Proposed Design

Our proposed design includes a Modular Wetland System, 8 ft x 6 ft sized unit, which is widely considered a biofiltration BMP which adheres to Tier 3 as well. The difference between a Modular

Wetland System and a non-proprietary biofiltration basin is that this system is more efficient, and has more performance analysis and studies available.

The MWS unit proposed requires 63 square feet footprint area to treat the design capture volume, which is a unit with an 8 ft x 6 ft model with an outside dimension of 9 ft x 7 ft.

It is possible to propose permeable pavers as a design solution along a portion of the proposed parking stalls to increase the permeable area of the site, however the modular wetland system unit would still be required to treat the impervious surface runoff.

Appendices

Appendix A – pWQMP Harvest and Use Assessment & Bioretention and Biotreatment Assessment
Appendix B – BMP Design Volume calculations
Appendix C – Bioretention Facility calculations for Bioretention Basin & Section Detail
Appendix D – Bioretention Facility calculations for Bioretention Flow Through Planter
Appendix E – Alternative BMP Options 1, 2, 3

APPENDIX A

D.2 Harvest and Use Assessment

Not feasible based on calculations.

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: 0.07

Type of Landscaping (Conservation Design or Active Turf): Conservative 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: 1.15

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: 2.12

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: 2.44

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)
2.44	0.07

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: 40

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: 1.15

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: 176

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: 202.40

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)
202.40	40

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.

Criteria

The evaluation of the feasibility of Harvest and Use BMPs is performed for three potential categories of use: toilet flushing, irrigation, and other on-site non-potable uses.

For evaluation of **toilet flushing**, flush volumes and use rates from the literature have been combined with a long-term continuous simulation to develop a minimum demand, referred to as the Toilet Users To Impervious Area (TUTIA) ratio, that would be required to achieve the minimum 40 percent long-term retention of runoff. See Table 2-2 below, as well as the discussion of LID Retention vs. LID Bioretention BMPs above.

- If the proposed project does meet or exceed this minimum demand, implementing this Harvest and Use BMP would be less effective than a Bioretention BMP, and as such, this Harvest and Use BMP would not be required for the project.

TABLE 2-2. Harvest and Use Data for Toilet Use

Project type	**Residential**	**Retail / Office Commercial**	**Industrial**	**Schools**
Basis of Use Type	*Resident*	*Employee (non-visitor)*	*Employee (non-visitor)*	*Employee (non-student)*
Design Capture Storm depth, in	**Minimum toilet users per tributary impervious acre for partial capture (tu/ac)**			
0.50	85	114	142	24
0.55	93	123	158	26
0.60	101	132	172	29
0.65	108	141	185	31
0.70	116	150	198	33
0.75	123	159	208	35
0.80	131	167	219	37
0.85	138	176	229	39
0.90	145	184	238	40
0.95	152	193	247	42
1.00	159	201	255	43
1.05	166	209	263	44
1.10	172	217	271	45
1.15	179	225	278	46
1.20	185	233	285	47

[A]*Unit demands used in analysis:* *Residential = 9.3 gal/resident/day*
Retail/office = 7 gal/employee/day
Industrial = 5.5 gal/employee/day
Schools = 33 gal/employee/day

For evaluation of **irrigation**, typical evapotranspiration and water demands have been combined with a long-term continuous simulation, to develop a minimum ratio of Effective Irrigated Area per Tributary Impervious Area (EIATIA) that would be required to achieve the minimum 40 percent long-term retention of runoff. See Table 2-3 below, as well as the discussion of LID Retention vs. LID Bioretention BMPs above. For the purposes of this assessment, landscaping will either be a 'Conservation Design' (Low water use, native species, etc.), or 'Active Turf areas' (higher water use species such as conventional sod).

TABLE 2-3. Harvest and Use Data for Irrigation Use[A, B]

General Landscape Type	Conservation Design: K_L=0.35	Active Turf Areas: K_L[C]=0.70
Design Capture Storm Depth, in	**Minimum Required Effective Irrigated Area per Tributary Impervious Acre for partial capture (ac/ac)**	
0.50	0.26	0.22
0.55	0.52	0.35
0.60	0.79	0.47
0.65	1.05	0.60
0.70	1.32	0.72
0.75	1.59	0.85
0.80	1.85	0.98
0.85	2.12	1.10
0.90	2.38	1.23
0.95	2.65	1.35
1.00	2.92	1.48
1.05	3.18	1.60
1.10	3.45	1.73
1.15	3.71	1.85
1.20	3.98	1.98

[A]*ET data from the CIMIS station at U.C. Riverside used for this analysis.*

[B]*To use this table, select the Design Storm for your project area. Then select the planting/irrigation management type (i.e., conservation versus active turf). The resulting value gives the minimum required irrigated area per tributary area for stormwater capture which will be used in Step 3 of D.2 in the Template.*

[C]*K_L = Landscape Coefficient, K_L = Ks × Kd × Kmc where Ks = species factor, Kd = density factor and Kmc = microclimate factor. The landscape coefficient (K_L) incorporates plant species, microclimate and water management/irrigation practices as adapted from Appendix X of the 2011 Orange County Technical Guidance Document located here:* ***http://www.ocwatershed.com/WQMP.aspx***

For the table above, the lower value corresponds to water conservation practices and the higher value corresponds to traditional irrigation practices for grass turf.

Each Co-Permittee has a model ordinance based on AB 1881. Specifying certain high water use plants contradicts the intent of AB 1881.

APPENDIX B

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	BKF Engineering	Date	6/27/2024
Designed by	Daniel David	Case No	
Company Project Number/Name	Beaumont Library		

BMP Identification

BMP NAME / ID: -

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} = 0.85 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)*
A-1	*50,188*	*Concrete or Asphalt*	*1*	*0.89*	*44767.7*			
A-1	*1,986*	*Ornamental Landscaping*	*0.1*	*0.11*	*219.4*			

APPENDIX C

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

Company Name: BKF Engineers
Date: 9/24/2024
Designed by:
County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T = 1.2 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 3,187 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 = 18.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.76 ft

Minimum Surface Area, A_m

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

A_M = 1,810 ft^2

Proposed Surface Area — A= - ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

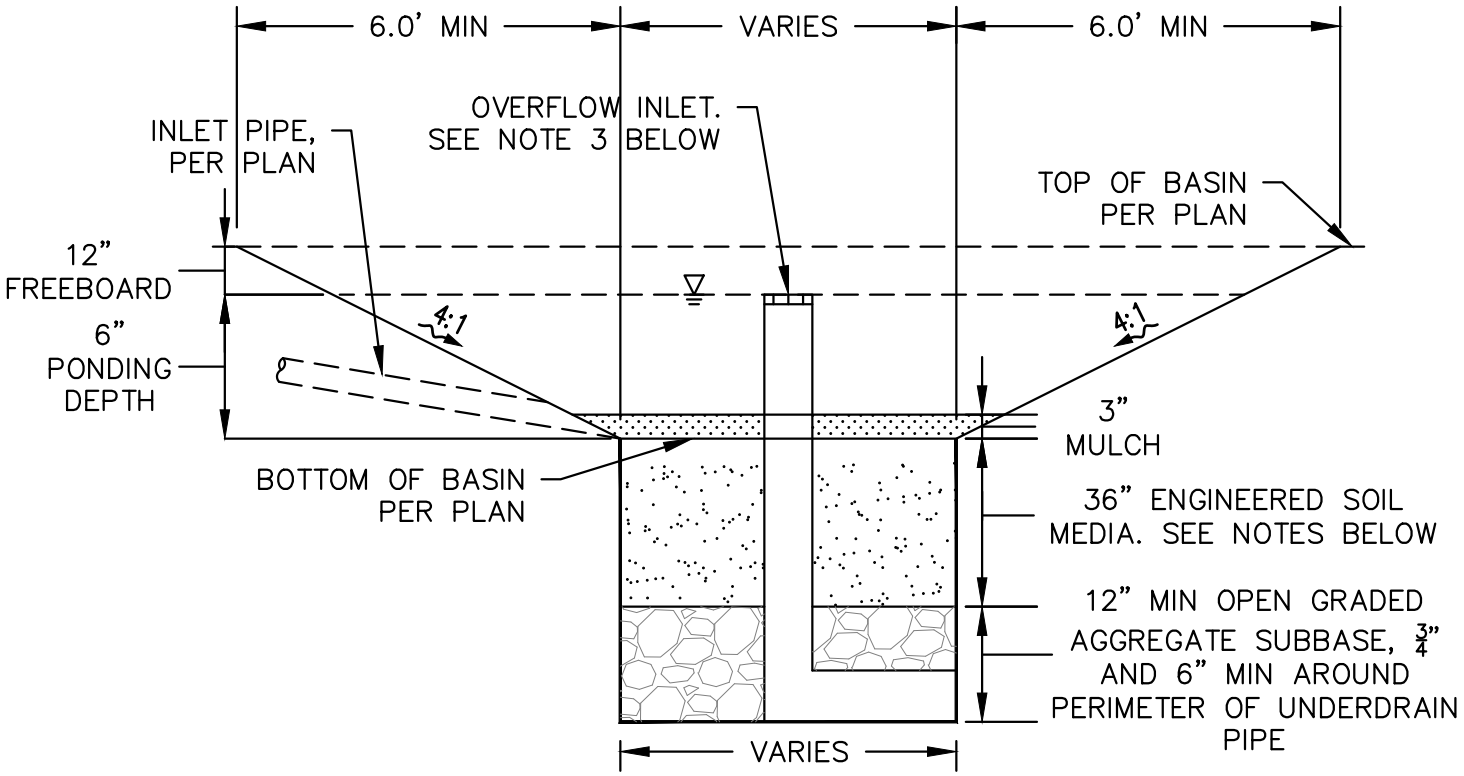
Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — %

6" Check Dam Spacing — feet

Describe Vegetation:

Notes: Bioretention Basin


6.0' MIN
VARIES
6.0' MIN
INLET PIPE, PER PLAN
OVERFLOW INLET. SEE NOTE 3 BELOW
TOP OF BASIN PER PLAN
12" FREEBOARD
6" PONDING DEPTH
4:1
4:1
3" MULCH
BOTTOM OF BASIN PER PLAN
36" ENGINEERED SOIL MEDIA. SEE NOTES BELOW
12" MIN OPEN GRADED AGGREGATE SUBBASE, ¾" AND 6" MIN AROUND PERIMETER OF UNDERDRAIN PIPE
VARIES

APPENDIX D

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

Company Name:	BKF Engineers	Date:	9/24/2024
Designed by:		County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	1.2	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	3,187	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 =	8.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.80	ft
Minimum Surface Area, A_m			
$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	1,771	ft^2
Proposed Surface Area	A=	-	ft^2
Minimum Required Length of Bioretention Facility, L	L =	221.4	ft

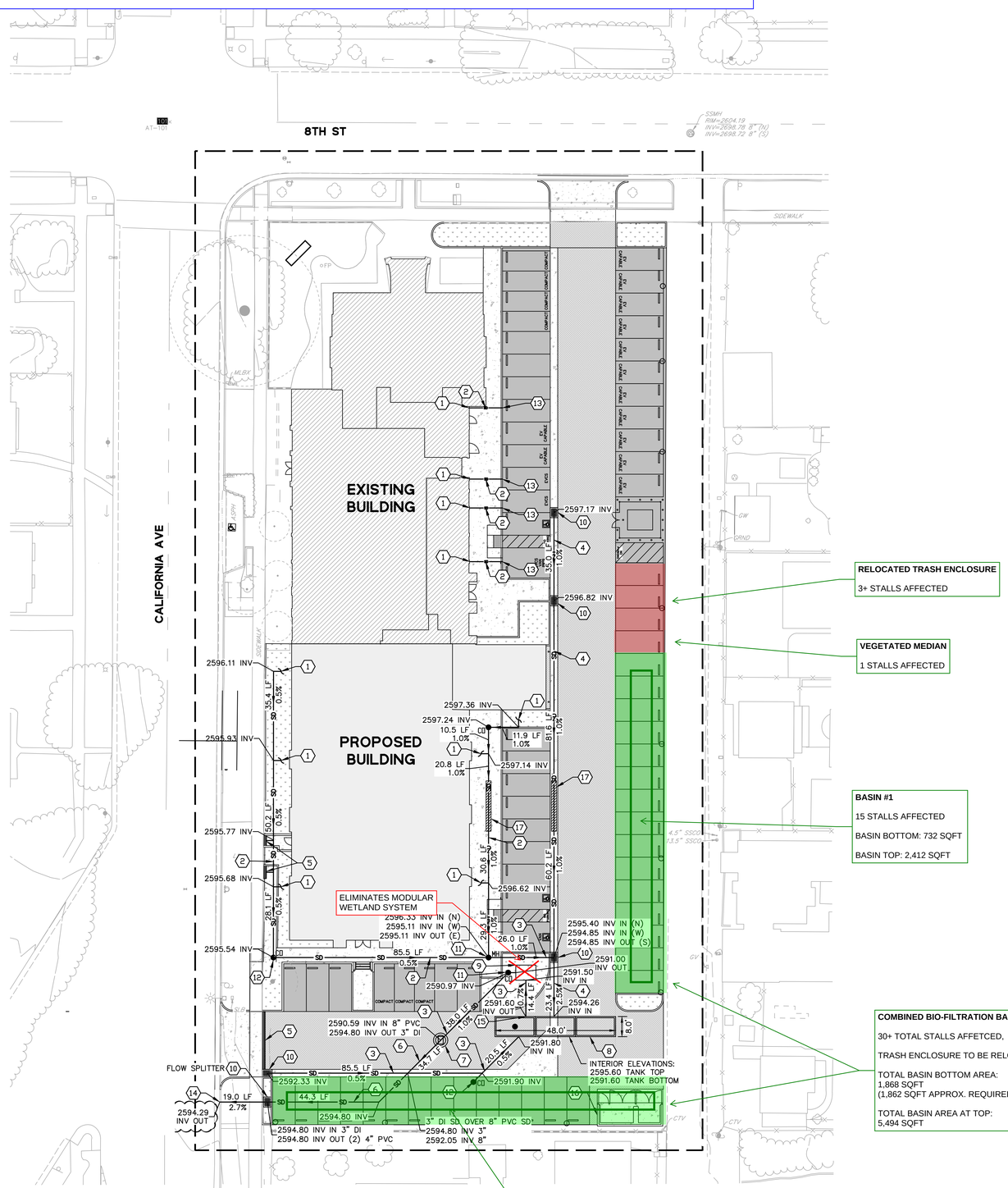
Bioretention Facility Properties

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

Notes: Bioretention Flow Through Planter

APPENDIX E

OPTION 1 - BIO-FILTRATION BASINS



LEGEND:

- LIMIT OF WORK
- CONCRETE
- ASPHALT FOR EMERGENCY VEHICLES / DRIVE AISLE
- ASPHALT FOR PARKING STALL
- PROPOSED BUILDING
- LANDSCAPE AREA
- MH — STORM DRAIN MANHOLE
- CO — STORM DRAIN CLEANOUT
- DROP INLET

DRAINAGE KEYNOTES:

1. PROPOSED ROOF DOWNSPOUT CONNECTION PER DETAIL 4/C602
2. INSTALL 4" SDR35 PVC STORM DRAIN LINE AND FITTINGS
3. INSTALL 8" SDR35 PVC STORM DRAIN LINE AND FITTINGS
4. INSTALL 12" SDR35 PVC STORM DRAIN LINE AND FITTINGS
5. CONSTRUCT 6" TRENCH DRAIN PER DETAIL 3/C601
6. INSTALL 3" DI STORM DRAIN FORCE MAIN
7. INSTALL PUMP STATION PER DETAIL 1/C605
8. INSTALL UNDERGROUND DETENTION SYSTEM PER DETAIL 1/C604
9. INSTALL MODULAR WETLAND SYSTEM PER DETAIL 2/C606
10. CONSTRUCT STORM DRAIN DROP INLET PER DETAIL 1/C601
11. INSTALL STORM DRAIN MANHOLE STRUCTURE PER DETAIL 1/C602
12. INSTALL STORM DRAIN CLEANOUT STRUCTURE PER DETAIL 2/C601
13. PROPOSED CURB DRAIN, SINGLE PIPE CONDITION PER DETAIL 3A/C602
14. PROPOSED CURB DRAIN, DOUBLE PIPE CONDITION PER DETAIL 3B/C602
15. INSTALL ORIFICE RESTRICTOR PLATE PER DETAIL 2/C604
16. STORM DRAIN PUMP CONTROLLER CABINET MOUNTED TO TRASH ENCLOSURE WALL PER ELECTRICAL AND STRUCTURAL PLANS
17. CONSTRUCT SLURRY CEMENT ENCASEMENT ALONG THE UTILITY, EXTENDING 10 LINEAR FEET ON BOTH SIDES OF THE CROSSING, PER DETAIL 7, SHEET C602

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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Los Angeles, CA 90012
phone: 213.614.0900
fax: 213.929.2247
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REGISTERED PROFESSIONAL ENGINEER
BRUCE W. KING
No. C 42393
CIVIL
STATE OF CALIFORNIA

PLEASE RECYCLE

Project

BEAUMONT LIBRARY RENOVATION & ADITION
125 E 8TH ST,
BEAUMONT, CA 92223

Job No: 23-040

Owner

BEAUMONT LIBRARY DISTRICT

REVISIONS

REV	DATE	DESCRIPTION

Sheet Title

DRAINAGE PLAN

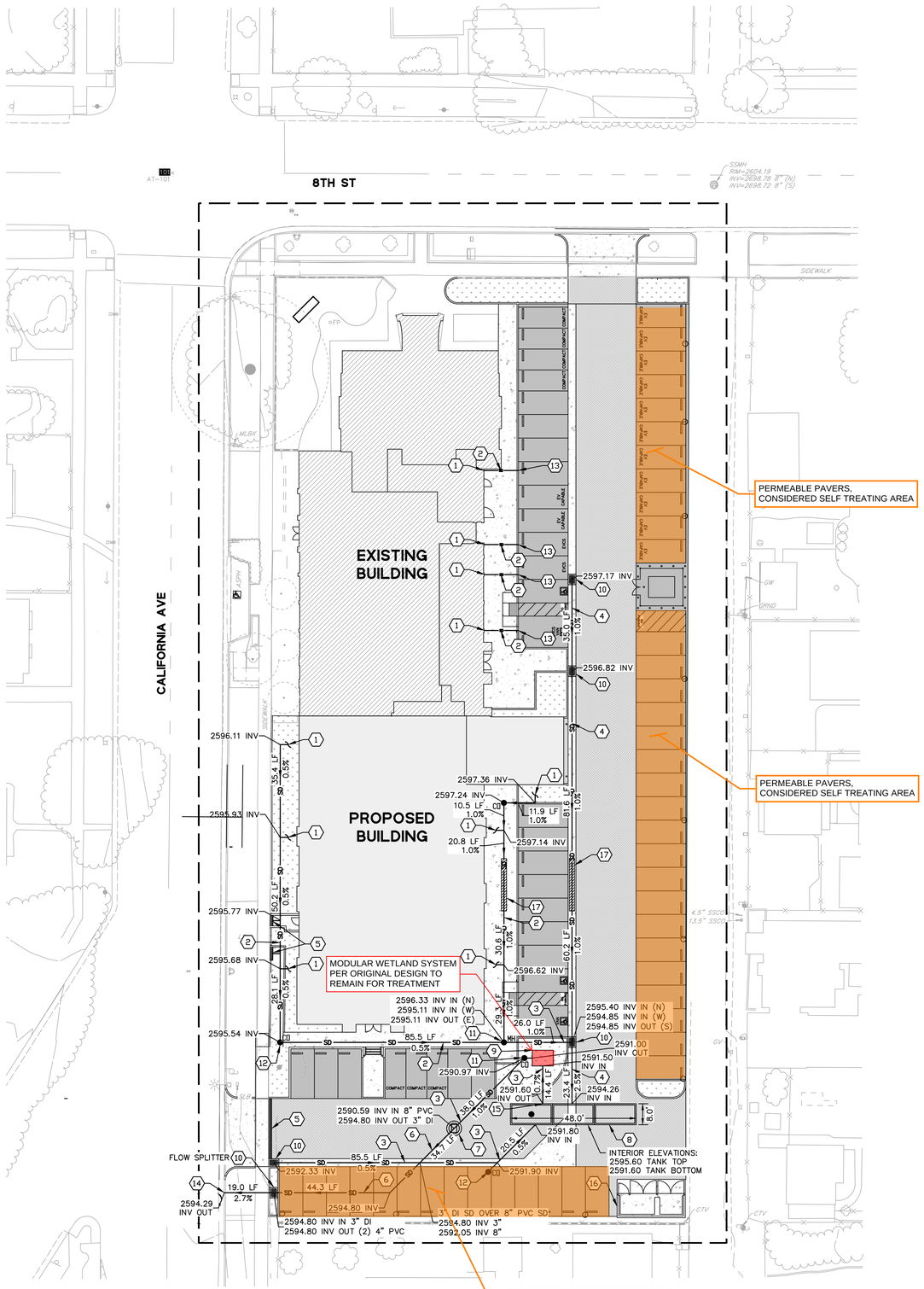
Date: 9/20/2024

Sheet No:

C301

NOT FOR CONSTRUCTION

OPTION 2 - PERMEABLE PAVERS



LEGEND:

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N

GRAPHIC SCALE

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(IN FEET)
1 inch = 20 ft.

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CIVIL
STATE OF CALIFORNIA

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125 E 8TH ST,
BEAUMONT, CA 92223

Job No: 23-040

Owner

BEAUMONT LIBRARY DISTRICT

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REV	DATE	DESCRIPTION

Sheet Title

DRAINAGE PLAN

Date: 9/20/2024

Sheet No:

C301

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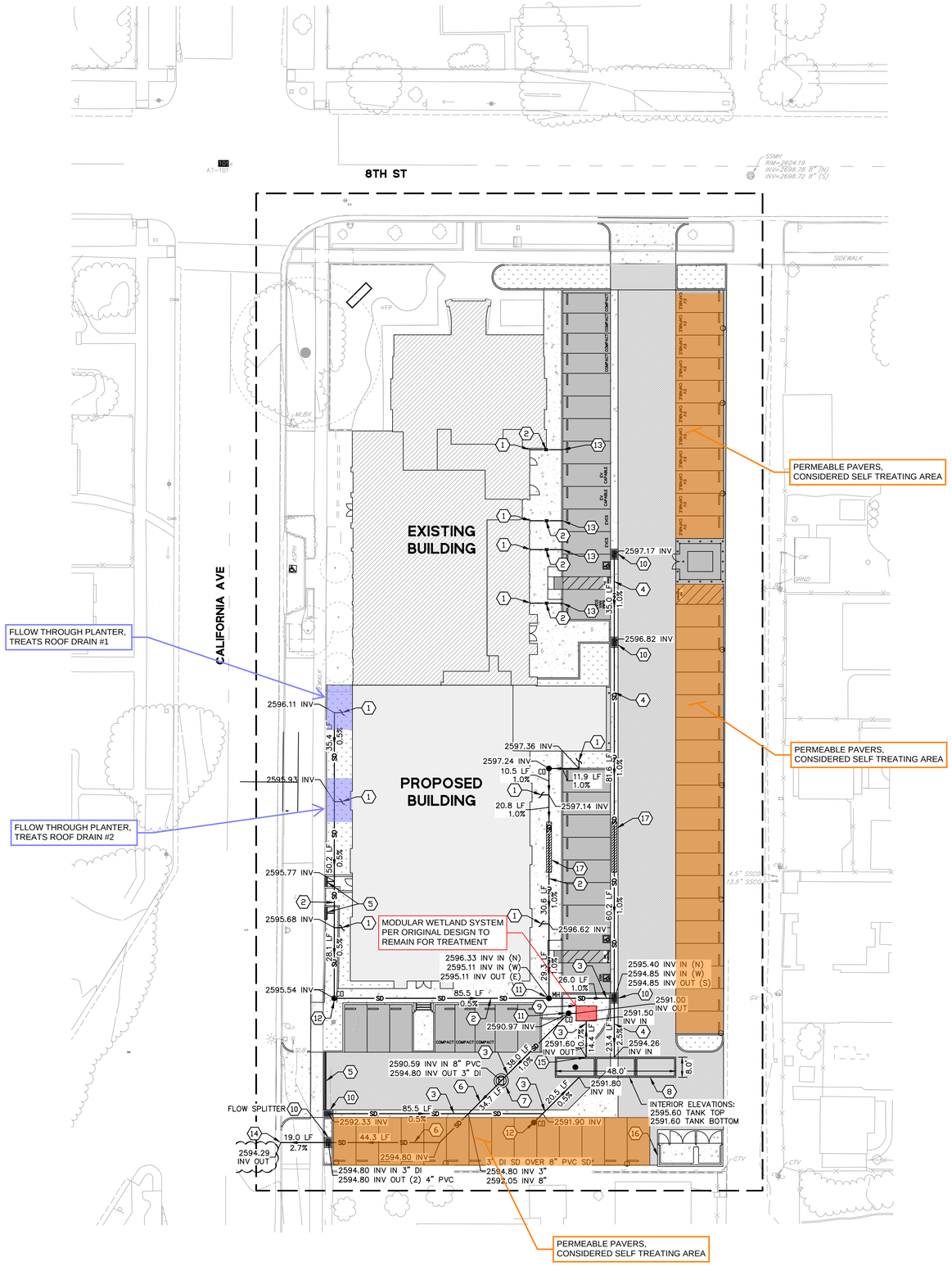
OPTION 3 - PERMEABLE PAVERS AND FLOW THROUGH PLANTERS



LEGEND:

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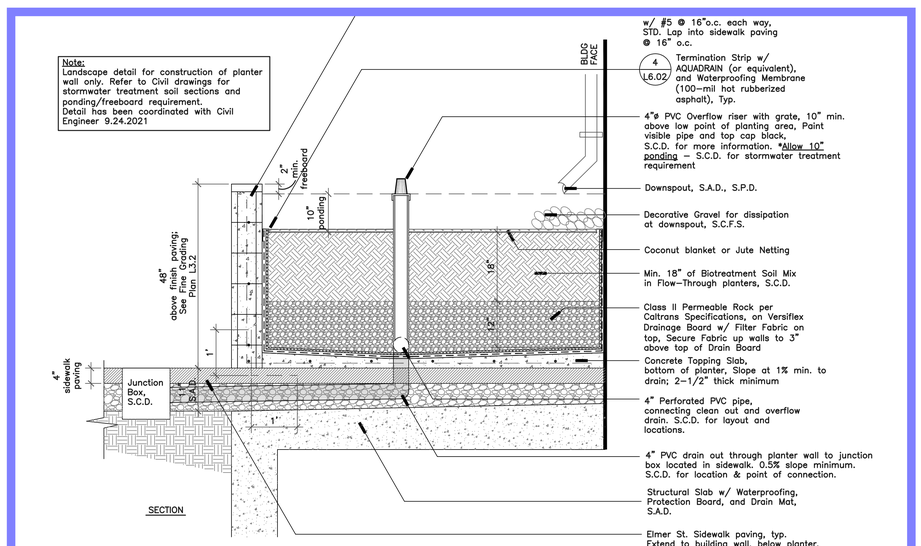

CMU Stormwater Treatment Planter Wall - On Structure (Elmer St.)

Scale: 3/4" = 1'-0"

tsk

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Penthouse
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Sheet Title

DRAINAGE PLAN

Date: 9/20/2024

Sheet No:

C301

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Lenna Von Alt

From: Hugo Escobedo <hescobedo@beaumontca.gov>
Sent: Tuesday, November 5, 2024 5:08 PM
To: Lenna Von Alt
Cc: Pedro Espinet; Melody Arechiga; Crystal Wong; Bruce Kirby; Vincent Lin; Richard Godsey
Subject: RE: Beaumont Library - Technical Letter

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Lenna –

Thank you for providing the technical letter explaining the feasibility of the different LID BMP options.

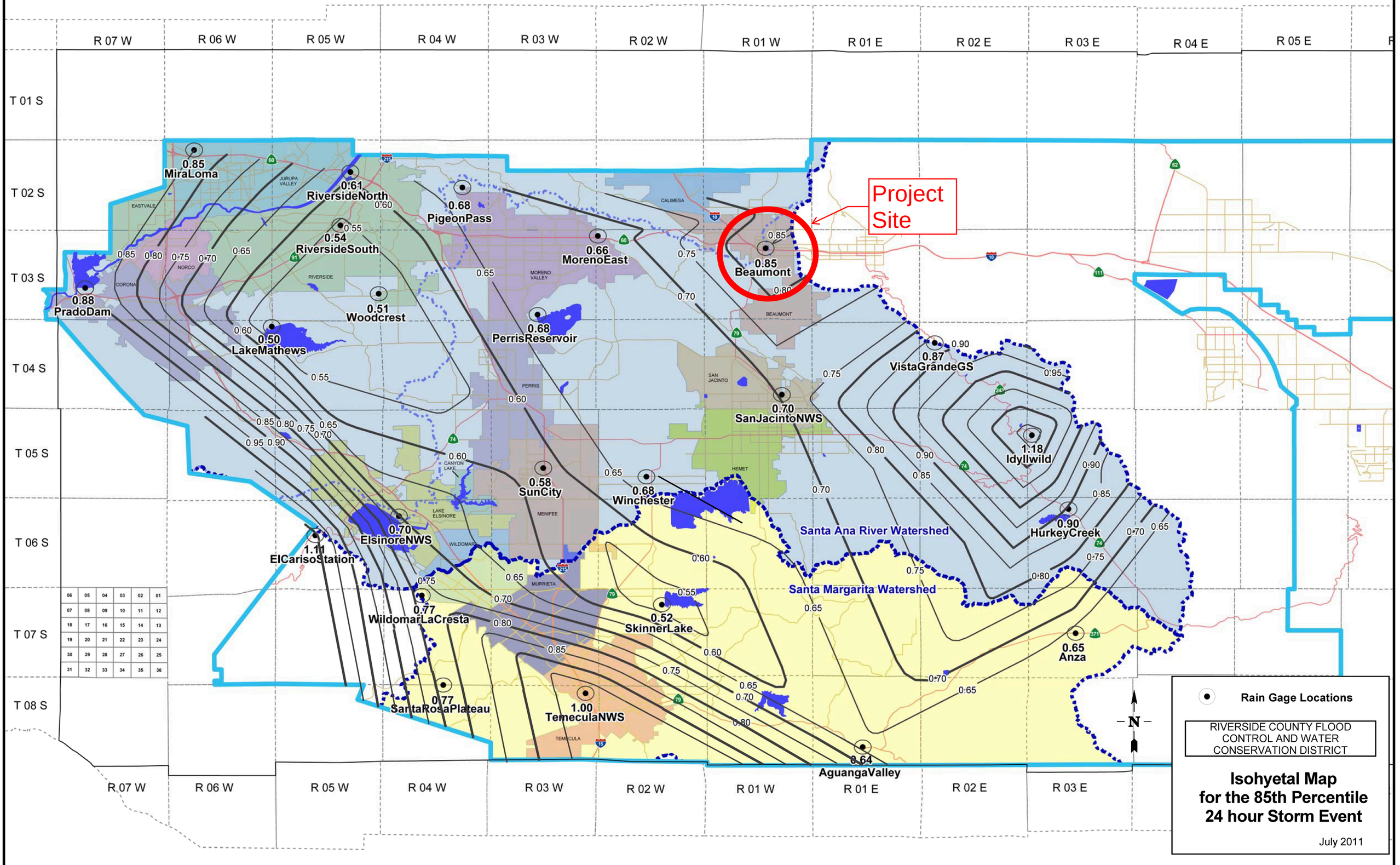
Public Works has no further comments. It is acceptable to proceed with the proposed design as summarized in the letter. Please note that the City does not require the permeable pavers, since the addition of pavers does not achieve eliminating the modular wetland system.

HUGO ESCOBEDO
Public Works |Senior Engineer

City of Beaumont
550 E. 6th Street, Beaumont, CA 92223
Office (951) 769-8520 x406 | Cell (760) 994-3990
BeaumontCa.gov
Facebook | Twitter | Instagram | YouTube
#ACITYELEVATED

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation


R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
Project Site
0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
Santa Ana River Watershed
Santa Margarita Watershed
JURUPA VALLEY
EASTVALE
CORONA
NORCO
RIVERSIDE
MORENO VALLEY
CALIMESA
BEAUMONT
SAN JACINTO
PERRIS
HEMET
CANYON LAKE
LAKE ELSINORE
WILDOMAR
MENIFEE
MURRIETA
TEMECULA
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011
N

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: BKF Engineering
Date: 11/12/2024
Designed by: Daniel David
Case No:
Company Project Number/Name: Beaumont Library

BMP Identification

BMP NAME / ID: -

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} = 0.85 inches

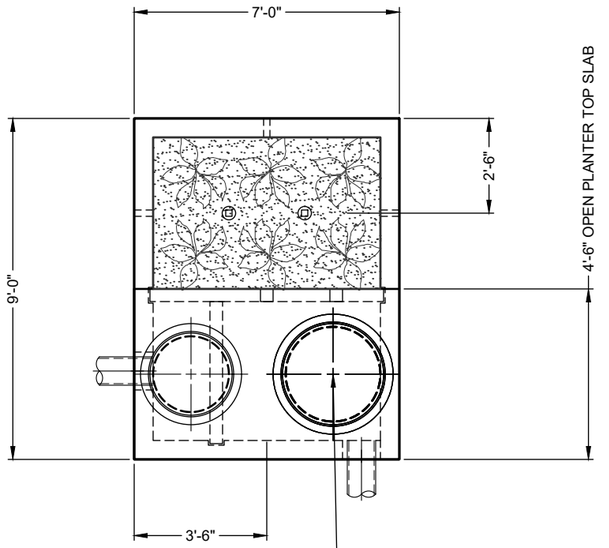
Drainage Management Area Tabulation

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

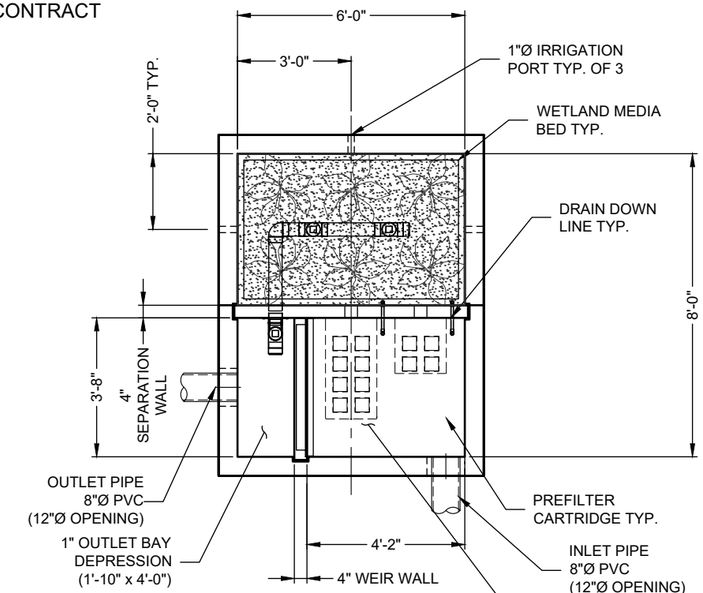
DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-1	*48,169*	*Concrete or Asphalt*	*1*	*0.89*	*42966.7*			
A-1	*4,761*	*Ornamental Landscaping*	*0.1*	*0.11*	*525.9*			
	52930		***Total***		**43492.6**	**0.85**	***3080.7***	**-**

Notes:

THIS DOCUMENT IS FOR INFORMATIONAL PURPOSES
ONLY AND IS NOT A FINAL CONSTRUCTION CONTRACT



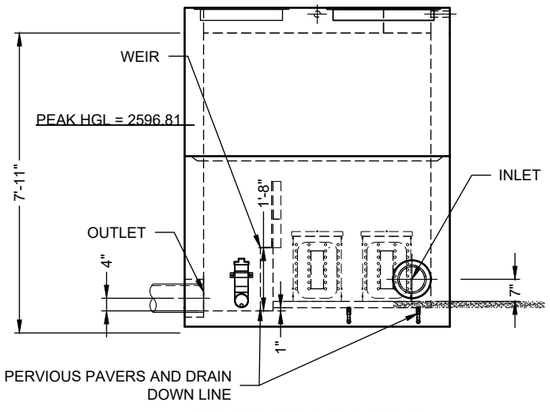
PLAN VIEW



PLAN VIEW
TOP SLAB NOT SHOWN

SITE DESIGN DATA	
WATER QUALITY VOLUME (CF)	3081.00
PEAK FLOWRATE (CFS)	0.81
DRAIN DOWN TIME (HRS)	24
MAXIMUM POLLUTANT DENSITY (PREFILTER) (GPM/SF)	2.1
PREFILTER LOADING RATE (GPM/SF)	0.63
WETLAND MEDIA LOADING RATE (GPM/SF)	0.26
MEDIA OPERATING HEAD (FT)	3.27
SURFACE LOADING	PEDESTRIAN
GROUNDWATER ELEVATION*	2591

STRUCTURE DETAILS	
NUMBER OF DELIVERED PIECES (DOES NOT INCLUDE GRADE RINGS/RISERS)	3
MAXIMUM FOOTPRINT	9.00' x 7.00'
DELIVERED HEAVIEST PICK*	15700 LB.
TOP SLAB	600 LB.
TOP SECTION	11400 LB.
BASE SECTION	15700 LB.



RIM ELEV. 2599+/-
TOP OF STRUCTURE ELEV. 2599.00

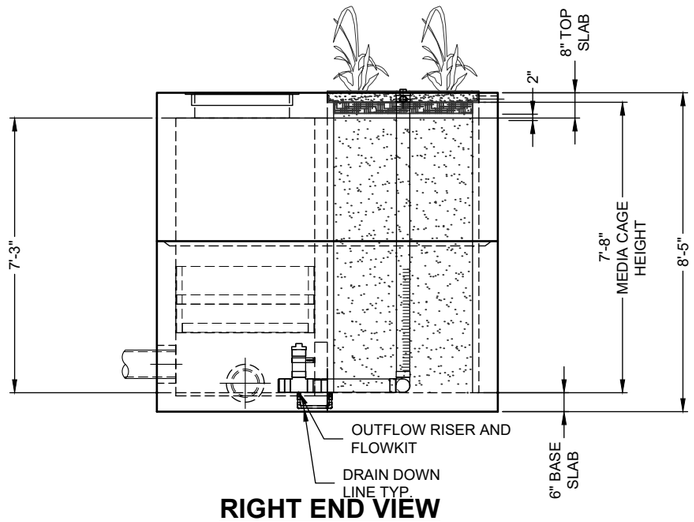
WEIR/TREATMENT HGL ELEV. 2594.42

INLET 1 INVERT ELEV. 2591.50

OUTLET 1 INVERT ELEV. 2591.00
OUTSIDE BOTTOM ELEV. 2590.58

*MEDIA CASTINGS, IF REQUIRED, NOT SHOWN

ELEVATION VIEW*



RIGHT END VIEW

RVRSD
6505 / 000000
LAYOUT 4
MWS-L-6-8-R
6.38 TS
1.21 TIW

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CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
6655 Wedgwood Road, Suite 130, Maple Grove, MN 55311
763-231-3705 763-416-1633 FAX

CONTECH STORMWATER SOLUTIONS
MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH
PROPOSAL
DRAWING

MODULAR WETLANDS MWSL0608OP - 811819-010
BEAUMONT LIBRARY ADDITION & RENOVATION
BEAUMONT, CA
SITE DESIGNATION: MWSL0608

PROJECT No.:	SEQ. No.:	DATE:
811819	010	08/27/24
DESIGNED: MCD	DRAWN: MCD	
CHECKED: MCD	APPROVED: MCD	
SHEET NO.: 1 OF 1		

I:\MERLIN\PROJECT\ACTIVE\811800\811819811819-10-MODULAR WETLANDS\DRAWINGS\811819-10-MWSL0608OP-CONFAB.DWG 12/3/2024 3:57 PM

MWS Linear 2.0 HGL Sizing Calculations

MWS MODEL SIZE	WETLAND PERMITER LENGTH	LOADING RATE GPM/SF	HGL HEIGHT																												
			SHALLOW MODELS																			STANDARD HEIGHT MODEL	HIGH CAPACITY MODELS									
			1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.65	3.70	3.75	3.80	3.85	3.90	3.95
MWS-L-4-4	6.70	1.0	0.022	0.023	0.025	0.026	0.028	0.029	0.031	0.032	0.034	0.035	0.037	0.038	0.040	0.042	0.043	0.045	0.046	0.048	0.049	0.051	**0.052**	0.054	0.055	0.056	0.057	0.058	0.058	0.059	0.060	0.061
MWS-L-3-6	10.06	1.0	0.032	0.035	0.037	0.039	0.042	0.044	0.046	0.048	0.051	0.053	0.055	0.058	0.060	0.062	0.065	0.067	0.069	0.072	0.074	0.076	**0.078**	0.081	0.083	0.084	0.085	0.087	0.088	0.089	0.090	0.091
MWS-L-4-6	9.30	1.0	0.030	0.032	0.034	0.036	0.038	0.041	0.043	0.045	0.047	0.049	0.051	0.053	0.055	0.058	0.060	0.062	0.064	0.066	0.068	0.070	**0.073**	0.075	0.077	0.078	0.079	0.080	0.081	0.082	0.083	0.084
MWS-L-4-8	14.80	1.0	0.048	0.051	0.054	0.058	0.061	0.065	0.068	0.071	0.075	0.078	0.082	0.085	0.088	0.092	0.095	0.099	0.102	0.105	0.109	0.112	**0.115**	0.119	0.122	0.124	0.126	0.127	0.129	0.131	0.132	0.134
MWS-L-4-13	18.40	1.0	0.059	0.063	0.068	0.072	0.076	0.080	0.084	0.089	0.093	0.097	0.101	0.106	0.110	0.114	0.118	0.122	0.127	0.131	0.135	0.139	**0.144**	0.148	0.152	0.154	0.156	0.158	0.160	0.163	0.165	0.167
MWS-L-4-15	22.40	1.0	0.072	0.077	0.082	0.087	0.093	0.098	0.103	0.108	0.113	0.118	0.123	0.129	0.134	0.139	0.144	0.149	0.154	0.159	0.165	0.170	**0.175**	0.180	0.185	0.188	0.190	0.193	0.195	0.198	0.200	0.203
MWS-L-4-17	26.40	1.0	0.085	0.091	0.097	0.103	0.109	0.115	0.121	0.127	0.133	0.139	0.145	0.151	0.158	0.164	0.170	0.176	0.182	0.188	0.194	0.200	**0.206**	0.212	0.218	0.221	0.224	0.227	0.230	0.233	0.236	0.239
MWS-L-4-19	30.40	1.0	0.098	0.105	0.112	0.119	0.126	0.133	0.140	0.147	0.153	0.160	0.167	0.174	0.181	0.188	0.195	0.202	0.209	0.216	0.223	0.230	**0.237**	0.244	0.251	0.255	0.258	0.262	0.265	0.269	0.272	0.276
MWS-L-4-21	34.40	1.0	0.111	0.118	0.126	0.134	0.142	0.150	0.158	0.166	0.174	0.182	0.189	0.197	0.205	0.213	0.221	0.229	0.237	0.245	0.253	0.261	**0.268**	0.276	0.284	0.288	0.292	0.296	0.300	0.304	0.308	0.312
MWS-L-6-8	18.80	1.0	0.060	0.065	0.069	0.073	0.078	0.082	0.086	0.091	0.095	0.099	0.104	0.108	0.112	0.116	0.121	0.125	0.129	0.134	0.138	0.142	**0.147**	0.151	0.155	0.157	0.160	0.162	0.164	0.166	0.168	0.170
MWS-L-8-8	29.60	1.0	0.095	0.102	0.109	0.115	0.122	0.129	0.136	0.143	0.149	0.156	0.163	0.170	0.177	0.183	0.190	0.197	0.204	0.211	0.217	0.224	**0.231**	0.238	0.245	0.248	0.251	0.255	0.258	0.262	0.265	0.268
MWS-L-8-12	44.40	1.0	0.143	0.153	0.163	0.173	0.183	0.194	0.204	0.214	0.224	0.234	0.245	0.255	0.265	0.275	0.285	0.296	0.306	0.316	0.326	0.336	**0.346**	0.357	0.367	0.372	0.377	0.382	0.387	0.392	0.397	0.402
MWS-L-8-16	59.20	1.0	0.190	0.204	0.217	0.231	0.245	0.258	0.272	0.285	0.299	0.312	0.326	0.340	0.353	0.367	0.380	0.394	0.408	0.421	0.435	0.448	**0.462**	0.476	0.489	0.496	0.503	0.509	0.516	0.523	0.530	0.537
MWS-L-8-20	74.00	1.0	0.238	0.255	0.272	0.289	0.306	0.323	0.340	0.357	0.374	0.391	0.408	0.425	0.442	0.459	0.476	0.493	0.509	0.526	0.543	0.560	**0.577**	0.594	0.611	0.620	0.628	0.637	0.645	0.654	0.662	0.671
MWS-L-10-20 or MWS-L-8-24	88.80	1.0	0.285	0.306	0.326	0.346	0.367	0.387	0.408	0.428	0.448	0.469	0.489	0.509	0.530	0.550	0.571	0.591	0.611	0.632	0.652	0.673	**0.693**	0.713	0.734	0.744	0.754	0.764	0.774	0.785	0.795	0.805
4'x'4 media cage	14.80	1.0	0.048	0.051	0.054	0.058	0.061	0.065	0.068	0.071	0.075	0.078	0.082	0.085	0.088	0.092	0.095	0.099	0.102	0.105	0.109	0.112	**0.115**	0.119	0.122	0.124						

DETENTION BASIN SIZING

CALCULATION OF DETENTION BASIN OUTLET CAPACITY THE OUTLET CONSISTS OF A RESTRICTOR PLATE 2.5 INCH IN DIAMETER AT THE OUTLET OF THE DETENTION BASIN.

THE SUBMERGED ORIFICE EQUATION IS: $Q=0.63A(2G\Delta H)^{1/2}$ WHERE A IS THE OPENING AREA IN SF, ΔH IS THE DIFFERENCE IN DEPTHS ON EACH SIDE OF THE ORIFICE OPENING (MEASURED FROM THE CENTROID OF THE ORIFICE OPENING). G IS EQUAL TO 32.2 FPS.

DIAMETER OF OPENING = 2.5 INCHES
AREA OF OPENING= 0.034 SQUARE FEET

DEPTH OF WATER IN BASIN (FTS)	ASSUMED DEPTH OF FLOW AT ORIFICE (FT)	CALCULATED, Q $Q=0.63A(2G\Delta H)^{1/2}$ (FT)	BASIN OUTLET INVERT ELEVATION (FT)	PONDED WATER SURFACE ELEVATION (FT)
0.5	0.10	0.11	100	100.50
1.0	0.10	0.16	100	101.00
1.5	0.10	0.20	100	101.50
2.0	0.10	0.24	100	102.00
2.5	0.10	0.27	100	102.50
3.0	0.10	0.29	100	103.00
3.5	0.10	0.32	100	103.50
4.0	0.10	0.34	100	104.00

SQUARE FOOTAGE OF UNDERGROUND STORAGE BASIN
315.00 (3 ROWS OF 7'x15' SC-4 MODULES)

DEPTH (FTS)	FLOW VOLUME ACCUMULATED (cubic feet)	FLOW VOLUME ACCUMULATED (acre-feet)
0.5	157.50	0.0036
1.0	315.00	0.0072
1.5	472.50	0.0108
2.0	630.00	0.0145
2.5	787.50	0.0181
3.0	945.00	0.0217
3.5	1102.50	0.0253
4.0	1260.00	0.0289

OUTFLOW RATING DATA FOR:
OUTFLOW WITH RESTRICTOR PLATE AT 2.5" DIAMETER OUTLET OF BASIN

PONDED WATER SURFACE ELEVATION (FT)	DEPTH OF FLOW AT BASIN OUTLET (FT)	ACCUMULATED VOLUME (ACRE-FEET)	OUTFLOW CFS
0	0	0.0000	0
100.5	0.5	0.0036	0.11
101.0	1.0	0.0072	0.16
101.5	1.5	0.0108	0.20
102.0	2.0	0.0145	0.24
102.5	2.5	0.0181	0.27
103.0	3.0	0.0217	0.29
103.5	3.5	0.0253	0.32
104.0	4.0	0.0289	0.34

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
Study date: 11/26/24

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
85TH PERCENTILE STORM EVENT
POST CONDITION
DETENTION BASIN ROUTING CALCULATIONS

Program License Serial Number 6447

********** HYDROGRAPH INFORMATION **********

From study/file name: BEAUPOST242.rte
**********HYDROGRAPH DATA**********
Number of intervals = 289
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.113 (CFS)
Total volume = 0.069 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 0.000 to Point/Station 0.000
**** RETARDING BASIN ROUTING ****
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User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 289
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.006	0.280	0.005	0.007
1.000	0.012	0.420	0.011	0.013
1.500	0.018	0.520	0.016	0.020
2.000	0.024	0.610	0.022	0.026
2.500	0.030	0.680	0.028	0.032
3.000	0.036	0.750	0.033	0.039

3.500	0.042	0.810	0.039	0.045
4.000	0.048	0.870	0.045	0.051

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.0	0.06	0.08	0.11	Depth (Ft.)
0.083	0.01	0.00	0.000	OI					0.00
0.167	0.01	0.00	0.000	OI					0.00
0.250	0.01	0.00	0.000	OI					0.01
0.333	0.01	0.00	0.000	OI					0.01
0.417	0.01	0.01	0.000	OI					0.01
0.500	0.01	0.01	0.000	O					0.01
0.583	0.01	0.01	0.000	O					0.01
0.667	0.01	0.01	0.000	O					0.02
0.750	0.01	0.01	0.000	O					0.02
0.833	0.01	0.01	0.000	OI					0.02
0.917	0.01	0.01	0.000	OI					0.02
1.000	0.01	0.01	0.000	O					0.02
1.083	0.01	0.01	0.000	O					0.02
1.167	0.01	0.01	0.000	IO					0.02
1.250	0.01	0.01	0.000	IO					0.02
1.333	0.01	0.01	0.000	O					0.02
1.417	0.01	0.01	0.000	O					0.02
1.500	0.01	0.01	0.000	O					0.02
1.583	0.01	0.01	0.000	O					0.02
1.667	0.01	0.01	0.000	O					0.02
1.750	0.01	0.01	0.000	O					0.02
1.833	0.01	0.01	0.000	OI					0.02
1.917	0.01	0.01	0.000	O					0.02
2.000	0.01	0.01	0.000	O					0.02
2.083	0.01	0.01	0.000	O					0.02
2.167	0.01	0.01	0.000	O					0.02
2.250	0.01	0.01	0.000	O					0.02
2.333	0.01	0.01	0.000	O					0.02
2.417	0.01	0.01	0.000	O					0.02
2.500	0.01	0.01	0.000	O					0.02
2.583	0.02	0.01	0.000	OI					0.02
2.667	0.02	0.01	0.000	O					0.03
2.750	0.02	0.01	0.000	O					0.03
2.833	0.02	0.02	0.000	O					0.03
2.917	0.02	0.02	0.000	O					0.03
3.000	0.02	0.02	0.000	O					0.03
3.083	0.02	0.02	0.000	O					0.03
3.167	0.02	0.02	0.000	O					0.03
3.250	0.02	0.02	0.000	O					0.03
3.333	0.02	0.02	0.000	O					0.03
3.417	0.02	0.02	0.000	O					0.03
3.500	0.02	0.02	0.000	O					0.03
3.583	0.02	0.02	0.000	O					0.03
3.667	0.02	0.02	0.000	O					0.03
3.750	0.02	0.02	0.000	O					0.03
3.833	0.02	0.02	0.000	OI					0.03
3.917	0.02	0.02	0.000	O					0.03
4.000	0.02	0.02	0.000	O					0.03
4.083	0.02	0.02	0.000	O					0.03
4.167	0.02	0.02	0.000	O					0.03
4.250	0.02	0.02	0.000	O					0.03
4.333	0.02	0.02	0.000	OI					0.04
4.417	0.02	0.02	0.000	OI					0.04

4.500	0.02	0.02	0.000	|	O |	|	|	|	0.04
4.583	0.02	0.02	0.000	|	O |	|	|	|	0.04
4.667	0.02	0.02	0.000	|	O |	|	|	|	0.04
4.750	0.02	0.02	0.000	|	O |	|	|	|	0.04
4.833	0.03	0.02	0.000	|	OI|	|	|	|	0.04
4.917	0.03	0.02	0.001	|	OI|	|	|	|	0.04
5.000	0.03	0.02	0.001	|	OI|	|	|	|	0.04
5.083	0.02	0.02	0.001	|	O |	|	|	|	0.04
5.167	0.02	0.02	0.001	|	IO |	|	|	|	0.04
5.250	0.02	0.02	0.000	|	IO |	|	|	|	0.04
5.333	0.02	0.02	0.000	|	O |	|	|	|	0.04
5.417	0.02	0.02	0.000	|	O |	|	|	|	0.04
5.500	0.02	0.02	0.000	|	O |	|	|	|	0.04
5.583	0.03	0.02	0.000	|	OI|	|	|	|	0.04
5.667	0.03	0.02	0.001	|	OI|	|	|	|	0.04
5.750	0.03	0.02	0.001	|	OI|	|	|	|	0.04
5.833	0.03	0.03	0.001	|	O|	|	|	|	0.05
5.917	0.03	0.03	0.001	|	O|	|	|	|	0.05
6.000	0.03	0.03	0.001	|	O|	|	|	|	0.05
6.083	0.03	0.03	0.001	|	OI	|	|	|	0.05
6.167	0.03	0.03	0.001	|	OI	|	|	|	0.05
6.250	0.03	0.03	0.001	|	OI	|	|	|	0.05
6.333	0.03	0.03	0.001	|	O	|	|	|	0.05
6.417	0.03	0.03	0.001	|	O	|	|	|	0.05
6.500	0.03	0.03	0.001	|	O	|	|	|	0.05
6.583	0.03	0.03	0.001	|	OI	|	|	|	0.05
6.667	0.03	0.03	0.001	|	OI	|	|	|	0.05
6.750	0.03	0.03	0.001	|	OI	|	|	|	0.06
6.833	0.03	0.03	0.001	|	|O	|	|	|	0.06
6.917	0.03	0.03	0.001	|	|O	|	|	|	0.06
7.000	0.03	0.03	0.001	|	|O	|	|	|	0.06
7.083	0.03	0.03	0.001	|	|O	|	|	|	0.06
7.167	0.03	0.03	0.001	|	|O	|	|	|	0.06
7.250	0.03	0.03	0.001	|	|O	|	|	|	0.06
7.333	0.04	0.03	0.001	|	|OI	|	|	|	0.06
7.417	0.04	0.03	0.001	|	|OI	|	|	|	0.06
7.500	0.04	0.03	0.001	|	|OI	|	|	|	0.06
7.583	0.04	0.04	0.001	|	| OI	|	|	|	0.06
7.667	0.04	0.04	0.001	|	| OI	|	|	|	0.07
7.750	0.04	0.04	0.001	|	| OI	|	|	|	0.07
7.833	0.04	0.04	0.001	|	| O I	|	|	|	0.07
7.917	0.04	0.04	0.001	|	| OI	|	|	|	0.07
8.000	0.04	0.04	0.001	|	| OI	|	|	|	0.07
8.083	0.05	0.04	0.001	|	| O I	|	|	|	0.08
8.167	0.05	0.04	0.001	|	| O I |	|	|	0.08
8.250	0.05	0.05	0.001	|	| O I |	|	|	0.08
8.333	0.05	0.05	0.001	|	| OI |	|	|	0.08
8.417	0.05	0.05	0.001	|	| OI |	|	|	0.09
8.500	0.05	0.05	0.001	|	| OI |	|	|	0.09
8.583	0.05	0.05	0.001	|	| OI |	|	|	0.09
8.667	0.05	0.05	0.001	|	| OI|	|	|	0.09
8.750	0.05	0.05	0.001	|	| OI|	|	|	0.09
8.833	0.06	0.05	0.001	|	| OI|	|	|	0.09
8.917	0.06	0.05	0.001	|	| OI	|	|	0.09
9.000	0.06	0.05	0.001	|	| OI	|	|	0.10
9.083	0.06	0.06	0.001	|	| O|I	|	|	0.10
9.167	0.06	0.06	0.001	|	| OI	|	|	0.10
9.250	0.06	0.06	0.001	|	| OI	|	|	0.11
9.333	0.07	0.06	0.001	|	| |OI	|	|	0.11
9.417	0.07	0.06	0.001	|	| |OI	|	|	0.11
9.500	0.07	0.06	0.001	|	| |OI	|	|	0.11
9.583	0.07	0.06	0.001	|	| | OI	|	|	0.12
9.667	0.07	0.07	0.001	|	| | OI	|	|	0.12

9.750	0.07	0.07	0.001	|	|	| OI |	|	0.12
9.833	0.07	0.07	0.001	|	|	| OI |	|	0.12
9.917	0.07	0.07	0.001	|	|	| OI |	|	0.12
10.000	0.07	0.07	0.002	|	|	| OI |	|	0.13
10.083	0.06	0.07	0.001	|	|	I| O |	|	0.12
10.167	0.05	0.06	0.001	|	|	I | O |	|	0.11
10.250	0.05	0.06	0.001	|	|	I |O |	|	0.11
10.333	0.05	0.06	0.001	|	|	I O |	|	0.10
10.417	0.05	0.06	0.001	|	|	IO| |	|	0.10
10.500	0.05	0.05	0.001	|	|	IO| |	|	0.10
10.583	0.06	0.05	0.001	|	|	O|I |	|	0.10
10.667	0.07	0.06	0.001	|	|	O I |	|	0.10
10.750	0.07	0.06	0.001	|	|	O I |	|	0.11
10.833	0.07	0.06	0.001	|	|	|OI |	|	0.11
10.917	0.07	0.06	0.001	|	|	|OI |	|	0.11
11.000	0.07	0.06	0.001	|	|	| O |	|	0.11
11.083	0.06	0.06	0.001	|	|	| O |	|	0.12
11.167	0.06	0.06	0.001	|	|	|IO |	|	0.11
11.250	0.06	0.06	0.001	|	|	|IO |	|	0.11
11.333	0.06	0.06	0.001	|	|	|IO |	|	0.11
11.417	0.06	0.06	0.001	|	|	|O |	|	0.11
11.500	0.06	0.06	0.001	|	|	|O |	|	0.11
11.583	0.06	0.06	0.001	|	|	IO |	|	0.11
11.667	0.06	0.06	0.001	|	|	IO |	|	0.11
11.750	0.06	0.06	0.001	|	|	O |	|	0.11
11.833	0.06	0.06	0.001	|	|	O |	|	0.11
11.917	0.06	0.06	0.001	|	|	O |	|	0.11
12.000	0.06	0.06	0.001	|	|	O |	|	0.11
12.083	0.08	0.06	0.001	|	|	|O I |	|	0.11
12.167	0.08	0.07	0.001	|	|	| O I|	|	0.12
12.250	0.08	0.07	0.002	|	|	| O I|	|	0.13
12.333	0.09	0.08	0.002	|	|	| O I |	|	0.13
12.417	0.09	0.08	0.002	|	|	| O I |	|	0.14
12.500	0.09	0.08	0.002	|	|	| O I |	|	0.14
12.583	0.09	0.08	0.002	|	|	| O|I |	|	0.15
12.667	0.09	0.09	0.002	|	|	| O I |	|	0.15
12.750	0.09	0.09	0.002	|	|	| O I |	|	0.16
12.833	0.10	0.09	0.002	|	|	|O I |	|	0.16
12.917	0.10	0.09	0.002	|	|	|O I |	|	0.16
13.000	0.10	0.09	0.002	|	|	| OI |	|	0.17
13.083	0.11	0.10	0.002	|	|	| O I |	|	0.17
13.167	0.11	0.10	0.002	|	|	| O I |	|	0.18
13.250	0.11	0.10	0.002	|	|	| O I |	|	0.19
13.333	0.11	0.11	0.002	|	|	| O I |	|	0.19
13.417	0.11	0.11	0.002	|	|	| O I |	|	0.19
13.500	0.11	0.11	0.002	|	|	| O I |	|	0.20
13.583	0.09	0.11	0.002	|	|	| I O |	|	0.19
13.667	0.08	0.10	0.002	|	|	| I | O |	|	0.18
13.750	0.08	0.09	0.002	|	|	| I | O |	|	0.17
13.833	0.08	0.09	0.002	|	|	| I |O |	|	0.16
13.917	0.08	0.09	0.002	|	|	| I O |	|	0.15
14.000	0.08	0.08	0.002	|	|	| I O| |	|	0.15
14.083	0.09	0.08	0.002	|	|	| OI |	|	0.15
14.167	0.09	0.08	0.002	|	|	| O|I |	|	0.15
14.250	0.09	0.09	0.002	|	|	| OI |	|	0.15
14.333	0.09	0.09	0.002	|	|	| O |	|	0.15
14.417	0.09	0.09	0.002	|	|	| O |	|	0.15
14.500	0.09	0.09	0.002	|	|	| O |	|	0.15
14.583	0.09	0.09	0.002	|	|	| O |	|	0.15
14.667	0.09	0.09	0.002	|	|	| O |	|	0.15
14.750	0.09	0.09	0.002	|	|	| O |	|	0.15
14.833	0.08	0.09	0.002	|	|	| IO |	|	0.15
14.917	0.08	0.09	0.002	|	|	| IO |	|	0.15

15.000	0.08	0.08	0.002	|	|	| O|	|	0.15
15.083	0.08	0.08	0.002	|	|	| IO|	|	0.15
15.167	0.08	0.08	0.002	|	|	| IO|	|	0.15
15.250	0.08	0.08	0.002	|	|	| IO|	|	0.15
15.333	0.08	0.08	0.002	|	|	| IO |	|	0.15
15.417	0.08	0.08	0.002	|	|	| IO |	|	0.14
15.500	0.08	0.08	0.002	|	|	| IO |	|	0.14
15.583	0.07	0.08	0.002	|	|	| I O |	|	0.14
15.667	0.06	0.07	0.002	|	|	|I O |	|	0.13
15.750	0.06	0.07	0.002	|	|	|I O |	|	0.13
15.833	0.06	0.07	0.001	|	|	|I O |	|	0.12
15.917	0.06	0.07	0.001	|	|	|IO |	|	0.12
16.000	0.06	0.07	0.001	|	|	|IO |	|	0.12
16.083	0.02	0.06	0.001	|	I|	O |	|	0.11
16.167	0.01	0.05	0.001	| I	|	O |	|	0.09
16.250	0.01	0.04	0.001	| I	| O	|	|	0.07
16.333	0.01	0.03	0.001	| I	O |	|	|	0.06
16.417	0.01	0.03	0.001	| I	O|	|	|	0.05
16.500	0.01	0.02	0.000	| I	O |	|	|	0.04
16.583	0.01	0.02	0.000	| I O	|	|	|	0.04
16.667	0.01	0.02	0.000	| I O	|	|	|	0.03
16.750	0.01	0.02	0.000	| I O	|	|	|	0.03
16.833	0.01	0.01	0.000	| IO	|	|	|	0.02
16.917	0.01	0.01	0.000	| IO	|	|	|	0.02
17.000	0.01	0.01	0.000	| IO	|	|	|	0.02
17.083	0.02	0.01	0.000	| OI	|	|	|	0.02
17.167	0.02	0.01	0.000	| OI	|	|	|	0.02
17.250	0.02	0.01	0.000	| OI	|	|	|	0.03
17.333	0.02	0.01	0.000	| O	|	|	|	0.03
17.417	0.02	0.02	0.000	| O	|	|	|	0.03
17.500	0.02	0.02	0.000	| O	|	|	|	0.03
17.583	0.02	0.02	0.000	| O	|	|	|	0.03
17.667	0.02	0.02	0.000	| O	|	|	|	0.03
17.750	0.02	0.02	0.000	| O	|	|	|	0.03
17.833	0.01	0.02	0.000	| IO	|	|	|	0.03
17.917	0.01	0.02	0.000	| IO	|	|	|	0.03
18.000	0.01	0.01	0.000	| IO	|	|	|	0.03
18.083	0.01	0.01	0.000	| IO	|	|	|	0.03
18.167	0.01	0.01	0.000	| O	|	|	|	0.03
18.250	0.01	0.01	0.000	| O	|	|	|	0.02
18.333	0.01	0.01	0.000	| O	|	|	|	0.02
18.417	0.01	0.01	0.000	| O	|	|	|	0.02
18.500	0.01	0.01	0.000	| O	|	|	|	0.02
18.583	0.01	0.01	0.000	| O	|	|	|	0.02
18.667	0.01	0.01	0.000	| IO	|	|	|	0.02
18.750	0.01	0.01	0.000	| IO	|	|	|	0.02
18.833	0.01	0.01	0.000	| IO	|	|	|	0.02
18.917	0.01	0.01	0.000	|IO	|	|	|	0.02
19.000	0.01	0.01	0.000	|IO	|	|	|	0.02
19.083	0.01	0.01	0.000	| O	|	|	|	0.02
19.167	0.01	0.01	0.000	| O	|	|	|	0.02
19.250	0.01	0.01	0.000	| O	|	|	|	0.02
19.333	0.01	0.01	0.000	| OI	|	|	|	0.02
19.417	0.01	0.01	0.000	| O	|	|	|	0.02
19.500	0.01	0.01	0.000	| O	|	|	|	0.02
19.583	0.01	0.01	0.000	| O	|	|	|	0.02
19.667	0.01	0.01	0.000	| IO	|	|	|	0.02
19.750	0.01	0.01	0.000	| IO	|	|	|	0.02
19.833	0.01	0.01	0.000	| O	|	|	|	0.02
19.917	0.01	0.01	0.000	|IO	|	|	|	0.02
20.000	0.01	0.01	0.000	|IO	|	|	|	0.02
20.083	0.01	0.01	0.000	| O	|	|	|	0.02
20.167	0.01	0.01	0.000	| O	|	|	|	0.02

20.250	0.01	0.01	0.000	| O	|	|	|	0.02
20.333	0.01	0.01	0.000	| O	|	|	|	0.02
20.417	0.01	0.01	0.000	| O	|	|	|	0.02
20.500	0.01	0.01	0.000	| O	|	|	|	0.02
20.583	0.01	0.01	0.000	| O	|	|	|	0.02
20.667	0.01	0.01	0.000	| O	|	|	|	0.02
20.750	0.01	0.01	0.000	| O	|	|	|	0.02
20.833	0.01	0.01	0.000	| O	|	|	|	0.02
20.917	0.01	0.01	0.000	|IO	|	|	|	0.02
21.000	0.01	0.01	0.000	|IO	|	|	|	0.01
21.083	0.01	0.01	0.000	| O	|	|	|	0.01
21.167	0.01	0.01	0.000	| O	|	|	|	0.02
21.250	0.01	0.01	0.000	| O	|	|	|	0.02
21.333	0.01	0.01	0.000	| O	|	|	|	0.02
21.417	0.01	0.01	0.000	|IO	|	|	|	0.01
21.500	0.01	0.01	0.000	|IO	|	|	|	0.01
21.583	0.01	0.01	0.000	| O	|	|	|	0.01
21.667	0.01	0.01	0.000	| O	|	|	|	0.01
21.750	0.01	0.01	0.000	| O	|	|	|	0.02
21.833	0.01	0.01	0.000	| O	|	|	|	0.02
21.917	0.01	0.01	0.000	|IO	|	|	|	0.01
22.000	0.01	0.01	0.000	|IO	|	|	|	0.01
22.083	0.01	0.01	0.000	| O	|	|	|	0.01
22.167	0.01	0.01	0.000	| O	|	|	|	0.01
22.250	0.01	0.01	0.000	| O	|	|	|	0.02
22.333	0.01	0.01	0.000	| O	|	|	|	0.02
22.417	0.01	0.01	0.000	|IO	|	|	|	0.01
22.500	0.01	0.01	0.000	|IO	|	|	|	0.01
22.583	0.01	0.01	0.000	|IO	|	|	|	0.01
22.667	0.01	0.01	0.000	|IO	|	|	|	0.01
22.750	0.01	0.01	0.000	|IO	|	|	|	0.01
22.833	0.01	0.01	0.000	|O	|	|	|	0.01
22.917	0.01	0.01	0.000	|O	|	|	|	0.01
23.000	0.01	0.01	0.000	|O	|	|	|	0.01
23.083	0.01	0.01	0.000	|O	|	|	|	0.01
23.167	0.01	0.01	0.000	|O	|	|	|	0.01
23.250	0.01	0.01	0.000	|O	|	|	|	0.01
23.333	0.01	0.01	0.000	|O	|	|	|	0.01
23.417	0.01	0.01	0.000	|O	|	|	|	0.01
23.500	0.01	0.01	0.000	|O	|	|	|	0.01
23.583	0.01	0.01	0.000	|O	|	|	|	0.01
23.667	0.01	0.01	0.000	|O	|	|	|	0.01
23.750	0.01	0.01	0.000	|O	|	|	|	0.01
23.833	0.01	0.01	0.000	|O	|	|	|	0.01
23.917	0.01	0.01	0.000	|O	|	|	|	0.01
24.000	0.01	0.01	0.000	|O	|	|	|	0.01
24.083	0.00	0.01	0.000	IO	|	|	|	0.01
24.167	0.00	0.00	0.000	IO	|	|	|	0.01
24.250	0.00	0.00	0.000	O	|	|	|	0.01
24.333	0.00	0.00	0.000	O	|	|	|	0.00
24.417	0.00	0.00	0.000	O	|	|	|	0.00
24.500	0.00	0.00	0.000	O	|	|	|	0.00
24.583	0.00	0.00	0.000	O	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 295
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.110 (CFS)
Total volume = 0.069 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Beaumont Library Addition and Renovation Project

125 E 8th Street,
Beaumont, CA 92223
APN
Project Number: PW2025-0164

FINAL HYDROLOGY AND HYDRAULICS REPORT

March 2025

Prepared for:
Beaumont Library District
125 East 8th Street
Beaumont, CA 92223
(951) 845-1357

Prepared by:
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BKF Engineers
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Newport Beach, CA 92660
949 526 8460

TABLE OF CONTENTS

1. **Introduction** 1
2. **Hydrology Analysis** 2
3. **Onsite Storm Drain Sizing** 4
4. **Conclusion** 5
5. **Technical Appendices** 8

1. Introduction

The Beaumont Library District has requested that BKF Engineers prepare a Hydrology and Hydraulics Study for the Beaumont Library Addition and Renovation Project.

The project site's address is 125 E 8th Street, Beaumont, CA 92223. The site is located at the southeast corner of the intersection of N California Ave. and E 8th St. Per the City of Beaumont's Master Drainage Plan (MDP), the site does not fall within a 100-year flood plain nor does it fall within an area with specific recommendations of improvements. The runoff produced from the site will ultimately discharge into Line 3 of the MDP. The site lies within the FEMA Flood Zone "ZONE X" per FEMA Map 06065C0811G dated August 28, 2008. The existing site does not have any off-site run-on impacts. The existing site is approximately 1.34 acres consisting of three existing building structures, an asphalt paved parking lot, and landscaping. The existing site is approximately 77.8% impervious and 22.2% pervious. In the existing condition, storm water sheet flows over the asphalt paved parking lot from the north-east to the south-west portion of the site, which is towards California Avenue. Storm water during small storm events will either flow into a v-ditch close to the south of the existing library structure or to an existing drop inlet located at the south-west corner of the site. The v-ditch and inlet both discharge to California Avenue via under sidewalk drains. During larger storm events, storm water sheet flows over the public sidewalk and parkway, into the curb and gutter of California Avenue. The storm water will then continue south and will be eventually collected by a public grate inlet located at the northwest corner of the intersection of N California Ave. and E 6th St.

The proposed project includes renovation of the existing Beaumont Library District building, demolition and reconfiguration of the existing parking lot and landscape areas, and the addition of a new single-story library building. The proposed site will be approximately 91% impervious and 9% pervious. In the proposed condition, the site will not have any off-site run-on impacts. In the proposed condition, storm water will be collected by inlet structures and conveyed in underground pipes to an underground detention system. After passing through the detention system, storm water will be treated by a modular wetlands unit. The storm water will then be pumped up and discharged to California Avenue through an under sidewalk drain.

The underground detention system and outlet are sized to address the hydromodification concerns as noted in the Water Quality Management Report (WQMP) for this project. The proposed condition 2-year 24-hr peak flow rate cannot be 10% greater than the existing condition. The underground detention system and outlet are also sized to ensure the proposed condition's 100-year 24-hour storm event peak flow rate does not exceed the existing condition's.

During a large storm event and if the underground detention system is completely full, stormwater will bubble back up through the four inlets located onsite. The primary and the first grate that stormwater will bubble back up

through will be the inlet located at the southwest corner of the site, which is the same overflow discharge point in the existing condition. Stormwater will then discharge towards California Avenue via street sheet flow. The peak flows will be similar to the existing condition.

The purpose of this hydrology report is to analyze the pre-project and post-project peak flow rates. Additionally, hydraulic calculations will be performed to demonstrate that the proposed on-site drainage system is adequately sized to handle a 100-year storm event.

2. Hydrology Analysis

The hydrologic and hydraulic analyses were completed following the methods outlined in the Riverside County Flood Control & Water Conservation District (RCFC & WCD) Hydrology Manual, dated April 1978. The rational method was used to estimate time of concentrations and peak flow rates generated from the pre/post-developed 2-year, 10-year, and 100-year storm events. The calculations were done utilizing CivilDesign Software Version 9.0 and are included in Appendix A.

The synthetic unit hydrograph method was used to determine the onsite existing and proposed hydrographs for the 24-hour durations of the 2-year and 100-year storm event. CivilDesign was used to complete the synthetic unit hydrograph and the basin routing analysis to demonstrate that the post-development runoff discharge rate is similar to the pre-development condition. The results of the analyses are included in Appendix C.

The type of soil and soil conditions are major factors affecting infiltration/detention and resultant stormwater runoff. The Natural Resources Conservation Service (NRCS) has classified soil into one general hydrologic soil group (HSG) for comparing infiltration and runoff rates. The HSG is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge, and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the RCFC & WCD Hydrology Manual, Plate C-1.19, included in Appendix D, the project area is in HSG C. Per the Historical Infiltration Rates Letter dated June 25, 2024, and prepared by Universal Engineering Services, Inc., the site is considered to have low infiltration rates, within a minimum and maximum range of 0.008- to 0.075-in/hr. Due to the low rates, infiltration is not feasible for this project. See Appendix E for the geotechnical report and for the Historical Infiltration Rates Letter.

In addition, antecedent moisture condition (AMC) I was used to calculate the 2-year peak flows, AMC II for the 10-year peak flows, and AMC III for the 100-year peak flows. The rainfall data was gathered from NOAA Atlas 14 for the Project site and the data can be found in Appendix D.

The results of the rational method study demonstrate that the post-project storm water peak flow runoff rate is greater than the pre-project condition. A summary of the calculations for the 2, 10, and 100-year storms for the pre-project and post-project conditions are shown in the tables below.

Table 2-1: Pre-Project Subarea Flow Summary

Subarea ID	Area (ac)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
A1	0.66	1.21	2.40	4.09
A2	0.68	1.41	2.78	4.73
Total	1.34	2.62	5.18	8.82

Table 2-2: Post-Project Subarea Flow Summary

Subarea ID	Area (ac)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
A1	0.52	1.08	2.13	3.62
A2	0.08	0.16	0.32	0.55
A3	0.28	0.55	1.09	1.87
A4	0.30	0.58	1.16	1.99
A5	0.16	0.31	0.62	1.06
Total	1.34	2.68	5.33	9.10

The results of the synthetic unit hydrograph method and the basin routing calculations demonstrate that the underground detention basin and outlet are sized correctly for water quality and hydrology purposes. The results are summarized in the table below. The hydrograph and basin routing calculations are included in Appendix C. The basin drawdown calculations are included in Appendix C as well.

Table 2-3: Hydrograph and Basin Routing Summary

Basin - Storm Event	Existing		Proposed		Post-Routing	
	CFS	Volume (CF)	CFS	Volume (CF)	CFS	Storage (CF)
2 year, 24-hour	0.364	9,636	0.416	11,020	0.378	2,159
100 year, 1-hour	7.794	8,609	6.943	8,902	7.554	2,159
100 year, 24-hour	0.902	23,157	1.012	26,452	0.810	2,159

3. Onsite Storm Drain Inlet and Pipe Sizing

Hydraulic Analyses were performed to determine the pipe sizes with capacity for storm events of up to 100-years in magnitude using the Hydraulic Toolbox software developed by the Federal Highway Administration. Hydraulic Toolbox can be used to calculate the full flow capacity of a pipe based on pipe diameter, slope, and Manning's Roughness Coefficient. Using the results of the Hydraulic Toolbox calculations, a table was created with the full flow capacity for the typical PVC pipe increments. The table was then used to determine the pipe size required for each pipe segment. The calculations are included in Appendix B.

Table 3-3 and Table 3-4 summarize the results of the hydraulic analysis. Storm Drain line designations can be found on the Proposed Condition Rational Method Hydrology Map.

Table 3-3: Full Flow Capacity for Standard PVC Pipe Sizes

Pipe Diameter (in)	Slope %	Manning's Roughness Coefficient	Full Flow Capacity (cfs)
4	1.0	0.010	0.24
8	0.5	0.010	1.13
8	1.0	0.010	1.59
12	0.5	0.010	3.28
12	1.0	0.010	4.63
12	1.4	0.010	5.89
15	1.5	0.010	11.05

Table 3-4: Onsite Storm Drain Sizes

Storm Drain Line	Tributary Inlets	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)	Slope %	Pipe Dia. (in)
1	1A	1.08	2.13	3.62	1.4	12
IA	1A, 1B	1.24	2.45	4.17	1.4	12
2A	1A, 1B	1.79	3.54	6.04	1.5	15
3A	3A	0.31	0.62	1.06	0.5	12
3B	2A, 3A	0.89	1.78	3.05	0.5	12
4A*	-	0.38	-	0.81	1.0	8
5A**	-	0.38	-	0.81	-	3
6A**	-	0.38	-	0.81	1.0	(4)-4

*Storm Drain Line 4A peak flow is reduced due to the detention provided by the underground detention system. The peak flow expected during a 2-year, 24-hour storm event is expected to reach a max of 0.38 cfs. The peak flow expected during a 100-year, 24-hour storm event is expected to reach a max of 0.81 cfs. During larger storm events, Storm water will follow the overflow drainage path and sheet flow to California Avenue, bypassing Line 3A.

**Storm Drain Lines 5A and 6A are downstream of a pump system. The pump system is sized to handle the max discharge it can receive from the upstream detention system (0.81 CFS). 5A will be a pressurized line and 6A are the four 4" curb drains downstream of 5A.

In addition, the onsite storm drain inlets were analyzed to determine the required sizes for a 100-year storm event. The analysis was done utilizing FlowMaster Version 7.0 Computer Program developed by Haestad Methods, Inc. The FlowMaster input includes cross slope, gutter slope, inlet length, and a clogging factor. The program calculates inlet efficiency, intercepted flow, bypass flow, and the depth of flow. The FlowMaster Calculations are included in Appendix B and are summarized in Table 3-5 below.

Table 3-5: Onsite Storm Drain Inlet Sizing

Storm Drain Inlet	Proposed Size (WxL, ft)	Depth (in)	Q_{100} (CFS)	Intercepted Flow (CFS)	Bypass Flow (CFS)
IA	2x6	4.4	3.62	3.62	-
1B	2x3	2.1	0.55	0.55	-
2A	2x3	3.2	1.99	1.48	0.51
3A	2x3, 0.5x23*	2.3	1.06+0.51	1.57	-

4. Conclusion

The results from this hydrology study demonstrates that the post-project storm water peak flow runoff rate is greater than the pre-project condition. These results are summarized in Section 2 of this report and the calculations can be found in Appendix A. To accommodate this increase, an underground detention basin is utilized to ensure the 100-year 24-hour storm event proposed condition's peak flow does not exceed the peak flow of the existing condition.

The underground detention system was also designed so that the system will store an adequate amount of runoff to maintain the pre-development conditions for the 2-year, 24-hour storm event. These results are summarized in Section 2 of this report and the calculations can be found in Appendix C.

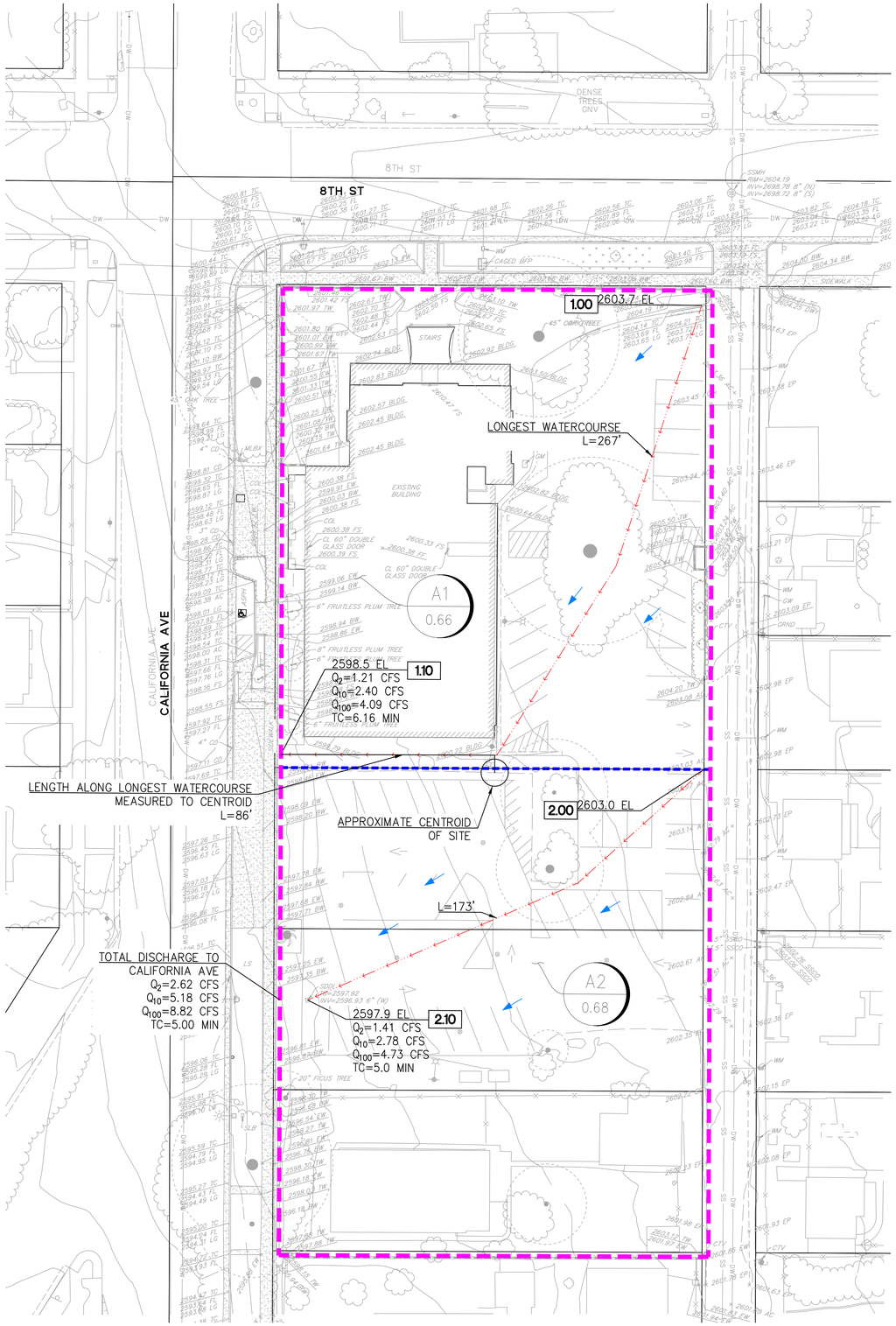
In addition, the basin will be able to drain within 1.36 hours per the basin drawdown calculations included in Appendix C.

Lastly, the proposed storm drain system on-site is adequately sized to handle the peak flows of a 100-year storm event. These results are summarized in Section 3 of this report and the calculations can be found in Appendix B.

Exhibits

Exhibit 1 Pre-Condition Hydrology Map

Exhibit 2 Post-Condition Hydrology Map



LEGEND

- SUBAREA NUMBER
- WATERSHED DESIGNATION
- 1A / 0.09 — AREA IN ACRES
- WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH OF TRAVEL & LENGTH
- NODE NUMBER
- 1.2 — 204.6 EL — ELEVATION
- 200.0 INV — INVERT ELEVATION
- Q_{100}=16.6 cfs — PEAK FLOW FOR STORM FREQUENCY
- FLOW DIRECTION

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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RECOMMENDED BY: _____ PRINCIPAL ENGINEER DATE: _____
APPROVED BY: _____ CITY ENGINEER DATE: _____

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

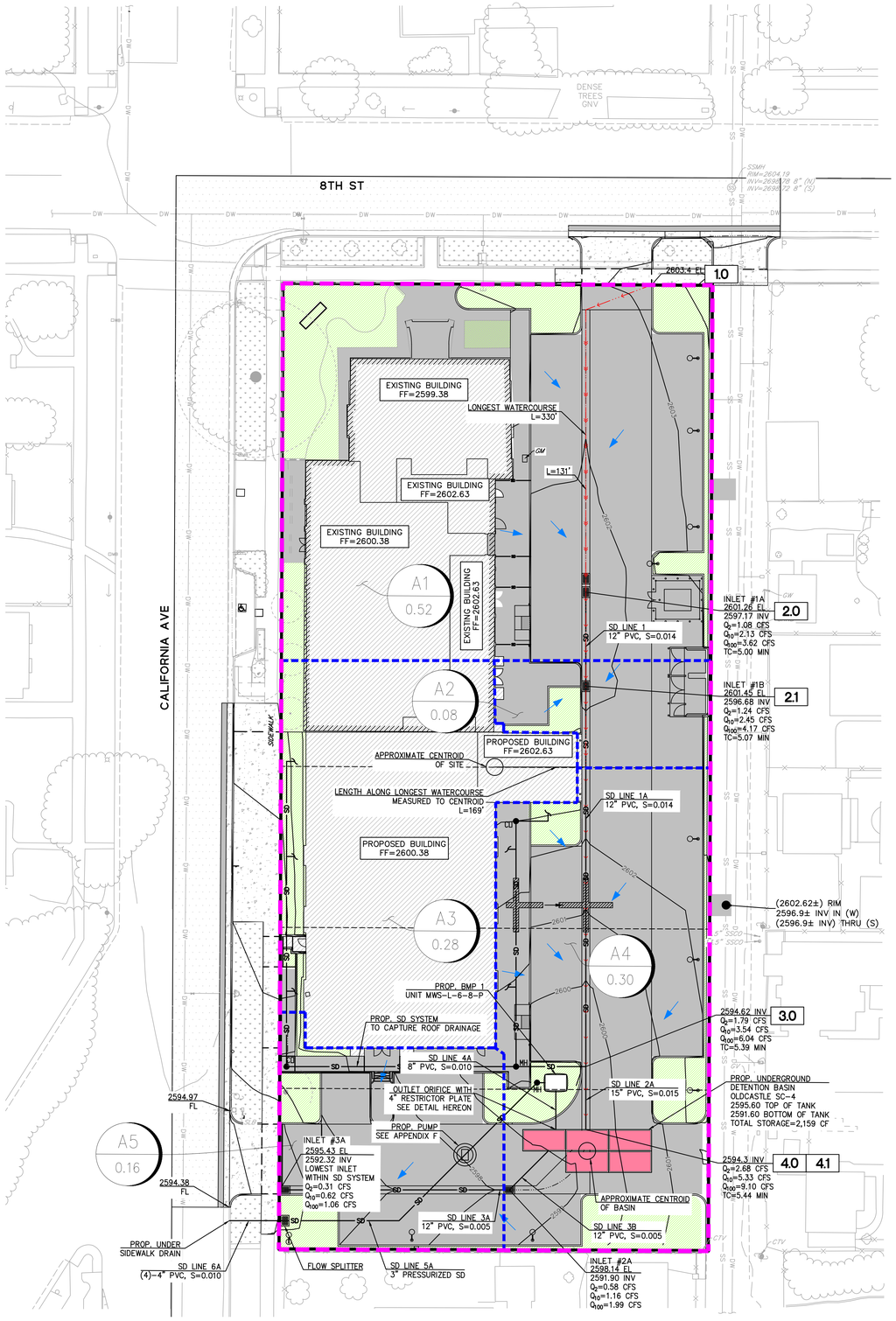
CITY OF BEAUMONT, CALIFORNIA

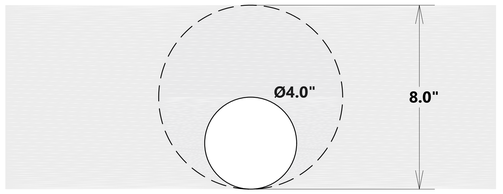
PRE-DEVELOPMENT CONDITIONS HYDROLOGY MAP

BEAUMONT LIBRARY ADDITION & RENOVATION PROJECT
125 E 8TH ST, BEAUMONT, CA 92223

SHEET -

FILE NO:





ORIFICE RESTRICTOR PLATE DETAIL

LEGEND

- SUBAREA NUMBER
- WATERSHED DESIGNATION
- 1A / 0.09 — AREA IN ACRES
- WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH OF TRAVEL & LENGTH
- NODE NUMBER
- 1.2 — 204.6 EL — ELEVATION
- 200.0 INV — INVERT ELEVATION
- Q_{100}=16.6 cfs — PEAK FLOW FOR STORM FREQUENCY
- SD — PROPOSED STORM DRAIN
- FLOW DIRECTION
- ASPHALT PAVEMENT/CONCRETE
- BUILDING HATCH
- UNDERGROUND DETENTION BASIN
- PROPOSED LANDSCAPING

N

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
A SCRIBED "X" AT THE TOP OF A CURB RAMP WITHIN THE SOUTHEAST CURB RETURN AT THE INTERSECTION OF ELEVENTH STREET MAPLE AVENUE.

ELEV. 100.00, TBM

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

DESIGN BY:
DRAWN BY:
CHECKED BY:
SCALE: AS SHOWN
DATE:
JOB NUMBER:

BKF
4675 MACARTHUR CT.
SUITE 400
NEWPORT BEACH, CA 92660
(949) 526-8460
www.bkf.com

REGISTERED PROFESSIONAL ENGINEER BRUCE W. KIRBY No. C 42393 CIVIL STATE OF CALIFORNIA

REVIEWED BY: _____ STAFF ENGINEER DATE: _____
RECOMMENDED BY: _____ PRINCIPAL ENGINEER DATE: _____
APPROVED BY: _____ CITY ENGINEER DATE: _____

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

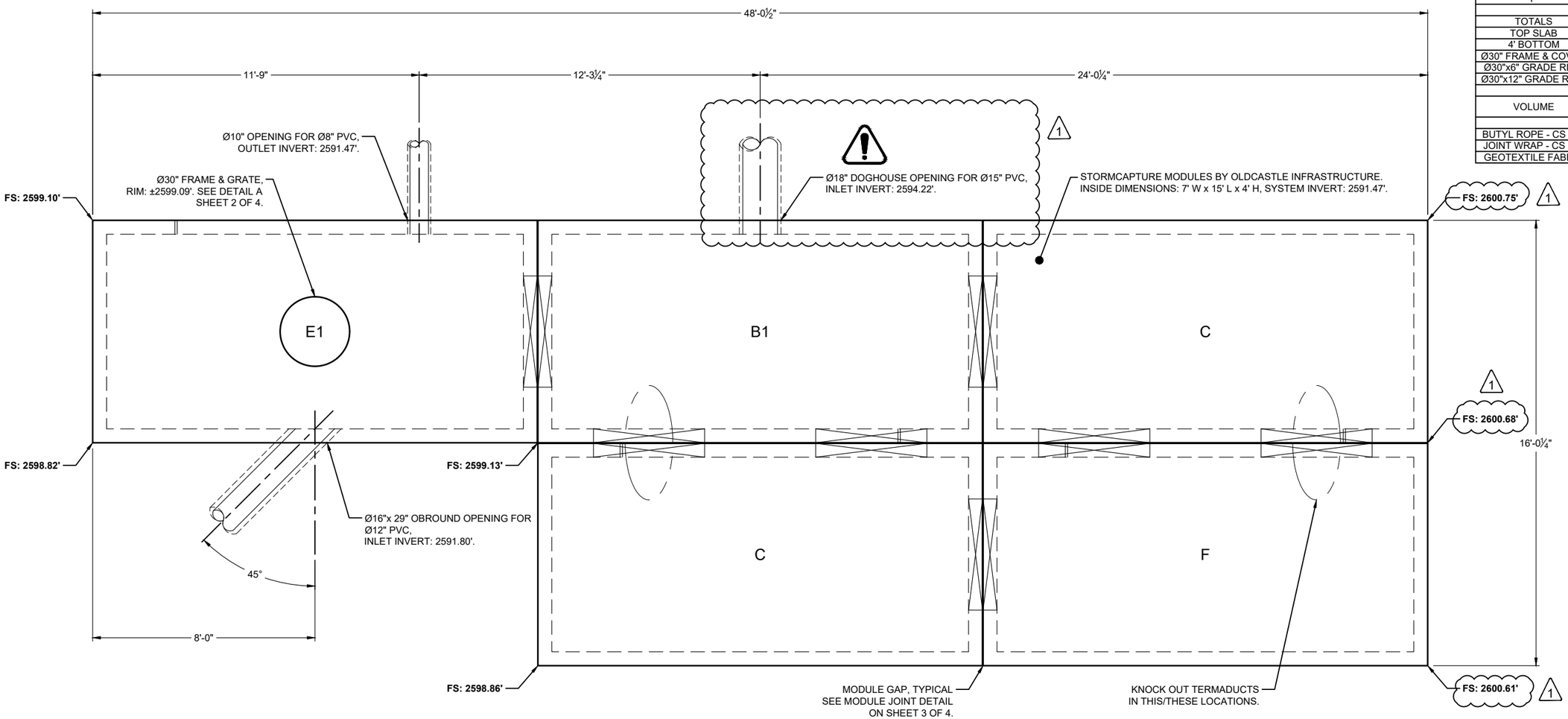
CITY OF BEAUMONT, CALIFORNIA

POST-CONDITION HYDROLOGY EXHIBIT
BEAUMONT LIBRARY ADDITION & RENOVATION PROJECT
125 E 8TH ST, BEAUMONT, CA 92223

SHEET -
FILE NO:

⚠ LOWERED INLET IE FROM 2594.26' TO 2594.22' TO FIT PIPE WITHIN MODULE.

BILL OF MATERIALS				
TYPE	QTY	HEIGHT	STD	NOTES
B1	1	4'		
C	2	4'		
E1	1	4'		
F	1	4'		
TOTALS				
TOP SLAB	5	7"		
4' BOTTOM	5			
Ø30" FRAME & COVER	1			
Ø30"x6" GRADE RING	1			
Ø30"x12" GRADE RING	2			
VOLUME	2,159	CUBIC FEET		
BUTYL ROPE - CS 102	21	ROLLS		
JOINT WRAP - CS 212	1	ROLL		
GEOTEXTILE FABRIC	1	ROLL		



PLAN VIEW
SCALE: 1/4" = 1'-0"

DESIGN NOTES

1. LIVE LOADING CRITERIA:
   - A. AASHTO HS-20-44 DESIGN TRUCK (WITH IMPACT AT 0.50FT MINIMUM COVER)
   - B. LATERAL LIVE LOAD SURCHARGE: 80 PSF (TO 8.00FT DEPTH)
   - C. NO LATERAL SURCHARGE(S) FROM ANY ADJACENT BUILDINGS, WALLS, FOUNDATIONS, OR ANY ADDITIONAL SITE ELEMENTS.
2. SOIL LOADING CRITERIA:
   - A. SOIL COVER DEPTH: 0.50FT (MIN.) - 5.00FT (MAX.)
   - B. SOIL UNIT WEIGHT: 120 PCF
   - C. ASSUMED WATER TABLE ELEVATION: BELOW BOTTOM OF PRECAST
   - D. REQUIRED ALLOWABLE BEARING PRESSURE: 2,500 PSF
   - E. EQUIVALENT LATERAL FLUID PRESSURE, ACTIVE: 45 PCF (DRAINED)
   - F. EQUIVALENT LATERAL FLUID PRESSURE, AT-REST: 60 PCF (DRAINED)
   - G. EQUIVALENT LATERAL FLUID PRESSURE, PASSIVE: 150 PCF (DRAINED)
   - H. ASSUMED COEFFICIENT OF FRICTION: 0.40
   - I. SEISMIC LATERAL EARTH PRESSURES: 30.5H PCF (APPLIED AS INVERTED TRIANGLE)
3. STORMCAPTURE MODULE TYPE: DETENTION (SOILTIGHT).
4. CONCRETE (NORMAL WEIGHT):
   - A. MIN. 28-DAY COMPRESSIVE STRENGTH: 6,000 PSI
   - B. CEMENT: ASTM C150
5. STEEL REINFORCEMENT: ASTM A615 / A706 (GRADE 60), ASTM A1064 (GRADE 80)
6. REFERENCE STANDARDS: ASTM C913 & C890, ACI 318-14

Detention/ Infiltration

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

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STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	PLAN-N
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

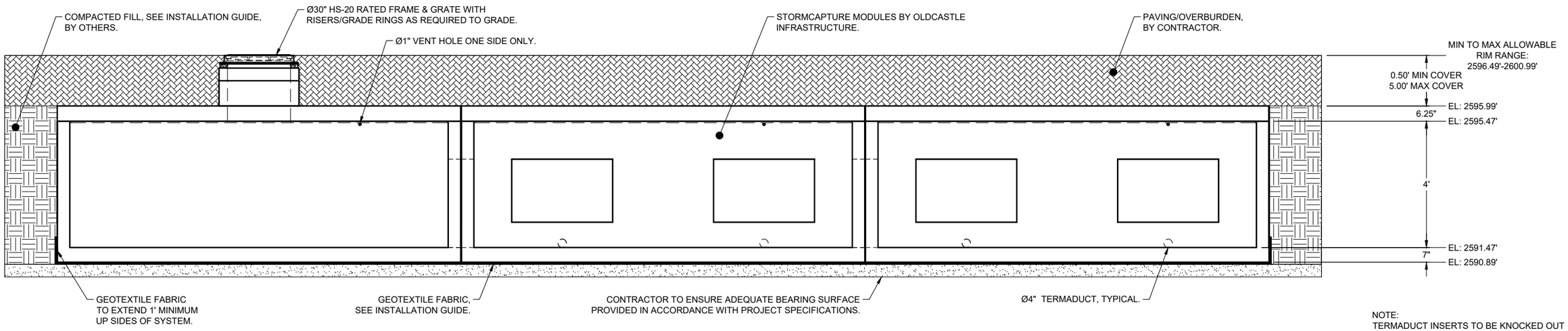
DRAWING NAME: SUBMITTAL DRAWING

SHEET: 1 OF 4

REVIEWING NOTES

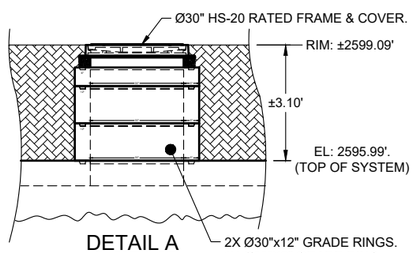
1. THIS SYSTEM HAS BEEN DESIGNED PER THE DESIGN PARAMETERS SPECIFIED IN THE DESIGN NOTES. REVIEWING ENGINEER SHALL VERIFY THAT THESE PARAMETERS MEET OR EXCEED PROJECT SPECIFIC REQUIREMENTS. IF SITE CONDITIONS DIFFER FROM NOTED DESIGN PARAMETERS, REVIEWING ENGINEER SHALL NOTIFY OLDCASTLE FOR POTENTIAL REDESIGN AND/OR PRICING ADJUSTMENTS.
2. REVIEWING ENGINEER SHALL VERIFY ALL PIPE PENETRATION LOCATIONS, SIZES, AND INVERTS.
3. REVIEWING ENGINEER SHALL VERIFY ALL MANWAY ACCESS LOCATIONS AND RIM ELEVATIONS.
4. THIS SYSTEM IS DESIGNED FOR A GROUNDWATER TABLE ELEVATION PER DESIGN NOTE 2C, SHEET 1. REVIEWING ENGINEER SHALL VERIFY THAT THE DESIGN GROUNDWATER ELEVATION MEETS OR EXCEEDS SITE CONDITION REQUIREMENTS. NOTIFY OLDCASTLE IF SITE CONDITIONS VARY FROM WHAT HAS BEEN SPECIFIED FOR POTENTIAL SYSTEM DESIGN CHANGES AND/OR PRICING ADJUSTMENTS.
5. STORMCAPTURE MODULES ARE NOT WATERTIGHT. IF A WATERTIGHT SOLUTION IS REQUIRED, CONTACT OLDCASTLE FOR RECOMMENDATIONS. THE WATERTIGHT APPLICATION TO BE PROVIDED AND IMPLEMENTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE SELECTED WATERTIGHT SOLUTION PERFORMS AS SPECIFIED BY THE MANUFACTURER.
6. DESIGN OF THE STORMCAPTURE PRECAST MODULE SYSTEM ASSUMES NO ADJACENT BUILDING(S), WALL(S), OR STRUCTURAL FOUNDATION(S) WITHIN A 1:1 INFLUENCE LINE FROM THE BOTTOM EDGE OF ANY SYSTEM MODULE. ANY SITE ELEMENTS BEYOND THIS ZONE OF INFLUENCE ARE ASSUMED TO HAVE NO IMPACT ON THE SYSTEM AND EXERT ZERO LATERAL SURCHARGE ONTO THE MODULES. THE CONTRACTOR SHALL VERIFY THAT ANY ADJACENT BUILDING(S), WALL(S), OR STRUCTURAL FOUNDATION(S) DO NOT LIE WITHIN THIS INFLUENCE ZONE OR DO NOT SURCHARGE THE PRECAST MODULES.
7. WRITTEN APPROVAL OF SUBMITTAL DRAWINGS ALONG WITH SIGNED PURCHASE ORDER REQUIRED FOR BEGINNING OF PRODUCT FABRICATION. ANY SYSTEM MODIFICATION POST-APPROVAL MAY RESULT IN CHANGE ORDER(S) AND/OR POTENTIAL DELIVERY DELAYS.
8. ALL SAND FILTER MEDIA, DRAIN ROCK AGGREGATE, PIPE, AND FITTINGS PROVIDED BY CONTRACTOR.

WATERPROOFING TO BE PROVIDED BY OTHERS.



NOTE:
TERMADUCT INSERTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS ONLY (BY OTHERS).

TYPICAL ELEVATION
NTS



DETAIL A
MODULE E1
SCALE: 1/4" = 1'-0"

Detention/ Infiltration

REV	DESCRIPTION	DATE
⚠	UPDATED PER COMMENTS	2/10/25

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STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

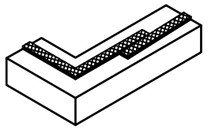
DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

DRAWING NAME	SHEET
SUBMITTAL DRAWING	2 OF 4

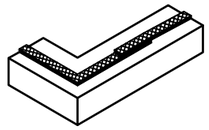
INSTALLATION NOTES

1. UNDERGROUND PRECAST CONCRETE SYSTEM INSTALLATION SHALL BE PER ASTM C891, “STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES” AND PER OLDCASTLE.
2. MODULE SUBBASE OR SUBGRADE SHALL BE LEVEL/SCREEDED AND COMPACTED ADEQUATELY FOR REQUIRED BEARING CAPACITY PER DESIGN NOTE 2D, SHEET 1. CONTRACTOR AND/OR INSTALLING SUB-CONTRACTOR SHALL VERIFY THAT SOIL BEARING CONDITIONS MEET OR EXCEED DESIGN REQUIRED MINIMUMS PRIOR TO PLACEMENT AND INSTALLATION OF MODULES.
3. ANY CONSTRUCTION EQUIPMENT EXCEEDING NOTED DESIGN LOADING IS NOT PERMITTED OVER OR ADJACENT TO ANY MODULE WITHOUT FORMAL REVIEW AND WRITTEN APPROVAL BY OLDCASTLE ENGINEERING, ELSE PRODUCT WARRANTY MAY BE VOIDED. ANY DESIGN CONSTRAINT EXCEEDING THE DESIGN PARAMETERS NOTED ABOVE MAY REQUIRE CUSTOM STRUCTURAL DESIGN, SUBGRADE REVISIONS, AND/OR PRICING ADJUSTMENTS.
4. HEAVY VIBRATORY COMPACTION EQUIPMENT SHALL NOT BE OPERATED WITHIN 10 FEET OF MODULE EXTERIOR.
5. MINIMUM OF 0.50FT OF SOIL COVER REQUIRED FOR CONSTRUCTION EQUIPMENT OPERATION ON TOP OF SYSTEM. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND INSTALLING SUB-CONTRACTOR TO ENSURE THAT NO MODULES ARE DAMAGED DURING CONSTRUCTION.
6. UNLESS NOTED OTHERWISE, ALL PIPE SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR MAY MODIFY AT RISK ANY OLDCASTLE PRODUCT(S) IN THE FIELD OR AFTER DELIVERY WITHOUT FORMAL REVIEW AND WRITTEN APPROVAL BY OLDCASTLE ENGINEERING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT ANY PRODUCT MODIFICATIONS DO NOT INVALIDATE THE PRODUCT WARRANTY.
8. MODULE PLACEMENT FIELD TOLERANCES SHALL NOT EXCEED 3/4" BETWEEN ADJACENT MODULES. IF MODULE GAP EXCEEDS 3/4", CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS AND RESET MODULE(S) TO BRING WITHIN NOTED TOLERANCES.
9. CONTRACTOR IS RESPONSIBLE FOR PRODUCTS ONCE DELIVERED TO THE SITE. OLDCASTLE IS NOT RESPONSIBLE FOR OFFLOADING PRODUCTS, MAINTENANCE, AND INSTALLATION OF PRODUCTS ONCE THEY ARRIVE TO THE SITE.
10. CONTRACTOR SHALL INSTALL SYSTEM PER PROJECT WATERPROOFING AND SOILTIGHTNESS REQUIREMENTS. WATERPROOFING AND SOILTIGHTNESS INSTALLATION IS NOT BY OLDCASTLE AND OLDCASTLE WILL PROVIDE NO GUARANTEE FOR THIS COMPONENT OF SYSTEM INSTALLATION.

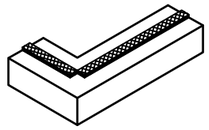
KEYWAYS MUST BE FREE OF DIRT, ROCKS, AND WATER. ROCKS AND DIRT PREVENT THE VAULT SECTIONS FROM SEATING AND SEALING PROPERLY. REMOVE ALL PROTECTIVE PAPER FROM RUBBER SEALANT MATERIAL. SPLICE RUBBER SEALANT MATERIAL WITH A "SIDE BY SIDE" JOINT, AWAY FROM CORNERS. CORNER SPLICING WILL NOT SEAL PROPERLY.



CORRECT - INSTALL RUBBER SEALANT MATERIAL AT THE OUTER EDGE OF THE KEYWAY. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.



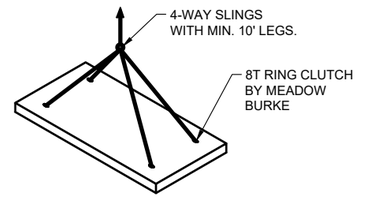
INCORRECT - DO NOT OVERLAP THE RUBBER SEALANT MATERIAL AT SPLICE.



INCORRECT - DO NOT SPLICE RUBBER SEALANT MATERIAL AT A CORNER. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.

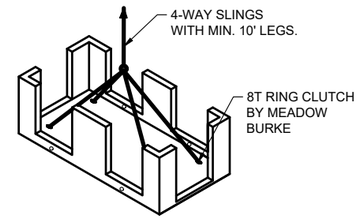
BUTYL RUBBER SEALANT (CONSEAL CS-102 OR EQUAL) PLACEMENT DETAIL

NTS



TOP SLAB LIFTING DETAIL

N.T.S.



BOTTOM MODULE LIFTING DETAIL

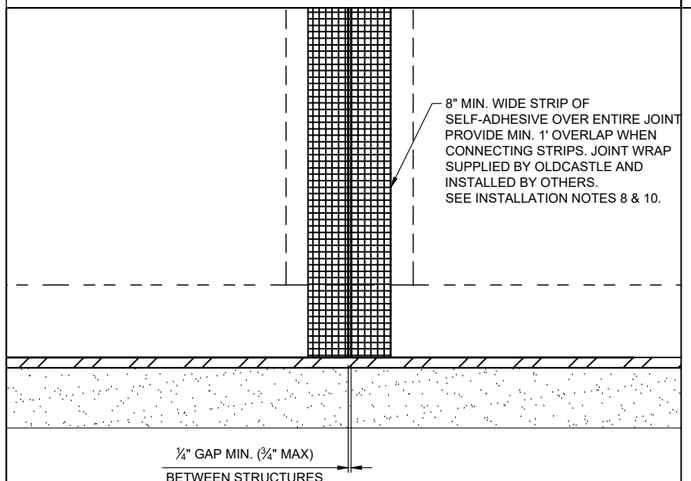
N.T.S.

HEAVIEST PICK
WEIGHT = 24,250 LBS

MAXIMUM EQUIPMENT OPERATING WEIGHT (OW) BY TRACK WIDTH				
TRACK WIDTH	12"	18"	24"	30"
MIN TRACK LENGTH	8'-0"	10'-0"	12'-0"	14'-0"
FILL DEPTH (FT)	OW (LBS)	OW (LBS)	OW (LBS)	OW (LBS)
0.5	35,000	45,000	52,500	54,500
1	35,000	45,000	56,000	60,500
2	35,000	45,000	56,000	64,000
3	76,000	78,500	83,500	88,000
4	94,000	100,000	106,000	113,000
5	100,000	116,000	132,000	149,000

NOTES:

A. IF CONSTRUCTION EQUIPMENT EXCEEDS THE ABOVE OPERATING WEIGHT LIMITS REFER TO INSTALLATION NOTE 3.
B. FOR WHEELED CONSTRUCTION EQUIPMENT LIMITS REFER TO INSTALLATION NOTE 3.
C. MINIMUM AXLE SPACING FOR ALL TRACK WIDTHS IS 6'-0".



MODULE JOINT DETAIL

SCALE: 1/2" = 1'-0"

Detention/
Infiltration

REV	DESCRIPTION	DATE
⚠	UPDATED PER COMMENTS	2/10/25

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CUSTOMER: BKF Engineers		
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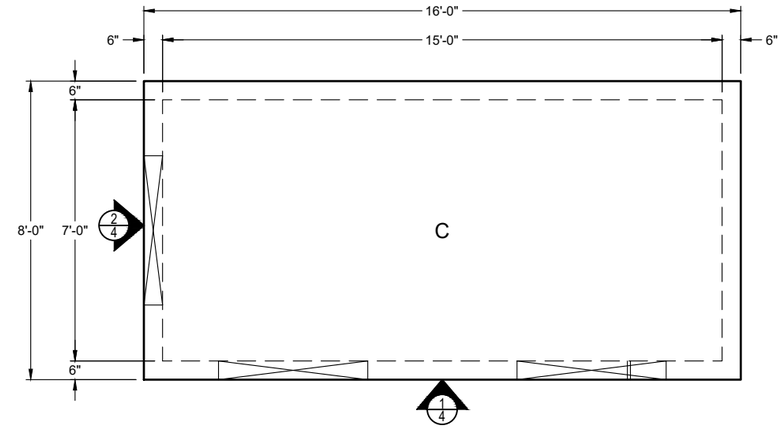
DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

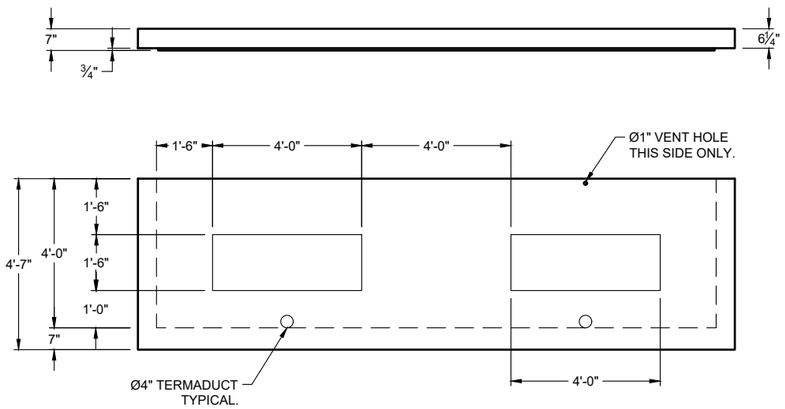
DRAWING NAME: SUBMITTAL DRAWING

SHEET: 3 OF 4



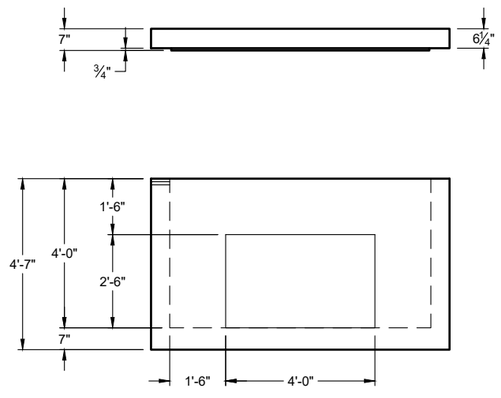
TYPICAL PLAN VIEW

SCALE: 1/4" = 1'-0"



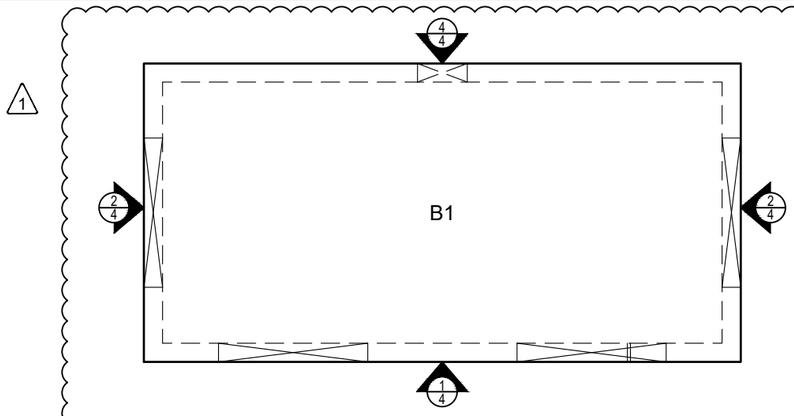
DETAIL 1 - TYPICAL WALL ELEVATION

SCALE: 1/4" = 1'-0"



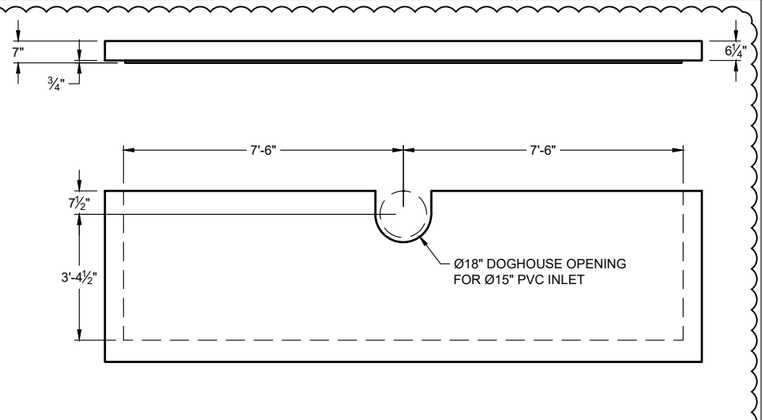
DETAIL 2 - TYPICAL WALL ELEVATION

SCALE: 1/4" = 1'-0"



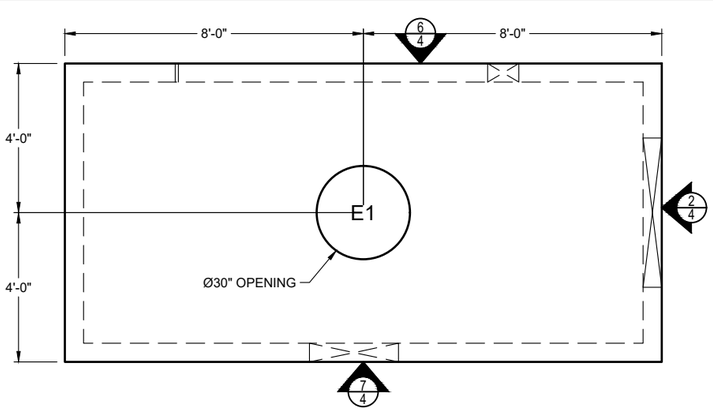
DETAIL 3 - MODULE B1

SCALE: 1/4" = 1'-0"



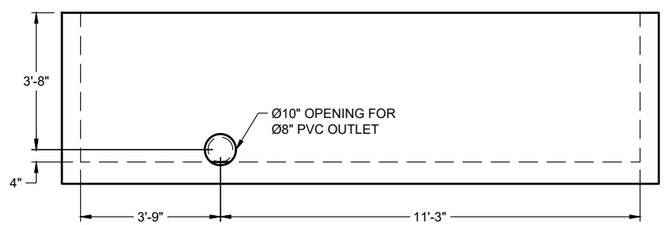
DETAIL 4 - MODULE B1

SCALE: 1/4" = 1'-0"



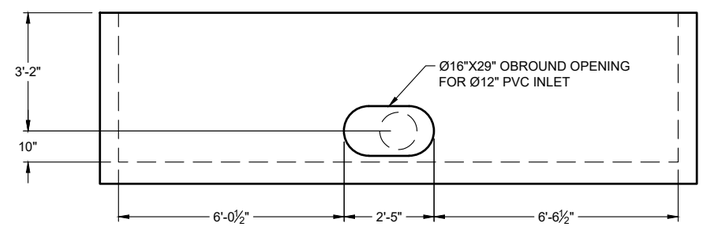
DETAIL 5 - MODULE E1

SCALE: 1/4" = 1'-0"



DETAIL 6 - MODULE E1

SCALE: 1/4" = 1'-0"



DETAIL 7 - MODULE E1

SCALE: 1/4" = 1'-0"

Detention/
Infiltration

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

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STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	PLAN-N
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

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1/10/24	070-FO	PPS	HMF	HMF	S302167-3

DRAWING NAME: SUBMITTAL DRAWING

SHEET: 4 OF 4

5. Technical Appendices

APPENDIX A	CivilCADD/CivilDesign Rational Method Calculations
APPENDIX B	Onsite Storm Drain Sizing
APPENDIX C	Hydrograph, Detention Basin Routing, and Detention Basin Drawdown Calculations
APPENDIX D	Riverside County Hydrology Manual Soil Maps and Rainfall Data
APPENDIX E	Geotechnical Report
APPENDIX F	Pump Details

APPENDIX C: Hydrograph and Detention Basin Routing Calculations

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

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Study date 11/26/24 File: beaulibpre242.out

++

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

Program License Serial Number 6447

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

English Units used in output format

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
2-YEAR, 24-HOUR STORM EVENT, HYDROGRAPH
EXISTING CONDITION

Drainage Area = 1.34(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.34(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 267.00(Ft.)
Length along longest watercourse measured to centroid = 86.00(Ft.)
Length along longest watercourse = 0.051 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 5.20(Ft.)
Slope along watercourse = 102.8315 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.010 Hr.
Lag time = 0.60 Min.
25% of lag time = 0.15 Min.
40% of lag time = 0.24 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	2.71	3.63

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	6.50	8.71

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.710(In)
Area Averaged 100-Year Rainfall = 6.500(In)

Point rain (area averaged) = 2.710(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.710(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.340	32.00	0.788

Total Area Entered = 1.34(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	16.2	0.870	0.788	0.253	1.000	0.253
					Sum (F) =	0.253

Area averaged mean soil loss (F) (In/Hr) = 0.253
Minimum soil loss rate ((In/Hr)) = 0.126
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.269

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	829.542	100.000	1.350
		Sum =	100.000 Sum=	1.350

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.022	(0.448)	0.006	0.016
2	0.17	0.07	0.022	(0.446)	0.006	0.016
3	0.25	0.07	0.022	(0.445)	0.006	0.016
4	0.33	0.10	0.033	(0.443)	0.009	0.024
5	0.42	0.10	0.033	(0.441)	0.009	0.024
6	0.50	0.10	0.033	(0.440)	0.009	0.024
7	0.58	0.10	0.033	(0.438)	0.009	0.024
8	0.67	0.10	0.033	(0.436)	0.009	0.024
9	0.75	0.10	0.033	(0.434)	0.009	0.024
10	0.83	0.13	0.043	(0.433)	0.012	0.032
11	0.92	0.13	0.043	(0.431)	0.012	0.032
12	1.00	0.13	0.043	(0.429)	0.012	0.032
13	1.08	0.10	0.033	(0.428)	0.009	0.024
14	1.17	0.10	0.033	(0.426)	0.009	0.024
15	1.25	0.10	0.033	(0.424)	0.009	0.024
16	1.33	0.10	0.033	(0.422)	0.009	0.024
17	1.42	0.10	0.033	(0.421)	0.009	0.024
18	1.50	0.10	0.033	(0.419)	0.009	0.024
19	1.58	0.10	0.033	(0.417)	0.009	0.024
20	1.67	0.10	0.033	(0.416)	0.009	0.024
21	1.75	0.10	0.033	(0.414)	0.009	0.024
22	1.83	0.13	0.043	(0.412)	0.012	0.032
23	1.92	0.13	0.043	(0.411)	0.012	0.032
24	2.00	0.13	0.043	(0.409)	0.012	0.032

25	2.08	0.13	0.043	(0.407)	0.012	0.032
26	2.17	0.13	0.043	(0.406)	0.012	0.032
27	2.25	0.13	0.043	(0.404)	0.012	0.032
28	2.33	0.13	0.043	(0.403)	0.012	0.032
29	2.42	0.13	0.043	(0.401)	0.012	0.032
30	2.50	0.13	0.043	(0.399)	0.012	0.032
31	2.58	0.17	0.054	(0.398)	0.015	0.040
32	2.67	0.17	0.054	(0.396)	0.015	0.040
33	2.75	0.17	0.054	(0.394)	0.015	0.040
34	2.83	0.17	0.054	(0.393)	0.015	0.040
35	2.92	0.17	0.054	(0.391)	0.015	0.040
36	3.00	0.17	0.054	(0.390)	0.015	0.040
37	3.08	0.17	0.054	(0.388)	0.015	0.040
38	3.17	0.17	0.054	(0.386)	0.015	0.040
39	3.25	0.17	0.054	(0.385)	0.015	0.040
40	3.33	0.17	0.054	(0.383)	0.015	0.040
41	3.42	0.17	0.054	(0.381)	0.015	0.040
42	3.50	0.17	0.054	(0.380)	0.015	0.040
43	3.58	0.17	0.054	(0.378)	0.015	0.040
44	3.67	0.17	0.054	(0.377)	0.015	0.040
45	3.75	0.17	0.054	(0.375)	0.015	0.040
46	3.83	0.20	0.065	(0.374)	0.017	0.048
47	3.92	0.20	0.065	(0.372)	0.017	0.048
48	4.00	0.20	0.065	(0.370)	0.017	0.048
49	4.08	0.20	0.065	(0.369)	0.017	0.048
50	4.17	0.20	0.065	(0.367)	0.017	0.048
51	4.25	0.20	0.065	(0.366)	0.017	0.048
52	4.33	0.23	0.076	(0.364)	0.020	0.055
53	4.42	0.23	0.076	(0.363)	0.020	0.055
54	4.50	0.23	0.076	(0.361)	0.020	0.055
55	4.58	0.23	0.076	(0.359)	0.020	0.055
56	4.67	0.23	0.076	(0.358)	0.020	0.055
57	4.75	0.23	0.076	(0.356)	0.020	0.055
58	4.83	0.27	0.087	(0.355)	0.023	0.063
59	4.92	0.27	0.087	(0.353)	0.023	0.063
60	5.00	0.27	0.087	(0.352)	0.023	0.063
61	5.08	0.20	0.065	(0.350)	0.017	0.048
62	5.17	0.20	0.065	(0.349)	0.017	0.048
63	5.25	0.20	0.065	(0.347)	0.017	0.048
64	5.33	0.23	0.076	(0.346)	0.020	0.055
65	5.42	0.23	0.076	(0.344)	0.020	0.055
66	5.50	0.23	0.076	(0.343)	0.020	0.055
67	5.58	0.27	0.087	(0.341)	0.023	0.063
68	5.67	0.27	0.087	(0.340)	0.023	0.063
69	5.75	0.27	0.087	(0.338)	0.023	0.063
70	5.83	0.27	0.087	(0.337)	0.023	0.063
71	5.92	0.27	0.087	(0.335)	0.023	0.063
72	6.00	0.27	0.087	(0.334)	0.023	0.063
73	6.08	0.30	0.098	(0.332)	0.026	0.071
74	6.17	0.30	0.098	(0.331)	0.026	0.071
75	6.25	0.30	0.098	(0.329)	0.026	0.071
76	6.33	0.30	0.098	(0.328)	0.026	0.071
77	6.42	0.30	0.098	(0.326)	0.026	0.071
78	6.50	0.30	0.098	(0.325)	0.026	0.071
79	6.58	0.33	0.108	(0.323)	0.029	0.079
80	6.67	0.33	0.108	(0.322)	0.029	0.079
81	6.75	0.33	0.108	(0.320)	0.029	0.079
82	6.83	0.33	0.108	(0.319)	0.029	0.079
83	6.92	0.33	0.108	(0.318)	0.029	0.079
84	7.00	0.33	0.108	(0.316)	0.029	0.079
85	7.08	0.33	0.108	(0.315)	0.029	0.079
86	7.17	0.33	0.108	(0.313)	0.029	0.079
87	7.25	0.33	0.108	(0.312)	0.029	0.079

88	7.33	0.37	0.119	(0.310)	0.032	0.087
89	7.42	0.37	0.119	(0.309)	0.032	0.087
90	7.50	0.37	0.119	(0.308)	0.032	0.087
91	7.58	0.40	0.130	(0.306)	0.035	0.095
92	7.67	0.40	0.130	(0.305)	0.035	0.095
93	7.75	0.40	0.130	(0.303)	0.035	0.095
94	7.83	0.43	0.141	(0.302)	0.038	0.103
95	7.92	0.43	0.141	(0.301)	0.038	0.103
96	8.00	0.43	0.141	(0.299)	0.038	0.103
97	8.08	0.50	0.163	(0.298)	0.044	0.119
98	8.17	0.50	0.163	(0.296)	0.044	0.119
99	8.25	0.50	0.163	(0.295)	0.044	0.119
100	8.33	0.50	0.163	(0.294)	0.044	0.119
101	8.42	0.50	0.163	(0.292)	0.044	0.119
102	8.50	0.50	0.163	(0.291)	0.044	0.119
103	8.58	0.53	0.173	(0.290)	0.047	0.127
104	8.67	0.53	0.173	(0.288)	0.047	0.127
105	8.75	0.53	0.173	(0.287)	0.047	0.127
106	8.83	0.57	0.184	(0.285)	0.050	0.135
107	8.92	0.57	0.184	(0.284)	0.050	0.135
108	9.00	0.57	0.184	(0.283)	0.050	0.135
109	9.08	0.63	0.206	(0.281)	0.055	0.151
110	9.17	0.63	0.206	(0.280)	0.055	0.151
111	9.25	0.63	0.206	(0.279)	0.055	0.151
112	9.33	0.67	0.217	(0.277)	0.058	0.158
113	9.42	0.67	0.217	(0.276)	0.058	0.158
114	9.50	0.67	0.217	(0.275)	0.058	0.158
115	9.58	0.70	0.228	(0.273)	0.061	0.166
116	9.67	0.70	0.228	(0.272)	0.061	0.166
117	9.75	0.70	0.228	(0.271)	0.061	0.166
118	9.83	0.73	0.238	(0.270)	0.064	0.174
119	9.92	0.73	0.238	(0.268)	0.064	0.174
120	10.00	0.73	0.238	(0.267)	0.064	0.174
121	10.08	0.50	0.163	(0.266)	0.044	0.119
122	10.17	0.50	0.163	(0.264)	0.044	0.119
123	10.25	0.50	0.163	(0.263)	0.044	0.119
124	10.33	0.50	0.163	(0.262)	0.044	0.119
125	10.42	0.50	0.163	(0.261)	0.044	0.119
126	10.50	0.50	0.163	(0.259)	0.044	0.119
127	10.58	0.67	0.217	(0.258)	0.058	0.158
128	10.67	0.67	0.217	(0.257)	0.058	0.158
129	10.75	0.67	0.217	(0.255)	0.058	0.158
130	10.83	0.67	0.217	(0.254)	0.058	0.158
131	10.92	0.67	0.217	(0.253)	0.058	0.158
132	11.00	0.67	0.217	(0.252)	0.058	0.158
133	11.08	0.63	0.206	(0.251)	0.055	0.151
134	11.17	0.63	0.206	(0.249)	0.055	0.151
135	11.25	0.63	0.206	(0.248)	0.055	0.151
136	11.33	0.63	0.206	(0.247)	0.055	0.151
137	11.42	0.63	0.206	(0.246)	0.055	0.151
138	11.50	0.63	0.206	(0.244)	0.055	0.151
139	11.58	0.57	0.184	(0.243)	0.050	0.135
140	11.67	0.57	0.184	(0.242)	0.050	0.135
141	11.75	0.57	0.184	(0.241)	0.050	0.135
142	11.83	0.60	0.195	(0.240)	0.052	0.143
143	11.92	0.60	0.195	(0.238)	0.052	0.143
144	12.00	0.60	0.195	(0.237)	0.052	0.143
145	12.08	0.83	0.271	(0.236)	0.073	0.198
146	12.17	0.83	0.271	(0.235)	0.073	0.198
147	12.25	0.83	0.271	(0.234)	0.073	0.198
148	12.33	0.87	0.282	(0.232)	0.076	0.206
149	12.42	0.87	0.282	(0.231)	0.076	0.206
150	12.50	0.87	0.282	(0.230)	0.076	0.206

151	12.58	0.93	0.304	(0.229)	0.082	0.222
152	12.67	0.93	0.304	(0.228)	0.082	0.222
153	12.75	0.93	0.304	(0.227)	0.082	0.222
154	12.83	0.97	0.314	(0.226)	0.085	0.230
155	12.92	0.97	0.314	(0.224)	0.085	0.230
156	13.00	0.97	0.314	(0.223)	0.085	0.230
157	13.08	1.13	0.369	(0.222)	0.099	0.269
158	13.17	1.13	0.369	(0.221)	0.099	0.269
159	13.25	1.13	0.369	(0.220)	0.099	0.269
160	13.33	1.13	0.369	(0.219)	0.099	0.269
161	13.42	1.13	0.369	(0.218)	0.099	0.269
162	13.50	1.13	0.369	(0.217)	0.099	0.269
163	13.58	0.77	0.249	(0.215)	0.067	0.182
164	13.67	0.77	0.249	(0.214)	0.067	0.182
165	13.75	0.77	0.249	(0.213)	0.067	0.182
166	13.83	0.77	0.249	(0.212)	0.067	0.182
167	13.92	0.77	0.249	(0.211)	0.067	0.182
168	14.00	0.77	0.249	(0.210)	0.067	0.182
169	14.08	0.90	0.293	(0.209)	0.079	0.214
170	14.17	0.90	0.293	(0.208)	0.079	0.214
171	14.25	0.90	0.293	(0.207)	0.079	0.214
172	14.33	0.87	0.282	(0.206)	0.076	0.206
173	14.42	0.87	0.282	(0.205)	0.076	0.206
174	14.50	0.87	0.282	(0.204)	0.076	0.206
175	14.58	0.87	0.282	(0.203)	0.076	0.206
176	14.67	0.87	0.282	(0.202)	0.076	0.206
177	14.75	0.87	0.282	(0.201)	0.076	0.206
178	14.83	0.83	0.271	(0.199)	0.073	0.198
179	14.92	0.83	0.271	(0.198)	0.073	0.198
180	15.00	0.83	0.271	(0.197)	0.073	0.198
181	15.08	0.80	0.260	(0.196)	0.070	0.190
182	15.17	0.80	0.260	(0.195)	0.070	0.190
183	15.25	0.80	0.260	(0.194)	0.070	0.190
184	15.33	0.77	0.249	(0.193)	0.067	0.182
185	15.42	0.77	0.249	(0.192)	0.067	0.182
186	15.50	0.77	0.249	(0.191)	0.067	0.182
187	15.58	0.63	0.206	(0.190)	0.055	0.151
188	15.67	0.63	0.206	(0.189)	0.055	0.151
189	15.75	0.63	0.206	(0.189)	0.055	0.151
190	15.83	0.63	0.206	(0.188)	0.055	0.151
191	15.92	0.63	0.206	(0.187)	0.055	0.151
192	16.00	0.63	0.206	(0.186)	0.055	0.151
193	16.08	0.13	0.043	(0.185)	0.012	0.032
194	16.17	0.13	0.043	(0.184)	0.012	0.032
195	16.25	0.13	0.043	(0.183)	0.012	0.032
196	16.33	0.13	0.043	(0.182)	0.012	0.032
197	16.42	0.13	0.043	(0.181)	0.012	0.032
198	16.50	0.13	0.043	(0.180)	0.012	0.032
199	16.58	0.10	0.033	(0.179)	0.009	0.024
200	16.67	0.10	0.033	(0.178)	0.009	0.024
201	16.75	0.10	0.033	(0.177)	0.009	0.024
202	16.83	0.10	0.033	(0.176)	0.009	0.024
203	16.92	0.10	0.033	(0.176)	0.009	0.024
204	17.00	0.10	0.033	(0.175)	0.009	0.024
205	17.08	0.17	0.054	(0.174)	0.015	0.040
206	17.17	0.17	0.054	(0.173)	0.015	0.040
207	17.25	0.17	0.054	(0.172)	0.015	0.040
208	17.33	0.17	0.054	(0.171)	0.015	0.040
209	17.42	0.17	0.054	(0.170)	0.015	0.040
210	17.50	0.17	0.054	(0.169)	0.015	0.040
211	17.58	0.17	0.054	(0.169)	0.015	0.040
212	17.67	0.17	0.054	(0.168)	0.015	0.040
213	17.75	0.17	0.054	(0.167)	0.015	0.040

214	17.83	0.13	0.043	(0.166)	0.012	0.032
215	17.92	0.13	0.043	(0.165)	0.012	0.032
216	18.00	0.13	0.043	(0.164)	0.012	0.032
217	18.08	0.13	0.043	(0.164)	0.012	0.032
218	18.17	0.13	0.043	(0.163)	0.012	0.032
219	18.25	0.13	0.043	(0.162)	0.012	0.032
220	18.33	0.13	0.043	(0.161)	0.012	0.032
221	18.42	0.13	0.043	(0.160)	0.012	0.032
222	18.50	0.13	0.043	(0.160)	0.012	0.032
223	18.58	0.10	0.033	(0.159)	0.009	0.024
224	18.67	0.10	0.033	(0.158)	0.009	0.024
225	18.75	0.10	0.033	(0.157)	0.009	0.024
226	18.83	0.07	0.022	(0.157)	0.006	0.016
227	18.92	0.07	0.022	(0.156)	0.006	0.016
228	19.00	0.07	0.022	(0.155)	0.006	0.016
229	19.08	0.10	0.033	(0.154)	0.009	0.024
230	19.17	0.10	0.033	(0.154)	0.009	0.024
231	19.25	0.10	0.033	(0.153)	0.009	0.024
232	19.33	0.13	0.043	(0.152)	0.012	0.032
233	19.42	0.13	0.043	(0.152)	0.012	0.032
234	19.50	0.13	0.043	(0.151)	0.012	0.032
235	19.58	0.10	0.033	(0.150)	0.009	0.024
236	19.67	0.10	0.033	(0.149)	0.009	0.024
237	19.75	0.10	0.033	(0.149)	0.009	0.024
238	19.83	0.07	0.022	(0.148)	0.006	0.016
239	19.92	0.07	0.022	(0.147)	0.006	0.016
240	20.00	0.07	0.022	(0.147)	0.006	0.016
241	20.08	0.10	0.033	(0.146)	0.009	0.024
242	20.17	0.10	0.033	(0.146)	0.009	0.024
243	20.25	0.10	0.033	(0.145)	0.009	0.024
244	20.33	0.10	0.033	(0.144)	0.009	0.024
245	20.42	0.10	0.033	(0.144)	0.009	0.024
246	20.50	0.10	0.033	(0.143)	0.009	0.024
247	20.58	0.10	0.033	(0.142)	0.009	0.024
248	20.67	0.10	0.033	(0.142)	0.009	0.024
249	20.75	0.10	0.033	(0.141)	0.009	0.024
250	20.83	0.07	0.022	(0.141)	0.006	0.016
251	20.92	0.07	0.022	(0.140)	0.006	0.016
252	21.00	0.07	0.022	(0.140)	0.006	0.016
253	21.08	0.10	0.033	(0.139)	0.009	0.024
254	21.17	0.10	0.033	(0.138)	0.009	0.024
255	21.25	0.10	0.033	(0.138)	0.009	0.024
256	21.33	0.07	0.022	(0.137)	0.006	0.016
257	21.42	0.07	0.022	(0.137)	0.006	0.016
258	21.50	0.07	0.022	(0.136)	0.006	0.016
259	21.58	0.10	0.033	(0.136)	0.009	0.024
260	21.67	0.10	0.033	(0.135)	0.009	0.024
261	21.75	0.10	0.033	(0.135)	0.009	0.024
262	21.83	0.07	0.022	(0.134)	0.006	0.016
263	21.92	0.07	0.022	(0.134)	0.006	0.016
264	22.00	0.07	0.022	(0.133)	0.006	0.016
265	22.08	0.10	0.033	(0.133)	0.009	0.024
266	22.17	0.10	0.033	(0.133)	0.009	0.024
267	22.25	0.10	0.033	(0.132)	0.009	0.024
268	22.33	0.07	0.022	(0.132)	0.006	0.016
269	22.42	0.07	0.022	(0.131)	0.006	0.016
270	22.50	0.07	0.022	(0.131)	0.006	0.016
271	22.58	0.07	0.022	(0.131)	0.006	0.016
272	22.67	0.07	0.022	(0.130)	0.006	0.016
273	22.75	0.07	0.022	(0.130)	0.006	0.016
274	22.83	0.07	0.022	(0.130)	0.006	0.016
275	22.92	0.07	0.022	(0.129)	0.006	0.016
276	23.00	0.07	0.022	(0.129)	0.006	0.016

277	23.08	0.07	0.022	(0.129)	0.006	0.016
278	23.17	0.07	0.022	(0.128)	0.006	0.016
279	23.25	0.07	0.022	(0.128)	0.006	0.016
280	23.33	0.07	0.022	(0.128)	0.006	0.016
281	23.42	0.07	0.022	(0.128)	0.006	0.016
282	23.50	0.07	0.022	(0.127)	0.006	0.016
283	23.58	0.07	0.022	(0.127)	0.006	0.016
284	23.67	0.07	0.022	(0.127)	0.006	0.016
285	23.75	0.07	0.022	(0.127)	0.006	0.016
286	23.83	0.07	0.022	(0.127)	0.006	0.016
287	23.92	0.07	0.022	(0.126)	0.006	0.016
288	24.00	0.07	0.022	(0.126)	0.006	0.016

(Loss Rate Not Used)

Sum = 100.0 Sum = 23.8

Flood volume = Effective rainfall 1.98(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.73(In)
Total soil loss = 0.081(Ac.Ft)
Total rainfall = 2.71(In)
Flood volume = 9636.0 Cubic Feet
Total soil loss = 3545.9 Cubic Feet

Peak flow rate of this hydrograph = 0.364(CFS)

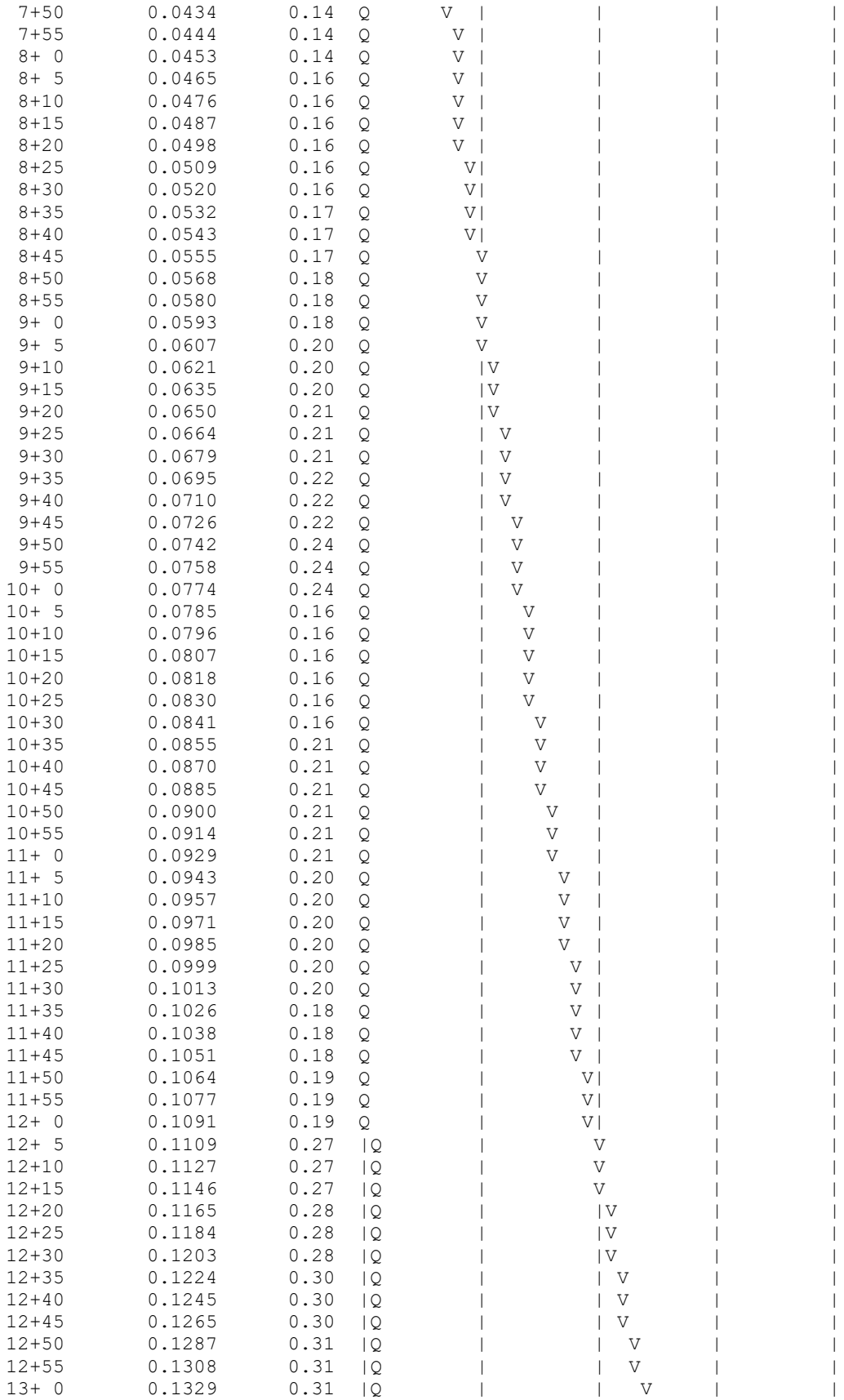
++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q				
0+10	0.0003	0.02	Q				
0+15	0.0004	0.02	Q				
0+20	0.0007	0.03	Q				
0+25	0.0009	0.03	Q				
0+30	0.0011	0.03	Q				
0+35	0.0013	0.03	Q				
0+40	0.0015	0.03	Q				
0+45	0.0018	0.03	Q				
0+50	0.0021	0.04	Q				
0+55	0.0024	0.04	Q				
1+ 0	0.0027	0.04	Q				
1+ 5	0.0029	0.03	Q				
1+10	0.0031	0.03	Q				
1+15	0.0033	0.03	Q				
1+20	0.0035	0.03	Q				
1+25	0.0038	0.03	Q				
1+30	0.0040	0.03	Q				
1+35	0.0042	0.03	Q				
1+40	0.0044	0.03	Q				
1+45	0.0046	0.03	Q				
1+50	0.0049	0.04	Q				
1+55	0.0052	0.04	Q				
2+ 0	0.0055	0.04	Q				
2+ 5	0.0058	0.04	QV				
2+10	0.0061	0.04	QV				
2+15	0.0064	0.04	QV				
2+20	0.0067	0.04	QV				
2+25	0.0070	0.04	QV				
2+30	0.0073	0.04	QV				

2+35	0.0077	0.05	QV	|	|	|	|
2+40	0.0080	0.05	QV	|	|	|	|
2+45	0.0084	0.05	QV	|	|	|	|
2+50	0.0088	0.05	QV	|	|	|	|
2+55	0.0091	0.05	QV	|	|	|	|
3+ 0	0.0095	0.05	QV	|	|	|	|
3+ 5	0.0099	0.05	QV	|	|	|	|
3+10	0.0102	0.05	QV	|	|	|	|
3+15	0.0106	0.05	QV	|	|	|	|
3+20	0.0110	0.05	QV	|	|	|	|
3+25	0.0114	0.05	Q V	|	|	|	|
3+30	0.0117	0.05	Q V	|	|	|	|
3+35	0.0121	0.05	Q V	|	|	|	|
3+40	0.0125	0.05	Q V	|	|	|	|
3+45	0.0128	0.05	Q V	|	|	|	|
3+50	0.0133	0.06	Q V	|	|	|	|
3+55	0.0137	0.06	Q V	|	|	|	|
4+ 0	0.0142	0.06	Q V	|	|	|	|
4+ 5	0.0146	0.06	Q V	|	|	|	|
4+10	0.0150	0.06	Q V	|	|	|	|
4+15	0.0155	0.06	Q V	|	|	|	|
4+20	0.0160	0.07	Q V	|	|	|	|
4+25	0.0165	0.07	Q V	|	|	|	|
4+30	0.0170	0.07	Q V	|	|	|	|
4+35	0.0175	0.07	Q V	|	|	|	|
4+40	0.0181	0.07	Q V	|	|	|	|
4+45	0.0186	0.07	Q V	|	|	|	|
4+50	0.0192	0.09	Q V	|	|	|	|
4+55	0.0198	0.09	Q V	|	|	|	|
5+ 0	0.0204	0.09	Q V	|	|	|	|
5+ 5	0.0208	0.06	Q V	|	|	|	|
5+10	0.0212	0.06	Q V	|	|	|	|
5+15	0.0217	0.06	Q V	|	|	|	|
5+20	0.0222	0.07	Q V	|	|	|	|
5+25	0.0227	0.07	Q V	|	|	|	|
5+30	0.0232	0.07	Q V	|	|	|	|
5+35	0.0238	0.09	Q V	|	|	|	|
5+40	0.0244	0.09	Q V	|	|	|	|
5+45	0.0250	0.09	Q V	|	|	|	|
5+50	0.0256	0.09	Q V	|	|	|	|
5+55	0.0262	0.09	Q V	|	|	|	|
6+ 0	0.0268	0.09	Q V	|	|	|	|
6+ 5	0.0274	0.10	Q V	|	|	|	|
6+10	0.0281	0.10	Q V	|	|	|	|
6+15	0.0288	0.10	Q V	|	|	|	|
6+20	0.0294	0.10	Q V	|	|	|	|
6+25	0.0301	0.10	Q V	|	|	|	|
6+30	0.0307	0.10	Q V	|	|	|	|
6+35	0.0315	0.11	Q V	|	|	|	|
6+40	0.0322	0.11	Q V	|	|	|	|
6+45	0.0330	0.11	Q V	|	|	|	|
6+50	0.0337	0.11	Q V	|	|	|	|
6+55	0.0344	0.11	Q V	|	|	|	|
7+ 0	0.0352	0.11	Q V	|	|	|	|
7+ 5	0.0359	0.11	Q V	|	|	|	|
7+10	0.0366	0.11	Q V	|	|	|	|
7+15	0.0374	0.11	Q V	|	|	|	|
7+20	0.0382	0.12	Q V	|	|	|	|
7+25	0.0390	0.12	Q V	|	|	|	|
7+30	0.0398	0.12	Q V	|	|	|	|
7+35	0.0407	0.13	Q V	|	|	|	|
7+40	0.0416	0.13	Q V	|	|	|	|
7+45	0.0425	0.13	Q V	|	|	|	|



13+ 5	0.1355	0.36	Q		V		
13+10	0.1380	0.36	Q		V		
13+15	0.1405	0.36	Q		V		
13+20	0.1430	0.36	Q		V		
13+25	0.1455	0.36	Q		V		
13+30	0.1480	0.36	Q		V		
13+35	0.1497	0.25	Q		V		
13+40	0.1514	0.25	Q		V		
13+45	0.1531	0.25	Q		V		
13+50	0.1548	0.25	Q		V		
13+55	0.1565	0.25	Q		V		
14+ 0	0.1582	0.25	Q		V		
14+ 5	0.1602	0.29	Q		V		
14+10	0.1621	0.29	Q		V		
14+15	0.1641	0.29	Q		V		
14+20	0.1661	0.28	Q		V		
14+25	0.1680	0.28	Q		V		
14+30	0.1699	0.28	Q		V		
14+35	0.1718	0.28	Q		V		
14+40	0.1737	0.28	Q		V		
14+45	0.1756	0.28	Q		V		
14+50	0.1775	0.27	Q		V		
14+55	0.1793	0.27	Q		V		
15+ 0	0.1812	0.27	Q		V		
15+ 5	0.1829	0.26	Q		V		
15+10	0.1847	0.26	Q		V		
15+15	0.1865	0.26	Q		V		
15+20	0.1882	0.25	Q		V		
15+25	0.1899	0.25	Q		V		
15+30	0.1916	0.25	Q		V		
15+35	0.1930	0.20	Q		V		
15+40	0.1944	0.20	Q		V		
15+45	0.1958	0.20	Q		V		
15+50	0.1972	0.20	Q		V		
15+55	0.1986	0.20	Q		V		
16+ 0	0.2000	0.20	Q		V		
16+ 5	0.2003	0.04	Q		V		
16+10	0.2006	0.04	Q		V		
16+15	0.2009	0.04	Q		V		
16+20	0.2012	0.04	Q		V		
16+25	0.2015	0.04	Q		V		
16+30	0.2017	0.04	Q		V		
16+35	0.2020	0.03	Q		V		
16+40	0.2022	0.03	Q		V		
16+45	0.2024	0.03	Q		V		
16+50	0.2026	0.03	Q		V		
16+55	0.2029	0.03	Q		V		
17+ 0	0.2031	0.03	Q		V		
17+ 5	0.2034	0.05	Q		V		
17+10	0.2038	0.05	Q		V		
17+15	0.2042	0.05	Q		V		
17+20	0.2045	0.05	Q		V		
17+25	0.2049	0.05	Q		V		
17+30	0.2053	0.05	Q		V		
17+35	0.2057	0.05	Q		V		
17+40	0.2060	0.05	Q		V		
17+45	0.2064	0.05	Q		V		
17+50	0.2067	0.04	Q		V		
17+55	0.2070	0.04	Q		V		
18+ 0	0.2073	0.04	Q		V		
18+ 5	0.2076	0.04	Q		V		
18+10	0.2079	0.04	Q		V		
18+15	0.2082	0.04	Q		V		

18+20	0.2085	0.04	Q	|	|	|	V |
18+25	0.2088	0.04	Q	|	|	|	V |
18+30	0.2090	0.04	Q	|	|	|	V |
18+35	0.2093	0.03	Q	|	|	|	V |
18+40	0.2095	0.03	Q	|	|	|	V |
18+45	0.2097	0.03	Q	|	|	|	V |
18+50	0.2099	0.02	Q	|	|	|	V |
18+55	0.2100	0.02	Q	|	|	|	V |
19+ 0	0.2102	0.02	Q	|	|	|	V |
19+ 5	0.2104	0.03	Q	|	|	|	V |
19+10	0.2106	0.03	Q	|	|	|	V |
19+15	0.2108	0.03	Q	|	|	|	V |
19+20	0.2111	0.04	Q	|	|	|	V |
19+25	0.2114	0.04	Q	|	|	|	V |
19+30	0.2117	0.04	Q	|	|	|	V |
19+35	0.2119	0.03	Q	|	|	|	V |
19+40	0.2121	0.03	Q	|	|	|	V |
19+45	0.2124	0.03	Q	|	|	|	V |
19+50	0.2125	0.02	Q	|	|	|	V |
19+55	0.2127	0.02	Q	|	|	|	V |
20+ 0	0.2128	0.02	Q	|	|	|	V |
20+ 5	0.2130	0.03	Q	|	|	|	V |
20+10	0.2132	0.03	Q	|	|	|	V |
20+15	0.2135	0.03	Q	|	|	|	V |
20+20	0.2137	0.03	Q	|	|	|	V |
20+25	0.2139	0.03	Q	|	|	|	V |
20+30	0.2141	0.03	Q	|	|	|	V |
20+35	0.2144	0.03	Q	|	|	|	V |
20+40	0.2146	0.03	Q	|	|	|	V |
20+45	0.2148	0.03	Q	|	|	|	V |
20+50	0.2149	0.02	Q	|	|	|	V |
20+55	0.2151	0.02	Q	|	|	|	V |
21+ 0	0.2152	0.02	Q	|	|	|	V |
21+ 5	0.2155	0.03	Q	|	|	|	V |
21+10	0.2157	0.03	Q	|	|	|	V |
21+15	0.2159	0.03	Q	|	|	|	V|
21+20	0.2161	0.02	Q	|	|	|	V|
21+25	0.2162	0.02	Q	|	|	|	V|
21+30	0.2163	0.02	Q	|	|	|	V|
21+35	0.2166	0.03	Q	|	|	|	V|
21+40	0.2168	0.03	Q	|	|	|	V|
21+45	0.2170	0.03	Q	|	|	|	V|
21+50	0.2172	0.02	Q	|	|	|	V|
21+55	0.2173	0.02	Q	|	|	|	V|
22+ 0	0.2175	0.02	Q	|	|	|	V|
22+ 5	0.2177	0.03	Q	|	|	|	V|
22+10	0.2179	0.03	Q	|	|	|	V|
22+15	0.2181	0.03	Q	|	|	|	V|
22+20	0.2183	0.02	Q	|	|	|	V|
22+25	0.2184	0.02	Q	|	|	|	V|
22+30	0.2186	0.02	Q	|	|	|	V|
22+35	0.2187	0.02	Q	|	|	|	V|
22+40	0.2189	0.02	Q	|	|	|	V|
22+45	0.2190	0.02	Q	|	|	|	V|
22+50	0.2191	0.02	Q	|	|	|	V|
22+55	0.2193	0.02	Q	|	|	|	V|
23+ 0	0.2194	0.02	Q	|	|	|	V|
23+ 5	0.2196	0.02	Q	|	|	|	V|
23+10	0.2197	0.02	Q	|	|	|	V|
23+15	0.2199	0.02	Q	|	|	|	V|
23+20	0.2200	0.02	Q	|	|	|	V|
23+25	0.2202	0.02	Q	|	|	|	V|
23+30	0.2203	0.02	Q	|	|	|	V|

23+35	0.2205	0.02	Q	|	|	|	V|
23+40	0.2206	0.02	Q	|	|	|	V|
23+45	0.2208	0.02	Q	|	|	|	V|
23+50	0.2209	0.02	Q	|	|	|	V|
23+55	0.2211	0.02	Q	|	|	|	V|
24+ 0	0.2212	0.02	Q	|	|	|	V|

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

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Study date 11/26/24 File: beaulibpost242.out

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

Program License Serial Number 6447

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

English Units used in output format

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
2-YEAR, 24-HOUR STORM EVENT, HYDROGRAPH
POST CONDITION

Drainage Area = 1.34(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.34(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 330.00(Ft.)
Length along longest watercourse measured to centroid = 169.00(Ft.)
Length along longest watercourse = 0.063 Mi.
Length along longest watercourse measured to centroid = 0.032 Mi.
Difference in elevation = 9.10(Ft.)
Slope along watercourse = 145.6000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.79 Min.
25% of lag time = 0.20 Min.
40% of lag time = 0.32 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	2.71	3.63

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	6.50	8.71

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.710(In)
Area Averaged 100-Year Rainfall = 6.500(In)

Point rain (area averaged) = 2.710(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.710(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.340	32.00	0.910

Total Area Entered = 1.34(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	16.2	0.870	0.910	0.158	1.000	0.158
					Sum (F) =	0.158

Area averaged mean soil loss (F) (In/Hr) = 0.158
Minimum soil loss rate ((In/Hr)) = 0.079
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.164

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	632.538	76.700	1.036
2	0.167	1265.076	23.300	0.315
		Sum = 100.000	Sum=	1.350

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.022	(0.279)	0.004	0.018
2	0.17	0.07	0.022	(0.278)	0.004	0.018
3	0.25	0.07	0.022	(0.277)	0.004	0.018
4	0.33	0.10	0.033	(0.276)	0.005	0.027
5	0.42	0.10	0.033	(0.275)	0.005	0.027
6	0.50	0.10	0.033	(0.274)	0.005	0.027
7	0.58	0.10	0.033	(0.273)	0.005	0.027
8	0.67	0.10	0.033	(0.272)	0.005	0.027
9	0.75	0.10	0.033	(0.271)	0.005	0.027
10	0.83	0.13	0.043	(0.270)	0.007	0.036
11	0.92	0.13	0.043	(0.269)	0.007	0.036
12	1.00	0.13	0.043	(0.268)	0.007	0.036
13	1.08	0.10	0.033	(0.266)	0.005	0.027
14	1.17	0.10	0.033	(0.265)	0.005	0.027
15	1.25	0.10	0.033	(0.264)	0.005	0.027
16	1.33	0.10	0.033	(0.263)	0.005	0.027
17	1.42	0.10	0.033	(0.262)	0.005	0.027
18	1.50	0.10	0.033	(0.261)	0.005	0.027
19	1.58	0.10	0.033	(0.260)	0.005	0.027
20	1.67	0.10	0.033	(0.259)	0.005	0.027
21	1.75	0.10	0.033	(0.258)	0.005	0.027
22	1.83	0.13	0.043	(0.257)	0.007	0.036
23	1.92	0.13	0.043	(0.256)	0.007	0.036

24	2.00	0.13	0.043	(0.255)	0.007	0.036
25	2.08	0.13	0.043	(0.254)	0.007	0.036
26	2.17	0.13	0.043	(0.253)	0.007	0.036
27	2.25	0.13	0.043	(0.252)	0.007	0.036
28	2.33	0.13	0.043	(0.251)	0.007	0.036
29	2.42	0.13	0.043	(0.250)	0.007	0.036
30	2.50	0.13	0.043	(0.249)	0.007	0.036
31	2.58	0.17	0.054	(0.248)	0.009	0.045
32	2.67	0.17	0.054	(0.247)	0.009	0.045
33	2.75	0.17	0.054	(0.246)	0.009	0.045
34	2.83	0.17	0.054	(0.245)	0.009	0.045
35	2.92	0.17	0.054	(0.244)	0.009	0.045
36	3.00	0.17	0.054	(0.243)	0.009	0.045
37	3.08	0.17	0.054	(0.242)	0.009	0.045
38	3.17	0.17	0.054	(0.241)	0.009	0.045
39	3.25	0.17	0.054	(0.240)	0.009	0.045
40	3.33	0.17	0.054	(0.239)	0.009	0.045
41	3.42	0.17	0.054	(0.238)	0.009	0.045
42	3.50	0.17	0.054	(0.237)	0.009	0.045
43	3.58	0.17	0.054	(0.236)	0.009	0.045
44	3.67	0.17	0.054	(0.235)	0.009	0.045
45	3.75	0.17	0.054	(0.234)	0.009	0.045
46	3.83	0.20	0.065	(0.233)	0.011	0.054
47	3.92	0.20	0.065	(0.232)	0.011	0.054
48	4.00	0.20	0.065	(0.231)	0.011	0.054
49	4.08	0.20	0.065	(0.230)	0.011	0.054
50	4.17	0.20	0.065	(0.229)	0.011	0.054
51	4.25	0.20	0.065	(0.228)	0.011	0.054
52	4.33	0.23	0.076	(0.227)	0.012	0.063
53	4.42	0.23	0.076	(0.226)	0.012	0.063
54	4.50	0.23	0.076	(0.225)	0.012	0.063
55	4.58	0.23	0.076	(0.224)	0.012	0.063
56	4.67	0.23	0.076	(0.223)	0.012	0.063
57	4.75	0.23	0.076	(0.222)	0.012	0.063
58	4.83	0.27	0.087	(0.221)	0.014	0.072
59	4.92	0.27	0.087	(0.220)	0.014	0.072
60	5.00	0.27	0.087	(0.219)	0.014	0.072
61	5.08	0.20	0.065	(0.218)	0.011	0.054
62	5.17	0.20	0.065	(0.217)	0.011	0.054
63	5.25	0.20	0.065	(0.216)	0.011	0.054
64	5.33	0.23	0.076	(0.215)	0.012	0.063
65	5.42	0.23	0.076	(0.214)	0.012	0.063
66	5.50	0.23	0.076	(0.214)	0.012	0.063
67	5.58	0.27	0.087	(0.213)	0.014	0.072
68	5.67	0.27	0.087	(0.212)	0.014	0.072
69	5.75	0.27	0.087	(0.211)	0.014	0.072
70	5.83	0.27	0.087	(0.210)	0.014	0.072
71	5.92	0.27	0.087	(0.209)	0.014	0.072
72	6.00	0.27	0.087	(0.208)	0.014	0.072
73	6.08	0.30	0.098	(0.207)	0.016	0.082
74	6.17	0.30	0.098	(0.206)	0.016	0.082
75	6.25	0.30	0.098	(0.205)	0.016	0.082
76	6.33	0.30	0.098	(0.204)	0.016	0.082
77	6.42	0.30	0.098	(0.203)	0.016	0.082
78	6.50	0.30	0.098	(0.202)	0.016	0.082
79	6.58	0.33	0.108	(0.202)	0.018	0.091
80	6.67	0.33	0.108	(0.201)	0.018	0.091
81	6.75	0.33	0.108	(0.200)	0.018	0.091
82	6.83	0.33	0.108	(0.199)	0.018	0.091
83	6.92	0.33	0.108	(0.198)	0.018	0.091
84	7.00	0.33	0.108	(0.197)	0.018	0.091
85	7.08	0.33	0.108	(0.196)	0.018	0.091
86	7.17	0.33	0.108	(0.195)	0.018	0.091

87	7.25	0.33	0.108	(0.194)	0.018	0.091
88	7.33	0.37	0.119	(0.193)	0.020	0.100
89	7.42	0.37	0.119	(0.193)	0.020	0.100
90	7.50	0.37	0.119	(0.192)	0.020	0.100
91	7.58	0.40	0.130	(0.191)	0.021	0.109
92	7.67	0.40	0.130	(0.190)	0.021	0.109
93	7.75	0.40	0.130	(0.189)	0.021	0.109
94	7.83	0.43	0.141	(0.188)	0.023	0.118
95	7.92	0.43	0.141	(0.187)	0.023	0.118
96	8.00	0.43	0.141	(0.186)	0.023	0.118
97	8.08	0.50	0.163	(0.186)	0.027	0.136
98	8.17	0.50	0.163	(0.185)	0.027	0.136
99	8.25	0.50	0.163	(0.184)	0.027	0.136
100	8.33	0.50	0.163	(0.183)	0.027	0.136
101	8.42	0.50	0.163	(0.182)	0.027	0.136
102	8.50	0.50	0.163	(0.181)	0.027	0.136
103	8.58	0.53	0.173	(0.180)	0.028	0.145
104	8.67	0.53	0.173	(0.180)	0.028	0.145
105	8.75	0.53	0.173	(0.179)	0.028	0.145
106	8.83	0.57	0.184	(0.178)	0.030	0.154
107	8.92	0.57	0.184	(0.177)	0.030	0.154
108	9.00	0.57	0.184	(0.176)	0.030	0.154
109	9.08	0.63	0.206	(0.175)	0.034	0.172
110	9.17	0.63	0.206	(0.175)	0.034	0.172
111	9.25	0.63	0.206	(0.174)	0.034	0.172
112	9.33	0.67	0.217	(0.173)	0.036	0.181
113	9.42	0.67	0.217	(0.172)	0.036	0.181
114	9.50	0.67	0.217	(0.171)	0.036	0.181
115	9.58	0.70	0.228	(0.170)	0.037	0.190
116	9.67	0.70	0.228	(0.170)	0.037	0.190
117	9.75	0.70	0.228	(0.169)	0.037	0.190
118	9.83	0.73	0.238	(0.168)	0.039	0.199
119	9.92	0.73	0.238	(0.167)	0.039	0.199
120	10.00	0.73	0.238	(0.166)	0.039	0.199
121	10.08	0.50	0.163	(0.166)	0.027	0.136
122	10.17	0.50	0.163	(0.165)	0.027	0.136
123	10.25	0.50	0.163	(0.164)	0.027	0.136
124	10.33	0.50	0.163	(0.163)	0.027	0.136
125	10.42	0.50	0.163	(0.162)	0.027	0.136
126	10.50	0.50	0.163	(0.162)	0.027	0.136
127	10.58	0.67	0.217	(0.161)	0.036	0.181
128	10.67	0.67	0.217	(0.160)	0.036	0.181
129	10.75	0.67	0.217	(0.159)	0.036	0.181
130	10.83	0.67	0.217	(0.158)	0.036	0.181
131	10.92	0.67	0.217	(0.158)	0.036	0.181
132	11.00	0.67	0.217	(0.157)	0.036	0.181
133	11.08	0.63	0.206	(0.156)	0.034	0.172
134	11.17	0.63	0.206	(0.155)	0.034	0.172
135	11.25	0.63	0.206	(0.155)	0.034	0.172
136	11.33	0.63	0.206	(0.154)	0.034	0.172
137	11.42	0.63	0.206	(0.153)	0.034	0.172
138	11.50	0.63	0.206	(0.152)	0.034	0.172
139	11.58	0.57	0.184	(0.152)	0.030	0.154
140	11.67	0.57	0.184	(0.151)	0.030	0.154
141	11.75	0.57	0.184	(0.150)	0.030	0.154
142	11.83	0.60	0.195	(0.149)	0.032	0.163
143	11.92	0.60	0.195	(0.149)	0.032	0.163
144	12.00	0.60	0.195	(0.148)	0.032	0.163
145	12.08	0.83	0.271	(0.147)	0.044	0.227
146	12.17	0.83	0.271	(0.146)	0.044	0.227
147	12.25	0.83	0.271	(0.146)	0.044	0.227
148	12.33	0.87	0.282	(0.145)	0.046	0.236
149	12.42	0.87	0.282	(0.144)	0.046	0.236

150	12.50	0.87	0.282	(0.143)	0.046	0.236
151	12.58	0.93	0.304	(0.143)	0.050	0.254
152	12.67	0.93	0.304	(0.142)	0.050	0.254
153	12.75	0.93	0.304	(0.141)	0.050	0.254
154	12.83	0.97	0.314	(0.141)	0.052	0.263
155	12.92	0.97	0.314	(0.140)	0.052	0.263
156	13.00	0.97	0.314	(0.139)	0.052	0.263
157	13.08	1.13	0.369	(0.138)	0.060	0.308
158	13.17	1.13	0.369	(0.138)	0.060	0.308
159	13.25	1.13	0.369	(0.137)	0.060	0.308
160	13.33	1.13	0.369	(0.136)	0.060	0.308
161	13.42	1.13	0.369	(0.136)	0.060	0.308
162	13.50	1.13	0.369	(0.135)	0.060	0.308
163	13.58	0.77	0.249	(0.134)	0.041	0.208
164	13.67	0.77	0.249	(0.134)	0.041	0.208
165	13.75	0.77	0.249	(0.133)	0.041	0.208
166	13.83	0.77	0.249	(0.132)	0.041	0.208
167	13.92	0.77	0.249	(0.132)	0.041	0.208
168	14.00	0.77	0.249	(0.131)	0.041	0.208
169	14.08	0.90	0.293	(0.130)	0.048	0.245
170	14.17	0.90	0.293	(0.130)	0.048	0.245
171	14.25	0.90	0.293	(0.129)	0.048	0.245
172	14.33	0.87	0.282	(0.128)	0.046	0.236
173	14.42	0.87	0.282	(0.128)	0.046	0.236
174	14.50	0.87	0.282	(0.127)	0.046	0.236
175	14.58	0.87	0.282	(0.126)	0.046	0.236
176	14.67	0.87	0.282	(0.126)	0.046	0.236
177	14.75	0.87	0.282	(0.125)	0.046	0.236
178	14.83	0.83	0.271	(0.124)	0.044	0.227
179	14.92	0.83	0.271	(0.124)	0.044	0.227
180	15.00	0.83	0.271	(0.123)	0.044	0.227
181	15.08	0.80	0.260	(0.122)	0.043	0.217
182	15.17	0.80	0.260	(0.122)	0.043	0.217
183	15.25	0.80	0.260	(0.121)	0.043	0.217
184	15.33	0.77	0.249	(0.121)	0.041	0.208
185	15.42	0.77	0.249	(0.120)	0.041	0.208
186	15.50	0.77	0.249	(0.119)	0.041	0.208
187	15.58	0.63	0.206	(0.119)	0.034	0.172
188	15.67	0.63	0.206	(0.118)	0.034	0.172
189	15.75	0.63	0.206	(0.117)	0.034	0.172
190	15.83	0.63	0.206	(0.117)	0.034	0.172
191	15.92	0.63	0.206	(0.116)	0.034	0.172
192	16.00	0.63	0.206	(0.116)	0.034	0.172
193	16.08	0.13	0.043	(0.115)	0.007	0.036
194	16.17	0.13	0.043	(0.115)	0.007	0.036
195	16.25	0.13	0.043	(0.114)	0.007	0.036
196	16.33	0.13	0.043	(0.113)	0.007	0.036
197	16.42	0.13	0.043	(0.113)	0.007	0.036
198	16.50	0.13	0.043	(0.112)	0.007	0.036
199	16.58	0.10	0.033	(0.112)	0.005	0.027
200	16.67	0.10	0.033	(0.111)	0.005	0.027
201	16.75	0.10	0.033	(0.110)	0.005	0.027
202	16.83	0.10	0.033	(0.110)	0.005	0.027
203	16.92	0.10	0.033	(0.109)	0.005	0.027
204	17.00	0.10	0.033	(0.109)	0.005	0.027
205	17.08	0.17	0.054	(0.108)	0.009	0.045
206	17.17	0.17	0.054	(0.108)	0.009	0.045
207	17.25	0.17	0.054	(0.107)	0.009	0.045
208	17.33	0.17	0.054	(0.107)	0.009	0.045
209	17.42	0.17	0.054	(0.106)	0.009	0.045
210	17.50	0.17	0.054	(0.106)	0.009	0.045
211	17.58	0.17	0.054	(0.105)	0.009	0.045
212	17.67	0.17	0.054	(0.105)	0.009	0.045

213	17.75	0.17	0.054	(0.104)	0.009	0.045
214	17.83	0.13	0.043	(0.103)	0.007	0.036
215	17.92	0.13	0.043	(0.103)	0.007	0.036
216	18.00	0.13	0.043	(0.102)	0.007	0.036
217	18.08	0.13	0.043	(0.102)	0.007	0.036
218	18.17	0.13	0.043	(0.101)	0.007	0.036
219	18.25	0.13	0.043	(0.101)	0.007	0.036
220	18.33	0.13	0.043	(0.100)	0.007	0.036
221	18.42	0.13	0.043	(0.100)	0.007	0.036
222	18.50	0.13	0.043	(0.100)	0.007	0.036
223	18.58	0.10	0.033	(0.099)	0.005	0.027
224	18.67	0.10	0.033	(0.099)	0.005	0.027
225	18.75	0.10	0.033	(0.098)	0.005	0.027
226	18.83	0.07	0.022	(0.098)	0.004	0.018
227	18.92	0.07	0.022	(0.097)	0.004	0.018
228	19.00	0.07	0.022	(0.097)	0.004	0.018
229	19.08	0.10	0.033	(0.096)	0.005	0.027
230	19.17	0.10	0.033	(0.096)	0.005	0.027
231	19.25	0.10	0.033	(0.095)	0.005	0.027
232	19.33	0.13	0.043	(0.095)	0.007	0.036
233	19.42	0.13	0.043	(0.094)	0.007	0.036
234	19.50	0.13	0.043	(0.094)	0.007	0.036
235	19.58	0.10	0.033	(0.094)	0.005	0.027
236	19.67	0.10	0.033	(0.093)	0.005	0.027
237	19.75	0.10	0.033	(0.093)	0.005	0.027
238	19.83	0.07	0.022	(0.092)	0.004	0.018
239	19.92	0.07	0.022	(0.092)	0.004	0.018
240	20.00	0.07	0.022	(0.091)	0.004	0.018
241	20.08	0.10	0.033	(0.091)	0.005	0.027
242	20.17	0.10	0.033	(0.091)	0.005	0.027
243	20.25	0.10	0.033	(0.090)	0.005	0.027
244	20.33	0.10	0.033	(0.090)	0.005	0.027
245	20.42	0.10	0.033	(0.090)	0.005	0.027
246	20.50	0.10	0.033	(0.089)	0.005	0.027
247	20.58	0.10	0.033	(0.089)	0.005	0.027
248	20.67	0.10	0.033	(0.088)	0.005	0.027
249	20.75	0.10	0.033	(0.088)	0.005	0.027
250	20.83	0.07	0.022	(0.088)	0.004	0.018
251	20.92	0.07	0.022	(0.087)	0.004	0.018
252	21.00	0.07	0.022	(0.087)	0.004	0.018
253	21.08	0.10	0.033	(0.087)	0.005	0.027
254	21.17	0.10	0.033	(0.086)	0.005	0.027
255	21.25	0.10	0.033	(0.086)	0.005	0.027
256	21.33	0.07	0.022	(0.086)	0.004	0.018
257	21.42	0.07	0.022	(0.085)	0.004	0.018
258	21.50	0.07	0.022	(0.085)	0.004	0.018
259	21.58	0.10	0.033	(0.085)	0.005	0.027
260	21.67	0.10	0.033	(0.084)	0.005	0.027
261	21.75	0.10	0.033	(0.084)	0.005	0.027
262	21.83	0.07	0.022	(0.084)	0.004	0.018
263	21.92	0.07	0.022	(0.083)	0.004	0.018
264	22.00	0.07	0.022	(0.083)	0.004	0.018
265	22.08	0.10	0.033	(0.083)	0.005	0.027
266	22.17	0.10	0.033	(0.083)	0.005	0.027
267	22.25	0.10	0.033	(0.082)	0.005	0.027
268	22.33	0.07	0.022	(0.082)	0.004	0.018
269	22.42	0.07	0.022	(0.082)	0.004	0.018
270	22.50	0.07	0.022	(0.082)	0.004	0.018
271	22.58	0.07	0.022	(0.081)	0.004	0.018
272	22.67	0.07	0.022	(0.081)	0.004	0.018
273	22.75	0.07	0.022	(0.081)	0.004	0.018
274	22.83	0.07	0.022	(0.081)	0.004	0.018
275	22.92	0.07	0.022	(0.081)	0.004	0.018

276	23.00	0.07	0.022	(0.080)	0.004	0.018
277	23.08	0.07	0.022	(0.080)	0.004	0.018
278	23.17	0.07	0.022	(0.080)	0.004	0.018
279	23.25	0.07	0.022	(0.080)	0.004	0.018
280	23.33	0.07	0.022	(0.080)	0.004	0.018
281	23.42	0.07	0.022	(0.079)	0.004	0.018
282	23.50	0.07	0.022	(0.079)	0.004	0.018
283	23.58	0.07	0.022	(0.079)	0.004	0.018
284	23.67	0.07	0.022	(0.079)	0.004	0.018
285	23.75	0.07	0.022	(0.079)	0.004	0.018
286	23.83	0.07	0.022	(0.079)	0.004	0.018
287	23.92	0.07	0.022	(0.079)	0.004	0.018
288	24.00	0.07	0.022	(0.079)	0.004	0.018

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.2

Flood volume = Effective rainfall 2.27(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.44(In)
Total soil loss = 0.050(Ac.Ft)
Total rainfall = 2.71(In)
Flood volume = 11020.1 Cubic Feet
Total soil loss = 2161.8 Cubic Feet

Peak flow rate of this hydrograph = 0.416(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q				
0+10	0.0003	0.02	Q				
0+15	0.0005	0.02	Q				
0+20	0.0007	0.03	Q				
0+25	0.0010	0.04	Q				
0+30	0.0012	0.04	Q				
0+35	0.0015	0.04	Q				
0+40	0.0017	0.04	Q				
0+45	0.0020	0.04	Q				
0+50	0.0023	0.05	Q				
0+55	0.0026	0.05	Q				
1+ 0	0.0030	0.05	Q				
1+ 5	0.0032	0.04	Q				
1+10	0.0035	0.04	Q				
1+15	0.0037	0.04	Q				
1+20	0.0040	0.04	Q				
1+25	0.0042	0.04	Q				
1+30	0.0045	0.04	Q				
1+35	0.0047	0.04	Q				
1+40	0.0050	0.04	Q				
1+45	0.0053	0.04	Q				
1+50	0.0056	0.05	Q				
1+55	0.0059	0.05	Q				
2+ 0	0.0062	0.05	Q				
2+ 5	0.0066	0.05	QV				
2+10	0.0069	0.05	QV				
2+15	0.0073	0.05	QV				
2+20	0.0076	0.05	QV				
2+25	0.0079	0.05	QV				

2+30	0.0083	0.05	QV				
2+35	0.0087	0.06	QV				
2+40	0.0091	0.06	QV				
2+45	0.0095	0.06	QV				
2+50	0.0099	0.06	QV				
2+55	0.0104	0.06	QV				
3+ 0	0.0108	0.06	QV				
3+ 5	0.0112	0.06	QV				
3+10	0.0116	0.06	QV				
3+15	0.0120	0.06	QV				
3+20	0.0125	0.06	QV				
3+25	0.0129	0.06	Q V				
3+30	0.0133	0.06	Q V				
3+35	0.0137	0.06	Q V				
3+40	0.0142	0.06	Q V				
3+45	0.0146	0.06	Q V				
3+50	0.0151	0.07	Q V				
3+55	0.0156	0.07	Q V				
4+ 0	0.0161	0.07	Q V				
4+ 5	0.0166	0.07	Q V				
4+10	0.0171	0.07	Q V				
4+15	0.0176	0.07	Q V				
4+20	0.0182	0.08	Q V				
4+25	0.0188	0.09	Q V				
4+30	0.0193	0.09	Q V				
4+35	0.0199	0.09	Q V				
4+40	0.0205	0.09	Q V				
4+45	0.0211	0.09	Q V				
4+50	0.0218	0.10	Q V				
4+55	0.0224	0.10	Q V				
5+ 0	0.0231	0.10	Q V				
5+ 5	0.0237	0.08	Q V				
5+10	0.0242	0.07	Q V				
5+15	0.0247	0.07	Q V				
5+20	0.0252	0.08	Q V				
5+25	0.0258	0.09	Q V				
5+30	0.0264	0.09	Q V				
5+35	0.0271	0.10	Q V				
5+40	0.0278	0.10	Q V				
5+45	0.0284	0.10	Q V				
5+50	0.0291	0.10	Q V				
5+55	0.0298	0.10	Q V				
6+ 0	0.0305	0.10	Q V				
6+ 5	0.0312	0.11	Q V				
6+10	0.0320	0.11	Q V				
6+15	0.0327	0.11	Q V				
6+20	0.0335	0.11	Q V				
6+25	0.0342	0.11	Q V				
6+30	0.0350	0.11	Q V				
6+35	0.0358	0.12	Q V				
6+40	0.0367	0.12	Q V				
6+45	0.0375	0.12	Q V				
6+50	0.0383	0.12	Q V				
6+55	0.0392	0.12	Q V				
7+ 0	0.0400	0.12	Q V				
7+ 5	0.0409	0.12	Q V				
7+10	0.0417	0.12	Q V				
7+15	0.0426	0.12	Q V				
7+20	0.0435	0.13	Q V				
7+25	0.0444	0.13	Q V				
7+30	0.0453	0.13	Q V				
7+35	0.0463	0.14	Q V				
7+40	0.0473	0.15	Q V				

7+45	0.0483	0.15	Q	V	|	|	|	|
7+50	0.0494	0.16	Q	V	|	|	|	|
7+55	0.0505	0.16	Q	V	|	|	|	|
8+ 0	0.0516	0.16	Q	V	|	|	|	|
8+ 5	0.0528	0.18	Q	V	|	|	|	|
8+10	0.0541	0.18	Q	V	|	|	|	|
8+15	0.0554	0.18	Q	V	|	|	|	|
8+20	0.0566	0.18	Q	V	|	|	|	|
8+25	0.0579	0.18	Q	V	|	|	|	|
8+30	0.0592	0.18	Q	V	|	|	|	|
8+35	0.0605	0.19	Q	V	|	|	|	|
8+40	0.0618	0.20	Q	V	|	|	|	|
8+45	0.0632	0.20	Q	V	|	|	|	|
8+50	0.0646	0.21	Q	V	|	|	|	|
8+55	0.0660	0.21	Q	V	|	|	|	|
9+ 0	0.0675	0.21	Q	V	|	|	|	|
9+ 5	0.0690	0.23	Q	V	|	|	|	|
9+10	0.0706	0.23	Q	|	V	|	|	|
9+15	0.0722	0.23	Q	|	V	|	|	|
9+20	0.0739	0.24	Q	|	V	|	|	|
9+25	0.0756	0.24	Q	|	V	|	|	|
9+30	0.0773	0.24	Q	|	V	|	|	|
9+35	0.0790	0.25	|Q	|	V	|	|	|
9+40	0.0808	0.26	|Q	|	V	|	|	|
9+45	0.0826	0.26	|Q	|	V	|	|	|
9+50	0.0844	0.27	|Q	|	V	|	|	|
9+55	0.0863	0.27	|Q	|	V	|	|	|
10+ 0	0.0881	0.27	|Q	|	V	|	|	|
10+ 5	0.0895	0.20	Q	|	V	|	|	|
10+10	0.0908	0.18	Q	|	V	|	|	|
10+15	0.0920	0.18	Q	|	V	|	|	|
10+20	0.0933	0.18	Q	|	V	|	|	|
10+25	0.0946	0.18	Q	|	V	|	|	|
10+30	0.0958	0.18	Q	|	V	|	|	|
10+35	0.0974	0.23	Q	|	V	|	|	|
10+40	0.0991	0.24	Q	|	V	|	|	|
10+45	0.1008	0.24	Q	|	V	|	|	|
10+50	0.1025	0.24	Q	|	V	|	|	|
10+55	0.1042	0.24	Q	|	V	|	|	|
11+ 0	0.1059	0.24	Q	|	V	|	|	|
11+ 5	0.1075	0.24	Q	|	V	|	|	|
11+10	0.1091	0.23	Q	|	V	|	|	|
11+15	0.1107	0.23	Q	|	V	|	|	|
11+20	0.1123	0.23	Q	|	V	|	|	|
11+25	0.1139	0.23	Q	|	V	|	|	|
11+30	0.1155	0.23	Q	|	V	|	|	|
11+35	0.1170	0.21	Q	|	V	|	|	|
11+40	0.1184	0.21	Q	|	V	|	|	|
11+45	0.1198	0.21	Q	|	V	|	|	|
11+50	0.1213	0.22	Q	|	V	|	|	|
11+55	0.1229	0.22	Q	|	V	|	|	|
12+ 0	0.1244	0.22	Q	|	V	|	|	|
12+ 5	0.1263	0.29	|Q	|	V	|	|	|
12+10	0.1284	0.31	|Q	|	V	|	|	|
12+15	0.1306	0.31	|Q	|	V	|	|	|
12+20	0.1327	0.32	|Q	|	V	|	|	|
12+25	0.1349	0.32	|Q	|	V	|	|	|
12+30	0.1371	0.32	|Q	|	V	|	|	|
12+35	0.1394	0.34	|Q	|	V	|	|	|
12+40	0.1418	0.34	|Q	|	V	|	|	|
12+45	0.1442	0.34	|Q	|	V	|	|	|
12+50	0.1466	0.35	|Q	|	V	|	|	|
12+55	0.1490	0.36	|Q	|	V	|	|	|

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13+ 0       0.1515      0.36  |Q        |          |  V      |          |
13+ 5       0.1542      0.40  |Q        |          |   V     |          |
13+10       0.1571      0.42  |Q        |          |   V     |          |
13+15       0.1600      0.42  |Q        |          |    V    |          |
13+20       0.1628      0.42  |Q        |          |    V    |          |
13+25       0.1657      0.42  |Q        |          |     V   |          |
13+30       0.1686      0.42  |Q        |          |     V   |          |
13+35       0.1707      0.31  |Q        |          |     V   |          |
13+40       0.1727      0.28  |Q        |          |      V  |          |
13+45       0.1746      0.28  |Q        |          |      V  |          |
13+50       0.1766      0.28  |Q        |          |      V  |          |
13+55       0.1785      0.28  |Q        |          |       V |          |
14+ 0       0.1804      0.28  |Q        |          |       V |          |
14+ 5       0.1826      0.32  |Q        |          |       V |          |
14+10       0.1849      0.33  |Q        |          |        V|          |
14+15       0.1872      0.33  |Q        |          |        V|          |
14+20       0.1894      0.32  |Q        |          |        V|          |
14+25       0.1916      0.32  |Q        |          |         V          |
14+30       0.1938      0.32  |Q        |          |         V          |
14+35       0.1960      0.32  |Q        |          |         V          |
14+40       0.1982      0.32  |Q        |          |          |V        |
14+45       0.2004      0.32  |Q        |          |          |V        |
14+50       0.2025      0.31  |Q        |          |          | V       |
14+55       0.2046      0.31  |Q        |          |          | V       |
15+ 0       0.2067      0.31  |Q        |          |          | V       |
15+ 5       0.2087      0.30  |Q        |          |          |  V      |
15+10       0.2108      0.29  |Q        |          |          |  V      |
15+15       0.2128      0.29  |Q        |          |          |  V      |
15+20       0.2148      0.28  |Q        |          |          |  V      |
15+25       0.2167      0.28  |Q        |          |          |   V     |
15+30       0.2186      0.28  |Q        |          |          |   V     |
15+35       0.2203      0.24  Q         |          |          |   V     |
15+40       0.2219      0.23  Q         |          |          |    V    |
15+45       0.2235      0.23  Q         |          |          |    V    |
15+50       0.2251      0.23  Q         |          |          |    V    |
15+55       0.2267      0.23  Q         |          |          |    V    |
16+ 0       0.2283      0.23  Q         |          |          |     V   |
16+ 5       0.2290      0.09  Q         |          |          |     V   |
16+10       0.2293      0.05  Q         |          |          |     V   |
16+15       0.2296      0.05  Q         |          |          |     V   |
16+20       0.2300      0.05  Q         |          |          |     V   |
16+25       0.2303      0.05  Q         |          |          |     V   |
16+30       0.2306      0.05  Q         |          |          |     V   |
16+35       0.2309      0.04  Q         |          |          |     V   |
16+40       0.2312      0.04  Q         |          |          |     V   |
16+45       0.2314      0.04  Q         |          |          |     V   |
16+50       0.2317      0.04  Q         |          |          |     V   |
16+55       0.2319      0.04  Q         |          |          |     V   |
17+ 0       0.2322      0.04  Q         |          |          |     V   |
17+ 5       0.2326      0.06  Q         |          |          |     V   |
17+10       0.2330      0.06  Q         |          |          |     V   |
17+15       0.2334      0.06  Q         |          |          |     V   |
17+20       0.2338      0.06  Q         |          |          |     V   |
17+25       0.2343      0.06  Q         |          |          |      V  |
17+30       0.2347      0.06  Q         |          |          |      V  |
17+35       0.2351      0.06  Q         |          |          |      V  |
17+40       0.2355      0.06  Q         |          |          |      V  |
17+45       0.2359      0.06  Q         |          |          |      V  |
17+50       0.2363      0.05  Q         |          |          |      V  |
17+55       0.2366      0.05  Q         |          |          |      V  |
18+ 0       0.2370      0.05  Q         |          |          |      V  |
18+ 5       0.2373      0.05  Q         |          |          |      V  |
18+10       0.2376      0.05  Q         |          |          |      V  |
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18+15	0.2380	0.05	Q	|	|	|	V |
18+20	0.2383	0.05	Q	|	|	|	V |
18+25	0.2387	0.05	Q	|	|	|	V |
18+30	0.2390	0.05	Q	|	|	|	V |
18+35	0.2393	0.04	Q	|	|	|	V |
18+40	0.2395	0.04	Q	|	|	|	V |
18+45	0.2398	0.04	Q	|	|	|	V |
18+50	0.2400	0.03	Q	|	|	|	V |
18+55	0.2401	0.02	Q	|	|	|	V |
19+ 0	0.2403	0.02	Q	|	|	|	V |
19+ 5	0.2405	0.03	Q	|	|	|	V |
19+10	0.2408	0.04	Q	|	|	|	V |
19+15	0.2410	0.04	Q	|	|	|	V |
19+20	0.2414	0.05	Q	|	|	|	V |
19+25	0.2417	0.05	Q	|	|	|	V |
19+30	0.2420	0.05	Q	|	|	|	V |
19+35	0.2423	0.04	Q	|	|	|	V |
19+40	0.2426	0.04	Q	|	|	|	V |
19+45	0.2428	0.04	Q	|	|	|	V |
19+50	0.2430	0.03	Q	|	|	|	V |
19+55	0.2432	0.02	Q	|	|	|	V |
20+ 0	0.2433	0.02	Q	|	|	|	V |
20+ 5	0.2436	0.03	Q	|	|	|	V |
20+10	0.2438	0.04	Q	|	|	|	V |
20+15	0.2441	0.04	Q	|	|	|	V |
20+20	0.2443	0.04	Q	|	|	|	V |
20+25	0.2446	0.04	Q	|	|	|	V |
20+30	0.2448	0.04	Q	|	|	|	V |
20+35	0.2451	0.04	Q	|	|	|	V |
20+40	0.2453	0.04	Q	|	|	|	V |
20+45	0.2456	0.04	Q	|	|	|	V |
20+50	0.2458	0.03	Q	|	|	|	V |
20+55	0.2459	0.02	Q	|	|	|	V |
21+ 0	0.2461	0.02	Q	|	|	|	V |
21+ 5	0.2464	0.03	Q	|	|	|	V |
21+10	0.2466	0.04	Q	|	|	|	V |
21+15	0.2469	0.04	Q	|	|	|	V|
21+20	0.2470	0.03	Q	|	|	|	V|
21+25	0.2472	0.02	Q	|	|	|	V|
21+30	0.2474	0.02	Q	|	|	|	V|
21+35	0.2476	0.03	Q	|	|	|	V|
21+40	0.2479	0.04	Q	|	|	|	V|
21+45	0.2481	0.04	Q	|	|	|	V|
21+50	0.2483	0.03	Q	|	|	|	V|
21+55	0.2485	0.02	Q	|	|	|	V|
22+ 0	0.2486	0.02	Q	|	|	|	V|
22+ 5	0.2489	0.03	Q	|	|	|	V|
22+10	0.2491	0.04	Q	|	|	|	V|
22+15	0.2494	0.04	Q	|	|	|	V|
22+20	0.2496	0.03	Q	|	|	|	V|
22+25	0.2497	0.02	Q	|	|	|	V|
22+30	0.2499	0.02	Q	|	|	|	V|
22+35	0.2501	0.02	Q	|	|	|	V|
22+40	0.2502	0.02	Q	|	|	|	V|
22+45	0.2504	0.02	Q	|	|	|	V|
22+50	0.2506	0.02	Q	|	|	|	V|
22+55	0.2508	0.02	Q	|	|	|	V|
23+ 0	0.2509	0.02	Q	|	|	|	V|
23+ 5	0.2511	0.02	Q	|	|	|	V|
23+10	0.2513	0.02	Q	|	|	|	V|
23+15	0.2514	0.02	Q	|	|	|	V|
23+20	0.2516	0.02	Q	|	|	|	V|
23+25	0.2518	0.02	Q	|	|	|	V|

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   23+30       0.2519      0.02  Q          |          |          |         V|
   23+35       0.2521      0.02  Q          |          |          |         V|
   23+40       0.2523      0.02  Q          |          |          |         V|
   23+45       0.2524      0.02  Q          |          |          |         V|
   23+50       0.2526      0.02  Q          |          |          |         V|
   23+55       0.2528      0.02  Q          |          |          |         V|
   24+ 0       0.2529      0.02  Q          |          |          |         V|
   24+ 5       0.2530      0.01  Q          |          |          |          V
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DETENTION BASIN SIZING

CALCULATION OF DETENTION BASIN OUTLET CAPACITY. THE OUTLET CONSISTS OF A RESTRICTOR PLATE 4 INCH IN DIAMETER AT THE OUTLET OF THE DETENTION BASIN.

THE SUBMERGED ORIFICE EQUATION IS:	$Q=0.63A(2G\Delta H)^{1/2}$	WHERE A IS THE OPENING AREA IN SF, ΔH IS THE DIFFERENCE IN DEPTHS ON EACH SIDE OF THE ORIFICE OPENING (MEASURED FROM THE CENTROID OF THE ORIFICE OPENING). G IS EQUAL TO 32.2 FT/S.

DIAMETER OF OPENING =	4 INCHES	12 INCHES
AREA OF OPENING=	0.087 SQUARE FEET	0.785 SQUARE FEET

DEPTH OF WATER IN BASIN (FT)	ASSUMED DEPTH OF FLOW AT ORIFICE (FT)	CALCULATED, Q $Q=0.63A(2G\Delta H)^{1/2}$ (FT)	BASIN OUTLET INVERT ELEVATION (FT)	PONDED WATER SURFACE ELEVATION (FT)
0.5	0.40	0.28	100	100.50
1.0	0.90	0.42	100	101.00
1.5	1.40	0.52	100	101.50
2.0	1.90	0.61	100	102.00
2.5	2.40	0.68	100	102.50
3.0	2.90	0.75	100	103.00
3.5	3.40	0.81	100	103.50
3.83	3.73	0.85	100	103.83
3.9	3.80	8.18	100	103.90
4.0	3.90	8.30	100	104.00

TOP OF LOWEST GRATE = 2953.43 TG
BOTTOM OF TANK = 2591.60'
TOP OF TANK = 2595.60'

2595.60 - 2953.43 = 0.17'

4.00 - 0.17 = 3.83'

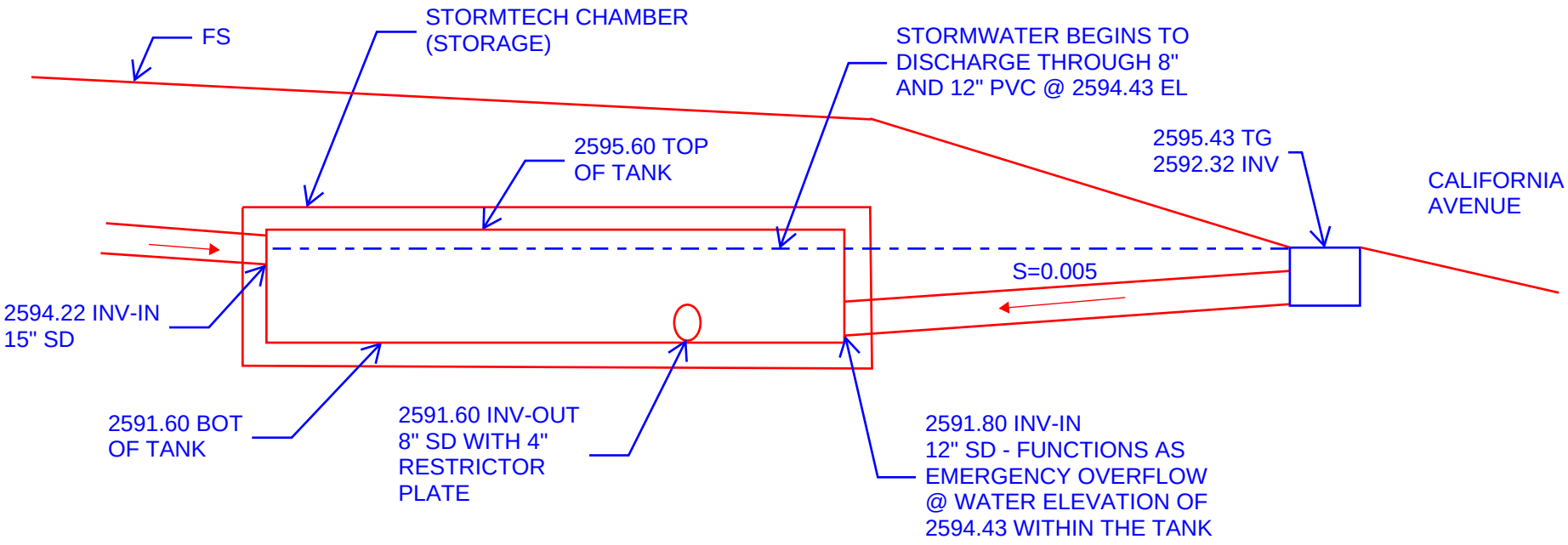
AT A BASIN DEPTH OF 3.83', THE WATER LEVEL WITHIN THE TANK BEGINS TO BECOME GREATER THAN THE LOWEST GRATE WITHIN THE STORM DRAIN SYSTEM. THEREFORE, STORMWATER WILL BEGIN TO BUBBLE UP THE LOWEST GRATE AND DISCHARGE OUT OF THE INLET.

TO ACCOUNT FOR THIS, AN ADDITIONAL SUBMERGED EQUATION IS CALCULATED FOR THE 12" INLET PIPE THAT IS CONNECTING THE LOWEST GRATE AND UNDERGROUND TANK.

THIS DISCHARGE VALUE IS THEN ADDED TO THE CALCULATED Q.

SEE EMERGENCY OVERFLOW EXHIBIT ON NEXT PAGE FOR REFERENCE.

BEAUMONT EMERGENCY OVERFLOW EXHIBIT



SQUARE FOOTAGE OF UNDERGROUND STORAGE BASIN
525.00 (5 ROWS OF 7'x15' SC-4 MODULES)

DEPTH (FT)	FLOW VOLUME ACCUMULATED (cubic feet)	FLOW VOLUME ACCUMULATED (acre-feet)
0.5	262.50	0.0060
1.0	525.00	0.0121
1.5	787.50	0.0181
2.0	1050.00	0.0241
2.5	1312.50	0.0301
3.0	1575.00	0.0362
3.5	1837.50	0.0422
3.83	2010.75	0.0462
3.9	2047.50	0.0470
4.0	2159.00	0.0496

OUTFLOW RATING DATA FOR:
OUTFLOW WITH RESTRICTOR PLATE AT 4" DIAMETER OUTLET OF BASIN

PONDED WATER SURFACE ELEVATION (FT)	DEPTH OF FLOW AT BASIN OUTLET (FT)	ACCUMULATED VOLUME (ACRE-FEET)	OUTFLOW CFS
0	0	0.000	0
100.5	0.5	0.006	0.28
101.0	1.0	0.012	0.42
101.5	1.5	0.018	0.52
102.0	2.0	0.024	0.61
102.5	2.5	0.030	0.68
103.0	3.0	0.036	0.75
103.5	3.5	0.042	0.81
103.83	3.83	0.046	0.85
103.9	3.9	0.047	8.18
104.0	4.0	0.050	8.30

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 11/26/24

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
2-YEAR, 24-HOUR STORM EVENT
DETENTION BASIN ROUTING CALCULATIONS
POST-CONDITION

Program License Serial Number 6447

********** HYDROGRAPH INFORMATION **********

From study/file name: BEAULIBPOST242.rte
**********HYDROGRAPH DATA**********
Number of intervals = 289
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.416 (CFS)
Total volume = 0.253 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 0.000 to Point/Station 0.000
**** RETARDING BASIN ROUTING ****
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User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 289
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.006	0.280	0.005	0.007
1.000	0.012	0.420	0.011	0.013
1.500	0.018	0.520	0.016	0.020
2.000	0.024	0.610	0.022	0.026
2.500	0.030	0.680	0.028	0.032
3.000	0.036	0.750	0.033	0.039

3.500	0.042	0.810	0.039	0.045
4.000	0.048	0.870	0.045	0.051

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.1	0.21	0.31	0.42	Depth (Ft.)
0.083	0.02	0.00	0.000	OI					0.00
0.167	0.02	0.01	0.000	OI					0.01
0.250	0.02	0.01	0.000	OI					0.02
0.333	0.03	0.02	0.000	OI					0.03
0.417	0.04	0.02	0.000	OI					0.04
0.500	0.04	0.03	0.001	O					0.05
0.583	0.04	0.03	0.001	O					0.05
0.667	0.04	0.03	0.001	O					0.06
0.750	0.04	0.03	0.001	O					0.06
0.833	0.05	0.04	0.001	OI					0.06
0.917	0.05	0.04	0.001	OI					0.07
1.000	0.05	0.04	0.001	O					0.07
1.083	0.04	0.04	0.001	O					0.08
1.167	0.04	0.04	0.001	IO					0.07
1.250	0.04	0.04	0.001	IO					0.07
1.333	0.04	0.04	0.001	O					0.07
1.417	0.04	0.04	0.001	O					0.07
1.500	0.04	0.04	0.001	O					0.07
1.583	0.04	0.04	0.001	O					0.07
1.667	0.04	0.04	0.001	O					0.07
1.750	0.04	0.04	0.001	O					0.07
1.833	0.05	0.04	0.001	OI					0.07
1.917	0.05	0.04	0.001	O					0.07
2.000	0.05	0.04	0.001	O					0.08
2.083	0.05	0.04	0.001	O					0.08
2.167	0.05	0.05	0.001	O					0.08
2.250	0.05	0.05	0.001	O					0.08
2.333	0.05	0.05	0.001	O					0.08
2.417	0.05	0.05	0.001	O					0.09
2.500	0.05	0.05	0.001	O					0.09
2.583	0.06	0.05	0.001	OI					0.09
2.667	0.06	0.05	0.001	O					0.09
2.750	0.06	0.05	0.001	O					0.10
2.833	0.06	0.06	0.001	O					0.10
2.917	0.06	0.06	0.001	O					0.10
3.000	0.06	0.06	0.001	O					0.11
3.083	0.06	0.06	0.001	O					0.11
3.167	0.06	0.06	0.001	O					0.11
3.250	0.06	0.06	0.001	O					0.11
3.333	0.06	0.06	0.001	O					0.11
3.417	0.06	0.06	0.001	O					0.11
3.500	0.06	0.06	0.001	O					0.11
3.583	0.06	0.06	0.001	O					0.11
3.667	0.06	0.06	0.001	O					0.11
3.750	0.06	0.06	0.001	O					0.11
3.833	0.07	0.06	0.001	OI					0.11
3.917	0.07	0.07	0.001	O					0.12
4.000	0.07	0.07	0.001	O					0.12
4.083	0.07	0.07	0.001	O					0.12
4.167	0.07	0.07	0.002	O					0.13
4.250	0.07	0.07	0.002	O					0.13
4.333	0.08	0.07	0.002	OI					0.13
4.417	0.09	0.08	0.002	OI					0.14

4.500	0.09	0.08	0.002	|	O |	|	|	|	0.14
4.583	0.09	0.08	0.002	|	O |	|	|	|	0.14
4.667	0.09	0.08	0.002	|	O |	|	|	|	0.15
4.750	0.09	0.08	0.002	|	O |	|	|	|	0.15
4.833	0.10	0.09	0.002	|	OI|	|	|	|	0.15
4.917	0.10	0.09	0.002	|	OI|	|	|	|	0.16
5.000	0.10	0.09	0.002	|	OI|	|	|	|	0.16
5.083	0.08	0.09	0.002	|	O |	|	|	|	0.16
5.167	0.07	0.09	0.002	|	IO |	|	|	|	0.15
5.250	0.07	0.08	0.002	|	IO |	|	|	|	0.15
5.333	0.08	0.08	0.002	|	O |	|	|	|	0.15
5.417	0.09	0.08	0.002	|	O |	|	|	|	0.15
5.500	0.09	0.08	0.002	|	O |	|	|	|	0.15
5.583	0.10	0.09	0.002	|	OI|	|	|	|	0.15
5.667	0.10	0.09	0.002	|	OI|	|	|	|	0.16
5.750	0.10	0.09	0.002	|	OI|	|	|	|	0.16
5.833	0.10	0.09	0.002	|	O|	|	|	|	0.17
5.917	0.10	0.09	0.002	|	O|	|	|	|	0.17
6.000	0.10	0.10	0.002	|	O|	|	|	|	0.17
6.083	0.11	0.10	0.002	|	OI	|	|	|	0.17
6.167	0.11	0.10	0.002	|	OI	|	|	|	0.18
6.250	0.11	0.10	0.002	|	OI	|	|	|	0.18
6.333	0.11	0.11	0.002	|	O	|	|	|	0.19
6.417	0.11	0.11	0.002	|	O	|	|	|	0.19
6.500	0.11	0.11	0.002	|	O	|	|	|	0.19
6.583	0.12	0.11	0.002	|	OI	|	|	|	0.20
6.667	0.12	0.11	0.002	|	OI	|	|	|	0.20
6.750	0.12	0.12	0.002	|	OI	|	|	|	0.21
6.833	0.12	0.12	0.003	|	|O	|	|	|	0.21
6.917	0.12	0.12	0.003	|	|O	|	|	|	0.21
7.000	0.12	0.12	0.003	|	|O	|	|	|	0.21
7.083	0.12	0.12	0.003	|	|O	|	|	|	0.22
7.167	0.12	0.12	0.003	|	|O	|	|	|	0.22
7.250	0.12	0.12	0.003	|	|O	|	|	|	0.22
7.333	0.13	0.12	0.003	|	|OI	|	|	|	0.22
7.417	0.13	0.13	0.003	|	|OI	|	|	|	0.22
7.500	0.13	0.13	0.003	|	|OI	|	|	|	0.23
7.583	0.14	0.13	0.003	|	| OI	|	|	|	0.23
7.667	0.15	0.14	0.003	|	| OI	|	|	|	0.24
7.750	0.15	0.14	0.003	|	| OI	|	|	|	0.25
7.833	0.16	0.14	0.003	|	| O I	|	|	|	0.25
7.917	0.16	0.15	0.003	|	| OI	|	|	|	0.26
8.000	0.16	0.15	0.003	|	| OI	|	|	|	0.27
8.083	0.18	0.16	0.003	|	| O I	|	|	|	0.28
8.167	0.18	0.16	0.003	|	| O I |	|	|	0.29
8.250	0.18	0.17	0.004	|	| O I |	|	|	0.30
8.333	0.18	0.17	0.004	|	| OI |	|	|	0.31
8.417	0.18	0.18	0.004	|	| OI |	|	|	0.31
8.500	0.18	0.18	0.004	|	| OI |	|	|	0.32
8.583	0.19	0.18	0.004	|	| OI |	|	|	0.32
8.667	0.20	0.18	0.004	|	| OI|	|	|	0.33
8.750	0.20	0.19	0.004	|	| OI|	|	|	0.34
8.833	0.21	0.19	0.004	|	| OI|	|	|	0.34
8.917	0.21	0.20	0.004	|	| OI	|	|	0.35
9.000	0.21	0.20	0.004	|	| OI	|	|	0.36
9.083	0.23	0.20	0.004	|	| O|I	|	|	0.36
9.167	0.23	0.21	0.005	|	| OI	|	|	0.38
9.250	0.23	0.22	0.005	|	| OI	|	|	0.39
9.333	0.24	0.22	0.005	|	| |OI	|	|	0.40
9.417	0.24	0.23	0.005	|	| |OI	|	|	0.41
9.500	0.24	0.23	0.005	|	| |OI	|	|	0.42
9.583	0.25	0.24	0.005	|	| | OI	|	|	0.42
9.667	0.26	0.24	0.005	|	| | OI	|	|	0.43

9.750	0.26	0.25	0.005	|	|	| OI	|	|	0.44
9.833	0.27	0.25	0.005	|	|	| OI	|	|	0.45
9.917	0.27	0.26	0.005	|	|	| OI	|	|	0.46
10.000	0.27	0.26	0.006	|	|	| OI	|	|	0.46
10.083	0.20	0.25	0.005	|	|	I| O	|	|	0.45
10.167	0.18	0.24	0.005	|	|	I | O	|	|	0.42
10.250	0.18	0.22	0.005	|	|	I |O	|	|	0.40
10.333	0.18	0.21	0.005	|	|	I O	|	|	0.38
10.417	0.18	0.20	0.004	|	|	IO|	|	|	0.36
10.500	0.18	0.20	0.004	|	|	IO|	|	|	0.35
10.583	0.23	0.20	0.004	|	|	O|I	|	|	0.36
10.667	0.24	0.21	0.005	|	|	O I	|	|	0.38
10.750	0.24	0.22	0.005	|	|	O I	|	|	0.39
10.833	0.24	0.23	0.005	|	|	|OI	|	|	0.41
10.917	0.24	0.23	0.005	|	|	|OI	|	|	0.41
11.000	0.24	0.24	0.005	|	|	| O	|	|	0.42
11.083	0.24	0.24	0.005	|	|	| O	|	|	0.42
11.167	0.23	0.24	0.005	|	|	|IO	|	|	0.42
11.250	0.23	0.24	0.005	|	|	|IO	|	|	0.42
11.333	0.23	0.23	0.005	|	|	|IO	|	|	0.42
11.417	0.23	0.23	0.005	|	|	|O	|	|	0.42
11.500	0.23	0.23	0.005	|	|	|O	|	|	0.42
11.583	0.21	0.23	0.005	|	|	IO	|	|	0.41
11.667	0.21	0.23	0.005	|	|	IO	|	|	0.40
11.750	0.21	0.22	0.005	|	|	O	|	|	0.39
11.833	0.22	0.22	0.005	|	|	O	|	|	0.39
11.917	0.22	0.22	0.005	|	|	O	|	|	0.39
12.000	0.22	0.22	0.005	|	|	O	|	|	0.39
12.083	0.29	0.23	0.005	|	|	|O I	|	|	0.41
12.167	0.31	0.25	0.005	|	|	| O I|	|	|	0.44
12.250	0.31	0.26	0.006	|	|	| O I|	|	|	0.47
12.333	0.32	0.28	0.006	|	|	| O I	|	|	0.49
12.417	0.32	0.28	0.006	|	|	| O I	|	|	0.51
12.500	0.32	0.29	0.006	|	|	| O I	|	|	0.53
12.583	0.34	0.29	0.007	|	|	| O |I	|	|	0.55
12.667	0.34	0.30	0.007	|	|	| O| I	|	|	0.58
12.750	0.34	0.31	0.007	|	|	| O| I	|	|	0.60
12.833	0.35	0.31	0.007	|	|	| O I	|	|	0.62
12.917	0.36	0.32	0.008	|	|	| O I	|	|	0.64
13.000	0.36	0.32	0.008	|	|	| O I	|	|	0.66
13.083	0.40	0.33	0.008	|	|	| |O I |	|	|	0.69
13.167	0.42	0.34	0.009	|	|	| | O I	|	|	0.73
13.250	0.42	0.35	0.009	|	|	| | O I	|	|	0.77
13.333	0.42	0.36	0.010	|	|	| | O I	|	|	0.80
13.417	0.42	0.37	0.010	|	|	| | O I	|	|	0.83
13.500	0.42	0.38	0.010	|	|	| | O I	|	|	0.85
13.583	0.31	0.38	0.010	|	|	| I O	|	|	0.84
13.667	0.28	0.36	0.010	|	|	| I | O	|	|	0.80
13.750	0.28	0.35	0.009	|	|	| I | O	|	|	0.76
13.833	0.28	0.34	0.009	|	|	| I | O	|	|	0.72
13.917	0.28	0.33	0.008	|	|	| I |O	|	|	0.69
14.000	0.28	0.33	0.008	|	|	| I O	|	|	0.66
14.083	0.32	0.32	0.008	|	|	| O	|	|	0.65
14.167	0.33	0.32	0.008	|	|	| OI	|	|	0.65
14.250	0.33	0.32	0.008	|	|	| OI	|	|	0.65
14.333	0.32	0.32	0.008	|	|	| O	|	|	0.66
14.417	0.32	0.32	0.008	|	|	| O	|	|	0.65
14.500	0.32	0.32	0.008	|	|	| O	|	|	0.65
14.583	0.32	0.32	0.008	|	|	| O	|	|	0.65
14.667	0.32	0.32	0.008	|	|	| O	|	|	0.65
14.750	0.32	0.32	0.008	|	|	| O	|	|	0.65
14.833	0.31	0.32	0.008	|	|	| IO	|	|	0.64
14.917	0.31	0.32	0.008	|	|	| IO	|	|	0.64

15.000	0.31	0.32	0.008	|	|	| IO |	0.63
15.083	0.30	0.31	0.007	|	|	| I O |	0.62
15.167	0.29	0.31	0.007	|	|	| IO|	0.61
15.250	0.29	0.31	0.007	|	|	| IO|	0.60
15.333	0.28	0.31	0.007	|	|	| I O|	0.59
15.417	0.28	0.30	0.007	|	|	| I O|	0.58
15.500	0.28	0.30	0.007	|	|	| I O|	0.57
15.583	0.24	0.29	0.007	|	|	| I O |	0.55
15.667	0.23	0.29	0.006	|	|	|I O |	0.52
15.750	0.23	0.28	0.006	|	|	|I O |	0.49
15.833	0.23	0.26	0.006	|	|	|I O |	0.47
15.917	0.23	0.26	0.005	|	|	|I O |	0.46
16.000	0.23	0.25	0.005	|	|	|I O |	0.44
16.083	0.09	0.22	0.005	| I|		|O |	0.40
16.167	0.05	0.18	0.004	| I |	| O	|	0.33
16.250	0.05	0.15	0.003	| I |	| O	|	0.26
16.333	0.05	0.12	0.003	| I |	|O	|	0.21
16.417	0.05	0.10	0.002	| I O|		|	0.18
16.500	0.05	0.09	0.002	| I O |		|	0.15
16.583	0.04	0.07	0.002	| I O |		|	0.13
16.667	0.04	0.06	0.001	| I O |		|	0.11
16.750	0.04	0.06	0.001	| I O |		|	0.10
16.833	0.04	0.05	0.001	| IO |		|	0.09
16.917	0.04	0.05	0.001	| IO |		|	0.08
17.000	0.04	0.04	0.001	| IO |		|	0.08
17.083	0.06	0.04	0.001	| OI |		|	0.08
17.167	0.06	0.05	0.001	| OI |		|	0.09
17.250	0.06	0.05	0.001	| OI |		|	0.09
17.333	0.06	0.05	0.001	| O |		|	0.10
17.417	0.06	0.06	0.001	| O |		|	0.10
17.500	0.06	0.06	0.001	| O |		|	0.10
17.583	0.06	0.06	0.001	| O |		|	0.10
17.667	0.06	0.06	0.001	| O |		|	0.11
17.750	0.06	0.06	0.001	| O |		|	0.11
17.833	0.05	0.06	0.001	| IO |		|	0.11
17.917	0.05	0.06	0.001	| IO |		|	0.10
18.000	0.05	0.05	0.001	| IO |		|	0.10
18.083	0.05	0.05	0.001	| IO |		|	0.09
18.167	0.05	0.05	0.001	| O |		|	0.09
18.250	0.05	0.05	0.001	| O |		|	0.09
18.333	0.05	0.05	0.001	| O |		|	0.09
18.417	0.05	0.05	0.001	| O |		|	0.09
18.500	0.05	0.05	0.001	| O |		|	0.09
18.583	0.04	0.05	0.001	| O |		|	0.09
18.667	0.04	0.05	0.001	| IO |		|	0.08
18.750	0.04	0.04	0.001	| IO |		|	0.08
18.833	0.03	0.04	0.001	| IO |		|	0.07
18.917	0.02	0.04	0.001	|IO |		|	0.06
19.000	0.02	0.03	0.001	|IO |		|	0.06
19.083	0.03	0.03	0.001	| O |		|	0.06
19.167	0.04	0.03	0.001	| O |		|	0.06
19.250	0.04	0.03	0.001	| O |		|	0.06
19.333	0.05	0.04	0.001	| OI |		|	0.06
19.417	0.05	0.04	0.001	| O |		|	0.07
19.500	0.05	0.04	0.001	| O |		|	0.07
19.583	0.04	0.04	0.001	| O |		|	0.08
19.667	0.04	0.04	0.001	| IO |		|	0.07
19.750	0.04	0.04	0.001	| IO |		|	0.07
19.833	0.03	0.04	0.001	| O |		|	0.07
19.917	0.02	0.03	0.001	|IO |		|	0.06
20.000	0.02	0.03	0.001	|IO |		|	0.06
20.083	0.03	0.03	0.001	| O |		|	0.06
20.167	0.04	0.03	0.001	| O |		|	0.06

20.250	0.04	0.03	0.001	| O	|	|	|	|	0.06
20.333	0.04	0.03	0.001	| O	|	|	|	|	0.06
20.417	0.04	0.04	0.001	| O	|	|	|	|	0.06
20.500	0.04	0.04	0.001	| O	|	|	|	|	0.06
20.583	0.04	0.04	0.001	| O	|	|	|	|	0.06
20.667	0.04	0.04	0.001	| O	|	|	|	|	0.06
20.750	0.04	0.04	0.001	| O	|	|	|	|	0.06
20.833	0.03	0.04	0.001	| O	|	|	|	|	0.06
20.917	0.02	0.03	0.001	|IO	|	|	|	|	0.06
21.000	0.02	0.03	0.001	|IO	|	|	|	|	0.05
21.083	0.03	0.03	0.001	| O	|	|	|	|	0.05
21.167	0.04	0.03	0.001	| O	|	|	|	|	0.06
21.250	0.04	0.03	0.001	| O	|	|	|	|	0.06
21.333	0.03	0.03	0.001	| O	|	|	|	|	0.06
21.417	0.02	0.03	0.001	|IO	|	|	|	|	0.06
21.500	0.02	0.03	0.001	|IO	|	|	|	|	0.05
21.583	0.03	0.03	0.001	| O	|	|	|	|	0.05
21.667	0.04	0.03	0.001	| O	|	|	|	|	0.06
21.750	0.04	0.03	0.001	| O	|	|	|	|	0.06
21.833	0.03	0.03	0.001	| O	|	|	|	|	0.06
21.917	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.000	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.083	0.03	0.03	0.001	| O	|	|	|	|	0.05
22.167	0.04	0.03	0.001	| O	|	|	|	|	0.05
22.250	0.04	0.03	0.001	| O	|	|	|	|	0.06
22.333	0.03	0.03	0.001	| O	|	|	|	|	0.06
22.417	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.500	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.583	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.667	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.750	0.02	0.03	0.001	|IO	|	|	|	|	0.05
22.833	0.02	0.03	0.001	|O	|	|	|	|	0.05
22.917	0.02	0.03	0.001	|O	|	|	|	|	0.05
23.000	0.02	0.03	0.001	|O	|	|	|	|	0.04
23.083	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.167	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.250	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.333	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.417	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.500	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.583	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.667	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.750	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.833	0.02	0.02	0.001	|O	|	|	|	|	0.04
23.917	0.02	0.02	0.001	|O	|	|	|	|	0.04
24.000	0.02	0.02	0.001	|O	|	|	|	|	0.04
24.083	0.01	0.02	0.000	IO	|	|	|	|	0.04
24.167	0.00	0.02	0.000	IO	|	|	|	|	0.03
24.250	0.00	0.01	0.000	O	|	|	|	|	0.02
24.333	0.00	0.01	0.000	O	|	|	|	|	0.02
24.417	0.00	0.01	0.000	O	|	|	|	|	0.01
24.500	0.00	0.00	0.000	O	|	|	|	|	0.01
24.583	0.00	0.00	0.000	O	|	|	|	|	0.01
24.667	0.00	0.00	0.000	O	|	|	|	|	0.00
24.750	0.00	0.00	0.000	O	|	|	|	|	0.00
24.833	0.00	0.00	0.000	O	|	|	|	|	0.00
24.917	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 299
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.378 (CFS)
Total volume = 0.253 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

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

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Study date 11/26/24 File: BEAULIBPRE24100.out

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

Program License Serial Number 6447

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

English Units used in output format

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
100-YEAR, 24-HOUR STORM EVENT, HYDROGRAPH
EXISTING CONDITION

Drainage Area = 1.34(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.34(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 267.00(Ft.)
Length along longest watercourse measured to centroid = 86.00(Ft.)
Length along longest watercourse = 0.051 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 5.20(Ft.)
Slope along watercourse = 102.8315 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.010 Hr.
Lag time = 0.60 Min.
25% of lag time = 0.15 Min.
40% of lag time = 0.24 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	2.71	3.63

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	6.50	8.71

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.710(In)
Area Averaged 100-Year Rainfall = 6.500(In)

Point rain (area averaged) = 6.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.340	32.00	0.788

Total Area Entered = 1.34(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	16.2	0.870	0.788	0.253	1.000	0.253
					Sum (F) =	0.253

Area averaged mean soil loss (F) (In/Hr) = 0.253
Minimum soil loss rate ((In/Hr)) = 0.126
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.269

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	829.542	100.000	1.350
		Sum =	100.000 Sum=	1.350

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.052	(0.448)	0.014	0.038
2	0.17	0.07	0.052	(0.446)	0.014	0.038
3	0.25	0.07	0.052	(0.445)	0.014	0.038
4	0.33	0.10	0.078	(0.443)	0.021	0.057
5	0.42	0.10	0.078	(0.441)	0.021	0.057
6	0.50	0.10	0.078	(0.440)	0.021	0.057
7	0.58	0.10	0.078	(0.438)	0.021	0.057
8	0.67	0.10	0.078	(0.436)	0.021	0.057
9	0.75	0.10	0.078	(0.434)	0.021	0.057
10	0.83	0.13	0.104	(0.433)	0.028	0.076
11	0.92	0.13	0.104	(0.431)	0.028	0.076
12	1.00	0.13	0.104	(0.429)	0.028	0.076
13	1.08	0.10	0.078	(0.428)	0.021	0.057
14	1.17	0.10	0.078	(0.426)	0.021	0.057
15	1.25	0.10	0.078	(0.424)	0.021	0.057
16	1.33	0.10	0.078	(0.422)	0.021	0.057
17	1.42	0.10	0.078	(0.421)	0.021	0.057
18	1.50	0.10	0.078	(0.419)	0.021	0.057
19	1.58	0.10	0.078	(0.417)	0.021	0.057
20	1.67	0.10	0.078	(0.416)	0.021	0.057
21	1.75	0.10	0.078	(0.414)	0.021	0.057
22	1.83	0.13	0.104	(0.412)	0.028	0.076
23	1.92	0.13	0.104	(0.411)	0.028	0.076
24	2.00	0.13	0.104	(0.409)	0.028	0.076

25	2.08	0.13	0.104	(0.407)	0.028	0.076
26	2.17	0.13	0.104	(0.406)	0.028	0.076
27	2.25	0.13	0.104	(0.404)	0.028	0.076
28	2.33	0.13	0.104	(0.403)	0.028	0.076
29	2.42	0.13	0.104	(0.401)	0.028	0.076
30	2.50	0.13	0.104	(0.399)	0.028	0.076
31	2.58	0.17	0.130	(0.398)	0.035	0.095
32	2.67	0.17	0.130	(0.396)	0.035	0.095
33	2.75	0.17	0.130	(0.394)	0.035	0.095
34	2.83	0.17	0.130	(0.393)	0.035	0.095
35	2.92	0.17	0.130	(0.391)	0.035	0.095
36	3.00	0.17	0.130	(0.390)	0.035	0.095
37	3.08	0.17	0.130	(0.388)	0.035	0.095
38	3.17	0.17	0.130	(0.386)	0.035	0.095
39	3.25	0.17	0.130	(0.385)	0.035	0.095
40	3.33	0.17	0.130	(0.383)	0.035	0.095
41	3.42	0.17	0.130	(0.381)	0.035	0.095
42	3.50	0.17	0.130	(0.380)	0.035	0.095
43	3.58	0.17	0.130	(0.378)	0.035	0.095
44	3.67	0.17	0.130	(0.377)	0.035	0.095
45	3.75	0.17	0.130	(0.375)	0.035	0.095
46	3.83	0.20	0.156	(0.374)	0.042	0.114
47	3.92	0.20	0.156	(0.372)	0.042	0.114
48	4.00	0.20	0.156	(0.370)	0.042	0.114
49	4.08	0.20	0.156	(0.369)	0.042	0.114
50	4.17	0.20	0.156	(0.367)	0.042	0.114
51	4.25	0.20	0.156	(0.366)	0.042	0.114
52	4.33	0.23	0.182	(0.364)	0.049	0.133
53	4.42	0.23	0.182	(0.363)	0.049	0.133
54	4.50	0.23	0.182	(0.361)	0.049	0.133
55	4.58	0.23	0.182	(0.359)	0.049	0.133
56	4.67	0.23	0.182	(0.358)	0.049	0.133
57	4.75	0.23	0.182	(0.356)	0.049	0.133
58	4.83	0.27	0.208	(0.355)	0.056	0.152
59	4.92	0.27	0.208	(0.353)	0.056	0.152
60	5.00	0.27	0.208	(0.352)	0.056	0.152
61	5.08	0.20	0.156	(0.350)	0.042	0.114
62	5.17	0.20	0.156	(0.349)	0.042	0.114
63	5.25	0.20	0.156	(0.347)	0.042	0.114
64	5.33	0.23	0.182	(0.346)	0.049	0.133
65	5.42	0.23	0.182	(0.344)	0.049	0.133
66	5.50	0.23	0.182	(0.343)	0.049	0.133
67	5.58	0.27	0.208	(0.341)	0.056	0.152
68	5.67	0.27	0.208	(0.340)	0.056	0.152
69	5.75	0.27	0.208	(0.338)	0.056	0.152
70	5.83	0.27	0.208	(0.337)	0.056	0.152
71	5.92	0.27	0.208	(0.335)	0.056	0.152
72	6.00	0.27	0.208	(0.334)	0.056	0.152
73	6.08	0.30	0.234	(0.332)	0.063	0.171
74	6.17	0.30	0.234	(0.331)	0.063	0.171
75	6.25	0.30	0.234	(0.329)	0.063	0.171
76	6.33	0.30	0.234	(0.328)	0.063	0.171
77	6.42	0.30	0.234	(0.326)	0.063	0.171
78	6.50	0.30	0.234	(0.325)	0.063	0.171
79	6.58	0.33	0.260	(0.323)	0.070	0.190
80	6.67	0.33	0.260	(0.322)	0.070	0.190
81	6.75	0.33	0.260	(0.320)	0.070	0.190
82	6.83	0.33	0.260	(0.319)	0.070	0.190
83	6.92	0.33	0.260	(0.318)	0.070	0.190
84	7.00	0.33	0.260	(0.316)	0.070	0.190
85	7.08	0.33	0.260	(0.315)	0.070	0.190
86	7.17	0.33	0.260	(0.313)	0.070	0.190
87	7.25	0.33	0.260	(0.312)	0.070	0.190

88	7.33	0.37	0.286	(0.310)	0.077	0.209
89	7.42	0.37	0.286	(0.309)	0.077	0.209
90	7.50	0.37	0.286	(0.308)	0.077	0.209
91	7.58	0.40	0.312	(0.306)	0.084	0.228
92	7.67	0.40	0.312	(0.305)	0.084	0.228
93	7.75	0.40	0.312	(0.303)	0.084	0.228
94	7.83	0.43	0.338	(0.302)	0.091	0.247
95	7.92	0.43	0.338	(0.301)	0.091	0.247
96	8.00	0.43	0.338	(0.299)	0.091	0.247
97	8.08	0.50	0.390	(0.298)	0.105	0.285
98	8.17	0.50	0.390	(0.296)	0.105	0.285
99	8.25	0.50	0.390	(0.295)	0.105	0.285
100	8.33	0.50	0.390	(0.294)	0.105	0.285
101	8.42	0.50	0.390	(0.292)	0.105	0.285
102	8.50	0.50	0.390	(0.291)	0.105	0.285
103	8.58	0.53	0.416	(0.290)	0.112	0.304
104	8.67	0.53	0.416	(0.288)	0.112	0.304
105	8.75	0.53	0.416	(0.287)	0.112	0.304
106	8.83	0.57	0.442	(0.285)	0.119	0.323
107	8.92	0.57	0.442	(0.284)	0.119	0.323
108	9.00	0.57	0.442	(0.283)	0.119	0.323
109	9.08	0.63	0.494	(0.281)	0.133	0.361
110	9.17	0.63	0.494	(0.280)	0.133	0.361
111	9.25	0.63	0.494	(0.279)	0.133	0.361
112	9.33	0.67	0.520	(0.277)	0.140	0.380
113	9.42	0.67	0.520	(0.276)	0.140	0.380
114	9.50	0.67	0.520	(0.275)	0.140	0.380
115	9.58	0.70	0.546	(0.273)	0.147	0.399
116	9.67	0.70	0.546	(0.272)	0.147	0.399
117	9.75	0.70	0.546	(0.271)	0.147	0.399
118	9.83	0.73	0.572	(0.270)	0.154	0.418
119	9.92	0.73	0.572	(0.268)	0.154	0.418
120	10.00	0.73	0.572	(0.267)	0.154	0.418
121	10.08	0.50	0.390	(0.266)	0.105	0.285
122	10.17	0.50	0.390	(0.264)	0.105	0.285
123	10.25	0.50	0.390	(0.263)	0.105	0.285
124	10.33	0.50	0.390	(0.262)	0.105	0.285
125	10.42	0.50	0.390	(0.261)	0.105	0.285
126	10.50	0.50	0.390	(0.259)	0.105	0.285
127	10.58	0.67	0.520	(0.258)	0.140	0.380
128	10.67	0.67	0.520	(0.257)	0.140	0.380
129	10.75	0.67	0.520	(0.255)	0.140	0.380
130	10.83	0.67	0.520	(0.254)	0.140	0.380
131	10.92	0.67	0.520	(0.253)	0.140	0.380
132	11.00	0.67	0.520	(0.252)	0.140	0.380
133	11.08	0.63	0.494	(0.251)	0.133	0.361
134	11.17	0.63	0.494	(0.249)	0.133	0.361
135	11.25	0.63	0.494	(0.248)	0.133	0.361
136	11.33	0.63	0.494	(0.247)	0.133	0.361
137	11.42	0.63	0.494	(0.246)	0.133	0.361
138	11.50	0.63	0.494	(0.244)	0.133	0.361
139	11.58	0.57	0.442	(0.243)	0.119	0.323
140	11.67	0.57	0.442	(0.242)	0.119	0.323
141	11.75	0.57	0.442	(0.241)	0.119	0.323
142	11.83	0.60	0.468	(0.240)	0.126	0.342
143	11.92	0.60	0.468	(0.238)	0.126	0.342
144	12.00	0.60	0.468	(0.237)	0.126	0.342
145	12.08	0.83	0.650	(0.236)	0.175	0.475
146	12.17	0.83	0.650	(0.235)	0.175	0.475
147	12.25	0.83	0.650	(0.234)	0.175	0.475
148	12.33	0.87	0.676	(0.232)	0.182	0.494
149	12.42	0.87	0.676	(0.231)	0.182	0.494
150	12.50	0.87	0.676	(0.230)	0.182	0.494

151	12.58	0.93	0.728	(0.229)	0.196	0.532
152	12.67	0.93	0.728	(0.228)	0.196	0.532
153	12.75	0.93	0.728	(0.227)	0.196	0.532
154	12.83	0.97	0.754	(0.226)	0.203	0.551
155	12.92	0.97	0.754	(0.224)	0.203	0.551
156	13.00	0.97	0.754	(0.223)	0.203	0.551
157	13.08	1.13	0.884	0.222	(0.238)	0.662
158	13.17	1.13	0.884	0.221	(0.238)	0.663
159	13.25	1.13	0.884	0.220	(0.238)	0.664
160	13.33	1.13	0.884	0.219	(0.238)	0.665
161	13.42	1.13	0.884	0.218	(0.238)	0.666
162	13.50	1.13	0.884	0.217	(0.238)	0.667
163	13.58	0.77	0.598	(0.215)	0.161	0.437
164	13.67	0.77	0.598	(0.214)	0.161	0.437
165	13.75	0.77	0.598	(0.213)	0.161	0.437
166	13.83	0.77	0.598	(0.212)	0.161	0.437
167	13.92	0.77	0.598	(0.211)	0.161	0.437
168	14.00	0.77	0.598	(0.210)	0.161	0.437
169	14.08	0.90	0.702	(0.209)	0.189	0.513
170	14.17	0.90	0.702	(0.208)	0.189	0.513
171	14.25	0.90	0.702	(0.207)	0.189	0.513
172	14.33	0.87	0.676	(0.206)	0.182	0.494
173	14.42	0.87	0.676	(0.205)	0.182	0.494
174	14.50	0.87	0.676	(0.204)	0.182	0.494
175	14.58	0.87	0.676	(0.203)	0.182	0.494
176	14.67	0.87	0.676	(0.202)	0.182	0.494
177	14.75	0.87	0.676	(0.201)	0.182	0.494
178	14.83	0.83	0.650	(0.199)	0.175	0.475
179	14.92	0.83	0.650	(0.198)	0.175	0.475
180	15.00	0.83	0.650	(0.197)	0.175	0.475
181	15.08	0.80	0.624	(0.196)	0.168	0.456
182	15.17	0.80	0.624	(0.195)	0.168	0.456
183	15.25	0.80	0.624	(0.194)	0.168	0.456
184	15.33	0.77	0.598	(0.193)	0.161	0.437
185	15.42	0.77	0.598	(0.192)	0.161	0.437
186	15.50	0.77	0.598	(0.191)	0.161	0.437
187	15.58	0.63	0.494	(0.190)	0.133	0.361
188	15.67	0.63	0.494	(0.189)	0.133	0.361
189	15.75	0.63	0.494	(0.189)	0.133	0.361
190	15.83	0.63	0.494	(0.188)	0.133	0.361
191	15.92	0.63	0.494	(0.187)	0.133	0.361
192	16.00	0.63	0.494	(0.186)	0.133	0.361
193	16.08	0.13	0.104	(0.185)	0.028	0.076
194	16.17	0.13	0.104	(0.184)	0.028	0.076
195	16.25	0.13	0.104	(0.183)	0.028	0.076
196	16.33	0.13	0.104	(0.182)	0.028	0.076
197	16.42	0.13	0.104	(0.181)	0.028	0.076
198	16.50	0.13	0.104	(0.180)	0.028	0.076
199	16.58	0.10	0.078	(0.179)	0.021	0.057
200	16.67	0.10	0.078	(0.178)	0.021	0.057
201	16.75	0.10	0.078	(0.177)	0.021	0.057
202	16.83	0.10	0.078	(0.176)	0.021	0.057
203	16.92	0.10	0.078	(0.176)	0.021	0.057
204	17.00	0.10	0.078	(0.175)	0.021	0.057
205	17.08	0.17	0.130	(0.174)	0.035	0.095
206	17.17	0.17	0.130	(0.173)	0.035	0.095
207	17.25	0.17	0.130	(0.172)	0.035	0.095
208	17.33	0.17	0.130	(0.171)	0.035	0.095
209	17.42	0.17	0.130	(0.170)	0.035	0.095
210	17.50	0.17	0.130	(0.169)	0.035	0.095
211	17.58	0.17	0.130	(0.169)	0.035	0.095
212	17.67	0.17	0.130	(0.168)	0.035	0.095
213	17.75	0.17	0.130	(0.167)	0.035	0.095

214	17.83	0.13	0.104	(0.166)	0.028	0.076
215	17.92	0.13	0.104	(0.165)	0.028	0.076
216	18.00	0.13	0.104	(0.164)	0.028	0.076
217	18.08	0.13	0.104	(0.164)	0.028	0.076
218	18.17	0.13	0.104	(0.163)	0.028	0.076
219	18.25	0.13	0.104	(0.162)	0.028	0.076
220	18.33	0.13	0.104	(0.161)	0.028	0.076
221	18.42	0.13	0.104	(0.160)	0.028	0.076
222	18.50	0.13	0.104	(0.160)	0.028	0.076
223	18.58	0.10	0.078	(0.159)	0.021	0.057
224	18.67	0.10	0.078	(0.158)	0.021	0.057
225	18.75	0.10	0.078	(0.157)	0.021	0.057
226	18.83	0.07	0.052	(0.157)	0.014	0.038
227	18.92	0.07	0.052	(0.156)	0.014	0.038
228	19.00	0.07	0.052	(0.155)	0.014	0.038
229	19.08	0.10	0.078	(0.154)	0.021	0.057
230	19.17	0.10	0.078	(0.154)	0.021	0.057
231	19.25	0.10	0.078	(0.153)	0.021	0.057
232	19.33	0.13	0.104	(0.152)	0.028	0.076
233	19.42	0.13	0.104	(0.152)	0.028	0.076
234	19.50	0.13	0.104	(0.151)	0.028	0.076
235	19.58	0.10	0.078	(0.150)	0.021	0.057
236	19.67	0.10	0.078	(0.149)	0.021	0.057
237	19.75	0.10	0.078	(0.149)	0.021	0.057
238	19.83	0.07	0.052	(0.148)	0.014	0.038
239	19.92	0.07	0.052	(0.147)	0.014	0.038
240	20.00	0.07	0.052	(0.147)	0.014	0.038
241	20.08	0.10	0.078	(0.146)	0.021	0.057
242	20.17	0.10	0.078	(0.146)	0.021	0.057
243	20.25	0.10	0.078	(0.145)	0.021	0.057
244	20.33	0.10	0.078	(0.144)	0.021	0.057
245	20.42	0.10	0.078	(0.144)	0.021	0.057
246	20.50	0.10	0.078	(0.143)	0.021	0.057
247	20.58	0.10	0.078	(0.142)	0.021	0.057
248	20.67	0.10	0.078	(0.142)	0.021	0.057
249	20.75	0.10	0.078	(0.141)	0.021	0.057
250	20.83	0.07	0.052	(0.141)	0.014	0.038
251	20.92	0.07	0.052	(0.140)	0.014	0.038
252	21.00	0.07	0.052	(0.140)	0.014	0.038
253	21.08	0.10	0.078	(0.139)	0.021	0.057
254	21.17	0.10	0.078	(0.138)	0.021	0.057
255	21.25	0.10	0.078	(0.138)	0.021	0.057
256	21.33	0.07	0.052	(0.137)	0.014	0.038
257	21.42	0.07	0.052	(0.137)	0.014	0.038
258	21.50	0.07	0.052	(0.136)	0.014	0.038
259	21.58	0.10	0.078	(0.136)	0.021	0.057
260	21.67	0.10	0.078	(0.135)	0.021	0.057
261	21.75	0.10	0.078	(0.135)	0.021	0.057
262	21.83	0.07	0.052	(0.134)	0.014	0.038
263	21.92	0.07	0.052	(0.134)	0.014	0.038
264	22.00	0.07	0.052	(0.133)	0.014	0.038
265	22.08	0.10	0.078	(0.133)	0.021	0.057
266	22.17	0.10	0.078	(0.133)	0.021	0.057
267	22.25	0.10	0.078	(0.132)	0.021	0.057
268	22.33	0.07	0.052	(0.132)	0.014	0.038
269	22.42	0.07	0.052	(0.131)	0.014	0.038
270	22.50	0.07	0.052	(0.131)	0.014	0.038
271	22.58	0.07	0.052	(0.131)	0.014	0.038
272	22.67	0.07	0.052	(0.130)	0.014	0.038
273	22.75	0.07	0.052	(0.130)	0.014	0.038
274	22.83	0.07	0.052	(0.130)	0.014	0.038
275	22.92	0.07	0.052	(0.129)	0.014	0.038
276	23.00	0.07	0.052	(0.129)	0.014	0.038

277	23.08	0.07	0.052	(0.129)	0.014	0.038
278	23.17	0.07	0.052	(0.128)	0.014	0.038
279	23.25	0.07	0.052	(0.128)	0.014	0.038
280	23.33	0.07	0.052	(0.128)	0.014	0.038
281	23.42	0.07	0.052	(0.128)	0.014	0.038
282	23.50	0.07	0.052	(0.127)	0.014	0.038
283	23.58	0.07	0.052	(0.127)	0.014	0.038
284	23.67	0.07	0.052	(0.127)	0.014	0.038
285	23.75	0.07	0.052	(0.127)	0.014	0.038
286	23.83	0.07	0.052	(0.127)	0.014	0.038
287	23.92	0.07	0.052	(0.126)	0.014	0.038
288	24.00	0.07	0.052	(0.126)	0.014	0.038

(Loss Rate Not Used)

Sum = 100.0 Sum = 57.1

Flood volume = Effective rainfall 4.76(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 1.74(In)
Total soil loss = 0.194(Ac.Ft)
Total rainfall = 6.50(In)
Flood volume = 23157.1 Cubic Feet
Total soil loss = 8460.1 Cubic Feet

Peak flow rate of this hydrograph = 0.902(CFS)

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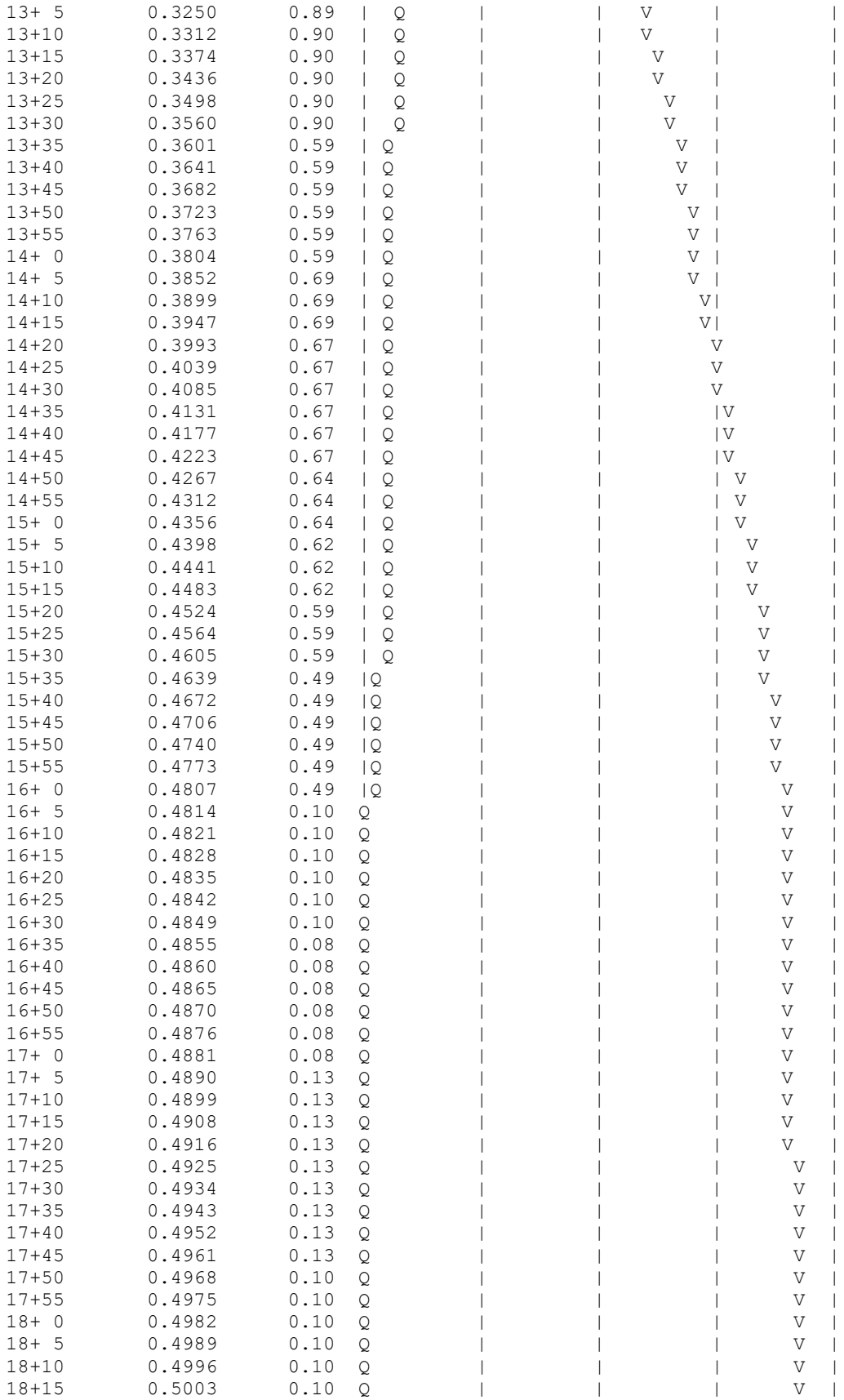
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0004	0.05	Q				
0+10	0.0007	0.05	Q				
0+15	0.0011	0.05	Q				
0+20	0.0016	0.08	Q				
0+25	0.0021	0.08	Q				
0+30	0.0027	0.08	Q				
0+35	0.0032	0.08	Q				
0+40	0.0037	0.08	Q				
0+45	0.0042	0.08	Q				
0+50	0.0050	0.10	Q				
0+55	0.0057	0.10	Q				
1+ 0	0.0064	0.10	Q				
1+ 5	0.0069	0.08	Q				
1+10	0.0074	0.08	Q				
1+15	0.0080	0.08	Q				
1+20	0.0085	0.08	Q				
1+25	0.0090	0.08	Q				
1+30	0.0096	0.08	Q				
1+35	0.0101	0.08	Q				
1+40	0.0106	0.08	Q				
1+45	0.0111	0.08	Q				
1+50	0.0118	0.10	Q				
1+55	0.0126	0.10	Q				
2+ 0	0.0133	0.10	Q				
2+ 5	0.0140	0.10	QV				
2+10	0.0147	0.10	QV				
2+15	0.0154	0.10	QV				
2+20	0.0161	0.10	QV				
2+25	0.0168	0.10	QV				
2+30	0.0175	0.10	QV				

2+35	0.0184	0.13	QV	|	|	|	|
2+40	0.0193	0.13	QV	|	|	|	|
2+45	0.0202	0.13	QV	|	|	|	|
2+50	0.0210	0.13	QV	|	|	|	|
2+55	0.0219	0.13	QV	|	|	|	|
3+ 0	0.0228	0.13	QV	|	|	|	|
3+ 5	0.0237	0.13	QV	|	|	|	|
3+10	0.0246	0.13	QV	|	|	|	|
3+15	0.0255	0.13	QV	|	|	|	|
3+20	0.0264	0.13	QV	|	|	|	|
3+25	0.0272	0.13	Q V	|	|	|	|
3+30	0.0281	0.13	Q V	|	|	|	|
3+35	0.0290	0.13	Q V	|	|	|	|
3+40	0.0299	0.13	Q V	|	|	|	|
3+45	0.0308	0.13	Q V	|	|	|	|
3+50	0.0318	0.15	Q V	|	|	|	|
3+55	0.0329	0.15	Q V	|	|	|	|
4+ 0	0.0340	0.15	Q V	|	|	|	|
4+ 5	0.0350	0.15	Q V	|	|	|	|
4+10	0.0361	0.15	Q V	|	|	|	|
4+15	0.0371	0.15	Q V	|	|	|	|
4+20	0.0384	0.18	Q V	|	|	|	|
4+25	0.0396	0.18	Q V	|	|	|	|
4+30	0.0409	0.18	Q V	|	|	|	|
4+35	0.0421	0.18	Q V	|	|	|	|
4+40	0.0433	0.18	Q V	|	|	|	|
4+45	0.0446	0.18	Q V	|	|	|	|
4+50	0.0460	0.21	Q V	|	|	|	|
4+55	0.0474	0.21	Q V	|	|	|	|
5+ 0	0.0488	0.21	Q V	|	|	|	|
5+ 5	0.0499	0.15	Q V	|	|	|	|
5+10	0.0509	0.15	Q V	|	|	|	|
5+15	0.0520	0.15	Q V	|	|	|	|
5+20	0.0532	0.18	Q V	|	|	|	|
5+25	0.0545	0.18	Q V	|	|	|	|
5+30	0.0557	0.18	Q V	|	|	|	|
5+35	0.0571	0.21	Q V	|	|	|	|
5+40	0.0585	0.21	Q V	|	|	|	|
5+45	0.0600	0.21	Q V	|	|	|	|
5+50	0.0614	0.21	Q V	|	|	|	|
5+55	0.0628	0.21	Q V	|	|	|	|
6+ 0	0.0642	0.21	Q V	|	|	|	|
6+ 5	0.0658	0.23	Q V	|	|	|	|
6+10	0.0674	0.23	Q V	|	|	|	|
6+15	0.0690	0.23	Q V	|	|	|	|
6+20	0.0706	0.23	Q V	|	|	|	|
6+25	0.0722	0.23	Q V	|	|	|	|
6+30	0.0738	0.23	Q V	|	|	|	|
6+35	0.0755	0.26	|Q V	|	|	|	|
6+40	0.0773	0.26	|Q V	|	|	|	|
6+45	0.0791	0.26	|Q V	|	|	|	|
6+50	0.0808	0.26	|Q V	|	|	|	|
6+55	0.0826	0.26	|Q V	|	|	|	|
7+ 0	0.0844	0.26	|Q V	|	|	|	|
7+ 5	0.0861	0.26	|Q V	|	|	|	|
7+10	0.0879	0.26	|Q V	|	|	|	|
7+15	0.0897	0.26	|Q V	|	|	|	|
7+20	0.0916	0.28	|Q V	|	|	|	|
7+25	0.0936	0.28	|Q V	|	|	|	|
7+30	0.0955	0.28	|Q V	|	|	|	|
7+35	0.0976	0.31	|Q V	|	|	|	|
7+40	0.0997	0.31	|Q V	|	|	|	|
7+45	0.1019	0.31	|Q V	|	|	|	|

7+50	0.1042	0.33	Q V				
7+55	0.1065	0.33	Q V				
8+ 0	0.1088	0.33	Q V				
8+ 5	0.1114	0.39	Q V				
8+10	0.1141	0.39	Q V				
8+15	0.1167	0.39	Q V				
8+20	0.1194	0.39	Q V				
8+25	0.1220	0.39	Q V				
8+30	0.1247	0.39	Q V				
8+35	0.1275	0.41	Q V				
8+40	0.1303	0.41	Q V				
8+45	0.1332	0.41	Q V				
8+50	0.1362	0.44	Q V				
8+55	0.1392	0.44	Q V				
9+ 0	0.1422	0.44	Q V				
9+ 5	0.1456	0.49	Q V				
9+10	0.1489	0.49	Q V				
9+15	0.1523	0.49	Q V				
9+20	0.1558	0.51	Q V				
9+25	0.1594	0.51	Q V				
9+30	0.1629	0.51	Q V				
9+35	0.1666	0.54	Q V				
9+40	0.1703	0.54	Q V				
9+45	0.1740	0.54	Q V				
9+50	0.1779	0.56	Q V				
9+55	0.1818	0.56	Q V				
10+ 0	0.1857	0.56	Q V				
10+ 5	0.1884	0.39	Q V				
10+10	0.1910	0.39	Q V				
10+15	0.1937	0.39	Q V				
10+20	0.1963	0.39	Q V				
10+25	0.1990	0.39	Q V				
10+30	0.2016	0.39	Q V				
10+35	0.2052	0.51	Q V				
10+40	0.2087	0.51	Q V				
10+45	0.2122	0.51	Q V				
10+50	0.2158	0.51	Q V				
10+55	0.2193	0.51	Q V				
11+ 0	0.2228	0.51	Q V				
11+ 5	0.2262	0.49	Q V				
11+10	0.2296	0.49	Q V				
11+15	0.2329	0.49	Q V				
11+20	0.2363	0.49	Q V				
11+25	0.2396	0.49	Q V				
11+30	0.2430	0.49	Q V				
11+35	0.2460	0.44	Q V				
11+40	0.2490	0.44	Q V				
11+45	0.2520	0.44	Q V				
11+50	0.2552	0.46	Q V				
11+55	0.2584	0.46	Q V				
12+ 0	0.2616	0.46	Q V				
12+ 5	0.2660	0.64	Q V				
12+10	0.2704	0.64	Q V				
12+15	0.2748	0.64	Q V				
12+20	0.2794	0.67	Q V				
12+25	0.2840	0.67	Q V				
12+30	0.2886	0.67	Q V				
12+35	0.2936	0.72	Q V				
12+40	0.2985	0.72	Q V				
12+45	0.3035	0.72	Q V				
12+50	0.3086	0.74	Q V				
12+55	0.3138	0.74	Q V				
13+ 0	0.3189	0.74	Q V				



18+20	0.5010	0.10	Q	|	|	|	V |
18+25	0.5017	0.10	Q	|	|	|	V |
18+30	0.5024	0.10	Q	|	|	|	V |
18+35	0.5030	0.08	Q	|	|	|	V |
18+40	0.5035	0.08	Q	|	|	|	V |
18+45	0.5040	0.08	Q	|	|	|	V |
18+50	0.5044	0.05	Q	|	|	|	V |
18+55	0.5047	0.05	Q	|	|	|	V |
19+ 0	0.5051	0.05	Q	|	|	|	V |
19+ 5	0.5056	0.08	Q	|	|	|	V |
19+10	0.5061	0.08	Q	|	|	|	V |
19+15	0.5067	0.08	Q	|	|	|	V |
19+20	0.5074	0.10	Q	|	|	|	V |
19+25	0.5081	0.10	Q	|	|	|	V |
19+30	0.5088	0.10	Q	|	|	|	V |
19+35	0.5093	0.08	Q	|	|	|	V |
19+40	0.5099	0.08	Q	|	|	|	V |
19+45	0.5104	0.08	Q	|	|	|	V |
19+50	0.5107	0.05	Q	|	|	|	V |
19+55	0.5111	0.05	Q	|	|	|	V |
20+ 0	0.5115	0.05	Q	|	|	|	V |
20+ 5	0.5120	0.08	Q	|	|	|	V |
20+10	0.5125	0.08	Q	|	|	|	V |
20+15	0.5130	0.08	Q	|	|	|	V |
20+20	0.5136	0.08	Q	|	|	|	V |
20+25	0.5141	0.08	Q	|	|	|	V |
20+30	0.5146	0.08	Q	|	|	|	V |
20+35	0.5152	0.08	Q	|	|	|	V |
20+40	0.5157	0.08	Q	|	|	|	V |
20+45	0.5162	0.08	Q	|	|	|	V |
20+50	0.5166	0.05	Q	|	|	|	V |
20+55	0.5169	0.05	Q	|	|	|	V |
21+ 0	0.5173	0.05	Q	|	|	|	V |
21+ 5	0.5178	0.08	Q	|	|	|	V |
21+10	0.5184	0.08	Q	|	|	|	V|
21+15	0.5189	0.08	Q	|	|	|	V|
21+20	0.5192	0.05	Q	|	|	|	V|
21+25	0.5196	0.05	Q	|	|	|	V|
21+30	0.5199	0.05	Q	|	|	|	V|
21+35	0.5205	0.08	Q	|	|	|	V|
21+40	0.5210	0.08	Q	|	|	|	V|
21+45	0.5215	0.08	Q	|	|	|	V|
21+50	0.5219	0.05	Q	|	|	|	V|
21+55	0.5222	0.05	Q	|	|	|	V|
22+ 0	0.5226	0.05	Q	|	|	|	V|
22+ 5	0.5231	0.08	Q	|	|	|	V|
22+10	0.5237	0.08	Q	|	|	|	V|
22+15	0.5242	0.08	Q	|	|	|	V|
22+20	0.5245	0.05	Q	|	|	|	V|
22+25	0.5249	0.05	Q	|	|	|	V|
22+30	0.5252	0.05	Q	|	|	|	V|
22+35	0.5256	0.05	Q	|	|	|	V|
22+40	0.5260	0.05	Q	|	|	|	V|
22+45	0.5263	0.05	Q	|	|	|	V|
22+50	0.5267	0.05	Q	|	|	|	V|
22+55	0.5270	0.05	Q	|	|	|	V|
23+ 0	0.5274	0.05	Q	|	|	|	V|
23+ 5	0.5277	0.05	Q	|	|	|	V|
23+10	0.5281	0.05	Q	|	|	|	V|
23+15	0.5284	0.05	Q	|	|	|	V|
23+20	0.5288	0.05	Q	|	|	|	V|
23+25	0.5291	0.05	Q	|	|	|	V|
23+30	0.5295	0.05	Q	|	|	|	V|

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   23+35       0.5298      0.05  Q          |          |          |         V|
   23+40       0.5302      0.05  Q          |          |          |         V|
   23+45       0.5306      0.05  Q          |          |          |         V|
   23+50       0.5309      0.05  Q          |          |          |         V|
   23+55       0.5313      0.05  Q          |          |          |         V|
   24+ 0       0.5316      0.05  Q          |          |          |          V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/26/24 File: beaulibpost24100.out

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

Program License Serial Number 6447

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

English Units used in output format

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
100-YEAR, 24-HOUR STORM EVENT, HYDROGRAPH
POST CONDITION

Drainage Area = 1.34(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.34(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 330.00(Ft.)
Length along longest watercourse measured to centroid = 169.00(Ft.)
Length along longest watercourse = 0.063 Mi.
Length along longest watercourse measured to centroid = 0.032 Mi.
Difference in elevation = 9.10(Ft.)
Slope along watercourse = 145.6000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.79 Min.
25% of lag time = 0.20 Min.
40% of lag time = 0.32 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	2.71	3.63

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	6.50	8.71

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.710(In)
Area Averaged 100-Year Rainfall = 6.500(In)

Point rain (area averaged) = 6.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.340	32.00	0.910

Total Area Entered = 1.34(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	16.2	0.870	0.910	0.158	1.000	0.158
					Sum (F) =	0.158

Area averaged mean soil loss (F) (In/Hr) = 0.158
Minimum soil loss rate ((In/Hr)) = 0.079
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.164

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	632.538	76.700	1.036
2	0.167	1265.076	23.300	0.315
		Sum = 100.000	Sum=	1.350

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.052	(0.279)	0.009	0.043
2	0.17	0.07	0.052	(0.278)	0.009	0.043
3	0.25	0.07	0.052	(0.277)	0.009	0.043
4	0.33	0.10	0.078	(0.276)	0.013	0.065
5	0.42	0.10	0.078	(0.275)	0.013	0.065
6	0.50	0.10	0.078	(0.274)	0.013	0.065
7	0.58	0.10	0.078	(0.273)	0.013	0.065
8	0.67	0.10	0.078	(0.272)	0.013	0.065
9	0.75	0.10	0.078	(0.271)	0.013	0.065
10	0.83	0.13	0.104	(0.270)	0.017	0.087
11	0.92	0.13	0.104	(0.269)	0.017	0.087
12	1.00	0.13	0.104	(0.268)	0.017	0.087
13	1.08	0.10	0.078	(0.266)	0.013	0.065
14	1.17	0.10	0.078	(0.265)	0.013	0.065
15	1.25	0.10	0.078	(0.264)	0.013	0.065
16	1.33	0.10	0.078	(0.263)	0.013	0.065
17	1.42	0.10	0.078	(0.262)	0.013	0.065
18	1.50	0.10	0.078	(0.261)	0.013	0.065
19	1.58	0.10	0.078	(0.260)	0.013	0.065
20	1.67	0.10	0.078	(0.259)	0.013	0.065
21	1.75	0.10	0.078	(0.258)	0.013	0.065
22	1.83	0.13	0.104	(0.257)	0.017	0.087
23	1.92	0.13	0.104	(0.256)	0.017	0.087

24	2.00	0.13	0.104	(0.255)	0.017	0.087
25	2.08	0.13	0.104	(0.254)	0.017	0.087
26	2.17	0.13	0.104	(0.253)	0.017	0.087
27	2.25	0.13	0.104	(0.252)	0.017	0.087
28	2.33	0.13	0.104	(0.251)	0.017	0.087
29	2.42	0.13	0.104	(0.250)	0.017	0.087
30	2.50	0.13	0.104	(0.249)	0.017	0.087
31	2.58	0.17	0.130	(0.248)	0.021	0.109
32	2.67	0.17	0.130	(0.247)	0.021	0.109
33	2.75	0.17	0.130	(0.246)	0.021	0.109
34	2.83	0.17	0.130	(0.245)	0.021	0.109
35	2.92	0.17	0.130	(0.244)	0.021	0.109
36	3.00	0.17	0.130	(0.243)	0.021	0.109
37	3.08	0.17	0.130	(0.242)	0.021	0.109
38	3.17	0.17	0.130	(0.241)	0.021	0.109
39	3.25	0.17	0.130	(0.240)	0.021	0.109
40	3.33	0.17	0.130	(0.239)	0.021	0.109
41	3.42	0.17	0.130	(0.238)	0.021	0.109
42	3.50	0.17	0.130	(0.237)	0.021	0.109
43	3.58	0.17	0.130	(0.236)	0.021	0.109
44	3.67	0.17	0.130	(0.235)	0.021	0.109
45	3.75	0.17	0.130	(0.234)	0.021	0.109
46	3.83	0.20	0.156	(0.233)	0.026	0.130
47	3.92	0.20	0.156	(0.232)	0.026	0.130
48	4.00	0.20	0.156	(0.231)	0.026	0.130
49	4.08	0.20	0.156	(0.230)	0.026	0.130
50	4.17	0.20	0.156	(0.229)	0.026	0.130
51	4.25	0.20	0.156	(0.228)	0.026	0.130
52	4.33	0.23	0.182	(0.227)	0.030	0.152
53	4.42	0.23	0.182	(0.226)	0.030	0.152
54	4.50	0.23	0.182	(0.225)	0.030	0.152
55	4.58	0.23	0.182	(0.224)	0.030	0.152
56	4.67	0.23	0.182	(0.223)	0.030	0.152
57	4.75	0.23	0.182	(0.222)	0.030	0.152
58	4.83	0.27	0.208	(0.221)	0.034	0.174
59	4.92	0.27	0.208	(0.220)	0.034	0.174
60	5.00	0.27	0.208	(0.219)	0.034	0.174
61	5.08	0.20	0.156	(0.218)	0.026	0.130
62	5.17	0.20	0.156	(0.217)	0.026	0.130
63	5.25	0.20	0.156	(0.216)	0.026	0.130
64	5.33	0.23	0.182	(0.215)	0.030	0.152
65	5.42	0.23	0.182	(0.214)	0.030	0.152
66	5.50	0.23	0.182	(0.214)	0.030	0.152
67	5.58	0.27	0.208	(0.213)	0.034	0.174
68	5.67	0.27	0.208	(0.212)	0.034	0.174
69	5.75	0.27	0.208	(0.211)	0.034	0.174
70	5.83	0.27	0.208	(0.210)	0.034	0.174
71	5.92	0.27	0.208	(0.209)	0.034	0.174
72	6.00	0.27	0.208	(0.208)	0.034	0.174
73	6.08	0.30	0.234	(0.207)	0.038	0.196
74	6.17	0.30	0.234	(0.206)	0.038	0.196
75	6.25	0.30	0.234	(0.205)	0.038	0.196
76	6.33	0.30	0.234	(0.204)	0.038	0.196
77	6.42	0.30	0.234	(0.203)	0.038	0.196
78	6.50	0.30	0.234	(0.202)	0.038	0.196
79	6.58	0.33	0.260	(0.202)	0.043	0.217
80	6.67	0.33	0.260	(0.201)	0.043	0.217
81	6.75	0.33	0.260	(0.200)	0.043	0.217
82	6.83	0.33	0.260	(0.199)	0.043	0.217
83	6.92	0.33	0.260	(0.198)	0.043	0.217
84	7.00	0.33	0.260	(0.197)	0.043	0.217
85	7.08	0.33	0.260	(0.196)	0.043	0.217
86	7.17	0.33	0.260	(0.195)	0.043	0.217

87	7.25	0.33	0.260	(0.194)	0.043	0.217
88	7.33	0.37	0.286	(0.193)	0.047	0.239
89	7.42	0.37	0.286	(0.193)	0.047	0.239
90	7.50	0.37	0.286	(0.192)	0.047	0.239
91	7.58	0.40	0.312	(0.191)	0.051	0.261
92	7.67	0.40	0.312	(0.190)	0.051	0.261
93	7.75	0.40	0.312	(0.189)	0.051	0.261
94	7.83	0.43	0.338	(0.188)	0.055	0.283
95	7.92	0.43	0.338	(0.187)	0.055	0.283
96	8.00	0.43	0.338	(0.186)	0.055	0.283
97	8.08	0.50	0.390	(0.186)	0.064	0.326
98	8.17	0.50	0.390	(0.185)	0.064	0.326
99	8.25	0.50	0.390	(0.184)	0.064	0.326
100	8.33	0.50	0.390	(0.183)	0.064	0.326
101	8.42	0.50	0.390	(0.182)	0.064	0.326
102	8.50	0.50	0.390	(0.181)	0.064	0.326
103	8.58	0.53	0.416	(0.180)	0.068	0.348
104	8.67	0.53	0.416	(0.180)	0.068	0.348
105	8.75	0.53	0.416	(0.179)	0.068	0.348
106	8.83	0.57	0.442	(0.178)	0.072	0.370
107	8.92	0.57	0.442	(0.177)	0.072	0.370
108	9.00	0.57	0.442	(0.176)	0.072	0.370
109	9.08	0.63	0.494	(0.175)	0.081	0.413
110	9.17	0.63	0.494	(0.175)	0.081	0.413
111	9.25	0.63	0.494	(0.174)	0.081	0.413
112	9.33	0.67	0.520	(0.173)	0.085	0.435
113	9.42	0.67	0.520	(0.172)	0.085	0.435
114	9.50	0.67	0.520	(0.171)	0.085	0.435
115	9.58	0.70	0.546	(0.170)	0.090	0.456
116	9.67	0.70	0.546	(0.170)	0.090	0.456
117	9.75	0.70	0.546	(0.169)	0.090	0.456
118	9.83	0.73	0.572	(0.168)	0.094	0.478
119	9.92	0.73	0.572	(0.167)	0.094	0.478
120	10.00	0.73	0.572	(0.166)	0.094	0.478
121	10.08	0.50	0.390	(0.166)	0.064	0.326
122	10.17	0.50	0.390	(0.165)	0.064	0.326
123	10.25	0.50	0.390	(0.164)	0.064	0.326
124	10.33	0.50	0.390	(0.163)	0.064	0.326
125	10.42	0.50	0.390	(0.162)	0.064	0.326
126	10.50	0.50	0.390	(0.162)	0.064	0.326
127	10.58	0.67	0.520	(0.161)	0.085	0.435
128	10.67	0.67	0.520	(0.160)	0.085	0.435
129	10.75	0.67	0.520	(0.159)	0.085	0.435
130	10.83	0.67	0.520	(0.158)	0.085	0.435
131	10.92	0.67	0.520	(0.158)	0.085	0.435
132	11.00	0.67	0.520	(0.157)	0.085	0.435
133	11.08	0.63	0.494	(0.156)	0.081	0.413
134	11.17	0.63	0.494	(0.155)	0.081	0.413
135	11.25	0.63	0.494	(0.155)	0.081	0.413
136	11.33	0.63	0.494	(0.154)	0.081	0.413
137	11.42	0.63	0.494	(0.153)	0.081	0.413
138	11.50	0.63	0.494	(0.152)	0.081	0.413
139	11.58	0.57	0.442	(0.152)	0.072	0.370
140	11.67	0.57	0.442	(0.151)	0.072	0.370
141	11.75	0.57	0.442	(0.150)	0.072	0.370
142	11.83	0.60	0.468	(0.149)	0.077	0.391
143	11.92	0.60	0.468	(0.149)	0.077	0.391
144	12.00	0.60	0.468	(0.148)	0.077	0.391
145	12.08	0.83	0.650	(0.147)	0.107	0.543
146	12.17	0.83	0.650	(0.146)	0.107	0.543
147	12.25	0.83	0.650	(0.146)	0.107	0.543
148	12.33	0.87	0.676	(0.145)	0.111	0.565
149	12.42	0.87	0.676	(0.144)	0.111	0.565

150	12.50	0.87	0.676	(0.143)	0.111	0.565
151	12.58	0.93	0.728	(0.143)	0.119	0.609
152	12.67	0.93	0.728	(0.142)	0.119	0.609
153	12.75	0.93	0.728	(0.141)	0.119	0.609
154	12.83	0.97	0.754	(0.141)	0.124	0.630
155	12.92	0.97	0.754	(0.140)	0.124	0.630
156	13.00	0.97	0.754	(0.139)	0.124	0.630
157	13.08	1.13	0.884	0.138	(0.145)	0.746
158	13.17	1.13	0.884	0.138	(0.145)	0.746
159	13.25	1.13	0.884	0.137	(0.145)	0.747
160	13.33	1.13	0.884	0.136	(0.145)	0.748
161	13.42	1.13	0.884	0.136	(0.145)	0.748
162	13.50	1.13	0.884	0.135	(0.145)	0.749
163	13.58	0.77	0.598	(0.134)	0.098	0.500
164	13.67	0.77	0.598	(0.134)	0.098	0.500
165	13.75	0.77	0.598	(0.133)	0.098	0.500
166	13.83	0.77	0.598	(0.132)	0.098	0.500
167	13.92	0.77	0.598	(0.132)	0.098	0.500
168	14.00	0.77	0.598	(0.131)	0.098	0.500
169	14.08	0.90	0.702	(0.130)	0.115	0.587
170	14.17	0.90	0.702	(0.130)	0.115	0.587
171	14.25	0.90	0.702	(0.129)	0.115	0.587
172	14.33	0.87	0.676	(0.128)	0.111	0.565
173	14.42	0.87	0.676	(0.128)	0.111	0.565
174	14.50	0.87	0.676	(0.127)	0.111	0.565
175	14.58	0.87	0.676	(0.126)	0.111	0.565
176	14.67	0.87	0.676	(0.126)	0.111	0.565
177	14.75	0.87	0.676	(0.125)	0.111	0.565
178	14.83	0.83	0.650	(0.124)	0.107	0.543
179	14.92	0.83	0.650	(0.124)	0.107	0.543
180	15.00	0.83	0.650	(0.123)	0.107	0.543
181	15.08	0.80	0.624	(0.122)	0.102	0.522
182	15.17	0.80	0.624	(0.122)	0.102	0.522
183	15.25	0.80	0.624	(0.121)	0.102	0.522
184	15.33	0.77	0.598	(0.121)	0.098	0.500
185	15.42	0.77	0.598	(0.120)	0.098	0.500
186	15.50	0.77	0.598	(0.119)	0.098	0.500
187	15.58	0.63	0.494	(0.119)	0.081	0.413
188	15.67	0.63	0.494	(0.118)	0.081	0.413
189	15.75	0.63	0.494	(0.117)	0.081	0.413
190	15.83	0.63	0.494	(0.117)	0.081	0.413
191	15.92	0.63	0.494	(0.116)	0.081	0.413
192	16.00	0.63	0.494	(0.116)	0.081	0.413
193	16.08	0.13	0.104	(0.115)	0.017	0.087
194	16.17	0.13	0.104	(0.115)	0.017	0.087
195	16.25	0.13	0.104	(0.114)	0.017	0.087
196	16.33	0.13	0.104	(0.113)	0.017	0.087
197	16.42	0.13	0.104	(0.113)	0.017	0.087
198	16.50	0.13	0.104	(0.112)	0.017	0.087
199	16.58	0.10	0.078	(0.112)	0.013	0.065
200	16.67	0.10	0.078	(0.111)	0.013	0.065
201	16.75	0.10	0.078	(0.110)	0.013	0.065
202	16.83	0.10	0.078	(0.110)	0.013	0.065
203	16.92	0.10	0.078	(0.109)	0.013	0.065
204	17.00	0.10	0.078	(0.109)	0.013	0.065
205	17.08	0.17	0.130	(0.108)	0.021	0.109
206	17.17	0.17	0.130	(0.108)	0.021	0.109
207	17.25	0.17	0.130	(0.107)	0.021	0.109
208	17.33	0.17	0.130	(0.107)	0.021	0.109
209	17.42	0.17	0.130	(0.106)	0.021	0.109
210	17.50	0.17	0.130	(0.106)	0.021	0.109
211	17.58	0.17	0.130	(0.105)	0.021	0.109
212	17.67	0.17	0.130	(0.105)	0.021	0.109

213	17.75	0.17	0.130	(0.104)	0.021	0.109
214	17.83	0.13	0.104	(0.103)	0.017	0.087
215	17.92	0.13	0.104	(0.103)	0.017	0.087
216	18.00	0.13	0.104	(0.102)	0.017	0.087
217	18.08	0.13	0.104	(0.102)	0.017	0.087
218	18.17	0.13	0.104	(0.101)	0.017	0.087
219	18.25	0.13	0.104	(0.101)	0.017	0.087
220	18.33	0.13	0.104	(0.100)	0.017	0.087
221	18.42	0.13	0.104	(0.100)	0.017	0.087
222	18.50	0.13	0.104	(0.100)	0.017	0.087
223	18.58	0.10	0.078	(0.099)	0.013	0.065
224	18.67	0.10	0.078	(0.099)	0.013	0.065
225	18.75	0.10	0.078	(0.098)	0.013	0.065
226	18.83	0.07	0.052	(0.098)	0.009	0.043
227	18.92	0.07	0.052	(0.097)	0.009	0.043
228	19.00	0.07	0.052	(0.097)	0.009	0.043
229	19.08	0.10	0.078	(0.096)	0.013	0.065
230	19.17	0.10	0.078	(0.096)	0.013	0.065
231	19.25	0.10	0.078	(0.095)	0.013	0.065
232	19.33	0.13	0.104	(0.095)	0.017	0.087
233	19.42	0.13	0.104	(0.094)	0.017	0.087
234	19.50	0.13	0.104	(0.094)	0.017	0.087
235	19.58	0.10	0.078	(0.094)	0.013	0.065
236	19.67	0.10	0.078	(0.093)	0.013	0.065
237	19.75	0.10	0.078	(0.093)	0.013	0.065
238	19.83	0.07	0.052	(0.092)	0.009	0.043
239	19.92	0.07	0.052	(0.092)	0.009	0.043
240	20.00	0.07	0.052	(0.091)	0.009	0.043
241	20.08	0.10	0.078	(0.091)	0.013	0.065
242	20.17	0.10	0.078	(0.091)	0.013	0.065
243	20.25	0.10	0.078	(0.090)	0.013	0.065
244	20.33	0.10	0.078	(0.090)	0.013	0.065
245	20.42	0.10	0.078	(0.090)	0.013	0.065
246	20.50	0.10	0.078	(0.089)	0.013	0.065
247	20.58	0.10	0.078	(0.089)	0.013	0.065
248	20.67	0.10	0.078	(0.088)	0.013	0.065
249	20.75	0.10	0.078	(0.088)	0.013	0.065
250	20.83	0.07	0.052	(0.088)	0.009	0.043
251	20.92	0.07	0.052	(0.087)	0.009	0.043
252	21.00	0.07	0.052	(0.087)	0.009	0.043
253	21.08	0.10	0.078	(0.087)	0.013	0.065
254	21.17	0.10	0.078	(0.086)	0.013	0.065
255	21.25	0.10	0.078	(0.086)	0.013	0.065
256	21.33	0.07	0.052	(0.086)	0.009	0.043
257	21.42	0.07	0.052	(0.085)	0.009	0.043
258	21.50	0.07	0.052	(0.085)	0.009	0.043
259	21.58	0.10	0.078	(0.085)	0.013	0.065
260	21.67	0.10	0.078	(0.084)	0.013	0.065
261	21.75	0.10	0.078	(0.084)	0.013	0.065
262	21.83	0.07	0.052	(0.084)	0.009	0.043
263	21.92	0.07	0.052	(0.083)	0.009	0.043
264	22.00	0.07	0.052	(0.083)	0.009	0.043
265	22.08	0.10	0.078	(0.083)	0.013	0.065
266	22.17	0.10	0.078	(0.083)	0.013	0.065
267	22.25	0.10	0.078	(0.082)	0.013	0.065
268	22.33	0.07	0.052	(0.082)	0.009	0.043
269	22.42	0.07	0.052	(0.082)	0.009	0.043
270	22.50	0.07	0.052	(0.082)	0.009	0.043
271	22.58	0.07	0.052	(0.081)	0.009	0.043
272	22.67	0.07	0.052	(0.081)	0.009	0.043
273	22.75	0.07	0.052	(0.081)	0.009	0.043
274	22.83	0.07	0.052	(0.081)	0.009	0.043
275	22.92	0.07	0.052	(0.081)	0.009	0.043

276	23.00	0.07	0.052	(0.080)	0.009	0.043
277	23.08	0.07	0.052	(0.080)	0.009	0.043
278	23.17	0.07	0.052	(0.080)	0.009	0.043
279	23.25	0.07	0.052	(0.080)	0.009	0.043
280	23.33	0.07	0.052	(0.080)	0.009	0.043
281	23.42	0.07	0.052	(0.079)	0.009	0.043
282	23.50	0.07	0.052	(0.079)	0.009	0.043
283	23.58	0.07	0.052	(0.079)	0.009	0.043
284	23.67	0.07	0.052	(0.079)	0.009	0.043
285	23.75	0.07	0.052	(0.079)	0.009	0.043
286	23.83	0.07	0.052	(0.079)	0.009	0.043
287	23.92	0.07	0.052	(0.079)	0.009	0.043
288	24.00	0.07	0.052	(0.079)	0.009	0.043

(Loss Rate Not Used)

Sum = 100.0 Sum = 65.3

Flood volume = Effective rainfall 5.44(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 1.06(In)
Total soil loss = 0.119(Ac.Ft)
Total rainfall = 6.50(In)
Flood volume = 26452.2 Cubic Feet
Total soil loss = 5165.0 Cubic Feet

Peak flow rate of this hydrograph = 1.012(CFS)

++

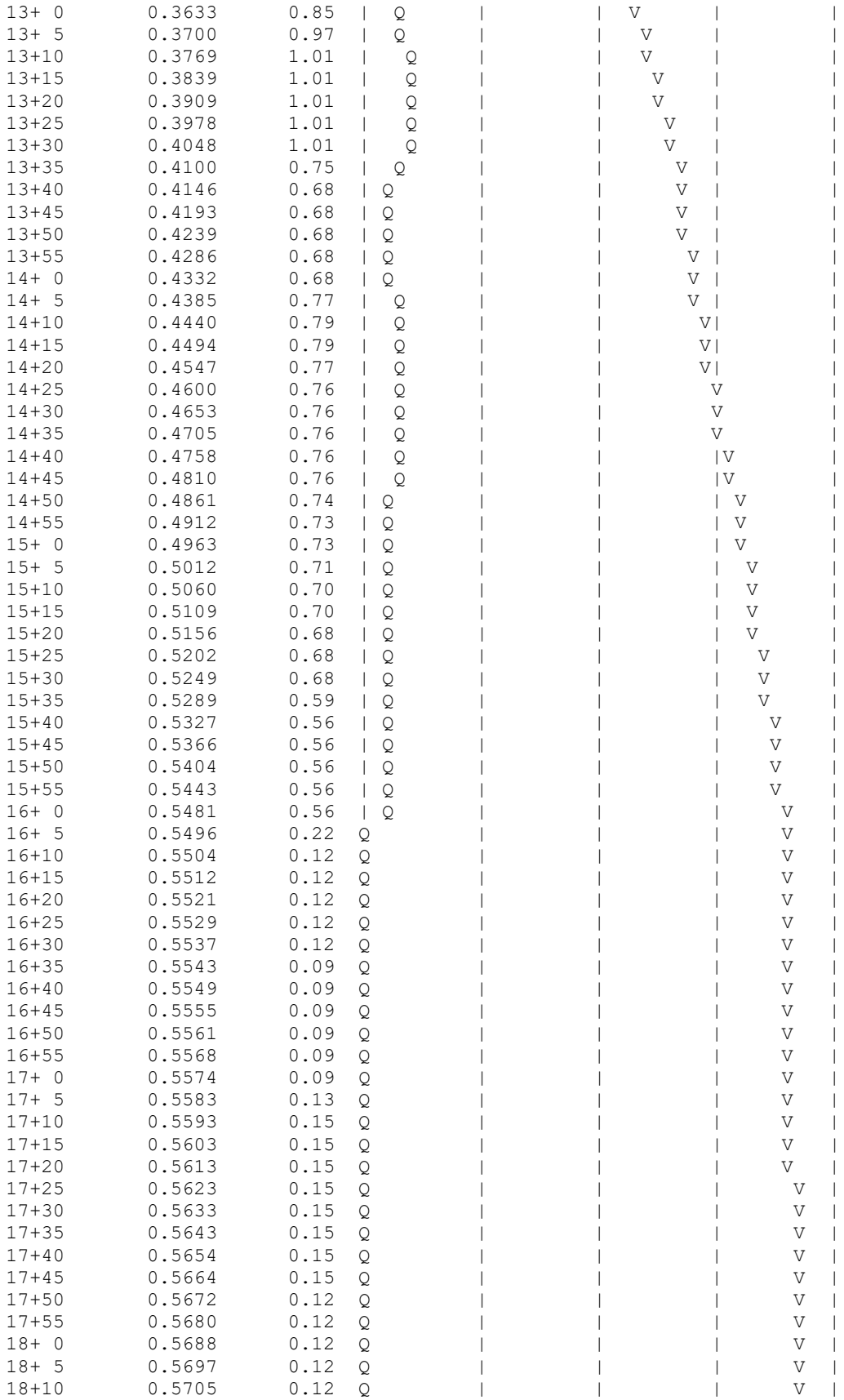
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0003	0.05	Q				
0+10	0.0007	0.06	Q				
0+15	0.0011	0.06	Q				
0+20	0.0017	0.08	Q				
0+25	0.0023	0.09	Q				
0+30	0.0029	0.09	Q				
0+35	0.0035	0.09	Q				
0+40	0.0041	0.09	Q				
0+45	0.0047	0.09	Q				
0+50	0.0055	0.11	Q				
0+55	0.0063	0.12	Q				
1+ 0	0.0071	0.12	Q				
1+ 5	0.0077	0.09	Q				
1+10	0.0084	0.09	Q				
1+15	0.0090	0.09	Q				
1+20	0.0096	0.09	Q				
1+25	0.0102	0.09	Q				
1+30	0.0108	0.09	Q				
1+35	0.0114	0.09	Q				
1+40	0.0120	0.09	Q				
1+45	0.0126	0.09	Q				
1+50	0.0134	0.11	Q				
1+55	0.0142	0.12	Q				
2+ 0	0.0150	0.12	Q				
2+ 5	0.0158	0.12	QV				
2+10	0.0166	0.12	QV				
2+15	0.0174	0.12	QV				
2+20	0.0182	0.12	QV				
2+25	0.0190	0.12	QV				

2+30	0.0198	0.12	QV	|	|	|	|
2+35	0.0208	0.14	QV	|	|	|	|
2+40	0.0218	0.15	QV	|	|	|	|
2+45	0.0228	0.15	QV	|	|	|	|
2+50	0.0238	0.15	QV	|	|	|	|
2+55	0.0248	0.15	QV	|	|	|	|
3+ 0	0.0259	0.15	QV	|	|	|	|
3+ 5	0.0269	0.15	QV	|	|	|	|
3+10	0.0279	0.15	QV	|	|	|	|
3+15	0.0289	0.15	QV	|	|	|	|
3+20	0.0299	0.15	QV	|	|	|	|
3+25	0.0309	0.15	Q V	|	|	|	|
3+30	0.0319	0.15	Q V	|	|	|	|
3+35	0.0329	0.15	Q V	|	|	|	|
3+40	0.0339	0.15	Q V	|	|	|	|
3+45	0.0350	0.15	Q V	|	|	|	|
3+50	0.0361	0.17	Q V	|	|	|	|
3+55	0.0373	0.18	Q V	|	|	|	|
4+ 0	0.0386	0.18	Q V	|	|	|	|
4+ 5	0.0398	0.18	Q V	|	|	|	|
4+10	0.0410	0.18	Q V	|	|	|	|
4+15	0.0422	0.18	Q V	|	|	|	|
4+20	0.0436	0.20	Q V	|	|	|	|
4+25	0.0450	0.21	Q V	|	|	|	|
4+30	0.0464	0.21	Q V	|	|	|	|
4+35	0.0478	0.21	Q V	|	|	|	|
4+40	0.0492	0.21	Q V	|	|	|	|
4+45	0.0506	0.21	Q V	|	|	|	|
4+50	0.0522	0.23	Q V	|	|	|	|
4+55	0.0538	0.23	Q V	|	|	|	|
5+ 0	0.0554	0.23	Q V	|	|	|	|
5+ 5	0.0568	0.19	Q V	|	|	|	|
5+10	0.0580	0.18	Q V	|	|	|	|
5+15	0.0592	0.18	Q V	|	|	|	|
5+20	0.0606	0.20	Q V	|	|	|	|
5+25	0.0620	0.21	Q V	|	|	|	|
5+30	0.0634	0.21	Q V	|	|	|	|
5+35	0.0650	0.23	Q V	|	|	|	|
5+40	0.0666	0.23	Q V	|	|	|	|
5+45	0.0682	0.23	Q V	|	|	|	|
5+50	0.0698	0.23	Q V	|	|	|	|
5+55	0.0714	0.23	Q V	|	|	|	|
6+ 0	0.0730	0.23	Q V	|	|	|	|
6+ 5	0.0748	0.26	|Q V	|	|	|	|
6+10	0.0766	0.26	|Q V	|	|	|	|
6+15	0.0785	0.26	|Q V	|	|	|	|
6+20	0.0803	0.26	|Q V	|	|	|	|
6+25	0.0821	0.26	|Q V	|	|	|	|
6+30	0.0839	0.26	|Q V	|	|	|	|
6+35	0.0859	0.29	|Q V	|	|	|	|
6+40	0.0879	0.29	|Q V	|	|	|	|
6+45	0.0899	0.29	|Q V	|	|	|	|
6+50	0.0920	0.29	|Q V	|	|	|	|
6+55	0.0940	0.29	|Q V	|	|	|	|
7+ 0	0.0960	0.29	|Q V	|	|	|	|
7+ 5	0.0980	0.29	|Q V	|	|	|	|
7+10	0.1001	0.29	|Q V	|	|	|	|
7+15	0.1021	0.29	|Q V	|	|	|	|
7+20	0.1043	0.32	|Q V	|	|	|	|
7+25	0.1065	0.32	|Q V	|	|	|	|
7+30	0.1087	0.32	|Q V	|	|	|	|
7+35	0.1111	0.35	|Q V	|	|	|	|
7+40	0.1135	0.35	|Q V	|	|	|	|

7+45	0.1159	0.35	Q V				
7+50	0.1185	0.37	Q V				
7+55	0.1212	0.38	Q V				
8+ 0	0.1238	0.38	Q V				
8+ 5	0.1267	0.43	Q V				
8+10	0.1298	0.44	Q V				
8+15	0.1328	0.44	Q V				
8+20	0.1358	0.44	Q V				
8+25	0.1389	0.44	Q V				
8+30	0.1419	0.44	Q V				
8+35	0.1451	0.46	Q V				
8+40	0.1483	0.47	Q V				
8+45	0.1516	0.47	Q V				
8+50	0.1549	0.49	Q V				
8+55	0.1584	0.50	Q V				
9+ 0	0.1618	0.50	Q V				
9+ 5	0.1656	0.54	Q V				
9+10	0.1694	0.56	Q V				
9+15	0.1733	0.56	Q V				
9+20	0.1773	0.58	Q V				
9+25	0.1813	0.59	Q V				
9+30	0.1853	0.59	Q V				
9+35	0.1895	0.61	Q V				
9+40	0.1938	0.62	Q V				
9+45	0.1980	0.62	Q V				
9+50	0.2024	0.64	Q V				
9+55	0.2069	0.65	Q V				
10+ 0	0.2113	0.65	Q V				
10+ 5	0.2147	0.49	Q V				
10+10	0.2177	0.44	Q V				
10+15	0.2208	0.44	Q V				
10+20	0.2238	0.44	Q V				
10+25	0.2268	0.44	Q V				
10+30	0.2299	0.44	Q V				
10+35	0.2337	0.55	Q V				
10+40	0.2377	0.59	Q V				
10+45	0.2418	0.59	Q V				
10+50	0.2458	0.59	Q V				
10+55	0.2499	0.59	Q V				
11+ 0	0.2539	0.59	Q V				
11+ 5	0.2578	0.56	Q V				
11+10	0.2616	0.56	Q V				
11+15	0.2655	0.56	Q V				
11+20	0.2693	0.56	Q V				
11+25	0.2732	0.56	Q V				
11+30	0.2770	0.56	Q V				
11+35	0.2805	0.51	Q V				
11+40	0.2840	0.50	Q V				
11+45	0.2874	0.50	Q V				
11+50	0.2910	0.52	Q V				
11+55	0.2947	0.53	Q V				
12+ 0	0.2983	0.53	Q V				
12+ 5	0.3030	0.69	Q V				
12+10	0.3081	0.73	Q V				
12+15	0.3131	0.73	Q V				
12+20	0.3184	0.76	Q V				
12+25	0.3236	0.76	Q V				
12+30	0.3289	0.76	Q V				
12+35	0.3344	0.81	Q V				
12+40	0.3401	0.82	Q V				
12+45	0.3458	0.82	Q V				
12+50	0.3516	0.84	Q V				
12+55	0.3575	0.85	Q V				


13+ 0 0.3633 0.85
13+ 5 0.3700 0.97
13+10 0.3769 1.01
13+15 0.3839 1.01
13+20 0.3909 1.01
13+25 0.3978 1.01
13+30 0.4048 1.01
13+35 0.4100 0.75
13+40 0.4146 0.68
13+45 0.4193 0.68
13+50 0.4239 0.68
13+55 0.4286 0.68
14+ 0 0.4332 0.68
14+ 5 0.4385 0.77
14+10 0.4440 0.79
14+15 0.4494 0.79
14+20 0.4547 0.77
14+25 0.4600 0.76
14+30 0.4653 0.76
14+35 0.4705 0.76
14+40 0.4758 0.76
14+45 0.4810 0.76
14+50 0.4861 0.74
14+55 0.4912 0.73
15+ 0 0.4963 0.73
15+ 5 0.5012 0.71
15+10 0.5060 0.70
15+15 0.5109 0.70
15+20 0.5156 0.68
15+25 0.5202 0.68
15+30 0.5249 0.68
15+35 0.5289 0.59
15+40 0.5327 0.56
15+45 0.5366 0.56
15+50 0.5404 0.56
15+55 0.5443 0.56
16+ 0 0.5481 0.56
16+ 5 0.5496 0.22
16+10 0.5504 0.12
16+15 0.5512 0.12
16+20 0.5521 0.12
16+25 0.5529 0.12
16+30 0.5537 0.12
16+35 0.5543 0.09
16+40 0.5549 0.09
16+45 0.5555 0.09
16+50 0.5561 0.09
16+55 0.5568 0.09
17+ 0 0.5574 0.09
17+ 5 0.5583 0.13
17+10 0.5593 0.15
17+15 0.5603 0.15
17+20 0.5613 0.15
17+25 0.5623 0.15
17+30 0.5633 0.15
17+35 0.5643 0.15
17+40 0.5654 0.15
17+45 0.5664 0.15
17+50 0.5672 0.12
17+55 0.5680 0.12
18+ 0 0.5688 0.12
18+ 5 0.5697 0.12
18+10 0.5705 0.12

18+15	0.5713	0.12	Q	|	|	|	V |
18+20	0.5721	0.12	Q	|	|	|	V |
18+25	0.5729	0.12	Q	|	|	|	V |
18+30	0.5737	0.12	Q	|	|	|	V |
18+35	0.5744	0.09	Q	|	|	|	V |
18+40	0.5750	0.09	Q	|	|	|	V |
18+45	0.5756	0.09	Q	|	|	|	V |
18+50	0.5760	0.07	Q	|	|	|	V |
18+55	0.5764	0.06	Q	|	|	|	V |
19+ 0	0.5768	0.06	Q	|	|	|	V |
19+ 5	0.5774	0.08	Q	|	|	|	V |
19+10	0.5780	0.09	Q	|	|	|	V |
19+15	0.5786	0.09	Q	|	|	|	V |
19+20	0.5794	0.11	Q	|	|	|	V |
19+25	0.5802	0.12	Q	|	|	|	V |
19+30	0.5810	0.12	Q	|	|	|	V |
19+35	0.5816	0.09	Q	|	|	|	V |
19+40	0.5822	0.09	Q	|	|	|	V |
19+45	0.5828	0.09	Q	|	|	|	V |
19+50	0.5833	0.07	Q	|	|	|	V |
19+55	0.5837	0.06	Q	|	|	|	V |
20+ 0	0.5841	0.06	Q	|	|	|	V |
20+ 5	0.5847	0.08	Q	|	|	|	V |
20+10	0.5853	0.09	Q	|	|	|	V |
20+15	0.5859	0.09	Q	|	|	|	V |
20+20	0.5865	0.09	Q	|	|	|	V |
20+25	0.5871	0.09	Q	|	|	|	V |
20+30	0.5877	0.09	Q	|	|	|	V |
20+35	0.5883	0.09	Q	|	|	|	V |
20+40	0.5889	0.09	Q	|	|	|	V |
20+45	0.5895	0.09	Q	|	|	|	V |
20+50	0.5900	0.07	Q	|	|	|	V |
20+55	0.5904	0.06	Q	|	|	|	V |
21+ 0	0.5908	0.06	Q	|	|	|	V |
21+ 5	0.5913	0.08	Q	|	|	|	V |
21+10	0.5919	0.09	Q	|	|	|	V |
21+15	0.5926	0.09	Q	|	|	|	V|
21+20	0.5930	0.07	Q	|	|	|	V|
21+25	0.5934	0.06	Q	|	|	|	V|
21+30	0.5938	0.06	Q	|	|	|	V|
21+35	0.5944	0.08	Q	|	|	|	V|
21+40	0.5950	0.09	Q	|	|	|	V|
21+45	0.5956	0.09	Q	|	|	|	V|
21+50	0.5960	0.07	Q	|	|	|	V|
21+55	0.5964	0.06	Q	|	|	|	V|
22+ 0	0.5968	0.06	Q	|	|	|	V|
22+ 5	0.5974	0.08	Q	|	|	|	V|
22+10	0.5980	0.09	Q	|	|	|	V|
22+15	0.5986	0.09	Q	|	|	|	V|
22+20	0.5991	0.07	Q	|	|	|	V|
22+25	0.5995	0.06	Q	|	|	|	V|
22+30	0.5999	0.06	Q	|	|	|	V|
22+35	0.6003	0.06	Q	|	|	|	V|
22+40	0.6007	0.06	Q	|	|	|	V|
22+45	0.6011	0.06	Q	|	|	|	V|
22+50	0.6015	0.06	Q	|	|	|	V|
22+55	0.6019	0.06	Q	|	|	|	V|
23+ 0	0.6023	0.06	Q	|	|	|	V|
23+ 5	0.6027	0.06	Q	|	|	|	V|
23+10	0.6031	0.06	Q	|	|	|	V|
23+15	0.6035	0.06	Q	|	|	|	V|
23+20	0.6039	0.06	Q	|	|	|	V|
23+25	0.6043	0.06	Q	|	|	|	V|

23+30	0.6047	0.06	Q	|	|	|	V|
23+35	0.6051	0.06	Q	|	|	|	V|
23+40	0.6055	0.06	Q	|	|	|	V|
23+45	0.6060	0.06	Q	|	|	|	V|
23+50	0.6064	0.06	Q	|	|	|	V|
23+55	0.6068	0.06	Q	|	|	|	V|
24+ 0	0.6072	0.06	Q	|	|	|	V|
24+ 5	0.6073	0.01	Q	|	|	|	V|

DETENTION BASIN SIZING

CALCULATION OF DETENTION BASIN OUTLET CAPACITY. THE OUTLET CONSISTS OF A RESTRICTOR PLATE 4 INCH IN DIAMETER AT THE OUTLET OF THE DETENTION BASIN.

THE SUBMERGED ORIFICE EQUATION IS:	$Q=0.63A(2G\Delta H)^{1/2}$	WHERE A IS THE OPENING AREA IN SF, ΔH IS THE DIFFERENCE IN DEPTHS ON EACH SIDE OF THE ORIFICE OPENING (MEASURED FROM THE CENTROID OF THE ORIFICE OPENING). G IS EQUAL TO 32.2 FT/S.

DIAMETER OF OPENING =	4 INCHES	12 INCHES
AREA OF OPENING=	0.087 SQUARE FEET	0.785 SQUARE FEET

DEPTH OF WATER IN BASIN (FT)	ASSUMED DEPTH OF FLOW AT ORIFICE (FT)	CALCULATED, Q $Q=0.63A(2G\Delta H)^{1/2}$ (FT)	BASIN OUTLET INVERT ELEVATION (FT)	PONDED WATER SURFACE ELEVATION (FT)
0.5	0.40	0.28	100	100.50
1.0	0.90	0.42	100	101.00
1.5	1.40	0.52	100	101.50
2.0	1.90	0.61	100	102.00
2.5	2.40	0.68	100	102.50
3.0	2.90	0.75	100	103.00
3.5	3.40	0.81	100	103.50
3.83	3.73	0.85	100	103.83
3.9	3.80	8.18	100	103.90
4.0	3.90	8.30	100	104.00

TOP OF LOWEST GRATE = 2953.43 TG
BOTTOM OF TANK = 2591.60'
TOP OF TANK = 2595.60'

2595.60 - 2953.43 = 0.17'

4.00 - 0.17 = 3.83'

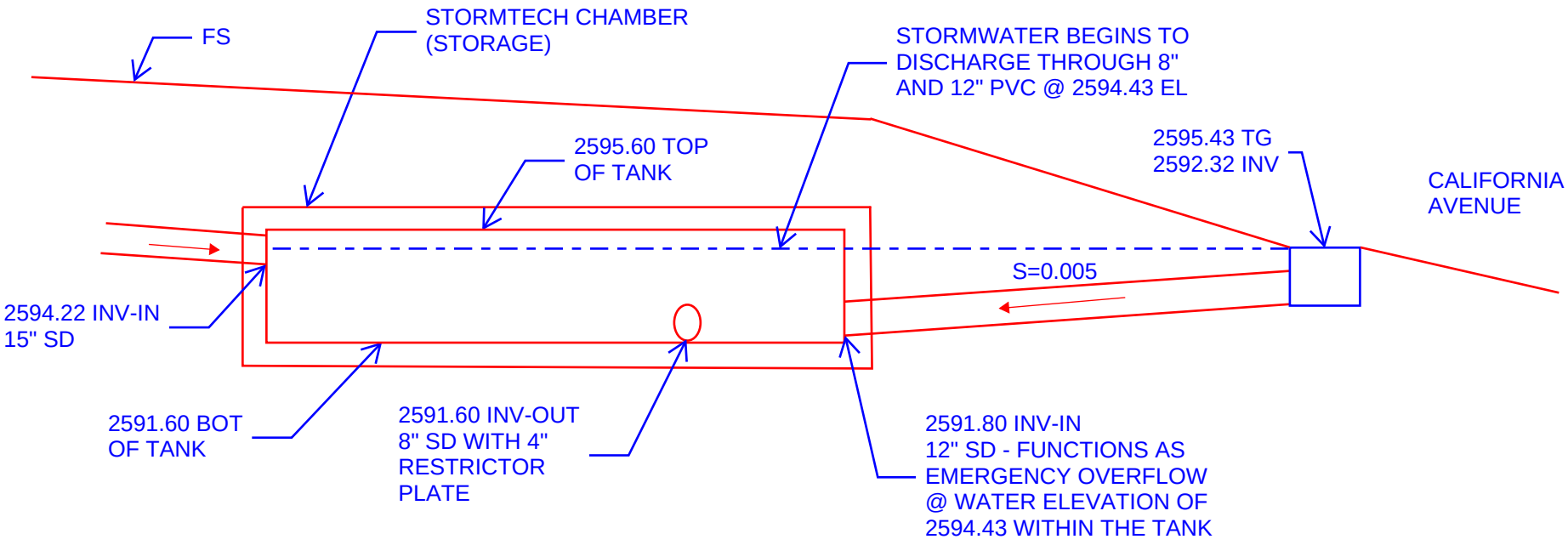
AT A BASIN DEPTH OF 3.83', THE WATER LEVEL WITHIN THE TANK BEGINS TO BECOME GREATER THAN THE LOWEST GRATE WITHIN THE STORM DRAIN SYSTEM. THEREFORE, STORMWATER WILL BEGIN TO BUBBLE UP THE LOWEST GRATE AND DISCHARGE OUT OF THE INLET.

TO ACCOUNT FOR THIS, AN ADDITIONAL SUBMERGED EQUATION IS CALCULATED FOR THE 12" INLET PIPE THAT IS CONNECTING THE LOWEST GRATE AND UNDERGROUND TANK.

THIS DISCHARGE VALUE IS THEN ADDED TO THE CALCULATED Q.

SEE EMERGENCY OVERFLOW EXHIBIT ON NEXT PAGE FOR REFERENCE.

BEAUMONT EMERGENCY OVERFLOW EXHIBIT



SQUARE FOOTAGE OF UNDERGROUND STORAGE BASIN
525.00 (5 ROWS OF 7'x15' SC-4 MODULES)

DEPTH (FT)	FLOW VOLUME ACCUMULATED (cubic feet)	FLOW VOLUME ACCUMULATED (acre-feet)
0.5	262.50	0.0060
1.0	525.00	0.0121
1.5	787.50	0.0181
2.0	1050.00	0.0241
2.5	1312.50	0.0301
3.0	1575.00	0.0362
3.5	1837.50	0.0422
3.83	2010.75	0.0462
3.9	2047.50	0.0470
4.0	2159.00	0.0496

OUTFLOW RATING DATA FOR:
OUTFLOW WITH RESTRICTOR PLATE AT 4" DIAMETER OUTLET OF BASIN

PONDED WATER SURFACE ELEVATION (FT)	DEPTH OF FLOW AT BASIN OUTLET (FT)	ACCUMULATED VOLUME (ACRE-FEET)	OUTFLOW CFS
0	0	0.000	0
100.5	0.5	0.006	0.28
101.0	1.0	0.012	0.42
101.5	1.5	0.018	0.52
102.0	2.0	0.024	0.61
102.5	2.5	0.030	0.68
103.0	3.0	0.036	0.75
103.5	3.5	0.042	0.81
103.83	3.83	0.046	0.85
103.9	3.9	0.047	8.18
104.0	4.0	0.050	8.30

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 11/26/24

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
100-YEAR, 24-HOUR STORM EVENT
DETENTION BASIN ROUTING CALCULATIONS
POST-CONDITION

Program License Serial Number 6447

********** HYDROGRAPH INFORMATION **********

From study/file name: BEAULIBPOST24100.rte
**********HYDROGRAPH DATA**********
Number of intervals = 289
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 1.012 (CFS)
Total volume = 0.607 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 0.000 to Point/Station 0.000
**** RETARDING BASIN ROUTING ****
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User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 289
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.006	0.280	0.005	0.007
1.000	0.012	0.420	0.011	0.013
1.500	0.018	0.520	0.016	0.020
2.000	0.024	0.610	0.022	0.026
2.500	0.030	0.680	0.028	0.032
3.000	0.036	0.750	0.033	0.039

3.500	0.042	0.810	0.039	0.045
4.000	0.048	0.870	0.045	0.051

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.3	0.51	0.76	1.01	Depth (Ft.)
0.083	0.05	0.01	0.000	OI					0.01
0.167	0.06	0.02	0.000	OI					0.03
0.250	0.06	0.03	0.001	OI					0.05
0.333	0.08	0.04	0.001	|OI					0.07
0.417	0.09	0.05	0.001	|OI					0.09
0.500	0.09	0.06	0.001	|OI					0.11
0.583	0.09	0.07	0.001	| O					0.12
0.667	0.09	0.07	0.002	| O					0.13
0.750	0.09	0.08	0.002	| O					0.14
0.833	0.11	0.08	0.002	| OI					0.15
0.917	0.12	0.09	0.002	| OI					0.17
1.000	0.12	0.10	0.002	| O					0.18
1.083	0.09	0.10	0.002	| O					0.18
1.167	0.09	0.10	0.002	| IO					0.18
1.250	0.09	0.10	0.002	| IO					0.17
1.333	0.09	0.09	0.002	| O					0.17
1.417	0.09	0.09	0.002	| O					0.16
1.500	0.09	0.09	0.002	| O					0.16
1.583	0.09	0.09	0.002	| O					0.16
1.667	0.09	0.09	0.002	| O					0.16
1.750	0.09	0.09	0.002	| O					0.16
1.833	0.11	0.09	0.002	| OI					0.16
1.917	0.12	0.10	0.002	| O					0.18
2.000	0.12	0.10	0.002	| O					0.18
2.083	0.12	0.11	0.002	| O					0.19
2.167	0.12	0.11	0.002	| O					0.20
2.250	0.12	0.11	0.002	| O					0.20
2.333	0.12	0.11	0.002	| O					0.20
2.417	0.12	0.11	0.002	| O					0.20
2.500	0.12	0.12	0.002	| O					0.21
2.583	0.14	0.12	0.003	| OI					0.21
2.667	0.15	0.13	0.003	| OI					0.22
2.750	0.15	0.13	0.003	| O					0.24
2.833	0.15	0.14	0.003	| O					0.24
2.917	0.15	0.14	0.003	| O					0.25
3.000	0.15	0.14	0.003	| O					0.25
3.083	0.15	0.14	0.003	| O					0.25
3.167	0.15	0.14	0.003	| O					0.26
3.250	0.15	0.14	0.003	| O					0.26
3.333	0.15	0.15	0.003	| O					0.26
3.417	0.15	0.15	0.003	| O					0.26
3.500	0.15	0.15	0.003	| O					0.26
3.583	0.15	0.15	0.003	| O					0.26
3.667	0.15	0.15	0.003	| O					0.26
3.750	0.15	0.15	0.003	| O					0.26
3.833	0.17	0.15	0.003	| OI					0.27
3.917	0.18	0.16	0.003	| OI					0.28
4.000	0.18	0.16	0.003	| O					0.29
4.083	0.18	0.17	0.004	| O					0.30
4.167	0.18	0.17	0.004	| O					0.30
4.250	0.18	0.17	0.004	| O					0.30
4.333	0.20	0.18	0.004	| OI					0.31
4.417	0.21	0.18	0.004	| OI					0.33

4.500	0.21	0.19	0.004	|	OI |	|	|	|	0.34
4.583	0.21	0.19	0.004	|	O |	|	|	|	0.35
4.667	0.21	0.20	0.004	|	O |	|	|	|	0.35
4.750	0.21	0.20	0.004	|	O |	|	|	|	0.36
4.833	0.23	0.20	0.004	|	OI|	|	|	|	0.36
4.917	0.23	0.21	0.005	|	OI|	|	|	|	0.38
5.000	0.23	0.22	0.005	|	OI|	|	|	|	0.39
5.083	0.19	0.22	0.005	|	O |	|	|	|	0.39
5.167	0.18	0.21	0.004	|	IO |	|	|	|	0.37
5.250	0.18	0.20	0.004	|	IO |	|	|	|	0.35
5.333	0.20	0.20	0.004	|	O |	|	|	|	0.35
5.417	0.21	0.20	0.004	|	O |	|	|	|	0.35
5.500	0.21	0.20	0.004	|	O |	|	|	|	0.36
5.583	0.23	0.20	0.004	|	OI|	|	|	|	0.37
5.667	0.23	0.21	0.005	|	OI|	|	|	|	0.38
5.750	0.23	0.22	0.005	|	OI|	|	|	|	0.39
5.833	0.23	0.22	0.005	|	O|	|	|	|	0.40
5.917	0.23	0.23	0.005	|	O|	|	|	|	0.40
6.000	0.23	0.23	0.005	|	O|	|	|	|	0.41
6.083	0.26	0.23	0.005	|	OI	|	|	|	0.42
6.167	0.26	0.24	0.005	|	OI	|	|	|	0.43
6.250	0.26	0.25	0.005	|	OI	|	|	|	0.44
6.333	0.26	0.25	0.005	|	OI	|	|	|	0.45
6.417	0.26	0.26	0.005	|	O	|	|	|	0.46
6.500	0.26	0.26	0.006	|	O	|	|	|	0.46
6.583	0.29	0.26	0.006	|	OI	|	|	|	0.47
6.667	0.29	0.27	0.006	|	OI	|	|	|	0.48
6.750	0.29	0.28	0.006	|	OI	|	|	|	0.49
6.833	0.29	0.28	0.006	|	OI	|	|	|	0.50
6.917	0.29	0.28	0.006	|	OI	|	|	|	0.51
7.000	0.29	0.28	0.006	|	OI	|	|	|	0.52
7.083	0.29	0.29	0.006	|	|O	|	|	|	0.52
7.167	0.29	0.29	0.006	|	|O	|	|	|	0.52
7.250	0.29	0.29	0.006	|	|O	|	|	|	0.53
7.333	0.32	0.29	0.006	|	|OI	|	|	|	0.54
7.417	0.32	0.29	0.007	|	|OI	|	|	|	0.55
7.500	0.32	0.30	0.007	|	|OI	|	|	|	0.57
7.583	0.35	0.30	0.007	|	|OI	|	|	|	0.59
7.667	0.35	0.31	0.007	|	|O I	|	|	|	0.61
7.750	0.35	0.32	0.008	|	| OI	|	|	|	0.63
7.833	0.37	0.32	0.008	|	| OI	|	|	|	0.66
7.917	0.38	0.33	0.008	|	| O I	|	|	|	0.69
8.000	0.38	0.34	0.009	|	| O I	|	|	|	0.71
8.083	0.43	0.35	0.009	|	| O I	|	|	|	0.75
8.167	0.44	0.36	0.010	|	| O I	|	|	|	0.79
8.250	0.44	0.37	0.010	|	| O I	|	|	|	0.83
8.333	0.44	0.38	0.010	|	| OI	|	|	|	0.87
8.417	0.44	0.39	0.011	|	| OI	|	|	|	0.90
8.500	0.44	0.40	0.011	|	| OI	|	|	|	0.93
8.583	0.46	0.41	0.011	|	| O I	|	|	|	0.95
8.667	0.47	0.42	0.012	|	| OI	|	|	|	0.99
8.750	0.47	0.42	0.012	|	| OI	|	|	|	1.01
8.833	0.49	0.43	0.013	|	| O I|	|	|	|	1.05
8.917	0.50	0.44	0.013	|	| O I|	|	|	|	1.08
9.000	0.50	0.44	0.013	|	| OI|	|	|	|	1.12
9.083	0.54	0.45	0.014	|	| O |I	|	|	|	1.16
9.167	0.56	0.46	0.015	|	| O |I	|	|	|	1.21
9.250	0.56	0.47	0.015	|	| O |I	|	|	|	1.26
9.333	0.58	0.48	0.016	|	| O| I	|	|	|	1.32
9.417	0.59	0.49	0.016	|	| O| I	|	|	|	1.37
9.500	0.59	0.50	0.017	|	| O| I	|	|	|	1.42
9.583	0.61	0.51	0.018	|	| O I	|	|	|	1.47
9.667	0.62	0.52	0.018	|	| O I	|	|	|	1.53

9.750	0.62	0.53	0.019	|	|	O I |	|	1.58
9.833	0.64	0.54	0.020	|	|	|O I |	|	1.63
9.917	0.65	0.55	0.020	|	|	|O I |	|	1.68
10.000	0.65	0.56	0.021	|	|	|O I |	|	1.73
10.083	0.49	0.56	0.021	|	|	I|O |	|	1.74
10.167	0.44	0.55	0.020	|	|	I |O |	|	1.68
10.250	0.44	0.54	0.019	|	|	I |O |	|	1.62
10.333	0.44	0.53	0.019	|	|	I O |	|	1.57
10.417	0.44	0.52	0.018	|	|	I O |	|	1.52
10.500	0.44	0.51	0.018	|	|	I O |	|	1.47
10.583	0.55	0.51	0.018	|	|	OI |	|	1.46
10.667	0.59	0.52	0.018	|	|	O I |	|	1.49
10.750	0.59	0.53	0.018	|	|	O I |	|	1.53
10.833	0.59	0.53	0.019	|	|	O I |	|	1.56
10.917	0.59	0.54	0.019	|	|	O I |	|	1.60
11.000	0.59	0.54	0.019	|	|	|OI |	|	1.62
11.083	0.56	0.55	0.020	|	|	|O |	|	1.64
11.167	0.56	0.55	0.020	|	|	|O |	|	1.65
11.250	0.56	0.55	0.020	|	|	|O |	|	1.66
11.333	0.56	0.55	0.020	|	|	|O |	|	1.66
11.417	0.56	0.55	0.020	|	|	|O |	|	1.67
11.500	0.56	0.55	0.020	|	|	|O |	|	1.67
11.583	0.51	0.55	0.020	|	|	IO |	|	1.66
11.667	0.50	0.54	0.020	|	|	I|O |	|	1.64
11.750	0.50	0.54	0.019	|	|	I|O |	|	1.61
11.833	0.52	0.54	0.019	|	|	O |	|	1.60
11.917	0.53	0.54	0.019	|	|	O |	|	1.59
12.000	0.53	0.54	0.019	|	|	O |	|	1.59
12.083	0.69	0.54	0.020	|	|	|O I |	|	1.63
12.167	0.73	0.56	0.021	|	|	|O I|	|	1.72
12.250	0.73	0.58	0.022	|	|	| O I|	|	1.81
12.333	0.76	0.59	0.023	|	|	| O I|	|	1.91
12.417	0.76	0.61	0.024	|	|	| O I |	|	2.00
12.500	0.76	0.62	0.025	|	|	| O I |	|	2.08
12.583	0.81	0.63	0.026	|	|	| O |I |	|	2.17
12.667	0.82	0.65	0.027	|	|	| O | I |	|	2.27
12.750	0.82	0.66	0.028	|	|	| O | I |	|	2.37
12.833	0.84	0.67	0.030	|	|	| O | I |	|	2.46
12.917	0.85	0.69	0.031	|	|	| O | I |	|	2.56
13.000	0.85	0.70	0.032	|	|	| O | I |	|	2.65
13.083	0.97	0.72	0.033	|	|	| O | I |	|	2.77
13.167	1.01	0.74	0.035	|	|	| O| I|	|	2.92
13.250	1.01	0.76	0.037	|	|	| O| I|	|	3.07
13.333	1.01	0.77	0.038	|	|	| O I|	|	3.20
13.417	1.01	0.79	0.040	|	|	| O I|	|	3.34
13.500	1.01	0.81	0.042	|	|	| |O I |	|	3.46
13.583	0.75	0.81	0.042	|	|	| I|O |	|	3.50
13.667	0.68	0.80	0.041	|	|	| I |O |	|	3.45
13.750	0.68	0.80	0.041	|	|	| I |O |	|	3.38
13.833	0.68	0.79	0.040	|	|	| I O |	|	3.31
13.917	0.68	0.78	0.039	|	|	| I O |	|	3.25
14.000	0.68	0.77	0.038	|	|	| I O |	|	3.19
14.083	0.77	0.77	0.038	|	|	| O |	|	3.16
14.167	0.79	0.77	0.038	|	|	| OI |	|	3.17
14.250	0.79	0.77	0.038	|	|	| OI |	|	3.18
14.333	0.77	0.77	0.038	|	|	| O |	|	3.19
14.417	0.76	0.77	0.038	|	|	| O |	|	3.18
14.500	0.76	0.77	0.038	|	|	| O |	|	3.18
14.583	0.76	0.77	0.038	|	|	| O |	|	3.17
14.667	0.76	0.77	0.038	|	|	| O |	|	3.17
14.750	0.76	0.77	0.038	|	|	| O |	|	3.17
14.833	0.74	0.77	0.038	|	|	| IO |	|	3.16
14.917	0.73	0.77	0.038	|	|	| IO |	|	3.14

15.000	0.73	0.76	0.037			IO	3.12
15.083	0.71	0.76	0.037			I O	3.10
15.167	0.70	0.76	0.037			IO	3.07
15.250	0.70	0.75	0.036			IO	3.04
15.333	0.68	0.75	0.036			I O	3.00
15.417	0.68	0.75	0.036			I O	2.97
15.500	0.68	0.74	0.035			I O	2.93
15.583	0.59	0.73	0.034			I O	2.87
15.667	0.56	0.72	0.033			I O	2.78
15.750	0.56	0.71	0.032			I O	2.69
15.833	0.56	0.70	0.031			I O	2.61
15.917	0.56	0.68	0.030			I O	2.53
16.000	0.56	0.67	0.030			I O	2.46
16.083	0.22	0.65	0.028	I		O	2.30
16.167	0.12	0.62	0.024	I		O	2.04
16.250	0.12	0.57	0.021	I		O	1.77
16.333	0.12	0.52	0.018	I		O	1.52
16.417	0.12	0.48	0.016	I		O	1.30
16.500	0.12	0.44	0.013	I	O		1.10
16.583	0.09	0.40	0.011	I	O		0.92
16.667	0.09	0.35	0.009	I	O		0.76
16.750	0.09	0.31	0.007	I	O		0.62
16.833	0.09	0.28	0.006	I	O		0.50
16.917	0.09	0.23	0.005	I	O		0.40
17.000	0.09	0.19	0.004	I O			0.34
17.083	0.13	0.17	0.004	IO			0.30
17.167	0.15	0.16	0.003	IO			0.28
17.250	0.15	0.16	0.003	O			0.28
17.333	0.15	0.15	0.003	O			0.27
17.417	0.15	0.15	0.003	O			0.27
17.500	0.15	0.15	0.003	O			0.27
17.583	0.15	0.15	0.003	O			0.27
17.667	0.15	0.15	0.003	O			0.27
17.750	0.15	0.15	0.003	O			0.26
17.833	0.12	0.14	0.003	IO			0.26
17.917	0.12	0.14	0.003	IO			0.25
18.000	0.12	0.13	0.003	IO			0.24
18.083	0.12	0.13	0.003	IO			0.23
18.167	0.12	0.13	0.003	O			0.22
18.250	0.12	0.12	0.003	O			0.22
18.333	0.12	0.12	0.003	O			0.22
18.417	0.12	0.12	0.003	O			0.22
18.500	0.12	0.12	0.003	O			0.21
18.583	0.09	0.12	0.002	O			0.21
18.667	0.09	0.11	0.002	IO			0.19
18.750	0.09	0.10	0.002	IO			0.18
18.833	0.07	0.10	0.002	IO			0.17
18.917	0.06	0.09	0.002	IO			0.15
19.000	0.06	0.08	0.002	IO			0.14
19.083	0.08	0.08	0.002	O			0.14
19.167	0.09	0.08	0.002	O			0.14
19.250	0.09	0.08	0.002	O			0.15
19.333	0.11	0.09	0.002	OI			0.15
19.417	0.12	0.09	0.002	OI			0.17
19.500	0.12	0.10	0.002	O			0.18
19.583	0.09	0.10	0.002	O			0.18
19.667	0.09	0.10	0.002	IO			0.18
19.750	0.09	0.10	0.002	IO			0.17
19.833	0.07	0.09	0.002	O			0.16
19.917	0.06	0.08	0.002	IO			0.15
20.000	0.06	0.08	0.002	IO			0.14
20.083	0.08	0.07	0.002	O			0.13
20.167	0.09	0.08	0.002	O			0.14

20.250	0.09	0.08	0.002	| O	|	|	|	0.14
20.333	0.09	0.08	0.002	| O	|	|	|	0.15
20.417	0.09	0.08	0.002	| O	|	|	|	0.15
20.500	0.09	0.09	0.002	| O	|	|	|	0.15
20.583	0.09	0.09	0.002	| O	|	|	|	0.15
20.667	0.09	0.09	0.002	| O	|	|	|	0.15
20.750	0.09	0.09	0.002	| O	|	|	|	0.16
20.833	0.07	0.08	0.002	| O	|	|	|	0.15
20.917	0.06	0.08	0.002	|IO	|	|	|	0.14
21.000	0.06	0.07	0.002	|IO	|	|	|	0.13
21.083	0.08	0.07	0.002	| O	|	|	|	0.13
21.167	0.09	0.08	0.002	| O	|	|	|	0.13
21.250	0.09	0.08	0.002	| O	|	|	|	0.14
21.333	0.07	0.08	0.002	| O	|	|	|	0.14
21.417	0.06	0.07	0.002	|IO	|	|	|	0.13
21.500	0.06	0.07	0.001	|IO	|	|	|	0.12
21.583	0.08	0.07	0.001	| O	|	|	|	0.12
21.667	0.09	0.07	0.002	| O	|	|	|	0.13
21.750	0.09	0.08	0.002	| O	|	|	|	0.14
21.833	0.07	0.08	0.002	| O	|	|	|	0.14
21.917	0.06	0.07	0.002	|IO	|	|	|	0.13
22.000	0.06	0.07	0.001	|IO	|	|	|	0.12
22.083	0.08	0.07	0.001	| O	|	|	|	0.12
22.167	0.09	0.07	0.002	| O	|	|	|	0.13
22.250	0.09	0.08	0.002	| O	|	|	|	0.14
22.333	0.07	0.08	0.002	| O	|	|	|	0.14
22.417	0.06	0.07	0.002	|IO	|	|	|	0.13
22.500	0.06	0.07	0.001	|IO	|	|	|	0.12
22.583	0.06	0.07	0.001	|IO	|	|	|	0.12
22.667	0.06	0.06	0.001	|IO	|	|	|	0.11
22.750	0.06	0.06	0.001	|O	|	|	|	0.11
22.833	0.06	0.06	0.001	|O	|	|	|	0.11
22.917	0.06	0.06	0.001	|O	|	|	|	0.11
23.000	0.06	0.06	0.001	|O	|	|	|	0.11
23.083	0.06	0.06	0.001	|O	|	|	|	0.11
23.167	0.06	0.06	0.001	|O	|	|	|	0.11
23.250	0.06	0.06	0.001	|O	|	|	|	0.11
23.333	0.06	0.06	0.001	|O	|	|	|	0.11
23.417	0.06	0.06	0.001	|O	|	|	|	0.11
23.500	0.06	0.06	0.001	|O	|	|	|	0.11
23.583	0.06	0.06	0.001	|O	|	|	|	0.11
23.667	0.06	0.06	0.001	|O	|	|	|	0.11
23.750	0.06	0.06	0.001	|O	|	|	|	0.11
23.833	0.06	0.06	0.001	|O	|	|	|	0.10
23.917	0.06	0.06	0.001	|O	|	|	|	0.10
24.000	0.06	0.06	0.001	|O	|	|	|	0.10
24.083	0.01	0.05	0.001	IO	|	|	|	0.09
24.167	0.00	0.04	0.001	IO	|	|	|	0.07
24.250	0.00	0.03	0.001	O	|	|	|	0.05
24.333	0.00	0.02	0.000	O	|	|	|	0.04
24.417	0.00	0.02	0.000	O	|	|	|	0.03
24.500	0.00	0.01	0.000	O	|	|	|	0.02
24.583	0.00	0.01	0.000	O	|	|	|	0.01
24.667	0.00	0.01	0.000	O	|	|	|	0.01
24.750	0.00	0.00	0.000	O	|	|	|	0.01
24.833	0.00	0.00	0.000	O	|	|	|	0.01
24.917	0.00	0.00	0.000	O	|	|	|	0.00
25.000	0.00	0.00	0.000	O	|	|	|	0.00
25.083	0.00	0.00	0.000	O	|	|	|	0.00
25.167	0.00	0.00	0.000	O	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 302

```
            Time interval =    5.0 (Min.)
            Maximum/Peak flow rate =        0.810 (CFS)
            Total volume =       0.607 (Ac.Ft)
      Status of hydrographs being held in storage
                 Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
      Peak (CFS)      0.000     0.000     0.000     0.000     0.000
      Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
****************************************************************************

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

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Study date 03/20/25 File: beaulibpre1100.out

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

Program License Serial Number 6447

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

English Units used in output format

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
100-YEAR 1-HOUR STORM EVENT, HYDROGRAPH
EXISTING CONDITION

Drainage Area = 1.34(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.34(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 267.00(Ft.)
Length along longest watercourse measured to centroid = 86.00(Ft.)
Length along longest watercourse = 0.051 Mi.
Length along longest watercourse measured to centroid = 0.016 Mi.
Difference in elevation = 5.20(Ft.)
Slope along watercourse = 102.8315 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.010 Hr.
Lag time = 0.60 Min.
25% of lag time = 0.15 Min.
40% of lag time = 0.24 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	0.59	0.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	1.93	2.59

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.594(In)
Area Averaged 100-Year Rainfall = 1.930(In)

Point rain (area averaged) = 1.930(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.930(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.340	32.00	0.788

Total Area Entered = 1.34(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	52.0	0.552	0.788	0.160	1.000	0.160
					Sum (F) =	0.160

Area averaged mean soil loss (F) (In/Hr) = 0.160
Minimum soil loss rate ((In/Hr)) = 0.080
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.269

Slope of intensity-duration curve for a 1 hour storm =0.4800

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	829.542	100.000	1.350
		Sum = 100.000	Sum=	1.350

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	1.019	0.160	(0.274)	0.859
2	0.17	4.50	1.042	0.160	(0.280)	0.882
3	0.25	5.40	1.251	0.160	(0.336)	1.090
4	0.33	5.40	1.251	0.160	(0.336)	1.090
5	0.42	5.70	1.320	0.160	(0.355)	1.160
6	0.50	6.40	1.482	0.160	(0.399)	1.322
7	0.58	7.90	1.830	0.160	(0.492)	1.669
8	0.67	9.10	2.108	0.160	(0.567)	1.947
9	0.75	12.80	2.964	0.160	(0.797)	2.804
10	0.83	25.60	5.929	0.160	(1.595)	5.769
11	0.92	7.90	1.830	0.160	(0.492)	1.669
12	1.00	4.90	1.135	0.160	(0.305)	0.975
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	21.2

Flood volume = Effective rainfall 1.77(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.16(In)
Total soil loss = 0.018(Ac.Ft)
Total rainfall = 1.93(In)
Flood volume = 8608.5 Cubic Feet
Total soil loss = 779.3 Cubic Feet

Peak flow rate of this hydrograph = 7.794(CFS)

1 - H O U R S T O R M

R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0080	1.16	V Q				
0+10	0.0162	1.19	VQ				
0+15	0.0263	1.47	Q				
0+20	0.0365	1.47	Q V				
0+25	0.0473	1.57	Q V				
0+30	0.0596	1.79	Q	V			
0+35	0.0751	2.26	Q	V			
0+40	0.0932	2.63	Q	V			
0+45	0.1193	3.79		Q	V		
0+50	0.1730	7.79				Q V	
0+55	0.1886	2.26	Q				V
1+ 0	0.1976	1.32	Q				V

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

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Study date 03/20/25 File: beaulibpost1100.out

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

Program License Serial Number 6447

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

English Units used in output format

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
100-YEAR 1-HOUR STORM, HYDROGRAPH
POST CONDITION

Drainage Area = 1.34(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.34(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 330.00(Ft.)
Length along longest watercourse measured to centroid = 169.00(Ft.)
Length along longest watercourse = 0.063 Mi.
Length along longest watercourse measured to centroid = 0.032 Mi.
Difference in elevation = 9.10(Ft.)
Slope along watercourse = 145.6000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.013 Hr.
Lag time = 0.79 Min.
25% of lag time = 0.20 Min.
40% of lag time = 0.32 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	0.59	0.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.34	1.93	2.59

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.594(In)
Area Averaged 100-Year Rainfall = 1.930(In)

Point rain (area averaged) = 1.930(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.930(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.340	32.00	0.910

Total Area Entered = 1.34(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.0	52.0	0.552	0.910	0.100	1.000	0.100
					Sum (F) =	0.100

Area averaged mean soil loss (F) (In/Hr) = 0.100
Minimum soil loss rate ((In/Hr)) = 0.050
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.164

Slope of intensity-duration curve for a 1 hour storm =0.4800

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	632.538	76.700	1.036
2	0.167	1265.076	23.300	0.315
		Sum = 100.000	Sum=	1.350

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	1.019	0.100	(0.167)	0.919
2	0.17	4.50	1.042	0.100	(0.171)	0.942
3	0.25	5.40	1.251	0.100	(0.205)	1.151
4	0.33	5.40	1.251	0.100	(0.205)	1.151
5	0.42	5.70	1.320	0.100	(0.216)	1.220
6	0.50	6.40	1.482	0.100	(0.243)	1.382
7	0.58	7.90	1.830	0.100	(0.300)	1.730
8	0.67	9.10	2.108	0.100	(0.346)	2.008
9	0.75	12.80	2.964	0.100	(0.486)	2.865
10	0.83	25.60	5.929	0.100	(0.972)	5.829
11	0.92	7.90	1.830	0.100	(0.300)	1.730
12	1.00	4.90	1.135	0.100	(0.186)	1.035
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	22.0

Flood volume = Effective rainfall 1.83(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.10(In)
Total soil loss = 0.011(Ac.Ft)
Total rainfall = 1.93(In)
Flood volume = 8902.2 Cubic Feet
Total soil loss = 485.6 Cubic Feet

Peak flow rate of this hydrograph = 6.943(CFS)

1 - H O U R S T O R M

R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0066	0.95	V Q				
0+10	0.0153	1.27	V Q				
0+15	0.0255	1.49	VQ				
0+20	0.0362	1.55	QV				
0+25	0.0474	1.63	Q V				
0+30	0.0600	1.82	Q V				
0+35	0.0753	2.23	Q V				
0+40	0.0934	2.63	Q V				
0+45	0.1182	3.60	Q V				
0+50	0.1660	6.94	Q V				
0+55	0.1910	3.63	Q V				
1+ 0	0.2021	1.62	Q V				
1+ 5	0.2044	0.33	Q V				

DETENTION BASIN SIZING

CALCULATION OF DETENTION BASIN OUTLET CAPACITY. THE OUTLET CONSISTS OF A RESTRICTOR PLATE 4 INCH IN DIAMETER AT THE OUTLET OF THE DETENTION BASIN.

THE SUBMERGED ORIFICE EQUATION IS:	$Q=0.63A(2G\Delta H)^{1/2}$	WHERE A IS THE OPENING AREA IN SF, ΔH IS THE DIFFERENCE IN DEPTHS ON EACH SIDE OF THE ORIFICE OPENING (MEASURED FROM THE CENTROID OF THE ORIFICE OPENING). G IS EQUAL TO 32.2 FT/S.

DIAMETER OF OPENING =	4 INCHES	12 INCHES
AREA OF OPENING=	0.087 SQUARE FEET	0.785 SQUARE FEET

DEPTH OF WATER IN BASIN (FT)	ASSUMED DEPTH OF FLOW AT ORIFICE (FT)	CALCULATED, Q $Q=0.63A(2G\Delta H)^{1/2}$ (FT)	BASIN OUTLET INVERT ELEVATION (FT)	PONDED WATER SURFACE ELEVATION (FT)
0.5	0.40	0.28	100	100.50
1.0	0.90	0.42	100	101.00
1.5	1.40	0.52	100	101.50
2.0	1.90	0.61	100	102.00
2.5	2.40	0.68	100	102.50
3.0	2.90	0.75	100	103.00
3.5	3.40	0.81	100	103.50
3.83	3.73	0.85	100	103.83
3.9	3.80	8.18	100	103.90
4.0	3.90	8.30	100	104.00

TOP OF LOWEST GRATE = 2953.43 TG
BOTTOM OF TANK = 2591.60'
TOP OF TANK = 2595.60'

2595.60 - 2953.43 = 0.17'

4.00 - 0.17 = 3.83'

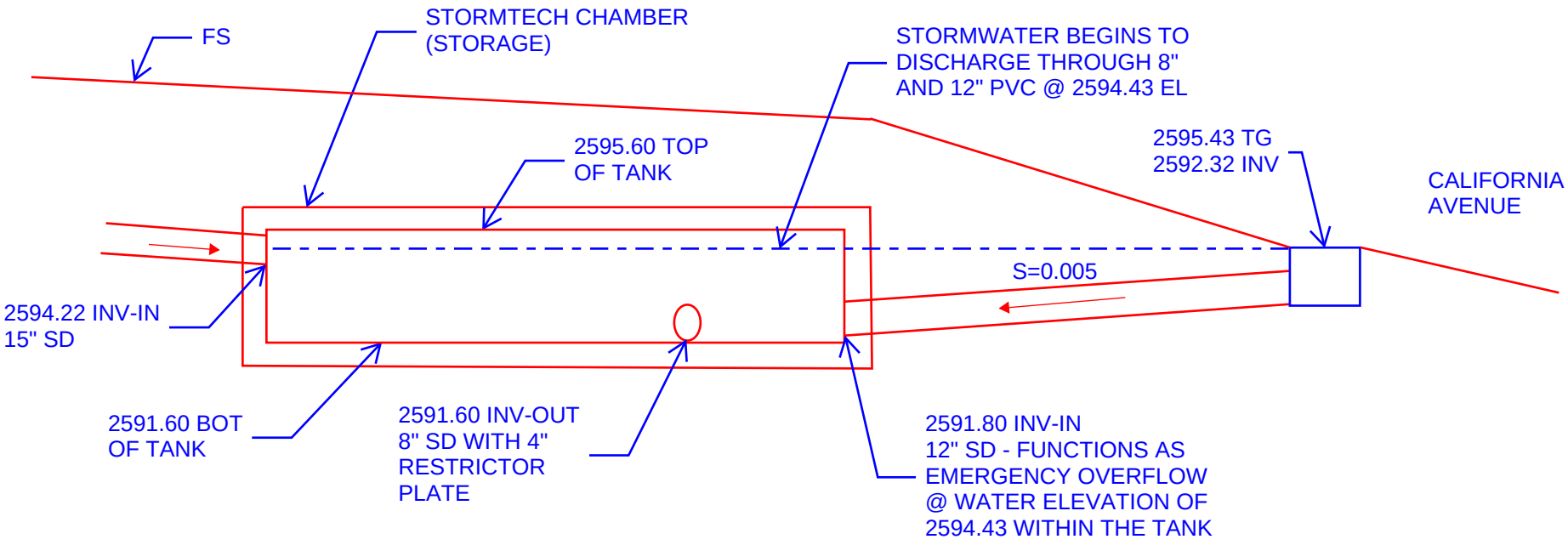
AT A BASIN DEPTH OF 3.83', THE WATER LEVEL WITHIN THE TANK BEGINS TO BECOME GREATER THAN THE LOWEST GRATE WITHIN THE STORM DRAIN SYSTEM. THEREFORE, STORMWATER WILL BEGIN TO BUBBLE UP THE LOWEST GRATE AND DISCHARGE OUT OF THE INLET.

TO ACCOUNT FOR THIS, AN ADDITIONAL SUBMERGED EQUATION IS CALCULATED FOR THE 12" INLET PIPE THAT IS CONNECTING THE LOWEST GRATE AND UNDERGROUND TANK.

THIS DISCHARGE VALUE IS THEN ADDED TO THE CALCULATED Q.

SEE EMERGENCY OVERFLOW EXHIBIT ON NEXT PAGE FOR REFERENCE.

BEAUMONT EMERGENCY OVERFLOW EXHIBIT



SQUARE FOOTAGE OF UNDERGROUND STORAGE BASIN
525.00 (5 ROWS OF 7'x15' SC-4 MODULES)

DEPTH (FT)	FLOW VOLUME ACCUMULATED (cubic feet)	FLOW VOLUME ACCUMULATED (acre-feet)
0.5	262.50	0.0060
1.0	525.00	0.0121
1.5	787.50	0.0181
2.0	1050.00	0.0241
2.5	1312.50	0.0301
3.0	1575.00	0.0362
3.5	1837.50	0.0422
3.83	2010.75	0.0462
3.9	2047.50	0.0470
4.0	2159.00	0.0496

OUTFLOW RATING DATA FOR:
OUTFLOW WITH RESTRICTOR PLATE AT 4" DIAMETER OUTLET OF BASIN

PONDED WATER SURFACE ELEVATION (FT)	DEPTH OF FLOW AT BASIN OUTLET (FT)	ACCUMULATED VOLUME (ACRE-FEET)	OUTFLOW CFS
0	0	0.000	0
100.5	0.5	0.006	0.28
101.0	1.0	0.012	0.42
101.5	1.5	0.018	0.52
102.0	2.0	0.024	0.61
102.5	2.5	0.030	0.68
103.0	3.0	0.036	0.75
103.5	3.5	0.042	0.81
103.83	3.83	0.046	0.85
103.9	3.9	0.047	8.18
104.0	4.0	0.050	8.30

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
Study date: 03/20/25

BEAUMONT LIBRARY REDEVELOPMENT PROJECT
100-YEAR, 1-HOUR STORM EVENT
DETENTION BASIN ROUTING CALCULATIONS
POST-CONDITION

Program License Serial Number 6447

********** HYDROGRAPH INFORMATION **********

From study/file name: BEAULIBPOST1100.rte
**********HYDROGRAPH DATA**********
Number of intervals = 13
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 6.943 (CFS)
Total volume = 0.204 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 0.000 to Point/Station 0.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 13
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.006	0.280	0.005	0.007
1.000	0.012	0.420	0.011	0.013
1.500	0.018	0.520	0.016	0.020
2.000	0.024	0.610	0.022	0.026
2.500	0.030	0.680	0.028	0.032
3.000	0.036	0.750	0.033	0.039
3.500	0.042	0.810	0.039	0.045
3.830	0.046	0.850	0.043	0.049
3.900	0.047	8.180	0.019	0.075

4.000 0.050 8.300 0.021 0.079

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 1.7 3.47 5.21 6.94	Depth (Ft.)
0.083	0.95	0.13	0.003	O I | | | |	0.24
0.167	1.27	0.35	0.009	|O I | | | |	0.74
0.250	1.49	0.48	0.015	| O I | | | |	1.29
0.333	1.55	0.58	0.022	| O I| | | |	1.86
0.417	1.63	0.67	0.029	| O I| | | |	2.41
0.500	1.82	0.75	0.036	| O I | | |	2.99
0.583	2.23	0.83	0.044	| O | I | | |	3.70
0.667	2.63	3.45	0.046	| | I O| | |	3.85
0.750	3.60	2.80	0.046	| | O I | |	3.85
0.833	6.94	7.55	0.047	| | | | O	3.89
0.917	3.63	3.19	0.046	| | O I | |	3.85
1.000	1.62	2.10	0.046	| I|O | |	3.84
1.083	0.33	0.82	0.043	|I O | | |	3.57
1.167	0.00	0.77	0.038	I O | | |	3.20
1.250	0.00	0.72	0.033	I O | | |	2.78
1.333	0.00	0.66	0.029	I O | | |	2.38
1.417	0.00	0.61	0.024	I O | | |	2.01
1.500	0.00	0.55	0.020	I O | | |	1.68
1.583	0.00	0.50	0.017	I O | | |	1.38
1.667	0.00	0.44	0.013	I O | | |	1.11
1.750	0.00	0.38	0.010	IO | | |	0.87
1.833	0.00	0.33	0.008	IO | | |	0.67
1.917	0.00	0.28	0.006	IO | | |	0.49
2.000	0.00	0.20	0.004	O | | |	0.36
2.083	0.00	0.14	0.003	O | | |	0.26
2.167	0.00	0.10	0.002	O | | |	0.19
2.250	0.00	0.08	0.002	O | | |	0.14
2.333	0.00	0.05	0.001	O | | |	0.10
2.417	0.00	0.04	0.001	O | | |	0.07
2.500	0.00	0.03	0.001	O | | |	0.05
2.583	0.00	0.02	0.000	O | | |	0.04
2.667	0.00	0.01	0.000	O | | |	0.03
2.750	0.00	0.01	0.000	O | | |	0.02
2.833	0.00	0.01	0.000	O | | |	0.01
2.917	0.00	0.01	0.000	O | | |	0.01
3.000	0.00	0.00	0.000	O | | |	0.01
3.083	0.00	0.00	0.000	O | | |	0.01
3.167	0.00	0.00	0.000	O | | |	0.00
3.250	0.00	0.00	0.000	O | | |	0.00
3.333	0.00	0.00	0.000	O | | |	0.00
3.417	0.00	0.00	0.000	O | | |	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 41
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.554 (CFS)
Total volume = 0.204 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

DETENTION BASIN DRAWDOWN TIME CALCULATIONS

CALCULATION OF DETENTION BASIN DRAWDOWN TIME

THE SUBMERGED ORIFICE EQUATION IS:

$$Q(h) = C_d A\sqrt{2gh}$$

$Q(h)$ is the discharge at a given height h,

C_d is the discharge coefficient,

A is the area of the orifice,

g is the acceleration due to gravity,

h is the height of the fluid above the orifice.

TO CALCULATE TIME (t) IT TAKES TO DRAIN THE TANK, INTEGRATION OF THE SUBMERGED ORIFICE EQUATION IS NEEDED.

$$Q = \frac{dV}{dt}$$

V = VOLUME t=TIME

$$V = A_{\text{tank}} H$$

$$\frac{dV}{dt} = A_{\text{tank}} \frac{dH}{dt}$$

$$A_{\text{tank}} \frac{dH}{dt} = C_d A\sqrt{2gH}$$

$$\frac{dH}{\sqrt{H}} = \frac{C_d A}{A_{\text{tank}}} \sqrt{2g}\, dt$$

$$\int_{H_0}^{0} \frac{dH}{\sqrt{H}} = \int_{0}^{t} \frac{C_d A}{A_{\text{tank}}} \sqrt{2g}\, dt$$

$$\int \frac{dH}{\sqrt{H}} = 2\sqrt{H}$$

$$2\sqrt{H}\Big|_{H_0}^{0} = \frac{C_d A}{A_{\text{tank}}} \sqrt{2g}\, t$$

$$2\sqrt{H_0} - 2\sqrt{0} = 2\sqrt{H_0}$$

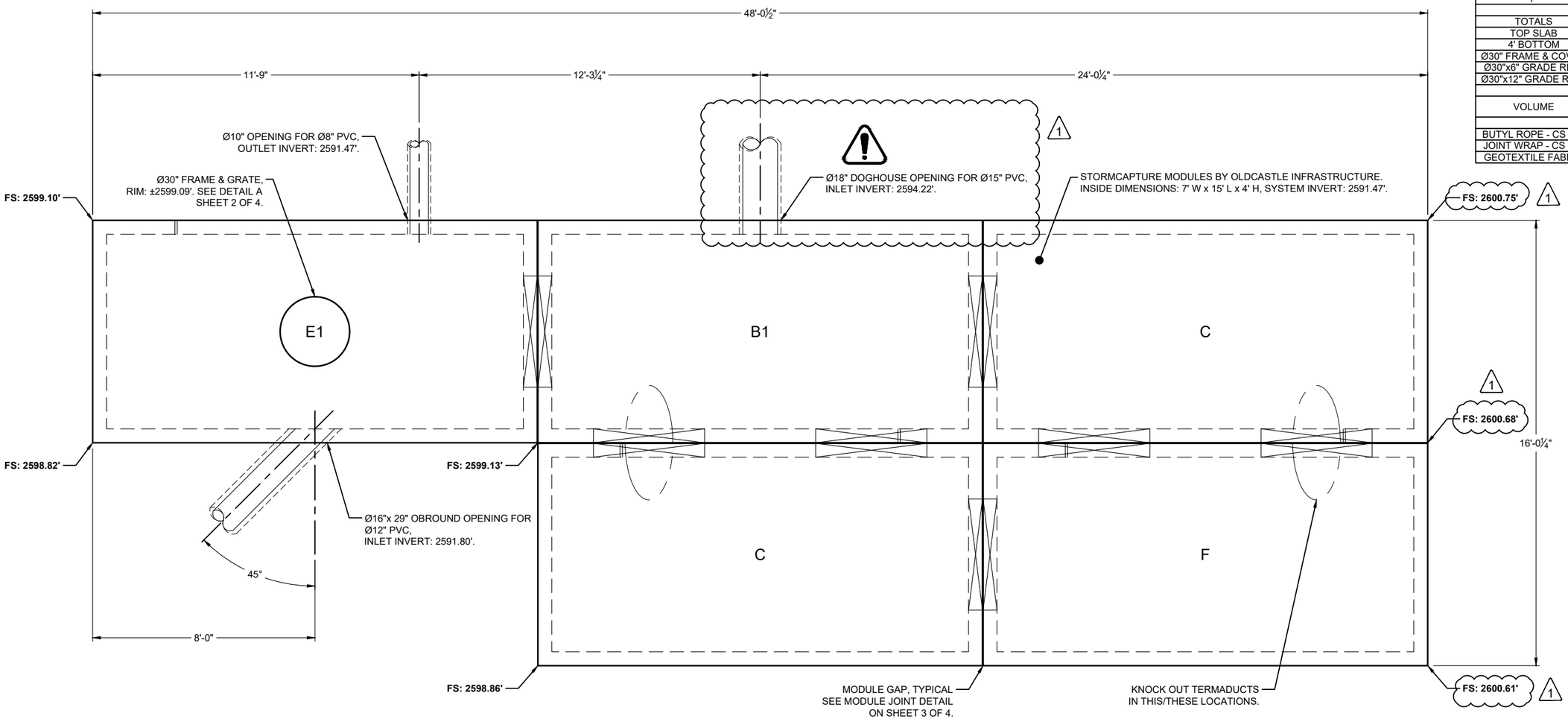
$$2\sqrt{H_0} = \frac{C_d A}{A_{\text{tank}}} \sqrt{2g}\, t$$

$$t = \frac{2A_{\text{tank}}\sqrt{H_0}}{C_d A\sqrt{2g}}$$

Cross Sectional Area of the Basin (Atank, sqft) =	539.75
Discharge Coefficient (Cd) =	0.63
Area of the Orifice (A, sqft) =	0.087
Height of Tank (H_o, ft) =	4
Gravity (g, ft/s) =	32.2
Detention Basin Drawdown Time (t, seconds) =	4894
Detention Basin Drawdown Time (t, hours) =	1.36

⚠ LOWERED INLET IE FROM 2594.26' TO 2594.22' TO FIT PIPE WITHIN MODULE.

BILL OF MATERIALS				
TYPE	QTY	HEIGHT	STD	NOTES
B1	1	4'		
C	2	4'		
E1	1	4'		
F	1	4'		
TOTALS				
TOP SLAB	5	7"		
4' BOTTOM	5			
Ø30" FRAME & COVER	1			
Ø30"x6" GRADE RING	1			
Ø30"x12" GRADE RING	2			
VOLUME	2,159	CUBIC FEET		
BUTYL ROPE - CS 102	21	ROLLS		
JOINT WRAP - CS 212	1	ROLL		
GEOTEXTILE FABRIC	1	ROLL		



PLAN VIEW
SCALE: 1/4" = 1'-0"

DESIGN NOTES

1. LIVE LOADING CRITERIA:
   - A. AASHTO HS-20-44 DESIGN TRUCK (WITH IMPACT AT 0.50FT MINIMUM COVER)
   - B. LATERAL LIVE LOAD SURCHARGE: 80 PSF (TO 8.00FT DEPTH)
   - C. NO LATERAL SURCHARGE(S) FROM ANY ADJACENT BUILDINGS, WALLS, FOUNDATIONS, OR ANY ADDITIONAL SITE ELEMENTS.
2. SOIL LOADING CRITERIA:
   - A. SOIL COVER DEPTH: 0.50FT (MIN.) - 5.00FT (MAX.)
   - B. SOIL UNIT WEIGHT: 120 PCF
   - C. ASSUMED WATER TABLE ELEVATION: BELOW BOTTOM OF PRECAST
   - D. REQUIRED ALLOWABLE BEARING PRESSURE: 2,500 PSF
   - E. EQUIVALENT LATERAL FLUID PRESSURE, ACTIVE: 45 PCF (DRAINED)
   - F. EQUIVALENT LATERAL FLUID PRESSURE, AT-REST: 60 PCF (DRAINED)
   - G. EQUIVALENT LATERAL FLUID PRESSURE, PASSIVE: 150 PCF (DRAINED)
   - H. ASSUMED COEFFICIENT OF FRICTION: 0.40
   - I. SEISMIC LATERAL EARTH PRESSURES: 30.5H PCF (APPLIED AS INVERTED TRIANGLE)
3. STORMCAPTURE MODULE TYPE: DETENTION (SOILTIGHT).
4. CONCRETE (NORMAL WEIGHT):
   - A. MIN. 28-DAY COMPRESSIVE STRENGTH: 6,000 PSI
   - B. CEMENT: ASTM C150
5. STEEL REINFORCEMENT: ASTM A615 / A706 (GRADE 60), ASTM A1064 (GRADE 80)
6. REFERENCE STANDARDS: ASTM C913 & C890, ACI 318-14

Detention/ Infiltration

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

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STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	PLAN-N
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

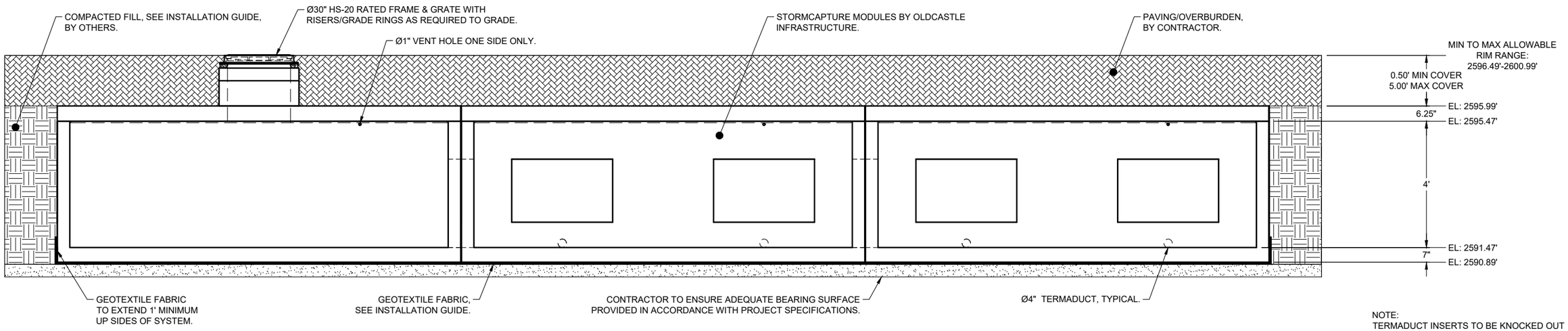
DRAWING NAME: SUBMITTAL DRAWING

SHEET: 1 OF 4

REVIEWING NOTES

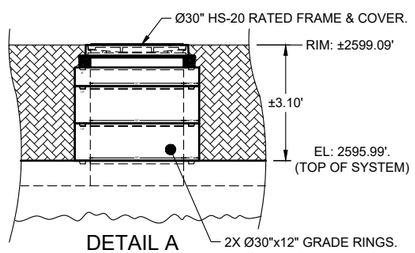
1. THIS SYSTEM HAS BEEN DESIGNED PER THE DESIGN PARAMETERS SPECIFIED IN THE DESIGN NOTES. REVIEWING ENGINEER SHALL VERIFY THAT THESE PARAMETERS MEET OR EXCEED PROJECT SPECIFIC REQUIREMENTS. IF SITE CONDITIONS DIFFER FROM NOTED DESIGN PARAMETERS, REVIEWING ENGINEER SHALL NOTIFY OLDCASTLE FOR POTENTIAL REDESIGN AND/OR PRICING ADJUSTMENTS.
2. REVIEWING ENGINEER SHALL VERIFY ALL PIPE PENETRATION LOCATIONS, SIZES, AND INVERTS.
3. REVIEWING ENGINEER SHALL VERIFY ALL MANWAY ACCESS LOCATIONS AND RIM ELEVATIONS.
4. THIS SYSTEM IS DESIGNED FOR A GROUNDWATER TABLE ELEVATION PER DESIGN NOTE 2C, SHEET 1. REVIEWING ENGINEER SHALL VERIFY THAT THE DESIGN GROUNDWATER ELEVATION MEETS OR EXCEEDS SITE CONDITION REQUIREMENTS. NOTIFY OLDCASTLE IF SITE CONDITIONS VARY FROM WHAT HAS BEEN SPECIFIED FOR POTENTIAL SYSTEM DESIGN CHANGES AND/OR PRICING ADJUSTMENTS.
5. STORMCAPTURE MODULES ARE NOT WATERTIGHT. IF A WATERTIGHT SOLUTION IS REQUIRED, CONTACT OLDCASTLE FOR RECOMMENDATIONS. THE WATERTIGHT APPLICATION TO BE PROVIDED AND IMPLEMENTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE SELECTED WATERTIGHT SOLUTION PERFORMS AS SPECIFIED BY THE MANUFACTURER.
6. DESIGN OF THE STORMCAPTURE PRECAST MODULE SYSTEM ASSUMES NO ADJACENT BUILDING(S), WALL(S), OR STRUCTURAL FOUNDATION(S) WITHIN A 1:1 INFLUENCE LINE FROM THE BOTTOM EDGE OF ANY SYSTEM MODULE. ANY SITE ELEMENTS BEYOND THIS ZONE OF INFLUENCE ARE ASSUMED TO HAVE NO IMPACT ON THE SYSTEM AND EXERT ZERO LATERAL SURCHARGE ONTO THE MODULES. THE CONTRACTOR SHALL VERIFY THAT ANY ADJACENT BUILDING(S), WALL(S), OR STRUCTURAL FOUNDATION(S) DO NOT LIE WITHIN THIS INFLUENCE ZONE OR DO NOT SURCHARGE THE PRECAST MODULES.
7. WRITTEN APPROVAL OF SUBMITTAL DRAWINGS ALONG WITH SIGNED PURCHASE ORDER REQUIRED FOR BEGINNING OF PRODUCT FABRICATION. ANY SYSTEM MODIFICATION POST-APPROVAL MAY RESULT IN CHANGE ORDER(S) AND/OR POTENTIAL DELIVERY DELAYS.
8. ALL SAND FILTER MEDIA, DRAIN ROCK AGGREGATE, PIPE, AND FITTINGS PROVIDED BY CONTRACTOR.

WATERPROOFING TO BE PROVIDED BY OTHERS.



NOTE:
TERMADUCT INSERTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS ONLY (BY OTHERS).

TYPICAL ELEVATION
NTS



DETAIL A
MODULE E1
SCALE: 1/4" = 1'-0"

Detention/ Infiltration

REV	DESCRIPTION	DATE
⚠	UPDATED PER COMMENTS	2/10/25

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STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

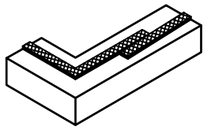
DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

DRAWING NAME	SHEET
SUBMITTAL DRAWING	2 OF 4

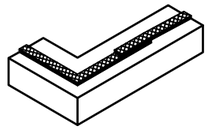
INSTALLATION NOTES

1. UNDERGROUND PRECAST CONCRETE SYSTEM INSTALLATION SHALL BE PER ASTM C891, “STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES” AND PER OLDCASTLE.
2. MODULE SUBBASE OR SUBGRADE SHALL BE LEVEL/SCREEDED AND COMPACTED ADEQUATELY FOR REQUIRED BEARING CAPACITY PER DESIGN NOTE 2D, SHEET 1. CONTRACTOR AND/OR INSTALLING SUB-CONTRACTOR SHALL VERIFY THAT SOIL BEARING CONDITIONS MEET OR EXCEED DESIGN REQUIRED MINIMUMS PRIOR TO PLACEMENT AND INSTALLATION OF MODULES.
3. ANY CONSTRUCTION EQUIPMENT EXCEEDING NOTED DESIGN LOADING IS NOT PERMITTED OVER OR ADJACENT TO ANY MODULE WITHOUT FORMAL REVIEW AND WRITTEN APPROVAL BY OLDCASTLE ENGINEERING, ELSE PRODUCT WARRANTY MAY BE VOIDED. ANY DESIGN CONSTRAINT EXCEEDING THE DESIGN PARAMETERS NOTED ABOVE MAY REQUIRE CUSTOM STRUCTURAL DESIGN, SUBGRADE REVISIONS, AND/OR PRICING ADJUSTMENTS.
4. HEAVY VIBRATORY COMPACTION EQUIPMENT SHALL NOT BE OPERATED WITHIN 10 FEET OF MODULE EXTERIOR.
5. MINIMUM OF 0.50FT OF SOIL COVER REQUIRED FOR CONSTRUCTION EQUIPMENT OPERATION ON TOP OF SYSTEM. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND INSTALLING SUB-CONTRACTOR TO ENSURE THAT NO MODULES ARE DAMAGED DURING CONSTRUCTION.
6. UNLESS NOTED OTHERWISE, ALL PIPE SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR MAY MODIFY AT RISK ANY OLDCASTLE PRODUCT(S) IN THE FIELD OR AFTER DELIVERY WITHOUT FORMAL REVIEW AND WRITTEN APPROVAL BY OLDCASTLE ENGINEERING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT ANY PRODUCT MODIFICATIONS DO NOT INVALIDATE THE PRODUCT WARRANTY.
8. MODULE PLACEMENT FIELD TOLERANCES SHALL NOT EXCEED 3/4" BETWEEN ADJACENT MODULES. IF MODULE GAP EXCEEDS 3/4", CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS AND RESET MODULE(S) TO BRING WITHIN NOTED TOLERANCES.
9. CONTRACTOR IS RESPONSIBLE FOR PRODUCTS ONCE DELIVERED TO THE SITE. OLDCASTLE IS NOT RESPONSIBLE FOR OFFLOADING PRODUCTS, MAINTENANCE, AND INSTALLATION OF PRODUCTS ONCE THEY ARRIVE TO THE SITE.
10. CONTRACTOR SHALL INSTALL SYSTEM PER PROJECT WATERPROOFING AND SOILTIGHTNESS REQUIREMENTS. WATERPROOFING AND SOILTIGHTNESS INSTALLATION IS NOT BY OLDCASTLE AND OLDCASTLE WILL PROVIDE NO GUARANTEE FOR THIS COMPONENT OF SYSTEM INSTALLATION.

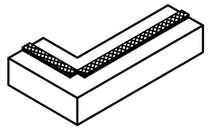
KEYWAYS MUST BE FREE OF DIRT, ROCKS, AND WATER. ROCKS AND DIRT PREVENT THE VAULT SECTIONS FROM SEATING AND SEALING PROPERLY. REMOVE ALL PROTECTIVE PAPER FROM RUBBER SEALANT MATERIAL. SPLICE RUBBER SEALANT MATERIAL WITH A "SIDE BY SIDE" JOINT, AWAY FROM CORNERS. CORNER SPLICING WILL NOT SEAL PROPERLY.



CORRECT - INSTALL RUBBER SEALANT MATERIAL AT THE OUTER EDGE OF THE KEYWAY. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.



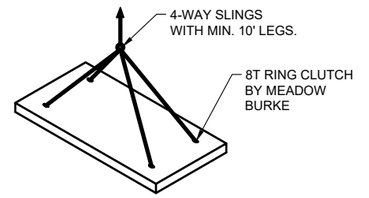
INCORRECT - DO NOT OVERLAP THE RUBBER SEALANT MATERIAL AT SPLICE.



INCORRECT - DO NOT SPLICE RUBBER SEALANT MATERIAL AT A CORNER. RUBBER SEALANT SHOULD BE CONTINUOUS AROUND CORNERS.

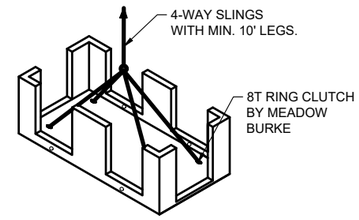
BUTYL RUBBER SEALANT (CONSEAL CS-102 OR EQUAL) PLACEMENT DETAIL

NTS



TOP SLAB LIFTING DETAIL

N.T.S.



BOTTOM MODULE LIFTING DETAIL

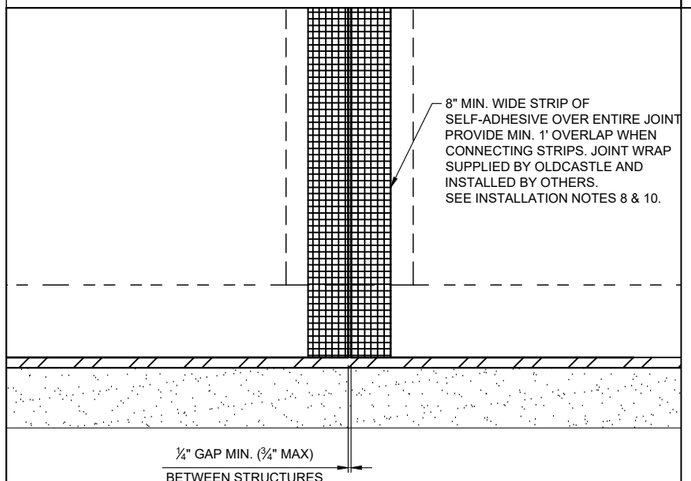
N.T.S.

HEAVIEST PICK
WEIGHT = 24,250 LBS

MAXIMUM EQUIPMENT OPERATING WEIGHT (OW) BY TRACK WIDTH				
TRACK WIDTH	12"	18"	24"	30"
MIN TRACK LENGTH	8'-0"	10'-0"	12'-0"	14'-0"
FILL DEPTH (FT)	OW (LBS)	OW (LBS)	OW (LBS)	OW (LBS)
0.5	35,000	45,000	52,500	54,500
1	35,000	45,000	56,000	60,500
2	35,000	45,000	56,000	64,000
3	76,000	78,500	83,500	88,000
4	94,000	100,000	106,000	113,000
5	100,000	116,000	132,000	149,000

NOTES:

A. IF CONSTRUCTION EQUIPMENT EXCEEDS THE ABOVE OPERATING WEIGHT LIMITS REFER TO INSTALLATION NOTE 3.
B. FOR WHEELED CONSTRUCTION EQUIPMENT LIMITS REFER TO INSTALLATION NOTE 3.
C. MINIMUM AXLE SPACING FOR ALL TRACK WIDTHS IS 6'-0".



MODULE JOINT DETAIL

SCALE: 1/2" = 1'-0"

Detention/
Infiltration

REV	DESCRIPTION	DATE
⚠	UPDATED PER COMMENTS	2/10/25

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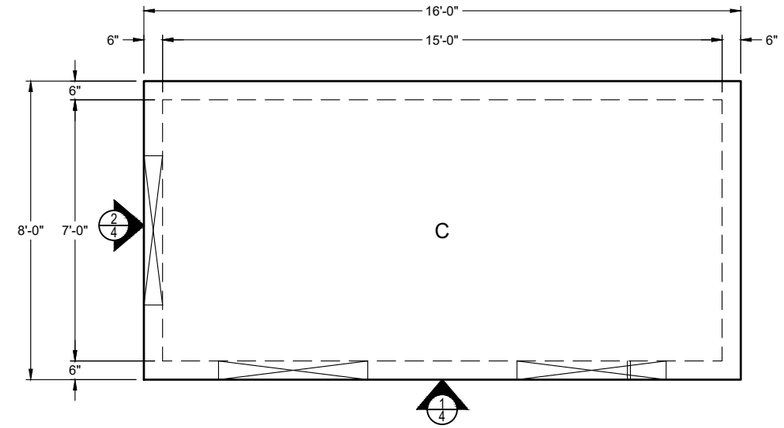
STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

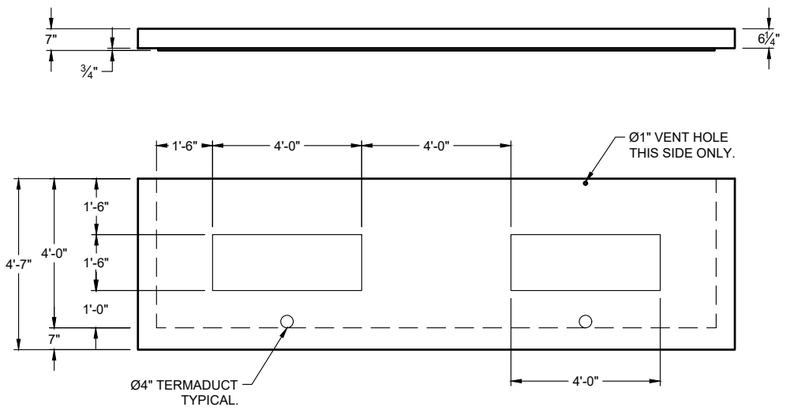
DRAWING NAME: SUBMITTAL DRAWING

SHEET: 3 OF 4



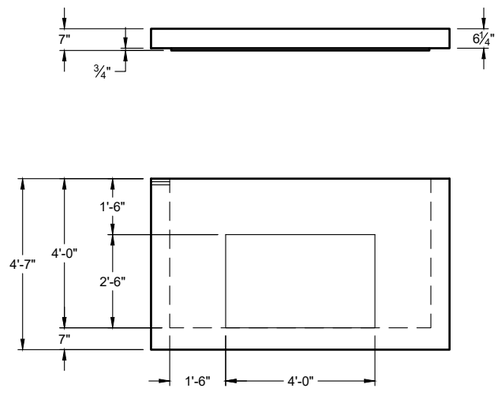
TYPICAL PLAN VIEW

SCALE: 1/4" = 1'-0"



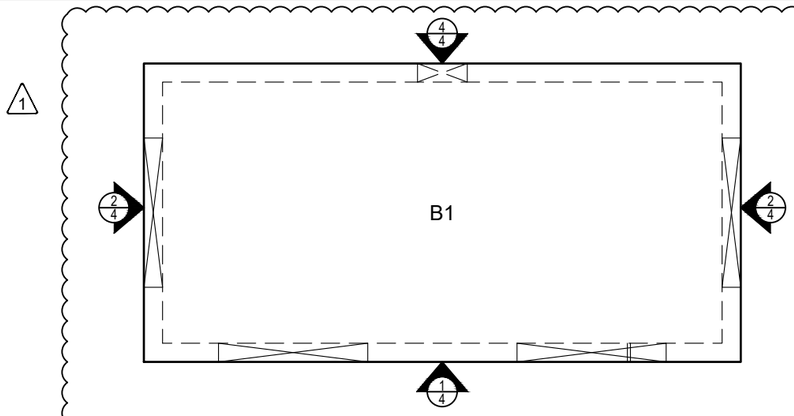
DETAIL 1 - TYPICAL WALL ELEVATION

SCALE: 1/4" = 1'-0"



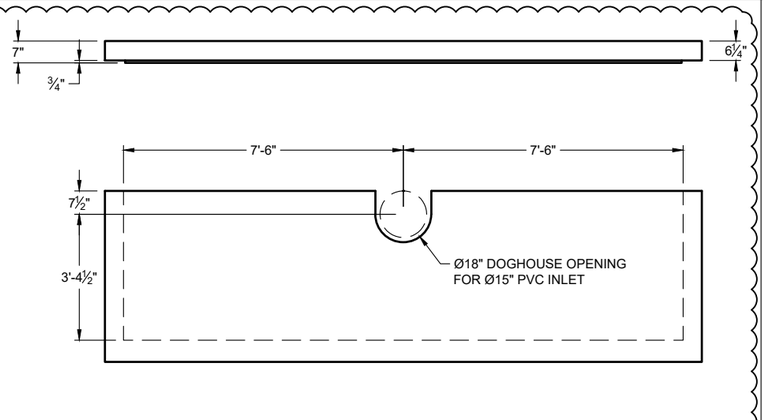
DETAIL 2 - TYPICAL WALL ELEVATION

SCALE: 1/4" = 1'-0"



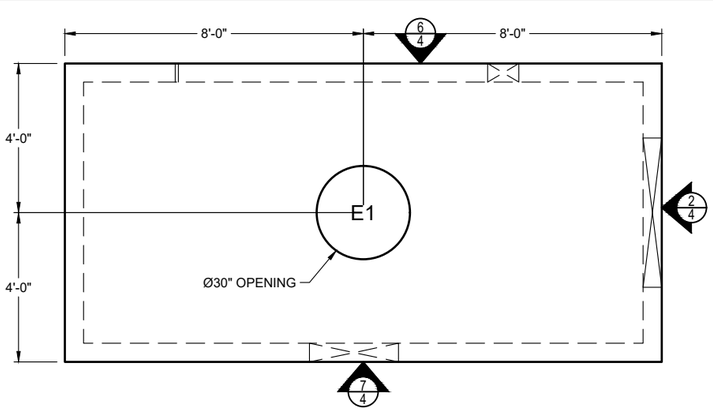
DETAIL 3 - MODULE B1

SCALE: 1/4" = 1'-0"



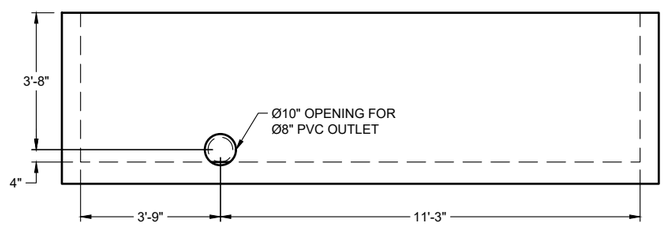
DETAIL 4 - MODULE B1

SCALE: 1/4" = 1'-0"



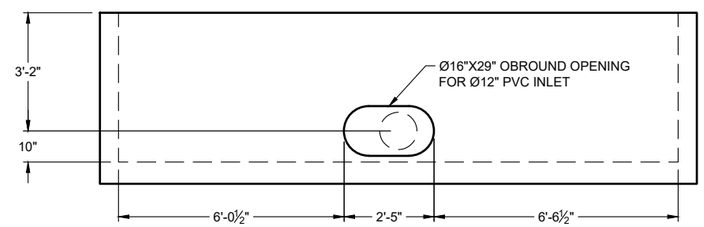
DETAIL 5 - MODULE E1

SCALE: 1/4" = 1'-0"



DETAIL 6 - MODULE E1

SCALE: 1/4" = 1'-0"



DETAIL 7 - MODULE E1

SCALE: 1/4" = 1'-0"

Detention/
Infiltration

REV	DESCRIPTION	DATE
1	UPDATED PER COMMENTS	2/10/25

Oldcastle Infrastructure™
A CRH COMPANY

Ph: 800.579.8819 | www.oldcastleinfrastructure.com/stormwater

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STORMCAPTURE ® DETENTION SYSTEM	SYSTEM ID: -	PLAN-N
CUSTOMER: BKF Engineers		
JOB NAME: BEAUMONT LIBRARY ADDITION AND RENOVATION - Beaumont, CA		JOB NUMBER: 24-1202202

DATE	MFG	DRAWN	ENGINEER	CHECKED	SALES ORDER
1/10/24	070-FO	PPS	HMF	HMF	S302167-3

DRAWING NAME: SUBMITTAL DRAWING

SHEET: 4 OF 4

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Attachment 1

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section H of the 2018 SMR 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 H.1 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.

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.	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://www.rcwatershed.org/about/materials-library/#1450469138395-bb76dd39-d810 ☑ Provide IPM information to new owners, lessees and operators.

Attachment 1
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://www.rcwatershed.org/about/materials-library/#1450469201433-f5f358c9-6008
❑ **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://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 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

Appendix 8
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://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 ❑ Car dealerships and similar may rinse cars with water only.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations; "Outdoor Cleaning Activities;" and "Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants. Brochures can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9

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

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

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

Attachment 1
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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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.	

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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☒ **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

WQMP
Operation & Maintenance (O&M) Plan

Project Name:

Beaumont Library Addition and Renovation Project

Prepared for:

Beaumont Library District
125 East 8th Street
Beaumont, CA 92223

(951) 845-1357

Prepared on:

November 2024

TABLE OF CONTENTS

8.1.1 Project Information 3

8.1.2 Responsible Party 4

8.1.3 Record Keeping 4

8.1.4 Electronic Date Submittal 4

8.1.5 Vector Control 4

8.1.6 Required Permits 4

8.1.7 Inspections 4

8.1.8 Monitoring Plan 5

8.1.9 Operation and Maintenance Requirements 5

This O&M Plan describes the designated responsible party for implementation of this WQMP, including: operation and maintenance of all the structural BMP(s), conducting the training/educational program and duties, and any other necessary activities. The O&M Plan includes detailed inspection and maintenance requirements for all structural BMPs, including copies of any maintenance contract agreements, manufacturer's maintenance requirements, permits, etc.

8.1.1 Project Information

APN: 418-081-016, 418-081002, 418-081-003, 418-081-004
Address: 125 East 8th Street, Beaumont, CA 92223
Site Size: 1.23 Acres
List Structural BMPs, number of each, etc.:

- 1 Modular Wetland System Unit

How many buildings:

- 1 building

% impervious of site: 90%

There are 2 drainage areas and 1 BMP. 1 drainage area is considered self-treating. Flows are conveyed through the parking lot and proposed storm drain system.

8.1.2 Responsible Party

The responsible party for implementation of this WQMP is:

Beaumont Library District.

8.1.3 Record Keeping

Parties responsible for the O&M plan shall retain records for at least 5 years.

All training and educational activities and BMP operation and maintenance shall be documented to verify compliance with this O&M Plan. A sample Training Log and Inspection and Maintenance Log are included in Appendix C of this document.

The WQMP Verification Form (Appendix D) shall be completed accurately and submitted, with associated documentation, to the City of Moreno Valley as requested. Failure to complete and submit the verification form will result in a noncompliance and enforcement actions may be taken.

8.1.4 Electronic Data Submittal

This document along with the Site Plan and Attachments shall be provided in PDF format. Autocad files and/or GIS coordinates of BMPs shall also be submitted to the City.

8.1.5 Vector Control

Standing water which exists for longer than 72 hours may contribute to mosquito breeding areas. Best Management Practices (BMPs) shall be inspected for standing water on a regular basis. Standing water may indicate that the BMP is not functioning properly and proper action to remedy the situation shall be taken in a timely manner.

Elimination of standing water and managing garbage, lawn clippings, and pet droppings, can help decrease the presence of mosquitoes and flies in the area.

8.1.6 Required Permits

No permits are required for the implementation, operation, and maintenance of the BMPs.

8.1.7 Inspections

Routine inspection and required maintenance of all BMPs and the site should begin immediately upon completion of construction and continue throughout the life of the project. The City may conduct a site inspection to evaluate compliance with the Project WQMP, at any time.

8.1.8 Monitoring Plan

No monitoring is required.

8.1.9 Operation and Maintenance Requirements

BMP	Inspection/Maintenance Activities	Minimum Frequency
On-site Storm Drain Inlets	The painted message shall be inspected annually & repainted as necessary.	Annually.
	Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected after each storm event and, if necessary, cleaned prior to the storm season by October 1st each year.	Annually
Indoor Pest Control	**Weekly.** Maintain landscaping using minimum or no pesticides. **Ongoing.** Provide IPM information to new owners, leesees and operators.	Weekly, Ongoing
Landscape Pest Control & Fertilizers	**Weekly.** Maintain landscaping using minimum or no pesticides. **Ongoing.** Provide IPM information to new owners, leesees and operators.	Weekly, Ongoing
Plazas, sidewalks, and parking lots	Sweep plazas, sidewalks, and parking lots **regularly** to prevent accumulation of litter and debris.	Regularly

For treatment control maintenance of the modular wetland system, adhere to the Maintenance Guidelines for Modular Wetland System – Linear.

BMP OPERATION & MAINTENANCE LOG
BEAUMONT LIBRARY

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

TRAINING / EDUCATIONAL LOG

Date of Training/Educational Activity: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

Topic of Training/Educational Activity: _____

_____

Name of Participant	Signature of Participant

AND MAIL TO:
CITY CLERK

Recorded by Request of:

SPACE ABOVE FOR RECORDER'S USE ONLY

STORMWATER FACILITIES MAINTENANCE AGREEMENT

Assessor's Parcel No.: **Location:**

This AGREEMENT for the maintenance and repair of certain Stormwater Management Facilities is entered into between _____ (hereinafter referred to as "OWNER") and the City of Beaumont (hereinafter referred to as "CITY") for the benefit of the CITY, the OWNER, the successors in interest to the CITY or the OWNER, and the public generally.

RECITALS

A. OWNER is the owner of certain real property located in the City of Beaumont, California, more particularly described in Exhibit "A" hereto (hereinafter referred to as the "PROPERTY").

B. In accordance with the City of Beaumont's Urban Runoff Regulations, Beaumont Municipal Code, Chapter 13.24, STORMWATER/URBAN RUNOFF MANAGEMENT AND DISCHARGE CONTROLS TITLE 13 (the "Stormwater Ordinance"), the City of Beaumont Subdivision Ordinance, the City of Beaumont Zoning Ordinance, The City of Beaumont Grading Ordinance and/or other ordinances or regulations of CITY which regulate land development and urban runoff, OWNER has prepared and submitted to CITY, a Water Quality Management Plan (hereinafter the WQMP), which is on file with CITY's Engineering Department. The WQMP proposes that stormwater runoff from the PROPERTY be managed by the use of the Stormwater Management Facilities which are identified in the WQMP as "Best Management Practices" or "BMPs". The WQMP specifies the manner and standards by which the BMPs must be repaired and maintained in order to retain their effectiveness, as set forth in the Operation Maintenance Plan (hereinafter "O&M PLAN"), as set forth in section 8.1.9 of the O & M Report dated November 2024, prepared by BKF Engineers.

C. The information contained in the WQMP and CITY has relied upon OWNER's representations that the BMPs will be maintained pursuant to the WQMP, in approving OWNER's development applications. It is the purpose of this Agreement to assure that the BMPs are maintained, by creating obligations, which are enforceable against the OWNER and the OWNER's successors in interest in the PROPERTY. It is intended that these obligations be enforceable notwithstanding other provisions related to BMP maintenance, which are provided by law.

AGREEMENT

NOW, THEREFORE, for consideration of (a) CITY's approval of the above development applications and (b) the mutual covenants set forth herein, IT IS HEREBY AGREED AS FOLLOWS:

1. **Maintenance of Stormwater Management Facilities.** OWNER agrees, for itself and its successors in interest, to all or any portion of the PROPERTY, to comply in all respects with the requirements of the Stormwater Ordinance and the WQMP with regards to the maintenance of BMPs designated in the WQMP, and in particular agrees to perform, at its sole cost, expense and liability, the following "MAINTENANCE ACTIVITIES": all inspections, cleaning, repairs, servicing, maintenance and other actions specified in the O&M PLAN, with respect to all of the BMPs listed at Recital "B" above, at the times and in the manner specified in the O&M PLAN. OWNER shall initiate, perform and complete all MAINTENANCE ACTIVITIES at the required time, without request or demand from CITY or any other agency. OWNER shall provide annual written verification of BMP maintenance and operability to the CITY. OWNER further agrees that "MAINTENANCE ACTIVITIES" shall include replacement or modification of the BMPs in the event of failure. Replacement shall be with an identical type, size and model of BMP, except that:

(a) The CITY Engineer may authorize substitution of an alternative BMP if he or she determines that it will function as well as the failed BMP; and

(b) Pursuant to Section 13.24 of the Stormwater Ordinance, if the failure of the BMP, in the judgment of the CITY Engineer indicates that the BMP in use is inappropriate or inadequate to the circumstances, the BMP must be modified or replaced with an upgraded BMP to prevent future failure in the same or similar circumstances.

2. **Notices.** OWNER further agrees that it shall, prior to transferring ownership of any land on which any of the above BMPs are located, and also prior to transferring ownership of any such BMP, provide clear written notice of the above maintenance obligations associated with that BMP to the transferee. OWNER further agrees to provide evidence to CITY Engineer that OWNER has requested the California Department of Real Estate to include in the public report issued for the development of the PROPERTY, a notification regarding the BMP maintenance requirements described herein.

DRAFT

3. **CITY's Right to Perform Maintenance.** It is agreed that CITY shall have the right, but not the obligation, to elect to perform any or all of the MAINTENANCE ACTIVITIES if, in the CITY's sole judgment, OWNER has failed to perform the same. It is recognized and understood that the CITY makes no representation that it intends to or will perform any of the MAINTENANCE ACTIVITIES, and any election by CITY to perform any of the MAINTENANCE ACTIVITIES, shall in no way relieve OWNER of its continuing maintenance obligations under this agreement. If CITY elects to perform any of the MAINTENANCE ACTIVITIES, it is understood that CITY shall be deemed to be acting as the agent of the OWNER and said work shall be without warranty or representation by CITY as to safety or effectiveness, shall be deemed to be accepted by OWNER "as is", and shall be covered by OWNER's indemnity provisions below.

If CITY performs any of the MAINTENANCE ACTIVITIES, after CITY has demanded that OWNER perform the same and OWNER has failed to do so within a reasonable time stated in the CITY's demand, then OWNER shall pay all of CITY's costs incurred in performing the MAINTENANCE ACTIVITIES. OWNER's obligation to pay CITY's costs of performing MAINTENANCE ACTIVITIES is a continuing obligation and shall apply whether or not CITY has utilized all or any portion of the security provided pursuant to Paragraph 5.

4. **Grant of Easement to CITY.** OWNER hereby grants to CITY a perpetual easement over, under and across all of the PROPERTY for purposes of accessing the BMPs and performing any of the MAINTENANCE ACTIVITIES specified in Paragraph 1 above. CITY shall have the right, at any time and without prior notice to OWNER, to enter upon any part of said area as may be necessary or convenient for such purposes. OWNER shall at all times maintain the PROPERTY so as to make CITY's access clear and unobstructed.

5. **Security.** OWNER shall provide security to assure faithful performance of the obligations of this agreement. The security shall be in the form of an easement as referenced in Section 4, above. CITY shall have the right to enforce its rights under the agreement through specific performance and any other remedies available to it in law. In the event that OWNER violates this agreement, CITY retains the sole right to require the posting of a performance bond or letter of credit to ensure compliance with the provisions of this agreement. The form of bond and/or letter of credit shall be subject to the approval of the City Attorney.

6. **Administration of Agreement for CITY.** CITY hereby designates its Engineer as the officer charged with responsibility and authority to administer this Agreement on behalf of CITY. Any notice or communication related to the implementation of this Agreement desired or required to be delivered to CITY shall be addressed to:

City Engineer
City of Beaumont
550 E. 6th Street
Beaumont, CA 92223

DRAFT

The City Engineer is also granted authority to enter into appropriate amendments to this Agreement on behalf of CITY, provided that the amendment is consistent with the purposes of this Agreement as set forth above.

7. **Defense and Indemnity.** CITY shall not be liable for, and OWNER and its successors in interest shall defend and indemnify CITY and the employees and agents of CITY (collectively "CITY PARTIES"), against any and all claims, demands, liability, judgments, awards, fines, mechanic's liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as "CLAIMS"), related to this Agreement and arising either directly or indirectly from any act, error, omission or negligence of OWNER, OWNER's successors, or their contractors, licensees, agents, servants or employees, including, without limitation, claims caused by the concurrent negligent act, error or omission, whether active or passive of CITY PARTIES. OWNER shall have no obligation, however, to defend or indemnify CITY PARTIES from a claim if it is determined by a court of competent jurisdiction that such claim was caused by the sole negligence or willful misconduct of CITY PARTIES. Nothing is this Agreement, CITY's approval of the subdivision or other applications or plans and specifications, or inspection of the work, is intended to acknowledge responsibility for any such matter, and CITY PARTIES shall have absolutely no responsibility or liability therefore unless otherwise provided by applicable law.

8. **Common Interest Developments.** If the PROPERTY is developed as a "Common Interest Development" as defined in Civil Code section 4100 which will include membership in or ownership of an "ASSOCIATION" as defined in Civil Code section 4080 then the following provisions of this Paragraph 8 shall apply during such time as the PROPERTY is encumbered by a "DECLARATION" as defined in Civil Code section 4135, and the Common Area, as "Common Area" is defined in Civil Code section 4095, of the PROPERTY is managed and controlled by the ASSOCIATION:

(a) The ASSOCIATION, through its Board of Directors, shall assume full responsibility to perform the MAINTENANCE ACTIVITIES pursuant to this Agreement, and shall undertake all actions and efforts necessary to accomplish the MAINTENANCE ACTIVITIES, including but not limited to, levying regular or special assessments against each member of the ASSOCIATION sufficient to provide funding for the MAINTENANCE ACTIVITIES, conducting a vote of the membership related to such assessments if required by law. In the event insufficient votes have been obtained to authorize an assessment, the ASSOCIATION shall seek authority from a court of competent jurisdiction for a reduced percentage of affirmative votes necessary to authorize the assessment, re-conducting the vote of the membership in order to obtain the votes necessary to authorize an assessment, and the ASSOCIATION shall take all action authorized by the DECLARATION or California law to collect delinquent assessments, including but not limited to, the recording and foreclosure of assessment liens.

(b) No provision of the DECLARATION, nor any other governing document of the ASSOCIATION or grant of authority to its members, shall grant or recognize a right of any member or other person to alter, improve, maintain or repair any of the PROPERTY in any

manner which would impair the functioning of the BMPs to manage drainage or stormwater runoff as described in the WQMP. In the event of any conflict between the terms of this Agreement and the DECLARATION or other ASSOCIATION governing documents, the provisions of this Agreement shall prevail.

9. **Agreement Binds Successors and Runs with the PROPERTY.** It is understood and agreed that the terms, covenants and conditions herein contained shall constitute covenants running with the land and shall be binding upon the heirs, executors, administrators, successors and assigns of OWNER and CITY, shall be deemed to be for the benefit of all persons owning any interest in the PROPERTY (including the interest of CITY or its successors in the easement granted herein). It is the intent of the parties hereto that this Agreement may be recorded and shall be binding upon all persons purchasing or otherwise acquiring all or any lot, unit or other portion of the PROPERTY, who shall be deemed to have consented to and become bound by all the provisions hereof.

10. **Amendment and Release.** The terms of this Agreement may be modified only by a written amendment approved and signed by the City Council or the CITY Engineer acting on behalf of CITY and by OWNER or OWNER's successor(s) in interest. This Agreement may be terminated and OWNER and the PROPERTY released from the covenants set forth herein, by a Release, which CITY may execute if it determines that another mechanism will assure the ongoing maintenance of the BMPs or that it is no longer necessary to assure such maintenance.

11. **Governing Law and Severability.** This Agreement shall be governed by the laws of the State of California. Venue in any action related to this Agreement shall be in the Superior Court of the State of California, County of Riverside. In the event that any of the provisions of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, the validity, and enforceability of the remaining provisions shall not be affected thereby.

DRAFT

IN WITNESS WHEREOF, the parties have executed this Agreement on the _____ day of _____, 20____.

BY: _____

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.

ALL SIGNATURES MUST BE NOTARIZED

STATE OF _____ }

COUNTY OF_____ }

On _____ before me, _____
name and title of officer

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 the 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)

CITY OF BEAUMONT:

_____
City Manager

CITY CLERK CERTIFICATION:

This is to certify that the interest in real property conveyed by deed or grant to the City of Beaumont, a political corporation and/or governmental agency is hereby accepted by the undersigned officer or agent on behalf of the City Council pursuant to authority conferred by Resolution No. ___ adopted on _____and the grantee consents to recordation thereof by its duly authorized officer.

Dated: _____By: _____
City Clerk

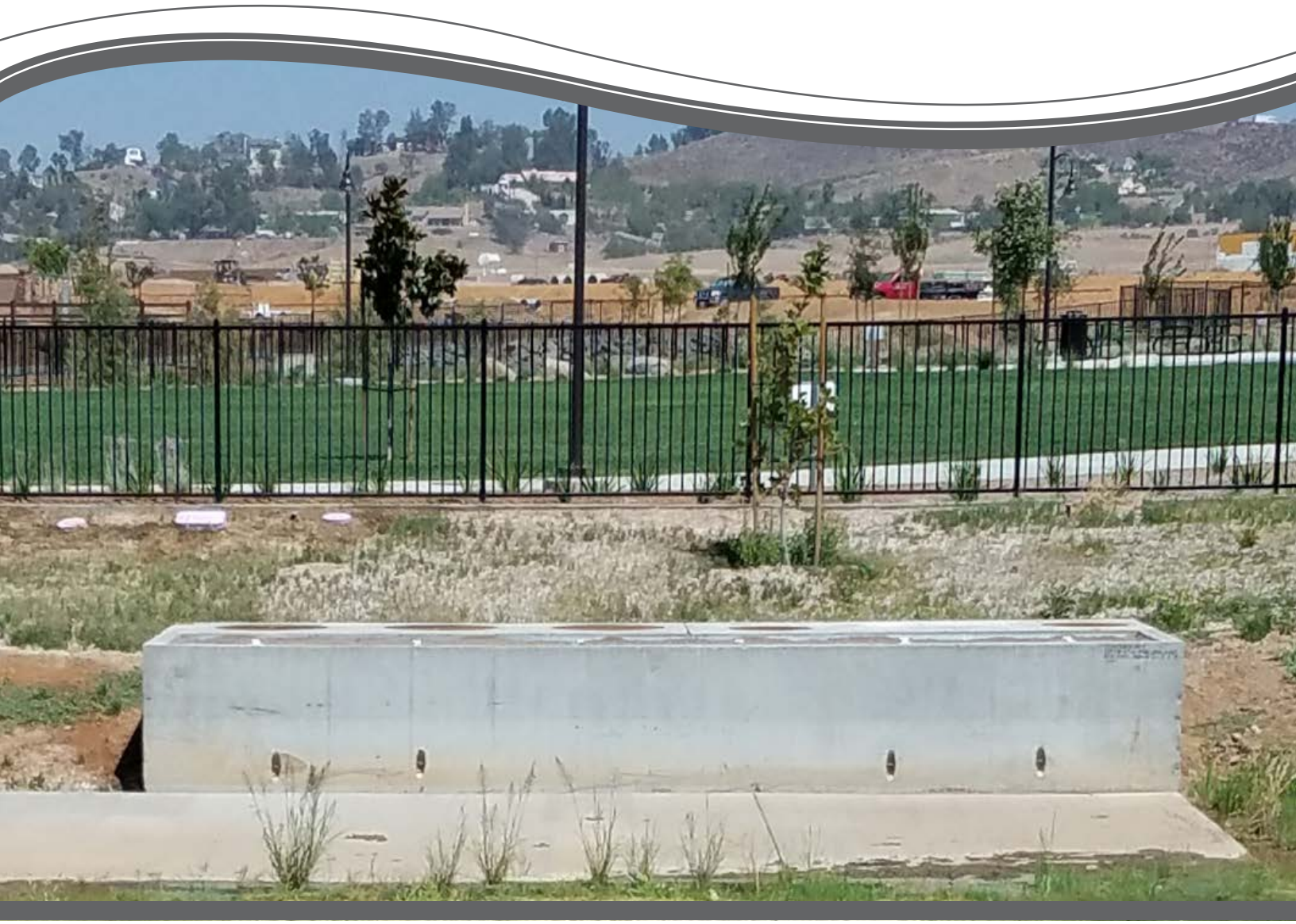
DRAFT

Appendix 10: Educational Materials

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

CONTECH®
ENGINEERED SOLUTIONS

Modular Wetlands® Linear Operatons & Maintenance Manual



MODULAR WETLANDS®

MODULAR WETLANDS LINEAR
OPERATION & MAINTENANCE MANUAL

TABLE OF CONTENTS

Overview 3
Safety Notice & Personal Safety Equipment 4
Modular Wetlands Linear Components List 5
Inspection Summary & Equipment List 6
Inspection & Maintenance Notes 7
Inspection Process 7
Maintenance Indicators 9
Maintenance Summary & Equipment List 9
Maintenance Instructions 11
Replacing Biofiltration Media if Required 14
Replacing Drain Down Filter Media (Only on Older California Models) 16
Notes 17
Inspection Report 18
Cleaning & Maintenance Report 19

OVERVIEW

This operation and maintenance (O&M) manual is for the Modular Wetlands Linear Biofilter (MWL). Please read the instructions and equipment lists closely prior to starting. It is important to follow all necessary safety procedures associated with state and local regulations. Please contact Contech for more information on pre-authorized third-party service providers who can provide inspection and maintenance services in your area. For a list of service providers in your area, please visit www.conteches.com/maintenance.

WARNING

Confined space entry may be required. Contractor to obtain all equipment and training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to always proceed safely.

SAFETY NOTICE & PERSONAL SAFETY EQUIPMENT

Job site safety is a topic and a practice addressed comprehensively by others. The inclusions here are merely reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s), and Service Provider(s). OSHA and Canadian OSH, Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Service Provider's responsibility and outside the scope of Contech Engineered Solutions.

Safety Boots

Gloves

Hard Hat

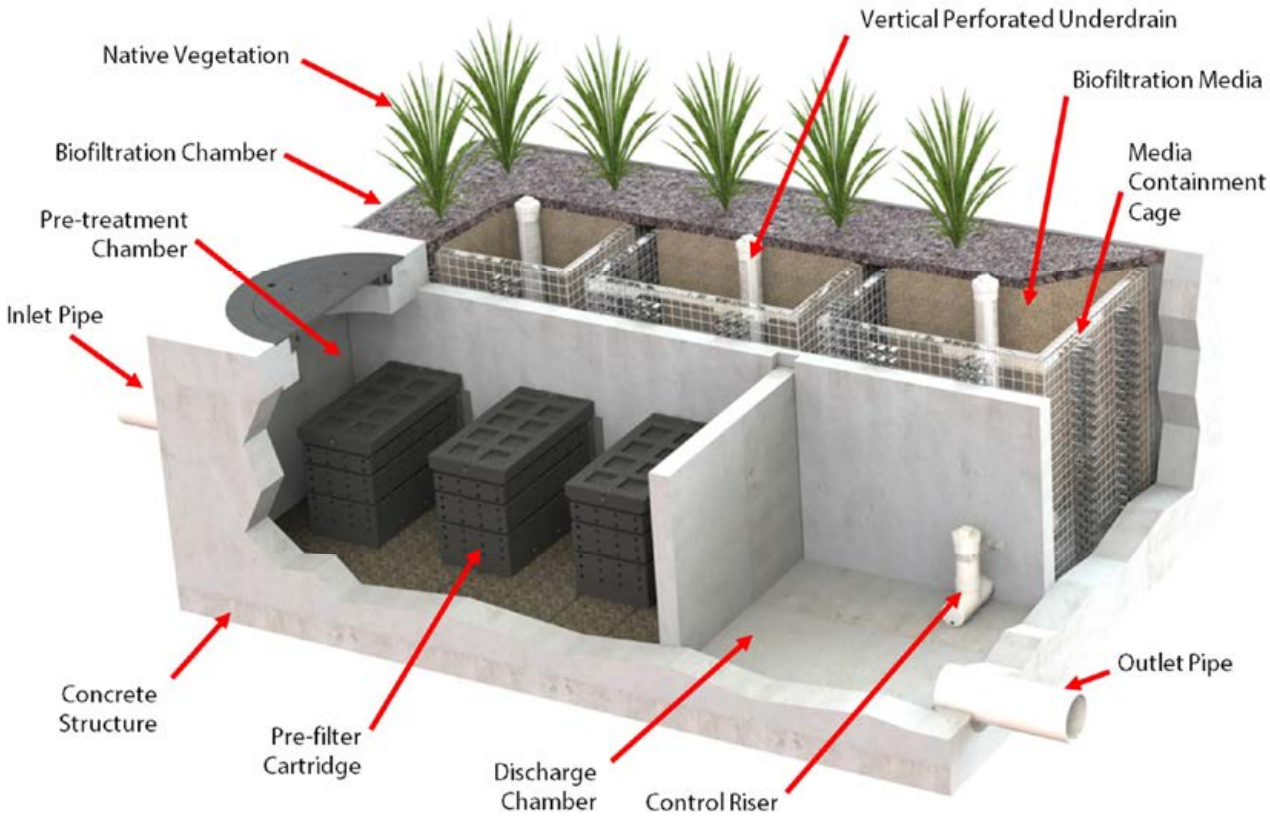
Eye Protection

Maintenance and Protection of Traffic Plan

MODULAR WETLANDS LINEAR COMPONENTS LIST

The MWL system comes in multiple sizes and configurations, including side by side or end to end layouts, both as open planters or underground systems. See shop drawings (plans) for project specific details.

The standard MWL system is comprised of the following components:



INSPECTION SUMMARY & EQUIPMENT LIST

Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site-specific loading conditions. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided.

- Inspect pre-treatment, biofiltration, and discharge chambers an average of once every six to twelve months. Varies based on site specific and local conditions.
- Average inspection time is approximately 15 minutes. Always ensure appropriate safety protocol and procedures are followed.

The following is a list of equipment required to allow for simple and effective inspection of the MWL:

Modular Wetlands Linear Inspection Form

Flashlight

Tape Measure

Access Cover Hook

Ratchet
& 7/16" Socket
(if required for older pre-filter cartridges that have two bolts holding the lids on)

INSPECTION & MAINTENANCE NOTES

1. Following maintenance and/or inspection, it is recommended that the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics, and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the biofiltration chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

INSPECTION PROCESS

1. Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other information (see inspection form).
2. Observe the inside of the system through the access covers. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the system and all chambers.
3. Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
4. Through observation and/or digital photographs, estimate the amount of trash, debris accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick, estimate the amount of sediment in this chamber. Record this depth on the inspection form.
5. Through visual observation, inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediment on the cartridges, any build-up on the tops of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can be further inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber - see notes previous notes regarding confined space entry). Record the color of the material. New material is a light green color. As the media becomes clogged, it will turn darker in color, eventually becoming dark brown or black. The closer to black the media is the higher percentage that the media is exhausted and in need of replacement.

6. The biofiltration chamber is generally maintenance-free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation, it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection form and indicate through visual observation or digital photographs if trimming of the vegetation is required.

7. The discharge chamber houses the control riser (if applicable), drain down filter (only in California - older models), and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating condition and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the pre-filter cartridge as mentioned above.

8. Finalize the inspection report for analysis by the maintenance manager to determine if maintenance is required.

MAINTENANCE INDICATORS

Based upon the observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- Obstructions in the system or its inlet and/or outlet pipes.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18".
- Excessive accumulation of sediment in the pre-treatment chamber of more than 6" in depth.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. When media is more than 85% clogged, replacement is required. The darker the BioMediaGREEN, the more clogged it is and in need of replacement.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter (California only - older models).
- Overgrown vegetation.

MAINTENANCE SUMMARY & EQUIPMENT LIST

The time has come to maintain your MWL. All necessary pre-maintenance steps must be carried out before maintenance occurs. Once traffic control has been set up per local and state regulations and access covers have been safely opened, the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition, the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and maintenance equipment.
- Ensure traffic control is set up and properly positioned.
- Prepared pre-checks (OSHA, safety, confined space entry) are performed.
    - A gas meter should be used to detect the presence of any hazardous gases prior to entering the system. If hazardous gases are present, do not enter the vault. Following appropriate confined space procedures, take steps such as utilizing a venting system to address the hazard. Once it is determined to be safe, enter the system utilizing appropriate entry equipment such as a ladder and tripod with harness.

The following is a list of equipment required for maintenance of the MWL:

Modular Wetlands Linear Maintenance Form

Flashlight

Access Cover Hook

Ratchet
& 7/16" Socket
(if required for older pre-filter cartridges that have two bolts holding the lids on)

Vacuum Assisted Truck with Pressure Washer

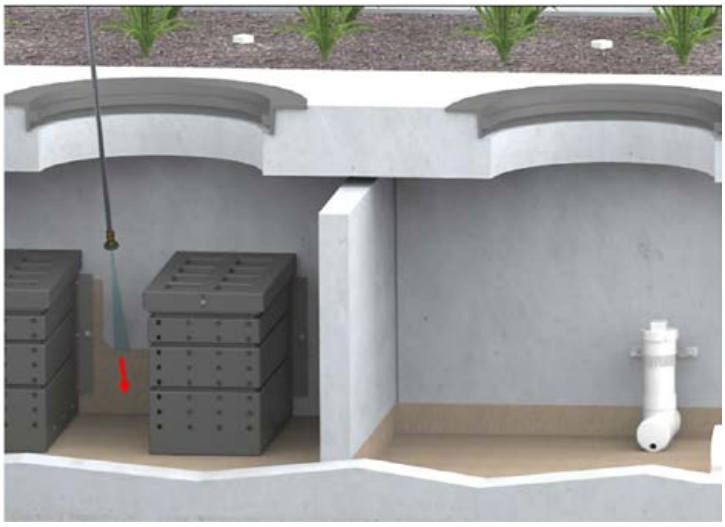
Replacement
BioMediaGREEN
(If Required)

(order BioMediaGREEN from Contech's Maintenance Team members at https://www.conteches.com/maintenance)

MAINTENANCE INSTRUCTIONS

1. ACCESS COVER REMOVAL

Upon determining that the vault is safe for entry, remove all access cover(s) and position the vacuum truck accordingly.



2. PRESSURE WASH SYSTEM CHAMBERS

With the pressure washer, spray down pollutants accumulated on the walls and floors of the pre-treatment and discharge chambers. Then wash any accumulated sediment from the pre-filter cartridge(s).

3. VACUUM SYSTEM CHAMBERS

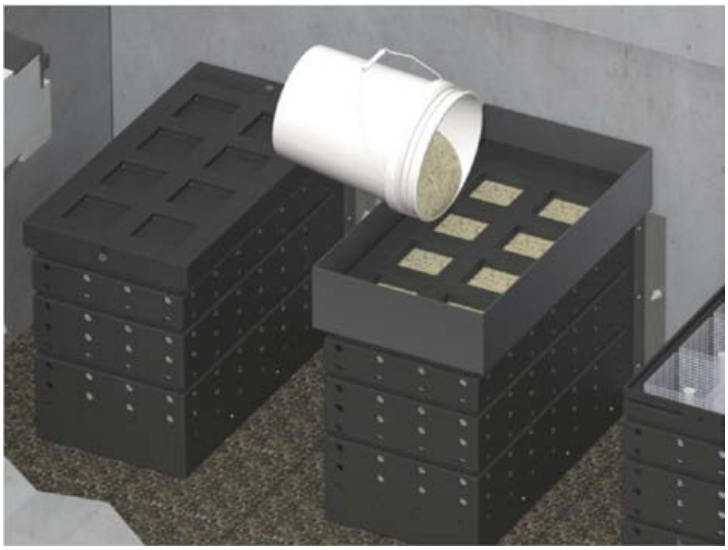
Vacuum out pre-treatment and discharge chambers and remove all accumulated pollutants including trash, debris, and sediments. Be sure to vacuum the pre-treatment floor until the pervious pavers are visible and clean. **(MWL systems outside of California may or may not have pervious pavers on the floor in the pre-treatment chamber)** If pre-filter cartridges require media replacement, proceed to **Step 4**. If not, replace the access cover(s) and proceed to **Step 7**.

4. PRE-FILTER CARTRIDGE LID REMOVAL

After successfully cleaning out the pre-treatment chamber, enter the chamber and remove the lid(s) from the pre-filter cartridge(s) by removing the two thumb screws. (Older pre-filter cartridges have two bolts holding the lids on that require a 7/16" socket to remove)

5. VACUUM EXISTING PRE-FILTER MEDIA

Utilize the vacuum truck hose or hose extension to remove the filter media from each of the individual media cages. Once filter media has been sucked out, use a pressure washer to spray down the inside of the cartridge and its media cages. Remove cleaned media cages and place to the side. Once removed, the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.



6. PRE-FILTER MEDIA REPLACEMENT

Reinstall media cages and fill with new media from the manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. The easiest way to fill the media cages is to utilize a refilling tray that can also be sourced from the manufacturer. Place the refilling tray on top of the cartridge and fill with new bulk media shaking it down into the cages. Using your hands, lightly compact the media into each filter cage. Once the cages are full (each cartridge will hold five heaping 5gal buckets of bulk media), remove the refilling tray and replace the cartridge top, ensuring fasteners are properly tightened.

7. MAINTAINING VEGETATION

In general, the biofiltration chamber is maintenance-free with the exception of maintaining the vegetation. The MWL utilizes vegetation similar to surrounding landscape areas, therefore, trim vegetation to match surrounding vegetation. If any plants have died, replace them with new ones.

8. INSPECT UNDERDRAIN SYSTEM

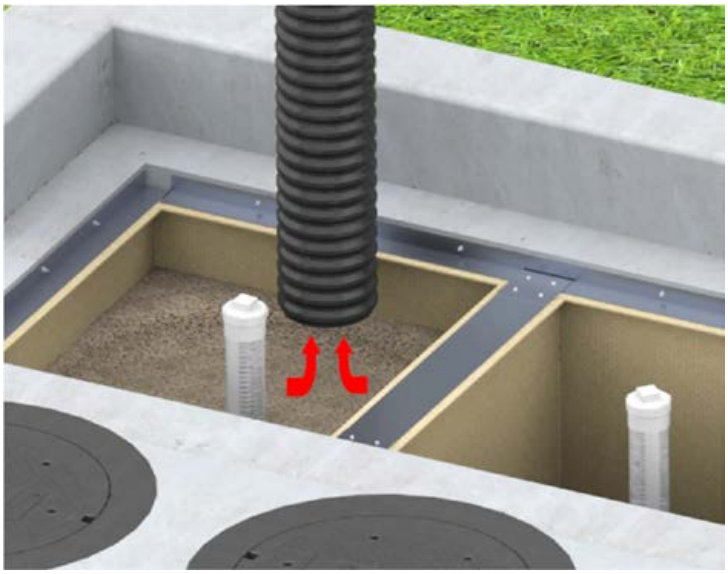
Each vertical under drain on the biofiltration chamber has a removable threaded cap that can be taken off to check for any blockages or root growth. Once removed, a jetting attachment to the pressure washer can be used to clean out the under drain and orifice riser if needed.

9. REPLACE ACCESS COVERS

Once maintenance is complete, replace all access cover(s)

REPLACING BIOFILTRATION MEDIA IF REQUIRED

As with all biofilter systems, at some point the biofiltration media will need to be replaced, either due to physical clogging or sorptive exhaustion (for dissolved pollutants) of the media ion exchange capacity (to remove dissolved metals and phosphorous). The general life of this media is 10 to 20 years based on site specific conditions and pollutant loading, so replacing the biofiltration media should not be a common occurrence. In the event that the biofiltration media requires replacement, contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new biofiltration media. The quantity of media needed can be determined by providing the model number and unit depth. Media will be provided in super sacks for easy installation. Each sack will weigh between 1,000 and 2,000 lbs. Biofiltration media replacement can be done following the steps below:



1. VACUUM EXISTING BIOFILTRATION MEDIA

Remove the mulch and vegetation to access the biofiltration media, and then position the vacuum truck accordingly. Utilize the vacuum truck to vacuum out all the media. Once all media is removed, use the pressure washer to spray down all the netting and underdrain systems on the inside of the media containment cage. Vacuum out any remaining debris after spraying down netting. Inspect the netting for any damage or holes. If the netting is damaged, it can be repaired or replaced with guidance by the manufacturer.

2. INSTALLING NEW BIOFILTRATION MEDIA

Ensure that the chamber is fully cleaned prior to installation of new media into the media containment cage(s). Media will be provided in super sacks for easy installation. A lifting apparatus (forklift, backhoe, boom truck, or other) is recommended to position the super sack over the biofiltration chamber. Add media in lifts to ensure that the riser pipes remain vertical. Be sure to only fill the media cage(s) up to the same level as the old media.

3. REPLANT VEGETATION

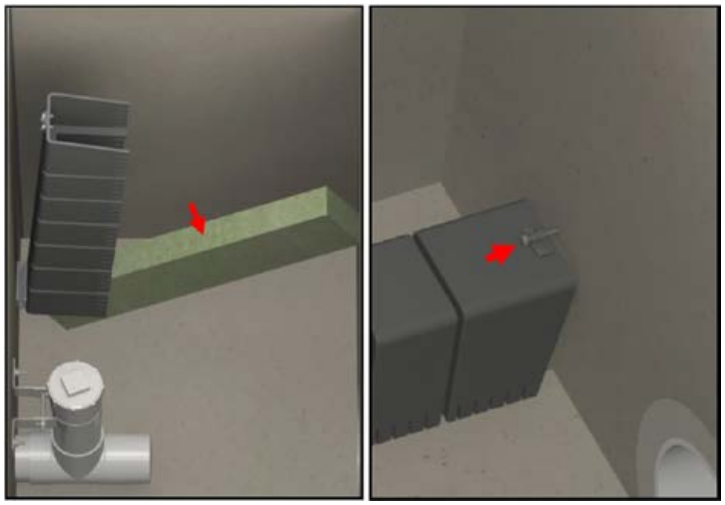
Once the media has been replaced, replant the vegetation and cover biofiltration chamber with approved mulch (if applicable). If the existing vegetation is not being reused, and new vegetation is being planted, you will need to acquire new plant establishment media that will be installed just below the mulch layer at each plant location. (see plan drawings for details). Contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new plant establishment media.

REPLACING DRAIN DOWN FILTER MEDIA (ONLY ON OLDER CALIFORNIA MODELS)

NOTE: The drain down filter is only found on units installed in California prior to 2023
If during inspection it was determined that the drain down filter media requires replacement, contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new media.

1. REMOVE EXISTING DRAIN DOWN MEDIA

Pull knob back to unlock the locking mechanism and lift the drain down filter housing to remove the used BioMediaGREEN filter block.



2. INSTALL NEW DRAIN DOWN MEDIA

Ensure that the chamber and housing are fully cleaned prior to installation of new media, and then insert the new BioMediaGREEN filter block. The media filter block should fit snugly between the chamber walls and be centered under the filter housing. Lower the housing over the filter block and secure the locking mechanism.

NOTES

CONTECH® ENGINEERED SOLUTIONS

Inspection Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

CONTECH®
ENGINEERED SOLUTIONS

Cleaning and Maintenance Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

CONTECH®
ENGINEERED SOLUTIONS

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800-338-1122

WWW.CONTECHES.COM

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SUPPORT

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT WWW.CONTECHES.COM

ModWetLinear OM Manual 03/24

After the Storm

A Citizen's Guide to Understanding Stormwater

EPA 833-B-03-002

January 2003

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What is stormwater runoff?

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

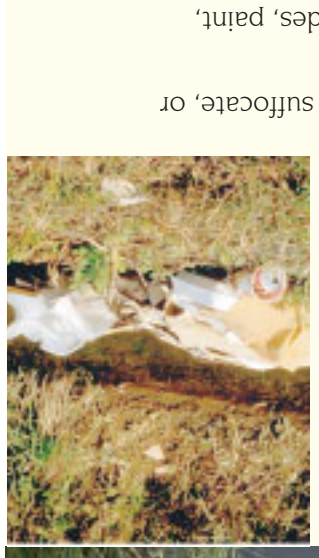
Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking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

Why is stormwater runoff a problem?

The effects of pollution

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

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



Stormwater Pollution Solutions

Residential

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

Lawn care

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

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

Septic systems

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

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

Auto care

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

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

Pet waste

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

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

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

Residential landscaping

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

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

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

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

Commercial

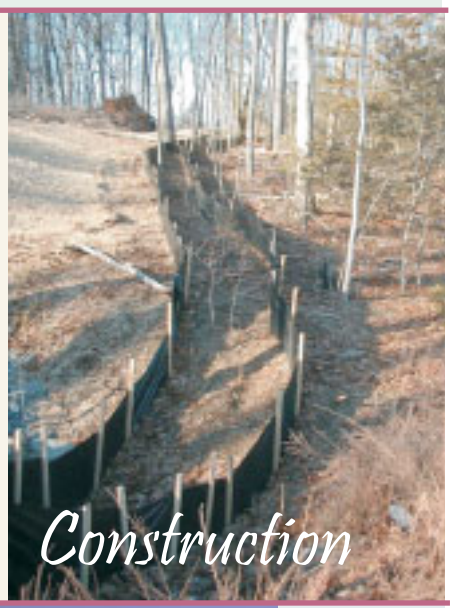
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

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

Construction

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

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



Agriculture

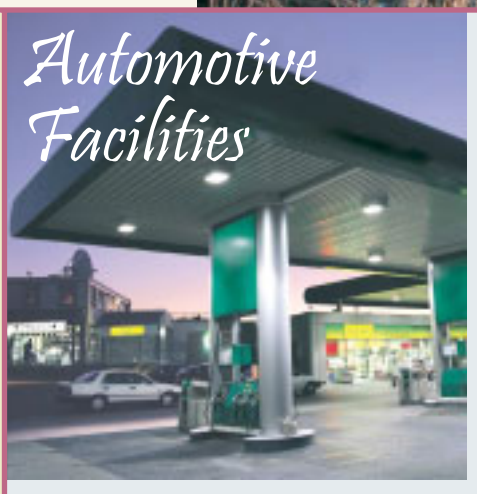
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria,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

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

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

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



Automotive Facilities

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

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

Trash Storage Areas SD-32

Description

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

Design Objectives

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

Approach

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

Suitable Applications

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

Design Considerations

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

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

Designing New Installations

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

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

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

Redeveloping Existing Installations

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

Additional Information

Maintenance Considerations

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

Other Resources

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

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

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

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

Fueling Areas SD-30

Photo Credit: Geoff Brosseau

Design Objectives

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

Description

Fueling areas have the potential to contribute oil and grease, solvents, car battery acid, coolant and gasoline to the stormwater conveyance system. Spills at vehicle and equipment fueling areas can be a significant source of pollution because fuels contain toxic materials and heavy metals that are not easily removed by stormwater treatment devices.

Approach

Project plans must be developed for cleaning near fuel dispensers, emergency spill cleanup, containment, and leak prevention.

Suitable Applications

Appropriate applications include commercial, industrial, and any other areas planned to have fuel dispensing equipment, including retail gasoline outlets, automotive repair shops, and major non-retail dispensing areas.

Design Considerations

Design requirements for fueling areas are governed by Building and Fire Codes and by current local agency ordinances and zoning requirements. Design requirements described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements.

Designing New Installations

Covering

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Fuel dispensing areas should provide an overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area should drain to the project's treatment control BMP(s) prior to discharging to the stormwater conveyance system. Note - If fueling large equipment or vehicles that would prohibit the use of covers or roofs, the fueling island should be designed to sufficiently accommodate the larger vehicles and equipment and to prevent stormwater run-on and runoff. Grade to direct stormwater to a dead-end sump.

Surfacing

Fuel dispensing areas should be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete should be prohibited. Use asphalt sealant to protect asphalt paved areas surrounding the fueling area. This provision may be made to sites that have pre-existing asphalt surfaces.

The concrete fuel dispensing area should be extended a minimum of 6.5 ft from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 ft, whichever is less.

Grading/Contouring

Dispensing areas should have an appropriate slope to prevent ponding, and be separated from the rest of the site by a grade break that prevents run-on of urban runoff. (Slope is required to be 2 to 4% in some jurisdictions' stormwater management and mitigation plans.)

Fueling areas should be graded to drain toward a dead-end sump. Runoff from downspouts/roofs should be directed away from fueling areas. Do not locate storm drains in the immediate vicinity of the fueling area.

Redeveloping Existing Installations

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

Additional Information

- In the case of an emergency, provide storm drain seals, such as isolation valves, drain plugs, or drain covers, to prevent spills or contaminated stormwater from entering the stormwater conveyance system.

Other Resources

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

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

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

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

Storm Drain Signage SD-13

Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

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

Designing New Installations

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

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

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

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

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

Redeveloping Existing Installations

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

Additional Information

Maintenance Considerations

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

Placement

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

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

Supplemental Information

Examples

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

Other Resources

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

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

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

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

Efficient Irrigation SD-12

Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

Designing New Installations

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

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

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

Redeveloping Existing Installations

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

Other Resources

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

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

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

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

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.

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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.

Drainage System Maintenance SC-44

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

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

Targeted Constituents

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

Approach

Pollution Prevention

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

Suggested Protocols

Catch Basins/Inlet Structures

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

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

Storm Drain Conveyance System

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

Pump Stations

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

Open Channel

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

Illicit Connections and Discharges

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

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

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

Illegal Dumping

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

Training

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

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).

- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

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

Other Considerations (Limitations and Regulations)

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

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

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

Maintenance

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

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

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

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

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

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

References and Resources

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

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

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

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

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

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

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

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
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Parking/Storage Area Maintenance SC-43

Objectives

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

Targeted Constituents

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

Description

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

Approach

Pollution Prevention

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

Suggested Protocols

General

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

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

Controlling Litter

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

Surface cleaning

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

Surface Repair

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

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

Inspection

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

Training

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

Spill Response and Prevention

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

Other Considerations

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

Requirements

Costs

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

Maintenance

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

SC-43 Parking/Storage Area Maintenance

Supplemental Information

Further Detail of the BMP

Surface Repair

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

References and Resources

http://www.stormwatercenter.net/

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

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

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

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

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

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

Building & Grounds Maintenance SC-41

Objectives

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

Targeted Constituents

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

Description

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

Approach

Pollution Prevention

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

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Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

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

Landscaping Activities

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

Building Repair, Remodeling, and Construction

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

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

Mowing, Trimming, and Planting

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

Fertilizer and Pesticide Management

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

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

Inspection

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

Training

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

Spill Response and Prevention

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

Other Considerations

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

Requirements

Costs

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

Maintenance

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

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

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

References and Resources

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

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

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

Spill Prevention, Control & Cleanup SC-11

Photo Credit: Geoff Brosseau

Objectives

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

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Targeted Constituents

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

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

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- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain*.

  - Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills 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. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. 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.

Reporting

- Report spills that pose an immediate threat to human health or the environment 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).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - 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

Training

- Educate employees about spill prevention and cleanup.

- 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 should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- A Spill Prevention Control and Countermeasure Plan (SPCC) is required for facilities that are subject to the oil pollution regulations specified in Part 112 of Title 40 of the Code of Federal Regulations or if they have a storage capacity of 10,000 gallons or more of petroleum. (Health and Safety Code 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, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- 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 contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- 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 facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate 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 sewer. 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.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.