

Recording requested by and mail to:

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

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

APN: 418-122-021 & 418-160-006

**STORM WATER MANAGEMENT WQMP/BMP FACILITIES
COVENANT AND AGREEMENT NO.**

City of Beaumont, Riverside County, California

THIS COVENANT AND AGREEMENT is made and entered into this April 1 of 2026, by and between JSJ Property Holdings 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 539 & 545 Pennsylvania Ave. (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: <u>Lakhbir Kaur Sondh</u> | By: _____ |
| Name: <u>Lakhbir Kaur Sondh</u> | Name: _____ |
| Title: <u>Manager</u> | Title: _____ |
| Organization: <u>JSJ Property Holdings LLC</u> | 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

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 SAN BERNARDINO

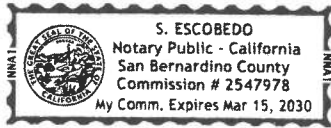
On April 1, 2026 before me, S.ESCOBEDO, NOTARY PUBLIC
Date Here Insert Name and Title of the Officer

personally appeared LAKHBIR KAUR SONDH
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.

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 S. Escobedo
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

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

Description of Attached Document

Title or Type of Document: STORMWATER MANAGEMENT WQMP/BMP FACILITIES COVENANT
And Agreement NO.
Document Date: April 1, 2026 Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

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

LEGAL DESCRIPTION

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

PARCEL 1:

THE EASTERLY HALF OF LOT 2 IN BLOCK 92 AS SHOWN BY AMENDED MAP OF THE TOWN OF BEAUMONT, CITY OF BEAUMONT, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ON FILE IN BOOK 6, PAGES 16 AND 17 OF MAPS, RECORDS OF SAN BERNARDINO COUNTY, CALIFORNIA.

PARCEL 2:

THAT PORTION OF THE EASTERLY 190 FEET OF LOT 3 IN BLOCK 92 AS SHOWN BY AMENDED MAP OF THE TOWN OF BEAUMONT, CITY OF BEAUMONT, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ON FILE IN BOOK 6, PAGES 16 AND 17 OF MAPS, RECORDS OF THE COUNTY OF SAN BERNARDINO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY CORNER OF SAID LOT 3; THENCE WESTERLY ALONG THE NORTHERLY LINE THERETO 190.00 FEET TO THE NORTHWESTERLY CORNER OF SAID EASTERLY 190 FEET; THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID EASTERLY 190 FEET, A DISTANCE OF 73.41 FEET; THENCE EASTERLY IN A DIRECT LINE TO A POINT IN THE EASTERLY LINE OF SAID LOT, DISTANT THEREON 75.67 FEET SOUTHERLY FROM SAID NORTHEASTERLY CORNER; THENCE NORTHERLY ALONG SAID EASTERLY LINE TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM ALL MINERALS, OILS, GASSES AND OTHER HYDROCARBONS BY WHATSOEVER NAME KNOWN, THAT MAY BE WITHIN OR UNDER THE PARCEL OF LAND HEREIN ABOVE DESCRIBED WITHOUT HOWEVER, THE RIGHT TO DRILL, DIG OR MINE THROUGH THE SURFACE THEREOF.

ALSO EXCEPTING AND RESERVING UNTO THE STATE OF CALIFORNIA AND ALL RIGHTS OF INGRESS AND EGRESS FROM THE LAND HEREIN CONVEYED OVER AND ACROSS THE SOUTHERLY LINE THEREOF.

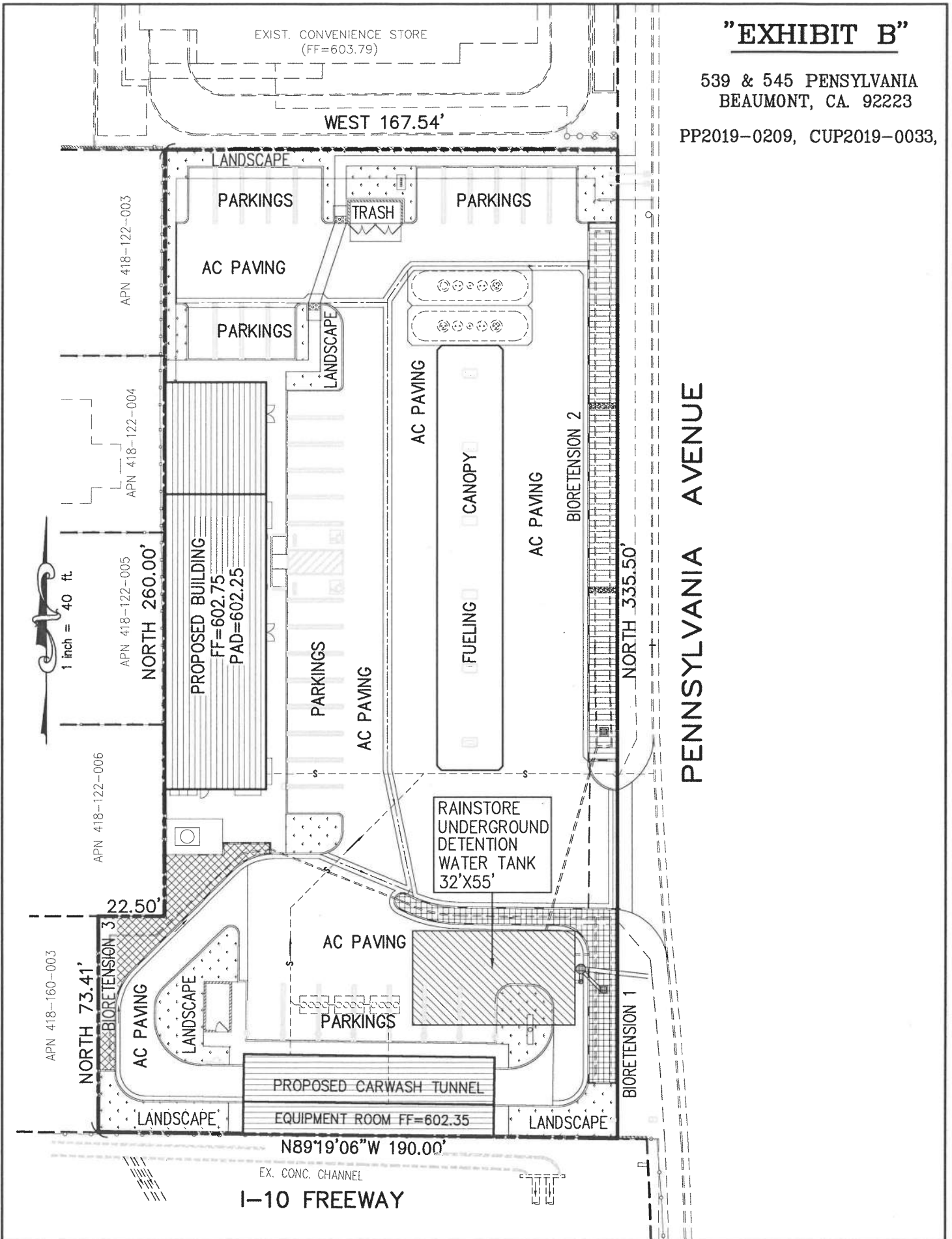
IT IS THE PURPOSE OF THE FOREGOING EXCEPTION AND RESERVATION TO PROVIDE THAT NO EASEMENT OF ACCESS SHALL ATTACH OR BE APPURTENANT TO THE PROPERTY HEREBY CONVEYED BY REASON OF THE FACT THAT THE SAME ABUTS UPON A PUBLIC WAY AND UPON A STATE HIGHWAY, WITH ACCESS ONLY TO THE STATE HIGHWAY BEING RESTRICTED.

APN: 418-122-021-9, 418-160-006-4

"EXHIBIT B"

539 & 545 PENNSYLVANIA
BEAUMONT, CA. 92223

PP2019-0209, CUP2019-0033,



PENNSYLVANIA AVENUE

Project Specific Water Quality Management Plan

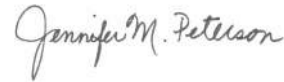
A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County

Project Title: Gas Station, Convenience Store, and Carwash

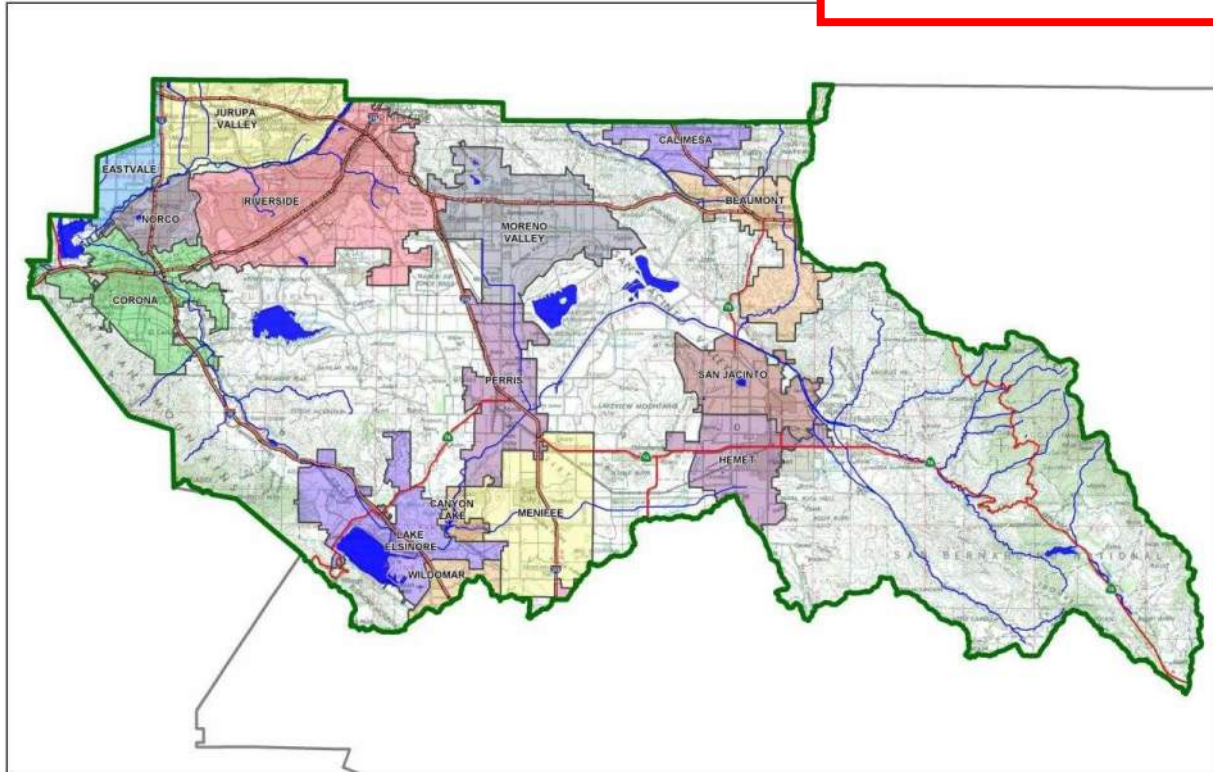
Public Works No: PW2023-1078

Design Review/Case No: Case No: CUP2019-003

No further comments. NV5 recommends approval of the FWQMP.



Jennifer M. Peterson, RCE 67821



Contact Information:

Prepared for: Mr. Jaswinder Sondh
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91745 Tel. No. (626) 224-4636

Prepared by: Moment Engineering. 4707
Soria Drive. San Diego CA, 92115 Ph: (619)
374-8677
Email:clarissa@momentengineering.com

- Preliminary
- Final

Original Date Prepared: October, 2023

Revision Date(s): July 25, 2025

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

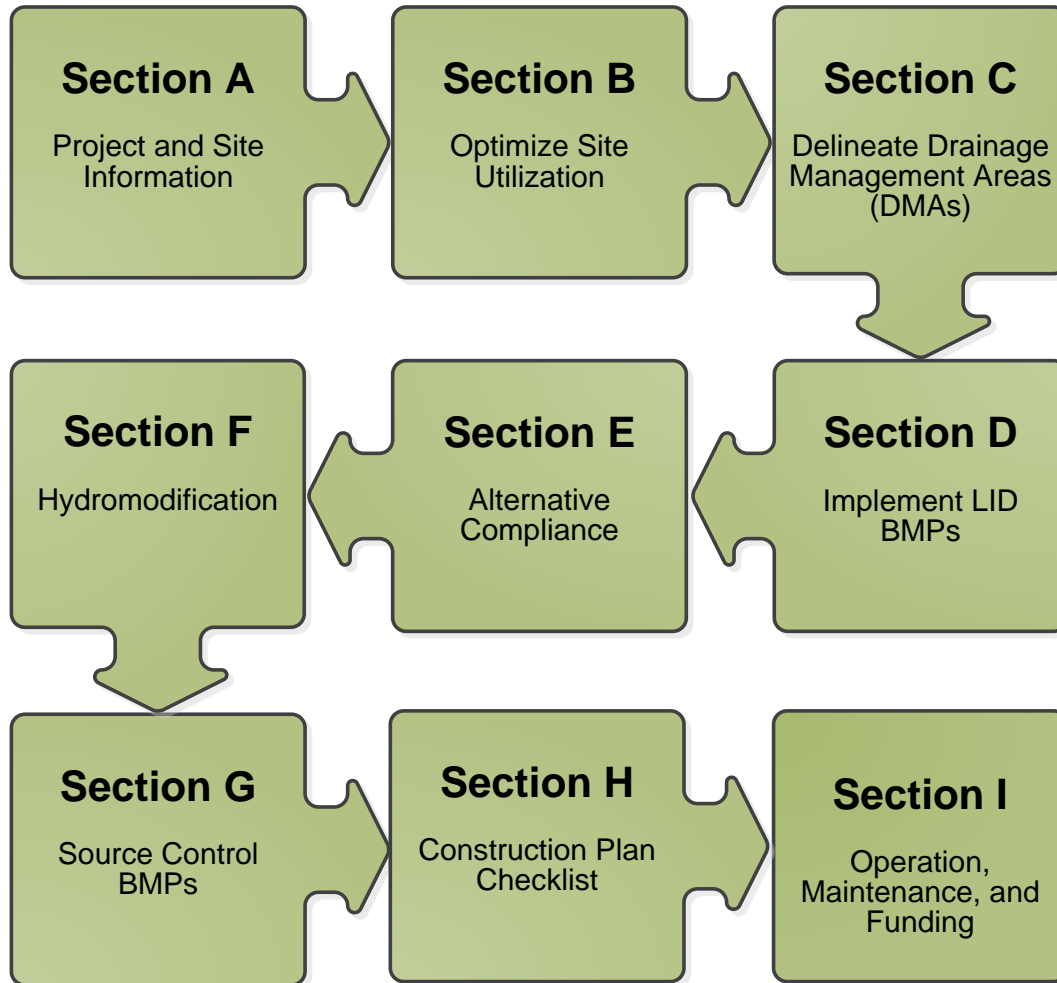
Template revised June 30, 2016



Introduction

This Project-Specific WQMP for the **Santa Ana Region** has been prepared to help guide in documenting compliance for **Gas Station, Convenience Store, and Carwash project in City of Beaumont**. Below is a flowchart for the layout of this WQMP that will provide the steps required to document compliance.

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 Mr. Jaswinder Sondh by SPB Engineering, Inc. for the Gas Station, Convenience Store, and Carwash.

This WQMP is intended to comply with the requirements of the City of Beaumont for Developing vacant land and construction of a proposed gas service station, convenience store, and carwash, Planning Case No. CUP2019-0033 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Beaumont Water Quality Ordinance (Municipal Code Section 13.24.020).

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

Lakbir Kayr Sondh
Owner's Signature

LAKHIR KAYR SONDH
Owner's Printed Name

7-28-2025
Date

Manager
Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. PW2023-1078 and any subsequent amendments thereto."

Fahad Masud
Preparer's Signature

Fahad Masud
Preparer's Printed Name

7/8/2025
Date

Principal Engineer
Preparer's Title/Position

Preparer's Licensure:



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Section A: Project and Site Information

Project consists of developing vacant land and constructing a gas station, convenience store, and carwash. Site is designed to maintain natural drainage where feasible, which conveys stormwater from southeast to northwest with a mild slope, in both existing and developed conditions. This development utilizes grass lined swales and/or concrete v-ditches to convey water to catch basins. Each catch basin is equipped with a treatment control catch basin insert, stormwater is then conveyed via conduits that discharge into underground chambers designed to collect stormwater and allow infiltration of design capture volume of stormwater. Underground infiltration system is located on the northwest corner of site. Excess stormwater discharges from site through a curb face overflow conduit.

| PROJECT INFORMATION | |
|---|--|
| Type of Project: | Commercial-Gas Station, Convenience Store, and Carwash |
| Planning Area: | Beaumont |
| Community Name: | City of Beaumont |
| Development Name: | Commercial-Gas Station, Convenience Store, and Carwash |
| PROJECT LOCATION | |
| Latitude & Longitude (DMS): 33.9284, -116.9665 | |
| Project Watershed and Sub-Watershed: Santa Ana; Santa Ana River, Reach 3 | |
| Gross Acres: 1.2 +/- acres | |
| APN(s): 418-122-021, 418-160-006 | |
| Map Book and Page No.: Map Book 6, Pages 16 and 17 of Maps, Records of San Bernardino County | |
| PROJECT CHARACTERISTICS | |
| Proposed or Potential Land Use(s) | Commercial |
| Proposed or Potential SIC Code(s) | 7542 |
| Area of Impervious Project Footprint (SF) | 44523 |
| Total Area of <u>proposed</u> Impervious Surfaces within the Project Limits (SF)/or Replacement | 44523 |
| Does the project consist of offsite road improvements? | <input checked="" type="checkbox"/> Y <input type="checkbox"/> N |
| Does the project propose to construct unpaved roads? | <input type="checkbox"/> Y <input checked="" type="checkbox"/> N |
| Is the project part of a larger common plan of development (phased project)? | <input type="checkbox"/> Y <input checked="" type="checkbox"/> N |
| EXISTING SITE CHARACTERISTICS | |
| Total area of <u>existing</u> Impervious Surfaces within the project limits (SF) | 0 |
| Is the project located within any MSHCP Criteria Cell? | <input type="checkbox"/> Y <input checked="" type="checkbox"/> N |
| If so, identify the Cell number: | |
| Are there any natural hydrologic features on the project site? | <input type="checkbox"/> Y <input checked="" type="checkbox"/> N |
| Is a Geotechnical Report attached? | <input checked="" type="checkbox"/> Y <input type="checkbox"/> N |
| If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D) | |
| What is the Water Quality Design Storm Depth for the project? | 0.845 |

A.1 Maps and Site Plans

Appendix 1 includes a map of the local vicinity and existing site. In addition, WQMP Site Plan, located in Appendix 1, includes 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

A.2 Receiving Waters

In order of upstream to downstream, the receiving waters that the project site is tributary to are as follows. A map of the receiving waters is included in Appendix 1.

Table A.1 Identification of Receiving Waters

| Receiving Waters | Hydrologic Unit | EPA Approved 303(d) List Impairments | Designated Beneficial Uses | Proximity to RARE Beneficial Use |
|---|-----------------|---|--|----------------------------------|
| Potrero Creek | 1807020201 | N/A | MUN, AGR, IND, POW, REC1, REC2, WARM, WILD, RARE | N/A |
| San Jacinto River | 1807020202 | N/A | MUN, AGR, IND, POW, REC1, REC2, WARM, WILD, RARE | N/A |
| Canyon Lake (Railroad Canyon Reservoir) | 180702020307 | Nutrients, Pathogens | MUN, AGR, GWR, REC1, REC2, WARM, WILD | N/A |
| Lake Elsinore | 180702020308 | Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs; Sediment Toxicity, Unknown Toxicity | REC1, REC2, WARM, WILD | N/A |

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

Table A.2 Other Applicable Permits

| Agency | Permit Required | |
|--|---------------------------------------|---------------------------------------|
| State Department of Fish and Game, 1602 Streambed Alteration Agreement | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |
| State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert. | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |
| US Army Corps of Engineers, CWA Section 404 Permit | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |
| US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |
| Statewide Construction General Permit Coverage | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N |
| Statewide Industrial General Permit Coverage | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |
| Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP) | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |
| Other (please list in the space below as required) | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N |
| City of Beaumont Conditional Use Permit | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N |
| Caltrans Encroachment Permit | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N |
| City of Beaumont Grading Permit | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N |
| ESA – Burrowing Owl Survey | <input type="checkbox"/> Y | <input checked="" type="checkbox"/> N |

Section B: Optimize Site Utilization (LID Principles)

This site will utilize permeability of onsite soils, therefore infiltration bmps will be feasible. LID principles utilized for this site will be a combination of source control and structural bmps.

Source control bmps include roofs being conveyed to downspouts that convey and discharge water to vegetated swales where feasible and/or to drain inlets that will have filter systems installed for pre-treatment. Water will then be conveyed to underground detention chambers for infiltration.

Site Optimization

Does the project identify and preserve existing drainage patterns? If so, how? If not, why?

Proposed drainage patterns are consistent with existing, where feasible. Unable to flow from north to south due to new structure located on the south.

Does the project identify and protect existing vegetation? If so, how? If not, why?

No existing vegetation to preserve.

Does the project identify and preserve natural infiltration capacity? If so, how? If not, why?

No, underground infiltration and proprietary treatments are not acceptable for this site.

Does the project identify and minimize impervious area? If so, how? If not, why?

Impervious areas will drain to landscaped areas or filtered catch basin inlets. Inlets where drainage is conveyed will be fitted with filter inserts as pre-treatment before entering Bio-retention Basins BMP.

Does the project identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, all hardscaped areas drain to landscaped areas where feasible and then treated by Bio-retention Planter with Underdrain, to improve water quality.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

| DMA Name or ID | Surface Type(s) | Area (Sq. Ft.) | DMA Type |
|----------------|-----------------|----------------|----------|
| 1A | Roof + Sidewalk | 16,421.6 | D |
| 1A | Landscaped | 2,874.4 | D |
| 2A | Roof + Sidewalk | 22,780 | D |
| 2A | Landscaped | 3,524.7 | D |
| 3A | Roof + Sidewalk | 5,322 | D |
| 3A | Landscaped | 1,724.5 | D |
| 4D | Landscaped | 1,034 | A |

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

| DMA Name or ID | Area (Sq. Ft.) | Stabilization Type | Irrigation Type (if any) |
|----------------|----------------|--------------------|--------------------------|
| 4D | 1,034 | Landscape | N/A |

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

| DMA Name or ID | BMP Name or ID |
|----------------|---|
| 1A | Bioretention basin w/ Underdrains. B1 (Basin 1) |
| 2A | Bioretention basin w/ Underdrains. B2 (Basin 2) |
| 3A | Bioretention basin w/ Underdrains. B3 (Basin 3) |

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (ref: Chapter 2.4.4 of the WQMP Guidance Document)? Y N

Geotechnical Report

A Geotechnical Report is required by the City of Beaumont to confirm present and past site characteristics that may affect the use of Infiltration BMPs, see Appendix 3.

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 Infiltration Feasibility

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

D.2 Harvest and Use Assessment

The following conditions apply:

- Reclaimed water will be used for the non-potable water demands for the project.
- Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verified with the City of Beaumont).
- The Design Capture Volume will be addressed using Infiltration Only BMPs. (Harvest and Use BMPs are still encouraged, but are not required as the Design Capture Volume will be infiltrated or evapotranspired).
- None of the above.

Harvest and Use BMPs need not be assessed for the site.

Irrigation Use Feasibility

Step 1:

Total Area of Irrigated Landscape: 0.21

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

Step 2:

Total Area of Impervious Surfaces: 1.02

Step 3:

The project EIATIA factor: 1.1

Step 4:

Minimum required irrigated area: 1.122

Step 5:

| Minimum required irrigated area (Step 4) | Available Irrigated Landscape (Step 1) |
|---|---|
| 1.122 | 0.21 |

Toilet Use Feasibility

Step 1:

Projected Number of Daily Toilet Users: 100

Project Type: Commercial

Step 2:

Total Area of Impervious Surfaces: 1.02

Step 3:

The project TUTIA factor: 176

Step 4:

Minimum number of toilet users: 179

Step 5:

| Minimum required Toilet Users (Step 4) | Projected number of toilet users (Step 1) |
|---|--|
| 179 | 100 |

Other Non-Potable Use Feasibility

N/A.

Step 1:

Average Daily Demand: N/A

Step 2:

Total Area of Impervious Surfaces: N/A

Step 3:

The project factor: N/A

Step 4:

Minimum required use: N/A

Step 5:

| Minimum required non-potable use (Step 4) | Projected average daily use (Step 1) |
|--|---|
| N/A | N/A |

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.

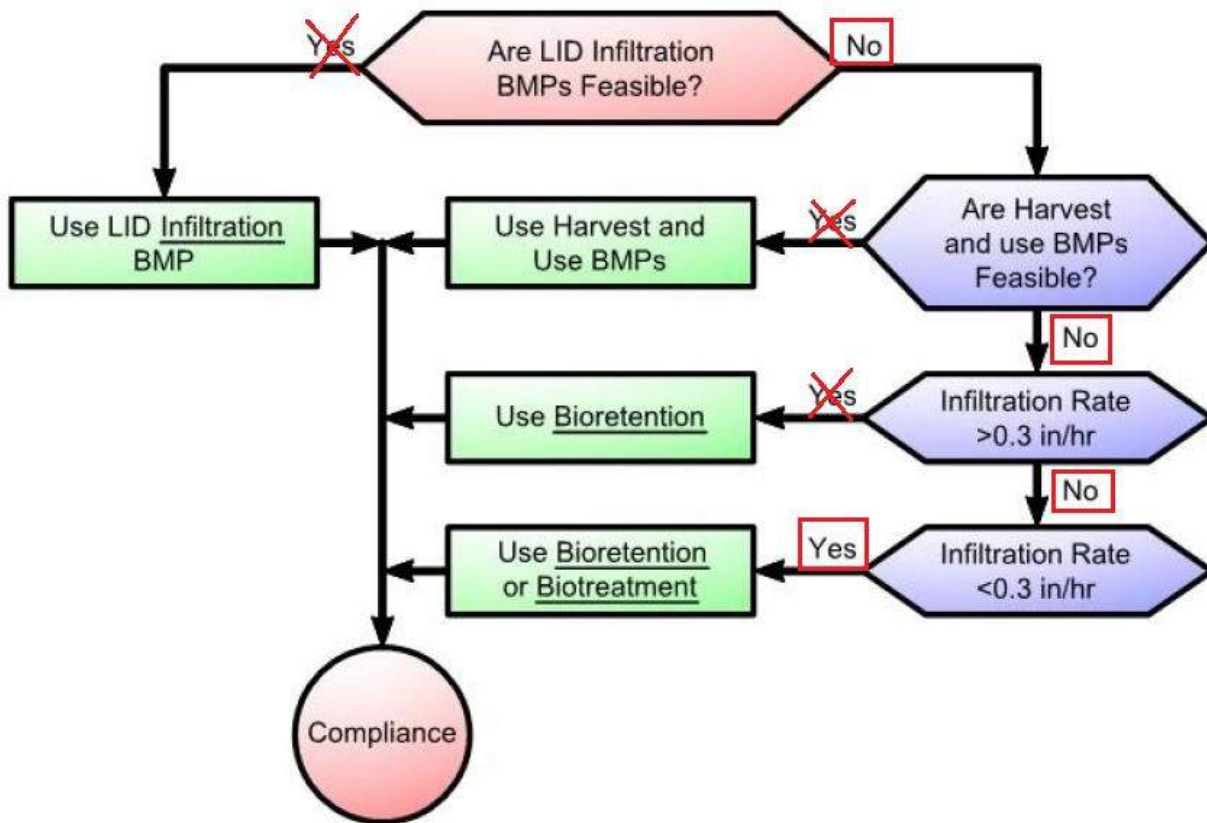
For the project, the following applies:

- LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4
- A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5.
- None of the above.

D.4 Feasibility Assessment Summaries

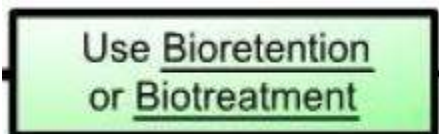
Table D.2 LID Prioritization Summary Matrix

| DMA Name/ID | LID BMP Hierarchy | | | | No LID (Alternative Compliance) |
|-------------|--------------------------|--------------------------|-------------------------------------|--------------------------|---------------------------------|
| | 1. Infiltration | 2. Harvest and use | 3. Bioretention | 4. Biotreatment | |
| 1A | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2A | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3A | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



LID BMP Feasibility Flow Chart

Based on LID BMP Prioritization, for alternate BMPs situated in poor infiltration rate; Bio-retention Basins were selected as the most appropriate treatment BMPs.



D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

| DMA Type/ID | DMA Area (square feet) | Post-Project Surface Type | Effective Impervious Fraction, I_f | DMA Runoff Factor | DMA Areas x Runoff Factor | Bioretention Basin | | |
|-------------|------------------------|---------------------------|--------------------------------------|-------------------|---------------------------|-------------------------|-----------------------------|---|
| | [A] | | | | | | | |
| D/3A | 5322 | Roof/Hardscape | 1 | 0.89 | 4747.2 | Design Storm Depth (in) | Design Volume, (cubic feet) | Capture V_{BMP} on Plans (cubic feet) |
| D/3B | 1724.5 | Landscape | 0.3 | 0.23 | 388.3 | | | |
| D/2A | 22780 | Concrete/Asphalt | 1 | 0.89 | 20319.8 | | | |
| D/2B | 3524.7 | Landscape | 0.3 | 0.23 | 793.6 | | | |
| D/1A | 16421.6 | Concrete/Asphalt | 1 | 0.89 | 14647.5 | | | |
| D/1B | 2874.4 | Landscape | 0.3 | 0.23 | 647.2 | | | |
| A/4A | 1034 | Landscape | 0.3 | 0.23 | 232.8 | | | |
| | $A_T = \Sigma[53681]$ | | | | $\Sigma = [41776]$ | | | |

[B], [C] are obtained from Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A of the WQMP Guidance Document

[G] is obtained from LID BMP design procedure sheet, placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to confirmation of LID waiver approval by the Regional Board). For the project, the following applies:

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 Regional Board 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 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.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

The project does not create a Hydrologic Condition of Concern, meeting/not meeting the criteria for HCOC Exemption as shown below:

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The City of Riverside 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

HCOC EXEMPTION 2: The volume and time of concentration¹ 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 City of Riverside

Does the project qualify for this HCOC Exemption? Y N

Results included in Table F.1 below and hydrologic analysis included in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

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

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

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (Canyon Lake, Lake Elsinore, Santa Ana River) 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 Sensitivity Maps.

Does the project qualify for this HCOC Exemption? Y N

F.2 HCOC Mitigation

As an alternative to the HCOC Exemption Criteria above, HCOC criteria is considered mitigated if the project meets one of the following conditions, as indicated:

- 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.
- d. None of the above.

The proposed project Bioretention Basins and Underground Detention are capable of all of the following:

1. Releasing the post-development hydrograph for 2-year, 24-hour at flow rates less than or equal to the pre-development 2-year, 24-hour peak flow rates.
2. Passing the 100-year storm event without damage to the BMP.
3. Controlling outlet velocities such that downstream erosion and habitat loss are minimized.

Supporting calculations can be found in the reference locations provided in Appendix 7 of this report.

With proposed mitigation, this project **is not** potentially susceptible to hydromodification impacts, an HCOC does not exist and hydromodification **does not** need to be considered further

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.

Based on the information provided above, **this project meets the requirements of Condition C** and will not create a hydrologic condition of concern in the proximate or downstream receiving waters. The post-development hydrograph for the 2-year, 24-hour rainfall event will be mitigated by the implementation of Site Design BMPs to limit discharges to a flow rate no greater than 110% of pre-development 2-year flow.

**HCOC Mitigation:
Drainage Area A = 1.23 Ac**

| Storm Frequency | Existing Q₂ (cfs) [1] | Proposed Q₂ (cfs) | Det. Basin Outlet Q₂ (cfs) [2] | Different [2] – [1] (cfs) | Different [2] – [1] (%) |
|------------------------|---|---|--|--|--|
| 2-year 24-hour | 0.133 | 0.316 | 0.104 | -0.029 | -22% |

Section G: Source Control BMPs

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

Table G.1 Permanent and Operational Source Control Measures

| Potential Sources of Runoff pollutants | Permanent Structural Source Control BMPs | Operational Source Control BMPs |
|---|--|--|
| Storm Drain Inlets | Stenciling should be maintained clear and legible. | Routinely clean catch basin so as to maintain a level not to exceed 40% full/capacity & dispose in accordance with local laws. |
| Education of Property Owners, Tenants and Occupants on Stormwater BMPs (N1) | | 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 discharge or allow anyone to discharge anything to storm drains or store or deposit materials so as to create a potential discharge to storm drains." Developer/HOA to provide "Education of homeowners on Stormwater packet, which will also be included in the CC&Rs" and posted in HOA office. |
| Sump Pump | Stenciling shall be maintained clear and legible. | Maintain area around sump pump and keep optimal operation by removing debris and sediment from entering pump & dispose waste in accordance with local laws. |
| Trash Storage Area | Maintain all signs, screens & covers. | Keep area cleaned. |
| Sidewalk & Parking | Repair damaged sections & ensure clear flow lines, adjust or repair drainage structures. | Keep area clean of trash & debris by sweeping and routine maintenance. Clean up all spills immediately. |
| Landscape / Outdoor Pesticide Use | Employ rain-trigger shutoff devices to prevent irrigation after precipitation. Design irrigation | Maintain landscaping using minimum or no pesticides |

| | | |
|---------------------------|--|--|
| | system to each landscape area's specific water requirements. | Irrigation System and Landscape Management (N3) See applicable operational BMPs in "What you should know for.....Landscape and Gardening" |
| Bio-retention Basin areas | BMP Maintenance (N4) | Landscape maintenance crews shall regularly clean and remove landscape waste and litter on a weekly frequency. |

Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

| BMP No. or ID | BMP Identifier and Description | Plan Sheet Number(s) | Latitude / Longitude |
|---------------|-----------------------------------|----------------------|----------------------|
| B1 | Bioretention Basin w/ Underdrains | 3 | 33.9284, -116.9665 |
| B2 | Bioretention Basin w/ Underdrains | 3 | 33.9284, -116.9665 |
| B3 | Bioretention Basin w/ Underdrains | 3 | 33.9284, -116.9665 |

Section I: Operation, Maintenance and Funding

As required by the City of Riverside, the following Operation, Maintenance and Funding details are provided as summarized:

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.
3. An outline of general maintenance requirements for the Stormwater BMPs 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.
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.

See Appendix 9 for a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on site, and an agreement assigning responsibility for maintenance and providing for inspections and certification.

Maintenance Mechanism: Property Owner

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

Y N

Project owner:

JSI Property Holding, Inc.
9484 Sherwood Drive
Rancho Cucamonga, CA. 91737

Telephone: (626) 224 -4636

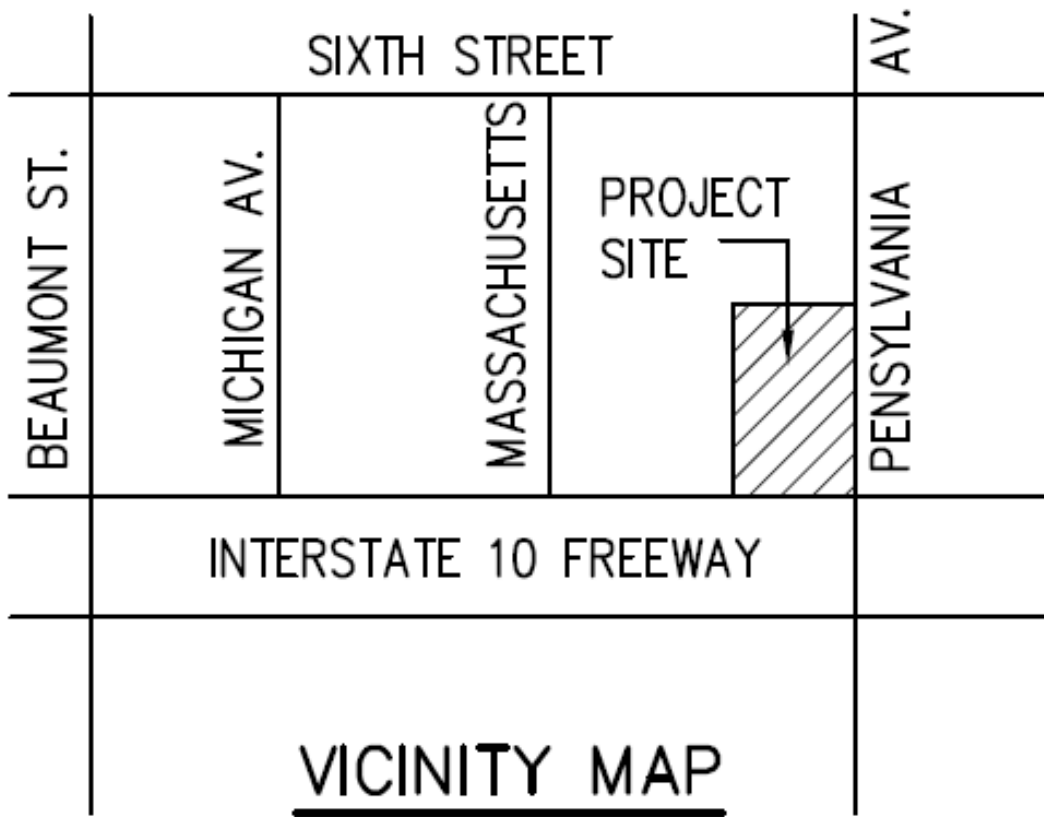
Contact person: Lakhbir Sondh

Email: jas_sondh@hotmail.com

Operation and Maintenance Plan and Maintenance Mechanism is included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP are included in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

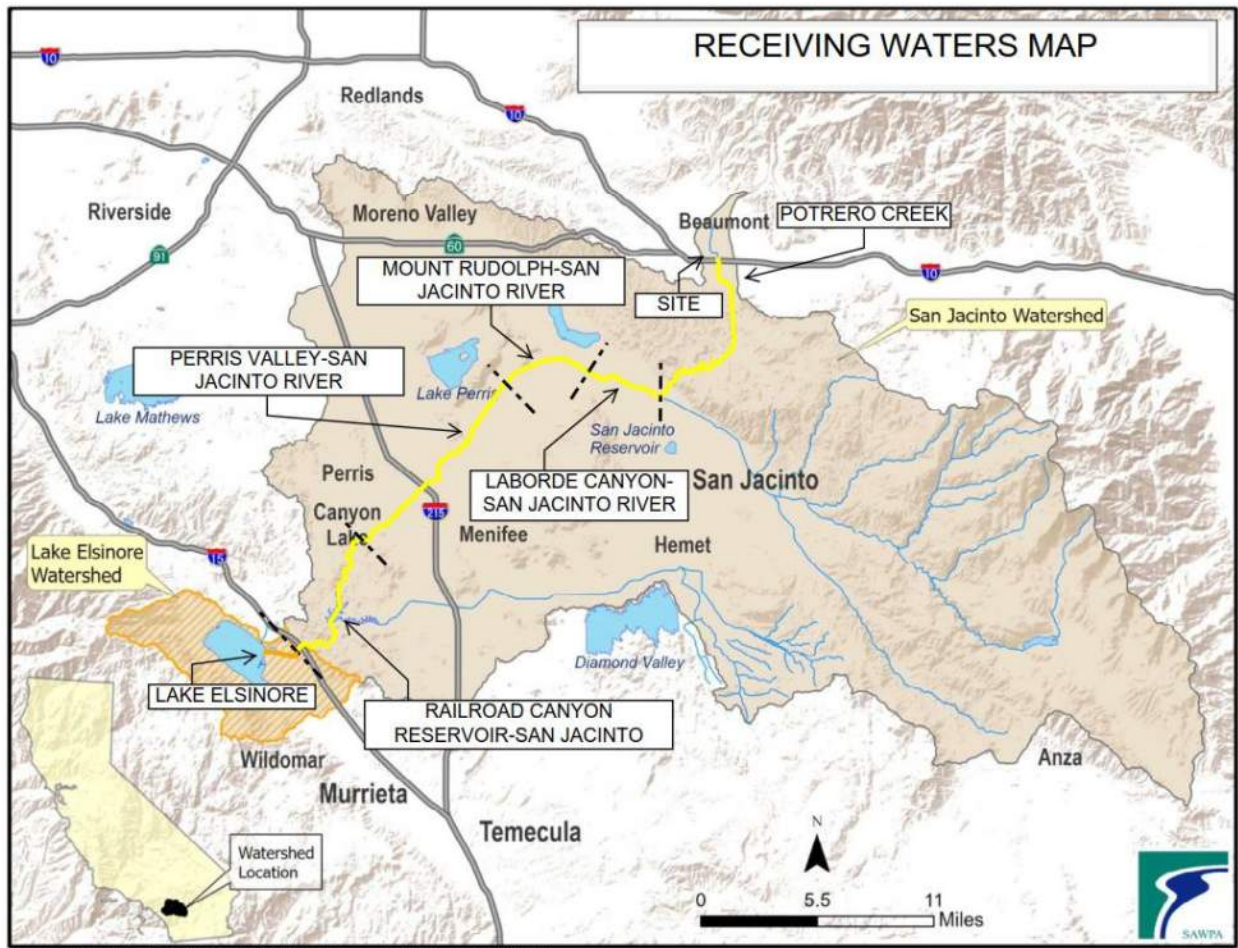


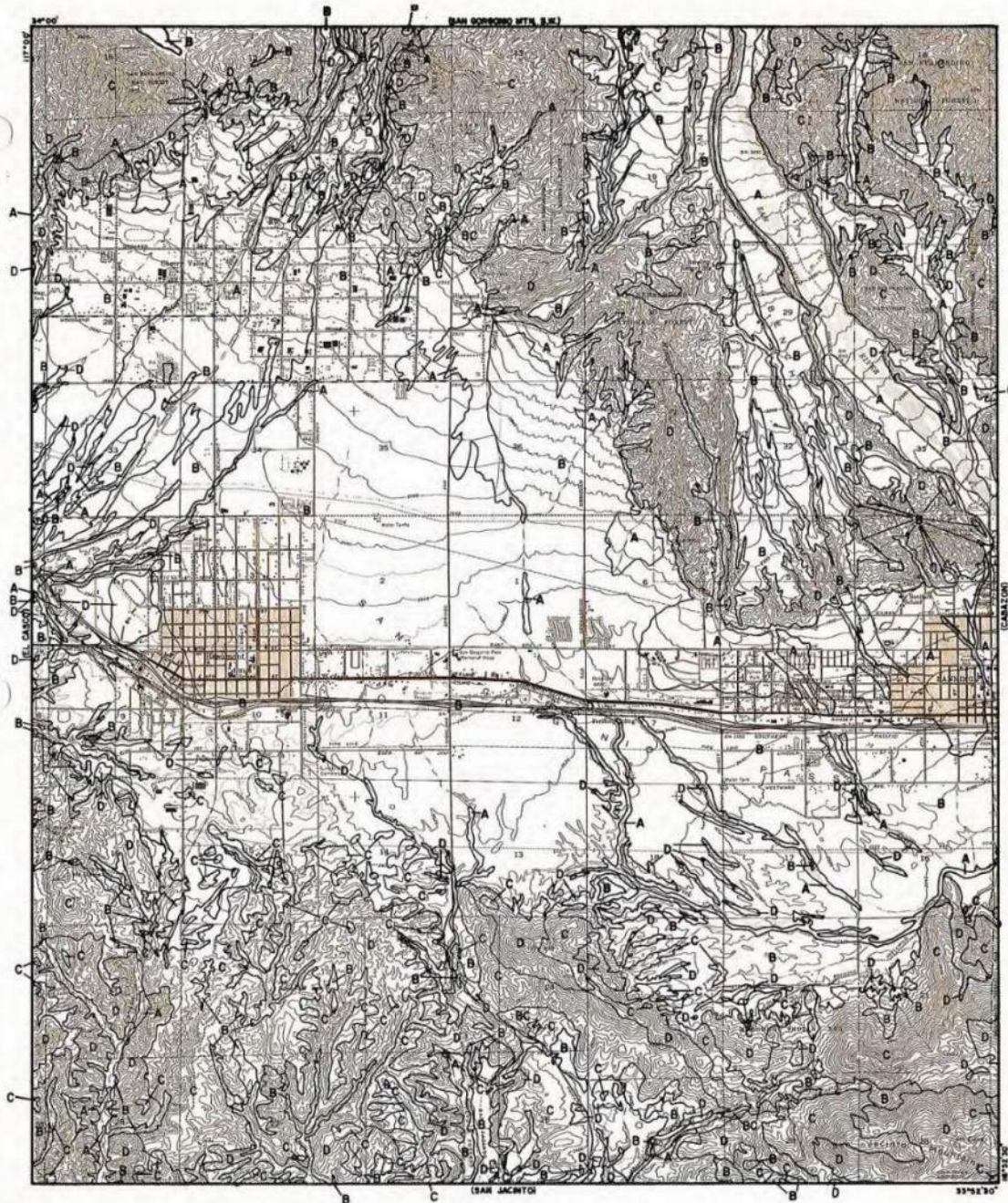
VICINITY MAP

NOT TO SCALE



Location Map (Aerial – Current Condition)





| | |
|--|---|
| <p>LEGEND</p> <p>— SOILS GROUP BOUNDARY</p> <p>A SOILS GROUP DESIGNATION</p> <p>RCFC&WCD</p> <p>HYDROLOGY MANUAL</p> | <p>HYDROLOGIC SOILS GROUP MAP</p> <p>FOR</p> <p>BEAUMONT</p> |
|--|---|

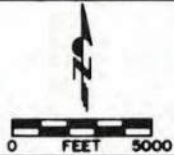
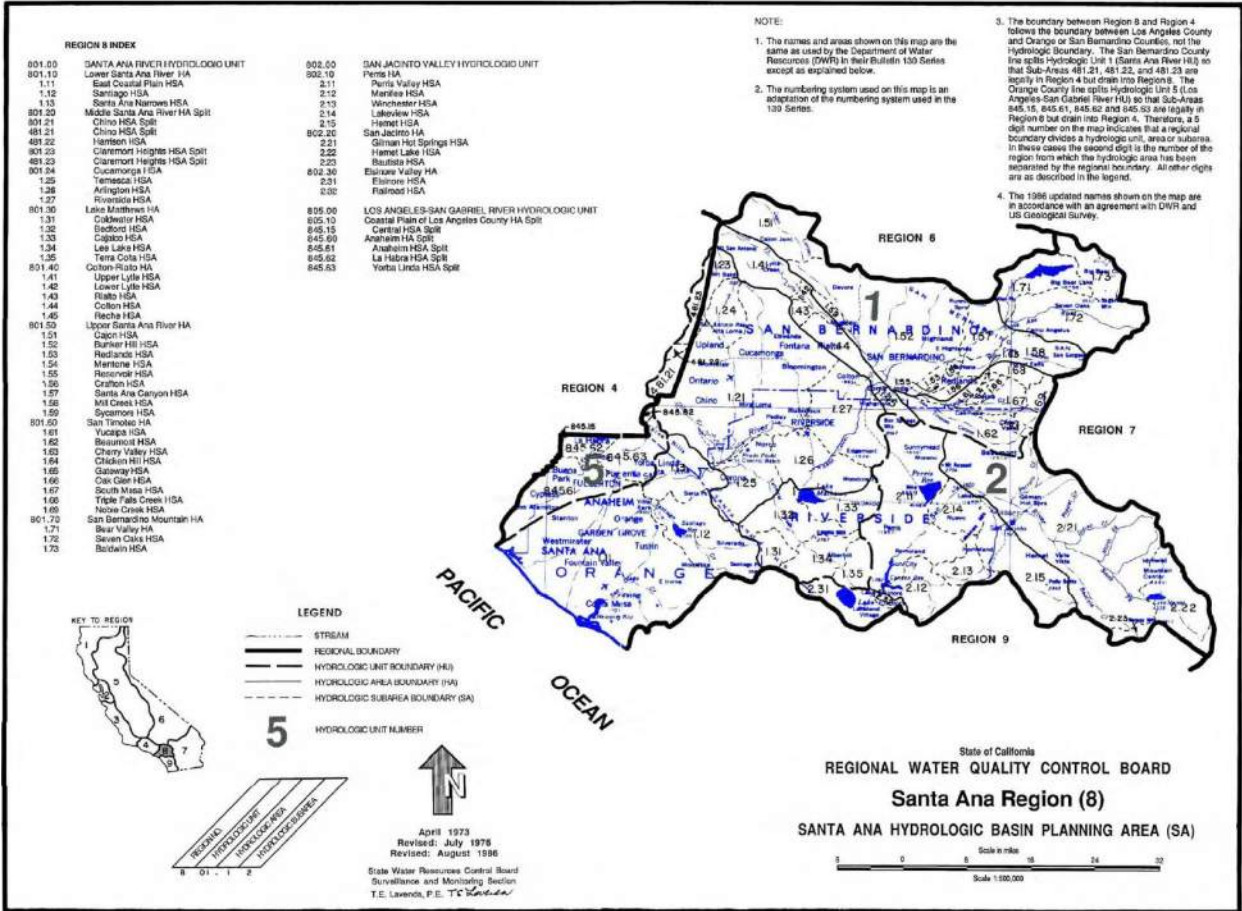
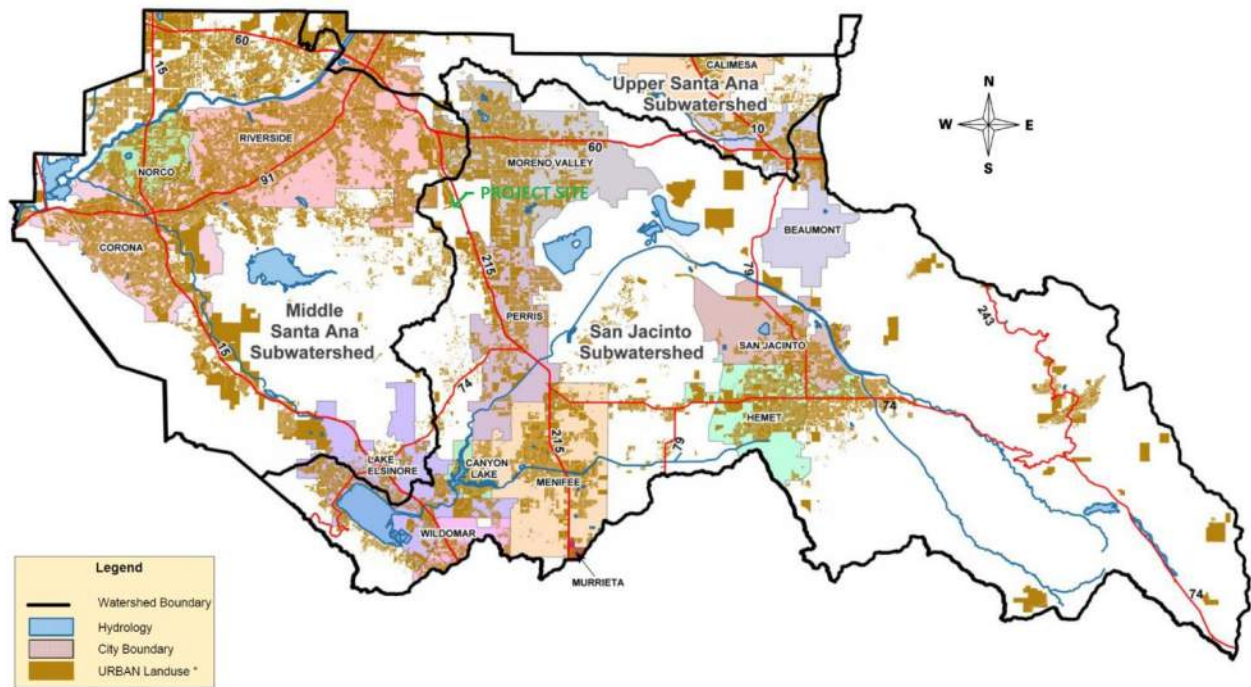


PLATE C-1.19





* Areas not in URBAN: Agricultural, State, Federal, Tribal, Preserves & Open Space, Rural-Residential, Highways/Freeways

Water Conservation Tool - Rivers... x Rivo SWCTT x Search x +

content.rcflood.org/PermitTracker/ Error

Riverside County SWCT² Stormwater & Water Conservation Tracking Tool

Choose search item from list Enter Value Locate Clear Results 33.92876, -116.96946 Zoom: 16.5

Toggle Legend Clear Layers Metadata Map Tutorial

- Dam
- Levee
- Spreading Ground
- Other
- Permit Areas
- Hydrologic Unit Codes(HUC)
- Topographic Drainage Boundary
- Drainage Area Boundaries
- City Storm Drains
- WQMP 85% Design Isohyetal Map
- CRP (Control Release Point)
- FEMA Floodplain
- Flood Plain - Other Special Studies
- As-Built Plans

▶ Groundwater Data

- ▶ Critical Coarse Sediment Yield Areas
- ▶ U.S. Fish and Wildlife Critical Habitat
- ▶ WRMSHCP Potential Survey Areas
- ▶ SKRHCP
- ▶ CVMShCP Survey Data and Conservation Areas

100 m
300 ft
Topo

Type here to search

5:04 PM
7/14/2023

Water Conservation Tool - Rivers... x Rivo SWCTT x Search x +

content.rcflood.org/PermitTracker/ Error

Riverside County SWCT² Stormwater & Water Conservation Tracking Tool

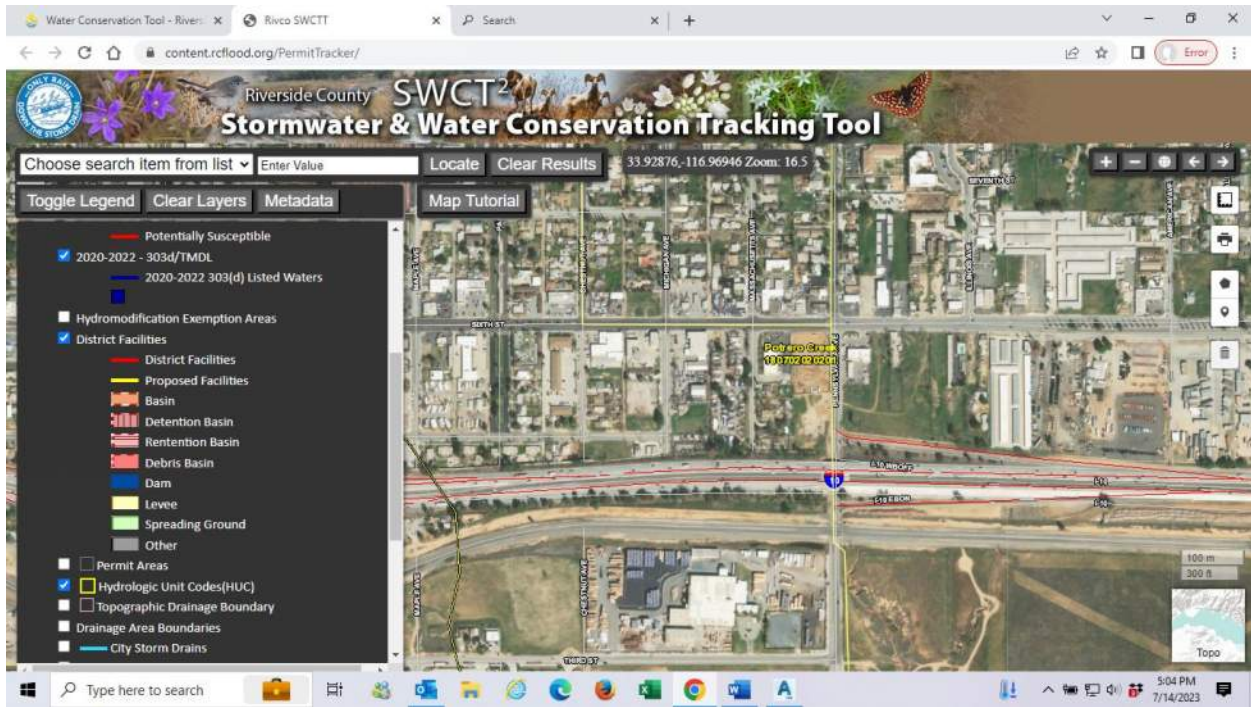
Choose search item from list Enter Value Locate Clear Results 33.92876, -116.96946 Zoom: 16.5

Toggle Legend Clear Layers Metadata Map Tutorial

- Potentially Susceptible
- 2020-2022 - 303d/TMDL
- 2020-2022 303(d) Listed Waters
- Hydromodification Exemption Areas
- District Facilities
 - District Facilities
 - Proposed Facilities
 - Basin
 - Detention Basin
 - Retention Basin
 - Debris Basin
 - Dam
 - Levee
 - Spreading Ground
 - Other
- Permit Areas
- Hydrologic Unit Codes(HUC)
- Topographic Drainage Boundary
- Drainage Area Boundaries
- City Storm Drains

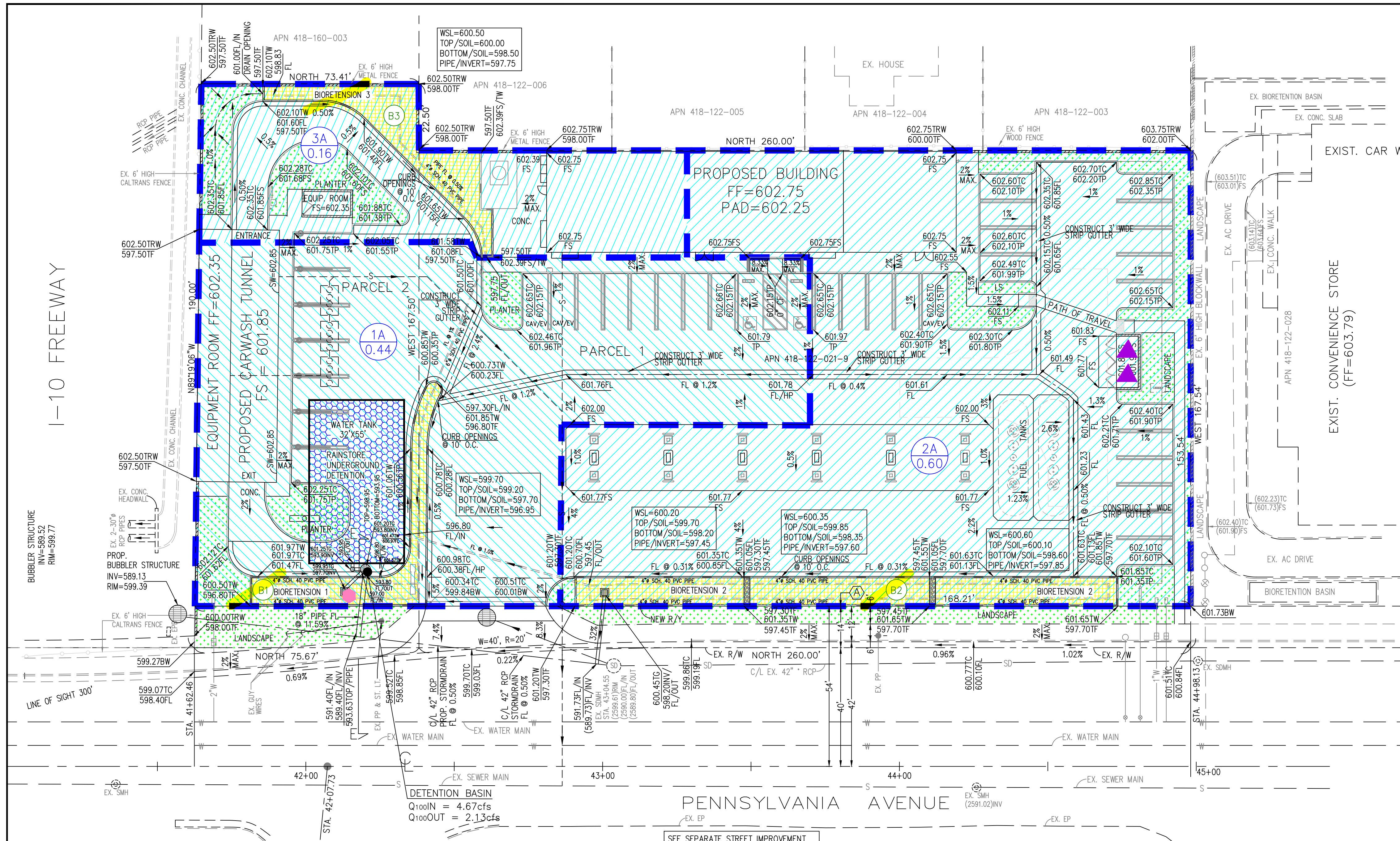
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7/14/2023

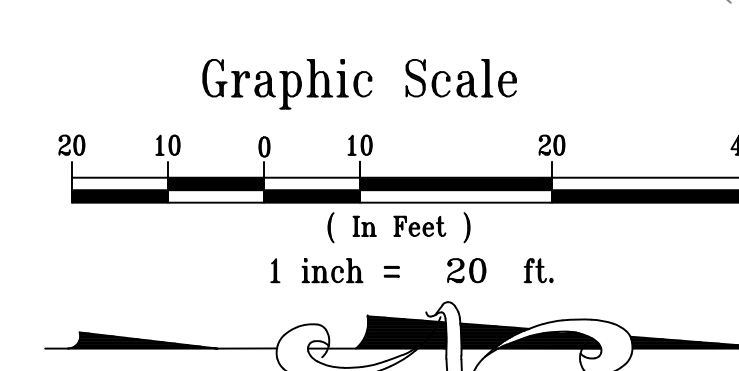
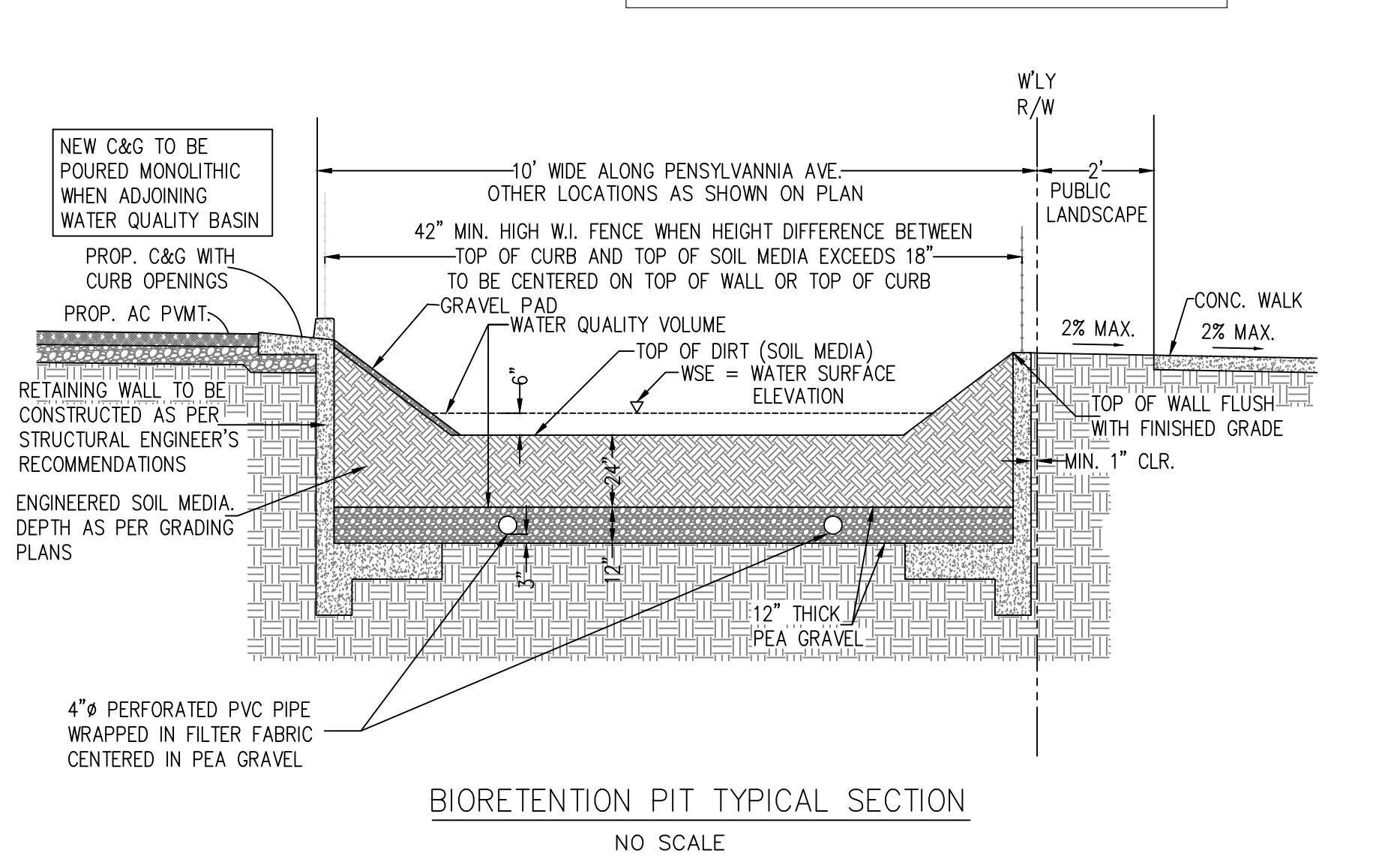
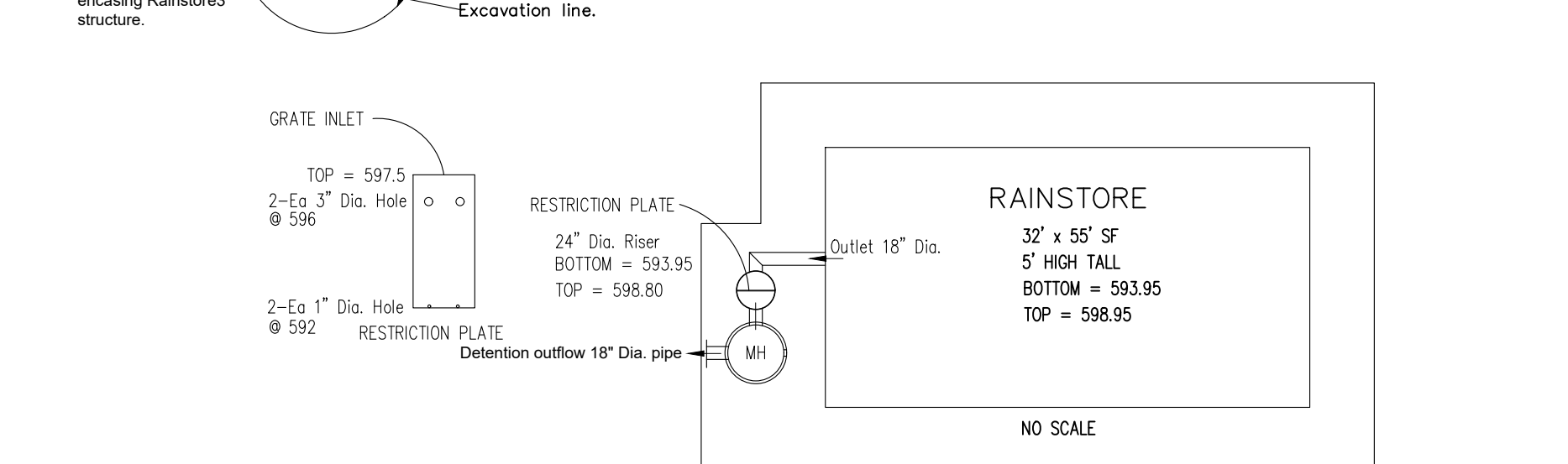
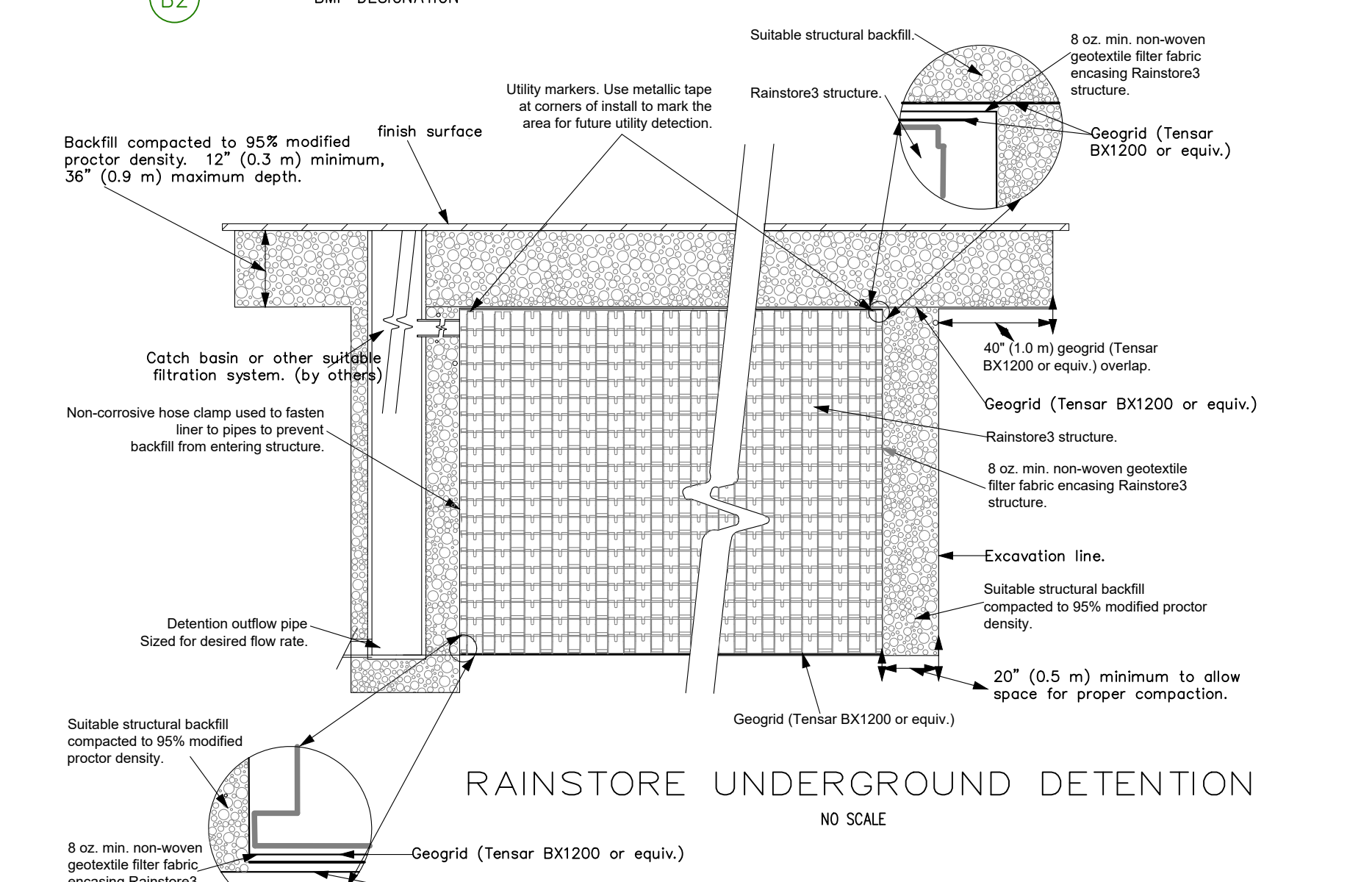


WQMP Site Plan

I-10 FREEWAY



- BMP LEGEND**
- DMA AREAS
 - BMP BIO-RETENTION BASINS
 - UNDERGROUND DETENTION BASIN
 - LANDSCAPE/PERVIOUS AREAS
 - DMA BOUNDARY
 - GENERAL SURFACE FLOW DIRECTION
 - DMA DESIGNATION
 - DMA ACREAGE
 - BMP DESIGNATION
- OTHER PROJECT BMPs LIST:**
- VEGETATION BUFFER ALONG BMP INLETS
 - CATCH BASIN - MS4 STENCILING AND SIGNAGE
 - LANDSCAPE AND IRRIGATION SYSTEM
 - OPEN SPACE, REFUSE AREAS
 - ROOFED TRASH ENCLOSURE
- LID PRACTICES TO BE IMPLEMENTED FOR THIS PROJECT:**
- CONSERVATION DESIGN
 - RUNOFF CONVEYANCE
 - ROOF DOWNSPOUT DISCONNECTION
 - EFFICIENT / LOW IMPACT LANDSCAPING
 - NON STORMWATER DISCHARGES



CURVE DATA

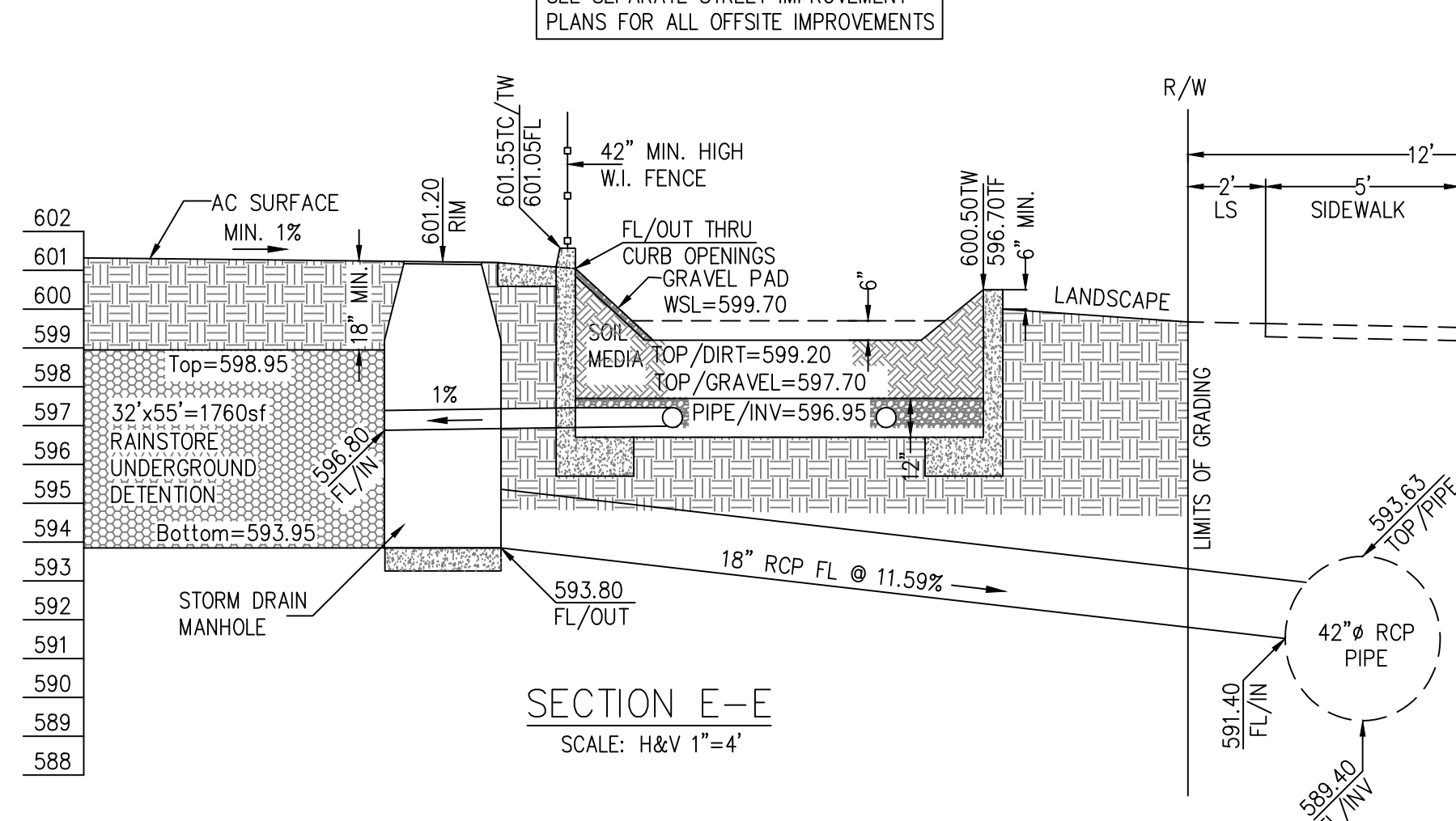
| NO. | DELTA | RADIUS | LENGTH | TANGENT |
|-----|----------|----------|---------|---------|
| C1 | 2°47'03" | 1112.00' | 54.04' | 27.02' |
| C2 | 5°51'39" | 1112.00' | 113.75' | 56.92' |

LINE DATA

| NO. | BEARING | DISTANCE |
|-----|-------------|----------|
| L1 | N89°19'07"W | 3.98' |

DEDICATION

14' WIDE DEDICATION TO THE CITY OF BEAUMONT FOR ROAD AND INCIDENTAL PURPOSES



BENCHMARK:
City of Beaumont Bench Mark No. 11.A.82
1-3/8" brass disc stamped City BM 11 at the southwest end of the southeast curb return at Sixth Street and Pennsylvania Ave. Elevation = 2602.803 (NAVD 82)

PLAN PREPARED BY
SPB ENGINEERING, INC.
1391 WINDEMERE LANE
TUSTIN, CA 92780
PHONE: (714) 931-0912
EMAIL: fiji1961@gmail.com

DESIGN BY: STJ
DRAWN BY: SAT
CHECKED BY: JH
SCALE: 1"=20'
DATE: 7/10/2023
JOB NUMBER: PUBLIC WORKS DEPARTMENT
550 E. 6TH ST, BEAUMONT, CA 92223

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

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
539 & 545 PENNSYLVANIA
BEAUMONT, CA. 92223
BMP PLAN

SHEET
1
OF 1 SHEETS
FILE NO: 3530
PW2023-1078

DIGALERT
Call 2 Working Days Before You Dig! 811

| BY | MARK | DESCRIPTION | APPR. | DATE |
|----------|------|-------------|-------|------|
| ENGINEER | | REVISIONS | | CITY |

INDER JI CHAUHAN DATE
R.C.E. 28466 EXPIRES 03-31-26

Appendix 2: Construction Plans

Grading and Drainage Plans

GRADING NOTES

- ALL GRADING SHALL CONFORM TO THE CITY OF BEAUMONT ORDINANCES, CURRENT ADOPTED CALIFORNIA BUILDING CODE, APPENDIX J, STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, "LATEST EDITION" AND RECOMMENDATIONS OF THE SOILS ENGINEER.
- NO WORK SHALL BE COMMENCED UNTIL ALL PERMITS HAVE BEEN OBTAINED FROM THE CITY AND OTHER APPROPRIATE AGENCIES.
- ALL PROPERTY CORNERS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION / GRADING.
- DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE AND EROSION CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER, SEDIMENT, TRANSPORTATION, AND DAMAGE TO ADJACENT PROPERTIES.
- DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS.
- NO FILL SHALL BE PLACED ON EXISTING GROUND THAT HAS NOT BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL, AND OTHER DELETERIOUS MATERIAL.
- MAXIMUM CUT AND FILL SLOPE = 2: 1 EXCEPT WHERE SPECIFICALLY APPROVED OTHERWISE.
- PROVIDE A 5' BY 1' HIGH BERM OR EQUIVALENT ALONG THE TOP OF ALL FILL SLOPES OVER 5' HIGH.
- PROVIDE A BROW DITCH DESIGNED TO HANDLE 100 YR STORM FLOWS ALONG THE TOP OF CUT SLOPES.
- NO OBSTRUCTION OF FLOODPLAIN OR NATURAL WATER COURSES SHALL BE PERMITTED.
- ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE SHALL CONTINUE TO FUNCTION ESPECIALLY DURING STORM CONDITIONS. PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT ADJOINING PROPERTIES DURING GRADING OPERATIONS.
- CUT AND FILL SLOPES EQUAL TO OR GREATER THAN 3' IN VERTICAL HEIGHT SHALL BE PLANTED WITH GRASS OR GROUND COVER TO PROTECT THE SLOPE FROM EROSION AND INSTABILITY IN ACCORDANCE WITH CITY OF BEAUMONT REQUIREMENTS PRIOR TO FINAL GRADING INSPECTION.
- ALL SLOPES REQUIRED TO BE PLANTED SHALL BE PLANTED WITH APPROVED GROUND COVER AT 12" ON CENTER. SLOPES EXCEEDING 15' IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED TREES SPACED NOT TO EXCEED 20' ON CENTER OR SHRUBS NOT TO EXCEED 10' OR A COMBINATION OF SHRUBS AND TREES NOT TO EXCEED 15' IN ADDITION TO A GRASS MIX GROUND COVER. SLOPES EQUAL TO OR GREATER THAN 4' IN VERTICAL HEIGHT SHALL BE PROVIDED WITH AN IN-GROUND IRRIGATION SYSTEM COMPLETE WITH AN APPROPRIATE BACKFLOW PREVENTION DEVICE PER CITY REQUIREMENTS.
- IF STEEP SLOPING TERRAIN OCCURS UPON WHICH FILL IS TO BE PLACED, IT MUST BE CLEARED, KEYED, AND BENCHED INTO FIRM NATURAL SOIL FOR FULL SUPPORT. PREPARATION SHALL BE APPROVED BY A SUITABLY AND REGISTERED GEOTECHNICAL ENGINEER OR GEOLOGIST PRIOR TO PLACEMENT OF FILL MATERIAL.
- THE GROUND IMMEDIATELY ADJACENT TO A FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT SLOPE NOT LESS THAN ONE VERTICAL IN 20 UNITS HORIZONTAL (5-PERCENT SLOPE) FOR A MINIMUM DISTANCE OF 10 FEET MEASURED PERPENDICULAR TO THE FACE OF THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET (3048 MM) OF HORIZONTAL DISTANCE, A 5-PERCENT SLOPE SHALL BE PROVIDED TO AN APPROVED ALTERNATIVE METHOD OF DIVERTING WATER AWAY FROM THE FOUNDATION. SWALES USED FOR THIS PURPOSES SHALL BE SLOPED A MINIMUM OF 2 PERCENT WHERE LOCATED WITHIN 10 FEET OF THE BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2 PERCENT AWAY FROM THE BUILDING.
- ALL GRADING SHALL BE CONTINUOUSLY OBSERVED BY A COMPETENT SOILS ENGINEER WHO SHALL VERIFY THAT ALL FILL HAS BEEN PLACED PROPERLY AND WHO SHALL SUBMIT A FINAL COMPACTION REPORT FOR ALL FILLS OVER 1' DEEP.
- A FINAL GEOTECHNICAL REPORT OF COMPLETION OF THE ROUGH GRADING, STATING SUBSTANTIAL CONFORMANCE WITH THE APPROVED GRADING PLAN, SHALL BE SUBMITTED TO THE BUILDING AND SAFETY DEPARTMENT PRIOR TO REQUESTING INSPECTION AND ISSUANCE OF BUILDING PERMITS. CERTIFICATIONS SHALL INCLUDE LINE GRADES, ELEVATIONS AND LOCATION OF CUT/FILL SLOPES.
- A LAND SURVEYOR OR ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING SHALL SUBMIT A PAD CERTIFICATION FOR ALL PADS. THE ELEVATION WITH RESPECT TO MEAN SEA LEVEL SHALL BE GIVEN. IF AN ELEVATION WITH RESPECT TO ADJACENT GROUND SURFACE IS REQUIRED, THE ACTUAL DISTANCE ABOVE THE ADJACENT GROUND SHALL BE GIVEN.
- A GEOTECHNICAL ENGINEER OR GEOLOGIST SHALL SUBMIT TO THE BUILDING AND SAFETY DEPARTMENT AND THE PUBLIC WORKS DEPARTMENT A FINAL GEOTECHNICAL REPORT OF COMPACTION OF FINAL GRADING STATING SUBSTANTIAL CONFORMANCE WITH THE APPROVED PLANS FOR ALL GRADING DESIGNATED AS "ENGINEERED GRADING".
- THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT AT LEAST 24 HOURS IN ADVANCE REQUESTING FINISH LOT GRADE AND DRAINAGE INSPECTION. THIS INSPECTION MUST BE APPROVED PRIOR TO BUILDING PERMIT FINAL INSPECTION FOR EACH LOT.
- ALL STORM DRAINS, CATCH BASINS AND STORM WATER RUNOFF STRUCTURES WILL BE PROVIDED WITH ADEQUATE CAPABILITIES TO FILTER AND RETAIN SEDIMENT, GRIT, OIL, AND GREASE TO PREVENT POLLUTION IN STORM WATER RUNOFF IN COMPLIANCE WITH THE CITY OF BEAUMONT'S BEST MANAGEMENT PRACTICES AND BEAUMONT'S DRAINAGE MASTER PLAN FOR STORMWATER AS WELL AS BEST MANAGEMENT PRACTICES IDENTIFIED IN CURRENT REPORT OF WASTE DISCHARGE FOR RIVERSIDE COUNTY PERMITEES.
- CONTRACTOR SHALL NOTIFY UNDERGROUND ALERT TWO DAYS BEFORE DIGGING AT 8-1-1 AND THE FOLLOWING UTILITY OR AGENCIES A MINIMUM OF TWO WORKING DAYS PRIOR TO COMMENCING ANY CONSTRUCTION OR GRADING:
 - CITY OF BEAUMONT (951) 769-8520
 - VERIZON (xxx) xxx-xxxx
 - SOUTHERN CALIFORNIA GAS COMPANY (xxx) xxx-xxxx
 - BEAUMONT CHERRY VALLEY WATER DISTRICT
 - EDISON
 - BEAUMONT CHERRY VALLEY WATER DISTRICT
 - EDISON
- TRENCHING FOR UTILITIES AND STRUCTURES IS NOT ALLOWED UNTIL A SOIL COMPACTION REPORT IS SUBMITTED TO AND APPROVED BY THE PUBLIC WORKS DEPARTMENT.
- THE CONTRACTOR SHALL MAINTAIN ADJACENT STREETS IN A NEAT, SAFE, CLEAN AND SANITARY CONDITION AT ALL TIMES AND TO THE SATISFACTION OF THE CITY'S INSPECTOR. THE ADJACENT SHALL BE KEPT CLEAN OF SEDIMENT, DEBRIS, AND OTHER NUISANCES AT ALL TIMES. THE DEVELOPER SHALL BE RESPONSIBLE FOR ANY CLEAN UP ON ADJACENT STREETS AFFECTED BY THE CONSTRUCTION.
- ALL OPERATIONS CONDUCTED ON THE SITE OR ADJACENT THERETO SHALL ADHERE TO THE NOISE ORDINANCE SET FORTH BY THE CITY MUNICIPAL CODE. ALL OPERATIONS SHALL BE LIMITED BY THE NOISE ORDINANCE TO THE LIMIT OF DECIBELS SPECIFIED FOR THE AREA AND TIME PERIOD. CONSTRUCTION ACTIVITIES WILL BE LIMITED BETWEEN 7.00 AM AND 6.00 PM MONDAY THROUGH FRIDAY.

- ALL OFF-SITE HAUL ROUTES SHALL BE SUBMITTED BY THE CONTRACTOR TO THE CITY ENGINEER FOR APPROVAL TWO FULL WORKING DAYS PRIOR TO BEGINNING OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEBRIS, OR DAMAGE OCCURING ALONG THE HAUL ROUTE OR ADJACENT STREETS AS A RESULT OF THE GRADING OPERATION.

EROSION CONTROL NOTES

- IN CASE OF EMERGENCY, CALL Mr. LAKHBIR SONDH, OFFICE: (626) 224-4636
- EQUIPMENT AND WORKERS FOR EMERGENCY WORK SHALL BE MADE AVAILABLE AT ALL TIMES. NECESSARY MATERIALS SHALL BE AVAILABLE ON SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES WHEN RAIN IS IMMINENT. EROSION CONTROL DEVICES SHALL NOT BE MOVED OR MODIFIED WITHOUT THE APPROVAL OF THE QSP.
- ALL NECESSARY EROSION CONTROL DEVICES SHALL BE IN PLACE AT THE END OF EACH WORKING DAY WHEN THE 72-HOUR RAIN PROBABILITY FORECAST EXCEEDS 50%.
- AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM THE STREET, SURGE BEAMS, SILT FENCES, AND DESILTING BASINS WITH THE BASINS PUMPED AND WATER TO BE DISPERSED ON SITE.
- GRADED AREAS ON THE PERMITTED AREA MUST DRAIN AWAY FROM THE FACE OF SLOPES AT THE CONCLUSION OF EACH WORKING DAY. DRAINAGE IS TO BE DIRECTED TOWARD DESILTING FACILITIES.
- THE PERMITEE AND CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATER CREATES A HAZARDOUS CONDITION.
- ALL TEMPORARY GRADING HAUL ROUTES ROADS WITHIN AREAS WHICH ARE TO REMAIN UNDEVELOPED AND NATURAL SHALL BE RESTORED TO NATURAL CONDITIONS AND REVEGETATED WITH NATIVE GRASSES UPON COMPLETION OF GRADING OPERATIONS.
- STOCKPILING AND/OR VEHICLE STAGING AREAS SHALL BE LOCATED AS FAR AS PRACTICABLE FROM DWELLINGS.
- EROSION CONTROL DEVICES WILL BE MODIFIED AS NEEDED AS THE PROJECT PROGRESSES.
- THE PLACEMENT OF ADDITIONAL DEVICES TO REDUCE EROSION DAMAGE WITHIN THE SITE IS LEFT TO THE DISCRETION OF THE QSP.
- THE QSP SHALL OBSERVE EROSION CONTROL WORK AND MUST INFORM THE CITY AND THE DEVELOPER IF THE WORK IS NOT IN ACCORDANCE WITH THE APPROVED PLAN.

SOURCE OF TOPOGRAPHY

THE TOPOGRAPHY SHOWN HEREON IS PER AN ACTUAL FIELD SURVEY PERFORMED BY PLUMP ENGINEERING, INC. UNDER THE SUPERVISION OF ETHAN REMINGTON, LS 9220 ON SEPTEMBER 21, 2020.

SOIL ENGINEER'S STATEMENT

THIS PLAN HAS BEEN REVIEWED BY _____ AND APPEARS TO BE IN GENERAL CONFORMANCE WITH RECOMMENDATIONS IN OUR REPORT DATED 06-09-2020 UN 203169-10A THIS PLAN HAS BEEN REVIEWED FOR GEOTECHNICAL ASPECTS ONLY. WE MAKE NO REPRESENTATION REGARDING ACCURACY OF DIMENSIONS, QUANTITIES, MEASUREMENTS, CALCULATIONS, OR ANY PORTION OF THE DESIGN. GEOTECHNICAL CONDITIONS AND RECOMMENDATIONS SHOULD BE CONFIRMED BY THE GEOTECHNICAL CONSULTANT IN THE FIELD AT TIME OF CONSTRUCTION.

SOILS ENGINEER STEPHEN MICHAEL POOL RCE 692 EXP. 6.30.25
 ENGINEERING GEOLOGIST AARON G. WOOD RCE 2550 EXP. 6.30.25

GEOTECHNICAL FIRM:

EARTH STRATA GEOTECHNICAL SERVICES, INC.
 4284 REMINGTON AVENUE
 TEMECULA, CA. 92590
 (951) 461-4028

DECLARATION OF ENGINEER OF RECORD

I HEREBY DECLARE THAT THE DESIGN OF IMPROVEMENTS SHOWN ON THESE PLANS COMPLIES WITH ALL PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES. AS THE ENGINEER OF RECORD FOR THE PLANS, I ASSUME FULL RESPONSIBILITY FOR THE DESIGN OF THE IMPROVEMENTS, WITH RESPECT TO THE PLAN CHECK PERFORMED BY THE CITY OF BEAUMONT. I UNDERSTAND AND ACKNOWLEDGE THE FOLLOWING: (1) THE PLAN CHECK IS A REVIEW FOR THE LIMITED PURPOSE OF ENSURING THE PLANS COMPLY WITH THE CITY'S STANDARDS, PROCEDURES, POLICIES, AND ORDINANCES, (2) THE PLAN CHECK IS NOT A DETERMINATION OF THE TECHNICAL ADEQUACY OF THE DESIGN OF THE IMPROVEMENTS, AND (3) THE PLAN CHECK DOES NOT RELIEVE ME OF MY LEGAL AND PROFESSIONAL RESPONSIBILITY FOR THE DESIGN OF THE IMPROVEMENTS. AS THE ENGINEER OF RECORD, I AGREE TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY, ITS ELECTED OFFICIALS, EMPLOYEES, AND AGENTS FROM ANY AND ALL ACTUAL OR ALLEGED CLAIMS, DEMANDS, CAUSE OF ACTION, LIABILITY, LOSS, DAMAGE, OR INJURY TO PROPERTY OR PERSONS, INCLUDING WRONGFUL DEATH, WHETHER IMPOSED BY A COURT OF LAW OR BY ADMINISTRATIVE ACTION OF ANY FEDERAL, STATE OR LOCAL GOVERNMENTAL AGENCY, ARISING OUT OF OR INCIDENT TO ANY NEGLIGENT ACTS, OMISSIONS, OR ERRORS BY THE ENGINEER OF RECORD, ITS EMPLOYEES, CONSULTANTS, OR AGENTS.

SIGNATURE OF ENGINEER OF RECORD _____ R.C.E. 28466 LICENSE NUMBER _____ DATE _____

CONSTRUCTION NOTES AND QUANTITIES ESTIMATE

ONSITE GRADING

- ① CONSTRUCT CONC. CURB 6" CF PER DETAIL (A) AS SHOWN ON SHT. 6 ----- 860 LF
- ② CONSTRUCT 3' WIDE STRIP GUTTER PER DETAIL (B) AS SHOWN ON SHT. 6 ----- 325 LF
- ③ CONSTRUCT CONCRETE CURB AND GUTTER PER DETAIL (C) AS SHOWN ON SHEET 6-----545 LF
- ④ CONSTRUCT TRUNCATED DOMES PER DETAIL (D) AS SHOWN ON SHT. 6 OR PER ARCHITECTURAL PLANS----- 45 SF
- ⑤ CONSTRUCT 70sq. INCH ACCESSIBILITY SIGN PER SECTION 3107(A) PER ARCHITECTURAL PLANS, OR PER DETAIL (E) AS SHOWN ON SHT. 6-----2 EA (PER BUILDING PLANS AND SEPARATE PERMIT)
- ⑥ CONSTRUCT 3" A.C. OVER 4" CLASS II BASE IN PARKING AREAS AS PER SOIL ENGINEER'S RECOMMENDATIONS.-----6865 SF
- ⑦ PAINT HANDICAP PARKING STAMPEL PER ARCHITECTURAL PLANS OR PER DETAIL (F) AS SHOWN ON SHT. 6 ----- 2 EA
- ⑧ PAINT HANDICAP PARKING STRIPES PER ARCHITECTURAL PLANS-----LS LS
- ⑨ PAINT PARKING STRIPES PER ARCHITECTURAL PLANS-----LS LS
- ⑩ CONSTRUCT 4 INCH MIN. THICK CONC. SIDEWALK PER ARCHITECTURAL PLANS --- 3700 SF
- ⑪ PAINT PATH OF TRAVEL WAY PER ARCHITECTURAL PLANS-----135 LS
- ⑫ CONSTRUCT CURB RAMPS AS SHOWN ON PLAN-----145 SF SEE DETAIL (G) AS SHOWN ON SHT. 6
- ⑬ CONSTRUCT TRASH ENCLOSURE PER ARCHITECT'S PLAN-----1 EA
- ⑭ CONSTRUCT 4"Ø SCH. 40 PVC PIPE-----700 LF
- ⑮ CONSTRUCT 5" THICK CONCRETE SLAB WITH #4 REBARS @ 18" O.C. OR PER SOILS ENGINEER'S RECOMMENDATIONS AND ARCHITECT'S PLANS-----6030 SF
- ⑯ CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER CITY OF BEAUMONT STD. PLAN NO. 210 , W=40', R=12' -----LS LS
- ⑰ CONSTRUCT WHEEL STOP PER DETAIL (H) AS SHOWN ON SHT. 6 OR PER ARCHITECT'S PLAN----- 2 EA
- ⑱ CONSTRUCT 3 1/2" A.C. OVER 4" CLASS II BASE IN DRIVE AREAS AS PER SOIL ENGINEER'S RECOMMENDATIONS.-----18,892 SF
- ⑲ CONSTRUCT 6"Ø SCH. 40 PVC PIPE----- 70 LF
- ⑳ CONSTRUCT CURB OPENINGS PER DETAIL (J) AS SHOWN ON SHT. 6-----LS LS
- ㉑ CONSTRUCT 4.5' MAX. HIGH BLOCK RETAINING WALL AND 6' HIGH BLOCKWALL PER STRUCTURAL ENGINEER'S PLANS (PER SEPARATE PLAN & PERMIT)----- 330 LF
- ㉒ CONSTRUCT 4.5' MAX. HIGH BLOCK RETAINING WALL AROUND BIOTENSION BASINS PER STRUCTURAL ENGINEER'S PLANS----- 795 LF
- ㉓ CONSTRUCT BIOTENSION BASINS PER DETAIL AS SHOWN ON SHEET 3 & 4-----2915 LF
- ㉔ CONSTRUCT 'RAINSTORE UNDERGROUND DETENTION' CHAMBER PER DETAIL AS SHOWN ON SHEET 3 (32'X55')-----1 EA
- ㉕ CONSTRUCT 24" SQ CATCH BASIN (FOR OVERFLOW CONTROL IN RETENSION BASIN) SEE DETAIL ON SHEET 4 ----- 2 EA
- ㉖ CONSTRUCT ROCK WEIR PER DETAIL AS SHOWN ON SHEET 4----- 3 EA
- ㉗ CONSTRUCT STORM DRAIN MANHOLE W/HEAVY DUTY TRAFFIC RATED GRATE PER COUNTY OF RIVERSIDE FLOOD CONTROL DISTRICT STD. PLAN NO. MH257---1 EA
- ㉘ CONSTRUCT 12"Ø RCP----- 35 SF
- ㉙ CONSTRUCT 18"Ø RCP & CONNECT TO EX. 42"Ø RCP PIPE----- 22 LF
- ㉚ CONSTRUCT 24"Ø RISER W/GRATE INLET ONE WAY RESTRICTION PLATE USE HEAVY DUTY TRAFFIC RATED COVER----- 1 EA
- ㉛ CONSTRUCT 24" SQ. CATCH BASIN, HEIGHT AS SHOWN ON PLAN ON SHT. 3 FOR OVERFLOW WATER FROM BMP'S----- 2 EA
- ㉜ CONSTRUCT ONSITE LIGHTS PER ARCHITECT'S PLANS-----10 EA

SEWER (EMWD EASTERN MUNICIPAL WATER DISTRICT)

- ③① CONSTRUCT SADDLE CONNECTION TO EX. 18" V.C.P. WITH 6" P.V.C. SDR 35 PIPE PER EMWD STD. SB-176-----1 EA
- ③② CONSTRUCT 6" DIA. PVC SDR 35 PIPE-----130 LF
- ③③ CONSTRUCT 6" TO 4" PVC SDR 35 WYE CONNECTION-----1 EA
- ③④ CONSTRUCT PIPE BEDDING AND TRENCH REPAIR PER EMWD STD. SB-158-----LS LS
- ③⑤ CONSTRUCT 4" PVC DIA. SDR 35 PIPE----- 200 LF
- ③⑥ CONSTRUCT PRIVATE ON-LINE SEWER SERVICE CLEANOUT PER EMWD STD. SB-52-----3 EA
- ③⑦ CONSTRUCT 1500 GAL. CLARIFIER W/SAMPLE BOX MANUFACTURED BY PRECAST PRODUCTS MODEL NO. C-H-10-1500 (CUT SHEET ON SHEET 7)-----3 EA OR PER EMWD STD. SB-75

GENERAL INFORMATION

- GROSS AREA = 57,723 sf, 1.325 ac
- DEDICATION AREA = 4,041 sf, 0.093 ac
- NET AREA = 53,682 sf, 1.232 ac, 100%
- PERVIOUS AREA = 9,159 sf, 0.210 ac, 17.06%
- IMPERVIOUS AREA = 44,523 sf, 1.022 ac, 82.94%

FEMA FLOOD NOTE

DFIRM PANEL NO.: 06065C0812G
 EFFECTIVE: 08/28/2008
 FLOOD ZONE: ZONE X
 AREA OF MINIMAL FLOOD HAZARD
 AFFECTS: APPROX. NORTH HALF
 FLOOD ZONE: ZONE AO (DEPTH 3 FEET)
 WITH BASE FLOOD ELEVATION
 AFFECTS: APPROX. SOUTH HALF

EARTHWORK QUANTITIES

CUT = 285 CY
 FILL = 1705 CY
 TOTAL = 1990 CY
 IMPORT = 1420 CY
 DISTURBED AREA = 57,723SF

LIST OF BMP'S

- UNDERGROUND RETENSION CHAMBERS
- BIOTENSION BASIN (AS SHOWN ON WQMP REPORT)

SHEET INDEX

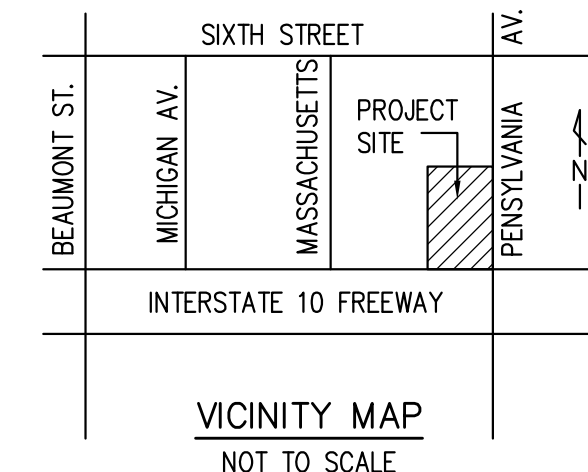
SHEET 1 TITLE SHEET
 SHEET 2 GRADING PLAN
 SHEET 3 BIOTENSION PLAN
 SHEET 4 BIOTENSION DETAIL
 SHEET 5 CROSS SECTIONS
 SHEET 6 DETAILS
 SHEET 7 WATER & SEWER
 SHEET 8 EROSION CONTROL

OWNER/APPLICANT

JSJ PROPERTY HOLDINGS, LLC
 9484 SHERWOOD DRIVE
 RANCHO CUCAMONGA, CA. 91737
 PHONE: (626) 224-4636
 jas_sondh@hotmail.com
 MR. LAKHBIR SINGH

WATER (BCVWD BEAUMONT CHERRY VALLEY WATER DISTRICT)

- ④① SAWCUT AND REMOVE EXISTING A.C. PAVING & BASE-----210 SF
- ④② CONSTRUCT TRENCH REPAIR PER BCVWD STD. PLATE 1-----160 SF
- ④③ CONSTRUCT 2" (DOMESTIC) WATER SERVICE CONNECTION SERVICE WITH BACKFLOW DEVICE PER BCVWD STD. PLATE 6-4-----1 EA
- ④④ CONSTRUCT 1" (IRRIGATION) WATER SERVICE CONNECTION SERVICE WITH BACKFLOW DEVICE PER BCVWD STD. PLATE 6-3-----1 EA
- ④⑤ CONSTRUCT 2" DOMESTIC WATER SERVICE CONNECTION SERVICE WITH BACKFLOW DEVICE PER BCVWD STD. PLATE 6-4-----1 EA
- ④⑥ CONSTRUCT SERVICE TRENCH REPAIR PER BCVWD STD. 6-2-----80 SF
- ④⑦ CONSTRUCT 12" X 6" TEE-----1 EA
- ④⑧ CONSTRUCT 6" DIA. PVC CLASS C-900 PIPE-----220 SF
- ④⑨ CONSTRUCT 6" X 90' ELBOW-----2 EA
- ⑤① CONSTRUCT 6" DOUBLE DETECTOR CHECK VALVE PER BCVWD STD. NO. 7-----1 EA
- ⑤② CONSTRUCT 4" F.D.C. ON 6" FIRE LINE-----1 EA
- ⑤③ CONSTRUCT 6" FIRE RISER-----1 EA
- ⑤④ CONSTRUCT 6" POTABLE FIRE HYDRANT PER BCVWD STD. PLATE 1-----1 EA
- ⑤⑤ CONSTRUCT 6" GATE VALVE PER BCVWD STD. PLATE 2-----2 EA



LEGAL DESCRIPTION

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

PARCEL 1:

THE EASTERLY HALF OF LOT 2 IN BLOCK 92 AS SHOWN BY AMENDED MAP OF THE TOWN OF BEAUMONT, CITY OF BEAUMONT, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ON FILE IN BOOK 6, PAGES 16 AND 17 OF MAPS, RECORDS OF SAN BERNARDINO COUNTY, CALIFORNIA.

PARCEL 2:

THAT PORTION OF THE EASTERLY 190 FEET OF LOT 3 IN BLOCK 92 AS SHOWN BY AMENDED MAP OF THE TOWN OF BEAUMONT, CITY OF BEAUMONT, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ON FILE IN BOOK 6, PAGES 16 AND 17 OF MAPS, RECORDS OF THE COUNTY OF SAN BERNARDINO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY CORNER OF SAID LOT 3; THENCE WESTERLY ALONG THE NORTHERLY LINE THERETO 190.00 FEET TO THE NORTHWESTERLY CORNER OF SAID EASTERLY 190 FEET; THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID EASTERLY 190 FEET, A DISTANCE OF 73.41 FEET; THENCE EASTERLY IN A DIRECT LINE TO A POINT IN THE EASTERLY LINE OF SAID LOT, DISTANT THEREON 75.67 FEET SOUTHERLY FROM SAID NORTHEASTERLY CORNER; THENCE NORTHERLY ALONG SAID EASTERLY LINE TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM ALL MINERALS, OILS, GASSES AND OTHER HYDROCARBONS BY WHATEVER NAME KNOWN, THAT MAY BE WITHIN OR UNDER THE PARCEL OF LAND HEREIN ABOVE DESCRIBED WITHOUT HOWEVER, THE RIGHT TO DRILL, DIG OR MINE THROUGH THE SURFACE THEREOF.

ALSO EXCEPTING AND RESERVING UNTO THE STATE OF CALIFORNIA AND AND ALL RIGHTS OF INGRESS AND EGRESS FROM THE LAND HEREIN CONVEYED OVER AND ACROSS THE SOUTHERLY LINE THEREOF.

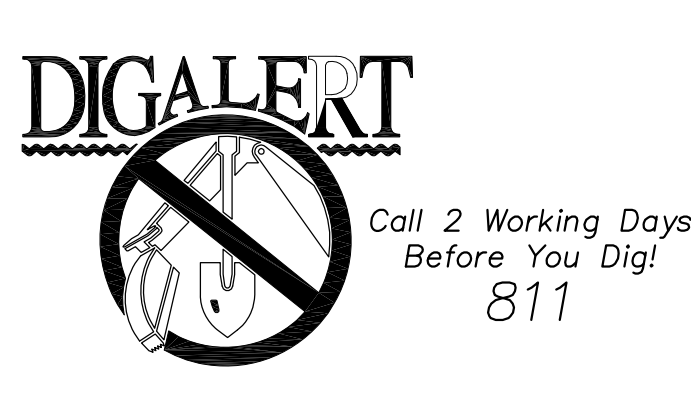
IT IS THE PURPOSE OF THE FOREGOING EXCEPTION AND RESERVATION TO PROVIDE THAT NO EASEMENT OF ACCESS SHALL ATTACH OR BE APPURTENANT TO THE PROPERTY HEREBY CONVEYED BY REASON OF THE FACT THAT THE SAME ABUTS UPON A PUBLIC WAY AND UPON A STATE HIGHWAY, WITH ACCESS UNO TO THE STATE HIGHWAY BEING RESTRICTED.
 APN: 418-122-021-9, 418-160-006-4

ABBREVIATIONS

| | | | |
|------|---------------------|--------|--|
| (00) | EXISTING ELEVATIONS | N/LY | NORTHERLY |
| 00 | NEW ELEVATIONS | PP | POWER POLE |
| AC | ASPHALTIC CONCRETE | PCC | PORTLAND CEMENT CONCRETE |
| BW | BACK OF WALK | PVC | POLYVINYL CHLORIDE |
| BLK | BLOCK | RCP | ROLLED CONCRETE PIPE |
| CF | CURB FACE | RD | ROOF DRAIN |
| CL | CENTER LINE | -S- | SEWER MAIN |
| C.I. | CAST IRON | SW | SIDEWALK |
| CONC | CONCRETE | ST | STREET |
| CB | CATCH BASIN | STPPWC | STANDARDS PLAN FOR PUBLIC WORKS CONSTRUCTION |
| C&G | CURB AND GUTTER | | |
| DIA | DIAMETER | | |
| ELY | EASTERLY | SMH | SEWER MAIN HOLE |
| FL | FLOW LINE | SD | STORM DRAIN |
| FS | FINISHED SURFACE | TP | TOP OF PAVEMENT |
| FF | FINISHED FLOOR | TC | TOP OF CURB |
| FH | FIRE HYDRANT | TG | TOP OF GRATE |
| GB | GRADE BREAK | TRW | TOP OF RET/WALL |
| GS | GAS METER | TF | TOP OF FOOTING |
| H | HIGH | VW | VATER VALVE |
| INV | INVERT | VCP | VITRIFIED CLAY PIPE |
| HP | HIGH POINT | V | VERTICAL |
| HC | HANDICAP | WM | WATER METER |
| LT | LIGHT | -W- | WATER MAIN |
| MH | MAN HOLE | | |

HATCH LEGEND

| | |
|--|-------------------------------|
| | CONCRETE SLABS |
| | DIRT/EARTH MATERIAL |
| | ADA PATH OF TRAVEL |
| | FLOWLINE OR SLOPE DIRECTION |
| | LOCATIONS FOR TRUNCATED DOMES |
| | PROPERTY LINE & R/W |
| | FUTURE R/W |
| | CENTERLINE OR FLOWLINE |
| | EX. FENCE |
| | EX. CONTOURS |
| | EX. UTILITIES (AS LABELLED) |
| | PROP. CONTOURS |



BENCHMARK:
 City of Beaumont Bench Mark No. 11.A.82
 1-3/8" brass disc stamped City BM 11 at
 the southwest end of the southeast curb
 return at Sixth Street and Pennsylvania Ave.
 Elevation = 2602.803 (NAVD 82)

| BY | MARK | DESCRIPTION | APPR. | DATE |
|----|------|-------------------|-------|------|
| | | R E V I S I O N S | | CITY |

PLAN PREPARED BY
SPB ENGINEERING, INC.
 1391 WINDEMERE LANE
 TUSTIN, CA. 92780
 PHONE: (714) 931-0912
 EMAIL: fiji1961@gmail.com

INDER AT CHAUHAN DATE _____
 R.C.E. 28466 EXPIRES 03-31-26

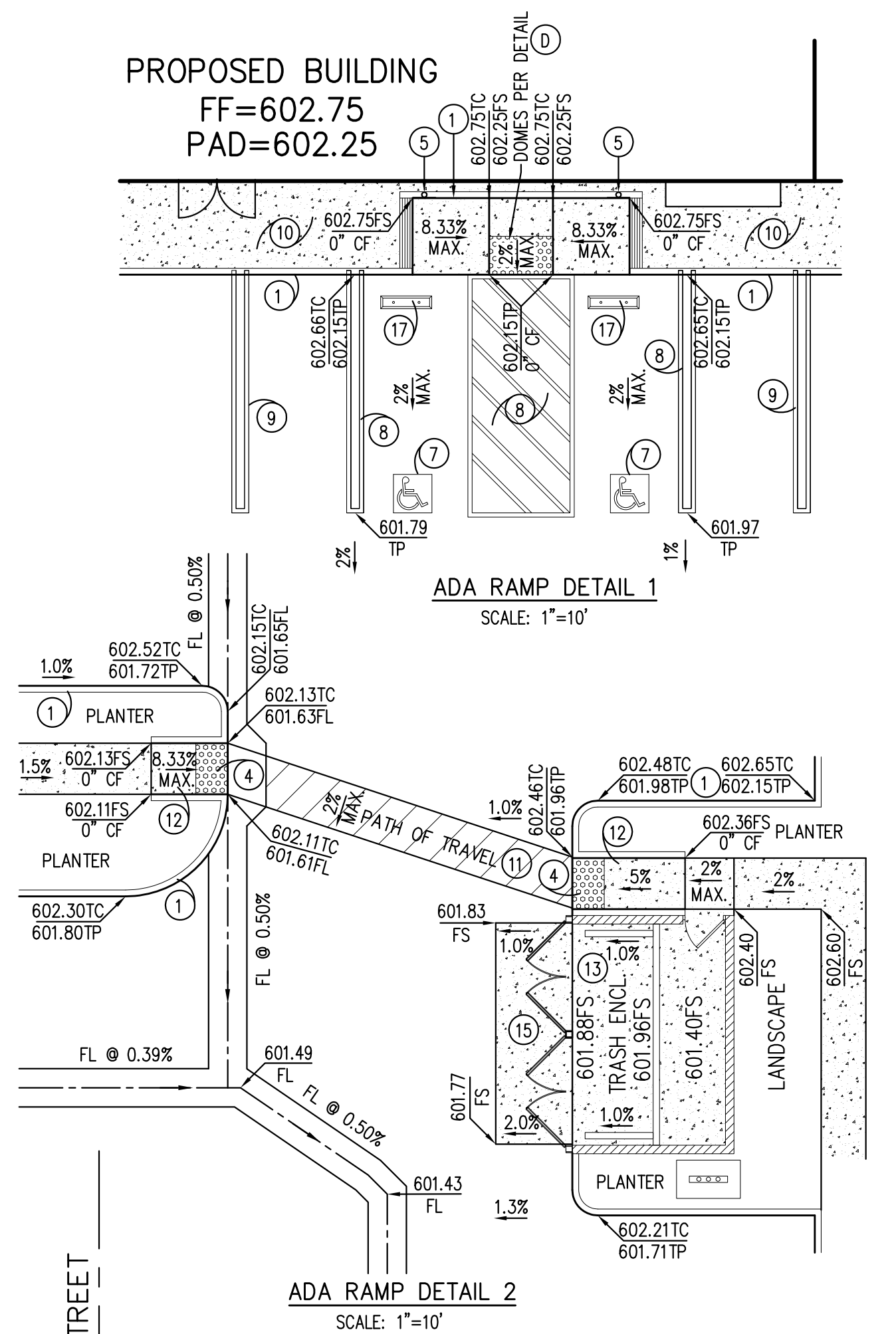
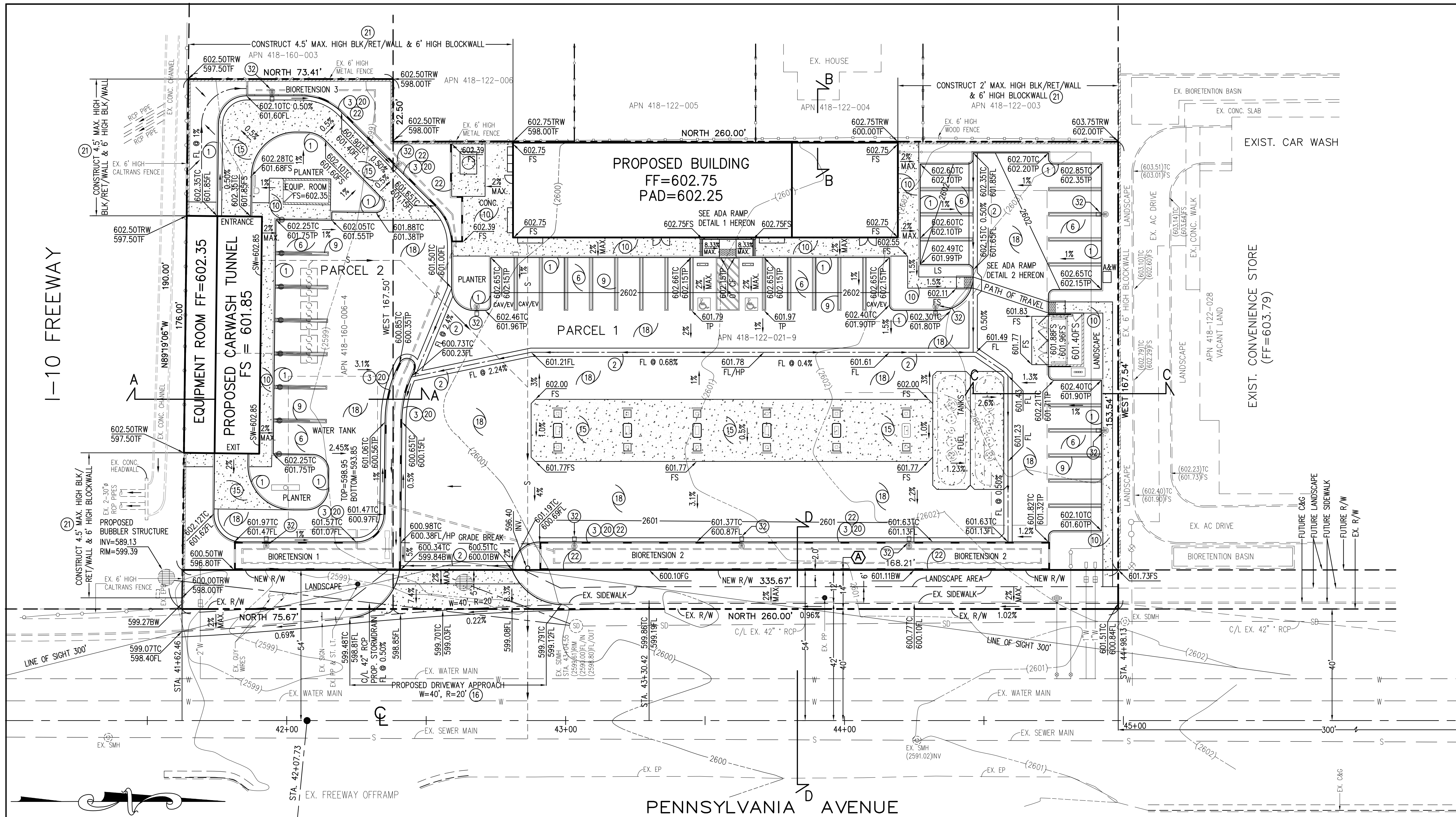
DESIGN BY: STJ
 DRAWN BY: SAT
 CHECKED BY: JH
 SCALE: 1"=20'
 DATE: 7/10/2023
 JOB NUMBER: _____

PUBLIC WORKS DEPARTMENT
 550 E. 6TH ST, BEAUMONT, CA 92223

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

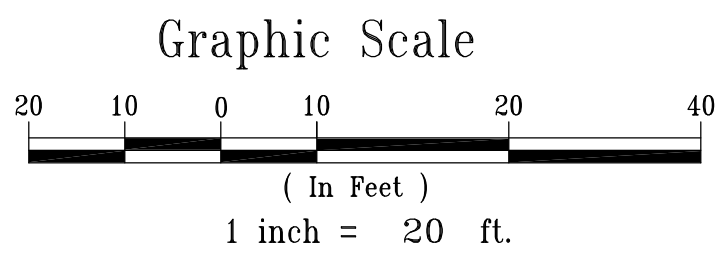
CITY OF BEAUMONT, CALIFORNIA
 GRADING PLANS FOR:
539 & 545 PENNSYLVANIA
BEAUMONT, CA 92223
GAS STATION, C-STORE & CARWASH
PP2019-0209, CUP2019-0033,
TITLE SHEET

S H E E T
1
 OF 8 SHEETS
 FILE NO: 3530
PW2023-1082

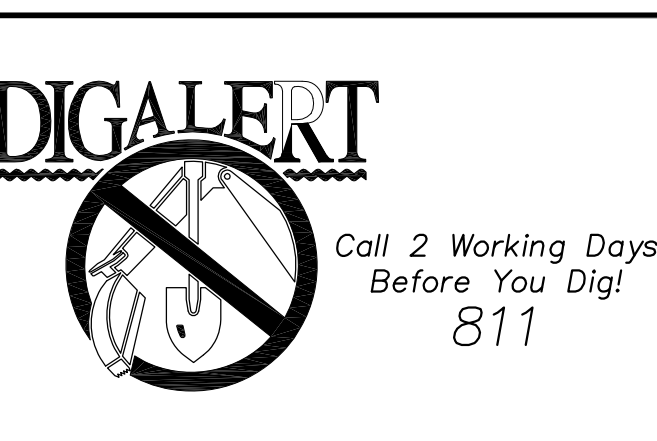


CONSTRUCTION NOTES

- 1) CONSTRUCT CONC. CURB 6" CF PER DETAIL (A) AS SHOWN ON SHT. 6
- 2) CONSTRUCT 3" WIDE STRIP GUTTER PER DETAIL (B) AS SHOWN ON SHT. 6
- 3) CONSTRUCT CONCRETE CURB AND GUTTER PER DETAIL (C) AS SHOWN ON SHEET 5
- 4) CONSTRUCT TRUNCATED DOMES PER DETAIL (G) AS SHOWN ON SHT. 6 OR PER ARCHITECTURAL PLANS
- 5) CONSTRUCT 70sq. INCH ACCESSIBILITY SIGN PER SECTION 3107(A) PER ARCHITECTURAL PLANS, OR PER DETAIL (H) AS SHOWN ON SHT. 6 (PER BUILDING PLANS AND SEPARATE PERMIT)
- 6) CONSTRUCT 3" A.C. OVER 4" CLASS II BASE IN PARKING AREAS AS PER SOIL ENGINEER'S RECOMMENDATIONS.
- 7) PAINT HANDICAP PARKING STAMPEL PER ARCHITECTURAL PLANS OR PER DETAIL (J) AS SHOWN ON SHT. 6
- 8) PAINT HANDICAP PARKING STRIPES PER ARCHITECTURAL PLANS
- 9) PAINT PARKING STRIPES PER ARCHITECTURAL PLANS
- 10) CONSTRUCT 4 INCH MIN. THICK CONC. SIDEWALK PER ARCHITECTURAL PLANS
- 11) PAINT PATH OF TRAVEL WAY PER ARCHITECTURAL PLANS
- 12) CONSTRUCT CURB RAMPS AS SHOWN ON PLAN SEE DETAIL (K) AS SHOWN ON SHT. 6
- 13) CONSTRUCT TRASH ENCLOSURE PER ARCHITECT'S PLAN
- 15) CONSTRUCT 5" THICK CONCRETE SLAB WITH #4 REBARS @ 18" O.C. OR PER SOILS ENGINEER'S RECOMMENDATIONS AND ARCHITECT'S PLANS
- 16) CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER CITY OF BEAUMONT PER STD. PLAN NO. 210, W=40', R=20'
- 17) CONSTRUCT WHEEL STOP PER DETAIL (L) AS SHOWN ON SHT. 6 OR PER ARCHITECT'S PLAN
- 18) CONSTRUCT 3 1/2" A.C. OVER 4" CLASS II BASE IN DRIVE AREAS AS PER SOIL ENGINEER'S RECOMMENDATIONS.
- 21) CONSTRUCT 4.5' MAX. HIGH BLOCK RETAINING WALL AND 6' HIGH BLOCKWALL PER STRUCTURAL ENGINEER'S PLANS (PER SEPARATE PLAN & PERMIT)
- 20) CONSTRUCT CURB OPENINGS PER DETAIL (N) AS SHOWN ON SHT. 6
- 22) CONSTRUCT 4.5' MAX. HIGH BLOCK RETAINING WALL AROUND BIORETENSION BASINS PER STRUCTURAL ENGINEER'S PLANS
- 32) CONSTRUCT ONSITE LIGHTS PER ARCHITECT'S PLAN



DEDICATION
14' WIDE ROW DEDICATION PER DOC. REC.



BENCHMARK:
City of Beaumont Bench Mark No. 11.A.82
1-3/8" brass disc stamped City BM 11 at the southwest end of the southeast curb return at Sixth Street and Pennsylvania Ave. Elevation = 2602.803 (NAVD 82)

| BY | MARK | DESCRIPTION | APPR. | DATE |
|----------|------|-------------|-------|------|
| ENGINEER | | REVISIONS | | CITY |

PLAN PREPARED BY
SPB ENGINEERING, INC.
1391 WINDEMERE LANE
TUSTIN, CA. 92780
PHONE: (714) 931-0912
EMAIL: fiji1961@gmail.com

INDER JI CHAUHAN DATE
R.C.E. 28466 EXPIRES 03-31-26

DESIGN BY: STJ
DRAWN BY: SAT
CHECKED BY: JH
SCALE: 1"=20'
DATE: 7/10/2023
JOB NUMBER: 2023-003

BEAUMONT
CALIFORNIA
PUBLIC WORKS DEPARTMENT
350 E. 6TH ST, BEAUMONT, CA 92223

REVIEWED BY: _____ DATE: _____
STAFF ENGINEER

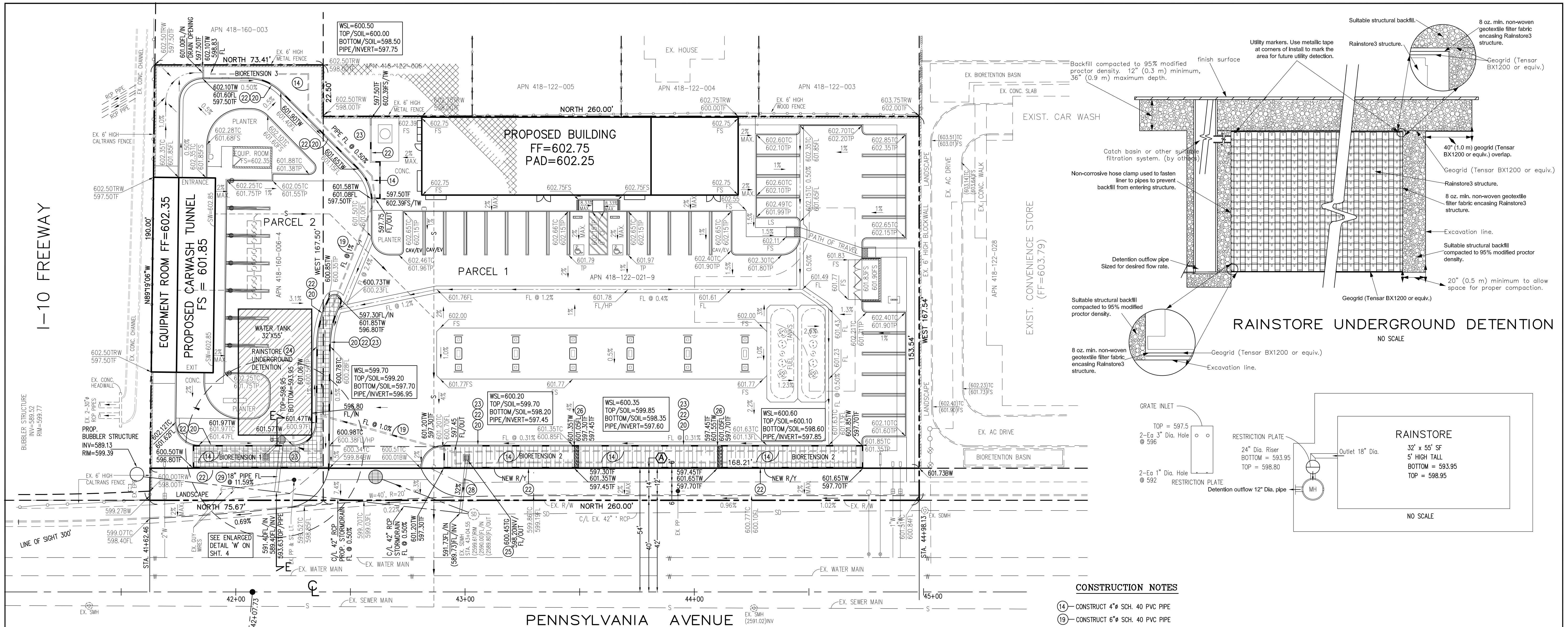
RECOMMENDED BY: _____ DATE: _____
PRINCIPAL ENGINEER

APPROVED BY: _____ DATE: _____
CITY ENGINEER

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
539 & 545 PENNSYLVANIA
BEAUMONT, CA 92223
GAS STATION, C-STORE & CARWASH
PP2019-0209, CUP2019-0033,
PRECISE GRADING

SHEET
2
OF 8 SHEETS
FILE NO: 3530
PW2023-1082

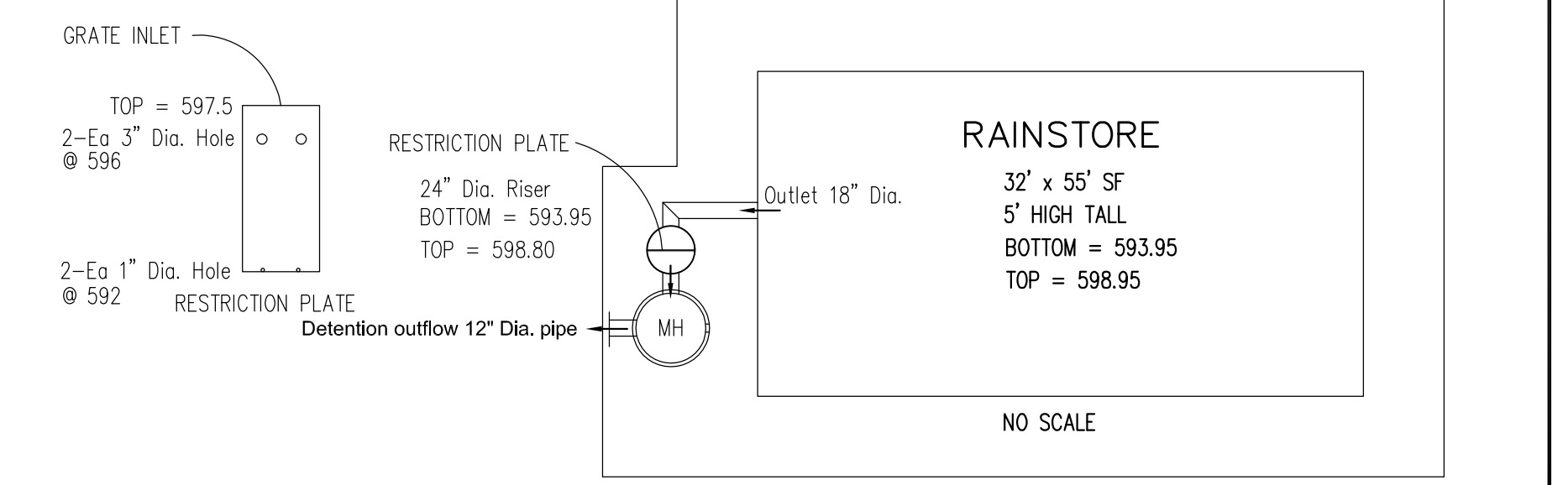
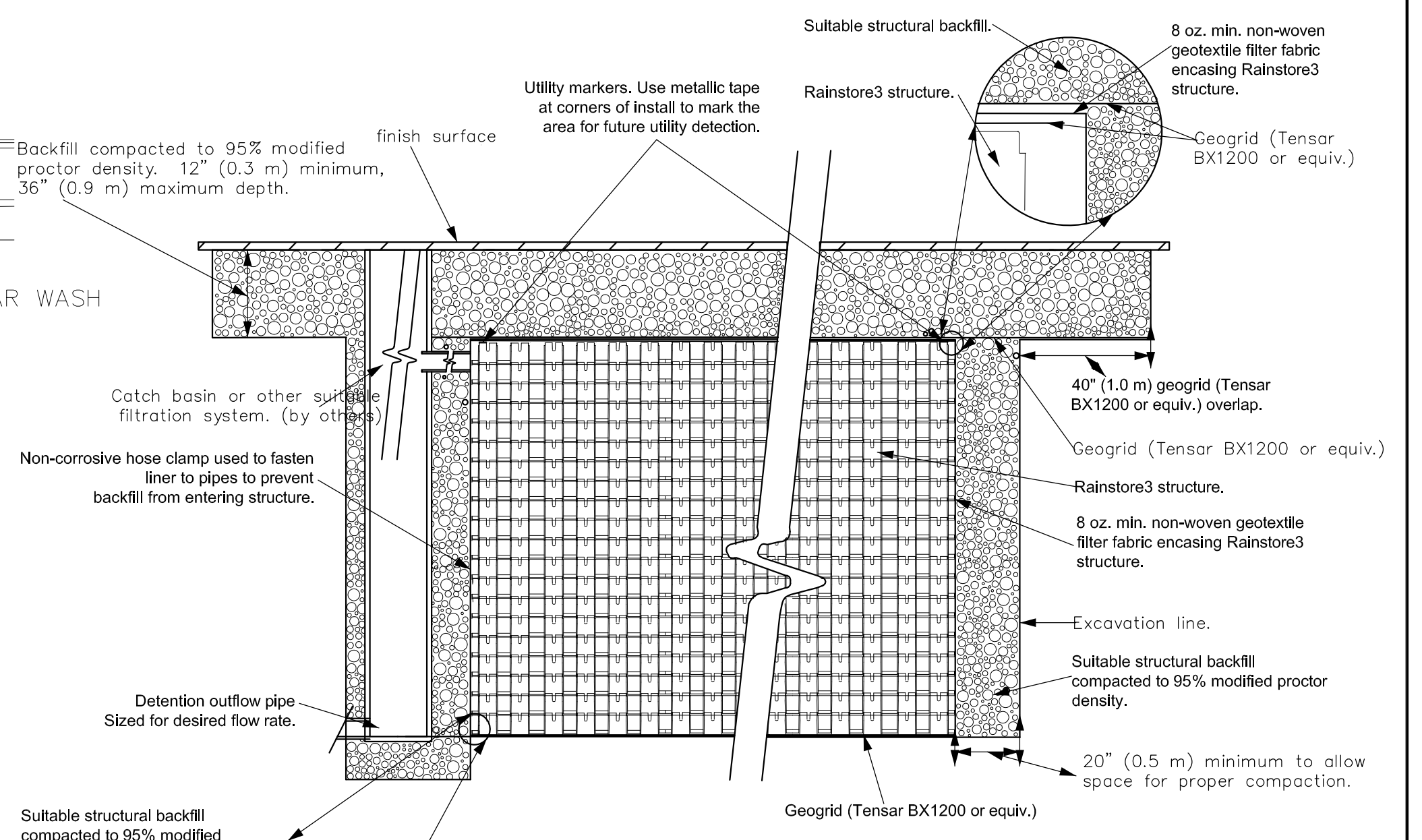
I-10 FREEWAY



CONSTRUCTION NOTES

- 14- CONSTRUCT 4" SCH. 40 PVC PIPE
19- CONSTRUCT 6" SCH. 40 PVC PIPE
20- CONSTRUCT CURB OPENINGS PER DETAIL (N) AS SHOWN ON SHT. 4
21- CONSTRUCT 4.5' MAX. HIGH BLOCK RETAINING WALL AND 6' HIGH BLOCKWALL PER STRUCTURAL ENGINEER'S PLANS (PER SEPARATE PLAN & PERMIT)
22- CONSTRUCT 4.5' MAX. HIGH BLOCK RETAINING WALL AROUND BIORETENSION BASINS PER STRUCTURAL ENGINEER'S PLANS
23- CONSTRUCT BIORETENSION BASINS PER DETAIL AS SHOWN ON SHEET 4
24- CONSTRUCT 'RAINSTORE UNDERGROUND DETENTION' CHAMBER PER DETAIL AS SHOWN ON SHEET 3 (30'x50')
25- CONSTRUCT 24" SQ CATCH BASIN (FOR OVERFLOW CONTROL IN RETENTION BASIN) SEE DETAIL ON SHEET 4
26- CONSTRUCT ROCK WEIR PER DETAIL AS SHOWN ON SHEET 3
27- CONSTRUCT STORM DRAIN MANHOLE W/HEAVY DUTY TRAFFIC RATED GRATE PER COUNTY OF RIVERSIDE FLOOD CONTROL DISTRICT STD. PLAN NO. MH257
28- CONSTRUCT 12" RCP
29- CONSTRUCT 18" RCP & CONNECT TO EX. 42" RCP PIPE
30- CONSTRUCT 24" RISER W/GRATE INLET ONE WAY RESTRICTION PLATE USE HEAVY DUTY TRAFFIC RATED COVER
31- CONSTRUCT 24" SQ. CATCH BASIN, HEIGHT AS SHOWN ON PLAN ON SHT. 3 FOR OVERFLOW WATER FROM BMP'S

RAINSTORE UNDERGROUND DETENTION



Graphic Scale

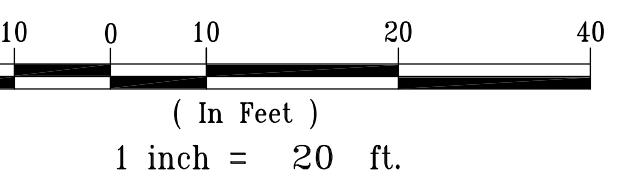
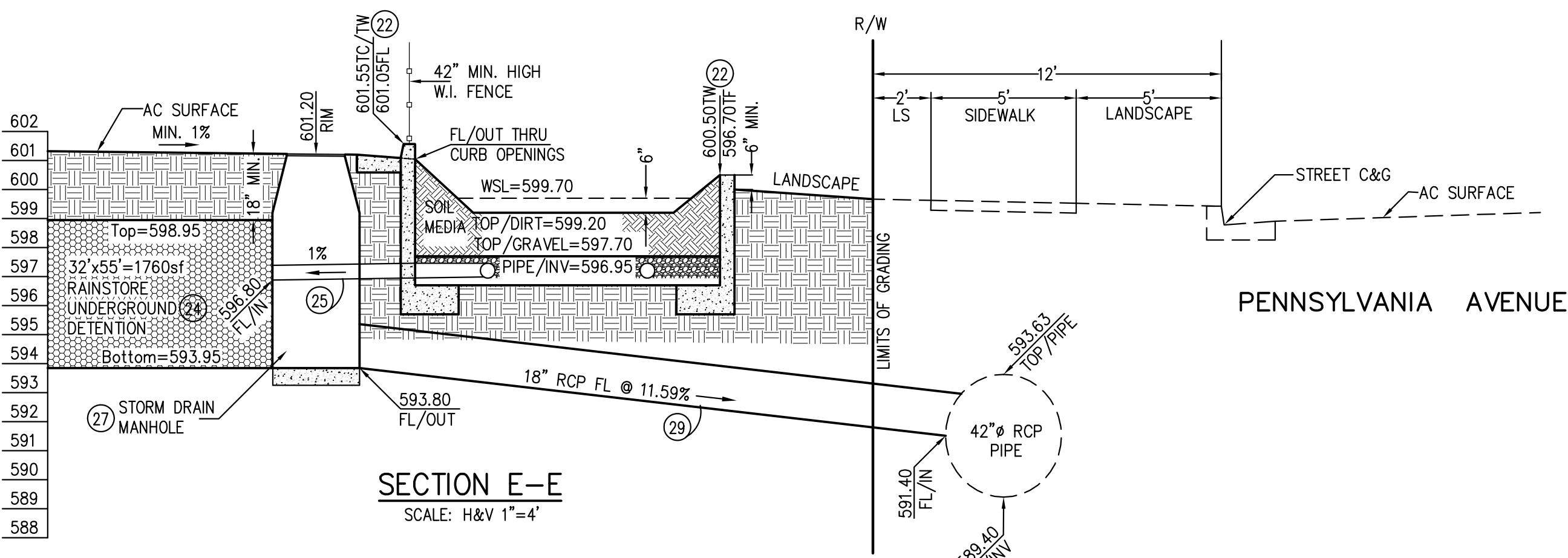


Table with 4 columns: NO., DELTA, RADIUS, LENGTH, TANGENT. Contains curve data for C1 and C2.

Table with 2 columns: NO., BEARING, DISTANCE. Contains line data for L1.

DEDICATION
14' WIDE DEDICATION TO THE CITY OF BEAUMONT FOR ROAD AND INCIDENTAL PURPOSES

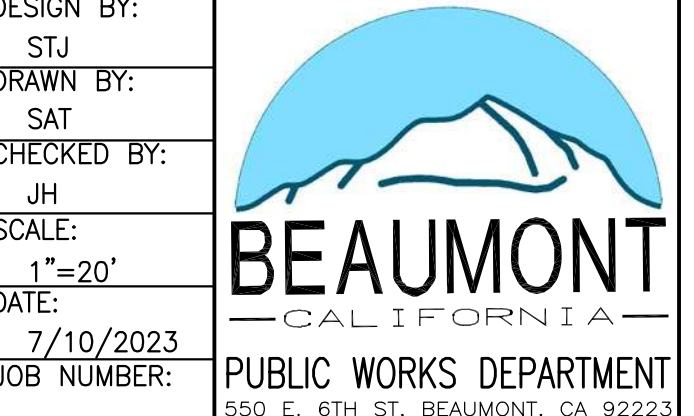


BENCHMARK: City of Beaumont Bench Mark No. 11.A.82 1-3/8" brass disc stamped City BM 11 at the southwest end of the southeast curb return at Sixth Street and Pennsylvania Ave. Elevation = 2602.803 (NAVD 82)

Table with 4 columns: BY, MARK, DESCRIPTION, APPR. DATE. Used for recording revisions.

PLAN PREPARED BY
SPB ENGINEERING, INC.
1391 WINDEMERE LANE
TUSTIN, CA. 92780
PHONE: (714) 931-0912
EMAIL: fiji1961@gmail.com

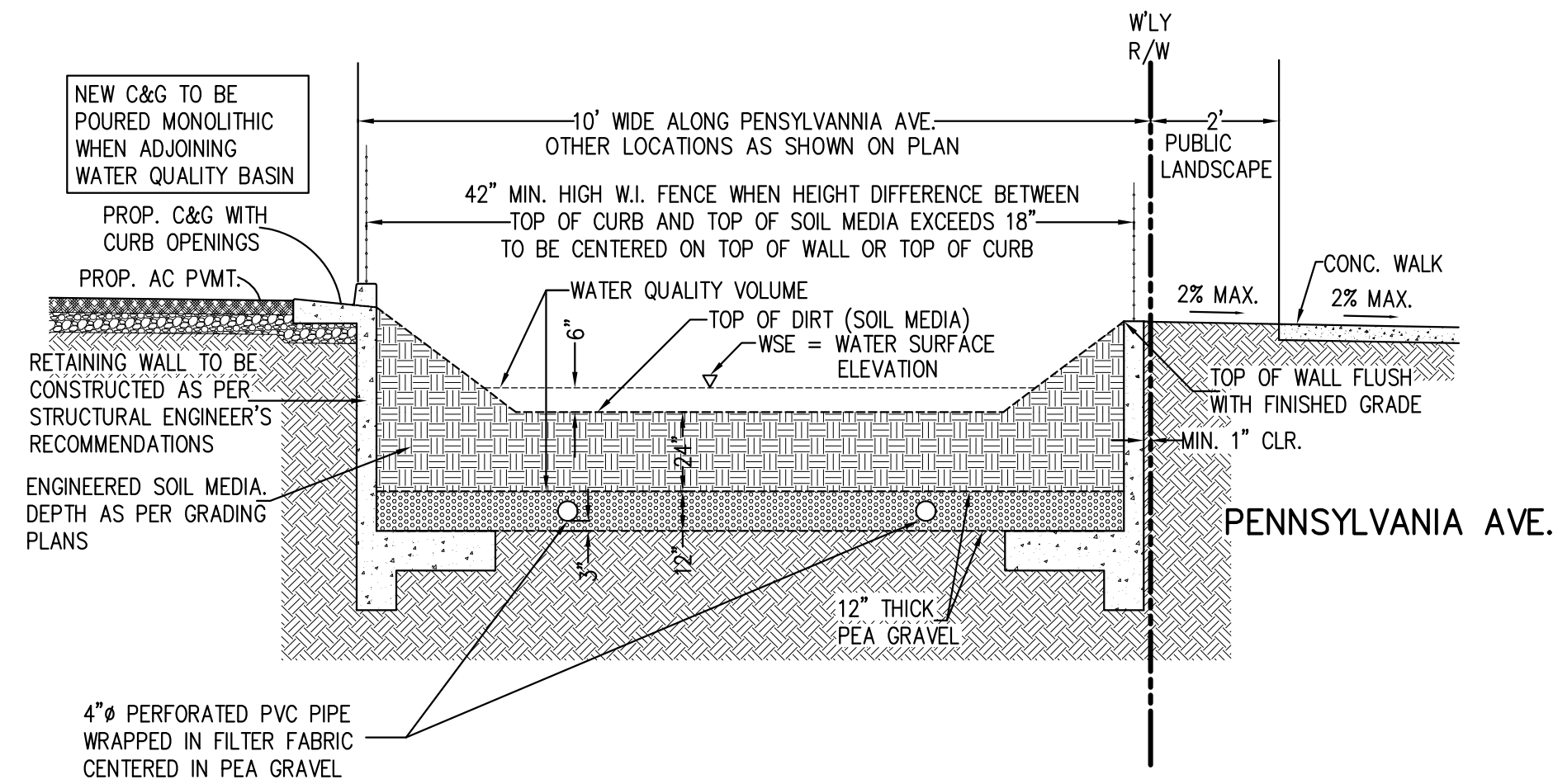
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DRAWN BY: SAT
CHECKED BY: JH
SCALE: 1"=20'
DATE: 7/10/2023
JOB NUMBER: PUBLIC WORKS DEPARTMENT



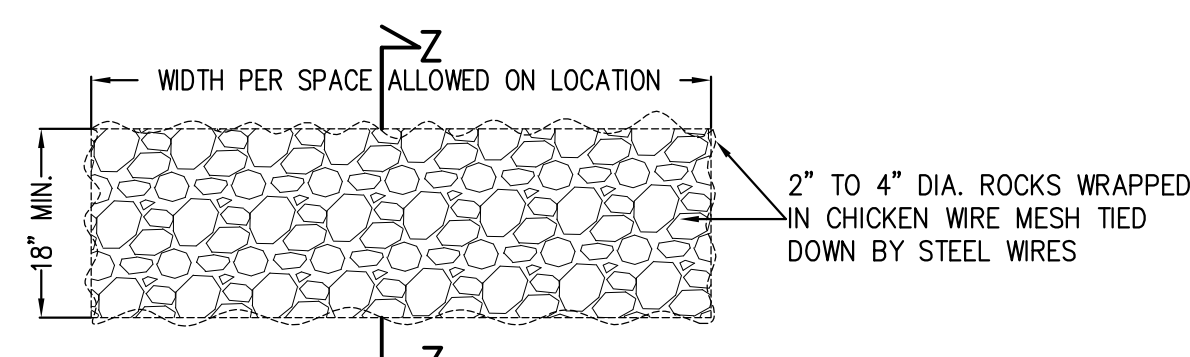
REVIEWED BY: STAFF ENGINEER DATE:
RECOMMENDED BY: PRINCIPAL ENGINEER DATE:
APPROVED BY: CITY ENGINEER DATE:

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
539 & 545 PENNSYLVANIA
BEAUMONT, CA 92223
GAS STATION, C-STORE & CARWASH
PP2019-0209, CUP2019-0033,
BIORETENTION PLAN

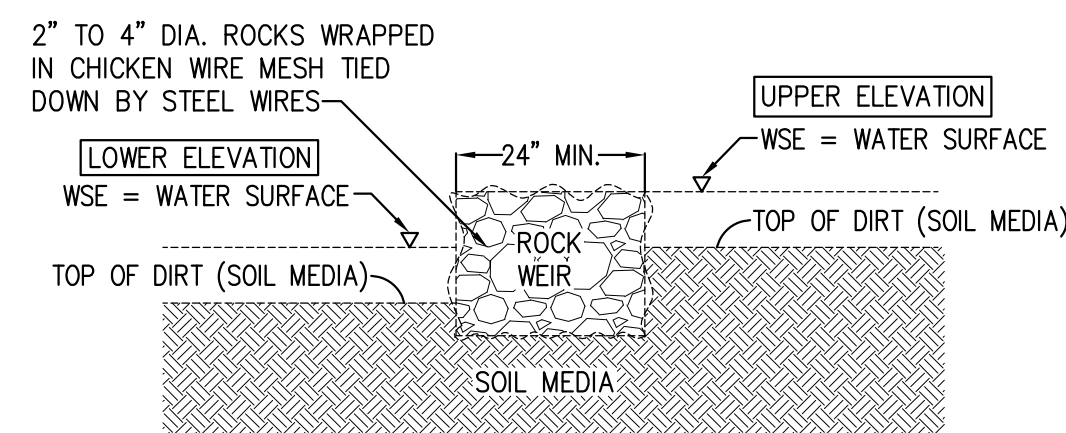
SHEET 3 OF 8 SHEETS
FILE NO: 3530
PW2023-1082



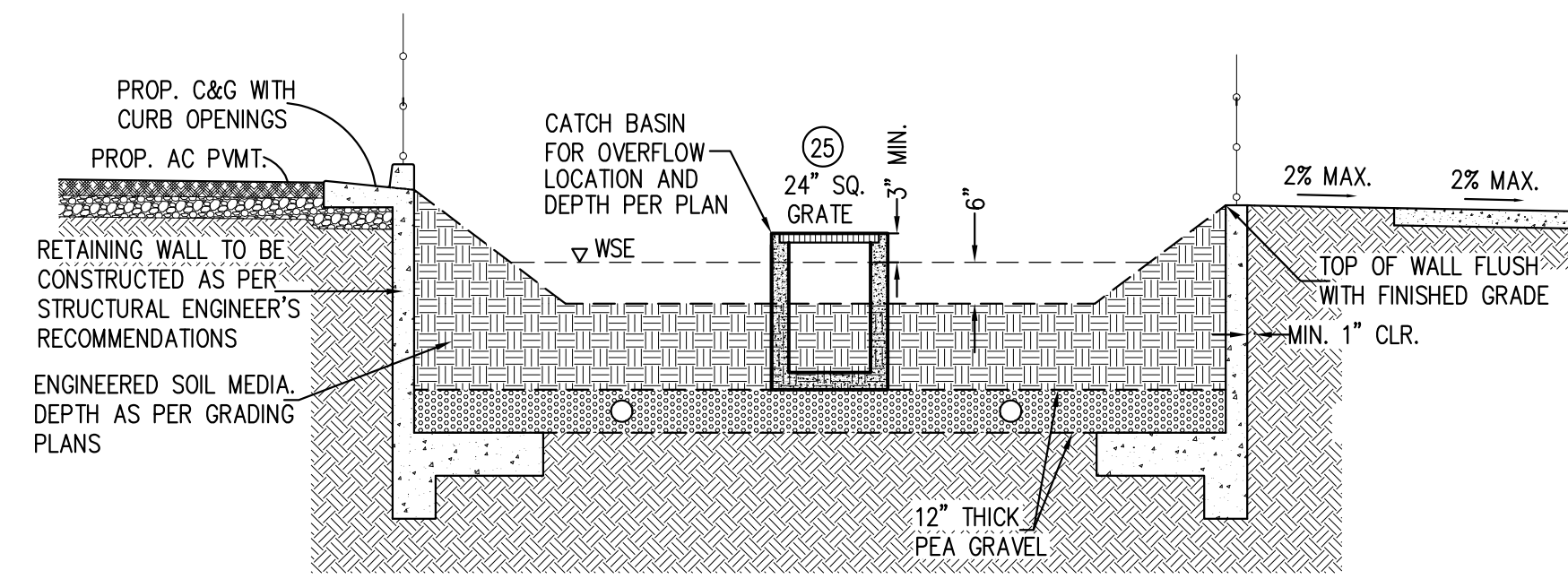
BIOFILTRATION PIT TYPICAL SECTION
NO SCALE



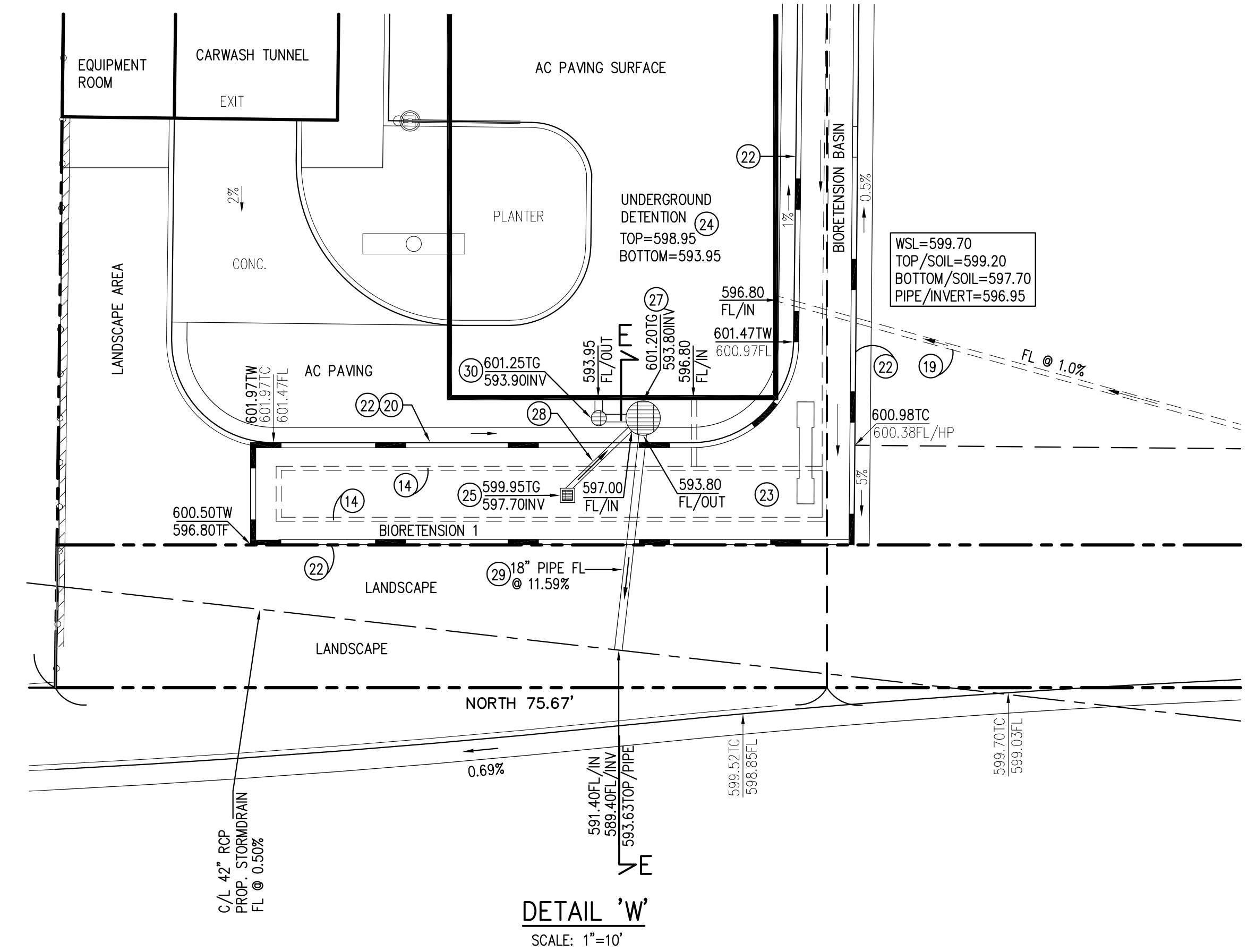
BIOFILTRATION WEIR AT GRADE CHANGE
NO SCALE



SECTION Z-Z
NO SCALE



CATCH BASIN FOR OVERFLOW
NO SCALE



DETAIL 'W'
SCALE: 1"=10'



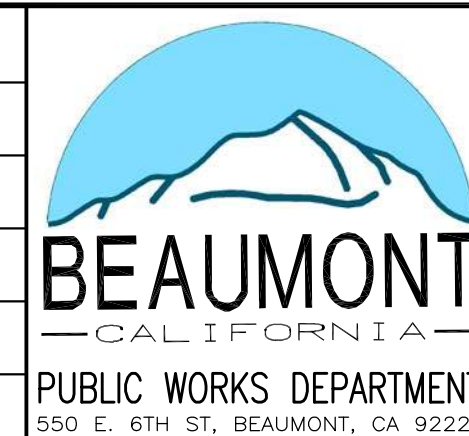
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INDER JT CHAUHAN DATE
R.C.E. 28466 EXPIRES 03-31-26

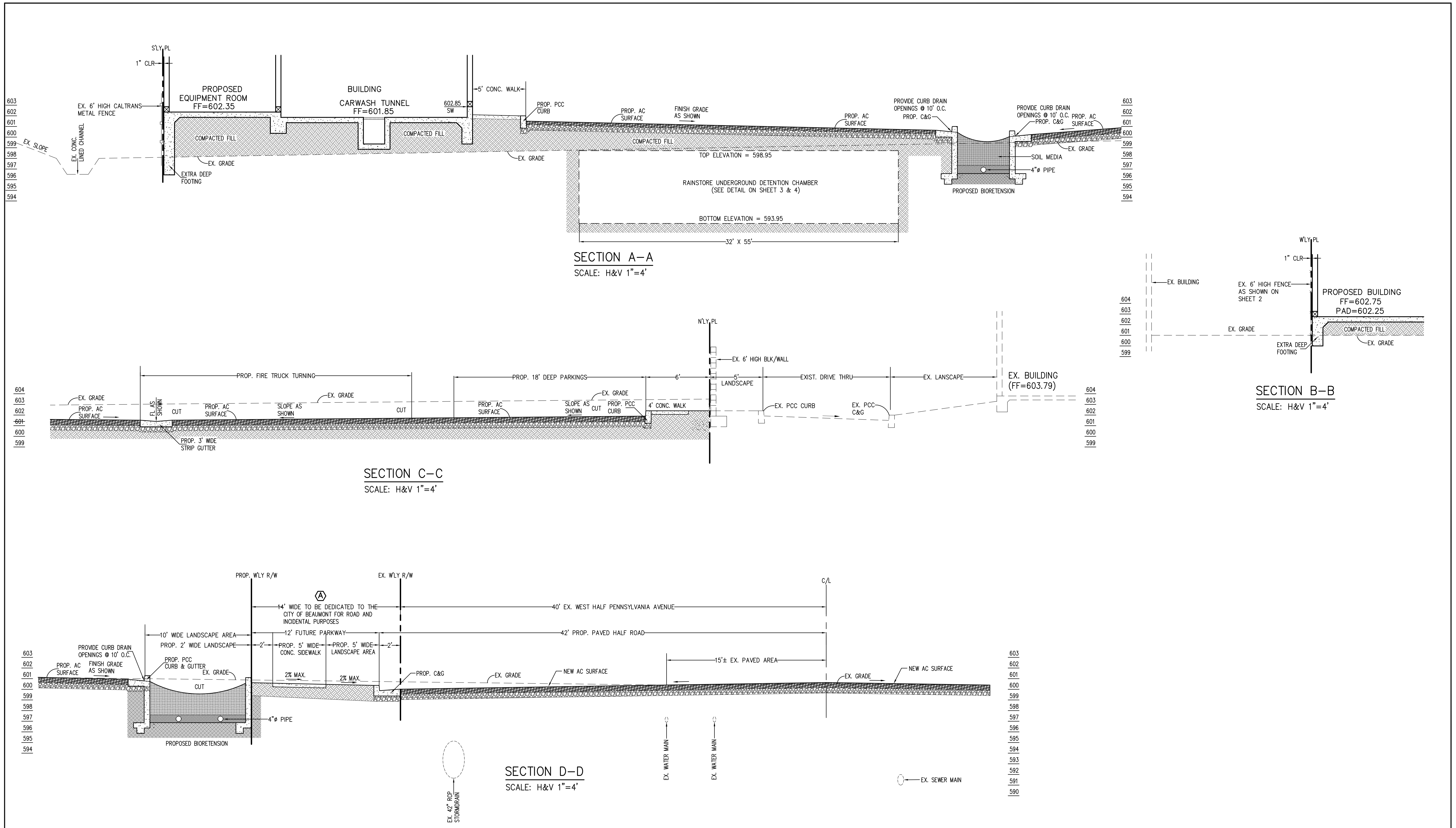
DESIGN BY: STJ
DRAWN BY: SAT
CHECKED BY: JH
SCALE: 1"=20'
DATE: 7/10/2023
JOB NUMBER:



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

CITY OF BEAUMONT, CALIFORNIA
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PP2019-0209, CUP2019-0033,
BIORETENTION DETAILS

SHEET
4
OF 8 SHEETS
FILE NO: 3530
PW2023-1082

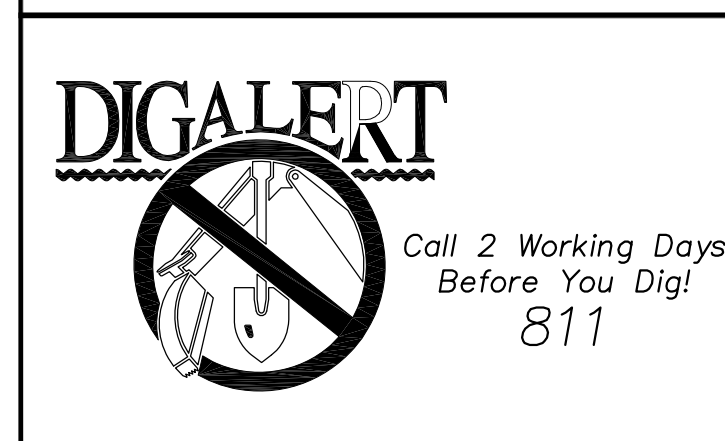


SECTION A-A
SCALE: H&V 1"=4'

SECTION B-B
SCALE: H&V 1"=4'

SECTION C-C
SCALE: H&V 1"=4'

SECTION D-D
SCALE: H&V 1"=4'



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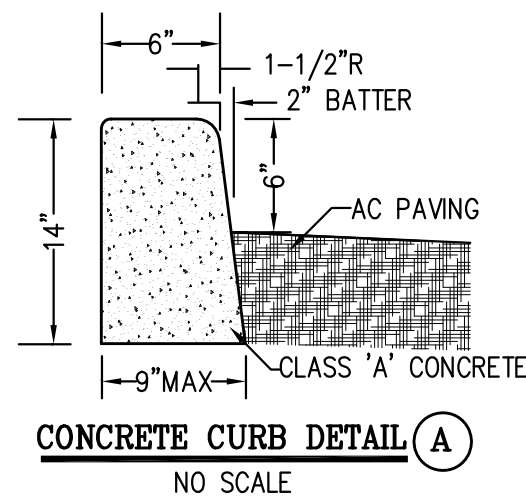
REVIEWED BY: _____ DATE: _____
STAFF ENGINEER

RECOMMENDED BY: _____ DATE: _____
PRINCIPAL ENGINEER

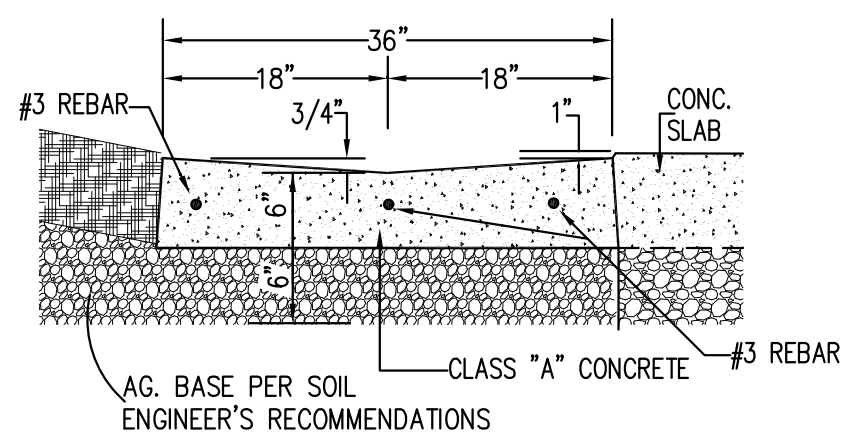
APPROVED BY: _____ DATE: _____
CITY ENGINEER

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
**539 & 545 PENNSYLVANIA
BEAUMONT, CA 92223
GAS STATION, C-STORE & CARWASH
PP2019-0209, CUP2019-0033,
CROSS SECTIONS**

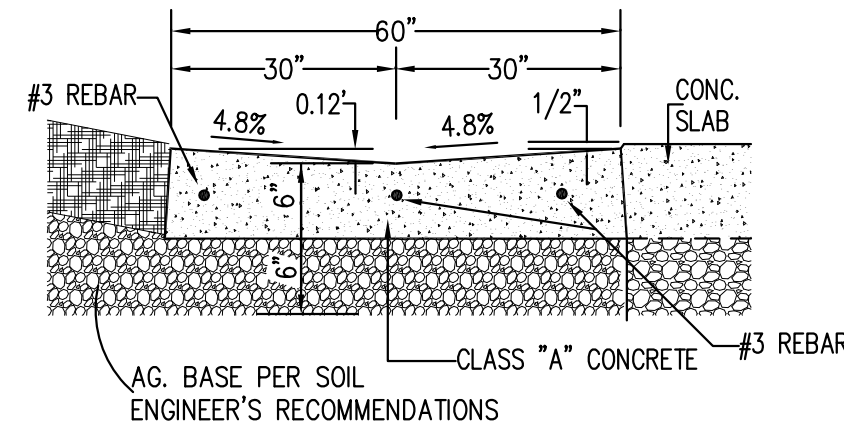
SHEET
5
OF 8 SHEETS
FILE NO: 3530
PW2023-1082



CONCRETE CURB DETAIL (A)
NO SCALE

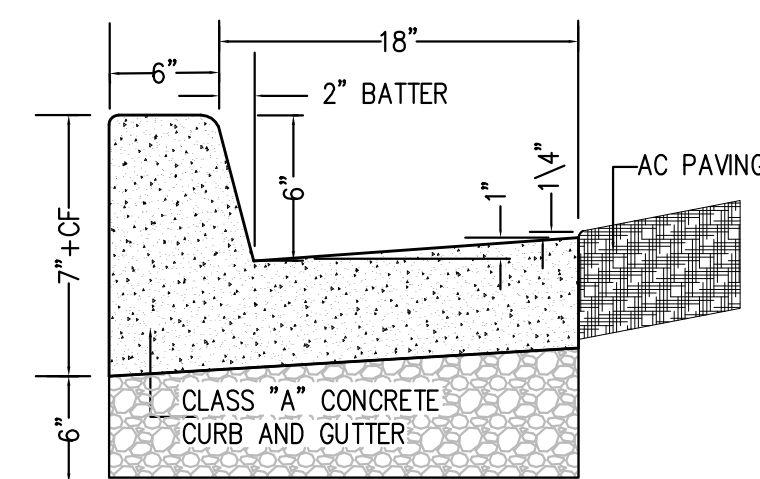


CONCRETE RIBBON GUTTER (B)
NO SCALE

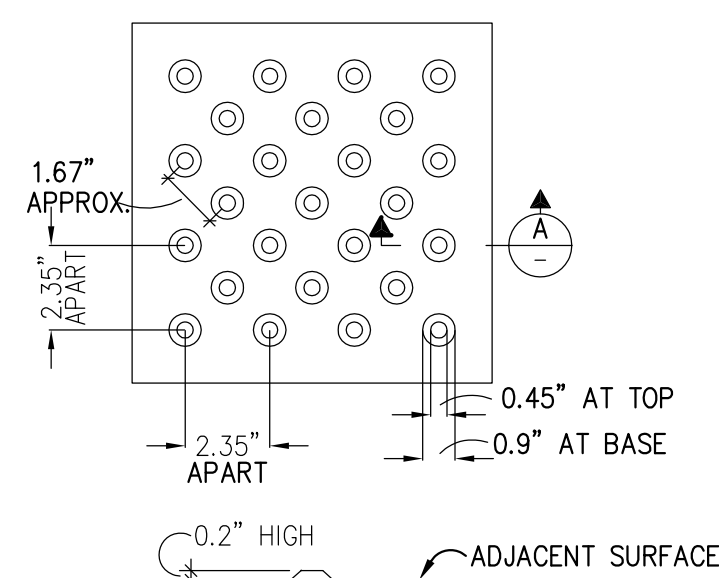


CONCRETE RIBBON GUTTER
NO SCALE

APPLIES TO PATH OF TRAVEL CROSSINGS ONLY

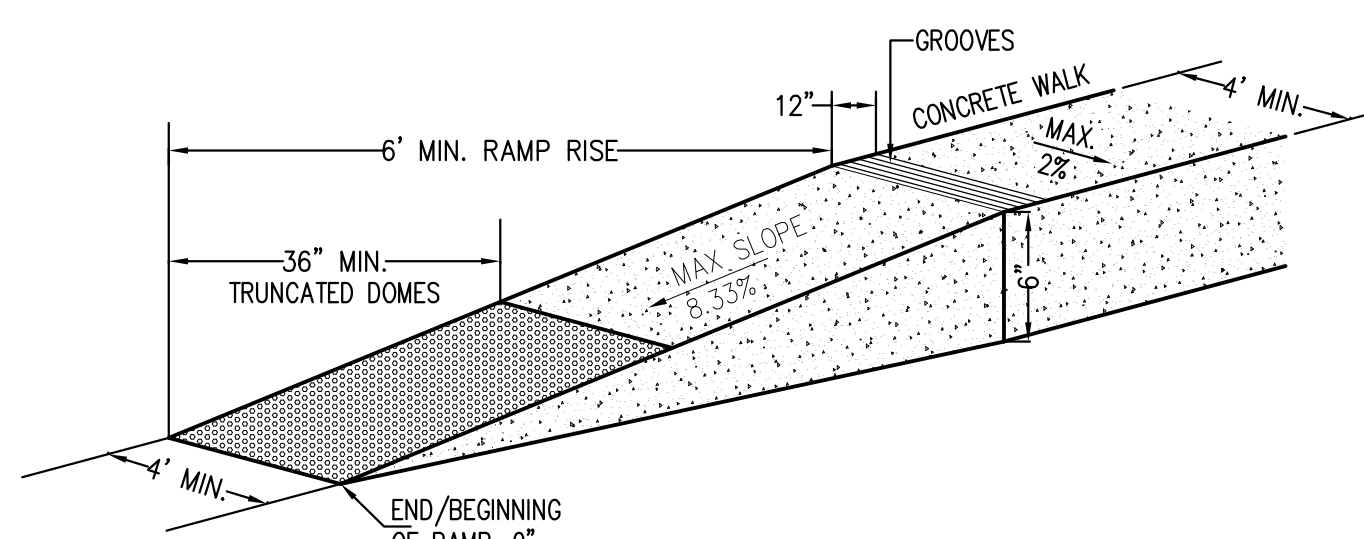


CONCRETE CURB AND GUTTER DETAIL (C)
NO SCALE



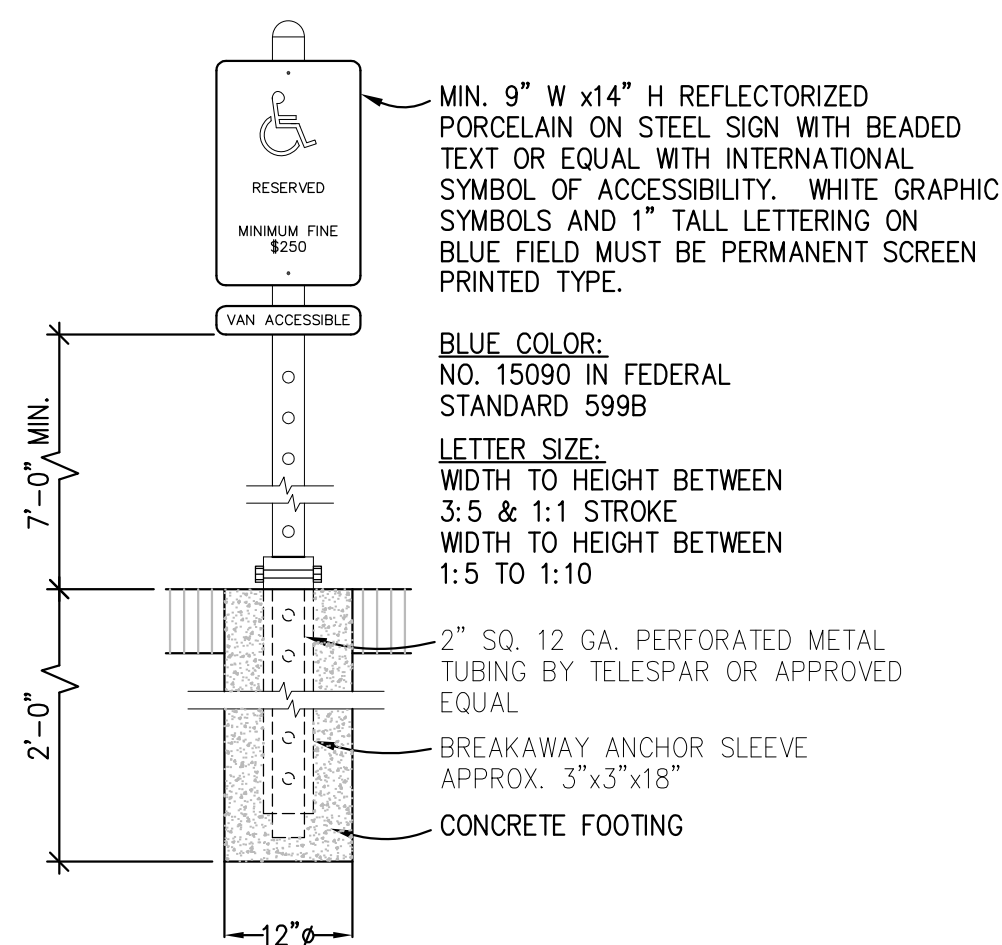
Typical Section A-A

Typical Plan - Truncated Domes (D)
NO SCALE

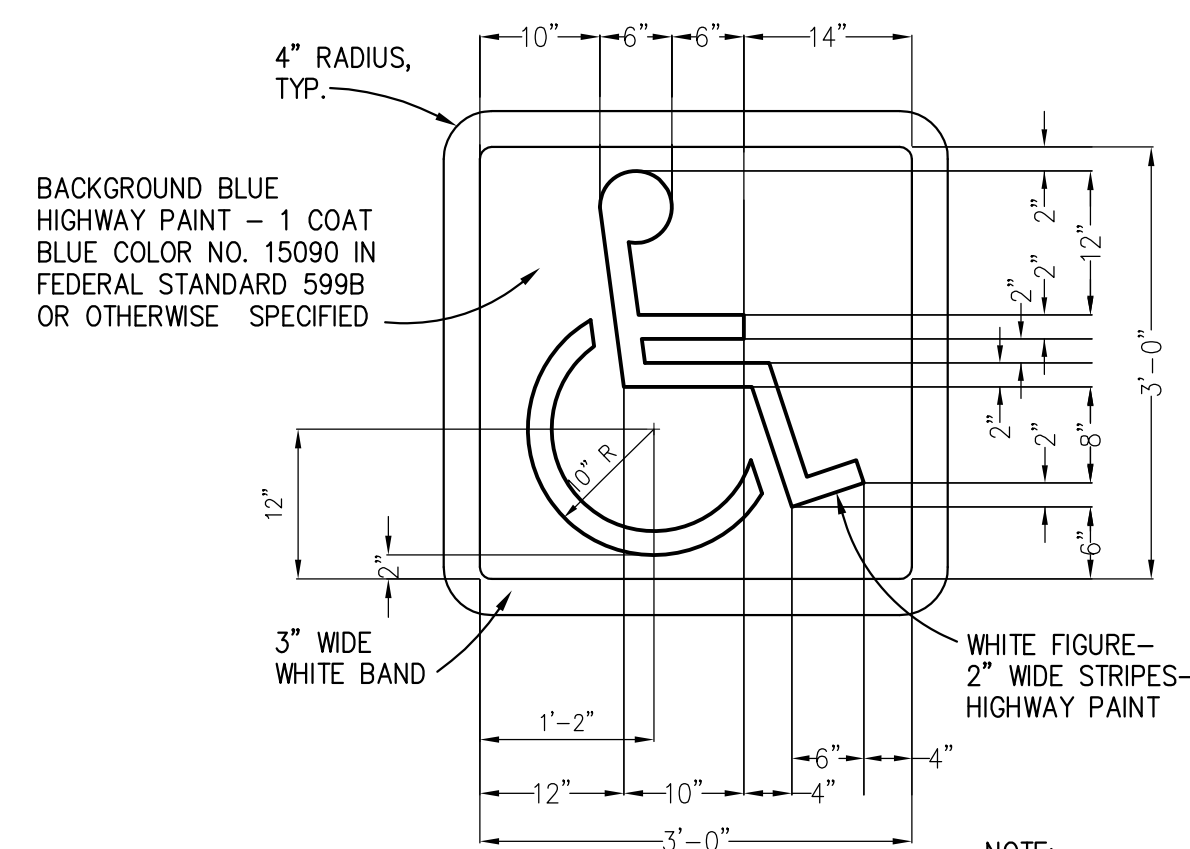


STRAIGHT RAMP RUN DETAIL (G)

TYPICAL FOR ALL RAMPS
NOT TO SCALE



ACCESSIBILITY SIGN (E)
NO SCALE



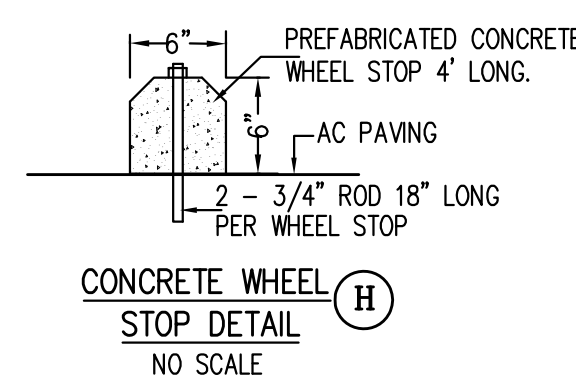
BACKGROUND BLUE HIGHWAY PAINT - 1 COAT
BLUE COLOR NO. 15090 IN FEDERAL STANDARD 599B OR OTHERWISE SPECIFIED

NOTE:
THIS DETAIL IS TO ILLUSTRATE MINIMUM SYMBOL DIMENSIONS AND REQUIRED GRAPHICS. REFER TO PLANS FOR EXACT LOCATIONS

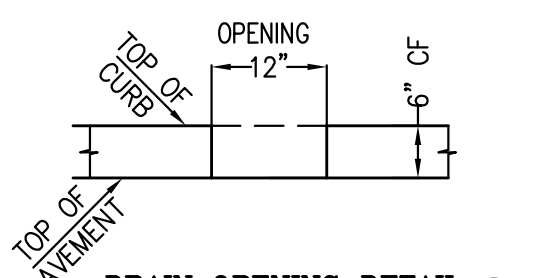
ACCESSIBLE PARKING GRAPHICS SHALL COMPLY WITH PART 2, TITLE 24 CALIFORNIA CODE OF REGULATIONS

GRID LINES SHOWN ARE FOR PROPORTIONS ONLY AND ARE NOT TO APPEAR AS PART OF THE SYMBOL

HANDICAP STAMP (F)
NO SCALE

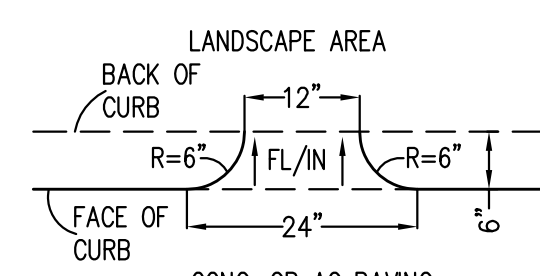


CONCRETE WHEEL STOP DETAIL (H)
NO SCALE



DRAIN OPENING DETAIL (J)
NO SCALE

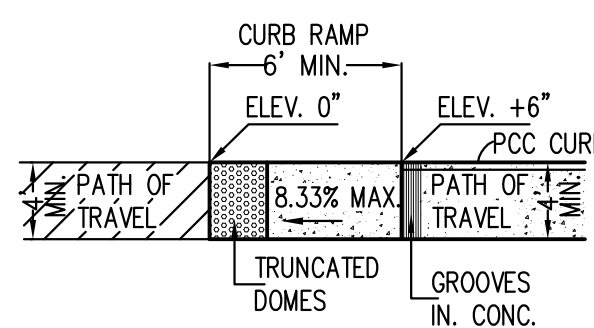
DRAIN OPENINGS @ 10' O.C. OR WHERE AS SHOWN.



DRAIN OPENING DETAIL

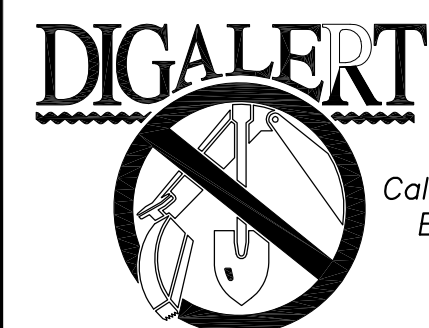
PLAN VIEW

NO SCALE



CURB RAMP DETAIL (TYPICAL)
NO SCALE

ALL ACCESSIBILITY DETAILS SHALL COMPLY WITH THE CURRENT 2018 CBC, CHAPTER 11B



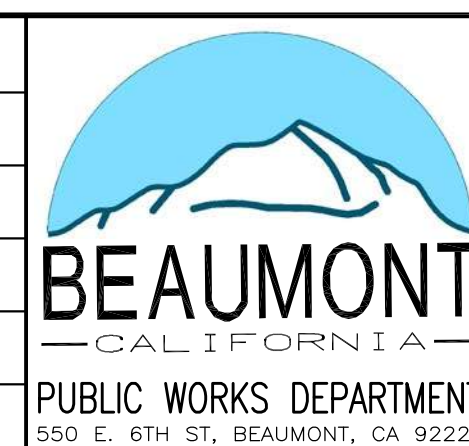
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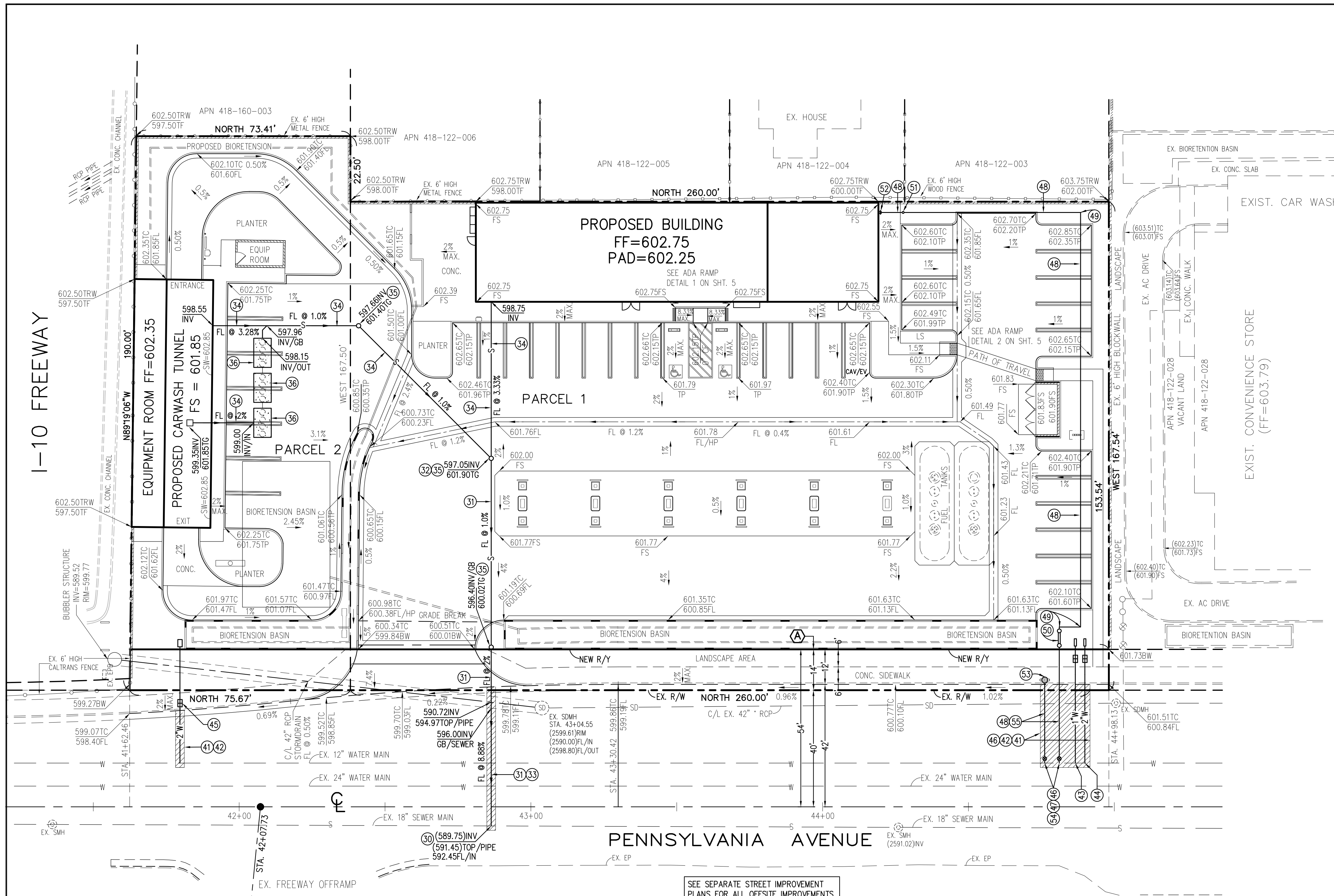
DESIGN BY: STJ
DRAWN BY: SAT
CHECKED BY: JH
SCALE: 1"=20'
DATE: 7/10/2023
JOB NUMBER:



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

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
539 & 545 PENNSYLVANIA
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GAS STATION, C-STORE & CARWASH
PP2019-0209, CUP2019-0033,
DETAILS

SHEET
6
OF 8 SHEETS
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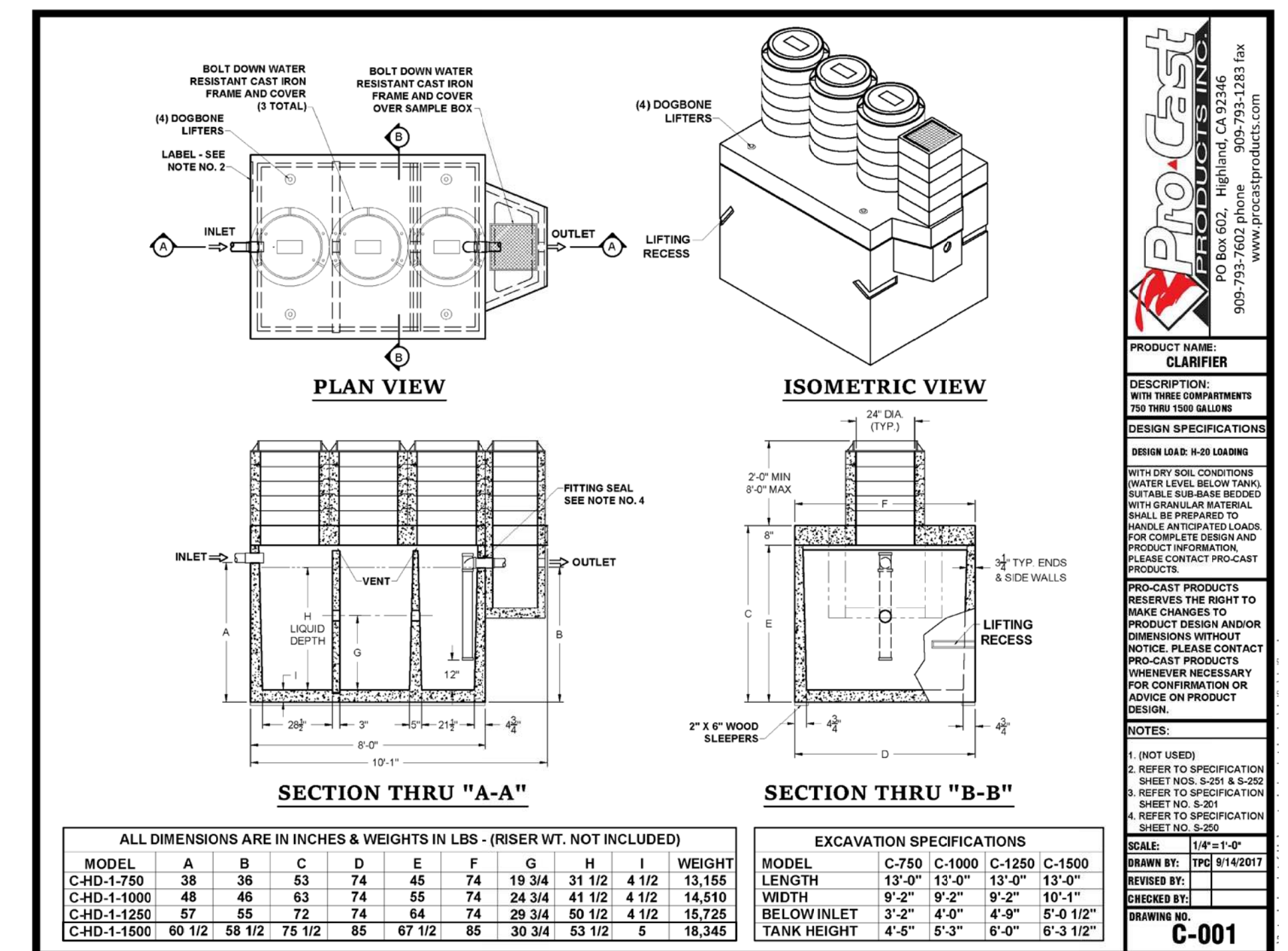
SEWER (EMWD EASTERN MUNICIPAL WATER DISTRICT)

- 30 CONSTRUCT SADDLE CONNECTION TO EX. 18" V.C.P. WITH 6" P.V.C. SDR 35 PIPE PER EMWD STD. SB-176
- 31 CONSTRUCT 6" DIA. PVC SDR 35 PIPE
- 32 CONSTRUCT 6" TO 4" PVC SDR 35 WYE CONNECTION
- 33 CONSTRUCT PIPE BEDDING AND TRENCH REPAIR PER EMWD STD. SB-158
- 34 CONSTRUCT 4" PVC DIA. SDR 35 PIPE
- 35 CONSTRUCT PRIVATE ON-LINE SEWER SERVICE CLEANOUT PER EMWD STD. SB-52
- 36 CONSTRUCT 1500 GAL. CLARIFIER W/SAMPLE BOX MANUFACTURED BY PRECAST PRODUCTS MODEL NO. C-HD-1-1500 (CUT SHEET HEREON) OR PER EMWD STD. SB-75

WATER (BCVWD BEAUMONT CHERRY VALLEY WATER DISTRICT)

- 41 SAWCUT AND REMOVE EXISTING A.C. PAVING & BASE
- 42 CONSTRUCT TRENCH REPAIR PER BCVWD STD. PLATE 1
- 43 CONSTRUCT 2" (DOMESTIC) WATER SERVICE CONNECTION SERVICE WITH BACKFLOW DEVICE PER BCVWD STD. PLATE 6-4
- 44 CONSTRUCT 1" (IRRIGATION) WATER SERVICE CONNECTION SERVICE WITH BACKFLOW DEVICE PER BCVWD STD. PLATE 6-3
- 45 CONSTRUCT 2" DOMESTIC WATER SERVICE CONNECTION SERVICE WITH BACKFLOW DEVICE PER BCVWD STD. PLATE 6-4
- 46 CONSTRUCT SERVICE TRENCH REPAIR PER BCVWD STD. 6-2
- 47 CONSTRUCT 12" X 6" TEE
- 48 CONSTRUCT 6" DIA. PVC CLASS C-900 PIPE
- 49 CONSTRUCT 6" X 90° ELBOW
- 50 CONSTRUCT 6" DOUBLE DETECTOR CHECK VALVE PER BCVWD STD. NO. 7
- 51 CONSTRUCT 4" F.D.C. ON 6" FIRE LINE
- 52 CONSTRUCT 6" FIRE RISER
- 53 CONSTRUCT 6" POTABLE FIRE HYDRANT PER BCVWD STD. PLATE 1
- 54 CONSTRUCT 6" GATE VALVE PER BCVWD STD. PLATE 2

NOTE:
THE CONTRACTOR OR SUBCONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTH OF EXISTING SEWER MAIN AND WATER MAIN PRIOR TO START OF CONSTRUCTION.



Pro-Cast
PROCAST PRODUCTS, INC.
PO Box 602, Highland, CA 92346
909-793-7600 phone 909-793-1283 fax
www.procastproducts.com

PRODUCT NAME: CLARIFIER

DESCRIPTION: WITH THREE COMPARTMENTS TO TREAT 1500 GALLONS

DESIGN SPECIFICATIONS

DESIGN LOADS: R-20 LBR/RSQ

WITH OFF-BEAM CONCRETE WATER LEVEL BELOW TANKS, ALL REINFORCING BARS SHALL BE PROVIDED WITH GRANULAR MATERIAL SHALL BE PROVIDED TO HANDLE ANTICIPATED LOADS FOR COMPLETE DESIGN AND PLEASE CONTACT PRO-CAST PRODUCTS FOR MORE INFORMATION.

PRO-CAST PRODUCTS RESERVES THE RIGHT TO MAKE CHANGES TO PRODUCT DESIGN AND/OR DIMENSIONS WITHOUT NOTICE. PLEASE CONTACT PRO-CAST PRODUCTS WHENEVER NECESSARY FOR CONFIRMATION OR ADVISE ON PRODUCT DESIGN.

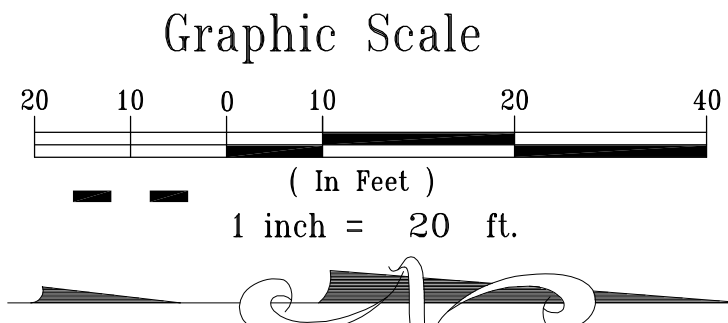
NOTES:
1. (NOT USED)
2. REFER TO SPECIFICATION SHEET PWS-001A & B-202
3. REFER TO SPECIFICATION SHEET PWS-001
4. REFER TO SPECIFICATION SHEET PWS-002

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

DRAWN BY: TPD 8/14/2017
REVIEWED BY:
CHECKED BY:

C-001

| ALL DIMENSIONS ARE IN INCHES & WEIGHTS IN LBS. - (RISER WT. NOT INCLUDED) | | | | | | | | | | EXCAVATION SPECIFICATIONS | | | | | | | |
|---|----|-----|----|-----|----|----|--------|--------|--------|---------------------------|-------------|--------|-------------|--------|-----------|-------|-----------|
| MODEL | A | B | C | D | E | F | G | H | I | WEIGHT | MODEL | C-750 | C-1000 | C-1250 | C-1500 | | |
| C-HD-1-750 | 38 | 36 | 53 | 74 | 45 | 74 | 19.3/4 | 31.1/2 | 4.1/2 | 13.155 | LENGTH | 19'-0" | 19'-0" | 19'-0" | 13'-0" | | |
| C-HD-1-1000 | 48 | 46 | 63 | 74 | 55 | 74 | 24.3/4 | 41.1/2 | 4.1/2 | 14.510 | WIDTH | 9'-2" | 9'-2" | 9'-2" | 10'-1" | | |
| C-HD-1-1250 | 57 | 55 | 72 | 74 | 64 | 74 | 29.3/4 | 50.1/2 | 4.1/2 | 15.725 | BELOW INLET | 3'-2" | 4'-0" | 4'-9" | 5'-0.1/2" | | |
| C-HD-1-1500 | 60 | 1/2 | 75 | 1/2 | 85 | 67 | 1/2 | 85 | 30.3/4 | 53.1/2 | 5 | 18.345 | TANK HEIGHT | 4'-5" | 5'-3" | 6'-0" | 6'-3.1/2" |



DEDICATION
14' WIDE DEDICATION TO THE CITY OF BEAUMONT FOR ROAD AND INCIDENTAL PURPOSES



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JOB NUMBER:



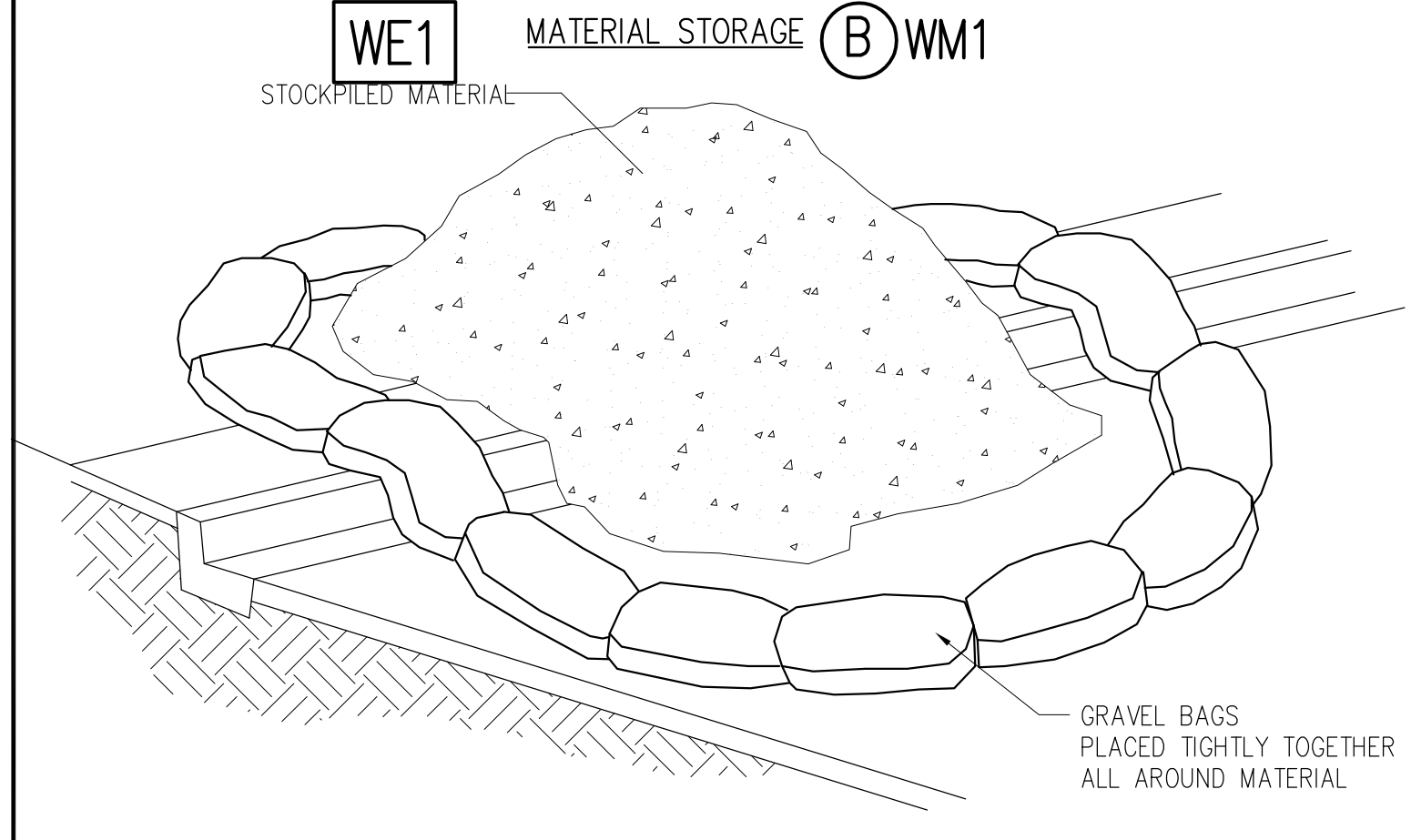
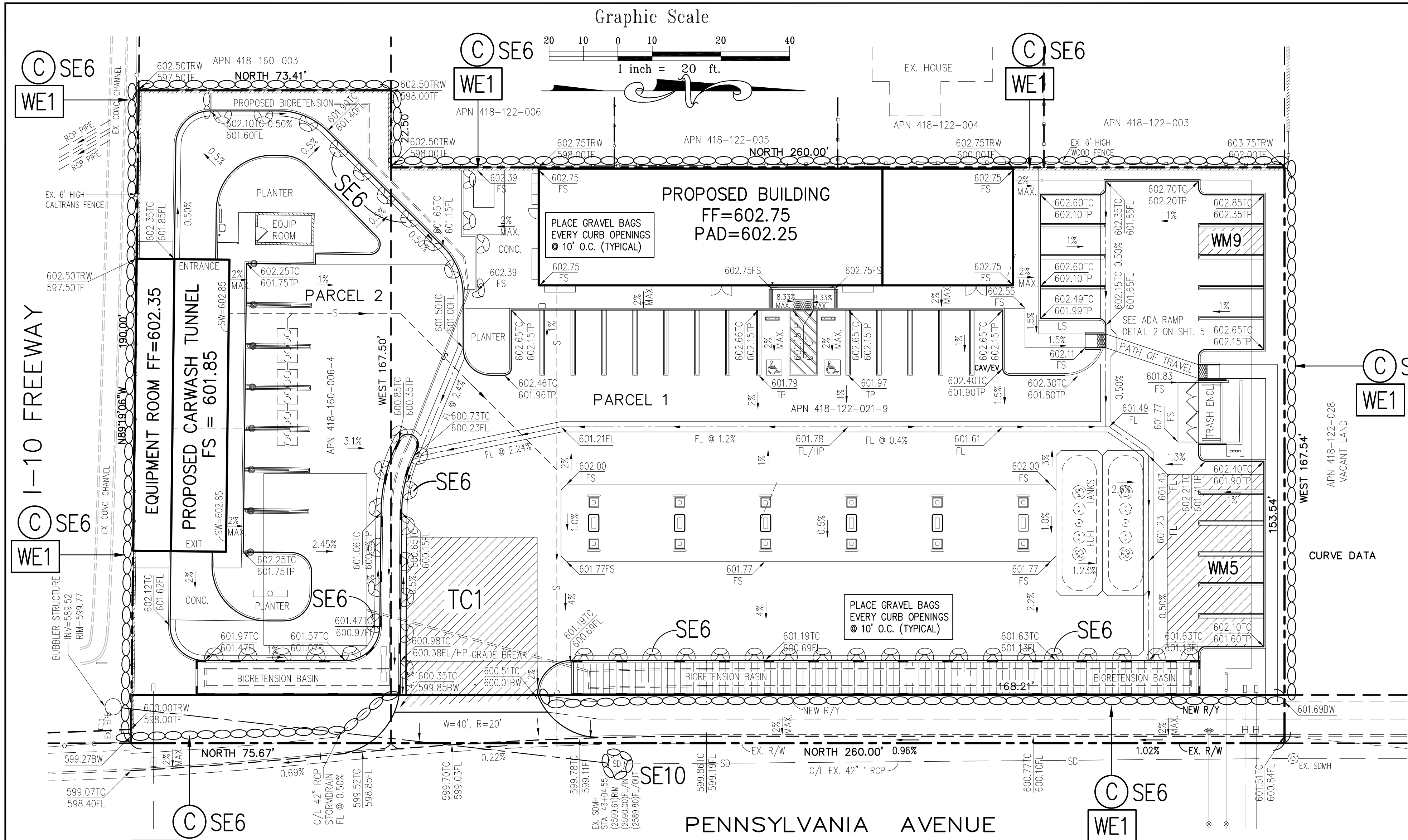
REVIEWED BY: _____ DATE: _____
STAFF ENGINEER

RECOMMENDED BY: _____ DATE: _____
PRINCIPAL ENGINEER

APPROVED BY: _____ DATE: _____
CITY ENGINEER

CITY OF BEAUMONT, CALIFORNIA
GRADING PLANS FOR:
N/W COR. PENNSYLVANIA AVE. & 10 FRWY
PROP. PUMP STATION, CONVENIENCE STORE AND CARWASH
PP2019-0209, CUP2019-0033, WATER AND SEWER

SHEET
7
OF 8 SHEETS
FILE NO: 3530
PW2023-1082

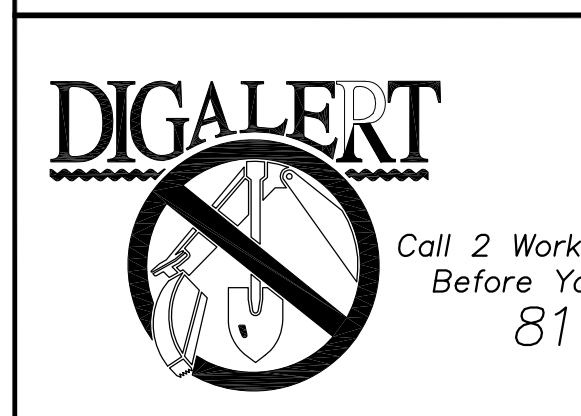


NOTES:

- DIRT AND OTHER CONSTRUCTION RELATED MATERIALS PLACED IN THE STREET OR ON OTHER IMPERVIOUS SURFACES MUST BE CONTAINED WITH SANDBAGS OR OTHER MEASURES TO PREVENT TRANSPORT TO THE STORMDRAIN SYSTEM.
- ANY CONSTRUCTION MATERIAL STORED OR STOCKPILED ON-SITE SHALL BE PROTECTED FROM BEING TRANSPORTED BY THE FORCE OF WIND OR WATER.

DEDICATION

14' WIDE DEDICATION TO THE CITY OF BEAUMONT FOR ROAD AND INCIDENTAL PURPOSES



BENCHMARK:
City of Beaumont Bench Mark No. 11.A.82
1-3/8" brass disc stamped City BM 11 at the southwest end of the southeast curb return at Sixth Street and Pennsylvania Ave. Elevation = 2602.803 (NAVD 82)

| BY | MARK | DESCRIPTION | APPR. | DATE |
|----------|------|-------------|-------|------|
| ENGINEER | | REVISIONS | | CITY |

PLAN PREPARED BY
SPB ENGINEERING, INC.
1391 WINDEMERE LANE
TUSTIN, CA. 92780
PHONE: (714) 931-0912
EMAIL: fiji1961@gmail.com

INDER JI CHAUHAN DATE
R.C.E. 28466 EXPIRES 03-31-26

DESIGN BY: STJ
DRAWN BY: SAT
CHECKED BY: JH
SCALE: 1"=20'
DATE: 7/10/2023
JOB NUMBER: 550 E. 6TH ST, BEAUMONT, CA 92223

REVIEWED BY: _____ DATE: _____
STAFF ENGINEER

RECOMMENDED BY: _____ DATE: _____
PRINCIPAL ENGINEER

APPROVED BY: _____ DATE: _____
CITY ENGINEER

CITY OF BEAUMONT, CALIFORNIA

GRADING PLANS FOR:
539 & 545 PENNSYLVANIA
BEAUMONT, CA 92223
GAS STATION, C-STORE & CARWASH
PP2019-0209, CUP2019-0033,
EROSION CONTROL

SHEET
8
OF 8 SHEETS
FILE NO: 3530
PW2023-1082

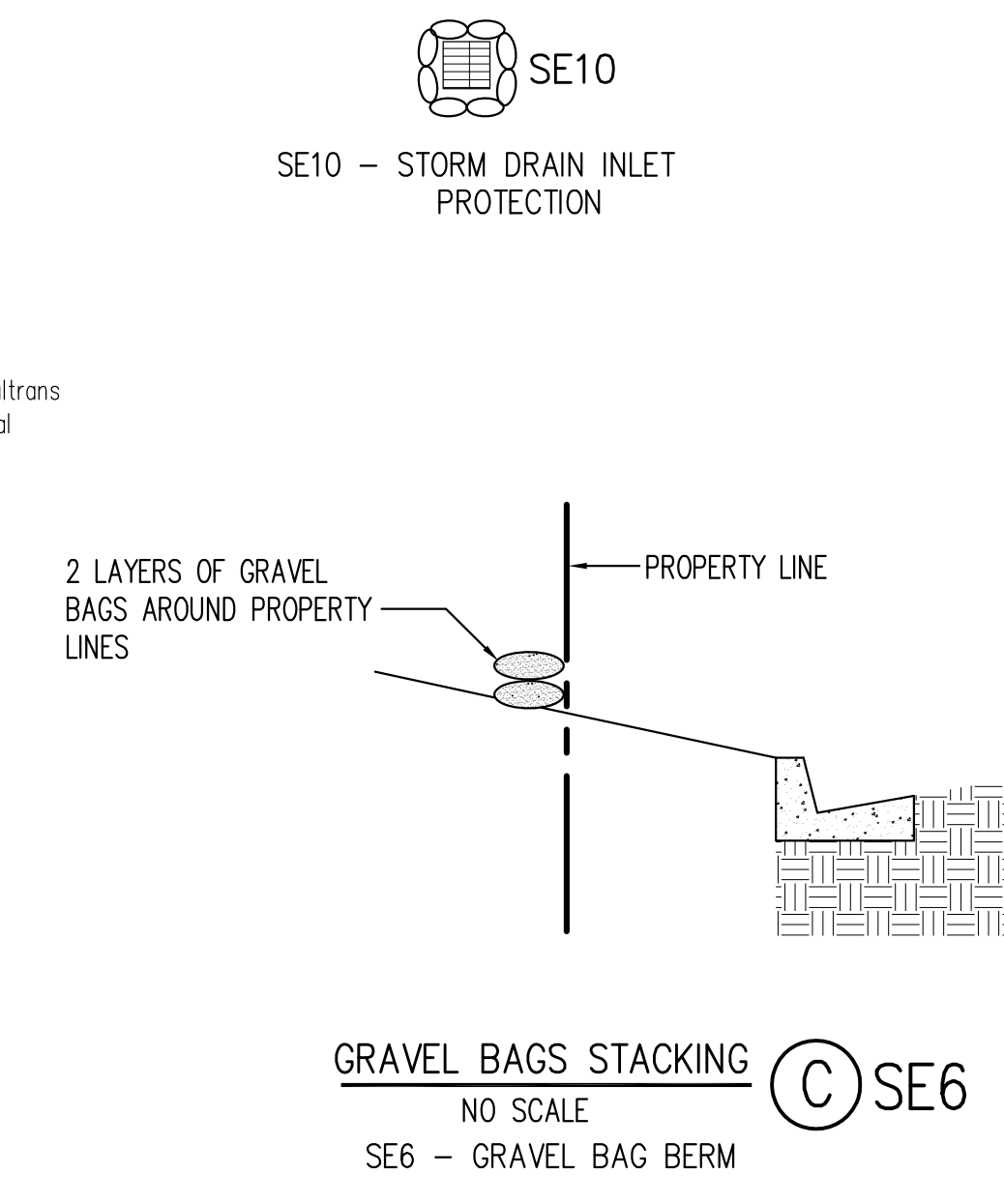
EROSION CONTROL NOTES:

- EROSION CONTROL IS REQUIRED FOR GRADING OPERATIONS ON A YEAR ROUND BASIS. APPROVED PLANS ARE REQUIRED FOR ALL WORK REQUIRING A GRADE PERMIT
- IN CASE OF EMERGENCY, CALL Mr. LAKHBIR SINGH AT (626) 224-4636 (RESPONSIBLE OWNER) (FIRM) (24 HOUR PHONE NO)
- THE ENGINEER OF RECORD WILL SUPERVISE EROSION CONTROL WORK AND ENSURE THAT WORK IS IN ACCORDANCE WITH APPROVED PLANS.
- CITY APPROVAL OF PLANS DOES NOT RELIEVE THE DEVELOPER FROM RESPONSIBILITY FOR THE CORRECTION OF ERROR AND OMISSION DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE REQUIRED PLAN REVISIONS SHALL BE PROMPTLY SUBMITTED TO THE PUBLIC WORKS DIRECTOR FOR APPROVAL.
- THE PUBLIC WORKS DIRECTOR RESERVES THE RIGHT TO MAKE CHANGES OR MODIFICATIONS TO THIS PLAN AS DEEMED NECESSARY.
- STANDBY CREW FOR EMERGENCY WORK SHALL BE MADE AVAILABLE AT ALL TIMES. NECESSARY MATERIALS SHALL BE AVAILABLE ON SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) OR TO REPAIR ANY DAMAGED BMPs WHEN RAIN IS IMMINENT.
- AN EFFECTIVE COMBINATION OF EROSION AND SEDIMENT CONTROL BMPs SHALL BE IMPLEMENTED AND MAINTAINED TO PREVENT AND/OR MINIMIZE THE TRANSPORT OF SOIL IN RUNOFF FROM DISTURBED SOIL AREAS ON THE CONSTRUCTION SITE AT ALL TIMES. IN ADDITION, BMPs SHALL BE INSPECTED PRIOR TO PREDICTED STORM EVENTS AND FOLLOWING STORM EVENTS. BMPs SHALL NOT BE MOVED OR MODIFIED WITHOUT THE APPROVAL OF THE CITY INSPECTOR.
- ALL REMOVABLE PROTECTIVE DEVICES SHOWN SHALL BE IN PLACE AT THE END OF EACH WORKING DAY WHEN THE FIVE-DAY RAIN PROBABILITY FORECAST EXCEEDS 40 PERCENT, AS FORECASTED BY NATIONAL WEATHER SERVICE.
- AFTER A RAIN EVENT EXCEEDING ONE-QUARTER INCH IN ANY 12 HOUR PERIOD, OR UPON DIRECTION OF THE PUBLIC WORKS DIRECTOR, ALL SILT AND DEBRIS SHALL BE REMOVED FROM CHECK DAMS, SILT FENCES, AND DESILTING BASINS; AND THE BASINS SHALL BE PUMPED DRY AND RESTORED TO ORIGINAL DESIGN CONDITION. ANY EROSION CONTROL MEASURES DAMAGED DURING A RAIN EVENT SHALL ALSO BE IMMEDIATELY REPAIRED.
- DESILTING BASINS ARE TO BE CONSTRUCTED AS GRADING OF INDIVIDUAL GRADING AREAS ARE COMPLETE PER ROUGH GRADING PLANS.
- THE CONTRACTORS SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATER CREATES A HAZARDOUS CONDITION.
- AREAS SHALL BE MAINTAINED IN SUCH A STATE THAT FIRE ACCESS SHALL BE MAINTAINED AT ALL TIMES (INCLUDING ACCESS TO NEIGHBORING PROPERTIES).
- GRADED AREAS AROUND THE SITE PERIMETER MUST DRAIN AWAY FROM THE FACE OF SLOPE AT THE CONCLUSION OF EACH WORKING DAY
- TEMPORARY EROSION PROTECTION IS REQUIRED FOR MANUFACTURED SLOPES PRIOR TO PERMANENT PLANTING
- ALL DISTURBED SLOPES SHALL BE PLANTED AND PROTECTED WITHIN 45 DAYS OF THE COMPLETION OF EACH STAGE OF GRADING. SUITABLE MEASURES TO PREVENT SLOPE EROSION INCLUDING, BUT NOT LIMITED TO, RAPID GROWTH VEGETATION SUFFICIENT TO STABILIZE THE SOIL, SHALL BE INSTALLED ON ALL DISTURBED AREAS UNTIL SUCH TIME AS THE PERMANENT VEGETATIVE COVER SUFFICIENTLY MATURES TO PROVIDE PERMANENT STABILITY.
- NO OBSTRUCTION OR DISTURBANCE OF NATURAL DRAINAGE COURSES OR EXISTING STORM DRAIN INLETS SHALL OCCUR DURING GRADING OPERATIONS, UNLESS ADEQUATE TEMPORARY/PERMANENT DRAINAGE FACILITIES HAVE BEEN APPROVED AND INSTALLED TO CARRY SURFACE WATER TO THE NEAREST PARTIAL STREET, STORM DRAIN OR NATURAL WATER COURSE. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST BE MAINTAINED IN A STATE TO ALLOW FOR CONTINUOUS FUNCTION.
- THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN SUCH A WAY IN SUCH A MANNER THAT STORM RUNOFF WILL BE CONTAINED WITHIN THE PROJECT OR CHANNELLED INTO THE STORM DRAIN SYSTEM WHICH SERVES THE RUNOFF AREA. STORM RUNOFF FROM ONE AREA SHALL NOT BE ALLOWED TO DIVERT TO ANOTHER RUNOFF AREA.
- CONFORMANCE WITH THE REQUIREMENTS OF THESE PLANS SHALL IN NO WAY RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITIES TO THIS SITES AND ADJACENT PROPERTIES. DURING GRADING OPERATIONS, TEMPORARY DRAINAGE CONTROL SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE ADJACENT PROPERTIES. TEMPORARY DRAINAGE CONTROL SHALL CONSIST OF, BUT NOT LIMITED TO, CONSTRUCTING SUCH FACILITIES AND TAKING SUCH MEASURES AS ARE NECESSARY TO PREVENT, CONTROL AND ABATE WATER, MUD AND EROSION DAMAGE TO PUBLIC AND PRIVATE PROPERTY AS A RESULT OF THE CONSTRUCTION OF THIS PROJECT.

- FILL AREAS WHILE BEING BROUGHT UP TO GRADE AND DURING PERIODS OF COMPLETION PRIOR TO FINAL GRADE, SHALL BE PROTECTED BY VARIOUS MEASURES TO ELIMINATE EROSION AND THE SILTATION OF DOWNSTREAM FACILITIES AND ADJACENT AREAS. THESE MEASURES MAY INCLUDE, BUT SHALL NOT BE LIMITED TO: TEMPORARY DOWN DRAINS, EITHER IN THE FORM OF PIPES OR PAVED DITCHES TO DESILT RUNOFF; PROTECTION SUCH AS SAND BAGS AROUND INLETS WHICH HAVE NOT BEEN BROUGHT UP TO GRADE; AND EARTH BERMS AND APPROPRIATE GRADING TO DIRECT DRAINAGE AWAY FROM THE EDGE OF THE TOP OF SLOPES SHALL BE CONSTRUCTED AND MAINTAINED ON THOSE FILL AREAS WHERE EARTHWORK OPERATIONS ARE NOT IN PROGRESS.
- CLEARING AND GRUBBING SHOULD BE LIMITED TO AREAS THAT WILL RECEIVE IMMEDIATE GRADING. EROSION CONTROL MEASURES WILL BE REQUIRED TO PROTECT AREAS WHICH HAVE BEEN CLEARED AND GRUBBED PRIOR TO GRADING OPERATION, AND WHICH ARE SUBJECT TO RUNOFF DURING A RAIN EVENT. THESE MEASURES MAY INCLUDE BUT SHALL NOT BE LIMITED TO: GRADED DITCHES; BRUSH BARRIERS AND SILT FENCES. CARE SHALL BE EXERCISED TO PRESERVE VEGETATION BEYOND LIMITS OF GRADING.
- CONSTRUCTION SITES SHALL BE MANAGED TO MINIMIZE THE EXPOSURE TIME OF DISTURBED SOIL AREAS THROUGH PHASING AND SCHEDULING OF GRADING TO THE EXTENT FEASIBLE AND THE USE OF TEMPORARY AND PERMANENT SOIL STABILIZATION
- STOCKPILES OF SOIL SHALL BE PROPERLY CONTAINED TO ELIMINATE OR REDUCE SEDIMENT TRANSPORT FROM THE SITE TO STREETS, DRAINAGE FACILITIES OR ADJACENT PROPERTIES VIA RUNOFF, VEHICLE TRACKING, OR WIND.
- CONSTRUCTION SITES SHALL BE MAINTAINED IN SUCH A CONDITION THAT WIND OR RUNOFF DOES NOT CARRY WASTES OR POLLUTANTS OFF THE SITE TO STREETS, DRAINAGE FACILITIES OR ADJOINING PROPERTIES.
- DISCHARGES OTHER THAN STORM WATER (NON-STORM WATER DISCHARGES) ARE PROHIBITED, EXCEPT AS AUTHORIZED BY AN INDIVIDUAL NPDES PERMIT, THE STATEWIDE GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY, OR OTHER APPLICABLE GENERAL NPDES PERMIT. POTENTIAL POLLUTANTS INCLUDE BUT ARE NOT LIMITED TO: SOLID OR LIQUID CHEMICAL SPILLS; WASTES FROM PAINTS; STAINS SEALANTS; SOLVENTS; DETERGENTS; GLUES; LIME; PESTICIDES; HERBICIDES; FERTILIZERS; WOOD PRESERVATIVES; AND ASBESTOS FIBERS, PAINT FLAKES OR STUCCO FRAGMENTS; FUELS, OILS, LUBRICANTS, AND HYDRAULIC, RADIATOR OR BATTERY FLUIDS; CONCRETE AND RELATED CUTTING OR CURING RESIDUES; FLOATABLE WASTES; WASTES FROM STREET CLEANING; SUPER-CHLORINATED POTABLE WATER FROM LINE FLUSHING AND TESTING; AND RUNOFF FROM EQUIPMENT AND VEHICLE WASHING DURING CONSTRUCTION. DISPOSAL OF SUCH MATERIALS SHOULD OCCUR IN A SPECIFIED AND CONTROLLED TEMPORARY AREA ON SITE PHYSICALLY SEPARATED FROM POTENTIAL STORM WATER RUNOFF, WITH ULTIMATE DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS.
- AT THE END OF EACH DAY OF CONSTRUCTION ACTIVITY ALL CONSTRUCTION DEBRIS AND WASTE MATERIALS SHALL BE COLLECTED AND PROPERLY DISPOSED IN TRASH OR RECYCLE BINS.
- PAVED STREETS, SIDEWALKS AND OTHER IMPROVEMENTS SHALL BE MAINTAINED IN A NEAT AND CLEAN CONDITION, FREE OF LOOSE SOIL, CONSTRUCTION DEBRIS AND TRASH. STREET SWEEPING OR OTHER EQUALLY EFFECTIVE MEANS SHALL BE USED ON A REGULAR BASIS TO CONTROL SILT THAT HAS BEEN DEPOSITED ON STREETS OR SIDEWALKS. WATERING SHALL NOT BE USED TO CLEAN STREETS.
- DISCHARGING CONTAMINATED GROUNDWATER PRODUCED BY DEWATERING GROUNDWATER THAT HAS INFILTRATED INTO THE CONSTRUCTION SITE IS PROHIBITED. DISCHARGING OF CONTAMINATED SOILS VIA SURFACE EROSION IS ALSO PROHIBITED. DISCHARGING NON-CONTAMINATED GROUNDWATER PRODUCED BY DEWATERING ACTIVITIES MAY REQUIRE A NPDES PERMIT FROM SANTA ANA REGIONAL BOARD.
- ALL CONSTRUCTION CONTRACTOR AND SUBCONTRACTOR PERSONNEL ARE TO BE MADE AWARE OF THE REQUIRED BEST MANAGEMENT PRACTICES AND GOOD HOUSEKEEPING MEASURES FOR THE PROJECT SITE AND ANY ASSOCIATED CONSTRUCTION STAGING AREAS.

CONSTRUCTION NOTES & QUANTITIES ESTIMATE

- CONSTRUCT 2 ROWS HIGH GRAVEL BAGS ————— 1250 LF
- CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE PER CITY STD. 225 ————— 2000 SF
- CONSTRUCT WIND EROSION CONTROL FENCE AROUND PERIMETER OF THE PROPERTY ————— 1250 LF



RAINSTORE3 CUT SHEET

Underground "tank" storage for stormwater



PRODUCT DESCRIPTION

Rainstore3 is a structure of thin-walled cylindrical columns injection molded of recycled resins of either high impact polypropylene (HIPP), or high density polyethylene (HDPE) plastic for strength, durability, and green industry benefit. For potable water storage, virgin plastic is used. Cylinders are 10cm (4") diameter, 5mm(0.2") average wall thickness, 10 cm (4") tall, and spaced 16.7 cm (4.6") apart. T-shaped beams connect the cylinders and resist external lateral soil/water pressure. Compression fittings between layers create a rigid structure for ease of transport and installation. Four archway openings in the bottom of each cylinder allow water to move freely throughout assembled columns. A single Rainstore 3 injection molded unit is comprised of 36 cylindrical columns that occupy one square meter (40"x 40"x 4"). A stack of 10 units will comprise one cubic meter (35.31 cubic feet), with approximately 250 gallons of net water storage.

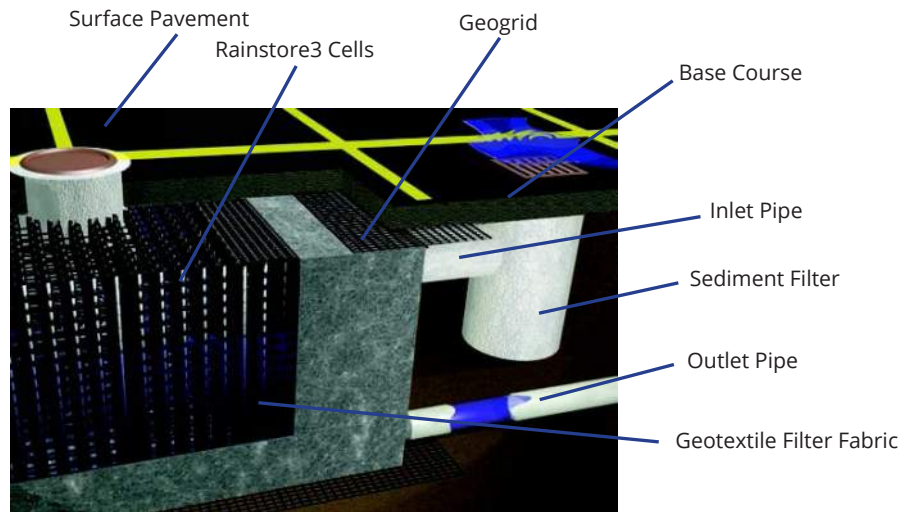
RS3 allows for water containment depths from 10 cm to 2.4 meters (4" to 94" or 7.9'). Standard depths of 0.5 m (1.6'), 1m (3.2'), 1.5m (4.9'), and 2m (6.6') are stocked and custom depths are also available. Side bumpers provide foolproof, accurate spacing. Structures may be moved by hand cart. A level compacted gravel base will insure proper alignment. RS3 withstands repeated freeze-thaw cycles, will not rust, break down, crack, is not affected by chemicals, extremes of pH, oils, salts, or fertilizers. Ethylene plastics have a projected service life in excess of 100 years provided they are not exposed to UV light.

APPLICATIONS INCLUDED

- Subsurface Water Storage--Detention, Retention
- Water Reuse and Recycling
- Process Water Storage--Heating and Cooling
- Combined Water Conveyance and Storage
- Energy Dissipation at Pipe Outfall
- Septic Leach Fields and Wetlands Treatment
- Dry Wells, Wet Vaults, and Cisterns

BENEFITS INCLUDED

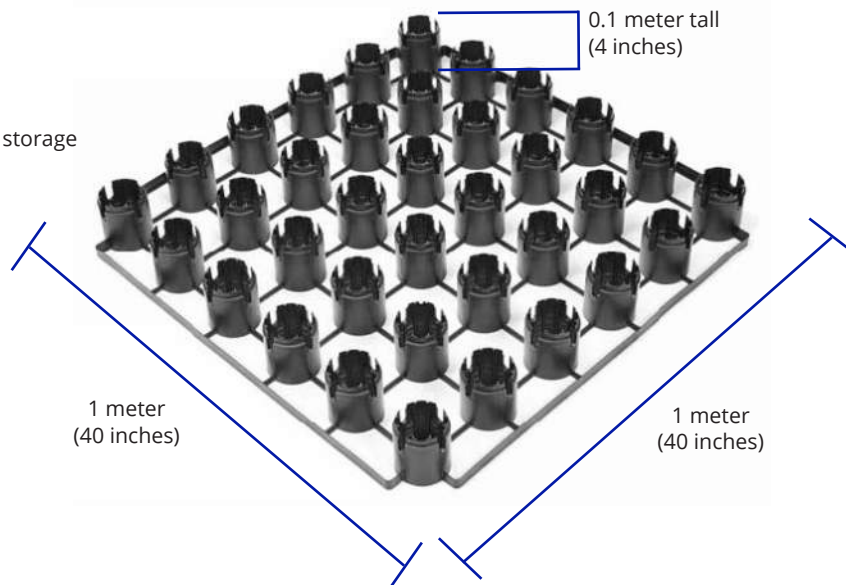
- Heavy Load Capacity Above Chamber
- Maximum Excavation to Storage Efficiency
- 94% Void Space
- Large Surface Area for Rapid Exfiltration
- Simple and Low Cost Liner Materials
- Modular for Design Flexibility
- Rapid Installation



ONE UNIT

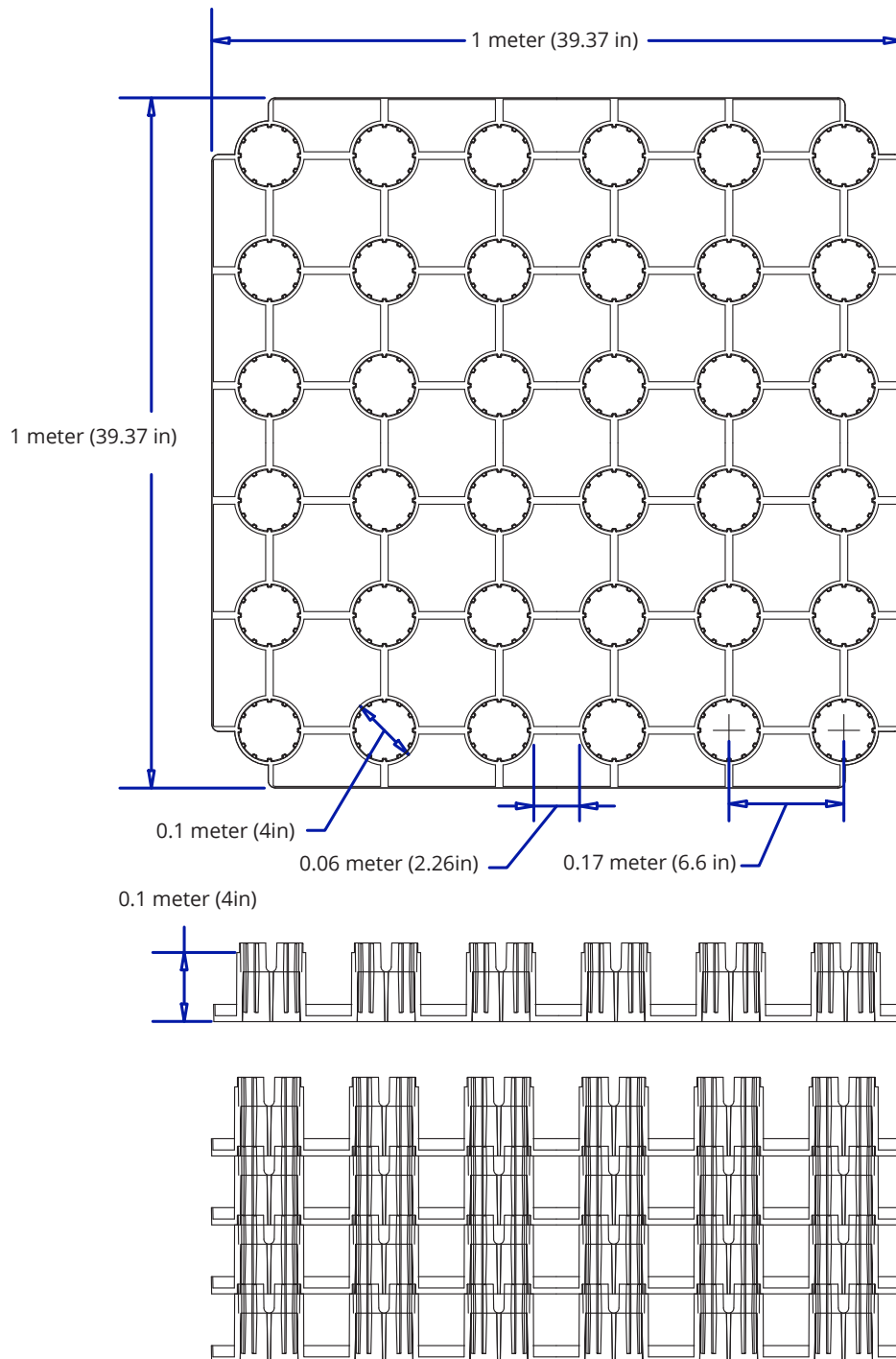
Volume = 0.1 cubic meter
(3.531 cubic feet)
25 gallons of net water storage

Weight = 14.0 lbs (30.87 kg)



RAINSTORE3 UNIT DETAIL

Single Rainstore3 Injection Molded Unit - Geometry and Dimensions



Not to Scale

RAINSTORE3 TECHNICAL SPECIFICATION DETENTION



Section 33 49 23.13 Underground Storm Drainage Water Retention Tanks
(Formerly 02630 Storm Drainage Containment & Reuse)

PART 1 - GENERAL

1.1 - GENERAL PROVISIONS

A. The Conditions of the Contract and all Sections of Division 1 are hereby made a part of this Section.

1.2 - DESCRIPTION OF WORK

A. Work Included:

1. Provide excavation and base preparation per Geotechnical Engineer's recommendations and/or as shown on drawings, to provide adequate support for project designs loads and safety from excavation sidewall collapse. See 2.2 Materials.
2. Provide Rainstore3 system products including Rainstore3 units, geomembranes, geotextiles, geogrids, inlet and outlet pipe with connections and installation per the manufacturer's instructions furnished under this section.

B. Related Work:

1. Subgrade excavation preparation under Section 31 20 00 Earth Moving (02300 - Earthwork).
2. Utilities and subsurface drainage - Section 33 40 00 Storm Drainage Utilites (02700 - Subsurface Drainage and Structures), as needed.

1.3 - QUALITY ASSURANCE

A. Follow Section 01 33 23 Shop Drawings, Product Data, and Samples (01340 Shop Drawings, Product Data, and Samples) requirements.

B. Installation: Performed only by skilled work people with satisfactory record of performance on pipe, chamber, or pond/landfill construction projects of comparable size and quality.

1.4 - SUBMITALS

A. Submit manufacturer's product data and installation instructions.

B. Submit a 20 in x 20 in section of Rainstore3 product for review. Reviewed and accepted samples will be returned to the Contractor.

C. Submit material certificates for geomembrane, geotextile, geogrid, base course and backfill materials.

1.5 - DELIVERY, STORAGE AND HANDLING

A. Protect Rainstore3 cells from damage during delivery and store under tarp to protect from sunlight when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.

B. Handling is to be performed with equipment appropriate to the size (height) of cells and site conditions, and may include, hand, handcart, forklifts, extension lifts, small cranes, etc., with care given to minimize damage to spacer bars and surrounding cells.

1.5 - PROJECT CONDITIONS

A. Review installation procedures and coordinate Rainstore3 work with other work affected, such as grading, excavation, utilities, construction access, erosion control to prevent all non-installation related construction traffic over the completed Rainstore3 installation, especially with loads greater than design loads.

B. Cold weather:

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen work or wet, saturated or muddy subgrade.
3. Care must be taken when handling geomembrane liner and Rainstore3 cells when air temperature is at 40 degrees or below as plastic becomes brittle.

C. Protect partially completed Rainstore3 installation against damage from other construction traffic when work is in progress, and following completion of backfill, with highly visible construction tape, fencing, or other means until construction is complete.

D. Protect adjacent work from damage during Rainstore3 installation.

PART 2 - PRODUCTS

2.1 - AVAILABILITY

A. Acceptable Manufacturer: Invisible Structures, Inc., which is located at: 3510 Himalaya Rd. Suite 200; Aurora, CO 80011; Tel: 303-233-8383; Web: www.invisiblestructures.com.

B. Substitutions: Not permitted.

2.2 - MATERIALS

- A. Base of Excavation: Shall be smooth soil, level and free of lumps or debris. Compact to at least 90% or as required by Engineer. Structural fill material may be used to amend the structural capacity of the soil, and should be placed on top of the geogrid layer if needed. Materials that can not be stabilized by compaction, such as sand and/or drainage rock, should be avoided.
- B. Geogrid: Use geogrid product, such as Tensar BX1200, or equal, to overlay the excavation floor, the assembled cells, and above the completed liner, extending at least twice the width of side backfill, with geogrid joints overlapped by at least 12".
- C. Geotextile: Shall be non-woven PP or PET with a weight of at least 8 oz per square yard, appropriate for the soil type and depth conditions, placed in two layers sandwiching the geomembrane on the floor of the excavation, the sides of the chamber, and chamber top.
- D. Rainstore3 Cells: Injection molded plastic units (layers) 1x1x0.1 m (Approximately 40"x40"x4"), (0.1 m³ each) assembled into vertical columnar cell structures of variable height (custom for each project) with each layer consisting of hollow rings rising from a strong open grid Unit weight = 6.4 kg (14.2 lb.), volume = 6% solid. DO NOT cut Rainstore3 Cells – Cells must be installed whole. Cutting of Rainstore3 is only permitted for installation of maintenance ports. DO NOT disassemble, reassemble, or reconfigure the height (stacks) of Rain store3. Stacks must be assembled at Invisible Structures manufacturing facility.
- E. Side Backfill: Structural fill free from lumps and debris or any other sharp materials to backfill along the sides of the cellular structure, taking care to compact with powered mechanical compactor, in lifts that do not exceed 12", to provide a settlement free-surface over the top and sides of the structure. Fill material should NOT consist of high percentage of clay or silt materials. Fill material should increase in shear strength when compacted; thus, no drain rock or pure open-graded rock allowed.
- F. Top Backfill: Use 12" minimum to 36" maximum depth of 3/4" minus sandy/gravel roadbase material (with fines less than 3%). If backfill mixture must be custom mixed, use a ratio of 2 parts clean 3/4" drainage rock to 1 part clean sharp sand.
- G. Utility Marker: Use metallic tape at corners of install to mark the area for future utility detection.

PART 3 - EXECUTION

3.1 - INSPECTION

- A. Examine prepared excavation and conditions for smoothness, compaction and level. Do not start Rainstore3 installation until unsatisfactory conditions are corrected. Check for presence of seasonal high water table, which must be kept at levels 3 feet below the bottom of the Rainstore3 structure at all times. Different municipalities have different regulations regarding the required distance between the bottom of an underground infiltration structure and the top of the seasonal high water table. Please check with your local regulations to ensure compliance.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Project Manager for resolution.

3.2 - PREPARATION

- A. Place geogrid over prepared grade, with any joints overlapped by a minimum of 12", extending over the entire excavation bottom.
- B. Place the geotextile fabric on the geogrid, extending the excess portion of the rolls up the sides of the excavated area. Overlap the geotextile joints 12" or per manufacturer's recommendations.
- C. It is helpful to identify the outline of the Rainstore3 cell placement on the fabric, using spray paint or chalk line, to ensure squareness.
- D. The geotextile fabric will later be brought up and encompass all sides and the top of the Rainstore3 units.

3.3 - INSTALLATION

- A. Install Rainstore3 cells by placing side by side, with grid side down. Try to place sides of cells without damaged bumpers along outside of structure to resist backfill forces against fabric and liner materials. DO NOT cut Rainstore3 Cells – Cells must be installed whole. Cutting of Rainstore3 is only permitted for installation of maintenance ports. DO NOT disassemble, reassemble, or reconfigure the height (stacks) of Rainstore3. Place metallic tape on top corners of install to mark the area for future utility detection. Place a layer of geogrid directly over the top of the cells to bridge columns and joints and provide a secure walking surface. Place geotextile fabric layer over the top and sides to prevent soil entry into the chamber. Take great care to avoid damage to fabric liner material during placement.
- B. After placement of Rainstore3 cells, bring liner material up the sides and over the top of the structure, overlapping or sealing joints per manufacturers recommendations. Fold excess fabric at corners to lay flat against sides of structure, securing folds and seams with staples or similar methods.
- C. Identify locations of inlet, outlet, inspection ports, and any other penetrations of the liner, securing pipe into prefabricated boots with stainless steel pipe clamps. Support pipe in trenches and during backfill operations to prevent damage to liner or pipe.
- D. With chambers greater than 1.2 meters (4 feet) deep, place piles of cover material over closed chamber top surface along the edge of the chamber to provide vertical load on perimeter cells. This will ensure compression of the columns and aid in resistance to side pressures from backfill operations.
- E. Use a powered mechanical compactor to conduct backfill operations on structure sides with care to avoid damage to liner while providing required compaction forces to the top level of the structure.
- F. Place a geogrid layer over the top of the structure, extending beyond the outside edge of the excavation by at least 40". Any joints must be overlapped by a minimum of 12".
- G. Place sufficient sandy gravel backfill material over geogrid to ensure support of design loads. Place cover backfill in 6" lifts and compact with vibrating plates or walk-behind rollers (do not use drivable rolling compactors) to a minimum of 95%, with a minimum depth of 12" and a maximum depth of 36". Take care to place backfill on top of structure and avoid damage to structure or liner, using low pressure tire or track vehicles.

- H. Ensure that all non-chamber construction traffic be kept away from the limits of excavation until the project is complete and final surface materials are in place.
- I. Place surfacing materials, such as groundcovers (no shrubs or trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.
- J. Any slopes creating additional overburden above the Rainstore3 system should be carefully located. The toe of said slope should be 10' away from the closest edge of the Rainstore3 system. This will prevent any additional earth pressure on the Rainstore3 system.

3.4 - MAINTANANCE

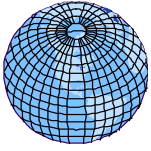
- A. . Perform cleaning during the installation of work and upon completion of the Work. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

END OF SECTION



Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data



GLOBAL GEO-ENGINEERING, INC.

September 7, 2023
Project 7862-04

Sondh Venture Inc.
11768 Foothill Boulevard
Rancho Cucamonga, California 91730

Attention: Mr. Jaswinder Singh Sondh

Subject: Geotechnical Investigation Report Update
Proposed Developments – *Gas Station and a Convenience Store*
Northwest Corner of Pennsylvania Avenue and I-10 Freeway
Beaumont, California

- References:
- a) Global Geo-Engineering, Inc. – *Infiltration Rate, Proposed Developments – Gas Station and a Convenience Store, Northwest Corner of Pennsylvania Avenue and I-10 Freeway, Beaumont, California* Project 7862-06 dated September 11 2018;
 - b) Global Geo-Engineering, Inc. - *Geotechnical Investigation Report Update, Proposed Developments – Gas Station and a Convenience Store, Northwest Corner of Pennsylvania Avenue and I-10 Freeway, Beaumont, California* Project 7862-04 dated September 21, 2018.
-

Dear Mr. Sondh:

- a) This letter provides an update to the referenced geotechnical investigation report dated September 21, 2018.
- b) We understand that the surface conditions have not changed significantly since the referenced report was prepared.
- c) We reviewed the *Proposed Site Plan, Sheet Number AS-1.0* prepared by Karaki Western State Engineering dated September 23, 2021. The proposed improvements are same as before and will include:
 - i) a 3,400-ft² Convenience store with an attached 1,292 ft² Quick Serve Restaurant;
 - ii) a 3,504 ft² Canopy;
 - iii) a 2,295 ft² carwash;
 - v) associated parking and driveway pavement.

- d) However, the store, restaurant and the canopy have been re-oriented. The site plan is attached.
- e) The recommendations provided in the referenced report s remain applicable. Copies of the report are enclosed in *Appendix A* and *B*.
- f) Additional recommendations are provided below.
- g) For seismic analysis of the proposed project in accordance with the ASCE 7-16 Standard, we recommend the following:

| ITEM | VALUE |
|--|-----------|
| Site Longitude (Decimal-degrees) | -116.9664 |
| Site Latitude (Decimal-degrees) | 33.9280 |
| Site Class | D |
| Seismic Risk Category | II |
| Site Modified Peak Ground Acceleration, PGA_M | 0.831 |
| Mapped Spectral Response Acceleration-Short Period (0.2 Sec) - S_s | 1.856 |
| Mapped Spectral Response Acceleration-1 Second Period – S_1 | 0.633 |
| Short Period Site Coefficient- F_a | 1.0 |
| Long Period Site Coefficient F_v | 1.7 |
| Adjusted Spectral Response Acceleration @ 0.2 Sec. Period (S_{ms}) | 1.856 |
| Adjusted Spectral Response Acceleration @ 1Sec.Period (S_{m1}) | 1.076 |
| Design Spectral Response Acceleration @ 0.2 Sec. Period (S_{Ds}) | 1.238 |
| Design Spectral Response Acceleration @ 1-Sec. Period (S_{D1}) | 0.717 |

The opportunity to be of service is sincerely appreciated. If you have any questions or if we can be of further assistance, please call.

Very truly yours,

GLOBAL GEO-ENGINEERING, INC.

Mohan B. Upasani
 Principal Geotechnical Engineer
 RGE 2301
 (Exp. March 31, 2025)



Kevin B. Young
 Principal Engineering Geologist
 CEG 2253
 (Exp. October 31, 2023)



MBU:mbu

Sondh Venture Inc.
September 7, 2023
Project 7862-04
Page 3

Enclosures:

Terms and Conditions

Proposed Site Plan

Global Geo-Engineering, Inc. Report 7862-04 dated September 11, 2018

Global Geo-Engineering, Inc. Report 7862-04 dated September 21, 2018

- Sheet AS-1.0

- Appendix A

- Appendix B

TERMS AND CONDITIONS

Consultant shall serve Client by providing professional counsel and technical advice regarding subsurface conditions consistent with the scope of services agreed-to between the parties. Consultant will use his professional judgment and will perform his services using that degree of care and skill ordinarily exercised under similar circumstances, by reputable foundation engineers and/or engineering geologists practicing in this or similar localities.

- In assisting Client, the Consultant may include or rely on information and drawings prepared by others for the purpose of clarification, reference or bidding; however, by including the same, the Consultant assumes no responsibility for the information shown thereon and Client agrees that Consultant is not responsible for any defects in its services that result from reliance on the information and drawings prepared by others. Consultant shall not be liable for any incorrect advice; judgment or decision based on any inaccurate information furnished by the Client or any third party, and Client will indemnify Consultant against claims, demands, or liability arising out of, or contribute to, by such information.
- Unless otherwise negotiated in writing, Client agrees to limit any and all liability, claim for damages, cost of defense, or expenses to be levied against Consultant on account of design defect, error, omission, or professional negligence to a sum **not to exceed ten thousand dollars or charged fees whichever is less**. Further, Client agrees to notify any construction contractor or subcontractor who may perform work in connection with any design, report, or study prepared by Consultant of such limitation of liability for design defects, errors, omissions, or professional negligence, and require as a condition precedent to their performing the work a like limitation of liability on their part as against the Consultant. In the event the Client fails to obtain a like limitation of liability provision as to design defects, errors, omissions or professional negligence, any liability of the Client and Consultant to such contractor or subcontractor arising out of a negligence shall be allocated between Client and Consultant in such a manner that the aggregate liability of Consultant for such design defects to all parties, including the Client shall **not exceed ten thousand dollars or charged fees whichever is less**. No warranty, expressed or implied of merchantability or fitness, is made or intended in connection with the work to be performed by Consultant or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings made by Consultant.
- The Client agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless the Consultant, its officers, directors, employees, agents and subconsultants from and against all claims, damages, liabilities or costs, including reasonable attorney's fees and defense costs, of any nature whatsoever arising from or in connection with the Project to the extent that said claims, damages, liabilities or costs arise out of the work, services, or conduct of Client or Client's contractors, subconsultants, or other third party not under Consultant's control. Client further agrees that the duty to defend set forth herein arises immediately and is not contingent on a finding of fault against Client or Client's contractors, subconsultants, or other third parties. Client shall not be obligated under this provision to indemnify Consultant for Consultant's sole negligence or willful misconduct.
- Client shall grant free access to the site for all necessary equipment and personnel and Client shall notify any and all possessors of the project site that Client has granted Consultant free access to the project site at no charge to Consultant unless expressly agreed to otherwise in writing.
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- Client and Consultant agree to waive claims against each other for consequential damages arising out of or relating to this agreement. Neither party to this agreement shall assign the contract without the express, written consent of the other party.
- Consultant agrees to cover all open test holes and place a cover to carry a 200-pound load on each hole prior to leaving project site unattended. Consultant agrees that all test holes will be backfilled upon completion of the job. However, Client may request test holes to remain open after completion of Consultants work. In the event Client agrees to pay for all costs associated with covering and backfilling said test holes at a later date, and Client shall indemnify, defend and hold harmless Consultant for all claims, demands and liabilities arising from his request, except for the sole negligence of the Consultant, to the extent permitted by law.
- Consultant shall not be responsible for the general safety on the job or for the work of Client, other contractors and third parties.
- Consultant shall be excused for any delay in completion of the contract caused by acts of God, acts of the Client or Client's agent and/or contractors, inclement weather, labor trouble, acts of public utilities, public bodies, or inspectors, extra work, failure of Client to make payments promptly, or other contingencies unforeseen by Consultant and beyond reasonable control of the Consultant.
- In the event that either party desires to terminate this contract prior to completion of the project, written notification of such intention to terminate must be tendered to the other party. In the event Client notifies Consultant of such intention to terminate Consultant's services prior to completion of the contract, Consultant reserves the right to complete such analysis and records as are necessary to place files in order, to dispose of samples, put equipment in order, and (where considered necessary to protect his professional reputation) to complete a report on the work performed to date. In the event that Consultant incurs cost in Client's termination of this Agreement, a termination charge to cover such cost shall be paid by Client.
- If the Client is a corporation, the individual or individuals who sign or initial this Contract, on behalf of the Client, guarantee that Client will perform its duties under this Contract. The individual or individuals so signing or initialing this Contract warrant that they are duly authorized agents of the Client.
- Any notice required or permitted under this Contract may be given by ordinary mail at the address contained in this Contract, but such address may be changed by written notice given by one party to the other from time to time. Notice shall be deemed received in the ordinary course of the mail. This agreement shall be deemed to have been entered into the County of Orange, State of California.

LIMITATIONS

Our findings, interpretations, analyses, and recommendations are professional opinions, prepared and presented in accordance with generally accepted professional practices and are based on observation, laboratory data and our professional experience. Consultant does not assume responsibility for the proper execution of the work by others by undertaking the services being provided to Client under this agreement and shall in no way be responsible for the deficiencies or defects in the work performed by others not under Consultant's direct control. No other warranty herein is expressed or implied.

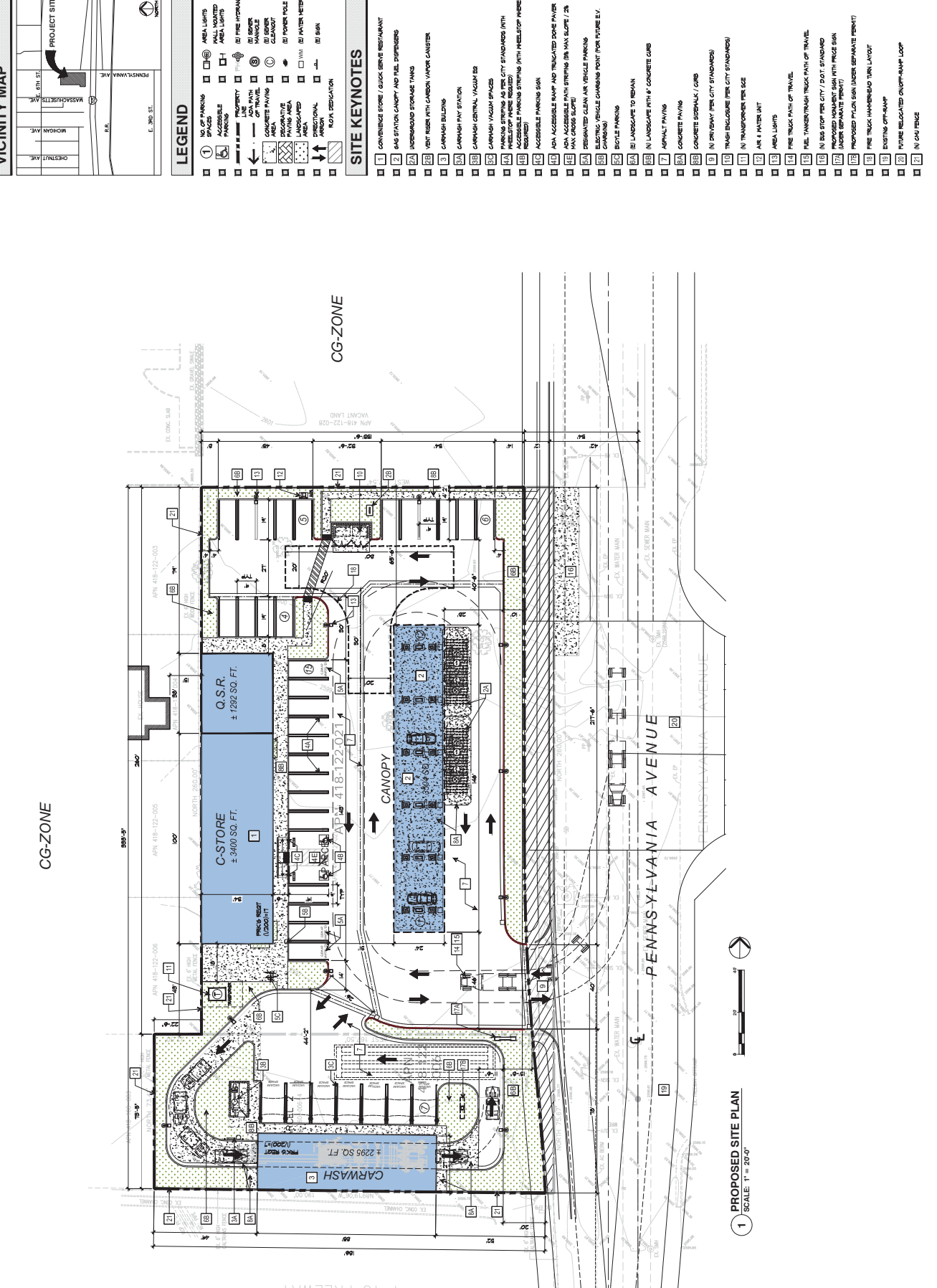


EXHIBIT 2. SITE PLAN

Project 7862-04

Appendix A

Global Geo-Engineering, Inc.

Infiltration Rate Report dated September 11, 2018



GLOBAL GEO-ENGINEERING, INC.

September 11, 2018
Project 7862-06

Sondh Venture Inc.
11768 Fothill Boulevard
Rancho Cucamonga, California 91730

Attention: Mr. Jaswinder Singh Sondh

Subject: Infiltration Rate
Proposed Developments – *Gas Station and Convenience Store*
Northwest Corner of Pennsylvania Avenue and I-10 Freeway
Beaumont, California

Dear Mr. Sondh:

1. INTRODUCTION

- a) As requested, we have conducted an infiltration test for the proposed on-site storm water disposal system to be constructed at the above referenced site located in city of Beaumont, California.
- b) An approximate location is shown on the *Location Map, Figure 1*.
- c) The purpose of our study was to determine the infiltration rate for the proposed on-site storm water disposal system.

2. FIELD EXPLORATION

- a) During the recent geotechnical investigation, we drilled three borings with depths ranging from 20 feet to 30 feet for purpose of geotechnical investigation along with two 8-inch diameter borings for percolation test to determine infiltration rate. Percolation boring P-1 was drilled in the southeast area of the site where as P-2 was drilled on the east side, along Pennsylvania Avenue.
- b) The borings were drilled using a truck mounted hollow stem auger drill rig. No Seepage or groundwater was noted to exist in any of the boreholes. *Logs of Borings* are enclosed as *Figures 2 through 6*. The locations of the borings are shown on the *Boring Location Plan, Figure 7*.

10-01-2018 C:\Program Files (x86)\mtech\2014\temp\Boring Logs 2002 Editon\7862-04 - Sondh, Beaumont B-1 bor










| Global Geo-Engineering, Inc. Irvine, California Geologists and Geotechnical Engineers | | | | | | | LOG OF BORING B-1 | | | Drilling Method : Hollow Stem Sampling Method : California Modified Hammer Weight (lbs) : 140 Hammer Drop (in) : 30 | | |
|---|---|-----------------------------|---------------------------|------------|---------------------|-------------|---|---------|--|--|--|---|
| Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California | | | | | | | Date : August 29, 2018 Logged By : KBY Drilling Company : Cal Pac Drilling Rig : Mobile B-53 | | | | | |
| Project 7862-06 | | | | | | | | | | | | |
| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | | Water Levels | |
| | | | | | | | | |  Ring |  Bulk |  Standard Penetration Testing |  Groundwater Encountered |
| | | | | | | | | | DESCRIPTION | | | |
| 0 |  | | | | | | | | | Silty SAND: fine grained, orange to dark yellow brown, slightly moist, medium dense, porous with Sandy SILT interbeds | | |
| 5 |  | 4.9 | 101.0 | 26 | | | | | | @5' dark orange brown, slightly porous | | |
| 10 |  | 9.6 | 113.6 | 38 | | | SM/ML | | | @9' orange to yellow brown | | |
| 15 |  | 8.4 | 114.1 | 38 | | | | | | @14' medium dense to dense, slightly gravelly | | |
| 20 |  | 9.0 | 108.7 | 57 | | | | | | @19' yellow brown, more Silty | | |
| | | 4.5 | 107.8 | 41 | | | | | | ALLUVIAL FAN DEPOSITS | | |
| | | | | | | | | | | Bottom of Boring at 20 feet: | | |
| | | | | | | | | | | Notes: 1. Caving to 13 feet after augers were removed 2. No groundwater or seepage encountered 3. Boring backfilled | | |
| 25 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |

Figure 2

10-01-2018 C:\Program Files (x86)\ytech\2014\Temp\Boring Logs 2002 Editon\7862-04 - Sondh, Beaumont B-2.bor

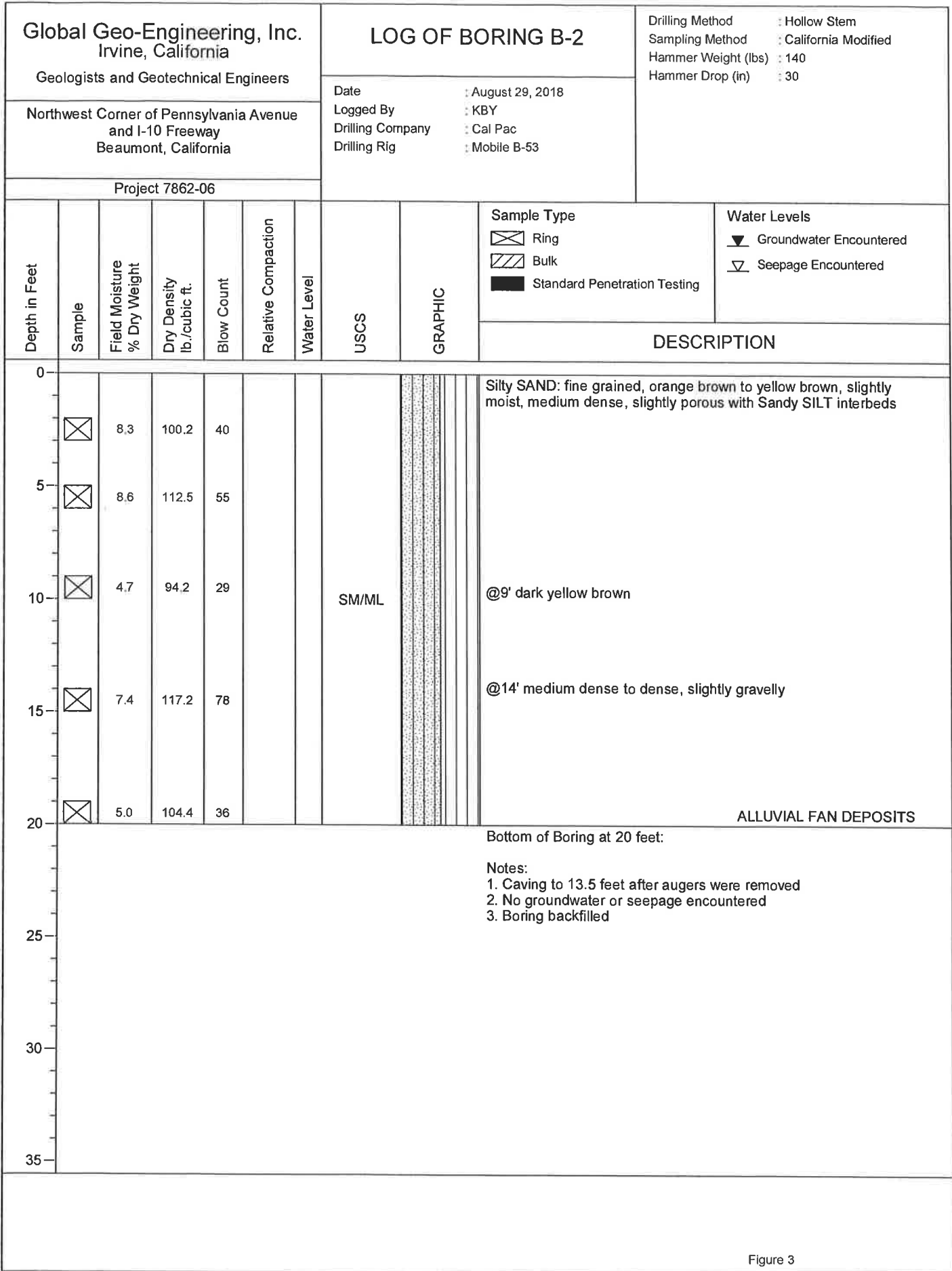


Figure 3

Global Geo-Engineering, Inc.
Irvine, California

Geologists and Geotechnical Engineers













Northwest Corner of Pennsylvania Avenue
and I-10 Freeway
Beaumont, California

LOG OF BORING B-3

Date : August 29, 2018
Logged By : KBY
Drilling Company : Cal Pac
Drilling Rig : Mobile B-53

Drilling Method : Hollow Stem
Sampling Method : California Modified
Hammer Weight (lbs) : 140
Hammer Drop (in) : 30

Project 7862-06

| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | Water Levels | DESCRIPTION |
|--|---|-----------------------------|---------------------------|------------|---------------------|-------------|-------|---------|--|--|---|
| | | | | | | | | |  Ring  Bulk  Standard Penetration Testing |  Groundwater Encountered  Seepage Encountered | |
| 0 |  | 12.5 | 114.0 | 27 | | | | | | | Silty SAND: fine grained, orange brown, moist, medium dense, slightly porous with Sandy SILT interbeds, slight CLAY content |
| 5 |  | 9.6 | 112.6 | 27 | | | | | | | |
| 10 |  | 13.1 | 116.4 | 24 | | | | | | | @9' orange brown |
| 15 |  | 9.4 | 113.5 | 27 | | | SM/ML | | | | @14' slightly gravelly |
| 20 |  | 13.9 | 111.7 | 21 | | | | | | | |
| 25 |  | 15.7 | 115.3 | 24 | | | | | | | @24' more Silty, dark orange brown |
| 30 |  | 12.4 | 113.9 | 30 | | | | | | | @29' less Silty, fine to medium grained, yellow brown ALLUVIAL FAN DEPOSITS |
| Bottom of Boring at 30 feet: | | | | | | | | | | | |
| Notes: 1. Caving to 24 feet after augers were removed 2. No groundwater or seepage encountered 3. Boring backfilled | | | | | | | | | | | |
| 35 | | | | | | | | | | | |

10-01-2018 C:\Program Files (x86)\mtech\2014\temp\Boring Logs 2002 Editon\7862-04 - Sondh, Beaumont B-3 bor

Figure 4

Global Geo-Engineering, Inc.
Irvine, California

Geologists and Geotechnical Engineers

Northwest Corner of Pennsylvania Avenue
and I-10 Freeway
Beaumont, California

LOG OF BORING P-1

Date : August 29, 2018
 Logged By : KBY
 Drilling Company : Cal Pac
 Drilling Rig : Mobile B-53

Drilling Method : Hollow Stem
 Sampling Method : California Modified
 Hammer Weight (lbs) : 140
 Hammer Drop (in) : 30

Project 7862-06

| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | Water Levels | DESCRIPTION |
|---------------|--------|-----------------------------|---------------------------|------------|---------------------|-------------|------|---------|---|--|---|
| | | | | | | | | | <input type="checkbox"/> Ring <input type="checkbox"/> Bulk <input type="checkbox"/> Standard Penetration Testing | <input type="checkbox"/> Groundwater Encountered <input type="checkbox"/> Seepage Encountered | |
| 0 | | | | | | | SM | | | | Silty SAND: fine grained, orange brown, moist, medium dense with Sandy SILT interbeds |
| 5 | | | | | | | | | | | ALLUVIAL FAN DEPOSITS |
| | | | | | | | | | | | Bottom of Boring at 5 feet: Notes: 1. No groundwater or seepage encountered 2. Perforated pipe and gravel installed for future percolation testing |
| 10 | | | | | | | | | | | |

10-01-2018 C:\Program Files (x86)\mtech\2014\temp\Boring Logs 2002 Edition\7862-04 - Sondh, Beaumont P-1.bor

Figure 5

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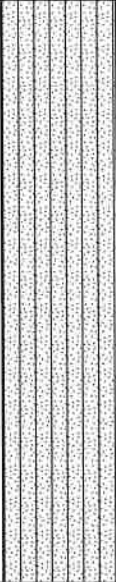
| Global Geo-Engineering, Inc. Irvine, California Geologists and Geotechnical Engineers | | | | | | | LOG OF BORING P-2 | | | Drilling Method : Hollow Stem Sampling Method : California Modified Hammer Weight (lbs) : 140 Hammer Drop (in) : 30 | | |
|---|--|--------------------------------|------------------------------|------------|---------------------|-------------|---|--|--|--|--|--|
| Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California | | | | | | | Date : August 29, 2018 Logged By : KBY Drilling Company : Cal Pac Drilling Rig : Mobile B-53 | | | | | |
| Project 7862-06 | | | | | | | | | | | | |
| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type ☒ Ring ☑ Bulk ■ Standard Penetration Testing | | Water Levels ▼ Groundwater Encountered ▽ Seepage Encountered | |
| | | | | | | | | | DESCRIPTION | | | |
| 0 | | | | | | | SM |  | Silty SAND: fine grained, orange brown to yellow brown, slightly moist, medium dense with Sandy SILT interbeds | | | |
| 5 | ALLUVIAL FAN DEPOSITS Bottom of Boring at 5 feet: Notes: 1. No groundwater or seepage encountered 2. Perforated pipe and gravel installed for future percolation testing | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |

Figure 6

- c) All the borings encountered Silty SAND alluvium soils.

3. PERCOLATION STUDY

- a) The percolation study was conducted in both the borings.
- b) The borings were thoroughly pre-soaked for a period of 24 hours. The percolation testing was conducted on the next day following the pre-soak. From a fixed reference point, the drop in the water level was measured in 60-minute intervals for a period of just over, six hours for all the borings, refilling after every reading. The results of the field percolation tests are provided in *Figure 8 and 9*. Before the testing started the Boring P-1 had 30 inches of water left from the pre-soak and the Boring P-2 had 10 inches of water left from the pre-soak.
- c) The drops in the water during the last reading period of 60 minutes and the corresponding percolation rates were:

| Boring No. | Date | Drop (Inches) | Percolation Rate (min/inch) |
|------------|-----------------|---------------|-----------------------------|
| P-1 | August 30, 2018 | 1.75 | 34.3 |
| P-2 | August 30, 2018 | 7 | 8.6 |

- d) In accordance with *Riverside County – Low Impact Development BMP Design Handbook*, Page 20 (see attached), we used *Porchet* method to calculate the infiltration rate. The rates are shown below:

| Boring No. | Percolation Rate (inch/hour) |
|------------|------------------------------|
| P-1 | 0.05 |
| P-2 | 0.24 |

- e) These rates are calculated using a factor of safety of 1.0. Appropriate factor of safety should be utilized while designing the basin.

Field Percolation Test

| | |
|---------------|-----|
| Test Hole No: | P-1 |
|---------------|-----|

| | |
|-------------------------------|-----------|
| Depth of Test Hole (D_T): | 66 inches |
| Diameter of Test Hole: | 8 inches |
| Presoak Date: | 8/29/2018 |
| Water Level after Presoak: | 30 inches |
| Test Date: | 8/30/2018 |
| Tested by: | ERV |

| Trial No. | ΔT | D_o | D_f | ΔD | Percolation Rate (min/in.) |
|-----------|-------------------------|---------------------------------|-------------------------------|-----------------------------|-------------------------------|
| | Time Interval (min.) | Initial Depth to Water (in.) | Final Depth to Water (in.) | Change in Water Level (in.) | |
| 1 | 60 | 0 | 3 | 3 | 20 |
| 2 | 60 | 0 | 2.5 | 2.5 | 24 |
| 3 | 60 | 0 | 2 | 2 | 30 |
| 4 | 60 | 0 | 2 | 2 | 30 |
| 5 | 60 | 0 | 1.75 | 1.75 | 34.29 |
| 6 | 60 | 0 | 1.75 | 1.75 | 34.29 |

*Note = D_o and D_f measured from the top of the ground surface

| | |
|---|------------|
| Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California | |
| Date: September 2018 | Figure No: |
| Project No: 7862-06 | 8 |

Field Percolation Test

| | |
|---------------|-----|
| Test Hole No: | P-2 |
|---------------|-----|

| | |
|-------------------------------|-----------|
| Depth of Test Hole (D_T): | 60 inches |
| Diameter of Test Hole: | 8 inches |
| Presoak Date: | 8/29/2018 |
| Water Level after Presoak: | 10 inches |
| Test Date: | 8/30/2018 |
| Tested by: | ERV |

| Trial No. | ΔT | D_o | D_f | ΔD | Percolation Rate (min/in.) |
|-----------|----------------------|------------------------------|----------------------------|-----------------------------|----------------------------|
| | Time Interval (min.) | Initial Depth to Water (in.) | Final Depth to Water (in.) | Change in Water Level (in.) | |
| 1 | 60 | 0 | 8 | 8 | 7.5 |
| 2 | 60 | 0 | 8 | 8 | 7.5 |
| 3 | 60 | 0 | 7.5 | 7.5 | 8 |
| 4 | 60 | 0 | 7.25 | 7.25 | 8.28 |
| 5 | 60 | 0 | 7 | 7 | 8.57 |
| 6 | 60 | 0 | 7 | 7 | 8.57 |

*Note = D_o and D_f measured from the top of the ground surface

| | |
|---|--|
| Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California | |
|---|--|

| | |
|----------------------|------------|
| Date: September 2018 | Figure No: |
| Project No: 7862-06 | 9 |

2.3 - Percolation Tests

The *percolation test* is widely used for assessing the suitability of a soil for onsite wastewater disposal. Depending on the required depth of testing, there are two versions of the percolation test. For shallow depth testing (less than 10 feet), the procedure would be as shown in Figure 8 (Photo 6). For deep testing (10 feet to 40 feet), the procedure is as shown in Figure 9. For deep testing, special care must be taken to ensure that caving of the sidewalls does not occur.

This test measures the length of time required for a quantity of water to infiltrate into the soil and is often called a “percolation rate”. It should be noted that the percolation rate is related to, but not equal to, the infiltration rate. While an infiltration rate is a measure of the speed at which water progresses downward into the soil, the percolation rate measures not only the downward progression but the lateral progression through the soil as well. This reflects the fact that the surface area for infiltration testing would include only the horizontal surface while the percolation test includes both the bottom surface area and the sidewalls of the test hole. However, there is a relationship between the values obtained by a percolation test and infiltration rate. Based on the ¹“Porchet Method”, the following equation may be used to convert percolation rates to the tested infiltration rate, I_t :

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

Where:

- I_t = tested infiltration rate, inches/hour
- ΔH = change in head over the time interval, inches
- Δt = time interval, minutes
- * r = effective radius of test hole
- H_{avg} = average head over the time interval, inches

An example of this procedure is provided on Page 26 based data form Table 5, *Sample Percolation Test Data*. Figure 11 provides a plot of the converted percolation test data.

*Where a rectangular test hole is used, an equivalent radius should be determined based on the actual area of the rectangular test hole. (i.e., $r = (A/\pi)^{0.5}$)

Note to the designer: The values obtained using this method may vary from those obtained from methods considered to be more accurate. The designer is encouraged to explore the derivation of these equations (Ritzema; Smedema)

Final Report - Ultimately, as discussed in Section 1.7, a final report shall be provided and, based on the test results, an infiltration rate shall be recommended.

¹H.P. Ritzema, “Drainage Principles and Applications,” International Institute for Land Reclamation and Improvement (ILRI), Publication 16, 2nd revised edition, 1994, Wageningen, The Netherlands.

Sondh Venture Inc.
September 11, 2018
Project 7862-06
Page 3

The opportunity to be of service is sincerely appreciated. If you have any questions or if we can be of further assistance, please call.

Very truly yours,

GLOBAL GEO-ENGINEERING, INC.



Mohan B. Upasani
Principal Geotechnical Engineer
RGE 2301
(Exp. March 31, 2019)



Enclosures:

| | |
|--|-----------------------|
| Location Map | - Figure 1 |
| Logs of Borings | - Figures 2 through 6 |
| Boring Location Plan | - Figure 7 |
| Field Percolation Test Data | - Figures 8 and 9 |
| Riverside County – Low Impact Development BMP Design Handbook, Page 20 | |
| Terms and Conditions | |

TERMS AND CONDITIONS OF AUTHORIZATION

Consultant shall serve Client by providing professional counsel and technical advice regarding subsurface conditions consistent with the scope of services agreed-to between the parties. Consultant will use his professional judgment and will perform his services using that degree of care and skill ordinarily exercised under similar circumstances, by reputable foundation engineers and/or engineering geologists practicing in this or similar localities.

- In assisting Client, the Consultant may include or rely on information and drawings prepared by others for the purpose of clarification, reference or bidding; however, by including the same, the Consultant assumes no responsibility for the information shown thereon and Client agrees that Consultant is not responsible for any defects in its services that result from reliance on the information and drawings prepared by others. Consultant shall not be liable for any incorrect advice, judgment or decision based on any inaccurate information furnished by the Client or any third party, and Client will indemnify Consultant against claims, demands, or liability arising out of, or contribute to, by such information.
- Unless otherwise negotiated in writing, Client agrees to limit any and all liability, claim for damages, cost of defense, or expenses to be levied against Consultant on account of design defect, error, omission, or professional negligence to a sum not to exceed ten thousand dollars or charged fees whichever is less. Further, Client agrees to notify any construction contractor or subcontractor who may perform work in connection with any design, report, or study prepared by Consultant of such limitation of liability for design defects, errors, omissions, or professional negligence, and require as a condition precedent to their performing the work a like limitation of liability on their part as against the Consultant. In the event the Client fails to obtain a like limitation of liability provision as to design defects, errors, omissions or professional negligence, any liability of the Client and Consultant to such contractor or subcontractor arising out of a negligence shall be allocated between Client and Consultant in such a manner that the aggregate liability of Consultant for such design defects to all parties, including the Client shall not exceed ten thousand dollars or charged fees whichever is less. No warranty, expressed or implied of merchantability or fitness, is made or intended in connection with the work to be performed by Consultant or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings made by Consultant.
- The Client agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless the Consultant, its officers, directors, employees, agents and subconsultants from and against all claims, damages, liabilities or costs, including reasonable attorney's fees and defense costs, of any nature whatsoever arising from or in connection with the Project to the extent that said claims, damages, liabilities or costs arise out of the work, services, or conduct of Client or Client's contractors, subconsultants, or other third party not under Consultant's control. Client further agrees that the duty to defend set forth herein arises immediately and is not contingent on a finding of fault against Client or Client's contractors, subconsultants, or other third parties. Client shall not be obligated under this provision to indemnify Consultant for Consultant's sole negligence or willful misconduct.
- Client shall grant free access to the site for all necessary equipment and personnel and Client shall notify any and all possessors of the project site that Client has granted Consultant free access to the project site at no charge to Consultant unless expressly agreed to otherwise in writing.
- If Client is not the property owner for the subject Project, Client agrees that it will notify the property owner of the terms of this agreement and obtain said property owner's approval to the terms and conditions herein. Should Client fail to obtain the property owner's agreement as required herein, Client agrees to be solely responsible to Consultant for all damages, liabilities, costs, including litigation fees and costs, arising from such failure that exceed that limitation of Consultant's liability herein.
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- Consultant agrees to cover all open test holes and place a cover to carry a 200-pound load on each hole prior to leaving project site unattended. Consultant agrees that all test holes will be backfilled upon completion of the job. However, Client may request test holes to remain open after completion of Consultants work. In the event Client agrees to pay for all costs associated with covering and backfilling said test holes at a later date, and Client shall indemnify, defend and hold harmless Consultant for all claims, demands and liabilities arising from his request, except for the sole negligence of the Consultant, to the extent permitted by law.
- Consultant shall not be responsible for the general safety on the job or for the work of Client, other contractors and third parties.
- Consultant shall be excused for any delay in completion of the contract caused by acts of God, acts of the Client or Client's agent and/or contractors, inclement weather, labor trouble, acts of public utilities, public bodies, or inspectors, extra work, failure of Client to make payments promptly, or other contingencies unforeseen by Consultant and beyond reasonable control of the Consultant.
- In the event that either party desires to terminate this contract prior to completion of the project, written notification of such intention to terminate must be tendered to the other party. In the event Client notifies Consultant of such intention to terminate Consultant's services prior to completion of the contract, Consultant reserves the right to complete such analysis and records as are necessary to place files in order, to dispose of samples, put equipment in order, and (where considered necessary to protect his professional reputation) to complete a report on the work performed to date. In the event that Consultant incurs cost in Client's termination of this Agreement, a termination charge to cover such cost shall be paid by Client.
- If the Client is a corporation, the individual or individuals who sign or initial this Contract, on behalf of the Client, guarantee that Client will perform its duties under this Contract. The individual or individuals so signing or initialing this Contract warrant that they are duly authorized agents of the Client.
- Any notice required or permitted under this Contract may be given by ordinary mail at the address contained in this Contract, but such address may be changed by written notice given by one party to the other from time to time. Notice shall be deemed received in the ordinary course of the mail. This agreement shall be deemed to have been entered into the County of Orange, State of California.

LIMITATIONS

Our findings, interpretations, analyses, and recommendations are professional opinions, prepared and presented in accordance with generally accepted professional practices and are based on observation, laboratory data and our professional experience. Consultant does not assume responsibility for the proper execution of the work by others by undertaking the services being provided to Client under this agreement and shall in no way be responsible for the deficiencies or defects in the work performed by others not under Consultant's direct control. No other warranty herein is expressed or implied.

Project 7862-04

Appendix B

Global Geo-Engineering, Inc.

Geotechnical Investigation Report dated September 21, 2018



GLOBAL GEO-ENGINEERING, INC.

September 21, 2018
Project 7862-04

Sondh Venture Inc.
11768 Foothill Boulevard
Rancho Cucamonga, California 91730

Attention: Mr. Jaswinder Singh Sondh

Subject: Geotechnical Investigation Report
Proposed Developments – *Gas Station and a Convenience Store*
Northwest Corner of Pennsylvania Avenue and I-10 Freeway
Beaumont, California

References: See Appendix A

Dear Mr. Sondh:

1. INTRODUCTION

- a) In accordance with your request, we have conducted a geotechnical investigation for the planned improvements at the subject property located in Beaumont, California.
- b) We reviewed the preliminary site plan provided to us. The planned development will include construction of a gas station, a car wash and 3,800 square feet convenience store and parking areas on an approximate 1.33-acre vacant lot. A retention basin is also proposed for the storm water runoff.
- c) Grading and structural plans are not available at this time. However, we have assumed wall loads of 3 kip/ft and a column load of 50 kips. Also, we have assumed that the proposed grades will not change significantly from the existing grades.
- d) This report is subject to the Terms and Conditions enclosed to this report and incorporated herein by reference.

2. SCOPE

The scope of services we provided was as follows:

- a) Preliminary planning and preparation;
- b) Review of available geotechnical reports and maps, pertaining to the site;

- c) Field exploration, consisting of excavating five borings to depths ranging from 5 to 30 feet below ground surface using a truck mounted hollow stem auger drill rig. Two of the 5-foot deep borings were used for percolation testing;
- d) Logging of the borings by our Engineering Geologist;
- e) Obtaining in-situ and bulk samples for classification and laboratory testing;
- f) Laboratory testing of selected samples considered representative of site conditions, in order to derive relevant engineering properties;
- g) Geotechnical analyses of the field and the laboratory data;
- h) Preparation of a final geotechnical report presenting our findings, conclusions and recommendations pertaining to:
 - i) grading;
 - ii) processing of soils;
 - iii) foundation type(s);
 - iv) foundation depths;
 - v) bearing capacity;
 - vi) expansivity;
 - vii) sulphate content and cement type;
 - viii) shrinkage factor, subsidence;
 - ix) slabs-on-grade;
 - x) settlement;
 - xi) retaining walls (if any):
 - active pressure;
 - at-rest pressure;
 - passive resistance;
 - coefficient of friction;
 - xii) seismic characteristics;
 - xiii) drainage and ground water.

3. **FIELD EXPLORATION**

Details of the field investigation, including the *Logs of Borings* for this investigation, are presented in *Appendix B*.

4. **LABORATORY TESTING**

A description of the laboratory testing and the results is presented in *Appendix C*.

5. **SITE DESCRIPTION**

5.1 **Location**

- a) The property is located at the northwestern corner of Pennsylvania Avenue and the I-10 Freeway in the city of Beaumont, California.
- b) The approximate project location is shown on the *Location Map, Figure 1*.

5.2 **Surface Site Conditions**

- a) The project site is currently vacant and void of any building structures. The ground surface within the central area of the site is generally bare of any vegetation. The northern and southern ends of the property are covered with a moderate growth of grass, weeds and trees. A few shallow dirt stockpiles have been dumped at the southern end of the project site.
- b) The ground surface within the property boundaries is relatively level. The natural ground surface within the project site area descends to the south at a 1.5 percent gradient.
- c) Surface drainage at the site consists of sheet flow runoff of incident rainfall, derived from within the property boundaries and surrounding upgradient areas. The nearest predominant drainage feature is the San Gorgonio River, located about 4.7 miles northeast of the project site.

5.4 Geology

5.4.1 Regional Geologic Setting

The project site is located within the San Gorgonio Pass area of Riverside County, which forms part of the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges consist of a series of mountain ranges separated by longitudinal valleys. The ranges trend northwest-southeast and are sub-parallel to faults branching from the San Andreas Fault. The Peninsular Ranges extend from the southern side of the Santa Monica Mountains and the San Gabriel Mountains into Baja California, Mexico (CDMG, 1997).

5.4.2 Local Geologic Setting

The project site area is underlain by Holocene- to Pleistocene-age alluvial deposits derived from the erosional processes within the nearby San Bernardino Mountains.

5.5 Subsurface Site Conditions

5.5.1 General

The following paragraphs generally describe the subsurface materials encountered in our boring excavations. The locations of the borings are shown on our *Boring Location Plan, Figure B-7*.

5.5.2 Alluvial Fan Deposits

- a) Holocene-aged to Pleistocene-aged alluvial fan deposits, consisting of Silty SAND with Sandy SILT interbeds, were encountered in our boring excavations.
- b) The alluvial sediments were generally found to be fine grained, orange brown to yellowish brown, slightly moist to moist, and medium dense to dense.

6. GROUND WATER

- a) No groundwater or seepage was encountered in any our boring excavations.

- b) Our review of well data records provided on the *California Department of Water Resources* internet website shows that the closest groundwater well is located approximately 3,000 feet south of the project site. Numerous groundwater level measurements were shown to have been collected from the well during the period from April 2005 to October 2010. Groundwater levels were generally found to range between 70 and 120 feet below ground surface.

7. POTENTIAL SEISMIC HAZARDS

7.1 General

- a) The property is located in the general proximity of several active and potentially active faults, which are typical for sites in the Southern California region. Earthquakes occurring on active faults within a 70-mile radius are capable of generating ground shaking of engineering significance to the proposed construction.
- b) In Southern California, most of the seismic damage to manmade structures results from ground shaking and, to a lesser degree, from liquefaction and ground rupture caused by earthquakes along active fault zones. In general, the greater the magnitude of the earthquake, the greater is the potential damage.

7.2 Ground Surface Rupture

- a) The subject property is not situated within a State of California delineated *Earthquake Fault Zone* (formerly known as the *Alquist-Priolo Special Studies Zone*), however, during historic times, a number of major earthquakes have occurred along active faults in Southern California. The closest known active fault is the Banning-San Geronio Pass Fault Zone, located at a distance of about 1.5 miles northeast of the project site.
- b) Other known active faults include the San Jacinto Fault and the San Andreas Fault, located at distances of about 6.9 miles and 7.6 miles, respectively, from the subject property.
- c) Due to the distance of the closest active fault to the site, ground rupture is not considered a significant hazard at the site.

7.3 Deterministic Seismic Hazard Analysis

- a) We utilized the *U.S. Seismic Design Maps* internet program provided by the U.S. Geological Survey to calculate the peak ground acceleration (PGA) at the project site location. Using the 2010 ASCE-7 (w/March 2013 errata) standard, the PGA at the subject property resulted to be 0.547g.

- b) *Figure 2* shows the geographical relationships among the site locations, nearby faults and the epicenters of significant occurrences. From the seismic history of the region and proximity, the San Andreas Fault has the greatest potential for causing earthquake damage related to ground shaking at this site.

8. CONCLUSIONS AND RECOMMENDATIONS

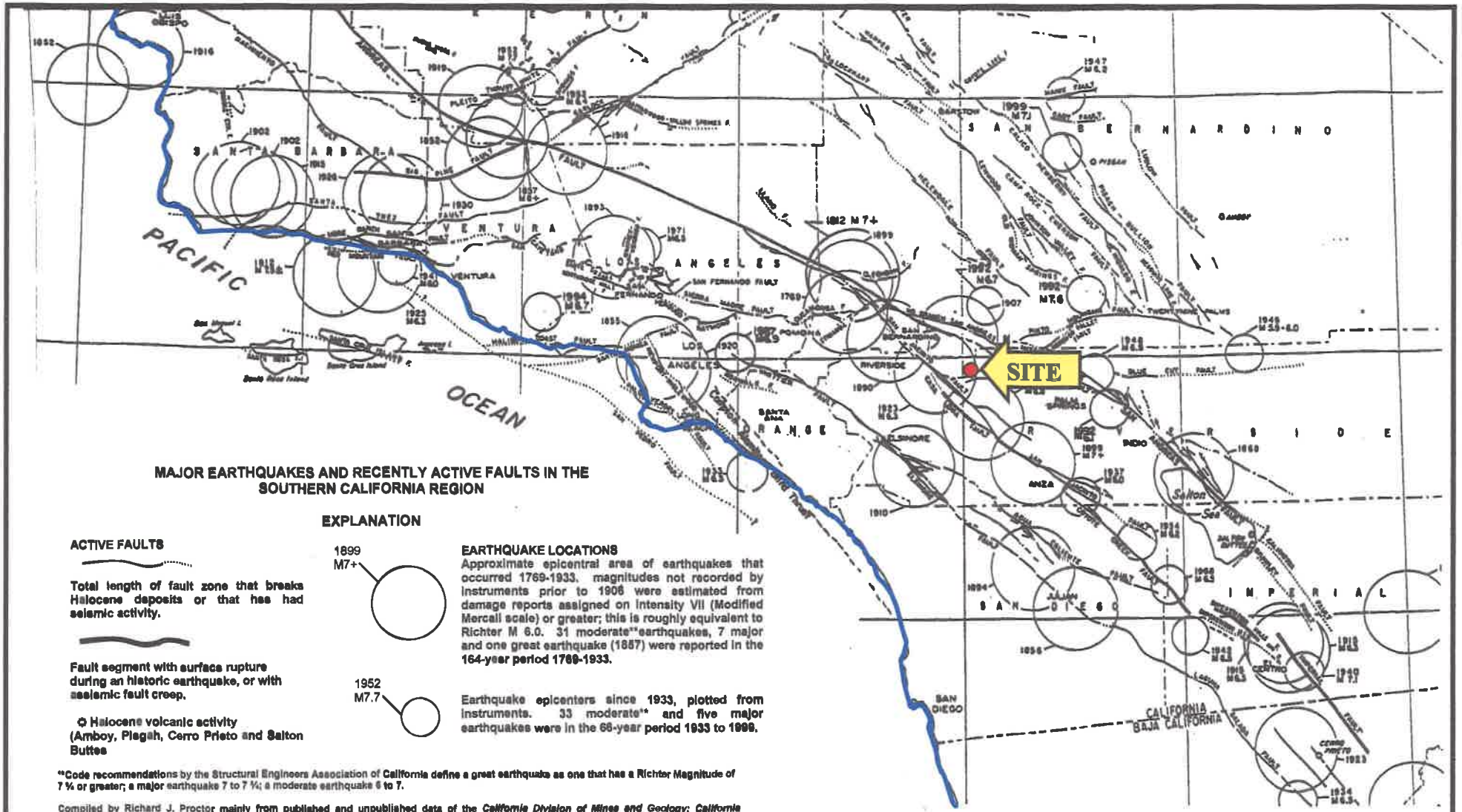
8.1 General

- a) It is our opinion that the site will be suitable for the proposed development from a geotechnical aspect, assuming that our recommendations are incorporated in the project plan designs and specifications, and are implemented during construction.
- b) We are of the opinion that the proposed structures may be supported on shallow spread footings, founded in the compacted fill. The dispenser canopy footings can be supported by the native soils.
- c) We are also of the opinion that with due and reasonable precautions, the required grading will not endanger adjacent property nor will grading be affected adversely by adjoining property.
- d) The design recommendations in the report should be reviewed during the grading phase when soil conditions in the excavations become exposed.
- e) The final grading plans and foundation plans/design loads should be reviewed by the Geotechnical Engineer.

8.2 Grading

8.2.1 Processing of On-Site Soils

- a) We recommend that the soils under the car wash and the convenience store should be overexcavated to a depth of 3 feet below the pad grade and one foot below the deepest footing bottom and replaced with compacted fill, subject to review during the grading operations.
- b) The recommended overexcavation will provide at least one foot of compacted fill below the bottom of the footings. Deeper overexcavation will be required if the footings are designed to be deeper than 2 feet.



MAJOR EARTHQUAKES AND RECENTLY ACTIVE FAULTS IN THE SOUTHERN CALIFORNIA REGION

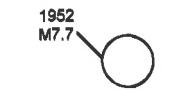
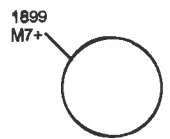
ACTIVE FAULTS

Total length of fault zone that breaks Miocene deposits or that has had seismic activity.

Fault segment with surface rupture during an historic earthquake, or with aseismic fault creep.

○ Miocene volcanic activity (Amboy, Piegah, Cerro Prieto and Salton Buttes)

EXPLANATION



EARTHQUAKE LOCATIONS

Approximate epicentral area of earthquakes that occurred 1769-1933. Magnitudes not recorded by instruments prior to 1906 were estimated from damage reports assigned on Intensity VII (Modified Mercalli scale) or greater; this is roughly equivalent to Richter M 6.0. 31 moderate** earthquakes, 7 major and one great earthquake (1887) were reported in the 164-year period 1769-1933.

Earthquake epicenters since 1933, plotted from instruments. 33 moderate** and five major earthquakes were in the 66-year period 1933 to 1999.

**Code recommendations by the Structural Engineers Association of California define a great earthquake as one that has a Richter Magnitude of 7 1/2 or greater; a major earthquake 7 to 7 1/4; a moderate earthquake 6 to 7.

Compiled by Richard J. Proctor mainly from published and unpublished data of the California Division of Mines and Geology; California Department of Water Resources Bulletin 116-B (1964); selections from bulletins of the Geological and Seismological Societies of America; from C.F. Richter, Elementary Seismology (1958); and the National Atlas, p. 66, and from Working Group on California Earthquake Probabilities-SBA Bulletin V 65.



GLOBAL GEO-ENGINEERING, INC.

**GEOLOGIC AND SOILS ENGINEERING
IRVINE, CALIFORNIA**

Northwest Corner of Pennsylvania Avenue and I-10 Freeway
Beaumont, California

Date: September 2018

Figure No:

Project No: 7862-04-04

2

- c) The canopy footings are expected to be deeper than 2 feet; as such no overexcavation below the footings is deemed necessary, subject to review during the construction.
- d) The overexcavation should extend laterally beyond the edges of the footings for a distance equal to the depth of the overexcavation below the footings.
- e) Wherever structural fills are to be placed, the upper 6 to 8 inches of the subgrade should, after stripping or overexcavation, first be scarified and reworked.
- f) There should be at least 12 inches of reworked existing soils or compacted fill under exterior hardscape areas, subject to review during the grading.
- g) Any loosening of reworked or native material, consequent to the passage of construction traffic, weathering, etc., should be made good prior to further construction.
- h) The depths of overexcavation should be reviewed by the Geotechnical Engineer during construction. Any surface or subsurface obstructions, or any variation of site materials or conditions encountered during grading should be brought immediately to the attention of the Geotechnical Engineer for proper exposure, removal or processing, as directed.
- i) No underground obstructions or facilities should remain in any structural areas. Depressions and/or cavities created as a result of the removal of obstructions should be backfilled properly with suitable materials, and compacted.

8.2.2 Material Selection

After the site has been stripped of any debris, vegetation and organic soils, excavated on-site soils are considered satisfactory for reuse in the construction of on-site fills, with the following provisions:

- a) The organic content does not exceed 3 percent by volume;
- b) Large size rocks greater than 8 inches in diameter should not be incorporated in compacted fill;

- c) Rocks greater than 4 inches in diameter should not be incorporated in compacted fill to within 1 foot of the underside of the footings and slabs.

8.2.3 Compaction Requirements

- a) Reworking/compaction shall include significant moisture-conditioning as needed to bring the soils to slightly above the optimum moisture content. All reworked soils and structural fills should be densified to achieve at least 90 percent relative compaction with reference to laboratory compaction standard.
- b) The optimum moisture content and maximum dry density should be determined in the laboratory in accordance with ASTM Test Designation D1557.
- c) Fill should be compacted in lifts not exceeding 8 inches (loose).

8.2.4 Excavating Conditions

- a) Excavation of on-site materials may be accomplished with standard earthmoving or trenching equipment. No hard rock was encountered which will require blasting.
- b) No seepage or ground water was encountered in any of our excavations. Dewatering is not anticipated.

8.2.5 Shrinkage

For preliminary earthwork calculation, an average shrinkage factor of 7 percent is recommended for the fill soils (this does not include handling losses).

8.2.6 Expansion Potential

- a) Due the presence granular Silty SAND, expansion potential of the subgrade site soils is considered *low*.
- b) The soil expansion potential for building pad should be determined during the final stages of rough grading.

8.2.7 Sulphate Content

The sulphate exposure based on the results of the laboratory is less than 0.1 percent. The sulphate exposure of the subgrade soils is considered to be *negligible*.

8.2.8 Utility Trenching

- a) The walls of temporary construction trenches in fill should stand nearly vertical, with only minor sloughing, provided the total depth does not exceed 4 feet (approximately).
- b) Trenches should be located so as not to impair the bearing capacity or to cause settlement under foundations. As a guide, trenches should be clear of a 45-degree plane, extending outward and downward from the edge of foundations. Shoring should comply with Cal-OSHA regulations.
- c) Existing soils may be utilized for trenching backfill, provided they are free of organic materials.
- d) All work associated with trench shoring must conform to the state and federal safety codes.

8.2.9 Construction Cuts

- a) The recommended overexcavation will require the cuts to be on the order of 3 feet. The cut can be made vertical subject to review during the excavation.
- b) If it is determined that the recommended cut will not be safe, it may be laid back at a gradient of 1:1 with the lower 3 feet vertical) or shoring may be required.

8.2.10 Surface Drainage Provisions

Positive surface gradients should be provided adjacent to the buildings to direct surface water run-off away from structural foundations and to suitable discharge facilities.

8.2.11 Grading Control

- a) All grading and earthwork should be performed under the observation of a Geotechnical Engineer in order to achieve proper subgrade preparation, selection of satisfactory materials, placement and compaction of all structural fill.
- b) Sufficient notification prior to stripping and earthwork construction is essential to make certain that the work will be adequately observed and tested.

8.3 Slab-on-Grade

- a) Concrete floor slabs may be founded on the compacted fill.
- b) A 2-inch thick SAND layer should be placed below slab-on-grade. 10-mil thick plastic vapor barrier is recommended to be installed below the SAND.
- c) It is recommended that #3 bars on 18-inch on center or equivalent, both ways, be provided as minimum reinforcement in slabs-on-grade. Joints should be provided and slabs should be at least 4 inches thick. Slab supporting vehicular traffic should be at least 6 inches thick and reinforced with #4 bars on 12 inches on center.
- d) The slab should be dowelled into the footings by #4 bars at a maximum spacing of 24 inches.
- e) The FFL should be at least 6 inches above highest adjacent grade.
- f) The subgrade should be kept moist prior to the concrete pour.

8.4 Spread Foundations

The proposed structures can be founded on shallow spread footings. The criteria presented as follows should be adopted:

8.4.1 Dimensions/Embedment Depths

| Number of Stories (floors supported) | Minimum Width (ft) | Minimum Footing Thickness (in) | Minimum Embedment Below Lowest Finished Grade (ft) | |
|---|-----------------------|--------------------------------------|--|----------|
| | | | Perimeter | Interior |
| 1 | 1.0 | 7 | 1.5 | 1.0 |
| Square Column Footings To 100 kip | 2.0 | 1.0 | 2.0 | |

8.4.2 Allowable Bearing Capacity

| Embedment Depth (ft) | Allowable Bearing Capacity (lb/ft ²) |
|-------------------------|---|
| 1.0 | 2,000 |

(Notes:

- The allowable bearing capacity may be increased by 600 lb/ft² for each additional foot increase in the depth and by 200 lb/ft² for each additional foot increase in the width, to a maximum value of 4,000 lb/ft²;
- These values may be increased by one-third in the case of short-duration loads, such as induced by wind or seismic forces;
- At least 4x#4 bars should be provided in wall footings, two on top and two at the bottom;
- Any pad footings should be tied at least in two directions by grade beams;
- In the event that footings are founded in structural fills consisting of imported materials, the allowable bearing capacities will depend on the type of these materials, and should be re-evaluated;
- Bearing capacities should be re-evaluated when loads have been obtained and footings sized during the preliminary design;
- Planter areas should not be sited adjacent to walls;
- Footing excavations should be observed by the Geotechnical Engineer. The subgrade should be kept moist prior to the concrete pour;

- It should be insured that the embedment depths do not become reduced or adversely affected by erosion, softening, planting, digging, etc.)

8.4.3 Settlements

Total and differential settlements under spread footings are expected to be within tolerable limits and are not expected to exceed 1 inch and ¾ inches over a horizontal distance of 40 feet, respectively.

8.5 Lateral Pressures

- a) The following lateral pressures are recommended for the design of retaining structures.

| Lateral Force | Soil Profile | Pressure (lb/ft ² /ft depth) | |
|--|--------------|---|------------------------|
| | | Unrestrained Wall | Rigidly Supported Wall |
| Active Pressure | Level | 34 | - |
| At-Rest Pressure | Level | - | 55 |
| Passive Resistance (ignore upper 1.5 ft.) | Level | 300 | - |

- b) Friction coefficient: 0.37 for soil (includes a Factor of Safety of 1.5).
- c) These values apply to the backfill using the existing soils.
- d) Backfill should be placed under engineering control.
- e) Subdrains comprised of 4-inch perforated (holes facing downward) Schedule 40, SDR-35 or equivalent PVC pipe covered in a minimum of one cubic foot per linear foot of filter rock and wrapped in Mirafi 140N filter fabric should be provided behind retaining walls. In the absence of the subdrain, higher pressure should be utilized to design the retaining walls.

8.6 Seismic Coefficients

- a) For seismic analysis of the proposed project in accordance with the ASCE 7-10 Standard, we recommend the following:

| ITEM | VALUE |
|--|-----------|
| Site Longitude (Decimal-degrees) | -116.9664 |
| Site Latitude (Decimal-degrees) | 33.9280 |
| Site Class | D |
| Seismic Design Category | D |
| Mapped Spectral Response Acceleration-Short Period (0.2 Sec) - S_s | 1.500 |
| Mapped Spectral Response Acceleration-1 Second Period - S_1 | 0.620 |
| Short Period Site Coefficient- F_a | 1.0 |
| Long Period Site Coefficient F_v | 1.5 |
| Adjusted Spectral Response Acceleration @ 0.2 Sec. Period (S_{ms}) | 1.500 |
| Adjusted Spectral Response Acceleration @ 1Sec.Period (S_{m1}) | 0.931 |
| Design Spectral Response Acceleration @ 0.2 Sec. Period (S_{Ds}) | 1.000 |
| Design Spectral Response Acceleration @ 1-Sec. Period (S_{D1}) | 0.620 |

- b) Due to the absence of shallow free groundwater and presence of dense soils, the potential for liquefaction is considered low.

8.7 Pavement

8.7.1 Asphalt Pavement Section

- a) Based on Traffic Indices (T.I.) and on the anticipated "R"-Value of 42, the following tentative structural pavement sections are recommended.

| Location | T.I. | Asphaltic Concrete (inches) | Aggregate Base (inches) |
|-------------|------|-----------------------------|-------------------------|
| Parking | 5.0 | 3 | 4 |
| Access Road | 6.0 | 3 | 6 |

- b) At the conclusion of grading operations, the subgrade soils should be tested to verify the R-Value.

8.7.2 Subgrade Preparation

All pavement areas shall be inspected, tested for compaction requirements, reworked where required and approved immediately prior to the placement of aggregate base. Subgrade soils within the upper 12 inches of finished grade shall be moisture-conditioned where necessary, shall be compacted to at least 90 percent relative compaction per ASTM D1557, and shall be free of any loose or soft areas.

8.7.3 Base Preparation

Unless otherwise specified, the base shall consist of Class II ¾-inch aggregate base or Crushed Miscellaneous Base (CMB). The base shall be compacted to a minimum of 95 percent relative compaction in accordance with the procedures described in ASTM Test Method D1557.

8.8 Corrosion Potential

- a) Soil Corrosion potential for metal and concrete was estimated by performing water-soluble sulfate, chloride, pH, and electrical resistivity tests during our prior investigation.
- b) Electrical resistivity is a measure of soil resistance to the flow of corrosion currents. Corrosion currents are generally high in low resistivity soils. The electrical resistivity of a soil decreases primarily with an increase in its chemical and moisture contents.
- c) A commonly accepted correlation between electrical resistivity and corrosivity for buried ferrous metals is presented below:

| Electrical Resistivity, Ohm-cm | Corrosion Potential |
|--------------------------------|---------------------|
| Less than 1,000 | Severe |
| 1,000-2,000 | Corrosive |
| 2,000-10,000 | Moderate |
| Greater than 10,000 | Mild |

- d) Results of electrical resistivity test indicate a value of 4,018 ohm-cm for the near-surface soils. Based on this data, it is our opinion that, in general, on-site near-surface soils are considered *moderately corrosive* in nature. This potential should be considered in design of underground metal pipes.


9. LIMITATIONS

- a) Soils and bedrock over an area show variations in geological structure, type, strength and other properties from what can be observed, sampled and tested from specimens extracted from necessarily limited exploratory borings. Therefore, there are natural limitations inherent in making geologic and soil engineering studies and analyses. Our findings, interpretations, analyses and recommendations are based on observation, laboratory data and our professional experience; and the projections we make are professional judgments conforming to the usual standards of the profession. No other warranty is herein expressed or implied.
- b) In the event that during construction, if the conditions are exposed which are significantly different from those described in this report, they should be brought to the attention of the Geotechnical Engineer.
- c) The recommendations provided in this report are intended to minimize the potential of distress to the structures caused by compressible soils. However, it should be noted that certain amount of settlement of the structures is unavoidable and should be anticipated during the lifetime of the existing and the proposed structures.

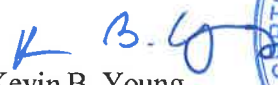
The opportunity to be of service is sincerely appreciated. If you have any questions or if we can be of further assistance, please call.

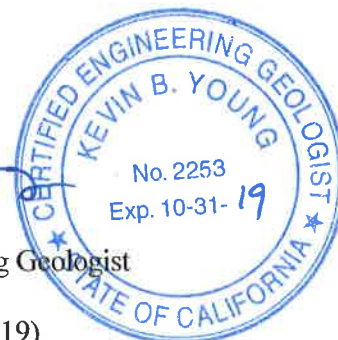
Very truly yours,

GLOBAL GEO-ENGINEERING, INC.


Mohan B. Upasani
Principal Geotechnical Engineer
RGE 2301
(Exp. March 31, 2019)




Kevin B. Young
Principal Engineering Geologist
CEG 2253
(Exp. October 31, 2019)



MBU/KBY: fdg

Enclosures:

Location Map
Seismicity Map
Terms and Conditions
References
Field Exploration
Unified Soils Classification System
Logs of Boring
Boring Location Plan
Laboratory Testing

- Figure 1
- Figure 2

- Appendix A
- Appendix B
Figure B-1
Figures B-2 through B-6
Figure B-7
- Appendix C

TERMS AND CONDITIONS

Consultant shall serve Client by providing professional counsel and technical advice regarding subsurface conditions consistent with the scope of services agreed-to between the parties. Consultant will use his professional judgment and will perform his services using that degree of care and skill ordinarily exercised under similar circumstances, by reputable foundation engineers and/or engineering geologists practicing in this or similar localities.

- In assisting Client, the Consultant may include or rely on information and drawings prepared by others for the purpose of clarification, reference or bidding; however, by including the same, the Consultant assumes no responsibility for the information shown thereon and Client agrees that Consultant is not responsible for any defects in its services that result from reliance on the information and drawings prepared by others. Consultant shall not be liable for any incorrect advice; judgment or decision based on any inaccurate information furnished by the Client or any third party, and Client will indemnify Consultant against claims, demands, or liability arising out of, or contribute to, by such information.
- Unless otherwise negotiated in writing, Client agrees to limit any and all liability, claim for damages, cost of defense, or expenses to be levied against Consultant on account of design defect, error, omission, or professional negligence to a sum not to exceed ten thousand dollars or charged fees whichever is less. Further, Client agrees to notify any construction contractor or subcontractor who may perform work in connection with any design, report, or study prepared by Consultant of such limitation of liability for design defects, errors, omissions, or professional negligence, and require as a condition precedent to their performing the work a like limitation of liability on their part as against the Consultant. In the event the Client fails to obtain a like limitation of liability provision as to design defects, errors, omissions or professional negligence, any liability of the Client and Consultant to such contractor or subcontractor arising out of a negligence shall be allocated between Client and Consultant in such a manner that the aggregate liability of Consultant for such design defects to all parties, including the Client shall not exceed ten thousand dollars or charged fees whichever is less. No warranty, expressed or implied of merchantability or fitness, is made or intended in connection with the work to be performed by Consultant or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings made by Consultant.
- The Client agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless the Consultant, its officers, directors, employees, agents and subconsultants from and against all claims, damages, liabilities or costs, including reasonable attorney's fees and defense costs, of any nature whatsoever arising from or in connection with the Project to the extent that said claims, damages, liabilities or costs arise out of the work, services, or conduct of Client or Client's contractors, subconsultants, or other third party not under Consultant's control. Client further agrees that the duty to defend set forth herein arises immediately and is not contingent on a finding of fault against Client or Client's contractors, subconsultants, or other third parties. Client shall not be obligated under this provision to indemnify Consultant for Consultant's sole negligence or willful misconduct.
- Client shall grant free access to the site for all necessary equipment and personnel and Client shall notify any and all possessors of the project site that Client has granted Consultant free access to the project site at no charge to Consultant unless expressly agreed to otherwise in writing.
- If Client is not the property owner for the subject Project, Client agrees that it will notify the property owner of the terms of this agreement and obtain said property owner's approval to the terms and conditions herein. Should Client fail to obtain the property owner's agreement as required herein, Client agrees to be solely responsible to Consultant for all damages, liabilities, costs, including litigation fees and costs, arising from such failure that exceed that limitation of Consultant's liability herein.
- Client shall locate for Consultant and shall assume responsibility for the accuracy of his representations as to the locations of all underground utilities and installations. Consultant will not be responsible for damage to any such utilities or installation not so located.
- Client and Consultant agree to waive claims against each other for consequential damages arising out of or relating to this agreement. Neither party to this agreement shall assign the contract without the express, written consent of the other party.
- Consultant agrees to cover all open test holes and place a cover to carry a 200-pound load on each hole prior to leaving project site unattended. Consultant agrees that all test holes will be backfilled upon completion of the job. However, Client may request test holes to remain open after completion of Consultants work. In the event Client agrees to pay for all costs associated with covering and backfilling said test holes at a later date, and Client shall indemnify, defend and hold harmless Consultant for all claims, demands and liabilities arising from his request, except for the sole negligence of the Consultant, to the extent permitted by law.
- Consultant shall not be responsible for the general safety on the job or for the work of Client, other contractors and third parties.
- Consultant shall be excused for any delay in completion of the contract caused by acts of God, acts of the Client or Client's agent and/or contractors, inclement weather, labor trouble, acts of public utilities, public bodies, or inspectors, extra work, failure of Client to make payments promptly, or other contingencies unforeseen by Consultant and beyond reasonable control of the Consultant.
- In the event that either party desires to terminate this contract prior to completion of the project, written notification of such intention to terminate must be tendered to the other party. In the event Client notifies Consultant of such intention to terminate Consultant's services prior to completion of the contract, Consultant reserves the right to complete such analysis and records as are necessary to place files in order, to dispose of samples, put equipment in order, and (where considered necessary to protect his professional reputation) to complete a report on the work performed to date. In the event that Consultant incurs cost in Client's termination of this Agreement, a termination charge to cover such cost shall be paid by Client.
- If the Client is a corporation, the individual or individuals who sign or initial this Contract, on behalf of the Client, guarantee that Client will perform its duties under this Contract. The individual or individuals so signing or initialing this Contract warrant that they are duly authorized agents of the Client.
- Any notice required or permitted under this Contract may be given by ordinary mail at the address contained in this Contract, but such address may be changed by written notice given by one party to the other from time to time. Notice shall be deemed received in the ordinary course of the mail. This agreement shall be deemed to have been entered into the County of Orange, State of California.

LIMITATIONS

Our findings, interpretations, analyses, and recommendations are professional opinions, prepared and presented in accordance with generally accepted professional practices and are based on observation, laboratory data and our professional experience. Consultant does not assume responsibility for the proper execution of the work by others by undertaking the services being provided to Client under this agreement and shall in no way be responsible for the deficiencies or defects in the work performed by others not under Consultant's direct control. No other warranty herein is expressed or implied.

APPENDIX A

References

1. Blake, T. F., 2000, *EQFAULT: A Computer Program for the Deterministic Prediction of Peak Horizontal Acceleration from Digitized California Fault*, User Manual and Program;
2. Boore, D.M., Joyner, W.B., and Fumal, T.E., 1997, *Equations for the Estimating Horizontal Response Spectra and Peak Acceleration from Western North American Earthquakes: A Summary of Recent Work*: Seismological Research Letters, Vol. 68, No. 1, pp. 128-153;
3. California Department of Water Resources, Retrieved September 21, 2018, *Water Data Library, Historical Data Map Interface* (Internet);
4. Dibblee, T.W. and Minch J.A., 2003, *Geologic Map of the Beaumont Quadrangle, Riverside County, California*, Dibblee Foundation Map DF-114;
5. Hart, Eart W., Revised 1997, *Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps*: California Division of Mines and Geology Special Publication 42;
6. United States Geological Survey, Earthquake Hazards Program, U.S. Seismic Design Maps Application, ASCE 7-10 Standard;
7. United States Geological Survey, 1996, Beaumont Quadrangle, 7.5-Minute Topographic Series.

APPENDIX B

Field Exploration

- a) The site was explored on August 29, 2018 utilizing a truck mounted hollow stem auger rig to excavate five borings to a maximum depth of 30 feet below the existing ground surface. Borings P-1 and P-2 were utilized for percolation testing. Borings B-1 through B-3 were subsequently backfilled. The soils encountered in the borings were logged and sampled by our Engineering Geologist. The soils were classified in accordance with the Unified Soil Classification System described in *Figure B-1*. The Logs of Boring are presented in *Figures B-2 through B-6*. The approximate locations of the drilled borings are shown on the *Boring Location Plan, Figure B-7*. The logs, as presented, are based on the field logs, modified as required from the results of the laboratory tests. Driven ring and bulk samples were obtained from the excavations for laboratory inspection and testing. The depths at which the samples were obtained are indicated on the logs.
- b) The number of blows of the hammer during sampling was recorded, together with the depth of penetration, the driving weight and the height of fall. The blows required per foot of penetration for given samples are indicated on the logs. These blow counts provide a measure of the density and consistency of the soil.
- c) No ground water or seepage was encountered in any of the boring excavations
- d) Caving occurred as noted on the boring logs.

UNIFIED SOILS CLASSIFICATION (ASTM D-2487)

| PRIMARY DIVISION | | | GROUP SYMBOL | SECONDARY DIVISIONS | |
|---|---|---------------------------|--------------|---|--------------------------------------|
| COARSE GRAINED SOILS More than half of materials is larger than #200 sieve size | GRAVELS More than half of coarse fraction is larger than #4 sieve | Clean Gravels (<5% fines) | GW | Well graded gravels, gravel-sand mixture, little or no fines | |
| | | | GP | Poorly graded gravels or gravel-sand mixtures, little or no fines | |
| | | Gravel with Fines | GM | Silty gravels, gravel-sand-silt mixture. Non-plastic fines. | |
| | | | GC | Clayey gravels, gravel-sand-clay mixtures. Plastic fines | |
| | SANDS More than half of coarse fraction is smaller than #4 sieve | Clean Sands (<5% fines) | SW | Well-graded sands, gravel-sand mixtures, little or no fines. | |
| | | | SP | Poorly graded sands or gravelly sands, little or no fines. | |
| | | Sands with Fines | SM | Silty sands, sand-silt mixtures. Non-Plastic fines. | |
| | | | SC | Clayey sands, sand-clay mixtures. Plastic fines. | |
| FINE GRAINED SOILS More than half of material is smaller than #200 sieve size | SILTS AND CLAYS LIQUID LIMIT IS 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. | |
| | | | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts. | |
| | SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50 | | CH | Inorganic clays of high plasticity, fat clays | |
| | | | OH | Organic clays of medium to high plasticity, organic silts. | |
| | | Highly Organic Soils | | PT | Peat and other highly organic soils. |

CLASSIFICATION BASED ON FIELD TESTS

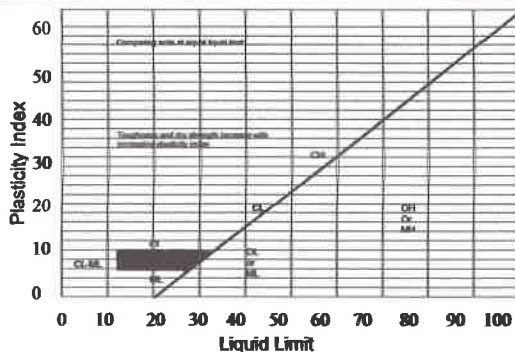
| PENETRATION RESISTANCE (PR) | |
|-----------------------------|------------|
| Sands and Gravels | |
| Relative Density | Blows/foot |
| Very loose | 0-4 |
| Loose | 4-10 |
| Medium Dense | 10-30 |
| Dense | 30-50 |
| Very Dense | Over 50 |

| Clays and Silts | | |
|-----------------|-------------|------------|
| Consistency | Blows/foot* | Strength** |
| Very Soft | 0-2 | 0-1/2 |
| Soft | 2-4 | 1/4-1/2 |
| Firm | 4-8 | 1/2-1 |
| Stiff | 8-15 | 1-2 |
| Very Stiff | 15-30 | 2-4 |
| Hard | Over 30 | Over 4 |

*Numbers of blows of 140 lb hammer falling 30 inches to drive a 2-inch O.D. (1 3/8 in. I.D.) Split Barrel sampler (ASTM-1568 Standard Penetration Test)

**Unconfined Compressive strength in tons/sq. ft. Read from pocket penetrometer

CLASSIFICATION CRITERIA BASED ON LAB TESTS



Plasticity chart for laboratory Classification of Fine-grained soils

GW and SW – $C_u = D_{60}/D_{10}$ greater than 4 for GW and 6 for SW; $C_c = (D_{30})^2/D_{10} \times D_{60}$ between 1 and 3

GP and SP – Clean gravel or sand not meeting requirement for GW and SW

GM and SM – Atterberg limit below "A" line or P.I. less than 4

GC and SC – Atterberg limit above "A" line P.I. greater than 7

CLASSIFICATION OF EARTH MATERIAL IS BASED ON FIELD INSPECTION AND SHOULD NOT BE CONSTRUED TO IMPLY LABORATORY ANALYSIS UNLESS SO STATED.

| Fines (Silty or Clay) | Fine Sand | Medium Sand | Coarse Sand | Fine Gravel | Coarse Gravel | Cobbles | Boulders |
|-----------------------|-----------|-------------|-------------|-------------|---------------|---------|----------|
| Sieve Sizes | 200 | 40 | 10 | 4 | 3/4" | 3" | 10" |



GLOBAL GEO-ENGINEERING, INC.
 GEOLOGIC AND SOILS ENGINEERING, IRVINE, CALIFORNIA

Northwest Corner of Pennsylvania Avenue and I-10 Freeway
 Beaumont, California

Date: September 2018

Figure No.:

Project No.: 7862-04

B-1

| | | | |
|--|---|--|--|
| Global Geo-Engineering, Inc. Irvine, California Geologists and Geotechnical Engineers | LOG OF BORING B-1 | | Drilling Method : Hollow Stem Sampling Method : California Modified Hammer Weight (lbs) : 140 Hammer Drop (in) : 30 |
| | Date : August 29, 2018 Logged By : KBY Drilling Company : Cal Pac Drilling Rig : Mobile B-53 | | |
| Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California | | | |
| Project 7862-04 | | | |

| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | Water Levels | DESCRIPTION |
|---------------|--------|-----------------------------|---------------------------|------------|---------------------|-------------|------|---------|---|--|-------------|
| | | | | | | | | | <input type="checkbox"/> Ring <input type="checkbox"/> Bulk <input type="checkbox"/> Standard Penetration Testing | <input type="checkbox"/> Groundwater Encountered <input type="checkbox"/> Seepage Encountered | |

| | | | | | | | | | | | |
|----|--|-----|-------|----|--|--|-------|--|--|--|---|
| 0 | | | | | | | | | | | Silty SAND: fine grained, orange to dark yellow brown, slightly moist, medium dense, porous with Sandy SILT interbeds |
| 5 | | 4.9 | 101.0 | 26 | | | | | | | @5' dark orange brown, slightly porous |
| 10 | | 9.6 | 113.6 | 38 | | | | | | | @9' orange to yellow brown |
| 15 | | 8.4 | 114.1 | 38 | | | SM/ML | | | | @14' medium dense to dense, slightly gravelly |
| 20 | | 9.0 | 108.7 | 57 | | | | | | | @19' yellow brown, more Silty |
| | | 4.5 | 107.8 | 41 | | | | | | | ALLUVIAL FAN DEPOSITS |

Bottom of Boring at 20 feet:

- Notes:
1. Caving to 13 feet after augers were removed
 2. No groundwater or seepage encountered
 3. Boring backfilled

09-24-2018 C:\Program Files (x86)\mtech2014\mtech\Boring Logs 2002 Edition\7862-04 - Sondh, Beaumont B-1.bor

Figure B-2

Global Geo-Engineering, Inc.
Irvine, California
Geologists and Geotechnical Engineers

LOG OF BORING B-2

Drilling Method : Hollow Stem
 Sampling Method : California Modified
 Hammer Weight (lbs) : 140
 Hammer Drop (in) : 30

Northwest Corner of Pennsylvania Avenue
and I-10 Freeway
Beaumont, California

Date : August 29, 2018
 Logged By : KBY
 Drilling Company : Cal Pac
 Drilling Rig : Mobile B-53

Project 7862-04

| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | Water Levels | DESCRIPTION |
|--|--------|-----------------------------|---------------------------|------------|---------------------|-------------|-------|---------|--|--|---|
| | | | | | | | | | Ring Bulk Standard Penetration Testing | Groundwater Encountered Seepage Encountered | |
| 0 | | | | | | | | | | | Silty SAND: fine grained, orange brown to yellow brown, slightly moist, medium dense, slightly porous with Sandy SILT interbeds |
| 5 | X | 8.3 | 100.2 | 40 | | | | | | | |
| 10 | X | 8.6 | 112.5 | 55 | | | | | | | |
| 15 | X | 4.7 | 94.2 | 29 | | | SM/ML | | | | @9' dark yellow brown |
| 20 | X | 7.4 | 117.2 | 78 | | | | | | | @14' medium dense to dense, slightly gravelly |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| ALLUVIAL FAN DEPOSITS | | | | | | | | | | | |
| Bottom of Boring at 20 feet: | | | | | | | | | | | |
| Notes: 1. Caving to 13.5 feet after augers were removed 2. No groundwater or seepage encountered 3. Boring backfilled | | | | | | | | | | | |

09-24-2018 C:\Program Files (x86)\mtech\2014\temp\Boring Logs 2002 Editon\7862-04 - Smith, Beaumont B-2 bor

Figure B-3

Global Geo-Engineering, Inc.
Irvine, California
Geologists and Geotechnical Engineers












LOG OF BORING B-3

Drilling Method : Hollow Stem
Sampling Method : California Modified
Hammer Weight (lbs) : 140
Hammer Drop (in) : 30

Northwest Corner of Pennsylvania Avenue
and I-10 Freeway
Beaumont, California

Date : August 29, 2018
Logged By : KBY
Drilling Company : Cal Pac
Drilling Rig : Mobile B-53

Project 7862-04

| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | Water Levels | DESCRIPTION |
|--|---|-----------------------------|---------------------------|------------|---------------------|-------------|-------|---------|--|--|---|
| | | | | | | | | |  Ring  Bulk  Standard Penetration Testing |  Groundwater Encountered  Seepage Encountered | |
| 0 | | | | | | | | | | | Silty SAND: fine grained, orange brown, moist, medium dense, slightly porous with Sandy SILT interbeds, slight CLAY content |
| 5 |  | 9.6 | 112.6 | 27 | | | | | | | |
| 10 |  | 13.1 | 116.4 | 24 | | | | | | | @9' orange brown |
| 15 |  | 9.4 | 113.5 | 27 | | | SM/ML | | | | @14' slightly gravelly |
| 20 |  | 13.9 | 111.7 | 21 | | | | | | | |
| 25 |  | 15.7 | 115.3 | 24 | | | | | | | @24' more Silty, dark orange brown |
| 30 |  | 12.4 | 113.9 | 30 | | | | | | | @29' less Silty, fine to medium grained, yellow brown ALLUVIAL FAN DEPOSITS |
| Bottom of Boring at 30 feet: | | | | | | | | | | | |
| Notes: 1. Caving to 24 feet after augers were removed 2. No groundwater or seepage encountered 3. Boring backfilled | | | | | | | | | | | |
| 35 | | | | | | | | | | | |

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Figure B-4

Global Geo-Engineering, Inc.
Irvine, California

Geologists and Geotechnical Engineers


Northwest Corner of Pennsylvania Avenue
and I-10 Freeway
Beaumont, California

LOG OF BORING P-1

Date : August 29, 2018
 Logged By : KBY
 Drilling Company : Cal Pac
 Drilling Rig : Mobile B-53

Drilling Method : Hollow Stem
 Sampling Method : California Modified
 Hammer Weight (lbs) : 140
 Hammer Drop (in) : 30

Project 7862-04

| Depth in Feet | Sample | Field Moisture % Dry Weight | Dry Density lb./cubic ft. | Blow Count | Relative Compaction | Water Level | USCS | GRAPHIC | Sample Type | Water Levels | DESCRIPTION |
|---------------|--------|-----------------------------|---------------------------|------------|---------------------|-------------|------|--|---|--|---|
| | | | | | | | | | <input type="checkbox"/> Ring <input type="checkbox"/> Bulk <input type="checkbox"/> Standard Penetration Testing | <input type="checkbox"/> Groundwater Encountered <input type="checkbox"/> Seepage Encountered | |
| 0 | | | | | | | SM |  | | | Silty SAND: fine grained, orange brown, moist, medium dense with Sandy SILT interbeds |
| 5 | | | | | | | | | | | <p>ALLUVIAL FAN DEPOSITS</p> <p>Bottom of Boring at 5 feet:</p> <p>Notes: 1. No groundwater or seepage encountered 2. Perforated pipe and gravel installed for future percolation testing</p> |
| 10 | | | | | | | | | | | |

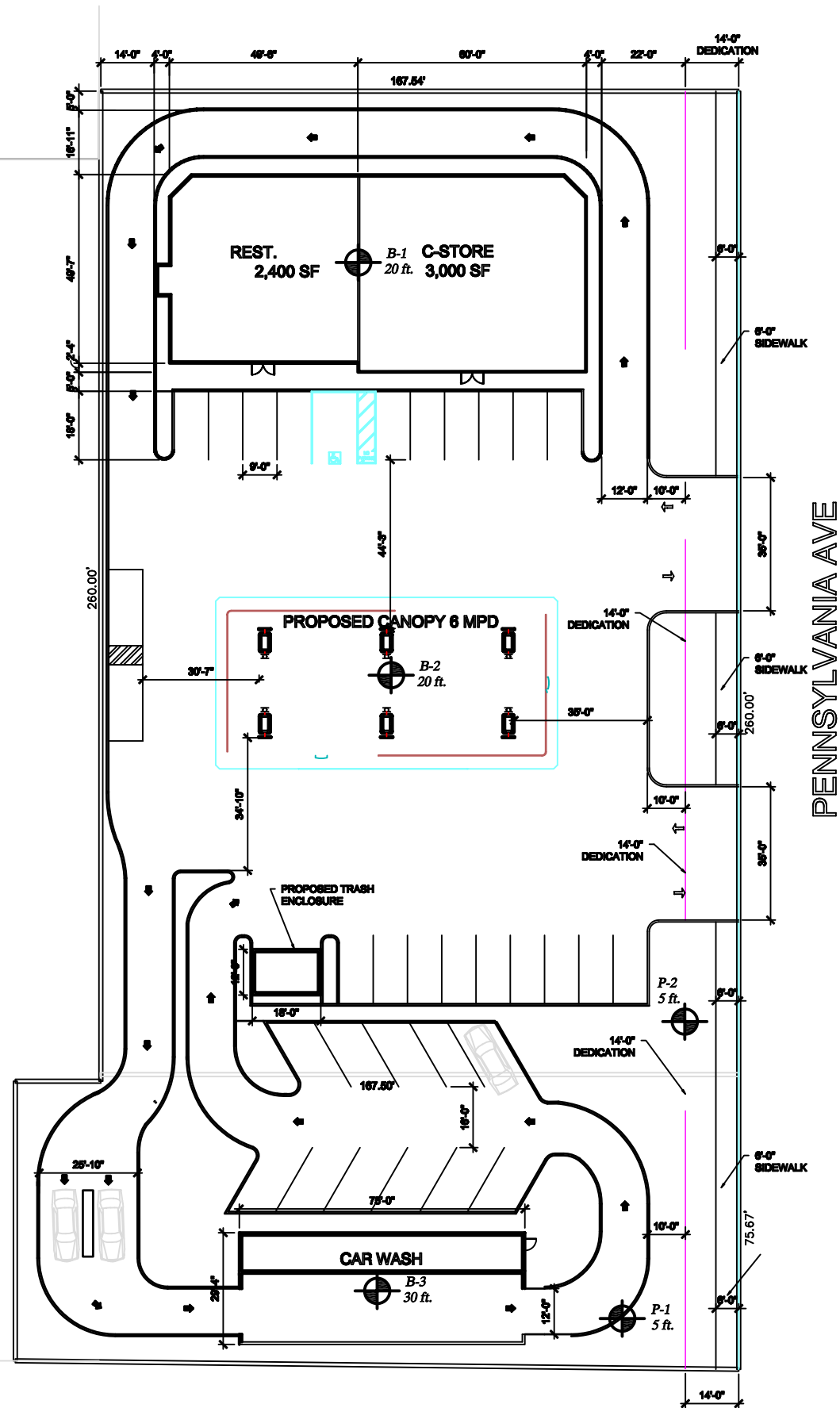
09-24-2018 C:\Program Files (x86)\mtech\2014\temp\Boring Logs 2002 Edition\7862-04 - Sondh, Beaumont P-1.bor

Figure B-5

BORING LOCATION PLAN

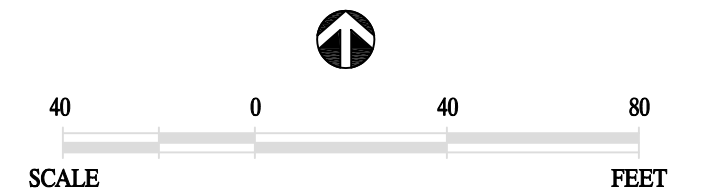
MASSACHUSETTS AVE

EXISTING
RESIDENTIAL



KEY

- B-3
30 ft. APPROXIMATE BORING LOCATION,
SHOWING TOTAL DEPTH
- P-2
5 ft. APPROXIMATE PERCOLATION TEST BORING LOCATION,
SHOWING TOTAL DEPTH



BORING LOCATION PLAN

PENNSYLVANIA AVE AT I-10 FWY,
BEAUMONT, CALIFORNIA

GLOBAL GEO-ENGINEERING, INC

APPENDIX CLaboratory Testing Program

The laboratory testing program in our investigation was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested as described below. Laboratory test results from the prior investigations are also shown below.

a) Moisture-Density

Moisture-density information usually provides a gross indication of soil consistency. Local variations at the time of the investigation can be delineated, and a correlation obtained between soils found on this site and nearby sites. The dry unit weights and field moisture contents were determined for selected samples. The results are shown on the *Logs of Borings*.

b) Compaction

A representative soil sample was tested in the laboratory to determine the maximum dry density and optimum moisture content, using the ASTM D1557 compaction test method. This test procedure requires 25 blows of a 10-pound hammer falling a height of 18 inches on each of five layers, in a 1/30 cubic foot cylinder. The results of the tests are shown below:

| Boring No. | Sample Depth (ft) | Soil Description | Optimum Moisture Content (%) | Maximum Dry Density (lb/ft ³) |
|------------|-------------------|------------------|------------------------------|---|
| B-1 | 1-3 | Silty SAND | 9.3 | 127.3 |

c) Direct Shear

Direct shear tests were conducted on relatively undisturbed samples, using a direct shear machine at a constant rate of strain in accordance with ASTM test Method D3080. Variable normal or confining loads are applied vertically and the soil shear strengths are obtained at these loads. The angle of internal friction and the cohesion are then evaluated. The samples were tested at saturated moisture contents. The test results are shown in terms of the Coulomb shear strength parameters, as shown below:

| Boring No. | Sample Depth (ft) | Soil Description | Coulomb Cohesion (lb/ft ²) | Angle of Internal Friction (°) | Peak/Residual |
|------------|-------------------|------------------|--|--------------------------------|------------------|
| B-1 | 2 | Silty SAND | 150 150 | 29 29 | Peak Ultimate |

d) Sulfate Content

A representative soil sample was analyzed for its sulphate content in accordance with California Test Method CA417. The results are given below:

| Boring No. | Sample Depth (ft) | Soil Description | Sulphate Content (%) |
|------------|-------------------|------------------|----------------------|
| B-1 | 1-3 | Silty SAND | 0.0037 |

e) Chloride Content

A representative soil sample was analyzed for chloride content in accordance with California Test Method CA422. The results are given below:

| Boring No. | Sample Depth (ft) | Soil Description | Chloride Content (%) |
|------------|-------------------|------------------|----------------------|
| B-1 | 1-3 | Silty SAND | 0.0032 |

f) Resistivity and pH

A representative soil sample was analyzed in accordance with California Test Methods CA532 and CA643 to determine the minimum resistivity and pH. The result is provided below:

| Boring No. | Sample Depth (ft) | Soil Description | Minimum Resistivity (ohm-cm) | pH |
|-------------------|--------------------------|-------------------------|-------------------------------------|-----------|
| B-1 | 1-3 | Silty SAND | 4,018 | 7.9 |

Appendix 4: Historical Site Conditions

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

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Tabulation and Sizing Calculations

BMPs Sizing Calculation:

These calculations are based on approved methodologies within the currently active Municipal Separate Storm Sewer System (MS4) permits for Santa Ana River Watershed regions of Riverside County. All included BMP designs are sized based on the design capture volume, V_{BMP} . However, there may be circumstances when flow based Treatment Control BMPs are utilized and therefore this section also includes the methodology for calculating the design flow rate, Q_{BMP} .

Calculating V_{BMP} :

Volume based BMPs, including all of the BMPs in this report, are sized to capture and treat the design capture volume, V_{BMP} . As the method for calculating and documenting the design capture volume varies by watershed. The watershed a particular project is within can be determined from the 'Locate my Watershed' tool available at: www.rcflood.org/npdes/. This project is within Santa Ana River watershed.

In order to meet Regional Water Quality Control Board (RWQCB) requirements, in the Santa Ana River Watershed the design capture volume (V_{BMP}) is based on capturing the volume of runoff generated from an 85th percentile, 24-hour storm event. Following the steps using the worksheet provided in the LID Handbook to calculate V_{BMP} in the Santa Ana River Watershed.

The Design Storm Depth (D_{85}) is determined by locating the project site on the Isohyetal Map for the 85th Percentile 24-hour Storm Event. For the Lake Elsinore area project D_{85} is 0.845 inches. See below Isohyetal Map.

Water Conservation Tool - Rivers... x Rivo SWCTT x Search x +

content.rcflood.org/PermitTracker/

Riverside County **SWCT²**
Stormwater & Water Conservation Tracking Tool

Choose search item from list Enter Value Locate Clear Results 33.9302, -116.990: WQMP report is only available at zoom level 16 or greater.

Toggle Legend Clear Layers Metadata Map Tutorial

- Dam
- Levee
- Spreading Ground
- Other
- Permit Areas
- Hydrologic Unit Codes(HUC)
- Topographic Drainage Boundary
- Drainage Area Boundaries
- City Storm Drains
- WQMP 85% Design Isohyetal Map
 - Rain Gauges
 - Isohyetal Minor Contours
 - Isohyetal Major Contours
- CRP (Control Release Point)
- FEMA Floodplain
- Flood Plain - Other Special Studies
- As-Built Plans
- ▶ Groundwater Data
- ▶ Critical Coarse Sediment Yield Areas
- ▶ U.S. Fish and Wildlife Critical Habitat
- ▶ WRMSHCP Potential Survey Areas

Windows taskbar: Type here to search, 3:05 PM, 7/14/2023

Santa Ana Watershed

V_{BMP} and Q_{BMP} worksheets

These worksheets are to be used to determine the required

Design Capture Volume (V_{BMP})

or the

Design Flow Rate (Q_{BMP})

for BMPs in the Santa Ana Watershed

To verify which watershed your project is located within, visit

www.rcflood.org/npdes

and use the 'Locate my Watershed' tool

If your project is not located in the Santa Ana Watershed,

Do not use these worksheets! Instead visit

www.rcflood.org/npdes/developers.aspx

To access worksheets applicable to your watershed

Use the **tabs across the bottom
to access the worksheets for the Santa Ana Watershed**

Table 2-1: Impervious Fraction Based on Various Land Use Covers

| Surface Type | Effective Impervious Fraction, I_f |
|--|--------------------------------------|
| Roofs | 1.00 |
| Concrete or Asphalt | 1.00 |
| Grouted or Gapless Paving Blocks | 1.00 |
| Compacted Soil (e.g. unpaved parking) | 0.40 |
| Decomposed Granite | 0.40 |
| Permeable Paving Blocks w/ Sand Filled Gap | 0.25 |
| Class 2 Base | 0.30 |
| Gravel or Class 2 Permeable Base | 0.10 |
| Pervious Concrete / Porous Asphalt | 0.10 |
| Open and Porous Pavers | 0.10 |
| Turf block | 0.10 |
| Ornamental Landscaping | 0.10 |
| Natural (A Soil) | 0.03 |
| Natural (B Soil) | 0.15 |
| Natural (C Soil) | 0.30 |
| Natural (D Soil) | 0.40 |

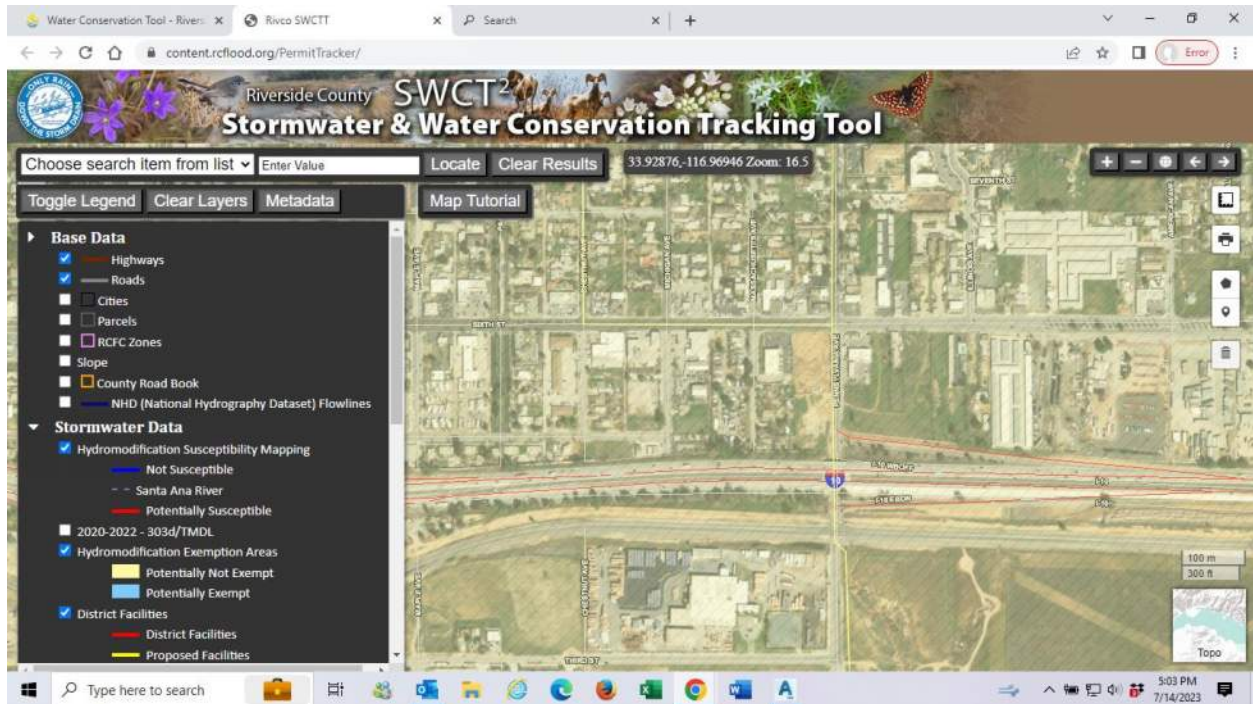
| | | | | |
|---|--------------------|--------------|-----------------------|-----------------------|
| Bioretention Facility - Design Procedure | | BMP ID 1A | Legend: | Required Entries |
| | | | | Calculated Cells |
| Company Name: | Moment Engineering | | Date: | 7/25/2025 |
| Designed by: | E.A. | | County/City Case No.: | |
| Design Volume | | | | |
| Enter the area tributary to this feature | | | $A_T =$ | 0.44 acres |
| Enter V_{BMP} determined from Section 2.1 of this Handbook | | | $V_{BMP} =$ | 1,083 ft ³ |
| Type of Bioretention Facility Design | | | | |
| <input checked="" type="radio"/> Side slopes required (parallel to parking spaces or adjacent to walkways) <input type="radio"/> 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 | | | $w_T =$ | 9.0 ft |
| Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ | | | $d_E =$ | 1.72 ft |
| Minimum Surface Area, A_m $A_M (ft^2) = \frac{V_{BMP} (ft^3)}{d_E (ft)}$ | | | $A_M =$ | 630 ft ² |
| Proposed Surface Area | | | $A =$ | 883 ft ² |
| Bioretention Facility Properties | | | | |
| Side Slopes in Bioretention Facility | | | $z =$ | 4 :1 |
| Diameter of Underdrain | | | | 6 inches |
| Longitudinal Slope of Site (3% maximum) | | | | 1 % |
| 6" Check Dam Spacing | | | | 25 feet |
| Describe Vegetation: | | | Natural Grasses | |
| Notes: | | | | |
| | | | | |
| | | | | |

| | | | | |
|---|--------------------|--------------|-----------------------|-----------------------|
| Bioretention Facility - Design Procedure | | BMP ID 2A | Legend: | Required Entries |
| | | | | Calculated Cells |
| Company Name: | Moment Engineering | | Date: | 7/25/2025 |
| Designed by: | E.A. | | County/City Case No.: | |
| Design Volume | | | | |
| Enter the area tributary to this feature | | | $A_T =$ | 0.6 acres |
| Enter V_{BMP} determined from Section 2.1 of this Handbook | | | $V_{BMP} =$ | 1,512 ft ³ |
| Type of Bioretention Facility Design | | | | |
| <input checked="" type="radio"/> Side slopes required (parallel to parking spaces or adjacent to walkways) <input type="radio"/> 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 | | | $w_T =$ | 9.0 ft |
| Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ | | | $d_E =$ | 1.72 ft |
| Minimum Surface Area, A_m $A_M (ft^2) = \frac{V_{BMP} (ft^3)}{d_E (ft)}$ | | | $A_M =$ | 878 ft ² |
| Proposed Surface Area | | | $A =$ | 1,645 ft ² |
| Bioretention Facility Properties | | | | |
| Side Slopes in Bioretention Facility | | | $z =$ | 4 :1 |
| Diameter of Underdrain | | | | 6 inches |
| Longitudinal Slope of Site (3% maximum) | | | | 1 % |
| 6" Check Dam Spacing | | | | 25 feet |
| Describe Vegetation: | | | Natural Grasses | |
| Notes: | | | | |
| | | | | |
| | | | | |

| | | | | |
|---|--------------------|--------------|-----------------------|---------------------|
| Bioretention Facility - Design Procedure | | BMP ID 3A | Legend: | Required Entries |
| | | | | Calculated Cells |
| Company Name: | Moment Engineering | | Date: | 7/25/2025 |
| Designed by: | E.A. | | County/City Case No.: | |
| Design Volume | | | | |
| Enter the area tributary to this feature | | | $A_T =$ | 0.16 acres |
| Enter V_{BMP} determined from Section 2.1 of this Handbook | | | $V_{BMP} =$ | 364 ft ³ |
| Type of Bioretention Facility Design | | | | |
| <input checked="" type="radio"/> Side slopes required (parallel to parking spaces or adjacent to walkways) <input type="radio"/> 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 | | | $w_T =$ | 9.0 ft |
| Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ | | | $d_E =$ | 1.72 ft |
| Minimum Surface Area, A_m $A_M (ft^2) = \frac{V_{BMP} (ft^3)}{d_E (ft)}$ | | | $A_M =$ | 212 ft ² |
| Proposed Surface Area | | | $A =$ | 935 ft ² |
| Bioretention Facility Properties | | | | |
| Side Slopes in Bioretention Facility | | | $z =$ | 4 :1 |
| Diameter of Underdrain | | | | 6 inches |
| Longitudinal Slope of Site (3% maximum) | | | | 1 % |
| 6" Check Dam Spacing | | | | 25 feet |
| Describe Vegetation: | | | Natural Grasses | |
| Notes: | | | | |
| | | | | |
| | | | | |

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



The project site is within the Applicable Area and the downstream is potentially Susceptible Stream Channel, therefore HCOC mitigation were provided.

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.

Based on the information provided above, **this project meets the requirements of Condition C** and will not create a hydrologic condition of concern in the proximate or downstream receiving waters. The post-development hydrograph for the 2-year, 24-hour rainfall event will be mitigated by the implementation of Site Design BMPs to limit discharges to a flow rate no greater than 110% of pre-development 2-year flow.

**HCOC Mitigation:
Drainage Area A = 1.23 Ac**

| Storm Frequency | Existing Q ₂ (cfs) [1] | Proposed Q ₂ (cfs) | Det. Basin Outlet Q ₂ (cfs) [2] | Different [2] – [1] (cfs) | Different [2] – [1] (%) |
|-----------------|---|----------------------------------|--|---------------------------------|-------------------------------|
| 2-year 24-hour | 0.133 | 0.316 | 0.104 | -0.029 | -22% |

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
Study date 08/27/23 File: beau2pr242.out

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

Program License Serial Number 4029

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

English Units used in output format

Beaumont - Pennsylvania Avenue & I-10 FWY
Inflow Hydrographs, Proposed Conditions
2-year 24-hour storm

Drainage Area = 1.23(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.23(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 379.00(Ft.)
Length along longest watercourse measured to centroid = 142.00(Ft.)
Length along longest watercourse = 0.072 Mi.
Length along longest watercourse measured to centroid = 0.027 Mi.
Difference in elevation = 2.70(Ft.)
Slope along watercourse = 37.6148 Ft./Mi.
Average Manning's 'N' = 0.018
Lag time = 0.020 Hr.
Lag time = 1.21 Min.
25% of lag time = 0.30 Min.
40% of lag time = 0.48 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]
1.23 2.60 3.20

100 YEAR Area rainfall data:

Area(Ac.) [1] Rainfall(In) [2] Weighting[1*2]
1.23 6.40 7.87

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.600(In)
Area Averaged 100-Year Rainfall = 6.400(In)

Point rain (area averaged) = 2.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.600(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
0.170 75.00 0.000
1.060 75.00 0.900
Total Area Entered = 1.23(Ac.)

| RI | RI | Infil. Rate | Impervious | Adj. Infil. Rate | Area% | F |
|-----------|-------|-------------|------------|------------------|--------|---------|
| AMC2 | AMC-1 | (In/Hr) | (Dec.%) | (In/Hr) | (Dec.) | (In/Hr) |
| 75.0 | 57.0 | 0.501 | 0.000 | 0.501 | 0.138 | 0.069 |
| 75.0 | 57.0 | 0.501 | 0.900 | 0.095 | 0.862 | 0.082 |
| Sum (F) = | | | | | | 0.151 |

Area averaged mean soil loss (F) (In/Hr) = 0.151
 Minimum soil loss rate ((In/Hr)) = 0.076
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.280

 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 | 413.145 | 0.818 |
| 2 | 0.167 | 826.290 | 0.422 |
| | | Sum = 100.000 | Sum= 1.240 |

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

| Unit | Time (Hr.) | Pattern Percent | Storm Rain (In/Hr) | Loss rate(In./Hr) | | Effective (In/Hr) |
|------|---------------|--------------------|-----------------------|-------------------|-------|----------------------|
| | | | | Max | Low | |
| 1 | 0.08 | 0.07 | 0.021 | (0.268) | 0.006 | 0.015 |
| 2 | 0.17 | 0.07 | 0.021 | (0.267) | 0.006 | 0.015 |
| 3 | 0.25 | 0.07 | 0.021 | (0.266) | 0.006 | 0.015 |
| 4 | 0.33 | 0.10 | 0.031 | (0.265) | 0.009 | 0.022 |
| 5 | 0.42 | 0.10 | 0.031 | (0.264) | 0.009 | 0.022 |
| 6 | 0.50 | 0.10 | 0.031 | (0.263) | 0.009 | 0.022 |
| 7 | 0.58 | 0.10 | 0.031 | (0.262) | 0.009 | 0.022 |
| 8 | 0.67 | 0.10 | 0.031 | (0.261) | 0.009 | 0.022 |
| 9 | 0.75 | 0.10 | 0.031 | (0.260) | 0.009 | 0.022 |
| 10 | 0.83 | 0.13 | 0.042 | (0.259) | 0.012 | 0.030 |
| 11 | 0.92 | 0.13 | 0.042 | (0.258) | 0.012 | 0.030 |
| 12 | 1.00 | 0.13 | 0.042 | (0.257) | 0.012 | 0.030 |
| 13 | 1.08 | 0.10 | 0.031 | (0.256) | 0.009 | 0.022 |
| 14 | 1.17 | 0.10 | 0.031 | (0.255) | 0.009 | 0.022 |
| 15 | 1.25 | 0.10 | 0.031 | (0.254) | 0.009 | 0.022 |
| 16 | 1.33 | 0.10 | 0.031 | (0.253) | 0.009 | 0.022 |
| 17 | 1.42 | 0.10 | 0.031 | (0.252) | 0.009 | 0.022 |
| 18 | 1.50 | 0.10 | 0.031 | (0.251) | 0.009 | 0.022 |
| 19 | 1.58 | 0.10 | 0.031 | (0.250) | 0.009 | 0.022 |
| 20 | 1.67 | 0.10 | 0.031 | (0.249) | 0.009 | 0.022 |
| 21 | 1.75 | 0.10 | 0.031 | (0.248) | 0.009 | 0.022 |
| 22 | 1.83 | 0.13 | 0.042 | (0.247) | 0.012 | 0.030 |
| 23 | 1.92 | 0.13 | 0.042 | (0.246) | 0.012 | 0.030 |
| 24 | 2.00 | 0.13 | 0.042 | (0.245) | 0.012 | 0.030 |
| 25 | 2.08 | 0.13 | 0.042 | (0.244) | 0.012 | 0.030 |
| 26 | 2.17 | 0.13 | 0.042 | (0.243) | 0.012 | 0.030 |
| 27 | 2.25 | 0.13 | 0.042 | (0.242) | 0.012 | 0.030 |
| 28 | 2.33 | 0.13 | 0.042 | (0.241) | 0.012 | 0.030 |
| 29 | 2.42 | 0.13 | 0.042 | (0.240) | 0.012 | 0.030 |
| 30 | 2.50 | 0.13 | 0.042 | (0.239) | 0.012 | 0.030 |
| 31 | 2.58 | 0.17 | 0.052 | (0.238) | 0.015 | 0.037 |
| 32 | 2.67 | 0.17 | 0.052 | (0.237) | 0.015 | 0.037 |
| 33 | 2.75 | 0.17 | 0.052 | (0.236) | 0.015 | 0.037 |
| 34 | 2.83 | 0.17 | 0.052 | (0.235) | 0.015 | 0.037 |
| 35 | 2.92 | 0.17 | 0.052 | (0.234) | 0.015 | 0.037 |
| 36 | 3.00 | 0.17 | 0.052 | (0.233) | 0.015 | 0.037 |
| 37 | 3.08 | 0.17 | 0.052 | (0.232) | 0.015 | 0.037 |
| 38 | 3.17 | 0.17 | 0.052 | (0.231) | 0.015 | 0.037 |
| 39 | 3.25 | 0.17 | 0.052 | (0.230) | 0.015 | 0.037 |
| 40 | 3.33 | 0.17 | 0.052 | (0.229) | 0.015 | 0.037 |
| 41 | 3.42 | 0.17 | 0.052 | (0.228) | 0.015 | 0.037 |
| 42 | 3.50 | 0.17 | 0.052 | (0.227) | 0.015 | 0.037 |
| 43 | 3.58 | 0.17 | 0.052 | (0.226) | 0.015 | 0.037 |

| | | | | | | |
|-----|------|------|-------|----------|-------|-------|
| 44 | 3.67 | 0.17 | 0.052 | (0.225) | 0.015 | 0.037 |
| 45 | 3.75 | 0.17 | 0.052 | (0.224) | 0.015 | 0.037 |
| 46 | 3.83 | 0.20 | 0.062 | (0.223) | 0.017 | 0.045 |
| 47 | 3.92 | 0.20 | 0.062 | (0.222) | 0.017 | 0.045 |
| 48 | 4.00 | 0.20 | 0.062 | (0.221) | 0.017 | 0.045 |
| 49 | 4.08 | 0.20 | 0.062 | (0.221) | 0.017 | 0.045 |
| 50 | 4.17 | 0.20 | 0.062 | (0.220) | 0.017 | 0.045 |
| 51 | 4.25 | 0.20 | 0.062 | (0.219) | 0.017 | 0.045 |
| 52 | 4.33 | 0.23 | 0.073 | (0.218) | 0.020 | 0.052 |
| 53 | 4.42 | 0.23 | 0.073 | (0.217) | 0.020 | 0.052 |
| 54 | 4.50 | 0.23 | 0.073 | (0.216) | 0.020 | 0.052 |
| 55 | 4.58 | 0.23 | 0.073 | (0.215) | 0.020 | 0.052 |
| 56 | 4.67 | 0.23 | 0.073 | (0.214) | 0.020 | 0.052 |
| 57 | 4.75 | 0.23 | 0.073 | (0.213) | 0.020 | 0.052 |
| 58 | 4.83 | 0.27 | 0.083 | (0.212) | 0.023 | 0.060 |
| 59 | 4.92 | 0.27 | 0.083 | (0.211) | 0.023 | 0.060 |
| 60 | 5.00 | 0.27 | 0.083 | (0.210) | 0.023 | 0.060 |
| 61 | 5.08 | 0.20 | 0.062 | (0.209) | 0.017 | 0.045 |
| 62 | 5.17 | 0.20 | 0.062 | (0.209) | 0.017 | 0.045 |
| 63 | 5.25 | 0.20 | 0.062 | (0.208) | 0.017 | 0.045 |
| 64 | 5.33 | 0.23 | 0.073 | (0.207) | 0.020 | 0.052 |
| 65 | 5.42 | 0.23 | 0.073 | (0.206) | 0.020 | 0.052 |
| 66 | 5.50 | 0.23 | 0.073 | (0.205) | 0.020 | 0.052 |
| 67 | 5.58 | 0.27 | 0.083 | (0.204) | 0.023 | 0.060 |
| 68 | 5.67 | 0.27 | 0.083 | (0.203) | 0.023 | 0.060 |
| 69 | 5.75 | 0.27 | 0.083 | (0.202) | 0.023 | 0.060 |
| 70 | 5.83 | 0.27 | 0.083 | (0.201) | 0.023 | 0.060 |
| 71 | 5.92 | 0.27 | 0.083 | (0.200) | 0.023 | 0.060 |
| 72 | 6.00 | 0.27 | 0.083 | (0.200) | 0.023 | 0.060 |
| 73 | 6.08 | 0.30 | 0.094 | (0.199) | 0.026 | 0.067 |
| 74 | 6.17 | 0.30 | 0.094 | (0.198) | 0.026 | 0.067 |
| 75 | 6.25 | 0.30 | 0.094 | (0.197) | 0.026 | 0.067 |
| 76 | 6.33 | 0.30 | 0.094 | (0.196) | 0.026 | 0.067 |
| 77 | 6.42 | 0.30 | 0.094 | (0.195) | 0.026 | 0.067 |
| 78 | 6.50 | 0.30 | 0.094 | (0.194) | 0.026 | 0.067 |
| 79 | 6.58 | 0.33 | 0.104 | (0.193) | 0.029 | 0.075 |
| 80 | 6.67 | 0.33 | 0.104 | (0.192) | 0.029 | 0.075 |
| 81 | 6.75 | 0.33 | 0.104 | (0.192) | 0.029 | 0.075 |
| 82 | 6.83 | 0.33 | 0.104 | (0.191) | 0.029 | 0.075 |
| 83 | 6.92 | 0.33 | 0.104 | (0.190) | 0.029 | 0.075 |
| 84 | 7.00 | 0.33 | 0.104 | (0.189) | 0.029 | 0.075 |
| 85 | 7.08 | 0.33 | 0.104 | (0.188) | 0.029 | 0.075 |
| 86 | 7.17 | 0.33 | 0.104 | (0.187) | 0.029 | 0.075 |
| 87 | 7.25 | 0.33 | 0.104 | (0.186) | 0.029 | 0.075 |
| 88 | 7.33 | 0.37 | 0.114 | (0.186) | 0.032 | 0.082 |
| 89 | 7.42 | 0.37 | 0.114 | (0.185) | 0.032 | 0.082 |
| 90 | 7.50 | 0.37 | 0.114 | (0.184) | 0.032 | 0.082 |
| 91 | 7.58 | 0.40 | 0.125 | (0.183) | 0.035 | 0.090 |
| 92 | 7.67 | 0.40 | 0.125 | (0.182) | 0.035 | 0.090 |
| 93 | 7.75 | 0.40 | 0.125 | (0.181) | 0.035 | 0.090 |
| 94 | 7.83 | 0.43 | 0.135 | (0.181) | 0.038 | 0.097 |
| 95 | 7.92 | 0.43 | 0.135 | (0.180) | 0.038 | 0.097 |
| 96 | 8.00 | 0.43 | 0.135 | (0.179) | 0.038 | 0.097 |
| 97 | 8.08 | 0.50 | 0.156 | (0.178) | 0.044 | 0.112 |
| 98 | 8.17 | 0.50 | 0.156 | (0.177) | 0.044 | 0.112 |
| 99 | 8.25 | 0.50 | 0.156 | (0.176) | 0.044 | 0.112 |
| 100 | 8.33 | 0.50 | 0.156 | (0.176) | 0.044 | 0.112 |
| 101 | 8.42 | 0.50 | 0.156 | (0.175) | 0.044 | 0.112 |
| 102 | 8.50 | 0.50 | 0.156 | (0.174) | 0.044 | 0.112 |
| 103 | 8.58 | 0.53 | 0.166 | (0.173) | 0.047 | 0.120 |
| 104 | 8.67 | 0.53 | 0.166 | (0.172) | 0.047 | 0.120 |
| 105 | 8.75 | 0.53 | 0.166 | (0.171) | 0.047 | 0.120 |
| 106 | 8.83 | 0.57 | 0.177 | (0.171) | 0.050 | 0.127 |
| 107 | 8.92 | 0.57 | 0.177 | (0.170) | 0.050 | 0.127 |
| 108 | 9.00 | 0.57 | 0.177 | (0.169) | 0.050 | 0.127 |
| 109 | 9.08 | 0.63 | 0.198 | (0.168) | 0.055 | 0.142 |
| 110 | 9.17 | 0.63 | 0.198 | (0.167) | 0.055 | 0.142 |
| 111 | 9.25 | 0.63 | 0.198 | (0.167) | 0.055 | 0.142 |
| 112 | 9.33 | 0.67 | 0.208 | (0.166) | 0.058 | 0.150 |
| 113 | 9.42 | 0.67 | 0.208 | (0.165) | 0.058 | 0.150 |
| 114 | 9.50 | 0.67 | 0.208 | (0.164) | 0.058 | 0.150 |
| 115 | 9.58 | 0.70 | 0.218 | (0.164) | 0.061 | 0.157 |
| 116 | 9.67 | 0.70 | 0.218 | (0.163) | 0.061 | 0.157 |
| 117 | 9.75 | 0.70 | 0.218 | (0.162) | 0.061 | 0.157 |

| | | | | | | |
|-----|-------|------|-------|----------|-------|-------|
| 118 | 9.83 | 0.73 | 0.229 | (0.161) | 0.064 | 0.165 |
| 119 | 9.92 | 0.73 | 0.229 | (0.160) | 0.064 | 0.165 |
| 120 | 10.00 | 0.73 | 0.229 | (0.160) | 0.064 | 0.165 |
| 121 | 10.08 | 0.50 | 0.156 | (0.159) | 0.044 | 0.112 |
| 122 | 10.17 | 0.50 | 0.156 | (0.158) | 0.044 | 0.112 |
| 123 | 10.25 | 0.50 | 0.156 | (0.157) | 0.044 | 0.112 |
| 124 | 10.33 | 0.50 | 0.156 | (0.157) | 0.044 | 0.112 |
| 125 | 10.42 | 0.50 | 0.156 | (0.156) | 0.044 | 0.112 |
| 126 | 10.50 | 0.50 | 0.156 | (0.155) | 0.044 | 0.112 |
| 127 | 10.58 | 0.67 | 0.208 | (0.154) | 0.058 | 0.150 |
| 128 | 10.67 | 0.67 | 0.208 | (0.154) | 0.058 | 0.150 |
| 129 | 10.75 | 0.67 | 0.208 | (0.153) | 0.058 | 0.150 |
| 130 | 10.83 | 0.67 | 0.208 | (0.152) | 0.058 | 0.150 |
| 131 | 10.92 | 0.67 | 0.208 | (0.151) | 0.058 | 0.150 |
| 132 | 11.00 | 0.67 | 0.208 | (0.151) | 0.058 | 0.150 |
| 133 | 11.08 | 0.63 | 0.198 | (0.150) | 0.055 | 0.142 |
| 134 | 11.17 | 0.63 | 0.198 | (0.149) | 0.055 | 0.142 |
| 135 | 11.25 | 0.63 | 0.198 | (0.148) | 0.055 | 0.142 |
| 136 | 11.33 | 0.63 | 0.198 | (0.148) | 0.055 | 0.142 |
| 137 | 11.42 | 0.63 | 0.198 | (0.147) | 0.055 | 0.142 |
| 138 | 11.50 | 0.63 | 0.198 | (0.146) | 0.055 | 0.142 |
| 139 | 11.58 | 0.57 | 0.177 | (0.145) | 0.050 | 0.127 |
| 140 | 11.67 | 0.57 | 0.177 | (0.145) | 0.050 | 0.127 |
| 141 | 11.75 | 0.57 | 0.177 | (0.144) | 0.050 | 0.127 |
| 142 | 11.83 | 0.60 | 0.187 | (0.143) | 0.052 | 0.135 |
| 143 | 11.92 | 0.60 | 0.187 | (0.143) | 0.052 | 0.135 |
| 144 | 12.00 | 0.60 | 0.187 | (0.142) | 0.052 | 0.135 |
| 145 | 12.08 | 0.83 | 0.260 | (0.141) | 0.073 | 0.187 |
| 146 | 12.17 | 0.83 | 0.260 | (0.140) | 0.073 | 0.187 |
| 147 | 12.25 | 0.83 | 0.260 | (0.140) | 0.073 | 0.187 |
| 148 | 12.33 | 0.87 | 0.270 | (0.139) | 0.076 | 0.195 |
| 149 | 12.42 | 0.87 | 0.270 | (0.138) | 0.076 | 0.195 |
| 150 | 12.50 | 0.87 | 0.270 | (0.138) | 0.076 | 0.195 |
| 151 | 12.58 | 0.93 | 0.291 | (0.137) | 0.082 | 0.210 |
| 152 | 12.67 | 0.93 | 0.291 | (0.136) | 0.082 | 0.210 |
| 153 | 12.75 | 0.93 | 0.291 | (0.136) | 0.082 | 0.210 |
| 154 | 12.83 | 0.97 | 0.302 | (0.135) | 0.084 | 0.217 |
| 155 | 12.92 | 0.97 | 0.302 | (0.134) | 0.084 | 0.217 |
| 156 | 13.00 | 0.97 | 0.302 | (0.133) | 0.084 | 0.217 |
| 157 | 13.08 | 1.13 | 0.354 | (0.133) | 0.099 | 0.255 |
| 158 | 13.17 | 1.13 | 0.354 | (0.132) | 0.099 | 0.255 |
| 159 | 13.25 | 1.13 | 0.354 | (0.131) | 0.099 | 0.255 |
| 160 | 13.33 | 1.13 | 0.354 | (0.131) | 0.099 | 0.255 |
| 161 | 13.42 | 1.13 | 0.354 | (0.130) | 0.099 | 0.255 |
| 162 | 13.50 | 1.13 | 0.354 | (0.129) | 0.099 | 0.255 |
| 163 | 13.58 | 0.77 | 0.239 | (0.129) | 0.067 | 0.172 |
| 164 | 13.67 | 0.77 | 0.239 | (0.128) | 0.067 | 0.172 |
| 165 | 13.75 | 0.77 | 0.239 | (0.128) | 0.067 | 0.172 |
| 166 | 13.83 | 0.77 | 0.239 | (0.127) | 0.067 | 0.172 |
| 167 | 13.92 | 0.77 | 0.239 | (0.126) | 0.067 | 0.172 |
| 168 | 14.00 | 0.77 | 0.239 | (0.126) | 0.067 | 0.172 |
| 169 | 14.08 | 0.90 | 0.281 | (0.125) | 0.079 | 0.202 |
| 170 | 14.17 | 0.90 | 0.281 | (0.124) | 0.079 | 0.202 |
| 171 | 14.25 | 0.90 | 0.281 | (0.124) | 0.079 | 0.202 |
| 172 | 14.33 | 0.87 | 0.270 | (0.123) | 0.076 | 0.195 |
| 173 | 14.42 | 0.87 | 0.270 | (0.122) | 0.076 | 0.195 |
| 174 | 14.50 | 0.87 | 0.270 | (0.122) | 0.076 | 0.195 |
| 175 | 14.58 | 0.87 | 0.270 | (0.121) | 0.076 | 0.195 |
| 176 | 14.67 | 0.87 | 0.270 | (0.121) | 0.076 | 0.195 |
| 177 | 14.75 | 0.87 | 0.270 | (0.120) | 0.076 | 0.195 |
| 178 | 14.83 | 0.83 | 0.260 | (0.119) | 0.073 | 0.187 |
| 179 | 14.92 | 0.83 | 0.260 | (0.119) | 0.073 | 0.187 |
| 180 | 15.00 | 0.83 | 0.260 | (0.118) | 0.073 | 0.187 |
| 181 | 15.08 | 0.80 | 0.250 | (0.117) | 0.070 | 0.180 |
| 182 | 15.17 | 0.80 | 0.250 | (0.117) | 0.070 | 0.180 |
| 183 | 15.25 | 0.80 | 0.250 | (0.116) | 0.070 | 0.180 |
| 184 | 15.33 | 0.77 | 0.239 | (0.116) | 0.067 | 0.172 |
| 185 | 15.42 | 0.77 | 0.239 | (0.115) | 0.067 | 0.172 |
| 186 | 15.50 | 0.77 | 0.239 | (0.114) | 0.067 | 0.172 |
| 187 | 15.58 | 0.63 | 0.198 | (0.114) | 0.055 | 0.142 |
| 188 | 15.67 | 0.63 | 0.198 | (0.113) | 0.055 | 0.142 |
| 189 | 15.75 | 0.63 | 0.198 | (0.113) | 0.055 | 0.142 |
| 190 | 15.83 | 0.63 | 0.198 | (0.112) | 0.055 | 0.142 |
| 191 | 15.92 | 0.63 | 0.198 | (0.112) | 0.055 | 0.142 |

| | | | | | | |
|-----|-------|------|-------|----------|-------|-------|
| 192 | 16.00 | 0.63 | 0.198 | (0.111) | 0.055 | 0.142 |
| 193 | 16.08 | 0.13 | 0.042 | (0.110) | 0.012 | 0.030 |
| 194 | 16.17 | 0.13 | 0.042 | (0.110) | 0.012 | 0.030 |
| 195 | 16.25 | 0.13 | 0.042 | (0.109) | 0.012 | 0.030 |
| 196 | 16.33 | 0.13 | 0.042 | (0.109) | 0.012 | 0.030 |
| 197 | 16.42 | 0.13 | 0.042 | (0.108) | 0.012 | 0.030 |
| 198 | 16.50 | 0.13 | 0.042 | (0.108) | 0.012 | 0.030 |
| 199 | 16.58 | 0.10 | 0.031 | (0.107) | 0.009 | 0.022 |
| 200 | 16.67 | 0.10 | 0.031 | (0.107) | 0.009 | 0.022 |
| 201 | 16.75 | 0.10 | 0.031 | (0.106) | 0.009 | 0.022 |
| 202 | 16.83 | 0.10 | 0.031 | (0.105) | 0.009 | 0.022 |
| 203 | 16.92 | 0.10 | 0.031 | (0.105) | 0.009 | 0.022 |
| 204 | 17.00 | 0.10 | 0.031 | (0.104) | 0.009 | 0.022 |
| 205 | 17.08 | 0.17 | 0.052 | (0.104) | 0.015 | 0.037 |
| 206 | 17.17 | 0.17 | 0.052 | (0.103) | 0.015 | 0.037 |
| 207 | 17.25 | 0.17 | 0.052 | (0.103) | 0.015 | 0.037 |
| 208 | 17.33 | 0.17 | 0.052 | (0.102) | 0.015 | 0.037 |
| 209 | 17.42 | 0.17 | 0.052 | (0.102) | 0.015 | 0.037 |
| 210 | 17.50 | 0.17 | 0.052 | (0.101) | 0.015 | 0.037 |
| 211 | 17.58 | 0.17 | 0.052 | (0.101) | 0.015 | 0.037 |
| 212 | 17.67 | 0.17 | 0.052 | (0.100) | 0.015 | 0.037 |
| 213 | 17.75 | 0.17 | 0.052 | (0.100) | 0.015 | 0.037 |
| 214 | 17.83 | 0.13 | 0.042 | (0.099) | 0.012 | 0.030 |
| 215 | 17.92 | 0.13 | 0.042 | (0.099) | 0.012 | 0.030 |
| 216 | 18.00 | 0.13 | 0.042 | (0.098) | 0.012 | 0.030 |
| 217 | 18.08 | 0.13 | 0.042 | (0.098) | 0.012 | 0.030 |
| 218 | 18.17 | 0.13 | 0.042 | (0.097) | 0.012 | 0.030 |
| 219 | 18.25 | 0.13 | 0.042 | (0.097) | 0.012 | 0.030 |
| 220 | 18.33 | 0.13 | 0.042 | (0.096) | 0.012 | 0.030 |
| 221 | 18.42 | 0.13 | 0.042 | (0.096) | 0.012 | 0.030 |
| 222 | 18.50 | 0.13 | 0.042 | (0.095) | 0.012 | 0.030 |
| 223 | 18.58 | 0.10 | 0.031 | (0.095) | 0.009 | 0.022 |
| 224 | 18.67 | 0.10 | 0.031 | (0.095) | 0.009 | 0.022 |
| 225 | 18.75 | 0.10 | 0.031 | (0.094) | 0.009 | 0.022 |
| 226 | 18.83 | 0.07 | 0.021 | (0.094) | 0.006 | 0.015 |
| 227 | 18.92 | 0.07 | 0.021 | (0.093) | 0.006 | 0.015 |
| 228 | 19.00 | 0.07 | 0.021 | (0.093) | 0.006 | 0.015 |
| 229 | 19.08 | 0.10 | 0.031 | (0.092) | 0.009 | 0.022 |
| 230 | 19.17 | 0.10 | 0.031 | (0.092) | 0.009 | 0.022 |
| 231 | 19.25 | 0.10 | 0.031 | (0.091) | 0.009 | 0.022 |
| 232 | 19.33 | 0.13 | 0.042 | (0.091) | 0.012 | 0.030 |
| 233 | 19.42 | 0.13 | 0.042 | (0.091) | 0.012 | 0.030 |
| 234 | 19.50 | 0.13 | 0.042 | (0.090) | 0.012 | 0.030 |
| 235 | 19.58 | 0.10 | 0.031 | (0.090) | 0.009 | 0.022 |
| 236 | 19.67 | 0.10 | 0.031 | (0.089) | 0.009 | 0.022 |
| 237 | 19.75 | 0.10 | 0.031 | (0.089) | 0.009 | 0.022 |
| 238 | 19.83 | 0.07 | 0.021 | (0.089) | 0.006 | 0.015 |
| 239 | 19.92 | 0.07 | 0.021 | (0.088) | 0.006 | 0.015 |
| 240 | 20.00 | 0.07 | 0.021 | (0.088) | 0.006 | 0.015 |
| 241 | 20.08 | 0.10 | 0.031 | (0.087) | 0.009 | 0.022 |
| 242 | 20.17 | 0.10 | 0.031 | (0.087) | 0.009 | 0.022 |
| 243 | 20.25 | 0.10 | 0.031 | (0.087) | 0.009 | 0.022 |
| 244 | 20.33 | 0.10 | 0.031 | (0.086) | 0.009 | 0.022 |
| 245 | 20.42 | 0.10 | 0.031 | (0.086) | 0.009 | 0.022 |
| 246 | 20.50 | 0.10 | 0.031 | (0.086) | 0.009 | 0.022 |
| 247 | 20.58 | 0.10 | 0.031 | (0.085) | 0.009 | 0.022 |
| 248 | 20.67 | 0.10 | 0.031 | (0.085) | 0.009 | 0.022 |
| 249 | 20.75 | 0.10 | 0.031 | (0.084) | 0.009 | 0.022 |
| 250 | 20.83 | 0.07 | 0.021 | (0.084) | 0.006 | 0.015 |
| 251 | 20.92 | 0.07 | 0.021 | (0.084) | 0.006 | 0.015 |
| 252 | 21.00 | 0.07 | 0.021 | (0.083) | 0.006 | 0.015 |
| 253 | 21.08 | 0.10 | 0.031 | (0.083) | 0.009 | 0.022 |
| 254 | 21.17 | 0.10 | 0.031 | (0.083) | 0.009 | 0.022 |
| 255 | 21.25 | 0.10 | 0.031 | (0.082) | 0.009 | 0.022 |
| 256 | 21.33 | 0.07 | 0.021 | (0.082) | 0.006 | 0.015 |
| 257 | 21.42 | 0.07 | 0.021 | (0.082) | 0.006 | 0.015 |
| 258 | 21.50 | 0.07 | 0.021 | (0.082) | 0.006 | 0.015 |
| 259 | 21.58 | 0.10 | 0.031 | (0.081) | 0.009 | 0.022 |
| 260 | 21.67 | 0.10 | 0.031 | (0.081) | 0.009 | 0.022 |
| 261 | 21.75 | 0.10 | 0.031 | (0.081) | 0.009 | 0.022 |
| 262 | 21.83 | 0.07 | 0.021 | (0.080) | 0.006 | 0.015 |
| 263 | 21.92 | 0.07 | 0.021 | (0.080) | 0.006 | 0.015 |
| 264 | 22.00 | 0.07 | 0.021 | (0.080) | 0.006 | 0.015 |
| 265 | 22.08 | 0.10 | 0.031 | (0.080) | 0.009 | 0.022 |

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|------|--------|------|-----|--|--|--|--|
| 2+35 | 0.0065 | 0.04 | QV | | | | |
| 2+40 | 0.0069 | 0.05 | QV | | | | |
| 2+45 | 0.0072 | 0.05 | QV | | | | |
| 2+50 | 0.0075 | 0.05 | QV | | | | |
| 2+55 | 0.0078 | 0.05 | QV | | | | |
| 3+ 0 | 0.0081 | 0.05 | QV | | | | |
| 3+ 5 | 0.0085 | 0.05 | QV | | | | |
| 3+10 | 0.0088 | 0.05 | QV | | | | |
| 3+15 | 0.0091 | 0.05 | QV | | | | |
| 3+20 | 0.0094 | 0.05 | QV | | | | |
| 3+25 | 0.0097 | 0.05 | Q V | | | | |
| 3+30 | 0.0101 | 0.05 | Q V | | | | |
| 3+35 | 0.0104 | 0.05 | Q V | | | | |
| 3+40 | 0.0107 | 0.05 | Q V | | | | |
| 3+45 | 0.0110 | 0.05 | Q V | | | | |
| 3+50 | 0.0114 | 0.05 | Q V | | | | |
| 3+55 | 0.0118 | 0.06 | Q V | | | | |
| 4+ 0 | 0.0121 | 0.06 | Q V | | | | |
| 4+ 5 | 0.0125 | 0.06 | Q V | | | | |
| 4+10 | 0.0129 | 0.06 | Q V | | | | |
| 4+15 | 0.0133 | 0.06 | Q V | | | | |
| 4+20 | 0.0137 | 0.06 | Q V | | | | |
| 4+25 | 0.0142 | 0.07 | Q V | | | | |
| 4+30 | 0.0146 | 0.07 | Q V | | | | |
| 4+35 | 0.0151 | 0.07 | Q V | | | | |
| 4+40 | 0.0155 | 0.07 | Q V | | | | |
| 4+45 | 0.0160 | 0.07 | Q V | | | | |
| 4+50 | 0.0165 | 0.07 | Q V | | | | |
| 4+55 | 0.0170 | 0.07 | Q V | | | | |
| 5+ 0 | 0.0175 | 0.07 | Q V | | | | |
| 5+ 5 | 0.0179 | 0.06 | Q V | | | | |
| 5+10 | 0.0183 | 0.06 | Q V | | | | |
| 5+15 | 0.0187 | 0.06 | Q V | | | | |
| 5+20 | 0.0191 | 0.06 | Q V | | | | |
| 5+25 | 0.0195 | 0.07 | Q V | | | | |
| 5+30 | 0.0200 | 0.07 | Q V | | | | |
| 5+35 | 0.0205 | 0.07 | Q V | | | | |
| 5+40 | 0.0210 | 0.07 | Q V | | | | |
| 5+45 | 0.0215 | 0.07 | Q V | | | | |
| 5+50 | 0.0220 | 0.07 | Q V | | | | |
| 5+55 | 0.0225 | 0.07 | Q V | | | | |
| 6+ 0 | 0.0230 | 0.07 | Q V | | | | |
| 6+ 5 | 0.0236 | 0.08 | Q V | | | | |
| 6+10 | 0.0242 | 0.08 | Q V | | | | |
| 6+15 | 0.0247 | 0.08 | Q V | | | | |
| 6+20 | 0.0253 | 0.08 | Q V | | | | |
| 6+25 | 0.0259 | 0.08 | Q V | | | | |
| 6+30 | 0.0265 | 0.08 | Q V | | | | |
| 6+35 | 0.0271 | 0.09 | Q V | | | | |
| 6+40 | 0.0277 | 0.09 | Q V | | | | |
| 6+45 | 0.0284 | 0.09 | Q V | | | | |
| 6+50 | 0.0290 | 0.09 | Q V | | | | |
| 6+55 | 0.0297 | 0.09 | Q V | | | | |
| 7+ 0 | 0.0303 | 0.09 | Q V | | | | |
| 7+ 5 | 0.0309 | 0.09 | Q V | | | | |
| 7+10 | 0.0316 | 0.09 | Q V | | | | |
| 7+15 | 0.0322 | 0.09 | Q V | | | | |
| 7+20 | 0.0329 | 0.10 | Q V | | | | |
| 7+25 | 0.0336 | 0.10 | Q V | | | | |
| 7+30 | 0.0343 | 0.10 | Q V | | | | |
| 7+35 | 0.0350 | 0.11 | Q V | | | | |
| 7+40 | 0.0358 | 0.11 | Q V | | | | |
| 7+45 | 0.0366 | 0.11 | Q V | | | | |
| 7+50 | 0.0374 | 0.12 | Q V | | | | |
| 7+55 | 0.0382 | 0.12 | Q V | | | | |
| 8+ 0 | 0.0391 | 0.12 | Q V | | | | |
| 8+ 5 | 0.0400 | 0.13 | Q V | | | | |
| 8+10 | 0.0409 | 0.14 | Q V | | | | |
| 8+15 | 0.0419 | 0.14 | Q V | | | | |
| 8+20 | 0.0428 | 0.14 | Q V | | | | |
| 8+25 | 0.0438 | 0.14 | Q V | | | | |
| 8+30 | 0.0448 | 0.14 | Q V | | | | |
| 8+35 | 0.0458 | 0.15 | Q V | | | | |
| 8+40 | 0.0468 | 0.15 | Q V | | | | |

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|-------|--------|------|---|---|--|--|--|--|--|
| 8+45 | 0.0478 | 0.15 | Q | V | | | | | |
| 8+50 | 0.0489 | 0.15 | Q | V | | | | | |
| 8+55 | 0.0500 | 0.16 | Q | V | | | | | |
| 9+ 0 | 0.0511 | 0.16 | Q | V | | | | | |
| 9+ 5 | 0.0522 | 0.17 | Q | V | | | | | |
| 9+10 | 0.0534 | 0.18 | Q | V | | | | | |
| 9+15 | 0.0547 | 0.18 | Q | V | | | | | |
| 9+20 | 0.0559 | 0.18 | Q | V | | | | | |
| 9+25 | 0.0572 | 0.19 | Q | V | | | | | |
| 9+30 | 0.0585 | 0.19 | Q | V | | | | | |
| 9+35 | 0.0598 | 0.19 | Q | V | | | | | |
| 9+40 | 0.0611 | 0.20 | Q | V | | | | | |
| 9+45 | 0.0625 | 0.20 | Q | V | | | | | |
| 9+50 | 0.0639 | 0.20 | Q | V | | | | | |
| 9+55 | 0.0653 | 0.20 | Q | V | | | | | |
| 10+ 0 | 0.0667 | 0.20 | Q | V | | | | | |
| 10+ 5 | 0.0678 | 0.16 | Q | V | | | | | |
| 10+10 | 0.0688 | 0.14 | Q | V | | | | | |
| 10+15 | 0.0697 | 0.14 | Q | V | | | | | |
| 10+20 | 0.0707 | 0.14 | Q | V | | | | | |
| 10+25 | 0.0716 | 0.14 | Q | V | | | | | |
| 10+30 | 0.0726 | 0.14 | Q | V | | | | | |
| 10+35 | 0.0738 | 0.17 | Q | V | | | | | |
| 10+40 | 0.0750 | 0.19 | Q | V | | | | | |
| 10+45 | 0.0763 | 0.19 | Q | V | | | | | |
| 10+50 | 0.0776 | 0.19 | Q | V | | | | | |
| 10+55 | 0.0789 | 0.19 | Q | V | | | | | |
| 11+ 0 | 0.0802 | 0.19 | Q | V | | | | | |
| 11+ 5 | 0.0814 | 0.18 | Q | V | | | | | |
| 11+10 | 0.0826 | 0.18 | Q | V | | | | | |
| 11+15 | 0.0838 | 0.18 | Q | V | | | | | |
| 11+20 | 0.0850 | 0.18 | Q | V | | | | | |
| 11+25 | 0.0863 | 0.18 | Q | V | | | | | |
| 11+30 | 0.0875 | 0.18 | Q | V | | | | | |
| 11+35 | 0.0886 | 0.16 | Q | V | | | | | |
| 11+40 | 0.0897 | 0.16 | Q | V | | | | | |
| 11+45 | 0.0908 | 0.16 | Q | V | | | | | |
| 11+50 | 0.0919 | 0.16 | Q | V | | | | | |
| 11+55 | 0.0931 | 0.17 | Q | V | | | | | |
| 12+ 0 | 0.0942 | 0.17 | Q | V | | | | | |
| 12+ 5 | 0.0957 | 0.21 | Q | V | | | | | |
| 12+10 | 0.0973 | 0.23 | Q | V | | | | | |
| 12+15 | 0.0988 | 0.23 | Q | V | | | | | |
| 12+20 | 0.1005 | 0.24 | Q | V | | | | | |
| 12+25 | 0.1022 | 0.24 | Q | V | | | | | |
| 12+30 | 0.1038 | 0.24 | Q | V | | | | | |
| 12+35 | 0.1056 | 0.25 | Q | V | | | | | |
| 12+40 | 0.1074 | 0.26 | Q | V | | | | | |
| 12+45 | 0.1091 | 0.26 | Q | V | | | | | |
| 12+50 | 0.1110 | 0.27 | Q | V | | | | | |
| 12+55 | 0.1128 | 0.27 | Q | V | | | | | |
| 13+ 0 | 0.1147 | 0.27 | Q | V | | | | | |
| 13+ 5 | 0.1168 | 0.30 | Q | V | | | | | |
| 13+10 | 0.1189 | 0.32 | Q | V | | | | | |
| 13+15 | 0.1211 | 0.32 | Q | V | | | | | |
| 13+20 | 0.1233 | 0.32 | Q | V | | | | | |
| 13+25 | 0.1255 | 0.32 | Q | V | | | | | |
| 13+30 | 0.1276 | 0.32 | Q | V | | | | | |
| 13+35 | 0.1293 | 0.25 | Q | V | | | | | |
| 13+40 | 0.1308 | 0.21 | Q | V | | | | | |
| 13+45 | 0.1323 | 0.21 | Q | V | | | | | |
| 13+50 | 0.1338 | 0.21 | Q | V | | | | | |
| 13+55 | 0.1352 | 0.21 | Q | V | | | | | |
| 14+ 0 | 0.1367 | 0.21 | Q | V | | | | | |
| 14+ 5 | 0.1383 | 0.24 | Q | V | | | | | |
| 14+10 | 0.1401 | 0.25 | Q | V | | | | | |
| 14+15 | 0.1418 | 0.25 | Q | V | | | | | |
| 14+20 | 0.1435 | 0.24 | Q | V | | | | | |
| 14+25 | 0.1451 | 0.24 | Q | V | | | | | |
| 14+30 | 0.1468 | 0.24 | Q | V | | | | | |
| 14+35 | 0.1485 | 0.24 | Q | V | | | | | |
| 14+40 | 0.1501 | 0.24 | Q | V | | | | | |
| 14+45 | 0.1518 | 0.24 | Q | V | | | | | |
| 14+50 | 0.1534 | 0.24 | Q | V | | | | | |

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|-------|--------|------|---|--|--|--|---|--|
| 14+55 | 0.1550 | 0.23 | Q | | | | V | |
| 15+ 0 | 0.1566 | 0.23 | Q | | | | V | |
| 15+ 5 | 0.1582 | 0.23 | Q | | | | V | |
| 15+10 | 0.1597 | 0.22 | Q | | | | V | |
| 15+15 | 0.1612 | 0.22 | Q | | | | V | |
| 15+20 | 0.1627 | 0.22 | Q | | | | V | |
| 15+25 | 0.1642 | 0.21 | Q | | | | V | |
| 15+30 | 0.1657 | 0.21 | Q | | | | V | |
| 15+35 | 0.1670 | 0.19 | Q | | | | V | |
| 15+40 | 0.1682 | 0.18 | Q | | | | V | |
| 15+45 | 0.1694 | 0.18 | Q | | | | V | |
| 15+50 | 0.1706 | 0.18 | Q | | | | V | |
| 15+55 | 0.1718 | 0.18 | Q | | | | V | |
| 16+ 0 | 0.1730 | 0.18 | Q | | | | V | |
| 16+ 5 | 0.1736 | 0.08 | Q | | | | V | |
| 16+10 | 0.1739 | 0.04 | Q | | | | V | |
| 16+15 | 0.1741 | 0.04 | Q | | | | V | |
| 16+20 | 0.1744 | 0.04 | Q | | | | V | |
| 16+25 | 0.1747 | 0.04 | Q | | | | V | |
| 16+30 | 0.1749 | 0.04 | Q | | | | V | |
| 16+35 | 0.1751 | 0.03 | Q | | | | V | |
| 16+40 | 0.1753 | 0.03 | Q | | | | V | |
| 16+45 | 0.1755 | 0.03 | Q | | | | V | |
| 16+50 | 0.1757 | 0.03 | Q | | | | V | |
| 16+55 | 0.1759 | 0.03 | Q | | | | V | |
| 17+ 0 | 0.1761 | 0.03 | Q | | | | V | |
| 17+ 5 | 0.1764 | 0.04 | Q | | | | V | |
| 17+10 | 0.1767 | 0.05 | Q | | | | V | |
| 17+15 | 0.1770 | 0.05 | Q | | | | V | |
| 17+20 | 0.1773 | 0.05 | Q | | | | V | |
| 17+25 | 0.1776 | 0.05 | Q | | | | V | |
| 17+30 | 0.1780 | 0.05 | Q | | | | V | |
| 17+35 | 0.1783 | 0.05 | Q | | | | V | |
| 17+40 | 0.1786 | 0.05 | Q | | | | V | |
| 17+45 | 0.1789 | 0.05 | Q | | | | V | |
| 17+50 | 0.1792 | 0.04 | Q | | | | V | |
| 17+55 | 0.1794 | 0.04 | Q | | | | V | |
| 18+ 0 | 0.1797 | 0.04 | Q | | | | V | |
| 18+ 5 | 0.1800 | 0.04 | Q | | | | V | |
| 18+10 | 0.1802 | 0.04 | Q | | | | V | |
| 18+15 | 0.1805 | 0.04 | Q | | | | V | |
| 18+20 | 0.1807 | 0.04 | Q | | | | V | |
| 18+25 | 0.1810 | 0.04 | Q | | | | V | |
| 18+30 | 0.1812 | 0.04 | Q | | | | V | |
| 18+35 | 0.1815 | 0.03 | Q | | | | V | |
| 18+40 | 0.1816 | 0.03 | Q | | | | V | |
| 18+45 | 0.1818 | 0.03 | Q | | | | V | |
| 18+50 | 0.1820 | 0.02 | Q | | | | V | |
| 18+55 | 0.1821 | 0.02 | Q | | | | V | |
| 19+ 0 | 0.1822 | 0.02 | Q | | | | V | |
| 19+ 5 | 0.1824 | 0.02 | Q | | | | V | |
| 19+10 | 0.1826 | 0.03 | Q | | | | V | |
| 19+15 | 0.1828 | 0.03 | Q | | | | V | |
| 19+20 | 0.1830 | 0.03 | Q | | | | V | |
| 19+25 | 0.1833 | 0.04 | Q | | | | V | |
| 19+30 | 0.1835 | 0.04 | Q | | | | V | |
| 19+35 | 0.1838 | 0.03 | Q | | | | V | |
| 19+40 | 0.1839 | 0.03 | Q | | | | V | |
| 19+45 | 0.1841 | 0.03 | Q | | | | V | |
| 19+50 | 0.1843 | 0.02 | Q | | | | V | |
| 19+55 | 0.1844 | 0.02 | Q | | | | V | |
| 20+ 0 | 0.1845 | 0.02 | Q | | | | V | |
| 20+ 5 | 0.1847 | 0.02 | Q | | | | V | |
| 20+10 | 0.1849 | 0.03 | Q | | | | V | |
| 20+15 | 0.1851 | 0.03 | Q | | | | V | |
| 20+20 | 0.1853 | 0.03 | Q | | | | V | |
| 20+25 | 0.1855 | 0.03 | Q | | | | V | |
| 20+30 | 0.1857 | 0.03 | Q | | | | V | |
| 20+35 | 0.1859 | 0.03 | Q | | | | V | |
| 20+40 | 0.1861 | 0.03 | Q | | | | V | |
| 20+45 | 0.1862 | 0.03 | Q | | | | V | |
| 20+50 | 0.1864 | 0.02 | Q | | | | V | |
| 20+55 | 0.1865 | 0.02 | Q | | | | V | |
| 21+ 0 | 0.1867 | 0.02 | Q | | | | V | |

| | | | | | | | |
|-------|--------|------|---|--|--|--|---|
| 21+ 5 | 0.1868 | 0.02 | Q | | | | V |
| 21+10 | 0.1870 | 0.03 | Q | | | | V |
| 21+15 | 0.1872 | 0.03 | Q | | | | V |
| 21+20 | 0.1874 | 0.02 | Q | | | | V |
| 21+25 | 0.1875 | 0.02 | Q | | | | V |
| 21+30 | 0.1876 | 0.02 | Q | | | | V |
| 21+35 | 0.1878 | 0.02 | Q | | | | V |
| 21+40 | 0.1880 | 0.03 | Q | | | | V |
| 21+45 | 0.1882 | 0.03 | Q | | | | V |
| 21+50 | 0.1883 | 0.02 | Q | | | | V |
| 21+55 | 0.1884 | 0.02 | Q | | | | V |
| 22+ 0 | 0.1886 | 0.02 | Q | | | | V |
| 22+ 5 | 0.1887 | 0.02 | Q | | | | V |
| 22+10 | 0.1889 | 0.03 | Q | | | | V |
| 22+15 | 0.1891 | 0.03 | Q | | | | V |
| 22+20 | 0.1893 | 0.02 | Q | | | | V |
| 22+25 | 0.1894 | 0.02 | Q | | | | V |
| 22+30 | 0.1895 | 0.02 | Q | | | | V |
| 22+35 | 0.1897 | 0.02 | Q | | | | V |
| 22+40 | 0.1898 | 0.02 | Q | | | | V |
| 22+45 | 0.1899 | 0.02 | Q | | | | V |
| 22+50 | 0.1900 | 0.02 | Q | | | | V |
| 22+55 | 0.1902 | 0.02 | Q | | | | V |
| 23+ 0 | 0.1903 | 0.02 | Q | | | | V |
| 23+ 5 | 0.1904 | 0.02 | Q | | | | V |
| 23+10 | 0.1906 | 0.02 | Q | | | | V |
| 23+15 | 0.1907 | 0.02 | Q | | | | V |
| 23+20 | 0.1908 | 0.02 | Q | | | | V |
| 23+25 | 0.1909 | 0.02 | Q | | | | V |
| 23+30 | 0.1911 | 0.02 | Q | | | | V |
| 23+35 | 0.1912 | 0.02 | Q | | | | V |
| 23+40 | 0.1913 | 0.02 | Q | | | | V |
| 23+45 | 0.1915 | 0.02 | Q | | | | V |
| 23+50 | 0.1916 | 0.02 | Q | | | | V |
| 23+55 | 0.1917 | 0.02 | Q | | | | V |
| 24+ 0 | 0.1918 | 0.02 | Q | | | | V |
| 24+ 5 | 0.1919 | 0.01 | Q | | | | V |

Unit Hydrograph Analysis

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Study date 08/27/23 File: beau2ex242.out

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

Program License Serial Number 4029

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

English Units used in output format

Beaumont - Pennsylvania Avenue & I-10 FWY
Inflow Hydrographs, Existing Conditions for comparison
2-year 24-hour storm

Drainage Area = 1.23(Ac.) = 0.002 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.23(Ac.) = 0.002 Sq. Mi.
Length along longest watercourse = 379.00(Ft.)
Length along longest watercourse measured to centroid = 142.00(Ft.)
Length along longest watercourse = 0.072 Mi.
Length along longest watercourse measured to centroid = 0.027 Mi.
Difference in elevation = 2.70(Ft.)
Slope along watercourse = 37.6148 Ft./Mi.
Average Manning's 'N' = 0.035
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 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] |
|---------------|------------------|----------------|
| 1.23 | 2.60 | 3.20 |

100 YEAR Area rainfall data:

| Area(Ac.) [1] | Rainfall(In) [2] | Weighting[1*2] |
|---------------|------------------|----------------|
| 1.23 | 6.40 | 7.87 |

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.600(In)
Area Averaged 100-Year Rainfall = 6.400(In)

Point rain (area averaged) = 2.600(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.600(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
1.230 89.00 0.000
Total Area Entered = 1.23(Ac.)

| | | | | | | |
|------|-------|-------------|------------|------------------|--------|-----------------|
| RI | RI | Infil. Rate | Impervious | Adj. Infil. Rate | Area% | F |
| AMC2 | AMC-1 | (In/Hr) | (Dec.%) | (In/Hr) | (Dec.) | (In/Hr) |
| 89.0 | 76.4 | 0.286 | 0.000 | 0.286 | 1.000 | 0.286 |
| | | | | | | Sum (F) = 0.286 |

Area averaged mean soil loss (F) (In/Hr) = 0.286
 Minimum soil loss rate ((In/Hr)) = 0.143
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.900

 Unit Hydrograph
 VALLEY S-Curve

Unit Hydrograph Data

| Unit time period (hrs) | Time % of lag | Distribution Graph % | Unit Hydrograph (CFS) |
|---------------------------|---------------|-------------------------|--------------------------|
| 1 | 0.083 | 212.475 | 45.477 |
| 2 | 0.167 | 424.949 | 42.506 |
| 3 | 0.250 | 637.424 | 8.309 |
| 4 | 0.333 | 849.898 | 3.708 |
| | | Sum = 100.000 | Sum= 1.240 |

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

| Unit Time (Hr.) | Pattern Percent | Storm Rain (In/Hr) | Loss rate(In./Hr) | | Effective (In/Hr) |
|--------------------|--------------------|-----------------------|-------------------|-------|----------------------|
| | | | Max | Low | |
| 1 | 0.08 | 0.021 | (0.508) | 0.019 | 0.002 |
| 2 | 0.17 | 0.021 | (0.506) | 0.019 | 0.002 |
| 3 | 0.25 | 0.021 | (0.504) | 0.019 | 0.002 |
| 4 | 0.33 | 0.031 | (0.502) | 0.028 | 0.003 |
| 5 | 0.42 | 0.031 | (0.500) | 0.028 | 0.003 |
| 6 | 0.50 | 0.031 | (0.498) | 0.028 | 0.003 |
| 7 | 0.58 | 0.031 | (0.496) | 0.028 | 0.003 |
| 8 | 0.67 | 0.031 | (0.494) | 0.028 | 0.003 |
| 9 | 0.75 | 0.031 | (0.492) | 0.028 | 0.003 |
| 10 | 0.83 | 0.042 | (0.490) | 0.037 | 0.004 |
| 11 | 0.92 | 0.042 | (0.488) | 0.037 | 0.004 |
| 12 | 1.00 | 0.042 | (0.486) | 0.037 | 0.004 |
| 13 | 1.08 | 0.031 | (0.485) | 0.028 | 0.003 |
| 14 | 1.17 | 0.031 | (0.483) | 0.028 | 0.003 |
| 15 | 1.25 | 0.031 | (0.481) | 0.028 | 0.003 |
| 16 | 1.33 | 0.031 | (0.479) | 0.028 | 0.003 |
| 17 | 1.42 | 0.031 | (0.477) | 0.028 | 0.003 |
| 18 | 1.50 | 0.031 | (0.475) | 0.028 | 0.003 |
| 19 | 1.58 | 0.031 | (0.473) | 0.028 | 0.003 |
| 20 | 1.67 | 0.031 | (0.471) | 0.028 | 0.003 |
| 21 | 1.75 | 0.031 | (0.469) | 0.028 | 0.003 |
| 22 | 1.83 | 0.042 | (0.467) | 0.037 | 0.004 |
| 23 | 1.92 | 0.042 | (0.466) | 0.037 | 0.004 |
| 24 | 2.00 | 0.042 | (0.464) | 0.037 | 0.004 |
| 25 | 2.08 | 0.042 | (0.462) | 0.037 | 0.004 |
| 26 | 2.17 | 0.042 | (0.460) | 0.037 | 0.004 |
| 27 | 2.25 | 0.042 | (0.458) | 0.037 | 0.004 |
| 28 | 2.33 | 0.042 | (0.456) | 0.037 | 0.004 |
| 29 | 2.42 | 0.042 | (0.454) | 0.037 | 0.004 |
| 30 | 2.50 | 0.042 | (0.452) | 0.037 | 0.004 |
| 31 | 2.58 | 0.052 | (0.451) | 0.047 | 0.005 |
| 32 | 2.67 | 0.052 | (0.449) | 0.047 | 0.005 |
| 33 | 2.75 | 0.052 | (0.447) | 0.047 | 0.005 |
| 34 | 2.83 | 0.052 | (0.445) | 0.047 | 0.005 |
| 35 | 2.92 | 0.052 | (0.443) | 0.047 | 0.005 |
| 36 | 3.00 | 0.052 | (0.441) | 0.047 | 0.005 |
| 37 | 3.08 | 0.052 | (0.440) | 0.047 | 0.005 |
| 38 | 3.17 | 0.052 | (0.438) | 0.047 | 0.005 |
| 39 | 3.25 | 0.052 | (0.436) | 0.047 | 0.005 |
| 40 | 3.33 | 0.052 | (0.434) | 0.047 | 0.005 |
| 41 | 3.42 | 0.052 | (0.432) | 0.047 | 0.005 |
| 42 | 3.50 | 0.052 | (0.430) | 0.047 | 0.005 |
| 43 | 3.58 | 0.052 | (0.429) | 0.047 | 0.005 |

| | | | | | | |
|-----|------|------|-------|----------|-------|-------|
| 44 | 3.67 | 0.17 | 0.052 | (0.427) | 0.047 | 0.005 |
| 45 | 3.75 | 0.17 | 0.052 | (0.425) | 0.047 | 0.005 |
| 46 | 3.83 | 0.20 | 0.062 | (0.423) | 0.056 | 0.006 |
| 47 | 3.92 | 0.20 | 0.062 | (0.422) | 0.056 | 0.006 |
| 48 | 4.00 | 0.20 | 0.062 | (0.420) | 0.056 | 0.006 |
| 49 | 4.08 | 0.20 | 0.062 | (0.418) | 0.056 | 0.006 |
| 50 | 4.17 | 0.20 | 0.062 | (0.416) | 0.056 | 0.006 |
| 51 | 4.25 | 0.20 | 0.062 | (0.414) | 0.056 | 0.006 |
| 52 | 4.33 | 0.23 | 0.073 | (0.413) | 0.066 | 0.007 |
| 53 | 4.42 | 0.23 | 0.073 | (0.411) | 0.066 | 0.007 |
| 54 | 4.50 | 0.23 | 0.073 | (0.409) | 0.066 | 0.007 |
| 55 | 4.58 | 0.23 | 0.073 | (0.407) | 0.066 | 0.007 |
| 56 | 4.67 | 0.23 | 0.073 | (0.406) | 0.066 | 0.007 |
| 57 | 4.75 | 0.23 | 0.073 | (0.404) | 0.066 | 0.007 |
| 58 | 4.83 | 0.27 | 0.083 | (0.402) | 0.075 | 0.008 |
| 59 | 4.92 | 0.27 | 0.083 | (0.400) | 0.075 | 0.008 |
| 60 | 5.00 | 0.27 | 0.083 | (0.399) | 0.075 | 0.008 |
| 61 | 5.08 | 0.20 | 0.062 | (0.397) | 0.056 | 0.006 |
| 62 | 5.17 | 0.20 | 0.062 | (0.395) | 0.056 | 0.006 |
| 63 | 5.25 | 0.20 | 0.062 | (0.393) | 0.056 | 0.006 |
| 64 | 5.33 | 0.23 | 0.073 | (0.392) | 0.066 | 0.007 |
| 65 | 5.42 | 0.23 | 0.073 | (0.390) | 0.066 | 0.007 |
| 66 | 5.50 | 0.23 | 0.073 | (0.388) | 0.066 | 0.007 |
| 67 | 5.58 | 0.27 | 0.083 | (0.387) | 0.075 | 0.008 |
| 68 | 5.67 | 0.27 | 0.083 | (0.385) | 0.075 | 0.008 |
| 69 | 5.75 | 0.27 | 0.083 | (0.383) | 0.075 | 0.008 |
| 70 | 5.83 | 0.27 | 0.083 | (0.382) | 0.075 | 0.008 |
| 71 | 5.92 | 0.27 | 0.083 | (0.380) | 0.075 | 0.008 |
| 72 | 6.00 | 0.27 | 0.083 | (0.378) | 0.075 | 0.008 |
| 73 | 6.08 | 0.30 | 0.094 | (0.376) | 0.084 | 0.009 |
| 74 | 6.17 | 0.30 | 0.094 | (0.375) | 0.084 | 0.009 |
| 75 | 6.25 | 0.30 | 0.094 | (0.373) | 0.084 | 0.009 |
| 76 | 6.33 | 0.30 | 0.094 | (0.371) | 0.084 | 0.009 |
| 77 | 6.42 | 0.30 | 0.094 | (0.370) | 0.084 | 0.009 |
| 78 | 6.50 | 0.30 | 0.094 | (0.368) | 0.084 | 0.009 |
| 79 | 6.58 | 0.33 | 0.104 | (0.366) | 0.094 | 0.010 |
| 80 | 6.67 | 0.33 | 0.104 | (0.365) | 0.094 | 0.010 |
| 81 | 6.75 | 0.33 | 0.104 | (0.363) | 0.094 | 0.010 |
| 82 | 6.83 | 0.33 | 0.104 | (0.362) | 0.094 | 0.010 |
| 83 | 6.92 | 0.33 | 0.104 | (0.360) | 0.094 | 0.010 |
| 84 | 7.00 | 0.33 | 0.104 | (0.358) | 0.094 | 0.010 |
| 85 | 7.08 | 0.33 | 0.104 | (0.357) | 0.094 | 0.010 |
| 86 | 7.17 | 0.33 | 0.104 | (0.355) | 0.094 | 0.010 |
| 87 | 7.25 | 0.33 | 0.104 | (0.353) | 0.094 | 0.010 |
| 88 | 7.33 | 0.37 | 0.114 | (0.352) | 0.103 | 0.011 |
| 89 | 7.42 | 0.37 | 0.114 | (0.350) | 0.103 | 0.011 |
| 90 | 7.50 | 0.37 | 0.114 | (0.349) | 0.103 | 0.011 |
| 91 | 7.58 | 0.40 | 0.125 | (0.347) | 0.112 | 0.012 |
| 92 | 7.67 | 0.40 | 0.125 | (0.345) | 0.112 | 0.012 |
| 93 | 7.75 | 0.40 | 0.125 | (0.344) | 0.112 | 0.012 |
| 94 | 7.83 | 0.43 | 0.135 | (0.342) | 0.122 | 0.014 |
| 95 | 7.92 | 0.43 | 0.135 | (0.341) | 0.122 | 0.014 |
| 96 | 8.00 | 0.43 | 0.135 | (0.339) | 0.122 | 0.014 |
| 97 | 8.08 | 0.50 | 0.156 | (0.337) | 0.140 | 0.016 |
| 98 | 8.17 | 0.50 | 0.156 | (0.336) | 0.140 | 0.016 |
| 99 | 8.25 | 0.50 | 0.156 | (0.334) | 0.140 | 0.016 |
| 100 | 8.33 | 0.50 | 0.156 | (0.333) | 0.140 | 0.016 |
| 101 | 8.42 | 0.50 | 0.156 | (0.331) | 0.140 | 0.016 |
| 102 | 8.50 | 0.50 | 0.156 | (0.330) | 0.140 | 0.016 |
| 103 | 8.58 | 0.53 | 0.166 | (0.328) | 0.150 | 0.017 |
| 104 | 8.67 | 0.53 | 0.166 | (0.327) | 0.150 | 0.017 |
| 105 | 8.75 | 0.53 | 0.166 | (0.325) | 0.150 | 0.017 |
| 106 | 8.83 | 0.57 | 0.177 | (0.323) | 0.159 | 0.018 |
| 107 | 8.92 | 0.57 | 0.177 | (0.322) | 0.159 | 0.018 |
| 108 | 9.00 | 0.57 | 0.177 | (0.320) | 0.159 | 0.018 |
| 109 | 9.08 | 0.63 | 0.198 | (0.319) | 0.178 | 0.020 |
| 110 | 9.17 | 0.63 | 0.198 | (0.317) | 0.178 | 0.020 |
| 111 | 9.25 | 0.63 | 0.198 | (0.316) | 0.178 | 0.020 |
| 112 | 9.33 | 0.67 | 0.208 | (0.314) | 0.187 | 0.021 |
| 113 | 9.42 | 0.67 | 0.208 | (0.313) | 0.187 | 0.021 |
| 114 | 9.50 | 0.67 | 0.208 | (0.311) | 0.187 | 0.021 |
| 115 | 9.58 | 0.70 | 0.218 | (0.310) | 0.197 | 0.022 |
| 116 | 9.67 | 0.70 | 0.218 | (0.308) | 0.197 | 0.022 |
| 117 | 9.75 | 0.70 | 0.218 | (0.307) | 0.197 | 0.022 |

| | | | | | | |
|-----|-------|------|-------|----------|----------|-------|
| 118 | 9.83 | 0.73 | 0.229 | (0.305) | 0.206 | 0.023 |
| 119 | 9.92 | 0.73 | 0.229 | (0.304) | 0.206 | 0.023 |
| 120 | 10.00 | 0.73 | 0.229 | (0.303) | 0.206 | 0.023 |
| 121 | 10.08 | 0.50 | 0.156 | (0.301) | 0.140 | 0.016 |
| 122 | 10.17 | 0.50 | 0.156 | (0.300) | 0.140 | 0.016 |
| 123 | 10.25 | 0.50 | 0.156 | (0.298) | 0.140 | 0.016 |
| 124 | 10.33 | 0.50 | 0.156 | (0.297) | 0.140 | 0.016 |
| 125 | 10.42 | 0.50 | 0.156 | (0.295) | 0.140 | 0.016 |
| 126 | 10.50 | 0.50 | 0.156 | (0.294) | 0.140 | 0.016 |
| 127 | 10.58 | 0.67 | 0.208 | (0.292) | 0.187 | 0.021 |
| 128 | 10.67 | 0.67 | 0.208 | (0.291) | 0.187 | 0.021 |
| 129 | 10.75 | 0.67 | 0.208 | (0.290) | 0.187 | 0.021 |
| 130 | 10.83 | 0.67 | 0.208 | (0.288) | 0.187 | 0.021 |
| 131 | 10.92 | 0.67 | 0.208 | (0.287) | 0.187 | 0.021 |
| 132 | 11.00 | 0.67 | 0.208 | (0.285) | 0.187 | 0.021 |
| 133 | 11.08 | 0.63 | 0.198 | (0.284) | 0.178 | 0.020 |
| 134 | 11.17 | 0.63 | 0.198 | (0.282) | 0.178 | 0.020 |
| 135 | 11.25 | 0.63 | 0.198 | (0.281) | 0.178 | 0.020 |
| 136 | 11.33 | 0.63 | 0.198 | (0.280) | 0.178 | 0.020 |
| 137 | 11.42 | 0.63 | 0.198 | (0.278) | 0.178 | 0.020 |
| 138 | 11.50 | 0.63 | 0.198 | (0.277) | 0.178 | 0.020 |
| 139 | 11.58 | 0.57 | 0.177 | (0.276) | 0.159 | 0.018 |
| 140 | 11.67 | 0.57 | 0.177 | (0.274) | 0.159 | 0.018 |
| 141 | 11.75 | 0.57 | 0.177 | (0.273) | 0.159 | 0.018 |
| 142 | 11.83 | 0.60 | 0.187 | (0.271) | 0.168 | 0.019 |
| 143 | 11.92 | 0.60 | 0.187 | (0.270) | 0.168 | 0.019 |
| 144 | 12.00 | 0.60 | 0.187 | (0.269) | 0.168 | 0.019 |
| 145 | 12.08 | 0.83 | 0.260 | (0.267) | 0.234 | 0.026 |
| 146 | 12.17 | 0.83 | 0.260 | (0.266) | 0.234 | 0.026 |
| 147 | 12.25 | 0.83 | 0.260 | (0.265) | 0.234 | 0.026 |
| 148 | 12.33 | 0.87 | 0.270 | (0.263) | 0.243 | 0.027 |
| 149 | 12.42 | 0.87 | 0.270 | (0.262) | 0.243 | 0.027 |
| 150 | 12.50 | 0.87 | 0.270 | (0.261) | 0.243 | 0.027 |
| 151 | 12.58 | 0.93 | 0.291 | 0.259 | (0.262) | 0.032 |
| 152 | 12.67 | 0.93 | 0.291 | 0.258 | (0.262) | 0.033 |
| 153 | 12.75 | 0.93 | 0.291 | 0.257 | (0.262) | 0.034 |
| 154 | 12.83 | 0.97 | 0.302 | 0.256 | (0.271) | 0.046 |
| 155 | 12.92 | 0.97 | 0.302 | 0.254 | (0.271) | 0.047 |
| 156 | 13.00 | 0.97 | 0.302 | 0.253 | (0.271) | 0.049 |
| 157 | 13.08 | 1.13 | 0.354 | 0.252 | (0.318) | 0.102 |
| 158 | 13.17 | 1.13 | 0.354 | 0.250 | (0.318) | 0.103 |
| 159 | 13.25 | 1.13 | 0.354 | 0.249 | (0.318) | 0.104 |
| 160 | 13.33 | 1.13 | 0.354 | 0.248 | (0.318) | 0.106 |
| 161 | 13.42 | 1.13 | 0.354 | 0.247 | (0.318) | 0.107 |
| 162 | 13.50 | 1.13 | 0.354 | 0.245 | (0.318) | 0.108 |
| 163 | 13.58 | 0.77 | 0.239 | (0.244) | 0.215 | 0.024 |
| 164 | 13.67 | 0.77 | 0.239 | (0.243) | 0.215 | 0.024 |
| 165 | 13.75 | 0.77 | 0.239 | (0.242) | 0.215 | 0.024 |
| 166 | 13.83 | 0.77 | 0.239 | (0.240) | 0.215 | 0.024 |
| 167 | 13.92 | 0.77 | 0.239 | (0.239) | 0.215 | 0.024 |
| 168 | 14.00 | 0.77 | 0.239 | (0.238) | 0.215 | 0.024 |
| 169 | 14.08 | 0.90 | 0.281 | 0.237 | (0.253) | 0.044 |
| 170 | 14.17 | 0.90 | 0.281 | 0.236 | (0.253) | 0.045 |
| 171 | 14.25 | 0.90 | 0.281 | 0.234 | (0.253) | 0.046 |
| 172 | 14.33 | 0.87 | 0.270 | 0.233 | (0.243) | 0.037 |
| 173 | 14.42 | 0.87 | 0.270 | 0.232 | (0.243) | 0.038 |
| 174 | 14.50 | 0.87 | 0.270 | 0.231 | (0.243) | 0.040 |
| 175 | 14.58 | 0.87 | 0.270 | 0.230 | (0.243) | 0.041 |
| 176 | 14.67 | 0.87 | 0.270 | 0.228 | (0.243) | 0.042 |
| 177 | 14.75 | 0.87 | 0.270 | 0.227 | (0.243) | 0.043 |
| 178 | 14.83 | 0.83 | 0.260 | 0.226 | (0.234) | 0.034 |
| 179 | 14.92 | 0.83 | 0.260 | 0.225 | (0.234) | 0.035 |
| 180 | 15.00 | 0.83 | 0.260 | 0.224 | (0.234) | 0.036 |
| 181 | 15.08 | 0.80 | 0.250 | 0.223 | (0.225) | 0.027 |
| 182 | 15.17 | 0.80 | 0.250 | 0.221 | (0.225) | 0.028 |
| 183 | 15.25 | 0.80 | 0.250 | 0.220 | (0.225) | 0.029 |
| 184 | 15.33 | 0.77 | 0.239 | (0.219) | 0.215 | 0.024 |
| 185 | 15.42 | 0.77 | 0.239 | (0.218) | 0.215 | 0.024 |
| 186 | 15.50 | 0.77 | 0.239 | (0.217) | 0.215 | 0.024 |
| 187 | 15.58 | 0.63 | 0.198 | (0.216) | 0.178 | 0.020 |
| 188 | 15.67 | 0.63 | 0.198 | (0.215) | 0.178 | 0.020 |
| 189 | 15.75 | 0.63 | 0.198 | (0.214) | 0.178 | 0.020 |
| 190 | 15.83 | 0.63 | 0.198 | (0.213) | 0.178 | 0.020 |
| 191 | 15.92 | 0.63 | 0.198 | (0.211) | 0.178 | 0.020 |

| | | | | | | |
|-----|-------|------|-------|----------|-------|-------|
| 192 | 16.00 | 0.63 | 0.198 | (0.210) | 0.178 | 0.020 |
| 193 | 16.08 | 0.13 | 0.042 | (0.209) | 0.037 | 0.004 |
| 194 | 16.17 | 0.13 | 0.042 | (0.208) | 0.037 | 0.004 |
| 195 | 16.25 | 0.13 | 0.042 | (0.207) | 0.037 | 0.004 |
| 196 | 16.33 | 0.13 | 0.042 | (0.206) | 0.037 | 0.004 |
| 197 | 16.42 | 0.13 | 0.042 | (0.205) | 0.037 | 0.004 |
| 198 | 16.50 | 0.13 | 0.042 | (0.204) | 0.037 | 0.004 |
| 199 | 16.58 | 0.10 | 0.031 | (0.203) | 0.028 | 0.003 |
| 200 | 16.67 | 0.10 | 0.031 | (0.202) | 0.028 | 0.003 |
| 201 | 16.75 | 0.10 | 0.031 | (0.201) | 0.028 | 0.003 |
| 202 | 16.83 | 0.10 | 0.031 | (0.200) | 0.028 | 0.003 |
| 203 | 16.92 | 0.10 | 0.031 | (0.199) | 0.028 | 0.003 |
| 204 | 17.00 | 0.10 | 0.031 | (0.198) | 0.028 | 0.003 |
| 205 | 17.08 | 0.17 | 0.052 | (0.197) | 0.047 | 0.005 |
| 206 | 17.17 | 0.17 | 0.052 | (0.196) | 0.047 | 0.005 |
| 207 | 17.25 | 0.17 | 0.052 | (0.195) | 0.047 | 0.005 |
| 208 | 17.33 | 0.17 | 0.052 | (0.194) | 0.047 | 0.005 |
| 209 | 17.42 | 0.17 | 0.052 | (0.193) | 0.047 | 0.005 |
| 210 | 17.50 | 0.17 | 0.052 | (0.192) | 0.047 | 0.005 |
| 211 | 17.58 | 0.17 | 0.052 | (0.191) | 0.047 | 0.005 |
| 212 | 17.67 | 0.17 | 0.052 | (0.190) | 0.047 | 0.005 |
| 213 | 17.75 | 0.17 | 0.052 | (0.189) | 0.047 | 0.005 |
| 214 | 17.83 | 0.13 | 0.042 | (0.188) | 0.037 | 0.004 |
| 215 | 17.92 | 0.13 | 0.042 | (0.187) | 0.037 | 0.004 |
| 216 | 18.00 | 0.13 | 0.042 | (0.186) | 0.037 | 0.004 |
| 217 | 18.08 | 0.13 | 0.042 | (0.185) | 0.037 | 0.004 |
| 218 | 18.17 | 0.13 | 0.042 | (0.185) | 0.037 | 0.004 |
| 219 | 18.25 | 0.13 | 0.042 | (0.184) | 0.037 | 0.004 |
| 220 | 18.33 | 0.13 | 0.042 | (0.183) | 0.037 | 0.004 |
| 221 | 18.42 | 0.13 | 0.042 | (0.182) | 0.037 | 0.004 |
| 222 | 18.50 | 0.13 | 0.042 | (0.181) | 0.037 | 0.004 |
| 223 | 18.58 | 0.10 | 0.031 | (0.180) | 0.028 | 0.003 |
| 224 | 18.67 | 0.10 | 0.031 | (0.179) | 0.028 | 0.003 |
| 225 | 18.75 | 0.10 | 0.031 | (0.178) | 0.028 | 0.003 |
| 226 | 18.83 | 0.07 | 0.021 | (0.177) | 0.019 | 0.002 |
| 227 | 18.92 | 0.07 | 0.021 | (0.177) | 0.019 | 0.002 |
| 228 | 19.00 | 0.07 | 0.021 | (0.176) | 0.019 | 0.002 |
| 229 | 19.08 | 0.10 | 0.031 | (0.175) | 0.028 | 0.003 |
| 230 | 19.17 | 0.10 | 0.031 | (0.174) | 0.028 | 0.003 |
| 231 | 19.25 | 0.10 | 0.031 | (0.173) | 0.028 | 0.003 |
| 232 | 19.33 | 0.13 | 0.042 | (0.173) | 0.037 | 0.004 |
| 233 | 19.42 | 0.13 | 0.042 | (0.172) | 0.037 | 0.004 |
| 234 | 19.50 | 0.13 | 0.042 | (0.171) | 0.037 | 0.004 |
| 235 | 19.58 | 0.10 | 0.031 | (0.170) | 0.028 | 0.003 |
| 236 | 19.67 | 0.10 | 0.031 | (0.169) | 0.028 | 0.003 |
| 237 | 19.75 | 0.10 | 0.031 | (0.169) | 0.028 | 0.003 |
| 238 | 19.83 | 0.07 | 0.021 | (0.168) | 0.019 | 0.002 |
| 239 | 19.92 | 0.07 | 0.021 | (0.167) | 0.019 | 0.002 |
| 240 | 20.00 | 0.07 | 0.021 | (0.166) | 0.019 | 0.002 |
| 241 | 20.08 | 0.10 | 0.031 | (0.166) | 0.028 | 0.003 |
| 242 | 20.17 | 0.10 | 0.031 | (0.165) | 0.028 | 0.003 |
| 243 | 20.25 | 0.10 | 0.031 | (0.164) | 0.028 | 0.003 |
| 244 | 20.33 | 0.10 | 0.031 | (0.163) | 0.028 | 0.003 |
| 245 | 20.42 | 0.10 | 0.031 | (0.163) | 0.028 | 0.003 |
| 246 | 20.50 | 0.10 | 0.031 | (0.162) | 0.028 | 0.003 |
| 247 | 20.58 | 0.10 | 0.031 | (0.161) | 0.028 | 0.003 |
| 248 | 20.67 | 0.10 | 0.031 | (0.161) | 0.028 | 0.003 |
| 249 | 20.75 | 0.10 | 0.031 | (0.160) | 0.028 | 0.003 |
| 250 | 20.83 | 0.07 | 0.021 | (0.159) | 0.019 | 0.002 |
| 251 | 20.92 | 0.07 | 0.021 | (0.159) | 0.019 | 0.002 |
| 252 | 21.00 | 0.07 | 0.021 | (0.158) | 0.019 | 0.002 |
| 253 | 21.08 | 0.10 | 0.031 | (0.157) | 0.028 | 0.003 |
| 254 | 21.17 | 0.10 | 0.031 | (0.157) | 0.028 | 0.003 |
| 255 | 21.25 | 0.10 | 0.031 | (0.156) | 0.028 | 0.003 |
| 256 | 21.33 | 0.07 | 0.021 | (0.156) | 0.019 | 0.002 |
| 257 | 21.42 | 0.07 | 0.021 | (0.155) | 0.019 | 0.002 |
| 258 | 21.50 | 0.07 | 0.021 | (0.155) | 0.019 | 0.002 |
| 259 | 21.58 | 0.10 | 0.031 | (0.154) | 0.028 | 0.003 |
| 260 | 21.67 | 0.10 | 0.031 | (0.153) | 0.028 | 0.003 |
| 261 | 21.75 | 0.10 | 0.031 | (0.153) | 0.028 | 0.003 |
| 262 | 21.83 | 0.07 | 0.021 | (0.152) | 0.019 | 0.002 |
| 263 | 21.92 | 0.07 | 0.021 | (0.152) | 0.019 | 0.002 |
| 264 | 22.00 | 0.07 | 0.021 | (0.151) | 0.019 | 0.002 |
| 265 | 22.08 | 0.10 | 0.031 | (0.151) | 0.028 | 0.003 |

| | | | | | | | |
|------|--------|------|-----|--|--|--|--|
| 2+35 | 0.0009 | 0.01 | QV | | | | |
| 2+40 | 0.0009 | 0.01 | QV | | | | |
| 2+45 | 0.0010 | 0.01 | QV | | | | |
| 2+50 | 0.0010 | 0.01 | QV | | | | |
| 2+55 | 0.0011 | 0.01 | QV | | | | |
| 3+ 0 | 0.0011 | 0.01 | QV | | | | |
| 3+ 5 | 0.0012 | 0.01 | QV | | | | |
| 3+10 | 0.0012 | 0.01 | QV | | | | |
| 3+15 | 0.0012 | 0.01 | QV | | | | |
| 3+20 | 0.0013 | 0.01 | QV | | | | |
| 3+25 | 0.0013 | 0.01 | QV | | | | |
| 3+30 | 0.0014 | 0.01 | QV | | | | |
| 3+35 | 0.0014 | 0.01 | QV | | | | |
| 3+40 | 0.0015 | 0.01 | QV | | | | |
| 3+45 | 0.0015 | 0.01 | QV | | | | |
| 3+50 | 0.0016 | 0.01 | QV | | | | |
| 3+55 | 0.0016 | 0.01 | Q V | | | | |
| 4+ 0 | 0.0017 | 0.01 | Q V | | | | |
| 4+ 5 | 0.0017 | 0.01 | Q V | | | | |
| 4+10 | 0.0018 | 0.01 | Q V | | | | |
| 4+15 | 0.0018 | 0.01 | Q V | | | | |
| 4+20 | 0.0019 | 0.01 | Q V | | | | |
| 4+25 | 0.0019 | 0.01 | Q V | | | | |
| 4+30 | 0.0020 | 0.01 | Q V | | | | |
| 4+35 | 0.0021 | 0.01 | Q V | | | | |
| 4+40 | 0.0021 | 0.01 | Q V | | | | |
| 4+45 | 0.0022 | 0.01 | Q V | | | | |
| 4+50 | 0.0023 | 0.01 | Q V | | | | |
| 4+55 | 0.0023 | 0.01 | Q V | | | | |
| 5+ 0 | 0.0024 | 0.01 | Q V | | | | |
| 5+ 5 | 0.0025 | 0.01 | Q V | | | | |
| 5+10 | 0.0025 | 0.01 | Q V | | | | |
| 5+15 | 0.0026 | 0.01 | Q V | | | | |
| 5+20 | 0.0026 | 0.01 | Q V | | | | |
| 5+25 | 0.0027 | 0.01 | Q V | | | | |
| 5+30 | 0.0028 | 0.01 | Q V | | | | |
| 5+35 | 0.0028 | 0.01 | Q V | | | | |
| 5+40 | 0.0029 | 0.01 | Q V | | | | |
| 5+45 | 0.0030 | 0.01 | Q V | | | | |
| 5+50 | 0.0030 | 0.01 | Q V | | | | |
| 5+55 | 0.0031 | 0.01 | Q V | | | | |
| 6+ 0 | 0.0032 | 0.01 | Q V | | | | |
| 6+ 5 | 0.0032 | 0.01 | Q V | | | | |
| 6+10 | 0.0033 | 0.01 | Q V | | | | |
| 6+15 | 0.0034 | 0.01 | Q V | | | | |
| 6+20 | 0.0035 | 0.01 | Q V | | | | |
| 6+25 | 0.0036 | 0.01 | Q V | | | | |
| 6+30 | 0.0036 | 0.01 | Q V | | | | |
| 6+35 | 0.0037 | 0.01 | Q V | | | | |
| 6+40 | 0.0038 | 0.01 | Q V | | | | |
| 6+45 | 0.0039 | 0.01 | Q V | | | | |
| 6+50 | 0.0040 | 0.01 | Q V | | | | |
| 6+55 | 0.0041 | 0.01 | Q V | | | | |
| 7+ 0 | 0.0042 | 0.01 | Q V | | | | |
| 7+ 5 | 0.0043 | 0.01 | Q V | | | | |
| 7+10 | 0.0044 | 0.01 | Q V | | | | |
| 7+15 | 0.0044 | 0.01 | Q V | | | | |
| 7+20 | 0.0045 | 0.01 | Q V | | | | |
| 7+25 | 0.0046 | 0.01 | Q V | | | | |
| 7+30 | 0.0047 | 0.01 | Q V | | | | |
| 7+35 | 0.0048 | 0.01 | Q V | | | | |
| 7+40 | 0.0049 | 0.02 | Q V | | | | |
| 7+45 | 0.0050 | 0.02 | Q V | | | | |
| 7+50 | 0.0052 | 0.02 | Q V | | | | |
| 7+55 | 0.0053 | 0.02 | Q V | | | | |
| 8+ 0 | 0.0054 | 0.02 | Q V | | | | |
| 8+ 5 | 0.0055 | 0.02 | Q V | | | | |
| 8+10 | 0.0056 | 0.02 | Q V | | | | |
| 8+15 | 0.0058 | 0.02 | Q V | | | | |
| 8+20 | 0.0059 | 0.02 | Q V | | | | |
| 8+25 | 0.0060 | 0.02 | Q V | | | | |
| 8+30 | 0.0062 | 0.02 | Q V | | | | |
| 8+35 | 0.0063 | 0.02 | Q V | | | | |
| 8+40 | 0.0064 | 0.02 | Q V | | | | |

| | | | | | | | | |
|-------|--------|------|---|--|--|--|---|--|
| 14+55 | 0.0268 | 0.04 | Q | | | | V | |
| 15+ 0 | 0.0271 | 0.04 | Q | | | | V | |
| 15+ 5 | 0.0273 | 0.04 | Q | | | | V | |
| 15+10 | 0.0276 | 0.04 | Q | | | | V | |
| 15+15 | 0.0278 | 0.04 | Q | | | | V | |
| 15+20 | 0.0281 | 0.03 | Q | | | | V | |
| 15+25 | 0.0283 | 0.03 | Q | | | | V | |
| 15+30 | 0.0285 | 0.03 | Q | | | | V | |
| 15+35 | 0.0287 | 0.03 | Q | | | | V | |
| 15+40 | 0.0288 | 0.03 | Q | | | | V | |
| 15+45 | 0.0290 | 0.02 | Q | | | | V | |
| 15+50 | 0.0292 | 0.02 | Q | | | | V | |
| 15+55 | 0.0293 | 0.02 | Q | | | | V | |
| 16+ 0 | 0.0295 | 0.02 | Q | | | | V | |
| 16+ 5 | 0.0296 | 0.02 | Q | | | | V | |
| 16+10 | 0.0297 | 0.01 | Q | | | | V | |
| 16+15 | 0.0297 | 0.01 | Q | | | | V | |
| 16+20 | 0.0298 | 0.01 | Q | | | | V | |
| 16+25 | 0.0298 | 0.01 | Q | | | | V | |
| 16+30 | 0.0298 | 0.01 | Q | | | | V | |
| 16+35 | 0.0299 | 0.00 | Q | | | | V | |
| 16+40 | 0.0299 | 0.00 | Q | | | | V | |
| 16+45 | 0.0299 | 0.00 | Q | | | | V | |
| 16+50 | 0.0299 | 0.00 | Q | | | | V | |
| 16+55 | 0.0300 | 0.00 | Q | | | | V | |
| 17+ 0 | 0.0300 | 0.00 | Q | | | | V | |
| 17+ 5 | 0.0300 | 0.01 | Q | | | | V | |
| 17+10 | 0.0301 | 0.01 | Q | | | | V | |
| 17+15 | 0.0301 | 0.01 | Q | | | | V | |
| 17+20 | 0.0302 | 0.01 | Q | | | | V | |
| 17+25 | 0.0302 | 0.01 | Q | | | | V | |
| 17+30 | 0.0302 | 0.01 | Q | | | | V | |
| 17+35 | 0.0303 | 0.01 | Q | | | | V | |
| 17+40 | 0.0303 | 0.01 | Q | | | | V | |
| 17+45 | 0.0304 | 0.01 | Q | | | | V | |
| 17+50 | 0.0304 | 0.01 | Q | | | | V | |
| 17+55 | 0.0305 | 0.01 | Q | | | | V | |
| 18+ 0 | 0.0305 | 0.01 | Q | | | | V | |
| 18+ 5 | 0.0305 | 0.01 | Q | | | | V | |
| 18+10 | 0.0306 | 0.01 | Q | | | | V | |
| 18+15 | 0.0306 | 0.01 | Q | | | | V | |
| 18+20 | 0.0306 | 0.01 | Q | | | | V | |
| 18+25 | 0.0307 | 0.01 | Q | | | | V | |
| 18+30 | 0.0307 | 0.01 | Q | | | | V | |
| 18+35 | 0.0307 | 0.00 | Q | | | | V | |
| 18+40 | 0.0308 | 0.00 | Q | | | | V | |
| 18+45 | 0.0308 | 0.00 | Q | | | | V | |
| 18+50 | 0.0308 | 0.00 | Q | | | | V | |
| 18+55 | 0.0308 | 0.00 | Q | | | | V | |
| 19+ 0 | 0.0308 | 0.00 | Q | | | | V | |
| 19+ 5 | 0.0309 | 0.00 | Q | | | | V | |
| 19+10 | 0.0309 | 0.00 | Q | | | | V | |
| 19+15 | 0.0309 | 0.00 | Q | | | | V | |
| 19+20 | 0.0310 | 0.00 | Q | | | | V | |
| 19+25 | 0.0310 | 0.01 | Q | | | | V | |
| 19+30 | 0.0310 | 0.01 | Q | | | | V | |
| 19+35 | 0.0311 | 0.00 | Q | | | | V | |
| 19+40 | 0.0311 | 0.00 | Q | | | | V | |
| 19+45 | 0.0311 | 0.00 | Q | | | | V | |
| 19+50 | 0.0311 | 0.00 | Q | | | | V | |
| 19+55 | 0.0311 | 0.00 | Q | | | | V | |
| 20+ 0 | 0.0312 | 0.00 | Q | | | | V | |
| 20+ 5 | 0.0312 | 0.00 | Q | | | | V | |
| 20+10 | 0.0312 | 0.00 | Q | | | | V | |
| 20+15 | 0.0312 | 0.00 | Q | | | | V | |
| 20+20 | 0.0313 | 0.00 | Q | | | | V | |
| 20+25 | 0.0313 | 0.00 | Q | | | | V | |
| 20+30 | 0.0313 | 0.00 | Q | | | | V | |
| 20+35 | 0.0313 | 0.00 | Q | | | | V | |
| 20+40 | 0.0314 | 0.00 | Q | | | | V | |
| 20+45 | 0.0314 | 0.00 | Q | | | | V | |
| 20+50 | 0.0314 | 0.00 | Q | | | | V | |
| 20+55 | 0.0314 | 0.00 | Q | | | | V | |
| 21+ 0 | 0.0315 | 0.00 | Q | | | | V | |

| | | | | | | | |
|-------|--------|------|---|--|--|--|---|
| 21+ 5 | 0.0315 | 0.00 | Q | | | | V |
| 21+10 | 0.0315 | 0.00 | Q | | | | V |
| 21+15 | 0.0315 | 0.00 | Q | | | | V |
| 21+20 | 0.0316 | 0.00 | Q | | | | V |
| 21+25 | 0.0316 | 0.00 | Q | | | | V |
| 21+30 | 0.0316 | 0.00 | Q | | | | V |
| 21+35 | 0.0316 | 0.00 | Q | | | | V |
| 21+40 | 0.0316 | 0.00 | Q | | | | V |
| 21+45 | 0.0317 | 0.00 | Q | | | | V |
| 21+50 | 0.0317 | 0.00 | Q | | | | V |
| 21+55 | 0.0317 | 0.00 | Q | | | | V |
| 22+ 0 | 0.0317 | 0.00 | Q | | | | V |
| 22+ 5 | 0.0317 | 0.00 | Q | | | | V |
| 22+10 | 0.0318 | 0.00 | Q | | | | V |
| 22+15 | 0.0318 | 0.00 | Q | | | | V |
| 22+20 | 0.0318 | 0.00 | Q | | | | V |
| 22+25 | 0.0318 | 0.00 | Q | | | | V |
| 22+30 | 0.0319 | 0.00 | Q | | | | V |
| 22+35 | 0.0319 | 0.00 | Q | | | | V |
| 22+40 | 0.0319 | 0.00 | Q | | | | V |
| 22+45 | 0.0319 | 0.00 | Q | | | | V |
| 22+50 | 0.0319 | 0.00 | Q | | | | V |
| 22+55 | 0.0319 | 0.00 | Q | | | | V |
| 23+ 0 | 0.0320 | 0.00 | Q | | | | V |
| 23+ 5 | 0.0320 | 0.00 | Q | | | | V |
| 23+10 | 0.0320 | 0.00 | Q | | | | V |
| 23+15 | 0.0320 | 0.00 | Q | | | | V |
| 23+20 | 0.0320 | 0.00 | Q | | | | V |
| 23+25 | 0.0321 | 0.00 | Q | | | | V |
| 23+30 | 0.0321 | 0.00 | Q | | | | V |
| 23+35 | 0.0321 | 0.00 | Q | | | | V |
| 23+40 | 0.0321 | 0.00 | Q | | | | V |
| 23+45 | 0.0321 | 0.00 | Q | | | | V |
| 23+50 | 0.0321 | 0.00 | Q | | | | V |
| 23+55 | 0.0322 | 0.00 | Q | | | | V |
| 24+ 0 | 0.0322 | 0.00 | Q | | | | V |
| 24+ 5 | 0.0322 | 0.00 | Q | | | | V |
| 24+10 | 0.0322 | 0.00 | Q | | | | V |
| 24+15 | 0.0322 | 0.00 | Q | | | | V |

 Beaumont - Pennsylvania Avenue & I-10 FWY
 Detention Basin Routing Calculations
 Inflow Hydrograph, 2-year 24-hour storm

Program License Serial Number 4029

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

From study/file name: beau2pr242.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 289
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 0.316 (CFS)
 Total volume = 0.192 (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 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

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

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

Depth vs. Storage and Depth vs. Discharge data:

| Basin Depth (Ft.) | Storage (Ac.Ft) | Outflow (CFS) | (S-O*dt/2) (Ac.Ft) | (S+O*dt/2) (Ac.Ft) |
|----------------------|--------------------|------------------|-----------------------|-----------------------|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1.000 | 0.030 | 0.060 | 0.030 | 0.030 |
| 2.000 | 0.070 | 0.080 | 0.070 | 0.070 |
| 3.000 | 0.100 | 0.100 | 0.100 | 0.100 |
| 4.000 | 0.140 | 0.120 | 0.140 | 0.140 |
| 5.000 | 0.170 | 0.500 | 0.168 | 0.172 |
| 6.000 | 0.210 | 5.720 | 0.190 | 0.230 |

 Hydrograph Detention Basin Routing

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

| Time (Hours) | Inflow (CFS) | Outflow (CFS) | Storage (Ac.Ft) | .0 | 0.1 | 0.16 | 0.24 | 0.32 | Depth (Ft.) |
|-----------------|-----------------|------------------|--------------------|----|-----|------|------|------|----------------|
| 0.083 | 0.01 | 0.00 | 0.000 | OI | | | | | 0.00 |
| 0.167 | 0.02 | 0.00 | 0.000 | OI | | | | | 0.00 |

| | | | | | | | | | |
|-------|------|------|-------|-----|--|--|--|--|------|
| 0.250 | 0.02 | 0.00 | 0.000 | O I | | | | | 0.01 |
| 0.333 | 0.02 | 0.00 | 0.000 | O I | | | | | 0.01 |
| 0.417 | 0.03 | 0.00 | 0.001 | O I | | | | | 0.02 |
| 0.500 | 0.03 | 0.00 | 0.001 | O I | | | | | 0.03 |
| 0.583 | 0.03 | 0.00 | 0.001 | O I | | | | | 0.03 |
| 0.667 | 0.03 | 0.00 | 0.001 | O I | | | | | 0.04 |
| 0.750 | 0.03 | 0.00 | 0.001 | O I | | | | | 0.04 |
| 0.833 | 0.03 | 0.00 | 0.001 | O I | | | | | 0.05 |
| 0.917 | 0.04 | 0.00 | 0.002 | O I | | | | | 0.06 |
| 1.000 | 0.04 | 0.00 | 0.002 | O I | | | | | 0.07 |
| 1.083 | 0.03 | 0.00 | 0.002 | O I | | | | | 0.07 |
| 1.167 | 0.03 | 0.00 | 0.002 | O I | | | | | 0.08 |
| 1.250 | 0.03 | 0.00 | 0.002 | O I | | | | | 0.08 |
| 1.333 | 0.03 | 0.01 | 0.003 | O I | | | | | 0.09 |
| 1.417 | 0.03 | 0.01 | 0.003 | O I | | | | | 0.09 |
| 1.500 | 0.03 | 0.01 | 0.003 | O I | | | | | 0.10 |
| 1.583 | 0.03 | 0.01 | 0.003 | O I | | | | | 0.10 |
| 1.667 | 0.03 | 0.01 | 0.003 | O I | | | | | 0.11 |
| 1.750 | 0.03 | 0.01 | 0.003 | O I | | | | | 0.11 |
| 1.833 | 0.03 | 0.01 | 0.004 | O I | | | | | 0.12 |
| 1.917 | 0.04 | 0.01 | 0.004 | O I | | | | | 0.13 |
| 2.000 | 0.04 | 0.01 | 0.004 | O I | | | | | 0.13 |
| 2.083 | 0.04 | 0.01 | 0.004 | O I | | | | | 0.14 |
| 2.167 | 0.04 | 0.01 | 0.004 | O I | | | | | 0.15 |
| 2.250 | 0.04 | 0.01 | 0.005 | O I | | | | | 0.15 |
| 2.333 | 0.04 | 0.01 | 0.005 | O I | | | | | 0.16 |
| 2.417 | 0.04 | 0.01 | 0.005 | O I | | | | | 0.16 |
| 2.500 | 0.04 | 0.01 | 0.005 | O I | | | | | 0.17 |
| 2.583 | 0.04 | 0.01 | 0.005 | O I | | | | | 0.18 |
| 2.667 | 0.05 | 0.01 | 0.006 | O I | | | | | 0.19 |
| 2.750 | 0.05 | 0.01 | 0.006 | O I | | | | | 0.19 |
| 2.833 | 0.05 | 0.01 | 0.006 | O I | | | | | 0.20 |
| 2.917 | 0.05 | 0.01 | 0.006 | O I | | | | | 0.21 |
| 3.000 | 0.05 | 0.01 | 0.007 | O I | | | | | 0.22 |
| 3.083 | 0.05 | 0.01 | 0.007 | O I | | | | | 0.22 |
| 3.167 | 0.05 | 0.01 | 0.007 | O I | | | | | 0.23 |
| 3.250 | 0.05 | 0.01 | 0.007 | O I | | | | | 0.24 |
| 3.333 | 0.05 | 0.01 | 0.007 | O I | | | | | 0.25 |
| 3.417 | 0.05 | 0.02 | 0.008 | O I | | | | | 0.25 |
| 3.500 | 0.05 | 0.02 | 0.008 | O I | | | | | 0.26 |
| 3.583 | 0.05 | 0.02 | 0.008 | O I | | | | | 0.27 |
| 3.667 | 0.05 | 0.02 | 0.008 | O I | | | | | 0.27 |
| 3.750 | 0.05 | 0.02 | 0.008 | O I | | | | | 0.28 |
| 3.833 | 0.05 | 0.02 | 0.009 | O I | | | | | 0.29 |
| 3.917 | 0.06 | 0.02 | 0.009 | O I | | | | | 0.30 |
| 4.000 | 0.06 | 0.02 | 0.009 | O I | | | | | 0.31 |
| 4.083 | 0.06 | 0.02 | 0.009 | O I | | | | | 0.31 |
| 4.167 | 0.06 | 0.02 | 0.010 | O I | | | | | 0.32 |
| 4.250 | 0.06 | 0.02 | 0.010 | O I | | | | | 0.33 |
| 4.333 | 0.06 | 0.02 | 0.010 | O I | | | | | 0.34 |
| 4.417 | 0.07 | 0.02 | 0.011 | O I | | | | | 0.35 |
| 4.500 | 0.07 | 0.02 | 0.011 | O I | | | | | 0.36 |
| 4.583 | 0.07 | 0.02 | 0.011 | O I | | | | | 0.37 |
| 4.667 | 0.07 | 0.02 | 0.011 | O I | | | | | 0.38 |
| 4.750 | 0.07 | 0.02 | 0.012 | O I | | | | | 0.39 |
| 4.833 | 0.07 | 0.02 | 0.012 | O I | | | | | 0.40 |
| 4.917 | 0.07 | 0.02 | 0.012 | O I | | | | | 0.41 |
| 5.000 | 0.07 | 0.03 | 0.013 | O I | | | | | 0.42 |
| 5.083 | 0.06 | 0.03 | 0.013 | O I | | | | | 0.43 |
| 5.167 | 0.06 | 0.03 | 0.013 | O I | | | | | 0.44 |
| 5.250 | 0.06 | 0.03 | 0.013 | O I | | | | | 0.45 |
| 5.333 | 0.06 | 0.03 | 0.014 | O I | | | | | 0.45 |
| 5.417 | 0.07 | 0.03 | 0.014 | O I | | | | | 0.46 |
| 5.500 | 0.07 | 0.03 | 0.014 | O I | | | | | 0.47 |
| 5.583 | 0.07 | 0.03 | 0.014 | O I | | | | | 0.48 |
| 5.667 | 0.07 | 0.03 | 0.015 | O I | | | | | 0.49 |
| 5.750 | 0.07 | 0.03 | 0.015 | O I | | | | | 0.50 |
| 5.833 | 0.07 | 0.03 | 0.015 | O I | | | | | 0.51 |
| 5.917 | 0.07 | 0.03 | 0.016 | O I | | | | | 0.52 |
| 6.000 | 0.07 | 0.03 | 0.016 | O I | | | | | 0.53 |
| 6.083 | 0.08 | 0.03 | 0.016 | O I | | | | | 0.54 |
| 6.167 | 0.08 | 0.03 | 0.017 | O I | | | | | 0.55 |
| 6.250 | 0.08 | 0.03 | 0.017 | O I | | | | | 0.56 |
| 6.333 | 0.08 | 0.03 | 0.017 | O I | | | | | 0.57 |

| | | | | | | | | | | |
|--------|------|------|-------|---|---|--|--|--|--|------|
| 6.417 | 0.08 | 0.04 | 0.018 | O | I | | | | | 0.59 |
| 6.500 | 0.08 | 0.04 | 0.018 | O | I | | | | | 0.60 |
| 6.583 | 0.09 | 0.04 | 0.018 | O | I | | | | | 0.61 |
| 6.667 | 0.09 | 0.04 | 0.019 | O | I | | | | | 0.62 |
| 6.750 | 0.09 | 0.04 | 0.019 | O | I | | | | | 0.63 |
| 6.833 | 0.09 | 0.04 | 0.019 | O | I | | | | | 0.65 |
| 6.917 | 0.09 | 0.04 | 0.020 | O | I | | | | | 0.66 |
| 7.000 | 0.09 | 0.04 | 0.020 | O | I | | | | | 0.67 |
| 7.083 | 0.09 | 0.04 | 0.020 | O | I | | | | | 0.68 |
| 7.167 | 0.09 | 0.04 | 0.021 | O | I | | | | | 0.69 |
| 7.250 | 0.09 | 0.04 | 0.021 | O | I | | | | | 0.71 |
| 7.333 | 0.10 | 0.04 | 0.022 | O | I | | | | | 0.72 |
| 7.417 | 0.10 | 0.04 | 0.022 | O | I | | | | | 0.73 |
| 7.500 | 0.10 | 0.04 | 0.022 | O | I | | | | | 0.74 |
| 7.583 | 0.11 | 0.05 | 0.023 | O | I | | | | | 0.76 |
| 7.667 | 0.11 | 0.05 | 0.023 | O | I | | | | | 0.77 |
| 7.750 | 0.11 | 0.05 | 0.024 | O | I | | | | | 0.79 |
| 7.833 | 0.12 | 0.05 | 0.024 | O | I | | | | | 0.80 |
| 7.917 | 0.12 | 0.05 | 0.025 | O | I | | | | | 0.82 |
| 8.000 | 0.12 | 0.05 | 0.025 | O | I | | | | | 0.84 |
| 8.083 | 0.13 | 0.05 | 0.026 | O | I | | | | | 0.85 |
| 8.167 | 0.14 | 0.05 | 0.026 | O | I | | | | | 0.87 |
| 8.250 | 0.14 | 0.05 | 0.027 | O | I | | | | | 0.89 |
| 8.333 | 0.14 | 0.05 | 0.027 | O | I | | | | | 0.91 |
| 8.417 | 0.14 | 0.06 | 0.028 | O | I | | | | | 0.93 |
| 8.500 | 0.14 | 0.06 | 0.028 | O | I | | | | | 0.95 |
| 8.583 | 0.15 | 0.06 | 0.029 | O | I | | | | | 0.97 |
| 8.667 | 0.15 | 0.06 | 0.030 | O | I | | | | | 0.99 |
| 8.750 | 0.15 | 0.06 | 0.030 | O | I | | | | | 1.01 |
| 8.833 | 0.15 | 0.06 | 0.031 | O | I | | | | | 1.02 |
| 8.917 | 0.16 | 0.06 | 0.032 | O | I | | | | | 1.04 |
| 9.000 | 0.16 | 0.06 | 0.032 | O | I | | | | | 1.06 |
| 9.083 | 0.17 | 0.06 | 0.033 | O | I | | | | | 1.07 |
| 9.167 | 0.18 | 0.06 | 0.034 | O | I | | | | | 1.09 |
| 9.250 | 0.18 | 0.06 | 0.035 | O | I | | | | | 1.11 |
| 9.333 | 0.18 | 0.06 | 0.035 | O | I | | | | | 1.13 |
| 9.417 | 0.19 | 0.06 | 0.036 | O | I | | | | | 1.15 |
| 9.500 | 0.19 | 0.06 | 0.037 | O | I | | | | | 1.18 |
| 9.583 | 0.19 | 0.06 | 0.038 | O | I | | | | | 1.20 |
| 9.667 | 0.20 | 0.06 | 0.039 | O | I | | | | | 1.22 |
| 9.750 | 0.20 | 0.06 | 0.040 | O | I | | | | | 1.24 |
| 9.833 | 0.20 | 0.07 | 0.041 | O | I | | | | | 1.26 |
| 9.917 | 0.20 | 0.07 | 0.042 | O | I | | | | | 1.29 |
| 10.000 | 0.20 | 0.07 | 0.042 | O | I | | | | | 1.31 |
| 10.083 | 0.16 | 0.07 | 0.043 | O | I | | | | | 1.33 |
| 10.167 | 0.14 | 0.07 | 0.044 | O | I | | | | | 1.35 |
| 10.250 | 0.14 | 0.07 | 0.044 | O | I | | | | | 1.36 |
| 10.333 | 0.14 | 0.07 | 0.045 | O | I | | | | | 1.37 |
| 10.417 | 0.14 | 0.07 | 0.045 | O | I | | | | | 1.38 |
| 10.500 | 0.14 | 0.07 | 0.046 | O | I | | | | | 1.40 |
| 10.583 | 0.17 | 0.07 | 0.046 | O | I | | | | | 1.41 |
| 10.667 | 0.19 | 0.07 | 0.047 | O | I | | | | | 1.43 |
| 10.750 | 0.19 | 0.07 | 0.048 | O | I | | | | | 1.45 |
| 10.833 | 0.19 | 0.07 | 0.049 | O | I | | | | | 1.47 |
| 10.917 | 0.19 | 0.07 | 0.050 | O | I | | | | | 1.49 |
| 11.000 | 0.19 | 0.07 | 0.050 | O | I | | | | | 1.51 |
| 11.083 | 0.18 | 0.07 | 0.051 | O | I | | | | | 1.53 |
| 11.167 | 0.18 | 0.07 | 0.052 | O | I | | | | | 1.55 |
| 11.250 | 0.18 | 0.07 | 0.053 | O | I | | | | | 1.57 |
| 11.333 | 0.18 | 0.07 | 0.053 | O | I | | | | | 1.58 |
| 11.417 | 0.18 | 0.07 | 0.054 | O | I | | | | | 1.60 |
| 11.500 | 0.18 | 0.07 | 0.055 | O | I | | | | | 1.62 |
| 11.583 | 0.16 | 0.07 | 0.055 | O | I | | | | | 1.64 |
| 11.667 | 0.16 | 0.07 | 0.056 | O | I | | | | | 1.65 |
| 11.750 | 0.16 | 0.07 | 0.057 | O | I | | | | | 1.67 |
| 11.833 | 0.16 | 0.07 | 0.057 | O | I | | | | | 1.68 |
| 11.917 | 0.17 | 0.07 | 0.058 | O | I | | | | | 1.70 |
| 12.000 | 0.17 | 0.07 | 0.059 | O | I | | | | | 1.71 |
| 12.083 | 0.21 | 0.07 | 0.059 | O | I | | | | | 1.73 |
| 12.167 | 0.23 | 0.08 | 0.060 | O | I | | | | | 1.76 |
| 12.250 | 0.23 | 0.08 | 0.061 | O | I | | | | | 1.78 |
| 12.333 | 0.24 | 0.08 | 0.062 | O | I | | | | | 1.81 |
| 12.417 | 0.24 | 0.08 | 0.064 | O | I | | | | | 1.84 |
| 12.500 | 0.24 | 0.08 | 0.065 | O | I | | | | | 1.87 |

| | | | | | | | | | | |
|--------|------|------|-------|--|---|--|---|---|--|------|
| 12.583 | 0.25 | 0.08 | 0.066 | | O | | | I | | 1.90 |
| 12.667 | 0.26 | 0.08 | 0.067 | | O | | | I | | 1.93 |
| 12.750 | 0.26 | 0.08 | 0.068 | | O | | | I | | 1.96 |
| 12.833 | 0.27 | 0.08 | 0.070 | | O | | | I | | 1.99 |
| 12.917 | 0.27 | 0.08 | 0.071 | | O | | | I | | 2.03 |
| 13.000 | 0.27 | 0.08 | 0.072 | | O | | | I | | 2.07 |
| 13.083 | 0.30 | 0.08 | 0.074 | | O | | | I | | 2.12 |
| 13.167 | 0.32 | 0.08 | 0.075 | | O | | | I | | 2.17 |
| 13.250 | 0.32 | 0.08 | 0.077 | | O | | | I | | 2.23 |
| 13.333 | 0.32 | 0.09 | 0.078 | | O | | | I | | 2.28 |
| 13.417 | 0.32 | 0.09 | 0.080 | | O | | | I | | 2.33 |
| 13.500 | 0.32 | 0.09 | 0.082 | | O | | | I | | 2.38 |
| 13.583 | 0.25 | 0.09 | 0.083 | | O | | | I | | 2.43 |
| 13.667 | 0.21 | 0.09 | 0.084 | | O | | I | | | 2.46 |
| 13.750 | 0.21 | 0.09 | 0.085 | | O | | I | | | 2.49 |
| 13.833 | 0.21 | 0.09 | 0.086 | | O | | I | | | 2.52 |
| 13.917 | 0.21 | 0.09 | 0.086 | | O | | I | | | 2.55 |
| 14.000 | 0.21 | 0.09 | 0.087 | | O | | I | | | 2.57 |
| 14.083 | 0.24 | 0.09 | 0.088 | | O | | I | | | 2.61 |
| 14.167 | 0.25 | 0.09 | 0.089 | | O | | I | | | 2.64 |
| 14.250 | 0.25 | 0.09 | 0.090 | | O | | I | | | 2.68 |
| 14.333 | 0.24 | 0.09 | 0.091 | | O | | I | | | 2.71 |
| 14.417 | 0.24 | 0.09 | 0.092 | | O | | I | | | 2.75 |
| 14.500 | 0.24 | 0.10 | 0.093 | | O | | I | | | 2.78 |
| 14.583 | 0.24 | 0.10 | 0.094 | | O | | I | | | 2.81 |
| 14.667 | 0.24 | 0.10 | 0.095 | | O | | I | | | 2.85 |
| 14.750 | 0.24 | 0.10 | 0.096 | | O | | I | | | 2.88 |
| 14.833 | 0.24 | 0.10 | 0.097 | | O | | I | | | 2.91 |
| 14.917 | 0.23 | 0.10 | 0.098 | | O | | I | | | 2.94 |
| 15.000 | 0.23 | 0.10 | 0.099 | | O | | I | | | 2.97 |
| 15.083 | 0.23 | 0.10 | 0.100 | | O | | I | | | 3.00 |
| 15.167 | 0.22 | 0.10 | 0.101 | | O | | I | | | 3.02 |
| 15.250 | 0.22 | 0.10 | 0.102 | | O | | I | | | 3.04 |
| 15.333 | 0.22 | 0.10 | 0.103 | | O | | I | | | 3.06 |
| 15.417 | 0.21 | 0.10 | 0.103 | | O | | I | | | 3.08 |
| 15.500 | 0.21 | 0.10 | 0.104 | | O | | I | | | 3.10 |
| 15.583 | 0.19 | 0.10 | 0.105 | | O | | I | | | 3.12 |
| 15.667 | 0.18 | 0.10 | 0.105 | | O | | I | | | 3.13 |
| 15.750 | 0.18 | 0.10 | 0.106 | | O | | I | | | 3.15 |
| 15.833 | 0.18 | 0.10 | 0.106 | | O | | I | | | 3.16 |
| 15.917 | 0.18 | 0.10 | 0.107 | | O | | I | | | 3.17 |
| 16.000 | 0.18 | 0.10 | 0.107 | | O | | I | | | 3.19 |
| 16.083 | 0.08 | 0.10 | 0.108 | | O | | I | | | 3.19 |
| 16.167 | 0.04 | 0.10 | 0.107 | | I | | O | | | 3.18 |
| 16.250 | 0.04 | 0.10 | 0.107 | | I | | O | | | 3.17 |
| 16.333 | 0.04 | 0.10 | 0.106 | | I | | O | | | 3.16 |
| 16.417 | 0.04 | 0.10 | 0.106 | | I | | O | | | 3.15 |
| 16.500 | 0.04 | 0.10 | 0.105 | | I | | O | | | 3.14 |
| 16.583 | 0.03 | 0.10 | 0.105 | | I | | O | | | 3.13 |
| 16.667 | 0.03 | 0.10 | 0.104 | | I | | O | | | 3.11 |
| 16.750 | 0.03 | 0.10 | 0.104 | | I | | O | | | 3.10 |
| 16.833 | 0.03 | 0.10 | 0.103 | | I | | O | | | 3.09 |
| 16.917 | 0.03 | 0.10 | 0.103 | | I | | O | | | 3.07 |
| 17.000 | 0.03 | 0.10 | 0.102 | | I | | O | | | 3.06 |
| 17.083 | 0.04 | 0.10 | 0.102 | | I | | O | | | 3.05 |
| 17.167 | 0.05 | 0.10 | 0.102 | | I | | O | | | 3.04 |
| 17.250 | 0.05 | 0.10 | 0.101 | | I | | O | | | 3.03 |
| 17.333 | 0.05 | 0.10 | 0.101 | | I | | O | | | 3.02 |
| 17.417 | 0.05 | 0.10 | 0.100 | | I | | O | | | 3.01 |
| 17.500 | 0.05 | 0.10 | 0.100 | | I | | O | | | 3.00 |
| 17.583 | 0.05 | 0.10 | 0.100 | | I | | O | | | 2.99 |
| 17.667 | 0.05 | 0.10 | 0.099 | | I | | O | | | 2.98 |
| 17.750 | 0.05 | 0.10 | 0.099 | | I | | O | | | 2.97 |
| 17.833 | 0.04 | 0.10 | 0.099 | | I | | O | | | 2.95 |
| 17.917 | 0.04 | 0.10 | 0.098 | | I | | O | | | 2.94 |
| 18.000 | 0.04 | 0.10 | 0.098 | | I | | O | | | 2.93 |
| 18.083 | 0.04 | 0.10 | 0.097 | | I | | O | | | 2.91 |
| 18.167 | 0.04 | 0.10 | 0.097 | | I | | O | | | 2.90 |
| 18.250 | 0.04 | 0.10 | 0.097 | | I | | O | | | 2.88 |
| 18.333 | 0.04 | 0.10 | 0.096 | | I | | O | | | 2.87 |
| 18.417 | 0.04 | 0.10 | 0.096 | | I | | O | | | 2.86 |
| 18.500 | 0.04 | 0.10 | 0.095 | | I | | O | | | 2.84 |
| 18.583 | 0.03 | 0.10 | 0.095 | | I | | O | | | 2.83 |
| 18.667 | 0.03 | 0.10 | 0.094 | | I | | O | | | 2.81 |

| | | | | | | | | | |
|--------|------|------|-------|---|---|--|--|--|------|
| 18.750 | 0.03 | 0.10 | 0.094 | I | O | | | | 2.80 |
| 18.833 | 0.02 | 0.10 | 0.093 | I | O | | | | 2.78 |
| 18.917 | 0.02 | 0.10 | 0.093 | I | O | | | | 2.76 |
| 19.000 | 0.02 | 0.09 | 0.092 | I | O | | | | 2.75 |
| 19.083 | 0.02 | 0.09 | 0.092 | I | O | | | | 2.73 |
| 19.167 | 0.03 | 0.09 | 0.091 | I | O | | | | 2.71 |
| 19.250 | 0.03 | 0.09 | 0.091 | I | O | | | | 2.70 |
| 19.333 | 0.03 | 0.09 | 0.091 | I | O | | | | 2.68 |
| 19.417 | 0.04 | 0.09 | 0.090 | I | O | | | | 2.67 |
| 19.500 | 0.04 | 0.09 | 0.090 | I | O | | | | 2.66 |
| 19.583 | 0.03 | 0.09 | 0.089 | I | O | | | | 2.64 |
| 19.667 | 0.03 | 0.09 | 0.089 | I | O | | | | 2.63 |
| 19.750 | 0.03 | 0.09 | 0.088 | I | O | | | | 2.62 |
| 19.833 | 0.02 | 0.09 | 0.088 | I | O | | | | 2.60 |
| 19.917 | 0.02 | 0.09 | 0.088 | I | O | | | | 2.58 |
| 20.000 | 0.02 | 0.09 | 0.087 | I | O | | | | 2.57 |
| 20.083 | 0.02 | 0.09 | 0.087 | I | O | | | | 2.55 |
| 20.167 | 0.03 | 0.09 | 0.086 | I | O | | | | 2.54 |
| 20.250 | 0.03 | 0.09 | 0.086 | I | O | | | | 2.52 |
| 20.333 | 0.03 | 0.09 | 0.085 | I | O | | | | 2.51 |
| 20.417 | 0.03 | 0.09 | 0.085 | I | O | | | | 2.49 |
| 20.500 | 0.03 | 0.09 | 0.084 | I | O | | | | 2.48 |
| 20.583 | 0.03 | 0.09 | 0.084 | I | O | | | | 2.46 |
| 20.667 | 0.03 | 0.09 | 0.084 | I | O | | | | 2.45 |
| 20.750 | 0.03 | 0.09 | 0.083 | I | O | | | | 2.44 |
| 20.833 | 0.02 | 0.09 | 0.083 | I | O | | | | 2.42 |
| 20.917 | 0.02 | 0.09 | 0.082 | I | O | | | | 2.41 |
| 21.000 | 0.02 | 0.09 | 0.082 | I | O | | | | 2.39 |
| 21.083 | 0.02 | 0.09 | 0.081 | I | O | | | | 2.38 |
| 21.167 | 0.03 | 0.09 | 0.081 | I | O | | | | 2.36 |
| 21.250 | 0.03 | 0.09 | 0.080 | I | O | | | | 2.35 |
| 21.333 | 0.02 | 0.09 | 0.080 | I | O | | | | 2.33 |
| 21.417 | 0.02 | 0.09 | 0.080 | I | O | | | | 2.32 |
| 21.500 | 0.02 | 0.09 | 0.079 | I | O | | | | 2.30 |
| 21.583 | 0.02 | 0.09 | 0.079 | I | O | | | | 2.29 |
| 21.667 | 0.03 | 0.09 | 0.078 | I | O | | | | 2.27 |
| 21.750 | 0.03 | 0.09 | 0.078 | I | O | | | | 2.26 |
| 21.833 | 0.02 | 0.08 | 0.077 | I | O | | | | 2.25 |
| 21.917 | 0.02 | 0.08 | 0.077 | I | O | | | | 2.23 |
| 22.000 | 0.02 | 0.08 | 0.077 | I | O | | | | 2.22 |
| 22.083 | 0.02 | 0.08 | 0.076 | I | O | | | | 2.20 |
| 22.167 | 0.03 | 0.08 | 0.076 | I | O | | | | 2.19 |
| 22.250 | 0.03 | 0.08 | 0.075 | I | O | | | | 2.18 |
| 22.333 | 0.02 | 0.08 | 0.075 | I | O | | | | 2.16 |
| 22.417 | 0.02 | 0.08 | 0.074 | I | O | | | | 2.15 |
| 22.500 | 0.02 | 0.08 | 0.074 | I | O | | | | 2.13 |
| 22.583 | 0.02 | 0.08 | 0.074 | I | O | | | | 2.12 |
| 22.667 | 0.02 | 0.08 | 0.073 | I | O | | | | 2.10 |
| 22.750 | 0.02 | 0.08 | 0.073 | I | O | | | | 2.09 |
| 22.833 | 0.02 | 0.08 | 0.072 | I | O | | | | 2.08 |
| 22.917 | 0.02 | 0.08 | 0.072 | I | O | | | | 2.06 |
| 23.000 | 0.02 | 0.08 | 0.071 | I | O | | | | 2.05 |
| 23.083 | 0.02 | 0.08 | 0.071 | I | O | | | | 2.03 |
| 23.167 | 0.02 | 0.08 | 0.071 | I | O | | | | 2.02 |
| 23.250 | 0.02 | 0.08 | 0.070 | I | O | | | | 2.00 |
| 23.333 | 0.02 | 0.08 | 0.070 | I | O | | | | 1.99 |
| 23.417 | 0.02 | 0.08 | 0.069 | I | O | | | | 1.98 |
| 23.500 | 0.02 | 0.08 | 0.069 | I | O | | | | 1.97 |
| 23.583 | 0.02 | 0.08 | 0.068 | I | O | | | | 1.96 |
| 23.667 | 0.02 | 0.08 | 0.068 | I | O | | | | 1.95 |
| 23.750 | 0.02 | 0.08 | 0.068 | I | O | | | | 1.94 |
| 23.833 | 0.02 | 0.08 | 0.067 | I | O | | | | 1.93 |
| 23.917 | 0.02 | 0.08 | 0.067 | I | O | | | | 1.92 |
| 24.000 | 0.02 | 0.08 | 0.066 | I | O | | | | 1.91 |
| 24.083 | 0.01 | 0.08 | 0.066 | I | O | | | | 1.90 |
| 24.167 | 0.00 | 0.08 | 0.065 | I | O | | | | 1.89 |
| 24.250 | 0.00 | 0.08 | 0.065 | I | O | | | | 1.87 |
| 24.333 | 0.00 | 0.08 | 0.064 | I | O | | | | 1.86 |
| 24.417 | 0.00 | 0.08 | 0.064 | I | O | | | | 1.85 |
| 24.500 | 0.00 | 0.08 | 0.063 | I | O | | | | 1.83 |
| 24.583 | 0.00 | 0.08 | 0.063 | I | O | | | | 1.82 |
| 24.667 | 0.00 | 0.08 | 0.062 | I | O | | | | 1.81 |
| 24.750 | 0.00 | 0.08 | 0.062 | I | O | | | | 1.79 |
| 24.833 | 0.00 | 0.08 | 0.061 | I | O | | | | 1.78 |

| | | | | | | | | | | |
|--------|------|------|-------|---|---|--|--|--|--|------|
| 24.917 | 0.00 | 0.08 | 0.061 | I | O | | | | | 1.77 |
| 25.000 | 0.00 | 0.08 | 0.060 | I | O | | | | | 1.75 |
| 25.083 | 0.00 | 0.07 | 0.060 | I | O | | | | | 1.74 |
| 25.167 | 0.00 | 0.07 | 0.059 | I | O | | | | | 1.73 |
| 25.250 | 0.00 | 0.07 | 0.059 | I | O | | | | | 1.72 |
| 25.333 | 0.00 | 0.07 | 0.058 | I | O | | | | | 1.70 |
| 25.417 | 0.00 | 0.07 | 0.058 | I | O | | | | | 1.69 |
| 25.500 | 0.00 | 0.07 | 0.057 | I | O | | | | | 1.68 |
| 25.583 | 0.00 | 0.07 | 0.057 | I | O | | | | | 1.66 |
| 25.667 | 0.00 | 0.07 | 0.056 | I | O | | | | | 1.65 |
| 25.750 | 0.00 | 0.07 | 0.056 | I | O | | | | | 1.64 |
| 25.833 | 0.00 | 0.07 | 0.055 | I | O | | | | | 1.63 |
| 25.917 | 0.00 | 0.07 | 0.055 | I | O | | | | | 1.61 |
| 26.000 | 0.00 | 0.07 | 0.054 | I | O | | | | | 1.60 |
| 26.083 | 0.00 | 0.07 | 0.054 | I | O | | | | | 1.59 |
| 26.167 | 0.00 | 0.07 | 0.053 | I | O | | | | | 1.58 |
| 26.250 | 0.00 | 0.07 | 0.053 | I | O | | | | | 1.56 |
| 26.333 | 0.00 | 0.07 | 0.052 | I | O | | | | | 1.55 |
| 26.417 | 0.00 | 0.07 | 0.052 | I | O | | | | | 1.54 |
| 26.500 | 0.00 | 0.07 | 0.051 | I | O | | | | | 1.53 |
| 26.583 | 0.00 | 0.07 | 0.051 | I | O | | | | | 1.52 |
| 26.667 | 0.00 | 0.07 | 0.050 | I | O | | | | | 1.50 |
| 26.750 | 0.00 | 0.07 | 0.050 | I | O | | | | | 1.49 |
| 26.833 | 0.00 | 0.07 | 0.049 | I | O | | | | | 1.48 |
| 26.917 | 0.00 | 0.07 | 0.049 | I | O | | | | | 1.47 |
| 27.000 | 0.00 | 0.07 | 0.048 | I | O | | | | | 1.46 |
| 27.083 | 0.00 | 0.07 | 0.048 | I | O | | | | | 1.44 |
| 27.167 | 0.00 | 0.07 | 0.047 | I | O | | | | | 1.43 |
| 27.250 | 0.00 | 0.07 | 0.047 | I | O | | | | | 1.42 |
| 27.333 | 0.00 | 0.07 | 0.046 | I | O | | | | | 1.41 |
| 27.417 | 0.00 | 0.07 | 0.046 | I | O | | | | | 1.40 |
| 27.500 | 0.00 | 0.07 | 0.045 | I | O | | | | | 1.39 |
| 27.583 | 0.00 | 0.07 | 0.045 | I | O | | | | | 1.37 |
| 27.667 | 0.00 | 0.07 | 0.044 | I | O | | | | | 1.36 |
| 27.750 | 0.00 | 0.07 | 0.044 | I | O | | | | | 1.35 |
| 27.833 | 0.00 | 0.07 | 0.044 | I | O | | | | | 1.34 |
| 27.917 | 0.00 | 0.07 | 0.043 | I | O | | | | | 1.33 |
| 28.000 | 0.00 | 0.07 | 0.043 | I | O | | | | | 1.32 |
| 28.083 | 0.00 | 0.07 | 0.042 | I | O | | | | | 1.30 |
| 28.167 | 0.00 | 0.07 | 0.042 | I | O | | | | | 1.29 |
| 28.250 | 0.00 | 0.07 | 0.041 | I | O | | | | | 1.28 |
| 28.333 | 0.00 | 0.07 | 0.041 | I | O | | | | | 1.27 |
| 28.417 | 0.00 | 0.07 | 0.040 | I | O | | | | | 1.26 |
| 28.500 | 0.00 | 0.06 | 0.040 | I | O | | | | | 1.25 |
| 28.583 | 0.00 | 0.06 | 0.039 | I | O | | | | | 1.24 |
| 28.667 | 0.00 | 0.06 | 0.039 | I | O | | | | | 1.23 |
| 28.750 | 0.00 | 0.06 | 0.039 | I | O | | | | | 1.21 |
| 28.833 | 0.00 | 0.06 | 0.038 | I | O | | | | | 1.20 |
| 28.917 | 0.00 | 0.06 | 0.038 | I | O | | | | | 1.19 |
| 29.000 | 0.00 | 0.06 | 0.037 | I | O | | | | | 1.18 |
| 29.083 | 0.00 | 0.06 | 0.037 | I | O | | | | | 1.17 |
| 29.167 | 0.00 | 0.06 | 0.036 | I | O | | | | | 1.16 |
| 29.250 | 0.00 | 0.06 | 0.036 | I | O | | | | | 1.15 |
| 29.333 | 0.00 | 0.06 | 0.036 | I | O | | | | | 1.14 |
| 29.417 | 0.00 | 0.06 | 0.035 | I | O | | | | | 1.13 |
| 29.500 | 0.00 | 0.06 | 0.035 | I | O | | | | | 1.12 |
| 29.583 | 0.00 | 0.06 | 0.034 | I | O | | | | | 1.11 |
| 29.667 | 0.00 | 0.06 | 0.034 | I | O | | | | | 1.10 |
| 29.750 | 0.00 | 0.06 | 0.033 | I | O | | | | | 1.08 |
| 29.833 | 0.00 | 0.06 | 0.033 | I | O | | | | | 1.07 |
| 29.917 | 0.00 | 0.06 | 0.033 | I | O | | | | | 1.06 |
| 30.000 | 0.00 | 0.06 | 0.032 | I | O | | | | | 1.05 |
| 30.083 | 0.00 | 0.06 | 0.032 | I | O | | | | | 1.04 |
| 30.167 | 0.00 | 0.06 | 0.031 | I | O | | | | | 1.03 |
| 30.250 | 0.00 | 0.06 | 0.031 | I | O | | | | | 1.02 |
| 30.333 | 0.00 | 0.06 | 0.030 | I | O | | | | | 1.01 |
| 30.417 | 0.00 | 0.06 | 0.030 | I | O | | | | | 1.00 |
| 30.500 | 0.00 | 0.06 | 0.030 | I | O | | | | | 0.99 |
| 30.583 | 0.00 | 0.06 | 0.029 | I | O | | | | | 0.97 |
| 30.667 | 0.00 | 0.06 | 0.029 | I | O | | | | | 0.96 |
| 30.750 | 0.00 | 0.06 | 0.028 | I | O | | | | | 0.95 |
| 30.833 | 0.00 | 0.06 | 0.028 | I | O | | | | | 0.93 |
| 30.917 | 0.00 | 0.06 | 0.028 | I | O | | | | | 0.92 |
| 31.000 | 0.00 | 0.05 | 0.027 | I | O | | | | | 0.91 |

| | | | | | | | | | | | |
|--------|------|------|-------|----|---|--|--|--|--|--|------|
| 31.083 | 0.00 | 0.05 | 0.027 | I | O | | | | | | 0.90 |
| 31.167 | 0.00 | 0.05 | 0.027 | I | O | | | | | | 0.88 |
| 31.250 | 0.00 | 0.05 | 0.026 | I | O | | | | | | 0.87 |
| 31.333 | 0.00 | 0.05 | 0.026 | I | O | | | | | | 0.86 |
| 31.417 | 0.00 | 0.05 | 0.025 | I | O | | | | | | 0.85 |
| 31.500 | 0.00 | 0.05 | 0.025 | I | O | | | | | | 0.84 |
| 31.583 | 0.00 | 0.05 | 0.025 | I | O | | | | | | 0.83 |
| 31.667 | 0.00 | 0.05 | 0.024 | I | O | | | | | | 0.81 |
| 31.750 | 0.00 | 0.05 | 0.024 | I | O | | | | | | 0.80 |
| 31.833 | 0.00 | 0.05 | 0.024 | I | O | | | | | | 0.79 |
| 31.917 | 0.00 | 0.05 | 0.023 | I | O | | | | | | 0.78 |
| 32.000 | 0.00 | 0.05 | 0.023 | I | O | | | | | | 0.77 |
| 32.083 | 0.00 | 0.05 | 0.023 | I | O | | | | | | 0.76 |
| 32.167 | 0.00 | 0.04 | 0.022 | I | O | | | | | | 0.75 |
| 32.250 | 0.00 | 0.04 | 0.022 | I | O | | | | | | 0.74 |
| 32.333 | 0.00 | 0.04 | 0.022 | I | O | | | | | | 0.73 |
| 32.417 | 0.00 | 0.04 | 0.022 | I | O | | | | | | 0.72 |
| 32.500 | 0.00 | 0.04 | 0.021 | I | O | | | | | | 0.71 |
| 32.583 | 0.00 | 0.04 | 0.021 | I | O | | | | | | 0.70 |
| 32.667 | 0.00 | 0.04 | 0.021 | I | O | | | | | | 0.69 |
| 32.750 | 0.00 | 0.04 | 0.020 | I | O | | | | | | 0.68 |
| 32.833 | 0.00 | 0.04 | 0.020 | I | O | | | | | | 0.67 |
| 32.917 | 0.00 | 0.04 | 0.020 | I | O | | | | | | 0.66 |
| 33.000 | 0.00 | 0.04 | 0.020 | I | O | | | | | | 0.65 |
| 33.083 | 0.00 | 0.04 | 0.019 | I | O | | | | | | 0.64 |
| 33.167 | 0.00 | 0.04 | 0.019 | I | O | | | | | | 0.64 |
| 33.250 | 0.00 | 0.04 | 0.019 | I | O | | | | | | 0.63 |
| 33.333 | 0.00 | 0.04 | 0.019 | I | O | | | | | | 0.62 |
| 33.417 | 0.00 | 0.04 | 0.018 | I | O | | | | | | 0.61 |
| 33.500 | 0.00 | 0.04 | 0.018 | I | O | | | | | | 0.60 |
| 33.583 | 0.00 | 0.04 | 0.018 | I | O | | | | | | 0.59 |
| 33.667 | 0.00 | 0.04 | 0.018 | I | O | | | | | | 0.59 |
| 33.750 | 0.00 | 0.03 | 0.017 | I | O | | | | | | 0.58 |
| 33.833 | 0.00 | 0.03 | 0.017 | I | O | | | | | | 0.57 |
| 33.917 | 0.00 | 0.03 | 0.017 | I | O | | | | | | 0.56 |
| 34.000 | 0.00 | 0.03 | 0.017 | I | O | | | | | | 0.55 |
| 34.083 | 0.00 | 0.03 | 0.016 | I | O | | | | | | 0.55 |
| 34.167 | 0.00 | 0.03 | 0.016 | I | O | | | | | | 0.54 |
| 34.250 | 0.00 | 0.03 | 0.016 | I | O | | | | | | 0.53 |
| 34.333 | 0.00 | 0.03 | 0.016 | I | O | | | | | | 0.52 |
| 34.417 | 0.00 | 0.03 | 0.016 | I | O | | | | | | 0.52 |
| 34.500 | 0.00 | 0.03 | 0.015 | I | O | | | | | | 0.51 |
| 34.583 | 0.00 | 0.03 | 0.015 | I | O | | | | | | 0.50 |
| 34.667 | 0.00 | 0.03 | 0.015 | I | O | | | | | | 0.50 |
| 34.750 | 0.00 | 0.03 | 0.015 | I | O | | | | | | 0.49 |
| 34.833 | 0.00 | 0.03 | 0.014 | I | O | | | | | | 0.48 |
| 34.917 | 0.00 | 0.03 | 0.014 | I | O | | | | | | 0.48 |
| 35.000 | 0.00 | 0.03 | 0.014 | I | O | | | | | | 0.47 |
| 35.083 | 0.00 | 0.03 | 0.014 | I | O | | | | | | 0.46 |
| 35.167 | 0.00 | 0.03 | 0.014 | I | O | | | | | | 0.46 |
| 35.250 | 0.00 | 0.03 | 0.014 | I | O | | | | | | 0.45 |
| 35.333 | 0.00 | 0.03 | 0.013 | I | O | | | | | | 0.44 |
| 35.417 | 0.00 | 0.03 | 0.013 | I | O | | | | | | 0.44 |
| 35.500 | 0.00 | 0.03 | 0.013 | I | O | | | | | | 0.43 |
| 35.583 | 0.00 | 0.03 | 0.013 | I | O | | | | | | 0.43 |
| 35.667 | 0.00 | 0.03 | 0.013 | I | O | | | | | | 0.42 |
| 35.750 | 0.00 | 0.02 | 0.012 | I | O | | | | | | 0.41 |
| 35.833 | 0.00 | 0.02 | 0.012 | I | O | | | | | | 0.41 |
| 35.917 | 0.00 | 0.02 | 0.012 | I | O | | | | | | 0.40 |
| 36.000 | 0.00 | 0.02 | 0.012 | I | O | | | | | | 0.40 |
| 36.083 | 0.00 | 0.02 | 0.012 | I | O | | | | | | 0.39 |
| 36.167 | 0.00 | 0.02 | 0.012 | I | O | | | | | | 0.39 |
| 36.250 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.38 |
| 36.333 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.38 |
| 36.417 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.37 |
| 36.500 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.37 |
| 36.583 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.36 |
| 36.667 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.36 |
| 36.750 | 0.00 | 0.02 | 0.011 | I | O | | | | | | 0.35 |
| 36.833 | 0.00 | 0.02 | 0.010 | I | O | | | | | | 0.35 |
| 36.917 | 0.00 | 0.02 | 0.010 | I | O | | | | | | 0.34 |
| 37.000 | 0.00 | 0.02 | 0.010 | I | O | | | | | | 0.34 |
| 37.083 | 0.00 | 0.02 | 0.010 | I | O | | | | | | 0.33 |
| 37.167 | 0.00 | 0.02 | 0.010 | IO | | | | | | | 0.33 |

| | | | | | | | | | |
|--------|------|------|-------|----|--|--|--|--|------|
| 37.250 | 0.00 | 0.02 | 0.010 | IO | | | | | 0.32 |
| 37.333 | 0.00 | 0.02 | 0.010 | IO | | | | | 0.32 |
| 37.417 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.31 |
| 37.500 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.31 |
| 37.583 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.31 |
| 37.667 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.30 |
| 37.750 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.30 |
| 37.833 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.29 |
| 37.917 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.29 |
| 38.000 | 0.00 | 0.02 | 0.009 | IO | | | | | 0.29 |
| 38.083 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.28 |
| 38.167 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.28 |
| 38.250 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.27 |
| 38.333 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.27 |
| 38.417 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.27 |
| 38.500 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.26 |
| 38.583 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.26 |
| 38.667 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.26 |
| 38.750 | 0.00 | 0.02 | 0.008 | IO | | | | | 0.25 |
| 38.833 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.25 |
| 38.917 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.25 |
| 39.000 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.24 |
| 39.083 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.24 |
| 39.167 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.24 |
| 39.250 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.23 |
| 39.333 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.23 |
| 39.417 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.23 |
| 39.500 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.22 |
| 39.583 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.22 |
| 39.667 | 0.00 | 0.01 | 0.007 | IO | | | | | 0.22 |
| 39.750 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.21 |
| 39.833 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.21 |
| 39.917 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.21 |
| 40.000 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.21 |
| 40.083 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.20 |
| 40.167 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.20 |
| 40.250 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.20 |
| 40.333 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.19 |
| 40.417 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.19 |
| 40.500 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.19 |
| 40.583 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.19 |
| 40.667 | 0.00 | 0.01 | 0.006 | IO | | | | | 0.18 |
| 40.750 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.18 |
| 40.833 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.18 |
| 40.917 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.18 |
| 41.000 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.17 |
| 41.083 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.17 |
| 41.167 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.17 |
| 41.250 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.17 |
| 41.333 | 0.00 | 0.01 | 0.005 | IO | | | | | 0.16 |
| 41.417 | 0.00 | 0.01 | 0.005 | O | | | | | 0.16 |
| 41.500 | 0.00 | 0.01 | 0.005 | O | | | | | 0.16 |
| 41.583 | 0.00 | 0.01 | 0.005 | O | | | | | 0.16 |
| 41.667 | 0.00 | 0.01 | 0.005 | O | | | | | 0.16 |
| 41.750 | 0.00 | 0.01 | 0.005 | O | | | | | 0.15 |
| 41.833 | 0.00 | 0.01 | 0.005 | O | | | | | 0.15 |
| 41.917 | 0.00 | 0.01 | 0.004 | O | | | | | 0.15 |
| 42.000 | 0.00 | 0.01 | 0.004 | O | | | | | 0.15 |
| 42.083 | 0.00 | 0.01 | 0.004 | O | | | | | 0.15 |
| 42.167 | 0.00 | 0.01 | 0.004 | O | | | | | 0.14 |
| 42.250 | 0.00 | 0.01 | 0.004 | O | | | | | 0.14 |
| 42.333 | 0.00 | 0.01 | 0.004 | O | | | | | 0.14 |
| 42.417 | 0.00 | 0.01 | 0.004 | O | | | | | 0.14 |
| 42.500 | 0.00 | 0.01 | 0.004 | O | | | | | 0.14 |
| 42.583 | 0.00 | 0.01 | 0.004 | O | | | | | 0.13 |
| 42.667 | 0.00 | 0.01 | 0.004 | O | | | | | 0.13 |
| 42.750 | 0.00 | 0.01 | 0.004 | O | | | | | 0.13 |
| 42.833 | 0.00 | 0.01 | 0.004 | O | | | | | 0.13 |
| 42.917 | 0.00 | 0.01 | 0.004 | O | | | | | 0.13 |
| 43.000 | 0.00 | 0.01 | 0.004 | O | | | | | 0.13 |
| 43.083 | 0.00 | 0.01 | 0.004 | O | | | | | 0.12 |
| 43.167 | 0.00 | 0.01 | 0.004 | O | | | | | 0.12 |
| 43.250 | 0.00 | 0.01 | 0.004 | O | | | | | 0.12 |
| 43.333 | 0.00 | 0.01 | 0.004 | O | | | | | 0.12 |

| | | | | | | | | | |
|--------|------|------|-------|---|--|--|--|--|------|
| 43.417 | 0.00 | 0.01 | 0.004 | 0 | | | | | 0.12 |
| 43.500 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.12 |
| 43.583 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.11 |
| 43.667 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.11 |
| 43.750 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.11 |
| 43.833 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.11 |
| 43.917 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.11 |
| 44.000 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.11 |
| 44.083 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.167 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.250 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.333 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.417 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.500 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.583 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.10 |
| 44.667 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 44.750 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 44.833 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 44.917 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 45.000 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 45.083 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 45.167 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 45.250 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 45.333 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.09 |
| 45.417 | 0.00 | 0.01 | 0.003 | 0 | | | | | 0.08 |
| 45.500 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 45.583 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 45.667 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 45.750 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 45.833 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 45.917 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 46.000 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 46.083 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.08 |
| 46.167 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.250 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.333 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.417 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.500 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.583 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.667 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.750 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.833 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 46.917 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.07 |
| 47.000 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.083 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.167 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.250 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.333 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.417 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.500 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.583 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.667 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.750 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.833 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 47.917 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.06 |
| 48.000 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.083 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.167 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.250 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.333 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.417 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.500 | 0.00 | 0.00 | 0.002 | 0 | | | | | 0.05 |
| 48.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 48.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 48.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 48.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 48.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 49.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 49.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 49.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.05 |
| 49.250 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.333 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.417 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.500 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |

| | | | | | | | | | |
|--------|------|------|-------|---|--|--|--|--|------|
| 49.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 49.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.250 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.333 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.417 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.500 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.04 |
| 50.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 50.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 50.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.250 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.333 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.417 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.500 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 51.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.250 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.333 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.417 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.500 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.03 |
| 52.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 52.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 52.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.250 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.333 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.417 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.500 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 53.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.250 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.333 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.417 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.500 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.583 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.667 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.750 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.833 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 54.917 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 55.000 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 55.083 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 55.167 | 0.00 | 0.00 | 0.001 | 0 | | | | | 0.02 |
| 55.250 | 0.00 | 0.00 | 0.000 | 0 | | | | | 0.02 |

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

Number of intervals = 663
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 0.104 (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

| Potential Sources of Runoff Pollutants | Permanent Controls— Show on WQMP Drawings | Permanent Controls—List in WQMP Table and Narrative | Operational BMPs—Include in WQMP Table and Narrative |
|---|--|--|---|
| <input checked="" type="checkbox"/> A. On-site storm drain inlets | <input checked="" type="checkbox"/> Locations of inlets. | <input checked="" type="checkbox"/> 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. | <input checked="" type="checkbox"/> Maintain and periodically repaint or replace inlet markings. <input checked="" type="checkbox"/> Provide stormwater pollution prevention information to new site owners, lessees, or operators. <input checked="" type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com <input checked="" type="checkbox"/> Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.” |
| <input type="checkbox"/> B. Interior floor drains and elevator shaft sump pumps | | <input type="checkbox"/> State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer. | <input type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow. |
| <input type="checkbox"/> c. Interior parking garages | | <input type="checkbox"/> State that parking garage floor drains will be plumbed to the sanitary sewer. | <input type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow. |
| <input type="checkbox"/> D1. Need for future indoor & structural pest control | | <input type="checkbox"/> Note building design features that discourage entry of pests. | <input type="checkbox"/> Provide Integrated Pest Management information to owners, lessees, and operators. |
| <input checked="" type="checkbox"/> D2. Landscape/ Outdoor Pesticide Use | <input checked="" type="checkbox"/> Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. | State that final landscape plans will accomplish all of the following. <input checked="" type="checkbox"/> Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. <input checked="" type="checkbox"/> Design landscaping to minimize | <input checked="" type="checkbox"/> Maintain landscaping using minimum or no pesticides. <input checked="" type="checkbox"/> See applicable operational BMPs in “What you should know for.....Landscape and |

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| | <input checked="" type="checkbox"/> Show self-retaining landscape areas, if any. <input checked="" type="checkbox"/> Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.) | irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. <input checked="" type="checkbox"/> Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. <input checked="" type="checkbox"/> Consider using pest-resistant plants, especially adjacent to hardscape. <input checked="" type="checkbox"/> To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions. | Gardening” at http://rcflood.org/stormwater/Error! Hyperlink reference not valid. <input checked="" type="checkbox"/> Provide IPM information to new owners, lessees and operators. |
| <input checked="" type="checkbox"/> E. Pools, spas, ponds, decorative fountains, and other water features. | <input checked="" type="checkbox"/> 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. | <input checked="" type="checkbox"/> See applicable operational BMPs in “Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain” at http://rcflood.org/stormwater/ |
| <input checked="" type="checkbox"/> F. Food service Restaurant maybe proposed in the proposed Commercial Areas (to be determined in final stage) | <input checked="" type="checkbox"/> 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. <input type="checkbox"/> On the drawing, show a note that this drain will be connected to a grease | <input checked="" type="checkbox"/> Describe the location and features of the designated cleaning area. <input type="checkbox"/> Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated. | <input checked="" type="checkbox"/> 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. |

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| | <p>interceptor before discharging to the sanitary sewer.</p> <p>Restaurant maybe proposed in the proposed Commercial Areas (to be determined in final stage)</p> | <p>Restaurant maybe proposed in the proposed Commercial Areas (to be determined in final stage)</p> | <p>Restaurant maybe proposed in the proposed Commercial Areas (to be determined in final stage)</p> |
| <p><input checked="" type="checkbox"/> G. Refuse areas</p> | <p><input checked="" type="checkbox"/> 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.</p> <p><input checked="" type="checkbox"/> If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent runoff and show locations of berms to prevent runoff from the area.</p> <p><input checked="" type="checkbox"/> Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.</p> | <p><input checked="" type="checkbox"/> State how site refuse will be handled and provide supporting detail to what is shown on plans.</p> <p><input checked="" type="checkbox"/> State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.</p> | <p><input checked="" type="checkbox"/> State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com</p> |
| <p><input type="checkbox"/> H. Industrial processes.</p> | <p><input type="checkbox"/> Show process area.</p> | <p><input type="checkbox"/> 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.”</p> | <p><input type="checkbox"/> 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/</p> |

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| <input type="checkbox"/> i. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.) | <input type="checkbox"/> Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent runoff or run-off from area. <input type="checkbox"/> 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. <input type="checkbox"/> 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. | <p>Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.</p> <p>Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Hazardous Waste Generation <input checked="" type="checkbox"/> Hazardous Materials Release Response and Inventory <input checked="" type="checkbox"/> California Accidental Release (CalARP) <input checked="" type="checkbox"/> Aboveground Storage Tank <input checked="" type="checkbox"/> Uniform Fire Code Article 80 Section 103(b) & (c) 1991 <input checked="" type="checkbox"/> Underground Storage Tank <p>www.cchealth.org/groups/hazmat/</p> | <input type="checkbox"/> 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 |
| <input type="checkbox"/> j. Vehicle and Equipment Cleaning | <input type="checkbox"/> 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 | <input type="checkbox"/> 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): <input type="checkbox"/> 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 <input type="checkbox"/> Car dealerships and similar may rinse cars with water only. |

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| | <p>are provided with an automatic shutoff to discourage such use).</p> <p>(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.</p> <p>(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.</p> | | |
| <input type="checkbox"/> k. Vehicle/Equipment Repair and Maintenance | <input type="checkbox"/> 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. <input type="checkbox"/> 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. | <input type="checkbox"/> State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. <input type="checkbox"/> 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. <input type="checkbox"/> 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 | <p>In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:</p> <p><input type="checkbox"/> 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.</p> <p><input type="checkbox"/> 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.</p> <p><input type="checkbox"/> No person shall leave unattended drip</p> |

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| | <input type="checkbox"/> 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. | requirements. | 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/ |
| <input checked="" type="checkbox"/> L. Fuel Dispensing Areas Gas Station maybe proposed in the proposed Commercial Areas (to be determined in final stage) | <input checked="" type="checkbox"/> Fueling areas 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. <input checked="" type="checkbox"/> 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 area1.] | | <input checked="" type="checkbox"/> Move loaded and unloaded items indoors as soon as possible. <input checked="" type="checkbox"/> See Fact Sheet SC-30, “Outdoor Loading and Unloading,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Gas Station maybe proposed in the proposed Commercial Areas (to be determined in final stage) |

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| | <p>The canopy [or cover] shall not drain onto the fueling area.</p> <p>Gas Station maybe proposed in the proposed Commercial Areas (to be determined in final stage)</p> | | |
| <p><input checked="" type="checkbox"/> M. Loading Docks</p> <p>The Loading Docks maybe use in the proposed Commercial Areas (to be determined in final stage)</p> | <p><input checked="" type="checkbox"/> 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.</p> <p><input checked="" type="checkbox"/> 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.</p> <p><input checked="" type="checkbox"/> Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.</p> <p>The Loading Docks maybe use in the proposed Commercial</p> | | <p><input checked="" type="checkbox"/> Move loaded and unloaded items indoors as soon as possible.</p> <p><input checked="" type="checkbox"/> See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com</p> <p>The Loading Docks maybe use in the proposed Commercial Areas (to be determined in final stage)</p> |

| | Areas (to be determined in final stage) | | |
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| <input checked="" type="checkbox"/> n. Fire Sprinkler Test Water | | <input checked="" type="checkbox"/> Provide a means to drain fire sprinkler test water to the sanitary sewer. | <input checked="" type="checkbox"/> 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 <input type="checkbox"/> Boiler drain lines <input type="checkbox"/> Condensate drain lines <input checked="" type="checkbox"/> Rooftop equipment <input type="checkbox"/> Drainage sumps <input checked="" type="checkbox"/> Roofing, gutters, and trim. <input type="checkbox"/> Other sources | | <input type="checkbox"/> Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. <input type="checkbox"/> Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. <input checked="" type="checkbox"/> Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. <input type="checkbox"/> Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. <input checked="" type="checkbox"/> Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. <input type="checkbox"/> Include controls for other sources as specified by local reviewer. | <input checked="" type="checkbox"/> Drain to landscaping areas. See D2 for landscape area maintenance. |
| <input checked="" type="checkbox"/> p. Plazas, sidewalks, and parking lots. | | | <input checked="" type="checkbox"/> 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. |

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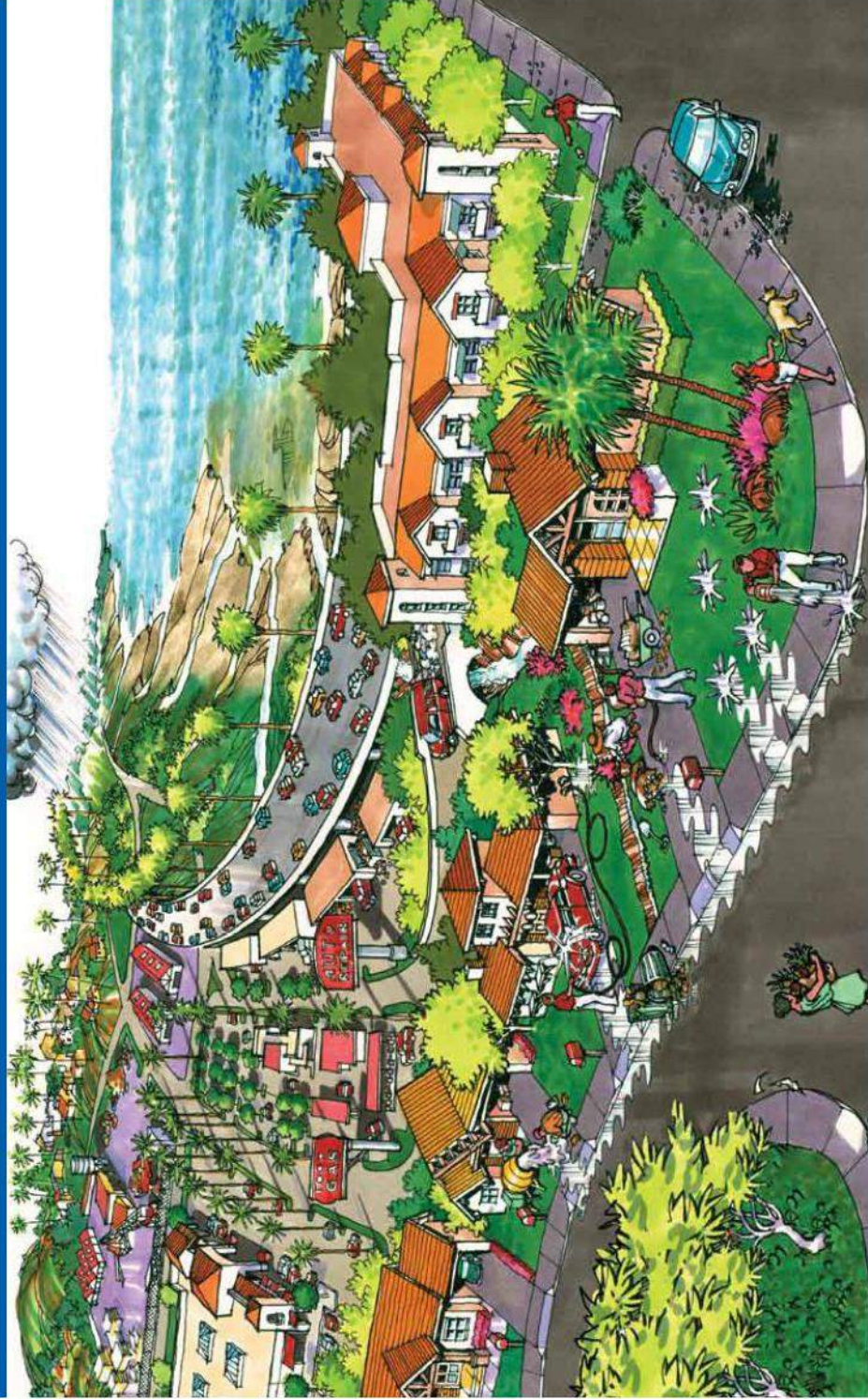
Appendix 9: O&M

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

Appendix 10: Educational Materials

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

The Ocean Begins at Your Front Door



Never allow pollutants to enter the street, gutter or storm drain!

Follow these simple steps to help reduce water pollution:

Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oilandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate-free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

Landscape and Gardening

- Do not over-water: Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oilandfills.com.

Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

Common Pollutants

Home Maintenance

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

Lawn and Garden

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

Automobile

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

Did You Know?

- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called "non-point source" pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

Where Does It Go?

- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

Sources of Non-Point Source Pollution

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.



The Effect on the Ocean



Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.



Stormwater and the Construction Industry

Protect Natural Features



- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Silt Fencing



- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Construction Phasing



- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

Vegetative Buffers



- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Site Stabilization



- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Maintain your BMPs!

IN RIVERSIDE COUNTY ... Call 1-800-506-2555 TO REPORT ILLEGAL STORMDRAIN DISPOSAL

E-mail: Flood.fcnpdes@co.riverside.ca.us
 Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....

REMEMBER, ONLY RAIN IN THE STORMDRAIN!

Construction Entrances



- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes



- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drains, or divert stormwater away from slopes.

Dirt Stockpiles



- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection



- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

www.epa.gov/nrpdes/menu/ufbmps



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



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

Important Links:

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

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

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

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

California Native Plant Society
www.cnps.org

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



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

*What you should know for...
 Landscape and Gardening*

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators

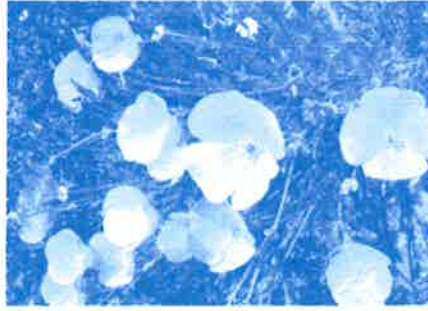


Tips for Landscape & Gardening

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

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.



- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.

- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.

- Try natural long-term common sense solutions first. **Integrated Pest Management (IPM)** can provide landscaping guidance and solutions, such as:

- ◆ **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
- ◆ **Biological Controls** - Use predatory insects to control harmful pests.
- ◆ **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

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

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

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

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District (951) 955-1200
 County of Riverside (951) 955-1000
 City of Banning (951) 922-3105
 City of Beaumont (951) 769-8520
 City of Calimesa (909) 795-9801
 City of Canyon Lake (951) 244-2955
 Cathedral City (760) 770-0327
 City of Coachella (760) 398-4978
 City of Corona (951) 736-2447
 City of Desert Hot Springs (760) 329-6411
 City of Eastvale (951) 361-0900
 City of Hemet (951) 765-2300
 City of Indian Wells (760) 346-2489
 City of Indio (760) 391-4000
 City of Lake Elsinore (951) 674-3124
 City of La Quinta (760) 777-7000
 City of Menifee (951) 672-6777
 City of Moreno Valley (951) 413-5000
 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) 694-7337
 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@reflood.org

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

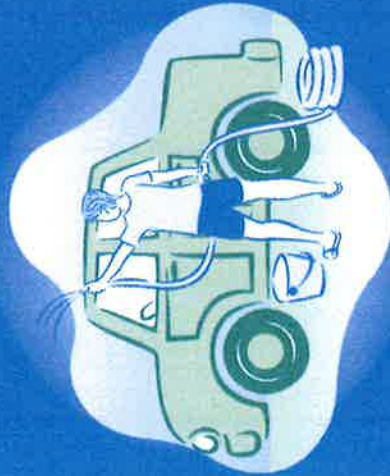
Online resources include:

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

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

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

Do you know where street flows actually go?

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



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

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

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

Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

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

Best Management Practices

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

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

Simple solutions for both light and heavy duty jobs:

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

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

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

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

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

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

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

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

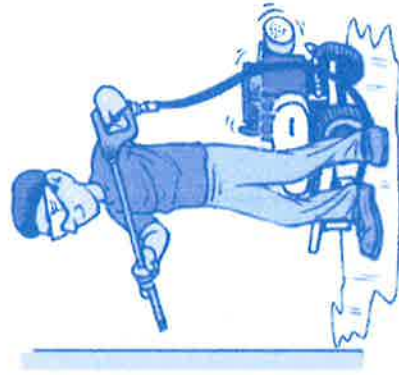


Report illegal storm drain disposal
Call Toll Free

1-800-506-2555

Using Cleaning Agents

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



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

Think Water Conservation

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

Screening Wash Water

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

Drain Inlet Protection & Collection of Wash Water

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

Concrete/Coring/Saw Cutting and Drilling Projects

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

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

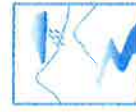
San Diego Region (9)
9771 Clairemont Mesa Blvd., Ste. A
San Diego, CA 92124
(619) 467-2952

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.



Storm Water
Clean Water
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

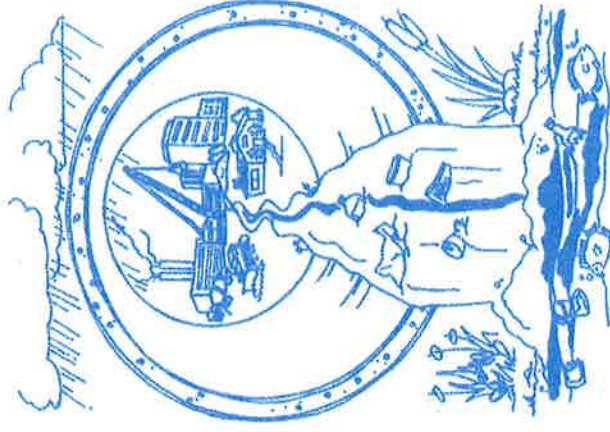
**FIND OUT
IF YOUR FACILITY
MUST OBTAIN A PERMIT**

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;

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.

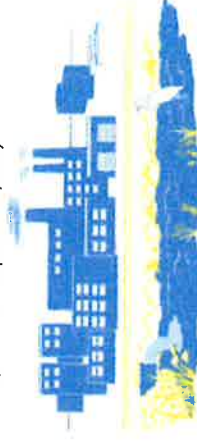
What are the requirements of the Industrial Activities Storm Water General Permit?

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.

STORM DRAIN MARKERS

CLIENT TESTIMONIALS



If You Identify With Quality,
You Identify With Us

SINCE 1975



*"Almetek has been great to work with and
the quality of their product is excellent.*

We will use them again!"

**- JOSH WINTERS
MACTEC FEDERAL PROGRAMS INC.**

2 Joy Drive, Hackettstown, NJ
Toll Free: 800-248-2080 • 908-850-9700
Fax: 908-850-9618 • www.almetek.com

Almetek's Markers last a lifetime and are cost effective

Our attractive 4" Disc, 3-D embossed, metal, Storm Drain Markers will last for decades. They may even last a lifetime. These markers are so strong that they are virtually indestructible.

The Perfect Marker!

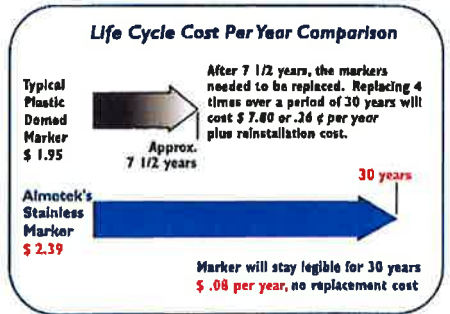
Almetek's metal markers have been engineered to perfection. They install easily, quickly and will remain permanently in place. Our patent pending sub-surface mounting installation with the turned down edges will ensure against theft and snow plow displacement. Our markers can be installed on the roadway, curb, storm drain grate or head. We are so sure of this product and its installation process that we will replace any missing marker with a brand new one, totally **FREE OF CHARGE.***

The Price is Right!

The price for stainless is less expensive than you think. A plastic marker may be pennies less initially, but in the long term, it will be more than three times expensive. Look at the facts.

Plastic isn't as durable as stainless steel. The estimated life of a domed marker is approximately 7 1/2 years and some customers are telling us that the plastic markers are failing after two years. During the span of 30 years, with a domed marker, you may need to replace it, at least, 4 times. The typical cost of a domed marker of \$1.95 and replacing 4 times, will cost you, without inflation and re-installation cost, \$7.80. Our stainless steel marker will only cost \$2.39 (500 order) and no

replacement cost for 30-years. The final fact: you will save at least \$5.40 per marker with Almetek's Stainless Steel Marker.



Now you know the facts. Go ahead and compare our Storm Drain Marker's advantages.

Our Storm Drain Marker's Advantages

All metal, deep 3-D embossed

UV baked enamel paint, 1-2 colors option or natural

Virtually indestructible
Heavy .0625" thick metal

9 different symbols

10 different legends

Deep-stamped, permanent sequential numbering option or stamp name of city or town

Easy-to-install, 2 adhesives, 2 different fasteners

Install into new or existing concrete

Prismatic finish

Up to 30-year warranty**

Attractive, high visibility

Theft-resistant with turned down edges (Patent Pending)

Snow plow proof (with sub-surface installation)

Lowest cost, .08¢ per year with Stainless Steel

Square center hole option for fastener

Custom designs available

Install on either top or side of drain, grate, curb or roadway, in any weather



Patent pending sub-surface mounting. See back page for all installation options.



BACK VIEW
Back has cavities for better adhesion.



CUSTOM IMPRINT
Optional: Engrave your City or Town or GPS location

* Provided that you have purchased our fastener, adhesive & sub-surface installation tool and followed all installation instructions.
** Stainless & Brass- 30-years, Aluminum and Anodized Aluminum, 15-years. Call for Almetek's Metal Storm Drain Warranty Certificate.

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.



SD-10 Site Design & Landscape Planning

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

Site Design & Landscape Planning SD-10

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.

SD-10 Site Design & Landscape Planning

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.



Rain Garden

Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

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



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

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

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say $\frac{1}{4}$ to $\frac{1}{2}$ 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



Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

Designing New Installations

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

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



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

Redeveloping Existing Installations

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

Other Resources

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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.

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Design Objectives

- Maximize Infiltration
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Description

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

Approach

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

Suitable Applications

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

Design Considerations

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

Designing New Installations

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

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



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

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

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

Redeveloping Existing Installations

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

Additional Information

Maintenance Considerations

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

Placement

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

Supplemental Information

Examples

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

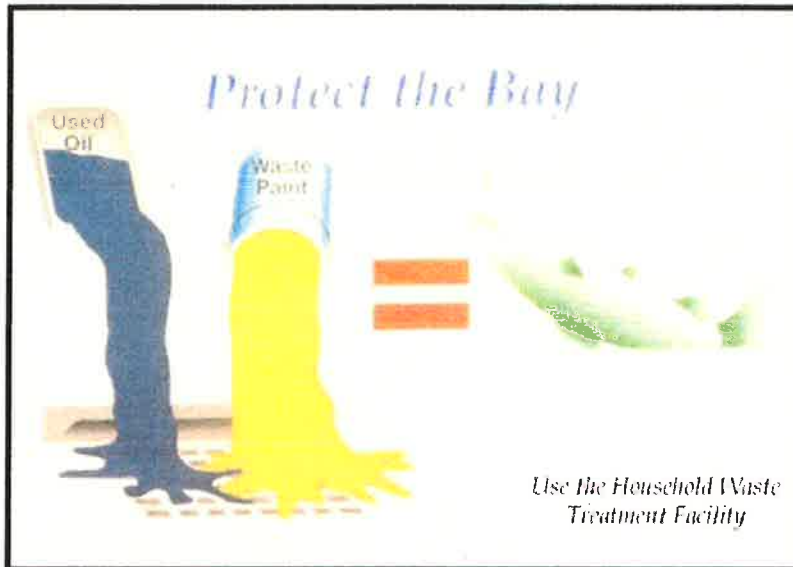
Other Resources

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

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

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Objectives

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

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

Targeted Constituents

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



Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols***Recommended Complaint Investigation Equipment***

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

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of “as-built” piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

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

Review Infield Piping

- A review of the “as-built” piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

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

Dye Testing

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

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post “No Dumping” signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

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

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
 - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a “non-stormwater” discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

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

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

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

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

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

Santa Clara Valley Urban Runoff Pollution Prevention Program <http://www.sevurpppp.org>

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



Objectives

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

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, re-use, and recycling; and preventing runoff and runoff.

Approach

Pollution Prevention

- Reduction in the amount of waste generated can be accomplished using the following source controls such as:
 - Production planning and sequencing
 - Process or equipment modification
 - Raw material substitution or elimination
 - Loss prevention and housekeeping
 - Waste segregation and separation
 - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

Targeted Constituents

| | |
|------------------|-------------------------------------|
| Sediment | <input checked="" type="checkbox"/> |
| Nutrients | <input checked="" type="checkbox"/> |
| Trash | <input checked="" type="checkbox"/> |
| Metals | <input checked="" type="checkbox"/> |
| Bacteria | <input checked="" type="checkbox"/> |
| Oil and Grease | <input checked="" type="checkbox"/> |
| Organics | <input checked="" type="checkbox"/> |
| Oxygen Demanding | <input checked="" type="checkbox"/> |



Suggested Protocols***General***

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater runoff and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage or leaks regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Place waste containers under cover if possible.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc. may not be

disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g. sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Stencil storm drains on the facility's property with prohibitive message regarding waste disposal.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers protected from vandalism, and in compliance with fire and hazardous waste codes.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Runon/Runoff Prevention

- Prevent stormwater runon from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent the waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training

- Train staff pollution prevention measures and proper disposal methods.
- Train employees and contractors proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.
- Vehicles transporting waste should have spill prevention equipment that can prevent spills during transport. The spill prevention equipment includes:
 - Vehicles equipped with baffles for liquid waste
 - Trucks with sealed gates and spill guards for solid waste

Other Considerations

- Hazardous waste cannot be re-used or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements***Costs***

- Capital and operation and maintenance costs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance

- None except for maintaining equipment for material tracking program.

Supplemental Information

Further Detail of the BMP

Land Treatment System

- Minimize the runoff of polluted stormwater from land application of municipal waste on-site by:
 - Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, there is a closed drainage system.
 - Avoiding application of waste to the site when it is raining or when the ground is saturated with water.
 - Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site.
 - Maintaining adequate barriers between the land application site and the receiving waters. Planted strips are particularly good.
 - Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins.
 - Performing routine maintenance to ensure the erosion control or site stabilization measures are working.

References and Resources

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

Orange County Stormwater Program

http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Associations (BASMAA). On-line: <http://www.basmaa.org>



Description

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

Approach

Pollution Prevention

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

Objectives

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

Targeted Constituents

| | |
|------------------|-------------------------------------|
| Sediment | <input checked="" type="checkbox"/> |
| Nutrients | <input checked="" type="checkbox"/> |
| Trash | <input checked="" type="checkbox"/> |
| Metals | <input checked="" type="checkbox"/> |
| Bacteria | <input checked="" type="checkbox"/> |
| Oil and Grease | <input checked="" type="checkbox"/> |
| Organics | <input checked="" type="checkbox"/> |
| Oxygen Demanding | <input checked="" type="checkbox"/> |



SC-41 Building & Grounds Maintenance

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

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

Landscaping Activities

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

Building Repair, Remodeling, and Construction

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

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

Mowing, Trimming, and Planting

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

Fertilizer and Pesticide Management

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

SC-41 Building & Grounds Maintenance

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

Inspection

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

Training

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

Spill Response and Prevention

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

Other Considerations

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

Requirements

Costs

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

Maintenance

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

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

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

References and Resources

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

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

Orange County Stormwater Program

http://www.ocwatersheds.com/StormWater/swp_introduction.asp

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

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

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -

<http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf>

Parking/Storage Area Maintenance SC-43



Objectives

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

Description

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

Approach

Pollution Prevention

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

Suggested Protocols

General

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

Targeted Constituents

| | |
|------------------|-------------------------------------|
| Sediment | <input checked="" type="checkbox"/> |
| Nutrients | <input checked="" type="checkbox"/> |
| Trash | <input checked="" type="checkbox"/> |
| Metals | <input checked="" type="checkbox"/> |
| Bacteria | <input checked="" type="checkbox"/> |
| Oil and Grease | <input checked="" type="checkbox"/> |
| Organics | <input checked="" type="checkbox"/> |
| Oxygen Demanding | <input checked="" type="checkbox"/> |



SC-43 Parking/Storage Area Maintenance

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

Controlling Litter

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

Surface cleaning

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

Surface Repair

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

Parking/Storage Area Maintenance SC-43

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

Inspection

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

Training

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

Spill Response and Prevention

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

Other Considerations

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

Requirements

Costs

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

Maintenance

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

SC-43 Parking/Storage Area Maintenance

Supplemental Information

Further Detail of the BMP

Surface Repair

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

References and Resources

<http://www.stormwatercenter.net/>

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

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

Orange County Stormwater Program

http://www.ocwatersheds.com/StormWater/swp_introduction.asp

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

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

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP)

<http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf>



Description

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

Approach

Pollution Prevention

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

Suggested Protocols

Catch Basins/Inlet Structures

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

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

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



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

Storm Drain Conveyance System

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

Pump Stations

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

Open Channel

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

Illicit Connections and Discharges

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

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

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

Training

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

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

Spill Response and Prevention

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

Other Considerations (Limitations and Regulations)

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

Requirements***Costs***

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

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

Maintenance

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

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

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

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

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

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

SC-44 Drainage System Maintenance

References and Resources

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

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

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

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

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

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

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

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http://www.epa.gov/npdes/menuofbmps/poll_16.htm