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: 417-020-070

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 August 26th, of 2025, by and between Orchard Logistics Venture, LLC, a Delaware limited liability company, ("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 745 Nicholas Rd (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 **Exhibit C** (for example bio- swales, catch basins, roof drains and appurtenances) be constructed and maintained to minimize pollutants in urban runoff from the Property.

The Owner further covenants and agrees as follows:

1. The on-site storm water management/BMP facilities required by **Exhibit C** shall be constructed by the Owner at its sole cost and expense.

2. The Owner shall adequately maintain the storm water management/BMP facilities required by **Exhibit C** in good working condition at all times, including source control BMPs, at all times as its sole responsibility, at the Owner's sole cost and expense. This includes those items required by **Exhibit C**, including, as applicable, pipes and channels built to convey stormwater on the Property, 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 per the requirements of **Exhibit C**.

3. The Owner shall annually inspect the stormwater management/BMP facilities required by **Exhibit C** 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 **Exhibit C** including as applicable, 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 stormwater management/BMP facilities, take samples and perform testing whenever the City deems reasonably 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 5 business days 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. If the City determines that Owner is not compliant with **Exhibit C**, then Owner or Owner's successors or assigns shall pay City for all reasonable 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 as required by this Agreement, upon five (5) business days advanced written notice, the City may enter upon the Property and take such steps as are necessary to correct deficiencies identified in the written notice and to charge the reasonable costs of such repairs to the Owner. Upon Owner's failure to pay such costs within thirty (30) days following written notice of said costs by the City, said costs shall constitute a lien against the Property and the City may record a form of lien applicable to code violation against title to the property. In the event of an emergency, as determined by City, advanced notice 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 the facilities required by **Exhibit C** in good working order as appropriate. The maintenance schedule for the storm water management BMP facilities (including sediment removal) is outlined in **Exhibit C** 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 due to Owner's failure to perform under this Agreement, then the Owner, its successors and assigns shall reimburse the City upon demand, within thirty (30) days of receipt thereof for all reasonable costs incurred by the City hereunder.

8. This Agreement imposes no liability of any kind whatsoever on the City. Owner agrees to indemnify, defend (with counsel reasonably approved by the City) and hold harmless the City and its authorized officers, employees, agents and volunteers from any and all claims, actions, losses, damages, and/or liability arising out of Owner's failure to comply with this Agreement or implement the BMPs required by **Exhibit C** , including the acts, errors or omissions of any person and for any costs or expenses incurred by the City on account of any claim except where such indemnification is prohibited by law. This indemnification provision shall apply regardless of the existence or degree of fault of indemnitees. The Owner's indemnification obligation applies to the City's "active" as well as "passive" negligence but does not apply to the City's "sole negligence" or "willful misconduct" within the meaning of Civil Code Section 2782, or to any claims, actions, losses, damages, and/or liabilities, to the extent caused by the acts or omissions of any third party contractors undertaking any work (other than field inspections) or other maintenance on

the Property on behalf of the City under this Agreement.

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

10. In addition to any remedy available to City under this Agreement, if Owner violates any term of this Agreement and does not cure the violation within the time 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 **Exhibit C** to the condition in which it/they existed prior to any such violation or injury. 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.

11. Owner shall provide actual notice of this Agreement and its terms to any respective buyers or successor(s) in interest. This Agreement shall be recorded in the official records through the title to ensure that all future buyers or successors in interest are on constructive notice of its terms and obligations

12. In order to be valid, any amendment or change to this Agreement including the requirements of the WQMP (**Exhibit C**) and BMPs must be a written amendment executed by the City and Owner recorded with the Riverside County Recorder.

WITNESS the following signatures:

OWNER:

Orchard Logistics Venture, LLC, a Delaware limited liability company
By: TC Orchard Logistics Member, LLC, a Delaware limited liability company
By: Trammell Crow So. Cal. Development, Inc., a Delaware corporation, its sole member
By _____
Name: Jared Riemer
Title: Vice President

SEE ATTACHED CERTIFICATE

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 ORANGE }

On 9/3/25 (Date) before me, NANCY A BARAJAS - NOTARY PUBLIC (Here Insert Name and Title of the Officer)

personally appeared JARED RIEMER (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.

NANCY A. BARAJAS
Notary Public - California
Orange County
Commission # 2391972
My Comm. Expires Feb 24, 2026

Place Notary Seal and/or Stamp Above

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 _____ (Signature of Notary Public)

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: Storm Water Management WQMP/BMP Facilities Covenant and Agreement No.

Document Date: 09/03/2025 Number of Pages: 3 OF 9

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: JARED RIEMER	Signer's Name: _____
☑ Corporate Officer – Title(s): VICE PRESIDENT	☐ 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: _____

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.

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.

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.

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

Real property in the City of Beaumont, County of Riverside, State of California, described as follows:

Parcel 1:

Parcel A as shown on Lot Line of Adjustment No. 06-LLA-09, as evidenced by document recorded August 02, 2007 as Instrument No. 2007-0501539 of Official Records, being more particularly described as follows:

That portion of the North Half of the Northwest Quarter of Section 9, Township 3 South, Range 1 West, San Bernardino Meridian in the City of Beaumont, County of Riverside, State of California which lies within the following boundaries:

Beginning at a point in the Westerly line of said Northwest Quarter distant South 00° 30' 39" East thereon 233.25 feet from the Northwesterly corner of said Section 9 to the Northwesterly corner of that certain parcel of land described as Parcel "B" in deed recorded June 10, 2003 in Instrument No. 2003-444207, of Official Records, records of said county, said last mentioned corner also being a point in the Southerly boundary of California State Highway 60;

Thence along the Northerly boundary of said certain parcel of land and along said Southerly boundary the following courses: South 86° 49' 31" East 65.12 feet; Thence North 83° 14' 55" East 203.04 feet; Thence South 89° 06' 58" East 300.24 feet; Thence South 86° 49' 31" East 600.00 feet; Thence South 89° 27' 35" East 48.60 feet to a line parallel with and 1130.00 feet Westerly, measured at right angles, from the Westerly line of that certain parcel of land described in deed recorded June 13, 2003 as Instrument No. 2003-435769, of said of Official Records; Thence along said parallel line, South 00° 23' 03" West 1112.14 feet to a point in the Northerly line of Parcel Map No. 25090 as per map filed in Book 165 Pages 69, 70 and 71, of Parcel Maps, records of said county; Thence along said last mentioned Northerly line, North 87° 34' 43" West 1197.78 feet to the Westerly line of said Northwest Quarter; Thence along said last mentioned Westerly line, North 00° 30' 39" West 1087.21 feet to "Point of Beginning".

Parcel 2:

A non-exclusive easement for ingress and egress as described in that certain Reciprocal Easement Agreement and Deed recorded May 17, 1994 as Instrument No. 201445 of Official Records.

Parcel 3:

A non-exclusive easement for ingress and egress as described in that certain Declaration of Grant of Easement recorded August 2, 2007 as Instrument No. 2007-0501538 of Official Records.

EXHIBIT "B"
DIAGRAM OF PROPERTY

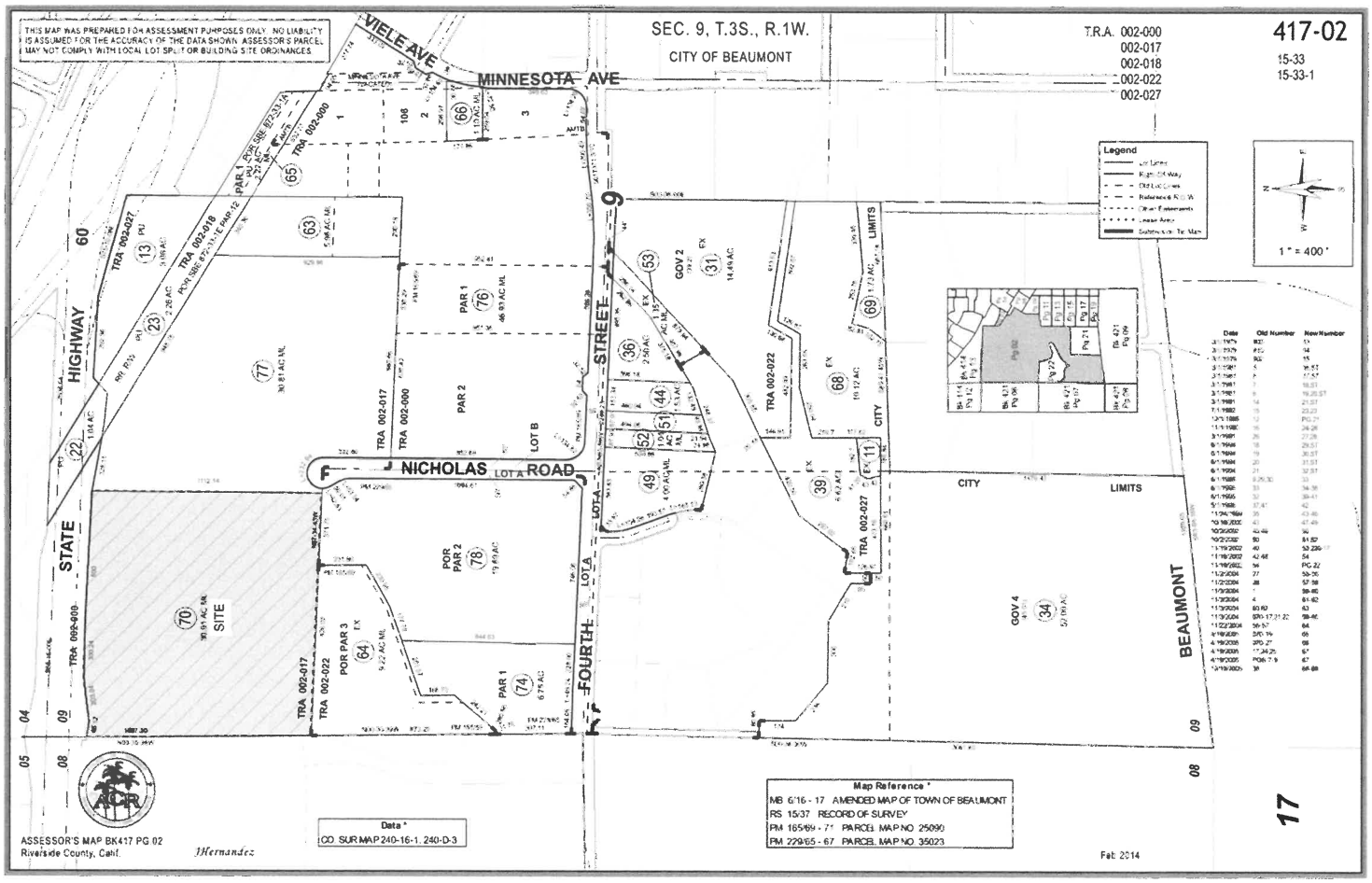


EXHIBIT "C"
WQMP

Final Water Quality Management Plan

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

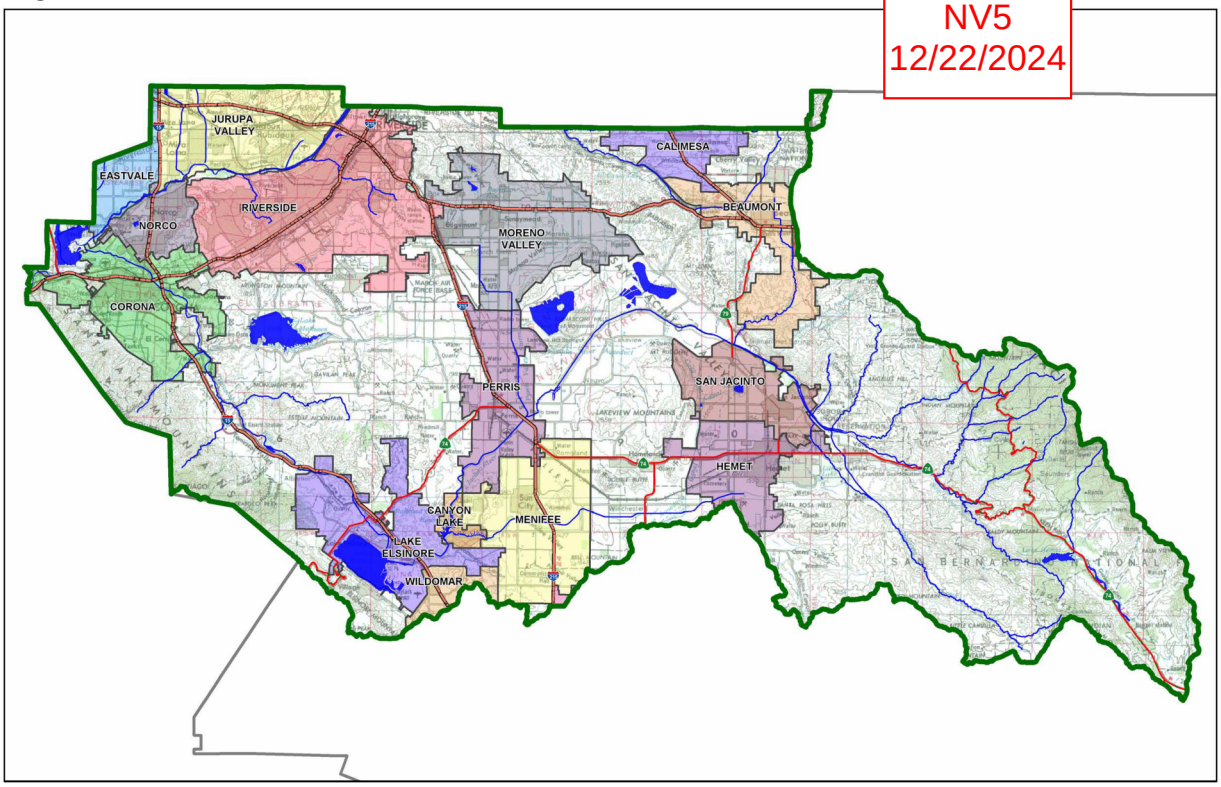
Reviewed by
Padma Asam / NV5
12/22/2024
Contact: padma.asam@nv5.com

Project Title: Orchard Logistics Center

Development No: PP2022-0440

Design Review/Case No: PW2024-0059

Approved
NV5
12/22/2024



☐ **Preliminary**
☒ **Final**

Original Date Prepared: 2/20/2024
Revision Date(s): 7/31/2024, 11/1/2024, 12/13/2024

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

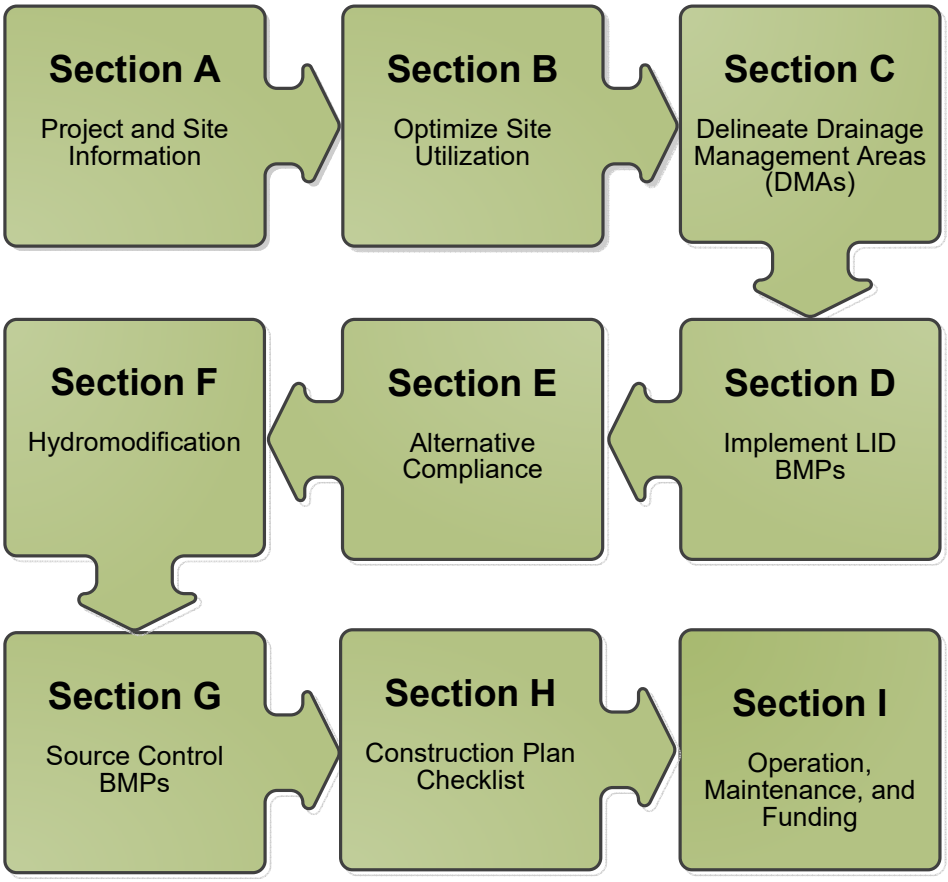
Contact Information:

Prepared for:
Orchard Logistics Venture, LLC
Contact: Kyle Dorand (VP Devp)
3501 Jamboree Road, Suite 230
Newport Beach, CA 92660
KDorand@trammellcrow.com
(949) 283-5713

Prepared by:
Huitt-Zollars, Inc.
Johnny Murad (PM)
3990 Concours, Suite 330
Ontario, CA 91764
jmurad@huitt-zollars.com
(909) 941-7799 X11411

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 Orchard Logistics Venture, LLC by Huitt-Zollars, Inc. for the Orchard Logistics Center project.

This WQMP is intended to comply with the requirements of City of Beaumont for APN 417-020-070 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 (Chapter 13.24 - STORMWATER/URBAN RUNOFF MANAGEMENT AND DISCHARGE CONTROLS).

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

Owner's Signature	Date: 12/13/2024
Owner's Printed Name: David Nazaryk	Owner's Title/Position: EVP

PREPARER'S CERTIFICATION

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

Preparer's Signature	Date: 12/13/2024
Preparer's Printed Name: Johnny Murad	Preparer's Title/Position: Managing Principal

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: 8

Section B: Optimize Site Utilization (LID Principles) 9

Section C: Delineate Drainage Management Areas (DMAs) 11

Section D: Implement LID BMPs 13

D.1 Infiltration Applicability 13
D.2 Harvest and Use Assessment 14
D.3 Bioretention and Biotreatment Assessment 16
D.4 Feasibility Assessment Summaries 17
D.5 LID BMP Sizing 18

Section E: Alternative Compliance (LID Waiver Program) 20

E.1 Identify Pollutants of Concern 21
E.2 Stormwater Credits (N/A) 22
E.3 Sizing Criteria (N/A) 22
E.4 Treatment Control BMP Selection 23

Section F: Hydromodification 24

F.1 Hydrologic Conditions of Concern (HCOC) Analysis 24
F.2 HCOC Mitigation 25

Section G: Source Control BMPs 26

Section H: Construction Plan Checklist 28

Section I: Operation, Maintenance and Funding 29

List of Tables

Table A.1 Identification of Receiving Waters 7
Table A.2 Other Applicable Permits 8
Table C.1 DMA Classifications 11
Table C.2 Type 'A', Self-Treating Areas (N/A) 11
Table C.3 Type 'B', Self-Retaining Areas (N/A) 11
Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas (N/A) 12
Table C.5 Type 'D', Areas Draining to BMPs 12
Table D.1 Infiltration Feasibility 13
Table D.2 LID Prioritization Summary Matrix 17
Table D.3 DCV Calculations for LID BMPs 18
Table E.1 Potential Pollutants by Land Use Type 21
Table E.2 Water Quality Credits 22
Table E.3 Treatment Control BMP Sizing 22
Table E.4 Treatment Control BMP Selection 23
Table F.1 Hydrologic Conditions of Concern Summary 24
Table G.1 Permanent and Operational Source Control Measures 26
Table H.1 Construction Plan Cross-reference 28

List of Appendices

Appendix 1: Maps and Site Plans 32
Appendix 2: Construction Plans 33
Appendix 3: Soils Information 34
Appendix 4: Historical Site Conditions 35
Appendix 5: LID Infeasibility 36
Appendix 6: BMP Design Details 37
Appendix 7: Hydromodification 38
Appendix 8: Source Control 39
Appendix 9: O&M 40
Appendix 10: Educational Materials 41

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	~30.9 AC
Community Name:	N/A
Development Name:	Orchard Logistics Center

PROJECT LOCATION
Latitude & Longitude (DMS): 33°55'53.41"N & 116°59'48.55"W
Project Watershed and Sub-Watershed: San Timoteo Creek & Santa Ana River Subwatershed
Gross Acres: ±30.9 AC
APN(s): 417-020-070
Map Book and Page No.: Thomas Bros. Map, Page 389

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s) **(General Warehousing and Storage)**	Industrial
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	1,107,059
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	1,107,059
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)	55,905
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?	0.83"

This project is a new development consisting of an industrial facility located at the northeast corner of Prosperity and Distribution Way. Proposed building is approximately 600,000 SF on ±30.9 acres of a partially improved lot.

BMP On-Site – Proposed development includes two drainage management areas: DMA A & DMA B. DMA A runoff originating from the site's parking lots, driveways, and roof drains will be directed to catch basins #1-9 (CB#1-9) and conveyed by storm drain line A & B to the proposed bioretention basin no. 1. DMA B low flow runoff originating from the site's southwest parking lots and driveways will be directed to bioretention basin no. 2 for treatment. Higher flows from this same area will be intercepted by CB#10. The runoff in bioretention basin no. 1 will be conveyed via the 6" perforated pipe and 2' trench to the outlet on the south end of the basin. Overflow from the main bioretention basin no. 1 and bioretention basin no. 2 will be conveyed by the proposed outlet to the existing 42-inch public storm drain lateral C-4 in Prosperity Way. See WQMP plan in Appendix 1. All runoff for both basins will be pre-treated with catch basin filters and a forebay prior to entering the basin.

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)

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Timoteo Creek Reach 3	None	GWR, REC1, REC2, WARM, WILD	Not a designated RARE
San Timoteo Creek Reach 2	None	GWR, REC1, REC2, WARM, WILD	Not a designated RARE
San Timoteo Creek Reach 1A	None	AGR, MUN, REC1, REC2, SPWN, WARM, WILD	Not a designated RARE
Santa Ana River Reach 4	Salinity, TDS, Chlorides, Pathogens	GWR, RARE, REC1, REC2, SPWN	25 miles
Santa Ana River (Reach 3)	Pathogens, Metals (Copper & Lead)	AGR, GWR, MUN, RARE, REC1, REC2, SPWN, WARM, WILD	33 Miles
Prado Flood Control Basin	Nutrients and Pathogens	MUN, GWR, REC1, REC2, WARM, WILD, RARE	53 Miles
Santa Ana River (Reach 2)	Pathogens	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	70 Miles
Santa Ana River (Reach 1)	None	MUN, REC1, REC2, WARM, WILD	Not a designated RARE
Pacific Ocean	None	None	Not a designated RARE

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

Table A.2 Other Applicable Permits

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

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

Section B: Optimize Site Utilization (LID Principles)

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

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

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

Site Constraints:
Based on the site's infiltration test and report (see Appendix 3), the native soil has a very slow infiltration rate. As a result, infiltration BMPs are infeasible for this development.

Solution:
A main bioretention basin no. 1 and secondary bioretention basin no. 2 will be used for LID design. The main bioretention basin no. 1 is sized to treat DMA A's WQMP DCV. The bioretention basin no. 2 is sized to treat DMA B's DCV. Both LID BMPs will remove pollutants of concern from surface runoff. The outlet on the southwest corner of the site will convey overflow from both BMPs to the 42-inch public storm drain lateral C-4 in Prosperity Way.

Site Optimization

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

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

Existing drainage patterns were identified. However, existing drainage patterns were not preserved because the site was previously used for agriculture and drained to four discharge points. In order to

incorporate LID design principles, the proposed drainage pattern follows a northeast to southwest drainage pattern. Runoff will be collected at the southwest corner of the site where a bioretention basin no. 1 and bioretention basin no. 2 will provide treatment. Approximately 96 percent of the site will be treated by the bioretention basin no. 1.

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

No. The site has no existing vegetation to protect. New vegetation will be planted throughout the site.

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

Natural infiltration capacity was identified by the infiltration tests performed by Southern California Geotechnical, Inc (SCG). Infiltration tests determined the site's infiltration rate is below the WQMP Guidance Document's minimum infiltration rate. As a result, infiltration BMPs were not be used for this development.

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

Yes. Proposed development includes landscape areas around the perimeter of the site and proposed building. Onsite bioretention basins will also provide additional landscape area. Therefore, by maximizing the onsite landscape area, the amount of impervious area was minimized.

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

No. The proposed drainage design does not direct runoff from impervious to pervious areas. However, the proposed drainage design directs runoff to the proposed onsite storm drain system which will convey runoff to the proposed bioretention basins on the southwest corner of the site.

Section C: Delineate Drainage Management Areas (DMAs)

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

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s) [1][2]	Area (Sq. Ft.)	DMA Type
DMA A1	Roof	600,756	D
DMA A2	Ornamental Landscaping	198,808	D
DMA A3	Decomposed Granite	9,388	D
DMA A4	Concrete or Asphalt	477,484	D
DMA B1	Ornamental Landscaping	25,570	D
DMA B2	Decomposed Granite	6,928	D
DMA B3	Concrete or Asphalt	25,001	D

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

Table C.2 Type 'A', Self-Treating Areas (N/A)

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

Table C.3 Type 'B', Self-Retaining Areas (N/A)

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

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

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas (N/A)

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

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

DMA Name or ID	BMP Name or ID
DMA A1	Bioretention Basin no. 1
DMA A2	Bioretention Basin no. 1
DMA A3	Bioretention Basin no. 1
DMA A4	Bioretention Basin no. 1
DMA B1	Bioretention Basin No. 2
DMA B2	Bioretention Basin No. 2
DMA B3	Bioretention Basin No. 2

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Co-permittee 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 A1, DMA A2, DMA A3, DMA A4, DMA B1, DMA B2, DMA B3	X	
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

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

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.
Response: Reclaimed water will not be used for non-potable water demands for this project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Co-permittee).
Response: Harvest and Use is not feasible for this project, therefore will not impact downstream water right.

☐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.
Response: Infiltration BMP will not be used for this project site. Bioretention will be used.

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: 224,520 SF (5.15 ac)

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

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

Total Area of Impervious Surfaces: 1,107,059 SF (25.41 ac)

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

Enter your EIATIA factor: 1.99

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: 2,214,118 SF (50.83 ac)

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)
2,214,118 SF	224,520 SF

➔ **Harvest and Use is not feasible for this project.**

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: 500

Project Type: Industrial

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: 1,107,059 SF (25.41 ac)

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: 224

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: 5,692

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)
5,692 Users	500 Users

➔ **Harvest and Use for toilet use is not feasible for this project.**

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: N/A

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: N/A

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: N/A

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: N/A

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)**
N/A	N/A

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 Co-permittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA A1	☐	☐	☒	☐	☐
DMA A2	☐	☐	☒	☐	☐
DMA A3	☐	☐	☒	☐	☐
DMA A4	☐	☐	☒	☐	☐
DMA B1	☐	☐	☒	☐	☐
DMA B2	☐	☐	☒	☐	☐
DMA B3	☐	☐	☒	☐	☐

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

Infiltration LID BMPs are not feasible for this development due to the slow infiltration rates (0-0.2 in/hr) reported in the Infiltration Test report created by Southern California Geotechnical, Inc. See Infiltration Test report in Appendix 3.

Harvest and Use LID BMPs are not feasible according to Section D.2.

Therefore, Bioretention LID BMPs will be used for DMA A & DMA B.

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Bioretention Basin 1*		
	[A]		[B]	[C]	[A] x [C]			
DMA A1	*600,756*	*Roofs*	*1*	*0.89*	*535,874*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA A2	*198,808*	*Ornamental Landscaping*	*0.1*	*0.11*	*21,960*			
DMA A3	*9,388*	*Decomposed Granite*	*0.4*	*0.28*	*2,626*			
DMA A4	*477,484*	*Concrete or Asphalt*	*1*	*0.89*	*425,916*			
	$A_T = \Sigma[A]$ 1,286,436				$\Sigma = [D]$ 986,376	[E] 0.83	$[F] = \frac{[D] \times [E]}{12}$ 68,224	[G] ***96,359***

[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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Bioretention Basin 2*		
	[A]		[B]	[C]	[A] x [C]			
DMA B1	*25,570*	*Ornamental Landscaping*	*0.1*	*0.11*	*2,824*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA B2	*6,928*	*Decomposed Granite*	*0.4*	*0.28*	*1,938*			
DMA B3	*25,001*	*Concrete or Asphalt*	*1*	*0.89*	*22,301*			
	$A_T = \Sigma[A]$ 57,499				Σ= [D] 27,063	[E] 0.83	$[F] = \frac{[D] \times [E]}{12}$ 1,872	[G] ***2,093***

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

Section E: Alternative Compliance (LID Waiver Program) N/A

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 Co-permittee). 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 N/A

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 (N/A)

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 N/A

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			
	[A]		[B]	[C]	[A] x [C]			
						Design Rainfall Intensity (in/hr)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	$A_T = \Sigma[A]$				Σ= [D] 34,741	[E] 0.2	$[F] = \frac{[D]x[E]}{[G]}$	[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 N/A

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

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

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

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
N/A		

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

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Co-permittee 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	(N/A)	(N/A)	(N/A)
Volume (Cubic Feet)	(N/A)	(N/A)	(N/A)

[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.

This project complies with condition c from section F.2 HCOC Mitigation.

Explanation:

Proposed post development unit hydrograph 2-yr 24-hr peak flow ($Q_{2,24}$) is approximately 8.0 CFS. Existing unit hydrograph $Q_{2,24}$ is approximately 5.0 CFS. The proposed bioretention basin is sized to detain post development 2-yr 24-hr peak flow ($Q_{2,24}$). After runoff is detained in the proposed bioretention system, proposed post development $Q_{2,24}$ is approximately 5.0 CFS and meets the HCOC mitigation requirements. See existing and proposed unit hydrographs as well as the project's basin routing summary details in Appendix 7.

Section G: Source Control BMPs

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

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

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

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

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

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Onsite Storm Drain Inlet	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 availability.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to new site owners, lessees, or operators. • See applicable operational BMP 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."

Loading Docks	The project site will have loading docks which are shown on the Water Quality Management plan. Loading docks shall be inspected on a weekly basis to help ensure that any trash and debris are collected prior to being washed into the storm drain system. All stormwater runoff from the loading dock areas will be discharged to a bioretention basin. Basin overflow will be conveyed to the public storm drain system. Documentation of loading dock inspection/maintenance shall be kept by the owner in perpetuity.	• 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
Fire Sprinkler Test	Underground fire protection service and fire sprinklers test will be provided per the uniform fire code and the requirements of Riverside County.	• Provide a means to drain fire sprinkler test water to the sanitary sewer.
Plazas, sidewalks, and Parking Lots	Documentation of such sweeping shall be kept by the owner in perpetuity. Frequency of sweeping shall be adjusted as needed to maintain a clean site.	• Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Trash Storage Areas	Trash storage areas shall be paved with an impervious surface designed not to allow run-on from adjoining areas. Trash storage areas shall be designed to divert runoff from adjoining roofs and pavements from the surrounding area and screened or walled to prevent off-site transport of trash. Trash dumpsters (containers) shall be leak proof and have attached covers and lids. Trash enclosures shall be roofed per City standards and the details on the WQMP exhibit in Appendix 1. Trash compactors shall be roofed and set on a concrete pad per City standards. The pad shall be a minimum of one foot larger all around than the trash compactor and sloped to drain to a sanitary sewer line. Connection of trash area drains to the MS4 is prohibited. See CASQA SD-32 BMP fact sheet in Appendix 10 for additional information. Signs shall be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	• Adequate number of receptacles shall be provided. 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 onsite. See fact sheet SC-34 "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com and in Appendix 10.
Indoor & Structural Pest Control	May be needed based on future Tenant.	• If needed, future tenant will need to provide Integrated Pest Management information.
Landscape / Outdoor Pesticide Use	Final Landscape Design plans will minimize runoff from landscaping to pavements to prevent pesticides from leaving the project site.	• Maintain landscaping using minimum or no pesticides if possible.

Section H: Construction Plan Checklist

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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
1	Bioretention Basin 1	Precise Grading Plan, Sheet 14	Lat: 33°55'49"N Long: 116°59'55"W
2	Bioretention Basin 2	Precise Grading Plan, Sheet 13	Lat: 33°55'54"N Long: 116°59'55"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 Co-permittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Co-permittee 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:

BMP	Responsible Party(s)	Inspection/Maintenance Activities Required	Minimum Frequency of Activities
Landscape and Irrigation	Owner	See CASQA BMP Fact sheet SD-10 and SD-12 in Appendix 10. -Site landscaping design shall be implemented in accordance with the requirements of the site specific WQMP and local agency requirements. -Site landscaping maintenance shall begin immediately after it has been planted. -Maintenance of landscaping shall occur on a weekly basis and adjusted accordingly based on current conditions and seasonal needs. -Inspection of irrigation system shall be provided on a bi-weekly basis to ensure proper function of the irrigation system.	Weekly

		-Malfunctioning systems shall be repaired or replaced immediately. -Inspect plant health on a monthly basis. Repair or replace unhealthy plants as needed. -Inspect side slopes of basins and sloped areas on a bi-weekly basis and repair as needed. Re-plant and apply erosion protection to those areas to help prevent erosion in the future. -Landscape clippings shall be swept and picked up immediately to prevent it from entering the storm drain system or adjacent sedimentation basins and filtration basins. Dispose of landscape clippings in a legal manner	
MS4 Stenciling and Signage	Owner	See CASQA BMP Fact sheet SD-13 in Appendix 10. -MS4 Stenciling and signage shall be placed during construction and inspection and maintenance shall begin upon completion of construction. -Inspect catch basin stenciling on a bi-monthly basis. Replace any damaged, missing or faded stencils in a timely manner.	Bi-monthly
Common area litter control, loading docks and trash storage areas	Owner	See CASQA BMP Fact sheet SD-32 in Appendix 10. -Inspection and Maintenance of common areas, loading docks and trash storage areas shall begin upon completion of construction. -Visual inspection of trash storage areas shall take place on a weekly basis and adjusted on an as needed basis. -Inspect areas for trash and debris. Remove any found trash and debris immediately. Dispose of trash and debris in a legal manner. -Inspect areas for any spills. Pick up/clean up found spills immediately. Dispose of spill material in a legal manner.	Daily
Parking lot sweeping	Owner	See CASQA BMP Fact sheet SD-11 and SE-7 in Appendix 10. -Parking lot sweeping shall begin after the completion of construction and take place on a monthly basis. Dispose of picked up material in a legal manner.	Monthly
Drainage facility (including roof drains) inspection and maintenance	Owner	See CASQA BMP Fact sheet SE-10 in Appendix 10. -Inspection and maintenance of site drainage facilities and roof drains shall begin immediately upon completion of construction. -Catch basins and roof drain inlet shall be clear of any debris - prior to any storm event to ensure proper function of the roof drains. Collected debris shall be disposed of in a legal manner.	Monthly, before & after rain event
Main Bioretention Basin no. 1 & Bioretention basin no. 2	Owner	See Appendix 6 for basin calculation and 10 for CASQA BMP Fact sheet TC-11. -Once the bioretention (sedimentation and media filter basin) have gone on-line, inspections should occur after every major storm for the first year to ensure that proper stabilization and	Every 6 months

		function is achieved. Continuous inspection and maintenance shall be provided once every six months. Special attention should be paid to how long water remains standing in the basin after a storm; standing water within the basin more than 48 hours after a storm indicates that the filtration rates are insufficient and maintenance of the filter basin bottom is needed. If standing water remains after 48 hours, the standing water shall be removed in accordance with the local agency guidelines and maintenance of the filter basin bottom shall be scheduled immediately. Factors that are typically responsible for clogging the filter basin bottom include upstream sediment erosion and excessive compaction of the basin bottom. These should be repaired immediately to help achieve the desired filtration rates. -Observe and document evidence of collected sediments, trash, debris and oils/greases. -Sediments, trash, debris and oils/greases shall be removed and disposed of in a legal manner. -Observe and document evidence of erosion of side slopes or flowlines. -Schedule repair of eroded side slopes or flowlines immediately. -Protection measures against further erosion shall be placed until the eroded areas are repaired. Protection measures should be at a minimum placement of gravel bags and fiber rolls to prevent further erosion of the affected areas until the areas have been repaired and vegetation has been established.	

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

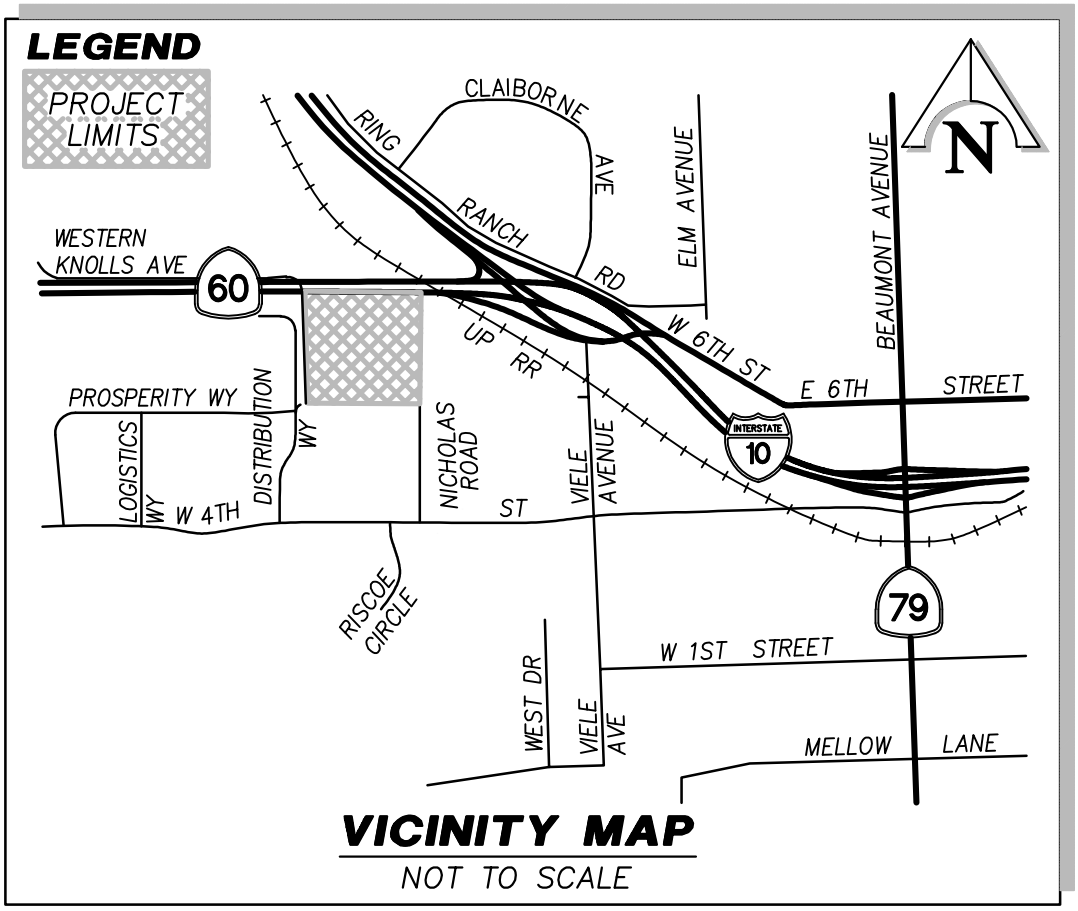
☐ Y ☒ N

Owner Information:
Kyle Dorand
Orchard Logistics Venture, LLC
3501 Jamboree Road, Suite 230
Newport Beach, CA 92660
KDorand@trammellcrow.com
(949) 283-5713

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.

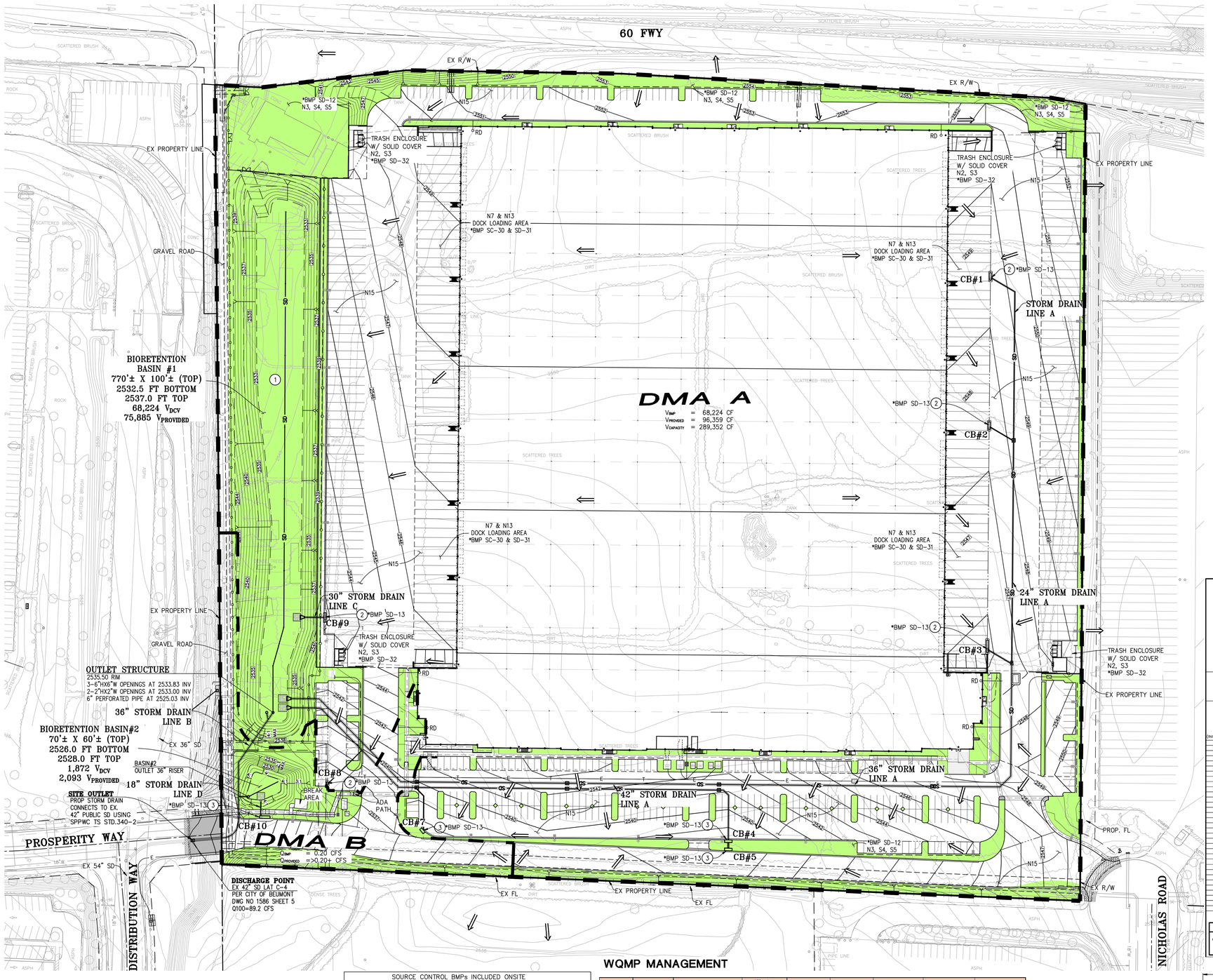
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



VICINITY MAP

NOT TO SCALE

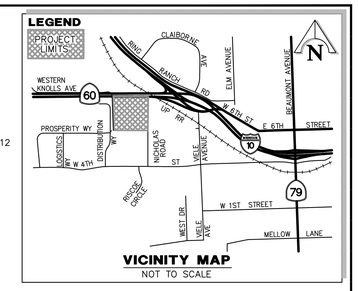


LEGEND

- PROPOSED STORM DRAIN
- PROPOSED FLOWLINE
- DRAINAGE AREA BOUNDARY
- PROPOSED CATCH BASIN INLET, SOURCE CONTROL BMP: N11, N14, N17, & S1
- PROPOSED LANDSCAPING AREA –*BMP SD–10 & SD–12 SOURCE CONTROL BMP: N3, S4, & S5
- CB CATCH BASIN
- RD ROOF DRAIN
- FLOW DIRECTION
- INLET STRUCTURE W/RIP–RAP

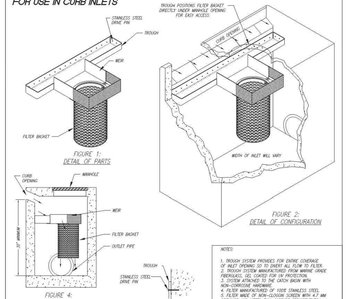
0 30 60 120 180

SCALE 1" = 60'



VICINITY MAP
NOT TO SCALE

BIO CLEAN FULL CAPTURE FILTER WITH TROUGH SYSTEM FOR USE IN CURB INLETS



MODEL NUMBER	TREATMENT FLOW GPM*	SOLIDS STORAGE CAPACITY (cu. ft)
BC-CURB-FC-30	2.85	2.21
BC-CURB-FC-24	2.85	1.77
BC-CURB-FC-18	2.85	1.33
BC-CURB-FC-12	2.85	0.88

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS — MEETS FULL CAPTURE REQUIREMENTS MODEL # BC-CURB-FC

TREATMENT FLOW RATE: 2.85 cfs

WARRANTY: 1 YEAR MANUFACTURED

BIO CLEAN ENVIRONMENTAL SERVICES, INC.
2727 LOKER AVENUE WEST, CARLSBAD, CA 92010
PHONE:760-431-7640 FAX:760-431-7598

DATE: 10/12/2017 SCALE: NTS
DRAFTER: M.C.P. UNITS = INCHES

PROJECTS
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:

NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING TO STREET ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE STAINLESS STEEL 316 WITH 2B MILL FINISH.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGING SCREEN WITH #3 MM PERFORATIONS AND 4.7 MM CAPTURE REQUIREMENT.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS SECURED DIRECTLY UNDER THE MANHOLE FOR EASY ACCESS FOR MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 10'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSISTENT & SAFETY FACTOR OF 2.0.
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM. ALL FLOW IS FIRST FORCED THROUGH THE FILTER SCREENS
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

Bio Clean
A Forterra Company
PAGE 1

CURB INLET FILTER

(2) NOT TO SCALE

Trash Capture Products

Grate Inlet Filter

The Bio Clean Grate Inlet Filter for catch basins keeps property owners in compliance. Preferred by public agencies and backed by an 8-year warranty, this easy to install filter is continuously chosen for its durability and simple maintenance.

Constructed of 100% high grade stainless steel, it is built to last longer than any other filter brand. The non-clogging screens provide higher levels of filtration and water flow. The filter is equipped with unimpeded high flow bypass for even the largest storm events.

The filter is also equipped with a floating hydrocarbon boom mounted to rails allowing it to flow up and down with the water level over a range of flow conditions.

The filter is designed for grated inlets of any size and depth. Each filter can be custom built to meet specific project needs: Screen size and media type can be modified to remove specific pollutants.

Advantages and Performance

- 8 Year warranty
- Custom sizes available
- No nets or geofabrics
- 15-years user life
- No replacement costs as found with fabric filters
- Meets LEED requirements
- Fits in shallow catch basins
- 100% removal of trash and debris
- Meets full capture requirements

100% Full trash capture

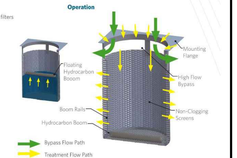


Specifications

Model #	Treatment Flow (CFS)	Bypass Flow (CFS)
BC-GRATE-13-13-12	1.55	1.50
BC-GRATE-18-18-18	4.32	3.68
BC-GRATE-24-24-24	7.67	4.83
BC-GRATE-30-30-24	12.97	6.21
BC-GRATE-25-38-24	13.53	6.59
BC-GRATE-36-36-24	19.64	7.60
BC-GRATE-48-48-18	25.59	10.13

NOTE: Treatment and bypass flow rates include a safety factor of 2.

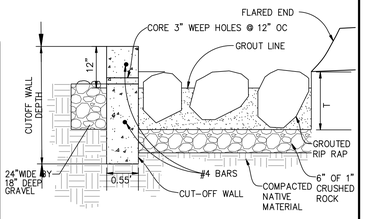
Operation



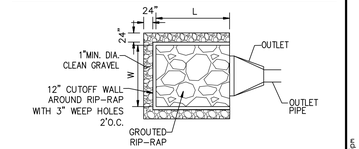
24

GRATE INLET FILTER

(3) NOT TO SCALE



LINE	LENGTH (L)	WIDTH (W)	THICKNESS (T)	CUTOFF WALL DEPTH	ROCK CLASS
A	12'	10'	1.25'	3.15'	NO. 2 BACKING
C	10'	10'	1.25'	3.15'	NO. 2 BACKING
D	10'	10'	1.25'	3.15'	NO. 2 BACKING
E	12'	10'	1.25'	3.15'	NO. 2 BACKING



BASIN OUTLET DETAIL
RIP RAP PER COUNTY STD 314
N.T.S.

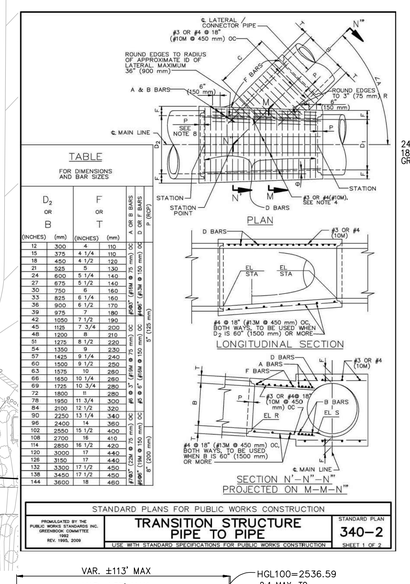


TABLE
FOR DIMENSIONS AND BAR SIZES

D2 OR B (INCHES)	D2 OR B (mm)	F OR T (INCHES)	F OR T (mm)	A, B BARS	D BARS
12	300	4	110	W	W
15	375	4 1/4	110	W	W
18	450	4 1/2	120	W	W
21	525	5	130	W	W
24	600	5 1/4	140	W	W
27	675	5 1/2	140	W	W
30	750	6	160	W	W
33	825	6 1/4	160	W	W
36	900	6 1/2	170	W	W
39	975	7	180	W	W
42	1050	7 1/2	190	W	W
45	1125	7 3/4	200	W	W
48	1200	8	215	W	W
51	1275	8 1/2	220	W	W
54	1350	9	230	W	W
57	1425	9 1/4	240	W	W
60	1500	9 1/2	250	W	W
63	1575	10	260	W	W
66	1650	10 1/4	260	W	W
69	1725	10 3/4	280	W	W
72	1800	11	280	W	W
78	1950	11 3/4	300	W	W
84	2100	12 1/2	320	W	W
90	2250	13 1/4	340	W	W
96	2400	14	360	W	W
102	2550	15 1/2	400	W	W
108	2700	16	410	W	W
114	2850	16 1/2	420	W	W
120	3000	17	440	W	W
126	3150	17	440	W	W
132	3300	17 1/2	450	W	W
138	3450	17 1/2	450	W	W
144	3600	18	460	W	W

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
PROMULGATED BY THE PUBLIC WORKS STANDARDS, INC. GREENBOOK COMMITTEE
REV. 1992, 2018

TRANSITION STRUCTURE PIPE TO PIPE

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

STANDARD PLAN 340–2
SHEET 1 OF 2

WQMP MANAGEMENT

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, If	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, Vbmp (cf)	Proposed Volume (cf)
DMA A1	600,756	Roofs	1	0.89	535874.4			
DMA A2	198,808	Ornamental Landscaping	0.1	0.11	21959.9			
DMA A3	9,388	Decomposed Granite	0.4	0.28	2625.9			
DMA A4	477,484	Concrete or Asphalt	1	0.89	425915.7			
DMA A	1,286,436	**Bio-Retention Basin #1**			**986375.9**	**0.83**	**68,224**	**75,885**

LAT. / LONG.
33°55'49" N / –116°59'55" W

*THE BIORETENTION BASIN #1 IS ALSO SIZED TO DETAIN 100–YEAR STORM FOR FLOOD CONTROL. SEE PRELIMINARY DRAINAGE REPORT FOR DETAILS

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, If	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, Vbmp (cf)	Proposed Volume (cf)
DMA B1	25,570	Ornamental Landscaping	0.1	0.11	2824.4			
DMA B2	6,928	Decomposed Granite	0.4	0.28	1937.8			
DMA B3	25,001	Concrete or Asphalt	1	0.89	22300.9			
DMA B	**57,499**	**Bio-Retention Basin #2 Total**			**27063.1**	**0.83**	**1,872**	**2,093**

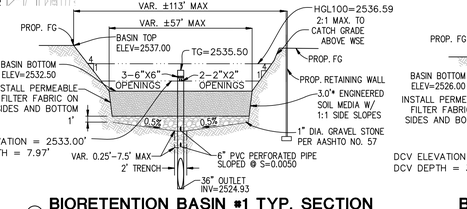
LAT. / LONG.
33°55'54" N / –116°59'55" W

SOURCE CONTROL BMPs INCLUDED ONSITE		
IDENTIFIER	DESCRIPTION OF BMP	RESPONSIBLE PARTY
N1	EDUCATION ON STORMWATER BMPs	OWNER
N2	ACTIVITY RESTRICTIONS	OWNER
N3	LANDSCAPE MANAGEMENT BMPS	OWNER
N4	BMP MAINTENANCE	OWNER
N6	LOCAL WATER QUALITY ORDINANCES	OWNER
N7	PROVIDE SPILL PLAN	OWNER
N10	UNIFORM FIRE CODE IMPLEMENTATION	OWNER
N11	LITTER/DEBRIS CONTROL PROGRAM	OWNER
N12	EMPLOYEE TRAINING	OWNER
N13	HOUSEKEEPING OF LOADING DOCKS	OWNER
N14	CATCH BASIN INSPECTION PROGRAM	OWNER
N15	VACUUM SWEEPING OF PARKING LOTS	OWNER
N17	NPDES COMPLIANCE	OWNER
N18	INDOOR & STRUCTURAL PEST CONTROL	OWNER
N19	LANDSCAPE/OUTDOOR PESTICIDE USE	OWNER
S1	STORM DRAIN STENCILING	OWNER
S3	REDUCED WASTE STORAGE POLLUTION	OWNER
S4	EFFICIENT IRRIGATION SYSTEM	OWNER
S5	LANDSCAPING MIN. 1–2" BELOW PAVEMENT	OWNER

*SEE WQMP REPORT ATTACHMENT C FOR BMP FACT SHEET

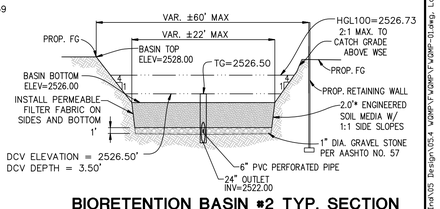
WQMP BMP NOTES

(1) BIORETENTION BASIN, SEE DETAIL HEREON.
(2) INSTALL BIOCLEAN GRATE INLET FILTER OR APPROVED EQUAL, SEE DETAIL HEREON.
(3) INSTALL BIOCLEAN CURB INLET FILTER OR APPROVED EQUAL, SEE DETAIL HEREON.



BIORETENTION BASIN #1 TYP. SECTION

(1) NOT TO SCALE



BASIN 1 TYP. SECTION

(1) NOT TO SCALE

BIORETENTION PLANTING NOTE:
BIORETENTION BASINS SHOULD BE DESIGNED WITH AT LEAST 70% MATURE COVERAGE THROUGHOUT THE BIORETENTION FACILITY. TO PREVENT THE BMP FROM BEING USED AS WALKWAYS, BIORETENTION FACILITIES SHOULD BE PLANTED WITH A COMBINATION OF SMALL TREES, DENSELY PLANTED SHRUBS, AND NATURAL GRASSES. GRASSES SHOULD BE ORNAMENTAL, PREFERABLY ONES THAT DON'T NEED TO BE MOWED.

ENGINEER
HUITT–ZOLLARS
3990 CONCOURS, SUITE 330
ONTARIO, CA 91764
PHONE: (909) 941–7799
CONTACT: JOHNNY MURAD

OWNER/DEVELOPER
ORCHARD LOGISTICS VENTURE, LLC
3501 JAMBOREE ROAD, SUITE 230
NEWPORT BEACH, CA 92660
PHONE: (949) 283–5713
CONTACT: KYLE DORAND

REGISTERED PROFESSIONAL ENGINEER — NO. 67512 EXPIRATION 6–30–2023 — CIVIL — STATE OF CALIFORNIA

REV	DESCRIPTION	DATE

FINAL WATER QUALITY MANAGEMENT PLAN
FOR
ORCHARD LOGISTICS CENTER
CITY OF BEAUMONT
APN 417-020-070

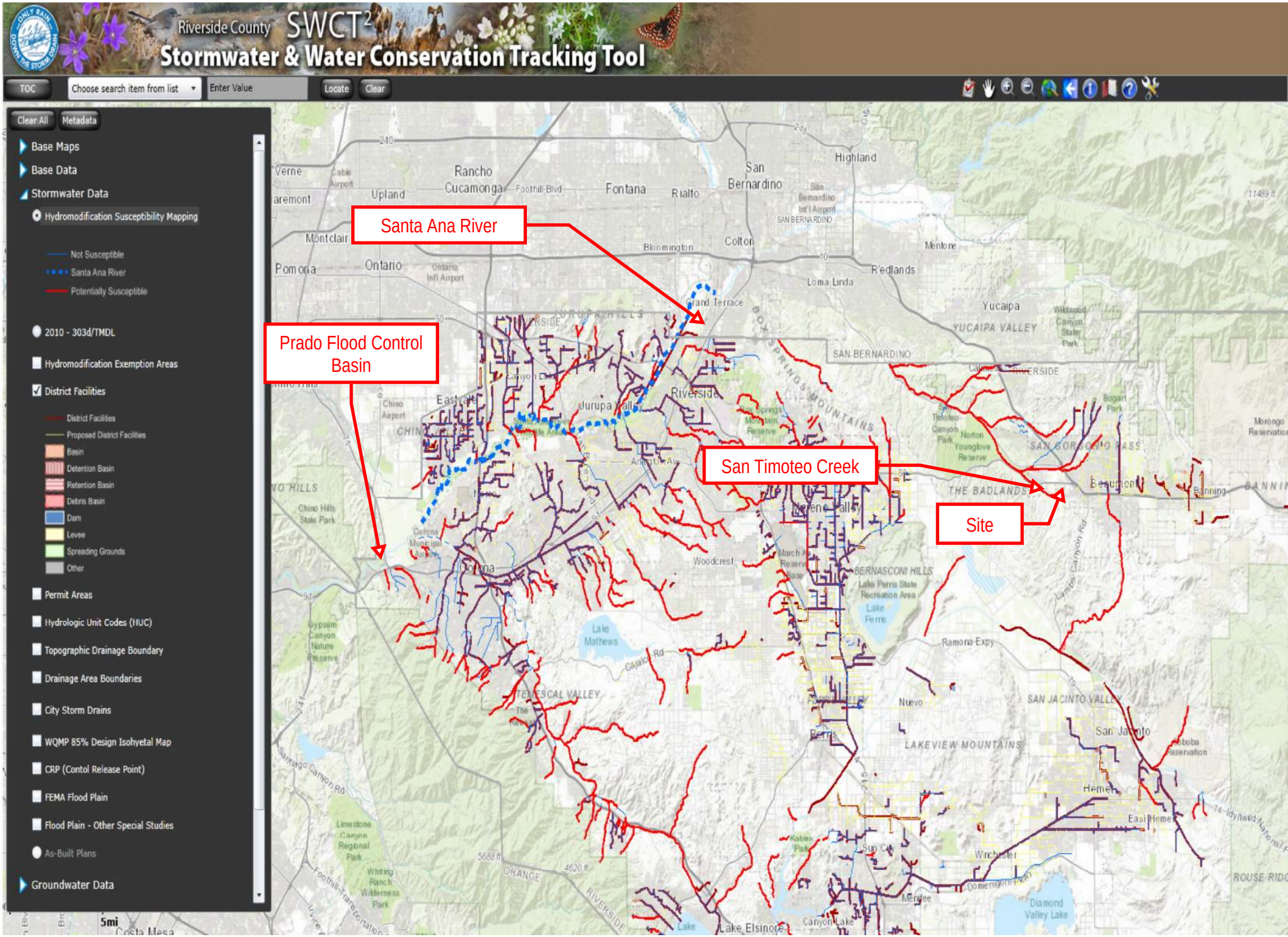
HUITT–ZOLLARS
HUITT–ZOLLARS, INC.
3990 CONCOURS, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941–7799

APPROVED BY JOHNNY MURAD — R.C.E. 67512 — EXPIRES 6–30–23 — DATE

DESIGNED BY SD/MG/DS
DRAWN BY H–Z STAFF
CHECKED BY JM/MG
FIELD BOOK

SHEET 1 OF 1 SHEETS
JOB NO. R312838.01

Plotted By: Mike Cruz - Plotted On: Nov 01, 2024 - 4:53pm
File Name: R:\R312838.01 - LDC - Bowling Ind\DS Design\DS-4 WQMP\X-WQMP-Plans - Layout: 1

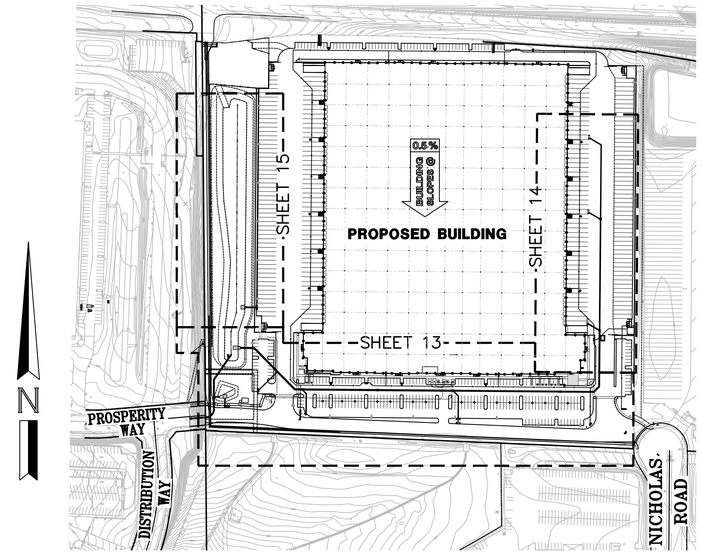

Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
TOC
Choose search item from list
Enter Value
Locate
Clear
Clear All
Metadata
Base Maps
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
Not Susceptible
Santa Ana River
Potentially Susceptible
2010 - 303d/TMDL
Hydromodification Exemption Areas
District Facilities
District Facilities
Proposed District Facilities
Basin
Detention Basin
Retention Basin
Debris Basin
Dam
Levee
Spreading Grounds
Other
Permit Areas
Hydrologic Unit Codes (HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
CRP (Contol Release Point)
FEMA Flood Plain
Flood Plain - Other Special Studies
As-Built Plans
Groundwater Data
Santa Ana River
Prado Flood Control Basin
San Timoteo Creek
Site
Rancho Cucamonga
Fontana
Rialto
San Bernardino
Highland
Upland
Montclair
Ontario
Colton
Redlands
Loma Linda
Yucaipa
Grand Terrace
Riverside
Eastvale
Jurupa Valley
Corona
Norco
Chino
Chino Hills
Woodcrest
Lake Mathews
Lake Perris
Nuevo
San Jacinto
Hemet
Menifee
Lake Elsinore
Canyon Lake
Beaumont
Banning
Calimesa
Mentone
Bloomington
Pomona
Verne
Ramona Expy
5mi

Appendix 2: Construction Plans

Grading and Drainage Plans & Landscape Plans

CONSTRUCTION NOTES

01	CONSTRUCT BIO RETENTION BASIN PER DETAIL ON SHEET 12	38,512 SF
02	INSTALL 6" SCHEDULE 40 PERFORATED PVC PIPE	678 LF
06	INSTALL ADS N-12 12" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12	115 LF
07	INSTALL ADS N-12 18" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12	448 LF
09	INSTALL ADS N-12 24" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12	353 LF
010	INSTALL ADS N-12 30" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12	27 LF
011	INSTALL ADS N-12 36" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12	658 LF
012	INSTALL ADS HDPE TO RCP CONNECTION COUPLER	1 EA
013	INSTALL ADS N-12 42" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12	642 LF
030	INSTALL ADS N-12 36"X24" HDPE TEE	1 EA
033	INSTALL ADS N-12 36" HDPE WYE-TEE	1 EA
036	INSTALL ADS N-12 18" 45° HDPE BEND	3 EA
038	INSTALL ADS N-12 36" 45° HDPE BEND	2 EA
040	INSTALL ADS N-12 12"X42" HDPE TEE	1 EA
041	INSTALL ADS N-12 42" 45° HDPE BEND	2 EA
048	CONSTRUCT 36" ADS DRAIN BASIN WITH DOME GRATE PER DETAIL ON SHEET 16	3 EA
052	CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. PLAN 300-4, (WIDTH PER PLAN) WITH CURB INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN DECK	4 EA
053	CONSTRUCT CURBSIDE OPENING CATCH BASIN WITH GRATINGS PER SPPWC STD. PLAN 302-4 WITH CURB INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ON TOP OF BASIN WALLS. (4 GRATES)	1 EA
054	CONSTRUCT GRATING CATCH BASIN PER SPPWC STD. PLAN 304-4 (NUMBER OF GRATES PER PLAN) WITH GRATED INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN WALLS	4 EA
056	CONSTRUCT GRATING CATCH BASIN LOCAL DEPRESSION PER DETAIL ON SHEET 16	1 EA
057	CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. PLAN 320-2	5 EA
058	CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. PLAN 321-2	1 EA
069	CONSTRUCT STORM DRAIN CLEANOUT PER DETAIL ON SHEET 16	7 EA
0125	CONSTRUCT RIP RAP & CUT-OFF WALL PER COUNTY OF RIVERSIDE STANDARD NO. 314 AND DETAIL ON SHEET 12	3 EA
0162	INSTALL ADS FLARED END SECTION, PIPE DIAMETER PER PLAN	2 EA
0163	INSTALL CONTECH FLARED END SECTION, PIPE DIAMETER PER PLAN	1 EA

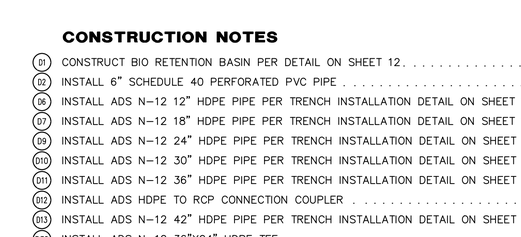


SHEET INDEX MAP

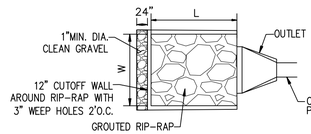
N.T.S.

0 100 200 400 600

SCALE 1" = 200'

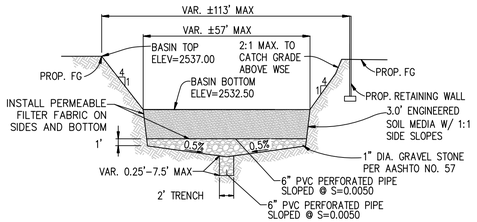


LINE	LENGTH (L)	WIDTH (W)	THICKNESS (T)	CUTOFF WALL DEPTH	ROCK CLASS
A	14'	10'	1.25'	3.15'	NO. 2 BACKING
C	10'	10'	1.25'	3.15'	NO. 2 BACKING
D	10'	10'	1.25'	3.15'	NO. 2 BACKING

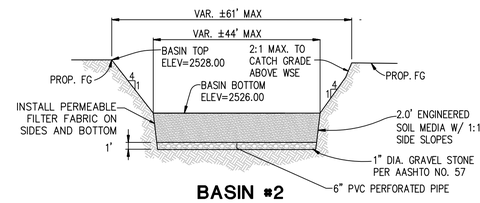


D125 RIP-RAP AND CUTOFF WALL DETAIL

NOT TO SCALE



BASIN #1

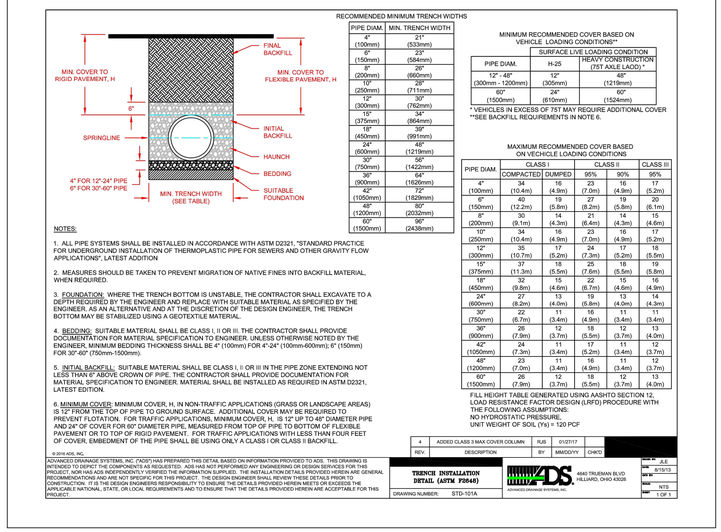


BASIN #2

ENGINEERED SOIL MEDIA REQUIREMENTS	
PERCENT RANGE	COMPONENT
70-75	WASHED NURSERY SAND
25-30	ORGANIC COMPOST

D1 BIO-RETENTION BASIN TYP. SECTION

NOT TO SCALE



RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4" (100mm)	21" (533mm)
6" (150mm)	23" (584mm)
8" (200mm)	26" (660mm)
10" (250mm)	28" (711mm)
12" (300mm)	30" (762mm)
15" (375mm)	34" (864mm)
18" (450mm)	39" (991mm)
24" (600mm)	48" (1219mm)
30" (750mm)	56" (1422mm)
36" (900mm)	64" (1626mm)
42" (1050mm)	72" (1829mm)
48" (1200mm)	80" (2032mm)
60" (1500mm)	96" (2438mm)

MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS**

PIPE DIAM.	SURFACE LIVE LOADING CONDITION	
	H-25	HEAVY CONSTRUCTION (75T AXLE LAOD) *
12"-48" (300mm - 1200mm)	12" (305mm)	48" (1219mm)
60" (1500mm)	24" (610mm)	60" (1524mm)

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER
**SEE BACKFILL REQUIREMENTS IN NOTE 6.

MAXIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

PIPE DIAM.	CLASS I		CLASS II	CLASS III
	COMPACTED	DUMPED	95%	95%
4" (100mm)	34 (10.4m)	16 (4.9m)	23 (7.0m)	17 (5.2m)
6" (150mm)	40 (12.2m)	19 (5.8m)	27 (8.2m)	20 (6.1m)
8" (200mm)	30 (9.1m)	14 (4.3m)	21 (6.4m)	15 (4.6m)
10" (250mm)	34 (10.4m)	16 (4.9m)	23 (7.0m)	17 (5.2m)
12" (300mm)	36 (10.7m)	17 (5.2m)	24 (7.3m)	18 (5.5m)
15" (375mm)	37 (11.3m)	18 (5.5m)	25 (7.6m)	19 (5.8m)
18" (450mm)	32 (9.8m)	15 (4.6m)	22 (6.7m)	16 (4.9m)
24" (600mm)	27 (8.2m)	13 (4.0m)	19 (5.8m)	14 (4.3m)
30" (750mm)	22 (6.7m)	11 (3.4m)	16 (4.9m)	11 (3.4m)
36" (900mm)	25 (7.9m)	12 (3.7m)	18 (5.5m)	13 (4.0m)
42" (1050mm)	24 (7.3m)	11 (3.4m)	17 (5.2m)	12 (3.7m)
48" (1200mm)	23 (7.0m)	11 (3.4m)	16 (4.9m)	12 (3.7m)
60" (1500mm)	26 (7.9m)	12 (3.7m)	18 (5.5m)	13 (4.0m)

FILL HEIGHT TABLE GENERATED USING AASHTO SECTION 12, LOAD RESISTANCE FACTOR DESIGN (LRFD) PROCEDURE WITH THE FOLLOWING ASSUMPTIONS:
NO HYDROSTATIC PRESSURE,
UNIT WEIGHT OF SOIL (Ys) = 120 PCF

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION.

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER, AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. FOR TRAFFIC APPLICATIONS WITH LESS THAN FOUR FEET OF COVER, EMBEDMENT OF THE PIPE SHALL BE USING ONLY A CLASS I OR CLASS II BACKFILL.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
4	ADDED CLASS 3 MAX COVER COLUMN	RJS	01/27/17	

© 2016 ADS, INC.

ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON INFORMATION PROVIDED TO ADS. THIS DRAWING IS INTENDED TO DEPICT THE COMPONENTS AS REQUESTED. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT. NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS ONLY. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER OF RECORD TO REVIEW THESE DETAILS FOR CONSTRUCTION. IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ENSURE THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL / STATE OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

TRENCH INSTALLATION DETAIL (ASTM F9648)

DRAWING NUMBER: STD-101A

4640 TRUEMAN BLVD
HILLIARD, OHIO 43026

DATE: 8/15/13
SCALE: NTS
SHEET: 1 OF 1

TRENCH INSTALLATION DETAIL

NOT TO SCALE

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:
CITY OF BEAUMONT MONUMENT "N-71 RESET 1960"
LOCATION:
70 YARDS NE OF THE NE CORNER OF THE SOUTHERN PACIFIC COMPANY RAILROAD STATION, 170 YARDS NW OF CALIFORNIA STREET ON THE SOUTHER SIDE. THE NEW HIGHWAY 60, 70 AND 99 BEING CONSTRUCTED THROUGH BEAUMONT. 21 FEET NORTHERLY OF THE CENTERLINE OF THE NEW 4TH STREET. 2 FEET SOUTHEAST FROM THE WESTERLY END OF THE WALL 2.7' BELOW THE TOP OF THE WALL 2" ABOVE THE CURB AND SET IN TOP OF THE CONCRETE POST.
ELEV. 2573.72, NGVD 29

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

HUITT ZOLLARS
3990 CONCOURS, SUITE 330, ONTARIO, CALIFORNIA 91764
Phone (909) 941-7799, www.huitt-zollars.com

PREPARED UNDER THE SUPERVISION OF: JOHNNY MURAD

JOHNNY MURAD
R.C.E. 67512
7-26-24
DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — JOHNNY MURAD — NO. 67512 EXPIRATION 6-30-2025 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: J.M./M.M.
DRAWN BY: HZ-STAFF
CHECKED BY: J.M.
SCALE: AS SHOWN
DATE: 3/18/2024
JOB NUMBER: R312838.01

BEAUMONT — CALIFORNIA

Reviewed By: _____ Date: _____
Staff Engineer

Recommended for Approval By: _____ Date: _____
Administrative Engineer

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

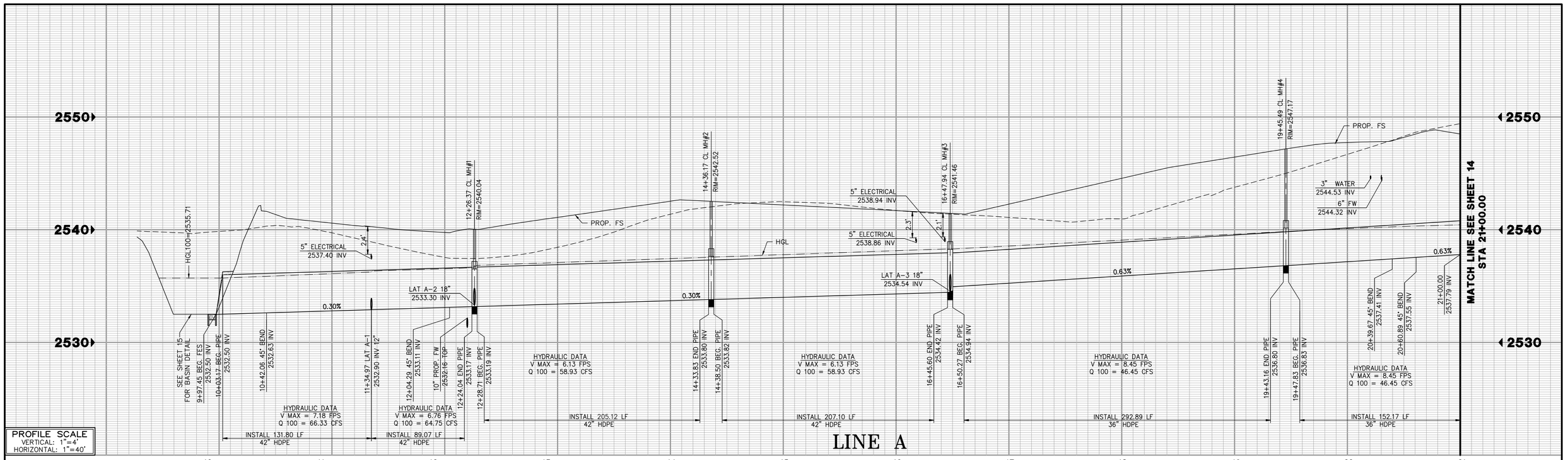
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLANS
ORCHARD LOGISTICS CENTER
745 NICHOLAS ROAD

ON-SITE STORM DRAIN NOTES, DETAILS AND QUANTITIES

SHEET 12 OF 20 SHEETS
FILE NO: PW2024-0049

h:\proj\R312838.01 - TCC - Bowling Ind\05 Design\051 DVGs\PreciseGrading\LPGR12-16-D52.dwg, Layout: 12, Jul 26, 2024 - 2:31pm

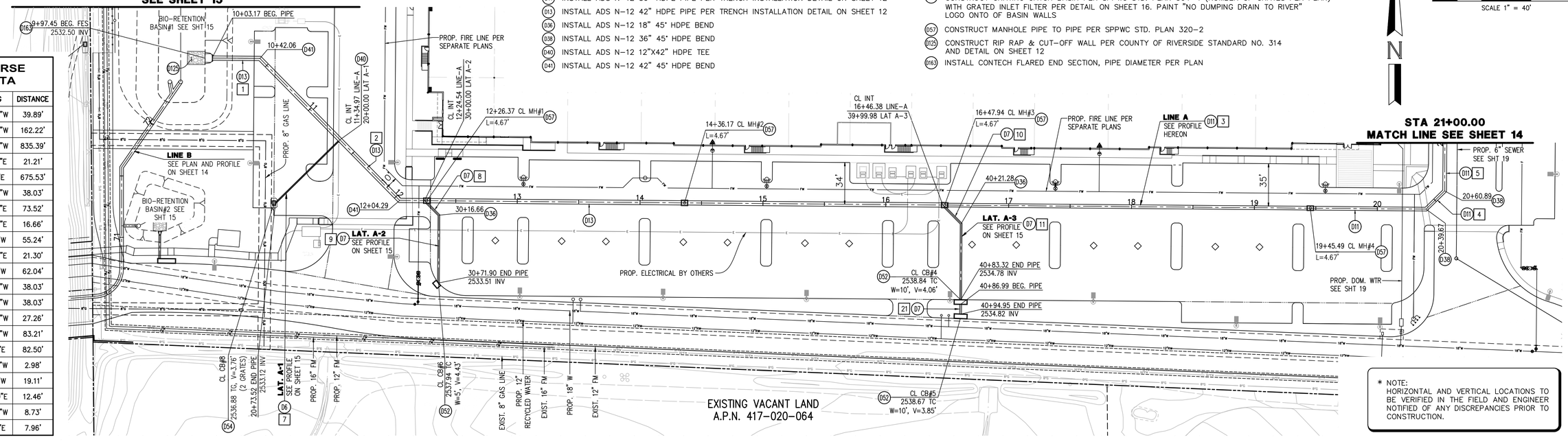


PROFILE SCALE
VERTICAL: 1"=4'
HORIZONTAL: 1"=40'

LINE A

CONSTRUCTION NOTES

(06) INSTALL ADS N-12 12" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(07) INSTALL ADS N-12 18" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(011) INSTALL ADS N-12 36" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(013) INSTALL ADS N-12 42" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(036) INSTALL ADS N-12 18" 45° HDPE BEND
(038) INSTALL ADS N-12 36" 45° HDPE BEND
(040) INSTALL ADS N-12 12"X42" HDPE TEE
(041) INSTALL ADS N-12 42" 45° HDPE BEND
(052) CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. PLAN 300-4, (WIDTH PER PLAN) WITH CURB INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN DECK
(054) CONSTRUCT GRATING CATCH BASIN PER SPPWC STD. PLAN 304-4 (NUMBER OF GRATES PER PLAN) WITH GRATED INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN WALLS
(057) CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. PLAN 320-2
(0122) CONSTRUCT RIP RAP & CUT-OFF WALL PER COUNTY OF RIVERSIDE STANDARD NO. 314 AND DETAIL ON SHEET 12
(0163) INSTALL CONTECH FLARED END SECTION, PIPE DIAMETER PER PLAN



COURSE DATA

	BEARING	DISTANCE
1	N89°30'49"W	39.89'
2	N44°30'49"W	162.22'
3	N89°30'49"W	835.39'
4	N45°29'11"E	21.21'
5	N0°29'11"E	675.53'
6	N59°30'49"W	38.03'
7	N45°29'11"E	73.52'
8	S44°36'14"E	16.66'
9	S0°23'46"W	55.24'
10	S44°36'14"E	21.30'
11	S0°23'46"W	62.04'
12	N59°30'49"W	38.03'
13	N59°30'49"W	38.03'
14	N89°30'49"W	27.26'
15	S34°37'24"W	83.21'
16	S0°00'00"E	82.50'
17	S85°08'13"W	2.98'
18	S0°37'20"W	19.11'
19	N90°00'00"E	12.46'
20	N10°22'36"W	8.73'
21	N0°23'46"E	7.96'

* NOTE:
HORIZONTAL AND VERTICAL LOCATIONS TO BE VERIFIED IN THE FIELD AND ENGINEER NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
CITY OF BEAUMONT MONUMENT "N-71 RESET 1960"
LOCATION:
70 YARDS NE OF THE NE CORNER OF THE SOUTHERN PACIFIC COMPANY RAILROAD STATION, 170 YARDS NW OF CALIFORNIA STREET ON THE SOUTHER SIDE. THE NEW HIGHWAY 60, 70 AND 99 BEING CONSTRUCTED THROUGH BEAUMONT. 21 FEET NORTHERLY OF THE CENTERLINE OF THE NEW 4TH STREET. 2 FEET SOUTHEAST FROM THE WESTERLY END OF THE WALL 2.7' BELOW THE TOP OF THE WALL 2" ABOVE THE CURB AND SET IN TOP OF THE CONCRETE POST.
ELEV. 2573.72, NGVD 29

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

HUITT ZOLLARS
3990 CONCOURS, SUITE 330, ONTARIO, CALIFORNIA 91764
Phone (909) 941-7799, www.huitt-zollars.com

PREPARED UNDER THE SUPERVISION OF: JOHNNY MURAD

JOHNNY MURAD
R.C.E. 67512
7-26-24
DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
JOHNNY MURAD
NO. 67512
EXPIRATION
6-30-2025
CIVIL
STATE OF CALIFORNIA

DESIGN BY: J.M./M.M.
DRAWN BY: HZ-STAFF
CHECKED BY: J.M.
SCALE: AS SHOWN
DATE: 3/18/2024
JOB NUMBER: R312838.01

BEAUMONT
CALIFORNIA

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

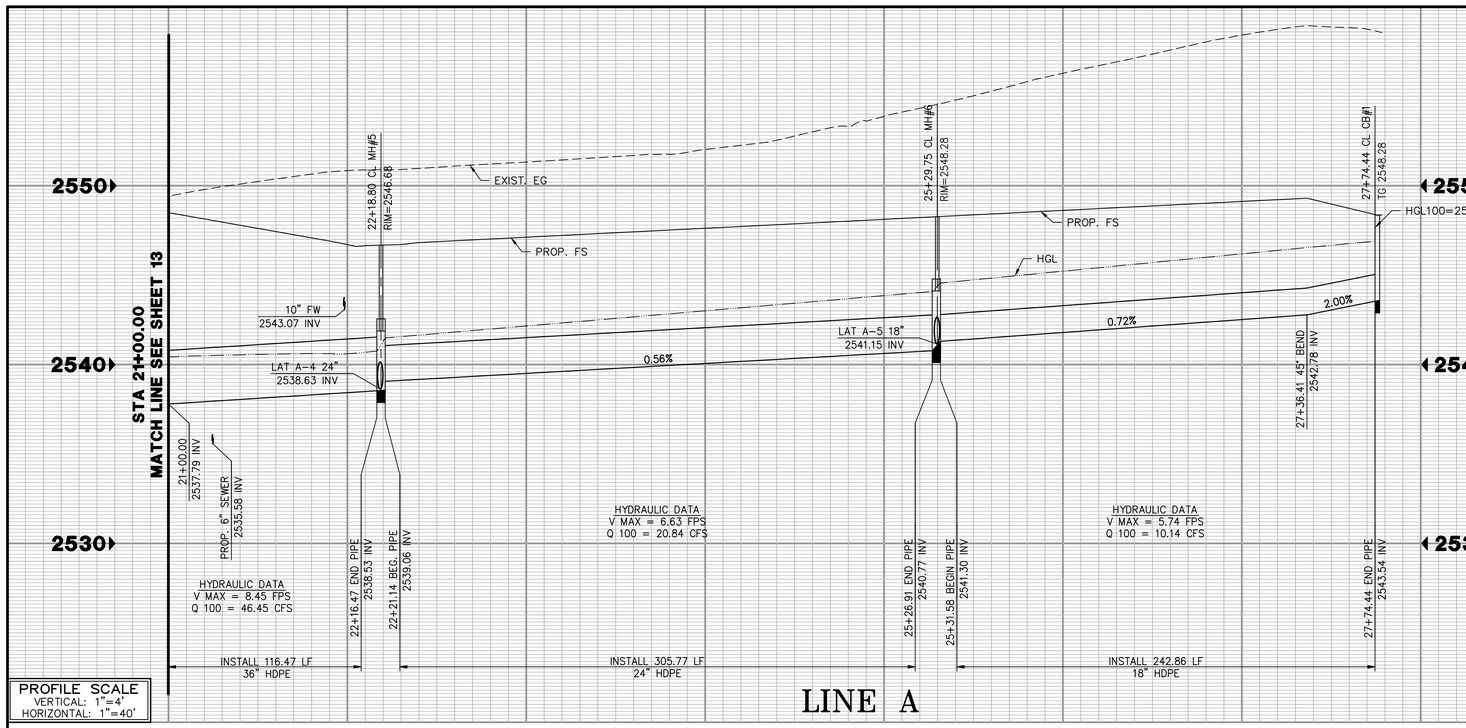
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St.
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLANS
ORCHARD LOGISTICS CENTER
745 NICHOLAS ROAD

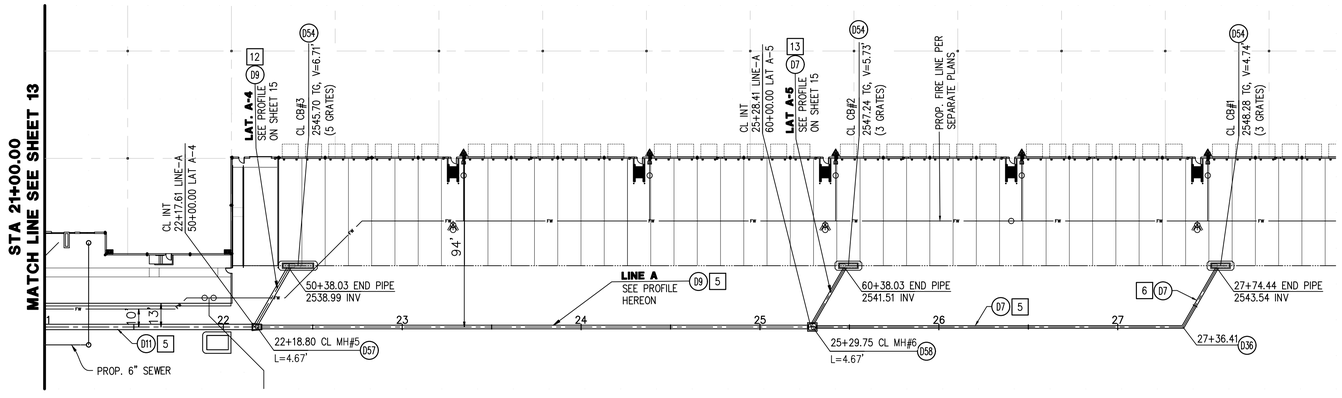
STORM DRAIN PLAN AND PROFILE

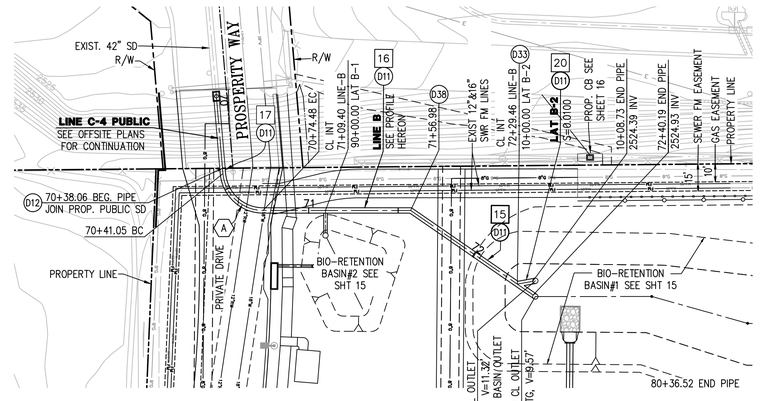
SHEET 13 OF 20 SHEETS
FILE NO: PW2024-0049

H:\proj\R312838.01 - TCC - Boeing Ind\05 Design\051 DWGs\PreciseGrading\LPGR12-16-DSD.dwg, Layout: 13, Jul 26, 2024 - 2:31pm



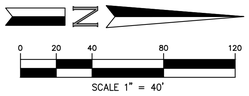
PROFILE SCALE
VERTICAL: 1"=4'
HORIZONTAL: 1"=40'

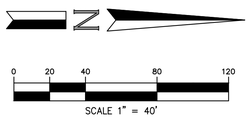




CONSTRUCTION NOTES

(D7) INSTALL ADS N-12 18" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(D9) INSTALL ADS N-12 24" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(D11) INSTALL ADS N-12 36" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(D12) INSTALL ADS HDPE TO RCP CONNECTION COUPLER
(D33) INSTALL ADS N-12 36" HDPE WYE-TEE
(D36) INSTALL ADS N-12 18" 45° HDPE BEND
(D38) INSTALL ADS N-12 36" 45° HDPE BEND
(D48) CONSTRUCT 36" ADS DRAIN BASIN WITH DOME GRATE PER DETAIL ON SHEET 16
(D54) CONSTRUCT GRATING CATCH BASIN PER SPPWC STD. PLAN 304-4 (NUMBER OF GRATES PER PLAN) WITH GRATED INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN WALLS
(D57) CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. PLAN 320-2
(D58) CONSTRUCT MANHOLE PIPE TO PIPE PER SPPWC STD. PLAN 321-2





COURSE DATA

	BEARING	DISTANCE
1	N89°30'49"W	39.89'
2	N44°30'49"W	162.22'
3	N89°30'49"W	835.39'
4	N45°29'11"E	21.21'
5	N0°29'11"E	675.53'
6	N59°30'49"W	38.03'
7	N45°29'11"E	73.52'
8	S44°36'14"E	16.66'
9	S0°23'46"W	55.24'
10	S44°36'14"E	21.30'
11	S0°23'46"W	62.04'
12	N59°30'49"W	38.03'
13	N59°30'49"W	38.03'
14	N89°30'49"W	27.26'
15	S34°37'24"W	83.21'
16	S0°00'00"E	82.50'
17	S85°08'13"W	2.98'
18	S0°37'20"W	19.11'
19	N90°00'00"E	12.46'
20	N10°22'36"W	8.73'
21	N0°23'46"E	7.96'

COURSE DATA

	Δ	R	L	T
A	85°8'13"	22.50'	33.43'	20.67

* NOTE:
HORIZONTAL AND VERTICAL LOCATIONS TO BE VERIFIED IN THE FIELD AND ENGINEER NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
CITY OF BEAUMONT MONUMENT "N-71 RESET 1960"
LOCATION:
70 YARDS NE OF THE NE CORNER OF THE SOUTHERN PACIFIC COMPANY RAILROAD STATION, 170 YARDS NW OF CALIFORNIA STREET ON THE SOUTHER SIDE. THE NEW HIGHWAY 60, 70 AND 99 BEING CONSTRUCTED THROUGH BEAUMONT. 21 FEET NORTHERLY OF THE CENTERLINE OF THE NEW 4TH STREET, 2 FEET SOUTHEAST FROM THE WESTERLY END OF THE WALL 2.7' BELOW THE TOP OF THE WALL 2" ABOVE THE CURB AND SET IN TOP OF THE CONCRETE POST.
ELEV. 2573.72, NGVD 29

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

HUITT ZOLLARS
3990 CONCOURS, SUITE 330, ONTARIO, CALIFORNIA 91764
Phone (909) 941-7799, www.huitt-zollars.com
PREPARED UNDER THE SUPERVISION OF: JOHNNY MURAD
JOHNNY MURAD
R.C.E. 67512
7-26-24
DATE

SEAL
REGISTERED PROFESSIONAL ENGINEER
JOHNNY MURAD
NO. 67512
EXPIRATION
6-30-2025
CIVIL
STATE OF CALIFORNIA

DESIGN BY: J.M. /M.M.
DRAWN BY: HZ-STAFF
CHECKED BY: J.M.
SCALE: AS SHOWN
DATE: 3/18/2024
JOB NUMBER: R312838.01

BEAUMONT
CALIFORNIA

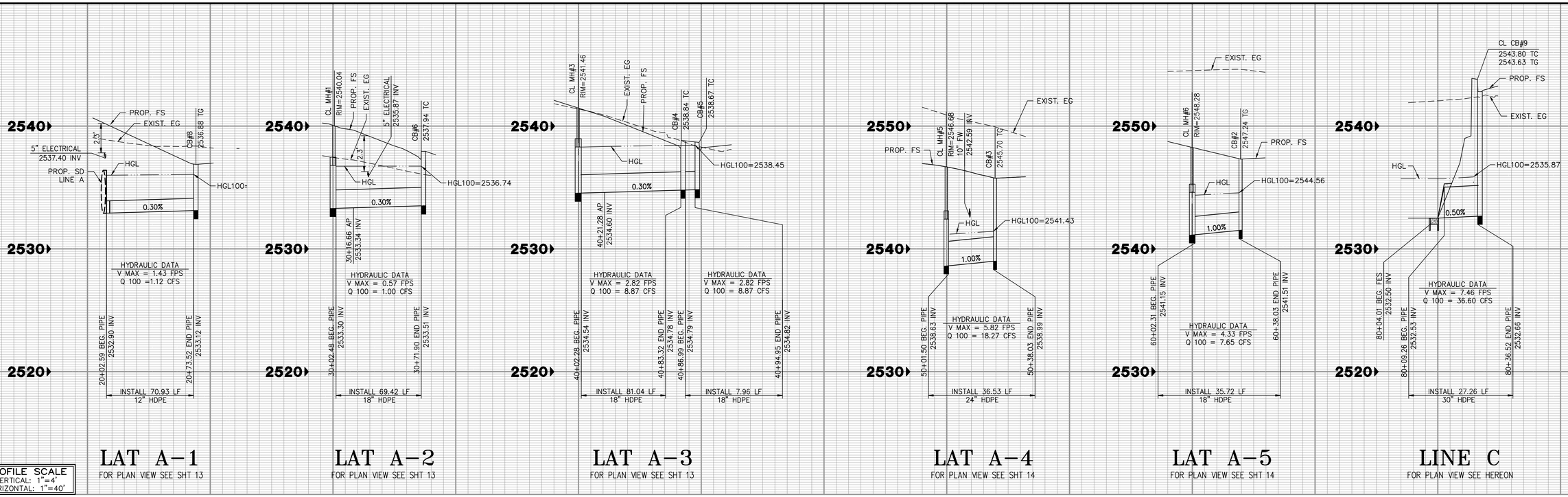
Reviewed By: _____ Staff Engineer Date: _____
Recommended for Approval By: _____ Administrative Engineer Date: _____
Approved By: _____ City Engineer/Director of Public Works Date: _____

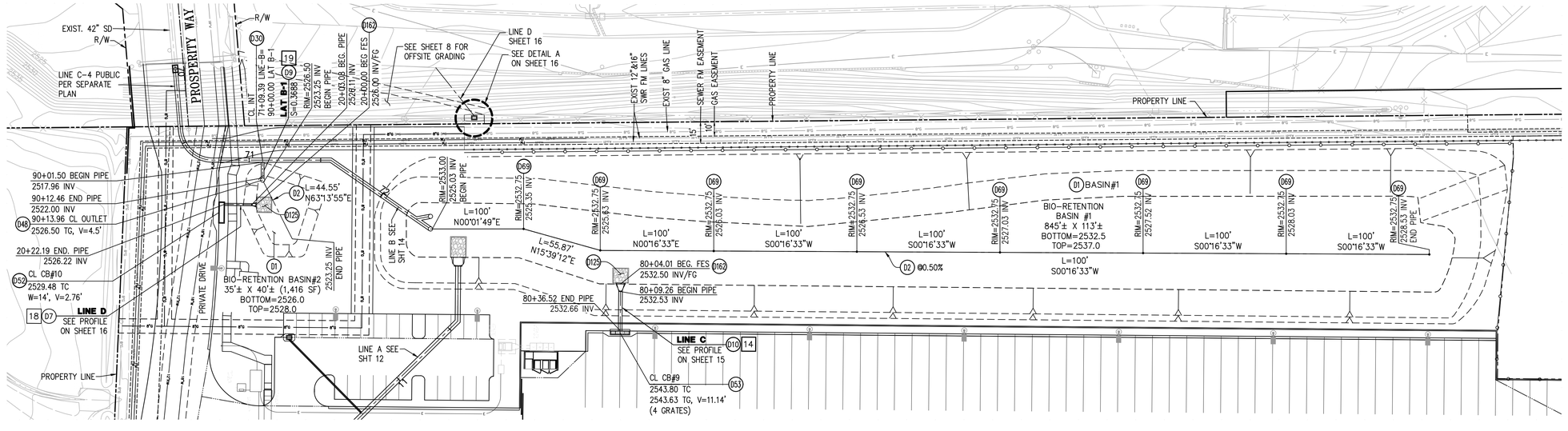
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLANS
ORCHARD LOGISTICS CENTER
745 NICHOLAS ROAD
STORM DRAIN PLAN AND PROFILE

SHEET 14 OF 20 SHEETS
FILE NO: PW2024-0049

H:\proj\R312838.01 - TCC - Doming Ind\05 Design\051 DWG's\Precise Grading\LPGR12-16-D51.dwg, Layout: 14, Jul 26, 2024 2:31pm





CONSTRUCTION NOTES

(D1) CONSTRUCT BIO RETENTION BASIN PER DETAIL ON SHEET 12
(D2) INSTALL 6" SCHEDULE 40 PERFORATED PVC PIPE
(D7) INSTALL ADS N-12 18" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(D9) INSTALL ADS N-12 24" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(D10) INSTALL ADS N-12 30" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12
(D30) INSTALL ADS N-12 36"X24" HDPE TEE
(D48) CONSTRUCT 36" ADS DRAIN BASIN WITH DOME GRATE PER DETAIL ON SHEET 16
(D52) CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. PLAN 300-4, (WIDTH PER PLAN) WITH CURB INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN DECK
(D53) CONSTRUCT CURBSIDE OPENING CATCH BASIN WITH GRATINGS PER SPPWC STD. PLAN 302-4 WITH CURB INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ON TOP OF BASIN WALLS. (4 GRATES)
(D69) CONSTRUCT STORM DRAIN CLEANOUT PER DETAIL ON SHEET 16
(D125) CONSTRUCT RIP RAP & CUT-OFF WALL PER COUNTY OF RIVERSIDE STANDARD NO. 314 AND DETAIL ON SHEET 12
(D162) INSTALL ADS FLARED END SECTION, PIPE DIAMETER PER PLAN

COURSE DATA		
	BEARING	DISTANCE
1	N89°30'49"W	39.89'
2	N44°30'49"W	162.22'
3	N89°30'49"W	835.39'
4	N45°29'11"E	21.21'
5	N0°29'11"E	675.53'
6	N59°30'49"W	38.03'
7	N45°29'11"E	73.52'
8	S44°36'14"E	16.66'
9	S0°23'46"W	55.24'
10	S44°36'14"E	21.30'
11	S0°23'46"W	62.04'
12	N59°30'49"W	38.03'
13	N59°30'49"W	38.03'
14	N89°30'49"W	27.26'
15	S34°37'24"W	83.21'
16	S0°00'00"E	82.50'
17	S85°08'13"W	2.98'
18	S0°37'20"W	19.11'
19	N90°00'00"E	12.46'
20	N10°22'36"W	8.73'
21	N0°23'46"E	7.96'

N

0 20 40 80 120
SCALE 1" = 40'

* NOTE:
HORIZONTAL AND VERTICAL LOCATIONS TO BE VERIFIED IN THE FIELD AND ENGINEER NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
CITY OF BEAUMONT MONUMENT "N-71 RESET 1960"
LOCATION:
70 YARDS NE OF THE NE CORNER OF THE SOUTHERN PACIFIC COMPANY RAILROAD STATION, 170 YARDS NW OF CALIFORNIA STREET ON THE SOUTHER SIDE. THE NEW HIGHWAY 60, 70 AND 99 BEING CONSTRUCTED THROUGH BEAUMONT. 21 FEET NORTHERLY OF THE CENTERLINE OF THE NEW 4TH STREET. 2 FEET SOUTHEAST FROM THE WESTERLY END OF THE WALL 2.7' BELOW THE TOP OF THE WALL 2" ABOVE THE CURB AND SET IN TOP OF THE CONCRETE POST.
ELEV. 2573.72, NGVD 29

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

HUITT ZOLLARS
3990 CONCOURS, SUITE 330, ONTARIO, CALIFORNIA 91764
Phone (909) 941-7799, www.huitt-zollars.com
PREPARED UNDER THE SUPERVISION OF: JOHNNY MURAD
JOHNNY MURAD R.C.E. 67512 — 7-26-24 DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER, JOHNNY MURAD, NO. 67512, EXPIRATION 6-30-2025, CIVIL, STATE OF CALIFORNIA

DESIGN BY: J.M./M.M.
DRAWN BY: HZ-STAFF
CHECKED BY: J.M.
SCALE: AS SHOWN
DATE: 3/18/2024
JOB NUMBER: R312838.01

BEAUMONT CALIFORNIA

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

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

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLANS
ORCHARD LOGISTICS CENTER
745 NICHOLAS ROAD
STORM DRAIN PLAN AND LATERAL PROFILE

SHEET 15 OF 20 SHEETS
FILE NO: PW2024-0049

H:\proj\R312838.01 - TCC - Bowing Ind\05 Design\05.1 DWGs\PreciseGrading\LPGR12-16-D53.dwg, Layout: 15, Jul 26, 2024 - 2:31pm

BIO CLEAN FULL CAPTURE FILTER WITH TROUGH SYSTEM
FOR USE IN CURB INLETS

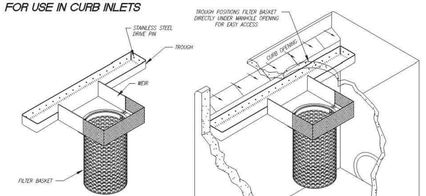


FIGURE 1:
DETAIL OF PARTS

FIGURE 2:
DETAIL OF CONFIGURATION

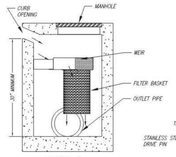


FIGURE 4:
DETAIL OF PROFILE



FIGURE 3:
DETAIL OF MOUNTING

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-FC-30	2.85	2.21
BC-CURB-FC-24	2.85	1.77
BC-CURB-FC-18	2.85	1.33
BC-CURB-FC-12	2.85	0.88

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS — MEETS FULL CAPTURE REQUIREMENTS

TREATMENT FLOW RATE: 2.85 cfs — MODEL #: BC-CURB-FC-

WARRANTY: 5 YEAR MANUFACTURERS

BIO CLEAN ENVIRONMENTAL SERVICES, INC.
305 VIA EL CENTRO, OCEANSIDE CA 92058
PHONE:(760)-433-7640 FAX:(760)-433-3176

DATE: 10/12/2017 — SCALE: NTS — DRAFTER: M.C.P.

PROJECT: — REVISIONS: — DATE: — REVISIONS: — DATE: — REVISIONS: — DATE:

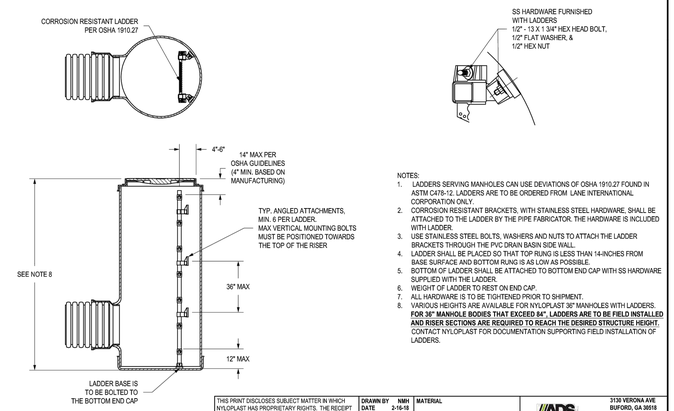
NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING. (3') TO DIVERT ALL FLOW TO FILTER.
2. FILTER BASKET IS MANUFACTURED FROM MARINE GRADE FIBERGLASS, UES (GARDEN) CONSTRUCTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 1008 STAINLESS STEEL
5. FILTER MADE OF NON-CLOGGIN SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 10'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
10. FLOW RATE IS CALCULATED AT A CAPACITY OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
11. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
12. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

Bio Clean
A Forterra Company

PAGE 1

D52 CURB INLET FILTER
NOT TO SCALE

NYLOPLAST 36" STRUCTURE WITH LADDER DETAIL



NOTES:
1. LADDERS SERVING MANHOLES CAN USE DEVIATIONS OF OSHA 1910.27 FOUND IN ASTM C478-12. LADDERS ARE TO BE ORDERED FROM LANE INTERNATIONAL CORPORATION ONLY.
2. CORROSION RESISTANT BRACKETS, WITH STAINLESS STEEL HARDWARE, SHALL BE ATTACHED TO THE LADDER BY THE PIPE FABRICATOR. THE HARDWARE IS INCLUDED WITH LADDER.
3. USE STAINLESS STEEL BOLTS, WASHERS AND NUTS TO ATTACH THE LADDER BRACKETS THROUGH THE PVC DRAIN BASIN SIDE WALL.
4. LADDER SHALL BE PLACED SO THAT TOP RUNG IS LESS THAN 14-INCHES FROM BASE SURFACE AND BOTTOM RUNG IS AS LOW AS POSSIBLE.
5. BOTTOM OF LADDER SHALL BE ATTACHED TO BOTTOM END CAP WITH SS HARDWARE SUPPLIED WITH THE LADDER.
6. WEIGHT OF LADDER TO REST ON END CAP.
7. ALL HARDWARE IS TO BE TIGHTENED PRIOR TO SHIPMENT.
8. VARIOUS HEIGHTS ARE AVAILABLE FOR NYLOPLAST 36" MANHOLES WITH LADDERS. **FOR 36" MANHOLE BODIES THAT EXCEED 84", LADDERS ARE TO BE FIELD INSTALLED AND RISER SECTIONS ARE REQUIRED TO REACH THE DESIRED STRUCTURE HEIGHT.** CONTACT NYLOPLAST FOR DOCUMENTATION SUPPORTING FIELD INSTALLATION OF LADDERS.

THIS PRINT DISCLOSES SUBJECT MATTER IN WHICH NYLOPLAST HAS PROPRIETARY RIGHTS. THE RECEIPT OR POSSESSION OF THIS PRINT DOES NOT CONFER, TRANSFER, OR LICENSE THE USE OF THE DESIGN OR TECHNICAL INFORMATION SHOWN HEREIN. REPRODUCTION OF THIS PRINT OR ANY INFORMATION CONTAINED HEREIN, OR MANUFACTURE OF ANY ARTICLE HEREFROM, FOR THE DISCLOSURE TO OTHERS IS FORBIDDEN, EXCEPT BY SPECIFIC WRITTEN PERMISSION FROM NYLOPLAST.
©2021 NYLOPLAST

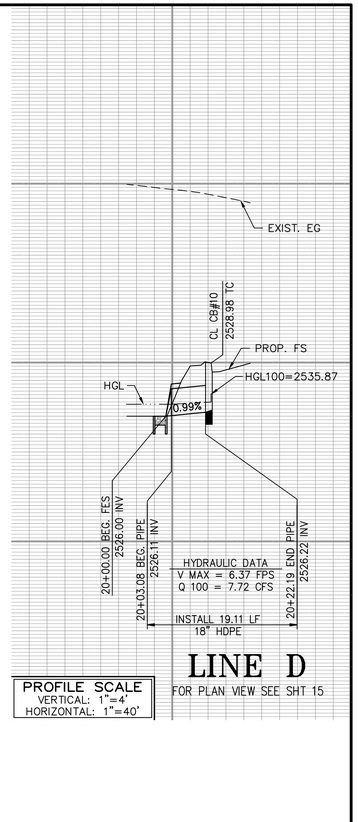
DRAWN BY	NMH	MATERIAL	
DATE	2-16-18		
APPD BY	NMH		
DATE	2-16-18	PROJECT NO./NAME	
REVSD BY	NMH		
DATE	10-04-21		
APPD BY	NMH		
DATE	10-04-21		
DWG SIZE	A	SCALE 1:30	SHEET 1 OF 1

ADS Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-3443
FAX (770) 932-2490
www.nyloplast-us.com

TITLE: NYLOPLAST 36" STRUCTURE WITH LADDER DETAIL

DWG NO. 7001-110-528 REV B

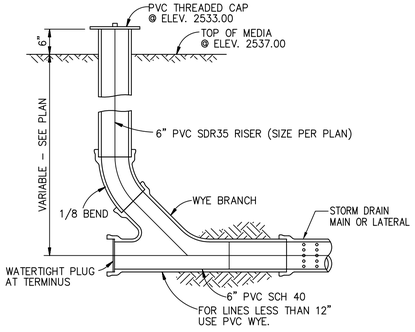
D48 ADS DRAIN BASIN
NOT TO SCALE



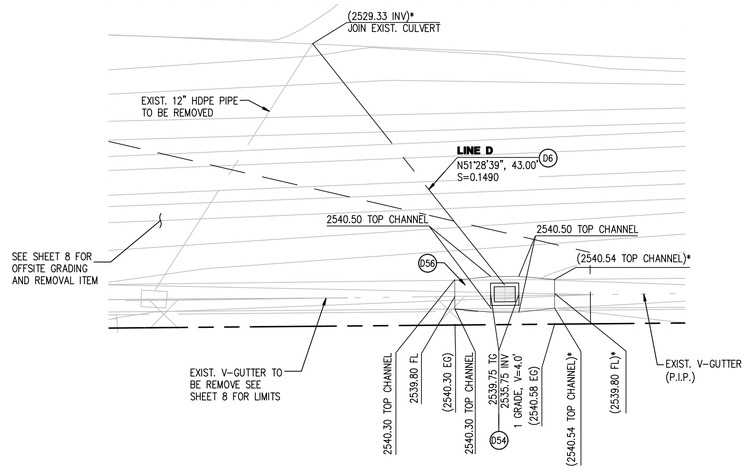
LINE D

PROFILE SCALE
VERTICAL: 1"=4'
HORIZONTAL: 1"=40'

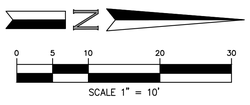
FOR PLAN VIEW SEE SHT 15

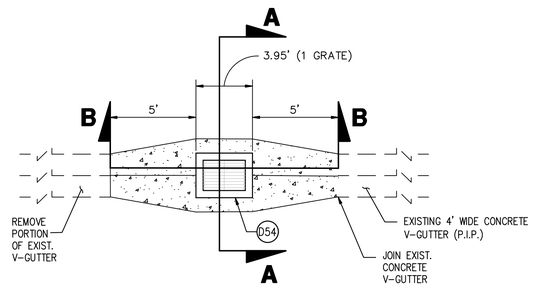


D69 STORM DRAIN CLEANOUT
NOT TO SCALE

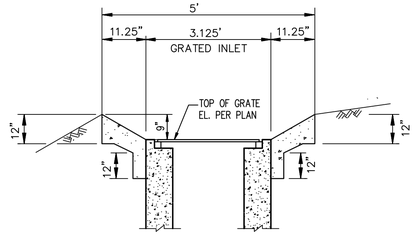


DETAIL A
1"=10'

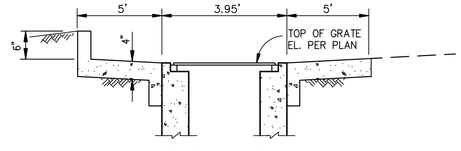




D56 GRATING INLET LOCAL DEPRESSION DETAIL
NOT TO SCALE



SECTION A-A



SECTION B-B

CONSTRUCTION NOTES

(D6) INSTALL ADS N-12 12" HDPE PIPE PER TRENCH INSTALLATION DETAIL ON SHEET 12

(D54) CONSTRUCT GRATING CATCH BASIN PER SPPWC STD. PLAN 304-4 (NUMBER OF GRATES PER PLAN) WITH GRATED INLET FILTER PER DETAIL ON SHEET 16. PAINT "NO DUMPING DRAIN TO RIVER" LOGO ONTO OF BASIN WALLS

(D56) CONSTRUCT GRATING CATCH BASIN LOCAL DEPRESSION PER DETAIL ON SHEET 16

* NOTE:
HORIZONTAL AND VERTICAL LOCATIONS TO BE VERIFIED IN THE FIELD AND ENGINEER NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

Trash Capture Products

Grate Inlet Filter

The Bio Clean Grate Inlet Filter for catch basins keeps property owners in compliance. Preferred by public agencies and backed by an 8 year warranty, this easy to install filter is continuously chosen for its durability and simple maintenance.

Constructed of 100% high grade stainless steel, it is built to last longer than any other filter brand. The non-clogging screens provide higher levels of filtration and water flow. The filter is equipped with unimpeded high flow bypass for even the largest storm events.

The filter is also equipped with a floating hydrocarbon boom mounted to rails allowing it to flow up and down with the water level over a range of flow conditions.

The filter is designed for grated inlets of any size and depth. Each filter can be custom built to meet specific project needs. Screen size and media type can be modified to remove specific pollutants.

Advantages and Performance

- 8 Year warranty
- Custom sizes available
- No nets or geofabrics
- 15+years user life
- No replacement costs as found with fabric filters
- Meets LEED requirements
- Fits in shallow catch basins
- 100% removal of trash and debris
- Meets full capture requirements

100% Full trash capture

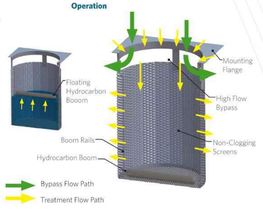


Specifications

Model #	Treatment Flow (CFS)	Bypass Flow (CFS)
BC-GRATE-12-12-12	1.55	1.55
BC-GRATE-18-18-18	4.32	3.68
BC-GRATE-24-24-24	7.67	4.83
BC-GRATE-30-30-24	12.97	6.21
BC-GRATE-25-38-24	13.53	6.59
BC-GRATE-36-36-24	19.64	7.60
BC-GRATE-48-48-18	25.59	10.13

NOTE: Treatment and bypass flow rates include a safety factor of 2.

Operation



24

D54 GRATE INLET FILTER
NOT TO SCALE

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:
CITY OF BEAUMONT MONUMENT "N-71 RESET 1960"
LOCATION:
70 YARDS NE OF THE NE CORNER OF THE SOUTHERN PACIFIC COMPANY RAILROAD STATION, 170 YARDS NW OF CALIFORNIA STREET ON THE SOUTHER SIDE. THE NEW HIGHWAY 60, 70 AND 99 BEING CONSTRUCTED THROUGH BEAUMONT. 21 FEET NORTHERLY OF THE CENTERLINE OF THE NEW 4TH STREET. 2 FEET SOUTHEAST FROM THE WESTERLY END OF THE WALL 2.7' BELOW THE TOP OF THE WALL 2" ABOVE THE CURB AND SET IN TOP OF THE CONCRETE POST.
ELEV. 2573.72, NGVD 29

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS		CITY

HUITT ZOLLARS
3990 CONCOURS, SUITE 330, ONTARIO, CALIFORNIA 91764
Phone (909) 941-7799, www.huitt-zollars.com

PREPARED UNDER THE SUPERVISION OF: JOHNNY MURAD

JOHNNY MURAD R.C.E. 67512 — 7-26-24 DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — JOHNNY MURAD — NO. 67512 EXPIRATION 6-30-2025 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	J.M./M.M.
DRAWN BY:	HZ-STAFF
CHECKED BY:	J.M.
SCALE:	AS SHOWN
DATE:	3/18/2024
JOB NUMBER:	R312838.01

BEAUMONT CALIFORNIA

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

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

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLANS
ORCHARD LOGISTICS CENTER
745 NICHOLAS ROAD
STORM DRAIN DETAILS

SHEET 16 OF 20 SHEETS
FILE NO: PW2024-0049

h:\proj\R312838.01 - TCC - Bowling Ind\NS Design\NS1 DWGs\PreciseGrading\LPGR12-16-DS1.dwg, Layout: 16, Jul 26, 2024 - 2:31pm

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL BUILDING

Nicholas Road, North of West 4th Street
Beaumont, California
for
Trammell Crow Company

SoCalGeo

SOUTHERN
CALIFORNIA
GEOTECHNICAL
A California Corporation

November 22, 2021

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Trammell Crow Company
3501 Jamboree Road, Suite 230
Newport Beach, California 92660

Attention: Mr. Kyle Dorand
Vice President - Development

Project No.: **21G254-1**

Subject: **Geotechnical Investigation**
Proposed Industrial Building
Nicholas Road, North of West 4th Street
Beaumont, California

Dear Mr. Dorand:

In accordance with your request, we have conducted a geotechnical investigation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

REGISTERED PROFESSIONAL ENGINEER
GREGORY K. MITCHELL
No. 2364
GEOTECHNICAL
STATE OF CALIFORNIA

Gregory K. Mitchell, GE 2364
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
ROBERT TRAZO
No. 2655
GEOTECHNICAL
STATE OF CALIFORNIA

Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 SCOPE OF SERVICES 3

3.0 SITE AND PROJECT DESCRIPTION 4

3.1 Site Conditions 4
3.2 Proposed Development 4

4.0 SUBSURFACE EXPLORATION 6

4.1 Scope of Exploration/Sampling Methods 6
4.2 Geotechnical Conditions 6

5.0 LABORATORY TESTING 8

6.0 CONCLUSIONS AND RECOMMENDATIONS 10

6.1 Seismic Design Considerations 10
6.2 Geotechnical Design Considerations 12
6.3 Site Grading Recommendations 14
6.4 Construction Considerations 18
6.5 Foundation Design and Construction 18
6.6 Floor Slab Design and Construction 20
6.7 Exterior Flatwork Design and Construction 21
6.8 Retaining Wall Design and Construction 21
6.9 Pavement Design Parameters 24

7.0 GENERAL COMMENTS 26

APPENDICES

A Plate 1: Site Location Map
Plate 2: Boring Location Plan
B Boring Logs
C Laboratory Test Results
D Grading Guide Specifications
E Seismic Design Parameters

1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Geotechnical Design Considerations

- Artificial fill soils were encountered at most of the boring locations, extending from the ground surface to depths of 2½ to 4½± feet. Additional soils classified as possible fill extend to depths of up to 6½± feet. The existing fill soils are considered to represent undocumented fill. These soils, in their present condition, are not considered suitable for support of the foundation loads of the new structure.
- The artificial fill soils are underlain by native alluvial soils. Results of laboratory testing indicate that the upper 5 to 6± feet of native alluvium possesses unfavorable consolidation/collapse characteristics.
- Remedial grading will be necessary to remove the undocumented fill soils in their entirety, the upper portion of the near-surface native alluvial soils, and any soils disturbed during the demolition process, and replace these materials as compacted structural fill soils.
- Based on conditions encountered at the boring locations and maps published by Riverside County, liquefaction is not a significant design concern for this project.

Site Preparation

- The site plan provided to our office indicates that the existing structures and pavements at the subject site will be demolished in order to facilitate the construction of the proposed development. Demolition should include all foundations, floor slabs, pavements, utilities and any other subsurface improvements that will not remain in place with the new development. Debris resultant from demolition should be disposed of off-site. Alternatively, concrete and asphalt debris may be pulverized to a maximum 2-inch particle size, and incorporated into new structural fills or it may be processed into CMB.
- Initial site stripping should include all vegetation and topsoil. Removal of numerous trees will be required, due to the current usage of the site as an orchard. Tree removal should include all significant root masses.
- Remedial grading is recommended to be performed within the proposed building area in order to remove all of the undocumented fill soils, the upper portion of the near-surface native alluvial soils, and any soils disturbed during the demolition process. The soils within the proposed building areas should be overexcavated to a depth of 5 feet below existing grade and to a depth of at least 3 feet below proposed building pad subgrade elevations. The depth of overexcavation should also be sufficient to remove any existing fill soils.
- The proposed foundation influence zones should be overexcavated to a depth of at least 3 feet below proposed foundation bearing grade.
- Following completion of the overexcavation, the exposed soils should be scarified to a depth of at least 12 inches and moisture conditioned to at least 2 to 4 percent above optimum moisture content. The overexcavation subgrade soils should then be recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.

- The new pavement and flatwork subgrade soils are recommended to be scarified to a depth of 12± inches, moisture conditioned and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density.

Building Foundations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 3,000 lbs/ft^2 maximum allowable soil bearing pressure.
- Reinforcement consisting of at least four (4) No. 5 rebars (2 top and 2 bottom) in strip footings, due to the presence of potentially expansive soils. Additional reinforcement may be necessary for structural considerations.

Building Floor Slab

- Conventional Slab-on-Grade: minimum 6 inches thick.
- Modulus of Subgrade Reaction: k = 150 psi/in.
- Reinforcement is not expected to be necessary for geotechnical considerations. The actual thickness and reinforcement of the floor slab should be determined by the structural engineer.

Pavements Design Recommendations

ASPHALT PAVEMENTS (R = 30)					
Materials	**Thickness (inches)**				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	6	8	10	11	13
Compacted Subgrade	12	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS (R = 30)				
Materials	**Thickness (inches)**			
	Autos and Light Truck Traffic (TI = 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	5½	6½	8
Compacted Subgrade (95% minimum compaction)	12	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 21P456, dated October 13, 2021. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slabs, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The subject site is located immediately northwest of the terminus of the Nicholas Road cul-de-sac, 1300± feet north of the intersection with West 4th Street in Beaumont, California. The site is bounded to the north by the Moreno Valley Freeway (60), to the east by an existing industrial building, to the south by an existing commercial/industrial building and vacant land and to the west by Western Knolls Avenue and an Amazon distribution facility. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of a roughly rectangular-shaped parcel, 30.9± acres in size. The site is presently developed as the Dowling Fruit Orchard. Three (3) buildings, ranging in size from 4,500 to 5,200± ft^2, are located in the northwest area of the site. Two (2) of the buildings are of wood-frame and stucco construction. The remaining building is of steel frame and metal panel construction. Ground surface cover on the west side of the buildings consists of Portland cement concrete and asphaltic concrete. The pavements are in fair condition with moderate cracking throughout. One (1) above-ground storage (AST) is located just east of the aforementioned buildings. Additionally, one (1) shade structure is also located in the northwest area of the site. The shade structure is of wood frame construction with a metal panel roof. This area is used for storing farming equipment. One (1) single-family residence (SFR) is located near the middle of the western property line. Ground surface cover surrounding the single-family residence consists of exposed soil with several large trees. A single dry-well is located in the central area of the site. The remaining areas of the site are presently planted with several types of medium to large fruit trees. Ground surface cover in these areas consists of exposed soil.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the southern three-quarters of the site slopes downward to the south at a gradient of 2± percent. The northern quarter of the site slopes downward to the north at a gradient of 1± percent.

3.2 Proposed Development

Based on a conceptual site plan provided to our office by the client, the site will be developed with one (1) new industrial building, 600,000± ft^2 in size, located in the central area of the site. The building will be constructed in a cross-dock configuration, with docks along most of the east and west building walls. It is expected that the building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters.

Detailed structural information has not been provided. It is assumed the building will be a single-story structure of tilt-up concrete construction, possibly incorporating limited areas of second floor mezzanine, typically supported on conventional shallow foundations with a concrete slab-on-

grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively.

No significant amounts of below grade construction, such as crawl spaces or new basements, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of up to 5± feet are expected to be necessary to achieve the proposed site grades.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration for this project consisted of seven (7) borings advanced to depths of 15 to 50± feet below the existing site grades. Two (2) of the borings were advanced to a depth of 50± feet below ground surface, as a part of the preliminary liquefaction evaluation. All of the borings were logged during drilling by a member of our staff.

The borings were advanced with hollow stem augers, by a conventional truck-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed soil samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. In-situ samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows of a 140-pound weight falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory.

The approximate locations of the borings are indicated on the Boring Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Gravel Surface

Boring No. B-1 encountered a 1± inch-thick layer of open graded gravel at the ground surface.

Artificial Fill

Artificial fill soils were encountered at the ground surface (or beneath the gravel surface) at Boring Nos. B-1 through B-6, extending from depths of 2½ to 4½± feet below ground surface. The fill soils generally consist of slightly cemented, medium dense to dense clayey fine sands, silty fine sands and fine sandy silts, and very stiff fine sandy clays. The fill soils possess a disturbed and mottled appearance, resulting in their classification as artificial fill.

Possible fill soils were encountered beneath the fill soils at Boring Nos. B-5 and B-6, extending to depths of 5½ to 6½± feet below ground surface. The possible fill soils consist of very stiff fine sandy clay and loose to medium dense silty fine sand. These soils differ in appearance to the near surface alluvium present at similar depths at the other borings, but also lack obvious indicators

of fill, such as a disturbed appearance or artificial debris content. The possible fill soils should be evaluated at the time of grading to determine if they consist of artificial fill materials.

Alluvium

Native alluvium was encountered at the ground surface at Boring No. B-7 and beneath the fill and possible fill soils at the remaining borings, extending to at least the maximum depth explored of 50± feet below ground surface. The near-surface alluvial soils, within the upper 4½ to 8± feet, generally consist of stiff fine sandy clay and medium dense clayey fine sand. These soils possess slight cementation. At depths greater than 8± feet, the alluvial soils generally consist of medium dense to dense silty fine sand and fine sandy silt. These soils possess trace to some clay and occasional cementation. Occasional layers of medium dense to very dense fine to medium sand, fine to coarse sand and very stiff clayey silt were encountered between depths of 17 to 50± feet below ground surface.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 50± feet at the time of the subsurface exploration.

Historic and recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. One monitoring well on record is located 1,312± feet east of the site. Water level readings within this monitoring well indicate a high groundwater level of 226± feet below ground surface in November 1991, and 149± feet below the ground surface in October 2010.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

All recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. Field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples have been tested to determine their consolidation and collapse potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-8 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

A representative bulk sample has been tested for its maximum dry density and optimum moisture content. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557, and are presented on Plate C-9 in Appendix C of this report. These tests are generally used to with compare the dry densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil types or soil mixes may be necessary at a later date.

Soluble Sulfates

Representative samples of the near-surface soils were submitted to a subcontracted analytical laboratory for determination of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete which comes into contact with these soils. The result of the soluble sulfate testing is not yet available. The

results of the soluble sulfate testing are presented below, and are discussed further in a subsequent section of this report.

Sample Identification	Soluble Sulfates (%)	Sulfate Classification
B-3 @ 0 to 5 feet	0.005	Not Applicable (S0)
B-5 @ 0 to 5 feet	0.001	Not Applicable (S0)

Corrosivity Testing

Representative bulk samples of the near-surface soils were submitted to a subcontracted corrosion engineering laboratory to identify potentially corrosive characteristics with respect to common construction materials. The corrosivity testing included a determination of the electrical resistivity, pH, and chloride and nitrate concentrations of the soils, as well as other tests. The results of some of these tests are presented below.

Sample Identification	Saturated Resistivity (ohm-cm)	pH	Chlorides (mg/kg)	Nitrates (mg/kg)
B-3 @ 0 to 5 feet	1,240	7.4	54	162
B-5 @ 0 to 5 feet	3,880	7.0	3.9	19

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our review, field exploration, laboratory testing and geotechnical analysis, the proposed development is considered feasible from a geotechnical standpoint. The recommendations contained in this report should be taken into the design, construction, and grading considerations.

The recommendations are contingent upon all grading and foundation construction activities being monitored by the geotechnical engineer of record. The recommendations are provided with the assumption that an adequate program of client consultation, construction monitoring, and testing will be performed during the final design and construction phases to verify compliance with these recommendations. Maintaining Southern California Geotechnical, Inc., (SCG) as the geotechnical consultant from the beginning to the end of the project will provide continuity of services. The geotechnical engineering firm providing testing and observation services shall assume the responsibility of Geotechnical Engineer of Record.

The Grading Guide Specifications, included as Appendix D, should be considered part of this report, and should be incorporated into the project specifications. The contractor and/or owner of the development should bring to the attention of the geotechnical engineer any conditions that differ from those stated in this report, or which may be detrimental for the development.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site-specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of available maps indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Furthermore, SCG did not identify any evidence of faulting during the geotechnical investigation. Therefore, the possibility of significant fault rupture on the site is considered to be low.

The potential for other geologic hazards such as seismically induced settlement, lateral spreading, tsunamis, inundation, seiches, flooding, and subsidence affecting the site is considered low.

Seismic Design Parameters

The 2019 California Building Code (CBC) provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of

the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site.

Based on standards in place at the time of this report, the proposed development is expected to be designed in accordance with the requirements of the 2019 edition of the California Building Code (CBC), which was adopted on January 1, 2020.

The 2019 CBC Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool, a web-based software application available at the website www.seismicmaps.org. This software application calculates seismic design parameters in accordance with several building code reference documents, including ASCE 7-16, upon which the 2019 CBC is based. The application utilizes a database of risk-targeted maximum considered earthquake (MCE_R) site accelerations at 0.01-degree intervals for each of the code documents. The tables below were created using data obtained from the application. The output generated from this program is included as Plate E-1 in Appendix E of this report.

The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than 0.2. However, Section 11.4.8 of ASCE 7-16 also indicates an exception to the requirement for a site-specific ground motion hazard analysis for certain structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) indicates that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." **Based on our understanding of the proposed development, the seismic design parameters presented below were calculated assuming that the exception in Section 11.4.8 applies to the proposed structure at this site. However, the structural engineer should verify that this exception is applicable to the proposed structure.** Based on the exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

2019 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_S	1.658
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.600
Site Class	---	D
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	1.658
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	1.020
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.105
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.680

It should be noted that the site coefficient F_v and the parameters S_{M1} and S_{D1} were not included in the SEAOC/OSHPD Seismic Design Maps Tool output for the 2019 CBC. We calculated these parameters-based on Table 1613.2.3(2) in Section 16.4.4 of the 2019 CBC using the value of S_1

obtained from the Seismic Design Maps Tool, assuming that a site-specific ground motion hazards analysis is not required for the proposed buildings at this site.

Liquefaction

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 (Bray and Sancio, 2006) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The Riverside County GIS website indicates that the subject site is located within a zone of low liquefaction susceptibility. In addition, the subsurface conditions encountered at the boring locations are not considered to be conducive to liquefaction. These conditions consist of moderate to high strength native alluvial soils and no evidence of a long-term groundwater table within 50 feet of the ground surface. In addition, research of available well data indicates that the groundwater depths in the area of the site are more than 100 feet below grade. Based on these considerations, liquefaction is not considered to be a design concern for this project.

6.2 Geotechnical Design Considerations

General

Most of the borings encountered artificial fill materials, extending to depths of 2½ to 4½± feet. Based their strength characteristics and a lack of documentation regarding the placement and compaction of the existing fill materials, these soils are considered to consist of undocumented fill, likely placed during previous agricultural operations at the site. Therefore, these materials are not suitable for the support of the foundation loads of the proposed building. In addition, the near surface fill and alluvium possess a potential for significant consolidation and/or collapse when exposed to load increases in the range of those that will be exerted by the foundations of the new structure. Finally, significant disturbance the upper 3 to 4 feet of soil is expected to occur during removal of the trees within the existing orchard areas. Based on these conditions, remedial grading is considered warranted within the proposed building area to completely remove the artificial fill soils and the upper portion of the near-surface native alluvium and replace these soils as compacted structural fill.

Settlement

The recommended remedial grading will remove all of the existing fill soils and a portion of the near-surface native alluvium, including collapsible/compressible soils, and replace these soils as compacted structural fill. The native soils that will remain in place below the recommended depth

of overexcavation will not be subject to significant load increases from the foundations of the new structure. Provided that the recommended remedial grading is completed, the post-construction settlement of the proposed structure is expected to be within tolerable limits.

Expansion

Laboratory testing performed on representative samples of the near-surface soils indicates that these materials possess a low expansion potential (EI = 39). Based on the presence of potentially expansive soils at this site, care should be given to proper moisture conditioning the building pad subgrade soils to a moisture content of 2 to 4 percent above the ASTM D-1557 optimum during site grading. It is recommended that additional expansion index testing be conducted at the completion of rough grading to verify the expansion potential of the as-graded building pad.

Soluble Sulfates

The results of the soluble sulfate testing indicate that the tested soil samples possess levels of soluble sulfates that are considered to be "not applicable" (S0) with respect to the American Concrete Institute (ACI) Publication 318-14 Building Code Requirements for Structural Concrete and Commentary, Section 4.3. Therefore, specialized concrete mix designs are not considered to be necessary, with regard to sulfate protection purposes. It is, however, recommended that additional soluble sulfate testing be conducted at the completion of rough grading to verify the soluble sulfate concentrations of the soils which are present at pad grade within the building area.

Corrosion Potential

The results of laboratory testing indicate that the on-site soils possess saturated resistivity in the range of 1,240 to 3,880 ohm-cm, and pH value of 7.0 and 7.4. These test results have been evaluated in accordance with guidelines published by the Ductile Iron Pipe Research Association (DIPRA). The DIPRA guidelines consist of a point system by which characteristics of the soils are used to quantify the corrosivity characteristics of the site. Resistivity and pH are two of the five factors that enter into the evaluation procedure. Redox potential, relative soil moisture content and sulfides are also included. Although sulfide testing was not part of the scope of services for this project, we have evaluated the corrosivity characteristics of the on-site soils using resistivity, pH and moisture content. **Based on these factors, and utilizing the DIPRA procedure, the on-site soils are considered to be corrosive to ductile iron pipe. Therefore, polyethylene encasement or some other appropriate method of protection is expected to be required for iron pipes.**

A relatively lows concentrations (3.9 and 54 mg/kg) of chlorides were detected in the samples submitted for corrosivity testing. In general, soils possessing chloride concentrations in excess of 500 parts per million (ppm) are considered to be corrosive with respect to steel reinforcement within reinforced concrete. Based on the lack of any significant chlorides in the tested sample, the site is considered to have a C1 chloride exposure in accordance with the American Concrete Institute (ACI) Publication 318 Building Code Requirements for Structural Concrete and Commentary. Therefore, a specialized concrete mix design for reinforced concrete for protection against chloride exposure is not considered warranted.

Nitrates present in soil can be corrosive to copper tubing at concentrations greater than 50 mg/kg. The tested sample possess nitrate concentrations of 19 and 162 mg/kg. **Based on this test**

result, the on-site soils are considered to be corrosive to copper pipe, and some type of protection will be required.

Since SCG does not practice in the area of corrosion engineering, we recommend that the client contact a corrosion engineer to provide a more thorough evaluation.

Shrinkage/Subsidence

Based on the results of the laboratory testing, removal and recompaction of the near-surface native alluvium will result in an average shrinkage of 4 to 12 percent. **The shrinkage estimate does not include volume loss due to organics/tree removal.**

It should be noted that the potential shrinkage estimate is based on dry density testing performed on small-diameter samples taken at the boring locations. If a more accurate and precise shrinkage estimate is desired, SCG can perform a shrinkage study involving several excavated test-pits where in-place densities are determined using in-situ testing methods instead of laboratory density testing on small-diameter samples. Please contact SCG for details and a cost estimate regarding a shrinkage study, if desired.

Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be 0.1 feet. This estimate may be used for grading in areas that are underlain by native alluvial soils.

These estimates are based on previous experience and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Grading and Foundation Plan Review

It is recommended that we be provided with copies of the finalized grading and foundation plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Site Stripping

Initial site preparation should include stripping of any surficial vegetation and organic soils. Based on conditions encountered at the time of the subsurface exploration, stripping of native grass and weed growth as well as numerous fruit trees is expected to be necessary throughout the majority of the site. Any organic topsoil and all tree root masses should be removed during site stripping.

These materials should be disposed of off-site. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.

Demolition of the existing structures and pavements should include all foundations, floor slabs, pavements, septic systems, utilities and any other subsurface improvements that will not remain in place with the new development. Debris resultant from demolition should be disposed of off-site. Alternatively, concrete and asphalt debris may be pulverized to a maximum 2-inch particle size, well mixed with the sandy on-site soils, and incorporated into new structural fills or it may be processed to create crushed miscellaneous base (CMB).

Treatment of Existing Soils: Building Pad

Remedial grading should be performed within the proposed building pad area in order to remove all of the existing undocumented fill soils, and a portion of the existing alluvium. The undocumented fill soils extend to depths of 2½ to 4½± feet at the boring locations. The soils within the proposed building pad area should also be overexcavated to a depth of 5 feet below existing grade and to a depth of at least 3 feet below proposed building pad subgrade elevation. The proposed foundation influence zones within the industrial building should be overexcavated to a depth of at least 3 feet below proposed foundation bearing grade.

The overexcavation areas should extend at least 5 feet beyond the building and foundation perimeters, and to an extent equal to the depth of fill below the new foundations. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the area of overexcavation should also encompass these areas.

Following completion of the overexcavation, the subgrade soils within the overexcavation areas should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling and probing to identify any soft, loose, or otherwise unstable soils that must be removed. The possible fill soils encountered at Boring Nos. B-5 and B-6 should be evaluated at the time of grading. If these soils are determined to represent undocumented fill, they should also be overexcavated. **Some localized areas of deeper excavation may be required if loose, porous, or low-density native soils are encountered at the base of the overexcavation.**

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches, and moisture conditioned to at 2 to 4 percent above optimum moisture content, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of proposed retaining and non-retaining site walls should be overexcavated to a depth of at least 3 feet below foundation bearing grade and replaced as compacted structural fill. Any existing fill soils in these areas should be removed. Subgrades for erection pads for concrete tilt-up walls are considered to be a part of the foundation system and should also be overexcavated. Additional overexcavation may be required if porous or collapsible alluvium is encountered, as discussed above. The overexcavation subgrade soils should be

evaluated by the geotechnical engineer prior to scarifying, moisture conditioning and recompacting the upper 12 inches of exposed subgrade soils. The previously excavated soils may then be replaced as compacted structural fill.

If the full lateral extent of overexcavation is not achievable for the proposed walls, the foundations should be redesigned using a lower bearing pressure. The geotechnical engineer of record should be contacted for recommendations pertaining to this type of condition.

Treatment of Existing Soils: Parking and Drive Areas

Based on economic considerations, overexcavation of the undocumented fill soils and near-surface alluvial soils in the new parking and drive areas is not considered warranted, with the exception of areas where lower strength, or unstable soils are identified by the geotechnical engineer during grading.

Subgrade preparation in the new parking and drive areas should initially consist of removal of all soils disturbed during stripping. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of variable strength alluvial soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

The grading recommendations presented above for the proposed parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within the proposed parking areas. The grading recommendations presented above do not completely mitigate the extent of low strength collapsible alluvium in the parking areas. As such, settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction. If the owner cannot tolerate the risk of such settlements, the parking and drive areas should be overexcavated to a depth of 2 feet below proposed pavement subgrade elevation, with the resulting soils replaced as compacted structural fill.

Treatment of Existing Soils: Flatwork Areas

Subgrade preparation in the new flatwork areas should initially consist of removal of all soils disturbed during stripping and possible demolition operations. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned or air dried to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of variable strength alluvial soils throughout the subject site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

As noted previously, the subject site is underlain by low expansive soils. Support of new flatwork on low expansive soils carries minor additional risk with respect to flatwork movement and potential distress. This report provides recommendations for moisture conditioning and additional steel reinforcement in the flatwork areas in order to minimize the potential effects of the

expansive soils. However, if additional protection is desired, the client should consider the placement of a 1 to 2-foot thick layer of non-expansive soil beneath all flatwork.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 2 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer.
- All grading and fill placement activities should be completed in accordance with the requirements of the 2019 CBC and the grading code of the city of Beaumont and/or the county of Riverside.
- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Imported Structural Fill

All imported structural fill should consist of very low expansive (EI < 20), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. As an alternative, a clean sand (minimum Sand Equivalent of 30) may be placed within trenches and compacted in place (jetting or flooding is not recommended). Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the city of Beaumont and/or the county of Riverside. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

6.4 Construction Considerations

Excavation Considerations

The near-surface soils generally consist of silty sands and clayey sands, with some zones of sandy silts. Some of these materials will likely be subject to minor caving within shallow excavations. Where caving occurs within shallow excavations, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, the inclination of temporary slopes should not exceed 2h:1v. Deeper excavations may require some form of external stabilization such as shoring or bracing. Maintaining adequate moisture content within the near-surface soils will improve excavation stability. All excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Moisture Sensitive Subgrade Soils

Most of the near surface soils possess appreciable silt and clay content and may become unstable if exposed to significant moisture infiltration or disturbance by construction traffic. In addition, based on their granular content, some of the on-site soils will also be susceptible to erosion. The site should, therefore, be graded to prevent ponding of surface water and to prevent water from running into excavations.

Unstable subgrade soils may be encountered at the base of the overexcavations within the proposed building area. The extent of unstable subgrade soils will, to a large degree. depend on methods used by the contractor to avoid adding additional moisture to these soils or disturbing soils which already possess high moisture contents. If grading occurs during a period of relatively wet weather, an increase in subgrade instability should also be expected. If unstable subgrade conditions are encountered, it is recommended that only tracked vehicles be used for fill placement and compaction.

If the construction schedule dictates that site grading will occur during a period of wet weather, allowances should be made for costs and delays associated with drying the on-site soils or import of a drier, less moisture sensitive fill material. Grading during wet or cool weather may also increase the depth of overexcavation in the pad area as well as the need for a stabilization layer.

Groundwater

The static groundwater table is considered to exist at a depth greater than 50± feet below existing grade. Therefore, groundwater is not expected to impact the grading or foundation construction activities.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pad will be underlain by newly placed structural fill soils extending to depths of at least 3 feet below foundation bearing grade. Based on this subsurface profile, the proposed structure may be supported on shallow foundations.

Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 3,000 lbs/ft^2.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: Four (4) No. 5 rebars (2 top and 2 bottom), due to the presence of potentially expansive soils.
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent exterior grade. Interior column footings may be placed immediately beneath the floor slab.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by 1/3 when considering short duration wind or seismic loads. The minimum steel reinforcement recommended above is based on standard geotechnical practice. Additional rigidity may be necessary for structural considerations. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Soils suitable for direct foundation support should consist of newly placed structural fill compacted at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should be removed to a depth of suitable bearing compacted structural fill, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavations.

The foundation subgrade soils should also be properly moisture conditioned to 2 to 4 percent above the Modified Proctor optimum, to a depth of at least 12 inches below bearing grade. Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process.

Estimated Foundation Settlements

Post-construction total and differential static settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively, under static conditions. Differential movements are expected to occur over a 50-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 300 lbs/ft^3
- Friction Coefficient: 0.30

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against compacted structural fill soils. The maximum allowable passive pressure is 2,500 lbs/ft^2.

6.6 Floor Slab Design and Construction

Subgrades which will support new floor slabs should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, the floor of the proposed structure may be constructed as a conventional slab-on-grade, supported on newly placed structural fill, extending to a depth of at least 3 feet below finished pad grade. Based on geotechnical considerations, the floor slab may be designed as follows:

- Minimum slab thickness: 6 inches.

- Modulus of Subgrade Reaction: 150 psi/in.

- Minimum slab reinforcement: Not required for geotechnical considerations. The actual floor slab reinforcement should be determined by the structural engineer, based upon the imposed loading.

- Slab underlayment: If moisture sensitive floor coverings will be used then minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire slab area where such moisture sensitive floor coverings are expected. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. A polyolefin material such as Stego® Wrap Vapor Barrier or equivalent will meet these specifications. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview. Where moisture sensitive floor coverings are not anticipated, the vapor barrier may be eliminated.

- Moisture condition the floor slab subgrade soils to 2 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 12 inches. The moisture content of the

floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement.

6.7 Exterior Flatwork Design and Construction

Subgrades which will support new exterior slabs-on-grade for sidewalks, patios, and other concrete flatwork, should be prepared in accordance with the recommendations contained in the ***Grading Recommendations*** section of this report. Based on geotechnical considerations, exterior slabs on grade may be designed as follows:

- Minimum slab thickness: 4½ inches.

- Minimum slab reinforcement: No. 3 bars at 18 inches on center, in both directions.

- The flatwork at building entry areas should be structurally connected to the perimeter foundation that is recommended to span across the door opening. This recommendation is designed to reduce the potential for differential movement at this joint.

- Moisture condition the flatwork subgrade soils to at least 2 to 4 percent of optimum moisture content, to a depth of at least 12 inches. Adequate moisture conditioning should be verified by the geotechnical engineer 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

- Control joints should be provided at a maximum spacing of 8 feet on center in two directions for slabs and at 6 feet on center for sidewalks. Control joints are intended to direct cracking. Minor cracking of exterior concrete slabs on grade should be expected.

Expansion or felt joints should be used at the interface of exterior slabs on grade and any fixed structures to permit relative movement.

6.8 Retaining Wall Design and Construction

Although not indicated on the site plan, some small (less than 6 feet in height) retaining walls may be required in truck court area and to facilitate the new site grades. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. We have provided parameters assuming the use of on-site soils for retaining wall backfill. The on-site soils generally consist of silty sands, sandy silts, and clayey sands. Some zones of sandy clays were also encountered near the ground surface. **The sandy clays are not recommended to be used as retaining wall backfill.** Based on their classifications, the on-site silty sands, sandy silts and clayey sands are expected to possess a friction angle of at least 30 degrees when compacted to 90 percent of the ASTM-1557 maximum dry density.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

RETAINING WALL DESIGN PARAMETERS

Design Parameter		**Soil Type**
		On-Site Silty Sands, Sandy Silts, Silty Clays
Internal Friction Angle (ϕ)		30°
Unit Weight		128 lbs/ft^3
Equivalent Fluid Pressure:	Active Condition (level backfill)	43 lbs/ft^3
	Active Condition (2h:1v backfill)	69 lbs/ft^3
	At-Rest Condition (level backfill)	64 lbs/ft^3

Regardless of the backfill type, the walls should be designed using a soil-footing coefficient of friction of 0.30 and an equivalent passive pressure of 300 lbs/ft^3. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Seismic Lateral Earth Pressures

In accordance with the 2019 CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Retaining Wall Foundation Design

The retaining wall foundations should be supported within newly placed compacted structural fill, extending to a depth of at least 3 feet below proposed foundation bearing grade. Foundations to support new retaining walls should be designed in accordance with the general Foundation Design Parameters presented in a previous section of this report.

Backfill Material

On-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back-wall face should have a particle size no greater than 3 inches. **The on-site sandy clays are not recommended to be used as retaining wall backfill.** The retaining wall backfill materials should be well-graded.

It is recommended that a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls be used. If the drainage composite material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The drainage composite should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering-controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 2-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 10-foot on-center spacing. Alternatively, 4-inch diameter holes at an approximate 20-foot on-center spacing can be used for this type of drainage system. In addition, the weep holes should include a 2 cubic foot pocket of open graded gravel, surrounded by an approved geotextile fabric, at each weep hole location.

- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system. The actual design of this type of system should be determined by the civil engineer to verify that the drainage system possesses the adequate capacity and slope for its intended use.

Weep holes or a footing drain will not be required for building stem walls.

6.9 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The on-site soils generally consist of silty sands, sandy silts, clayey sands, and sandy clays. These soils are generally considered to possess fair pavement support characteristics with estimated R-values ranging from 30 to 40. The subsequent pavement design is therefore based upon an assumed R-value of 30. Any fill material imported to the site should have support characteristics equal to or greater than that of the on-site soils and be placed and compacted under engineering controlled conditions. It is recommended that R-value testing be performed after completion of rough grading. Depending upon the results of the R-value testing, it may be feasible to use thinner pavement sections in some areas of the site.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20 year design life, assuming six operational traffic days per week.

Traffic Index	No. of Heavy Trucks per Day
4.0	0
5.0	1
6.0	3
7.0	11
8.0	35
9.0	93

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R=30)					
Materials	**Thickness (inches)**				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	6	8	10	11	13
Compacted Subgrade	12	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the Marshall maximum density, as determined by ASTM D-2726. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS (R=30)				
Materials	**Thickness (inches)**			
	Autos and Light Truck Traffic (TI = 5.0 to 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	5½	6½	8
Compacted Subgrade (95% minimum compaction)	12	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness.

7.0 GENERAL COMMENTS

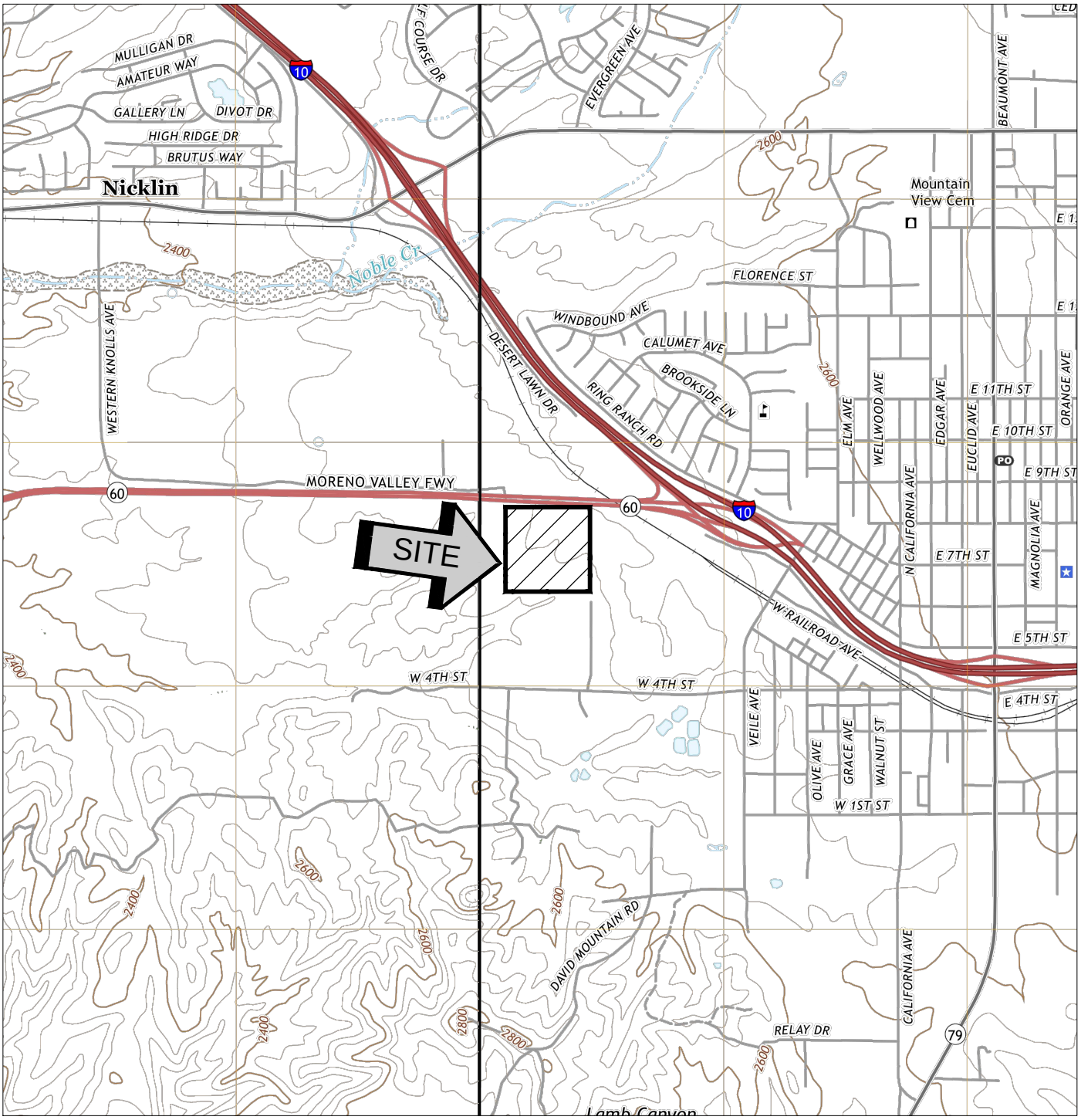
This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

APPENDIX A



SOURCE: USGS TOPOGRAPHIC MAP OF THE BEAUMONT AND EL CASCO QUADRANGLES, RIVERSIDE COUNTY, CALIFORNIA, 2018.

SITE LOCATION MAP

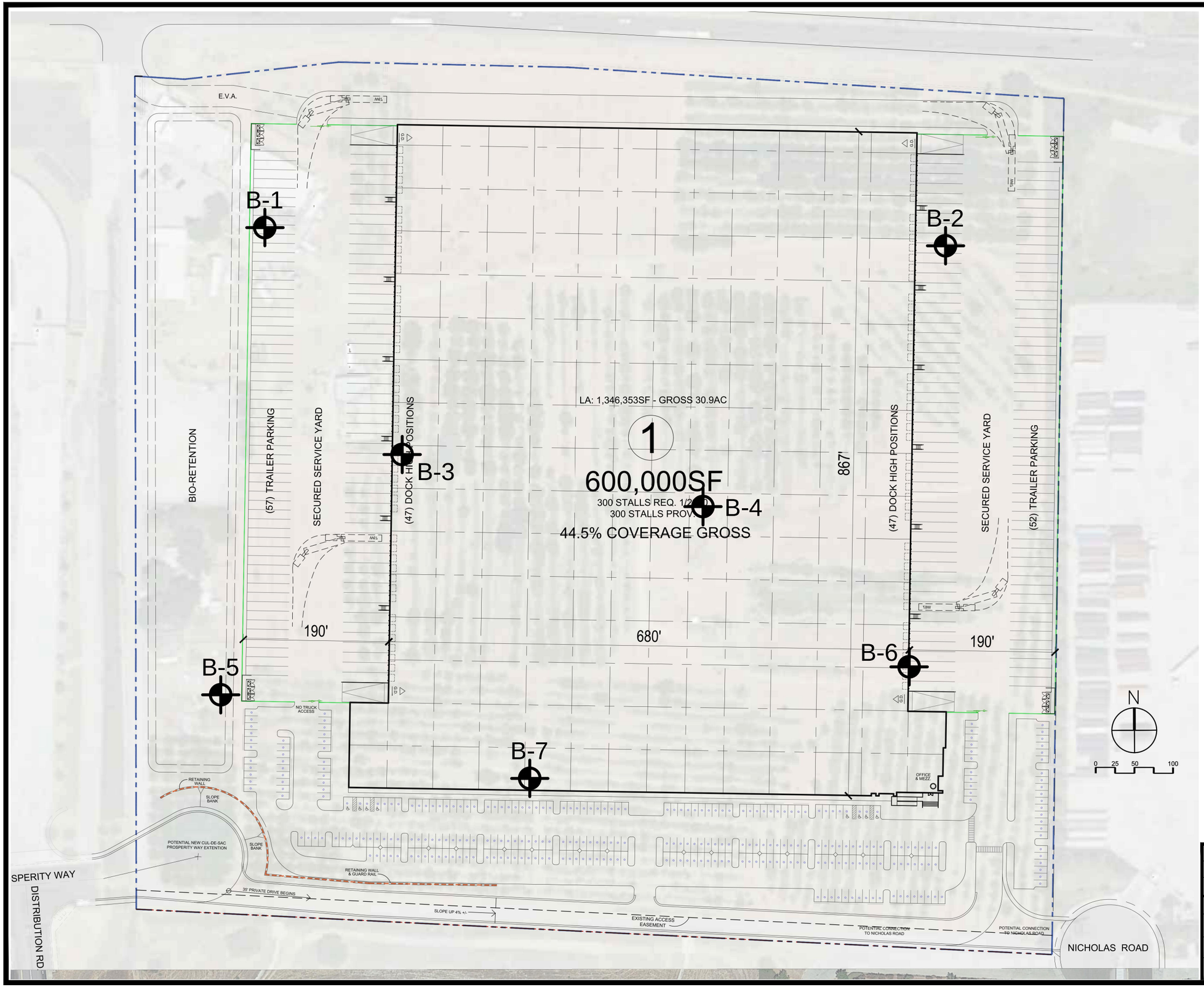
PROPOSED INDUSTRIAL BUILDING

BEAUMONT, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: MD CHKD: GKM	
SCG PROJECT 21G254-1	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

APPROXIMATE BORING LOCATION

BORING LOCATION PLAN

PROPOSED INDUSTRIAL BUILDING

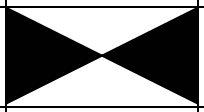
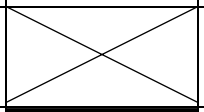
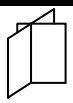
BEAUMONT, CALIFORNIA

SCALE: 1" = 120'	
DRAWN: MD CHKD: GKM	
SCG PROJECT 21G254-1	
PLATE 2	

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX B

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

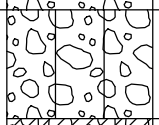
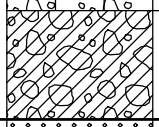
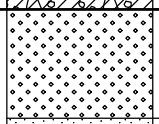
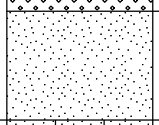
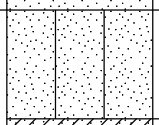
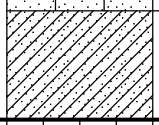
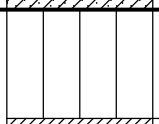
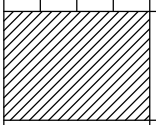
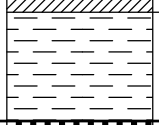
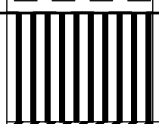
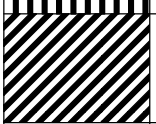
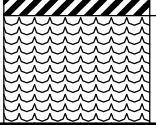
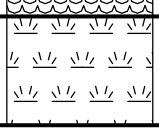
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 21 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					1± inch Open Graded Gravel							
					FILL: Red Brown fine Sandy Clay, little Silt, trace medium to coarse Sand, slightly porous, slightly cemented, medium dense to dense-damp		9					
					ALLUVIUM: Red Brown fine Sandy Clay, little Silt, trace medium Sand, stiff-damp		8					
5		23			Red Brown Silty fine Sand, little medium Sand, little Clay, slightly cemented, medium dense-moist	109	13					
		18				109	11					
		16			Red Brown Silty fine Sand to fine Sandy Silt, little Clay, trace medium Sand, medium dense-moist to very moist	108	14					
10		22				104	18					
		12			Red Brown fine Sandy Silt, some Clay, medium dense-moist		14					
15												
		26					13					
20												
		19					16					
25					Boring Terminated at 25'							

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG **PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 41 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown Clayey fine Sand, slightly cemented, medium dense-damp		11					
					ALLUVIUM:Red Brown Clayey fine Sand, little medium Sand, medium dense-damp to moist		15					
5		13	4.5		Red Brown fine Sandy Clay, little medium Sand, cemented, very stiff-damp to moist		12					
		11			Red Brown fine Sandy Silt to Silty fine Sand, medium dense-moist to very moist		22					
10												
15		19			@ 13½ feet, trace to little Clay		17			56		
		13			@ 18½ feet, little Calcareous veining		16			44		
20												
		19					15			52		
25												
					Brown Silty fine Sand, medium dense-damp to very moist							
		15					11			37		
30												
		24					10					

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG **PLATE B-2a**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 41 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Brown Silty fine Sand, medium dense-damp to very moist							
					Brown Silty fine to medium Sand, medium dense-damp							
		24					9					
40												
					Brown fine to medium Sand, trace Silt, dense-damp							
		45					6					
45												
					Brown Silty fine Sand, dense-damp to moist							
		42					12					
50												
					Boring Terminated at 50'							

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG **PLATE B-2b**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 15 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown Clayey fine Sand, trace medium to coarse Sand, cemented, dense-moist		13					EI=39 @ 0-5 feet
					ALLUVIUM: Red Brown Clayey fine to medium Sand, slightly cemented, medium dense to dense-moist		13					
5		47				107	11					
		31			Red Brown fine Sandy Silt, little Clay, trace medium Sand, medium dense-moist to very moist	106	18					
		23			Red Brown Silty fine Sand, little Clay, medium dense-damp	115	5					
10		38			Brown fine Sandy Silt, some Clay, medium dense-moist	112	17					
		23					13					
15					Brown Silty fine Sand, trace medium Sand, medium dense-damp							
		16					8					
20					Boring Terminated at 20'							

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG **PLATE B-3**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 12 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown Clayey fine Sand, slightly cemented, medium dense-damp		7					
					ALLUVIUM: Red Brown fine Sandy Clay, trace medium Sand, slightly cemented, stiff to very stiff-moist		16					
5		38	4.5			118	13					
		63			Red Brown Silty fine Sand, little Clay, slightly cemented, medium dense to dense-damp to moist	113	15					
		32				106	9					
10		26			Brown Silty fine Sand, medium dense-damp to moist	93	12					
		28			Brown fine Sandy Silt, trace medium Sand, medium dense-moist		15					
15					Boring Terminated at 15'							

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG **PLATE B-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-5

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 42 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		18			FILL: Red Brown Silty fine Sand to fine Sandy Silt, trace medium Sand, slightly cemented, medium dense-dry to damp		5					
		16			POSSIBLE FILL: Red Brown fine Sandy Clay, trace medium Sand, cemented, very stiff-damp		9					
5		20			ALLUVIUM: Red Brown fine Sandy Silt, trace medium Sand, slightly cemented, medium dense-damp to moist		11					
		18			Red Brown fine Sandy Silt, little Clay, trace medium Sand, medium dense-moist to very moist		19					
10												
		23			Red Brown fine Sandy Silt to Silty fine Sand, trace Clay, medium dense-moist		18					
15												
		16					17			52		
20												
		24	3.0		Brown Clayey Silt, some fine Sand, very stiff-moist		16	29	21	58		
25												
		12			Brown fine Sandy Silt, trace Clay, medium dense-moist		20			61		
30												
		51			Gray Brown fine to coarse Sand, very dense-dry to damp		3					

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG

PLATE B-5a

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-5

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 42 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Gray Brown fine to coarse Sand, dense-dry to damp							
					Brown Silty fine Sand to fine Sandy Silt, medium dense to dense-moist							
		20					15			50		
40												
		45					12					
45												
					Gray Brown fine to coarse Sand, little Silt, little fine Gravel, dense-damp							
		46					6					
50												
					Boring Terminated at 50'							

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG

PLATE B-5b

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-6

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown fine Sandy Clay, trace medium Sand, slightly porous, slightly cemented, very stiff-dry to damp		6					
							9					
5		15			POSSIBLE FILL: Red Brown Silty fine Sand, trace Clay, loose to medium dense-damp	94	8					
		31			ALLUVIUM: Red Brown Silty fine Sand to fine Sandy Silt, little Clay, trace Calcareous nodules, slightly cemented, medium dense-damp to moist	110	12					
10		26				107	13					
15		27			@ 13½ feet, trace medium to coarse Sand		15					
					Brown fine to medium Sand, little Silt, trace fine Gravel, very dense-damp							
20		55					4					
					Brown Silty fine Sand, medium dense-damp to moist							
25		22					12					
					Boring Terminated at 25'							

TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG

PLATE B-6

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-7

JOB NO.: 21G254-1
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/26/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: Dry
CAVE DEPTH: 17 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
0		13	4.5		ALLUVIUM: Brown fine Sandy Clay, slightly cemented, very stiff-moist		15					
		26	4.5				18					
5		21					19					
		12			Brown fine Sandy Silt, trace Clay, medium dense-moist to very moist		15					
10												
		18					16					
15												
		18					21					
20					Boring Terminated at 20'							

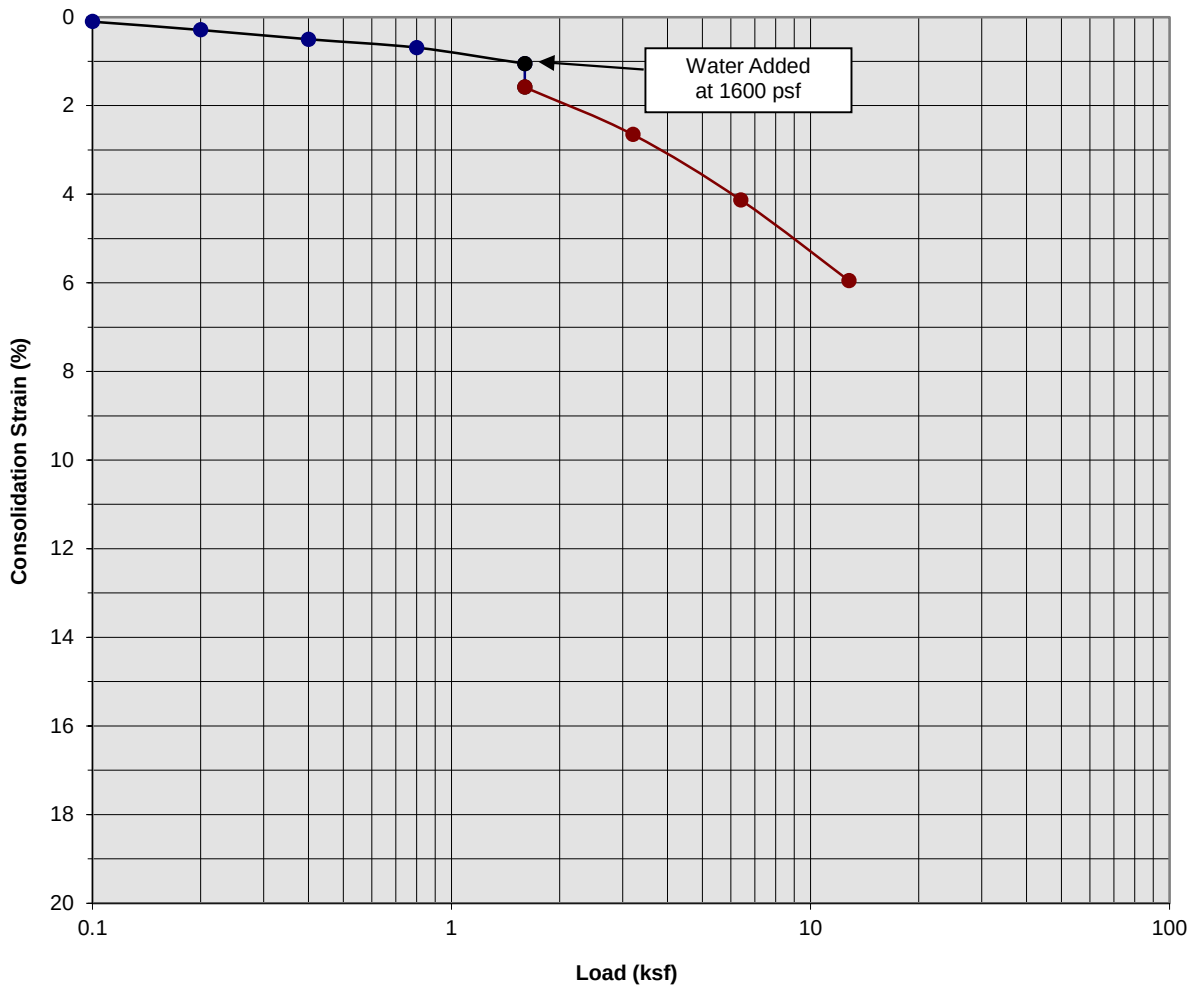
TBL 21G254-1.GPJ SOCALGEO.GDT 11/23/21

TEST BORING LOG

PLATE B-7

APPENDIX C

Consolidation/Collapse Test Results



Classification: Red Brown Silty fine Sand, little medium Sand and Clay

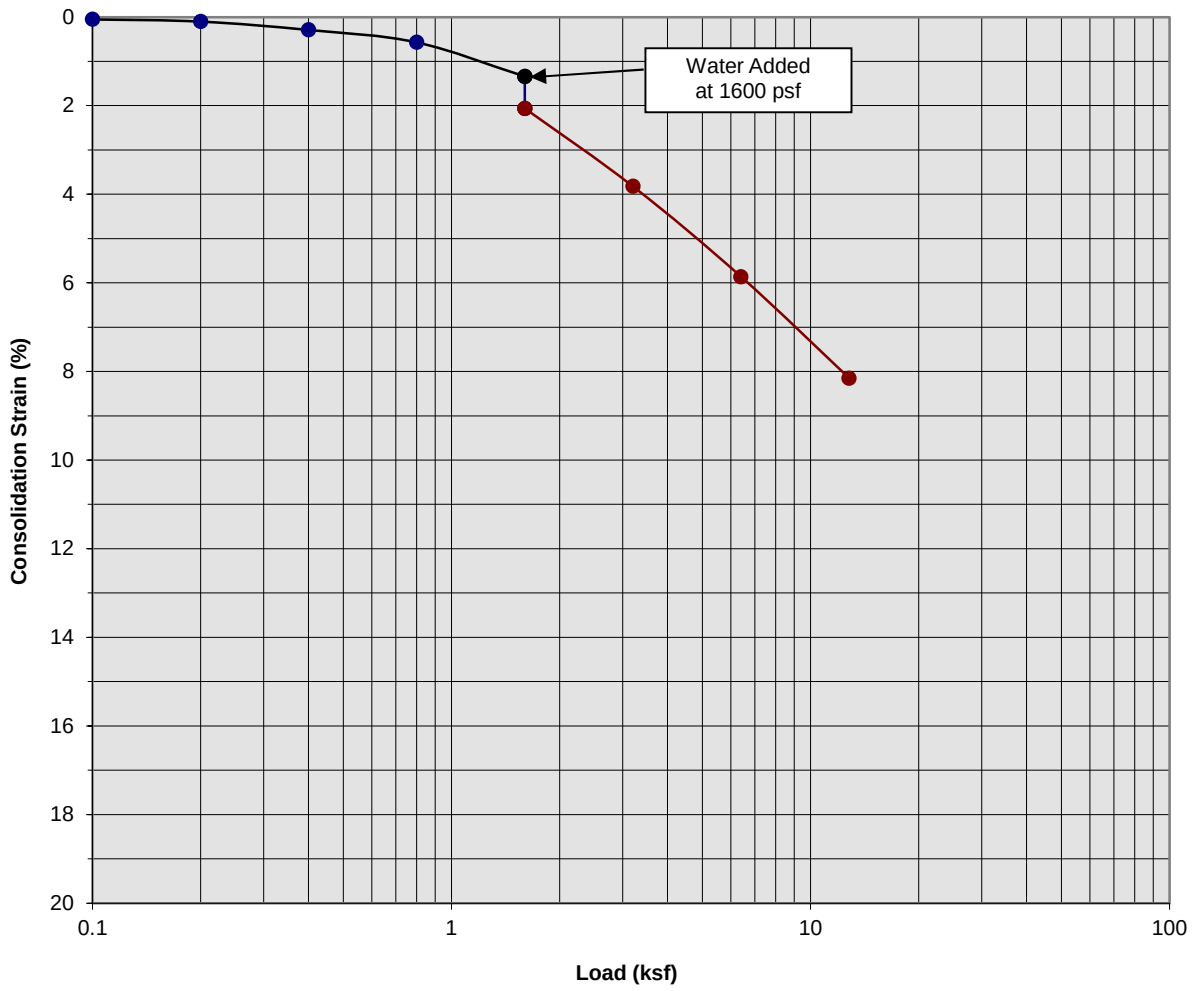
Boring Number:	B-1	Initial Moisture Content (%)	13
Sample Number:	---	Final Moisture Content (%)	16
Depth (ft)	5 to 6	Initial Dry Density (pcf)	110.3
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	117.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.53

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Red Brown Silty fine Sand, little medium Sand and Clay

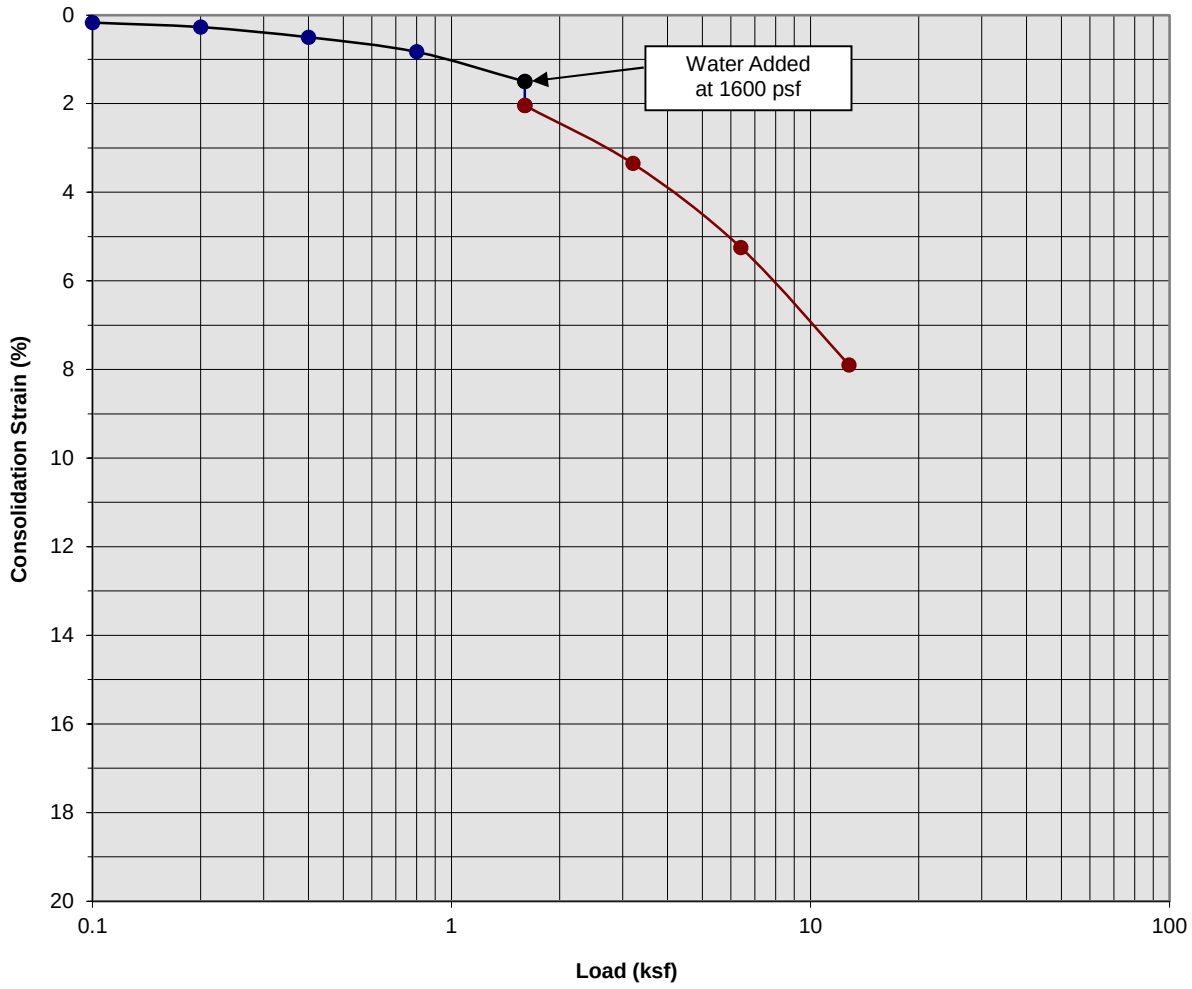
Boring Number:	B-1	Initial Moisture Content (%)	11
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	7 to 8	Initial Dry Density (pcf)	108.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	118.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.72

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Red Brown Silty fine Sand to fine Sandy Silt, little Clay

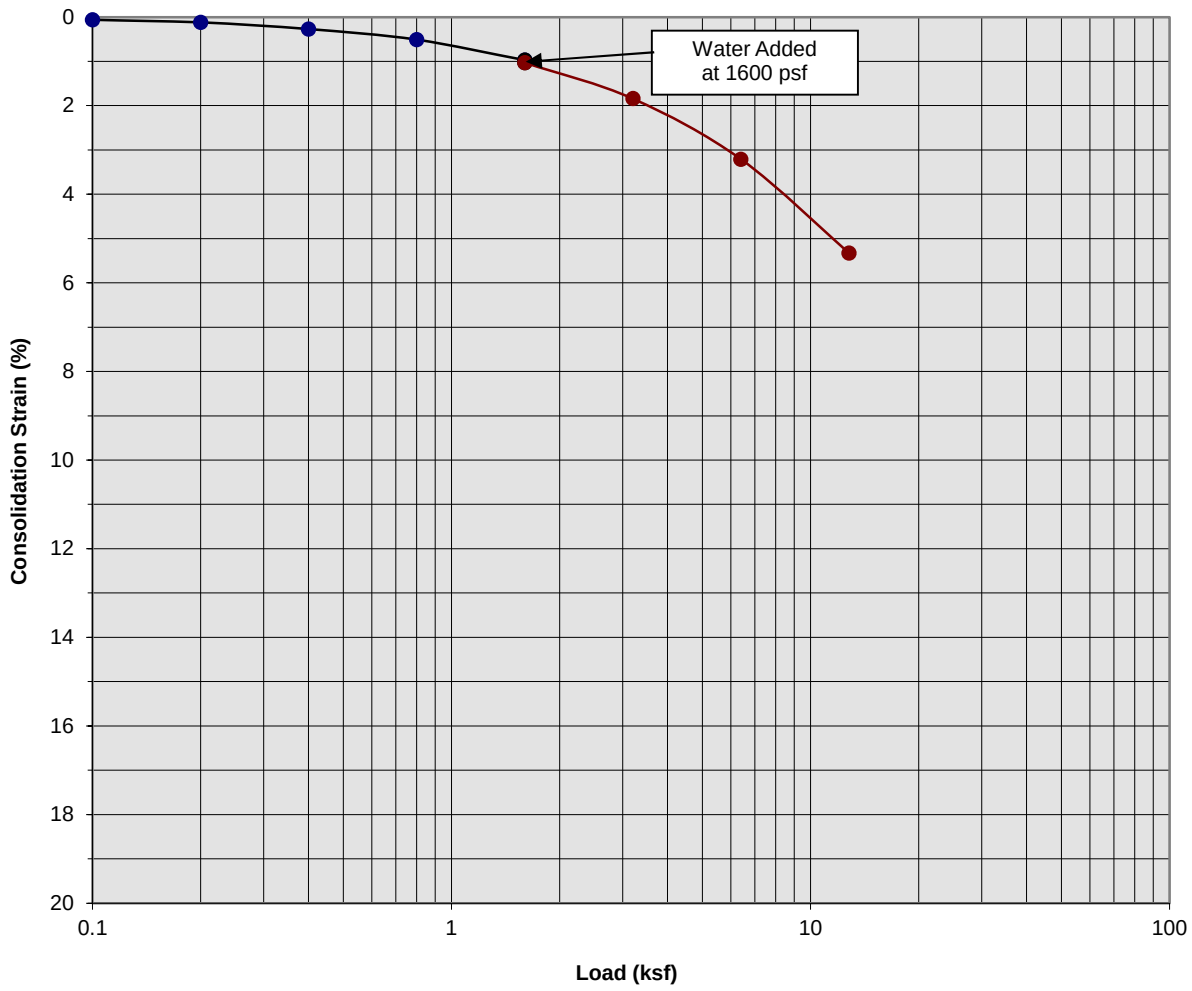
Boring Number:	B-1	Initial Moisture Content (%)	13
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	9 to 10	Initial Dry Density (pcf)	107.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.1
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.54

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Red Brown Silty fine Sand to fine Sandy Silt, little Clay

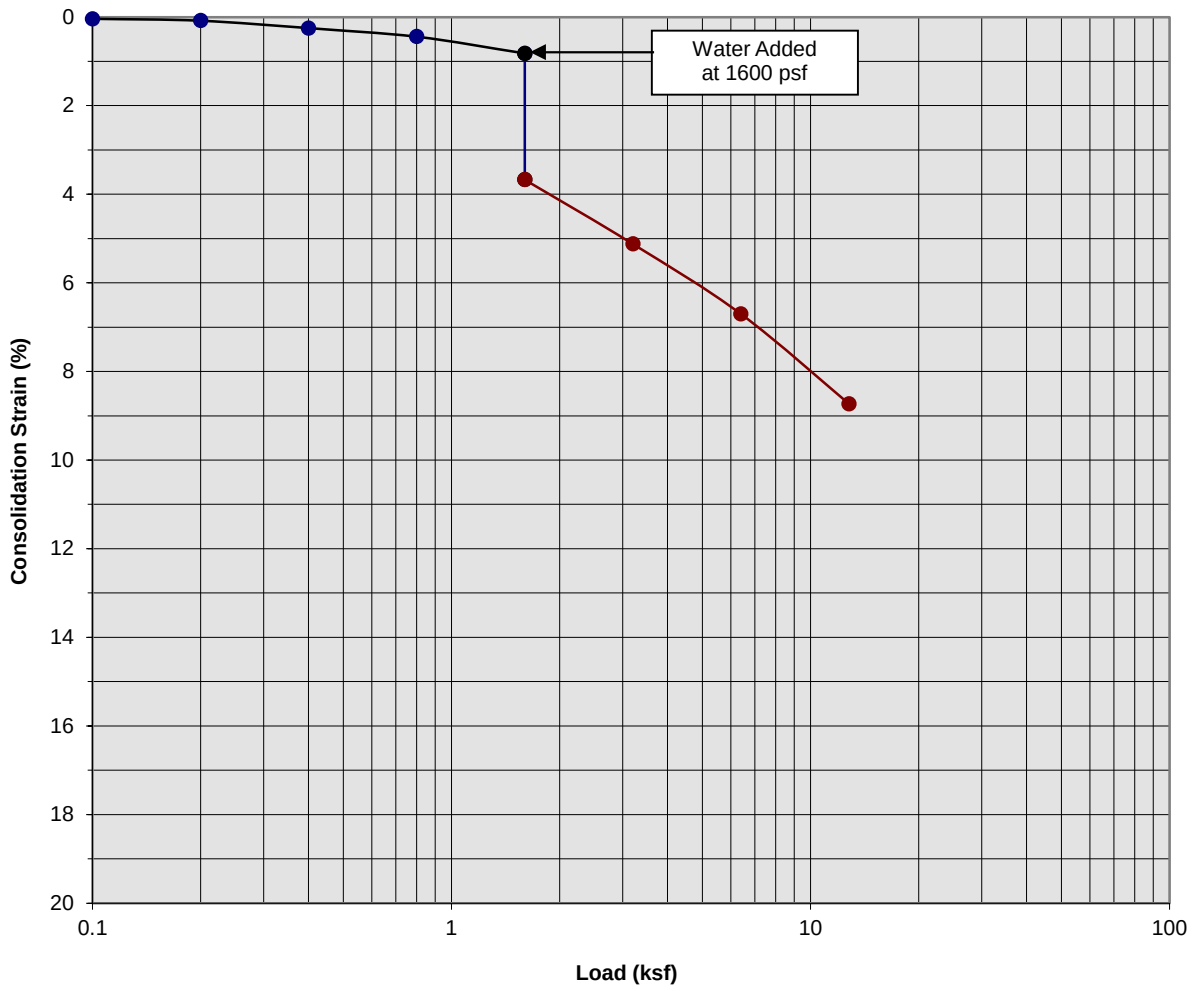
Boring Number:	B-1	Initial Moisture Content (%)	17
Sample Number:	---	Final Moisture Content (%)	21
Depth (ft)	11 to 12	Initial Dry Density (pcf)	102.9
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	108.3
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.06

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Red Brown Clayey fine to medium Sand

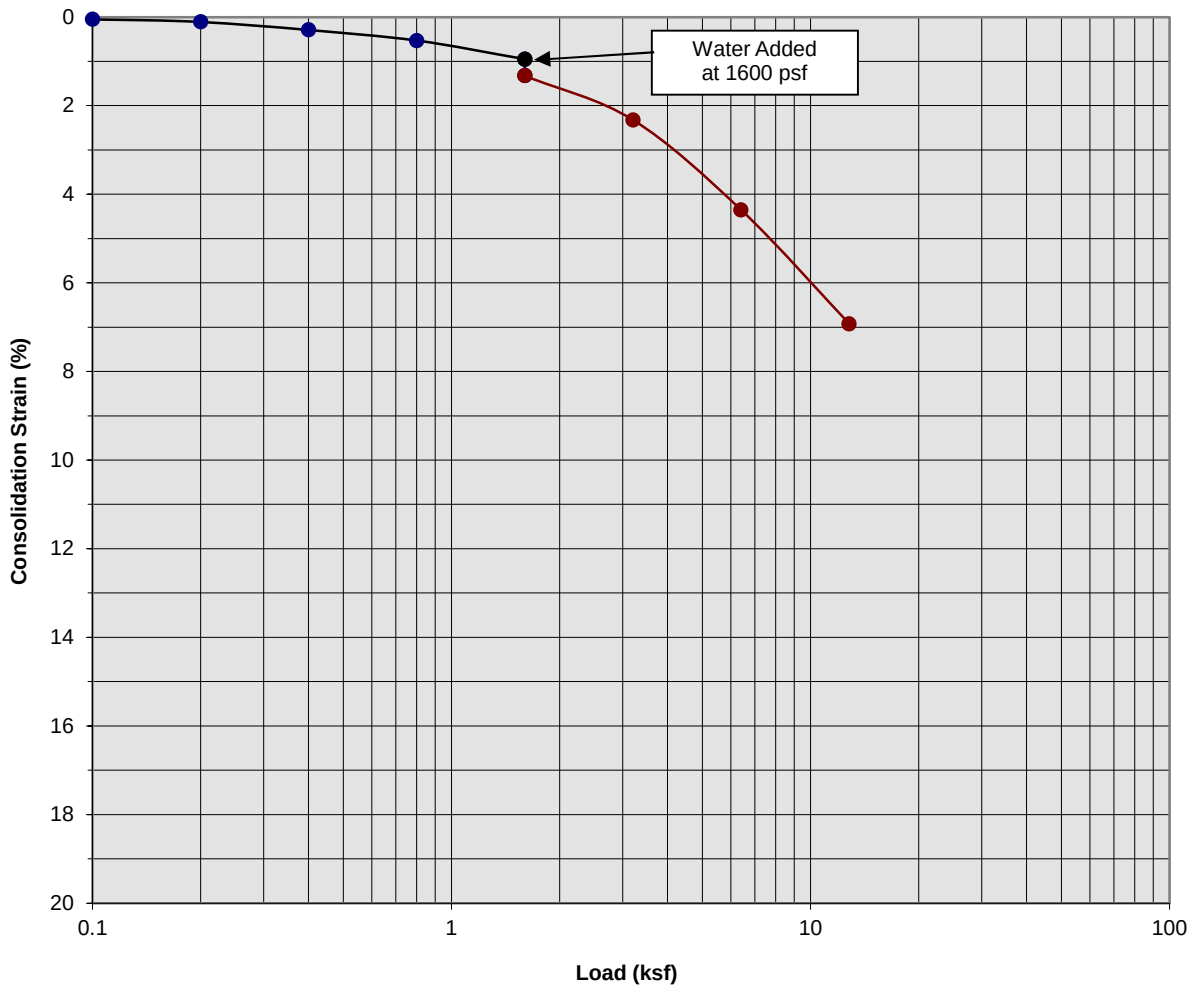
Boring Number:	B-3	Initial Moisture Content (%)	11
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	5 to 6	Initial Dry Density (pcf)	107.3
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	117.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	2.85

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Red Brown fine Sandy Silt, little Clay

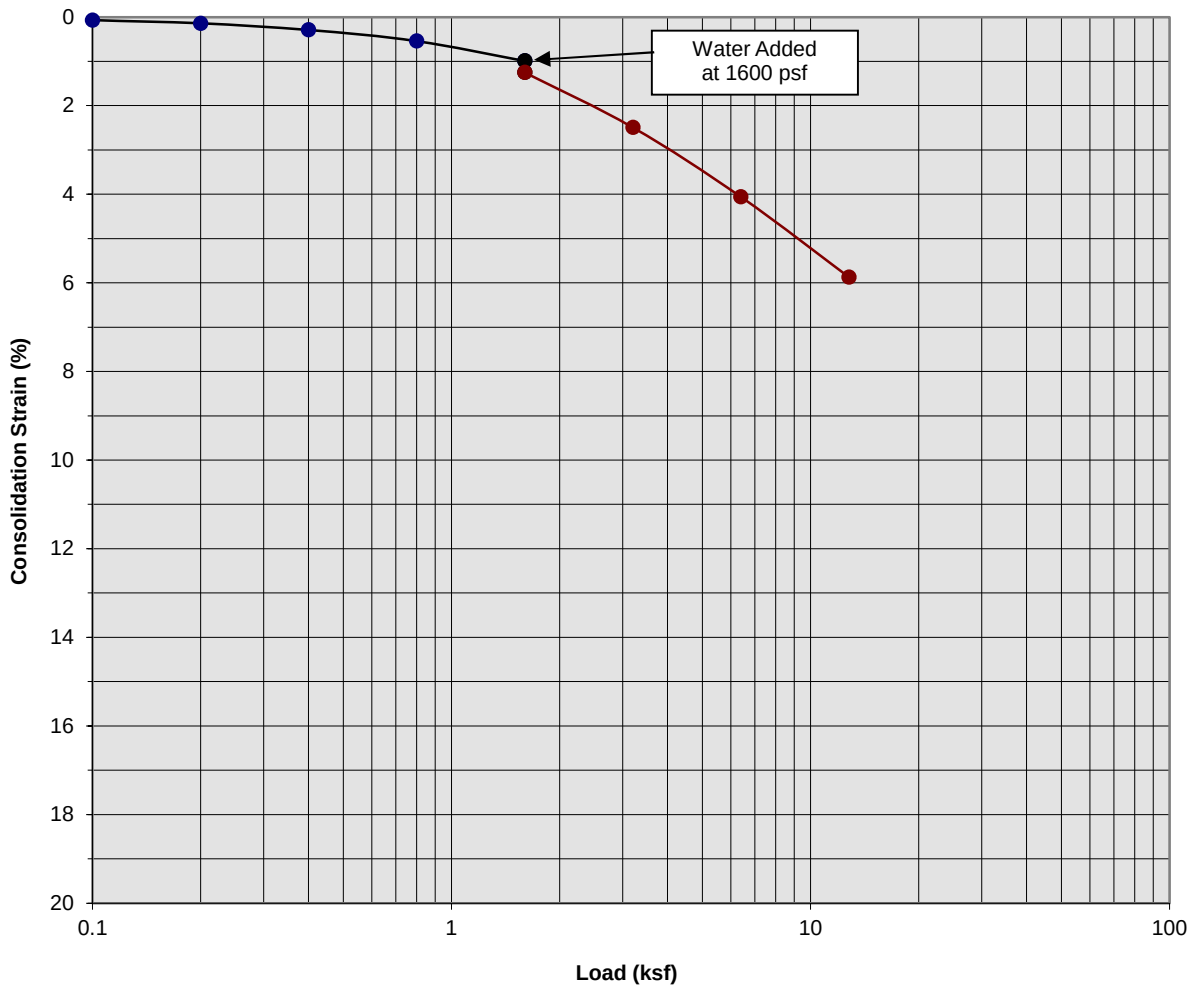
Boring Number:	B-3	Initial Moisture Content (%)	18
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	7 to 8	Initial Dry Density (pcf)	105.2
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	113.2
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.37

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Red Brown Silty fine Sand, little Clay

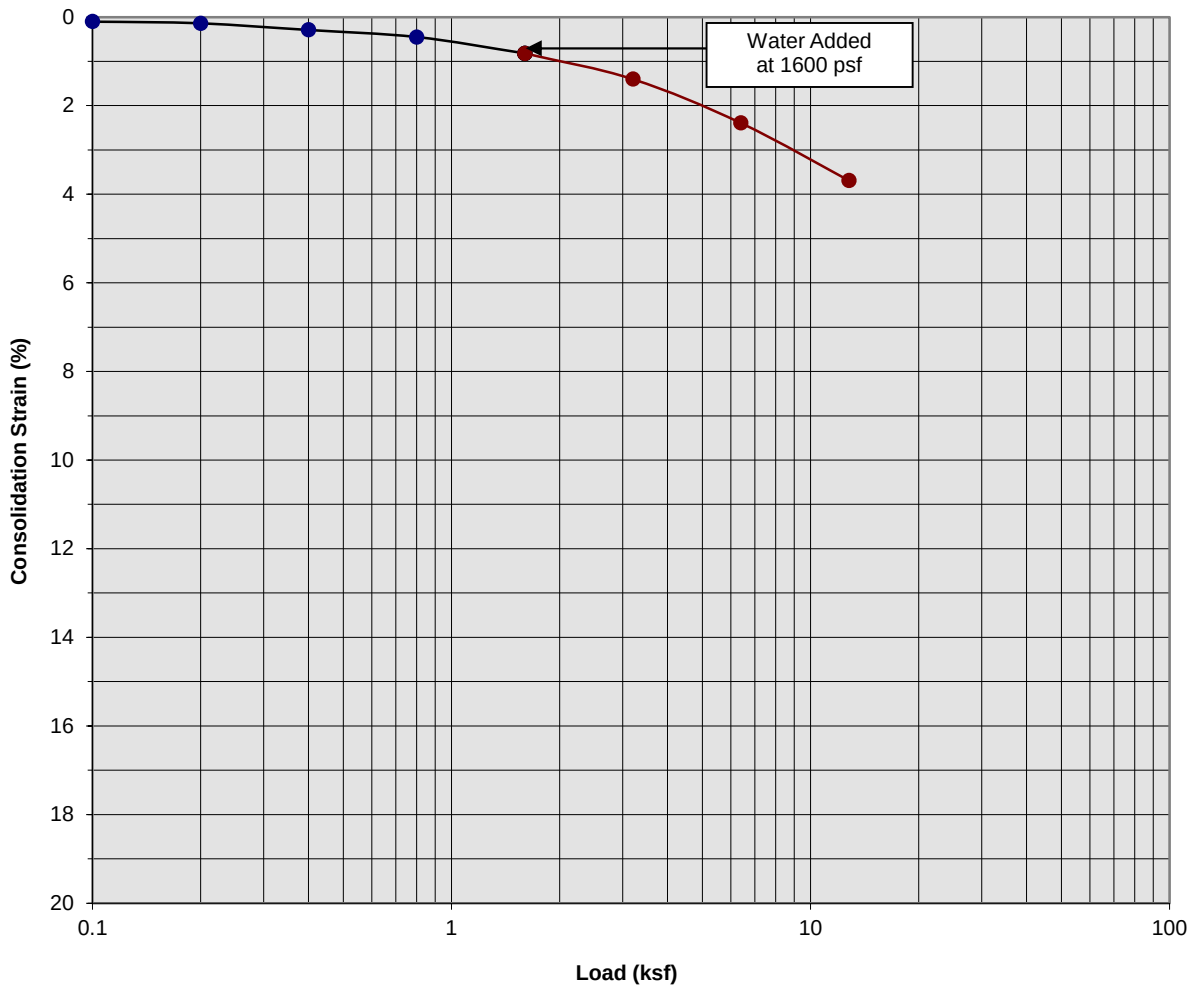
Boring Number:	B-3	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	9 to 10	Initial Dry Density (pcf)	115.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	121.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.26

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 7

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Brown fine Sandy Silt, some Clay

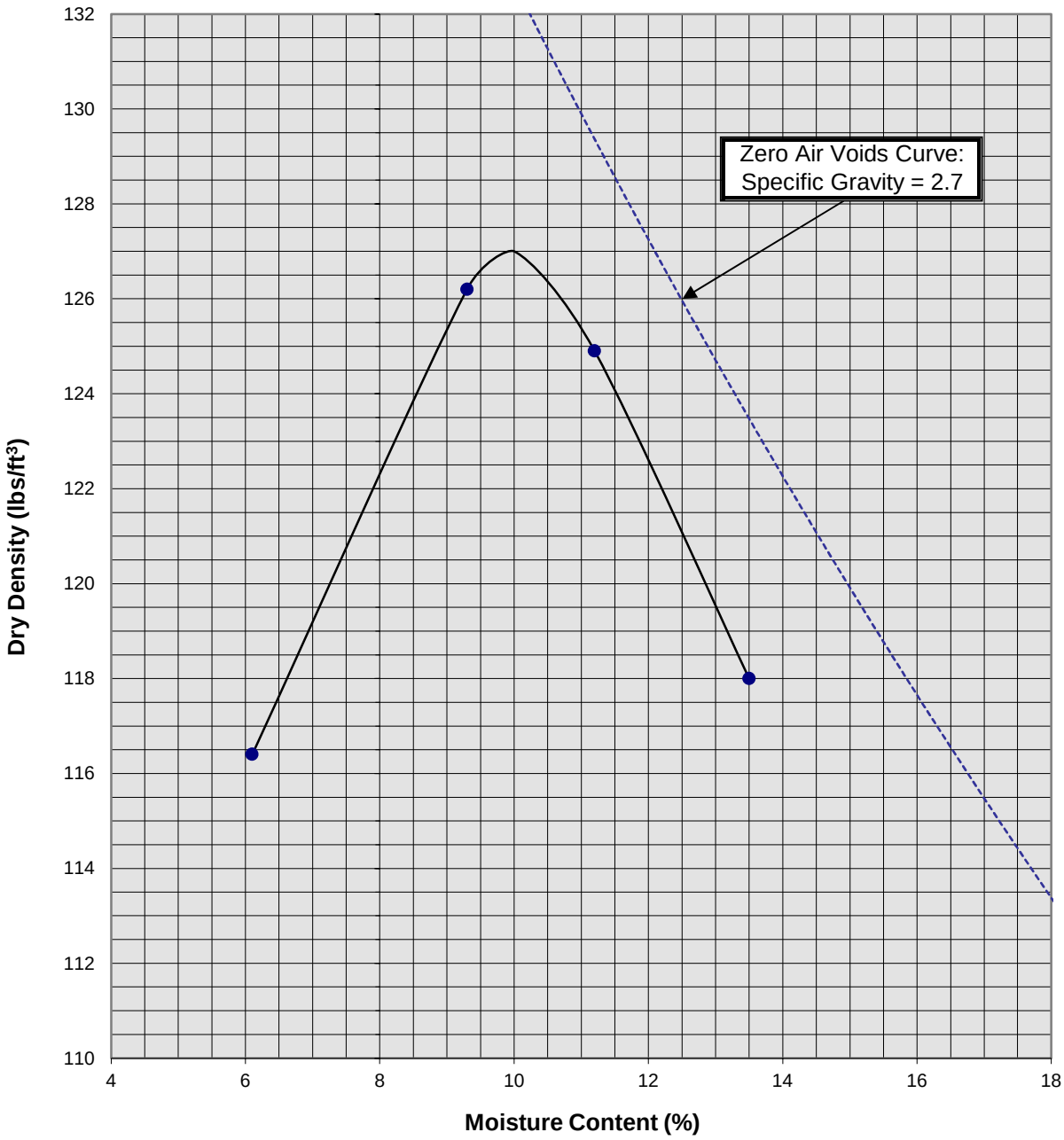
Boring Number:	B-3	Initial Moisture Content (%)	17
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	11 to 12	Initial Dry Density (pcf)	111.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	114.8
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.00

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C- 8

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-6 @ 0-5'
Optimum Moisture (%)	10
Maximum Dry Density (pcf)	127
Soil Classification	Red Brown Silty fine Sand to fine Sandy Clay

Proposed Industrial Building
Beaumont, California
Project No. 21G254-1

PLATE C-9

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.

- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.

- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.

- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.

- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.

- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.

- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

    - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

    - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or

concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

- Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

- To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

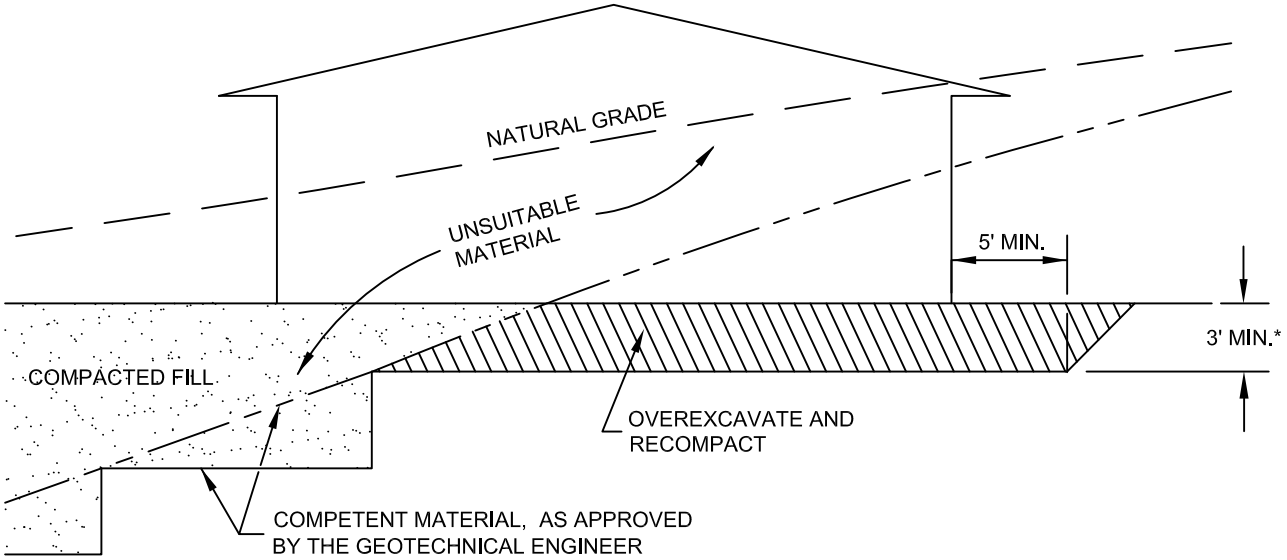
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.

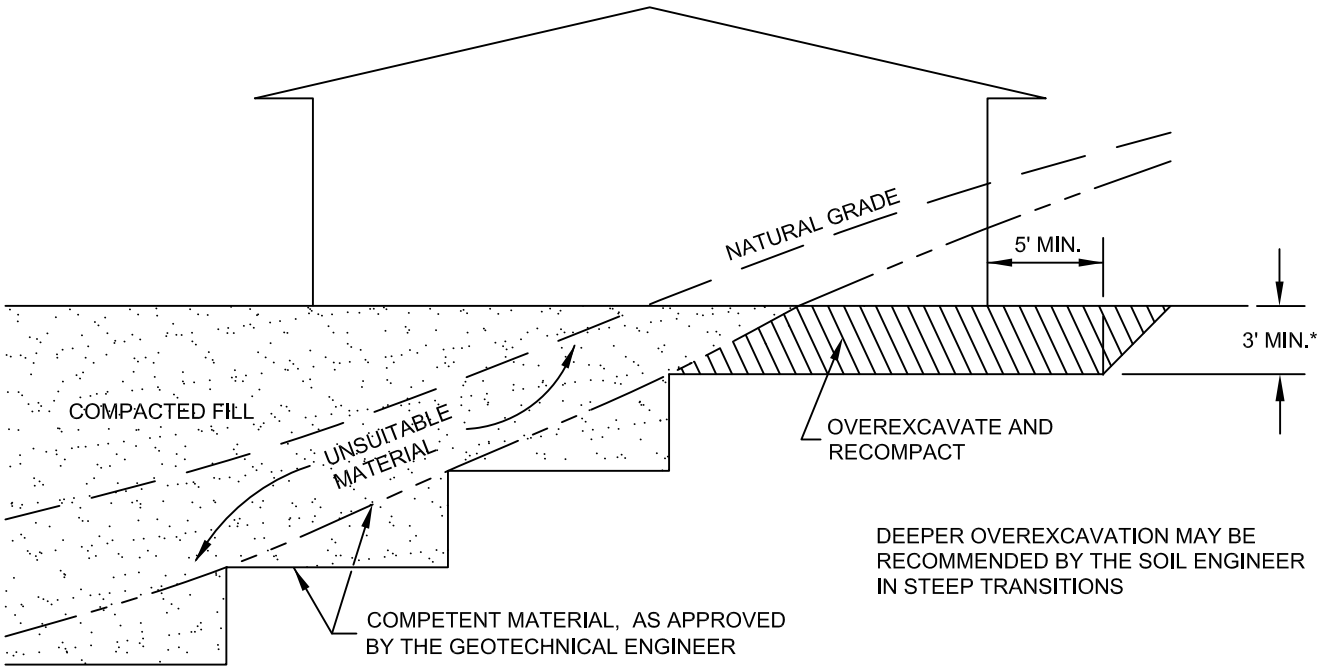
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.

- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION. ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL

GRADING GUIDE SPECIFICATIONS

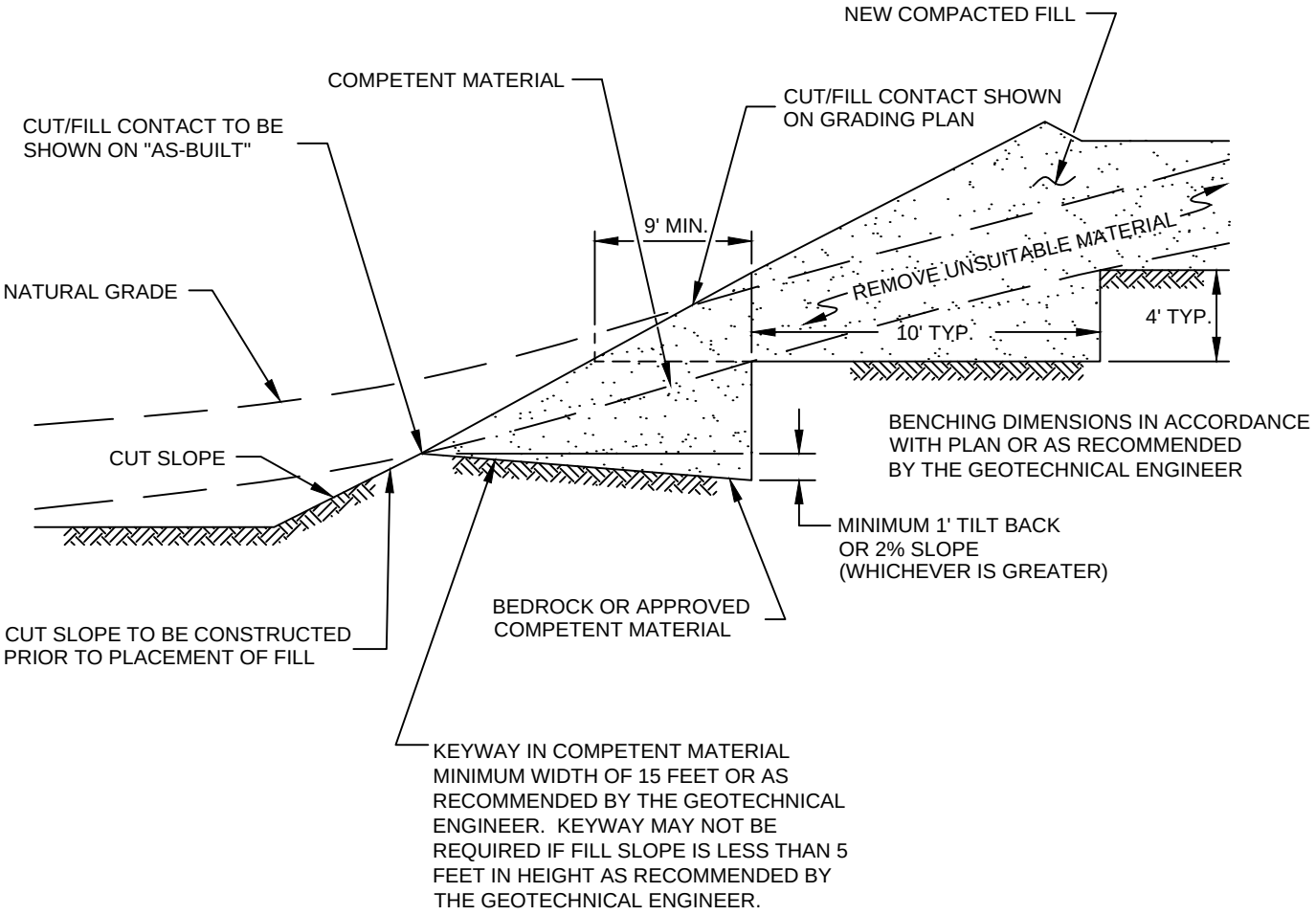
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



FILL ABOVE CUT SLOPE DETAIL

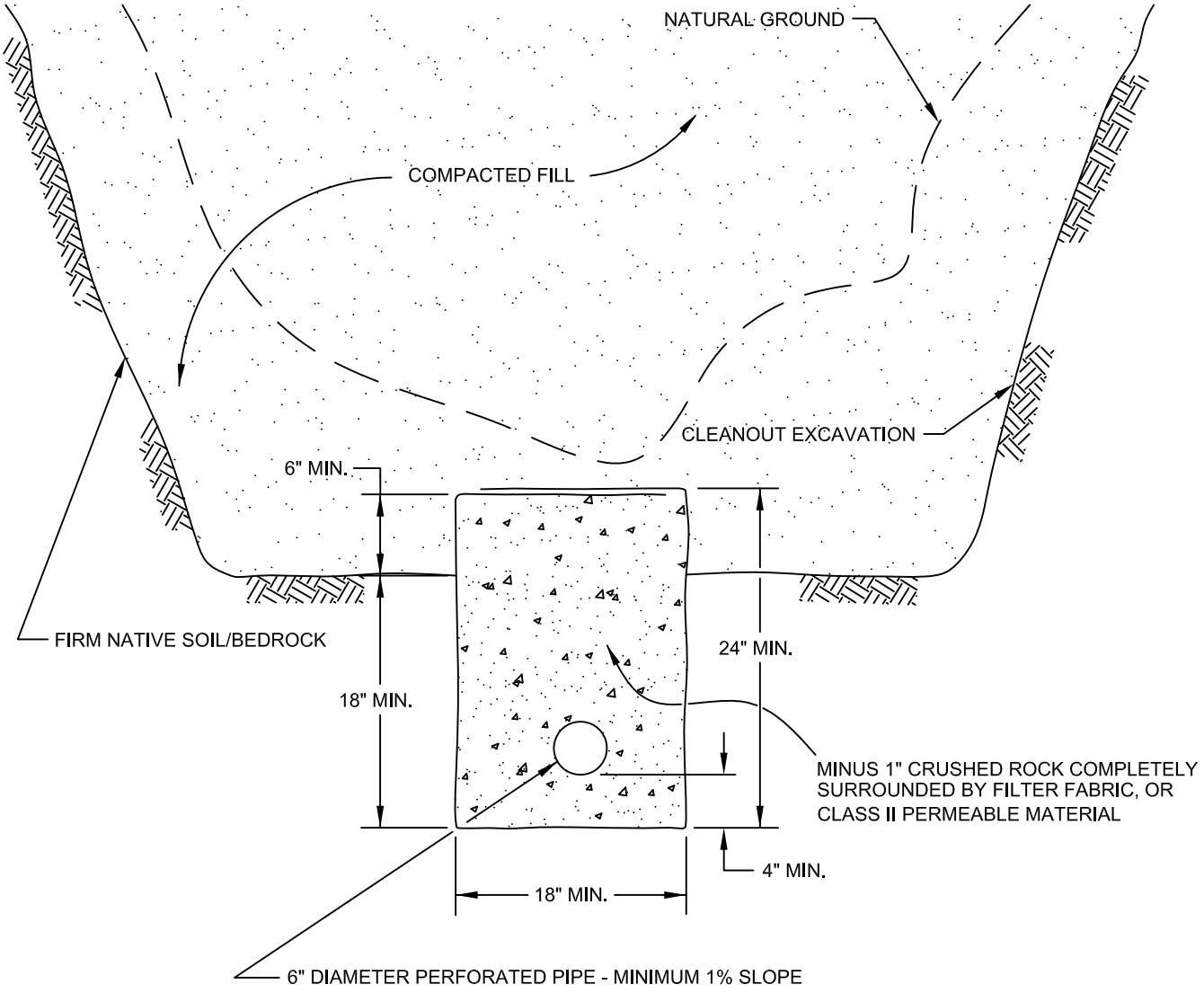
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

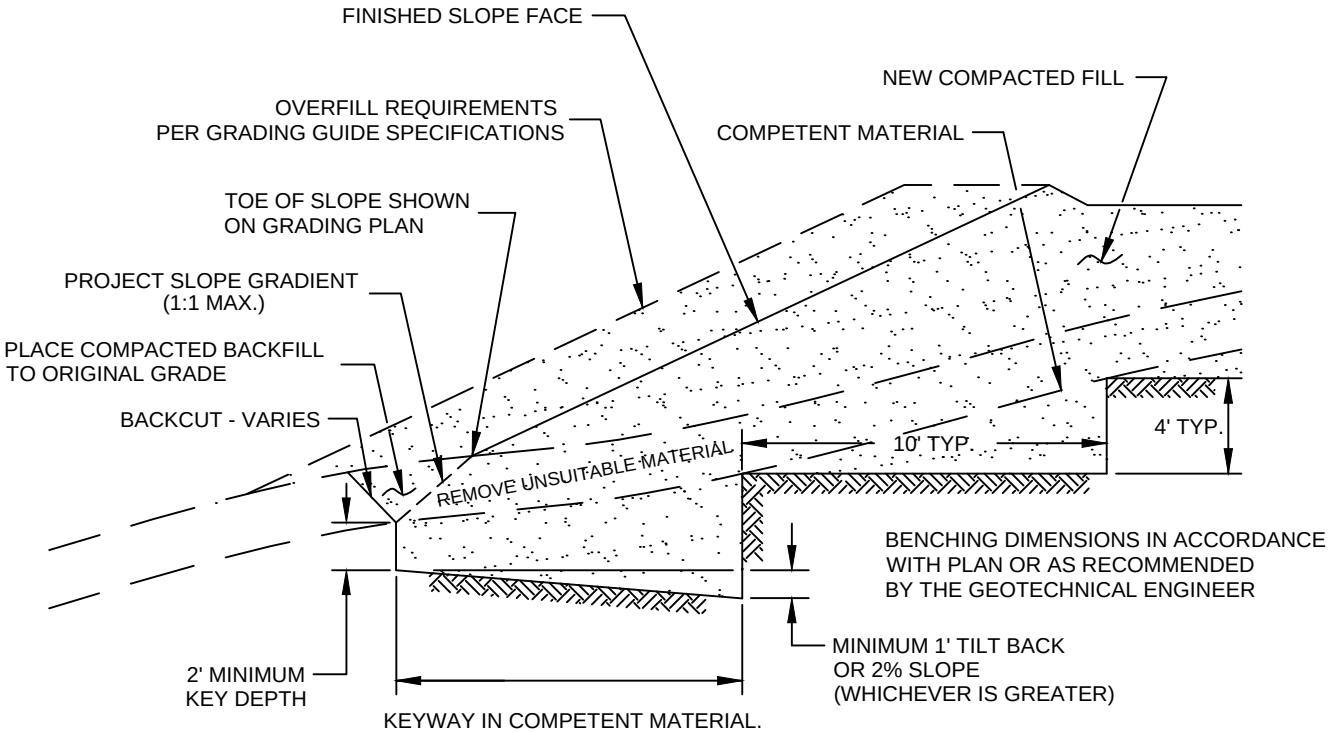
SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE
DRAWN: JAS
CHKD: GKM

PLATE D-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



NOTE:
BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL

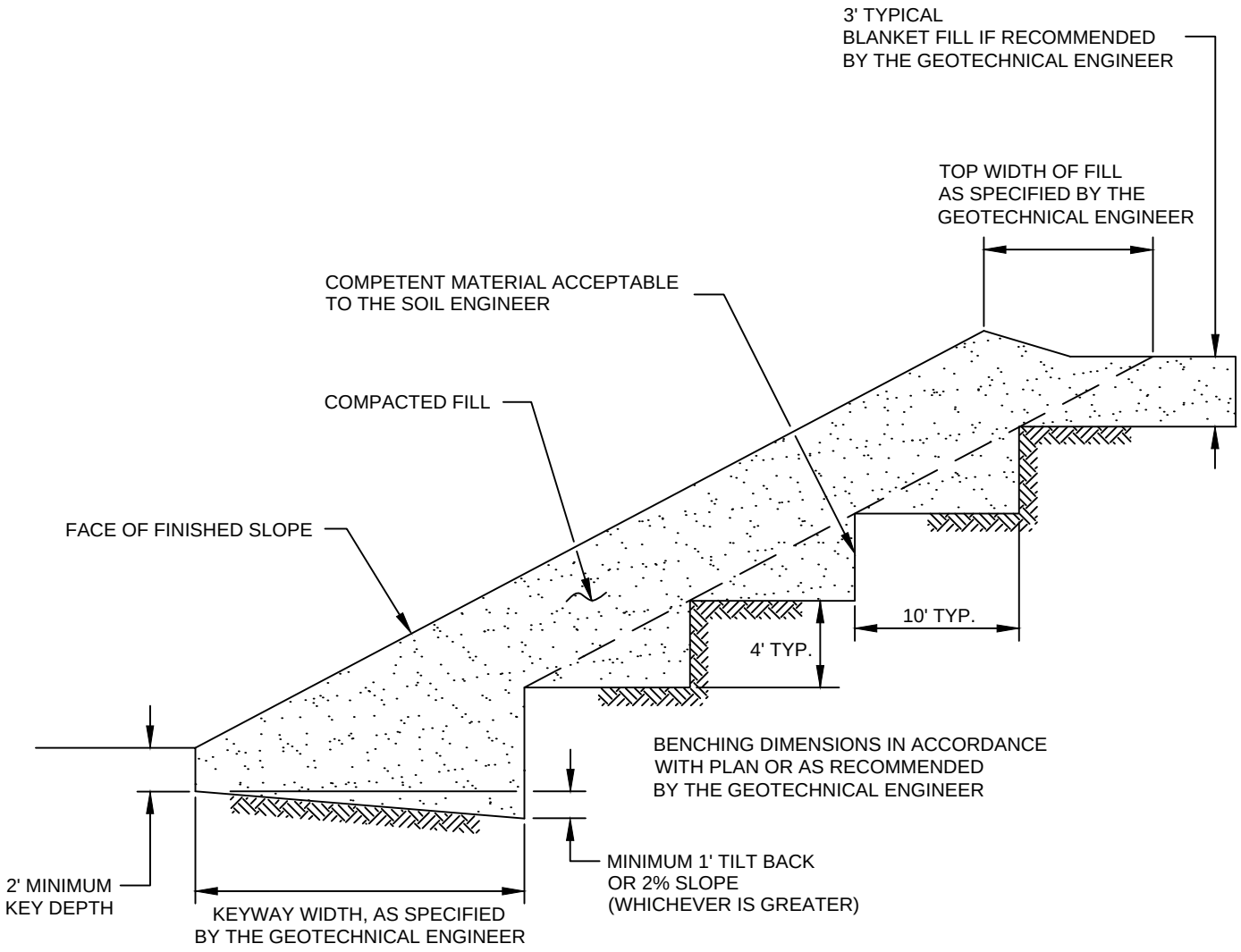
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



STABILIZATION FILL DETAIL

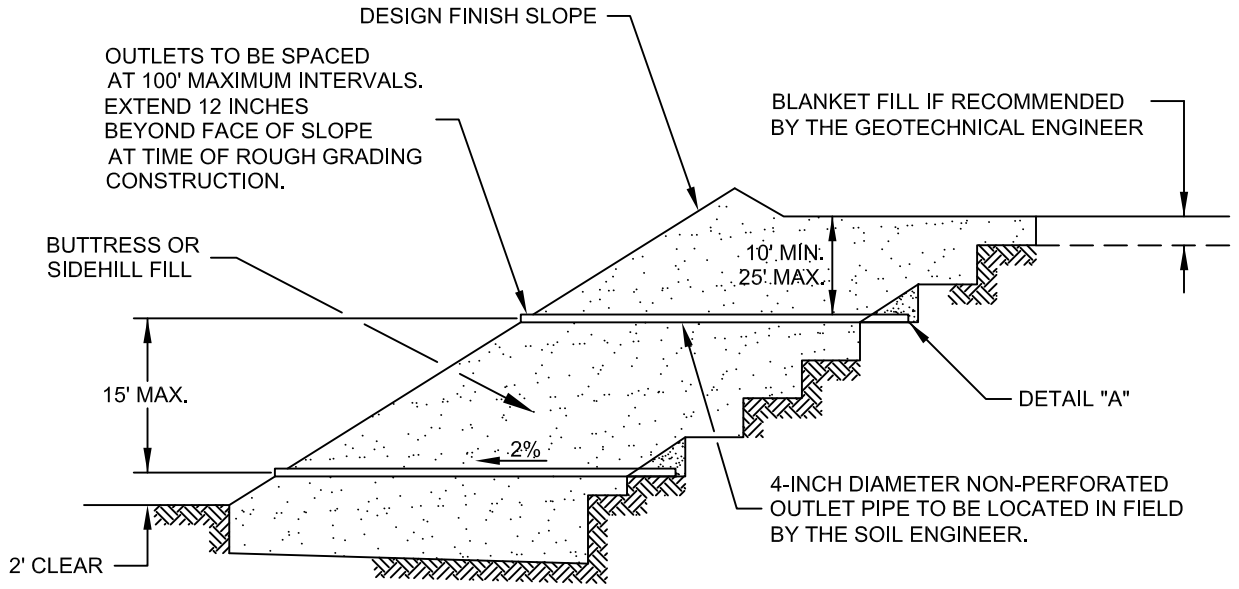
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



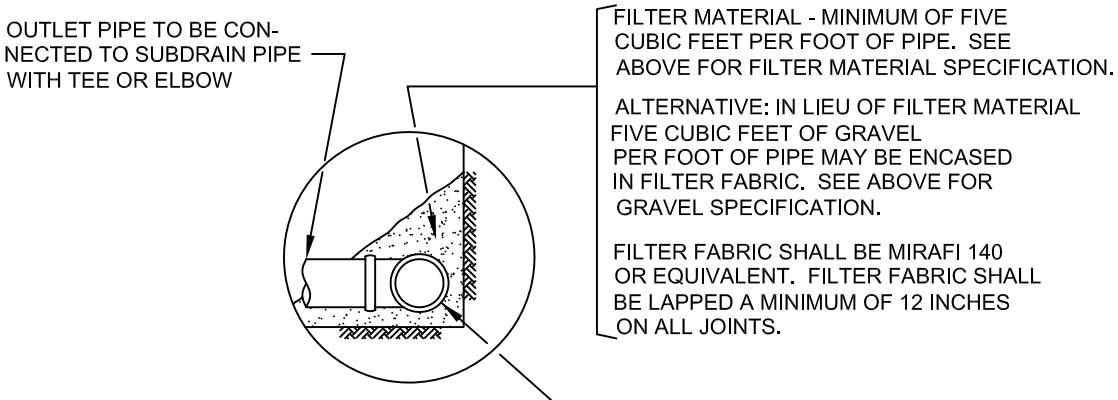
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

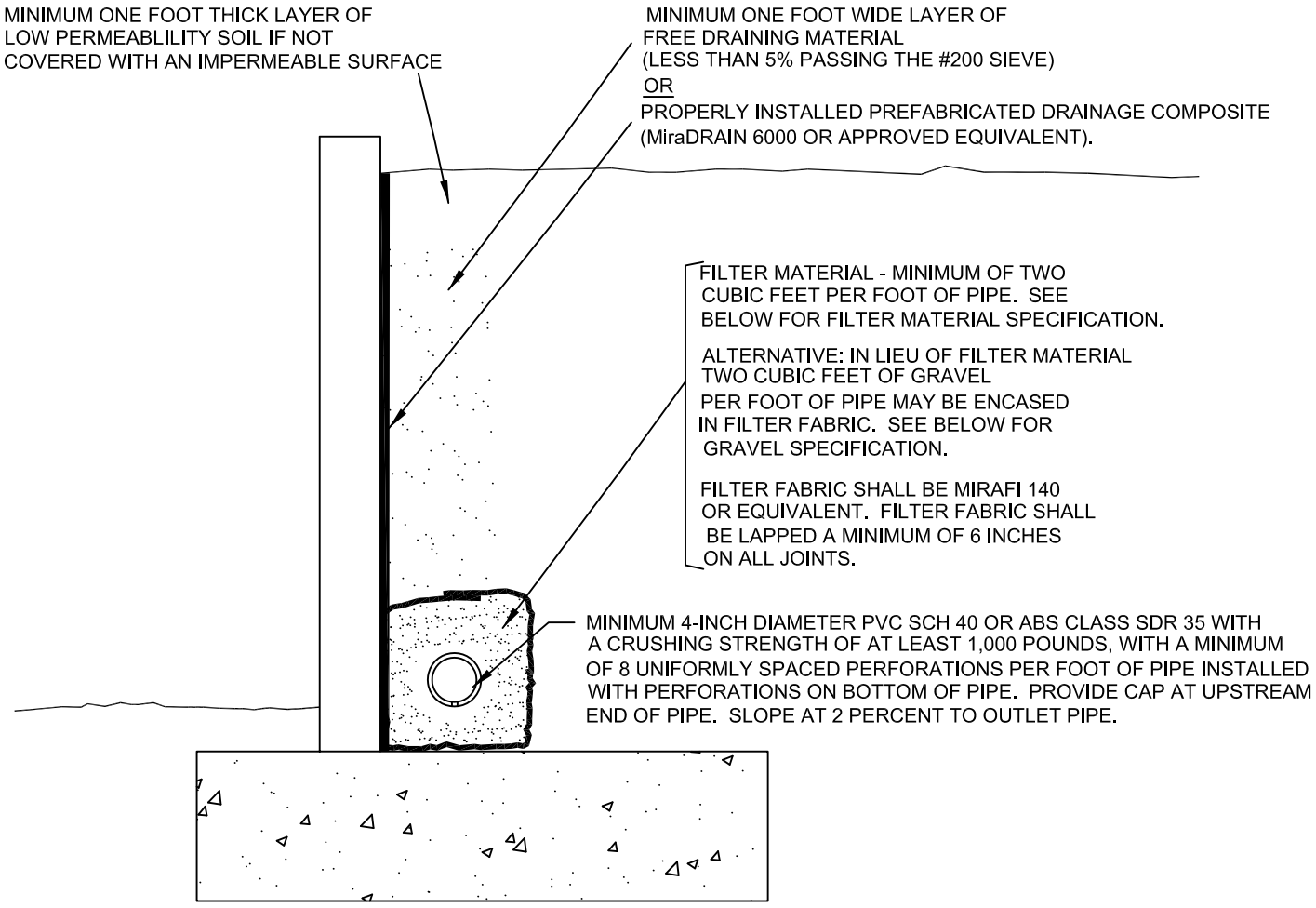
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

GRADING GUIDE SPECIFICATIONS

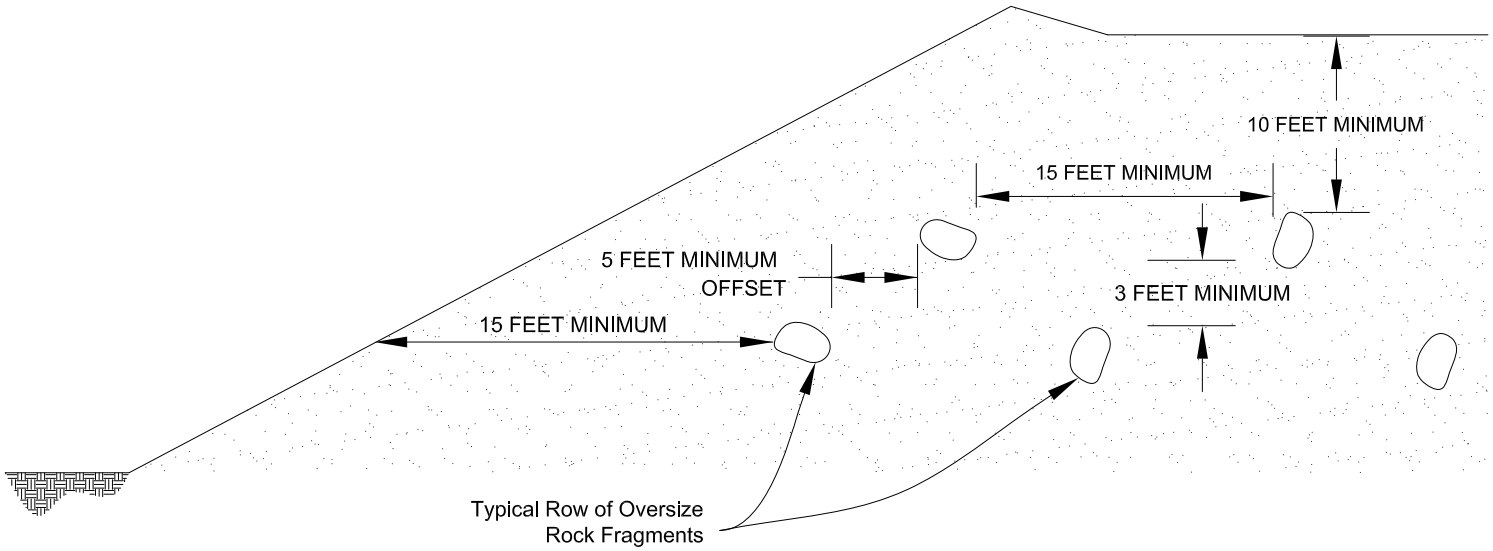
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

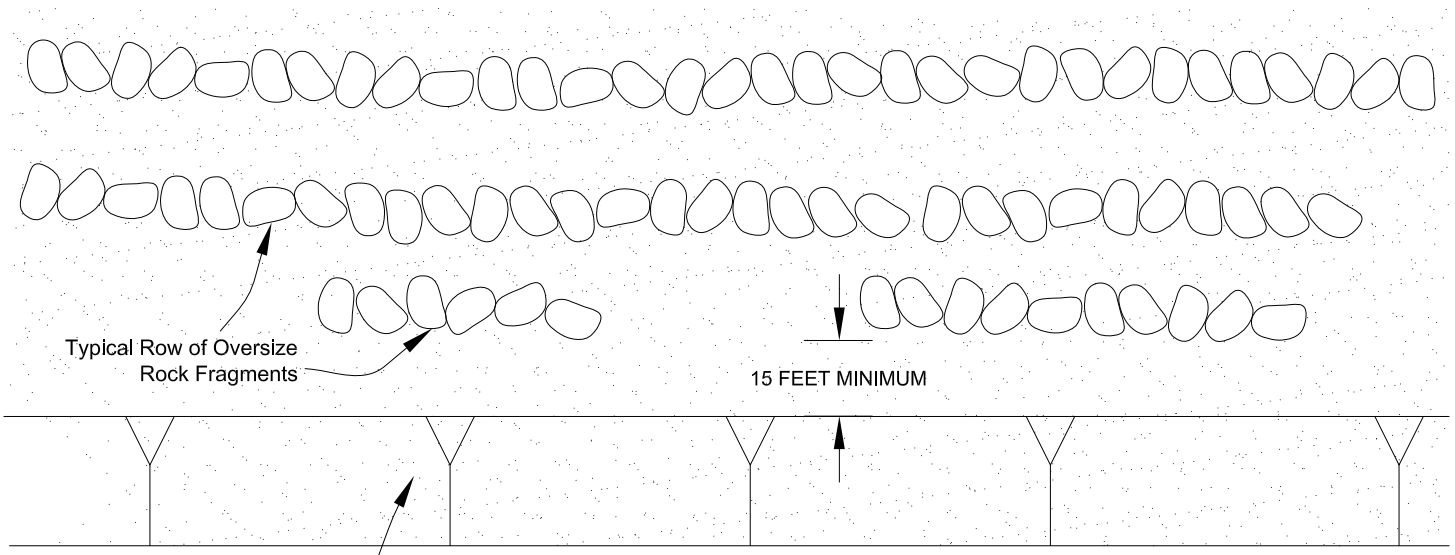
PLATE D-7

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX E

Latitude, Longitude: 33.931748, -116.996755



Date	11/11/2021, 2:20:41 PM
Design Code Reference Document	ASCE7-16
Risk Category	III
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.658	MCE_R ground motion. (for 0.2 second period)
S_1	0.6	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.658	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.105	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.678	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.745	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.093	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.28	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.658	Factored deterministic acceleration value. (0.2 second)
S1RT	0.807	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.905	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.678	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.918	Mapped value of the risk coefficient at short periods
C_{R1}	0.892	Mapped value of the risk coefficient at a period of 1 s

SOURCE: SEAOC/OSHPD Seismic Design Maps Tool
<https://seismicmaps.org/>

SEISMIC DESIGN PARAMETERS - 2019 CBC
PROPOSED INDUSTRIAL BUILDING
BEAUMONT, CALIFORNIA

DRAWN: MD
CHKD: GKM
SCG PROJECT 21G254-1
PLATE E-1

SOUTHERN CALIFORNIA GEOTECHNICAL

November 24, 2021

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Trammell Crow Company
3501 Jamboree Road, Suite 230
Newport Beach, California 92660

Attention: Mr. Kyle Dorand
Vice President - Development

Project No.: **21G254-2**

Subject: **Results of Infiltration Testing**
Proposed Industrial Building
Nicholas Road, North of West 4th Street
Beaumont, California

Reference: Geotechnical Investigation, Proposed Industrial Building, Nicholas Road, North of West 4th Street, Beaumont, California, prepared by Southern California Geotechnical, Inc. (SCG), prepared for Trammell Crow Company, SCG Project No. 21G254-1, dated November 22, 2021.

Mr. Dorand:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 21P456, dated October 13, 2021. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, prepared for the Riverside County Department of Environmental Health (RCDEH), dated December, 2013.

Site and Project Description

The subject site is located immediately northwest of the terminus of the Nicholas Road cul-de-sac, 1300± feet north of the intersection with West 4th Street in Beaumont, California. The site is bounded to the north by the Moreno Valley Freeway (60), to the east by an existing industrial building, to the south by an existing commercial/industrial building and vacant land and to the west by Western Knolls Avenue and an Amazon distribution facility. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of a roughly rectangular-shaped parcel, 30.9± acres in size. The site is presently developed as the Dowling Fruit Orchard. Three (3) buildings, ranging in size from 4,500 to 5,200± ft^2, are located in the northwest area of the site. Two (2) of the buildings are of wood-frame and

stucco construction. The remaining building is of steel frame and metal panel construction. Ground surface cover on the west side of the buildings consists of Portland cement concrete and asphaltic concrete. The pavements are in fair condition with moderate cracking throughout. One (1) above-ground storage (AST) is located just east of the aforementioned buildings. Additionally, one (1) shade structure is also located in the northwest area of the site. The shade structure is of wood frame construction with a metal panel roof. This area is used for storing farming equipment. One (1) single-family residence (SFR) is located near the middle of the western property line. Ground surface cover surrounding the single-family residence consists of exposed soil with several large trees. A single dry-well is located in the central area of the site. The remaining areas of the site are presently planted with several types of medium to large fruit trees. Ground surface cover in these areas consists of exposed soil.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the southern three-quarters of the site slopes downward to the south at a gradient of 2± percent. The northern quarter of the site slopes downward to the north at a gradient of 1± percent.

Proposed Development

Based on a conceptual site plan provided to our office by the client, the site will be developed with one (1) new industrial building, 600,000± ft^2 in size, located in the central area of the site. The building will be constructed in a cross-dock configuration, with docks along most of the east and west building walls. It is expected that the building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters.

The proposed development will include on-site stormwater infiltration. The infiltration system will consist of a detention/infiltration basin located in the western area of the site. The bottom of the infiltration system will extend to a depth of 15± feet below the existing site grades. It should be noted that the site plan was changed from the time of the field investigation to the issuance of this report. Therefore, none of the infiltration tests are located within the currently proposed location of the detention/infiltration basin.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site, also referenced above. As part of this study, seven (7) borings advanced to depths of 15 to 50± feet below the existing site grades. Artificial fill soils were encountered at the ground surface or beneath the gravel surface extending to depths of 2½ to 4½± feet below ground surface. The fill soils generally consist of medium dense to dense clayey fine sands, silty fine sands and fine sandy silts, and very stiff fine sandy clays. Possible fill soils were encountered at two of the borings extending to depths of 5½ to 6½± feet. The possible fill soils consist of very stiff fine sandy clay and loose to medium dense silty fine sand. Native alluvium was encountered beneath the fill or possible fill soils at all of the boring locations, extending to at least the maximum depth explored of 50± feet below ground surface. The near-surface alluvial soils, within the upper 4½ to 8± feet, generally consist of stiff fine sandy clay and medium dense clayey fine sand. These soils possess slight cementation. At depths greater than 8± feet, the alluvial soils generally consist of medium

dense to dense silty fine sand and fine sandy silt. These soils possess trace to some clay and occasional cementation. Occasional layers of medium dense to very dense fine to medium sand, fine to coarse sand and very stiff clayey silt were encountered between depths of 17 to 50± feet below ground surface.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the moisture content of the recovered soil samples and the lack of free water in the borings, the static groundwater table is at a greater depth than 50± feet below existing site grades.

Historic and recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. One monitoring well on record is located 1,312± feet east of the site. Water level readings within this monitoring well indicate a high groundwater level of 226± feet below ground surface in November 1991, and 149± feet below the ground surface in October 2010.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of three (3) infiltration test borings, advanced to a depth of 15± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as I-1 through I-3) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Artificial fill soils were encountered at the ground surface extending to depths of 2½± feet below ground surface. The fill soils generally consist of stiff fine sandy clays. Native alluvial soils were encountered beneath the fill soils at all of the infiltration test boring locations, extending to at least the maximum explored depth of 15± feet below existing site grades. The near-surface alluvium generally consists of stiff fine sandy clays extending to a depth of 7± feet. At greater depths, the alluvium consists of loose to medium dense silty fine to medium sands to fine sandy silts and fine to coarse sands with little silt. The Boring Logs, which illustrate the conditions encountered at the boring locations, are included with this report.

Infiltration Testing

As previously mentioned, the infiltration testing was performed in general accordance with the Riverside County guidelines: Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A.

Pre-soaking

In accordance with the county infiltration standards both of the infiltration test borings were pre-soaked prior to the infiltration testing. The pre-soaking process consisted of filling the test borings by inverting a full 5-gallon bottle of clear water supported over each hole so that the water level reaches a level of at least 5 times the hole's radius above the gravel at the bottom of each hole. The pre-soaking was completed after all of the water had percolated through each test hole or after 15 hours since initiating the pre-soak. Based on the results of the pre-soaking process, different infiltration procedures were used during the infiltration testing at the infiltration boring locations.

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of each test hole. In accordance with the Riverside County guidelines, in areas where "non-sandy soils" were encountered at the bottom of the infiltration test borings (where 6 inches of water did not infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), readings were taken at 30-minute intervals for a total of 6 hours at the test location. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the test are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Infiltration Rate (inches/hour)
I-1	15	Gray Brown Silty fine to coarse Sand, little fine Gravel, little Silt	0.2
I-2	15	Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay	0.1
I-3	15	Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay	0.0

Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples within the borings were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the bottom of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-3 of this report.

Design Recommendations

Three (3) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 0.0 to 0.2 inches per hour. **Based on the results of infiltration testing, infiltration is not recommended for a proposed infiltration system located in the southern area of the site.** As noted above, none of the infiltration tests were performed within the proposed infiltration system located in the western area of the site. However, based on the subsurface data collected during the concurrent geotechnical investigation, we expect the infiltration characteristics will be similar in the western area of the site to the southern area of the site.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rates contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between trench locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

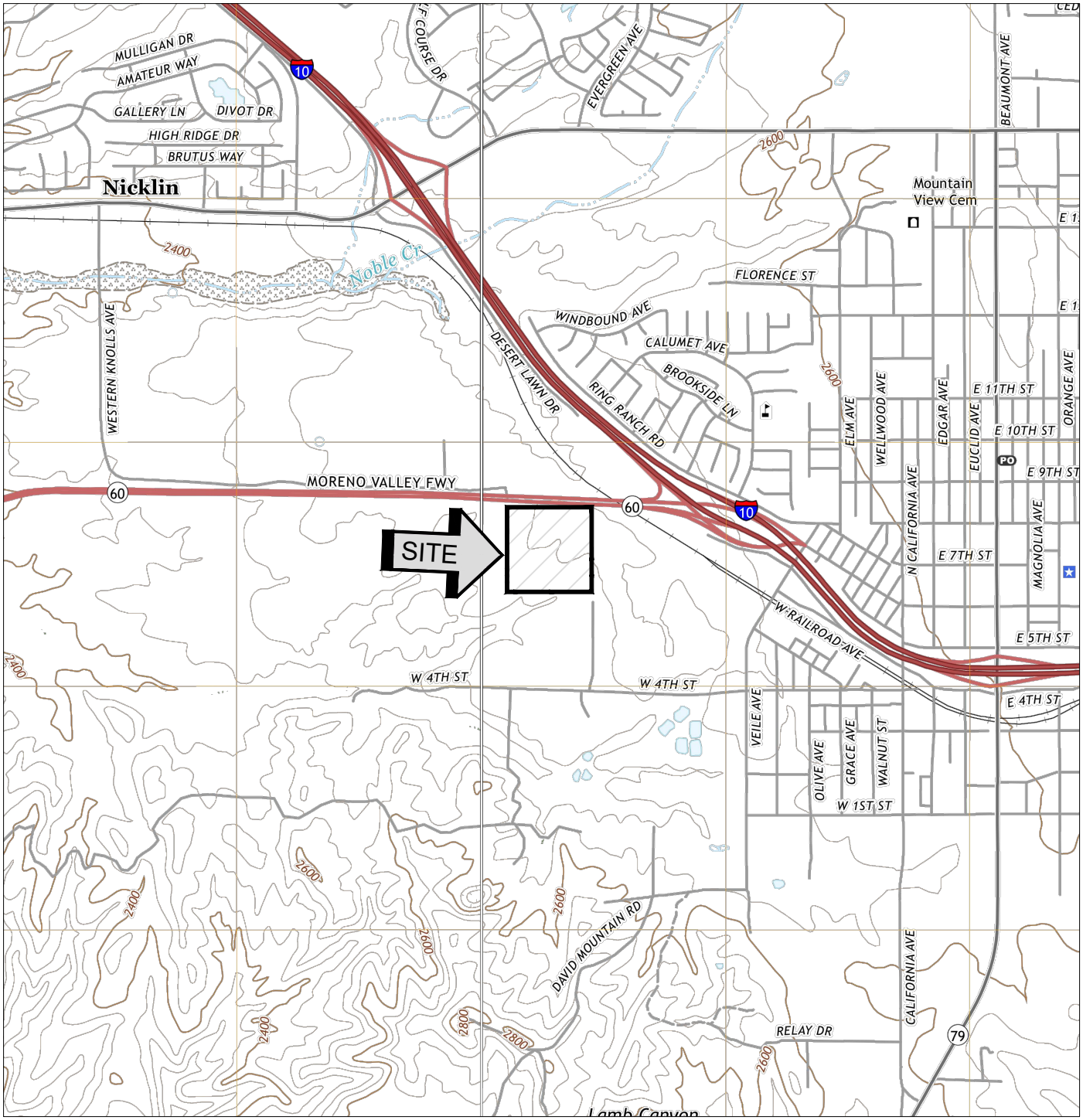
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Daryl Kas, CEG 2467
Senior Geologist

Gregory K. Mitchell, GE 2364
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs (5 pages)
Infiltration Test Results Spreadsheets (3 pages)
Grain Size Distribution Graphs (3 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE BEAUMONT AND EL CASCO QUADRANGLES, RIVERSIDE COUNTY, CALIFORNIA, 2018.

SITE LOCATION MAP

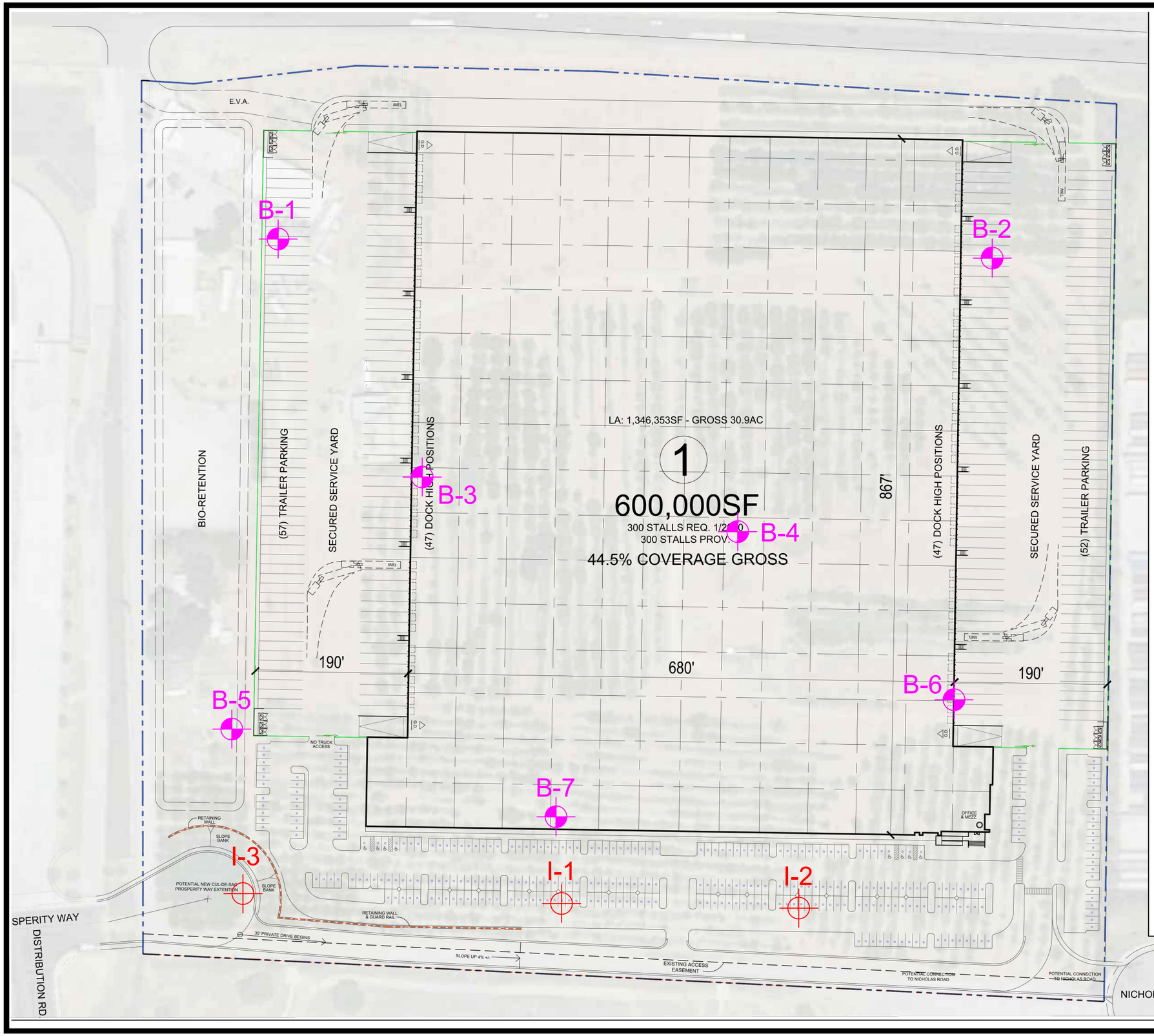
PROPOSED INDUSTRIAL BUILDING

BEAUMONT, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: MD CHKD: GKM	
SCG PROJECT 21G254-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



NORTH

SoCalGeo

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION LOCATION
- APPROXIMATE BORING LOCATION (SCG PROJECT NO. 21G254-1)

INFILTRATION TEST LOCATION PLAN

PROPOSED INDUSTRIAL BUILDING

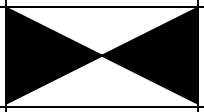
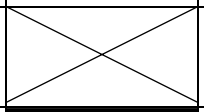
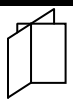
BEAUMONT, CALIFORNIA

SCALE: 1" = 120'	
DRAWN: MD CHKD: GKM	
SCG PROJECT 21G254-2	
PLATE 2	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

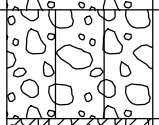
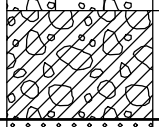
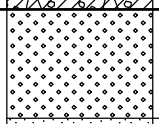
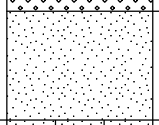
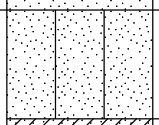
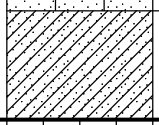
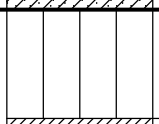
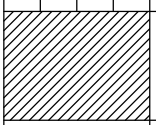
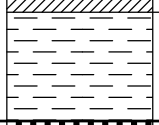
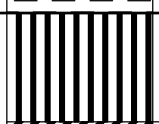
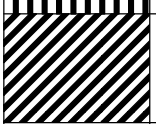
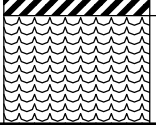
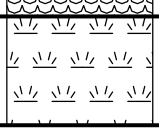
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-1

JOB NO.: 21G254-2
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/27/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown fine Sandy Clay, slightly porous, stiff-damp							
					ALLUVIUM: Brown fine Sandy Clay, trace medium Sand, slightly cemented, stiff-damp							
5		14	4.5				10					
					Brown fine Sandy Silt, trace medium Sand, medium dense-moist							
10		19					16					
					Gray Brown fine to coarse Sand, little fine Gravel, little Silt, medium dense-damp							
		23					4					
15					Boring Terminated at 15							

TBL 21G254-2.GPJ SOCALGEO.GDT 11/24/21

TEST BORING LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-2

JOB NO.: 21G254-2
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/27/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown fine Sandy Clay, slightly porous, stiff-damp							
					ALLUVIUM: Brown fine Sandy Clay, trace medium to coarse Sand, trace fine Gravel, stiff-damp to moist							
5		9	4.5				12					
					Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, loose-moist							
10		9					15					
		19					18					
15					Boring Terminated at 15'							

TBL 21G254-2.GPJ SOCALGEO.GDT 11/24/21

TEST BORING LOG **PLATE B-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-3

JOB NO.: 21G254-2
PROJECT: Proposed Industrial Building
LOCATION: Beaumont, California

DRILLING DATE: 10/27/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Red Brown fine Sandy Clay to Clayey fine Sand, slightly porous, stiff to medium dense-damp							
					ALLUVIUM: Brown fine Sandy Clay, slightly cemented, stiff-moist							
		11	4.5				15					
5												
		18	3.0				13					
10					@ 9½', 2±-inch fine to medium Sand lens							
					Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, medium dense-moist							
		17					15					
15					Boring Terminated at 15'							

TBL 21G254-2.GPJ SOCALGEO.GDT 11/24/21

TEST BORING LOG

PLATE B-3

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Beaumont, California
Project Number	21G254-2
Engineer	CB

Test Hole Radius	4	(in)
Test Depth	14.90	(ft)

Infiltration Test Hole	I-1

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	7:37 AM	25.00	12.20	1.92	NO	NON-SANDY SOILS
	Final	8:02 AM		12.36			
2	Initial	8:02 AM	25.00	12.20	1.80	NO	NON-SANDY SOILS
	Final	8:27 AM		12.35			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	8:30 AM	30.00	12.20	0.15	2.63	0.21
	Final	9:00 AM		12.35			
2	Initial	9:00 AM	30.00	12.20	0.14	2.63	0.20
	Final	9:30 AM		12.34			
3	Initial	9:30 AM	30.00	12.20	0.13	2.64	0.19
	Final	10:00 AM		12.33			
4	Initial	10:00 AM	30.00	12.20	0.13	2.64	0.19
	Final	10:30 AM		12.33			
5	Initial	10:30 AM	30.00	12.20	0.12	2.64	0.17
	Final	11:00 AM		12.32			
6	Initial	11:00 AM	30.00	12.20	0.12	2.64	0.17
	Final	11:30 AM		12.32			

Per County Standards, Infiltration Rate calculated as follows:

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

Where:

Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Beaumont, California
Project Number	21G254-2
Engineer	CB

Test Hole Radius	4	(in)
Test Depth	15.10	(ft)

Infiltration Test Hole	I-2

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	9:29 AM	25.00	12.20	1.20	NO	NON-SANDY SOILS
	Final	9:54 AM		12.30			
2	Initial	9:54 AM	25.00	12.20	1.20	NO	NON-SANDY SOILS
	Final	10:19 AM		12.30			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	10:18 AM	30.00	12.20	0.13	2.84	0.17
	Final	10:48 AM		12.33			
2	Initial	10:50 AM	30.00	12.20	0.13	2.84	0.17
	Final	11:20 AM		12.33			
3	Initial	11:20 AM	30.00	12.20	0.11	2.85	0.15
	Final	11:50 AM		12.31			
4	Initial	11:50 AM	30.00	12.20	0.12	2.84	0.16
	Final	12:20 PM		12.32			
5	Initial	12:20 PM	30.00	12.20	0.10	2.85	0.13
	Final	12:50 PM		12.30			
6	Initial	12:50 PM	30.00	12.20	0.10	2.85	0.13
	Final	1:20 PM		12.30			

Per County Standards, Infiltration Rate calculated as follows:

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

Where:

Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Beaumont, California
Project Number	21G254-2
Engineer	CB

Test Hole Radius	4	(in)
Test Depth	15.00	(ft)

Infiltration Test Hole	I-3

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:11 AM	25.00	11.65	0.60	NO	NON-SANDY SOILS
	Final	11:36 AM		11.70			
2	Initial	11:36 AM	25.00	11.70	0.60	NO	NON-SANDY SOILS
	Final	12:01 PM		11.75			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:01 PM	30.00	11.70	0.06	3.27	0.07
	Final	12:31 PM		11.76			
2	Initial	12:31 PM	30.00	11.70	0.06	3.27	0.07
	Final	1:01 PM		11.76			
3	Initial	1:01 PM	30.00	11.70	0.05	3.28	0.06
	Final	1:31 PM		11.75			
4	Initial	1:31 PM	30.00	11.70	0.04	3.28	0.05
	Final	2:01 PM		11.74			
5	Initial	2:01 PM	30.00	11.70	0.05	3.28	0.06
	Final	2:31 PM		11.75			
6	Initial	2:31 PM	30.00	11.70	0.04	3.28	0.05
	Final	3:01 PM		11.74			

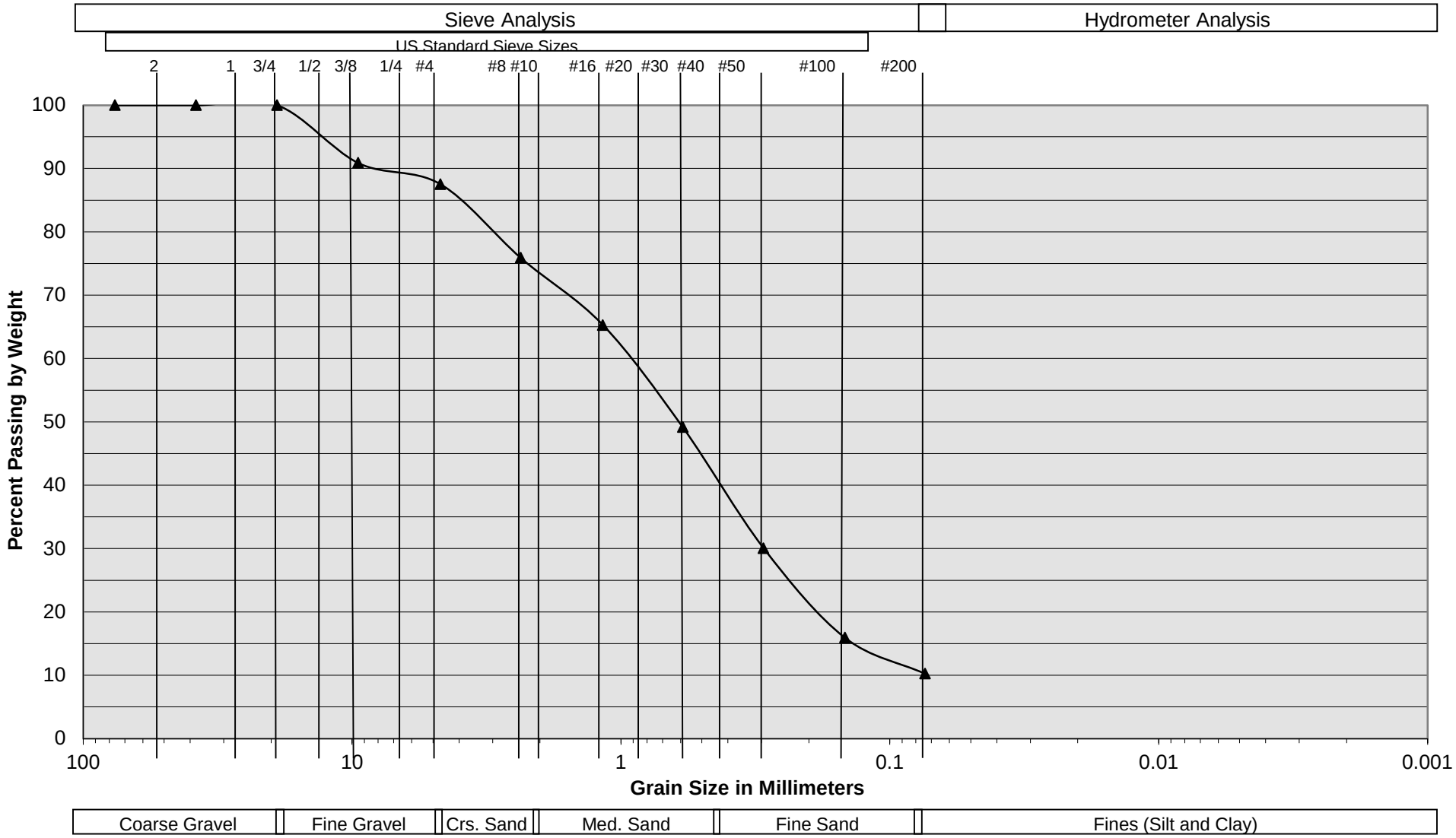
Per County Standards, Infiltration Rate calculated as follows:

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

Where:

Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

Grain Size Distribution

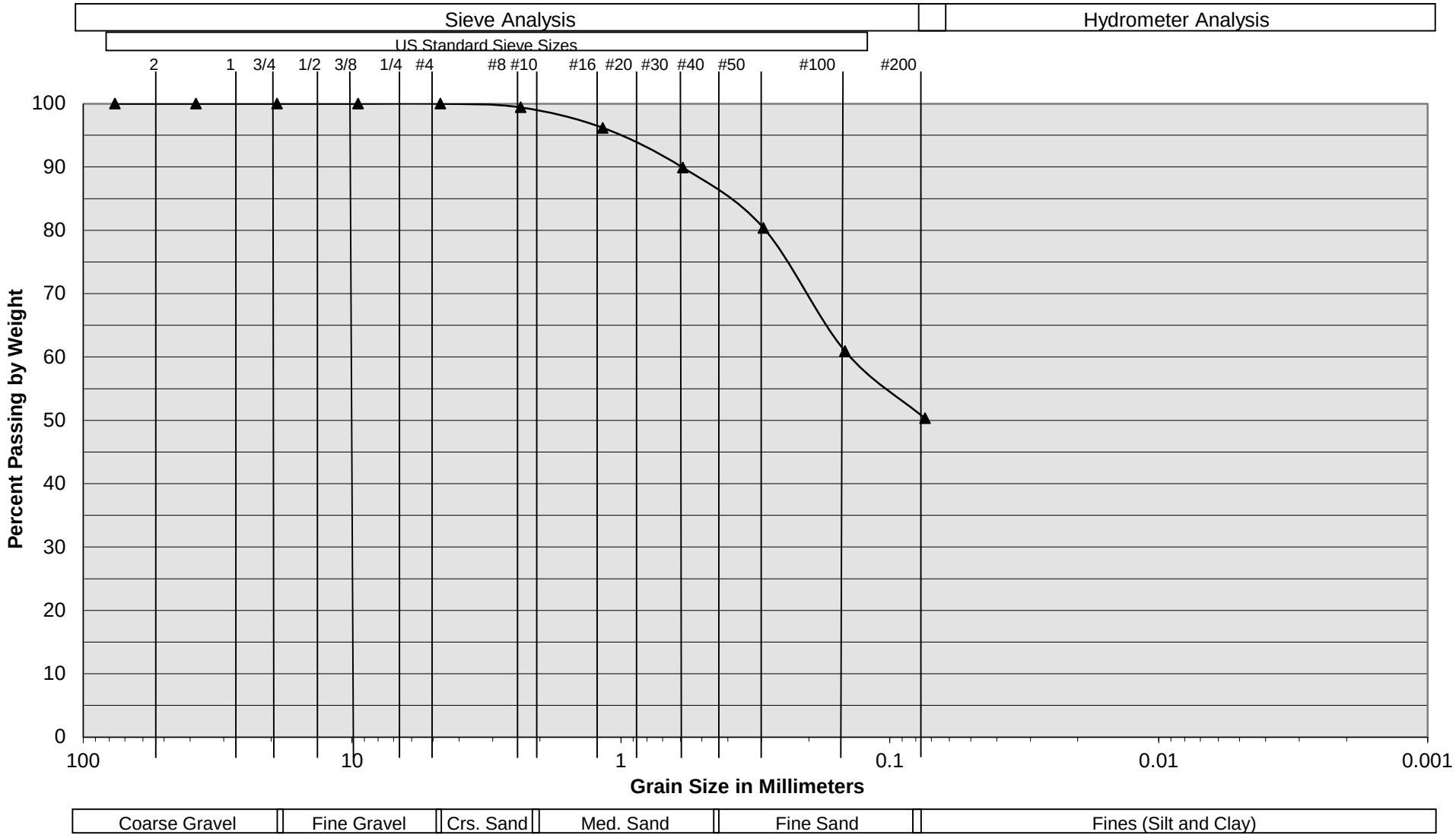


Sample Description	I-1 @ 13½'
Soil Classification	Gray Brown fine to coarse Sand, little fine Gravel, little Silt

Proposed Industrial Building
Beaumont, California
Project No. 21G254-2
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

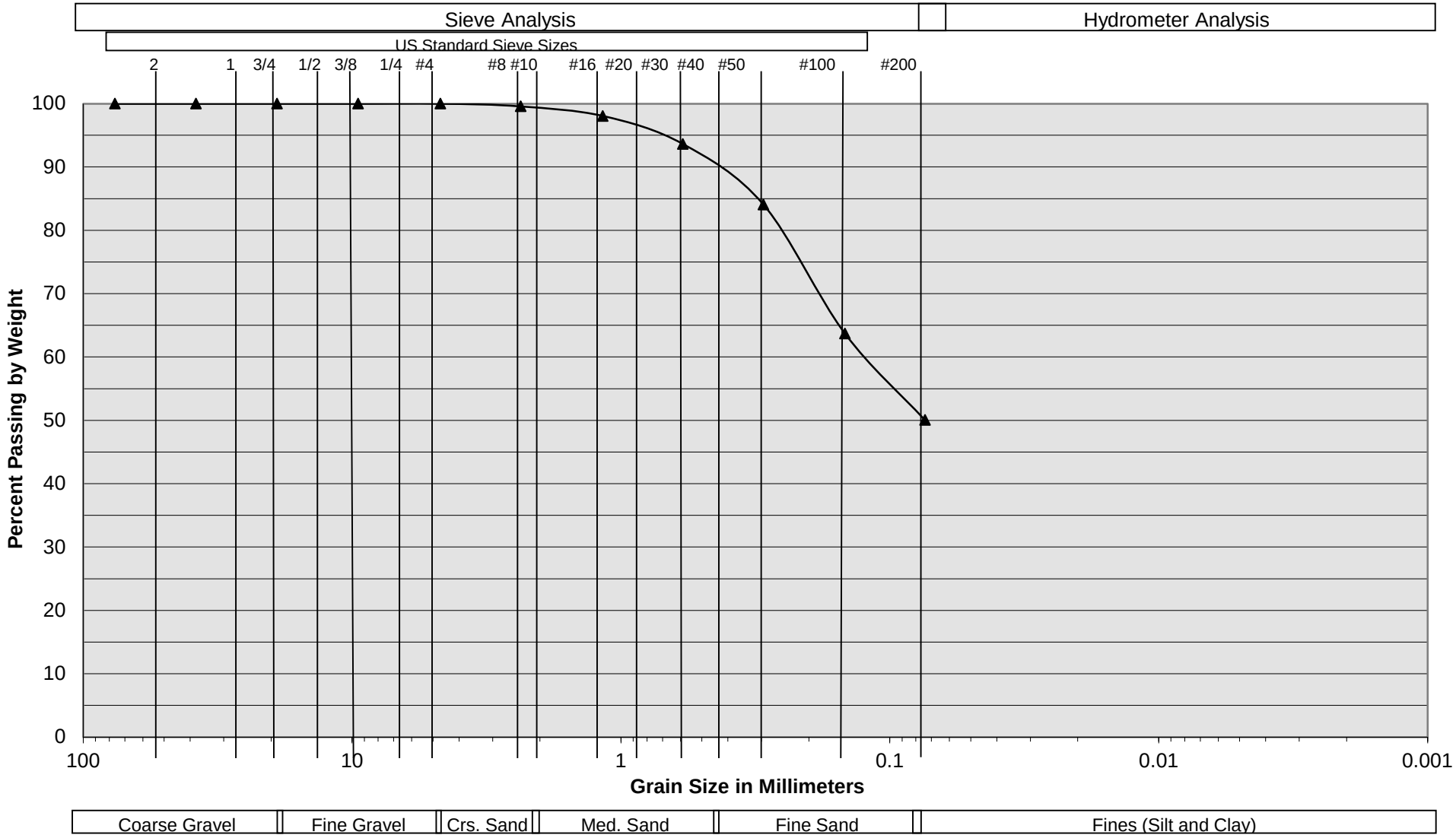


Sample Description	I-2 @ 13½'
Soil Classification	Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay

Proposed Industrial Building
Beaumont, California
Project No. 21G254-2
PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-3 @ 13½'
Soil Classification	Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay

Proposed Industrial Building
Beaumont, California
Project No. 21G254-2
PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Appendix 4: Historical Site Conditions

CITADEL EHS
assess • resolve • strengthen

December 3, 2021

Mr. Neal Holdridge
Principal/Environmental Manager
TRAMMELL CROW SO. CAL. DEVELOPMENT, INC.
3501 Jamboree Road Suite 230
Newport Beach, California 92660

Re: CITADEL Project No. 0096.1039.0
Environmentally Regulated Materials (ERMs) Survey Report
Asbestos, Lead, and Other ERMs Survey
Dowling Fruit Orchard Site
38021 CA-60
Beaumont, California 92223

Dear Mr. Holdridge:

Enclosed please find Citadel EHS's Environmentally Regulated Materials (ERMs) Survey Report for the above-referenced location.

The ERMs survey was conducted for Trammell Crow So. Cal. Development, Inc. in accordance with a mutually agreed upon scope of work.

If after your review you have any questions or require additional information, please do not hesitate to telephone me at (818) 246-2707.

Sincerely,
CITADEL EHS

Jack Samuels
Digitally signed by Jack Samuels
Date: 2021.12.03 10:41:40 -08'00'

Jack Samuels, CAC, CDPH
Associate Principal, Building Sciences

Enclosure

CITADEL EHS

assess • resolve • strengthen

TRAMMELL CROW SO. CAL. DEVELOPMENT, INC.
3501 Jamboree Road Suite 230
Newport Beach, California 92660

Environmentally Regulated Materials Survey Report

December 3, 2021

Citadel Project Number 0096.1039.0

Asbestos, Lead and Other ERMs Survey
Dowling Fruit Orchard Site
38021 CA-60
Beaumont, California 92223

CITADEL EHS
assess • resolve • strengthen

Table of Contents

1.0 INTRODUCTION **1**

2.0 SURVEY METHODOLOGIES **1**

FIELD METHODOLOGIES – ASBESTOS 1
FIELD METHODOLOGIES – LEAD CONTAINING MATERIALS (LCMS) 2
FIELD METHODOLOGIES – POLYCHLORINATED BIPHENYLS (PCBS)/DI(2-ETHYLHEXL) PHTHALATE (DEHP) 2
FIELD METHOLOGIES – UNIVERSAL/ELECTRONIC/RADIOACTIVE WASTES 3
FIELD METHODOLOGIES – OZONE DEPLETING SUBSTANCES (ODS) 3

3.0 RESULTS **3**

ASBESTOS 3
LEAD-CONTAINING MATERIALS 8
POLYCHLORINATED BIPHENYLS (PCBS)/DI(2-ETHYLHEXL) PHTHALATE (DEHP) VISUAL INSPECTION 9
UNIVERSAL/ELECTRONIC/RADIOACTIVE WASTES 11
OZONE DEPLETING SUBSTANCES 12

4.0 CONCLUSIONS AND RECOMMENDATIONS **13**

ASBESTOS 13
LEAD-CONTAINING MATERIALS 14
POLYCHLORINATED BIPHENYL (PCBS) AND DIETHYLHEXL PHTHALATE (DEHP) 15
UNIVERSAL/ELECTRONIC/RADIOACTIVE WASTES 16
OZONE DEPLETING SUBSTANCES 16

5.0 SURVEY LIMITATIONS **16**

6.0 DISCLAIMER **17**

7.0 SIGNATURES **18**

APPENDICES

A Project Team Certifications
B Site Plan and Drawings with Bulk Sample Locations
C Asbestos Laboratory Reports
D Table 3.0 - Lead XRF SA Results
E Table 3.1 – Lead XRF Results – LBP (Positive)
F Table 3.2 – LCP – ($\geq$0.01 mg/cm^2 and < 0.7 mg/cm^2)

1.0 INTRODUCTION

Citadel EHS (Citadel) was contracted by Trammell Crow So. Cal. Development, Inc. (Client) to conduct an Environmentally Regulated Materials (ERMs) survey of the buildings located on the Dowling Fruit Orchard Site located at 38021 CA-60 in Beaumont, California (Survey Area). Citadel identified 10 structures on the site. The Site Plans in Appendix **B** identify the structures by number.

Inspection for the following items was included in the scope of work.

- Asbestos-containing materials/asbestos-containing construction materials (ACMs/ACCMs);
- Representative lead-containing coatings and finishes, herein "lead-containing materials (LCMs);
- Suspect light ballasts filled with Polychlorinated Biphenyl (PCBs) and Diethylhexl Phthalate (DEHP) dielectric fluids;
- Universal/electronic/radioactive wastes consisting of fluorescent light tubes, mercury ampoules in pneumatic controls, switchboards, gauges, batteries, and thermostats, electronic waste {e.g., cathode ray tube (CRT) devices (including televisions and computer monitors, etc.)}, and radioactive materials (smoke detectors and exit signage); and,
- Ozone Depleting Substances (ODS) {Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFC)} such as refrigerants related to roof-top cooling units}.

The survey was conducted on November 17th, 18th, and 19th, 2021, by the Citadel staff listed in the table below. All work was conducted under the general supervision of, and the report was prepared by Mr. Jack S. Samuels. Mr. Samuels is a Division of Occupational Safety and Health (DOSH) Certified Asbestos Consultant (CAC) (No. 92-0475) and California Department of Public Health (CDPH) Lead Related Construction Inspector/Assessor (LRCIA) (No. LRC-00008171). The report was reviewed by Mr. Josh LaPrease. Mr. LaPrease is a DOSH CAC (No. 19-6681) and CDPH LRCIA (No. 00000890). Citadel's project team certifications can be found in Appendix **B**.

Staff Information

NAME (FIELD WORK WAS PREFORMED BY:)	CERTIFICATION DESCRIPTION
Nelson Ortiz	CSST No. 15-5586, LRCST No. LRC-00008185
Brian Weltman	CSST No. 17-5942, LRCST No. LRC-00002502

- CAC=California Division of Occupational Safety and Health (DOSH) Certified Asbestos Consultant
- CSST=DOSH Certified Site Surveillance Technician
- LRCIA=California Department of Public Health (CDPH) Lead Related Construction Inspector/Assessor
- LRCPM=CDPH LRC Project Monitor
- LRCST=CDPH LRC Sampling Technician

2.0 SURVEY METHODOLOGIES

FIELD METHODOLOGIES – ASBESTOS

Citadel began the field survey by visually inspecting the Survey Area to categorize suspect ACMs/ACCMs to be impacted by the project. Suspect ACMs/ACCMs were categorized by homogeneous areas (HAs). HAs consist of groupings of materials that have uniform appearances, textures, and installation dates. Following the walk through, representative bulk samples of suspect ACMs/ACCMs were then collected. As the samples were collected, the locations of the

HAs and samples were marked on field sketches. Locations of visible debris, if observed, were also noted.

ACMs/ACCMs Condition Assessment

Materials were assessed to be in good, *damaged*, or *significantly damaged* condition based on their condition at the time of the survey:

- ***Good Condition*** **-** No or very limited visible damage or deterioration was observed.
- ***Damaged Condition*** **-** Crumbling, blistering, water damage, gouges, or other damage was observed over less than 25% of the materials (one-tenth if evenly distributed); or accumulation of suspect powder, dust or debris below the material was observed.
- ***Significantly Damaged Condition*** **-** Crumbling, blistering, water damage, gouges, or other damage was observed over greater than 25% of the material (one-tenth if evenly distributed); material is delaminating or showing adhesive failure; or accumulation of suspect powder, dust or debris below the material was observed.

FIELD METHODOLOGIES – LEAD CONTAINING MATERIALS (LCMS)

A limited lead inspection/screening was conducted to test predominant surface paints/coatings on surface area components, such as walls, doors, floors, frames, etc. for lead-based paints and lead-containing paints. Citadel utilized X-Ray Florescence Spectrum Analysis (XRF-SA) to test suspect paints and coatings. Assays (tests) were taken from painted/coated surfaces as necessary.

The XRF irradiates the paint on a given surface causing the lead in the paint, if present, to emit a characteristic frequency of x-ray radiation. The intensity of this radiation is measured by the detector and related to the amount of lead in the paint. The type of XRF used in this survey was a Niton XLP-303A X-Ray Fluorescence Spectrum Analyzer. The XRF analyzer provides an in-the-field determination of suspect LBP without the need to collect substantial numbers of paint chip samples for subsequent laboratory analysis.

In order to obtain a reading, the XRF was placed with the face of the instrument flush against the surface to be tested. It was then held in place for the duration of the sample, which was determined by the instrument. At the conclusion of the sample time, the lead concentration was displayed on the device's readout screen. The values, expressed in milligrams per square centimeter (mg/cm^2), are stored in the device and can be recalled by the inspector upon downloading into computer software. The Niton is sensitive to 0.01 milligrams per square centimeter (mg/cm^2) of lead.

The instrument, equipped with a sealed radioactive source, was operated by certified personnel in accordance with manufacturer requirements and applicable regulations. The operator calibrated the XRF-SA pursuant to the manufacturer's specifications and regularly verified XRF-SA readings against pre-determined lead samples produced by the National Institute of Standards and Testing (NIST). These quality control measures produced a 95% confidence level that the XRF-SA readings accurately reflected the actual level of lead in the tested surfaces.

FIELD METHODOLOGIES – POLYCHLORINATED BIPHENYLS (PCBS)/DI(2-ETHYLHEXL) PHTHALATE (DEHP)

The inspection for polychlorinated biphenyls (PCBs) and di(2-ethylhexl) phthalate (DEHP) consisted of a visual inspection of the type(s) of equipment found in the Survey Area that commonly use dielectric fluids. Items such as fluorescent lighting ballasts were visually inspected to determine if: (1) they were "wet" ballasts (contain dielectric fluids) as opposed to magnetic, and (2) if the

ballasts were labeled "No PCBs" or "Does Not Contain PCBs." Wet ballasts were assumed to contain PCBs or DEHP unless so labeled. As required by Federal and State law, all ballasts manufactured post-1978 are required to be labeled with the aforementioned language. This portion of the survey was not intended to be comprehensive, but rather sought to identify potential hazards.

FIELD METHOLOGIES – UNIVERSAL/ELECTRONIC/RADIOACTIVE WASTES

The inspection for Universal/Electronic/Radioactive Wastes consisted of visual inspection of the Survey Area to determine if Universal/Electronic/Radioactive Wastes were present. This portion of the survey was not intended to be comprehensive, but rather sought to identify potential hazards.

FIELD METHODOLOGIES – OZONE DEPLETING SUBSTANCES (ODS)

Under Title VI of the Clean Air Act (CAA), US Environmental Protection Agency (USEPA's) Stratospheric Protection Division is responsible for several programs that protect the stratospheric ozone layer. Several types of refrigerants and propellants have been defined as Ozone Depleting Substances (ODS) by the EPA. These include, but are not limited to, Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFC), as well as Halon, Sulfur Dioxide (SO_2), and Ammonia (NH_3).

Citadel visually inspected the Survey Area for the following suspect ODS-containing equipment and appliances: refrigerators, freezers, dehumidifiers, window-mounted air-cooling units, and forced-air furnaces with cooling units, as well as propellants in fire suppression equipment. This portion of the survey was not intended to be comprehensive, but rather sought to identify potential hazards.

3.0 RESULTS

ASBESTOS

Asbestos Definitions

Asbestos-Containing Materials (ACM): The EPA's Asbestos NESHAPs and the South Coast Air Quality Management District (SCAQMD), the local air pollution control district, define an asbestos-containing material as any material that contains a concentration of asbestos of greater than one percent (>1.0%) by area as determined by PLM (Federal Register, Volume 59, No. 146, August 1, 1994, P. 38970-38971). NESHAPs and SCAQMD Rule 1403 further segregate asbestos-containing materials into *Regulated Asbestos-Containing Materials (RACM), Category I Non-Friable Materials,* and *Category II Non-Friable Materials*, which are defined as follows:

- **Regulated Asbestos-Containing Materials (RACM)/Asbestos-Containing Materials (ACM):** Includes all friable asbestos materials, Category I/Class I Nonfriable ACM that have become friable or will become friable, and Category II/Class II Nonfriable ACM that have a high probability of being crumbled, pulverized, or reduced to powder by the forces expected to act on the materials in the course of renovation or demolition.
- ***Category I Nonfriable ACM/Class I Nonfriable ACM:*** Includes asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products that when dry can be crumbled, pulverized, or reduced to powder by hand pressure in the course of renovation and demolition activities.
- ***Category II Nonfriable ACM/Class II Nonfriable ACM:*** Includes all non-friable materials, excluding *Category I/Class I Nonfriable ACM* that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Asbestos-Containing Construction Materials (ACCM): The California Department of Occupational Safety and Health (Cal/OSHA) further defines an asbestos-containing construction material (ACCM) as a material that contains greater than one-tenth of one percent (>0.1%) asbestos.

Presumed Asbestos-Containing Material (PACM) means thermal system insulation and surfacing material found in buildings, vessels, and vessel sections constructed no later than 1980 that are assumed to contain greater than one percent asbestos but have not been sampled or analyzed to verify or negate the presence of asbestos. PACM may also be used in this report to identify additional suspect ACM that was not sampled but should be assumed to be ACM.

Asbestos Results

During the survey a total of 144 asbestos bulk samples were collected and submitted for analysis. The samples were layered in some cases yielding 241 samples for analysis. The bulk samples were submitted to the following laboratory for analysis:

LA Testing
520 Mission Street
South Pasadena, California 91030
(323) 254-9960
CA NVLAP Code 200232-0, CA ELAP 2283

The samples were analyzed by polarized light microscopy (PLM) for asbestos content using EPA 600/R-93/116 Method. The EPA method is a semi-quantitative procedure with a detection limit of one-tenth to one percent (0.10 – 1.0%) by area, dependent upon the material being analyzed. If indicated, select samples were submitted for more objective analysis following EPA 600/R-93/116 Method Point Count procedures (1,000 points). The Point Count procedure is used to increase the amount of sample viewed under PLM so that the results are statistically enhanced, resulting in a generally more accurate analysis.

Table A.1 includes the findings of the sampling performed by Citadel.

Table A.1 Asbestos Bulk Sample Analytical Results

CITADEL HA/SAMPLE ID No.	MATERIAL DESCRIPTION	MATERIAL LOCATION	ESTIMATED QUANTITY	SAMPLE RESULTS
Building 1				
WPF1-034, 035, 036	Wall Plaster, White, Smooth	Throughout	N/A	NAD
CP1-037, 038, 038	Ceiling Plaster, White, Smooth	Room 5	N/A	NAD
CP2-040, 041, 042	Ceiling Plaster, White, Troweled	Room 1	N/A	NAD
WPF2-043, 044, 045	Wall Plaster, White, Troweled	Room 1	N/A	NAD
MISC1-046, 047, 048	Residual Mastic, Black	Under Display Racks, Throughout	N/A	NAD
CSR1-049, 050, 051	Drywall and Joint Compound Ceiling, White	Room 4	N/A	NAD

Table A.1 Asbestos Bulk Sample Analytical Results

CITADEL HA/SAMPLE ID No.	MATERIAL DESCRIPTION	MATERIAL LOCATION	ESTIMATED QUANTITY	SAMPLE RESULTS
RFM1-052, 053, 054	Rolled Roof Membrane	Roof	N/A	NAD
RPM1-055, 056, 057, 058	Rolled Roof Penetration Mastic, Black/Grey	Roof	N/A	NAD
MISC2-059, 060, 061	Rolled Roof Seam Mastic, Black/Grey	Roof	N/A	NAD
RFM2-062, 063, 064	Shingled Roof Membrane, Black/Grey	Roof	N/A	NAD
MISC3-065, 066, 067	**Mastic at Brace, Black/Silver**	**Roof**	**20 SF**	**3-5% Chrysotile**
MISC4-068, 069, 070	Mastic at HVAC Stand, Black	Roof	N/A	NAD
ES1-071, 072, 073, 074, 075	Exterior Stucco, Grey	Exterior	N/A	NAD
PB1-076, 077, 078	Barrier Paper, Brown	Exterior Under Stucco	N/A	NAD
MISC5-131, 132, 133	Concrete, Grey	Interior	N/A	NAD
Building 2				
WPF1-001, 002, 003	Plaster Walls, White, Sand Texture	Throughout	N/A	<0.1% Chrysotile (PCV)
VFT1-004, 005, 006	12"x12" Vinyl Floor Tiles, Wood Pattern, and Mastic	Room 1	N/A	NAD
CP1-007, 008, 009	Plaster Ceiling, White, Smooth	Throughout	N/A	NAD
FCM1-010, 011, 012	Carpet Mastic, Yellow	Rooms 1 and 2	N/A	NAD
MISC1-013, 014, 015	Moisture Barrier Paper, Black	Exterior Under Stucco	N/A	NAD
RPM1-016, 017, 018	**Roof Mastic, Black**	**Roof**	**300 SF**	**8-10% Chrysotile**
RPM2-019, 020, 021	**Roof Mastic, Silver**	**Roof**	**240 SF**	**4-8% Chrysotile**
ES1-022, 023, 024	Exterior Stucco, Grey, Sand Finish	Exterior	N/A	NAD
ES2-025, 026, 027	Exterior Stucco, Grey, Trowel Finish	Exterior East Wall	N/A	NAD
ES3-028, 029, 030	Exterior Stucco, Grey, Smooth Finish	Exterior	N/A	NAD
RPM3-031, 032, 033	**Roof Mastic, White**	**Roof**	**200 SF**	**8% Chrysotile**

Table A.1 Asbestos Bulk Sample Analytical Results

CITADEL HA/SAMPLE ID No.	MATERIAL DESCRIPTION	MATERIAL LOCATION	ESTIMATED QUANTITY	SAMPLE RESULTS
MISC2-128, 129, 130	Concrete, Grey	Interior	N/A	NAD
Building 3				
No suspect asbestos-containing materials were identified in Building 3				
Building 4				
9VFT1-079, 080, 081	**9"x9" Vinyl Floor Tile, Beige w/Black Mastic**	**Throughout**	**600 SF**	**FT: 5-6% Chrysotile M: NAD**
WPF1-082, 083, 084	Wall Plaster, White/Grey, Smooth	Throughout	N/A	NAD
WSR1-085, 086, 087	Drywall and Joint Compound, White	Room 3	N/A	NAD
CP1-088, 089, 090	Ceiling Plaster w/Button Board, White/Pink	Throughout	N/A	NAD
RFM1-091, 092, 093	Shingle Roof, Black/Grey, Multi-Layer	Roof	N/A	NAD
RPM1-094, 095, 096	**Roof Mastic, Black**	**Roof**	**10 SF**	**8-10% Chrysotile**
MISC1-097	**Transite Vent Pipe, Grey**	**Roof**	**14 LF**	**15% Chrysotile 2% Crocidolite**
WP1-098, 099, 100	Window Putty, White/Grey	Exterior	N/A	NAD
ES1-101, 102, 103	Exterior Stucco, Grey	Exterior	N/A	NAD
12VFT1-139, 140, 141	12"x12" Vinyl Floor Tile, Wood Pattern, w/Mastic	Room 5	N/A	NAD
MISC2-142, 143, 144	Concrete, Grey	Interior	N/A	NAD
Building 5				
WSR1-104, 105, 106	Drywall and Joint Compound, White	Throughout	N/A	NAD
9VFT1-107, 108, 109	9"x9" Vinyl Floor Tile, Brown w/Streaks, w/Black Mastic	Throughout	N/A	NAD
RFM1-110, 111, 112	Rolled Roofing Material, Grey/Black	Roof	N/A	NAD
MISC1-113, 114, 115	Roof Seam Mastic, Black	Roof	N/A	NAD

Table A.1 Asbestos Bulk Sample Analytical Results

CITADEL HA/SAMPLE ID No.	MATERIAL DESCRIPTION	MATERIAL LOCATION	ESTIMATED QUANTITY	SAMPLE RESULTS
MISC2-116, 117, 118	Concrete Steps, Grey	Exterior	N/A	NAD
Building 6				
WSR1-119, 120, 121	Drywall and Joint Compound, Wall, White	Throughout	N/A	NAD
CSR1-122, 123, 124	Drywall and Joint Compound Ceiling, White	Throughout	N/A	NAD
BP1-125, 126, 127	Barrier Paper, Brown	Throughout	N/A	NAD
Building 7				
No suspect asbestos-containing materials were identified in Building 7				
Building 8				
No suspect asbestos-containing materials were identified in Building 8				
Building 9				
No suspect asbestos-containing materials were identified in Building 9				
Building 10				
No suspect asbestos-containing materials were identified in Building 10				
Site				
MISC1-134, 135, 136, 137, 138	Concrete, Grey	Throughout	N/A	NAD

NAD= No Asbestos Detected
N/A=Not Applicable
PACM=Presumed Asbestos-Containing Material
SF= Square Feet, ft²
LF=Linear Feet, ft
EA=Each
PCV=Point Count Verified
NQ=Not Quantified
FT=Floor Tile
M=Mastic

The drawings with bulk sample locations can be found in Appendix **B**. Bulk sample laboratory results may be found in Appendix **C**.

LEAD-CONTAINING MATERIALS

Lead Definitions

- **Lead Containing Paint (LCP)** - A lead-containing paint is a paint or coating that contains any detectable concentration of lead.
- **Lead Based Paint (LBP) -** The Los Angeles County Department of Health and Human Services, Health & Safety Code, Chapter 11 defines LBP as paint containing lead greater than or equal to 0.7 mg/cm^2 (>0.7 mg/cm^2), or ≥ 5,000 ppm or > 0.5% by weight. This site is in Riverside County but this level was used to determine if a paint was LBP.
- **Lead Containing Material (LCM)** - A lead-containing material may consist of identified lead-containing paint (LCP), lead-based paint (LBP), or other materials such as lead sheeting, ceramic tile glazing, etc., or presumed LCMS.
- **Presumed Lead-Based Paint (PLBP)** - Title 17, California Code of Regulations, Division 1, Chapter 8 defines as paint or surface coating affixed to a component in or on a structure constructed prior to January 1, 1978 as a presumed lead-based paint unless it has been tested and found to contain an amount of lead less than one milligram per square centimeter 1.0 mg/cm^2 (<1.0 mg/cm^2) or less than 0.5% (< 0.5%) by weight.

A total of 184 assays (tests) (excluding "Null" and "Calibration Readings"), using the XRF-SA were conducted during the survey. Of the 184 assays collected, 14 were found to contain LBP (i.e., ≥0.7 mg/cm^2).

Table B.1 below summarizes the materials identified and sampled to be **Lead-Based Paints (LBP)** (detectable quantities of lead in concentrations of ≥5,000 ppm or ≥0.7 mg/cm^2) in the Survey Area:

TABLE B.1

COMPONENT	SUBSTRATE	COLOR(S)	SAMPLE LOCATION(S)
Building 1			
None Identified	N/A	N/A	N/A
Building 2			
None Identified	N/A	N/A	N/A
Building 3			
No suspect paint was identified in Building 3			
Building 4			
Door Frame	Wood	White	Room 2
Window	Wood	White	Room 2
Window Frame	Wood	Yellow	Room 2
Door	Wood	White	Room 3
Door Frame	Wood	White	Room 3

COMPONENT	SUBSTRATE	COLOR(S)	SAMPLE LOCATION(S)
Door	Wood	Yellow	Room 4
Door Frame	Wood	Yellow	Room 4
Door Frame	Wood	Yellow	Room 6
Door Frame	Wood	Yellow	Room 5
Door	Wood	Yellow	Room 5
Tub	Metal	White	Room 5
Building 5			
None Identified	N/A	N/A	N/A
Building 6			
None Identified	N/A	N/A	N/A
Building 7			
No suspect paint was identified in Building 7			
Building 8			
No suspect paint was identified in Building 8			
Building 9			
No suspect paint was identified in Building 9			
Building 10			
No suspect paint was identified in Building 10			
Site			
Striping	Concrete	Yellow	Parking Area

Additionally, Lead-Containing Paints (LCPs) were identified in the Survey Area, and are identified in Appendix **F**, Table 3.2.

XRF-SA results may be found in Appendix **D**, Table 3.0 – XRF-SA Results; Appendix **E**, Table 3.1 – Lead-Based Paint (LBP) XRF-SA results; and Appendix **F**, Table 3.2 – Lead-Containing Paint (LCP) results (i.e., ≥0.01 mg/cm^2 and <0.7 mg/cm^2).

POLYCHLORINATED BIPHENYLS (PCBS)/DI(2-ETHYLHEXL) PHTHALATE (DEHP) VISUAL INSPECTION

Fluorescent light ballasts with wet (liquid) capacitors utilize dielectric fluids that may contain PCBs or DEHP dielectric fluids.

PCBs are regulated under 40 CFR Part 761 as part of the Toxic Substances Control Act (TSCA). The PCB regulations and requirements apply to both PCB waste materials and PCBs still in use. States and the Federal Government regulate the use, storage, and disposal of equipment containing PCBs, depending upon the concentrations of PCBs present.

DEHP is regulated under the Resource Conservation and Recovery Act (RCRA), "Superfund", Superfund Amendments, Clean Water Act, Safe Drinking Water Act, OSHA, and by the Food and Drug Administration.

PCB and DEHP Definitions

Environmental Protection Agency: 40 CFR Part 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions has established the following threshold limits for liquid and non-liquid materials containing PCBs:

- **PCB-Contaminated Electrical Equipment** is defined as a liquid material (homogenous flowable material containing no more than 0.5% by weight non-dissolved material) that contains concentrations of PCBs at ≥50 ppm and <500 ppm, or where insufficient liquid is available for analysis, a non-porous surface having a PCB concentration of >10 µg/100 cm^2 but <100 µg/100 cm^2 as measured by a standard wipe test. Electrical Equipment includes, but is not limited to, transformers, capacitors, circuit breakers, re-closers, voltage regulators, switches, electromagnets, and cable.
- **PCB-Contaminated** is defined as a non-liquid material (does not flow at room temperature of 25 °C or 77 °F) that contains concentrations of PCBs at ≥50 PPM but <500 PPM; a liquid material that contains concentrations of PCBs at ≥50 ppm but <500 ppm, or where insufficient liquid is available for analysis, a non-porous surface having a PCB concentration of >10 µg/100 cm^2 but <100 µg/100 cm^2 as measured by a standard wipe test.
- **PCB Capacitor** is defined as any capacitor that contains concentrations of PCBs at >500 ppm.
- **PCB Transformer** is defined as any transformer that contains concentrations of PCBs <500 ppm.
- **PCB Bulk Product Waste** is defined as waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where at the time of designation for disposal the concentration of PCBs was ≥50 ppm. Fluorescent light ballasts with labels that do not contain the words "No PCBs" or "Does Not Contain PCBs" are considered a PCB Bulk Product Waste.
- **Di(2-ethylhexl) phalate** is a colorless, odorless, toxic liquid used in dielectric fluids from 1979 to 1991.

State of California-Department of Toxic Substances Control (DTSC): The DTSC enforces Title 22 of the California Code of Regulation, Chapter 11, Article 3, δ 66261.20-24 which has established the following threshold limits for PCBs in solid waste material:

- Total Threshold Limit Concentration (TTLC) of ≥50 ppm.
- Soluble Threshold Limit Concentration (STLC) of ≥5 mg/L.

Table C.1 below summarize the **PCB** and **DEHP** containing equipment identified in the survey area, along with the locations and estimated quantities of each material:

TABLE C.1

MATERIAL TYPE	LOCATION	QUANTITY
Building 1		
Light Fixture Ballasts	Throughout	208
Building 2		
Light Fixture Ballasts	Throughout	20

MATERIAL TYPE	LOCATION	QUANTITY
Building 3		
No PCB-containing items were identified in Building 3		
Building 4		
No PCB-containing items were identified in Building 4		
Building 5		
Light Fixture Ballasts	Throughout	1
Building 6		
No PCB-containing items were identified in Building 6		
Building 7		
Light Fixture Ballasts	Throughout	3
Building 8		
No PCB-containing items were identified in Building 8		
Building 9		
No PCB-containing items were identified in Building 9		
Building 10		
No PCB-containing items were identified in Building 10		

Citadel performed bulk sampling of suspect PCB-containing window putty on the site. The results of this sampling are presented under separate cover.

UNIVERSAL/ELECTRONIC/RADIOACTIVE WASTES

Universal Wastes

The *Universal Waste Rule* found in the California Code of Regulations (CCR), Title 22, division 4.5, Chapter 23, regulates the disposal of the following items such as:

- Mercury thermostats (ampoules);
- Batteries, including rechargeable nickel-cadmium batteries, silver button batteries, mercury batteries, small sealed lead acid batteries (burglar alarm and emergency light batteries), most alkaline batteries, carbon zinc batteries, and any other batteries that exhibit a characteristic of a hazardous waste (§66261.20 through §66261.24);
- Lamps, including fluorescent tubes, high intensity discharge lamps, sodium vapor lamps, and any other lamps that exhibit a characteristic of a hazardous waste;
- Non-empty aerosol cans;
- Mercury switches, including thermostats and tip switches in portable heaters, washing machine out-of-balance switches, silent wall switches, and other mercury-containing switches and products containing them;
- Mercury thermometers;
- Mercury pressure or vacuum gauges, including U tube manometers, barometers, and sphygmomanometers (blood pressure meters.);
- Medical devices containing mercury including, dilators and weighted tubing;
- Mercury-containing rubber flooring, including older gymnasium floors that were poured in place to form indoor tracks and gymnastic areas;
- Mercury gas flow regulators managed exclusively by natural gas utilities;
- Counterweights and dampers, including devices that use pouches of high density mercury to dampen shaking on hunting bows and snow skis or to absorb recoil on shotguns;
- Consumer electronic devices, including cell phones, game consoles, and computers; and

- Mercury gauges, including vacuum and pressure gauges, including blood pressure gauges, barometers, and manometers.

Table D.1 below summarize **universal/electronic/radioactive** wastes identified or assumed to be present in the Survey Area, along with the locations and estimated quantities of each material:

TABLE D.1

MATERIAL TYPE	LOCATION	QUANTITY
Building 1		
Fluorescent Light Tubes	Throughout	104
Building 2		
Fluorescent Light Tubes	Throughout	40
Light Bulbs (Compact Fluorescent)	Throughout	2
Exterior Lights	Exterior	2
Thermostats	Throughout	1
Smoke Detectors	Throughout	2
Building 3		
No universal waste was identified in Building 3		
Building 4		
Light Bulbs (Compact Fluorescent)	Throughout	9
Thermostats	Throughout	1
Building 5		
Fluorescent Light Tubes	Throughout	2
Light Bulbs (Compact Fluorescent)	Throughout	4
Exit Lights with Batteries	Throughout	2
Thermostats	Throughout	1
Smoke Detectors	Throughout	1
Building 6		
Light Bulb	Throughout	1
Building 7		
Fluorescent Light Tubes	Throughout	6
Building 8		
No universal waste was identified in Building 8		
Building 9		
No universal waste was identified in Building 9		
Building 10		
No universal waste was identified in Building 10		

OZONE DEPLETING SUBSTANCES

A chlorofluorocarbon (CFC) is an organic compound that contains carbon, chlorine, and fluorine, produced as a volatile derivative of methane and ethane. A common subclass is the hydrochlorofluorocarbons (HCFCs), which contain hydrogen, as well. They are also commonly known by the DuPont trade name Freon. The most common representative is dichlorodifluoromethane (R-12 or Freon-12). Many CFCs have been widely used as refrigerants, propellants (in aerosol applications), and solvents. The compounds are suspected of contributing to ozone depletion.

Table E.1 below summarize the **Ozone Depleting Substances** identified or assumed to be present in the Survey Area, along with the locations and estimated quantities of each material:

TABLE E.1

MATERIAL TYPE	LOCATION	QUANTITY
Building 1		
HVAC Units	Roof	2
Wall Mounted A/C Unit	Throughout	1

MATERIAL TYPE	LOCATION	QUANTITY
Freezers	Storage	2
Building 2		
HVAC Wall Unit	Throughout	1
Building 3		
No ozone depleting substances were identified in Building 3		
Building 4		
Wall Mounted A/C Unit	Throughout	1
Building 5		
HVAC Unit	Roof	1
Building 6		
No ozone depleting substances were identified in Building 6		
Building 7		
No ozone depleting substances were identified in Building 7		
Building 8		
No ozone depleting substances were identified in Building 8		
Building 9		
No ozone depleting substances were identified in Building 9		
Building 10		
No ozone depleting substances were identified in Building 10		

4.0 CONCLUSIONS AND RECOMMENDATIONS

ASBESTOS

The results of the survey indicate that ACMs are present in the Survey Area.

If suspect materials are identified during demolition activities that were not specifically sampled, they must be assumed to be ACM until they can be sampled.

All asbestos removal operations shall be performed by a Cal/OSHA-DOSH-registered and California-licensed asbestos contractor. All disturbances of asbestos-containing materials, and/or abatement operations, should be performed under the surveillance of a third-party Cal/OSHA Certified Asbestos Consultant retained by the Client.

All disturbances of asbestos-containing materials, and/or abatement operations, must be performed in accordance with the Cal/OSHA requirements set forth in 8 CCR 1529. Given the location of the subject facility, all asbestos abatement must also be performed in accordance with South Coast Air Quality Management District (SCAQMD) requirements set forth in Rule 1403.

Finally, notification of the presence and location of asbestos-containing materials shall be made to all employees and vendors who work within the subject structure, in accordance with California Health and Safety Code, Section 25915, et seq. (also known as Connolley Notification Bills).

Citadel recommends that all undamaged ACMs, ACCMs, and PACMs not to be disturbed as part of this project and scheduled to remain be managed in place in accordance with the EPA's guidance document Managing Asbestos In-Place (a.k.a., the Green Book). The Green Book can be obtained by calling the Toxic Substance Control Act Hotline at (202) 554-1404. Citadel also recommends that the materials be managed in place in accordance with the Client's Operations and Maintenance (O & M program) addressing building cleaning, maintenance, renovation, and general operation procedures to minimize exposure to asbestos.

LEAD-CONTAINING MATERIALS

Lead-Containing Materials/Lead-Based Paints (LCM/LBP)

This survey revealed that building components coated with LBP and LCP were identified within the Survey Area.

At present, there are no explicit state or federal regulations requiring mandatory lead removal prior to disturbance or demolition of structures with identified lead materials. However, there are applicable Cal/OSHA worker protection and training requirements, Cal/EPA waste disposal requirements, CDPH requirements for public and residential buildings, and SB 460 lead hazard regulations that apply to lead-related construction activities and their associated wastes

The following is a brief discussion and summary of applicable regulatory requirements:

- **Cal/OSHA:** 8 CCR 1532.1 governs occupational exposure to lead. This regulation requires that prior to initiation of certain activities, referred to as "trigger tasks", workers must be trained, medically evaluated, and properly fitted with respiratory protection, and protective clothing until statistically reliable personal eight-hour Time Weighted Average (TWA) results indicate lead exposure levels below the Personal Exposure Limit (PEL) for each unique task which disturbs lead-based and lead-containing coatings. This process is known as a Negative Exposure Assessment (NEA). If the result of the exposure assessment is above the Action Level (AL), additional monitoring is required, and if the result is above the PEL, additional exposure monitoring, worker protection (including respirator protection and PPE), training and medical requirements apply. At a minimum, contractors performing any lead in construction work shall have a hand washing station and HEPA vacuum present on the job site.
- "Trigger tasks" are tasks that are assumed to exceed the PEL pending an exposure assessment and encompass the majority of construction activities that disturb surface coatings. Examples of "trigger tasks" range from manual paint scraping as a lower expected exposure up to hot work and abrasive blasting as the highest expected exposures, and include any non-listed task that the employer determines may potentially expose employees to lead levels above the AL.

NOTE: "OSHA does not consider any method that relies solely on the analysis of bulk materials or surface content of lead (or other toxic material) to be acceptable for safely predicting employee exposure to airborne contaminates. Without air monitoring results or without the benefit of historical or objective data (including air sampling, which clearly demonstrates that the employee cannot be exposed above the AL during any process, operation, or activity) the analysis of bulk or surface samples cannot be used to determine employee exposure." OSHA Standard Interpretation dated 5/8/2000.

Furthermore, Cal/OSHA states that these rules apply to "any detectable concentration of lead", without a specified detection level. Due to the Consumer Product Safety Commission currently allowing paint to contain up to 600 parts per million (ppm) of lead for residential consumption and no limits for industrial or commercial coatings, the variation of lead content due to aging and weathering, and the variation of detection limits associated with both paint chip and XRF analysis, all coated surfaces should be treated as potentially containing lead, unless bulk sample analysis indicates that no lead was detected. Positive analytical results can be utilized to indicate that detectable lead is present, but negative XRF results cannot be interpreted as conclusively demonstrating the absence of lead.

Analytical data can be helpful in evaluation of lead-related environmental risks in general but cannot be used to calculate worker exposures and are not a substitute for employee exposure monitoring. As a result of the above, any employee that works around potential lead-based or

lead-containing coatings should have hazard communication training (lead awareness) training and personal exposure air monitoring if they will potentially disturb such coatings. Significant additional certification, notification, and work practices are required for materials found to be "lead-based" or where the operation or process involved results in airborne lead exposures exceeding the PEL.

- Any welding, cutting, or heating of metal surfaces containing surface coatings should be conducted in accordance with 29 CFR 1926.354 and 8 CCR 1537. These regulations require surfaces covered with toxic preservatives, and in enclosed areas, be stripped of all toxic coatings for a distance of at least 4 inches, in all directions, from the area of heat application prior to the initiation of such heat application. There are some provisions for conducting hot work on coated surfaces, but only with required respiratory protection such as properly selected supplied air respirators.
- **Cal/EPA** through the Division of Toxic Substance Control (DTSC) regulates disposal of lead hazardous waste (22 CCR Division 4.5, Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes). It is the responsibility of the waste generator to evaluate all waste streams produced and ensure that any resulting wastes that may be hazardous under California and Federal RCRA standards for lead be properly handled, packaged and transported under proper manifest to a permitted hazardous waste storage, treatment and disposal facility.
- **CDPH**: The Department of Public Health (DPH) has specific requirements (Title 17 Sections 35001 thru 36100) for hazard assessment and work involving lead-based paint (LBP) hazards in public or residential structures. These regulations require special certifications, work practices, and notifications for such activities.
- **Senate Bill 460 (SB 460)**: An act to amend Section 1941.1 of the Civil Code, and to amend Sections 17961, 17980, and 124130 of, and to add Sections 17920.10, 105251, 105252, 105253, 105254, 105255, 105256, and 105257 to, the Health and Safety Code, relating to lead abatement. This bill allows for fines and criminal penalties to be levied on any person who is found to have performed lead abatement without containment or created a measurable lead hazard based upon current CDPH standards. The testing for this determination can be initiated by any local official. A determination of a lead hazard is not solely based upon the lead content of the paint or coating and can be the result of the disturbance of such materials with low concentrations of lead.
- **EPA Lead Renovation, Repair, and Paint Rule (40 CFR, Part 745):** Beginning in April 2010, contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities, and schools built before 1978 must be certified and must follow specific work practices to prevent lead contamination.

POLYCHLORINATED BIPHENYL (PCBS) AND DIETHYLHEXL PHTHALATE (DEHP)

Field observations by Citadel indicated that equipment potentially containing PCBs/DEHPs are present throughout the Survey Area. This portion of the survey was not intended to be comprehensive, but rather sought to identify potential hazards that will be encountered during the project.

Typically, during demolition, the contractor will dismantle the fluorescent light fixtures by removing the tubes and then the ballasts and package them for recycling and disposal, regardless of the ballast labeling. The recommended disposal method for ballasts is recycle/incineration whereby the PCB and DEHP capacitors and asphalt potting material are removed and incinerated, and the metal carcasses are cleaned and sent to a metal recycler.

UNIVERSAL/ELECTRONIC/RADIOACTIVE WASTES

Field observations by Citadel indicated that Universal Wastes/Electronic Wastes are present throughout the Survey Area. The inspection for Universal Wastes/Electronic Wastes consisted of visual inspection of the buildings to determine if Universal Wastes/Electronic Wastes were present. This portion of the survey was not intended to be comprehensive, but rather sought to identify potential hazards that will be encountered during the project.

The *Universal Waste Rule* found in the California Code of Regulations, Title 22, division 4.5, Chapter 23, regulates the disposal of the following items:

Citadel visually identified universal/electronic/radioactive wastes present throughout the Survey Area. In accordance with regulatory requirements, Universal/Electronic/Radioactive Wastes should be removed prior to demolition activities and set aside for re-use or disposal/recycling by a licensed recycler or specific licensee.

Citadel recommends either re-using the light tubes, lamps, or monitors, or utilizing a licensed recycler to process the Universal/Electronic Wastes removed from the building. Recycling facilities must be authorized by the California Environmental Protection Agency – Department of Toxic Substances Control (DTSC) or the state in which they are located.

Bill(s) of lading should accompany each load of waste that leaves the site, including the name and address of the Generator, Contractor, pick-up site, disposal site, and quantity of universal waste disposed. The recycler should provide a statement certifying recycling/disposal/destruction of the identified wastes, including the date(s) of recycling/disposal/destruction, and identifying the disposal/destruction process used. In the case of Tritium-containing exit devices, the general licensee must file a report with the NRC.

OZONE DEPLETING SUBSTANCES

Citadel visually identified potential ozone depleting substances are present throughout the Survey Area. This portion of the survey was not intended to be comprehensive, but rather sought to identify potential hazards that will be encountered during the project. Packaged Components Chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFC), as well as Halon, Sulfur Dioxide (SO_2), and/or Ammonia (NH_3) should be extracted from the fire extinguishers, freezers, HVAC units, and other ODS-containing equipment by a trained technician for recovery or recycling prior to demolition.

5.0 SURVEY LIMITATIONS

The survey and bulk sampling were limited to representative locations of the buildings that were explicitly defined by the Client to be surveyed. Limited intrusive and no destructive sampling was conducted as part of the scope of services performed. Additional suspect materials and/or debris may be present in concealed spaces including, but not limited to, above-ceiling areas, within wall cavities, and beneath floor coverings, but will only be accessible during the course of demolition activities. Care must be exercised when accessing these areas. Any suspect environmentally regulated materials (ERMs) encountered during the course of demolition/renovation activities that were not previously sampled, including ERMs not specifically addressed herein, must be *presumed* to be ACMs/ACCMs and LCMs until sampled and proven otherwise. Quantities presented in this report are for informational purposes only and should not be the sole basis for an estimate for abatement. Contractors should verify and conduct their own takeoffs for their purposes.

This report has been prepared by Citadel EHS exclusively for our Client and their Authorized Representatives. The information contained herein pertains only to accessible materials identified

at the referenced property at the time of the survey performed in accordance with a mutually agreed upon scope of work. The findings and recommendations presented are based upon observations of present conditions and may not necessarily indicate future conditions. Citadel EHS implies no warranty to the accuracy of information provided them by outside agents and transmitted herein. The information contained herein may not be used, disclosed, or copied without written permission of the Client.

This survey report is not intended to be a stand-alone design document for the solicitation of bids. This survey report should only be used for developing the scope of work, bid/contract document, and as a reference document.

6.0 DISCLAIMER

The services performed by Citadel Environmental Services, Inc. ("Citadel"), d.b.a. Citadel EHS, in connection with this Report were performed in accordance with generally and currently accepted engineering practices and principles; provided, however, Citadel completed such services as directed by the Client and the recommendations described in this Report are therefore limited in purpose and scope. The procedures and methodologies used by Citadel in its performance of services, and the recommendations contained herein, are not intended to meet the requirements under any specific laws or regulatory guidelines unless expressly set forth in the Proposal.

The recommendations and conclusions set forth in this Report are based on information and data available to Citadel during the course of its performance of the services. Citadel relied on the information and data provided by or on behalf of Client, including, if applicable, historical and present operations, conditions and test data, and Citadel assumed all such information and data was correct and complete. Citadel shall not be liable for any damages or losses resulting from inaccuracies of, or omissions from, information or data provided by or on behalf of the Client, any interested third-parties, or any federal, state, county, or local governmental authority, or otherwise available in the public domain.

The information contained in this Report and conclusions resulting therefrom are based solely on information available to Citadel at the time of its performance of services, and from observations and perceived conditions and materials existing on the date of Citadel's limited survey of the site, if applicable. Citadel disclaims any inaccuracy in the Report as a result of any part or parcel of property to which Citadel was not provided access, or which was concealed, including, but not limited to, wall cavities/chases, ceiling plenums, below floor finishes, crawlspaces, below grade, beneath existing structures, or behind electrical panels.

The findings and recommendations presented in this Report are based upon observations of present conditions and may not necessarily indicate future conditions. No conclusions should be construed or inferred other than those expressly stated in this Report. EXCEPT FOR ANY WARRANTIES EXPRESSLY SET FORTH IN THE PROPOSAL OR OTHER WRITTEN AGREEMENT BETWEEN CITADEL AND CLIENT, CITADEL MAKES NO WARRANTIES HEREUNDER WITH RESPECT TO ANY INFORMATION CONTAINED IN THIS REPORT, EXPRESS OR IMPLIED, AND CITADEL HEREBY DISCLAIMS ALL OTHER WARRANTIES.

All testing and remediation methods have reliability limitations, and no method nor number of sampling locations can guarantee that a hazard will be discovered if contamination or other evidence of the hazard is not encountered within the performance of the services as authorized. Reliability of testing or remediation varies according to the sampling frequency and other service variables that were selected by Client. Citadel shall not be at fault or liable for any such limitations.

The information and opinions rendered in this report are exclusively for use and reliance by the Client. The information contained herein may not be used, disclosed, or copied without written permission of the Client and may not be relied upon without the written permission of Citadel.

7.0 SIGNATURES

Services performed by:

[Refer to project documentation for signature]

Nelson Ortiz
Certified Site Surveillance Technician (No. 15-5586)
Lead-Related Construction Sampling Technician (LRC-00008185)

Brian Weltman
Certified Site Surveillance Technician (No. 17-5942)
Lead-Related Construction Sampling Technician (LRC-00002502)

Report Prepared by:

Jack Samuels
Digitally signed by Jack Samuels
Date: 2021.12.03 10:42:14 -08'00'

Jack Samuels
Associate Principal, Building Sciences
Certified Asbestos Consultant (No. 92-0475)
Lead-Related Construction Inspector/Assessor (LRC-00008171)

Report Reviewed by:

Josh LaPrease
Digitally signed by Josh LaPrease
Date: 2021.12.03 10:42:39 -08'00'

Josh LaPrease, CAC, CDPH
Senior Project Manager, Building Sciences
Certified Asbestos Consultant (No. 19-6681)
Lead-Related Construction Inspector/Assessor (LRC-00000890)

Attachments

CITADEL EHS
assess • resolve • strengthen

Appendix A
Project Team Certifications

CERTIFICATIONS

INSPECTOR	Nelson N. Ortiz
CERTIFICATION	Certified Site Surveillance Technician
CERTIFIED BY	State of California Division of Occupational Safety and Health
CERTIFICATION NUMBER	15-5586
EXPIRATION DATE	03/15/22



INSPECTOR	Nelson N. Ortiz
CERTIFICATION	Lead-Related Project Monitor Lead-Related Sampling Technician
CERTIFIED BY	State of California Department of Public Health
CERTIFICATION NUMBER	LRC-00008186 LRC-00008185
EXPIRATION DATE	02/1/2022



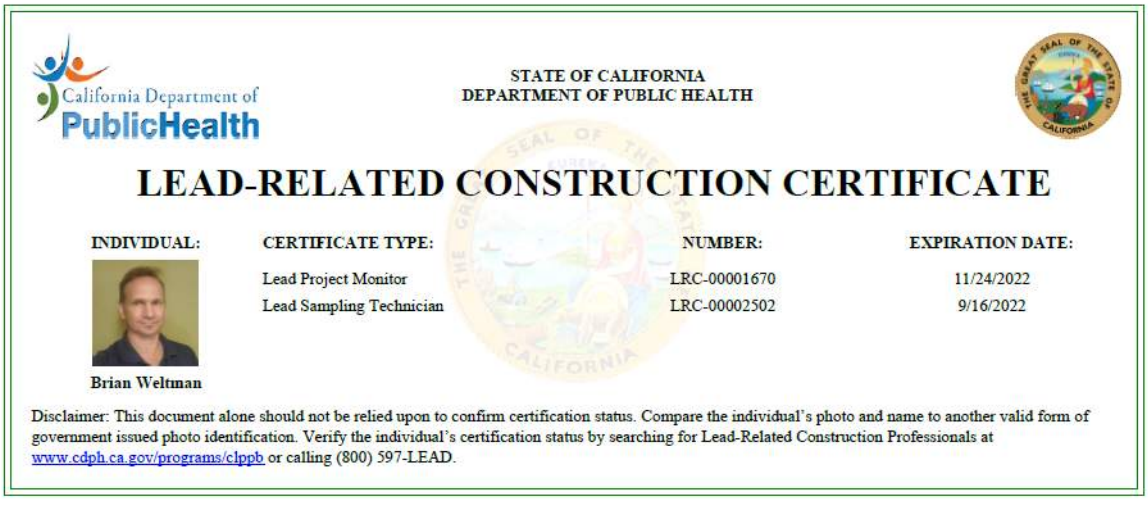
CITADEL EHS
assess • resolve • strengthen

CERTIFICATIONS

INSPECTOR	Brian G Weltman
CERTIFICATION	Certified Site Surveillance Technician
CERTIFIED BY	State of California Division of Occupational Safety and Health
CERTIFICATION NUMBER	17-5942
EXPIRATION DATE	1/17/2022



INSPECTOR	Brian G Weltman
CERTIFICATION/ CERTIFICATION NUMBER	Lead-Related Project Monitor/ LRC-00001670
CERTIFICATION/ CERTIFICATION NUMBER	Lead-Related Sampling Technician/ LRC-00002502
CERTIFIED BY	State of California Department of Public Health
EXPIRATION DATE	LRST 9/16/22 LRPM 11/24/22


California Department of PublicHealth

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
Brian Weltman	Lead Project Monitor	LRC-00001670	11/24/2022
	Lead Sampling Technician	LRC-00002502	9/16/2022

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD.

CITADEL EHS
assess • resolve • strengthen

CERTIFICATIONS

INSPECTOR	Jack Simmons Samuels
CERTIFICATION	Certified Asbestos Consultant
CERTIFIED BY	State of California Division of Occupational Safety and Health
CERTIFICATION NUMBER	92-0475
EXPIRATION DATE	01/07/22


State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

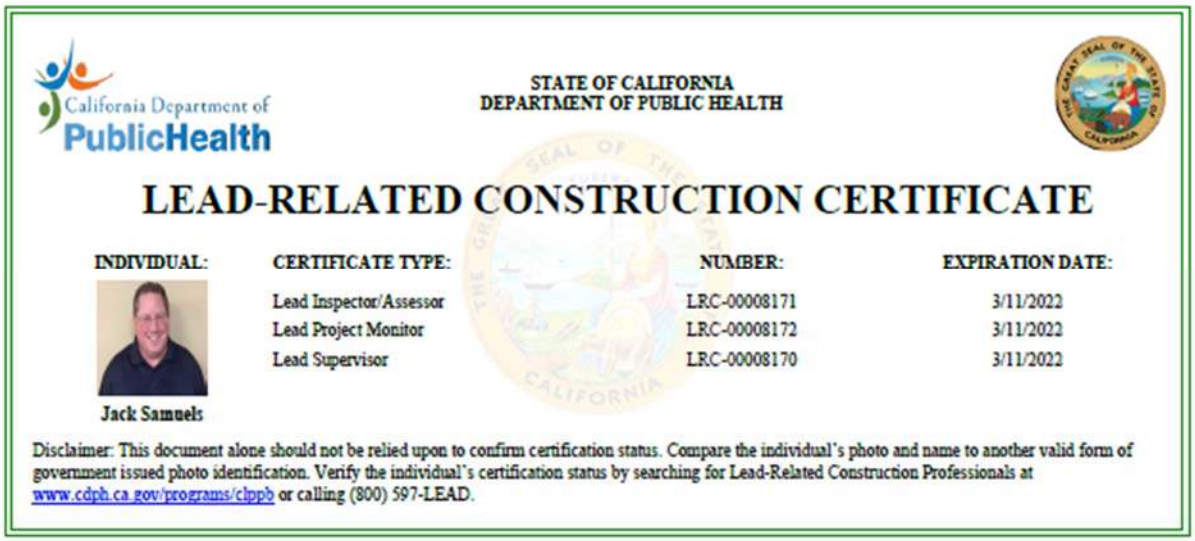
Jack Simmons Samuels
Name

Certification No. 92-0475

Expires on 01/07/22

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

INSPECTOR	Jack Simmons Samuels
CERTIFICATION	Lead-Related Inspector/Assessor Supervisor Project Monitor
CERTIFIED BY	State of California Department of Public Health
CERTIFICATION NUMBER	5380
EXPIRATION DATE	03/11/22


California Department of PublicHealth

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

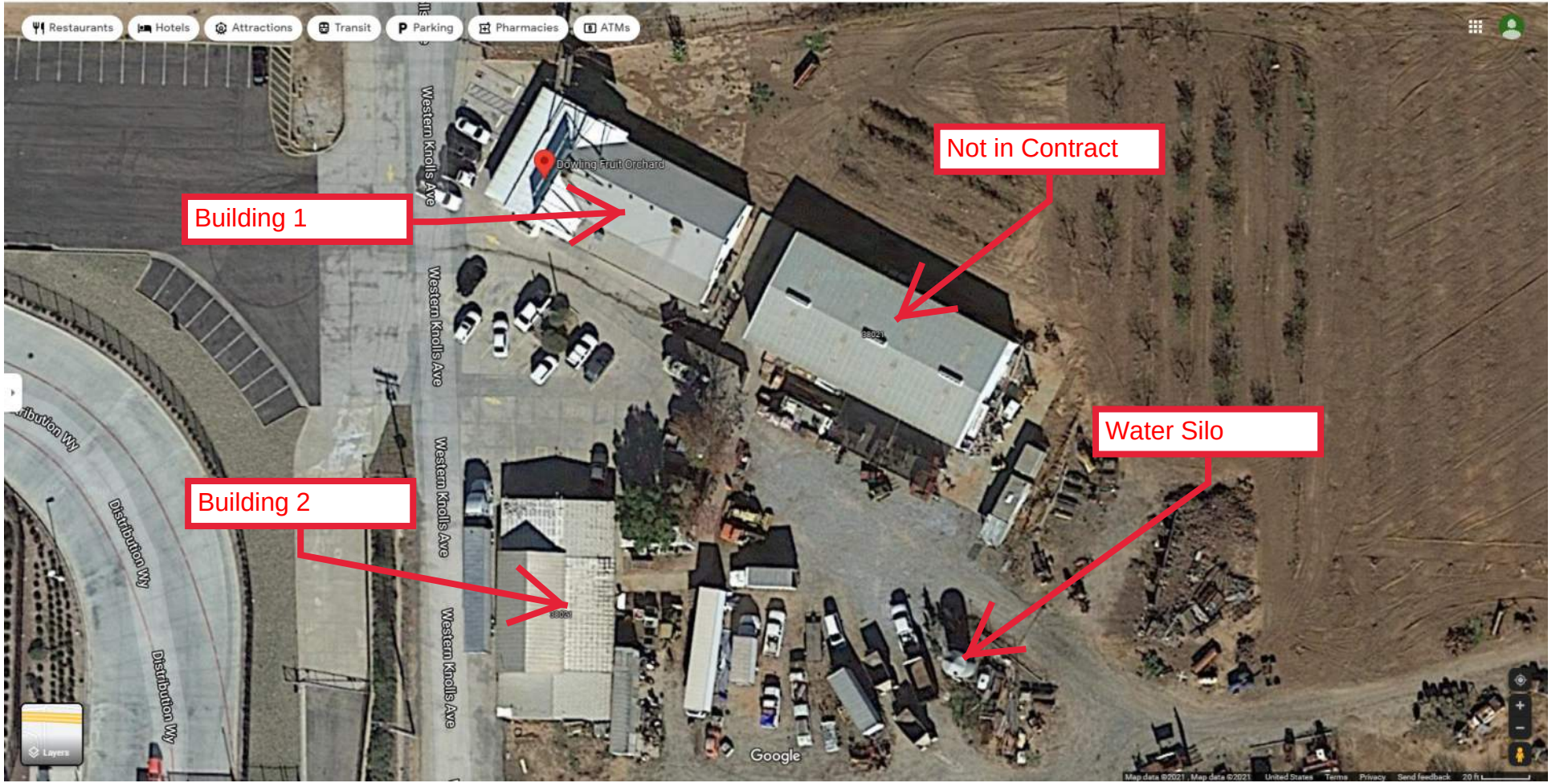
LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
Jack Samuels	Lead Inspector/Assessor	LRC-00008171	3/11/2022
	Lead Project Monitor	LRC-00008172	3/11/2022
	Lead Supervisor	LRC-00008170	3/11/2022

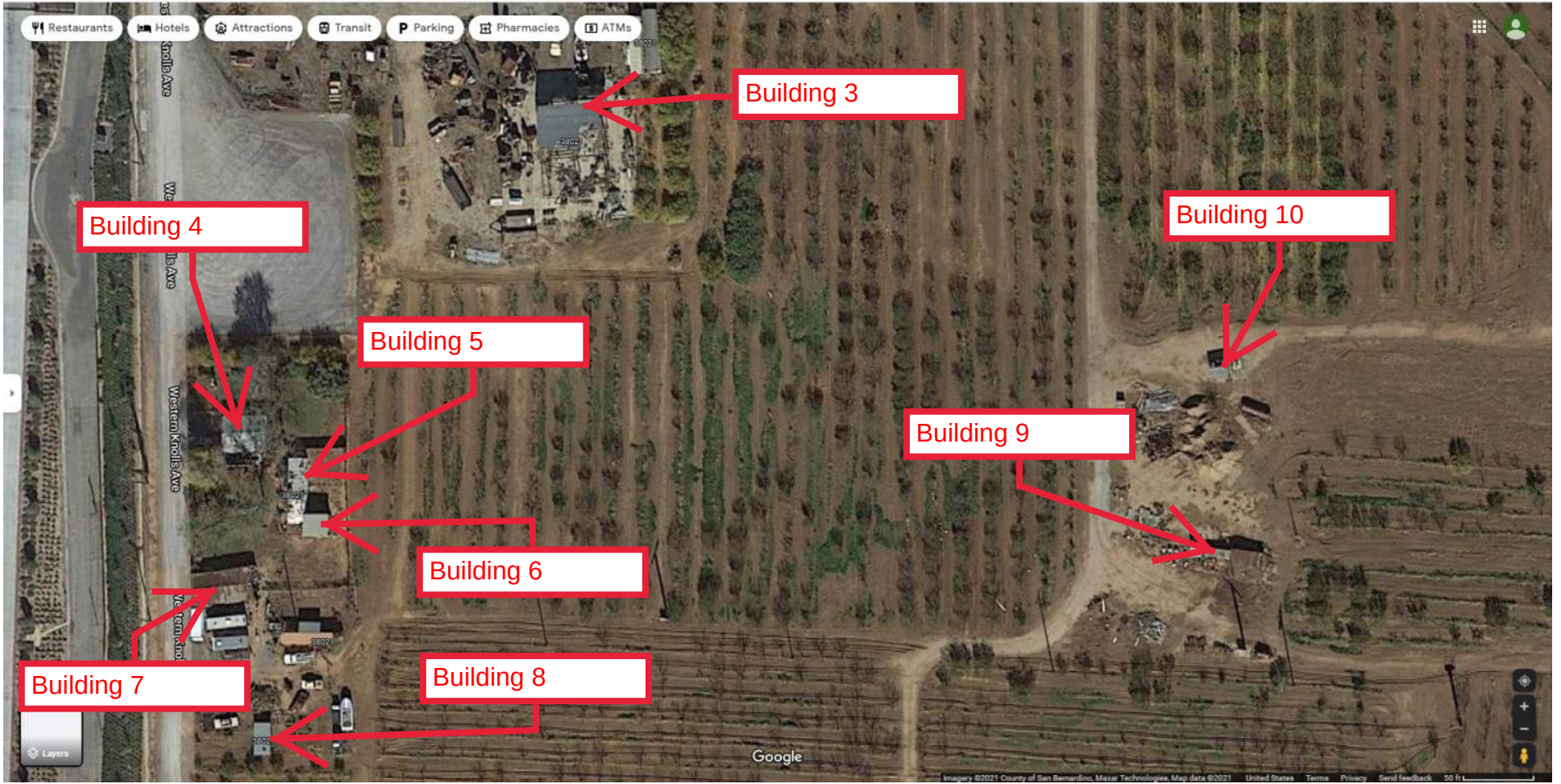
Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD.

CITADEL EHS
assess • resolve • strengthen

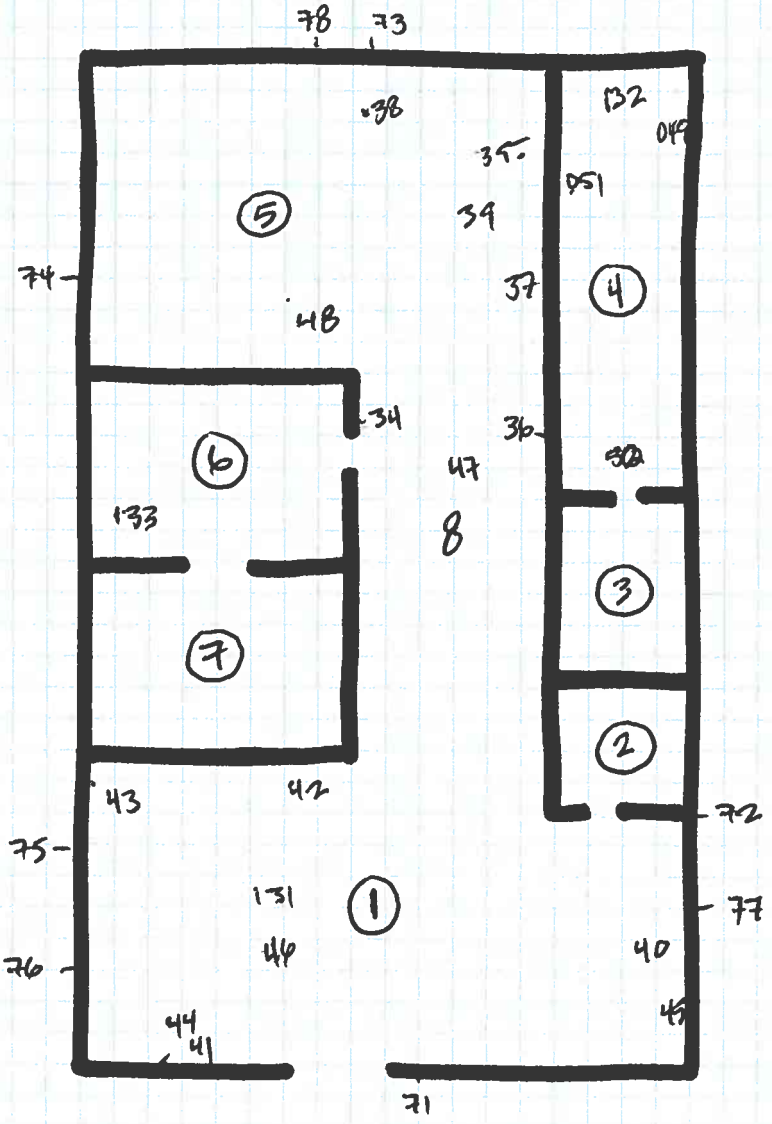
Appendix B
Drawings with Bulk Sample Locations



Dowling Ranch
Site Plan Page 1



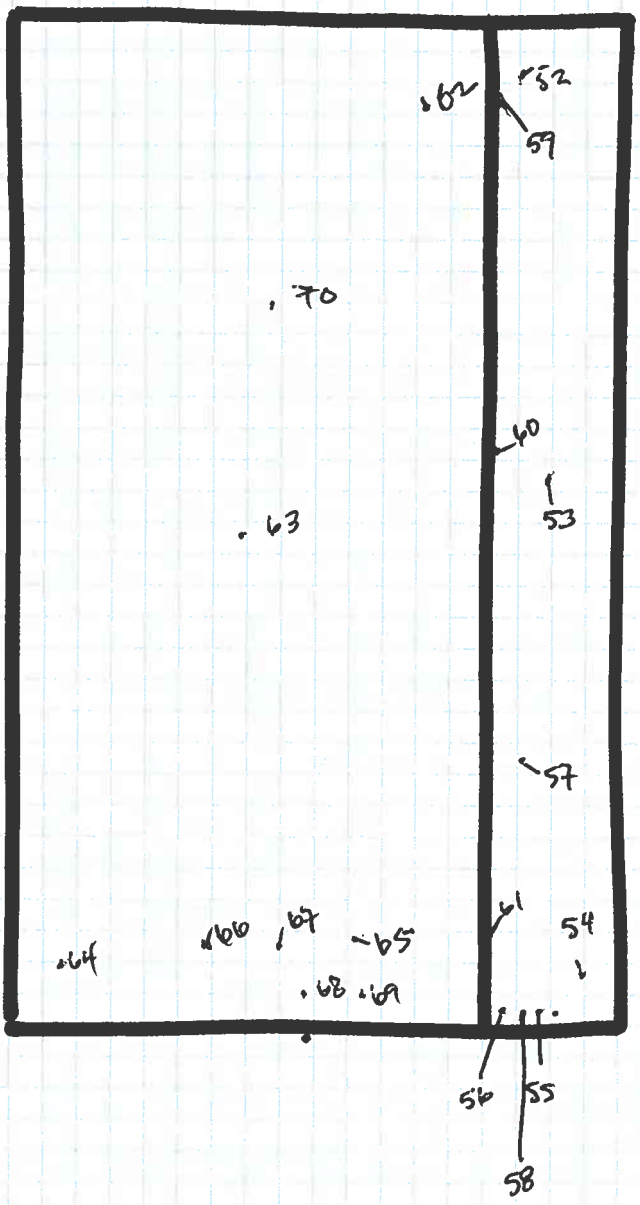
Dowling Ranch
Site Plan Page 2



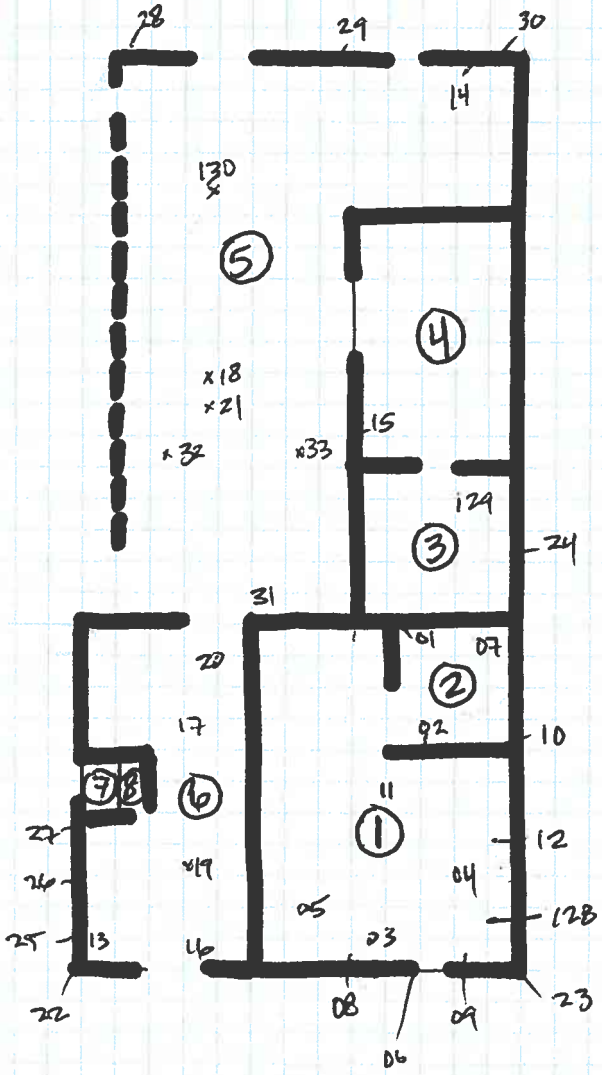
n

CITADEL EHS
assess resolve strengthen

Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11-17-21
Project ID:	Dowling Fruit Orchard	**Drawing:**	Building 1		
	Demo-Level Survey	**Floor:**	1st FLR		
Site Address:	38021 CA-60				
	Beaumont CA 92223	**Inspector:**	Brian W. / Nelson D.		

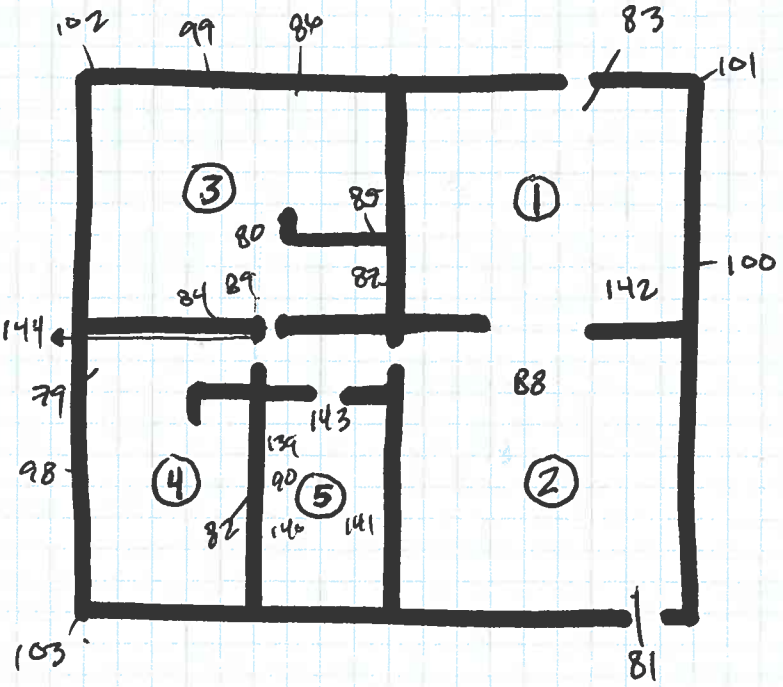


Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11.17.24
Project ID:	Dowling Fruit Orchard			**Drawing:**	Building 1 - Roof
	Demo-Level Survey			**Floor:**	Roof
Site Address:	38021 CA-60				
	Beaumont CA 92223			**Inspector:**	Brian W. / Nelson B.

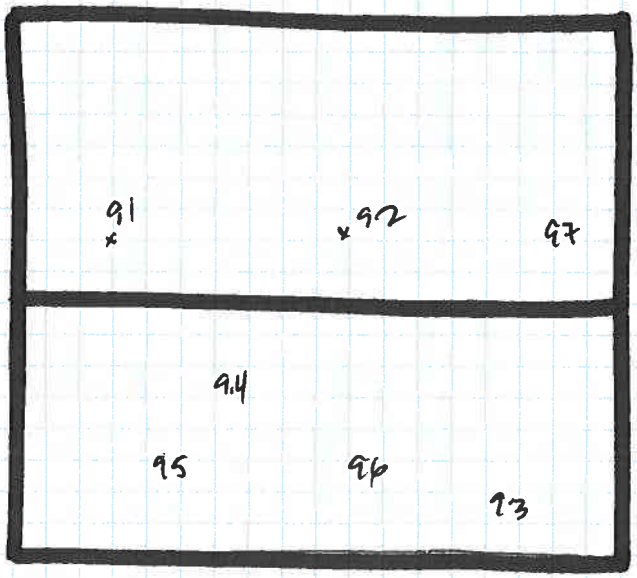


Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11-17-21
Project ID:	Dowling Fruit Orchard		**Drawing:**	Building 2	
	Demo-Level Survey		**Floor:**	1st FLR	
Site Address:	38021 CA-60				
	Beaumont CA 92223		**Inspector:**	Brian W / Nelson D.	

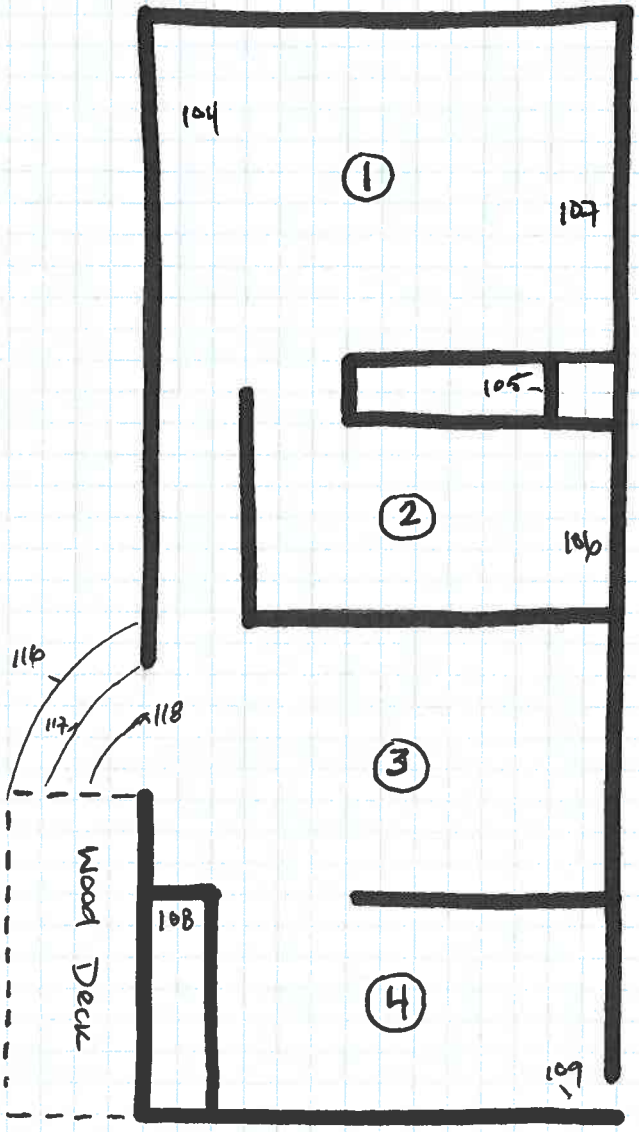
CITADEL EHS
assess resolve strengthen



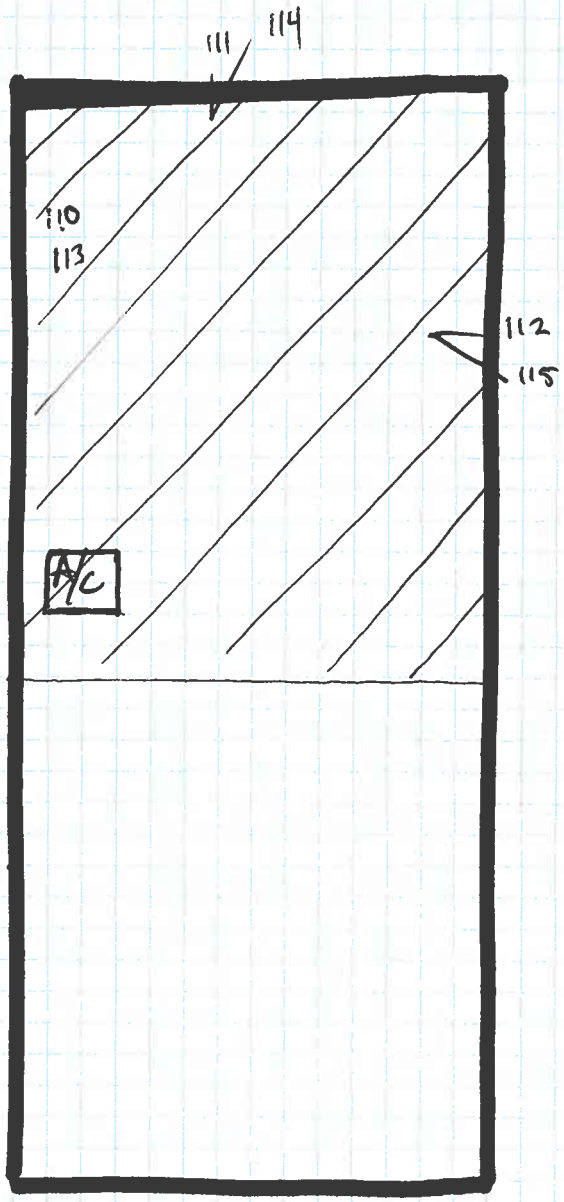
Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11/17/21
Project ID:	Dowling Fruit Orchard	**Drawing:**	Building 4		
	Demo-Level Survey	**Floor:**	1st FL		
Site Address:	38021 CA-60				
	Beaumont CA 92223	**Inspector:**	Brian W / Nelson O.		



Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11/17/21
Project ID:	Dowling Fruit Orchard			**Drawing:**	Building 4
	Demo-Level Survey			**Floor:**	ROOF
Site Address:	38021 CA-60				
	Beaumont CA 92223			**Inspector:**	Brian W. / Nelson O.

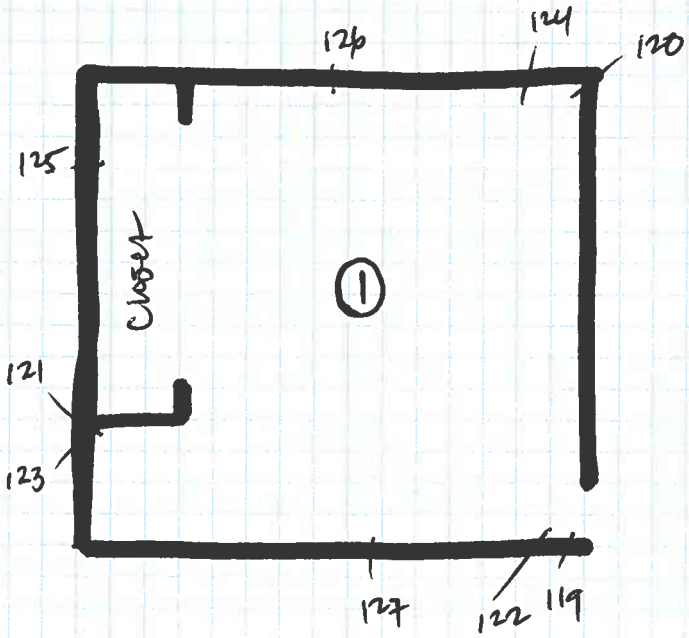


Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11/17/21
Project ID:	Dowling Fruit Orchard			**Drawing:**	Building 5
	Demo-Level Survey			**Floor:**	1st flr
Site Address:	38021 CA-60				
	Beaumont CA 92223			**Inspector:**	Brian W / Nelson D.



111 : Rolled Roof

Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11/17/21
Project ID:	Dowling Fruit Orchard	**Drawing:**	Building 5		
	Demo-Level Survey	**Floor:**	Roof		
Site Address:	38021 CA-60				
	Beaumont CA 92223	**Inspector:**	Brian W / Nelson O.		



Project No.:	0096.1039.0	**Client:**	Trammel Crow Company	**Date:**	11/17/21
Project ID:	Dowling Fruit Orchard		**Drawing:**	Building 6	
	Demo-Level Survey		**Floor:**	1st Flr	
Site Address:	38021 CA-60				
	Beaumont CA 92223		**Inspector:**	Brian W. / Nelson D.	

CITADEL EHS
assess • resolve • strengthen

Appendix C
Asbestos Laboratory Results

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761

Tel/Fax: (909) 295-6825 / (909) 295-6826

http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Attention:	Jack Samuels	**Phone:**	(818) 246-2707
	Citadel Environmental Services, Inc.	**Fax:**	(818) 246-3145
	2525 Cherry Avenue, Suite 105	**Received Date:**	11/19/2021 2:24 PM
	Signal Hill, CA 90755	**Analysis Date:**	11/23/2021 - 11/24/2021
		Collected Date:	11/17/2021

Project: 0096.1039.0/ Dowling Fruit Orchard Demo- Level Survey (JS)

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
001-Finish Coat *712102644-0001*	Unit B2/ Level 1/ Room 2 - white sand texture plaster walls	White/Yellow/Green Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	<1% Chrysotile
001-Base Coat *712102644-0001A*	Unit B2/ Level 1/ Room 2 - white sand texture plaster walls	Gray Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
002-Texture *712102644-0002*	Unit B2/ Level 1/ Room 2 - white sand texture plaster walls	White/Yellow Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
002-Plaster *712102644-0002A*	Unit B2/ Level 1/ Room 2 - white sand texture plaster walls	Gray Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
003 *712102644-0003*	Unit B2/ Level 1/ Room 1 - white sand texture plaster walls	Gray Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
004-VFT *712102644-0004*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Brown Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected
004-Mastic *712102644-0004A*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Yellow/Clear Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected
004-Leveling Compound *712102644-0004B*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Gray Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected
005-VFT *712102644-0005*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Brown Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected
005-Mastic *712102644-0005A*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Yellow/Clear Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected
006-VFT *712102644-0006*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Brown/Black Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected
006-Mastic *712102644-0006A*	Unit B2/ Level 1/ Room 1 - wood pattern 12x12 vft	Yellow Non-Fibrous Homogeneous	HA: VFT1	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order: 712102644
Customer ID: 32CITA50F
Customer PO:
Project ID: JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
007-Ceiling Tile *712102644-0007*	Unit B2/ Level 1/ Room 2 - smooth white plaster ceiling	Gray/White Non-Fibrous Homogeneous	35% Cellulose 15% Min. Wool HA: CP1	15% Perlite 35% Non-fibrous (Other)	None Detected
007-Drywall *712102644-0007A*	Unit B2/ Level 1/ Room 2 - smooth white plaster ceiling	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CP1	80% Non-fibrous (Other)	None Detected
007-Plaster *712102644-0007B*	Unit B2/ Level 1/ Room 2 - smooth white plaster ceiling	Gray/White Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
008-Drywall *712102644-0008*	Unit B2/ Level 1/ Room 1 - smooth white plaster ceiling	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass HA: CP1	78% Non-fibrous (Other)	None Detected
008-Plaster *712102644-0008A*	Unit B2/ Level 1/ Room 1 - smooth white plaster ceiling	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
009-Plaster *712102644-0009*	Unit B2/ Level 1/ Room 1 - smooth white plaster ceiling	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
009-Drywall *712102644-0009A*	Unit B2/ Level 1/ Room 1 - smooth white plaster ceiling	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CP1	80% Non-fibrous (Other)	None Detected
010 *712102644-0010*	Unit B2/ Level 1/ Room 2 - yellow carpet mastic	Gray/Yellow Non-Fibrous Homogeneous	HA: FCM1	100% Non-fibrous (Other)	None Detected
011 *712102644-0011*	Unit B2/ Level 1/ Room 1 - yellow carpet mastic	Gray/Yellow Non-Fibrous Homogeneous	HA: FCM1	100% Non-fibrous (Other)	None Detected
012 *712102644-0012*	Unit B2/ Level 1/ Room 1 - yellow carpet mastic	Yellow Non-Fibrous Homogeneous	HA: FCM1	100% Non-fibrous (Other)	None Detected
013 *712102644-0013*	Unit B2/ Level 1/ East - black moisture barrier paper	Brown Fibrous Homogeneous	60% Cellulose HA: MISC1	40% Non-fibrous (Other)	None Detected
014 *712102644-0014*	Unit B2/ Level 1/ South - black moisture barrier paper	Brown Fibrous Homogeneous	60% Cellulose HA: MISC1	40% Non-fibrous (Other)	None Detected
015 *712102644-0015*	Unit B2/ Level 1/ East - black moisture barrier paper	Brown/Black Fibrous Homogeneous	45% Cellulose HA: MISC1	55% Non-fibrous (Other)	None Detected
016 *712102644-0016*	Unit B2/ Level 1/ screw heads + seams NE - black roof mastic	Black Non-Fibrous Homogeneous	10% Cellulose HA: RPM1	90% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761

Tel/Fax: (909) 295-6825 / (909) 295-6826

http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
017 *712102644-0017*	Unit B2/ Level 1/ screw heads + seams N - black roof mastic	Black/Silver Non-Fibrous Homogeneous	HA: RPM1	90% Non-fibrous (Other)	10% Chrysotile
018 *712102644-0018*	Unit B2/ Level 1/ screw heads + seams E - black roof mastic	Black Non-Fibrous Homogeneous	HA: RPM1	92% Non-fibrous (Other)	8% Chrysotile
019 *712102644-0019*	Unit B2/ Level 1 - black roof mastic	Black/Silver Non-Fibrous Homogeneous	HA: RPM2	92% Non-fibrous (Other)	8% Chrysotile
020 *712102644-0020*	Unit B2/ Level 1 - black roof mastic	Black/Silver Non-Fibrous Homogeneous	HA: RPM2	92% Non-fibrous (Other)	8% Chrysotile
021 *712102644-0021*	Unit B2/ Level 1 - black roof mastic	Black/Silver Non-Fibrous Homogeneous	HA: RPM2	96% Non-fibrous (Other)	4% Chrysotile
022-Finish Coat *712102644-0022*	Unit B2/ Level 1/ NE - grey sand finish stucco exterior	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
022-Base Coat *712102644-0022A*	Unit B2/ Level 1/ NE - grey sand finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
023-Finish Coat *712102644-0023*	Unit B2/ Level 1/ NW - grey sand finish stucco exterior	White/Yellow Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
023-Base Coat *712102644-0023A*	Unit B2/ Level 1/ NW - grey sand finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
024-Finish Coat *712102644-0024*	Unit B2/ Level 1/ W center - grey sand finish stucco exterior	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
024-Base Coat *712102644-0024A*	Unit B2/ Level 1/ W center - grey sand finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
025-Texture *712102644-0025*	Unit B2/ Level 1/ East wall North - grey trowel finish stucco exterior	White Non-Fibrous Homogeneous	HA: ES2	100% Non-fibrous (Other)	None Detected
025-Stucco *712102644-0025A*	Unit B2/ Level 1/ East wall North - grey trowel finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES2	100% Non-fibrous (Other)	None Detected
026-Texture *712102644-0026*	Unit B2/ Level 1/ East wall middle - grey trowel finish stucco exterior	White Non-Fibrous Homogeneous	HA: ES2	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
026-Stucco *712102644-0026A*	Unit B2/ Level 1/ East wall middle - grey trowel finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES2	100% Non-fibrous (Other)	None Detected
027-Texture *712102644-0027*	Unit B2/ Level 1/ East wall South - grey trowel finish stucco exterior	White Non-Fibrous Homogeneous	HA: ES2	100% Non-fibrous (Other)	None Detected
027-Stucco *712102644-0027A*	Unit B2/ Level 1/ East wall South - grey trowel finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES2	100% Non-fibrous (Other)	None Detected
028 *712102644-0028*	Unit B2/ Level 1/ SE - grey smooth finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES3	100% Non-fibrous (Other)	None Detected
029 *712102644-0029*	Unit B2/ Level 1/ S - grey smooth finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES3	100% Non-fibrous (Other)	None Detected
030 *712102644-0030*	Unit B2/ Level 1/ SW - grey smooth finish stucco exterior	Gray Non-Fibrous Homogeneous	HA: ES3	100% Non-fibrous (Other)	None Detected
031 *712102644-0031*	Unit B2/ Level 1/ East roof seam - white roof mastic	White/Black Non-Fibrous Homogeneous	HA: RPM3	100% Non-fibrous (Other)	None Detected
032 *712102644-0032*	Unit B2/ Level 1/ SE Lower East roof seam - white roof mastic	White/Black Non-Fibrous Homogeneous	HA: RPM3	100% Non-fibrous (Other)	None Detected
033 *712102644-0033*	Unit B2/ Level 1/ Upper East roof seam - white roof mastic	Black/Silver Non-Fibrous Homogeneous	HA: RPM3	92% Non-fibrous (Other)	8% Chrysotile
034-Finish Coat *712102644-0034*	Unit B1/ Level 1/ Room 8 N - white smooth wall plaster	White Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
034-Base Coat *712102644-0034A*	Unit B1/ Level 1/ Room 8 N - white smooth wall plaster	Gray Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
035-Finish Coat *712102644-0035*	Unit B1/ Level 1/ Room 5 SE - white smooth wall plaster	White Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
035-Base Coat *712102644-0035A*	Unit B1/ Level 1/ Room 5 SE - white smooth wall plaster	Gray Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
036-Finish Coat *712102644-0036*	Unit B1/ Level 1/ Room S - white smooth wall plaster	White Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761

Tel/Fax: (909) 295-6825 / (909) 295-6826

http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
036-Base Coat *712102644-0036A*	Unit B1/ Level 1/ Room S - white smooth wall plaster	Gray Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
037-Finish Coat *712102644-0037*	Unit B1/ Level 1/ Room 5 S - white smooth ceiling paster	White Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
037-Base Coat *712102644-0037A*	Unit B1/ Level 1/ Room 5 S - white smooth ceiling paster	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
038-Finish Coat *712102644-0038*	Unit B1/ Level 1/ Room 5 E - white smooth ceiling paster	White Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
038-Base Coat *712102644-0038A*	Unit B1/ Level 1/ Room 5 E - white smooth ceiling paster	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
039-Finish Coat *712102644-0039*	Unit B1/ Level 1/ Room 5 center - white smooth ceiling paster	White Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
039-Base Coat *712102644-0039A*	Unit B1/ Level 1/ Room 5 center - white smooth ceiling paster	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
040-Finish Coat *712102644-0040*	Unit B1/ Level 1/ Room 1 S - white trowelled ceiling plaster	White Non-Fibrous Homogeneous	HA: CP2	100% Non-fibrous (Other)	None Detected
040-Base Coat *712102644-0040A*	Unit B1/ Level 1/ Room 1 S - white trowelled ceiling plaster	Gray Non-Fibrous Homogeneous	HA: CP2	100% Non-fibrous (Other)	None Detected
041-Finish Coat *712102644-0041*	Unit B1/ Level 1/ Room 1 W - white trowelled ceiling plaster	White Non-Fibrous Homogeneous	HA: CP2	100% Non-fibrous (Other)	None Detected
041-Base Coat *712102644-0041A*	Unit B1/ Level 1/ Room 1 W - white trowelled ceiling plaster	Gray Non-Fibrous Homogeneous	HA: CP2	100% Non-fibrous (Other)	None Detected
042-Finish Coat *712102644-0042*	Unit B1/ Level 1/ Room 1 N - white trowelled ceiling plaster	White Non-Fibrous Homogeneous	HA: CP2	100% Non-fibrous (Other)	None Detected
042-Base Coat *712102644-0042A*	Unit B1/ Level 1/ Room 1 N - white trowelled ceiling plaster	Gray Non-Fibrous Homogeneous	HA: CP2	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
043-Finish Coat *712102644-0043*	Unit B1/ Level 1/ Room 1 N - white trowelled wall plaster	White Non-Fibrous Homogeneous	HA: WPF2	100% Non-fibrous (Other)	None Detected
043-Base Coat *712102644-0043A*	Unit B1/ Level 1/ Room 1 N - white trowelled wall plaster	Gray Non-Fibrous Homogeneous	HA: WPF2	100% Non-fibrous (Other)	None Detected
044-Finish Coat *712102644-0044*	Unit B1/ Level 1/ Room 1 W - white trowelled wall plaster	White Non-Fibrous Homogeneous	HA: WPF2	100% Non-fibrous (Other)	None Detected
044-Base Coat *712102644-0044A*	Unit B1/ Level 1/ Room 1 W - white trowelled wall plaster	Gray Non-Fibrous Homogeneous	HA: WPF2	100% Non-fibrous (Other)	None Detected
045-Finish Coat *712102644-0045*	Unit B1/ Level 1/ Room 1 S - white trowelled wall plaster	White Non-Fibrous Homogeneous	HA: WPF2	100% Non-fibrous (Other)	None Detected
045-Base Coat *712102644-0045A*	Unit B1/ Level 1/ Room 1 S - white trowelled wall plaster	Gray Non-Fibrous Homogeneous	HA: WPF2	100% Non-fibrous (Other)	None Detected
046 *712102644-0046*	Unit B1/ Level 1/ Room 1 under display racks W - black mastic floor	Black Non-Fibrous Homogeneous	10% Cellulose HA: MISC1	90% Non-fibrous (Other)	None Detected
047 *712102644-0047*	Unit B1/ Level 1/ Room 8 under display racks center - black mastic floor	Black Non-Fibrous Homogeneous	10% Synthetic HA: MISC1	90% Non-fibrous (Other)	None Detected
048 *712102644-0048*	Unit B1/ Level 1/ Room 5 under display racks E - black mastic floor	Black Non-Fibrous Homogeneous	8% Synthetic HA: MISC1	92% Non-fibrous (Other)	None Detected
049 *712102644-0049*	Unit B1/ Level 1/ Room 4 S - white drywall ceiling	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CSR1	80% Non-fibrous (Other)	None Detected
050-Drywall *712102644-0050*	Unit B1/ Level 1/ Room 4 W - white drywall ceiling	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CSR1	80% Non-fibrous (Other)	None Detected
050-Joint Compound *712102644-0050A*	Unit B1/ Level 1/ Room 4 W - white drywall ceiling	White Non-Fibrous Homogeneous	HA: CSR1	100% Non-fibrous (Other)	None Detected
051-Drywall *712102644-0051*	Unit B1/ Level 1/ Room 4 N - white drywall ceiling	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CSR1	80% Non-fibrous (Other)	None Detected
051-Joint Compound *712102644-0051A*	Unit B1/ Level 1/ Room 4 N - white drywall ceiling	White Non-Fibrous Homogeneous	HA: CSR1	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order: 712102644
Customer ID: 32CITA50F
Customer PO:
Project ID: JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
052 *712102644-0052*	Unit B1/ Roof/ N/E - grey rolled roof membrane	Gray/Black Fibrous Heterogeneous	10% Synthetic HA: RFM1	90% Non-fibrous (Other)	None Detected
053 *712102644-0053*	Unit B1/ Roof/ center - grey rolled roof membrane	Gray/Black Fibrous Heterogeneous	15% Synthetic 10% Glass HA: RFM1	75% Non-fibrous (Other)	None Detected
054-Shingle *712102644-0054*	Unit B1/ Roof/ S/W - grey rolled roof membrane	White/Black Fibrous Heterogeneous	10% Synthetic HA: RFM1	90% Non-fibrous (Other)	None Detected
054-Roofing *712102644-0054A*	Unit B1/ Roof/ S/W - grey rolled roof membrane	Black Fibrous Homogeneous	10% Glass HA: RFM1	90% Non-fibrous (Other)	None Detected
054-Felts *712102644-0054B*	Unit B1/ Roof/ S/W - grey rolled roof membrane	Black Fibrous Homogeneous	10% Glass HA: RFM1	90% Non-fibrous (Other)	None Detected
055 *712102644-0055*	Unit B1/ Roof/ West - black/ grey pitch pocket mastic	Brown/Black Non-Fibrous Homogeneous	10% Cellulose HA: RPM	90% Non-fibrous (Other)	None Detected
056 *712102644-0056*	Unit B1/ Roof/ N/W - rolled roof penetration mastic	Brown/Black Non-Fibrous Homogeneous	10% Cellulose HA: RPM1	90% Non-fibrous (Other)	None Detected
057 *712102644-0057*	Unit B1/ Roof/ West center - rolled roof penetration mastic	Gray/Black Non-Fibrous Homogeneous	10% Cellulose HA: RPM1	90% Non-fibrous (Other)	None Detected
058 *712102644-0058*	Unit B1/ Roof/ West - rolled roof penetration mastic	Gray/Black Non-Fibrous Homogeneous	10% Cellulose HA: RPM1	90% Non-fibrous (Other)	None Detected
059 *712102644-0059*	Unit B1/ Roof/ N/E - rolled roof seam mastic	Gray/Black Non-Fibrous Homogeneous	10% Cellulose HA: MISC2	90% Non-fibrous (Other)	None Detected
060 *712102644-0060*	Unit B1/ Roof/ center - rolled roof seam mastic	Gray/Black Non-Fibrous Homogeneous	10% Cellulose HA: MISC2	90% Non-fibrous (Other)	None Detected
061 *712102644-0061*	Unit B1/ Roof/ N/W - rolled roof seam mastic	Gray/Black Non-Fibrous Homogeneous	8% Cellulose HA: MISC2	92% Non-fibrous (Other)	None Detected
062-Shingle 1 *712102644-0062*	Unit B1/ Roof/ S/E - black/grey shingled roof (pitched) roof membrane	White/Black Fibrous Heterogeneous	10% Glass HA: RFM2	90% Non-fibrous (Other)	None Detected
062-Shingle 2 *712102644-0062A*	Unit B1/ Roof/ S/E - black/grey shingled roof (pitched) roof membrane	Gray/Black/Green Fibrous Heterogeneous	10% Glass HA: RFM2	90% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
062-Felt *712102644-0062B*	Unit B1/ Roof/ S/E - black/grey shingled roof (pitched) roof membrane	Brown Fibrous Homogeneous	98% Cellulose HA: RFM2	2% Non-fibrous (Other)	None Detected
063-Shingle 1 *712102644-0063*	Unit B1/ Roof/ center - black/grey shingled roof (pitched) roof membrane	White/Black Fibrous Heterogeneous	10% Glass HA: RFM2	90% Non-fibrous (Other)	None Detected
063-Shingle 2 *712102644-0063A*	Unit B1/ Roof/ center - black/grey shingled roof (pitched) roof membrane	Gray/Black/Green Fibrous Heterogeneous	10% Glass HA: RFM2	90% Non-fibrous (Other)	None Detected
063-Felt *712102644-0063B*	Unit B1/ Roof/ center - black/grey shingled roof (pitched) roof membrane	Brown Fibrous Homogeneous	98% Cellulose HA: RFM2	2% Non-fibrous (Other)	None Detected
064-Shingle 1 *712102644-0064*	Unit B1/ Roof/ N/W - black/grey shingled roof (pitched) roof membrane	White/Black Fibrous Heterogeneous	10% Glass HA: RFM2	90% Non-fibrous (Other)	None Detected
064-Shingle 2 *712102644-0064A*	Unit B1/ Roof/ N/W - black/grey shingled roof (pitched) roof membrane	Black Fibrous Heterogeneous	10% Glass HA: RFM2	90% Non-fibrous (Other)	None Detected
064-Felt *712102644-0064B*	Unit B1/ Roof/ N/W - black/grey shingled roof (pitched) roof membrane	Brown Fibrous Homogeneous	98% Cellulose HA: RFM2	2% Non-fibrous (Other)	None Detected
065 *712102644-0065*	Unit B1/ Roof/ S/W - black/silver mastic at brace	Black/Silver Non-Fibrous Homogeneous	HA: MISC3	95% Non-fibrous (Other)	5% Chrysotile
066 *712102644-0066*	Unit B1/ Roof/ W center - black/silver mastic at brace	Gray/Black/Silver Non-Fibrous Homogeneous	10% Cellulose HA: MISC3	85% Non-fibrous (Other)	5% Chrysotile
067 *712102644-0067*	Unit B1/ Roof/ N West - black/silver mastic at brace	Gray/Black Non-Fibrous Homogeneous	15% Cellulose HA: MISC3	82% Non-fibrous (Other)	3% Chrysotile
068 *712102644-0068*	Unit B1/ Roof/ West - black mastic @ HVAC stand	Gray/Black Non-Fibrous Homogeneous	10% Cellulose HA: MISC4	90% Non-fibrous (Other)	None Detected
069 *712102644-0069*	Unit B1/ Roof/ West - black mastic @ HVAC stand	Black/Beige Non-Fibrous Homogeneous	10% Cellulose HA: MISC4	90% Non-fibrous (Other)	None Detected
070 *712102644-0070*	Unit B1/ Roof/ East - black mastic at HVAC stand	Black/Beige Non-Fibrous Homogeneous	10% Cellulose HA: MISC3	90% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order: 712102644
Customer ID: 32CITA50F
Customer PO:
Project ID: JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
071-Finish Coat *712102644-0071*	Unit B1/Level 1st/ exterior West - grey exterior stucco	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
071-Base Coat *712102644-0071A*	Unit B1/Level 1st/ exterior West - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
072-Finish Coat *712102644-0072*	Unit B1/Level 1st/ exterior S/W - grey exterior stucco	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
072-Base Coat *712102644-0072A*	Unit B1/Level 1st/ exterior S/W - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
073-Finish Coat *712102644-0073*	Unit B1/Level 1st/ exterior East - grey exterior stucco	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
073-Base Coat *712102644-0073A*	Unit B1/Level 1st/ exterior East - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
074-Finish Coat *712102644-0074*	Unit B1/Level 1st/ exterior N/E - grey exterior stucco	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
074-Base Coat *712102644-0074A*	Unit B1/Level 1st/ exterior N/E - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
075-Finish Coat *712102644-0075*	Unit B1/Level 1st/ exterior N/W - grey exterior stucco	White Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
075-Base Coat *712102644-0075A*	Unit B1/Level 1st/ exterior N/W - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
076 *712102644-0076*	Unit B1/Level Attic 1st/ North - brown barrier paper	Brown Fibrous Homogeneous	60% Cellulose HA: BP1	40% Non-fibrous (Other)	None Detected
077 *712102644-0077*	Unit B1/Level Attic 1st/ South - brown barrier paper	Brown Fibrous Homogeneous	60% Cellulose HA: BP1	40% Non-fibrous (Other)	None Detected
078 *712102644-0078*	Unit B1/Level Attic 1st/ East - brown barrier paper	Brown Fibrous Homogeneous	65% Cellulose HA: BP1	35% Non-fibrous (Other)	None Detected
079-VFT *712102644-0079*	Unit B4/ Level R 4/ North West - beige 9 VFTw/ mastic	Gray/Beige Non-Fibrous Homogeneous	HA: 9VFT1	94% Non-fibrous (Other)	6% Chrysotile

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
079-Mastic *712102644-0079A*	Unit B4/ Level R 4/ North West - beige 9 VFTw/ mastic	Black Non-Fibrous Homogeneous	HA: 9VFT1	100% Non-fibrous (Other)	None Detected
080-VFT *712102644-0080*	Unit B4/ Level R 3/ center - beige 9 VFTw/black mastic	Gray/Beige Non-Fibrous Homogeneous	HA: 9VFT1	94% Non-fibrous (Other)	6% Chrysotile
080-Mastic *712102644-0080A*	Unit B4/ Level R 3/ center - beige 9 VFTw/black mastic	Black Non-Fibrous Homogeneous	HA: 9VFT1	100% Non-fibrous (Other)	None Detected
081-VFT *712102644-0081*	Unit B4/ Level R 2/ S/E - beige 9 VFTw/black mastic	Gray/Beige Non-Fibrous Homogeneous	HA: 9VFT1	95% Non-fibrous (Other)	5% Chrysotile
081-Mastic *712102644-0081A*	Unit B4/ Level R 2/ S/E - beige 9 VFTw/black mastic	Black Non-Fibrous Homogeneous	HA: 9VFT1	100% Non-fibrous (Other)	None Detected
082-Finish Coat *712102644-0082*	Unit B4/ Level R 4/ East - white/ grey smooth wall plaster w/ button board	Green Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
082-Base Coat *712102644-0082A*	Unit B4/ Level R 4/ East - white/ grey smooth wall plaster w/ button board	White/Beige Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
082-Drywall *712102644-0082B*	Unit B4/ Level R 4/ East - white/ grey smooth wall plaster w/ button board	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WPF1	80% Non-fibrous (Other)	None Detected
083-Finish Coat *712102644-0083*	Unit B4/ Level R 1/ North - white/ grey smooth wall plaster w/ button board	Green Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
083-Base Coat *712102644-0083A*	Unit B4/ Level R 1/ North - white/ grey smooth wall plaster w/ button board	Beige Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
083-Drywall *712102644-0083B*	Unit B4/ Level R 1/ North - white/ grey smooth wall plaster w/ button board	Brown/Pink Fibrous Heterogeneous	20% Cellulose HA: WPF1	80% Non-fibrous (Other)	None Detected
084-Finish Coat *712102644-0084*	Unit B4/ Level R 3/ South - white/ grey smooth wall plaster w/ button board	Green/Beige Non-Fibrous Homogeneous	HA: WPF1	100% Non-fibrous (Other)	None Detected
084-Base Coat *712102644-0084A*	Unit B4/ Level R 3/ South - white/ grey smooth wall plaster w/ button board	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order: 712102644
Customer ID: 32CITA50F
Customer PO:
Project ID: JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
			HA: WPF1		
084-Drywall *712102644-0084B*	Unit B4/ Level R 3/ South - white/ grey smooth wall plaster w/ button board	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WPF1	80% Non-fibrous (Other)	None Detected
085-Drywall *712102644-0085*	Unit B4/ Level R 3/ East - white drywall with J/C	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass HA: WSR1	78% Non-fibrous (Other)	None Detected
085-Joint Compound *712102644-0085A*	Unit B4/ Level R 3/ East - white drywall with J/C	White Non-Fibrous Homogeneous	HA: WSR1	100% Non-fibrous (Other)	None Detected
085-Mesh *712102644-0085B*	Unit B4/ Level R 3/ East - white drywall with J/C	Yellow Fibrous Homogeneous	98% Glass HA: WSR1	2% Non-fibrous (Other)	None Detected
086-Texture *712102644-0086*	Unit B4/ Level R 3/ North - white drywall with J/C	White Non-Fibrous Homogeneous	HA: WSR1	100% Non-fibrous (Other)	None Detected
086-Drywall *712102644-0086A*	Unit B4/ Level R 3/ North - white drywall with J/C	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WSR1	80% Non-fibrous (Other)	None Detected
087-Texture *712102644-0087*	Unit B4/ Level R 3/ East - white drywall with J/C	White Non-Fibrous Homogeneous	HA: WSR1	100% Non-fibrous (Other)	None Detected
087-Drywall *712102644-0087A*	Unit B4/ Level R 3/ East - white drywall with J/C	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WSR1	80% Non-fibrous (Other)	None Detected
088-Finish Coat *712102644-0088*	Unit B4/ Level R 2/ N center - white/pink smooth ceiling plaster w/ button board	White Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
088-Base Coat *712102644-0088A*	Unit B4/ Level R 2/ N center - white/pink smooth ceiling plaster w/ button board	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
088-Buttonboard *712102644-0088B*	Unit B4/ Level R 2/ N center - white/pink smooth ceiling plaster w/ button board	Brown/Pink Fibrous Heterogeneous	20% Cellulose HA: CP1	80% Non-fibrous (Other)	None Detected
089-Finish Coat *712102644-0089*	Unit B4/ Level R 3/ S/E - white/pink smooth ceiling plaster w/ button board	Green Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
089-Base Coat *712102644-0089A*	Unit B4/ Level R 3/ S/E - white/pink smooth ceiling plaster w/ button board	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
089-Buttonboard *712102644-0089B*	Unit B4/ Level R 3/ S/E - white/pink smooth ceiling plaster w/ button board	Brown/Pink Fibrous Heterogeneous	20% Cellulose HA: CP1	80% Non-fibrous (Other)	None Detected
090-Finish Coat *712102644-0090*	Unit B4/ Level R 5/ West - white/pink smooth ceiling plaster w/ button board	White Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
090-Base Coat *712102644-0090A*	Unit B4/ Level R 5/ West - white/pink smooth ceiling plaster w/ button board	Gray Non-Fibrous Homogeneous	HA: CP1	100% Non-fibrous (Other)	None Detected
090-Buttonboard *712102644-0090B*	Unit B4/ Level R 5/ West - white/pink smooth ceiling plaster w/ button board	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CP1	80% Non-fibrous (Other)	None Detected
091-Shingle 1 *712102644-0091*	Unit B4/ Level Roof/ West - black/grey shingle roof-multi-layer	Brown/Gray/Black Fibrous Heterogeneous	15% Cellulose HA: RFM1	85% Non-fibrous (Other)	None Detected
091-Shingle 2 *712102644-0091A*	Unit B4/ Level Roof/ West - black/grey shingle roof-multi-layer	Brown/White/Black Fibrous Heterogeneous	15% Cellulose HA: RFM1	85% Non-fibrous (Other)	None Detected
091-Shingle 3 *712102644-0091B*	Unit B4/ Level Roof/ West - black/grey shingle roof-multi-layer	Gray/Black/Beige Fibrous Heterogeneous	15% Cellulose HA: RFM1	85% Non-fibrous (Other)	None Detected
091-Shingle 4 *712102644-0091C*	Unit B4/ Level Roof/ West - black/grey shingle roof-multi-layer	White/Black/Green Fibrous Heterogeneous	15% Cellulose HA: RFM1	85% Non-fibrous (Other)	None Detected
091-Shingle 5 *712102644-0091D*	Unit B4/ Level Roof/ West - black/grey shingle roof-multi-layer	Gray/White/Black Fibrous Heterogeneous	15% Cellulose 10% Glass HA: RFM1	75% Non-fibrous (Other)	None Detected
091-Thick Felt *712102644-0091E*	Unit B4/ Level Roof/ West - black/grey shingle roof-multi-layer	Brown Fibrous Homogeneous	45% Cellulose HA: RFM1	55% Non-fibrous (Other)	None Detected
092-Shingle 1 *712102644-0092*	Unit B4/ Level Roof/ center - black/grey shingle roof-multi-layer	Gray/Black Fibrous Heterogeneous	15% Glass HA: RFM1	85% Non-fibrous (Other)	None Detected
092-Shingle 2 *712102644-0092A*	Unit B4/ Level Roof/ center - black/grey shingle roof-multi-layer	Gray/Black/Green Fibrous Heterogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order: 712102644
Customer ID: 32CITA50F
Customer PO:
Project ID: JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
			HA: RFM1		
092-Shingle 3 *712102644-0092B*	Unit B4/ Level Roof/ center - black/grey shingle roof- multi-layer	Brown/Black/Beige Fibrous Heterogeneous	15% Glass	85% Non-fibrous (Other)	None Detected
			HA: RFM1		
092-Shingle 4 *712102644-0092C*	Unit B4/ Level Roof/ center - black/grey shingle roof- multi-layer	Brown/White/Black Fibrous Heterogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
			HA: RFM1		
092-Shingle 5 *712102644-0092D*	Unit B4/ Level Roof/ center - black/grey shingle roof- multi-layer	Brown/Gray/Beige Fibrous Heterogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
			HA: RFM1		
092-Thick Felt *712102644-0092E*	Unit B4/ Level Roof/ center - black/grey shingle roof- multi-layer	Brown Fibrous Homogeneous	65% Cellulose	35% Non-fibrous (Other)	None Detected
			HA: RFM1		
093-Shingle 1 *712102644-0093*	Unit B4/ Level Roof/ S/E - black/grey shingle roof- multi-layer	Gray/Black Fibrous Heterogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
			HA: RFM1		
093-Shingle 2 *712102644-0093A*	Unit B4/ Level Roof/ S/E - black/grey shingle roof- multi-layer	Brown/Black Non-Fibrous Homogeneous	10% Glass	90% Non-fibrous (Other)	None Detected
			HA: RFM1		
093-Shingle 3 *712102644-0093B*	Unit B4/ Level Roof/ S/E - black/grey shingle roof- multi-layer	Black Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
			HA: RFM1		
093-Thick Felt *712102644-0093C*	Unit B4/ Level Roof/ S/E - black/grey shingle roof- multi-layer	Black Fibrous Homogeneous	65% Cellulose	35% Non-fibrous (Other)	None Detected
			HA: RFM1		
094 *712102644-0094*	Unit B4/ Level Roof/ S center - black penetration mastic	Black Non-Fibrous Homogeneous		92% Non-fibrous (Other)	8% Chrysotile
			HA: RPM1		
095 *712102644-0095*	Unit B4/ Level Roof/ South - black penetration mastic	Black Non-Fibrous Homogeneous		90% Non-fibrous (Other)	10% Chrysotile
			HA: RPM1		
096 *712102644-0096*	Unit B4/ Level Roof/ East - black penetration mastic	Black Non-Fibrous Homogeneous		92% Non-fibrous (Other)	8% Chrysotile
			HA: RPM1		
097 *712102644-0097*	Unit B4/ Level Roof/ East - transite vent grey transite vent pipe	Gray Fibrous Homogeneous		83% Non-fibrous (Other)	15% Chrysotile 2% Crocidolite
			HA: MISC1		

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order: 712102644
Customer ID: 32CITA50F
Customer PO:
Project ID: JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
098 *712102644-0098*	Unit B4/ Level Roof/ West - white/grey window putty	Gray/White Non-Fibrous Homogeneous	HA: WP1	100% Non-fibrous (Other)	None Detected
099 *712102644-0099*	Unit B4/ Ext/ N/W - white/grey window putty	White/Beige Non-Fibrous Homogeneous	HA: WP1	100% Non-fibrous (Other)	None Detected
100 *712102644-0100*	Unit B4/ Ext/ East - white/grey window putty	White/Beige Non-Fibrous Homogeneous	HA: WP1	100% Non-fibrous (Other)	None Detected
101-Finish Coat *712102644-0101*	Unit B4/ Ext/ N/E - grey exterior stucco	Green Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
101-Base Coat *712102644-0101A*	Unit B4/ Ext/ N/E - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
102 *712102644-0102*	Unit B4/ Ext/ N/W - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
103-Finish Coat *712102644-0103*	Unit B4/ Ext/ S/W - grey exterior stucco	Green Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
103-Base Coat *712102644-0103A*	Unit B4/ Ext/ S/W - grey exterior stucco	Gray Non-Fibrous Homogeneous	HA: ES1	100% Non-fibrous (Other)	None Detected
104-Drywall *712102644-0104*	Unit B5/ Level R 1/ West - white drywall w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WSR	80% Non-fibrous (Other)	None Detected
104-Joint Compound *712102644-0104A*	Unit B5/ Level R 1/ West - white drywall w/ jc	White/Beige Non-Fibrous Homogeneous	HA: WSR	100% Non-fibrous (Other)	None Detected
105-Drywall *712102644-0105* *No joint compound present for analysis.*	Unit B5/ Level R 1/ S/E - white drywall w/ jc	Brown/Gray Fibrous Heterogeneous	20% Cellulose HA: WSR	80% Non-fibrous (Other)	None Detected
106-Drywall *712102644-0106*	Unit B5/ Level R 2/ S/E - white drywall w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WSR	80% Non-fibrous (Other)	None Detected
106-Joint Compound *712102644-0106A*	Unit B5/ Level R 2/ S/E - white drywall w/ jc	Beige Non-Fibrous Homogeneous	HA: WSR	100% Non-fibrous (Other)	None Detected
107-Vinyl Sheet Flooring *712102644-0107*	Unit B5/ Level R 1/ N/E - brown w/ streaks 9VFT w/ black mastic	Brown/Black Fibrous Heterogeneous	20% Cellulose HA: 9VFT	80% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
107-Mastic *712102644-0107A*	Unit B5/ Level R 1/ N/E - brown w/ streaks 9VFT w/ black mastic	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 9VFT		
108-Vinyl Sheet Flooring *712102644-0108* *No Mastic present for analysis.*	Unit B5/ Level R 1/ N/W - brown w/ streaks 9VFT w/ black mastic	Brown/Black Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
			HA: 9VFT		
109-Vinyl Sheet Flooring *712102644-0109*	Unit B5/ Level R 1/ S/E - brown w/ streaks 9VFT w/ black mastic	Brown/Black Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
			HA: 9VFT		
109-Mastic *712102644-0109A*	Unit B5/ Level R 1/ S/E - brown w/ streaks 9VFT w/ black mastic	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 9VFT		
110 *712102644-0110*	Unit B5/ Level roof/ N/W - grey/black rolled roof	Gray/Black Fibrous Heterogeneous	15% Synthetic	85% Non-fibrous (Other)	None Detected
			HA: RFM		
111 *712102644-0111*	Unit B5/ Level roof/ N center - grey/black rolled roof	Gray/Black Fibrous Heterogeneous	15% Synthetic	85% Non-fibrous (Other)	None Detected
			HA: RFM		
112 *712102644-0112*	Unit B5/ Level roof/ East - grey/black rolled roof	Gray/Black Fibrous Heterogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
			HA: RFM		
113 *712102644-0113*	Unit B5/ Level roof/ N/W - black roof seam mastic	Black Non-Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
			HA: MISC		
114 *712102644-0114*	Unit B5/ Level roof/ N center - black roof seam mastic	Black Non-Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
			HA: MISC		
115 *712102644-0115*	Unit B5/ Level roof/ East - black roof seam mastic	Black Non-Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
			HA: MISC		
116 *712102644-0116*	Unit B5/ Level 1st/ N. West - grey concrete steps	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: MISC		
117 *712102644-0117*	Unit B5/ Level 1st/ West - grey concrete steps	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: MISC		
118 *712102644-0118*	Unit B5/ Level 1st/ West - grey concrete steps	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: MISC		

Initial report from: 11/24/2021 13:50:04

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761

Tel/Fax: (909) 295-6825 / (909) 295-6826

http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
119-Drywall *712102644-0119*	Unit B6/ Level 1st/ S/E - white drywall ceiling w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass HA: WSR	78% Non-fibrous (Other)	None Detected
119-Joint Compound *712102644-0119A*	Unit B6/ Level 1st/ S/E - white drywall ceiling w/ jc	White Non-Fibrous Homogeneous	HA: WSR	100% Non-fibrous (Other)	None Detected
119-Mesh *712102644-0119B*	Unit B6/ Level 1st/ S/E - white drywall ceiling w/ jc	Yellow Fibrous Homogeneous	98% Glass HA: WSR	2% Non-fibrous (Other)	None Detected
120-Drywall *712102644-0120*	Unit B6/ Level 1st/ N/E - white drywall ceiling w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass HA: WSR	78% Non-fibrous (Other)	None Detected
120-Joint Compound *712102644-0120A*	Unit B6/ Level 1st/ N/E - white drywall ceiling w/ jc	White Non-Fibrous Homogeneous	HA: WSR	100% Non-fibrous (Other)	None Detected
120-Mesh *712102644-0120B*	Unit B6/ Level 1st/ N/E - white drywall ceiling w/ jc	Yellow Fibrous Homogeneous	98% Glass HA: WSR	2% Non-fibrous (Other)	None Detected
121-Drywall *712102644-0121*	Unit B6/ Level 1st/ West - white drywall ceiling w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose HA: WSR	80% Non-fibrous (Other)	None Detected
121-Joint Compound *712102644-0121A*	Unit B6/ Level 1st/ West - white drywall ceiling w/ jc	White Non-Fibrous Homogeneous	HA: WSR	100% Non-fibrous (Other)	None Detected
121-Mesh *712102644-0121B*	Unit B6/ Level 1st/ West - white drywall ceiling w/ jc	Yellow Fibrous Homogeneous	98% Glass HA: WSR	2% Non-fibrous (Other)	None Detected
122-Drywall *712102644-0122*	Unit B6/ Level 1st/ S/E - white drywall ceiling w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass HA: CSR	78% Non-fibrous (Other)	None Detected
122-Joint Compound *712102644-0122A*	Unit B6/ Level 1st/ S/E - white drywall ceiling w/ jc	White Non-Fibrous Homogeneous	HA: CSR	100% Non-fibrous (Other)	None Detected
122-Mesh *712102644-0122B*	Unit B6/ Level 1st/ S/E - white drywall ceiling w/ jc	Yellow Fibrous Homogeneous	98% Synthetic HA: CSR	2% Non-fibrous (Other)	None Detected
123-Drywall *712102644-0123*	Unit B6/ Level 1st/ N/E - white drywall ceiling w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass HA: CSR	78% Non-fibrous (Other)	None Detected
123-Joint Compound *712102644-0123A*	Unit B6/ Level 1st/ N/E - white drywall ceiling w/ jc	White Non-Fibrous Homogeneous	HA: CSR	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761

Tel/Fax: (909) 295-6825 / (909) 295-6826

http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
123-Mesh *712102644-0123B*	Unit B6/ Level 1st/ N/E - white drywall ceiling w/ jc	Yellow Fibrous Homogeneous	98% Glass HA: CSR	2% Non-fibrous (Other)	None Detected
124-Drywall *712102644-0124*	Unit B6/ Level 1st/ West - white drywall ceiling w/ jc	Brown/White Fibrous Heterogeneous	20% Cellulose HA: CSR	80% Non-fibrous (Other)	None Detected
124-Joint Compound *712102644-0124A*	Unit B6/ Level 1st/ West - white drywall ceiling w/ jc	White Non-Fibrous Homogeneous	HA: CSR	100% Non-fibrous (Other)	None Detected
124-Mesh *712102644-0124B*	Unit B6/ Level 1st/ West - white drywall ceiling w/ jc	Yellow Fibrous Homogeneous	98% Glass HA: CSR	2% Non-fibrous (Other)	None Detected
125 *712102644-0125*	Unit B6/ Level 1st/ West - brown barrier paper	Brown Fibrous Homogeneous	80% Cellulose HA: BP	20% Non-fibrous (Other)	None Detected
126 *712102644-0126*	Unit B6/ Level 1st/ North - brown barrier paper	Brown Fibrous Homogeneous	80% Cellulose HA: BP	20% Non-fibrous (Other)	None Detected
127 *712102644-0127*	Unit B6/ Level 1st/ South - brown barrier paper	Brown Fibrous Homogeneous	75% Cellulose HA: BP	25% Non-fibrous (Other)	None Detected
128 *712102644-0128*	Unit B2/ Level R 1/ N/W - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
129 *712102644-0129*	Unit B2/ Level R 3/ center - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
130 *712102644-0130*	Unit B2/ Level R 5/ S/W - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
131 *712102644-0131*	Unit B1/ Level R 1/ middle - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
132 *712102644-0132*	Unit B1/ Level R 4/ East - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
133 *712102644-0133*	Unit B1/ Level R 6/ North - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
134 *712102644-0134*	Ext. B/ Ext G./ South of steel buildng - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing
4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Tel/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
135 *712102644-0135*	Ext/ G/ S/W of steel building - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
136 *712102644-0136*	Ext/ G/ Parking area S/E - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
137 *712102644-0137*	Ext/ G/ East of bldg 1 - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
138 *712102644-0138*	Ext/ G/ North of building 1 - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
139-VFT *712102644-0139*	Unit B4/ Level R 5/ N/W - wood pattern 12VFT w/ mastic	Brown/Gray Non-Fibrous Homogeneous	HA: 12VFT	100% Non-fibrous (Other)	None Detected
139-Mastic *712102644-0139A*	Unit B4/ Level R 5/ N/W - wood pattern 12VFT w/ mastic	Yellow Non-Fibrous Homogeneous	HA: 12VFT	100% Non-fibrous (Other)	None Detected
140-VFT *712102644-0140*	Unit B4/ Level R 5/ S/W - wood pattern 12VFT w/ mastic	Brown/Gray Non-Fibrous Homogeneous	HA: 12VFT	100% Non-fibrous (Other)	None Detected
140-Mastic *712102644-0140A*	Unit B4/ Level R 5/ S/W - wood pattern 12VFT w/ mastic	Yellow Non-Fibrous Homogeneous	HA: 12VFT	100% Non-fibrous (Other)	None Detected
141-VFT *712102644-0141*	Unit B4/ Level R 5/ S/E - wood pattern 12VFT w/ mastic	Brown/Gray Non-Fibrous Homogeneous	HA: 12VFT	100% Non-fibrous (Other)	None Detected
141-Mastic / Leveling Compound *712102644-0141A* *Unable to separate*	Unit B4/ Level R 5/ S/E - wood pattern 12VFT w/ mastic	Gray/Yellow Non-Fibrous Heterogeneous	HA: 12VFT	100% Non-fibrous (Other)	None Detected
142 *712102644-0142*	Unit B4/ Level R 1/ S/E - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
143-Concrete *712102644-0143*	Unit B4/ Level R 5/ North - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
143-Mastic *712102644-0143A*	Unit B4/ Level R 5/ North - grey concrete	Beige Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected
144 *712102644-0144*	Unit B4/ Level R 4/ N/E - grey concrete	Gray Non-Fibrous Homogeneous	HA: MISC	100% Non-fibrous (Other)	None Detected

Initial report from: 11/24/2021 13:50:04

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761

Tel/Fax: (909) 295-6825 / (909) 295-6826

http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102644
Customer ID:	32CITA50F
Customer PO:	
Project ID:	JS

Analyst(s)

David Flores (80)
Joel Paruli (48)
Tania Lopez (113)

Carolynn Tom, Laboratory Manager
or Other Approved Signatory

LA Testing maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by LA Testing. LA Testing bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore LA Testing recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by LA Testing South Pasadena, CA NVLAP Lab Code 200232-0, CA ELAP 2283

Initial report from: 11/24/2021 13:50:04

LA Testing

4335 E. Airport Dr. Unit 110 Ontario, CA 91761
Phone/Fax: (909) 295-6825 / (909) 295-6826
http://www.LATesting.com / InlandEmpireLab@latesting.com

LA Testing Order:	712102677
Customer ID:	32CITA50F
Customer PO:	
Project ID:	

Attention: Jack Samuels
Citadel Environmental Services, Inc.
2525 Cherry Avenue, Suite 105
Signal Hill, CA 90755

Phone:	(818) 246-2707
Fax:	(818) 246-3145
Received:	11/29/2021 8:30 AM
Analysis Date:	11/29/2021
Collected:	11/17/2021

Project: Reference: 712102644 - JS/0096.1039.0/ Dowling Fruit Orchard Demo- Level Survey

Test Report: Asbestos Analysis of Bulk Material via EPA 600/R-93/116. Quantitation using the 1,000 Point Count Procedure

			Non-Asbestos		Asbestos	
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**	
001-Finish Coat *712102677-0001*	Unit B2/ Level 1/ Room 2 - white sand texture plaster walls	White/Yellow/Green Non-Fibrous Homogeneous		100.0% Non-fibrous (Other)	**<0.1%**	**Chrysotile**

Analyst(s)

Rosa Mendoza (1)

Carolynn Tom, Laboratory Manager
or other approved signatory

LA Testing maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by LA Testing. LA Testing bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore LA Testing recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by LA Testing South Pasadena, CA NVLAP Lab Code 200232-0, CA ELAP 2283

Initial report from: 11/29/2021 11:12:44

OrderID: 712102644

Gr 11/19
#712102644

CHAIN OF CUSTODY

CITADEL EHS

CITADEL LOCATION:

[ ] GLENDALE	[ ] ORANGE COUNTY	[X] SIGNAL HILL	[ ] VALENCIA
Contact:	Contact:	Contact: Kier DeLeo	Contact:
email:	email:	email: kdeleo@citadelehs.com	email:
1725 Victory Blvd.	151 Kalmus Drive	2525 Cherry Avenue. #105	28159 Ave Stanford
Glendale, CA 91201	Costa Mesa, CA 92626	Signal Hill, CA 90755	Suite 224
Phone: (818) 246-2707	Phone:(714) 547-4301	Phone: (818) 246-2707	Valencia, CA 91355
	Fax: (714) 547-4647	Fax: (818) 246-3145	Phone:(818) 246-2707

PROJECT AND SAMPLE INFORMATION

PROJECT NUMBER: 0096.1039.0

PROJECT NAME: Dowling Fruit Orchard Demo-Level Survey

NUMBER OF SAMPLES: 144 **SAMPLE NUMBERS:** 001 - 144

TYPE OF SAMPLES (CIRCLE ONE): AIR, TAPE, WATER, WIPE, BULK, SOIL, ZEFON, ANDERSEN, AIR-O-CELL, PLATE, OTHER

TYPE OF ANALYSIS:

Asbestos

- ____ Phase Contrast Microscopy
- X PLM
- ____ 1st Positive Stop
- ____ Point Count ____ 400 Point Count ____ 1000 Point Count
- ____ Transmission Electron Microscopy
- ____ Qualitative ____ Quantitive

Culturable Air

- ____ Andersen Fungi (genue ID, Aspergillus)
- ____ Andersen Bacteria

Non-Culturable Air

- ____ Non-Viable Spore Trap Slide

Surface Samples

- ____ Surface Sample (direct examination)

Lead

- ____ Flame Atomic Absorption
- ____ TTLC ____ STLC ____ TCLP

Culturable Samples

- ____ Quantitative Fungi-dust, bulk swab-1 medium
- ____ Quantitative Fungi-dust, bulk swab-3 media
- ____ Quantitative Bacteria-dust, bulk swab-1 medium
- ____ Quantitative Bacteria-dust, bulk, swab-3 media
- ____ E.coli and Coliforms (MUG)

Other ____

TURNAROUND TIME (CIRCLE ONE): Rush, 12 HOURS, 24 HOURS, 48 HOURS, 1 WEEK, 3 DAYS, 5 DAYS, 5-10 DAYS, OTHER, 6- hour

REPORT RESULTS VIA (CIRCLE ALL THAT APPLY): PHONE, FAX, WRITTEN REPORT, PDF

NOTES/COMMENTS: Special Projects "JS"

TRANSMITTAL RECORD:

walk in drop off

	Relinquished By:	Date:	Time:	Received By:	Date:	Time:
1	Nelson Ortiz	11.19.21	1424	Clom (WI) (T0104?2)	11/19	2:24P
2						
3						

Note: If relinquising samples to a lab drop box or a shipper (Fedex, etc) you must fill out the Recived by with the entity, date, and time.

LABORATORY INFORMATION: NAME: ____ LOCATION: ____

DISPOSITION OF SAMPLES: ____

BULK SAMPLE DATA FORM

~~#7121026444~~ Or 11/19

PROJECT NO.: 6J6.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/17/21
INSPECTOR(S): WELTMAN/N. ORTIZ
CSST/CAC NO: 17-5942 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
WPF1	001	WHITE SAND TEXTURE	PLASTER WALLS	B2	1	Room 2					
	002					Room 2					
	003					Room 1					
VFT1	004	WOOD PATTERN	12x12 VFT			Room 1					
	005										
	006										
CP1	007	SMOOTH WHITE	PLASTER CEILING			Room 2					
	008					Room 1					
	009					Room 1					
FCM1	010	YELLOW	CARPET MASTIC			Room 2					
	011					Room 1					
	012					Room 1					
MISC1	013	BLACK	MOISTURE BARRIER PAPER			EAST					
	014					SOUTH					

OrderID: 712102644

BULK SAMPLE DATA FORM

~~#7121026444~~ GC 11/19

PROJECT NO.: 6096.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/17/21
INSPECTOR(S): WELTMAN / E.N. ORTIZ
CSST/CAC NO: 17-5942 / 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
Misc	015	BLACK	MOISTURE BARRIER PAPER	B2	1	EAST					
RPM1	016	BLACK	ROOF MASTIC			SCREW HEADS + SEAMS NE					
	017					N					
	018					E					
RPM2	019	SILVER	ROOF MASTIC								
	020										
	021										
~~RPM~~ ES1	022	~~WHITE~~ GREY SAND FINISH	STUCCO EXTERIOR			NE					
	023					NW					
	024					W CENTER					
ES2	025	GREY TROWEL FINISH	STUCCO EXTERIOR			EAST WALL NORTH					
	026					MIDDLE					
	027					SOUTH					
	~~028~~										

OrderID: 7121026444

BULK SAMPLE DATA FORM #7121026444 GTW/R

PROJECT NO.: [illegible]6.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 1/1/17/21
INSPECTOR(S): WELTMAN / N. ORTIZ
CSST/CAC NO: 17-5942 / 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
ES3	028	GREY SMOOTH FINISH	STUCCO EXTERIOR	B2	1	SE					
	029					S					
	030					SW					
RPM3	031	WHITE	ROOF MASTIC	B2	1	EAST ROOF SEAM					
	032					LOWER EAST ROOF SEAM					
	033					UPPER EAST ROOF SEAM					
WPF1	~~030~~ 034	WHITE SMOOTH	WALL PLASTER	B1	1	ROOM 8 N					
	035					ROOM 5 SE					
	036					ROOM S					
CP1	037	WHITE SMOOTH	CEILING PLASTER	B1	1	ROOM 5 S					
	038					ROOM 5 E					
	039					RM 5 CENTER					
CP2	040	WHITE TROWELLED				RM 1 S					
	041					RM 1 W					

OrderID: 7121026444

BULK SAMPLE DATA FORM

#712102644 (Cm/19

PROJECT NO.: 0006.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/18/21
INSPECTOR(S): WELTMAN/N.ORTIZ
CSST/CAC NO: 17-5942 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
CP2	042	WHITE TROWELLED	CEILING PLASTER	B1	1	ROOM 1 N					
WPF2	043	WHITE TROWELLED	WALL PLASTER			ROOM 1 N					
	044					W					
	045					S					
MISC1	046	BLACK	MASTIC & FLOOR		RM1	UNDER DISPLAY RACKS W					
	047					RM 8 UNDER DISPLAY RACKS CENTER					
	048					RM5 UNDER DISPLAY RACKS E					
CSR1	049	WHITE	DRY WALL CEILING			ROOM 4 S					
	050					W					
	051					N					
RFM1 1	052	Grey Rolled Roof	Rolled Roof membrane	B1	Roof	N/E					
RFM1 1	053					Center					
RFM1 1	054					S/W					
RPF2	055	Black/Grey	Pitch Pocket Mastic	B1	Roof	West					

OrderID: 712102644

BULK SAMI DATA FORM #7121026440 11/19

PROJECT NO.: 0096.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/19/21
INSPECTOR(S): Weltman / N. Ortiz
CSST/CAC NO: 17-5942 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
RPM / 1	54	Black	Rolled Roof Penetration Mastic	B1	Roof	N/W			N	G	NA
RPM / 1	57	Black	↓	↓	↓	West center			↓	↓	↓
RPM / 1	58	Black	↓	↓	↓	West					
MISC / 2	59	Black/Grey	Rolled Roof Seam mastic	B1	Roof	N/E					
MISC / 2	60	Black/Grey	↓	↓	↓	Center					
MISC / 2	61	Black/Grey	↓	↓	↓	N/W					
RFM / 2	62	Black/Grey	Shingled Roof (Pitched) Roof Membrane	B1	Roof	S/E					
RFM / 2	63	Black/Grey	↓	↓	↓	Center					
RFM / 2	64	Black/Grey	↓	↓	↓	N/W					
MISC / 3	65	Black/Silver	Mastic at brace	B1	Roof	S/W					
MISC / 3	66	Black/Silver	Mastic at brace	↓	↓	W. Center					
MISC / 3	67	Black/Silver	Mastic at brace	↓	↓	N. West					
MISC / 4	68	Black	Mastic @ Hvac stand	B1	Roof	West					
MISC / 4	69	Black	↓	↓	↓	West			↓	↓	↓

OrderID: 7121026440

BULK SAMPLE DATA FORM

#7121026446 G 11/19

PROJECT NO.: 6.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/19/21
INSPECTOR(S): Weltman / N. ORTIZ
CSST/CAC NO: 17-5942 / 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	LEVEL	AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
MSC / 3	70	Black	Mastic at Hvac stand	B1	Roof	East			N	G	NA
ES / 1	71	Grey	Exterior Stucco	B1	1st	Exterior West					
ES / 1	72	Grey		B1	1st	Exterior S|W					
ES / 1	73	Grey		B1	1st	Exterior East					
ES / 1	74	Grey		B1	1st	Exterior N|E					
ES / 1	75	Grey		B1	1st	Exterior N|W					
BP / 1	76	Brown	Barrier paper	B1	Attic 1st	North					
BP / 1	77	Brown	Barrier Paper	B1	Attic 1st	South					
BP / 1	78	Brown	Barrier paper	B1	Attic 1st	East					
QVFT / 1	79	Beige	QVFT w/ Mastic	B4	R-4	North West					
QVFT / 1	80	Beige	QVFT w/ Black Mastic	B4	R-3	Corner					
QVFT / 1	81	Beige		B4	R-2	S|E					

OrderID: 712102644

BULK SAMI DATA FORM

~~#712102644~~ G11/17

PROJECT NO.: 0096.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/19/21
INSPECTOR(S): Weltman / Nortiz
CSST/CAC NO: 175942 / 5-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
WPF 1	B12	White/Grey	Smooth wall plaster w/ Button board	BY	R-4	East			N	G	NA
WPF 1	B13	↓	↓	↓	R-1	North			↓	↓	↓
WPF 1	B14	↓	↓	↓	R-3	South			↓	↓	↓
WSR 1	B15	White	drywall with J/C	BY	R-3	East			↓	↓	↓
WSR 1	B16	White	drywall with J/C	↓	R-3	North			↓	↓	↓
WSR 1	B17	White	drywall with J/C	↓	R-3	East			↓	↓	↓
CP 1	B18	White/pink	smooth ceiling plaster w/ Button board	BY	R-2	N. center			↓	↓	↓
CP 1	B19	↓	↓	↓	R-3	S/E.			↓	↓	↓
CP 1	B20	↓	↓	↓	R-1	West			↓	↓	↓
RFM 1	B21	Black/Grey	Shingle Roof - Multi-layr.	BY	ROOF	West			↓	↓	↓
RFM 1	B22	↓	↓	↓	↓	center			↓	↓	↓
RFM 1	B23	↓	↓	↓	↓	S/E			↓	/	↓

OrderID: 712102644

BULK SAMI DATA FORM

#71210264 Grid 9

PROJECT NO.: 0096.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 1/1/19/21
INSPECTOR(S): Weltman / N. Ortiz
CSST/CAC NO: 17-5542 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
RPM / 1	094	Black	Penetration mastic	BY	Roof	S. Center			N	G	NA
RPM / 1	095	Black	↓	↓		Southeast			↓	↓	↓
RPM / 1	096	Black	↓	↓		East			↓	↓	↓
MISC / 1	097	Transite Vent Grey	transite vent pipe	BY	Roof	East			↓	↓	↓
WP / 1	098	Mute / Grey	Window putty	BY	Ext.	West			↓	↓	↓
WP / 1	099	↓	↓	↓	↓	N/W			↓	↓	↓
WP / 1	100	↓	↓	↓	↓	East			↓	↓	↓
ES / 1	101	grey	Exterior stucco	BY	Ext.	N/E			↓	↓	↓
ES / 1	102	Grey	Exterior stucco	↓	↓	N/W			↓	↓	↓
ES / 1	103	Grey	Exterior stucco	↓	↓	S/W			↓	↓	↓

2.24.2021 Version

OrderID: 712102644

BULK SAMI DATA FORM

#7121026644 G N/S

PROJECT NO.: 0096.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 1/1/19-21
INSPECTOR(S): Weltman / Nortz
CSST/CAC NO: 17-5942 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
WST	104	White	drywall w/ JC	BS	R-1	West			N	G	NA
WST	105	White	drywall w/ JC	"	R-1	S/E			"	"	"
WST	106	White	drywall w/ JC	"	R-2	S/E			"	"	"
QVFT	107	Brown w/streaks	QVFT w/ Black Mastic	BS	R1	N/E			"	"	"
QVFT	108	Brown w/ streaks	"	"	R4	N/W			"	"	"
QVFT	109	Brown w/ streaks	"	"	R4	S/E			"	"	"
RFM	110	Grey/Black	Rolled Roof	BS	Roof	N-W			"	"	"
RFM	111	Grey/Black	"	"	"	N. Center			"	"	"
RFM	112	Grey/Black	"	"	"	East			"	"	"
MISC	113	Black	Roof Seam mastic	BS	Roof	N-W			"	"	"
MISC	114	Black	"	"	"	N. Center			"	"	"
MISC	115	Black	"	"	"	East			"	"	"

OrderID: 7121026644

#7121026444 GT 11/15

BULK SAMP DATA FORM

PROJECT NO.: 0096.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 11/19/21
INSPECTOR(S): Weltman / Nodar
CSST/CAC NO: 17-5442 15-5586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
MISC	116	Grey	Concrete steps	BS	1st	N.West			N	BS	NT
MISC	117	Grey	Concrete steps	↓	↓	West			↓	↓	↓
MISC	118	Grey	Concrete steps	↓	↓	West			↓	↓	↓
WSV	119	White	drywall wall w/ JC	B6	1st	S/E			↓	↓	↓
WSV	120	White	↓	↓	↓	N/E			↓	↓	↓
WSV	121	White	↓	↓	↓	West			↓	↓	↓
CSV	122	White	drywall ceiling w/ JC	↓	↓	S/E			↓	↓	↓
CSV	123	White	↓	↓	↓	N/E			↓	↓	↓
CSV	124	White	↓	↓	↓	West			↓	↓	↓
BP	125	Brown	Barrier paper	B6	1st	West			↓	↓	↓
BP	126	Brown	↓	↓	↓	North			↓	↓	↓
BP	127	Brown	↓	↓	↓	South			↓	↓	↓

OrderID: 7121026444

BULK SAMPLE DATA FORM

#7121026446 G11/F

PROJECT NO.: 6036.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 1/19/21
INSPECTOR(S): Weltman / Norris
CSST/CAC NO: 175942 / 150586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	LEVEL	AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
MISC	118	Grey	Concrete	B2	R1	N/W			N	G	NA
MISC	124	Grey	Concrete	B2	R3	Center					
MISC	130	Grey	Concrete	B2	R5	S/E					
MISC	131	Grey	concrete	B1	R1	Middle					
MISC	132	Grey	Concrete	B1	R4	East					
MISC	133	Grey	Concrete	B1	R6	North					
MISC	134	Grey	Concrete	ext. B	ext. G.	South of steel building					
MISC	135	Grey	Concrete	ext.	G.	S/W of steel building					
MISC	136	Grey	Concrete	ext.	G	parking area S/E					
MISC	137	Grey	concrete	ext.	G	East of bldg. 1					
MISC	138	Grey	concrete	ext.	G	North of building 1					
12VFT	139	Wood pattern	12VFT w/ mastic	B4	R5	N/W					
12VFT	140	↓	↓	B4	R5	S/W					
12VFT	141	↓	↓	B4	R5	S/E					

OrderID: 712102644

BULK SAMPLE DATA FORM #7121026644 CT 11/19

PROJECT NO.: 6696.1039.0
CLIENT: Trammel Crow Company
PROJECT ID: Dowling Fruit Orchard Demo-Level Survey
SITE ADDRESS: 38021 CA-60, Beaumont CA 92223

DATE: 1/1/19 R1
INSPECTOR(S): Weltman/N. Griz
CSST/CAC NO: 17-5942 15-3586

PAGE 1 OF 1

CITADEL EHS

HA TYPE / HA NO.	SAMPLE NO.	MATERIAL DESCRIPTION: COLOR/TEXTURE/PATTERN	MATERIAL DESCRIPTION: MATERIAL TYPE	BULK SAMPLE LOCATION: UNIT	BULK SAMPLE LOCATION: LEVEL	BULK SAMPLE LOCATION: AREA/LOCATION	QUANTITY: NO.	QUANTITY: UNITS	FRIABILITY	MATERIAL CONDITION	DAMAGE TYPE
MISC	142	Grey	Concrete	B4	R1	S/E			N	G	N4
MISC	143	Grey	Concrete	"	R5	North			"	"	"
MISC	144	Grey	Concrete	"	R4	N/E			"	"	"

OrderID: 712102644

CITADEL EHS
assess • resolve • strengthen

Appendix D
Table 3.0 - Lead XRF SA Results

TABLE 3.0 - XRF SA RESULTS
DEMOLITION LEVEL ERM SURVEY
DOWLING FRUIT ORCHARD SITE
38021 CA-60
BEAUMONT, CALIFORNIA 92223

Reading No	Time	Type	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	MISC	Results	Action Level	Lead Result (mg/cm2)
1	*11/17/2021 12:30*	*ShutterCal*	*cps*	*FINAL*													*2.56*
2	*11/17/2021 12:41*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
3	*11/17/2021 12:43*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*
4	*11/17/2021 12:44*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
5	*11/17/2021 12:45*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
6	11/17/2021 13:56	PAINT	mg / cm ^2	FINAL	DOOR	METAL	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	Negative	0.7	0
7	11/17/2021 13:57	PAINT	mg / cm ^2	FINAL	DOOR	METAL	N	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	Negative	0.7	0
8	11/17/2021 13:57	PAINT	mg / cm ^2	FINAL	DOOR FRAME	METAL	N	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	Negative	0.7	0
9	11/17/2021 13:57	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	LCP	0.7	0.02
10	11/17/2021 13:58	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	Negative	0.7	0
11	11/17/2021 13:58	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	Negative	0.7	0
12	11/17/2021 13:59	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	LCP	0.7	0.27
13	11/17/2021 13:59	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	LCP	0.7	0.08
14	11/17/2021 14:01	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.12
15	11/17/2021 14:02	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.04
16	11/17/2021 14:02	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.01
17	11/17/2021 14:03	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.04
18	11/17/2021 14:05	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 2	Negative	0.7	0
19	11/17/2021 14:06	PAINT	mg / cm ^2	FINAL	DOOR	METAL	W	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 2	LCP	0.7	0.02
20	11/17/2021 14:06	PAINT	mg / cm ^2	FINAL	DOOR FRAME	METAL	W	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 2	Negative	0.7	0
21	11/17/2021 14:07	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 2	Negative	0.7	0
22	11/17/2021 14:10	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 2	Negative	0.7	0
23	11/17/2021 14:11	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 2	Negative	0.7	0
24	11/17/2021 14:15	PAINT	mg / cm ^2	FINAL	RAFTER	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 2	Negative	0.7	0
25	11/17/2021 14:15	PAINT	mg / cm ^2	FINAL	HEADER	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 2	Negative	0.7	0
26	11/17/2021 14:16	PAINT	mg / cm ^2	FINAL	DOOR	METAL	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	Negative	0.7	0
27	11/17/2021 14:16	PAINT	mg / cm ^2	FINAL	DOOR FRAME	METAL	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	LCP	0.7	0.04
28	11/17/2021 14:17	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	Negative	0.7	0
29	11/17/2021 14:18	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	LCP	0.7	0.01
30	11/17/2021 14:18	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	LCP	0.7	0.14
31	11/17/2021 14:20	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	Negative	0.7	0
32	11/17/2021 14:21	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	E	POOR	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	Negative	0.7	0
33	11/17/2021 14:21	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	Negative	0.7	0
34	11/17/2021 14:21	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	Negative	0.7	0
35	11/17/2021 14:22	PAINT	mg / cm ^2	FINAL	COLUMN	METAL	N	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	Negative	0.7	0
37	11/17/2021 14:22	PAINT	mg / cm ^2	FINAL	BASEBOARD	CERAMIC	N	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	LCP	0.7	0.03
38	11/17/2021 14:22	PAINT	mg / cm ^2	FINAL	TOILET	CERAMIC	N	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	LCP	0.7	0.01
39	11/17/2021 14:23	PAINT	mg / cm ^2	FINAL	SINK	CERAMIC	W	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	LCP	0.7	0.09
40	11/17/2021 14:25	PAINT	mg / cm ^2	FINAL	FACIA	WOOD	E	POOR	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
41	11/17/2021 14:26	PAINT	mg / cm ^2	FINAL	RAFTER	WOOD	E	PEELING	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
42	11/17/2021 14:26	PAINT	mg / cm ^2	FINAL	HEADER	WOOD	E	PEELING	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
43	11/17/2021 14:27	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	PEELING	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
44	11/17/2021 14:28	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	PEELING	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
45	11/17/2021 14:28	PAINT	mg / cm ^2	FINAL	POSTS	CONCRETE	W	PEELING	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
46	11/17/2021 14:30	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	Negative	0.7	0
47	11/17/2021 14:33	PAINT	mg / cm ^2	FINAL	WINDOW	METAL	N	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	LCP	0.7	0.01
48	*11/17/2021 16:40*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*
49	*11/17/2021 16:41*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
50	*11/17/2021 16:42*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
51	11/17/2021 17:04	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	Negative	0.7	0
52	11/17/2021 17:06	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	Negative	0.7	0
53	11/17/2021 17:06	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	Negative	0.7	0
54	11/17/2021 17:07	PAINT	mg / cm ^2	FINAL	HEADER	WOOD	CENTER	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	LCP	0.7	0.07
55	11/17/2021 17:07	PAINT	mg / cm ^2	FINAL	POST	METAL	CENTER	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	LCP	0.7	0.01
56	11/17/2021 17:08	PAINT	mg / cm ^2	FINAL	DOOR	METAL	W	INTACT	SILVER	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	Negative	0.7	0
57	11/17/2021 17:08	PAINT	mg / cm ^2	FINAL	DOOR FRAME	METAL	W	INTACT	SILVER	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	Negative	0.7	0
58	11/17/2021 17:09	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	Negative	0.7	0
59	11/17/2021 17:10	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 1	Negative	0.7	0
60	11/17/2021 17:10	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 1	Negative	0.7	0
61	11/17/2021 17:11	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 1	Negative	0.7	0
62	11/17/2021 17:11	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 1	Negative	0.7	0
63	11/17/2021 17:11	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 1	Negative	0.7	0
64	11/17/2021 17:12	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 1	Negative	0.7	0

TABLE 3.0 - XRF SA RESULTS
DEMOLITION LEVEL ERM SURVEY
DOWLING FRUIT ORCHARD SITE
38021 CA-60
BEAUMONT, CALIFORNIA 92223

Reading No	Time	Type	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	MISC	Results	Action Level	Lead Result (mg/cm2)
65	11/17/2021 17:13	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
66	11/17/2021 17:14	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
67	11/17/2021 17:14	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
68	11/17/2021 17:14	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
69	11/17/2021 17:15	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
70	11/17/2021 17:15	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
71	11/17/2021 17:15	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 1	Negative	0.7	0
72	11/17/2021 17:16	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
73	11/17/2021 17:16	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
74	11/17/2021 17:17	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
75	11/17/2021 17:17	PAINT	mg / cm ^2	FINAL	WALL	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
76	11/17/2021 17:18	PAINT	mg / cm ^2	FINAL	WALL	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
77	11/17/2021 17:18	PAINT	mg / cm ^2	FINAL	DOOR	METAL	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
78	11/17/2021 17:18	PAINT	mg / cm ^2	FINAL	DOOR FRAME	METAL	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
79	11/17/2021 17:19	PAINT	mg / cm ^2	FINAL	POST	METAL	CENTER	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	LCP	0.7	0.02
80	11/17/2021 17:19	PAINT	mg / cm ^2	FINAL	HEADER	WOOD	CENTER	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	Negative	0.7	0
81	11/17/2021 17:20	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
82	11/17/2021 17:20	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
83	11/17/2021 17:21	PAINT	mg / cm ^2	FINAL	CEILING	DRYWALL	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
84	11/17/2021 17:21	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	N	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
85	11/17/2021 17:22	PAINT	mg / cm ^2	FINAL	BASEBOARD	CERAMIC	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	LCP	0.7	0.4
86	11/17/2021 17:22	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
87	11/17/2021 17:23	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
88	11/17/2021 17:23	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
89	11/17/2021 17:23	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	Negative	0.7	0
90	11/17/2021 17:24	PAINT	mg / cm ^2	FINAL	TRIM	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
91	11/17/2021 17:24	PAINT	mg / cm ^2	FINAL	TRIM	WOOD	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
92	11/17/2021 17:25	PAINT	mg / cm ^2	FINAL	FACIA	WOOD	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
93	11/17/2021 17:25	PAINT	mg / cm ^2	FINAL	EAVE	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
95	11/17/2021 17:25	PAINT	mg / cm ^2	FINAL	WALL	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
97	11/17/2021 17:26	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	SW	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
98	11/17/2021 17:27	PAINT	mg / cm ^2	FINAL	POST	WOOD	SW	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
99	11/17/2021 17:27	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	SW	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
100	11/17/2021 17:27	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	SW	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
101	11/17/2021 17:28	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
102	11/17/2021 17:28	PAINT	mg / cm ^2	FINAL	POST	WOOD	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
103	11/17/2021 17:29	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
104	11/17/2021 17:30	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
105	11/17/2021 17:30	PAINT	mg / cm ^2	FINAL	WALL	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
106	11/17/2021 17:31	PAINT	mg / cm ^2	FINAL	WINDOW TRIM	WOOD	E	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
107	11/17/2021 17:31	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	NE	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
108	11/17/2021 17:32	PAINT	mg / cm ^2	FINAL	CONDUIT	METAL	NE	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 1	Negative	0.7	0
109	*11/17/2021 17:51*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
110	*11/17/2021 17:52*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
111	*11/17/2021 17:53*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
112	*11/19/2021 13:04*	*ShutterCal*	*cps*	*FINAL*													*2.38*
113	*11/19/2021 13:06*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1*
114	*11/19/2021 13:07*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*
115	*11/19/2021 13:08*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*
116	11/19/2021 13:14	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	Negative	0.7	0
117	11/19/2021 13:14	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	Negative	0.7	<LOD
118	11/19/2021 13:15	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	LCP	0.7	0.02
119	11/19/2021 13:16	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	N	INTACT	WOOD	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	Negative	0.7	0
120	11/19/2021 13:17	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	LCP	0.7	0.6
121	11/19/2021 13:18	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LBP	0.7	1.2
122	11/19/2021 13:18	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.5
123	11/19/2021 13:19	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LBP	0.7	0.9
124	11/19/2021 13:19	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.4
125	11/19/2021 13:20	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.4
126	11/19/2021 13:20	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.5
127	11/19/2021 13:21	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	Negative	0.7	<LOD
128	11/19/2021 13:21	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.5
129	11/19/2021 13:21	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LBP	0.7	1.2

TABLE 3.0 - XRF SA RESULTS
DEMOLITION LEVEL ERM SURVEY
DOWLING FRUIT ORCHARD SITE
38021 CA-60
BEAUMONT, CALIFORNIA 92223

Reading No	Time	Type	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	MISC	Results	Action Level	Lead Result (mg/cm2)
130	11/19/2021 13:23	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	LBP	0.7	0.8
131	11/19/2021 13:24	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	LBP	0.7	0.8
132	11/19/2021 13:24	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	LCP	0.7	0.29
133	11/19/2021 13:25	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	Negative	0.7	0
134	11/19/2021 13:25	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	W	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	Negative	0.7	<LOD
135	11/19/2021 13:27	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	Negative	0.7	0
136	11/19/2021 13:27	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LCP	0.7	0.01
137	11/19/2021 13:27	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	Negative	0.7	0
138	11/19/2021 13:28	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LCP	0.7	0.4
139	11/19/2021 13:28	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LCP	0.7	0.4
140	11/19/2021 13:29	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LBP	0.7	0.8
141	11/19/2021 13:29	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LBP	0.7	1.1
142	11/19/2021 13:30	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 4	LCP	0.7	0.3
143	11/19/2021 13:31	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 4	LCP	0.7	0.6
144	11/19/2021 13:32	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 4	LBP	0.7	0.7
145	11/19/2021 13:34	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LBP	0.7	0.7
146	11/19/2021 13:34	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LBP	0.7	2.8
147	11/19/2021 13:41	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.5
148	11/19/2021 13:41	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.3
149	11/19/2021 13:42	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.4
150	11/19/2021 13:42	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.5
152	11/19/2021 13:43	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	Negative	0.7	<LOD
153	11/19/2021 13:43	PAINT	mg / cm ^2	FINAL	TUB	METAL	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LBP	0.7	5.1
154	11/19/2021 13:44	PAINT	mg / cm ^2	FINAL	TOILET	CERAMIC	NE	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	Negative	0.7	0
155	11/19/2021 13:47	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	LCP	0.7	0.5
156	11/19/2021 13:48	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
157	11/19/2021 13:49	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
158	11/19/2021 13:49	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
159	11/19/2021 13:50	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
160	11/19/2021 13:50	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	E	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
161	11/19/2021 13:51	PAINT	mg / cm ^2	FINAL	RAFTER	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
162	11/19/2021 13:52	PAINT	mg / cm ^2	FINAL	EAVE	WOOD	N	PEELING	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
163	11/19/2021 13:55	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	N	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
164	11/19/2021 13:55	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	Negative	0.7	0
165	11/19/2021 14:01	PAINT	mg / cm ^2	FINAL	WALL	METAL	W	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
166	11/19/2021 14:02	PAINT	mg / cm ^2	FINAL	WALL	METAL	S	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
167	11/19/2021 14:02	PAINT	mg / cm ^2	FINAL	WALL	METAL	N	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
168	11/19/2021 14:03	PAINT	mg / cm ^2	FINAL	WALL	METAL	E	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
170	11/19/2021 14:03	PAINT	mg / cm ^2	FINAL	WALL TRIM	METAL	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
171	11/19/2021 14:04	PAINT	mg / cm ^2	FINAL	WALL TRIM	METAL	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
172	11/19/2021 14:04	PAINT	mg / cm ^2	FINAL	WALL TRIM	METAL	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 5	Negative	0.7	0
173	11/19/2021 14:08	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	W	INTACT	TAN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 5	Negative	0.7	0
174	11/19/2021 14:08	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	N	INTACT	TAN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 5	Negative	0.7	0
175	11/19/2021 14:08	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	E	INTACT	TAN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 5	Negative	0.7	0
176	11/19/2021 14:09	PAINT	mg / cm ^2	FINAL	CEILING	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 5	Negative	0.7	0
177	11/19/2021 14:09	PAINT	mg / cm ^2	FINAL	CEILING	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 5	Negative	0.7	0
178	11/19/2021 14:10	PAINT	mg / cm ^2	FINAL	WALL	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 5	Negative	0.7	0
179	11/19/2021 14:10	PAINT	mg / cm ^2	FINAL	WALL	WOOD	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 5	Negative	0.7	0
180	11/19/2021 14:11	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 5	Negative	0.7	0
181	11/19/2021 14:11	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 5	Negative	0.7	0
182	11/19/2021 14:12	PAINT	mg / cm ^2	FINAL	WALL	WOOD	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 5	Negative	0.7	0
183	11/19/2021 14:12	PAINT	mg / cm ^2	FINAL	CEILING	DRYWALL	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 5	Negative	0.7	0
184	11/19/2021 14:13	PAINT	mg / cm ^2	FINAL	CEILING	DRYWALL	CENTER	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 5	Negative	0.7	0
185	11/19/2021 14:14	PAINT	mg / cm ^2	FINAL	WALL	WOOD	S	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 5	Negative	0.7	0
186	11/19/2021 14:14	PAINT	mg / cm ^2	FINAL	WALL	WOOD	W	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 5	Negative	0.7	0
187	11/19/2021 14:17	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	W	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 6	Negative	0.7	0
188	11/19/2021 14:17	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	N	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 6	Negative	0.7	0
189	11/19/2021 14:18	PAINT	mg / cm ^2	FINAL	WALL	DRYWALL	S	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 6	Negative	0.7	0
190	11/19/2021 14:18	PAINT	mg / cm ^2	FINAL	CEILING	DRYWALL	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 6	Negative	0.7	0
191	11/19/2021 14:19	PAINT	mg / cm ^2	FINAL	STAIRS	WOOD	E	INTACT	RED	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 6	Negative	0.7	0
192	11/19/2021 14:19	PAINT	mg / cm ^2	FINAL	DECK	WOOD	E	INTACT	RED	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 6	Negative	0.7	0
193	11/19/2021 14:19	PAINT	mg / cm ^2	FINAL	POST	WOOD	E	INTACT	RED	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 6	Negative	0.7	0
194	11/19/2021 14:20	PAINT	mg / cm ^2	FINAL	HANDRAIL	WOOD	E	INTACT	RED	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 6	Negative	0.7	0

TABLE 3.0 - XRF SA RESULTS
DEMOLITION LEVEL ERM SURVEY
DOWLING FRUIT ORCHARD SITE
38021 CA-60
BEAUMONT, CALIFORNIA 92223

Reading No	Time	Type	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	MISC	Results	Action Level	Lead Result (mg/cm2)
195	11/19/2021 17:21	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	LBP	0.7	1.4
196	11/19/2021 17:22	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	LBP	0.7	1.9
197	11/19/2021 17:23	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	LBP	0.7	1.5
198	11/19/2021 17:23	PAINT	mg / cm ^2	FINAL	FLOOR CURB	CONCRETE	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	Negative	0.7	0
199	11/19/2021 17:24	PAINT	mg / cm ^2	FINAL	FLOOR STOPPER	CONCRETE	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	Negative	0.7	0
200	*11/19/2021 17:25*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*
201	*11/19/2021 17:26*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*
202	*11/19/2021 17:27*	*PAINT*	*mg / cm ^2*	*FINAL*			*CALIBRATE*								*Positive*	*0.7*	*1.1*

CITADEL EHS
assess • resolve • strengthen

Appendix E
Table 3.1 - Lead XRF Results - LBP (Positive)

TABLE 3.1 - XRF SA RESULTS
LEAD-BASED PAINTS (≤0.7 mg/cm^2)
DEMOLITION LEVEL ERM SURVEY
DOWLING FRUIT ORCHARD SITE
38021 CA-60
BEAUMONT, CALIFORNIA 92223

Reading No	Time	Type	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	MISC	Results	Action Level	Lead Result (mg/cm2)
121	11/19/2021 13:18	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LBP	0.7	1.2
123	11/19/2021 13:19	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LBP	0.7	0.9
129	11/19/2021 13:21	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LBP	0.7	1.2
130	11/19/2021 13:23	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	LBP	0.7	0.8
131	11/19/2021 13:24	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	LBP	0.7	0.8
140	11/19/2021 13:29	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LBP	0.7	0.8
141	11/19/2021 13:29	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LBP	0.7	1.1
144	11/19/2021 13:32	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 4	LBP	0.7	0.7
145	11/19/2021 13:34	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LBP	0.7	0.7
146	11/19/2021 13:34	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LBP	0.7	2.8
153	11/19/2021 13:43	PAINT	mg / cm ^2	FINAL	TUB	METAL	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LBP	0.7	5.1
195	11/19/2021 17:21	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	LBP	0.7	1.4
196	11/19/2021 17:22	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	LBP	0.7	1.9
197	11/19/2021 17:23	PAINT	mg / cm ^2	FINAL	FLOOR	CONCRETE	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	PARKING	LBP	0.7	1.5

CITADEL EHS
assess • resolve • strengthen

Appendix F
Table 3.2 - Lead XRF Results (LCP)

TABLE 3.2 - XRF SA RESULTS
LEAD-CONTAINING PAINTS (≥0.01 mg/cm^2 AND <0.7mg/cm^2)
DEMOLITION LEVEL ERM SURVEY
DOWLING FRUIT ORCHARD SITE
38021 CA-60
BEAUMONT, CALIFORNIA 92223

Reading No	Time	Type	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Floor	Room	MISC	Results	Action Level	Lead Result (mg/cm2)
9	11/17/2021 13:57	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	LCP	0.7	0.02
12	11/17/2021 13:59	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	LCP	0.7	0.27
13	11/17/2021 13:59	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 2	LCP	0.7	0.08
14	11/17/2021 14:01	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.12
15	11/17/2021 14:02	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.04
16	11/17/2021 14:02	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.01
17	11/17/2021 14:03	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 2	LCP	0.7	0.04
19	11/17/2021 14:06	PAINT	mg / cm ^2	FINAL	DOOR	METAL	W	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 2	LCP	0.7	0.02
27	11/17/2021 14:16	PAINT	mg / cm ^2	FINAL	DOOR FRAME	METAL	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	LCP	0.7	0.04
29	11/17/2021 14:18	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	LCP	0.7	0.01
30	11/17/2021 14:18	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 2	LCP	0.7	0.14
37	11/17/2021 14:22	PAINT	mg / cm ^2	FINAL	BASEBOARD	CERAMIC	N	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	LCP	0.7	0.03
38	11/17/2021 14:22	PAINT	mg / cm ^2	FINAL	TOILET	CERAMIC	N	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	LCP	0.7	0.01
39	11/17/2021 14:23	PAINT	mg / cm ^2	FINAL	SINK	CERAMIC	W	POOR	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	7	BUILDING 2	LCP	0.7	0.09
47	11/17/2021 14:33	PAINT	mg / cm ^2	FINAL	WINDOW	METAL	N	INTACT	GREY	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 2	LCP	0.7	0.01
54	11/17/2021 17:07	PAINT	mg / cm ^2	FINAL	HEADER	WOOD	CENTER	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	LCP	0.7	0.07
55	11/17/2021 17:07	PAINT	mg / cm ^2	FINAL	POST	METAL	CENTER	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 1	LCP	0.7	0.01
79	11/17/2021 17:19	PAINT	mg / cm ^2	FINAL	POST	METAL	CENTER	INTACT	GREEN	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 1	LCP	0.7	0.02
85	11/17/2021 17:22	PAINT	mg / cm ^2	FINAL	BASEBOARD	CERAMIC	W	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 1	LCP	0.7	0.4
118	11/19/2021 13:15	PAINT	mg / cm ^2	FINAL	CEILING	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	LCP	0.7	0.02
120	11/19/2021 13:17	PAINT	mg / cm ^2	FINAL	DOOR FRAME	WOOD	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	1	BUILDING 4	LCP	0.7	0.6
122	11/19/2021 13:18	PAINT	mg / cm ^2	FINAL	DOOR	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.5
124	11/19/2021 13:19	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.4
125	11/19/2021 13:20	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.4
126	11/19/2021 13:20	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	W	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.5
128	11/19/2021 13:21	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	2	BUILDING 4	LCP	0.7	0.5
132	11/19/2021 13:24	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	PINK	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	3	BUILDING 4	LCP	0.7	0.29
136	11/19/2021 13:27	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	E	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LCP	0.7	0.01
138	11/19/2021 13:28	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LCP	0.7	0.4
139	11/19/2021 13:28	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	4	BUILDING 4	LCP	0.7	0.4
142	11/19/2021 13:30	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 4	LCP	0.7	0.3
143	11/19/2021 13:31	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	YELLOW	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	6	BUILDING 4	LCP	0.7	0.6
147	11/19/2021 13:41	PAINT	mg / cm ^2	FINAL	WINDOW	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.5
148	11/19/2021 13:41	PAINT	mg / cm ^2	FINAL	WINDOW FRAME	WOOD	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.3
149	11/19/2021 13:42	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.4
150	11/19/2021 13:42	PAINT	mg / cm ^2	FINAL	WALL	PLASTER	N	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	5	BUILDING 4	LCP	0.7	0.5
155	11/19/2021 13:47	PAINT	mg / cm ^2	FINAL	WALL	STUCCO	S	INTACT	WHITE	DOWLING FRUIT ORCHARD	N.ORTIZ	FIRST	EXT	BUILDING 4	LCP	0.7	0.5

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

We analyzed potential BMP's using the established hierarchy in the WQMP Guidance manual. It was determined that infiltration was not feasible due to the low site infiltration rates. Harvest and Reuse was determined not to be feasible due to drought conditions. LID bioretention method was the selected BMP for treatment for most of the site using a bioretention basin along the westerly side. Due to grade elevations, a small area located at the southwest corner of the site could not be conveyed to the basin. Instead bio-retention basin no. 2 will be constructed. This is a practical low maintenance option when no proprietary systems are allowed and when other options are not available.

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

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Site

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PigeonPass
0.66 MorenoEast
0.68 PerrisReservoir
0.85 Beaumont
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.90 HurkeyCreek
0.65 Anza
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | HEMET | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

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	Huitt-Zollars, Inc	Date	2/19/2024
Designed by	Dakota Stokley	Case No	
Company Project Number/Name	ORCHARD LOGISTICS CENTER		

BMP Identification

BMP NAME / ID: Bioretention Basin #1 (Main Basin)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.83 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)*
DMA A1	*600,756*	*Roofs*	*1*	*0.89*	*535874.4*			
DMA A2	*198,808*	*Ornamental Landscaping*	*0.1*	*0.11*	*21959.9*			
DMA A3	*9,388*	*Decomposed Granite*	*0.4*	*0.28*	*2625.9*			
DMA A4	*477,484*	*Concrete or Asphalt*	*1*	*0.89*	*425915.7*			

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: Huitt-Zollars, Inc — Date: 2/19/2024

Designed by: Dakota Stokley — Case No:

Company Project Number/Name: ORCHARD LOGISTICS CENTER

BMP Identification

BMP NAME / ID: Bioretention Basin #2 (lower basin)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.83 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)*
DMA B1	*25,570*	*Ornamental Landscaping*	*0.1*	*0.11*	*2824.4*			
DMA B2	*6,928*	*Decomposed Granite*	*0.4*	*0.28*	*1937.8*			
DMA B3	*25,001*	*Concrete or Asphalt*	*1*	*0.89*	*22300.9*			

Bioretention Facility - Design Procedure	BMP ID #1 Main Basin	Legend:	Required Entries / Calculated Cells

Company Name:	Huitt-Zollars, Inc	Date:	2/19/2024
Designed by:	Dakota Stokley	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	29.59	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	68,224	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 =	100.0	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 =	1.79	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	38,051	ft^2
Proposed Surface Area	A=	38,512	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Other

Notes: The area should be designed for at least 70% mature coverage throughout the Bioretention Facility. Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed.

Bioretention Facility - Design Procedure	BMP ID #2 Lower Basin	Legend:	Required Entries / Calculated Cells

Company Name: Huitt-Zollars, Inc — Date: 2/19/2024

Designed by: Dakota Stokley — County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T = 1.32 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 1,872 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 = 2.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 60.0 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 = 1.49 ft

Minimum Surface Area, A_m

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

A_M = 1,258 ft^2

Proposed Surface Area — A= 1,360 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 0.5 %

6" Check Dam Spacing — 0 feet

Describe Vegetation: Other

Notes: The area should be designed for at least 70% mature coverage throughout the Bioretention Facility. Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed.

BIO CLEAN FULL CAPTURE FILTER WITH TROUGH SYSTEM

FOR USE IN CURB INLETS

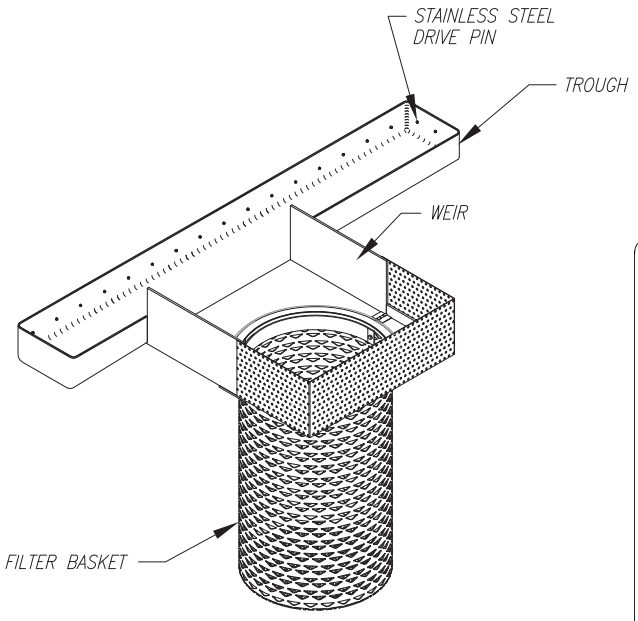


FIGURE 1:
DETAIL OF PARTS

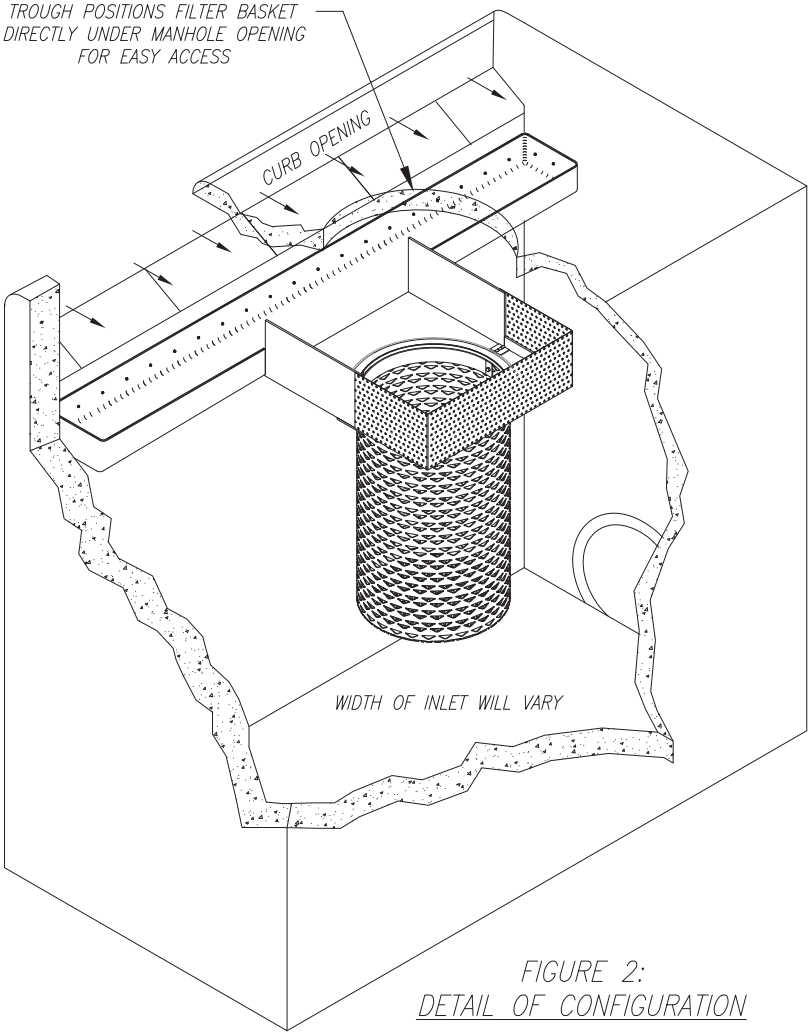


FIGURE 2:
DETAIL OF CONFIGURATION

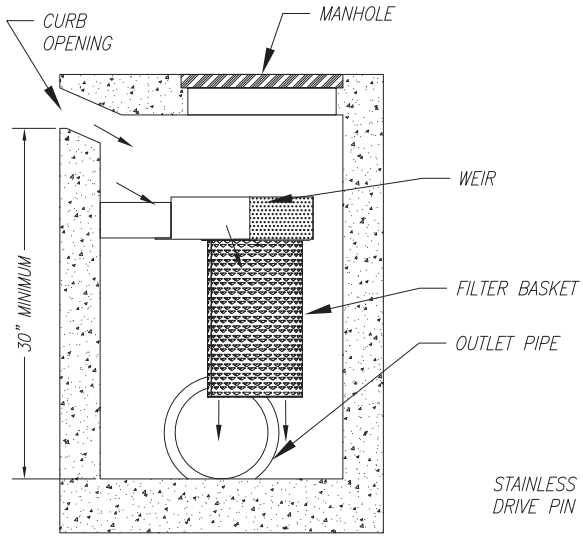


FIGURE 4:
DETAIL OF PROFILE

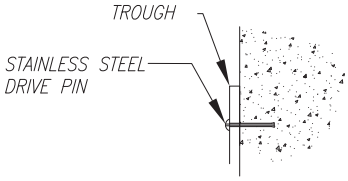


FIGURE 3:
DETAIL OF MOUNTING

NOTES:

1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 100% STAINLESS STEEL.
5. FILTER MADE OF NON-CLOGGIN SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

MODEL NUMBER	TREATMENT FLOW (cfs)*	SOLIDS STORAGE CAPACITY (cu ft)
BC-CURB-FC-30	2.85	2.21
BC-CURB-FC-24	2.85	1.77
BC-CURB-FC-18	2.85	1.33
BC-CURB-FC-12	2.85	0.88

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

DRAWING: BIO CLEAN CURB INLET FILTER DETAILS	MEETS FULL CAPTURE REQUIREMENTS
TREATMENT FLOW RATE: 2.85 cfs	MODEL #: BC-CURB-FC
WARRANTY: 5 YEAR MANUFACTURERS	PROJECT:

BIO CLEAN ENVIRONMENTAL SERVICES, INC.
398 VIA EL CENTRO, OCEANSIDE CA 92058
PHONE:760-433-7640 FAX:760-433-3176

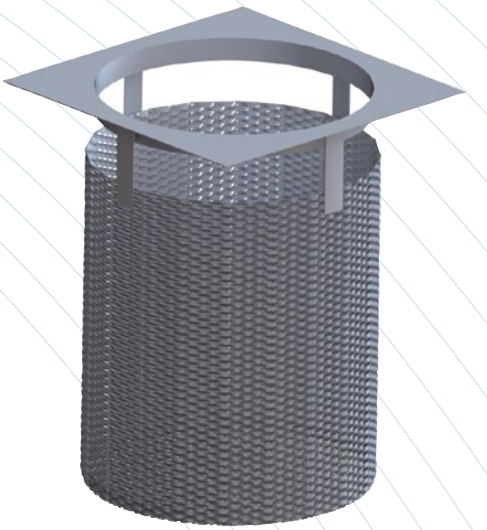
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

DATE: 10/12/2017	SCALE: NTS
DRAFTER: M.C.P.	UNITS = INCHES

Bio Clean
A Forterra Company

Grate Inlet Filter

100% Full trash capture



The Bio Clean Grate Inlet Filter for catch basins keeps property owners in compliance. Preferred by public agencies and backed by an 8 year warranty, this easy to install filter is continuously chosen for its durability and simple maintenance.

Constructed of 100% high grade stainless steel, it is built to last longer than any other filter brand. The non-clogging screens provide higher levels of filtration and water flow. The filter is equipped with unimpeded high flow bypass for even the largest storm events.

The filter is also equipped with a floating hydrocarbon boom mounted to rails allowing it to flow up and down with the water level over a range of flow conditions.

The filter is designed for grated inlets of any size and depth. Each filter can be custom built to meet specific project needs. Screen size and media type can be modified to remove specific pollutants.

Advantages and Performance

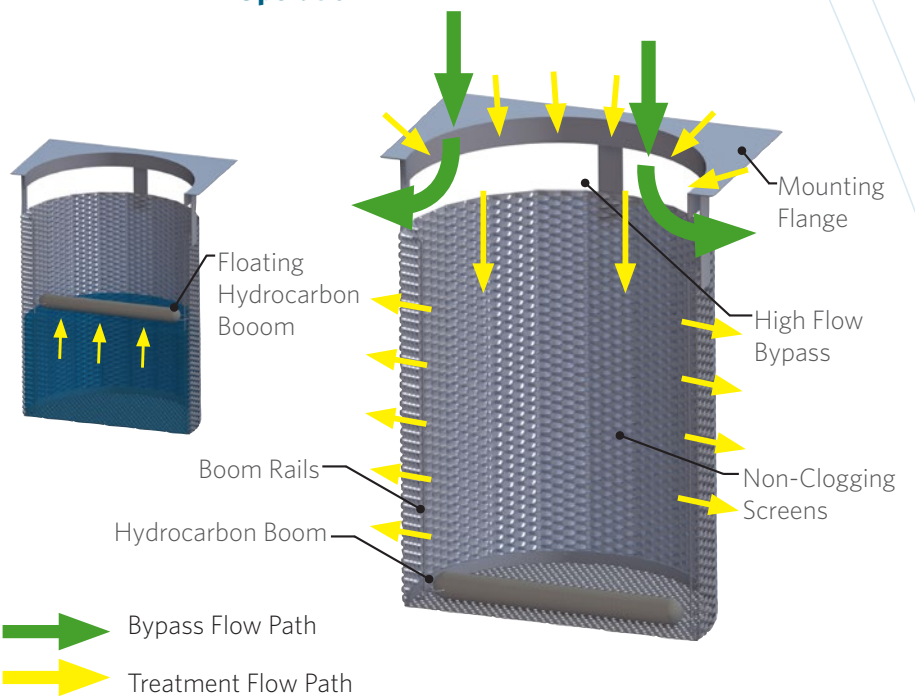
- 8 Year warranty
- Custom sizes available
- No nets or geofabrics
- 15+years user life
- No replacement costs as found with fabric filters
- Meets LEED requirements
- Fits in shallow catch basins
- 100% removal of trash and debris
- Meets full capture requirements

Specifications

Model #	Treatment Flow (CFS)	Bypass Flow (CFS)
BC-GRATE-12-12-12	1.55	1.55
BC-GRATE-18-18-18	4.32	3.68
BC-GRATE-24-24-24	7.67	4.83
BC-GRATE-30-30-24	12.97	6.21
BC-GRATE-25-38-24	13.53	6.59
BC-GRATE-36-36-24	19.64	7.60
BC-GRATE-48-48-18	25.59	10.13

NOTE: Treatment and bypass flow rates include a safety factor of 2.

Operation



PRETREATMENT DEVICES AND SIZING

CATCH BASIN FILTER INSERTS

Filters are based on type and size of CB

SIZE	TYPE
5'	CURB INLET
7'	CURB INLET
10'	CURB INLET
14'	CURB INLET
21'	CURB INLET
28'	CURB INLET
2 GRATES	GRATED INLET
12"X12:	GRATED INLET

BIO CLEAN DEBRIS SEPARATING BAFFLE BOX

MODEL	Qbmp	Max Qbmp	Max Q	Q100
DSBB 4-6	0.8 cfs	9.89 cfs	18.00 cfs	12.76 cfs
DSBB 5-10	1.2 cfs	21.90 cfs	40.00 cfs	18.42 cfs
DSBB 6-12	4.8 cfs	24.86 cfs	*45.00 cfs	78.45 cfs
DSBB 8-12	6.8 cfs	31.82 cfs	*80.00 cfs	117.13 cfs

* Diversion structure needed to bypass Q100

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

This site did not fall within a HCOC exempt area. Unit hydrograph and basin routing calculations were prepared to demonstrate that mitigation of the 2-yr 24-hr event was met. As a result, this project will comply with HCOC mitigation requirements.

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

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
Study date 06/27/24 File: 2838QUHEX2242.out

++

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

Program License Serial Number 6145

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

English Units used in output format

TCC - DOWLING INDUSTRIAL
EXISTING 2 YEAR UNIT HYDROGRAPH
2838QUHEX
DS

Drainage Area = 30.91(Ac.) = 0.048 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 30.91(Ac.) = 0.048 Sq. Mi.
Length along longest watercourse = 1314.00(Ft.)
Length along longest watercourse measured to centroid = 678.00(Ft.)
Length along longest watercourse = 0.249 Mi.
Length along longest watercourse measured to centroid = 0.128 Mi.
Difference in elevation = 25.40(Ft.)
Slope along watercourse = 102.0639 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.081 Hr.
Lag time = 4.85 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.94 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]
30.91	2.67	82.53

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
30.91	6.47	199.99

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.670(In)
Area Averaged 100-Year Rainfall = 6.470(In)

Point rain (area averaged) = 2.670(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.670(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
30.910	86.00	0.050

Total Area Entered = 30.91(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.050	0.328	1.000	0.328
					Sum (F) =	0.328

Area averaged mean soil loss (F) (In/Hr) = 0.328
Minimum soil loss rate ((In/Hr)) = 0.164
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.860

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.143	20.164	6.281
2	0.167	206.286	48.607	15.142
3	0.250	309.429	15.179	4.728
4	0.333	412.572	6.898	2.149
5	0.417	515.716	3.854	1.201
6	0.500	618.859	2.480	0.773
7	0.583	722.002	1.504	0.469
8	0.667	825.145	1.315	0.409
			Sum = 100.000 Sum=	31.151

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.021	0.581	0.018	0.00
2	0.17	0.07	0.021	0.579	0.018	0.00
3	0.25	0.07	0.021	0.576	0.018	0.00
4	0.33	0.10	0.032	0.574	0.028	0.00
5	0.42	0.10	0.032	0.572	0.028	0.00
6	0.50	0.10	0.032	0.570	0.028	0.00
7	0.58	0.10	0.032	0.567	0.028	0.00
8	0.67	0.10	0.032	0.565	0.028	0.00
9	0.75	0.10	0.032	0.563	0.028	0.00
10	0.83	0.13	0.043	0.561	0.037	0.01
11	0.92	0.13	0.043	0.559	0.037	0.01
12	1.00	0.13	0.043	0.556	0.037	0.01
13	1.08	0.10	0.032	0.554	0.028	0.00
14	1.17	0.10	0.032	0.552	0.028	0.00
15	1.25	0.10	0.032	0.550	0.028	0.00
16	1.33	0.10	0.032	0.548	0.028	0.00
17	1.42	0.10	0.032	0.545	0.028	0.00
18	1.50	0.10	0.032	0.543	0.028	0.00
19	1.58	0.10	0.032	0.541	0.028	0.00
20	1.67	0.10	0.032	0.539	0.028	0.00
21	1.75	0.10	0.032	0.537	0.028	0.00
22	1.83	0.13	0.043	0.535	0.037	0.01
23	1.92	0.13	0.043	0.532	0.037	0.01
24	2.00	0.13	0.043	0.530	0.037	0.01
25	2.08	0.13	0.043	0.528	0.037	0.01
26	2.17	0.13	0.043	0.526	0.037	0.01
27	2.25	0.13	0.043	0.524	0.037	0.01
28	2.33	0.13	0.043	0.522	0.037	0.01
29	2.42	0.13	0.043	0.520	0.037	0.01
30	2.50	0.13	0.043	0.518	0.037	0.01
31	2.58	0.17	0.053	0.515	0.046	0.01
32	2.67	0.17	0.053	0.513	0.046	0.01
33	2.75	0.17	0.053	0.511	0.046	0.01
34	2.83	0.17	0.053	0.509	0.046	0.01
35	2.92	0.17	0.053	0.507	0.046	0.01
36	3.00	0.17	0.053	0.505	0.046	0.01
37	3.08	0.17	0.053	0.503	0.046	0.01

38	3.17	0.17	0.053	0.501	0.046	0.01
39	3.25	0.17	0.053	0.499	0.046	0.01
40	3.33	0.17	0.053	0.497	0.046	0.01
41	3.42	0.17	0.053	0.494	0.046	0.01
42	3.50	0.17	0.053	0.492	0.046	0.01
43	3.58	0.17	0.053	0.490	0.046	0.01
44	3.67	0.17	0.053	0.488	0.046	0.01
45	3.75	0.17	0.053	0.486	0.046	0.01
46	3.83	0.20	0.064	0.484	0.055	0.01
47	3.92	0.20	0.064	0.482	0.055	0.01
48	4.00	0.20	0.064	0.480	0.055	0.01
49	4.08	0.20	0.064	0.478	0.055	0.01
50	4.17	0.20	0.064	0.476	0.055	0.01
51	4.25	0.20	0.064	0.474	0.055	0.01
52	4.33	0.23	0.075	0.472	0.064	0.01
53	4.42	0.23	0.075	0.470	0.064	0.01
54	4.50	0.23	0.075	0.468	0.064	0.01
55	4.58	0.23	0.075	0.466	0.064	0.01
56	4.67	0.23	0.075	0.464	0.064	0.01
57	4.75	0.23	0.075	0.462	0.064	0.01
58	4.83	0.27	0.085	0.460	0.073	0.01
59	4.92	0.27	0.085	0.458	0.073	0.01
60	5.00	0.27	0.085	0.456	0.073	0.01
61	5.08	0.20	0.064	0.454	0.055	0.01
62	5.17	0.20	0.064	0.452	0.055	0.01
63	5.25	0.20	0.064	0.450	0.055	0.01
64	5.33	0.23	0.075	0.448	0.064	0.01
65	5.42	0.23	0.075	0.446	0.064	0.01
66	5.50	0.23	0.075	0.444	0.064	0.01
67	5.58	0.27	0.085	0.442	0.073	0.01
68	5.67	0.27	0.085	0.440	0.073	0.01
69	5.75	0.27	0.085	0.438	0.073	0.01
70	5.83	0.27	0.085	0.436	0.073	0.01
71	5.92	0.27	0.085	0.434	0.073	0.01
72	6.00	0.27	0.085	0.433	0.073	0.01
73	6.08	0.30	0.096	0.431	0.083	0.01
74	6.17	0.30	0.096	0.429	0.083	0.01
75	6.25	0.30	0.096	0.427	0.083	0.01
76	6.33	0.30	0.096	0.425	0.083	0.01
77	6.42	0.30	0.096	0.423	0.083	0.01
78	6.50	0.30	0.096	0.421	0.083	0.01
79	6.58	0.33	0.107	0.419	0.092	0.01
80	6.67	0.33	0.107	0.417	0.092	0.01
81	6.75	0.33	0.107	0.415	0.092	0.01
82	6.83	0.33	0.107	0.414	0.092	0.01
83	6.92	0.33	0.107	0.412	0.092	0.01
84	7.00	0.33	0.107	0.410	0.092	0.01
85	7.08	0.33	0.107	0.408	0.092	0.01
86	7.17	0.33	0.107	0.406	0.092	0.01
87	7.25	0.33	0.107	0.404	0.092	0.01
88	7.33	0.37	0.117	0.402	0.101	0.02
89	7.42	0.37	0.117	0.401	0.101	0.02
90	7.50	0.37	0.117	0.399	0.101	0.02
91	7.58	0.40	0.128	0.397	0.110	0.02
92	7.67	0.40	0.128	0.395	0.110	0.02
93	7.75	0.40	0.128	0.393	0.110	0.02
94	7.83	0.43	0.139	0.391	0.119	0.02
95	7.92	0.43	0.139	0.390	0.119	0.02
96	8.00	0.43	0.139	0.388	0.119	0.02
97	8.08	0.50	0.160	0.386	0.138	0.02
98	8.17	0.50	0.160	0.384	0.138	0.02
99	8.25	0.50	0.160	0.382	0.138	0.02
100	8.33	0.50	0.160	0.381	0.138	0.02
101	8.42	0.50	0.160	0.379	0.138	0.02
102	8.50	0.50	0.160	0.377	0.138	0.02
103	8.58	0.53	0.171	0.375	0.147	0.02
104	8.67	0.53	0.171	0.374	0.147	0.02
105	8.75	0.53	0.171	0.372	0.147	0.02
106	8.83	0.57	0.182	0.370	0.156	0.03
107	8.92	0.57	0.182	0.368	0.156	0.03
108	9.00	0.57	0.182	0.367	0.156	0.03

109	9.08	0.63	0.203	0.365	0.175	0.03
110	9.17	0.63	0.203	0.363	0.175	0.03
111	9.25	0.63	0.203	0.361	0.175	0.03
112	9.33	0.67	0.214	0.360	0.184	0.03
113	9.42	0.67	0.214	0.358	0.184	0.03
114	9.50	0.67	0.214	0.356	0.184	0.03
115	9.58	0.70	0.224	0.354	0.193	0.03
116	9.67	0.70	0.224	0.353	0.193	0.03
117	9.75	0.70	0.224	0.351	0.193	0.03
118	9.83	0.73	0.235	0.349	0.202	0.03
119	9.92	0.73	0.235	0.348	0.202	0.03
120	10.00	0.73	0.235	0.346	0.202	0.03
121	10.08	0.50	0.160	0.344	0.138	0.02
122	10.17	0.50	0.160	0.343	0.138	0.02
123	10.25	0.50	0.160	0.341	0.138	0.02
124	10.33	0.50	0.160	0.339	0.138	0.02
125	10.42	0.50	0.160	0.338	0.138	0.02
126	10.50	0.50	0.160	0.336	0.138	0.02
127	10.58	0.67	0.214	0.334	0.184	0.03
128	10.67	0.67	0.214	0.333	0.184	0.03
129	10.75	0.67	0.214	0.331	0.184	0.03
130	10.83	0.67	0.214	0.330	0.184	0.03
131	10.92	0.67	0.214	0.328	0.184	0.03
132	11.00	0.67	0.214	0.326	0.184	0.03
133	11.08	0.63	0.203	0.325	0.175	0.03
134	11.17	0.63	0.203	0.323	0.175	0.03
135	11.25	0.63	0.203	0.322	0.175	0.03
136	11.33	0.63	0.203	0.320	0.175	0.03
137	11.42	0.63	0.203	0.318	0.175	0.03
138	11.50	0.63	0.203	0.317	0.175	0.03
139	11.58	0.57	0.182	0.315	0.156	0.03
140	11.67	0.57	0.182	0.314	0.156	0.03
141	11.75	0.57	0.182	0.312	0.156	0.03
142	11.83	0.60	0.192	0.311	0.165	0.03
143	11.92	0.60	0.192	0.309	0.165	0.03
144	12.00	0.60	0.192	0.307	0.165	0.03
145	12.08	0.83	0.267	0.306	0.230	0.04
146	12.17	0.83	0.267	0.304	0.230	0.04
147	12.25	0.83	0.267	0.303	0.230	0.04
148	12.33	0.87	0.278	0.301	0.239	0.04
149	12.42	0.87	0.278	0.300	0.239	0.04
150	12.50	0.87	0.278	0.298	0.239	0.04
151	12.58	0.93	0.299	0.297	---	0.00
152	12.67	0.93	0.299	0.295	---	0.00
153	12.75	0.93	0.299	0.294	---	0.01
154	12.83	0.97	0.310	0.292	---	0.02
155	12.92	0.97	0.310	0.291	---	0.02
156	13.00	0.97	0.310	0.289	---	0.02
157	13.08	1.13	0.363	0.288	---	0.08
158	13.17	1.13	0.363	0.286	---	0.08
159	13.25	1.13	0.363	0.285	---	0.08
160	13.33	1.13	0.363	0.284	---	0.08
161	13.42	1.13	0.363	0.282	---	0.08
162	13.50	1.13	0.363	0.281	---	0.08
163	13.58	0.77	0.246	0.279	0.211	0.03
164	13.67	0.77	0.246	0.278	0.211	0.03
165	13.75	0.77	0.246	0.276	0.211	0.03
166	13.83	0.77	0.246	0.275	0.211	0.03
167	13.92	0.77	0.246	0.274	0.211	0.03
168	14.00	0.77	0.246	0.272	0.211	0.03
169	14.08	0.90	0.288	0.271	---	0.02
170	14.17	0.90	0.288	0.269	---	0.02
171	14.25	0.90	0.288	0.268	---	0.02
172	14.33	0.87	0.278	0.267	---	0.01
173	14.42	0.87	0.278	0.265	---	0.01
174	14.50	0.87	0.278	0.264	---	0.01
175	14.58	0.87	0.278	0.263	---	0.02
176	14.67	0.87	0.278	0.261	---	0.02
177	14.75	0.87	0.278	0.260	---	0.02
178	14.83	0.83	0.267	0.259	---	0.01
179	14.92	0.83	0.267	0.257	---	0.01

180	15.00	0.83	0.267	0.256	---	0.01
181	15.08	0.80	0.256	0.255	---	0.00
182	15.17	0.80	0.256	0.253	---	0.00
183	15.25	0.80	0.256	0.252	---	0.00
184	15.33	0.77	0.246	0.251	0.211	0.03
185	15.42	0.77	0.246	0.249	0.211	0.03
186	15.50	0.77	0.246	0.248	0.211	0.03
187	15.58	0.63	0.203	0.247	0.175	0.03
188	15.67	0.63	0.203	0.246	0.175	0.03
189	15.75	0.63	0.203	0.244	0.175	0.03
190	15.83	0.63	0.203	0.243	0.175	0.03
191	15.92	0.63	0.203	0.242	0.175	0.03
192	16.00	0.63	0.203	0.241	0.175	0.03
193	16.08	0.13	0.043	0.239	0.037	0.01
194	16.17	0.13	0.043	0.238	0.037	0.01
195	16.25	0.13	0.043	0.237	0.037	0.01
196	16.33	0.13	0.043	0.236	0.037	0.01
197	16.42	0.13	0.043	0.235	0.037	0.01
198	16.50	0.13	0.043	0.233	0.037	0.01
199	16.58	0.10	0.032	0.232	0.028	0.00
200	16.67	0.10	0.032	0.231	0.028	0.00
201	16.75	0.10	0.032	0.230	0.028	0.00
202	16.83	0.10	0.032	0.229	0.028	0.00
203	16.92	0.10	0.032	0.227	0.028	0.00
204	17.00	0.10	0.032	0.226	0.028	0.00
205	17.08	0.17	0.053	0.225	0.046	0.01
206	17.17	0.17	0.053	0.224	0.046	0.01
207	17.25	0.17	0.053	0.223	0.046	0.01
208	17.33	0.17	0.053	0.222	0.046	0.01
209	17.42	0.17	0.053	0.221	0.046	0.01
210	17.50	0.17	0.053	0.220	0.046	0.01
211	17.58	0.17	0.053	0.219	0.046	0.01
212	17.67	0.17	0.053	0.217	0.046	0.01
213	17.75	0.17	0.053	0.216	0.046	0.01
214	17.83	0.13	0.043	0.215	0.037	0.01
215	17.92	0.13	0.043	0.214	0.037	0.01
216	18.00	0.13	0.043	0.213	0.037	0.01
217	18.08	0.13	0.043	0.212	0.037	0.01
218	18.17	0.13	0.043	0.211	0.037	0.01
219	18.25	0.13	0.043	0.210	0.037	0.01
220	18.33	0.13	0.043	0.209	0.037	0.01
221	18.42	0.13	0.043	0.208	0.037	0.01
222	18.50	0.13	0.043	0.207	0.037	0.01
223	18.58	0.10	0.032	0.206	0.028	0.00
224	18.67	0.10	0.032	0.205	0.028	0.00
225	18.75	0.10	0.032	0.204	0.028	0.00
226	18.83	0.07	0.021	0.203	0.018	0.00
227	18.92	0.07	0.021	0.202	0.018	0.00
228	19.00	0.07	0.021	0.201	0.018	0.00
229	19.08	0.10	0.032	0.200	0.028	0.00
230	19.17	0.10	0.032	0.199	0.028	0.00
231	19.25	0.10	0.032	0.198	0.028	0.00
232	19.33	0.13	0.043	0.197	0.037	0.01
233	19.42	0.13	0.043	0.196	0.037	0.01
234	19.50	0.13	0.043	0.196	0.037	0.01
235	19.58	0.10	0.032	0.195	0.028	0.00
236	19.67	0.10	0.032	0.194	0.028	0.00
237	19.75	0.10	0.032	0.193	0.028	0.00
238	19.83	0.07	0.021	0.192	0.018	0.00
239	19.92	0.07	0.021	0.191	0.018	0.00
240	20.00	0.07	0.021	0.190	0.018	0.00
241	20.08	0.10	0.032	0.189	0.028	0.00
242	20.17	0.10	0.032	0.189	0.028	0.00
243	20.25	0.10	0.032	0.188	0.028	0.00
244	20.33	0.10	0.032	0.187	0.028	0.00
245	20.42	0.10	0.032	0.186	0.028	0.00
246	20.50	0.10	0.032	0.185	0.028	0.00
247	20.58	0.10	0.032	0.185	0.028	0.00
248	20.67	0.10	0.032	0.184	0.028	0.00
249	20.75	0.10	0.032	0.183	0.028	0.00
250	20.83	0.07	0.021	0.182	0.018	0.00

251	20.92	0.07	0.021	0.182	0.018	0.00
252	21.00	0.07	0.021	0.181	0.018	0.00
253	21.08	0.10	0.032	0.180	0.028	0.00
254	21.17	0.10	0.032	0.179	0.028	0.00
255	21.25	0.10	0.032	0.179	0.028	0.00
256	21.33	0.07	0.021	0.178	0.018	0.00
257	21.42	0.07	0.021	0.177	0.018	0.00
258	21.50	0.07	0.021	0.177	0.018	0.00
259	21.58	0.10	0.032	0.176	0.028	0.00
260	21.67	0.10	0.032	0.175	0.028	0.00
261	21.75	0.10	0.032	0.175	0.028	0.00
262	21.83	0.07	0.021	0.174	0.018	0.00
263	21.92	0.07	0.021	0.174	0.018	0.00
264	22.00	0.07	0.021	0.173	0.018	0.00
265	22.08	0.10	0.032	0.172	0.028	0.00
266	22.17	0.10	0.032	0.172	0.028	0.00
267	22.25	0.10	0.032	0.171	0.028	0.00
268	22.33	0.07	0.021	0.171	0.018	0.00
269	22.42	0.07	0.021	0.170	0.018	0.00
270	22.50	0.07	0.021	0.170	0.018	0.00
271	22.58	0.07	0.021	0.169	0.018	0.00
272	22.67	0.07	0.021	0.169	0.018	0.00
273	22.75	0.07	0.021	0.168	0.018	0.00
274	22.83	0.07	0.021	0.168	0.018	0.00
275	22.92	0.07	0.021	0.167	0.018	0.00
276	23.00	0.07	0.021	0.167	0.018	0.00
277	23.08	0.07	0.021	0.167	0.018	0.00
278	23.17	0.07	0.021	0.166	0.018	0.00
279	23.25	0.07	0.021	0.166	0.018	0.00
280	23.33	0.07	0.021	0.166	0.018	0.00
281	23.42	0.07	0.021	0.165	0.018	0.00
282	23.50	0.07	0.021	0.165	0.018	0.00
283	23.58	0.07	0.021	0.165	0.018	0.00
284	23.67	0.07	0.021	0.165	0.018	0.00
285	23.75	0.07	0.021	0.164	0.018	0.00
286	23.83	0.07	0.021	0.164	0.018	0.00
287	23.92	0.07	0.021	0.164	0.018	0.00
288	24.00	0.07	0.021	0.164	0.018	0.00
Sum =		100.0			Sum =	4.1

Flood volume = Effective rainfall 0.34(In)
times area 30.9(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 2.33(In)
Total soil loss = 6.003(Ac.Ft)
Total rainfall = 2.67(In)
Flood volume = 38079.7 Cubic Feet
Total soil loss = 261485.1 Cubic Feet

Peak flow rate of this hydrograph = 2.457(CFS)

++

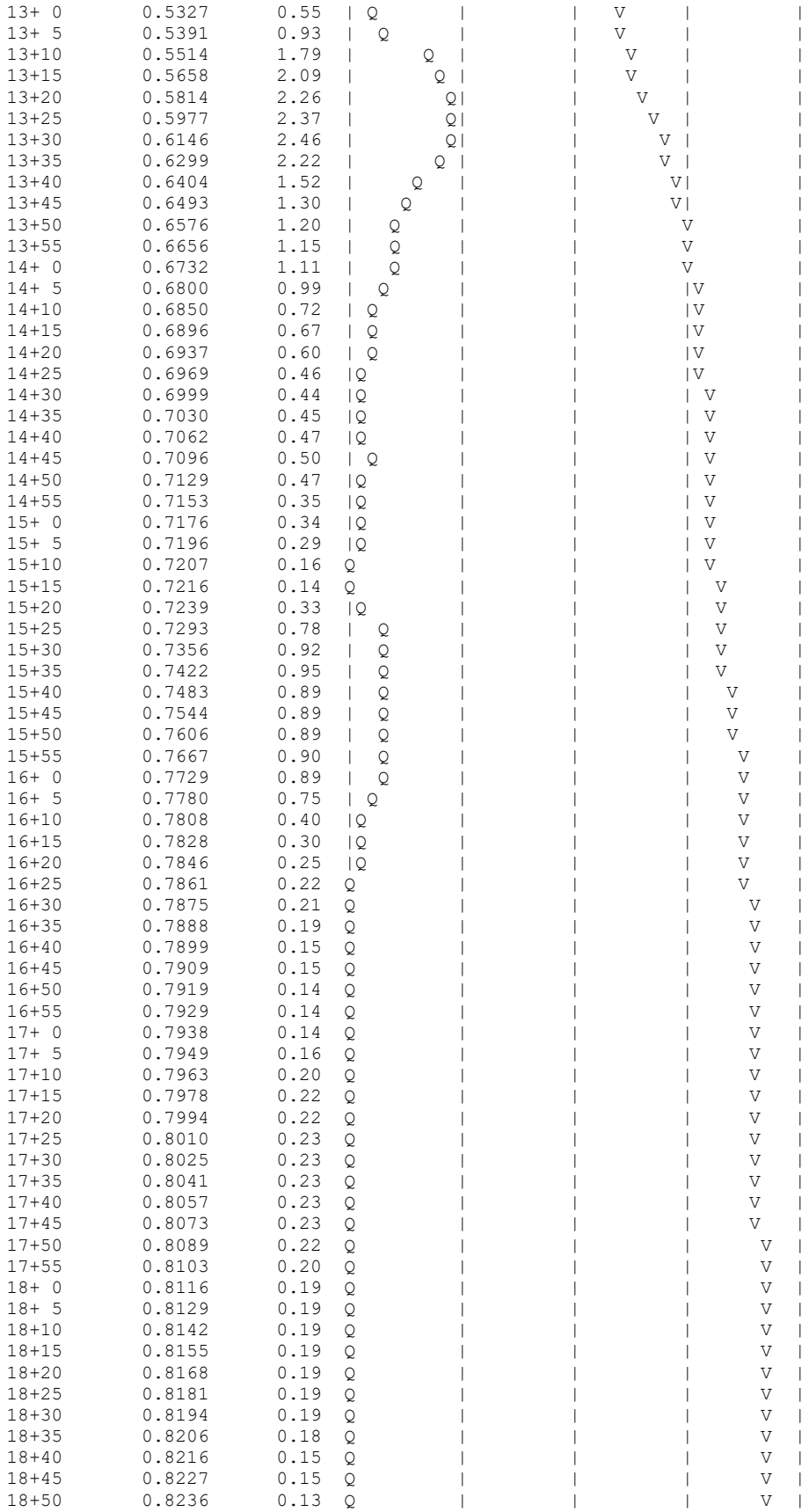
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0006	0.06	Q	|	|	|	|
0+15	0.0011	0.08	Q	|	|	|	|
0+20	0.0018	0.09	Q	|	|	|	|
0+25	0.0026	0.12	Q	|	|	|	|
0+30	0.0035	0.13	Q	|	|	|	|
0+35	0.0044	0.13	Q	|	|	|	|
0+40	0.0053	0.14	Q	|	|	|	|
0+45	0.0063	0.14	Q	|	|	|	|
0+50	0.0073	0.15	Q	|	|	|	|
0+55	0.0085	0.17	Q	|	|	|	|
1+ 0	0.0097	0.18	Q	|	|	|	|
1+ 5	0.0109	0.17	Q	|	|	|	|

1+10	0.0120	0.15	Q				
1+15	0.0130	0.15	Q				
1+20	0.0140	0.14	Q				
1+25	0.0150	0.14	Q				
1+30	0.0159	0.14	Q				
1+35	0.0169	0.14	Q				
1+40	0.0179	0.14	Q				
1+45	0.0188	0.14	Q				
1+50	0.0198	0.15	Q				
1+55	0.0210	0.17	Q				
2+ 0	0.0223	0.18	QV				
2+ 5	0.0235	0.18	QV				
2+10	0.0248	0.18	QV				
2+15	0.0261	0.19	QV				
2+20	0.0273	0.19	QV				
2+25	0.0286	0.19	QV				
2+30	0.0299	0.19	QV				
2+35	0.0313	0.20	QV				
2+40	0.0328	0.22	QV				
2+45	0.0343	0.23	QV				
2+50	0.0359	0.23	QV				
2+55	0.0375	0.23	QV				
3+ 0	0.0391	0.23	QV				
3+ 5	0.0407	0.23	QV				
3+10	0.0423	0.23	QV				
3+15	0.0439	0.23	Q V				
3+20	0.0455	0.23	Q V				
3+25	0.0471	0.23	Q V				
3+30	0.0487	0.23	Q V				
3+35	0.0503	0.23	Q V				
3+40	0.0519	0.23	Q V				
3+45	0.0535	0.23	Q V				
3+50	0.0552	0.24	Q V				
3+55	0.0570	0.27	|QV				
4+ 0	0.0589	0.27	|QV				
4+ 5	0.0608	0.28	|QV				
4+10	0.0627	0.28	|QV				
4+15	0.0646	0.28	|QV				
4+20	0.0666	0.29	|Q V				
4+25	0.0687	0.31	|Q V				
4+30	0.0709	0.32	|Q V				
4+35	0.0731	0.32	|Q V				
4+40	0.0754	0.32	|Q V				
4+45	0.0776	0.32	|Q V				
4+50	0.0799	0.33	|Q V				
4+55	0.0824	0.36	|Q V				
5+ 0	0.0849	0.37	|Q V				
5+ 5	0.0873	0.35	|Q V				
5+10	0.0894	0.31	|Q V				
5+15	0.0914	0.29	|Q V				
5+20	0.0935	0.30	|Q V				
5+25	0.0957	0.32	|Q V				
5+30	0.0979	0.32	|Q V				
5+35	0.1002	0.33	|Q V				
5+40	0.1026	0.36	|Q V				
5+45	0.1051	0.36	|Q V				
5+50	0.1077	0.37	|Q V				
5+55	0.1102	0.37	|Q V				
6+ 0	0.1128	0.37	|Q V				
6+ 5	0.1154	0.38	|Q V				
6+10	0.1182	0.40	|Q V				
6+15	0.1210	0.41	|Q V				
6+20	0.1239	0.42	|Q V				
6+25	0.1267	0.42	|Q V				
6+30	0.1296	0.42	|Q V				
6+35	0.1326	0.43	|Q V				
6+40	0.1357	0.45	|Q V				
6+45	0.1388	0.46	|Q V				
6+50	0.1420	0.46	|Q V				
6+55	0.1452	0.46	|Q V				
7+ 0	0.1484	0.46	|Q V				

7+ 5	0.1516	0.47	Q V				
7+10	0.1548	0.47	Q V				
7+15	0.1580	0.47	Q V				
7+20	0.1613	0.48	Q V				
7+25	0.1647	0.50	Q V				
7+30	0.1682	0.51	Q V				
7+35	0.1718	0.52	Q V				
7+40	0.1755	0.54	Q V				
7+45	0.1793	0.55	Q V				
7+50	0.1832	0.56	Q V				
7+55	0.1872	0.59	Q V				
8+ 0	0.1914	0.60	Q V				
8+ 5	0.1956	0.62	Q V				
8+10	0.2002	0.67	Q V				
8+15	0.2049	0.68	Q V				
8+20	0.2097	0.69	Q V				
8+25	0.2145	0.69	Q V				
8+30	0.2192	0.70	Q V				
8+35	0.2241	0.71	Q V				
8+40	0.2292	0.73	Q V				
8+45	0.2342	0.74	Q V				
8+50	0.2394	0.75	Q V				
8+55	0.2447	0.78	Q V				
9+ 0	0.2501	0.78	Q V				
9+ 5	0.2557	0.81	Q V				
9+10	0.2616	0.85	Q V				
9+15	0.2676	0.87	Q V				
9+20	0.2737	0.89	Q V				
9+25	0.2799	0.91	Q V				
9+30	0.2863	0.92	Q V				
9+35	0.2927	0.94	Q V				
9+40	0.2994	0.96	Q V				
9+45	0.3060	0.97	Q V				
9+50	0.3128	0.98	Q V				
9+55	0.3198	1.01	Q V				
10+ 0	0.3268	1.02	Q V				
10+ 5	0.3333	0.95	Q V				
10+10	0.3388	0.80	Q V				
10+15	0.3440	0.75	Q V				
10+20	0.3490	0.73	Q V				
10+25	0.3539	0.72	Q V				
10+30	0.3588	0.71	Q V				
10+35	0.3640	0.75	Q V				
10+40	0.3699	0.86	Q V				
10+45	0.3761	0.89	Q V				
10+50	0.3823	0.91	Q V				
10+55	0.3887	0.92	Q V				
11+ 0	0.3950	0.93	Q V				
11+ 5	0.4014	0.92	Q V				
11+10	0.4076	0.90	Q V				
11+15	0.4137	0.89	Q V				
11+20	0.4198	0.89	Q V				
11+25	0.4260	0.89	Q V				
11+30	0.4321	0.89	Q V				
11+35	0.4380	0.87	Q V				
11+40	0.4437	0.82	Q V				
11+45	0.4493	0.81	Q V				
11+50	0.4548	0.81	Q V				
11+55	0.4605	0.83	Q V				
12+ 0	0.4663	0.83	Q V				
12+ 5	0.4725	0.90	Q V				
12+10	0.4798	1.06	Q V				
12+15	0.4875	1.11	Q V				
12+20	0.4953	1.14	Q V				
12+25	0.5035	1.18	Q V				
12+30	0.5117	1.19	Q V				
12+35	0.5184	0.97	Q V				
12+40	0.5214	0.43	Q V				
12+45	0.5234	0.29	Q V				
12+50	0.5256	0.32	Q V				
12+55	0.5289	0.48	Q V				



18+55	0.8243	0.11	Q	|	|	|	V |
19+ 0	0.8251	0.10	Q	|	|	|	V |
19+ 5	0.8258	0.11	Q	|	|	|	V |
19+10	0.8267	0.13	Q	|	|	|	V |
19+15	0.8276	0.13	Q	|	|	|	V |
19+20	0.8286	0.15	Q	|	|	|	V |
19+25	0.8298	0.17	Q	|	|	|	V |
19+30	0.8310	0.18	Q	|	|	|	V |
19+35	0.8322	0.17	Q	|	|	|	V |
19+40	0.8332	0.15	Q	|	|	|	V |
19+45	0.8342	0.15	Q	|	|	|	V |
19+50	0.8351	0.13	Q	|	|	|	V |
19+55	0.8359	0.11	Q	|	|	|	V |
20+ 0	0.8366	0.10	Q	|	|	|	V |
20+ 5	0.8373	0.11	Q	|	|	|	V |
20+10	0.8382	0.13	Q	|	|	|	V |
20+15	0.8391	0.13	Q	|	|	|	V |
20+20	0.8401	0.14	Q	|	|	|	V |
20+25	0.8410	0.14	Q	|	|	|	V |
20+30	0.8420	0.14	Q	|	|	|	V |
20+35	0.8429	0.14	Q	|	|	|	V |
20+40	0.8439	0.14	Q	|	|	|	V |
20+45	0.8449	0.14	Q	|	|	|	V |
20+50	0.8458	0.13	Q	|	|	|	V |
20+55	0.8465	0.11	Q	|	|	|	V |
21+ 0	0.8472	0.10	Q	|	|	|	V |
21+ 5	0.8479	0.11	Q	|	|	|	V |
21+10	0.8488	0.13	Q	|	|	|	V |
21+15	0.8497	0.13	Q	|	|	|	V |
21+20	0.8506	0.13	Q	|	|	|	V |
21+25	0.8513	0.11	Q	|	|	|	V |
21+30	0.8520	0.10	Q	|	|	|	V |
21+35	0.8527	0.11	Q	|	|	|	V|
21+40	0.8536	0.13	Q	|	|	|	V|
21+45	0.8545	0.13	Q	|	|	|	V|
21+50	0.8554	0.13	Q	|	|	|	V|
21+55	0.8561	0.11	Q	|	|	|	V|
22+ 0	0.8568	0.10	Q	|	|	|	V|
22+ 5	0.8576	0.11	Q	|	|	|	V|
22+10	0.8584	0.13	Q	|	|	|	V|
22+15	0.8594	0.13	Q	|	|	|	V|
22+20	0.8602	0.13	Q	|	|	|	V|
22+25	0.8610	0.11	Q	|	|	|	V|
22+30	0.8616	0.10	Q	|	|	|	V|
22+35	0.8623	0.10	Q	|	|	|	V|
22+40	0.8630	0.10	Q	|	|	|	V|
22+45	0.8636	0.09	Q	|	|	|	V|
22+50	0.8643	0.09	Q	|	|	|	V|
22+55	0.8649	0.09	Q	|	|	|	V|
23+ 0	0.8656	0.09	Q	|	|	|	V|
23+ 5	0.8662	0.09	Q	|	|	|	V|
23+10	0.8668	0.09	Q	|	|	|	V|
23+15	0.8675	0.09	Q	|	|	|	V|
23+20	0.8681	0.09	Q	|	|	|	V|
23+25	0.8688	0.09	Q	|	|	|	V|
23+30	0.8694	0.09	Q	|	|	|	V|
23+35	0.8700	0.09	Q	|	|	|	V|
23+40	0.8707	0.09	Q	|	|	|	V|
23+45	0.8713	0.09	Q	|	|	|	V|
23+50	0.8720	0.09	Q	|	|	|	V|
23+55	0.8726	0.09	Q	|	|	|	V|
24+ 0	0.8733	0.09	Q	|	|	|	V|
24+ 5	0.8738	0.07	Q	|	|	|	V|
24+10	0.8740	0.03	Q	|	|	|	V|
24+15	0.8741	0.01	Q	|	|	|	V|
24+20	0.8741	0.01	Q	|	|	|	V|
24+25	0.8742	0.00	Q	|	|	|	V|
24+30	0.8742	0.00	Q	|	|	|	V|
24+35	0.8742	0.00	Q	|	|	|	V

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

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
Study date 06/27/24 File: 2838Q2PUHB1242.out

++

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

Program License Serial Number 6145

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

English Units used in output format

ORCHARD LOGISTICS CENTER
2 YEAR 1 HOUR BASIN 1 UNIT HYDROGRAPH
2838Q2PUHB1
AC

Drainage Area = 29.53(Ac.) = 0.046 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 29.53(Ac.) = 0.046 Sq. Mi.
Length along longest watercourse = 2297.00(Ft.)
Length along longest watercourse measured to centroid = 522.00(Ft.)
Length along longest watercourse = 0.435 Mi.
Length along longest watercourse measured to centroid = 0.099 Mi.
Difference in elevation = 20.25(Ft.)
Slope along watercourse = 46.5477 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.045 Hr.
Lag time = 2.73 Min.
25% of lag time = 0.68 Min.
40% of lag time = 1.09 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]
29.53	2.67	78.85

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
29.53	6.47	191.06

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.670(In)
Area Averaged 100-Year Rainfall = 6.470(In)

Point rain (area averaged) = 2.670(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.670(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
29.530	75.00	0.900

Total Area Entered = 29.53(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	57.0	0.501	0.900	0.095	1.000	0.095
					Sum (F) =	0.095

Area averaged mean soil loss (F) (In/Hr) = 0.095
Minimum soil loss rate ((In/Hr)) = 0.048
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	183.152	40.333	12.003
2	0.167	366.303	44.559	13.261
3	0.250	549.455	9.515	2.832
4	0.333	732.606	3.865	1.150
5	0.417	915.758	1.728	0.514
			Sum = 100.000	Sum= 29.761

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.021	0.169	0.004	0.02
2	0.17	0.07	0.021	0.168	0.004	0.02
3	0.25	0.07	0.021	0.167	0.004	0.02
4	0.33	0.10	0.032	0.167	0.006	0.03
5	0.42	0.10	0.032	0.166	0.006	0.03
6	0.50	0.10	0.032	0.165	0.006	0.03
7	0.58	0.10	0.032	0.165	0.006	0.03
8	0.67	0.10	0.032	0.164	0.006	0.03
9	0.75	0.10	0.032	0.163	0.006	0.03
10	0.83	0.13	0.043	0.163	0.008	0.04
11	0.92	0.13	0.043	0.162	0.008	0.04
12	1.00	0.13	0.043	0.162	0.008	0.04
13	1.08	0.10	0.032	0.161	0.006	0.03
14	1.17	0.10	0.032	0.160	0.006	0.03
15	1.25	0.10	0.032	0.160	0.006	0.03
16	1.33	0.10	0.032	0.159	0.006	0.03
17	1.42	0.10	0.032	0.158	0.006	0.03
18	1.50	0.10	0.032	0.158	0.006	0.03
19	1.58	0.10	0.032	0.157	0.006	0.03
20	1.67	0.10	0.032	0.156	0.006	0.03
21	1.75	0.10	0.032	0.156	0.006	0.03
22	1.83	0.13	0.043	0.155	0.008	0.04
23	1.92	0.13	0.043	0.155	0.008	0.04
24	2.00	0.13	0.043	0.154	0.008	0.04
25	2.08	0.13	0.043	0.153	0.008	0.04
26	2.17	0.13	0.043	0.153	0.008	0.04
27	2.25	0.13	0.043	0.152	0.008	0.04
28	2.33	0.13	0.043	0.151	0.008	0.04
29	2.42	0.13	0.043	0.151	0.008	0.04
30	2.50	0.13	0.043	0.150	0.008	0.04
31	2.58	0.17	0.053	0.150	0.010	0.04
32	2.67	0.17	0.053	0.149	0.010	0.04
33	2.75	0.17	0.053	0.148	0.010	0.04
34	2.83	0.17	0.053	0.148	0.010	0.04
35	2.92	0.17	0.053	0.147	0.010	0.04
36	3.00	0.17	0.053	0.147	0.010	0.04
37	3.08	0.17	0.053	0.146	0.010	0.04
38	3.17	0.17	0.053	0.145	0.010	0.04
39	3.25	0.17	0.053	0.145	0.010	0.04
40	3.33	0.17	0.053	0.144	0.010	0.04

41	3.42	0.17	0.053	0.144	0.010	0.04
42	3.50	0.17	0.053	0.143	0.010	0.04
43	3.58	0.17	0.053	0.142	0.010	0.04
44	3.67	0.17	0.053	0.142	0.010	0.04
45	3.75	0.17	0.053	0.141	0.010	0.04
46	3.83	0.20	0.064	0.141	0.012	0.05
47	3.92	0.20	0.064	0.140	0.012	0.05
48	4.00	0.20	0.064	0.139	0.012	0.05
49	4.08	0.20	0.064	0.139	0.012	0.05
50	4.17	0.20	0.064	0.138	0.012	0.05
51	4.25	0.20	0.064	0.138	0.012	0.05
52	4.33	0.23	0.075	0.137	0.013	0.06
53	4.42	0.23	0.075	0.136	0.013	0.06
54	4.50	0.23	0.075	0.136	0.013	0.06
55	4.58	0.23	0.075	0.135	0.013	0.06
56	4.67	0.23	0.075	0.135	0.013	0.06
57	4.75	0.23	0.075	0.134	0.013	0.06
58	4.83	0.27	0.085	0.134	0.015	0.07
59	4.92	0.27	0.085	0.133	0.015	0.07
60	5.00	0.27	0.085	0.132	0.015	0.07
61	5.08	0.20	0.064	0.132	0.012	0.05
62	5.17	0.20	0.064	0.131	0.012	0.05
63	5.25	0.20	0.064	0.131	0.012	0.05
64	5.33	0.23	0.075	0.130	0.013	0.06
65	5.42	0.23	0.075	0.129	0.013	0.06
66	5.50	0.23	0.075	0.129	0.013	0.06
67	5.58	0.27	0.085	0.128	0.015	0.07
68	5.67	0.27	0.085	0.128	0.015	0.07
69	5.75	0.27	0.085	0.127	0.015	0.07
70	5.83	0.27	0.085	0.127	0.015	0.07
71	5.92	0.27	0.085	0.126	0.015	0.07
72	6.00	0.27	0.085	0.126	0.015	0.07
73	6.08	0.30	0.096	0.125	0.017	0.08
74	6.17	0.30	0.096	0.124	0.017	0.08
75	6.25	0.30	0.096	0.124	0.017	0.08
76	6.33	0.30	0.096	0.123	0.017	0.08
77	6.42	0.30	0.096	0.123	0.017	0.08
78	6.50	0.30	0.096	0.122	0.017	0.08
79	6.58	0.33	0.107	0.122	0.019	0.09
80	6.67	0.33	0.107	0.121	0.019	0.09
81	6.75	0.33	0.107	0.121	0.019	0.09
82	6.83	0.33	0.107	0.120	0.019	0.09
83	6.92	0.33	0.107	0.119	0.019	0.09
84	7.00	0.33	0.107	0.119	0.019	0.09
85	7.08	0.33	0.107	0.118	0.019	0.09
86	7.17	0.33	0.107	0.118	0.019	0.09
87	7.25	0.33	0.107	0.117	0.019	0.09
88	7.33	0.37	0.117	0.117	---	0.00
89	7.42	0.37	0.117	0.116	---	0.00
90	7.50	0.37	0.117	0.116	---	0.00
91	7.58	0.40	0.128	0.115	---	0.01
92	7.67	0.40	0.128	0.115	---	0.01
93	7.75	0.40	0.128	0.114	---	0.01
94	7.83	0.43	0.139	0.114	---	0.03
95	7.92	0.43	0.139	0.113	---	0.03
96	8.00	0.43	0.139	0.113	---	0.03
97	8.08	0.50	0.160	0.112	---	0.05
98	8.17	0.50	0.160	0.112	---	0.05
99	8.25	0.50	0.160	0.111	---	0.05
100	8.33	0.50	0.160	0.110	---	0.05
101	8.42	0.50	0.160	0.110	---	0.05
102	8.50	0.50	0.160	0.109	---	0.05
103	8.58	0.53	0.171	0.109	---	0.06
104	8.67	0.53	0.171	0.108	---	0.06
105	8.75	0.53	0.171	0.108	---	0.06
106	8.83	0.57	0.182	0.107	---	0.07
107	8.92	0.57	0.182	0.107	---	0.07
108	9.00	0.57	0.182	0.106	---	0.08
109	9.08	0.63	0.203	0.106	---	0.10
110	9.17	0.63	0.203	0.105	---	0.10
111	9.25	0.63	0.203	0.105	---	0.10

112	9.33	0.67	0.214	0.104	---	0.11
113	9.42	0.67	0.214	0.104	---	0.11
114	9.50	0.67	0.214	0.103	---	0.11
115	9.58	0.70	0.224	0.103	---	0.12
116	9.67	0.70	0.224	0.102	---	0.12
117	9.75	0.70	0.224	0.102	---	0.12
118	9.83	0.73	0.235	0.101	---	0.13
119	9.92	0.73	0.235	0.101	---	0.13
120	10.00	0.73	0.235	0.100	---	0.13
121	10.08	0.50	0.160	0.100	---	0.06
122	10.17	0.50	0.160	0.099	---	0.06
123	10.25	0.50	0.160	0.099	---	0.06
124	10.33	0.50	0.160	0.099	---	0.06
125	10.42	0.50	0.160	0.098	---	0.06
126	10.50	0.50	0.160	0.098	---	0.06
127	10.58	0.67	0.214	0.097	---	0.12
128	10.67	0.67	0.214	0.097	---	0.12
129	10.75	0.67	0.214	0.096	---	0.12
130	10.83	0.67	0.214	0.096	---	0.12
131	10.92	0.67	0.214	0.095	---	0.12
132	11.00	0.67	0.214	0.095	---	0.12
133	11.08	0.63	0.203	0.094	---	0.11
134	11.17	0.63	0.203	0.094	---	0.11
135	11.25	0.63	0.203	0.093	---	0.11
136	11.33	0.63	0.203	0.093	---	0.11
137	11.42	0.63	0.203	0.092	---	0.11
138	11.50	0.63	0.203	0.092	---	0.11
139	11.58	0.57	0.182	0.091	---	0.09
140	11.67	0.57	0.182	0.091	---	0.09
141	11.75	0.57	0.182	0.091	---	0.09
142	11.83	0.60	0.192	0.090	---	0.10
143	11.92	0.60	0.192	0.090	---	0.10
144	12.00	0.60	0.192	0.089	---	0.10
145	12.08	0.83	0.267	0.089	---	0.18
146	12.17	0.83	0.267	0.088	---	0.18
147	12.25	0.83	0.267	0.088	---	0.18
148	12.33	0.87	0.278	0.087	---	0.19
149	12.42	0.87	0.278	0.087	---	0.19
150	12.50	0.87	0.278	0.087	---	0.19
151	12.58	0.93	0.299	0.086	---	0.21
152	12.67	0.93	0.299	0.086	---	0.21
153	12.75	0.93	0.299	0.085	---	0.21
154	12.83	0.97	0.310	0.085	---	0.22
155	12.92	0.97	0.310	0.084	---	0.23
156	13.00	0.97	0.310	0.084	---	0.23
157	13.08	1.13	0.363	0.084	---	0.28
158	13.17	1.13	0.363	0.083	---	0.28
159	13.25	1.13	0.363	0.083	---	0.28
160	13.33	1.13	0.363	0.082	---	0.28
161	13.42	1.13	0.363	0.082	---	0.28
162	13.50	1.13	0.363	0.081	---	0.28
163	13.58	0.77	0.246	0.081	---	0.16
164	13.67	0.77	0.246	0.081	---	0.16
165	13.75	0.77	0.246	0.080	---	0.17
166	13.83	0.77	0.246	0.080	---	0.17
167	13.92	0.77	0.246	0.079	---	0.17
168	14.00	0.77	0.246	0.079	---	0.17
169	14.08	0.90	0.288	0.079	---	0.21
170	14.17	0.90	0.288	0.078	---	0.21
171	14.25	0.90	0.288	0.078	---	0.21
172	14.33	0.87	0.278	0.077	---	0.20
173	14.42	0.87	0.278	0.077	---	0.20
174	14.50	0.87	0.278	0.077	---	0.20
175	14.58	0.87	0.278	0.076	---	0.20
176	14.67	0.87	0.278	0.076	---	0.20
177	14.75	0.87	0.278	0.075	---	0.20
178	14.83	0.83	0.267	0.075	---	0.19
179	14.92	0.83	0.267	0.075	---	0.19
180	15.00	0.83	0.267	0.074	---	0.19
181	15.08	0.80	0.256	0.074	---	0.18
182	15.17	0.80	0.256	0.074	---	0.18

183	15.25	0.80	0.256	0.073	---	0.18
184	15.33	0.77	0.246	0.073	---	0.17
185	15.42	0.77	0.246	0.072	---	0.17
186	15.50	0.77	0.246	0.072	---	0.17
187	15.58	0.63	0.203	0.072	---	0.13
188	15.67	0.63	0.203	0.071	---	0.13
189	15.75	0.63	0.203	0.071	---	0.13
190	15.83	0.63	0.203	0.071	---	0.13
191	15.92	0.63	0.203	0.070	---	0.13
192	16.00	0.63	0.203	0.070	---	0.13
193	16.08	0.13	0.043	0.069	0.008	0.04
194	16.17	0.13	0.043	0.069	0.008	0.04
195	16.25	0.13	0.043	0.069	0.008	0.04
196	16.33	0.13	0.043	0.068	0.008	0.04
197	16.42	0.13	0.043	0.068	0.008	0.04
198	16.50	0.13	0.043	0.068	0.008	0.04
199	16.58	0.10	0.032	0.067	0.006	0.03
200	16.67	0.10	0.032	0.067	0.006	0.03
201	16.75	0.10	0.032	0.067	0.006	0.03
202	16.83	0.10	0.032	0.066	0.006	0.03
203	16.92	0.10	0.032	0.066	0.006	0.03
204	17.00	0.10	0.032	0.066	0.006	0.03
205	17.08	0.17	0.053	0.065	0.010	0.04
206	17.17	0.17	0.053	0.065	0.010	0.04
207	17.25	0.17	0.053	0.065	0.010	0.04
208	17.33	0.17	0.053	0.064	0.010	0.04
209	17.42	0.17	0.053	0.064	0.010	0.04
210	17.50	0.17	0.053	0.064	0.010	0.04
211	17.58	0.17	0.053	0.063	0.010	0.04
212	17.67	0.17	0.053	0.063	0.010	0.04
213	17.75	0.17	0.053	0.063	0.010	0.04
214	17.83	0.13	0.043	0.062	0.008	0.04
215	17.92	0.13	0.043	0.062	0.008	0.04
216	18.00	0.13	0.043	0.062	0.008	0.04
217	18.08	0.13	0.043	0.062	0.008	0.04
218	18.17	0.13	0.043	0.061	0.008	0.04
219	18.25	0.13	0.043	0.061	0.008	0.04
220	18.33	0.13	0.043	0.061	0.008	0.04
221	18.42	0.13	0.043	0.060	0.008	0.04
222	18.50	0.13	0.043	0.060	0.008	0.04
223	18.58	0.10	0.032	0.060	0.006	0.03
224	18.67	0.10	0.032	0.059	0.006	0.03
225	18.75	0.10	0.032	0.059	0.006	0.03
226	18.83	0.07	0.021	0.059	0.004	0.02
227	18.92	0.07	0.021	0.059	0.004	0.02
228	19.00	0.07	0.021	0.058	0.004	0.02
229	19.08	0.10	0.032	0.058	0.006	0.03
230	19.17	0.10	0.032	0.058	0.006	0.03
231	19.25	0.10	0.032	0.058	0.006	0.03
232	19.33	0.13	0.043	0.057	0.008	0.04
233	19.42	0.13	0.043	0.057	0.008	0.04
234	19.50	0.13	0.043	0.057	0.008	0.04
235	19.58	0.10	0.032	0.056	0.006	0.03
236	19.67	0.10	0.032	0.056	0.006	0.03
237	19.75	0.10	0.032	0.056	0.006	0.03
238	19.83	0.07	0.021	0.056	0.004	0.02
239	19.92	0.07	0.021	0.055	0.004	0.02
240	20.00	0.07	0.021	0.055	0.004	0.02
241	20.08	0.10	0.032	0.055	0.006	0.03
242	20.17	0.10	0.032	0.055	0.006	0.03
243	20.25	0.10	0.032	0.055	0.006	0.03
244	20.33	0.10	0.032	0.054	0.006	0.03
245	20.42	0.10	0.032	0.054	0.006	0.03
246	20.50	0.10	0.032	0.054	0.006	0.03
247	20.58	0.10	0.032	0.054	0.006	0.03
248	20.67	0.10	0.032	0.053	0.006	0.03
249	20.75	0.10	0.032	0.053	0.006	0.03
250	20.83	0.07	0.021	0.053	0.004	0.02
251	20.92	0.07	0.021	0.053	0.004	0.02
252	21.00	0.07	0.021	0.052	0.004	0.02
253	21.08	0.10	0.032	0.052	0.006	0.03

254	21.17	0.10	0.032	0.052	0.006	0.03
255	21.25	0.10	0.032	0.052	0.006	0.03
256	21.33	0.07	0.021	0.052	0.004	0.02
257	21.42	0.07	0.021	0.051	0.004	0.02
258	21.50	0.07	0.021	0.051	0.004	0.02
259	21.58	0.10	0.032	0.051	0.006	0.03
260	21.67	0.10	0.032	0.051	0.006	0.03
261	21.75	0.10	0.032	0.051	0.006	0.03
262	21.83	0.07	0.021	0.051	0.004	0.02
263	21.92	0.07	0.021	0.050	0.004	0.02
264	22.00	0.07	0.021	0.050	0.004	0.02
265	22.08	0.10	0.032	0.050	0.006	0.03
266	22.17	0.10	0.032	0.050	0.006	0.03
267	22.25	0.10	0.032	0.050	0.006	0.03
268	22.33	0.07	0.021	0.050	0.004	0.02
269	22.42	0.07	0.021	0.049	0.004	0.02
270	22.50	0.07	0.021	0.049	0.004	0.02
271	22.58	0.07	0.021	0.049	0.004	0.02
272	22.67	0.07	0.021	0.049	0.004	0.02
273	22.75	0.07	0.021	0.049	0.004	0.02
274	22.83	0.07	0.021	0.049	0.004	0.02
275	22.92	0.07	0.021	0.049	0.004	0.02
276	23.00	0.07	0.021	0.048	0.004	0.02
277	23.08	0.07	0.021	0.048	0.004	0.02
278	23.17	0.07	0.021	0.048	0.004	0.02
279	23.25	0.07	0.021	0.048	0.004	0.02
280	23.33	0.07	0.021	0.048	0.004	0.02
281	23.42	0.07	0.021	0.048	0.004	0.02
282	23.50	0.07	0.021	0.048	0.004	0.02
283	23.58	0.07	0.021	0.048	0.004	0.02
284	23.67	0.07	0.021	0.048	0.004	0.02
285	23.75	0.07	0.021	0.048	0.004	0.02
286	23.83	0.07	0.021	0.048	0.004	0.02
287	23.92	0.07	0.021	0.048	0.004	0.02
288	24.00	0.07	0.021	0.048	0.004	0.02
Sum =		100.0			Sum =	20.9

Flood volume = Effective rainfall 1.74(In)
times area 29.5(Ac.)/[(In)/(Ft.)] = 4.3(Ac.Ft)
Total soil loss = 0.93(In)
Total soil loss = 2.290(Ac.Ft)
Total rainfall = 2.67(In)
Flood volume = 186427.1 Cubic Feet
Total soil loss = 99764.1 Cubic Feet

Peak flow rate of this hydrograph = 8.376(CFS)

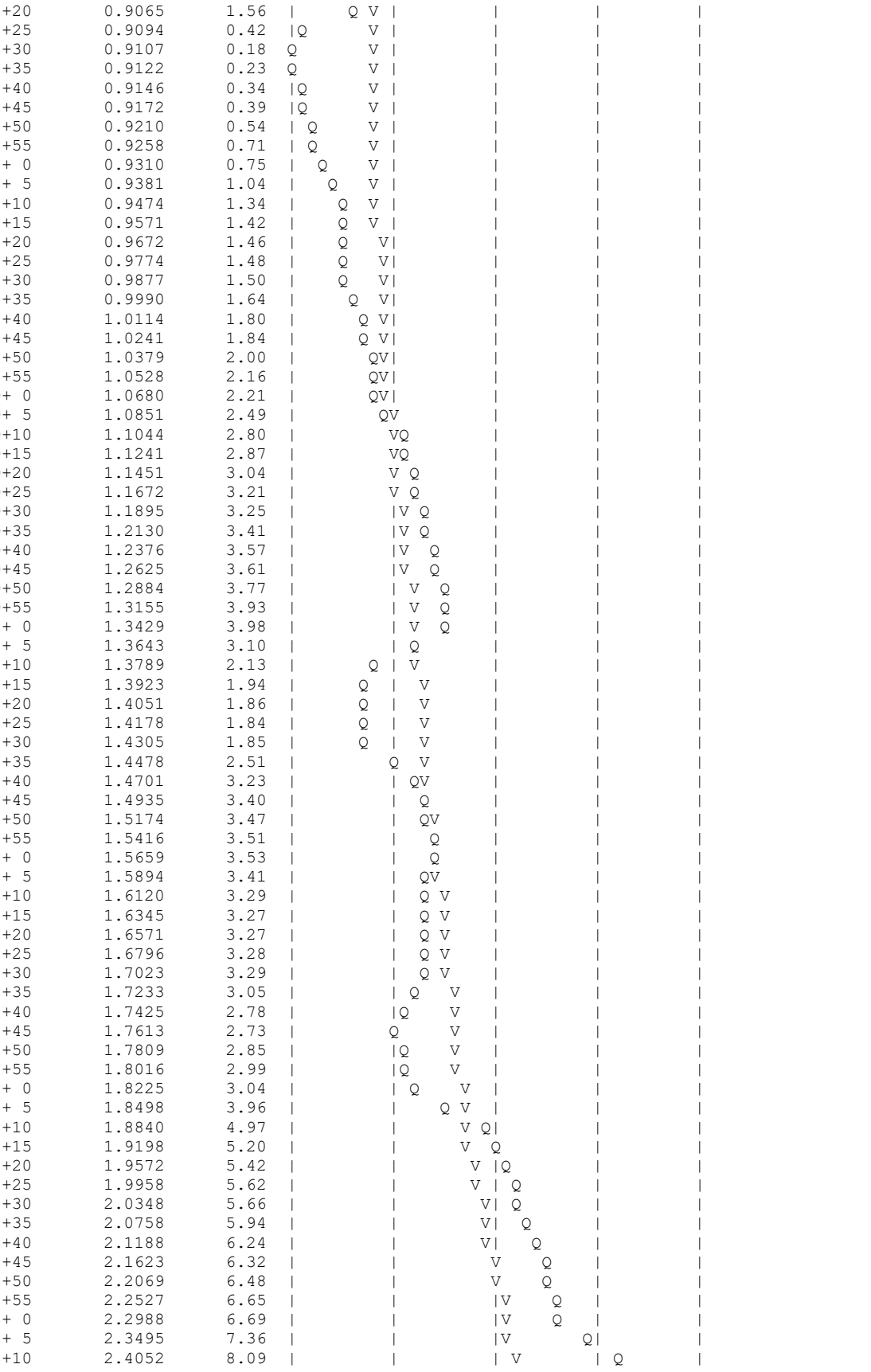
++

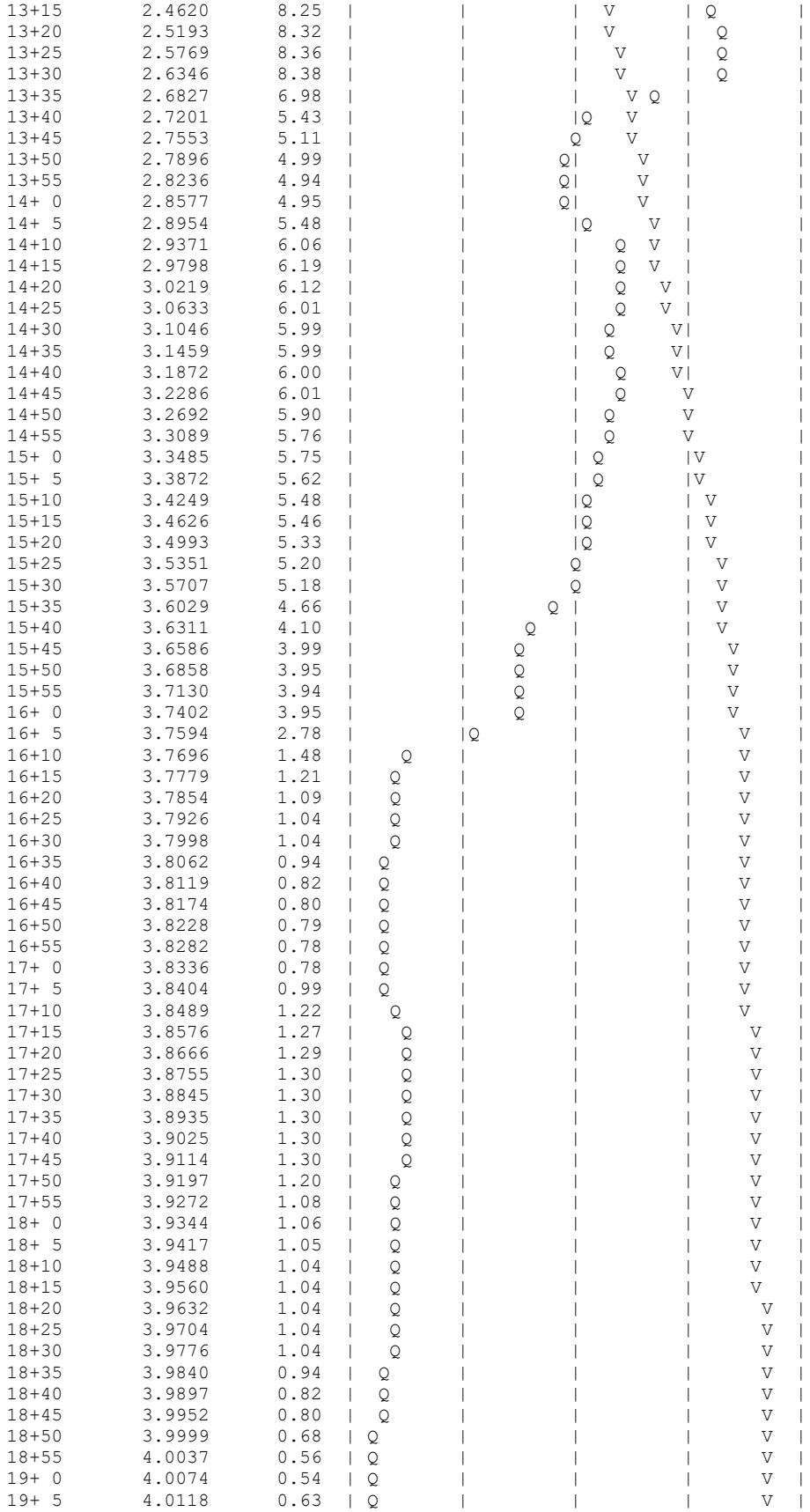
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0014	0.21	Q	|	|	|	|
0+10	0.0045	0.44	VQ	|	|	|	|
0+15	0.0079	0.49	VQ	|	|	|	|
0+20	0.0121	0.62	V Q	|	|	|	|
0+25	0.0173	0.74	V Q	|	|	|	|
0+30	0.0225	0.77	V Q	|	|	|	|
0+35	0.0279	0.78	V Q	|	|	|	|
0+40	0.0333	0.78	V Q	|	|	|	|
0+45	0.0387	0.78	V Q	|	|	|	|
0+50	0.0448	0.89	V Q	|	|	|	|
0+55	0.0517	1.00	V Q	|	|	|	|
1+ 0	0.0588	1.03	V Q	|	|	|	|
1+ 5	0.0652	0.93	V Q	|	|	|	|
1+10	0.0709	0.82	V Q	|	|	|	|
1+15	0.0764	0.80	V Q	|	|	|	|
1+20	0.0818	0.79	V Q	|	|	|	|

1+25	0.0872	0.78	V Q			
1+30	0.0926	0.78	V Q			
1+35	0.0979	0.78	V Q			
1+40	0.1033	0.78	V Q			
1+45	0.1087	0.78	V Q			
1+50	0.1148	0.89	V Q			
1+55	0.1217	1.00	V Q			
2+ 0	0.1288	1.03	V Q			
2+ 5	0.1360	1.04	V Q			
2+10	0.1432	1.04	V Q			
2+15	0.1503	1.04	V Q			
2+20	0.1575	1.04	V Q			
2+25	0.1647	1.04	V Q			
2+30	0.1719	1.04	V Q			
2+35	0.1798	1.15	V Q			
2+40	0.1885	1.26	V Q			
2+45	0.1974	1.29	V Q			
2+50	0.2063	1.30	V Q			
2+55	0.2153	1.30	V Q			
3+ 0	0.2243	1.30	V Q			
3+ 5	0.2333	1.30	V Q			
3+10	0.2422	1.30	V Q			
3+15	0.2512	1.30	V Q			
3+20	0.2602	1.30	V Q			
3+25	0.2692	1.30	V Q			
3+30	0.2782	1.30	V Q			
3+35	0.2871	1.30	V Q			
3+40	0.2961	1.30	V Q			
3+45	0.3051	1.30	V Q			
3+50	0.3148	1.41	V Q			
3+55	0.3253	1.53	V Q			
4+ 0	0.3360	1.55	V Q			
4+ 5	0.3467	1.56	V Q			
4+10	0.3575	1.56	V Q			
4+15	0.3683	1.56	V Q			
4+20	0.3798	1.67	V Q			
4+25	0.3921	1.79	V Q			
4+30	0.4045	1.81	V Q			
4+35	0.4171	1.82	V Q			
4+40	0.4297	1.83	V Q			
4+45	0.4422	1.83	V Q			
4+50	0.4555	1.93	V Q			
4+55	0.4696	2.05	V Q			
5+ 0	0.4839	2.07	V Q			
5+ 5	0.4968	1.87	V Q			
5+10	0.5081	1.64	V Q			
5+15	0.5191	1.59	V Q			
5+20	0.5306	1.68	V Q			
5+25	0.5429	1.79	V Q			
5+30	0.5554	1.81	V Q			
5+35	0.5687	1.93	V Q			
5+40	0.5828	2.05	V Q			
5+45	0.5970	2.07	V Q			
5+50	0.6114	2.08	V Q			
5+55	0.6257	2.09	V Q			
6+ 0	0.6401	2.09	V Q			
6+ 5	0.6552	2.19	V Q			
6+10	0.6711	2.31	V Q			
6+15	0.6871	2.33	V Q			
6+20	0.7033	2.34	V Q			
6+25	0.7194	2.35	V Q			
6+30	0.7356	2.35	V Q			
6+35	0.7525	2.45	V Q			
6+40	0.7702	2.57	V Q			
6+45	0.7880	2.59	V Q			
6+50	0.8059	2.60	V Q			
6+55	0.8239	2.61	V Q			
7+ 0	0.8419	2.61	V Q			
7+ 5	0.8598	2.61	V Q			
7+10	0.8778	2.61	V Q			
7+15	0.8957	2.61	V Q			

7+20	0.9065	1.56	
7+25	0.9094	0.42	
7+30	0.9107	0.18	
7+35	0.9122	0.23	
7+40	0.9146	0.34	
7+45	0.9172	0.39	
7+50	0.9210	0.54	
7+55	0.9258	0.71	
8+ 0	0.9310	0.75	
8+ 5	0.9381	1.04	
8+10	0.9474	1.34	
8+15	0.9571	1.42	
8+20	0.9672	1.46	
8+25	0.9774	1.48	
8+30	0.9877	1.50	
8+35	0.9990	1.64	
8+40	1.0114	1.80	
8+45	1.0241	1.84	
8+50	1.0379	2.00	
8+55	1.0528	2.16	
9+ 0	1.0680	2.21	
9+ 5	1.0851	2.49	
9+10	1.1044	2.80	
9+15	1.1241	2.87	
9+20	1.1451	3.04	
9+25	1.1672	3.21	
9+30	1.1895	3.25	
9+35	1.2130	3.41	
9+40	1.2376	3.57	
9+45	1.2625	3.61	
9+50	1.2884	3.77	
9+55	1.3155	3.93	
10+ 0	1.3429	3.98	
10+ 5	1.3643	3.10	
10+10	1.3789	2.13	
10+15	1.3923	1.94	
10+20	1.4051	1.86	
10+25	1.4178	1.84	
10+30	1.4305	1.85	
10+35	1.4478	2.51	
10+40	1.4701	3.23	
10+45	1.4935	3.40	
10+50	1.5174	3.47	
10+55	1.5416	3.51	
11+ 0	1.5659	3.53	
11+ 5	1.5894	3.41	
11+10	1.6120	3.29	
11+15	1.6345	3.27	
11+20	1.6571	3.27	
11+25	1.6796	3.28	
11+30	1.7023	3.29	
11+35	1.7233	3.05	
11+40	1.7425	2.78	
11+45	1.7613	2.73	
11+50	1.7809	2.85	
11+55	1.8016	2.99	
12+ 0	1.8225	3.04	
12+ 5	1.8498	3.96	
12+10	1.8840	4.97	
12+15	1.9198	5.20	
12+20	1.9572	5.42	
12+25	1.9958	5.62	
12+30	2.0348	5.66	
12+35	2.0758	5.94	
12+40	2.1188	6.24	
12+45	2.1623	6.32	
12+50	2.2069	6.48	
12+55	2.2527	6.65	
13+ 0	2.2988	6.69	
13+ 5	2.3495	7.36	
13+10	2.4052	8.09	



19+10	4.0169	0.74	Q				V
19+15	4.0222	0.77	Q				V
19+20	4.0283	0.88	Q				V
19+25	4.0352	1.00	Q				V
19+30	4.0423	1.03	Q				V
19+35	4.0487	0.93	Q				V
19+40	4.0543	0.82	Q				V
19+45	4.0598	0.80	Q				V
19+50	4.0645	0.68	Q				V
19+55	4.0684	0.56	Q				V
20+ 0	4.0721	0.54	Q				V
20+ 5	4.0764	0.63	Q				V
20+10	4.0815	0.74	Q				V
20+15	4.0868	0.77	Q				V
20+20	4.0922	0.78	Q				V
20+25	4.0976	0.78	Q				V
20+30	4.1030	0.78	Q				V
20+35	4.1083	0.78	Q				V
20+40	4.1137	0.78	Q				V
20+45	4.1191	0.78	Q				V
20+50	4.1238	0.68	Q				V
20+55	4.1276	0.56	Q				V
21+ 0	4.1313	0.54	Q				V
21+ 5	4.1357	0.63	Q				V
21+10	4.1408	0.74	Q				V
21+15	4.1461	0.77	Q				V
21+20	4.1507	0.67	Q				V
21+25	4.1546	0.56	Q				V
21+30	4.1583	0.54	Q				V
21+35	4.1626	0.63	Q				V
21+40	4.1677	0.74	Q				V
21+45	4.1730	0.77	Q				V
21+50	4.1777	0.67	Q				V
21+55	4.1815	0.56	Q				V
22+ 0	4.1852	0.54	Q				V
22+ 5	4.1896	0.63	Q				V
22+10	4.1947	0.74	Q				V
22+15	4.2000	0.77	Q				V
22+20	4.2046	0.67	Q				V
22+25	4.2085	0.56	Q				V
22+30	4.2121	0.54	Q				V
22+35	4.2158	0.53	Q				V
22+40	4.2194	0.52	Q				V
22+45	4.2230	0.52	Q				V
22+50	4.2265	0.52	Q				V
22+55	4.2301	0.52	Q				V
23+ 0	4.2337	0.52	Q				V
23+ 5	4.2373	0.52	Q				V
23+10	4.2409	0.52	Q				V
23+15	4.2445	0.52	Q				V
23+20	4.2481	0.52	Q				V
23+25	4.2517	0.52	Q				V
23+30	4.2553	0.52	Q				V
23+35	4.2589	0.52	Q				V
23+40	4.2625	0.52	Q				V
23+45	4.2661	0.52	Q				V
23+50	4.2696	0.52	Q				V
23+55	4.2732	0.52	Q				V
24+ 0	4.2768	0.52	Q				V
24+ 5	4.2790	0.31	Q				V
24+10	4.2795	0.08	Q				V
24+15	4.2797	0.03	Q				V
24+20	4.2798	0.01	Q				V

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

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
Study date 06/27/24 File: 2838Q2PUHB2242.out

++

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

Program License Serial Number 6145

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

English Units used in output format

ORCHARD LOGISTICS CENTER
2 YEAR 1 HOUR BASIN 2 UNIT HYDROGRAPH
2838Q2PUHB2
AC

Drainage Area = 1.32(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.32(Ac.) = 0.002 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.092 Hr.
Lag time = 5.52 Min.
25% of lag time = 1.38 Min.
40% of lag time = 2.21 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]
1.32	2.67	3.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
1.32	6.47	8.54

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.670(In)
Area Averaged 100-Year Rainfall = 6.470(In)

Point rain (area averaged) = 2.670(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.670(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
1.320	75.00	0.900

Total Area Entered = 1.32(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
75.0	57.0	0.501	0.900	0.095	1.000	0.095
					Sum (F) =	0.095

Area averaged mean soil loss (F) (In/Hr) = 0.095
Minimum soil loss rate ((In/Hr)) = 0.048
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	90.580	16.349	0.217
2	0.167	181.159	47.197	0.628
3	0.250	271.739	17.300	0.230
4	0.333	362.319	7.608	0.101
5	0.417	452.899	4.395	0.058
6	0.500	543.478	2.813	0.037
7	0.583	634.058	1.909	0.025
8	0.667	724.638	1.217	0.016
9	0.750	815.217	1.212	0.016
		Sum = 100.000	Sum=	1.330

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.021	0.169	0.004	0.02
2	0.17	0.07	0.021	0.168	0.004	0.02
3	0.25	0.07	0.021	0.167	0.004	0.02
4	0.33	0.10	0.032	0.167	0.006	0.03
5	0.42	0.10	0.032	0.166	0.006	0.03
6	0.50	0.10	0.032	0.165	0.006	0.03
7	0.58	0.10	0.032	0.165	0.006	0.03
8	0.67	0.10	0.032	0.164	0.006	0.03
9	0.75	0.10	0.032	0.163	0.006	0.03
10	0.83	0.13	0.043	0.163	0.008	0.04
11	0.92	0.13	0.043	0.162	0.008	0.04
12	1.00	0.13	0.043	0.162	0.008	0.04
13	1.08	0.10	0.032	0.161	0.006	0.03
14	1.17	0.10	0.032	0.160	0.006	0.03
15	1.25	0.10	0.032	0.160	0.006	0.03
16	1.33	0.10	0.032	0.159	0.006	0.03
17	1.42	0.10	0.032	0.158	0.006	0.03
18	1.50	0.10	0.032	0.158	0.006	0.03
19	1.58	0.10	0.032	0.157	0.006	0.03
20	1.67	0.10	0.032	0.156	0.006	0.03
21	1.75	0.10	0.032	0.156	0.006	0.03
22	1.83	0.13	0.043	0.155	0.008	0.04
23	1.92	0.13	0.043	0.155	0.008	0.04
24	2.00	0.13	0.043	0.154	0.008	0.04
25	2.08	0.13	0.043	0.153	0.008	0.04
26	2.17	0.13	0.043	0.153	0.008	0.04
27	2.25	0.13	0.043	0.152	0.008	0.04
28	2.33	0.13	0.043	0.151	0.008	0.04
29	2.42	0.13	0.043	0.151	0.008	0.04
30	2.50	0.13	0.043	0.150	0.008	0.04
31	2.58	0.17	0.053	0.150	0.010	0.04
32	2.67	0.17	0.053	0.149	0.010	0.04
33	2.75	0.17	0.053	0.148	0.010	0.04
34	2.83	0.17	0.053	0.148	0.010	0.04
35	2.92	0.17	0.053	0.147	0.010	0.04
36	3.00	0.17	0.053	0.147	0.010	0.04
37	3.08	0.17	0.053	0.146	0.010	0.04
38	3.17	0.17	0.053	0.145	0.010	0.04
39	3.25	0.17	0.053	0.145	0.010	0.04
40	3.33	0.17	0.053	0.144	0.010	0.04
41	3.42	0.17	0.053	0.144	0.010	0.04
42	3.50	0.17	0.053	0.143	0.010	0.04

43	3.58	0.17	0.053	0.142	0.010	0.04
44	3.67	0.17	0.053	0.142	0.010	0.04
45	3.75	0.17	0.053	0.141	0.010	0.04
46	3.83	0.20	0.064	0.141	0.012	0.05
47	3.92	0.20	0.064	0.140	0.012	0.05
48	4.00	0.20	0.064	0.139	0.012	0.05
49	4.08	0.20	0.064	0.139	0.012	0.05
50	4.17	0.20	0.064	0.138	0.012	0.05
51	4.25	0.20	0.064	0.138	0.012	0.05
52	4.33	0.23	0.075	0.137	0.013	0.06
53	4.42	0.23	0.075	0.136	0.013	0.06
54	4.50	0.23	0.075	0.136	0.013	0.06
55	4.58	0.23	0.075	0.135	0.013	0.06
56	4.67	0.23	0.075	0.135	0.013	0.06
57	4.75	0.23	0.075	0.134	0.013	0.06
58	4.83	0.27	0.085	0.134	0.015	0.07
59	4.92	0.27	0.085	0.133	0.015	0.07
60	5.00	0.27	0.085	0.132	0.015	0.07
61	5.08	0.20	0.064	0.132	0.012	0.05
62	5.17	0.20	0.064	0.131	0.012	0.05
63	5.25	0.20	0.064	0.131	0.012	0.05
64	5.33	0.23	0.075	0.130	0.013	0.06
65	5.42	0.23	0.075	0.129	0.013	0.06
66	5.50	0.23	0.075	0.129	0.013	0.06
67	5.58	0.27	0.085	0.128	0.015	0.07
68	5.67	0.27	0.085	0.128	0.015	0.07
69	5.75	0.27	0.085	0.127	0.015	0.07
70	5.83	0.27	0.085	0.127	0.015	0.07
71	5.92	0.27	0.085	0.126	0.015	0.07
72	6.00	0.27	0.085	0.126	0.015	0.07
73	6.08	0.30	0.096	0.125	0.017	0.08
74	6.17	0.30	0.096	0.124	0.017	0.08
75	6.25	0.30	0.096	0.124	0.017	0.08
76	6.33	0.30	0.096	0.123	0.017	0.08
77	6.42	0.30	0.096	0.123	0.017	0.08
78	6.50	0.30	0.096	0.122	0.017	0.08
79	6.58	0.33	0.107	0.122	0.019	0.09
80	6.67	0.33	0.107	0.121	0.019	0.09
81	6.75	0.33	0.107	0.121	0.019	0.09
82	6.83	0.33	0.107	0.120	0.019	0.09
83	6.92	0.33	0.107	0.119	0.019	0.09
84	7.00	0.33	0.107	0.119	0.019	0.09
85	7.08	0.33	0.107	0.118	0.019	0.09
86	7.17	0.33	0.107	0.118	0.019	0.09
87	7.25	0.33	0.107	0.117	0.019	0.09
88	7.33	0.37	0.117	0.117	---	0.00
89	7.42	0.37	0.117	0.116	---	0.00
90	7.50	0.37	0.117	0.116	---	0.00
91	7.58	0.40	0.128	0.115	---	0.01
92	7.67	0.40	0.128	0.115	---	0.01
93	7.75	0.40	0.128	0.114	---	0.01
94	7.83	0.43	0.139	0.114	---	0.03
95	7.92	0.43	0.139	0.113	---	0.03
96	8.00	0.43	0.139	0.113	---	0.03
97	8.08	0.50	0.160	0.112	---	0.05
98	8.17	0.50	0.160	0.112	---	0.05
99	8.25	0.50	0.160	0.111	---	0.05
100	8.33	0.50	0.160	0.110	---	0.05
101	8.42	0.50	0.160	0.110	---	0.05
102	8.50	0.50	0.160	0.109	---	0.05
103	8.58	0.53	0.171	0.109	---	0.06
104	8.67	0.53	0.171	0.108	---	0.06
105	8.75	0.53	0.171	0.108	---	0.06
106	8.83	0.57	0.182	0.107	---	0.07
107	8.92	0.57	0.182	0.107	---	0.07
108	9.00	0.57	0.182	0.106	---	0.08
109	9.08	0.63	0.203	0.106	---	0.10
110	9.17	0.63	0.203	0.105	---	0.10
111	9.25	0.63	0.203	0.105	---	0.10
112	9.33	0.67	0.214	0.104	---	0.11
113	9.42	0.67	0.214	0.104	---	0.11

114	9.50	0.67	0.214	0.103	---	0.11
115	9.58	0.70	0.224	0.103	---	0.12
116	9.67	0.70	0.224	0.102	---	0.12
117	9.75	0.70	0.224	0.102	---	0.12
118	9.83	0.73	0.235	0.101	---	0.13
119	9.92	0.73	0.235	0.101	---	0.13
120	10.00	0.73	0.235	0.100	---	0.13
121	10.08	0.50	0.160	0.100	---	0.06
122	10.17	0.50	0.160	0.099	---	0.06
123	10.25	0.50	0.160	0.099	---	0.06
124	10.33	0.50	0.160	0.099	---	0.06
125	10.42	0.50	0.160	0.098	---	0.06
126	10.50	0.50	0.160	0.098	---	0.06
127	10.58	0.67	0.214	0.097	---	0.12
128	10.67	0.67	0.214	0.097	---	0.12
129	10.75	0.67	0.214	0.096	---	0.12
130	10.83	0.67	0.214	0.096	---	0.12
131	10.92	0.67	0.214	0.095	---	0.12
132	11.00	0.67	0.214	0.095	---	0.12
133	11.08	0.63	0.203	0.094	---	0.11
134	11.17	0.63	0.203	0.094	---	0.11
135	11.25	0.63	0.203	0.093	---	0.11
136	11.33	0.63	0.203	0.093	---	0.11
137	11.42	0.63	0.203	0.092	---	0.11
138	11.50	0.63	0.203	0.092	---	0.11
139	11.58	0.57	0.182	0.091	---	0.09
140	11.67	0.57	0.182	0.091	---	0.09
141	11.75	0.57	0.182	0.091	---	0.09
142	11.83	0.60	0.192	0.090	---	0.10
143	11.92	0.60	0.192	0.090	---	0.10
144	12.00	0.60	0.192	0.089	---	0.10
145	12.08	0.83	0.267	0.089	---	0.18
146	12.17	0.83	0.267	0.088	---	0.18
147	12.25	0.83	0.267	0.088	---	0.18
148	12.33	0.87	0.278	0.087	---	0.19
149	12.42	0.87	0.278	0.087	---	0.19
150	12.50	0.87	0.278	0.087	---	0.19
151	12.58	0.93	0.299	0.086	---	0.21
152	12.67	0.93	0.299	0.086	---	0.21
153	12.75	0.93	0.299	0.085	---	0.21
154	12.83	0.97	0.310	0.085	---	0.22
155	12.92	0.97	0.310	0.084	---	0.23
156	13.00	0.97	0.310	0.084	---	0.23
157	13.08	1.13	0.363	0.084	---	0.28
158	13.17	1.13	0.363	0.083	---	0.28
159	13.25	1.13	0.363	0.083	---	0.28
160	13.33	1.13	0.363	0.082	---	0.28
161	13.42	1.13	0.363	0.082	---	0.28
162	13.50	1.13	0.363	0.081	---	0.28
163	13.58	0.77	0.246	0.081	---	0.16
164	13.67	0.77	0.246	0.081	---	0.16
165	13.75	0.77	0.246	0.080	---	0.17
166	13.83	0.77	0.246	0.080	---	0.17
167	13.92	0.77	0.246	0.079	---	0.17
168	14.00	0.77	0.246	0.079	---	0.17
169	14.08	0.90	0.288	0.079	---	0.21
170	14.17	0.90	0.288	0.078	---	0.21
171	14.25	0.90	0.288	0.078	---	0.21
172	14.33	0.87	0.278	0.077	---	0.20
173	14.42	0.87	0.278	0.077	---	0.20
174	14.50	0.87	0.278	0.077	---	0.20
175	14.58	0.87	0.278	0.076	---	0.20
176	14.67	0.87	0.278	0.076	---	0.20
177	14.75	0.87	0.278	0.075	---	0.20
178	14.83	0.83	0.267	0.075	---	0.19
179	14.92	0.83	0.267	0.075	---	0.19
180	15.00	0.83	0.267	0.074	---	0.19
181	15.08	0.80	0.256	0.074	---	0.18
182	15.17	0.80	0.256	0.074	---	0.18
183	15.25	0.80	0.256	0.073	---	0.18
184	15.33	0.77	0.246	0.073	---	0.17

185	15.42	0.77	0.246	0.072	---	0.17
186	15.50	0.77	0.246	0.072	---	0.17
187	15.58	0.63	0.203	0.072	---	0.13
188	15.67	0.63	0.203	0.071	---	0.13
189	15.75	0.63	0.203	0.071	---	0.13
190	15.83	0.63	0.203	0.071	---	0.13
191	15.92	0.63	0.203	0.070	---	0.13
192	16.00	0.63	0.203	0.070	---	0.13
193	16.08	0.13	0.043	0.069	0.008	0.04
194	16.17	0.13	0.043	0.069	0.008	0.04
195	16.25	0.13	0.043	0.069	0.008	0.04
196	16.33	0.13	0.043	0.068	0.008	0.04
197	16.42	0.13	0.043	0.068	0.008	0.04
198	16.50	0.13	0.043	0.068	0.008	0.04
199	16.58	0.10	0.032	0.067	0.006	0.03
200	16.67	0.10	0.032	0.067	0.006	0.03
201	16.75	0.10	0.032	0.067	0.006	0.03
202	16.83	0.10	0.032	0.066	0.006	0.03
203	16.92	0.10	0.032	0.066	0.006	0.03
204	17.00	0.10	0.032	0.066	0.006	0.03
205	17.08	0.17	0.053	0.065	0.010	0.04
206	17.17	0.17	0.053	0.065	0.010	0.04
207	17.25	0.17	0.053	0.065	0.010	0.04
208	17.33	0.17	0.053	0.064	0.010	0.04
209	17.42	0.17	0.053	0.064	0.010	0.04
210	17.50	0.17	0.053	0.064	0.010	0.04
211	17.58	0.17	0.053	0.063	0.010	0.04
212	17.67	0.17	0.053	0.063	0.010	0.04
213	17.75	0.17	0.053	0.063	0.010	0.04
214	17.83	0.13	0.043	0.062	0.008	0.04
215	17.92	0.13	0.043	0.062	0.008	0.04
216	18.00	0.13	0.043	0.062	0.008	0.04
217	18.08	0.13	0.043	0.062	0.008	0.04
218	18.17	0.13	0.043	0.061	0.008	0.04
219	18.25	0.13	0.043	0.061	0.008	0.04
220	18.33	0.13	0.043	0.061	0.008	0.04
221	18.42	0.13	0.043	0.060	0.008	0.04
222	18.50	0.13	0.043	0.060	0.008	0.04
223	18.58	0.10	0.032	0.060	0.006	0.03
224	18.67	0.10	0.032	0.059	0.006	0.03
225	18.75	0.10	0.032	0.059	0.006	0.03
226	18.83	0.07	0.021	0.059	0.004	0.02
227	18.92	0.07	0.021	0.059	0.004	0.02
228	19.00	0.07	0.021	0.058	0.004	0.02
229	19.08	0.10	0.032	0.058	0.006	0.03
230	19.17	0.10	0.032	0.058	0.006	0.03
231	19.25	0.10	0.032	0.058	0.006	0.03
232	19.33	0.13	0.043	0.057	0.008	0.04
233	19.42	0.13	0.043	0.057	0.008	0.04
234	19.50	0.13	0.043	0.057	0.008	0.04
235	19.58	0.10	0.032	0.056	0.006	0.03
236	19.67	0.10	0.032	0.056	0.006	0.03
237	19.75	0.10	0.032	0.056	0.006	0.03
238	19.83	0.07	0.021	0.056	0.004	0.02
239	19.92	0.07	0.021	0.055	0.004	0.02
240	20.00	0.07	0.021	0.055	0.004	0.02
241	20.08	0.10	0.032	0.055	0.006	0.03
242	20.17	0.10	0.032	0.055	0.006	0.03
243	20.25	0.10	0.032	0.055	0.006	0.03
244	20.33	0.10	0.032	0.054	0.006	0.03
245	20.42	0.10	0.032	0.054	0.006	0.03
246	20.50	0.10	0.032	0.054	0.006	0.03
247	20.58	0.10	0.032	0.054	0.006	0.03
248	20.67	0.10	0.032	0.053	0.006	0.03
249	20.75	0.10	0.032	0.053	0.006	0.03
250	20.83	0.07	0.021	0.053	0.004	0.02
251	20.92	0.07	0.021	0.053	0.004	0.02
252	21.00	0.07	0.021	0.052	0.004	0.02
253	21.08	0.10	0.032	0.052	0.006	0.03
254	21.17	0.10	0.032	0.052	0.006	0.03
255	21.25	0.10	0.032	0.052	0.006	0.03

256	21.33	0.07	0.021	0.052	0.004	0.02
257	21.42	0.07	0.021	0.051	0.004	0.02
258	21.50	0.07	0.021	0.051	0.004	0.02
259	21.58	0.10	0.032	0.051	0.006	0.03
260	21.67	0.10	0.032	0.051	0.006	0.03
261	21.75	0.10	0.032	0.051	0.006	0.03
262	21.83	0.07	0.021	0.051	0.004	0.02
263	21.92	0.07	0.021	0.050	0.004	0.02
264	22.00	0.07	0.021	0.050	0.004	0.02
265	22.08	0.10	0.032	0.050	0.006	0.03
266	22.17	0.10	0.032	0.050	0.006	0.03
267	22.25	0.10	0.032	0.050	0.006	0.03
268	22.33	0.07	0.021	0.050	0.004	0.02
269	22.42	0.07	0.021	0.049	0.004	0.02
270	22.50	0.07	0.021	0.049	0.004	0.02
271	22.58	0.07	0.021	0.049	0.004	0.02
272	22.67	0.07	0.021	0.049	0.004	0.02
273	22.75	0.07	0.021	0.049	0.004	0.02
274	22.83	0.07	0.021	0.049	0.004	0.02
275	22.92	0.07	0.021	0.049	0.004	0.02
276	23.00	0.07	0.021	0.048	0.004	0.02
277	23.08	0.07	0.021	0.048	0.004	0.02
278	23.17	0.07	0.021	0.048	0.004	0.02
279	23.25	0.07	0.021	0.048	0.004	0.02
280	23.33	0.07	0.021	0.048	0.004	0.02
281	23.42	0.07	0.021	0.048	0.004	0.02
282	23.50	0.07	0.021	0.048	0.004	0.02
283	23.58	0.07	0.021	0.048	0.004	0.02
284	23.67	0.07	0.021	0.048	0.004	0.02
285	23.75	0.07	0.021	0.048	0.004	0.02
286	23.83	0.07	0.021	0.048	0.004	0.02
287	23.92	0.07	0.021	0.048	0.004	0.02
288	24.00	0.07	0.021	0.048	0.004	0.02
Sum =		100.0			Sum =	20.9

Flood volume = Effective rainfall 1.74(In)
times area 1.3(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.93(In)
Total soil loss = 0.102(Ac.Ft)
Total rainfall = 2.67(In)
Flood volume = 8334.0 Cubic Feet
Total soil loss = 4459.5 Cubic Feet

Peak flow rate of this hydrograph = 0.371(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	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0003	0.02	Q	|	|	|	|
0+20	0.0004	0.02	Q	|	|	|	|
0+25	0.0006	0.03	Q	|	|	|	|
0+30	0.0008	0.03	Q	|	|	|	|
0+35	0.0011	0.03	Q	|	|	|	|
0+40	0.0013	0.03	Q	|	|	|	|
0+45	0.0015	0.03	Q	|	|	|	|
0+50	0.0018	0.04	Q	|	|	|	|
0+55	0.0021	0.04	Q	|	|	|	|
1+ 0	0.0024	0.04	Q	|	|	|	|
1+ 5	0.0027	0.04	Q	|	|	|	|
1+10	0.0029	0.04	Q	|	|	|	|
1+15	0.0032	0.04	Q	|	|	|	|
1+20	0.0034	0.04	Q	|	|	|	|
1+25	0.0037	0.04	Q	|	|	|	|
1+30	0.0039	0.04	Q	|	|	|	|

1+35	0.0042	0.04	Q	|	|	|	|
1+40	0.0044	0.04	Q	|	|	|	|
1+45	0.0047	0.03	Q	|	|	|	|
1+50	0.0049	0.04	QV	|	|	|	|
1+55	0.0052	0.04	QV	|	|	|	|
2+ 0	0.0055	0.04	QV	|	|	|	|
2+ 5	0.0058	0.05	QV	|	|	|	|
2+10	0.0061	0.05	QV	|	|	|	|
2+15	0.0065	0.05	QV	|	|	|	|
2+20	0.0068	0.05	QV	|	|	|	|
2+25	0.0071	0.05	QV	|	|	|	|
2+30	0.0074	0.05	QV	|	|	|	|
2+35	0.0077	0.05	QV	|	|	|	|
2+40	0.0081	0.05	QV	|	|	|	|
2+45	0.0085	0.06	QV	|	|	|	|
2+50	0.0089	0.06	QV	|	|	|	|
2+55	0.0093	0.06	QV	|	|	|	|
3+ 0	0.0097	0.06	Q V	|	|	|	|
3+ 5	0.0101	0.06	Q V	|	|	|	|
3+10	0.0105	0.06	Q V	|	|	|	|
3+15	0.0109	0.06	Q V	|	|	|	|
3+20	0.0113	0.06	Q V	|	|	|	|
3+25	0.0117	0.06	Q V	|	|	|	|
3+30	0.0121	0.06	Q V	|	|	|	|
3+35	0.0125	0.06	Q V	|	|	|	|
3+40	0.0129	0.06	Q V	|	|	|	|
3+45	0.0133	0.06	Q V	|	|	|	|
3+50	0.0137	0.06	Q V	|	|	|	|
3+55	0.0142	0.07	Q V	|	|	|	|
4+ 0	0.0146	0.07	Q V	|	|	|	|
4+ 5	0.0151	0.07	Q V	|	|	|	|
4+10	0.0156	0.07	Q V	|	|	|	|
4+15	0.0161	0.07	Q V	|	|	|	|
4+20	0.0166	0.07	Q V	|	|	|	|
4+25	0.0171	0.08	Q V	|	|	|	|
4+30	0.0176	0.08	Q V	|	|	|	|
4+35	0.0182	0.08	Q V	|	|	|	|
4+40	0.0187	0.08	Q V	|	|	|	|
4+45	0.0193	0.08	Q V	|	|	|	|
4+50	0.0199	0.08	Q V	|	|	|	|
4+55	0.0205	0.09	Q V	|	|	|	|
5+ 0	0.0211	0.09	Q V	|	|	|	|
5+ 5	0.0217	0.09	Q V	|	|	|	|
5+10	0.0223	0.08	Q V	|	|	|	|
5+15	0.0228	0.07	Q V	|	|	|	|
5+20	0.0233	0.07	Q V	|	|	|	|
5+25	0.0238	0.08	Q V	|	|	|	|
5+30	0.0244	0.08	Q V	|	|	|	|
5+35	0.0249	0.08	Q V	|	|	|	|
5+40	0.0255	0.09	Q V	|	|	|	|
5+45	0.0262	0.09	Q V	|	|	|	|
5+50	0.0268	0.09	Q V	|	|	|	|
5+55	0.0274	0.09	Q V	|	|	|	|
6+ 0	0.0281	0.09	Q V	|	|	|	|
6+ 5	0.0287	0.09	Q V	|	|	|	|
6+10	0.0294	0.10	Q V	|	|	|	|
6+15	0.0301	0.10	Q V	|	|	|	|
6+20	0.0308	0.10	Q V	|	|	|	|
6+25	0.0316	0.10	Q V	|	|	|	|
6+30	0.0323	0.10	Q V	|	|	|	|
6+35	0.0330	0.11	Q V	|	|	|	|
6+40	0.0338	0.11	Q V	|	|	|	|
6+45	0.0346	0.11	Q V	|	|	|	|
6+50	0.0354	0.12	Q V	|	|	|	|
6+55	0.0362	0.12	Q V	|	|	|	|
7+ 0	0.0370	0.12	Q V	|	|	|	|
7+ 5	0.0378	0.12	Q V	|	|	|	|
7+10	0.0386	0.12	Q V	|	|	|	|
7+15	0.0394	0.12	Q V	|	|	|	|
7+20	0.0400	0.10	Q V	|	|	|	|
7+25	0.0403	0.04	Q V	|	|	|	|

7+30	0.0405	0.02	Q	V	|	|	|
7+35	0.0406	0.02	Q	V	|	|	|
7+40	0.0408	0.02	Q	V	|	|	|
7+45	0.0409	0.02	Q	V	|	|	|
7+50	0.0410	0.02	Q	V	|	|	|
7+55	0.0412	0.03	Q	V	|	|	|
8+ 0	0.0415	0.03	Q	V	|	|	|
8+ 5	0.0417	0.04	Q	V	|	|	|
8+10	0.0421	0.05	Q	V	|	|	|
8+15	0.0425	0.06	Q	V	|	|	|
8+20	0.0429	0.06	Q	V	|	|	|
8+25	0.0433	0.06	Q	V|		|	|
8+30	0.0438	0.07	Q	V|		|	|
8+35	0.0443	0.07	Q	V|		|	|
8+40	0.0448	0.08	Q	V|		|	|
8+45	0.0453	0.08	Q	V|		|	|
8+50	0.0459	0.08	Q	V|		|	|
8+55	0.0465	0.09	Q	V|		|	|
9+ 0	0.0472	0.10	Q	V|		|	|
9+ 5	0.0479	0.10	Q	V		|	|
9+10	0.0487	0.12	Q	V		|	|
9+15	0.0496	0.12	Q	V		|	|
9+20	0.0504	0.13	Q	V		|	|
9+25	0.0514	0.14	Q	V		|	|
9+30	0.0524	0.14	Q	V		|	|
9+35	0.0534	0.15	Q	|V		|	|
9+40	0.0544	0.15	Q	|V		|	|
9+45	0.0555	0.16	Q	|V		|	|
9+50	0.0567	0.16	Q	|V		|	|
9+55	0.0578	0.17	Q	| V		|	|
10+ 0	0.0590	0.17	Q	| V		|	|
10+ 5	0.0601	0.16	Q	| V		|	|
10+10	0.0609	0.11	Q	| V		|	|
10+15	0.0616	0.10	Q	| V		|	|
10+20	0.0622	0.09	Q	| V		|	|
10+25	0.0629	0.09	Q	| V		|	|
10+30	0.0635	0.09	Q	| V		|	|
10+35	0.0641	0.10	Q	| V		|	|
10+40	0.0650	0.13	Q	| V		|	|
10+45	0.0660	0.14	Q	| V		|	|
10+50	0.0670	0.15	Q	| V		|	|
10+55	0.0681	0.15	Q	| V		|	|
11+ 0	0.0691	0.15	Q	| V		|	|
11+ 5	0.0702	0.15	Q	| V		|	|
11+10	0.0712	0.15	Q	| V		|	|
11+15	0.0722	0.15	Q	| V		|	|
11+20	0.0732	0.15	Q	| V		|	|
11+25	0.0742	0.15	Q	| V		|	|
11+30	0.0753	0.15	Q	| V		|	|
11+35	0.0762	0.14	Q	| V		|	|
11+40	0.0771	0.13	Q	| V		|	|
11+45	0.0780	0.13	Q	| V		|	|
11+50	0.0789	0.13	Q	| V		|	|
11+55	0.0798	0.13	Q	| V		|	|
12+ 0	0.0807	0.13	Q	| V		|	|
12+ 5	0.0818	0.15	Q	| V		|	|
12+10	0.0831	0.20	Q	| V		|	|
12+15	0.0846	0.22	Q	| V		|	|
12+20	0.0862	0.23	Q	| V		|	|
12+25	0.0879	0.24	Q	| V		|	|
12+30	0.0896	0.25	Q	| V		|	|
12+35	0.0913	0.25	|Q	| V		|	|
12+40	0.0932	0.27	|Q	| V		|	|
12+45	0.0951	0.28	|Q	| V		|	|
12+50	0.0970	0.28	|Q	| V		|	|
12+55	0.0990	0.29	|Q	| V		|	|
13+ 0	0.1011	0.30	|Q	| V		|	|
13+ 5	0.1032	0.31	|Q	| V		|	|
13+10	0.1056	0.34	|Q	| V		|	|
13+15	0.1080	0.36	|Q	| V		|	|
13+20	0.1105	0.36	|Q	| V		|	|

13+25	0.1131	0.37	|Q	|	|	V	|	|
13+30	0.1156	0.37	|Q	|	|	V	|	|
13+35	0.1180	0.35	|Q	|	|	V	|	|
13+40	0.1199	0.27	|Q	|	|	V	|	|
13+45	0.1216	0.25	Q	|	|	V	|	|
13+50	0.1233	0.24	Q	|	|	V	|	|
13+55	0.1249	0.23	Q	|	|	V	|	|
14+ 0	0.1264	0.23	Q	|	|	V	|	|
14+ 5	0.1281	0.23	Q	|	|	V	|	|
14+10	0.1298	0.26	|Q	|	|	V	|	|
14+15	0.1317	0.27	|Q	|	|	V	|	|
14+20	0.1336	0.27	|Q	|	|	V	|	|
14+25	0.1354	0.27	|Q	|	|	V	|	|
14+30	0.1372	0.27	|Q	|	|	V	|	|
14+35	0.1391	0.27	|Q	|	|	V|	|	|
14+40	0.1409	0.27	|Q	|	|	V|	|	|
14+45	0.1428	0.27	|Q	|	|	V|	|	|
14+50	0.1446	0.27	|Q	|	|	V	|	|
14+55	0.1464	0.26	|Q	|	|	V	|	|
15+ 0	0.1482	0.26	|Q	|	|	V	|	|
15+ 5	0.1500	0.26	|Q	|	|	|V	|	|
15+10	0.1517	0.25	Q	|	|	|V	|	|
15+15	0.1534	0.25	Q	|	|	| V	|	|
15+20	0.1550	0.24	Q	|	|	| V	|	|
15+25	0.1567	0.24	Q	|	|	| V	|	|
15+30	0.1583	0.23	Q	|	|	| V	|	|
15+35	0.1598	0.22	Q	|	|	| V	|	|
15+40	0.1612	0.20	Q	|	|	| V	|	|
15+45	0.1624	0.19	Q	|	|	| V	|	|
15+50	0.1637	0.18	Q	|	|	| V	|	|
15+55	0.1649	0.18	Q	|	|	| V	|	|
16+ 0	0.1662	0.18	Q	|	|	| V	|	|
16+ 5	0.1673	0.16	Q	|	|	| V	|	|
16+10	0.1679	0.09	Q	|	|	| V	|	|
16+15	0.1684	0.07	Q	|	|	| V	|	|
16+20	0.1688	0.06	Q	|	|	| V	|	|
16+25	0.1692	0.06	Q	|	|	| V	|	|
16+30	0.1696	0.05	Q	|	|	| V	|	|
16+35	0.1699	0.05	Q	|	|	| V	|	|
16+40	0.1702	0.04	Q	|	|	| V	|	|
16+45	0.1704	0.04	Q	|	|	| V	|	|
16+50	0.1707	0.04	Q	|	|	| V	|	|
16+55	0.1709	0.04	Q	|	|	| V	|	|
17+ 0	0.1712	0.04	Q	|	|	| V	|	|
17+ 5	0.1714	0.04	Q	|	|	| V	|	|
17+10	0.1718	0.05	Q	|	|	| V	|	|
17+15	0.1722	0.05	Q	|	|	| V	|	|
17+20	0.1725	0.06	Q	|	|	| V	|	|
17+25	0.1729	0.06	Q	|	|	| V	|	|
17+30	0.1733	0.06	Q	|	|	| V	|	|
17+35	0.1737	0.06	Q	|	|	| V	|	|
17+40	0.1741	0.06	Q	|	|	| V	|	|
17+45	0.1745	0.06	Q	|	|	| V	|	|
17+50	0.1749	0.06	Q	|	|	| V	|	|
17+55	0.1753	0.05	Q	|	|	| V	|	|
18+ 0	0.1756	0.05	Q	|	|	| V	|	|
18+ 5	0.1759	0.05	Q	|	|	| V	|	|
18+10	0.1763	0.05	Q	|	|	| V	|	|
18+15	0.1766	0.05	Q	|	|	| V	|	|
18+20	0.1769	0.05	Q	|	|	| V	|	|
18+25	0.1772	0.05	Q	|	|	| V	|	|
18+30	0.1775	0.05	Q	|	|	| V	|	|
18+35	0.1779	0.04	Q	|	|	| V	|	|
18+40	0.1781	0.04	Q	|	|	| V	|	|
18+45	0.1784	0.04	Q	|	|	| V	|	|
18+50	0.1786	0.03	Q	|	|	| V	|	|
18+55	0.1788	0.03	Q	|	|	| V	|	|
19+ 0	0.1790	0.03	Q	|	|	| V	|	|
19+ 5	0.1792	0.03	Q	|	|	| V	|	|
19+10	0.1794	0.03	Q	|	|	| V	|	|
19+15	0.1796	0.03	Q	|	|	| V	|	|

19+20	0.1799	0.04	Q	|	|	|	V |
19+25	0.1802	0.04	Q	|	|	|	V |
19+30	0.1805	0.04	Q	|	|	|	V |
19+35	0.1808	0.04	Q	|	|	|	V |
19+40	0.1810	0.04	Q	|	|	|	V |
19+45	0.1813	0.04	Q	|	|	|	V |
19+50	0.1815	0.03	Q	|	|	|	V |
19+55	0.1817	0.03	Q	|	|	|	V |
20+ 0	0.1819	0.03	Q	|	|	|	V |
20+ 5	0.1821	0.03	Q	|	|	|	V |
20+10	0.1823	0.03	Q	|	|	|	V |
20+15	0.1825	0.03	Q	|	|	|	V |
20+20	0.1827	0.03	Q	|	|	|	V |
20+25	0.1830	0.03	Q	|	|	|	V |
20+30	0.1832	0.03	Q	|	|	|	V |
20+35	0.1835	0.03	Q	|	|	|	V |
20+40	0.1837	0.03	Q	|	|	|	V |
20+45	0.1839	0.03	Q	|	|	|	V |
20+50	0.1842	0.03	Q	|	|	|	V |
20+55	0.1844	0.03	Q	|	|	|	V |
21+ 0	0.1845	0.03	Q	|	|	|	V |
21+ 5	0.1847	0.03	Q	|	|	|	V |
21+10	0.1849	0.03	Q	|	|	|	V |
21+15	0.1852	0.03	Q	|	|	|	V |
21+20	0.1854	0.03	Q	|	|	|	V |
21+25	0.1856	0.03	Q	|	|	|	V |
21+30	0.1857	0.03	Q	|	|	|	V |
21+35	0.1859	0.03	Q	|	|	|	V |
21+40	0.1861	0.03	Q	|	|	|	V |
21+45	0.1864	0.03	Q	|	|	|	V |
21+50	0.1866	0.03	Q	|	|	|	V|
21+55	0.1868	0.03	Q	|	|	|	V|
22+ 0	0.1869	0.03	Q	|	|	|	V|
22+ 5	0.1871	0.03	Q	|	|	|	V|
22+10	0.1873	0.03	Q	|	|	|	V|
22+15	0.1876	0.03	Q	|	|	|	V|
22+20	0.1878	0.03	Q	|	|	|	V|
22+25	0.1880	0.03	Q	|	|	|	V|
22+30	0.1881	0.03	Q	|	|	|	V|
22+35	0.1883	0.02	Q	|	|	|	V|
22+40	0.1885	0.02	Q	|	|	|	V|
22+45	0.1886	0.02	Q	|	|	|	V|
22+50	0.1888	0.02	Q	|	|	|	V|
22+55	0.1890	0.02	Q	|	|	|	V|
23+ 0	0.1891	0.02	Q	|	|	|	V|
23+ 5	0.1893	0.02	Q	|	|	|	V|
23+10	0.1895	0.02	Q	|	|	|	V|
23+15	0.1896	0.02	Q	|	|	|	V|
23+20	0.1898	0.02	Q	|	|	|	V|
23+25	0.1899	0.02	Q	|	|	|	V|
23+30	0.1901	0.02	Q	|	|	|	V|
23+35	0.1903	0.02	Q	|	|	|	V|
23+40	0.1904	0.02	Q	|	|	|	V|
23+45	0.1906	0.02	Q	|	|	|	V|
23+50	0.1907	0.02	Q	|	|	|	V|
23+55	0.1909	0.02	Q	|	|	|	V|
24+ 0	0.1911	0.02	Q	|	|	|	V|
24+ 5	0.1912	0.02	Q	|	|	|	V|
24+10	0.1912	0.01	Q	|	|	|	V|
24+15	0.1913	0.00	Q	|	|	|	V|
24+20	0.1913	0.00	Q	|	|	|	V|
24+25	0.1913	0.00	Q	|	|	|	V|
24+30	0.1913	0.00	Q	|	|	|	V|
24+35	0.1913	0.00	Q	|	|	|	V|
24+40	0.1913	0.00	Q	|	|	|	V

Project: Orchard Logistics Center

Water Quality Mitgation Routing Table

MAIN BIO-RETENTION BASIN #1

2-Year Storms

Stage Storage Number	Storage Depth (ft)	Elevation (ft)	Area (ft^2)	Incremental volume (ft^3)	Total Volume (ft^3)	Total Volume (acre-ft)	Outflow Q (cfs)	Notes
1	0.00	2525.03	40,370	0	0	0.000	0.0	**6-INCH OUTLET W/ 5-INCH ORIFICE PLATE**
2	3.47	2528.50	40,370	2,424	2,424	0.056	1.19	
3	4.47	2529.50	40,370	16,148	18,572	0.426	1.36	**TOP OF ROCK/BOTTOM OF MEDIA**
4	5.97	2531.00	40,370	18,167	36,739	0.843	1.58	
5	7.47	2532.50	40,370	18,167	54,905	1.260	1.77	**TOP OF MEDIA/BOTTOM OF BASIN**
6	7.97	2533.00	43,550	20,980	**75,885**	1.742	1.83	**WQMP Ponding Depth**
7	8.47	2533.50	46,747	22,574	98,459	2.260	2.09	**Discharge from 2 - 2"x2" openings 2533.00 inv**
8a	8.80	2533.83	48,931	15,787	114,246	2.623	2.18	

*WQMP Design Capture Volume (DCV) is 68,224 CF

Equations Used for outlet control Q:

Orifice Control Equation = $CA*(2gh)^{\wedge 1/2}$

Example @ WSE = 2535.00

6" Outlet C=0.6, A=0.1364, g=32.2, h=8.26

2- 2"x2" Openings C=0.6, A=0.0278, g=32.2, h=0.4167

Q 2" openings $= 0.6 * .0556 * \sqrt{2 * 32.2 * 0.4167}$=0.20

Q 6" Outlet $= 0.6 * .1364 * \sqrt{2 * 32.2 * 8.26}$=1.89

Q 6" Outlet + Q 2" openings $= 1.89 + 0.20$ = **2.09 cfs**

HUITT ZOLLARS

Project: Orchard Logistics Center

Storm Mitigation Routing Table

2, 5, 10, 100-Year Storms

MAIN BIO-RETENTION BASIN #2

Stage Storage Number	Storage Depth (ft)	Elevation (ft)	Area (ft^2)	Incremental volume (ft^3)	Total Volume (ft^3)	Total Volume (acre-ft)	Outflow Q (cfs)	Notes
5	0.00	2526.50	1,663	0	**0**	0.000	0.00	**WQMP 6" PONDING DEPTH**
6	0.50	2527.00	2,017	920	920	0.021	11.00	**Discharge 36" riser**
7	1.00	2527.50	2,403	1,105	2,025	0.046	31.10	
8	1.50	2528.00	2,810	1,303	3,328	0.076	41.68	

*WQMP Design Capture Volume (DCV) is 1,872 CF

Equations Used for outlet control Q:

Orifice Control Equation = $CA*(2gh)^{1/2}$

Weir Control Equation = $CP\ h^{1.5}$

Example @ WSE = 2527.50

Orfice Riser C=0.6, A=7.0686, g=32.2, h=1.0

Weir Riser C=3.3. P=9.4248, h=1.0

$$Q\ Orifice\ Riser = 0.6x7.0686x\sqrt{2 * 32.2 * 1.0} = 34.04$$

$$Q\ Weir\ Riser = 3.3x9.4248x1.0^{1.5} = 31.10$$

Weir Equation Controls Q Riser = 31.10

HUITT ZOLLARS

Project: Orchard Logistics Center

Bioretention System Routing Study

Basin Routing Summary Table

	2 YR 1 HR	2 YR 3 HR	2 YR 6 HR	2 YR 24 HR
Existing Q(cfs) 30.91 ac	31.71	15.46	13.74	2.46
Prop Q(cfs) 29.53 ac	37.01	22.78	21.83	8.37
Prop Q(cfs) 1.32 ac	1.64	0.96	0.88	0.37
Q (cfs) after Routing 29.53 ac	1.69	1.78	1.80	2.11
Q (cfs) after Routing 1.32 ac	0.96	0.75	0.73	0.35
Total Q (cfs) after Routing	2.65	2.53	2.53	2.46
WSE (ft) Basin 1	2531.85	2532.61	2532.78	2533.58
WSE (ft) Basin 2	2524.59	2524.17	2524.12	2523.53

	5 YR 1 HR	5 YR 3 HR	5 YR 6 HR	5 YR 24 HR
Existing Q(cfs) 30.91 ac	52.78	24.84	21.53	6.21
Prop Q(cfs) 29.53 ac	57.03	32.14	29.85	11.98
Prop Q(cfs) 1.32 ac	2.53	1.36	1.20	0.53
Q (cfs) after Routing 29.53 ac	4.00	4.60	5.03	5.36
Q (cfs) after Routing 1.32 ac	2.34	1.34	1.21	0.53
Total Q (cfs) after Routing	6.34	5.94	6.24	5.89
WSE (ft) Basin 1	2534.61	2534.95	2535.23	2535.45
WSE (ft) Basin 2	2526.61	2526.56	2526.55	2526.52

	10 YR 1 HR	10 YR 3 HR	10 YR 6 HR	10 YR 24 HR
Existing Q(cfs) 30.91 ac	73.70	36.93	32.41	13.36
Prop Q(cfs) 29.53 ac	73.29	40.33	37.03	15.67
Prop Q(cfs) 1.32 ac	3.25	1.62	1.50	0.70
Q (cfs) after Routing 29.53 ac	4.69	5.53	13.40	11.24
Q (cfs) after Routing 1.32 ac	3.02	1.69	1.45	0.69
Total Q (cfs) after Routing	7.71	7.22	14.85	11.93
WSE (ft) Basin 1	2535.08	2535.50	2535.84	2535.75
WSE (ft) Basin 2	2526.64	2526.58	2526.57	2526.53

	100 YR 1 HR	100 YR 3 HR	100 YR 6 HR	100 YR 24 HR
Existing Q(cfs) 30.91 ac	129.70	63.56	55.04	25.44
Prop Q(cfs) 29.53 ac	124.45	64.69	58.03	25.46
Prop Q(cfs) 1.32 ac	5.52	2.75	2.35	1.13
Q (cfs) after Routing 29.53 ac	24.68	34.93	35.73	22.36
Q (cfs) after Routing 1.32 ac	5.13	2.72	2.37	1.13
Total Q (cfs) after Routing	29.81	30.40	38.10	23.49
WSE (ft) Basin 1	2536.17	2536.42	2536.59	2536.17
WSE (ft) Basin 2	2526.73	2526.62	2526.61	2526.55

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 11/04/24

ORCHARD LOGISTICS CENTER
2 YEAR 24 HOUR BASIN 1 ROUTING
2838Q2R24B1
DS

Program License Serial Number 6145

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

From study/file name: 2838Q2UHP24B1.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 8.367 (CFS)
Total volume = 4.118 (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

****

++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
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
3.470	0.056	1.190	0.052	0.060
4.470	0.426	1.360	0.421	0.431
5.970	0.843	1.580	0.838	0.848
7.470	1.260	1.770	1.254	1.266
7.970	1.742	1.830	1.736	1.748
8.470	2.260	2.090	2.253	2.267

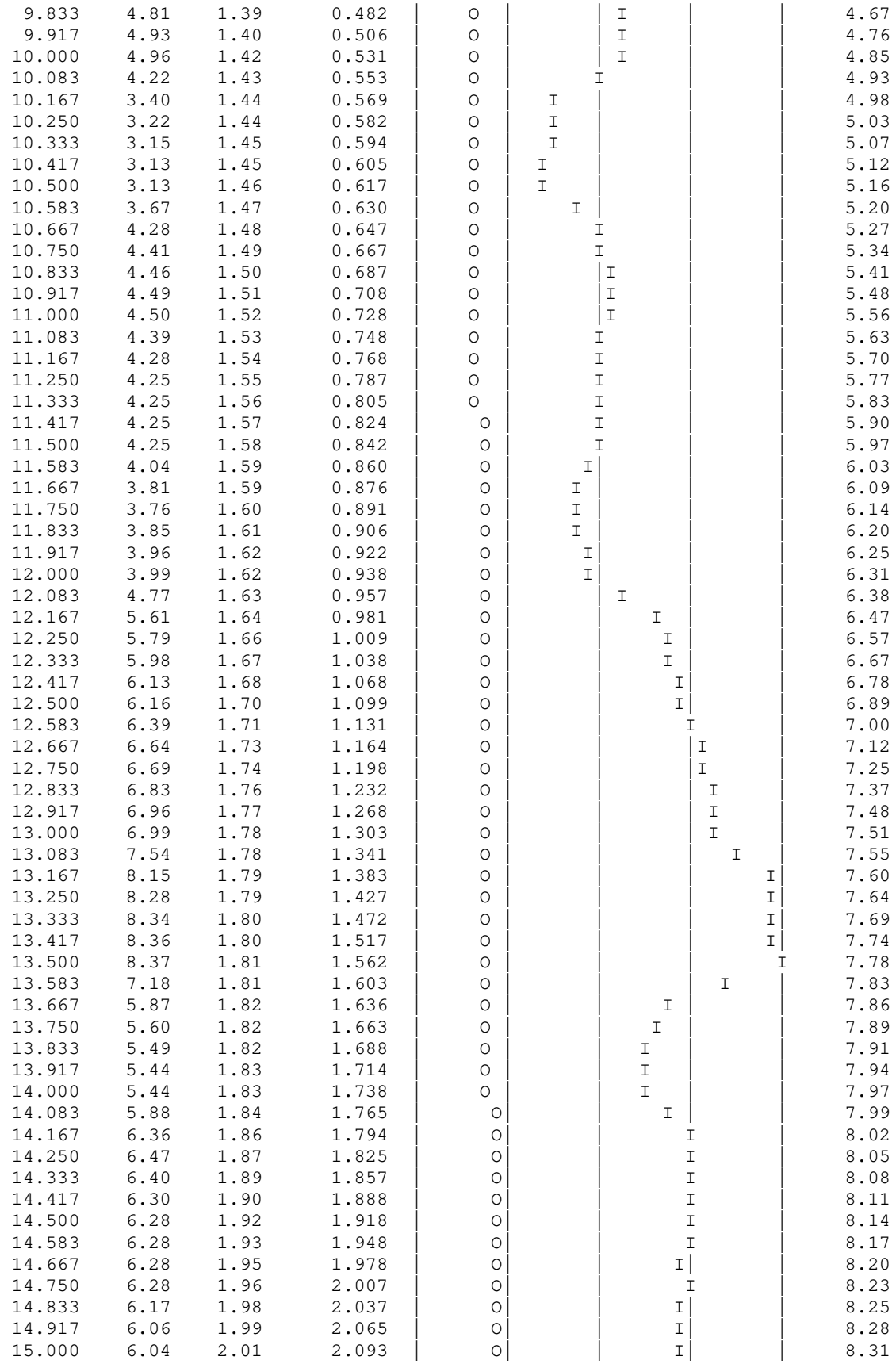
8.800 2.623 2.180 2.615 2.631

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.1 4.18 6.28 8.37	Depth (Ft.)
0.083	0.18	0.01	0.001	O	0.04
0.167	0.37	0.05	0.002	OI	0.14
0.250	0.41	0.10	0.004	OI	0.28
0.333	0.52	0.15	0.007	OI	0.43
0.417	0.63	0.20	0.010	O I	0.60
0.500	0.65	0.26	0.012	|OI	0.77
0.583	0.66	0.32	0.015	|OI	0.92
0.667	0.66	0.36	0.017	|OI	1.06
0.750	0.66	0.40	0.019	|OI	1.18
0.833	0.75	0.44	0.021	|OI	1.29
0.917	0.85	0.49	0.023	|O I	1.44
1.000	0.87	0.54	0.025	| OI	1.58
1.083	0.79	0.58	0.027	| OI	1.69
1.167	0.69	0.60	0.028	| O	1.76
1.250	0.67	0.61	0.029	| O	1.79
1.333	0.66	0.62	0.029	| O	1.81
1.417	0.66	0.63	0.029	| O	1.83
1.500	0.66	0.63	0.030	| O	1.84
1.583	0.66	0.63	0.030	| O	1.85
1.667	0.66	0.64	0.030	| O	1.86
1.750	0.66	0.64	0.030	| O	1.87
1.833	0.75	0.65	0.031	| O	1.89
1.917	0.85	0.67	0.032	| OI	1.95
2.000	0.87	0.69	0.033	| OI	2.03
2.083	0.88	0.72	0.034	| OI	2.10
2.167	0.88	0.74	0.035	| OI	2.16
2.250	0.88	0.76	0.036	| OI	2.21
2.333	0.88	0.78	0.037	| OI	2.26
2.417	0.88	0.79	0.037	| O	2.30
2.500	0.88	0.80	0.038	| O	2.34
2.583	0.97	0.82	0.039	| O	2.39
2.667	1.07	0.85	0.040	| OI	2.47
2.750	1.09	0.88	0.041	| OI	2.56
2.833	1.09	0.91	0.043	| OI	2.64
2.917	0.66	0.90	0.042	| IO	2.63
3.000	0.17	0.84	0.039	I O	2.44
3.083	0.07	0.74	0.035	I O	2.15
3.167	0.03	0.64	0.030	I O	1.88
3.250	0.02	0.56	0.026	I O	1.63
3.333	0.03	0.49	0.023	IO	1.42
3.417	0.03	0.42	0.020	IO	1.24
3.500	0.04	0.37	0.017	IO	1.08
3.583	0.04	0.33	0.015	IO	0.95
3.667	0.05	0.29	0.014	IO	0.84
3.750	0.05	0.25	0.012	O	0.74
3.833	0.17	0.24	0.011	O	0.69
3.917	0.29	0.23	0.011	OI	0.68
4.000	0.32	0.24	0.011	OI	0.71
4.083	0.34	0.26	0.012	OI	0.75
4.167	0.35	0.27	0.013	|O	0.78
4.250	0.35	0.28	0.013	|O	0.81
4.333	0.47	0.30	0.014	|O	0.87
4.417	0.59	0.33	0.015	|OI	0.96
4.500	0.62	0.37	0.017	|OI	1.07

4.583	0.64	0.40	0.019	OI				1.17
4.667	0.65	0.44	0.020	OI				1.27
4.750	0.65	0.46	0.022	OI				1.35
4.833	0.77	0.50	0.023	OI				1.45
4.917	0.89	0.54	0.026	OI				1.58
5.000	0.92	0.59	0.028	OI				1.73
5.083	0.72	0.62	0.029	O				1.82
5.167	0.49	0.62	0.029	IO				1.81
5.250	0.45	0.60	0.028	IO				1.75
5.333	0.54	0.59	0.028	O				1.71
5.417	0.65	0.59	0.028	O				1.71
5.500	0.68	0.60	0.028	O				1.75
5.583	0.81	0.62	0.029	OI				1.80
5.667	0.94	0.65	0.031	OI				1.91
5.750	0.97	0.69	0.033	OI				2.02
5.833	0.98	0.73	0.034	OI				2.14
5.917	0.99	0.77	0.036	OI				2.24
6.000	1.00	0.80	0.038	O				2.33
6.083	1.11	0.83	0.039	OI				2.43
6.167	1.24	0.88	0.041	OI				2.57
6.250	1.27	0.93	0.044	OI				2.71
6.333	1.28	0.98	0.046	OI				2.85
6.417	1.29	1.02	0.048	OI				2.97
6.500	1.30	1.06	0.050	O				3.08
6.583	1.41	1.10	0.052	OI				3.20
6.667	1.53	1.15	0.054	OI				3.35
6.750	1.56	1.19	0.057	OI				3.47
6.833	1.58	1.19	0.059	O I				3.48
6.917	1.59	1.19	0.062	O I				3.49
7.000	1.59	1.19	0.065	O I				3.49
7.083	1.60	1.20	0.068	O I				3.50
7.167	1.60	1.20	0.070	O I				3.51
7.250	1.61	1.20	0.073	O I				3.52
7.333	1.72	1.20	0.076	O I				3.53
7.417	1.85	1.20	0.080	O I				3.54
7.500	1.88	1.20	0.085	O I				3.55
7.583	2.00	1.21	0.090	O I				3.56
7.667	2.13	1.21	0.096	O I				3.58
7.750	2.16	1.21	0.102	O I				3.60
7.833	2.28	1.21	0.109	O I				3.61
7.917	2.41	1.22	0.117	O I				3.63
8.000	2.44	1.22	0.125	O I				3.66
8.083	2.67	1.23	0.135	O I				3.68
8.167	2.92	1.23	0.145	O I				3.71
8.250	2.98	1.24	0.157	O I				3.74
8.333	3.00	1.24	0.169	O I				3.78
8.417	3.02	1.25	0.181	O I				3.81
8.500	3.02	1.25	0.194	O I				3.84
8.583	3.13	1.26	0.206	O I				3.88
8.667	3.26	1.27	0.219	O I				3.91
8.750	3.29	1.27	0.233	O I				3.95
8.833	3.41	1.28	0.247	O I				3.99
8.917	3.54	1.28	0.263	O I				4.03
9.000	3.57	1.29	0.278	O I				4.07
9.083	3.80	1.30	0.295	O I				4.12
9.167	4.05	1.31	0.313	O I				4.16
9.250	4.10	1.32	0.332	O I				4.22
9.333	4.24	1.33	0.351	O I				4.27
9.417	4.37	1.34	0.372	O I				4.32
9.500	4.40	1.34	0.393	O I				4.38
9.583	4.52	1.35	0.414	O I				4.44
9.667	4.65	1.37	0.437	O I				4.51
9.750	4.68	1.38	0.459	O I				4.59



15.083	5.92	2.02	2.120	| O|	| I |	|	|	8.34
15.167	5.80	2.03	2.147	| O|	| I |	|	|	8.36
15.250	5.78	2.05	2.173	| O|	| I |	|	|	8.39
15.333	5.66	2.06	2.198	| O|	| I |	|	|	8.41
15.417	5.54	2.07	2.222	| O|	| I |	|	|	8.43
15.500	5.52	2.08	2.246	| O|	| I |	|	|	8.46
15.583	5.08	2.09	2.268	| O	I |	|	|	8.48
15.667	4.60	2.10	2.287	| O	I |	|	|	8.49
15.750	4.50	2.10	2.304	| O	I |	|	|	8.51
15.833	4.47	2.10	2.320	| O	I |	|	|	8.52
15.917	4.45	2.11	2.337	| O	I |	|	|	8.54
16.000	4.45	2.11	2.353	| O	I |	|	|	8.55
16.083	2.84	2.11	2.363	| O I	|	|	|	8.55
16.167	1.05	2.11	2.362	| I O	|	|	|	8.55
16.250	0.67	2.11	2.353	| I O	|	|	|	8.55
16.333	0.52	2.11	2.343	|I O	|	|	|	8.55
16.417	0.45	2.11	2.332	|I O	|	|	|	8.54
16.500	0.45	2.10	2.320	|I O	|	|	|	8.52
16.583	0.35	2.10	2.309	|I O	|	|	|	8.51
16.667	0.23	2.10	2.296	I O	|	|	|	8.50
16.750	0.21	2.10	2.283	I O	|	|	|	8.49
16.833	0.20	2.09	2.270	I O	|	|	|	8.48
16.917	0.20	2.09	2.257	I O|	|	|	|	8.47
17.000	0.20	2.08	2.244	I O|	|	|	|	8.45
17.083	0.42	2.08	2.232	|I O|	|	|	|	8.44
17.167	0.67	2.07	2.222	| I O|	|	|	|	8.43
17.250	0.72	2.07	2.212	| I O|	|	|	|	8.42
17.333	0.74	2.06	2.203	| I O|	|	|	|	8.41
17.417	0.76	2.06	2.194	| I O|	|	|	|	8.41
17.500	0.76	2.05	2.185	| I O|	|	|	|	8.40
17.583	0.76	2.05	2.176	| I O|	|	|	|	8.39
17.667	0.76	2.04	2.167	| I O|	|	|	|	8.38
17.750	0.77	2.04	2.158	| I O|	|	|	|	8.37
17.833	0.66	2.03	2.149	| I O|	|	|	|	8.36
17.917	0.54	2.03	2.139	| I O|	|	|	|	8.35
18.000	0.52	2.02	2.129	|I O|	|	|	|	8.34
18.083	0.51	2.02	2.119	|I O|	|	|	|	8.33
18.167	0.51	2.01	2.108	|I O|	|	|	|	8.32
18.250	0.52	2.01	2.098	|I O|	|	|	|	8.31
18.333	0.52	2.00	2.088	|I O|	|	|	|	8.30
18.417	0.52	2.00	2.078	|I O|	|	|	|	8.29
18.500	0.52	1.99	2.068	| I O|	|	|	|	8.28
18.583	0.42	1.99	2.057	|I O|	|	|	|	8.27
18.667	0.30	1.98	2.046	|I O|	|	|	|	8.26
18.750	0.28	1.98	2.034	|I O|	|	|	|	8.25
18.833	0.16	1.97	2.022	I O|	|	|	|	8.24
18.917	0.04	1.96	2.009	I O|	|	|	|	8.23
19.000	0.02	1.96	1.996	I O|	|	|	|	8.22
19.083	0.12	1.95	1.983	I O|	|	|	|	8.20
19.167	0.24	1.94	1.971	I O|	|	|	|	8.19
19.250	0.26	1.94	1.959	|I O|	|	|	|	8.18
19.333	0.38	1.93	1.948	|I O|	|	|	|	8.17
19.417	0.51	1.93	1.938	|I O|	|	|	|	8.16
19.500	0.54	1.92	1.928	| I O|	|	|	|	8.15
19.583	0.44	1.92	1.918	|I O|	|	|	|	8.14
19.667	0.33	1.91	1.908	|I O|	|	|	|	8.13
19.750	0.31	1.91	1.897	|I O|	|	|	|	8.12
19.833	0.19	1.90	1.886	I O|	|	|	|	8.11
19.917	0.07	1.90	1.873	I O|	|	|	|	8.10
20.000	0.05	1.89	1.861	I O|	|	|	|	8.08
20.083	0.15	1.88	1.848	I O|	|	|	|	8.07
20.167	0.26	1.88	1.837	|I O|	|	|	|	8.06
20.250	0.29	1.87	1.826	|I O|	|	|	|	8.05

20.333	0.30	1.87	1.815	|I O|	|	|	|	8.04
20.417	0.31	1.86	1.804	|I O|	|	|	|	8.03
20.500	0.31	1.86	1.794	|I O|	|	|	|	8.02
20.583	0.32	1.85	1.783	|I O|	|	|	|	8.01
20.667	0.32	1.85	1.773	|I O|	|	|	|	8.00
20.750	0.32	1.84	1.762	|I O|	|	|	|	7.99
20.833	0.21	1.83	1.751	I O|	|	|	|	7.98
20.917	0.10	1.83	1.740	I O |	|	|	|	7.97
21.000	0.07	1.83	1.728	I O |	|	|	|	7.96
21.083	0.17	1.83	1.716	I O |	|	|	|	7.94
21.167	0.29	1.83	1.705	|I O |	|	|	|	7.93
21.250	0.32	1.82	1.694	|I O |	|	|	|	7.92
21.333	0.22	1.82	1.684	I O |	|	|	|	7.91
21.417	0.11	1.82	1.672	I O |	|	|	|	7.90
21.500	0.08	1.82	1.660	I O |	|	|	|	7.89
21.583	0.18	1.82	1.649	I O |	|	|	|	7.87
21.667	0.30	1.82	1.638	|I O |	|	|	|	7.86
21.750	0.33	1.82	1.628	|I O |	|	|	|	7.85
21.833	0.23	1.81	1.617	I O |	|	|	|	7.84
21.917	0.12	1.81	1.606	I O |	|	|	|	7.83
22.000	0.09	1.81	1.594	I O |	|	|	|	7.82
22.083	0.19	1.81	1.582	I O |	|	|	|	7.80
22.167	0.31	1.81	1.572	|I O |	|	|	|	7.79
22.250	0.34	1.81	1.561	|I O |	|	|	|	7.78
22.333	0.24	1.81	1.551	I O |	|	|	|	7.77
22.417	0.13	1.80	1.540	I O |	|	|	|	7.76
22.500	0.10	1.80	1.528	I O |	|	|	|	7.75
22.583	0.09	1.80	1.516	I O |	|	|	|	7.74
22.667	0.09	1.80	1.505	I O |	|	|	|	7.72
22.750	0.09	1.80	1.493	I O |	|	|	|	7.71
22.833	0.09	1.80	1.481	I O |	|	|	|	7.70
22.917	0.09	1.80	1.469	I O |	|	|	|	7.69
23.000	0.09	1.79	1.458	I O |	|	|	|	7.68
23.083	0.10	1.79	1.446	I O |	|	|	|	7.66
23.167	0.10	1.79	1.434	I O |	|	|	|	7.65
23.250	0.10	1.79	1.423	I O |	|	|	|	7.64
23.333	0.10	1.79	1.411	I O |	|	|	|	7.63
23.417	0.10	1.79	1.399	I O |	|	|	|	7.61
23.500	0.10	1.79	1.388	I O |	|	|	|	7.60
23.583	0.10	1.78	1.376	I O |	|	|	|	7.59
23.667	0.10	1.78	1.365	I O |	|	|	|	7.58
23.750	0.10	1.78	1.353	I O |	|	|	|	7.57
23.833	0.10	1.78	1.341	I O |	|	|	|	7.55
23.917	0.10	1.78	1.330	I O |	|	|	|	7.54
24.000	0.10	1.78	1.318	I O |	|	|	|	7.53
24.083	0.06	1.78	1.307	I O |	|	|	|	7.52
24.167	0.02	1.77	1.295	I O |	|	|	|	7.51
24.250	0.01	1.77	1.283	I O |	|	|	|	7.49
24.333	0.00	1.77	1.270	I O |	|	|	|	7.48
24.417	0.00	1.77	1.258	I O |	|	|	|	7.46
24.500	0.00	1.76	1.246	I O |	|	|	|	7.42
24.583	0.00	1.76	1.234	I O |	|	|	|	7.38
24.667	0.00	1.75	1.222	I O |	|	|	|	7.33
24.750	0.00	1.75	1.210	I O |	|	|	|	7.29
24.833	0.00	1.74	1.198	I O |	|	|	|	7.25
24.917	0.00	1.74	1.186	I O |	|	|	|	7.20
25.000	0.00	1.73	1.174	I O |	|	|	|	7.16
25.083	0.00	1.73	1.162	I O |	|	|	|	7.12
25.167	0.00	1.72	1.150	I O |	|	|	|	7.07
25.250	0.00	1.71	1.138	I O |	|	|	|	7.03
25.333	0.00	1.71	1.126	I O |	|	|	|	6.99
25.417	0.00	1.70	1.115	I O |	|	|	|	6.95
25.500	0.00	1.70	1.103	I O |	|	|	|	6.91

25.583	0.00	1.69	1.091	I	O					6.86
25.667	0.00	1.69	1.080	I	O					6.82
25.750	0.00	1.68	1.068	I	O					6.78
25.833	0.00	1.68	1.056	I	O					6.74
25.917	0.00	1.67	1.045	I	O					6.70
26.000	0.00	1.67	1.033	I	O					6.66
26.083	0.00	1.66	1.022	I	O					6.61
26.167	0.00	1.66	1.011	I	O					6.57
26.250	0.00	1.65	0.999	I	O					6.53
26.333	0.00	1.65	0.988	I	O					6.49
26.417	0.00	1.64	0.976	I	O					6.45
26.500	0.00	1.64	0.965	I	O					6.41
26.583	0.00	1.63	0.954	I	O					6.37
26.667	0.00	1.63	0.943	I	O					6.33
26.750	0.00	1.62	0.932	I	O					6.29
26.833	0.00	1.62	0.920	I	O					6.25
26.917	0.00	1.61	0.909	I	O					6.21
27.000	0.00	1.61	0.898	I	O					6.17
27.083	0.00	1.60	0.887	I	O					6.13
27.167	0.00	1.60	0.876	I	O					6.09
27.250	0.00	1.59	0.865	I	O					6.05
27.333	0.00	1.59	0.854	I	O					6.01
27.417	0.00	1.58	0.843	I	O					5.97
27.500	0.00	1.57	0.833	I	O					5.93
27.583	0.00	1.57	0.822	I	O					5.89
27.667	0.00	1.56	0.811	I	O					5.85
27.750	0.00	1.56	0.800	I	O					5.82
27.833	0.00	1.55	0.789	I	O					5.78
27.917	0.00	1.55	0.779	I	O					5.74
28.000	0.00	1.54	0.768	I	O					5.70
28.083	0.00	1.53	0.758	I	O					5.66
28.167	0.00	1.53	0.747	I	O					5.62
28.250	0.00	1.52	0.737	I	O					5.59
28.333	0.00	1.52	0.726	I	O					5.55
28.417	0.00	1.51	0.716	I	O					5.51
28.500	0.00	1.51	0.705	I	O					5.47
28.583	0.00	1.50	0.695	I	O					5.44
28.667	0.00	1.50	0.685	I	O					5.40
28.750	0.00	1.49	0.674	I	O					5.36
28.833	0.00	1.49	0.664	I	O					5.33
28.917	0.00	1.48	0.654	I	O					5.29
29.000	0.00	1.47	0.644	I	O					5.25
29.083	0.00	1.47	0.633	I	O					5.22
29.167	0.00	1.46	0.623	I	O					5.18
29.250	0.00	1.46	0.613	I	O					5.14
29.333	0.00	1.45	0.603	I	O					5.11
29.417	0.00	1.45	0.593	I	O					5.07
29.500	0.00	1.44	0.583	I	O					5.04
29.583	0.00	1.44	0.573	I	O					5.00
29.667	0.00	1.43	0.564	I	O					4.96
29.750	0.00	1.43	0.554	I	O					4.93
29.833	0.00	1.42	0.544	I	O					4.89
29.917	0.00	1.42	0.534	I	O					4.86
30.000	0.00	1.41	0.524	I	O					4.82
30.083	0.00	1.41	0.515	I	O					4.79
30.167	0.00	1.40	0.505	I	O					4.75
30.250	0.00	1.40	0.495	I	O					4.72
30.333	0.00	1.39	0.486	I	O					4.68
30.417	0.00	1.39	0.476	I	O					4.65
30.500	0.00	1.38	0.467	I	O					4.62
30.583	0.00	1.38	0.457	I	O					4.58
30.667	0.00	1.37	0.448	I	O					4.55
30.750	0.00	1.37	0.438	I	O					4.51

30.833	0.00	1.36	0.429	I	O				4.48
30.917	0.00	1.36	0.419	I	O				4.45
31.000	0.00	1.35	0.410	I	O				4.43
31.083	0.00	1.35	0.401	I	O				4.40
31.167	0.00	1.34	0.392	I	O				4.38
31.250	0.00	1.34	0.382	I	O				4.35
31.333	0.00	1.34	0.373	I	O				4.33
31.417	0.00	1.33	0.364	I	O				4.30
31.500	0.00	1.33	0.355	I	O				4.28
31.583	0.00	1.32	0.346	I	O				4.25
31.667	0.00	1.32	0.337	I	O				4.23
31.750	0.00	1.31	0.327	I	O				4.20
31.833	0.00	1.31	0.318	I	O				4.18
31.917	0.00	1.31	0.309	I	O				4.15
32.000	0.00	1.30	0.300	I	O				4.13
32.083	0.00	1.30	0.292	I	O				4.11
32.167	0.00	1.29	0.283	I	O				4.08
32.250	0.00	1.29	0.274	I	O				4.06
32.333	0.00	1.29	0.265	I	O				4.03
32.417	0.00	1.28	0.256	I	O				4.01
32.500	0.00	1.28	0.247	I	O				3.99
32.583	0.00	1.27	0.238	I	O				3.96
32.667	0.00	1.27	0.230	I	O				3.94
32.750	0.00	1.27	0.221	I	O				3.92
32.833	0.00	1.26	0.212	I	O				3.89
32.917	0.00	1.26	0.203	I	O				3.87
33.000	0.00	1.25	0.195	I	O				3.85
33.083	0.00	1.25	0.186	I	O				3.82
33.167	0.00	1.25	0.178	I	O				3.80
33.250	0.00	1.24	0.169	I	O				3.78
33.333	0.00	1.24	0.161	I	O				3.75
33.417	0.00	1.23	0.152	I	O				3.73
33.500	0.00	1.23	0.144	I	O				3.71
33.583	0.00	1.23	0.135	I	O				3.68
33.667	0.00	1.22	0.127	I	O				3.66
33.750	0.00	1.22	0.118	I	O				3.64
33.833	0.00	1.21	0.110	I	O				3.62
33.917	0.00	1.21	0.101	I	O				3.59
34.000	0.00	1.21	0.093	I	O				3.57
34.083	0.00	1.20	0.085	I	O				3.55
34.167	0.00	1.20	0.077	I	O				3.53
34.250	0.00	1.20	0.068	I	O				3.50
34.333	0.00	1.19	0.060	I	O				3.48
34.417	0.00	1.11	0.052	I	O				3.23
34.500	0.00	0.96	0.045	I	O				2.79
34.583	0.00	0.83	0.039	I	O				2.41
34.667	0.00	0.71	0.034	I	O				2.08
34.750	0.00	0.62	0.029	I	O				1.80
34.833	0.00	0.53	0.025	I	O				1.55
34.917	0.00	0.46	0.022	I	O				1.34
35.000	0.00	0.40	0.019	I	O				1.16
35.083	0.00	0.34	0.016	I	O				1.00
35.167	0.00	0.30	0.014	I	O				0.86
35.250	0.00	0.26	0.012	O					0.75
35.333	0.00	0.22	0.010	O					0.64
35.417	0.00	0.19	0.009	O					0.56
35.500	0.00	0.16	0.008	O					0.48
35.583	0.00	0.14	0.007	O					0.42
35.667	0.00	0.12	0.006	O					0.36
35.750	0.00	0.11	0.005	O					0.31
35.833	0.00	0.09	0.004	O					0.27
35.917	0.00	0.08	0.004	O					0.23
36.000	0.00	0.07	0.003	O					0.20

36.083	0.00	0.06	0.003	O	|	|	|	|	0.17
36.167	0.00	0.05	0.002	O	|	|	|	|	0.15
36.250	0.00	0.04	0.002	O	|	|	|	|	0.13
36.333	0.00	0.04	0.002	O	|	|	|	|	0.11
36.417	0.00	0.03	0.002	O	|	|	|	|	0.10
36.500	0.00	0.03	0.001	O	|	|	|	|	0.08
36.583	0.00	0.02	0.001	O	|	|	|	|	0.07
36.667	0.00	0.02	0.001	O	|	|	|	|	0.06
36.750	0.00	0.02	0.001	O	|	|	|	|	0.05
36.833	0.00	0.02	0.001	O	|	|	|	|	0.05
36.917	0.00	0.01	0.001	O	|	|	|	|	0.04
37.000	0.00	0.01	0.001	O	|	|	|	|	0.03
37.083	0.00	0.01	0.000	O	|	|	|	|	0.03
37.167	0.00	0.01	0.000	O	|	|	|	|	0.03
37.250	0.00	0.01	0.000	O	|	|	|	|	0.02
37.333	0.00	0.01	0.000	O	|	|	|	|	0.02
37.417	0.00	0.01	0.000	O	|	|	|	|	0.02
37.500	0.00	0.00	0.000	O	|	|	|	|	0.01
37.583	0.00	0.00	0.000	O	|	|	|	|	0.01
37.667	0.00	0.00	0.000	O	|	|	|	|	0.01
37.750	0.00	0.00	0.000	O	|	|	|	|	0.01
37.833	0.00	0.00	0.000	O	|	|	|	|	0.01
37.917	0.00	0.00	0.000	O	|	|	|	|	0.01
38.000	0.00	0.00	0.000	O	|	|	|	|	0.01
38.083	0.00	0.00	0.000	O	|	|	|	|	0.01
38.167	0.00	0.00	0.000	O	|	|	|	|	0.00
38.250	0.00	0.00	0.000	O	|	|	|	|	0.00
38.333	0.00	0.00	0.000	O	|	|	|	|	0.00
38.417	0.00	0.00	0.000	O	|	|	|	|	0.00

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

Number of intervals = 461
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 2.116 (CFS)
Total volume = 4.118 (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

****

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 07/08/24

ORCHARD LOGISTICS CENTER
2 YEAR 1 HOUR BASIN 2 ROUTING
2838Q2R1B2
DS

Program License Serial Number 6145

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

From study/file name: 2838q2puhb212.rte
**********HYDROGRAPH DATA**********
Number of intervals = 20
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 1.642 (CFS)
Total volume = 0.054 (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

****

++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 20
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
1.000	0.012	0.670	0.010	0.014
2.000	0.022	1.160	0.018	0.026
3.000	0.031	1.490	0.026	0.036
3.500	0.048	1.640	0.042	0.054
4.000	0.069	12.760	0.025	0.113
4.500	0.095	32.990	-0.019	0.209
5.000	0.124	43.690	-0.026	0.274

Hydrograph Detention Basin Routing

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

Time	Inflow	Outflow	Storage	Depth

(Hours)	(CFS)	(CFS)	(Ac.Ft)	.0	0.4	0.82	1.23	1.64	(Ft.)
0.083	0.03	0.01	0.000	O	|	|	|	|	0.01
0.167	0.14	0.03	0.001	O I	|	|	|	|	0.05
0.250	0.23	0.08	0.001	|O I	|	|	|	|	0.12
0.333	0.27	0.14	0.002	| O I	|	|	|	|	0.20
0.417	0.32	0.19	0.003	| O I	|	|	|	|	0.28
0.500	0.37	0.24	0.004	| O I|	|	|	|	|	0.36
0.583	0.41	0.29	0.005	| O I	|	|	|	|	0.43
0.667	0.50	0.34	0.006	| O |I	|	|	|	|	0.51
0.750	0.67	0.42	0.008	| O I	|	|	|	|	0.63
0.833	1.16	0.58	0.010	| | O | I	|	|	|	|	0.87
0.917	1.64	0.83	0.015	| | O	|	|	|	I	1.32
1.000	0.93	0.96	0.018	| | | O	|	|	|	|	1.59
1.083	0.51	0.89	0.016	| |I |O	|	|	|	|	1.45
1.167	0.26	0.74	0.013	| I | O	|	|	|	|	1.15
1.250	0.16	0.58	0.010	| I | O	|	|	|	|	0.86
1.333	0.10	0.43	0.008	|I O	|	|	|	|	0.65
1.417	0.06	0.32	0.006	|I O	|	|	|	|	0.48
1.500	0.04	0.23	0.004	I O	|	|	|	|	0.35
1.583	0.01	0.17	0.003	I O	|	|	|	|	0.25
1.667	0.00	0.12	0.002	I O	|	|	|	|	0.17
1.750	0.00	0.08	0.001	IO	|	|	|	|	0.12
1.833	0.00	0.05	0.001	IO	|	|	|	|	0.08
1.917	0.00	0.04	0.001	O	|	|	|	|	0.05
2.000	0.00	0.02	0.000	O	|	|	|	|	0.04
2.083	0.00	0.02	0.000	O	|	|	|	|	0.02
2.167	0.00	0.01	0.000	O	|	|	|	|	0.02
2.250	0.00	0.01	0.000	O	|	|	|	|	0.01
2.333	0.00	0.01	0.000	O	|	|	|	|	0.01
2.417	0.00	0.00	0.000	O	|	|	|	|	0.01
2.500	0.00	0.00	0.000	O	|	|	|	|	0.00
2.583	0.00	0.00	0.000	O	|	|	|	|	0.00
2.667	0.00	0.00	0.000	O	|	|	|	|	0.00
2.750	0.00	0.00	0.000	O	|	|	|	|	0.00

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

Number of intervals = 33
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.959 (CFS)
Total volume = 0.054 (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

****

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 07/08/24

ORCHARD LOGISTICS CENTER
2 YEAR 3 HOUR BASIN 2 ROUTING
2838Q2R3B2
DS

Program License Serial Number 6145

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

From study/file name: 2838q2puhb232.rte
**********HYDROGRAPH DATA**********
Number of intervals = 44
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.962 (CFS)
Total volume = 0.076 (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

****

++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 44
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
1.000	0.012	0.670	0.010	0.014
2.000	0.022	1.160	0.018	0.026
3.000	0.031	1.490	0.026	0.036
3.500	0.048	1.640	0.042	0.054
4.000	0.069	12.760	0.025	0.113
4.500	0.095	32.990	-0.019	0.209
5.000	0.124	43.690	-0.026	0.274

Hydrograph Detention Basin Routing

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

Time	Inflow	Outflow	Storage	Depth

(Hours)	(CFS)	(CFS)	(Ac.Ft)	.0	0.2	0.48	0.72	0.96	(Ft.)
0.083	0.01	0.00	0.000	O					0.00
0.167	0.05	0.01	0.000	OI					0.02
0.250	0.05	0.02	0.000	OI					0.04
0.333	0.06	0.03	0.001	|O					0.05
0.417	0.08	0.05	0.001	|OI					0.07
0.500	0.10	0.06	0.001	| OI					0.09
0.583	0.12	0.08	0.001	| OI					0.11
0.667	0.12	0.09	0.002	| OI					0.13
0.750	0.14	0.10	0.002	| OI					0.15
0.833	0.14	0.11	0.002	| OI					0.17
0.917	0.12	0.12	0.002	| O					0.17
1.000	0.13	0.12	0.002	| OI					0.18
1.083	0.15	0.13	0.002	| OI					0.19
1.167	0.19	0.14	0.002	| O I					0.21
1.250	0.20	0.16	0.003	| OI					0.23
1.333	0.20	0.17	0.003	| OI					0.25
1.417	0.20	0.18	0.003	| OI					0.27
1.500	0.25	0.19	0.003	| O I					0.29
1.583	0.26	0.21	0.004	| OI					0.32
1.667	0.26	0.23	0.004	| OI					0.34
1.750	0.29	0.24	0.004	| OI					0.36
1.833	0.34	0.26	0.005	| O I					0.40
1.917	0.34	0.29	0.005	| O I					0.43
2.000	0.33	0.30	0.005	| O					0.45
2.083	0.33	0.31	0.006	| OI					0.46
2.167	0.37	0.32	0.006	| O I					0.48
2.250	0.48	0.36	0.006	| O I					0.53
2.333	0.53	0.40	0.007	| O |I					0.60
2.417	0.54	0.44	0.008	| O |I					0.66
2.500	0.77	0.51	0.009	| |O |I					0.76
2.583	0.91	0.62	0.011	| | O | I					0.92
2.667	0.96	0.71	0.013	| | O I					1.09
2.750	0.75	0.75	0.014	| | IO |					1.17
2.833	0.42	0.71	0.013	| | I O|					1.07
2.917	0.30	0.60	0.011	| |I | O |					0.89
3.000	0.23	0.49	0.009	| I| O |					0.73
3.083	0.15	0.39	0.007	| I | O |					0.58
3.167	0.08	0.30	0.005	| I | O |					0.45
3.250	0.04	0.22	0.004	|I O|					0.33
3.333	0.02	0.16	0.003	I O |					0.24
3.417	0.01	0.11	0.002	I O |					0.17
3.500	0.01	0.08	0.001	I O |					0.12
3.583	0.00	0.06	0.001	IO |					0.08
3.667	0.00	0.04	0.001	IO |					0.06
3.750	0.00	0.03	0.000	O |					0.04
3.833	0.00	0.02	0.000	O |					0.03
3.917	0.00	0.01	0.000	O |					0.02
4.000	0.00	0.01	0.000	O |					0.01
4.083	0.00	0.01	0.000	O |					0.01
4.167	0.00	0.00	0.000	O |					0.01
4.250	0.00	0.00	0.000	O |					0.00
4.333	0.00	0.00	0.000	O |					0.00
4.417	0.00	0.00	0.000	O |					0.00
4.500	0.00	0.00	0.000	O |					0.00

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

Number of intervals = 54
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.754 (CFS)
Total volume = 0.076 (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

****

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 07/08/24

ORCHARD LOGISTICS CENTER
2 YEAR 6 HOUR BASIN 2 ROUTING
2838Q2R6B2
DS

Program License Serial Number 6145

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

From study/file name: 2838q2puhb262.rte
**********HYDROGRAPH DATA**********
Number of intervals = 80
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.875 (CFS)
Total volume = 0.093 (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

****

++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 80
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
1.000	0.012	0.670	0.010	0.014
2.000	0.022	1.160	0.018	0.026
3.000	0.031	1.490	0.026	0.036
3.500	0.048	1.640	0.042	0.054
4.000	0.069	12.760	0.025	0.113
4.500	0.095	32.990	-0.019	0.209
5.000	0.124	43.690	-0.026	0.274

Hydrograph Detention Basin Routing

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

Time	Inflow	Outflow	Storage	Depth

(Hours)	(CFS)	(CFS)	(Ac.Ft)	.0	0.2	0.44	0.66	0.88	(Ft.)
0.083	0.01	0.00	0.000	O					0.00
0.167	0.04	0.01	0.000	OI					0.02
0.250	0.02	0.02	0.000	O					0.03
0.333	0.01	0.02	0.000	O					0.03
0.417	0.01	0.02	0.000	O					0.02
0.500	0.01	0.01	0.000	O					0.02
0.583	0.02	0.01	0.000	O					0.02
0.667	0.03	0.02	0.000	O					0.03
0.750	0.03	0.02	0.000	O					0.03
0.833	0.03	0.02	0.000	O					0.03
0.917	0.03	0.02	0.000	OI					0.04
1.000	0.03	0.03	0.000	OI					0.04
1.083	0.04	0.03	0.001	|O					0.04
1.167	0.05	0.03	0.001	|O					0.05
1.250	0.05	0.04	0.001	|O					0.06
1.333	0.05	0.04	0.001	|O					0.06
1.417	0.05	0.04	0.001	|O					0.07
1.500	0.05	0.05	0.001	|O					0.07
1.583	0.05	0.05	0.001	|O					0.07
1.667	0.05	0.05	0.001	|O					0.07
1.750	0.05	0.05	0.001	|O					0.07
1.833	0.05	0.05	0.001	|O					0.07
1.917	0.05	0.05	0.001	|O					0.08
2.000	0.05	0.05	0.001	|O					0.08
2.083	0.06	0.05	0.001	|OI					0.08
2.167	0.06	0.06	0.001	| O					0.08
2.250	0.07	0.06	0.001	| O					0.09
2.333	0.07	0.06	0.001	| O					0.09
2.417	0.07	0.06	0.001	| O					0.10
2.500	0.07	0.07	0.001	| O					0.10
2.583	0.07	0.07	0.001	| O					0.10
2.667	0.07	0.07	0.001	| O					0.10
2.750	0.08	0.07	0.001	| O					0.11
2.833	0.09	0.07	0.001	| OI					0.11
2.917	0.09	0.08	0.001	| OI					0.12
3.000	0.09	0.08	0.001	| O					0.12
3.083	0.09	0.09	0.002	| O					0.13
3.167	0.10	0.09	0.002	| O					0.13
3.250	0.11	0.09	0.002	| O					0.14
3.333	0.11	0.10	0.002	| OI					0.15
3.417	0.12	0.10	0.002	| OI					0.16
3.500	0.13	0.11	0.002	| O					0.17
3.583	0.15	0.12	0.002	| OI					0.18
3.667	0.17	0.13	0.002	| O I					0.20
3.750	0.18	0.15	0.003	| OI					0.22
3.833	0.19	0.16	0.003	| O I|				0.24
3.917	0.20	0.17	0.003	| OI|				0.26
4.000	0.22	0.18	0.003	| OI|				0.27
4.083	0.23	0.20	0.004	| OI					0.29
4.167	0.24	0.21	0.004	| OI					0.31
4.250	0.26	0.22	0.004	| OI					0.33
4.333	0.28	0.24	0.004	| O I					0.36
4.417	0.30	0.26	0.005	| |O I					0.38
4.500	0.32	0.27	0.005	| | OI					0.41
4.583	0.33	0.29	0.005	| | O I					0.44
4.667	0.35	0.31	0.006	| | OI					0.46
4.750	0.37	0.33	0.006	| | O I					0.49
4.833	0.39	0.34	0.006	| | O I |				0.51
4.917	0.40	0.36	0.006	| | OI |				0.54
5.000	0.42	0.38	0.007	| | O I|				0.56
5.083	0.45	0.40	0.007	| | O I					0.59
5.167	0.53	0.43	0.008	| | O| I				0.64
5.250	0.62	0.47	0.008	| | |O I |				0.71
5.333	0.69	0.53	0.010	| | | O |I				0.79
5.417	0.76	0.59	0.011	| | | O | I				0.89
5.500	0.88	0.67	0.012	| | | O I				1.00
5.583	0.87	0.73	0.013	| | | | O I|				1.12
5.667	0.50	0.71	0.013	| | | I | O |				1.09
5.750	0.26	0.61	0.011	| |I | O |				0.91
5.833	0.16	0.48	0.009	| I | |O |				0.72

5.917	0.14	0.38	0.007	| I |	O |	|	|	0.56
6.000	0.10	0.29	0.005	| I |	O |	|	|	0.44
6.083	0.07	0.23	0.004	| I	O |	|	|	0.34
6.167	0.03	0.17	0.003	|I	O |	|	|	0.25
6.250	0.01	0.12	0.002	I	O |	|	|	0.18
6.333	0.01	0.09	0.002	I	O |	|	|	0.13
6.417	0.00	0.06	0.001	I O	|	|	|	0.09
6.500	0.00	0.04	0.001	IO	|	|	|	0.06
6.583	0.00	0.03	0.001	IO	|	|	|	0.04
6.667	0.00	0.02	0.000	O	|	|	|	0.03
6.750	0.00	0.01	0.000	O	|	|	|	0.02
6.833	0.00	0.01	0.000	O	|	|	|	0.01
6.917	0.00	0.01	0.000	O	|	|	|	0.01
7.000	0.00	0.00	0.000	O	|	|	|	0.01
7.083	0.00	0.00	0.000	O	|	|	|	0.00
7.167	0.00	0.00	0.000	O	|	|	|	0.00
7.250	0.00	0.00	0.000	O	|	|	|	0.00
7.333	0.00	0.00	0.000	O	|	|	|	0.00

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

Number of intervals = 88
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.727 (CFS)
Total volume = 0.093 (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

****

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 07/08/24

ORCHARD LOGISTICS CENTER
2 YEAR 24 HOUR BASIN 2 ROUTING
2838Q2R24B2
AC

Program License Serial Number 6145

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

From study/file name: 2838q2puhb2242.rte
**********HYDROGRAPH DATA**********
Number of intervals = 296
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.371 (CFS)
Total volume = 0.191 (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

****

++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 296
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
1.000	0.012	0.670	0.010	0.014
2.000	0.022	1.160	0.018	0.026
3.000	0.031	1.490	0.026	0.036
3.500	0.048	1.640	0.042	0.054
4.000	0.069	12.760	0.025	0.113
4.500	0.095	32.990	-0.019	0.209
5.000	0.124	43.690	-0.026	0.274

Hydrograph Detention Basin Routing

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

Time	Inflow	Outflow	Storage	Depth

(Hours)	(CFS)	(CFS)	(Ac.Ft)	.0	0.1	0.19	0.28	0.37	(Ft.)
0.083	0.00	0.00	0.000	O					0.00
0.167	0.01	0.00	0.000	OI					0.01
0.250	0.02	0.01	0.000	OI					0.01
0.333	0.02	0.01	0.000	O					0.02
0.417	0.03	0.02	0.000	OI					0.02
0.500	0.03	0.02	0.000	OI					0.03
0.583	0.03	0.02	0.000	O					0.04
0.667	0.03	0.03	0.000	O					0.04
0.750	0.03	0.03	0.001	O					0.04
0.833	0.04	0.03	0.001	OI					0.05
0.917	0.04	0.03	0.001	OI					0.05
1.000	0.04	0.04	0.001	O					0.06
1.083	0.04	0.04	0.001	O					0.06
1.167	0.04	0.04	0.001	O					0.06
1.250	0.04	0.04	0.001	O					0.06
1.333	0.04	0.04	0.001	O					0.06
1.417	0.04	0.04	0.001	O					0.06
1.500	0.04	0.04	0.001	O					0.05
1.583	0.04	0.04	0.001	O					0.05
1.667	0.04	0.04	0.001	O					0.05
1.750	0.03	0.04	0.001	O					0.05
1.833	0.04	0.04	0.001	O					0.05
1.917	0.04	0.04	0.001	O					0.06
2.000	0.04	0.04	0.001	O					0.06
2.083	0.05	0.04	0.001	O					0.06
2.167	0.05	0.04	0.001	O					0.06
2.250	0.05	0.04	0.001	O					0.07
2.333	0.05	0.04	0.001	O					0.07
2.417	0.05	0.05	0.001	OI					0.07
2.500	0.05	0.05	0.001	OI					0.07
2.583	0.05	0.05	0.001	OI					0.07
2.667	0.05	0.05	0.001	O					0.07
2.750	0.06	0.05	0.001	O					0.07
2.833	0.06	0.05	0.001	O					0.08
2.917	0.06	0.05	0.001	O					0.08
3.000	0.06	0.06	0.001	O					0.08
3.083	0.06	0.06	0.001	OI					0.08
3.167	0.06	0.06	0.001	OI					0.08
3.250	0.06	0.06	0.001	OI					0.09
3.333	0.06	0.06	0.001	OI					0.09
3.417	0.06	0.06	0.001	OI					0.09
3.500	0.06	0.06	0.001	OI					0.09
3.583	0.06	0.06	0.001	O					0.09
3.667	0.06	0.06	0.001	O					0.09
3.750	0.06	0.06	0.001	O					0.09
3.833	0.06	0.06	0.001	O					0.09
3.917	0.07	0.06	0.001	O					0.09
4.000	0.07	0.06	0.001	O					0.09
4.083	0.07	0.06	0.001	O					0.10
4.167	0.07	0.07	0.001	O					0.10
4.250	0.07	0.07	0.001	O					0.10
4.333	0.07	0.07	0.001	OI					0.10
4.417	0.08	0.07	0.001	O					0.10
4.500	0.08	0.07	0.001	O					0.11
4.583	0.08	0.07	0.001	O					0.11
4.667	0.08	0.08	0.001	O					0.11
4.750	0.08	0.08	0.001	O					0.12
4.833	0.08	0.08	0.001	OI					0.12
4.917	0.09	0.08	0.001	O					0.12
5.000	0.09	0.08	0.002	O					0.13
5.083	0.09	0.09	0.002	O					0.13
5.167	0.08	0.08	0.002	IO					0.13
5.250	0.07	0.08	0.001	IO					0.12
5.333	0.07	0.08	0.001	O					0.12
5.417	0.08	0.08	0.001	O					0.12
5.500	0.08	0.08	0.001	O					0.12
5.583	0.08	0.08	0.001	OI					0.12
5.667	0.09	0.08	0.001	O					0.12
5.750	0.09	0.08	0.002	O					0.13
5.833	0.09	0.09	0.002	O					0.13

5.917	0.09	0.09	0.002	| O|	|	|	|	0.13
6.000	0.09	0.09	0.002	| OI	|	|	|	0.13
6.083	0.09	0.09	0.002	| OI	|	|	|	0.14
6.167	0.10	0.09	0.002	| O	|	|	|	0.14
6.250	0.10	0.10	0.002	| O	|	|	|	0.14
6.333	0.10	0.10	0.002	| O	|	|	|	0.15
6.417	0.10	0.10	0.002	| O	|	|	|	0.15
6.500	0.10	0.10	0.002	| OI	|	|	|	0.15
6.583	0.11	0.10	0.002	| OI	|	|	|	0.15
6.667	0.11	0.10	0.002	| |O	|	|	|	0.16
6.750	0.11	0.11	0.002	| |O	|	|	|	0.16
6.833	0.12	0.11	0.002	| |O	|	|	|	0.16
6.917	0.12	0.11	0.002	| |O	|	|	|	0.17
7.000	0.12	0.11	0.002	| |OI	|	|	|	0.17
7.083	0.12	0.11	0.002	| |OI	|	|	|	0.17
7.167	0.12	0.11	0.002	| |OI	|	|	|	0.17
7.250	0.12	0.12	0.002	| |OI	|	|	|	0.17
7.333	0.10	0.11	0.002	| IO	|	|	|	0.17
7.417	0.04	0.10	0.002	| I O	|	|	|	0.15
7.500	0.02	0.08	0.001	| I O |	|	|	|	0.12
7.583	0.02	0.06	0.001	|I O |	|	|	|	0.09
7.667	0.02	0.05	0.001	|I O |	|	|	|	0.07
7.750	0.02	0.04	0.001	|I O |	|	|	|	0.06
7.833	0.02	0.03	0.001	|IO |	|	|	|	0.05
7.917	0.03	0.03	0.001	| O |	|	|	|	0.04
8.000	0.03	0.03	0.001	| O |	|	|	|	0.04
8.083	0.04	0.03	0.001	| OI |	|	|	|	0.05
8.167	0.05	0.04	0.001	| OI |	|	|	|	0.05
8.250	0.06	0.04	0.001	| O I |	|	|	|	0.06
8.333	0.06	0.05	0.001	| OI |	|	|	|	0.07
8.417	0.06	0.05	0.001	| OI |	|	|	|	0.08
8.500	0.07	0.06	0.001	| OI |	|	|	|	0.08
8.583	0.07	0.06	0.001	| O |	|	|	|	0.09
8.667	0.08	0.06	0.001	| OI |	|	|	|	0.10
8.750	0.08	0.07	0.001	| OI |	|	|	|	0.10
8.833	0.08	0.07	0.001	| OI|	|	|	|	0.11
8.917	0.09	0.08	0.001	| OI|	|	|	|	0.12
9.000	0.10	0.08	0.001	| OI	|	|	|	0.12
9.083	0.10	0.09	0.002	| OI	|	|	|	0.13
9.167	0.12	0.10	0.002	| O I	|	|	|	0.14
9.250	0.12	0.10	0.002	| O I	|	|	|	0.15
9.333	0.13	0.11	0.002	| |O I	|	|	|	0.16
9.417	0.14	0.12	0.002	| | OI	|	|	|	0.18
9.500	0.14	0.12	0.002	| | O I	|	|	|	0.19
9.583	0.15	0.13	0.002	| | OI	|	|	|	0.20
9.667	0.15	0.14	0.002	| | O I	|	|	|	0.20
9.750	0.16	0.14	0.003	| | OI	|	|	|	0.21
9.833	0.16	0.15	0.003	| | O I |	|	|	|	0.22
9.917	0.17	0.15	0.003	| | OI |	|	|	|	0.23
10.000	0.17	0.16	0.003	| | O I|	|	|	|	0.24
10.083	0.16	0.16	0.003	| | IO |	|	|	|	0.24
10.167	0.11	0.15	0.003	| |I O |	|	|	|	0.23
10.250	0.10	0.14	0.002	| I O |	|	|	|	0.21
10.333	0.09	0.13	0.002	| I| O |	|	|	|	0.19
10.417	0.09	0.11	0.002	| I|O |	|	|	|	0.17
10.500	0.09	0.11	0.002	| I|O |	|	|	|	0.16
10.583	0.10	0.10	0.002	| O |	|	|	|	0.15
10.667	0.13	0.11	0.002	| |O I |	|	|	|	0.16
10.750	0.14	0.11	0.002	| |O I |	|	|	|	0.17
10.833	0.15	0.12	0.002	| | O I |	|	|	|	0.19
10.917	0.15	0.13	0.002	| | O I |	|	|	|	0.20
11.000	0.15	0.14	0.002	| | OI |	|	|	|	0.21
11.083	0.15	0.14	0.003	| | OI |	|	|	|	0.21
11.167	0.15	0.15	0.003	| | O |	|	|	|	0.22
11.250	0.15	0.15	0.003	| | O |	|	|	|	0.22
11.333	0.15	0.15	0.003	| | O |	|	|	|	0.22
11.417	0.15	0.15	0.003	| | O |	|	|	|	0.22
11.500	0.15	0.15	0.003	| | O |	|	|	|	0.22
11.583	0.14	0.15	0.003	| | O |	|	|	|	0.22
11.667	0.13	0.14	0.003	| | IO |	|	|	|	0.21
11.750	0.13	0.14	0.002	| | IO |	|	|	|	0.21

11.833	0.13	0.13	0.002	|	| IO	|	|	|	0.20
11.917	0.13	0.13	0.002	|	| O	|	|	|	0.20
12.000	0.13	0.13	0.002	|	| O	|	|	|	0.20
12.083	0.15	0.14	0.002	|	| O I	|	|	|	0.20
12.167	0.20	0.15	0.003	|	| O	|I	|	|	0.22
12.250	0.22	0.17	0.003	|	| O	| I	|	|	0.25
12.333	0.23	0.19	0.003	|	| O	I	|	|	0.28
12.417	0.24	0.20	0.004	|	|	|O I	|	|	0.30
12.500	0.25	0.22	0.004	|	|	| O I	|	|	0.32
12.583	0.25	0.23	0.004	|	|	| O I	|	|	0.34
12.667	0.27	0.24	0.004	|	|	| O I|	|	0.36
12.750	0.28	0.25	0.004	|	|	| O I|	|	0.37
12.833	0.28	0.26	0.005	|	|	| O I	|	0.39
12.917	0.29	0.27	0.005	|	|	| O|I	|	0.40
13.000	0.30	0.28	0.005	|	|	| O|I	|	0.41
13.083	0.31	0.28	0.005	|	|	| O I	|	0.43
13.167	0.34	0.30	0.005	|	|	| |O I	|	0.45
13.250	0.36	0.32	0.006	|	|	| O I	|	0.47
13.333	0.36	0.33	0.006	|	|	| O I|	|	0.49
13.417	0.37	0.34	0.006	|	|	| O I|	|	0.51
13.500	0.37	0.35	0.006	|	|	| OI|	|	0.52
13.583	0.35	0.35	0.006	|	|	| IO |	|	0.53
13.667	0.27	0.34	0.006	|	|	| I| O	|	0.51
13.750	0.25	0.31	0.006	|	|	| I | O	|	0.47
13.833	0.24	0.29	0.005	|	|	| I |O	|	0.44
13.917	0.23	0.27	0.005	|	|	| I O|	|	0.41
14.000	0.23	0.26	0.005	|	|	| I O |	|	0.39
14.083	0.23	0.25	0.004	|	|	| IO |	|	0.37
14.167	0.26	0.25	0.004	|	|	| OI |	|	0.37
14.250	0.27	0.25	0.005	|	|	| O I|	|	0.38
14.333	0.27	0.26	0.005	|	|	| OI|	|	0.39
14.417	0.27	0.26	0.005	|	|	| OI|	|	0.39
14.500	0.27	0.26	0.005	|	|	| OI|	|	0.39
14.583	0.27	0.26	0.005	|	|	| OI|	|	0.40
14.667	0.27	0.27	0.005	|	|	| OI|	|	0.40
14.750	0.27	0.27	0.005	|	|	| O|	|	0.40
14.833	0.27	0.27	0.005	|	|	| O|	|	0.40
14.917	0.26	0.27	0.005	|	|	| O |	|	0.40
15.000	0.26	0.26	0.005	|	|	| O |	|	0.39
15.083	0.26	0.26	0.005	|	|	| O |	|	0.39
15.167	0.25	0.26	0.005	|	|	| IO |	|	0.39
15.250	0.25	0.25	0.005	|	|	| IO |	|	0.38
15.333	0.24	0.25	0.005	|	|	| IO |	|	0.38
15.417	0.24	0.25	0.004	|	|	| IO |	|	0.37
15.500	0.23	0.24	0.004	|	|	| IO |	|	0.36
15.583	0.22	0.24	0.004	|	|	| IO |	|	0.36
15.667	0.20	0.23	0.004	|	|	I O |	|	0.34
15.750	0.19	0.22	0.004	|	|	I O |	|	0.32
15.833	0.18	0.21	0.004	|	|	I|O |	|	0.31
15.917	0.18	0.20	0.004	|	|	I|O |	|	0.30
16.000	0.18	0.19	0.003	|	|	IO |	|	0.29
16.083	0.16	0.18	0.003	|	| I O|	|	|	0.28
16.167	0.09	0.17	0.003	|	I O |	|	|	|	0.25
16.250	0.07	0.14	0.002	|	I | O	|	|	|	0.21
16.333	0.06	0.12	0.002	|	I |O	|	|	|	0.17
16.417	0.06	0.10	0.002	|	I O	|	|	|	0.15
16.500	0.05	0.08	0.001	|	I O|	|	|	|	0.12
16.583	0.05	0.07	0.001	|	I O |	|	|	|	0.11
16.667	0.04	0.06	0.001	|	I O |	|	|	|	0.09
16.750	0.04	0.06	0.001	|	IO |	|	|	|	0.08
16.833	0.04	0.05	0.001	|	IO |	|	|	|	0.07
16.917	0.04	0.05	0.001	|	O |	|	|	|	0.07
17.000	0.04	0.04	0.001	|	O |	|	|	|	0.06
17.083	0.04	0.04	0.001	|	O |	|	|	|	0.06
17.167	0.05	0.04	0.001	|	OI |	|	|	|	0.06
17.250	0.05	0.05	0.001	|	OI |	|	|	|	0.07
17.333	0.06	0.05	0.001	|	O |	|	|	|	0.07
17.417	0.06	0.05	0.001	|	O |	|	|	|	0.08
17.500	0.06	0.05	0.001	|	O |	|	|	|	0.08
17.583	0.06	0.05	0.001	|	O |	|	|	|	0.08
17.667	0.06	0.06	0.001	|	OI |	|	|	|	0.08

17.750	0.06	0.06	0.001	OI				0.08
17.833	0.06	0.06	0.001	O				0.08
17.917	0.05	0.06	0.001	O				0.08
18.000	0.05	0.05	0.001	O				0.08
18.083	0.05	0.05	0.001	O				0.08
18.167	0.05	0.05	0.001	O				0.08
18.250	0.05	0.05	0.001	O				0.07
18.333	0.05	0.05	0.001	O				0.07
18.417	0.05	0.05	0.001	O				0.07
18.500	0.05	0.05	0.001	O				0.07
18.583	0.04	0.05	0.001	IO				0.07
18.667	0.04	0.05	0.001	O				0.07
18.750	0.04	0.04	0.001	O				0.06
18.833	0.03	0.04	0.001	IO				0.06
18.917	0.03	0.04	0.001	IO				0.06
19.000	0.03	0.03	0.001	O				0.05
19.083	0.03	0.03	0.001	O				0.05
19.167	0.03	0.03	0.001	O				0.05
19.250	0.03	0.03	0.001	O				0.05
19.333	0.04	0.03	0.001	OI				0.05
19.417	0.04	0.03	0.001	OI				0.05
19.500	0.04	0.04	0.001	O				0.06
19.583	0.04	0.04	0.001	O				0.06
19.667	0.04	0.04	0.001	O				0.06
19.750	0.04	0.04	0.001	O				0.06
19.833	0.03	0.04	0.001	IO				0.06
19.917	0.03	0.04	0.001	IO				0.05
20.000	0.03	0.03	0.001	O				0.05
20.083	0.03	0.03	0.001	O				0.05
20.167	0.03	0.03	0.001	O				0.05
20.250	0.03	0.03	0.001	O				0.05
20.333	0.03	0.03	0.001	O				0.05
20.417	0.03	0.03	0.001	O				0.05
20.500	0.03	0.03	0.001	O				0.05
20.583	0.03	0.03	0.001	O				0.05
20.667	0.03	0.03	0.001	OI				0.05
20.750	0.03	0.03	0.001	OI				0.05
20.833	0.03	0.03	0.001	O				0.05
20.917	0.03	0.03	0.001	O				0.05
21.000	0.03	0.03	0.001	O				0.05
21.083	0.03	0.03	0.001	O				0.04
21.167	0.03	0.03	0.001	O				0.04
21.250	0.03	0.03	0.001	O				0.05
21.333	0.03	0.03	0.001	O				0.05
21.417	0.03	0.03	0.001	O				0.05
21.500	0.03	0.03	0.001	O				0.04
21.583	0.03	0.03	0.001	O				0.04
21.667	0.03	0.03	0.001	O				0.04
21.750	0.03	0.03	0.001	O				0.04
21.833	0.03	0.03	0.001	O				0.05
21.917	0.03	0.03	0.001	O				0.05
22.000	0.03	0.03	0.001	O				0.04
22.083	0.03	0.03	0.000	O				0.04
22.167	0.03	0.03	0.001	O				0.04
22.250	0.03	0.03	0.001	O				0.04
22.333	0.03	0.03	0.001	O				0.05
22.417	0.03	0.03	0.001	O				0.05
22.500	0.03	0.03	0.001	O				0.04
22.583	0.02	0.03	0.000	O				0.04
22.667	0.02	0.03	0.000	O				0.04
22.750	0.02	0.03	0.000	O				0.04
22.833	0.02	0.02	0.000	O				0.04
22.917	0.02	0.02	0.000	O				0.04
23.000	0.02	0.02	0.000	O				0.04
23.083	0.02	0.02	0.000	O				0.04
23.167	0.02	0.02	0.000	O				0.04
23.250	0.02	0.02	0.000	O				0.04
23.333	0.02	0.02	0.000	O				0.04
23.417	0.02	0.02	0.000	O				0.03
23.500	0.02	0.02	0.000	O				0.03
23.583	0.02	0.02	0.000	O				0.03

23.667	0.02	0.02	0.000	| O	|	|	|	0.03
23.750	0.02	0.02	0.000	| O	|	|	|	0.03
23.833	0.02	0.02	0.000	| O	|	|	|	0.03
23.917	0.02	0.02	0.000	| O	|	|	|	0.03
24.000	0.02	0.02	0.000	| O	|	|	|	0.03
24.083	0.02	0.02	0.000	|O	|	|	|	0.03
24.167	0.01	0.02	0.000	IO	|	|	|	0.03
24.250	0.00	0.02	0.000	IO	|	|	|	0.02
24.333	0.00	0.01	0.000	IO	|	|	|	0.02
24.417	0.00	0.01	0.000	O	|	|	|	0.01
24.500	0.00	0.01	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
25.000	0.00	0.00	0.000	O	|	|	|	0.00

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

Number of intervals = 300
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.353 (CFS)
Total volume = 0.191 (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 8: Source Control

Pollutant Sources/Source Control Checklist

SOURCE CONTROL BMPs INCLUDED ONSITE		
IDENTIFIER	DESCRIPTION OF BMP	RESPONSIBLE PARTY
N1	EDUCATION ON STORMWATER BMPs	OWNER
N2	ACTIVITY RESTRICTIONS	OWNER
N3	LANDSCAPE MANAGEMENT BMPS	OWNER
N4	BMP MAINTENANCE	OWNER
N6	LOCAL WATER QUALITY ORDINANCES	OWNER
N7	PROVIDE SPILL PLAN	OWNER
N10	UNIFORM FIRE CODE IMPLEMENTATION	OWNER
N11	LITTER/DEBRIS CONTROL PROGRAM	OWNER
N12	EMPLOYEE TRAINING	OWNER
N13	HOUSEKEEPING OF LOADING DOCKS	OWNER
N14	CATCH BASIN INSPECTION PROGRAM	OWNER
N15	VACUUM SWEEPING OF PARKING LOTS	OWNER
N17	NPDES COMPLIANCE	OWNER
S1	STORM DRAIN STENCILING	OWNER
S3	REDUCED WASTE STORAGE POLLUTION	OWNER
S4	EFFICIENT IRRIGATION SYSTEM	OWNER
S5	LANDSCAPING MIN. 1–2" BELOW PAVEMENT	OWNER

OPERATIONAL SOURCE CONTROL BMP'S

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Onsite Storm Drain Inlet	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 availability.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to new site owners, lessees, or operators. • See applicable operational BMP 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."
Loading Docks	The project site will have loading docks which are shown on the Water Quality Management plan. Loading docks shall be inspected on a weekly basis to help ensure that any trash and debris are collected prior to being washed into the storm drain system. All stormwater runoff from the loading dock areas will be discharged to a bioretention basin. Basin overflow will be conveyed to the public storm drain system. Documentation of loading dock inspection/maintenance shall be kept by the owner in perpetuity.	• 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
Fire Sprinkler Test	Underground fire protection service and fire sprinklers test will be provided per the uniform fire code and the requirements of Riverside County.	• Provide a means to drain fire sprinkler test water to the sanitary sewer.
Plazas, sidewalks, and Parking Lots	Documentation of such sweeping shall be kept by the owner in perpetuity. Frequency of sweeping shall be adjusted as needed to maintain a clean site.	• Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Trash Storage Areas	Trash storage areas shall be paved with an impervious surface designed not to allow run-on from adjoining areas. Trash storage areas shall be designed to divert runoff from adjoining roofs and pavements from the surrounding area and screened or walled to prevent off-site transport of trash. Trash dumpsters (containers) shall be leak proof and have attached covers and lids. Trash enclosures shall be roofed per City standards and the	• Adequate number of receptacles shall be provided. 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 onsite. See fact sheet SC-34 "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com and in Appendix 10.

	details on the WQMP exhibit in Appendix 1. Trash compactors shall be roofed and set on a concrete pad per City standards. The pad shall be a minimum of one foot larger all around than the trash compactor and sloped to drain to a sanitary sewer line. Connection of trash area drains to the MS4 is prohibited. See CASQA SD-32 BMP fact sheet in Appendix 10 for additional information. Signs shall be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
■ A. **On-site storm drain inlets**	■ **Locations of inlets.** On-site catch basins (CB) have shown on post construction BMP site plan which are only for pre-treatment purpose.	■ **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. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ■ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ■ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ■ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ■ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	■ **Maintain landscaping using minimum or no pesticides.** ■ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ■ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

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

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

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

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

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

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

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

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
■ P. **Plazas, sidewalks, and parking lots.**	Project site plaza, sidewalks and parking lots are designed through the site, see Post-Construction BMP Site Plan.		■ **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

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 _____ of 20___, by and between Orchards Logistics Venture, LLC, ("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 745 Nicholas Road (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: _____ By: _____

Name: Kyle Dorand Name: _____

Title: VP Development Title: _____

Organization: Orchards Logistics Venture, LLC 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.

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: _____
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.

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.

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.

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

REAL PROPERTY IN THE CITY OF BEAUMONT, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL A AS SHOWN ON LOT LINE OF ADJUSTMENT NO. 06-LLA-09, AS EVIDENCED BY DOCUMENT RECORDED AUGUST 02, 2007 AS INSTRUMENT NO. 2007-0501539 OF OFFICIAL RECORDS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THAT PORTION OF THE NORTH HALF OF THE NORTHWEST QUARTER OF SECTION 9, TOWNSHIP 3 SOUTH, RANGE 1 WEST, SAN BERNARDINO MERIDIAN IN THE CITY OF BEAUMONT, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA WHICH LIES WITHIN THE FOLLOWING BOUNDARIES:

BEGINNING AT A POINT IN THE WESTERLY LINE OF SAID NORTHWEST QUARTER DISTANT SOUTH 00°30'39" EAST THEREON 233.25 FEET FROM THE NORTHWESTERLY CORNER OF SAID SECTION 9 TO THE NORTHWESTERLY CORNER OF THAT CERTAIN PARCEL OF LAND DESCRIBED AS PARCEL "B" IN DEED RECORDED JUNE 10, 2003 IN INSTRUMENT NO. 2003-444207, OF OFFICIAL RECORDS, RECORDS OF SAID COUNTY, SAID LAST MENTIONED CORNER ALSO BEING A POINT IN THE SOUTHERLY BOUNDARY OF CALIFORNIA STATE HIGHWAY 60;

THENCE ALONG THE NORTHERLY BOUNDARY OF SAID CERTAIN PARCEL OF LAND AND ALONG SAID SOUTHERLY BOUNDARY THE FOLLOWING COURSES:

SOUTH 86°49'31" EAST 65.12 FEET;
THENCE NORTH 83°14'55" EAST 203.04 FEET;
THENCE SOUTH 89°06'58" EAST 300.24 FEET;
THENCE SOUTH 86°49'31" EAST 600.00 FEET;

THENCE SOUTH 89°27'35" EAST 48.60 FEET TO A LINE PARALLEL WITH AND 1130.00 FEET WESTERLY, MEASURED AT RIGHT ANGLES, FROM THE WESTERLY LINE OF THAT CERTAIN PARCEL OF LAND DESCRIBED IN DEED RECORDED JUNE 13, 2003 AS INSTRUMENT NO. 2003-435769, OF SAID OF OFFICIAL RECORDS;

THENCE ALONG SAID PARALLEL LINE, SOUTH 00°23'03" WEST 1112.14 FEET TO A POINT IN THE NORTHERLY LINE OF PARCEL MAP NO. 25090 AS PER MAP FILED IN BOOK 165 PAGES 69, 70 AND 71, OF PARCEL MAPS, RECORDS OF SAID COUNTY;

THENCE ALONG SAID LAST MENTIONED NORTHERLY LINE, NORTH 87°34'43" WEST 1197.78 FEET TO THE WESTERLY LINE OF SAID NORTHWEST QUARTER;

THENCE ALONG SAID LAST MENTIONED WESTERLY LINE, NORTH 00°30'39" WEST 1087.21 FEET TO "POINT OF BEGINNING".

APN: 417-020-070

EXHIBIT "B"
DIAGRAM OF PROPERTY

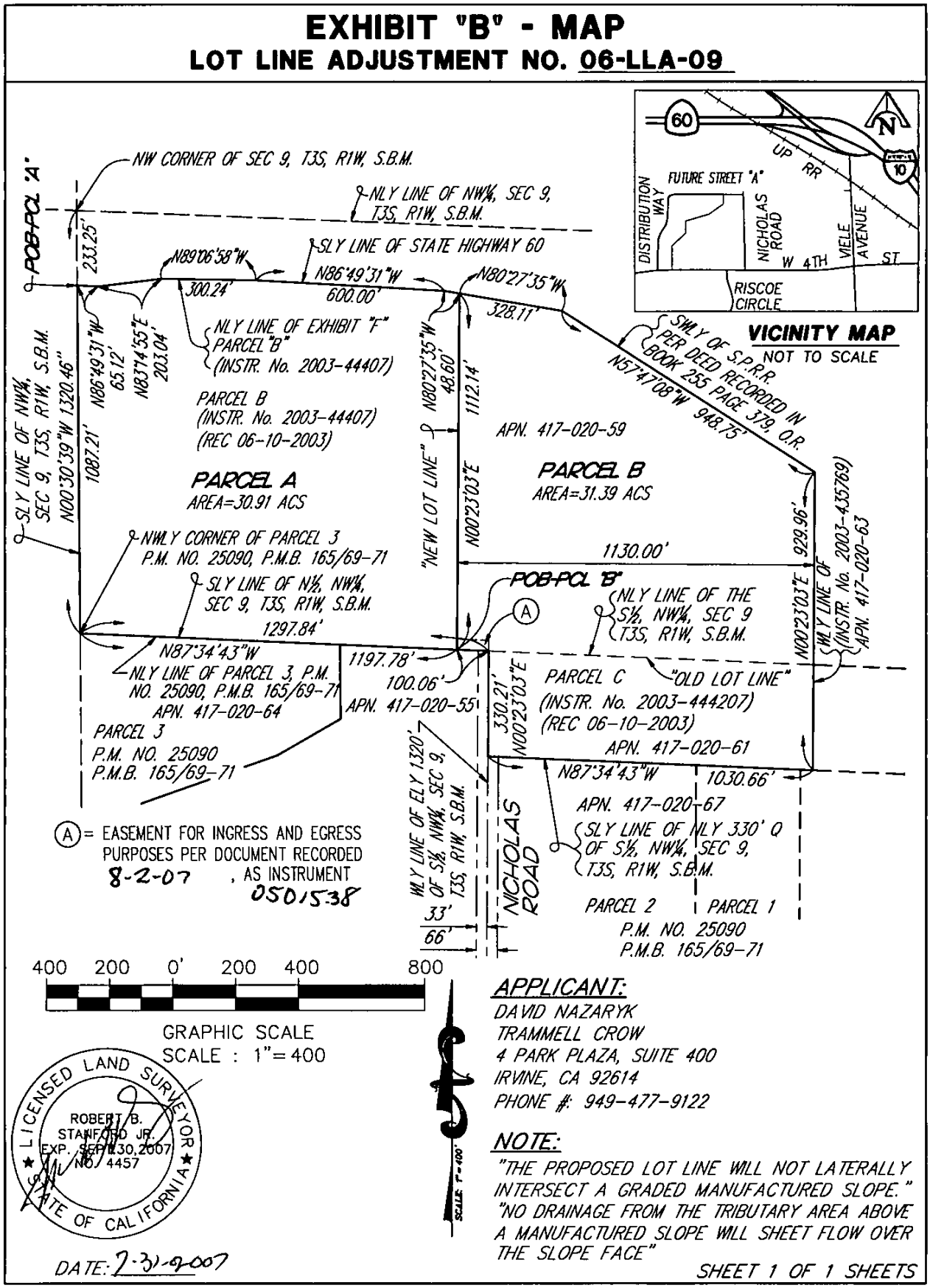
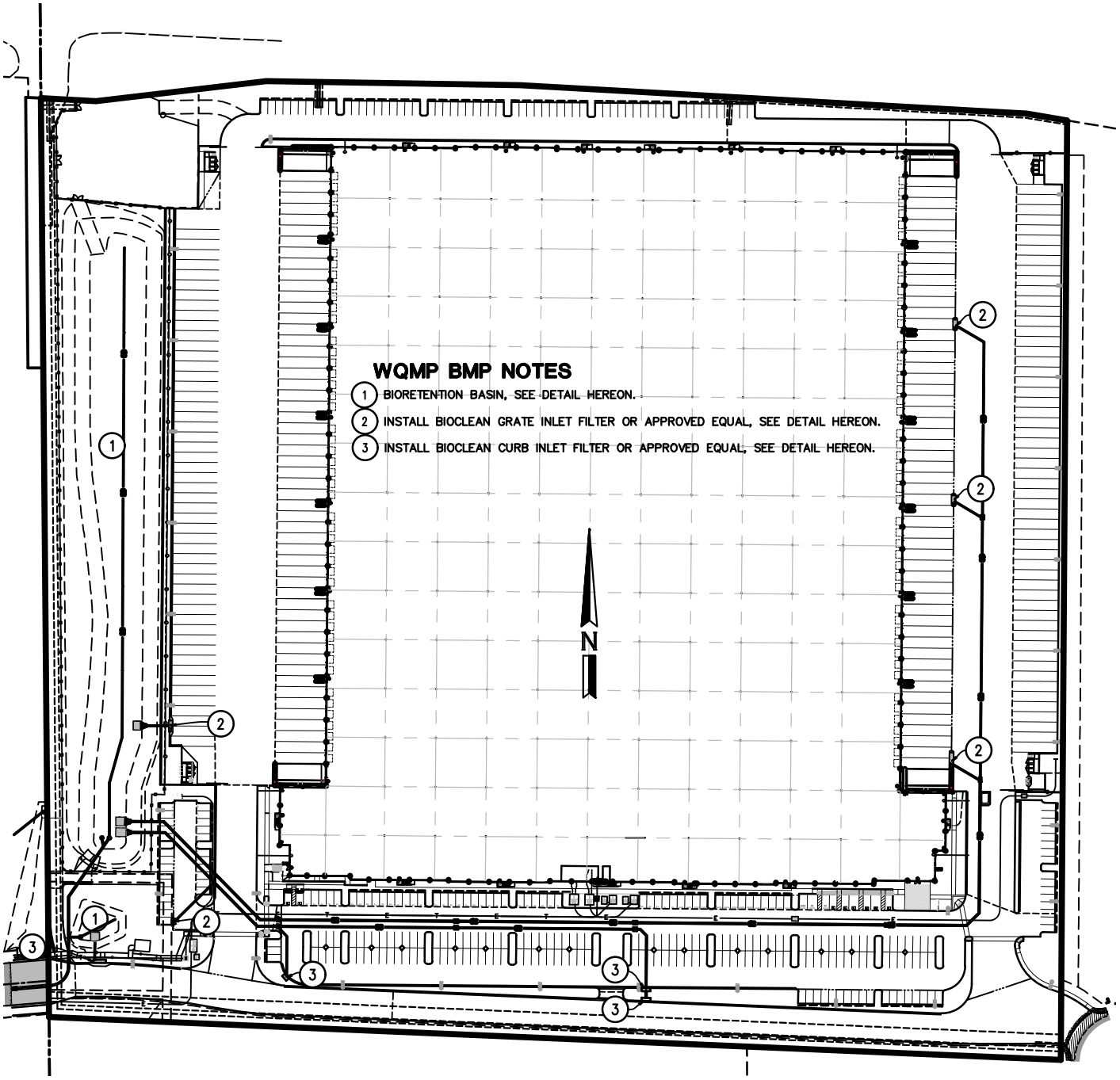


EXHIBIT "C"
WQMP



The below Source Control and Treatment Control BMP's shall be started once construction is complete and certificate of occupancy has been obtained.

Source Control BMP's Requiring ongoing operation and maintenance

- Landscape and Irrigation Design and Maintenance:
  See CASQA BMP Fact Sheet SD-10 in Appendix 10

  - Site landscaping design shall be implemented in accordance with the requirements of the site specific WQMP and local agency requirements.
  - Site landscaping maintenance shall begin immediately after it has been planted.
  - Maintenance of landscaping shall occur on a weekly basis and adjusted accordingly based on current conditions and seasonal needs.
  - Inspection of irrigation system shall be provided on a bi-weekly basis to ensure proper function of the irrigation system, no significant overspray is occurring.
  - Malfunctioning systems shall be repaired or replaced immediately.
  - Inspect plant health on a monthly basis. Repair or replace unhealthy plants as needed.
  - Inspect side slopes of basins and sloped areas on a bi-weekly basis and repair as needed. Re-plant and apply erosion protection to those areas to help prevent erosion in the future.
  - Landscape clippings shall be swept and picked up immediately to prevent it from entering the storm drain system or adjacent sedimentation basins and filtration basins. Dispose of landscape clippings in a legal manner

- MS4 Stenciling and Signage:
  See CASQA BMP Fact Sheet SD-13 in Appendix 10

  - MS4 Stenciling and signage shall be placed during construction and inspection and maintenance shall begin upon completion of construction.
  - Inspect catch basin stenciling on a bi-monthly basis. Replace any damaged, missing or faded stencils in a timely manner.

- Common area litter control, loading docks and trash storage areas:
  See CASQA BMP Fact Sheet SD-32 in Appendix D

  - Inspection and Maintenance of common areas, loading docks and trash storage areas shall begin upon completion of construction.
  - Visual inspection of common areas and loading docks shall take place on a daily basis and adjusted on an as needed basis. Visual inspection of trash storage areas shall take place on a weekly basis and adjusted on an as needed basis.
  - Inspect areas for trash and debris. Remove any found trash and debris immediately. Dispose of trash and debris in a legal manner.
  - Inspect areas for any spills. Pick up/clean up found spills immediately. Dispose of spill material in a legal manner.

- Parking lot sweeping:
  See CASQA BMP Fact Sheet SE-7 in Appendix 10

  - Parking lot sweeping shall being after the completion of construction and take place on a monthly basis.
  - Dispose of picked up material in a legal manner.

- Drainage facility (including roof drains) inspection and maintenance:

  - Inspection and maintenance of site drainage facilities and roof drains shall begin immediately upon completion of construction.

- Catch basin and roof drain inspections shall take place on a monthly basis, prior to a rain event and after a rain event.
- Collected debris shall be removed. Catch basins and roof drain inlet shall be clear of any debris prior to any storm event to ensure proper function of the roof drains. Collected debris shall be disposed of in a legal manner.
- Catch basin filters shall be inspected on a monthly basis.
- Catch basin filters that have exceeded 50% of the storage capacity shall be cleaned immediately.
- Catch basin filters shall be maintained per the manufacturer's specifications.
- Damaged catch basin filters shall be replaced with an approved equal prior to the next storm event or as soon as practicable.

Primary Treatment Control BMP's Requiring ongoing operation and maintenance:

- Bioretention Basins
  See Appendix 1 Post-Construction BMP Site Plan

  - Once the sedimentation and sand filter basin have gone on-line, inspections should occur after every major storm for the first year to ensure that proper stabilization and function is achieved. Continuous inspection and maintenance shall be provided once every six months. Special attention should be paid to how long water remains standing in the basin after a storm; standing water within the basin more than 48 hours after a storm indicates that the filtration rates are insufficient and maintenance of the filter basin bottom is needed. If standing water remains after 48 hours, the standing water shall be removed in accordance with the local agency guidelines and maintenance of the filter basin bottom shall be scheduled immediately. Factors that are typically responsible for clogging the filter basin bottom include upstream sediment erosion and excessive compaction of the basin bottom. These should be repaired immediately to help achieve the desired filtration rates.
  - Observe and document evidence of collected sediments, trash, debris and oils/greases.
  - Sediments, trash, debris and oils/greases shall be removed and disposed of in a legal manner.
  - Observe and document evidence of erosion of side slopes or flowlines.
  - Schedule repair of eroded side slopes or flowlines immediately.
  - Protection measures against further erosion shall be placed until the eroded areas are repaired. Protection measures should be at a minimum placement of gravel bags and fiber rolls to prevent further erosion of the affected areas until the areas have been repaired and vegetation has been established.

Pre-Treatment BMP's

- Bio-Clean Filters (or approved equal)
  See Appendix 10

  - The Owner will contract a contractor to inspect and maintain all catch basin filters located throughout the site.
  - The contracted party must have the proper training and knowledge to perform maintenance procedures on all catch basin filters.
  - The contracted party will inspect all the catch basin filters every three months, at the beginning of the wet season, and after periods of heavy runoff.
  - The contracted party will inspect for sediment, trash and debris build up and that the systems are properly functioning. Sediments, trash, and debris build up within the catch basin filter systems would be hand or vacuumed cleaned every three months or if during inspection ¼ of the catch basin filter system is full. Hand cleaning will require that the filter be removed from the catch basins. The waste material will then be dumped into a DOT approved container for disposal. Vacuum cleaning requires the filter system to be cleaned in place with the use of an industrial vacuum truck/trailer. The waste material will then be dumped into a DOT approved container for disposal.
  - Confined Space procedures must be followed at all times.

- When all the waste materials have been removed, the catch basin filters must be inspected for continued serviceability.
- Minor damage or defects found shall be corrected on the spot and a notation made on the maintenance record. The filter media shall be inspected for defects and continued serviceability and replaced as necessary if needed during any inspection.
- The filter media though shall be replaced once a year as a regular maintenance service. All spent media filters must be placed in the DOT approved container, along with the collected waste materials.
- Since the collected materials most likely contain petroleum hydrocarbons, heavy metals and other harmful pollutants, the materials must be treated as an EPA Class 2 Hazardous Waste and therefore proper disposal will be imposed by the City of Riverside or the County of Riverside. Therefore the Owner will contract a contractor with OSHA 1910.120 training in handling hazardous waste material. The contracted party will also be qualified as a licensed hazardous waste transporter to dispose of the all the collected waste materials in a lawful and timely manner and following all City of Moreno Valley or County of Riverside requirements. The waste material will be transported and disposed at an approved Hazardous Waste Facility.

A sample Inspection and Maintenance Form has been provided in Appendix I. The owner shall ensure that documentation of all inspections and maintenance is provided for all above source control and Treatment Control BMP's. Documentation shall be kept in perpetuity.

The entity responsible for ongoing inspection and maintenance of the above described Source Control and Treatment Control BMP's is:

Orchard Logistics Venture, LLC
Contact: Kyle Dorand (VP Devp)
3501 Jamboree Road, Suite 230
Newport Beach, CA 92660
KDorand@trammellcrow.com
(949) 283-5713

SAMPLE

BMP INSPECTION, MAINTENANCE AND RECORD KEEPING FORM

Today's Date: _____

Name of Person Performing Activity: _____

Company: _____

Phone Number: _____

Signature: _____

BMP Name	Brief Description of Inspection, and/or Maintenance Performed	Date Completed

Appendix 10: Educational Materials

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

Section 4
Source Control BMPs

4.1 Introduction

This section describes specific source control Best Management Practices (BMPs) to be considered for incorporation into newly developed public and private infrastructure, as well as retrofit into existing facilities to meet stormwater management objectives.

4.2 BMP Fact Sheets

Source control fact sheets for design are listed in Table 4-1. The fact sheets detail planning methods and concepts that should be taken into consideration by developers during project design. The fact sheets are arranged in three categories: those that have to do with landscape, irrigation, and signage considerations; those that have to do with use of particular materials, those that have to do with design of particular areas.

Table 4-1 Source Control BMPs for Design

Design	
SD-10	Site Design and Landscape Planning
SD-11	Roof Runoff Controls
SD-12	Efficient Irrigation
SD-13	Storm Drain System Signs
Materials	
SD-20	Pervious Pavements
SD-21	Alternative Building Materials
Areas	
SD-30	Fueling Areas
SD-31	Maintenance Bays and Docks
SD-32	Trash Enclosures
SD-33	Vehicle Washing Areas
SD-34	Outdoor Material Storage Areas
SD-35	Outdoor Work Areas
SD-36	Outdoor Processing Areas

4.3 Fact Sheet Format

A BMP fact sheet is a short document that provides information about a particular BMP. Typically each fact sheet contains the information outlined in Figure 4-1. Supplemental information is provided if it is available. The fact sheets also contain side bar presentations with information on BMP design objectives. Completed fact sheets for each of the above activities are provided in Section 4.4.

SDxx Example Fact Sheet

Description of the BMP
Approach
Suitable Applications
Design Considerations
- Designing New Installations
- Redeveloping Existing Installations

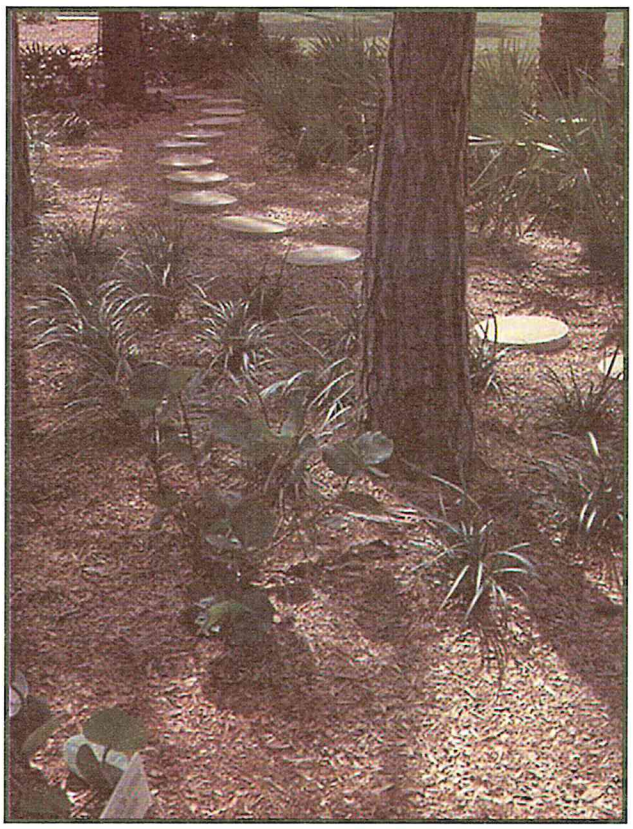
Supplemental Information
- Examples
- Other Resources

Figure 4-1
Example Fact Sheet

4.4 BMP Fact Sheets

Source Control BMP Fact Sheets for design follow. The BMP fact sheets are individually page numbered and are suitable for photocopying and inclusion in stormwater quality management plans. Fresh copies of the fact sheets can be individually downloaded from the California Stormwater BMP Handbook website at www.cabmphandbooks.com.

Site Design & Landscape Planning SD-10



Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

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

CASQA California Stormwater Quality Association

Designing New Installations

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

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

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

Conserve Natural Areas during Landscape Planning

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

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

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

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

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

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

Protection of Slopes and Channels during Landscape Design

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

Redeveloping Existing Installations

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

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

Other Resources

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

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

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

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

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

Roof Runoff Controls SD-11



Rain Garden

Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

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

CASQA California Stormwater Quality Association

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

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

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

Dry wells and Infiltration Trenches

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

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

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

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

Pop-up Drainage Emitter

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

Foundation Planting

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

Redeveloping Existing Installations

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

Supplemental Information

Examples

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

Other Resources

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

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

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

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.

CASQA California Stormwater Quality Association

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

Redeveloping Existing Installations

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

Other Resources

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

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

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

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

Storm Drain Signage SD-13



Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

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

Designing New Installations

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

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

CASQA California Stormwater Quality Association

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.

Pervious Pavements SD-20



Design Objectives

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

Description

Pervious paving is used for light vehicle loading in parking areas. The term describes a system comprising a load-bearing, durable surface together with an underlying layered structure that temporarily stores water prior to infiltration or drainage to a controlled outlet. The surface can itself be porous such that water infiltrates across the entire surface of the material (e.g., grass and gravel surfaces, porous concrete and porous asphalt), or can be built up of impermeable blocks separated by spaces and joints, through which the water can drain. This latter system is termed 'permeable' paving. Advantages of pervious pavements is that they reduce runoff volume while providing treatment, and are unobtrusive resulting in a high level of acceptability.

Approach

Attenuation of flow is provided by the storage within the underlying structure or sub base, together with appropriate flow controls. An underlying geotextile may permit groundwater recharge, thus contributing to the restoration of the natural water cycle. Alternatively, where infiltration is inappropriate (e.g., if the groundwater vulnerability is high, or the soil type is unsuitable), the surface can be constructed above an impermeable membrane. The system offers a valuable solution for drainage of spatially constrained urban areas.

Significant attenuation and improvement in water quality can be achieved by permeable pavements, whichever method is used. The surface and subsurface infrastructure can remove both the soluble and fine particulate pollutants that occur within urban runoff. Roof water can be piped into the storage area directly, adding areas from which the flow can be attenuated. Also, within lined systems, there is the opportunity for stored runoff to be piped out for reuse.

Suitable Applications

Residential, commercial and industrial applications are possible. The use of permeable pavement may be restricted in cold regions, arid regions or regions with high wind erosion. There are some specific disadvantages associated with permeable pavement, which are as follows:

- Permeable pavement can become clogged if improperly installed or maintained. However, this is countered by the ease with which small areas of paving can be cleaned or replaced when blocked or damaged.

- Their application should be limited to highways with low traffic volumes, axle loads and speeds (less than 30 mph limit), car parking areas and other lightly trafficked or non-trafficked areas. Permeable surfaces are currently not considered suitable for adoptable roads due to the risks associated with failure on high speed roads, the safety implications of ponding, and disruption arising from reconstruction.

- When using un-lined, infiltration systems, there is some risk of contaminating groundwater, depending on soil conditions and aquifer susceptibility. However, this risk is likely to be small because the areas drained tend to have inherently low pollutant loadings.

- The use of permeable pavement is restricted to gentle slopes.

- Porous block paving has a higher risk of abrasion and damage than solid blocks.

Design Considerations

Designing New Installations

If the grades, subsoils, drainage characteristics, and groundwater conditions are suitable, permeable paving may be substituted for conventional pavement on parking areas, cul de sacs and other areas with light traffic. Slopes should be flat or very gentle. Scottish experience has shown that permeable paving systems can be installed in a wide range of ground conditions, and the flow attenuation performance is excellent even when the systems are lined.

The suitability of a pervious system at a particular pavement site will, however, depend on the loading criteria required of the pavement.

Where the system is to be used for infiltrating drainage waters into the ground, the vulnerability of local groundwater sources to pollution from the site should be low, and the seasonal high water table should be at least 4 feet below the surface.

Ideally, the pervious surface should be horizontal in order to intercept local rainfall at source. On sloping sites, pervious surfaces may be terraced to accommodate differences in levels.

Design Guidelines

The design of each layer of the pavement must be determined by the likely traffic loadings and their required operational life. To provide satisfactory performance, the following criteria should be considered:

- The subgrade should be able to sustain traffic loading without excessive deformation.

- The granular capping and sub-base layers should give sufficient load-bearing to provide an adequate construction platform and base for the overlying pavement layers.

- The pavement materials should not crack of suffer excessive rutting under the influence of traffic. This is controlled by the horizontal tensile stress at the base of these layers.

There is no current structural design method specifically for pervious pavements. Allowances should be considered the following factors in the design and specification of materials:

- Pervious pavements use materials with high permeability and void space. All the current UK pavement design methods are based on the use of conventional materials that are dense and relatively impermeable. The stiffness of the materials must therefore be assessed.
- Water is present within the construction and can soften and weaken materials, and this must be allowed for.
- Existing design methods assume full friction between layers. Any geotextiles or geomembranes must be carefully specified to minimize loss of friction between layers.
- Porous asphalt loses adhesion and becomes brittle as air passes through the voids. Its durability is therefore lower than conventional materials.

The single sized grading of materials used means that care should be taken to ensure that loss of finer particles between unbound layers does not occur.

Positioning a geotextile near the surface of the pervious construction should enable pollutants to be trapped and retained close to the surface of the construction. This has both advantages and disadvantages. The main disadvantage is that the filtering of sediments and their associated pollutants at this level may hamper percolation of waters and can eventually lead to surface ponding. One advantage is that even if eventual maintenance is required to reinstate infiltration, only a limited amount of the construction needs to be disturbed, since the sub-base below the geotextile is protected. In addition, the pollutant concentration at a high level in the structure allows for its release over time. It is slowly transported in the stormwater to lower levels where chemical and biological processes may be operating to retain or degrade pollutants.

The design should ensure that sufficient void space exists for the storage of sediments to limit the period between remedial works.

- Pervious pavements require a single size grading to give open voids. The choice of materials is therefore a compromise between stiffness, permeability and storage capacity.
- Because the sub-base and capping will be in contact with water for a large part of the time, the strength and durability of the aggregate particles when saturated and subjected to wetting and drying should be assessed.
- A uniformly graded single size material cannot be compacted and is liable to move when construction traffic passes over it. This effect can be reduced by the use of angular crushed rock material with a high surface friction.

In pollution control terms, these layers represent the site of long term chemical and biological pollutant retention and degradation processes. The construction materials should be selected, in addition to their structural strength properties, for their ability to sustain such processes. In general, this means that materials should create neutral or slightly alkaline conditions and they should provide favorable sites for colonization by microbial populations.

Construction/Inspection Considerations

- Permeable surfaces can be laid without cross-falls or longitudinal gradients.
- The blocks should be lain level

- They should not be used for storage of site materials, unless the surface is well protected from deposition of silt and other spillages.
- The pavement should be constructed in a single operation, as one of the last items to be built, on a development site. Landscape development should be completed before pavement construction to avoid contamination by silt or soil from this source.
- Surfaces draining to the pavement should be stabilized before construction of the pavement.
- Inappropriate construction equipment should be kept away from the pavement to prevent damage to the surface, sub-base or sub-grade.

Maintenance Requirements

The maintenance requirements of a pervious surface should be reviewed at the time of design and should be clearly specified. Maintenance is required to prevent clogging of the pervious surface. The factors to be considered when defining maintenance requirements must include:

- Type of use
- Ownership
- Level of trafficking
- The local environment and any contributing catchments

Studies in the UK have shown satisfactory operation of porous pavement systems without maintenance for over 10 years and recent work by Imbe et al. at 9th ICUD, Portland, 2002 describes systems operating for over 20 years without maintenance. However, performance under such regimes could not be guaranteed, Table 1 shows typical recommended maintenance regimes:

Table 1 Typical Recommended Maintenance Regimes	
Activity	**Schedule**
■ Minimize use of salt or grit for de-icing ■ Keep landscaped areas well maintained ■ Prevent soil being washed onto pavement	Ongoing
■ Vacuum clean surface using commercially available sweeping machines at the following times: - End of winter (April) - Mid-summer (July / August) - After Autumn leaf-fall (November)	2/3 x per year
■ Inspect outlets	Annual
■ If routine cleaning does not restore infiltration rates, then reconstruction of part of the whole of a pervious surface may be required. ■ The surface area affected by hydraulic failure should be lifted for inspection of the internal materials to identify the location and extent of the blockage. ■ Surface materials should be lifted and replaced after brush cleaning. Geotextiles may need complete replacement. ■ Sub-surface layers may need cleaning and replacing. ■ Removed silts may need to be disposed of as controlled waste.	As needed (infrequent) Maximum 15-20 years

Permeable pavements are up to 25 % cheaper (or at least no more expensive than the traditional forms of pavement construction), when all construction and drainage costs are taken into account. (Accepting that the porous asphalt itself is a more expensive surfacing, the extra cost of which is offset by the savings in underground pipework etc.) (Niemczynowicz, et al., 1987)

Table 1 gives US cost estimates for capital and maintenance costs of porous pavements (Landphair et al., 2000)

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

Cost Considerations

Permeable pavements are up to 25 % cheaper (or at least no more expensive than the traditional forms of pavement construction), when all construction and drainage costs are taken into account. (Accepting that the porous asphalt itself is a more expensive surfacing, the extra cost of which is offset by the savings in underground pipework etc.) (Niemczynowicz, et al., 1987)

Table 2 gives US cost estimates for capital and maintenance costs of porous pavements (Landphair et al., 2000)

Table 2 Engineer's Estimate for Porous Pavement

Porous Pavement													
Item	Units	Price	Cycles/ Year	Quant. 1 Acre WS	Total	Quant. 2 Acre WS	Total	Quant. 3 Acre WS	Total	Quant. 4 Acre WS	Total	Quant. 5 Acre WS	Total
Grading	SY	$2.00		604	$1,208	1209	$2,418	1812	$3,624	2419	$4,838	3020	$6,040
Paving	SY	$19.00		212	$4,028	424	$8,056	636	$12,084	848	$16,112	1060	$20,140
Excavation	CY	$3.60		201	$724	403	$1,451	604	$2,174	806	$2,902	1008	$3,629
Filter Fabric	SY	$1.15		700	$805	1400	$1,610	2000	$2,300	2800	$3,220	3600	$4,140
Stone Fill	CY	$16.00		201	$3,216	403	$6,448	604	$9,664	806	$12,896	1008	$16,128
Sand	CY	$7.00		100	$700	200	$1,400	300	$2,100	400	$2,800	500	$3,500
Sight Well	EA	$300.00		2	$600	3	$900	4	$1,200	7	$2,100	7	$2,100
Seeding	LF	$0.05		644	$32	1288	$64	1932	$97	2576	$129	3220	$161
Check Dam	CY	$35.00		0	$0	0	$0	0	$0	0	$0	0	$0
Total Construction Costs					**$10,105**		**$19,929**		**$29,619**		**$40,158**		**$49,798**
Construction Costs Amortized for 20 Years					**$505**		**$996**		**$1,481**		**$2,008**		**$2,490**
Annual Maintenance Expense													
Item	Units	Price	Cycles/ Year	Quant. 1 Acre WS	Total	Quant. 2 Acre WS	Total	Quant. 3 Acre WS	Total	Quant. 4 Acre WS	Total	Quant. 5 Acre WS	Total
Sweeping	AC	$250.00	6	1	$1,500	2	$3,000	3	$4,500	4	$6,000	5	$7,500
Washing	AC	$250.00	6	1	$1,500	2	$3,000	3	$4,500	4	$6,000	5	$7,500
Inspection	MH	$20.00	5	5	$100	5	$100	5	$100	5	$100	5	$100
Deep Clean	AC	$450.00	0.5	1	$225	2	$450	3	$675	3.9	$878	5	$1,125
Total Annual Maintenance Expense					**$3,960**		**$7,792**		**$11,651**		**$15,483**		**$19,370**

Supplemental Information

■

Other Resources

Abbott C.L. and Comino-Mateos L. 2001. *In situ performance monitoring of an infiltration drainage system and field testing of current design procedures*. Journal CIWEM, 15(3), pp.198-202.

Construction Industry Research and Information Association (CIRIA). 2002. *Source Control using Constructed Pervious Surfaces C582*, London, SW1P 3AU.

Construction Industry Research and Information Association (CIRIA). 2000. *Sustainable urban drainage systems - design manual for Scotland and Northern Ireland Report C521*, London, SW1P 3AU.

Construction Industry Research and Information Association (CIRIA). 2000 C522 *Sustainable urban drainage systems - design manual for England and Wales*, London, SW1P 3AU.

Construction Industry Research and Information Association (CIRIA). *RP448 Manual of good practice for the design, construction and maintenance of infiltration drainage systems for stormwater runoff control and disposal*, London, SW1P 3AU.

Dierkes C., Kuhlmann L., Kandasamy J. & Angelis G. Pollution Retention Capability and Maintenance of Permeable Pavements. *Proc 9th International Conference on Urban Drainage, Portland Oregon, September 2002.*

Hart P (2002) Permeable Paving as a Stormwater Source Control System. *Paper presented at Scottish Hydraulics Study Group 14th* Annual seminar, SUDS. 22 March 2002, Glasgow.

Kobayashi M., 1999. Stormwater runoff control in Nagoya City. Proc. 8 th Int. Conf. on

Urban Storm Drainage, Sydney, Australia, pp.825-833.

Landphair, H., McFalls, J., Thompson, D., 2000, Design Methods, Selection, and Cost Effectiveness of Stormwater Quality Structures, Texas Transportation Institute Research Report 1837-1, College Station, Texas.

Legret M, Colandini V, Effects of a porous pavement with reservior strucutre on runoff water:water quality and the fate of heavy metals. Laboratoire Central Des Ponts et Chaussesss

Macdonald K. & Jefferies C. Performance Comparison of Porous Paved and Traditional Car Parks. *Proc. First National Conference on Sustainable Drainage Systems, Coventry June 2001.*

Niemczynowicz J, Hogland W, 1987: Test of porous pavements performed in Lund, Sweden, in Topics in Drainage Hydraulics and Hydrology. BC. Yen (Ed.), pub. Int. Assoc. For Hydraulic Research, pp 19-80.

Pratt C.J. SUSTAINABLE URBAN DRAINAGE – A Review of published material on the performance of various SUDS devices prepared for the UK Environment Agency. Coventry University, UK December 2001.

Pratt C.J., 1995. Infiltration drainage – case studies of UK practice. Project Report

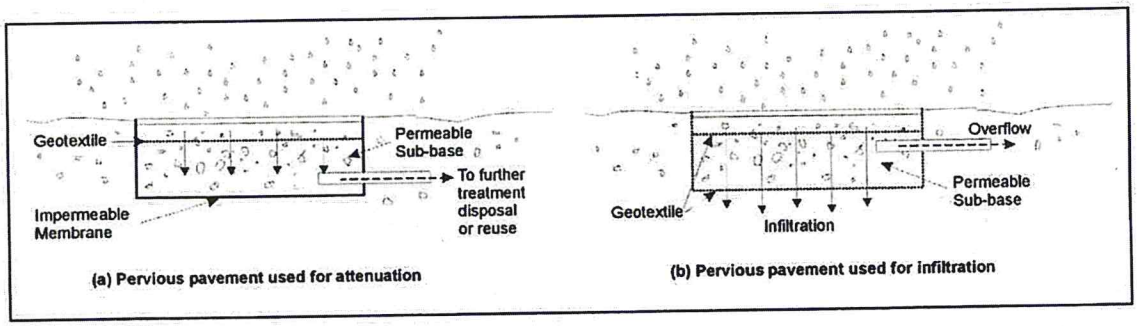
22,Construction Industry Research and Information Association, London, SW1P 3AU; also known as National Rivers Authority R & D Note 485

Pratt. C. J., 1990. Permeable Pavements for Stormwater Quality Enhancement. In: Urban Stormwater Quality Enhancement - Source Control, retrofitting and combined sewer technology, Ed. H.C. Torno, ASCE, ISBN 087262 7594, pp. 131-155

Raimbault G., 1997 French Developments in Reservoir Structures Sustainable water resources I the 21st century. Malmo Sweden

Schlüter W. & Jefferies C. Monitoring the outflow from a *Porous Car Park Proc. First National Conference on Sustainable Drainage Systems, Coventry June 2001.*

Wild, T.C., Jefferies, C., and D'Arcy, B.J. SUDS in Scotland – the Scottish SUDS database Report No SR(02)09 *Scotland and Northern Ireland Forum for Environmental Research, Edinburgh.* In preparation August 2002.



Schematics of a Pervious Pavement System

Alternative Building Materials SD-21



Design Objectives

- ✓ Maximize Infiltration
- ✓ Provide Retention
- ✓ Source Control
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutant
- Collect and Convey

Description

Alternative building materials are selected instead of conventional materials for new construction and renovation. These materials reduce potential sources of pollutants in stormwater runoff by eliminating compounds that can leach into runoff, reducing the need for pesticide application, reducing the need for painting and other maintenance, or by reducing the volume of runoff.

Approach

Alternative building materials are available for use as lumber for decking, roofing materials, home siding, and paving for driveways, decks, and sidewalks.

Suitable Applications

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

Design Considerations

Designing New Installations

Decking

One of the most common materials for construction of decks and other outdoor construction has traditionally been pressure treated wood, which is now being phased out. The standard treatment is called CCA, for chromated copper arsenate. The key ingredients are arsenic (which kills termites, carpenter ants and other insects), copper (which kills the fungi that cause wood to rot) and chromium (which reacts with the other ingredients to bind them to the wood). The amount of arsenic is far from trivial. A deck just 8 feet x 10 feet contains more than 1 1/3 pounds of this highly potent poison. Replacement materials include a new type of pressure treated wood, plastic and composite lumber.

There are currently over 20 products in the market consisting of plastic or plastic-wood composites. Plastic lumber is made from 100% recycled plastic, # 2 HDPE and polyethylene plastic milk jugs

and soap bottles. Plastic-wood composites are a combination of plastic and wood fibers or sawdust. These materials are a long last[illegible]xterior weather, insect, and chemical resistant wood lumber replacement for non structura[illegible]ications. Use it for decks, docks, raised garden beds and planter boxes, pallets, hand railings, outdoor furniture, animal pens, boat decks, etc.

New pressure treated wood uses a much safer recipe, ACQ, which stands for ammoniacal copper quartenary. It contains no arsenic and no chromium. Yet the American Wood Preservers Association has found it to be just as effective as the standard formula. ACQ is common in Japan and Europe.

Roofing

Several studies have indicated that metal used as roofing material, flashing, or gutters can leach metals into the environment. The leaching occurs because rainfall is slightly acidic and slowly dissolved the exposed metals. Common traditional applications include copper sheathing and galvanized (zinc) gutters.

Coated metal products are available for both roofing and gutter applications. These products eliminate contact of bare metal with rainfall, eliminating one source of metals in runoff. There are also roofing materials made of recycled rubber and plastic that resemble traditional materials.

A less traditional approach is the use of green roofs. These roofs are not just green, they're alive. Planted with grasses and succulents, low- profile green roofs reduce the urban heat island effect, stormwater runoff, and cooling costs, while providing wildlife habitat and a connection to nature for building occupants. These roofs are widely used on industrial facilities in Europe and have been established as experimental installations in several locations in the US, including Portland, Oregon. Their feasibility is questionable in areas of California with prolonged, dry, hot weather.

Paved Areas

Traditionally, concrete is used for construction of patios, sidewalks, and driveways. Although it is non-toxic, these paved areas reduce stormwater infiltration and increase the volume and rate of runoff. This increase in the amount of runoff is the leading cause of stream channel degradation in urban areas.

There are a number of alternative materials that can be used in these applications, including porous concrete and asphalt, modular blocks, and crushed granite. These materials, especially modular paving blocks, are widely available and a well established method to reduce stormwater runoff.

Building Siding

Wood siding is commonly used on the exterior of residential construction. This material weathers fairly rapidly and requires repeated painting to prevent rotting. Alternative "new" products for this application include cement-fiber and vinyl. Cement-fiber siding is a masonry product made from Portland cement, sand, and cellulose and will not burn, cup, swell, or shrink.

Pesticide Reduction

A common use of powerful pesticides is for the control of termites. Chlordane was used for many years for this purpose and is now found in urban streams and lakes nationwide. There are a

number of physical barriers that can be installed during construction to help reduce the use of pesticides.

Sand barriers for subterranean termites are a physical deterrent because the termites cannot tunnel through it. Sand barriers can be applied in crawl spaces under pier and beam foundations, under slab foundations, and between the foundation and concrete porches, terraces, patios and steps. Other possible locations include under fence posts, underground electrical cables, water and gas lines, telephone and electrical poles, inside hollow tile cells and against retaining walls.

Metal termite shields are physical barriers to termites which prevent them from building invisible tunnels. In reality, metal shields function as a helpful termite detection device, forcing them to build tunnels on the outside of the shields which are easily seen. Metal termite shields also help prevent dampness from wicking to adjoining wood members which can result in rot, thus making the material more attractive to termites and other pests. Metal flashing and metal plates can also be used as a barrier between piers and beams of structures such as decks, which are particularly vulnerable to termite attack.

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

There are no good, independent, comprehensive sources of information on alternative building materials for use in minimizing the impacts of stormwater runoff. Most websites or other references to "green" or "alternative" building materials focus on indoor applications, such as formaldehyde free plywood and low VOC paints, carpets, and pads. Some supplemental information on alternative materials is available from the manufacturers.

Fires are a source of concern in many areas of California. Information on the flammability of alternative decking materials is available from the University of California Forest Product Laboratory (UCFPL) website at: http://www.ucfpl.ucop.edu/WDDeckIntro.htm

Fueling Areas SD-30

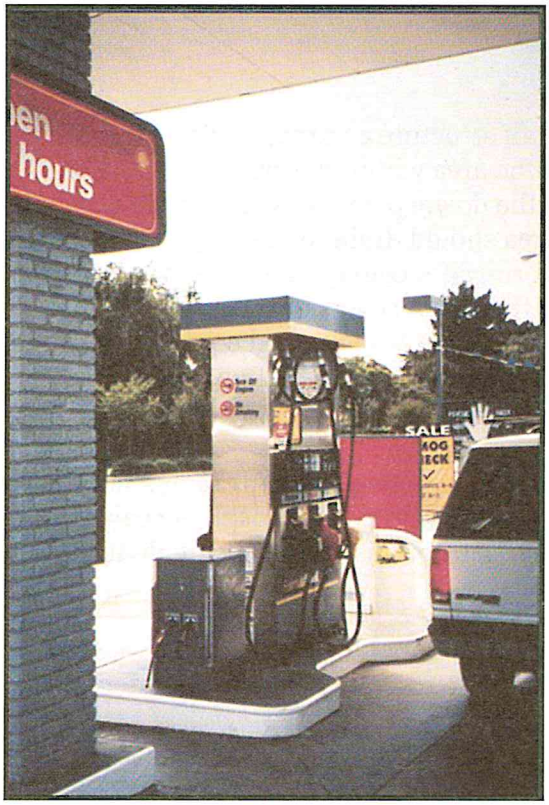


Photo Credit: Geoff Brosseau

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.

CASQA California Stormwater Quality Association

Designing New Installations

Covering

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.

Maintenance Bays & Docks SD-31



Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

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

Designing New Installations

Designs of maintenance bays should consider the following:

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

CASQA California Stormwater Quality Association

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

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

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

Redeveloping Existing Installations

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

Additional Information

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

Other Resources

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

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

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

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

Trash Storage Areas SD-32

Description

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

Approach

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

Design Objectives

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

Suitable Applications

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

Design Considerations

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

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

Designing New Installations

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

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

CASQA California Stormwater Quality Association

- 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.

Vehicle Washing Areas SD-33



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

Vehicle washing, equipment washing, and steam cleaning may contribute high concentrations of metals, oil and grease, solvents, phosphates, and suspended solids to wash waters that drain to stormwater conveyance systems.

Approach

Project plans should include appropriately designed area(s) for washing-steam cleaning of vehicles and equipment. Depending on the size and other parameters of the wastewater facility, wash water may be conveyed to a sewer, an infiltration system, recycling system or other alternative. Pretreatment may be required for conveyance to a sanitary sewer.

Suitable Applications

Appropriate applications include commercial developments, restaurants, retail gasoline outlets, automotive repair shops and others.

Design Considerations

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

Designing New Installations

Areas for washing/steam cleaning should incorporate one of the following features:

- Be self-contained and/or covered with a roof or overhang
- Be equipped with a clarifier or other pretreatment facility
- Have a proper connection to a sanitary sewer

CASQA California Stormwater Quality Association

- Include other features which are comparable and equally effective

CAR WASH AREAS - Some jurisdictions' stormwater management plans include vehicle-cleaning area source control design requirements for community car wash racks in complexes with a large number of dwelling units. In these cases, wash water from the areas may be directed to the sanitary sewer, to an engineered infiltration system, or to an equally effective alternative. Pre-treatment may also be required.

Depending on the jurisdiction, developers may be directed to divert surface water runoff away from the exposed area around the wash pad (parking lot, storage areas), and wash pad itself to alternatives other than the sanitary sewer. Roofing may be required for exposed wash pads.

It is generally advisable to cover areas used for regular washing of vehicles, trucks, or equipment, surround them with a perimeter berm, and clearly mark them as a designated washing area. Sumps or drain lines can be installed to collect wash water, which may be treated for reuse or recycling, or for discharge to the sanitary sewer. Jurisdictions may require some form of pretreatment, such as a trap, for these areas.

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.

Additional Information

Maintenance Considerations

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

Other Resources

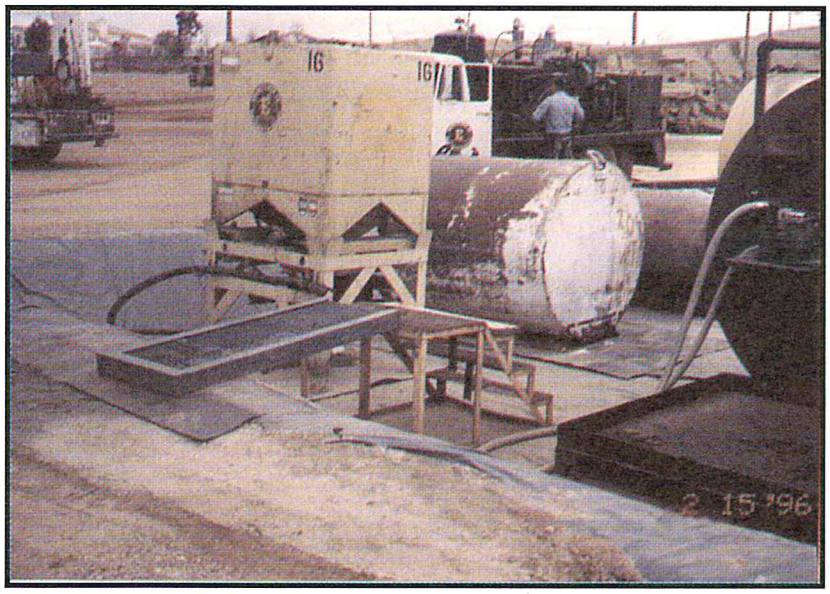
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

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

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

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

Outdoor Material Storage Areas SD-34



Design Objectives

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

Description

Proper design of outdoor storage areas for materials reduces opportunity for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the stormwater conveyance system. Materials may be in the form of raw products, by-products, finished products, and waste products. The type of pollutants associated with the materials will vary depending on the type of commercial or industrial activity.

Approach

Outdoor storage areas require a drainage approach different from the typical infiltration/detention strategy. In outdoor storage areas, infiltration is discouraged. Containment is encouraged. Preventative measures include enclosures, secondary containment structures and impervious surfaces.

Suitable Applications

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

Design Considerations

Some materials are more of a concern than others. Toxic and hazardous materials must be prevented from coming in contact with stormwater. Non-toxic or non-hazardous materials do not have to be prevented from stormwater contact. However, these materials may have toxic effects on receiving waters if allowed to be discharged with stormwater in significant quantities. Accumulated material on an impervious surface could result in significant impact on the rivers or streams that receive the runoff.

Material may be stored in a variety of ways, including bulk piles, containers, shelving, stacking, and tanks. Stormwater contamination may be prevented by eliminating the possibility of stormwater contact with the material storage areas either through diversion, cover, or capture of the stormwater. Control measures may also include minimizing the storage area. Design requirements

CASQA California Stormwater Quality Association

for material storage areas are governed by Building and Fire Codes, and by current City or County ordinances and zoning requirements. Control measures are site specific, and must meet local agency requirements.

Designing New Installations

Where proposed project plans include outdoor areas for storage of materials that may contribute pollutants to the stormwater conveyance system, the following structural or treatment BMPS should be considered:

- Materials with the potential to contaminate stormwater should be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with runoff or spillage to the stormwater conveyance system, or (2) protected by secondary containment structures such as berms, dikes, or curbs.
- The storage area should be paved and sufficiently impervious to contain leaks and spills.
- The storage area should slope towards a dead-end sump to contain spills and direct runoff from downspouts/roofs should be directed away from storage areas.
- The storage area should have a roof or awning that extends beyond the storage area to minimize collection of stormwater within the secondary containment area. A manufactured storage shed may be used for small containers.

Note that the location(s) of installations of where these preventative measures will be employed must be included on the map or plans identifying BMPs.

Redeveloping Existing Installations

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

Additional Information

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

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.

Outdoor Work Areas SD-35



Photo Credit: Geoff Brosseau

Design Objectives

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

Description

Proper design of outdoor work areas for materials reduces opportunity for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the stormwater conveyance system.

Approach

Outdoor work areas require a drainage approach different from the typical infiltration/detention strategy. In outdoor work areas, infiltration is discouraged; collection and conveyance are encouraged. In outdoor work areas, infiltration is discouraged and runoff is often routed directly to the sanitary sewer, not the storm drain. Because this runoff is being added to the loads normally received by the wastewater treatment plants, municipal stormwater programs and/or private developers must work with the local plant to develop solutions that minimize effects on the treatment facility. These concerns are best addressed in the planning and design stage of the outdoor work area.

Suitable Applications

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

Design Considerations

Design requirements for outdoor work areas are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements.

Designing New Installations

Outdoor work areas can be designed in particular ways to reduce impacts on both stormwater quality and sewage treatment plants.

- Create an impermeable surface such as concrete or asphalt, or a prefabricated metal drip pan, depending on the use.

CASQA California Stormwater Quality Association

- Cover the area with a roof. This prevents rain from falling on the work area and becoming polluted runoff.
- Berm or perform mounding around the perimeter of the area to prevent water from adjacent areas from flowing on to the surface of the work area.
- Directly connect runoff. Unlike other areas, runoff from work areas is directly connected to the sanitary sewer or other specialized containment system(s). This allows the more highly concentrated pollutants from these areas to receive special treatment that removes particular constituents. Approval for this connection must be obtained from the appropriate sanitary sewer agency.
- Locate the work area away from storm drains or catch basins.

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.

Outdoor Processing Areas SD-36

Description

Outdoor process equipment operations such as rock grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, landfills, waste piles, wastewater and solid waste treatment and disposal, and others operations may contribute a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the storm conveyance system.

Approach

Outdoor processing areas require a drainage approach different from the typical infiltration/detention strategy. In outdoor process equipment areas, infiltration is discouraged. Containment is encouraged, accompanied by collection and conveyance. Preventative measures include enclosures, secondary containment structures, dead-end sumps, and conveyance to treatment facilities in accordance with conditions established by the applicable sewer agency.

Design Objectives

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

Suitable Applications

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

Design Considerations

Design requirements for outdoor processing areas are governed by Building and Fire codes, and by current local agency ordinances, and zoning requirements.

Designing New Installations

Operations determined to be a potential threat to water quality should consider to the following recommendations:

- Cover or enclose areas that would be the most significant source of pollutants; or slope the area toward a dead-end sump; or, discharge to the sanitary sewer system following appropriate treatment in accordance with conditions established by the applicable sewer agency.
- Grade or berm area to prevent run-on from surrounding areas.
- Do not install storm drains in areas of equipment repair.
- Consider other features that are comparable or equally effective.
- Provide secondary containment structures (not double wall containers) where wet material processing occurs (e.g., electroplating), to hold spills resulting from accidents, leaking tanks, or equipment, or any other unplanned releases (Note: if these are plumbed to the sanitary sewer, they must be with the prior approval of the sewering agency.)

CASQA California Stormwater Quality Association

Redeveloping Existing Installations

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

Additional Information

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

Other Resources

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

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

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

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

EXAMPLE

Employee Training Self-Certification

Project Name: _____

Date: _____

Stormwater Quality Management Topic: (provide brief description of training)

_____

_____

_____

_____

_____

Course Length (hours): _____

Certification:

Attendee Name: _____

Signature: _____

Date: _____

After the Storm

A Citizen's Guide to Understanding Stormwater

WHEN IT RAINS IT DRAINS

EPA 833-B-03-002

January 2003

United States Environmental Protection Agency

THE YEAR OF CLEAN WATER

Printed on Recycled Paper

or visit

www.epa.gov/npdes/stormwater

www.epa.gov//nps

For more information contact:

What is stormwater runoff?

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

Why is stormwater runoff a problem?

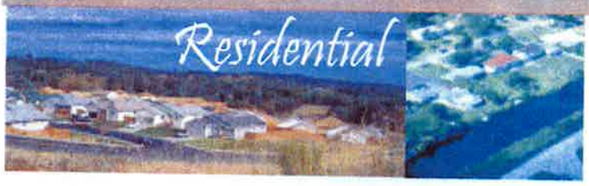
Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking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

The effects of pollution

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

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

Stormwater Pollution Solutions



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.

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.

Septic systems



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

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

Pet waste



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

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



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.



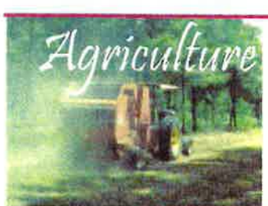
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- 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.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be washed 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.

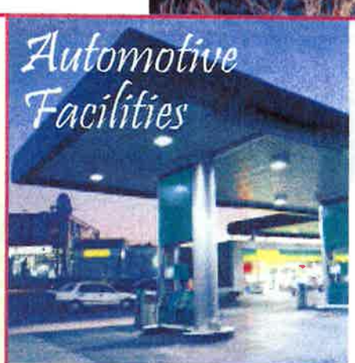




Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria,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



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.



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.

Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

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

Best Management Practices

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

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

Simple solutions for both light and heavy duty jobs:

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

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

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

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

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

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

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

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



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

Using Cleaning Agents

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



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

Think Water Conservation

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

Screening Wash Water

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

Drain Inlet Protection & Collection of Wash Water

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

Concrete/Coring/Saw Cutting and Drilling Projects

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

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

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

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

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

Online resources include:

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

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

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

Do you know where street flows actually go?

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



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

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

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



Resources

State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento CA 95814
(916) 341-5455
www.swrcb.ca.gov/stormwtr/

Colorado River Basin Regional Water
Quality Control Board - Region 7
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(760) 346-7491
www.swrcb.ca.gov/~rwqcb7/

Santa Ana Regional Water
Quality Control Board - Region 8
3737 Main Street, Suite 500
Riverside, CA 92501-3348
(909) 782-4130
www.swrcb.ca.gov/~rwqcb8/

San Diego Regional Water
Quality Control Board - Region 9
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124
(858) 467-2952
www.swrcb.ca.gov/~rwqcb9/

To report a hazardous materials spill, call:

Riverside County Hazardous Materials
Emergency Response Team
(909) 358-5055 8:00 a.m. – 5:00 p.m.
(909) 358-5245 after 5:00 p.m.

In an emergency call: **911**

For recycling and hazardous waste disposal, call:

(909) 358-5055

To report an illegal dumping or a clogged storm drain, call:

1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, please call (909) 955-1200 or visit the StormWater/CleanWater Protection Program website at:
www.co.riverside.ca.us/depts/flood/waterquality npdes.asp

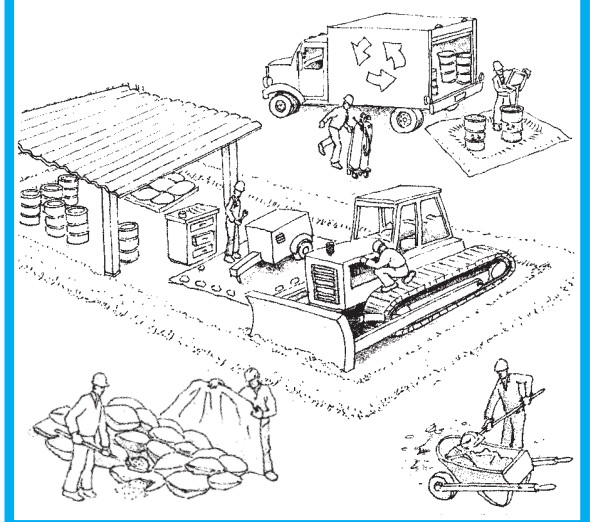
StormWater CleanWater
PROTECTION PROGRAM

The StormWater/CleanWater Protection Program gratefully acknowledges the Santa Clara Valley Nonpoint Pollution Control Program, Alameda Countywide CleanWater Program and the City of Los Angeles Stormwater Management Division for information provided in this brochure.

StormWater Pollution

What you should know for...

GENERAL CONSTRUCTION & SITE SUPERVISION



Best Management Practices (BMPs) for:

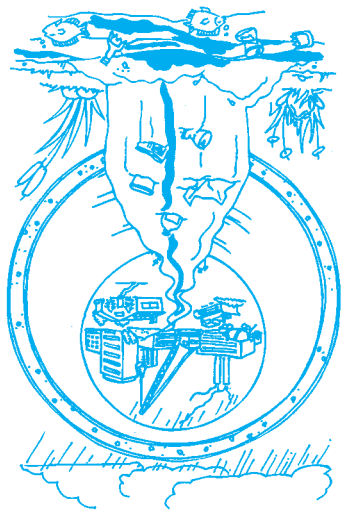
- Developers
- General Contractors
- Home Builders
- Construction Inspectors
- Anyone in the construction business

StormWater Pollution . . . What You Should Know

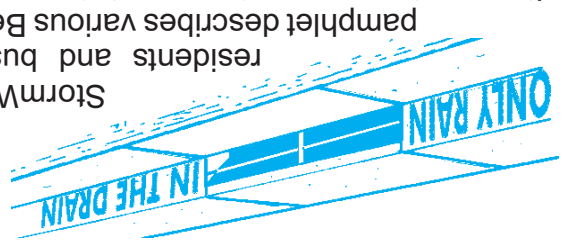
Riverside County has two drainage systems - sewers and storm drains. The storm drain system was designed to reduce flooding by carrying excess rainwater away from streets and developed areas. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our local waterways.

Unlike sanitary sewers, storm drains are not connected to a wastewater treatment plant – they flow directly to our local streams, rivers and lakes.

Stormwater runoff is a part of the natural hydrologic process. However, land development and construction activities can significantly alter natural drainage processes and introduce pollutants into stormwater runoff. Polluted stormwater runoff from construction sites has been identified as a major source of water pollution in California. It jeopardizes the quality of our local waterways and can pose a serious threat to the health of our aquatic ecosystems.



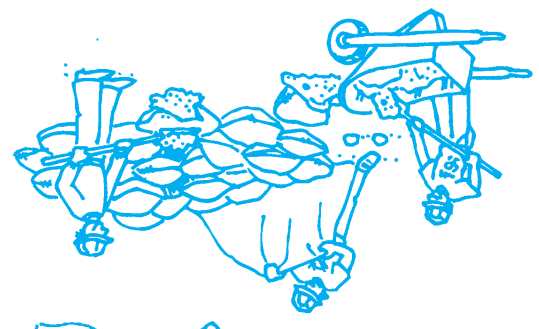
The Cities and County of Riverside StormWater/CleanWater Protection Program

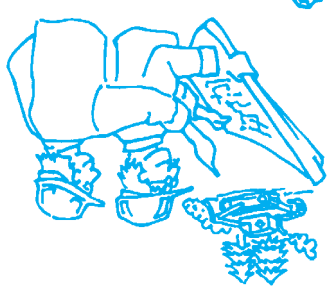


Because preventing pollution is much easier and less costly than cleaning up "after the fact," the Cities and County of Riverside StormWater/CleanWater Protection Program informs residents and businesses on pollution prevention activities. This pamphlet describes various Best Management Practices (BMPs) that construction site operators can use to prevent stormwater pollution.

In accordance with applicable federal and state law, the Cities and County of Riverside have adopted ordinances for stormwater management and discharge control that **prohibit** the discharge of pollutants into the storm drain system or local surface water. This includes discharges from construction sites containing sediment, concrete, mortar, paint, solvents, lubricants, vehicle fluids, fuel, pesticides, and construction debris.

PLEASE NOTE: The Federal, State and local regulations strictly prohibit the discharge of sediment and pollutants into the streets, the storm drain system or waterways. As an owner, operator or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees.





STORMWATER POLLUTION FROM CONSTRUCTION ACTIVITIES

The two most common sources of stormwater pollution problems associated with construction activities are ***erosion*** and ***sedimentation***. Failure to maintain adequate erosion and sediment controls at construction sites often results in sediment discharges into the storm drain system, creating multiple problems once it enters local waterways.

Construction vehicles and heavy equipment can also track significant amounts of mud and sediment onto adjacent streets. Additionally, wind may transport construction materials and wastes into streets storm drains, or directly into our local waterways.

What Should You Do?

Advance Planning to Prevent Pollution

- ❑ Remove existing vegetation only as needed.
- ❑ Schedule excavation, grading, and paving operations for dry weather periods, if possible.
- ❑ Designate a specific area of the construction site, well away from storm drain inlets or watercourses, for material storage and equipment maintenance.
- ❑ Develop and implement an effective combination of erosion and sediment controls for the construction site.
- ❑ Practice source reduction by ordering only the amount of materials that are needed to finish the project.
- ❑ Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- ❑ Control the amount of surface runoff at the construction site by impeding internally generated flows and using berms or drainage ditches to direct incoming offsite flows to go around the site. ***Note:*** *Consult local drainage policies for more information.*

Best Management Practices

The following Best Management Practices (BMPs) can significantly reduce pollutant discharges from your construction site. Compliance with stormwater regulations can be as simple as minimizing stormwater contact with potential pollutants by providing covers and secondary containment for construction materials, designating areas away from storm drain systems for storing equipment and materials and implementing good housekeeping practices at the construction site.

- ❑ Protect all storm drain inlets and streams located near the construction site to prevent sediment-laden water from entering the storm drain system.
- ❑ Limit access to and from the site. Stabilize construction entrances/exits to minimize the track out of dirt and mud onto adjacent streets. Conduct frequent street sweeping.
- ❑ Protect stockpiles and construction materials from winds and rain by storing them under a roof, secured impermeable tarp or plastic sheeting.
- ❑ Avoid storing or stockpiling materials near storm drain inlets, gullies or streams.
- ❑ Phase grading operations to limit disturbed areas and duration of exposure.
- ❑ Perform major maintenance and repairs of vehicles and equipment offsite.
- ❑ Wash out concrete mixers only in designated washout areas at the construction site.
- ❑ Set-up and operate small concrete mixers on tarps or heavy plastic drop cloths.
- ❑ Keep construction sites clean by removing trash, debris, wastes, etc. on a regular basis.
- ❑ Clean-up spills immediately using dry clean-up methods (e.g., absorbent materials such as cat litter, sand or rags for liquid spills; sweeping for dry spills such as cement, mortar or fertilizer) and by removing the contaminated soil from spills on dirt areas. .
- ❑ Prevent erosion by implementing any or a combination of soil stabilization practices such as mulching, surface roughening, permanent or temporary seeding.
- ❑ Maintain all vehicles and equipment in good working condition. Inspect frequently for leaks, and repair promptly.
- ❑ Practice proper waste disposal. Many construction materials and wastes, including solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation can be recycled. Materials that cannot be recycled must be taken to an appropriate landfill or disposed of as hazardous waste.
- ❑ Cover open dumpsters with secured tarps or plastic sheeting. Never clean out a dumpster by washing it down on the construction site.
- ❑ Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

General Construction Activities Stormwater Permit

(Construction Activities General Permit)

The State Water Resources Control Board (SWRCB) adopted a new Construction Activities General Permit (WQ Order No. 99-08DWQ) on August 19, 1999, superseding the now expired SWRCB statewide General Permit (WQ Order No. 92-08DWQ). This permit is administered and enforced by the SWRCB and the local Regional Water Quality Control Boards (RWQCB). The updated Construction Activities General Permit establishes a number of new stormwater management requirements for construction site operator.

NOTE: *Some construction activies stormwater permits are issued on a regional basis. Consult your local RWQCB to find out if your project requires coverage under any of these permits.*

Frequently Asked Questions:

Does my construction site require coverage under the Construction Activities General Permit?

Yes, if construction activity results in the disturbance of five or more acres of total land area or is part of a common plan of development that results in the disturbance of five or more acres.

How do I obtain coverage under the Construction Activities General Permit?

Obtain the permit package and submit the completed Notice of Intent (NOI) form to the SWRCB prior to grading or disturbing soil at the construction site. For ongoing construction activity involving a change of ownership, the new owner must submit a new NOI within 30 days of the date of change of ownership. The completed NOI along with the required fee should be mailed to the SWRCB.

What must I do to comply with the requirements of the Construction Activities General Permit?

- ● Implement BMPs for non-stormwater discharges year-round.
- ● Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) prior to commencing construction activities.
- ● Keep a copy of the SWPPP at the construction site for the entire duration of the project.
- ● Calculate the anticipated stormwater run-off.
- ● Implement an effective combination of erosion and sediment control on all soil disturbed areas.
- ● Conduct site inspections prior to anticipated storm events, every 24-hours during extended storm events, and after actual storm event.
- ● Perform repair and maintenance of BMPs as soon as possible after storm events depending upon worker safety.
- ● Update the SWPPP as needed, to manage pollutants or reflect changes in site conditions.
- ● Include description of post construction BMPs at the construction site, including parties responsible for long-term maintenance.

NOTE: *Please refer to the Construction Activities General Permit for detailed information. You may contact the SWRCB, your local RWQCB, or visit the SWRCB website at www.swrcb.ca.gov/stormwtr/ to obtain a State Construction Activities Stormwater General Permit packet.*

How long is this Construction Activities General Permit in effect?

The Permit coverage stays in effect untilyou submit a Notice of Termination (NOT) to the SWRCB. For the purpose of submitting a NOT, all soil disturbing activities have to be completed and one of the three following criteria has to be met:

1. Change of ownership;
2. A uniform vegetative cover with 70 percent coverage has been established; or,
3. Equivalent stabilization measures such as the use of reinforced channel liners, soil cement, fiber matrices, geotextiles, etc., have been employed.

For Information:

For more information on the General Industrial Storm Water Permit contact:

State Water Resources Control Board (SWRCB)
(916) 657-1146 or www.swrcb.ca.gov/ or, at your Regional Water Quality Control Board (RWQCB).

Santa Ana Region (8)
California Tower
3737 Main Street, Ste. 500
Riverside, CA 92501-3339
(909) 782-4130

San Diego Region (9)
9771 Clairemont Mesa Blvd., Ste. A
San Diego, CA 92124
(619) 467-2952

Colorado River Basin Region (7)
73-720 Fred Waring Dr., Ste. 100
Palm Desert, CA 92260
(760) 346-7491

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
HAZARDOUS WASTE DISPOSAL: (909) 358-5055
RECYCLING INFORMATION: 1-800-366-SAVE
TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call:
(909) 955-1111.

StormWater
CleanWater
PROTECTION PROGRAM

Riverside County gratefully acknowledges the State Water Quality Control Board and the American Public Works Association, Storm Water Quality Task Force for the information provided in this brochure.

DID YOU KNOW . . .

YOUR FACILITY MAY NEED A STORM WATER PERMIT?



Many industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit

FIND OUT IF YOUR FACILITY MUST OBTAIN A PERMIT

StormWater Pollution . . . What you should know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our waterways.

Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.



In recent years, awareness of the need to protect water quality has increased. As a result, federal, state, and local programs have been established to reduce polluted stormwater discharges to our waterways. The emphasis of these programs is to prevent stormwater pollution since it's much easier, and less costly, than cleaning up "after the fact."

National Pollutant Discharge Elimination System (NPDES)

In 1987, the Federal Clean Water Act was amended to establish a framework for regulating industrial stormwater discharges under the NPDES permit program. In California, NPDES permits are issued by the State Water Resources Control Board (SWRCB) and the nine (9) Regional Water Quality Control Boards (RWQCB). In general, certain industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit if the type of facilities or operations falls into one of the several categories described in this brochure.

How Do I Know If I Need A Permit?

Following are ***general descriptions*** of the industry categories types that are regulated by the Industrial Activities Storm Water General Permit. Contact your local Region Water Quality Control Board to determine if your facility/operation requires coverage under the Permit.

➜ Facilities such as cement manufacturing; feedlots; fertilizer manufacturing; petroleum refining; phosphate manufacturing; steam electric power generation; coal mining; mineral mining and processing; ore mining and dressing; and asphalt emulsion;

➜ Facilities classified as lumber and wood products (except wood kitchen cabinets); pulp, paper, and paperboard mills; chemical producers (except some pharmaceutical and biological products); petroleum and coal products; leather production and products; stone, clay and glass products; primary metal industries; fabricated structural metal; ship and boat building and repairing;

➜ Active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations;

➜ Hazardous waste treatment, storage, or disposal facilities;

➜ Landfills, land application sites and open dumps that receive or have received any industrial waste; unless there is a new overlying land use such as a golf course, park, etc., and there is no discharge associated with the landfill;

➜ Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards;

➜ Steam electric power generating facilities, facilities that generate steam for electric power by combustion;

➜ Transportation facilities that have vehicle maintenance shops, fueling facilities, equipment cleaning operations, or airport deicing operations. This includes school bus maintenance facilities operated by a school district;

➜ Sewage treatment facilities;

➜ Facilities that have areas where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water.

How do I obtain coverage under the Industrial Activities Storm Water General Permit?

Obtain a permit application package from your local Regional Water Quality Control Board listed on the back of this brochure or the State Water Resources Control Board (SWRCB). Submit a completed Notice of Intent (NOI) form, site map and the appropriate fee ($250 or $500) to the SWRCB. Facilities must submit an NOI thirty (30) days prior to beginning operation. Once you submit the NOI, the State Board will send you a letter acknowledging receipt of your NOI and will assign your facility a waste discharge identification number (WDID No.). You will also receive an annual fee billing. These billings should roughly coincide with the date the State Board processed your original NOI submittal.

What are the requirements of the Industrial Activities Storm Water General Permit?

The basic requirements of the Permit are:

1. The facility must eliminate any non-stormwater discharges or obtain a separate permit for such discharges.

2. The facility must develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must identify sources of pollutants that may be exposed to stormwater. Once the sources of pollutants have been identified, the facility operator must develop and implement Best Management Practices (BMPs) to minimize or prevent polluted runoff.

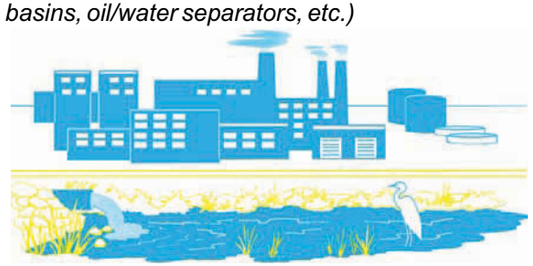
   Guidance in preparing a SWPPP is available from a document prepared by the California Storm Water Quality Task Force called the California Storm Water Best Management Practice Handbook.

3. The facility must develop and implement a Monitoring Program that includes conducting visual observations and collecting samples of the facility's storm water discharges associated with industrial activity. The General Permit requires that the analysis be conducted by a laboratory that is certified by the State of California.

4. The facility must submit to the Regional Board, every July 1, an annual report that includes the results of its monitoring program.

A Non-Storm Water Discharge is... *any discharge to a storm drain system that is not composed entirely of storm water. The following non-storm water discharges are authorized by the General Permit: fire hydrant flushing; potable water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; non-contaminated ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source.*

A BMP is . . . *a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs may include simple, non-structural methods such as good housekeeping, staff training and preventive maintenance. Additionally, BMPs may include structural modifications such as the installation of berms, canopies or treatment control (e.g. setting basins, oil/water separators, etc.)*



WARNING*: There are significant penalties for non-compliance: a minimum fine of $5,000 for failing to obtain permit coverage, and, up to $10,000 per day, per violation plus $10 per gallon of discharge in excess of 1,000 gallons.*

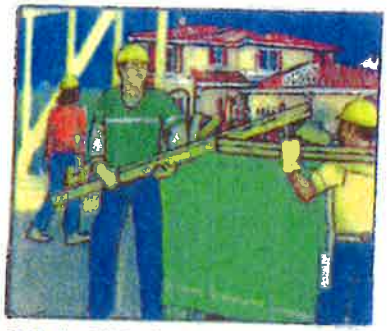
STORMWATER Pollution Prevention

CONSTRUCTION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Store Materials Safely
Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



Ordering Materials & Recycling Waste
Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.



Cleaning & Preventing Spills
Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.



Preventing Erosion
Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydromulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Channels can be lined with grass or roughened pavement to reduce runoff velocity.



Maintaining Vehicles & Equipment
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.



To report illegal dumping or for more information on stormwater pollution prevention, call:

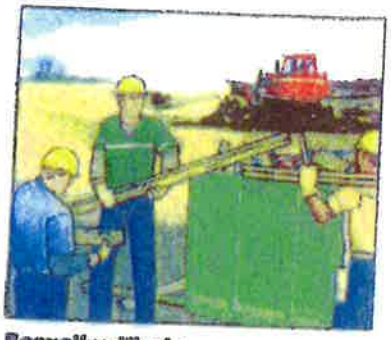
1 (800) CLEANUP

www.1800cleanup.org

STORMWATER Pollution Prevention

EXCAVATION AND GRADING

Sediment, cement wash, asphalt and vehicle fluids from soil excavation and grading often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Recycling Waste
Recycle broken asphalt, concrete, wood, and cleared vegetation whenever possible. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.



Maintaining Vehicles & Equipment
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutters and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks. Use gravel approaches where truck traffic is heavy to reduce soil compaction and limit the tracking of sediment into the street.



Cleaning & Preventing Spills
Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. Prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids. To report serious spills, call 911.



Storing Materials
Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



Preventing Erosion
Avoid excavation or grading during wet weather. Plant temporary vegetation on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff. Channels can be lined with grass or roughened pavement to reduce runoff velocity.



To report illegal dumping or for more information on stormwater pollution prevention, call

1 (800) CLEANUP

www.1800cleanup.org

STORMWATER Pollution Prevention

FRESH CONCRETE & MORTAR APPLICATION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Storing Materials

Keep construction materials and debris away from the street, gutter and storm drains. Secure open bags of cement and cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



Ordering Materials & Recycling Waste

Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. When breaking up paving, recycle the pieces at a crushing company. You can also recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. Call (909) 386-8401 for recycling and disposal information.



During Construction

Schedule excavation and grading during dry weather. Prevent mortar and cement from entering the street and storm drains by placing erosion controls. Setup small mixers on tarps or drop cloths, for easy cleanup of debris. Never bury waste material. Recycle or dispose of it as hazardous waste.



Cleaning Up

Wash concrete dust onto designated dirt areas, not down driveways or into the street or storm drains. Wash out concrete mixers and equipment in specified washout areas, where water can flow into a containment pond. Cement washwater can be recycled by pumping it back into cement mixers for reuse. Never dispose of cement washout into driveways, streets, gutters, storm drains or drainage ditches.



To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

STORMWATER Pollution Prevention

ROADWORK AND PAVING

Asphalt, saw-cut slurry and excavated materials from road paving, surfacing and pavement removal often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Preventing Erosion
Schedule excavation and grading work during dry weather. Develop and implement erosion and sediment control plans for excavated embankments. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



During Construction
Cover catch basins and maintenance holes when applying seal coat, slurry seal or fog seal. Use check dams, ditches or berms around excavations, and avoid over applying water for dust control. Never wash excess materials from exposed aggregate or concrete into the street, gutter or a storm drain.



Maintaining Vehicles & Equipment
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.

Asphalt & Concrete Removal
Barricade storm drain openings during saw-cutting, and recycle broken up pavement at a crushing company. For recycling information, call (909) 386-8401.



Cleaning & Preventing Spills
Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. Sweep up dry spills, instead of hosing. Prevent spills from paver machines by using drip pans, or by placing absorbent materials like cloths or rags under the machines when not in use. To report serious spills, call 911.



To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

Stormwater Pollution Prevention

PAINTING

Paints, solvents, adhesives and other toxic chemicals used in painting often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these simple tips to prevent pollution and protect our health.



Water-Based Paints
Use water-based paints whenever possible. They are less toxic than oil-based paints and easier to clean up. Look for products labeled "latex" or "cleans with water."



Paint Removal
Sweep up paint stripping residue, chips and dust instead of hosing into the street and dispose of them safely at a household hazardous waste collection facility. Call (800) CLEANUP for the facility in your area.



Painting Cleanup
Never clean brushes or rinse paint containers in the street, gutter or near a storm drain. Clean water-based paints in the sink. Clean oil-based paints with thinner, which can be reused by putting it in a jar to settle out the paint particles and then pouring off the clear liquid for future use. Wrap dried paint residue in newspaper and dispose of it in the trash.



Exterior Paint Removal
When stripping or cleaning building exteriors with high-pressure water, block nearby storm drains and divert washwater onto a designated dirt area. Ask your local wastewater treatment authority if you can collect building cleaning water and discharge it to the sewer.



Recycling Paint
Recycle leftover paint at a household hazardous waste collection facility, save it for touch ups or give it to someone who can use it, like a theatre group, school, city or community organization.

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

STORMWATER Pollution Prevention

HOME & GARDEN

Yard waste and household toxics like paints and pesticides often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these simple tips to prevent pollution and protect your health.



Recycle Household Hazardous Waste
Household products like paint, pesticides, solvents and cleaners are too dangerous to dump and too toxic to trash. Take them to be recycled at a convenient household hazardous waste collection facility. Call (800) CLEANUP for the facility in your area.



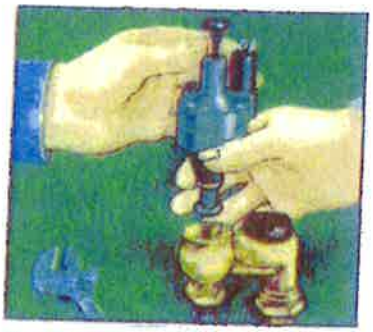
Disposing of Yard Waste
Recycle leaves, grass clippings and other yard waste, instead of blowing, sweeping or hosing into the street. Try grasscycling, leaving grass clippings on your lawn instead of using a grass catcher. The clippings act as a natural fertilizer, and because grass is mostly water, it also irrigates your lawn, conserving water.



Use Fertilizers & Pesticides Safely
Fertilizers and pesticides are often carried into the storm drain system by sprinkler runoff. Try using organic or non-toxic alternatives. If you use chemical fertilizers or pesticides, avoid applying near curbs and driveways and never apply before a rain.



Planting in the Yard
Produce less yard waste and save water by planting low maintenance, drought-tolerant trees and shrubs. Using drip irrigation, soaker hoses or micro-spray systems for flower beds and vegetation can also help reduce your water bill and prevent runoff.



Use Water Wisely
Cut your water costs and prevent runoff by controlling the amount of water and direction of sprinklers. The average lawn needs about an inch of water a week, including rainfall, or 10 to 20 minutes of watering. A half-inch per week is enough for fall and spring. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff.

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

STORMWATER Pollution Prevention

FOOD AND RESTAURANT

Food waste, grease, cleaning fluids, mop water and trash from restaurant operations often make their way into the San Bernardino County storm drain system, and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Recycle Oil & Grease

Oil and grease wastes can be recycled. Look in the yellow pages for rendering companies, or call (909) 386-8401 for disposal information. Don't pour oil or grease into sinks, floor drains or onto a parking lot or street. Keep grease bins covered and contained. Keep your grease interceptor maintained to prevent sewer overflows or backups and keep records of grease waste hauling.



Dumpster Areas

Keep dumpster lids closed and the areas around them clean. Do not fill with liquid waste or hose them out. Call your trash hauler to replace any dumpsters that are damaged or leak.



Cleaning & Maintenance

Clean equipment, floor mats, filters and garbage cans in a mop sink, wash rack or floor drain connected to the sewer through a grease trap. Don't wash them or pour wash water in a parking lot, alley, sidewalk or street. Sweep outside areas and put the debris in the garbage, instead of sweeping or hosing it into the parking lot or street.



Managing Spills

Clean food spills in loading and trash areas by using absorbent materials and sweeping then mopping, and discharge mop water into the sewer through a grease interceptor. Have spill containment and cleanup kits available. To report serious toxic spills, call 911.



Handling Toxic Chemicals

Dispose of all unwanted toxics materials like cleaners, solvents and detergents through a hazardous waste hauler. These items are not trash. For information on hazardous waste pickup, call (909) 386-8401. Use non-toxic cleaning products whenever possible.



To report illegal dumping or for more information on stormwater pollution prevention, call

1 (800) CLEANUP

www.1800cleanup.org

Prevención de Contaminación del Desagüe

RESTAURANTES

Desechos de comida, grasa, líquidos de limpieza, agua del trapiador y basura de un restaurant acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el rio de Santa Ana. Para prevenir esta contaminación y protejar la salud publica, siga estas practicas.



Reciclando Aceite & Grasa

El aceite y la grasa se pueden reciclar. Busca en las paginas amarillas compañias de reciclaje o llama al (909) 3[illegible]8407 para información. No los tires en los lavaderos, las coladeras, el estacionamiento o en la calle. Manten los recipientes de grasa cubiertos y guardados.



Areas de Basura

Manten el bote de basura cerrada y el área del basurero limpia. No lo llenes con desechos líquidos ni utilices la manguera para lavarlo. Llama al transportador de basura para reemplasar los botes de basura que esten dañados.



Limpiando & Mantenimiento

Limpia los tapetes de piso, los filtros y los botes de basura en el contenedor para trapeadores, lavavo, o en la coladera apropiado que llegue al drenaje. No los laves en el estacionamiento, los callejones, en la banqueta o en la calle. Barre el area de afuera y pon todo en la basura, en ves de dejarlo en la banqueta o en la calle.



Controlando Derrames

Usa métodos secos para limpiar los derrames, barriendo y usando tierra para desechos de gato, no uses la manguera para limpiar los derrames. Manten un kit de limpieza de derramamientos en tu negocio. Para reportar derrames llama al 911.



Manejando Quimicos Toxicos

Deposita los desechos toxicos como limpiadores, solventes, detergentes a un bote para toxicos. Estos no son basura. Para mas información sobre desechos peligrosos, llama al (909) 386-8401. Usa productos de limpieza que no sean toxicos.



Para reportar actividades ilegales u obtener más información de la prevención de contaminación llamar al

1 (800) CLEANUP

www.1800cleanup.org

Prevención de Contaminación del Desagüe

TRABAJO DE CARRETERAS & PAVIMENTO

Asfalto, mezcle y materiales de excavaciones del pavimento acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación y protejer la salud publica.



Previniendo Erosiones

Planea las excavaciones trabajo de jardineria durante el clima seco. Desarrolla e implementa planes de embarcamientos de control de sedimento y excavaciones. Cubre montones de tierra, grava y otros materiales con un plastico para protejerlos de la lluvia, aire y desagüe.



Durante Construcción

Cubre los lavados y de mantenimiento a los hoyos al aplicar selladura o mezcla. Revisa las areas de excavaciones, y evita pasarte de agua para prevenir polvadura. Nunca laves los materiales llenos de concreto en la calle, drenajes o en el desagüe.



Mantenimiento de Vehiculos & Herramientas

Has el mantenimiento y carga de vehiculos en el mismo lugar, lejos de la calle, las alcantarillas y los drenajes. Inspecciona los vehiculos y el equipo de cualquier goteadura y evita goteaduras de autos que no se usan vaciandoles la gasolina, aceite de transmision, frenos y liquidos del radiador.

Removiendo Asfalto & Concreto

Bloquea alrededor de los drenajes cuando estes usando las maquinas de sierra, tambien recicla todo el pavimento roto en la compañia demolidora. Para más información llama al (909) 386-8401.



Limpiando & Previniendo Derrames

Mantente siempre preparado para cualquier derrame, usa siempre las herramientas de seguridad al igual que materiales como, tierra para desechos de gato o aserrin Barre los derrames en ves de lavarlos con la manguera. Previene los derrames de las maquinas usando embudos o colocanto garras para absorver cualquier liquido. Para reportar derrames llama al 911.



Para reportar actividades ilegales u obtener más información de la prevención de contaminación llamar al:

1 (800) CLEANUP

www.1800cleanup.org

Prevención de Contaminación del Desagüe

PINTURA Pintura, solventes y otros quimicos peligrosos que se usan al pintar acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación y protejer la salud publica.



Pinturas de Agua

Usa pinturas de agua cuando sea posible. Son menos toxicos que las pinturas de aceite y mas faciles para limpiar. Busca los productos "latex" or "cleans with water".



Removiendo Pintura

Residuos de pintura, polvo de pintura y pinturas que contienen plomo son peligrosas. Borrelos en ves de lavarlos con la manguera y desechalos en unlugar de colección de desechos peligrosos. Llama al (800) CLEANUP para un lugar en tu area.



Limpiando Pintura

Nunca laves las brochas ni los contenedores de pintura en la calle, coladeras o desagües. Las de pintura de agua limpialas en el labavo y las de pintura de aceite con thiner, y vuelvelas a guardar en un frasco, para un uso futuro. Envuelve los residuos de pintura en un periodico y tiralos a la basura.



Removiendo Pintura en Exteriores

Al despintar o lavar exteriores de los edificios con agua de alta presión bloquea los drenajes cercanos y desvia el desagüe. Pregunta las autoridades si puedes descharla en las alcantarillas.



Reciclando Pintura

Recicla la pintura que sobra en un lugar de colección de materiales peligrosos, guardala para re-toques or regalela a alguien que la use, como a un teatro, a la escuela, una oraganizacion de la ciudad o de la comunidad.

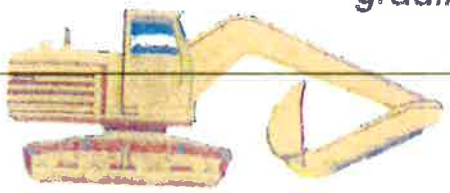
Para reportar actividades ilegales u obtener más información de la prevención de contaminación llamar al:

1 (800) CLEANUP

www.1800cleanup.org

EXCAVATION & GRADING OPERATIONS

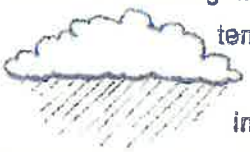
Sediment, cement wash, asphalt, and motor oil from soil excavation and grading operations often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.



Follow these practices to help prevent stormwater pollution...

Erosion Prevention...

Reduce erosion by avoiding excavation or grading activities during wet weather, and by planting



temporary vegetation on slopes where construction is not immediately planned. Plant permanent vegetation as soon as possible, once excavation and grading activities are complete. Diversion dikes can be constructed to channel runoff around the site; channels can be lined with grass or roughened pavement to reduce runoff velocity. For information on erosion control, call 799-7407.

General Business Practices...

Cover exposed piles of soil and other construction materials with plastic sheeting to prevent contact with rain water.

Recycling...



Recycle broken asphalt, concrete, wood, and cleared vegetation whenever possible. Unrecyclable materials must be taken to an appropriate landfill or disposed of as hazardous waste. For recycling or disposal information, call 386-8401.

Equipment Maintenance...



Maintain all vehicles and equipment by inspecting them frequently for leaks. Also, conduct maintenance and refueling at one location -- away from storm drains, and perform major equipment repairs and washings off site. Finally, use gravel approaches where truck traffic is frequent to reduce soil compaction and limit the tracking of sediment into the streets.

Spills...

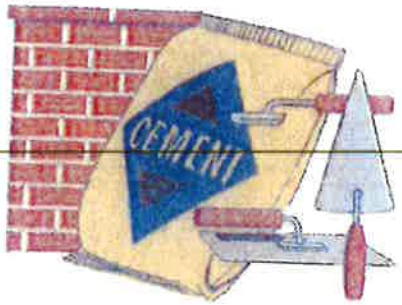
Avoid accidental spills by using a drip pan and funnel when draining or pouring fluids. Be ready for unexpected spills by preparing and using easy to find



spill containment and cleanup kits. Kits should include safety equipment and cleanup materials such as kitty litter, sawdust or commeal. Furthermore, prevent leaks from stored vehicles by draining gas, hydraulic oil, and transmission, brake & radiator fluid. REMEMBER: Never hose down dirty surfaces. To report serious spills, call 1-800-33-TOXIC.

For more information, call your city's stormwater representative

FRESH CONCRETE & MORTAR APPLICATION



Cement, cement wash, gravel, asphalt, solvents, and motor oil from fresh concrete and mortar activities often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

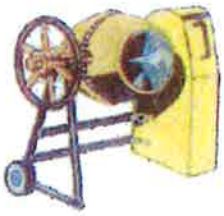
General Business Practices...

Schedule excavation and grading work during dry weather, and in case it rains, prevent materials from contacting stormwater by storing them under cover. Also, secure open bags of cement to keep wind-blown cement powder away from streets, gutters and storm drains.



During Construction...

Prevent mortar and cement from entering the storm drains by placing erosion controls (i.e., berms or temporary vegetation) down-slope to capture runoff. When breaking up paving, be sure to pick up all pieces and recycle them at a crushing company; small amounts of excess dry concrete, grout and mortar can be disposed of in the trash. Setup small mixers on tarps or heavy drop cloths to allow for easy cleanup of debris. REMEMBER: Never bury waste material -- recycle or dispose of it as hazardous waste. Call 386-8401 for recycling and disposal information.



Handling Materials & Wastes...

Minimize wastes when ordering materials by ordering only the amounts needed to complete the job. Whenever possible, use recycled or recyclable materials. Recycle broken asphalt, concrete, wood, and cleared vegetation. Unrecyclable materials must be taken to an appropriate landfill or disposed of as hazardous waste. For recycling and disposal information, call 386-8401.



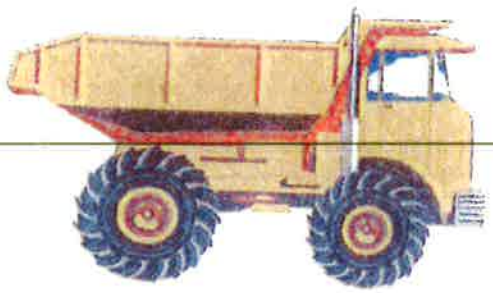
Cleaning up...

When cleaning up after driveway or sidewalk construction, wash concrete dust onto designated dirt areas, not down the driveway or into the street or storm drain. Also, wash out concrete mixers and equipment only in specified wash-out areas, where the water flows into containment ponds. Cement washwater can be recycled by pumping it back into cement mixers for reuse. REMEMBER: Never dispose of cement washout into driveways, streets, gutters, storm drains or drainage ditches.



For more information, call your city's stormwater representative

GENERAL CONSTRUCTION



Soil, cement wash, asphalt and motor oil from construction sites often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

General Business Practices...

Cover exposed piles of soil and other construction materials with plastic sheeting to prevent contact with rain water.

Erosion Prevention...

Reduce erosion by avoiding excavation or grading activities during wet weather, and by planting temporary vegetation on slopes where construction is not immediately planned.



Plant permanent vegetation as soon as possible, once excavation and grading activities are complete. Diversion dikes can be constructed to channel runoff around the site; channels can be lined with grass or roughened pavement to reduce runoff velocity. For information on erosion control, call 799-7407.

Equipment Maintenance...

Maintain all vehicles and equipment by inspecting them frequently for leaks. Also, conduct maintenance and refueling at one location -- away from storm drains, and perform major equipment repairs and washings off site.

Handling Materials & Waste...

Minimize wastes when ordering materials by ordering only the amounts needed to complete the job. Whenever possible, use recycled or recyclable materials. Recycle broken asphalt, concrete, wood, and cleared vegetation. Unrecyclable materials must be taken to an appropriate landfill or disposed of as hazardous waste. For recycling and disposal information, call 386-8401.

Spills...

Avoid accidental spills by using a drip pan and funnel when draining or pouring fluids. Be ready for unexpected spills by preparing and using easy to find spill containment and cleanup kits. Kits should include safety equipment and cleanup materials such as kitty litter, sawdust or cornmeal.



Furthermore, prevent leaks from stored vehicles by draining gas, hydraulic oil, and transmission, brake & radiator fluid. REMEMBER: Never hose down dirty surfaces; instead, sweep regularly. To report serious spills, call 1-800-33-TOXIC.

For more information, call your city's stormwater representative

HOME & GARDEN



Yard waste and household toxics such as paints, solvents, and pesticides often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

In Your Home...

Household products such as paints, paint thinners, drain openers, motor oil, wood polishes, insecticides & herbicides, oven cleaners, and many other general cleaners frequently get dumped on the ground, or into a gutter, street or storm drain. Instead of polluting our stormwaters, take these items to a household hazardous waste collection facility. Call 1-800-OILY-CAT for a facility in your area.



Fertilizers and Pesticides...

Fertilizers and pesticides are often carried into our storm drains by sprinkler runoff. To minimize stormwater pollution, use organic or non-toxic pesticides and fertilizers as directed, and keep them away from ditches, gutters and storm drains. Store them in a covered area, off the ground, to prevent contact with water. For additional gardening questions, call the San Bernardino Master Gardeners at 387-2182.



Trimmin' the Garden...

Decaying organic materials that enter our storm drains, such as grass, leaves, yard clippings, and pet waste, will use up oxygen in nearby streams, stressing aquatic life. Prevent stormwater pollution by not blowing, sweeping, raking or hosing yard waste into the street, gutter, or storm drain. Alternatively, leave grass clippings on your lawn after mowing, or compost your clippings and yard waste. Pet waste should not be composted, but rather disposed of in the trash to prevent the potential spread of diseases.



Planting In The Yard

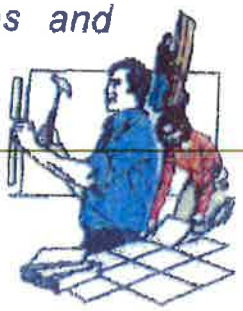
Produce less yard waste and save water by planting low maintenance trees and shrubs. Also, conserve water and minimize unwanted runoff by using drip irrigation, soaker hoses, or micro-spray systems to water vegetation.



For more information, call your city's stormwater representative

HOME REPAIR & REMODELING

Paints, solvents, adhesives, dusts, sediments, pesticides and household toxics commonly associated with home repair and remodeling activities often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.



Follow these practices to help prevent stormwater pollution...

Household Hazardous Wastes...

Common household cleaners, paint products, and wallpaper & tile adhesives contain toxic substances. Dispose of these products properly. REMEMBER: Toxic wastes should never enter the storm drain system. For disposal information, call 1-800-OILY-CAT.



Construction...

Keep all construction debris away from the street, gutter and storm drain, and if possible, schedule grading and excavation projects for dry weather. Cover excavated material and stockpiles of asphalt, sand, etc. with plastic tarps, and prevent erosion by planting fast-growing annual and perennial grasses, which will shield and bind the soil.

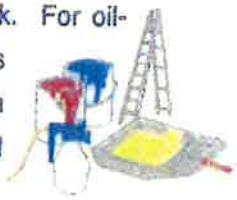
Landscape & Gardening...

Use fertilizers and pesticides as directed. Keep them away from ditches, gutters and storm drains, and store them in a covered area to prevent contact with rain water. Also, minimize runoff and conserve water by using drip irrigation, soaker hoses, or micro-spray systems. REMEMBER: Do not deposit leaves into the street, gutter, or storm drain.



Painting...

CLEANUP... Avoid cleaning brushes or rinsing paint containers into a street, gutter, or storm drain. For water-based paints, "brush out" as much paint as possible, and rinse in the sink. For oil-based paints, "brush out" as much paint as possible, clean with thinner, and then filter and reuse thinner or solvent.



REMOVAL... Paint stripping residue, chips & dust from marine paints, and paints containing lead or tributyl tin are hazardous wastes. Sweep them up and call 1-800-OILY-CAT for disposal information.

RECYCLING... Recycle or reuse leftover paint by using it for touch-ups, or by giving it to someone who can us it, such as a theatre group, school, city or other community organization. If you're unable to give it away, contact 1-800-OILY-CAT for disposal information.

Concrete & Masonry...

Store bags of cement and plaster away from gutters and storm drains, and under cover, protected from rainfall, runoff and wind. REMEMBER: Never dispose of cement washout or concrete dust onto driveways, streets, gutters or storm drains.

For more information, call your city's stormwater representative



PAINTING

Paints, solvents, adhesives, and toxic chemicals from painting operations often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

General Business Practices...

Keep all paint products and wastes away from the street, gutter, and storm drains. Reuse paint thinner by setting used thinner aside in a closed, labeled jar to settle out paint particles, and then pouring off the clear liquid for future use. Wrap dried paint residue in newspaper and dispose of it in the trash.

Water-Based Paints...

Purchase water-based paints whenever possible. Look for products labeled "latex" or "clean up with water."

Recycle or Reuse Paints...

Recycle/reuse leftover paint by using it for touch-ups, or by giving it to someone who can use it, such as a theatre group, school, city or other community organization. If you're unable to give it away, contact 386-8401 for information on hazardous waste pick-up.

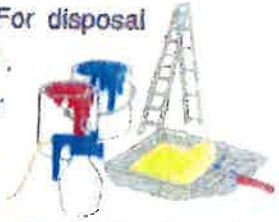
Paint Cleanup...



Avoid cleaning brushes and rinsing paint containers in a street, gutter, or storm drain. For water-based paints, "brush out" as much paint as possible and and rinse in the sink. For oil-based paints, "brush out" as much paint as possible, clean with thinner, and then filter and reuse thinner or solvent.

Paint Removal...

Chemical paint stripping residue, chips & dust from marine paints, and paints containing lead or tributyl tin are hazardous wastes. For disposal information, call 386-8401. Also, when stripping or cleaning building exteriors with high-pressure water, block storm drains and divert the washwater onto a designated dirt area. Check with your local wastewater treatment authority to find out if you can collect building cleaning water and discharge it to the sewer.



For more information, call your city's stormwater representative

RESTAURANTS



Food waste, grease, cleaning solvents & chemicals, mop water and trash from restaurant operations often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

Cleanin' It Right...



Pour mop and wash water into the mop sink or down floor drains, not into gutters, alleys, or parking lots. Wash greasy equipment only in designated wash areas properly connected to the sewer system with an appropriate oil/water separator, and avoid washing kitchen mats, garbage containers, and other items anywhere that wastewater can flow into the storm drain system.

What About Toxics...



General cleaners, floor cleaners, solvents, and detergents often contain toxic substances. Read labels carefully and store and dispose of these products properly. REMEMBER: Toxic wastes should never enter the storm drain system. To report toxic spills call 1-800-33-TOXIC. For information on hazardous waste pick-up call 386-8401.

Water - Friendly Products...

Whenever possible, purchase water-based cleaning products. Look for products labeled "non-toxic," "non-petroleum based," "ammonia-free," "phosphate-free," "dye and perfume-free," or "readily biodegradable."

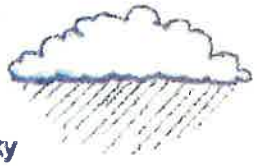
Recycle That Waste...



Oil and grease wastes can be recycled. REMEMBER: Never dump them down storm drains or onto parking lots. Look in the yellow pages for rendering companies, or call 386-8401 for disposal information.

How 'Bout That Dumpster...

Rain can wash oil, grease, and other substances often found in dumpsters into the storm drain system. Prevent polluted runoff by covering all dumpsters and replacing leaky ones, and ensuring that the area surrounding dumpsters remains free of litter.



For more information, call your city's stormwater representative

ROADWORK & PAVING

Asphalt, saw-cut slurry, and excavated materials from Road paving, surfacing and pavement removal operations often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.



Follow these practices to help prevent stormwater pollution...

During Construction...

Cover catch basins and maintenance holes when applying seal coat, slurry seal, fog seal, etc. Use check dams, ditches or berms around excavations, and avoid over-application of water for dust control. REMEMBER: Never wash excess materials from exposed aggregate or concrete into a street, gutter, or storm drain; collect and recycle them.

Asphalt & Concrete Removal...



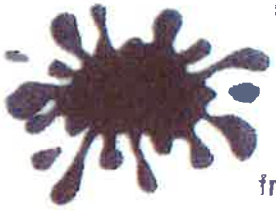
Barricade storm drain openings during saw-cutting, and after breaking up paving, be sure to remove all chunks and pieces and recycle them at a crushing company. For recycling information, call 386-8401.

Equipment Maintenance...

Maintain all vehicles and equipment by inspecting them frequently for leaks. Also, conduct maintenance and refueling at one location -- away from storm drains, and perform major equipment repairs and washings off site.

Spills...

Be ready for unexpected spills by preparing and using spill containment and cleanup kits. Kits should include



safety equipment and cleanup materials such as kitty litter, sawdust or cornmeal. Prevent drips from paver machines by catching fluids with drip pans or by placing absorbent material (cloth, rags, etc....) underneath the machines when they're not in use. To report serious spills, call 1-800-33-TOXIC.

General Business Practices...

Schedule excavation and grading work during dry weather, and develop and implement erosion and sediment control plans for excavated embankments. In



case it rains, cover exposed piles of soil and other construction materials with plastic sheeting to prevent contact with rain water.

For more information, call your city's stormwater representative

RURAL HOMES

Pesticides, fertilizers, septic system overflows, soil, and animal manure from rural homes often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.



Follow these practices to help prevent stormwater pollution...

Protecting Your Well...

Since old, uncapped and abandoned wells can serve as direct conduits to our groundwater, it s important to maintain these areas. Keep all livestock confinement areas away from wells, and keep septic drain fields and chemical storage areas down slope from wells. Install anti-siphoning devices between your well and water pipes to prevent backflow of pollutants and drinking water contamination. REMEMBER: Never dispose of anything in wells.



Fertilizers and Pesticides...

Avoid buying and mixing more pesticide than you need, and never apply more than the recommended amount. Consider spot treatments, rather than spraying pesticides everywhere. REMEMBER: Don t dispose of excess chemicals by dumping them on the ground, pouring them down a well, or draining them into ditches, sewers, drains or septic systems. Call 1-800-OILY-CAT for disposal information. Finally, store chemicals in a covered area, with an impermeable lined floor to prevent contact with rainwater.



That Rural Landscape...

Reduce soil erosion by covering parking areas with gravel, and by covering other exposed soils with vegetation. Gravel and vegetation will not only improve the appearance of your home, but will also assist in filtering out pollutants from water. For information on reducing erosion, call 799-7407.

Autos & Other Equipment...

Repair vehicles and other equipment away from wells, ditches and drains. Avoid accidental spills by using a drip pan and funnel when draining or pouring fluids. Prevent leaks from stored vehicles by draining gas, hydraulic oil, and transmission, brake & radiator fluid. For recycling information, call 1-800-OILY-CAT



Septic Systems

Septic systems should never be piped into a road ditch, storm sewer, stream or farm drain tile system. Also, avoid washing or flushing grease, alcohol, or strong chemicals into your septic system; these substances kill the bacteria needed to break down wastes.

For more information, call your city s stormwater representative

Curb Inlet Filter (CIB)

PROVEN STORMWATER TREATMENT TECHNOLOGY

BIO CLEAN ENVIRONMENTAL SERVICES, INC.

Overview

The Bio Clean Curb Inlet Filter (CIB) is best known for its patented 'Shelf System'. The shelf directs water flow into the filter which is positioned directly under the manhole for easy access.

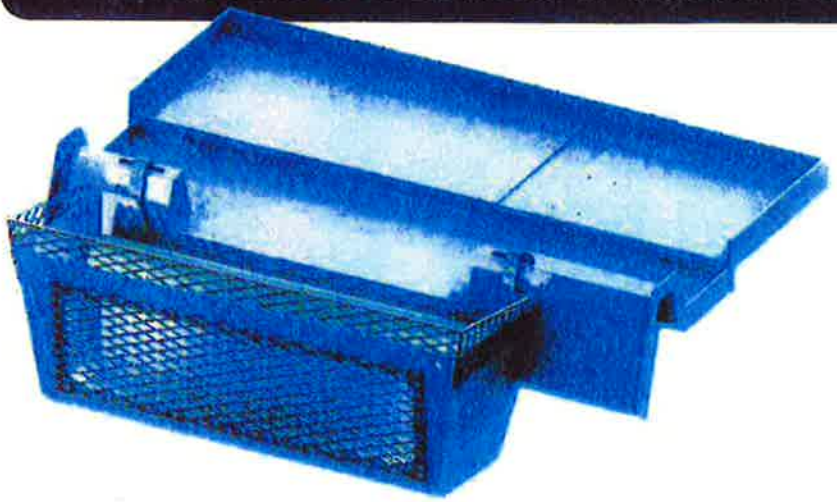
Used exclusively by numerous cities and counties for its easy maintenance and 15 minute cleaning time, the 'Shelf System' eliminates the need for confined space entry and allows it to be serviced with a standard vacuum truck or by lifting the basket through the manhole. The 'Shelf System' makes this filter the preferred choice of maintenance crews nationwide.

This industry leading filter and shelf system are constructed of UV coated marine grade fiberglass and high grade stainless steel. Its multi-level screening and hydrocarbon media captures everything from oils & grease to sediments, to foliage and litter.

Our manufacturing capabilities allow us to make these filters and shelf systems and more. This filter is easily adaptable to size and style of catch basin.

Includes the patented 'Shelf System'

- Allows the Filter to Be Cleaned in 15 Minutes or Less -



Performance

- 93% Removal of TSS
- 84% Removal of Turbidity
- 85% Removal of Nitrates
- 79% Removal of Zinc
- 32% Removal of BOD

Advantages

- 5 Year Warranty
- Works in Any Size Catch Basin
- No Nets or Geofabrics
- 15+ Year User Life
- Meets LEED Requirements
- Patented Shelf System
- Fiberglass Construction
- Internal Bypass

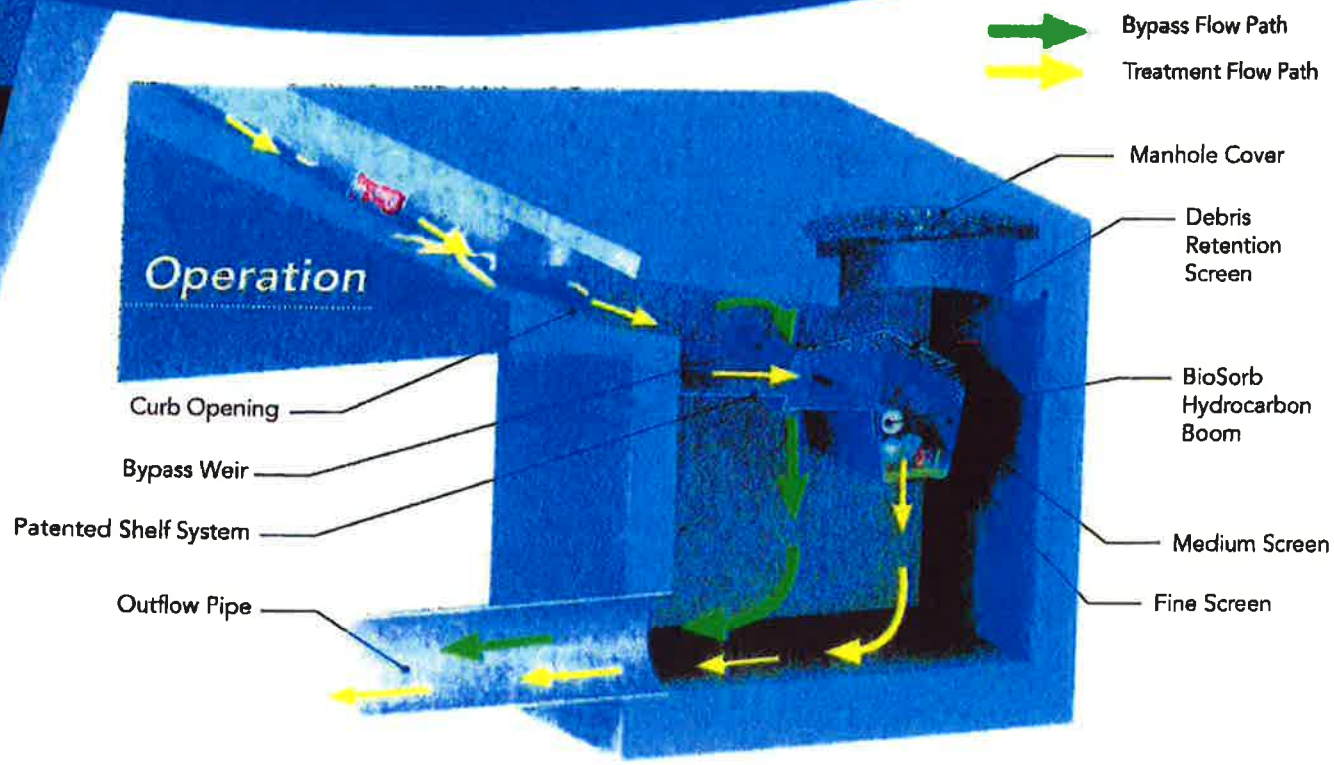
Specifications

Model #	Treatment Flow(CFS)	Bypass Flow (CFS)
BC-CIB-3	0.85	Unlimited



Curb Inlet Filter (CIB)

PROVEN STORMWATER TREATMENT TECHNOLOGY



Installation & Maintenance

Site	Company	Service Time (hours)	Total Scores (out of 25)
15	Hydrocompliance	1.75	9
17	KriStar	1.0	15
18	AbTech	0.5	18
19	Bio Clean	0.25	22

Hawaii Report Maintenance Score

Application

- Parking Lots
- Roadways


Superior Design Maximizes Debris Capture & Retention


Easy Maintenance Access

Approvals

City and County of Honolulu

County of San Diego

2972 San Luis Rey Rd
Oceanside, CA 92058
p 760.433.7640 f 760.433.3176
www.BioCleanEnvironmental.com

BIO CLEAN

Grate Inlet Filter (GISB)

PROVEN STORMWATER TREATMENT TECHNOLOGY

BIO CLEAN ENVIRONMENTAL SERVICES, INC.

Overview

The Bio Clean Grate Inlet Filter (GISB) for catch basins has been keeping property owners in compliance since 1994. Preferred by public agencies and backed with a 5 year unlimited warranty, this easy to install filter has been chosen because of its durability and easy maintenance.

Constructed of UV coated marine grade fiberglass and high grade stainless steel, it is built to last longer than any other filter brand. The multi-stage filtration provides three different sieve size filtration screens to optimize filtration and water flow. The filter is equipped with a hydrocarbon media boom and deflector shield protected bypass to eliminate scouring.

The filter is designed for grated inlets of any size and depth. Each filter can be custom built to meet specific project needs. Screen size and media type can be modified to remove specific pollutants.

Advantages

- 5 Year Warranty
- Custom Sizes Available
- Fits in Shallow Catch Basins
- No Nets or Geofabrics
- 15+ User Life
- No Replacement Costs as Found with Fabric Filters
- Meets LEED Requirements



Performance

- 74%-86% Removal of TSS
- 54% Removal of Oils & Grease
- 57%-71% Removal of Phosphorus
- 56%-60% Removal of Nitrogen

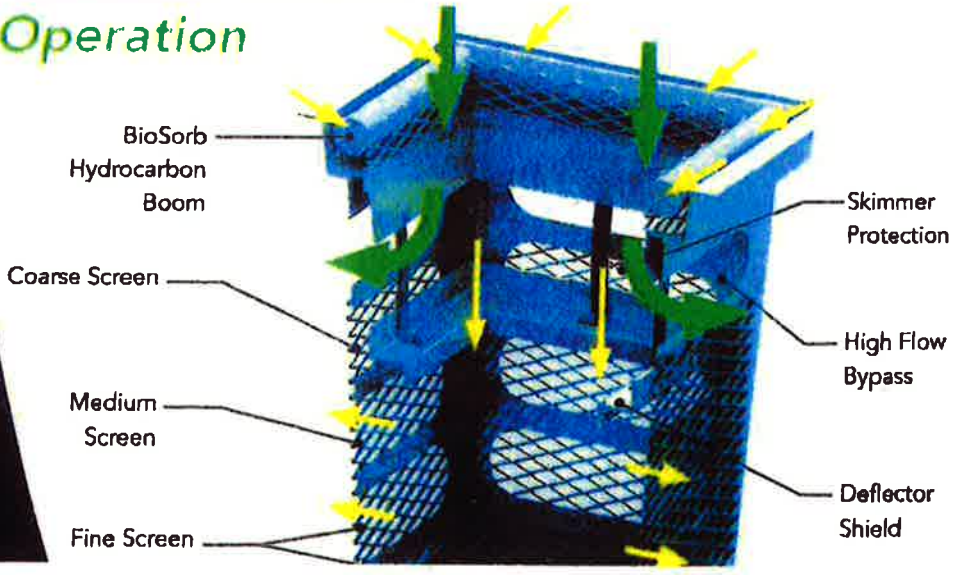
Specifications

Model #	Treatment Flow (CFS)	Bypass Flow (CFS)
BC-GISB-12-12-12	0.5	0.5
BC-GISB-18-18-18	0.8	0.8
BC-GISB-24-24-24	3.7	4.4
BC-GISB-36-36-24	5.8	13.4
BC-GISB-48-48-18	6.6	13.3

Bypass Flow Path

Treatment Flow Path

Operation



Grate Inlet Filter (GISB)

PROVEN STORMWATER TREATMENT TECHNOLOGY

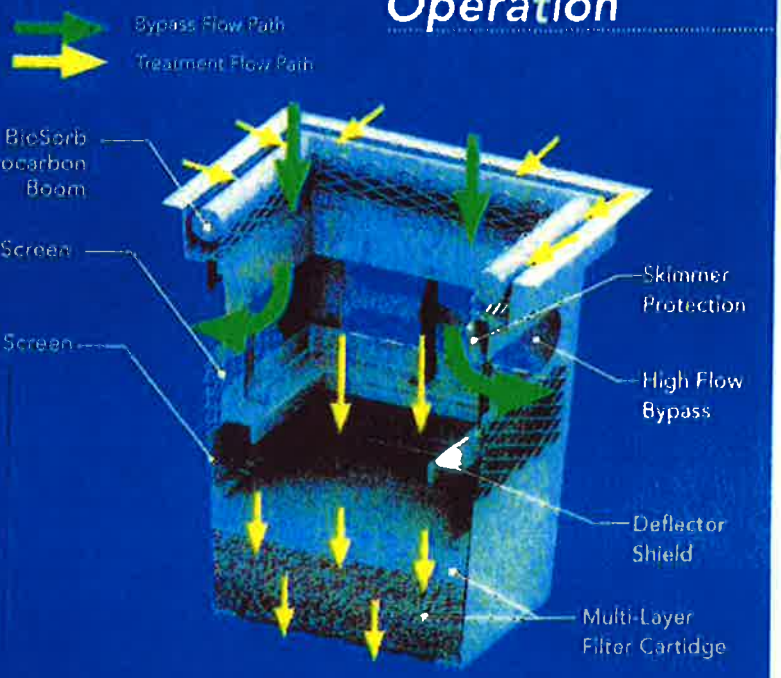
Media Filter

The Bio Clean Grate Inlet Media Filter (GISB-MF) is an advanced level filtration device designed with a multi-layered media filter for increased removal efficiencies.

Performance

- 85% Removal of Fine TSS
- 69% Removal of Dissolved Phosphorus
- 95% Removal of Copper
- 87% Removal of Lead
- 95% Removal of Zinc
- 90% to 95% Removal of Oils & Grease
- 68% Removal of Fecal Coliform (bacteria)

Operation

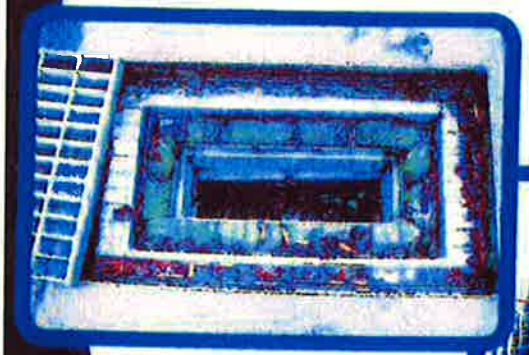


Specifications

Model #	Media Treatment Flow (CFS)	Screen Treatment Flow (CFS)	Bypass Flow (CFS)
BC-GISB-MF-12-12-12	0.007	0.2	0.5
BC-GISB-MF-18-18-18	0.02	0.5	0.8
BC-GISB-MF-24-24-24	0.04	0.9	4.4
BC-GISB-MF-36-36-24	0.17	1.8	13.4
GISB-MF-48-48-18	0.35	2.4	13.3

Application

- Parking Lots
- Roadways
- Bioswale Bypass Structures



Enhanced with Media to Meet Removal Requirements



Perfect for Retrofit Applications

Approvals

County of Orange

San Francisco Estuary Partnership

Meets Full Capture Requirements

Installation & Maintenance

See our website for installation &

2972 San Luis Rey Rd
Oceanside, CA 92058
p 760.433.7640 f 760.433.3176
www.BioCleanEnvironmental.com