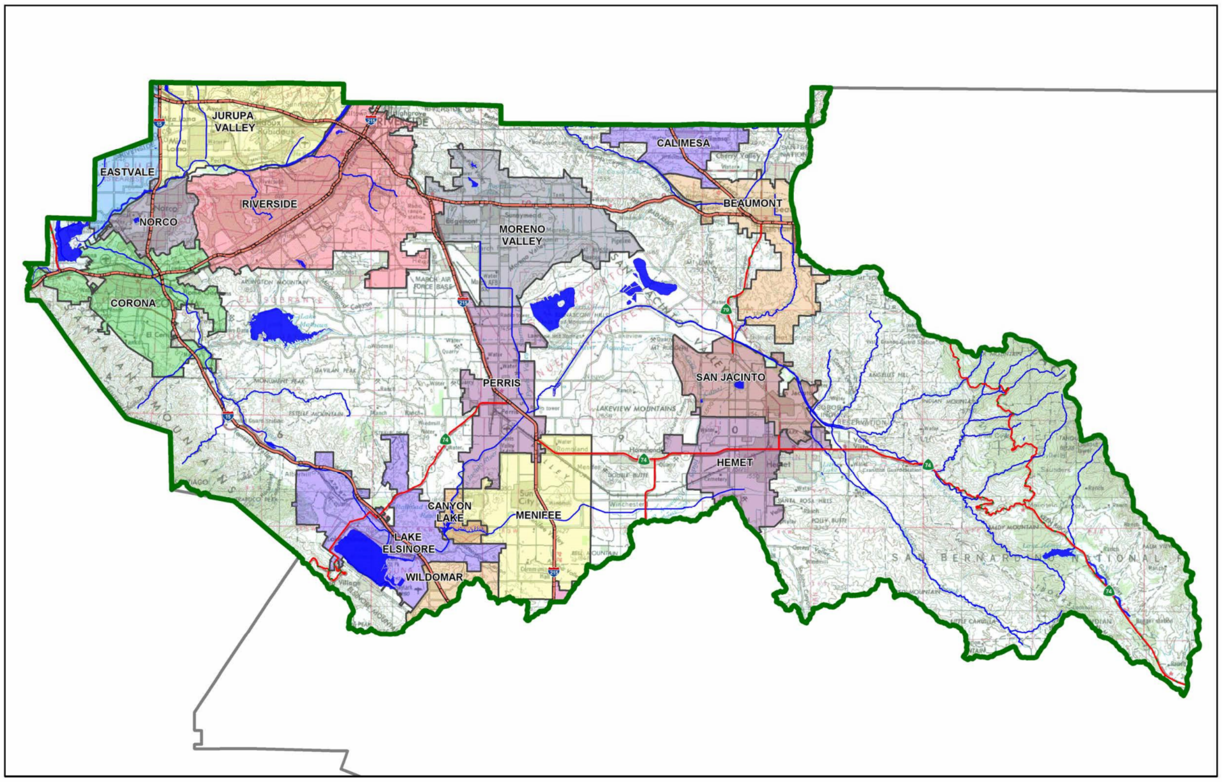
Master Project Specific Water Quality Management Plan

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

Project Title: Harvest Landing Retail Center and Business Park

Development No: TTM 38810, 38811-1, 38811-2, 38811-3

Design Review/Case No: P22-05250



☒ **Preliminary**
☐ **Final**

Original Date Prepared: October 3, 2024

Revision Date(s):

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

Contact Information:

Prepared for:
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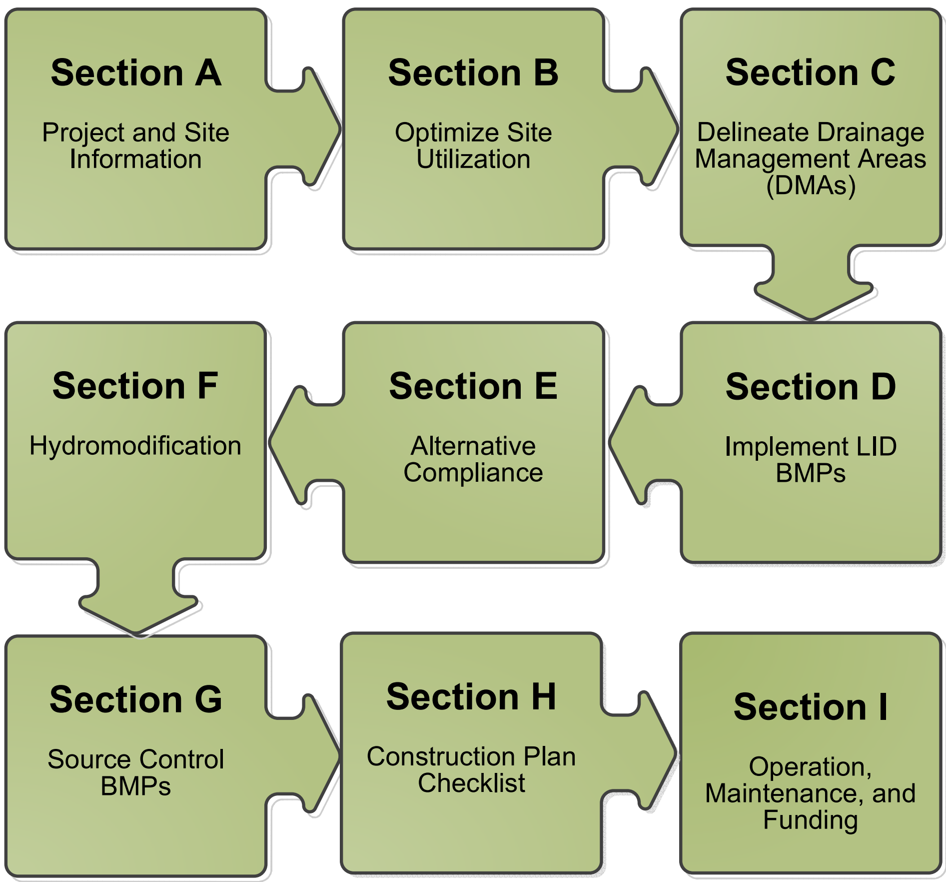
A Brief Introduction

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



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Howard Industrial Partners, Inc by FMCivil Engineers Inc for the Harvest Landing Retail Center and Business Park (P22-05250).

This WQMP is intended to comply with the requirements of the City of Perris for Water Quality Ordinance 1194 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 Perris Water Quality Ordinance 1194. (Municipal Code Section 14.22).

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

Timothy J Howard
Owner's Signature

10-4-24
Date

Tim Howard
Owner's Printed Name

President
Owner's Title/Position

PREPARER'S CERTIFICATION

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

Preparer's Signature

October 3, 2024
Date

Francisco Martinez, Jr
Preparer's Printed Name

Principal
Preparer's Title/Position

Preparer's Licensure:

REGISTERED PROFESSIONAL ENGINEER
FRANCISCO MARTINEZ JR
C-84640
CIVIL
STATE OF CALIFORNIA

CALIFORNIA ALL-PURPOSE CERTIFICATE OF
ACKNOWLEDGMENT

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

State of California }

County of Orange }

On 10-04-2024 before me, Nicole-Rae Gleason,
(insert name and title of the officer)

personally appeared Timothy John Howard,
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.

NICOLE-RAE GLEASON
COMM # 2451411
ORANGE County
California Notary Public
Comm Exp June 23, 2027

Notary Public Signature (Seal)

OPTIONAL INFORMATION

DOCUMENT

Owner's Certification
(name or type of document)

one
(number of pages)

10-04-2024
(document date)

SIGNER CAPACITY

—
(capacity claimed by the signer)

NOTICE
THE NOTARY PUBLIC DOES NOT CERTIFY THE AUTHORIZED CAPACITY OF THE SIGNER

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List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial and Industrial
Planning Area:	Harvest Landing Specific Plan
Community Name:	Perris
Development Name:	

PROJECT LOCATION
Latitude & Longitude (DMS): 33°48’49.79”, -117°13’58.08”
Project Watershed and Sub-Watershed: Santa Ana Watershed, San Jacinto River Sub-Watershed
Gross Acres: 311.8
APN(s) (Phase 1): 305-100-028, 305-110-001, 002, 003, 004, 005, 006, 007, 015, 016, 021, 022, 023, 024, 025, 026, 027, 032, 033, 034, 035, 305-120-004, 005, 006, 007, 008, 020, 021, 022, 023, 024, 025, 026, 305-130-001, 002, 003, 004, 005, 006, 009, 305-140-012, 024, 025, 026, 027, 031, 032, 034, 040, 041, 049, 050, 052, 053, 054, 055, 056, 057, 058, 059, 060, 061, 305-160-001, 002, 003, 022, 023, 024, 025, 026, 027, 028, 029, 030, 305-170-018, 305-190-014, 019, 020, 028, 029, 030, 031, 033, 305-220-011, 013, 018, 020, 021, 023, 028, 031, 038, 059, 060, 061, 062.
APN(s) (Phase 2): 305-060-036, 037, 042, 305-070-004, 305-090-015, 016, 017, 019, 026, 028, 030, 032, 055, 056, 057, 058, 059
Map Book and Page No.: Book 305, Pages 7, 9, 10, 11, 12, 13, 14, 16, 17, 19, 22

PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	General Warehousing, Retail, Multiple Business Use	
Proposed or Potential SIC Code(s)	4225, 5331, 5339, 5411, 5541, 5812	
Area of Impervious Project Footprint (SF)	±10,270,000	
Total Area of proposed Impervious Surfaces within Project Footprint (SF)/or Replacement	±10,270,000	
Does the project consist of offsite road improvements?	☐ Y	☒ N
Does the project propose to construct unpaved roads?	☐ Y	☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y	☒ N

EXISTING SITE CHARACTERISTICS		
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	±30,000	
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N
If so, identify the Cell number:	N/A	
Are there any natural hydrologic features on the project site?	☐ Y	☒ N
Is a Geotechnical Report attached?	☒ Y	☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	N/A	
What is the Water Quality Design Storm Depth for the project?	0.60	

See next page for Project Narrative:

Overall Project Narrative:

Harvest Landing Retail Center and Business Park is a proposed industrial and retail development consisting of multiple sites across two phases. The site is within the Harvest Landing Specific Plan Area, bounded by East Frontage Road to the west, an existing shopping center to the south, Placentia Avenue to the north, and Perris Boulevard to the east.

Phase I is comprised of 10 sites; Site 1 (59.37 acres) is a warehouse site, comprised of 1 building, truck yard, auto parking, and landscaping. Sites 2-7 (24.13, 7.15, 3.60, 3.47, 25.81, 16.37 ac., respectively) are each comprised of 1 building, truck yard, auto parking, and landscaping. Site 8 (22.16 ac.) is a retail shopping center with 18 buildings, an outdoor food court, and auto parking. Site 9 (24.33 ac.) is also a retail center, with three buildings currently proposed, auto parking, and a consumer fueling station which will be hydrologically separated from the rest of Site 9 and have separate treatment. Site 10 (12.91 ac.) contains a shared bioretention basin for treatment flows from Sites 8 and 9, underground detention system to store treatment flows, and lift station. The basin will be described in greater detail in a later section.

Phase II is a 95.96-acre portion of the development, with a currently unspecified use and number of sites. Its impact to the Design Capture Volume treatment needs of the development has been calculated with an assumption of 88% impervious cover types, and 12% pervious cover types. Treatment for Phase II will be performed onsite similarly to the Phase I Industrial Sites.

Construction phasing within Phases I and II have not yet been determined, except for the retail components being planned for construction before the industrial sites.

Site 10 (12.91 ac.) in Phase I will be the location of a shared bioretention basin which will treat flows from Sites 8 and 9 and will be referred to as “Offsite Basin” in the following sections of the report. Site 10 consists of a bioretention basin with a bottom surface area totaling 76,615 SF, and a Design Treatment Capacity of 137,907 cubic feet, along with open space areas and public amenities such as walking paths and benches. This site receives flows from only Sites 8 and 9, which are conveyed via a low flow water quality line, then stored inside an underground CMP chamber system where they will be pumped up to the surface via a lift station. The lift station will be sized to fully evacuate the chambers within 72 hours in the event of 2-year, 24-hour storm event.

Proposed public streets, namely Daniela Way and the extension of Barrett Avenue to Orange Avenue, will also be treated at each inlet with a proprietary flow-based device.

Flows in excess of the 2-year, 24-hour storm event from all sites will bypass into onsite underground detention systems within their respective sites, ultimately discharging into a proposed extension of MDP Line “K”.

All water quality treatment within Harvest Landing will be achieved via bioretention basins or proprietary flow-based devices (Modular Wetlands). This is because infiltration BMPs are not feasible for the overall development as infiltration rates are considerably low (<1in/hr) within large portions of the Harvest Landing area (See infiltration report in Appendix 3 and list of rates in Section B). The project also fails to meet the minimum criteria for Harvest and Use. Due to site layouts and constraints, most Harvest Landing sites could not accommodate on-site BMPs large enough to treat the DCV generated.

A.1 Maps and Site Plans

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

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

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Perris Valley Channel	None Listed	REC2, WILD, RARE	±0.9 Miles downstream of Site
San Jacinto River Reach 3	None Listed	RARE	±5.2 Miles downstream of Site
Canyon Lake (Railroad Canyon Reservoir)	Nutrients	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	±11.2 Miles downstream of Site
San Jacinto River Reach 1	None Listed	RARE	±14.8 Miles downstream of Site
Lake Elsinore	DDT, Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs (Polychlorinated biphenyls),Toxicity	REC1, REC2, COMM, WARM, WILD, RARE	±19.2 Miles downstream of Site

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

Table A.2 Other Applicable Permits

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

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

Section B: Optimize Site Utilization (LID Principles)

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

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

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

Site Optimization

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

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

Existing drainage patterns will be preserved. Flows currently sheet-flow eastward until reaching Perris Boulevard, where they are collected by City or County storm drain facilities, and eventually discharged into the Perris Valley Channel. Flows from the proposed development will also ultimately discharge to the Perris Valley Channel through an extension of the existing MDP Line "K", and through proposed public storm drain laterals that will connect to Line "K".

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

No, there is no significant vegetation to protect. Sites 1-3 and 7 are proposed to have landscaping coverages at or near 20% per site, with Site 4 at around 30%, and Site 5 at around 50%. Sites 6, 8 and 9, due to their layout and purpose, propose landscaping to the maximum extent practicable and maintain a minimum of 10% landscaping. Phase II Site layouts are undeveloped but assume a 12% minimum landscaping cover for DCV and Harvest and Reuse exemption calculations.

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

The Harvest Landing SP Sites have very poor natural infiltration capacity. See infiltration report in Appendix 3 for locations of infiltration tests. Infiltration rates average below 1 inch per hour. The infiltration rates found over the Specific Plan are as follows:

Test No.	Rate (in/hr)	Test No.	Rate (in/hr)	Test No.	Rate (in/hr)	Test No.	Rate (in/hr)
I-1	0.8	I-13	0.2	I-25	0.1	I-37	0.1
I-2	1.0	I-14	0.2	I-26	0.0	I-38	0.1
I-3	6.8	I-15	0.0	I-27	0.1	I-39	0.0
I-4	0.3	I-16	0.2	I-28	0.0	I-40	0.1
I-5	0.9	I-17	0.0	I-29	0.0	I-41	0.0
I-6	1.3	I-18	0.0	I-30	0.1	I-42	0.0
I-7	<0.1	I-19	0.1	I-31	0.1	I-43	0.0
I-8	0.2	I-20	0.1	I-32	0.1	I-44	0.1
I-9	0.1	I-21	0.4	I-33	0.1	I-45	0.8
I-10	0.3	I-22	0.3	I-34	0.1	I-46	0.1
I-11	0.2	I-23	0.1	I-35	0.1	I-47	0.1
I-12	0.2	I-24	1.7	I-36	0.0		

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

Impervious area was minimized to the maximum extent practicable per site depending on the proposed use case.

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

Overall, Site layouts did not allow for dispersion to adjacent pervious areas. Dispersion occurred on Sites 4 and 5 into bioretention basins, and for smaller impervious areas within Sites 2, 3, and 7. Otherwise due to grading constraints, impervious areas are largely disconnected from pervious areas.

Section C: Delineate Drainage Management Areas (DMAs)

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

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[12]	Area (Sq. Ft.)	DMA Type
S1-1A	Roofs	40526.29	D
S1-1B	Landscaping	19041.78	A
S1-1C	Concrete or Asphalt	277973.92	D
S1-2A	Roofs	55315.38	D
S1-2B	Landscaping	41163.15	A
S1-2C	Concrete or Asphalt	237178.68	D
S1-3A	Roofs	9599.60	D
S1-3B	Landscaping	35809.64	A
S1-3C	Concrete or Asphalt	254184.8	D
S1-4B	Landscaping	69045.08	A
S1-4C	Concrete or Asphalt	264175.33	D
S1-5C	Concrete or Asphalt	117505.00	D
S1-6C	Concrete or Asphalt	130304.77	D
S1-7B	Landscaping	42838.67	A
S1-7C	Concrete or Asphalt	140627.27	D
S1-8B	Landscaping	20084.43	A
S1-8C	Concrete or Asphalt	124278.20	D
S1-9B	Landscaping	9525.82	A
S1-9C	Concrete or Asphalt	38340	D
S1-10A	Roofs	36878.51	D
S1-10B	Landscaping	15265.47	A
S1-10C	Concrete or Asphalt	60733.10	D
S1-11A	Roofs	70795.56	D
S1-11B	Landscaping	19360.12	A
S1-11C	Concrete or Asphalt	29593.31	D
S1-12B	Landscaping	16895.67	A
S1-12C	Concrete or Asphalt	23273.88	D
S1-13B	Landscaping	7835.18	A
S1-13C	Concrete or Asphalt	28300.75	D
S1-14B	Landscaping	4875.73	A
S1-14C	Concrete or Asphalt	8629.30	D
S1-15B	Landscaping	107128.11	A
S1-16A	Roofs	19615.00	D
S1-16B	Landscaping	122816.87	A
S1-16C	Concrete or Asphalt	337.89	D
S2-1B	Landscaping	80975.94	A
S2-1C	Concrete or Asphalt	186366.60	D
S2-2A	Roofs	190057.60	D
S2-2B	Landscaping	9175.65	A
S2-2C	Concrete or Asphalt	23066.2	D
S2-3A	Roofs	194209.20	D
S2-3B	Landscaping	27649.37	A
S2-3C	Concrete or Asphalt	44222.67	D
S2-4C	Concrete or Asphalt	129874.50	D
S2-5B	Landscaping	95031.43	B
S2-5C	Concrete or Asphalt	17428.74	C
S2-6B	Landscaping	22173.93	A
S2-6C	Concrete or Asphalt	31142.53	D

S3-1A	Roofs	82323.47	D
S3-1B	Landscaping	13948.61	A
S3-1C	Concrete or Asphalt	49531.63	D
S3-2A	Roofs	28787.68	D
S3-2B	Landscaping	11245.32	A
S3-2C	Concrete or Asphalt	43453.31	D
S3-3B	Landscaping	11817.16	B
S3-3C	Concrete or Asphalt	116.28	C
S3-4B	Landscaping	26275.45	B
S3-4C	Concrete or Asphalt	4363.50	C
S3-5B	Landscaping	10776.10	A
S3-5C	Concrete or Asphalt	28679.95	D
S4-1A	Roofs	57919.51	D
S4-1B	Landscaping	42752.28	A
S4-1C	Concrete or Asphalt	56064.51	D
S5-1A	Roofs	18981.97	D
S5-1B	Landscaping	56677.24	A
S5-1C	Concrete or Asphalt	38716.49	D
S5-2A	Roofs	3619.40	D
S5-2B	Landscaping	13914.06	A
S5-2C	Concrete or Asphalt	19057.84	D
S6-1A	Roofs	142737.60	D
S6-1B	Landscaping	52222.06	A
S6-1C	Concrete or Asphalt	114415.6	D
S6-2A	Roofs	143823.90	D
S6-2B	Landscaping	53079.77	A
S6-2C	Concrete or Asphalt	127078.40	D
S6-3A	Roofs	88575.34	D
S6-3B	Landscaping	3149.25	A
S6-3C	Concrete or Asphalt	60762.75	D
S6-4A	Roofs	87541.33	D
S6-4B	Landscaping	3111.23	A
S6-4C	Concrete or Asphalt	60000.62	D
S6-5A	Roofs	20936.36	D
S6-5B	Landscaping	22753.70	A
S6-5C	Concrete or Asphalt	47001.96	D
S6-6A	Roofs	20934.50	D
S6-6B	Landscaping	24047.65	A
S6-6C	Concrete or Asphalt	52272.30	D
S7-1A	Roofs	57309.90	D
S7-1B	Landscaping	30570.41	A
S7-1C	Concrete or Asphalt	67852.19	D
S7-2A	Roofs	17606.00	D
S7-2B	Landscaping	3375.67	A
S7-2C	Concrete or Asphalt	11967.73	D
S7-3A	Roofs	54098.50	D
S7-3B	Landscaping	22677.90	A
S7-3C	Concrete or Asphalt	32139.36	D
S7-4A	Roofs	98582.75	D
S7-4B	Landscaping	35071.86	A
S7-4C	Concrete or Asphalt	93880.34	D
S7-5A	Roofs	56184.36	D
S7-5B	Landscaping	2393.99	A
S7-5C	Concrete or Asphalt	43500.29	D
S7-6A	Roofs	6528.45	D
S7-6B	Landscaping	13391.52	A
S7-6C	Concrete or Asphalt	1757.82	D
S7-7A	Roofs	13853.76	D
S7-7B	Landscaping	7156.22	A
S7-7C	Concrete or Asphalt	126.33	D
S7-8B	Landscaping	42867.99	B
S7-8C	Concrete or Asphalt	87.08	C
	Sites 8-10 and Phase II on next sheets	Sites 8-10 and Phase II on next sheets	

S8-1A	Roofs	252423.02	D
S8-1B	Landscaping	111038.81	A
S8-1C	Concrete or Asphalt	601813.44	D
S9-1A	Roofs	166666.10	D
S9-1B	Landscaping	155343.40	A
S9-1C	Concrete or Asphalt	629913.10	D
S9-2B	Landscaping	20433.98	A
S9-2C	Concrete or Asphalt	87575.20	D
S10-1B	Landscaping	409550.08	A
S10-1C	Concrete or Asphalt	76117.46	D
S10-1D	Landscaping	76615.37	A
P2-1A (Phase II West)	Impervious Cover	1617036.74	D
P2-1B (Phase II West)	Pervious Cover	220505.01	A
P2-2A (Phase II East)	Impervious Cover	2093617.79	D
P2-2B (Phase II East)	Pervious Cover	285493.33	A
S-1B (Public Streets)	Landscaping	82,751	A
S-1C (Public Streets)	Concrete or Asphalt		D

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

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
S1-1B	19041.78	Landscaping, Natural grasses	Drip Tubing
S1-2B	41163.15	Landscaping, Natural grasses	Drip Tubing
S1-3B	35809.64	Landscaping, Natural grasses	Drip Tubing
S1-4B	69045.08	Landscaping, Natural grasses	Drip Tubing
S1-7B	42838.67	Landscaping, Natural grasses	Drip Tubing
S1-8B	20084.43	Landscaping, Natural grasses	Drip Tubing
S1-9B	9525.82	Landscaping, Natural grasses	Drip Tubing
S1-10B	15265.47	Landscaping, Natural grasses	Drip Tubing
S1-11B	19360.12	Landscaping, Natural grasses	Drip Tubing
S1-12B	16895.67	Landscaping, Natural grasses	Drip Tubing
S1-13B	7835.18	Landscaping, Natural grasses	Drip Tubing
S1-14B	4875.73	Landscaping, Natural grasses	Drip Tubing
S1-15B	107128.11	Landscaping, Natural grasses	Drip Tubing
S1-16B	122816.87	Landscaping, Natural grasses	Drip Tubing
S2-1B	80975.94	Landscaping, Natural grasses	Drip Tubing
S2-2B	9175.65	Landscaping, Natural grasses	Drip Tubing
S2-3B	27649.37	Landscaping, Natural grasses	Drip Tubing
S2-6B	22173.93	Landscaping, Natural grasses	Drip Tubing
S3-1B	13948.61	Landscaping, Natural grasses	Drip Tubing
S3-2B	11245.32	Landscaping, Natural grasses	Drip Tubing
S3-5B	10776.10	Landscaping, Natural grasses	Drip Tubing
S4-1B	42752.28	Landscaping, Natural grasses	Drip Tubing
S5-1B	56677.24	Landscaping, Natural grasses	Drip Tubing
S5-2B	13914.06	Landscaping, Natural grasses	Drip Tubing
S6-1B	52222.06	Landscaping, Natural grasses	Drip Tubing
S6-2B	53079.77	Landscaping, Natural grasses	Drip Tubing
S6-3B	3149.25	Landscaping, Natural grasses	Drip Tubing
S6-4B	3111.23	Landscaping, Natural grasses	Drip Tubing
S6-5B	22753.70	Landscaping, Natural grasses	Drip Tubing
S6-6B	24047.65	Landscaping, Natural grasses	Drip Tubing
S7-1B	30570.41	Landscaping, Natural grasses	Drip Tubing
S7-2B	3375.67	Landscaping, Natural grasses	Drip Tubing
S7-3B	22677.90	Landscaping, Natural grasses	Drip Tubing
S7-4B	35071.86	Landscaping, Natural grasses	Drip Tubing
S7-5B	2393.99	Landscaping, Natural grasses	Drip Tubing
S7-6B	13391.52	Landscaping, Natural grasses	Drip Tubing
S7-7B	7156.22	Landscaping, Natural grasses	Drip Tubing
S8-1B	111038.81	Landscaping, Natural grasses	Drip Tubing
S9-1B	155343.40	Landscaping, Natural grasses	Drip Tubing
S9-2B	20433.98	Landscaping, Natural grasses	Drip Tubing
S10-1B	409550.08	Landscaping, Natural grasses	Drip Tubing
S10-1D	76615.37	Per Riverside County LID	Drip Tubing
P2-1B (Phase II West)	220505.01	Landscaping, Natural grasses	Drip Tubing
P2-2B (Phase II East)	285493.33	Landscaping, Natural grasses	Drip Tubing
S-1B (Public Streets)	41505.31	Landscaping, Natural grasses	Drip Tubing

Table C.3 Type ‘B’, Self-Retaining Areas

Self-Retaining Area				Type ‘C’ DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
S2-5B	Landscaping	95031.43	0.60	**S2-5C**	17428.74	0.71
S3-3B	Landscaping	11817.16	0.60	**S3-4C**	116.28	0.61
S3-4B	Landscaping	10776.10	0.60	**S3-5C**	4363.50	0.84
S7-8B	Landscaping	42867.99	0.60	**S7-8C**	87.08	0.60

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

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

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Impervious fraction [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
S2-5C	17428.74	Conc/ Asphalt	1	17428.74	**S2-5B**	95031.43	0.183
S3-3C	116.28	Conc/ Asphalt	1	116.28	**S3-3B**	11817.16	0.010
S3-4C	4363.50	Conc/ Asphalt	1	4363.50	**S3-3B**	10776.10	0.404
S7-8C	87.08	Conc/ Asphalt	1	87.08	**S7-8B**	42867.99	0.002

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

DMA Name or ID	BMP Name or ID
S1-1A	S1-1 Modular Wetlands
S1-1C	S1-1 Modular Wetlands
S1-2A	S1-2 Modular Wetlands
S1-2C	S1-2 Modular Wetlands
S1-3A	S1-3 Modular Wetlands
S1-3C	S1-3 Modular Wetlands
S1-4C	S1-4 Modular Wetlands
S1-5C	S1-5 Modular Wetlands
S1-6C	S1-6 Modular Wetlands
S1-7C	S1-7 Modular Wetlands
S1-8C	S1-8 Modular Wetlands
S1-9C	S1-9 Modular Wetlands
S1-10A	S1-10 Modular Wetlands
S1-10C	S1-10 Modular Wetlands
S1-11A	S1-11 Modular Wetlands
S1-11C	S1-11 Modular Wetlands
S1-12C	S1-12 Modular Wetlands
S1-13C	S1-13 Modular Wetlands
S1-14C	S1-14 Modular Wetlands
S1-16A	S1-16 Modular Wetlands
S1-16C	S1-16 Modular Wetlands
S2-1C	S2-1 Modular Wetlands
S2-2A	S2-2 Modular Wetlands
S2-2C	S2-2 Modular Wetlands
S2-3A	S2-3 Modular Wetlands
S2-3C	S2-3 Modular Wetlands
S2-4C	S2-4 Modular Wetlands
S2-6C	S2-6 Modular Wetlands
S3-1A	S3-1 Modular Wetlands
S3-1C	S3-1 Modular Wetlands
S3-2A	S3-2 Modular Wetlands
S3-2C	S3-2 Modular Wetlands
S3-5C	S3-5 Modular Wetlands
S4-1A	Site 4 Onsite Bioretention Basin
S4-1C	Site 4 Onsite Bioretention Basin
S5-1A	Site 5-1 Onsite Bioretention Basin
S5-1C	Site 5-1 Onsite Bioretention Basin
S5-2A	Site 5-2 Onsite Bioretention Basin
S5-2C	Site 5-2 Onsite Bioretention Basin
S6-1A	S6-1 Modular Wetlands
S6-1C	S6-1 Modular Wetlands
S6-2A	S6-2 Modular Wetlands
S6-2C	S6-2 Modular Wetlands
S6-3A	S6-3 Modular Wetlands
S6-3C	S6-3 Modular Wetlands
S6-4A	S6-4 Modular Wetlands
S6-4C	S6-4 Modular Wetlands
S6-5A	S6-5 Modular Wetlands
S6-5C	S6-5 Modular Wetlands

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

DMA Name or ID	BMP Name or ID
S6-6A	S6-6 Modular Wetlands
S6-6C	S6-6 Modular Wetlands
S7-1A	S7-1 Modular Wetlands
S7-1C	S7-1 Modular Wetlands
S7-2A	S7-2 Modular Wetlands
S7-2C	S7-2 Modular Wetlands
S7-3A	S7-3 Modular Wetlands
S7-3C	S7-3 Modular Wetlands
S7-4A	S7-4 Modular Wetlands
S7-4C	S7-4 Modular Wetlands
S7-5A	S7-5 Modular Wetlands
S7-5C	S7-5 Modular Wetlands
S7-6A	S7-6 Modular Wetlands
S7-6C	S7-6 Modular Wetlands
S7-7A	S7-7 Modular Wetlands
S7-7C	S7-7 Modular Wetlands
S8-1A	Offsite Basin
S8-1C	Offsite Basin
S9-1A	Offsite Basin
S9-1C	Offsite Basin
S9-2A	S9-2 Modular Wetlands
S9-2C	S9-2 Modular Wetlands
S10-1C	Offsite Basin
P2-1A (Phase II West)	Onsite Treatment TBD
P2-2A (Phase II East)	Onsite Treatment TBD
Streets 1C (Public Streets – Barrett Ave and Daniela Way)	Modular Wetlands at every inlet

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Geotechnical Report

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour? **See list in Section B or report in Appendix 3**	X	
If Yes, list affected DMAs: All DMAs		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

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

D.2 Harvest and Use Assessment

Please check what applies*:*

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

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

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

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

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape:

Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
12.21	5.39	1.70	0.98	1.62	3.64	3.62	2.55	4.04

Type of Landscaping (Conservation Design or Active Turf): **Conservation Design for all sites.**

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

Total Area of Impervious Surfaces:

Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
47.17	18.74	5.45	2.62	1.85	22.18	12.75	19.61	20.30

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

Enter your EIATIA factor: **0.79**

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

Minimum required irrigated area:

Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
37.26	14.81	4.30	2.07	1.46	17.52	10.07	15.49	16.03

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

Site	Total Area (ac)	Minimum Required (ac)
1	**12.21**	**37.26**
2	**5.39**	**14.81**
3	**1.70**	**4.30**
4	**0.98**	**2.07**
5	**1.62**	**1.46**
6	**3.64**	**17.52**
7	**3.62**	**10.07**
8	**2.55**	**15.49**
9	**4.04**	**16.03**

Toilet Use Feasibility

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

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

Projected Number of Daily Toilet Users:

Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
480	580	280	150	85	750	450	950	630

Project Type: **Industrial (Sites 1-7), Retail (Sites 8 & 9)**

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

Total Area of Impervious Surfaces:

Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
47.17	18.74	5.45	2.62	1.85	22.18	12.75	19.61	20.30

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

Enter your TUTIA factor: **172 for Industrial, 132 for Retail**

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

Minimum number of toilet users:

Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
8,113	3,223	937	450	317	3,815	2,193	2,589	2,679

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

Site	Estimated Users	Minimum Required
1	480	8,113
2	580	3,223
3	280	937
4	150	450
5	85	317
6	750	3,815
7	450	2,193
8	950	2,589
9	630	2,679

Other Non-Potable Use Feasibility

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

N/A

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

Average Daily Demand: N/A

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

Total Area of Impervious Surfaces: N/A

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

Enter the factor from Table 2-4: N/A

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

Minimum required use: N/A

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

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

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

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DA 4, DA 5-1 DA 5-2, DA 8, DA 9-1	☐	☐	☒	☐	☐
ALL OTHER DMA	☐	☐	☐	☐	☒
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***Bioretention Basin 4-1***		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)*	*Design Capture Volume, **V_{BMP}** (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4-1A	*57919.51*	*Roofs*	*1*	*0.89*	*51664.20*			
4-1C	*56064.51*	*Conc/Asphalt*	*1*	*0.89*	*50009.50*			
	$A_T = \Sigma[A]$ 113984.02				Σ= [D] 101673.70	0.60	5,084	***5,498***

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 5-1***		
	[A]		[B]	[C]	[A] x [C]	*Design Storm Depth (in)*	*Design Capture Volume, **V_{BMP}** (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
5-1A	*18981.97*	*Roofs*	*1*	*0.89*	*16391.90*			
5-1C	*38716.49*	*Conc/Asphalt*	*1*	*0.89*	*34535.10*			
	$A_T = \Sigma[A]$ 57698.46				Σ= [D] 51467.00	0.60	2,573	***4,321***

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

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 5-2***		
	[A]		[B]	[C]	[A] x [C]			
5-2A	*3619.40*	*Roofs*	*1*	*0.89*	*3228.50*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
5-2C	*19057.84*	*Conc/Asphalt*	*1*	*0.89*	*16999.60*			
	$A_T = \Sigma[A]$ 22677.24				$\Sigma= [D]$ 20228.10	0.60	1,011	***1,708***

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	***Offsite Basin***		
	[A]		[B]	[C]	[A] x [C]			
8-1A	*252423.02*	*Roofs*	*1*	*0.89*	*225161.30*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
8-1C	*601813.44*	*Conc/Asphalt*	*1*	*0.89*	*536817.60*			
9-1A	*166666.11*	*Roofs*	*1*	*0.89*	*148666.20*			
9-2C	*629913.07*	*Conc/Asphalt*	*1*	*0.89*	*561882.50*			
	$A_T = \Sigma[A]$ 1,650,815.64				$\Sigma= [D]$ 1,472,527	0.60	73,626	***137,907***

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

Section E: Alternative Compliance (LID Waiver Program)

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

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

\- *Or* -

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

E.1 Identify Pollutants of Concern

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

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

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

[1]Cannot Exceed 50%

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

E.3 Sizing Criteria

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

Table E.3 Treatment Control BMP Sizing

DMA Type/ ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**	***S1-1 Modular Wetlands 2 EA of MWS-L-8-24***		
	[A]		[B]	[C]	[A] x [C]			
S1-1A	40526.29	Roofs	0.89	1	36149.50	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S1-1C	277973.92	Conc/Asphalt	0.89	1	247952.70			
	A_T = 318500.21				Σ= 284,102.20	[E]=0.20	1.30	1.386

DMA Type/ ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**	***S1-2 Modular Wetlands 1 EA of MWS-L-8-24 & 1 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S1-2A	55315.38	Roofs	0.89	1	49341.30	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S1-2C	237178.68	Conc/Asphalt	0.89	1	211563.40			
	A_T = 292494.06				Σ= 260904.70	[E]=0.20	1.20	1.270

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-3 Modular Wetlands 1 EA of MWS-L-8-20 & 2 EA of MWS-L-8-16*		
	[A]		[B]	[C]	[A] x [C]			
S1-3A	95990.60	Roofs	0.89	1	85623.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S1-3C	254184.80	Conc/Asphalt	0.89	1	226732.80			
	A_T = 350175.40				Σ= 312356.40	[E]=0.20	1.43	1.501

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-4 Modular Wetlands 2 EA of MWS-L-8-20*		
	[A]		[B]	[C]	[A] x [C]			
S1-4C	264175.33	Conc/Asphalt	0.89	1	235644.40	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 264175.33				Σ= 235644.40	[E]=0.20	1.08	1.154

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-5 Modular Wetlands 1 EA of MWS-L-8-20*		
	[A]		[B]	[C]	[A] x [C]			
S1-5C	117505.00	Conc/Asphalt	0.89	1	104814.50	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 117505.00				Σ= 104814.50	[E]=0.20	0.48	0.577

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S1-6 Modular Wetlands 1 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S1-6C	130304.77	Conc/Asphalt	0.89	1	116231.90	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 130304.77				Σ= 116231.90	[E]=0.20	0.53	0.577

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S1-7 Modular Wetlands 1 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S1-7C	140627.27	Conc/Asphalt	0.89	1	125439.50	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 140627.27				Σ= 125439.50	[E]=0.20	0.58	0.577

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S1-8 Modular Wetlands 1 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S1-8C	124278.20	Conc/Asphalt	0.89	1	110856.20	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 124278.20				Σ= 110856.20	[E]=0.20	0.48	0.577

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-9 Modular Wetlands 1 EA of MWS-L-4-15*		
	[A]		[B]	[C]	[A] x [C]			
S1-9C	38340.00	Conc/Asphalt	0.89	1	34199.30	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 38340.00				Σ= 34199.30	[E]=0.20	0.16	0.175

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-10 Modular Wetlands 1 EA of MWS-L-8-16*		
	[A]		[B]	[C]	[A] x [C]			
S1-10A	36878.51	Roofs	0.89	1	32895.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S1-10C	60733.10	Conc/Asphalt	0.89	1	54173.90			
	A_T = 97611.61				Σ= 87069.50	[E]=0.20	0.40	0.462

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-11 Modular Wetlands 1 EA of MWS-L-8-16*		
	[A]		[B]	[C]	[A] x [C]			
S1-11A	70795.56	Roofs	0.89	1	63149.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S1-11C	29593.31	Conc/Asphalt	0.89	1	26397.20			
	A_T = 100388.87				Σ= 89546.80	[E]=0.20	0.41	0.462

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S1-12 Modular Wetlands 1 EA of MWS-L-4-8***		
	[A]		[B]	[C]	[A] x [C]			
S1-12C	23273.88	Conc/Asphalt	0.89	1	20760.30	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 23273.88				Σ= 20760.30	[E]=0.20	0.10	0.115

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S1-13 Modular Wetlands 1 EA of MWS-L-4-13***		
	[A]		[B]	[C]	[A] x [C]			
S1-13C	28300.75	Conc/Asphalt	0.89	1	25244.30	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 28300.75				Σ= 25244.30	[E]=0.20	0.12	0.144

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S1-14 Modular Wetlands 1 EA of MWS-L-4-4***		
	[A]		[B]	[C]	[A] x [C]			
S1-14C	8629.30	Conc/Asphalt	0.89	1	7697.30	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 8629.30				Σ= 7697.30	[E]=0.20	0.04	0.052

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S1-16 Modular Wetlands 1 EA of MWS-L-4-8*		
	[A]		[B]	[C]	[A] x [C]			
S1-16A	19615.00	Roofs	0.89	1	17496.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S1-16C	337.89	Conc/Asphalt	0.89	1	301.40			
	A_T = 19952.89				Σ= 34199.30	[E]=0.20	0.08	0.115

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S2-1 Modular Wetlands 1 EA of MWS-L-8-16 & 1 EA of MWS-L-8-12*		
	[A]		[B]	[C]	[A] x [C]			
S2-1C	186366.61	Conc/Asphalt	0.89	1	166239.00	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 186366.61				Σ= 166239.00	[E]=0.20	0.76	0.808

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S2-2 Modular Wetlands 2 EA of MWS-L-8-16*		
	[A]		[B]	[C]	[A] x [C]			
S2-2A	190057.62	Roofs	0.89	1	169531.40	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S2-2C	23066.20	Conc/Asphalt	0.89	1	20575.10			
	A_T = 213123.82				Σ= 190106.50	[E]=0.20	0.87	0.924

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S2-3 Modular Wetlands 2 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S2-3A	194209.17	Roofs	0.89	1	173234.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S2-3C	44222.67	Conc/Asphalt	0.89	1	39446.60			
	A_T = 238431.84				Σ= 212681.20	[E]=0.20	0.98	1.154

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S2-4 Modular Wetlands 1 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S2-4C	129874.52	Conc/Asphalt	0.89	1	115848.10	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 129874.52				Σ= 115848.10	[E]=0.20	0.53	0.577

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S2-5 Modular Wetlands 1 EA of MWS-L-4-6***		
	[A]		[B]	[C]	[A] x [C]			
S2-5C	17428.74	Conc/Asphalt	0.89	1	15546.40	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 17428.74				Σ= 15546.40	[E]=0.20	0.07	0.073

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

S2-6 Modular Wetlands
1 EA of MWS-L-4-13

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	[A]		[B]	[C]	[A] x [C]			
S2-6C	31142.53	Conc/Asphalt	0.89	1	27779.10			
	A_T = 31142.53				Σ= 27779.10	[E]=0.20	0.13	0.144

S3-1 Modular Wetlands
1 EA of MWS-L-8-20

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	[A]		[B]	[C]	[A] x [C]			
S3-1A	82323.47	Roofs	0.89	1	73432.50			
S3-1C	49531.63	Conc/Asphalt	0.89	1	44182.20			
	A_T = 131855.10				Σ= 117614.70	[E]=0.20	0.54	0.577

S3-2 Modular Wetlands
1 EA of MWS-L-8-12

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	[A]		[B]	[C]	[A] x [C]			
S3-2A	28787.68	Roofs	0.89	1	25678.60			
S3-2C	43453.31	Conc/Asphalt	0.89	1	38760.40			
	A_T = 72240.99				Σ= 64439.00	[E]=0.20	0.30	0.346

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S3-4 Modular Wetlands 1 EA of MWS-L-4-4*		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S3-4C	4363.50	Conc/Asphalt	0.89	1	3892.20			
	A_T = 4363.50				Σ= 3892.20	[E]=0.20	0.02	0.052

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S3-5 Modular Wetlands 1 EA of MWS-L-4-13*		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S3-5C	28679.95	Conc/Asphalt	0.89	1	25582.50			
	A_T = 28679.95				Σ= 25582.50	[E]=0.20	0.12	0.144

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S6-1 Modular Wetlands 2 EA of MWS-L-8-20*		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S6-1A	142737.57	Roofs	0.89	1	127321.90			
S6-1C	114415.59	Conc/Asphalt	0.89	1	105058.70			
	A_T = 257153.16				Σ= 229380.60	[E]=0.20	1.05	1.154

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S6-2 Modular Wetlands 2 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S6-2A	143823.86	Roofs	0.89	1	128290.90			
S6-2C	127078.39	Conc/Asphalt	0.89	1	113353.90			
	A_T = 270902.25				Σ= 241644.80	[E]=0.20	1.11	1.154

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S6-3 Modular Wetlands 1 EA of MWS-L-8-24***		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S6-3A	88575.34	Roofs	0.89	1	79009.20			
S6-3C	60762.75	Conc/Asphalt	0.89	1	54200.40			
	A_T = 149338.09				Σ= 133209.60	[E]=0.20	0.61	0.693

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S6-4 Modular Wetlands 1 EA of MWS-L-8-24***		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S6-4A	87541.33	Roofs	0.89	1	78086.90			
S6-4C	60000.62	Conc/Asphalt	0.89	1	53520.60			
	A_T = 147541.95				Σ= 131607.50	[E]=0.20	0.60	0.693

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S6-5 Modular Wetlands 1 EA of MWS-L-8-12***		
	[A]		[B]	[C]	[A] x [C]			
S6-5A	20936.36	Roofs	0.89	1	18675.20	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S6-5C	47001.96	Conc/Asphalt	0.89	1	41925.70			
	A_T = 67938.32				Σ= 60600.90	[E]=0.20	0.28	0.346

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S6-6 Modular Wetlands 1 EA of MWS-L-8-12***		
	[A]		[B]	[C]	[A] x [C]			
S6-6A	20934.50	Roofs	0.89	1	18673.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S6-6C	52272.30	Conc/Asphalt	0.89	1	46626.90			
	A_T = 73206.80				Σ= 65300.50	[E]=0.20	0.30	0.346

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S7-1 Modular Wetlands 1 EA of MWS-L-8-20***		
	[A]		[B]	[C]	[A] x [C]			
S7-1A	57309.90	Roofs	0.89	1	51120.40	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-1C	67852.19	Conc/Asphalt	0.89	1	60254.20			
	A_T = 125162.09				Σ= 111644.60	[E]=0.20	0.51	0.577

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S7-2 Modular Wetlands 1 EA of MWS-L-4-13*		
	[A]		[B]	[C]	[A] x [C]			
S7-2A	17606.00	Roofs	0.89	1	15704.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-2C	11967.73	Conc/Asphalt	0.89	1	10675.20			
	A_T = 29573.73				Σ= 26379.80	[E]=0.20	0.12	0.144

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S7-3 Modular Wetlands 1 EA of MWS-L-8-12*		
	[A]		[B]	[C]	[A] x [C]			
S7-3A	54098.50	Roofs	0.89	1	48255.90	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-3C	32139.36	Conc/Asphalt	0.89	1	28668.30			
	A_T = 86237.86				Σ= 76924.20	[E]=0.20	0.35	0.346

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S7-4 Modular Wetlands 1 EA of MWS-L-8-16 & 1 EA of MWS-L-8-12*		
	[A]		[B]	[C]	[A] x [C]			
S7-4A	98582.75	Roofs	0.89	1	87935.80	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-4C	93880.34	Conc/Asphalt	0.89	1	83741.30			
	A_T = 192463.09				Σ= 171677.10	[E]=0.20	0.79	0.808

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S7-5 Modular Wetlands 1 EA of MWS-L-8-16*		
	[A]		[B]	[C]	[A] x [C]			
S7-5A	56184.36	Roofs	0.89	1	50116.40	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-5C	43500.29	Conc/Asphalt	0.89	1	38802.30			
	A_T = 99684.65				Σ= 88918.70	[E]=0.20	0.41	0.462

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S7-6 Modular Wetlands 1 EA of MWS-L-4-4*		
	[A]		[B]	[C]	[A] x [C]			
S7-6A	6528.45	Roofs	0.89	1	5823.40	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-6C	1757.82	Conc/Asphalt	0.89	1	1568.00			
	A_T = 8286.27				Σ= 7391.40	[E]=0.20	0.03	0.052

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	*S7-7 Modular Wetlands 1 EA of MWS-L-4-6*		
	[A]		[B]	[C]	[A] x [C]			
S7-7A	13853.76	Roofs	0.89	1	12357.60	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S7-7C	126.23	Conc/Asphalt	0.89	1	112.60			
	A_T = 13979.99				Σ= 12470.20	[E]=0.20	0.06	0.073

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

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***S9-2 Modular Wetlands 1 EA of MWS-L-8-16***		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
S9-2C	87575.20	Conc/Asphalt	0.89	1	78117.10			
	A_T = 87575.20				Σ= 78117.10	[E]=0.20	0.36	0.462

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor	***Public Streets (Barrett Ave and Daniella Way) MWS-L-8-12 at each inlet***		
	[A]		[B]	[C]	[A] x [C]	*Design Rainfall Intensity (in/hr)*	*Minimum Flow Rate (cubic feet or cfs)*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
Streets 1C	346032.58	Conc/Asphalt	0.89	1	308661.10			
	A_T = 346032.58				Σ= 308661.10	[E]=0.20	1.42	1.73

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

E.4 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Contech Modular Wetlands	Metals, Organic Compounds, Trash & Debris, Hydrocarbons	High, >80%

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

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

The project is located within the Mapped HCOC Exempt areas as presented in the Riverside County WAP mapping tool as approved April 20, 2017.

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

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

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

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

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

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

F.2 HCOC Mitigation

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

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

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

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

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

The project is located within the Mapped HCOC Exempt areas as presented in the Riverside County WAP mapping tool as approved April 20, 2017.

Section G: Source Control BMPs

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

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

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

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

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

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-Site Storm Drain Inlet	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch basin markers may be available from the Riverside County Flood Control and Water Conservation District, call (951) 955-1200 to verify.	-Maintain and periodically repaint or replace inlet markings. -Provide stormwater pollution prevention information to new site owners, lessees, or operators. -See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com -Include the following in lease agreements: "Tenant shall not allow

		anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Loading Docks	The project site will have truck docks which will be shown on the Post-Construction BMP Site Plan. The truck docks shall be inspected on a weekly basis to help ensure that any trash and debris are collected prior to being washed into the underground storm drain system. All storm water runoff from the loading dock areas will be discharged into underground infiltration chambers prior to conveyance to the public storm drain system. Documentation of such inspection/maintenance shall be kept by the owner in perpetuity.	-Move loaded and unloaded items indoors as soon as possible. See fact sheet SC-30, "Outdoor Loading and Unloading," in Appendix 10.
Hardscape, Sidewalks, and Parking Lots	Documentation of sweeping activities shall be kept by the owner in perpetuity. Frequency of sweeping shall be adjusted as necessary to maintain a clean site.	Sweep hardscape, sidewalks, and parking lots regularly to prevent the accumulation of litter, debris and sediment. Parking lots to be vacuum swept by vacuum truck. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not the storm drain system.
Trash Storage Areas	Trash container storage area shall be paved with an impervious surface designed not to allow run-on from adjoining areas. They shall be designed to divert drainage from adjoining roofs and pavements from the surrounding area, and screened or walled to prevent off-site transport of trash. Dumpsters shall be leak proof and have attached covers and lids. Trash enclosures shall be roofed. Connection of trash area drains to the MS4 is prohibited. See CASQA SD-32 BMP fact sheet in Appendix 10 for additional information. Signs shall be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	An adequate number of receptacles shall be provided. Inspect receptables regularly and repair or replace leaky receptacles. Inspect condition of lids and replace as needed. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available onsite. See fact sheet SC-34 "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook in Appendix 10.

Fire Sprinkler Test Water	Provide a means to drain fire sprinkler test water to the sanitary sewer.	See note in Fact Sheet SC-41 “Building Grounds and Maintenance” in Appendix 10.
Fuel Dispensing Areas	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. 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.] The canopy [or cover] shall not drain onto the fueling area.	The property owner shall dry sweep the fueling area routinely. See the Fact Sheet SD-30, “Fueling Areas” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Section H: Construction Plan Checklist

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

****Table to be completed during Final WQMP****

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism: Maintenance mechanism for the offsite basin will be the responsibility of a POA to be determined during Final WQMP. Modular Wetland units will be maintained by the site owner (onsite) or by the City (public streets) per the manufacturer's recommendations. Bioretention basins will be maintained per County BMP Handbook by private owner.

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

☒ Y ☐ N

A POA will maintain the offsite shared bioretention basin for Sites 8 and 9. All other Sites will not be required to be part of this POA and BMPs within them will be maintained privately by their owners.

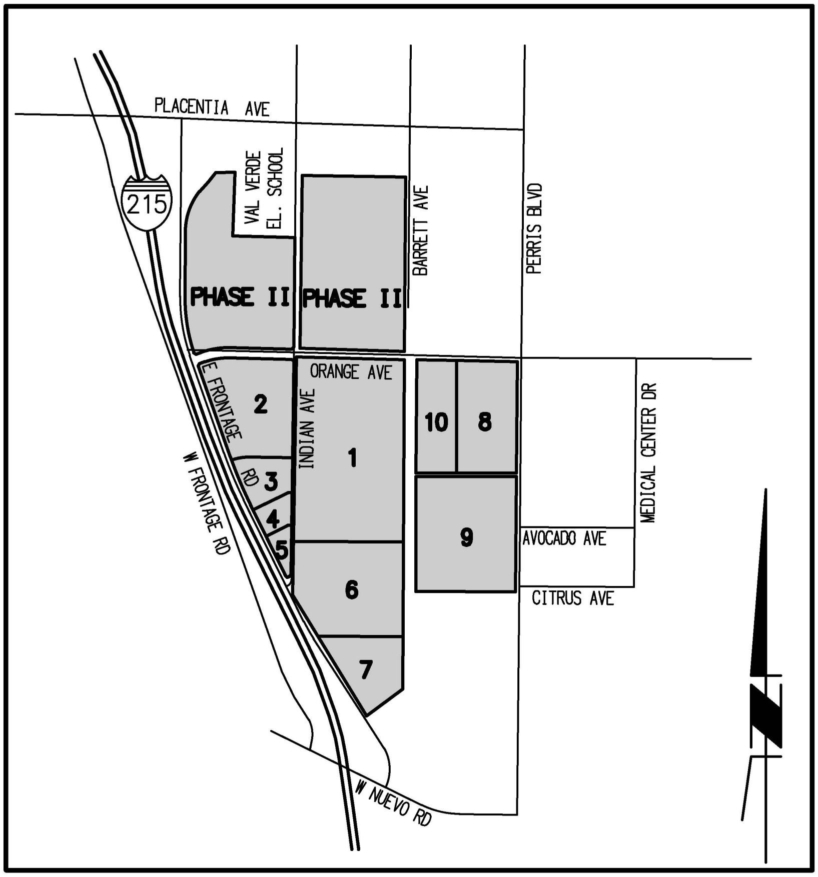
Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

This section will be completed during the Final WQMP. Owner info is provided for the PWQMP/Interim:

Name	Title	Address	Email	Phone
Tim Howard	**Partner**	**2244 North Pacific St, Orange, CA 92865**	**thoward@hipre.net**	**(714) 637-3333**

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



VICINITY MAP

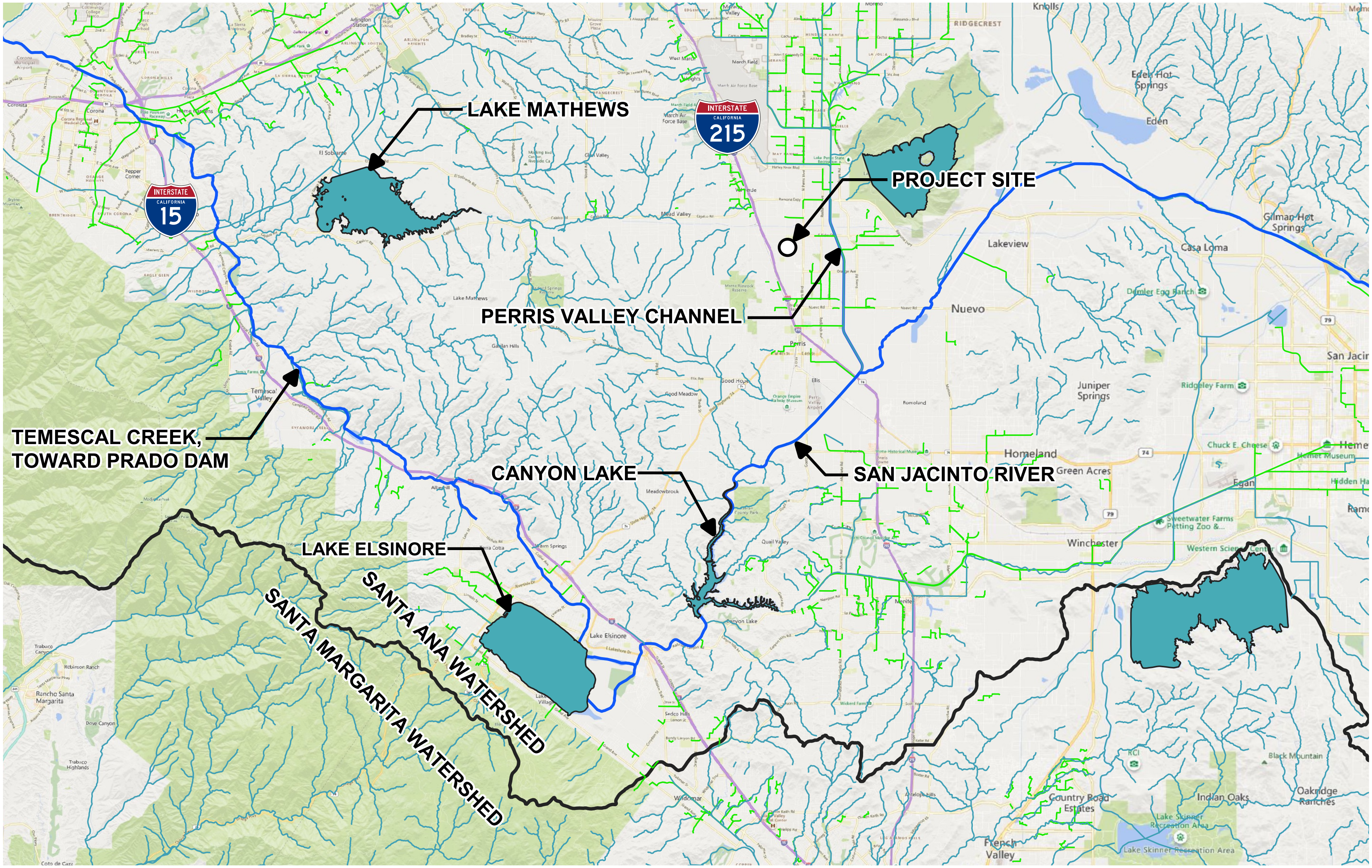
T4S, R3W, SEC 19
NOT TO SCALE

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120 | MURRIETA | CA 92562
951.973.0201 - FMCIVIL.COM

HARVEST LANDING RETAIL CENTER AND BUSINESS PARK

FIGURE 1
VICINITY MAP

H: \PDATA\20-001 HARVEST LANDING\DWGS\EXHIBITS\20-001-VICINITY-MAP.DWG HECTOR PAEZ 10/14/2024 9: 14 AM



FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE SUITE 306
MURRIETA | CA 92563
951.973.0201 - FMCIVIL.COM

Harvest Landing

In Perris, County of Riverside
Receiving Waters Exhibit

DMA Name/ID	DMA AREA (SF)	Treatment Type (Volume/Flow Rate)	Design Capture Volume (FT^3)/Treatment Flowrate (CFS)	Proposed Volume/Flow rate
S1-1	337541.99	FLOW RATE	1.30	1.386
S1-2	333657.21	FLOW RATE	1.20	1.270
S1-3	385985.04	FLOW RATE	1.43	1.501
S1-4	333220.41	FLOW RATE	1.08	1.154
S1-5	117505.00	FLOW RATE	0.48	0.577
S1-6	130304.77	FLOW RATE	0.53	0.577
S1-7	183465.94	FLOW RATE	0.58	0.577
S1-8	144362.63	FLOW RATE	0.51	0.577
S1-9	47865.82	FLOW RATE	0.16	0.175
S1-10	112877.08	FLOW RATE	0.40	0.462
S1-11	119748.99	FLOW RATE	0.41	0.462
S1-12	40169.55	FLOW RATE	0.10	0.115
S1-13	36135.93	FLOW RATE	0.12	0.144
S1-14	13505.03	FLOW RATE	0.04	0.052
S1-15	107128.11	FLOW RATE		
S1-16	142769.76	FLOW RATE	0.08	0.115
S2-1	267342.55	FLOW RATE	0.76	0.808
S2-2	222299.47	FLOW RATE	0.87	0.924
S2-3	265901.21	FLOW RATE	0.98	1.154
S2-4	129874.52	FLOW RATE	0.53	0.577
S2-5	112460.17	SELF RETAINING	N/A	N/A
S2-6	53316.46	FLOW RATE	0.13	0.144
S3-1	145803.70	FLOW RATE	0.54	0.577
S3-2	83486.30	FLOW RATE	0.3	0.346
S3-3	11933.40	SELF RETAINING	N/A	N/A
S3-4	30639.00	SELF RETAINING	N/A	N/A
S3-5	39456.10	FLOW RATE	0.12	0.144

DMA Name/ID	DMA AREA (SF)	Treatment Type (Volume/Flow Rate)	Design Capture Volume (FT^3)/Treatment Flowrate (CFS)	Proposed Volume/Flow rate
S4-1	156736.30	VOLUME	5083.7	5498
S5-1	114375.70	VOLUME	2573.4	4321
S5-2	36591.30	VOLUME	1011.4	1708
S6-1	309375.22	FLOW RATE	1.05	1.154
S6-2	323982.02	FLOW RATE	1.11	1.154
S6-3	152487.34	FLOW RATE	0.61	0.693
S6-4	150653.18	FLOW RATE	0.60	0.693
S6-5	90692.02	FLOW RATE	0.28	0.346
S6-6	97254.45	FLOW RATE	0.30	0.346
S7-1	155732.5	FLOW RATE	0.51	0.577
S7-2	32949.4	FLOW RATE	0.12	0.144
S7-3	108915.76	FLOW RATE	0.35	0.346
S7-4	227534.95	FLOW RATE	0.79	0.808
S7-5	102078.64	FLOW RATE	0.41	0.462
S7-6	21677.79	FLOW RATE	0.03	0.052
S7-7	21136.21	FLOW RATE	0.06	0.073
S7-8	42955.07	SELF RETAINING	N/A	N/A
S8-1	965275.27	VOLUME	38098.9	137907
S9-1	951923.55	VOLUME	35527.4	137907
S9-2	108009.18	FLOW RATE	0.36	0.462

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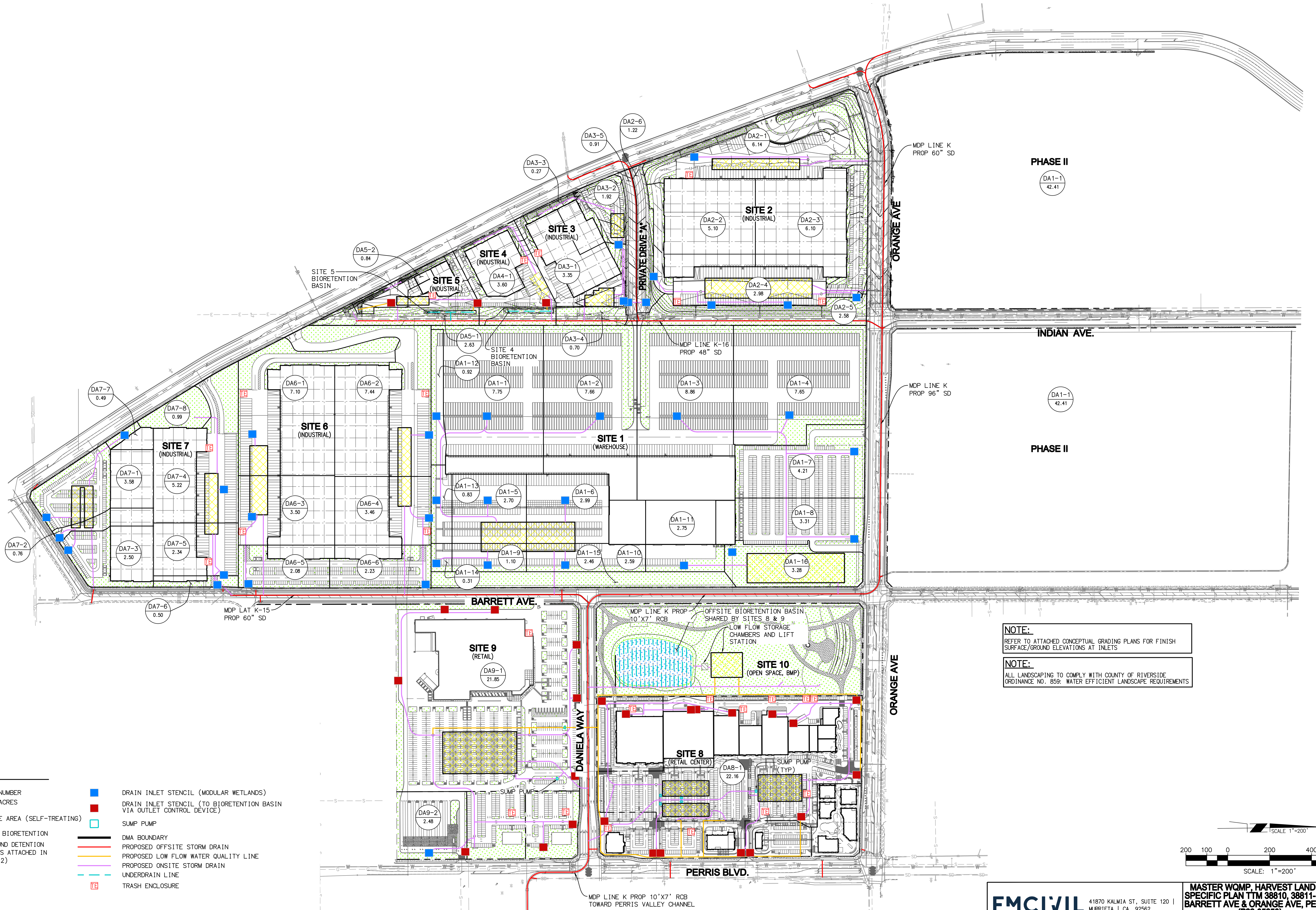
MASTER WQMP, HARVEST LANDING SPECIFIC PLAN TTM 38810, 38811-1,2,3, BARRETT AVE & ORANGE AVE, PERRIS (P22-05250)

DMA PLAN

1

OF 4 SHEETS



NOTE:
REFER TO ATTACHED CONCEPTUAL GRADING PLANS FOR FINISH SURFACE/GROUND ELEVATIONS AT INLETS

NOTE:
ALL LANDSCAPING TO COMPLY WITH COUNTY OF RIVERSIDE ORDINANCE NO. 859: WATER EFFICIENT LANDSCAPE REQUIREMENTS

LEGEND

- DMA1 — DA AREA NUMBER
- 3.38 — AREA IN ACRES
- LANDSCAPE AREA (SELF-TREATING)
- PROPOSED BIORETENTION
- UNDERGROUND DETENTION (SEE PLANS ATTACHED IN APPENDIX 2)
- DRAIN INLET STENCIL (MODULAR WETLANDS)
- DRAIN INLET STENCIL (TO BIORETENTION BASIN VIA OUTLET CONTROL DEVICE)
- SUMP PUMP
- DMA BOUNDARY
- PROPOSED OFFSITE STORM DRAIN
- PROPOSED LOW FLOW WATER QUALITY LINE
- PROPOSED ONSITE STORM DRAIN
- UNDERDRAIN LINE
- TE TRASH ENCLOSURE

200 100 0 200 400 600
SCALE: 1"=200'

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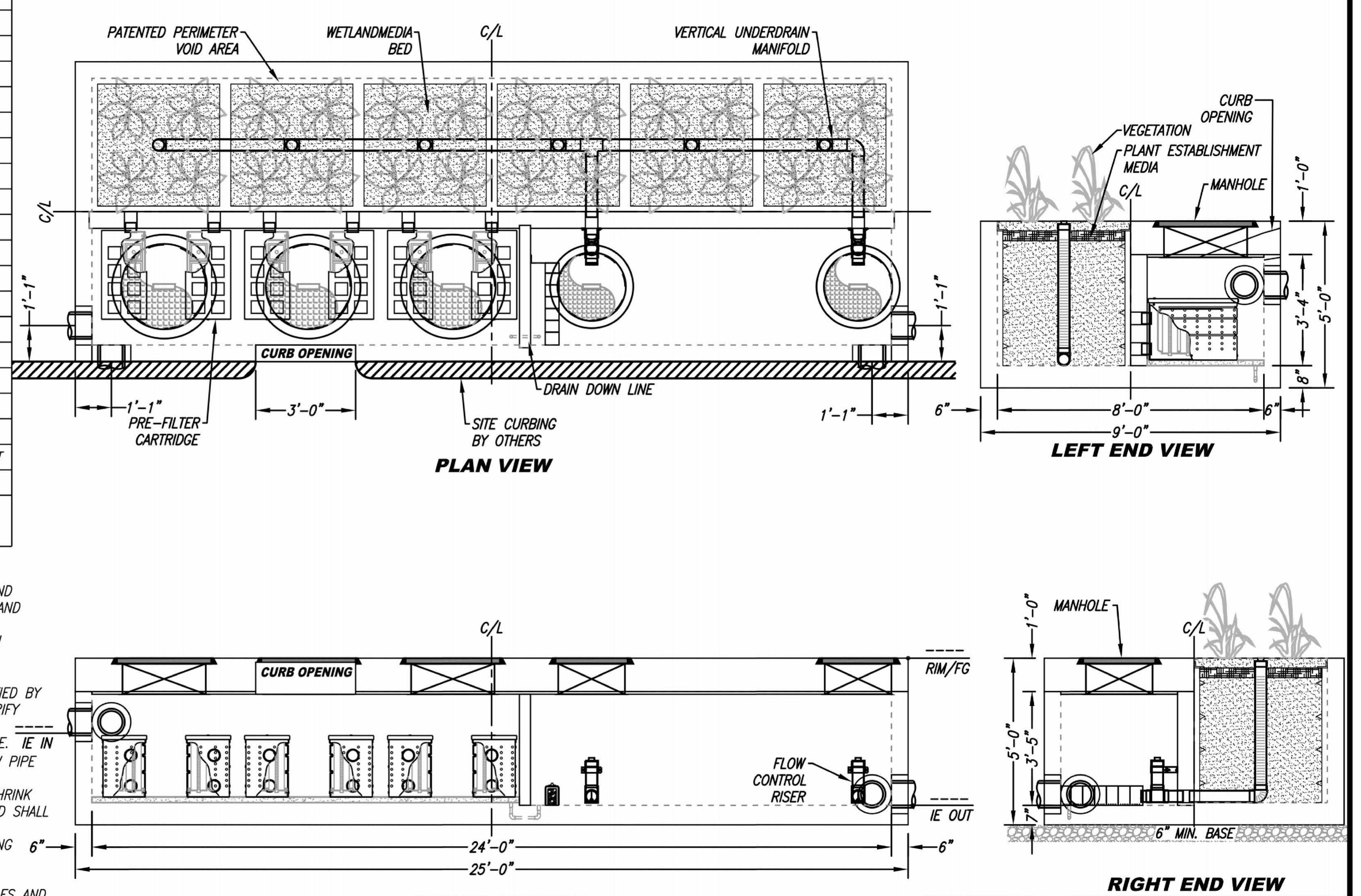
MASTER WQMP, HARVEST LANDING SPECIFIC PLAN TTM 38810, 38811-1,2,3, BARRETT AVE & ORANGE AVE, PERRIS (P22-05250)

POST-CONSTRUCTION BMP PLAN

2
OF 4 SHEETS

SITE SPECIFIC DATA

PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1		PVC	8"
INLET PIPE 2		N/A	N/A
OUTLET PIPE		PVC	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	3 EA ø30"	N/A	2 EA ø24"
WETLANDMEDIA VOLUME (CY)			TBD
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES:			



INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING MODULAR WETLANDS FOR ACTIVATION OF UNIT. MANUFACTURES WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A MODULAR WETLANDS REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

4/19/17 JHAYDEN

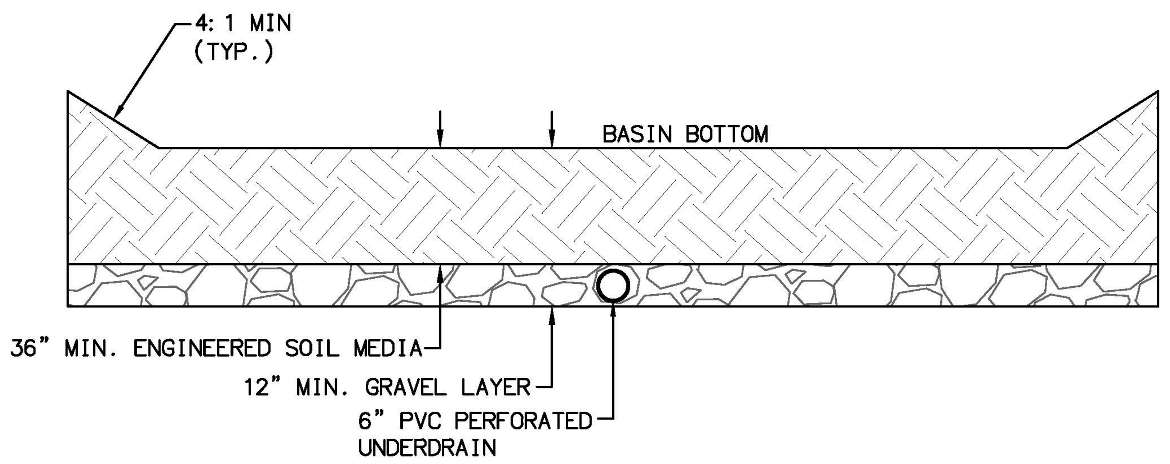
TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

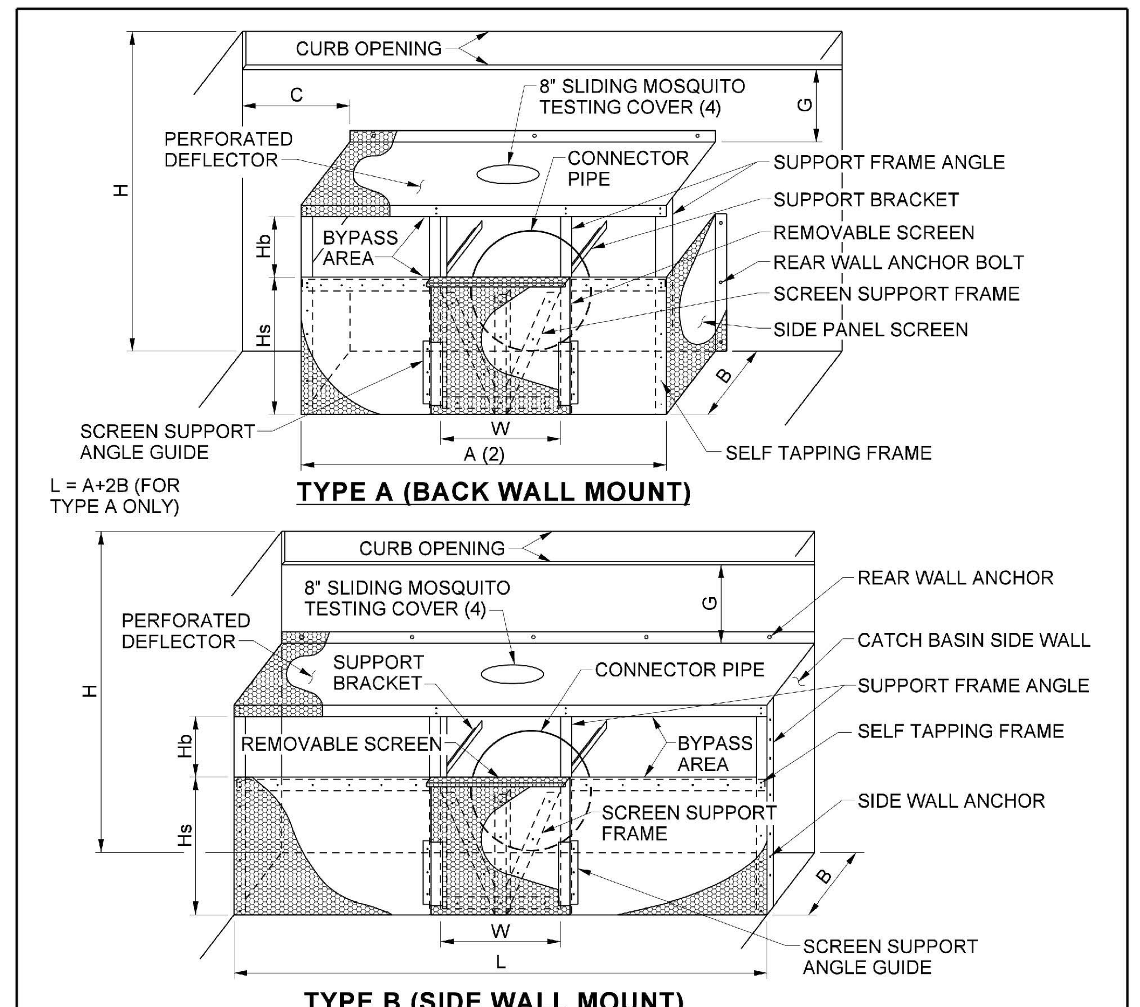
MODULAR WETLANDS
www.ModularWetlands.com | (855) 5MOD-WET

MWS-L-8-24-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

EXAMPLE MODULAR WETLANDS DETAIL



BIORETENTION BASIN SECTION
TYPICAL SECTION SITES 4, 5, 10
N.T.S.



DIMENSIONS:

SCREEN LENGTH (1)	L
REMOVABLE SCREEN WIDTH (2)	W (24" TO 36")
SCREEN HEIGHT (1)	Hs
SCREEN BYPASS HEIGHT (1)	Hb
MINIMUM WALL CLEARANCE (2)	C = 12"
MINIMUM INTERIOR SPACE (2)	B = 10"
DISTANCE BELOW GUTTER FL (1)	G
CATCH BASIN HEIGHT (5)	H

NOTES:

1. SEE TABLES ON PAGES 10-13 FOR VALUES.
2. SEE FTCD GENERAL NOTES ON STANDARD 313-3.
3. SEE FTCD SCREEN TYPE AND LOCATIONS WITHIN CATCH BASINS ON STANDARD 313-4 TO 313-8.
4. MOSQUITO TESTING COVER REQUIRED ONLY FOR STANDARD No. 301 AND 302 APPLICATIONS.
5. CB HEIGHT IS VERTICAL DISTANCE FROM TOP OF CURB TO OUTLET PIPE FLOW LINE.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:
Mark Lancaster 11/30/22
DIRECTOR OF TRANSPORTATION DATE
MARK LANCASTER, P.E.

REVISION DESCRIPTION	MARK	DATE	APPROVED

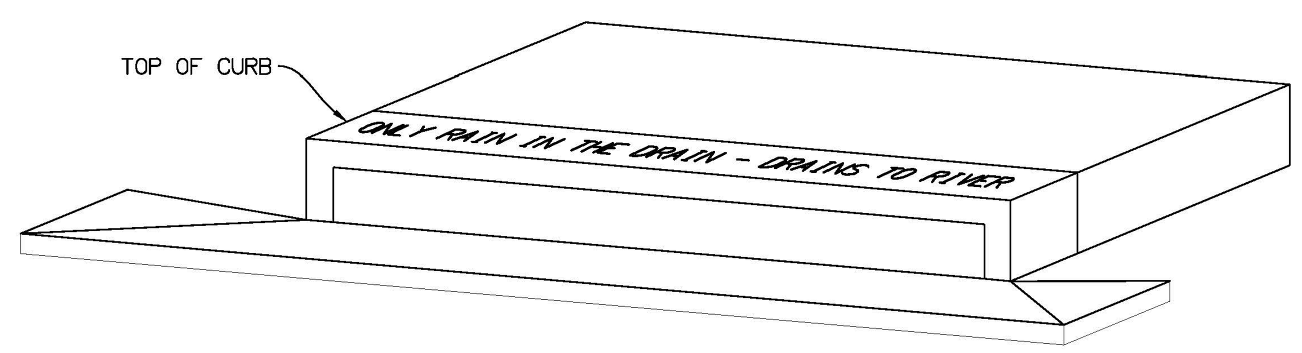
REGISTERED PROFESSIONAL ENGINEER MARK ALAN LANCASTER C48048 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

FULL TRASH CAPTURE DEVICE (FTCD) - CONNECTOR PIPE SCREEN (CPS)

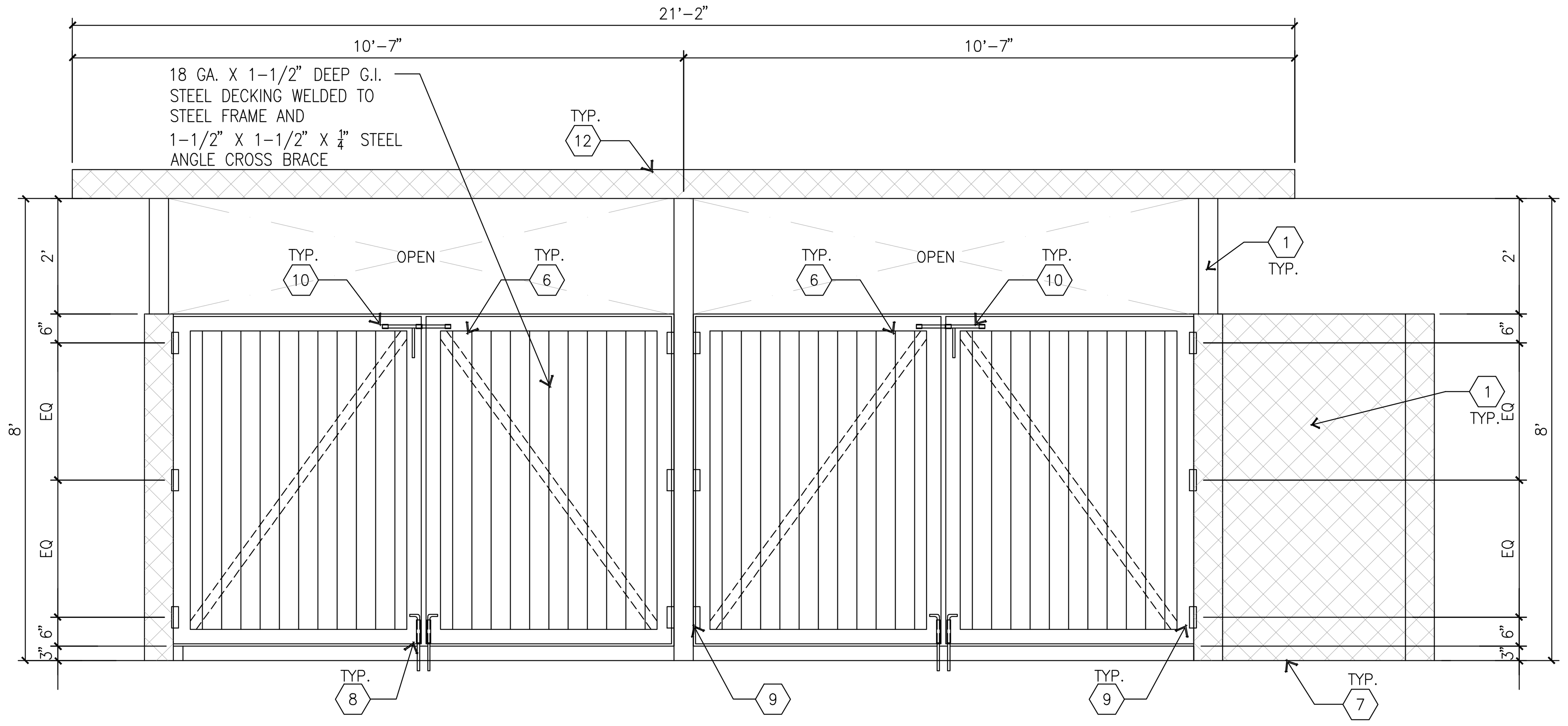
STANDARD No. 313 (1 OF 14)

INLET TRASH CAPTURE DEVICE DETAIL

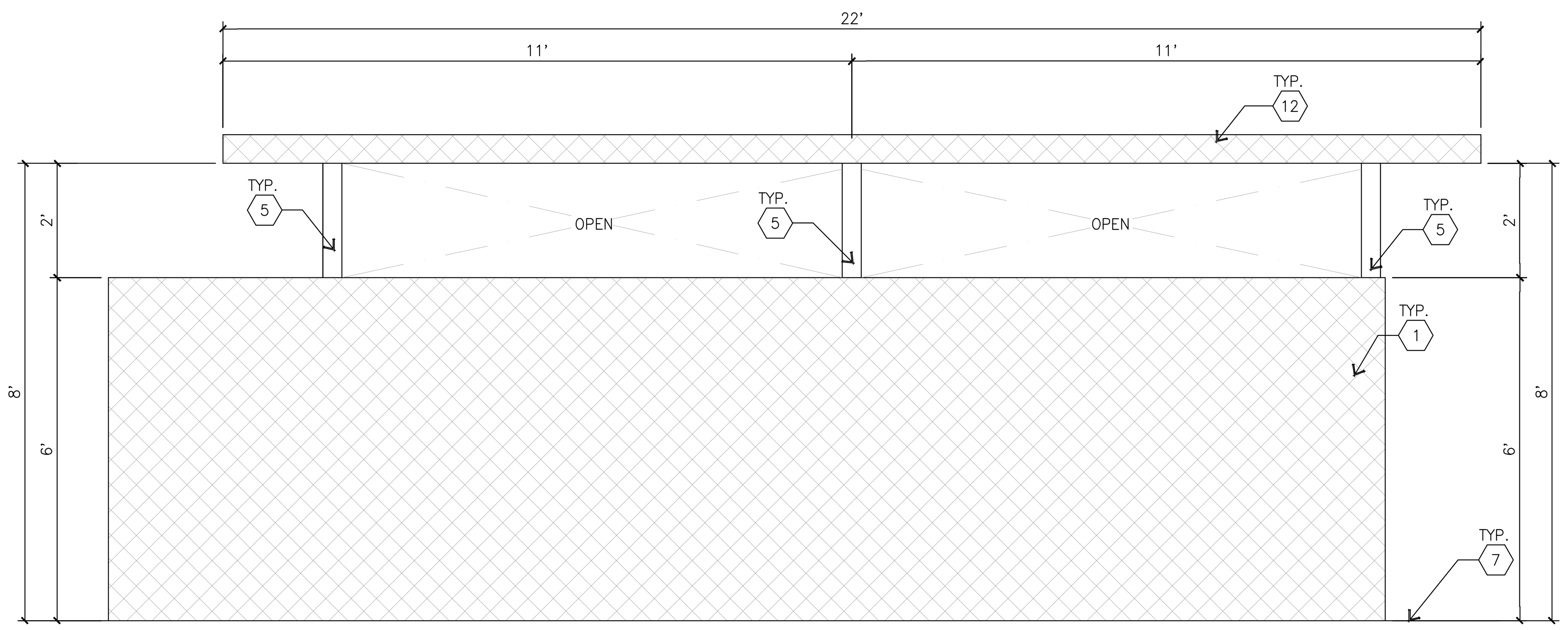


1. STENCILS TO HAVE 2" LETTERS AS FOLLOWS: "ONLY RAIN IN THE DRAIN - DRAINS TO RIVER".
2. PLACE BOTH STENCILS CENTERED WITHIN THE CATCH BASIN OPENINGS AND WITHIN THE TOP OF THE CURB.
3. SPRAY BOTH STENCILS WITH WHITE PAINT.
4. REMOVE STENCILS WHEN PAINT IS DRY.

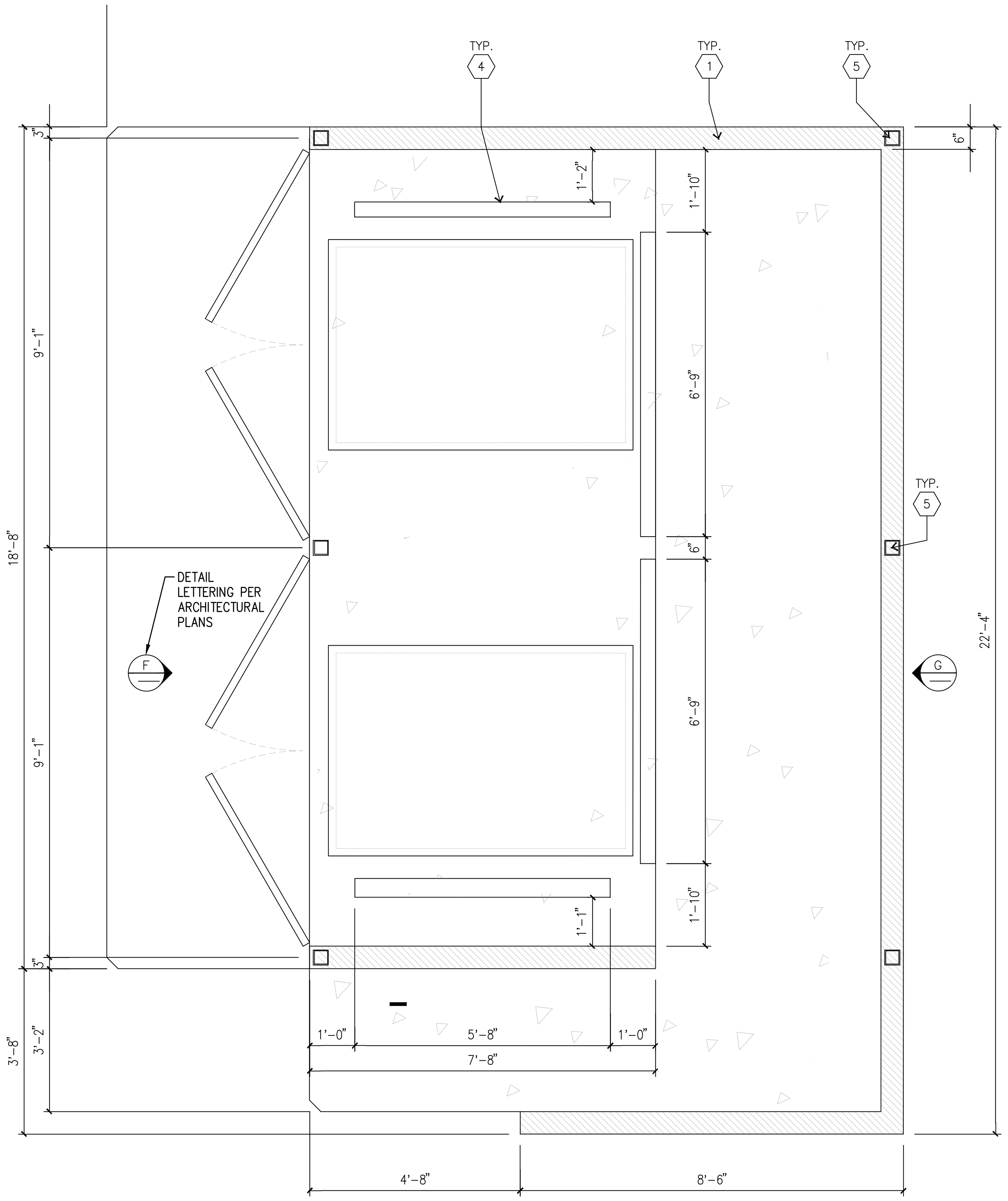
CATCH BASIN STENCILING DETAIL
NTS



TRASH ENCLOSURE ELEVATION (F)
N.T.S.



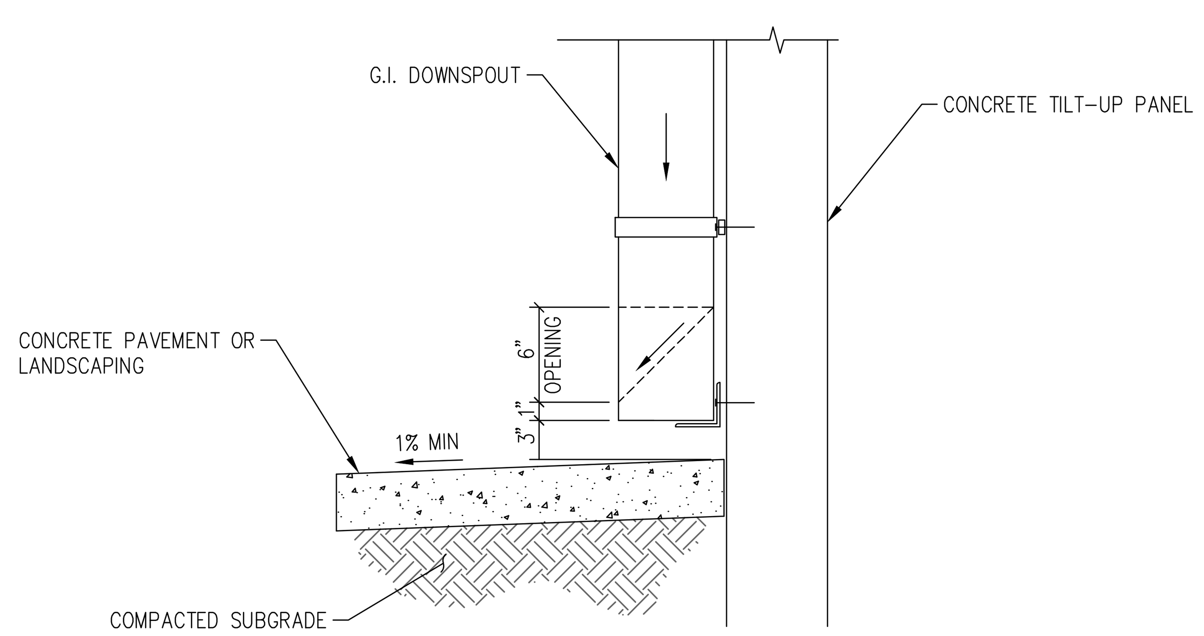
TRASH ENCLOSURE ELEVATION (G)
N.T.S.



ENLARGED TRASH ENCLOSURE PLAN (A)
N.T.S.

NOTES

1. CONCRETE TILT-UP WALL.
2. DOUBLE SWING METAL GATES.
3. CONCRETE APPRON 5" MIN.
4. 4"W X 6"H WHEEL STOPS WITH 1" BEVEL TOP CUTS, SHALL BE FROM RECYCLED MATERIALS. SECURED TO SLAB W/ 1/2" DIA. ANCHOR BLOTS @ 36" O.C. MIN. TYPICAL
5. STEEL TUBE FRAME
6. 18 GA. X 1 1/2" DEEP G.I. STEEL DECKING WELDED TO STEEL FRAME AND 1 1/2" X 1 1/2" X 1/4" STEEL ANGLE CROSS BRACE.
7. FINISH SURFACE.
8. STEEL CANE BOLT W/ SLEEVE, LOCATED ON OUTSIDE OF ONE GATE. (TYPICAL EA. SIDE)
9. HEAVY DUTY STEEL HINGE. (TYPICAL EA. GATE)
10. HEAVY DUTY SLIDE BOLT. (TYPICAL EA. GATE)
11. NOT USED
12. GALVANIZED CORRUGATED METAL DECK.
13. 20 GA. G.I. GUTTER PAINTED.



DOWNSPOUT DETAIL
N.T.S.

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		POST-CONSTRUCTION BMP DETAILS	OF 4 SHEETS

Appendix 2: Construction Plans

Grading and Drainage Plans

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- RETAINING WALL
- FENCE
- EDGE OF PAVEMENT
- SIGN
- MANHOLE
- RIGHT OF WAY
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- SCREEN WALL
- COMBINATION SCREEN/RETAINING WALL
- EXISTING LOT LINE
- RIDGE LINE
- RIBBON GUTTER
- FLOW ARROW
- PROPOSED EDGE OF PAVEMENT
- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING SWR LINE
- PROPOSED SEWER LINE
- EXISTING STORM DRAIN PIPE
- PROPOSED STORM DRAIN PIPE
- EXISTING OVERHEAD LINES
- CUT/FILL LINE
- SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

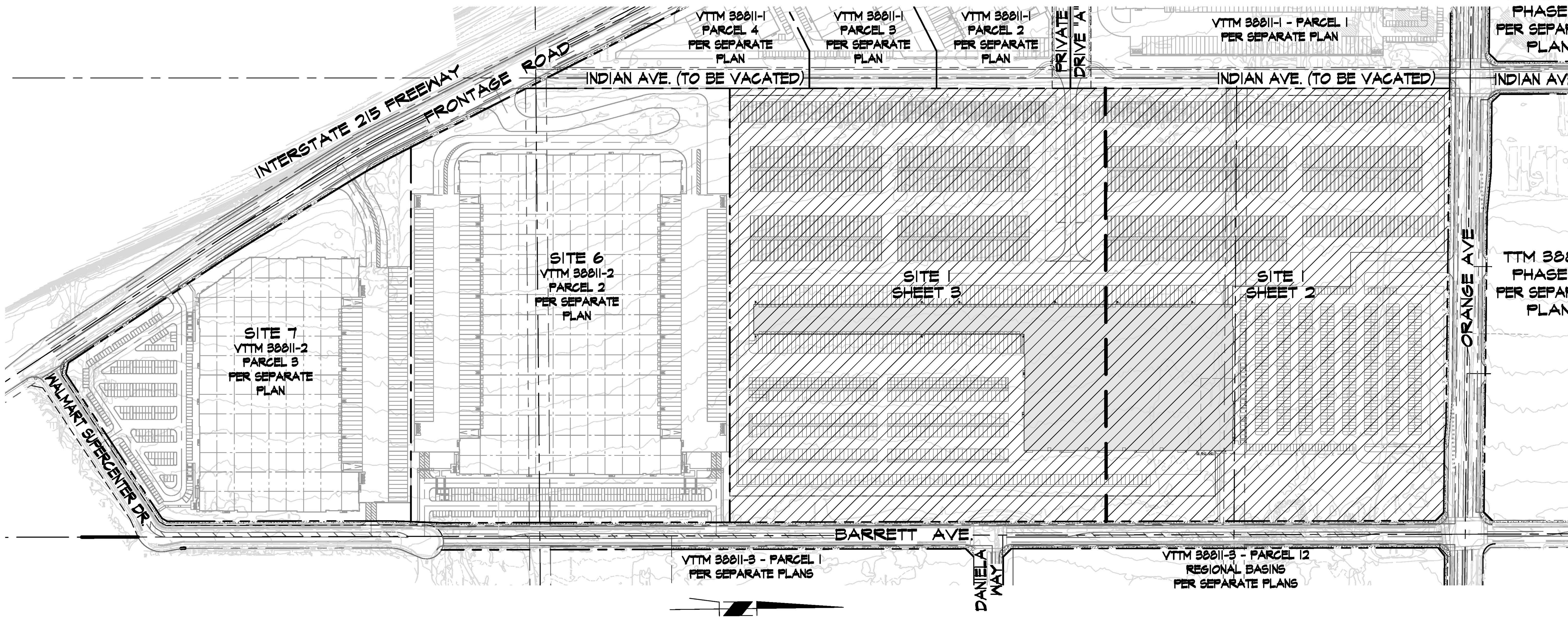
PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-120-004 thru 008, 020 thru 026, &
305-130-001 thru 006, 009, &
305-160-001 thru 003, 025 thru 030, &
305-140-014, 019, 020, 028 thru 031, &
305-220-011, 054 thru 062

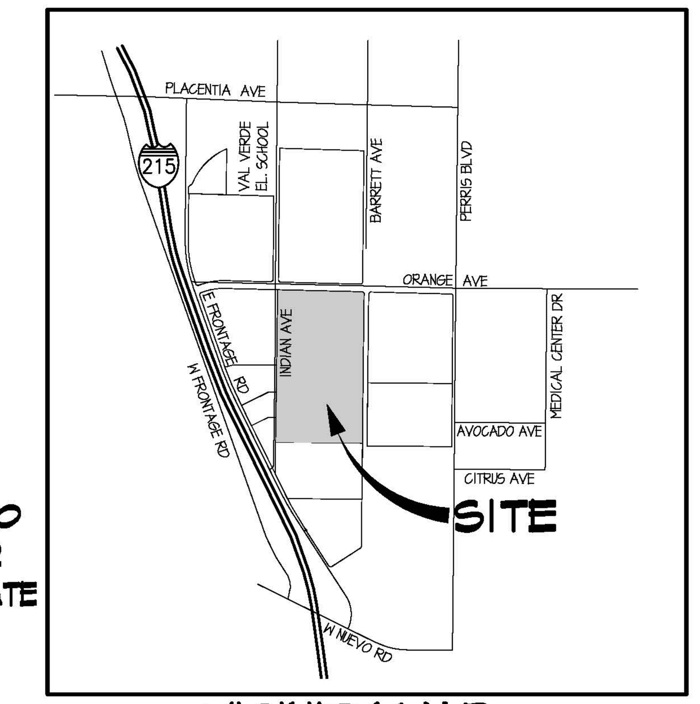
LEGAL DESCRIPTION

BLOCKS 1-4 OF FIGADOTA FARMS NO. 1A AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 68 TOGETHER WITH LOTS 1-8, AND 13-20 OF FIGADOTA FARMS AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 53 EXCEPTING THAT PORTION LYING WEST OF THE EASTERLY LINE OF THE FRONTAGE ROAD.



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER
HOWARD INDUSTRIAL PARTNERS
2244 NORTH PACIFIC STREET
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-637-3333

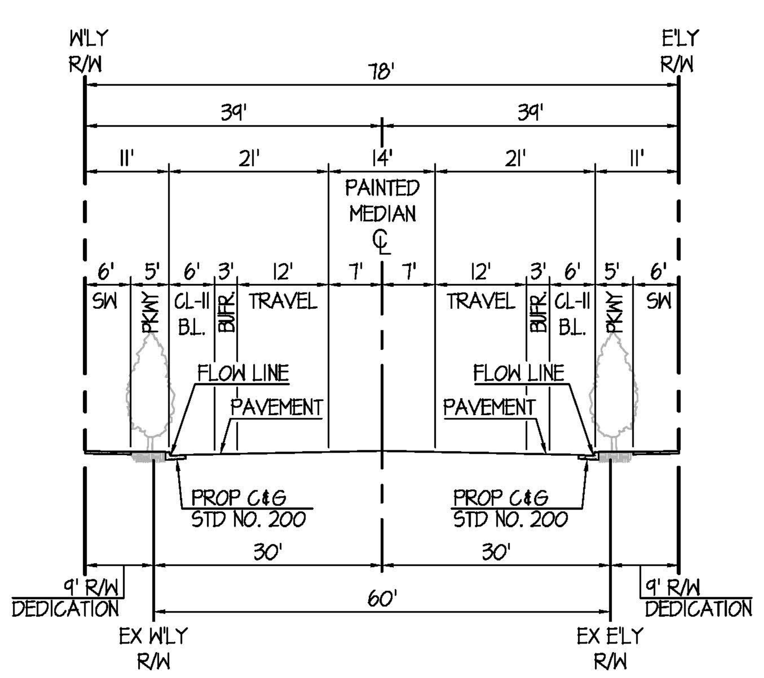
ENGINEER
FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

ARCHITECT
AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

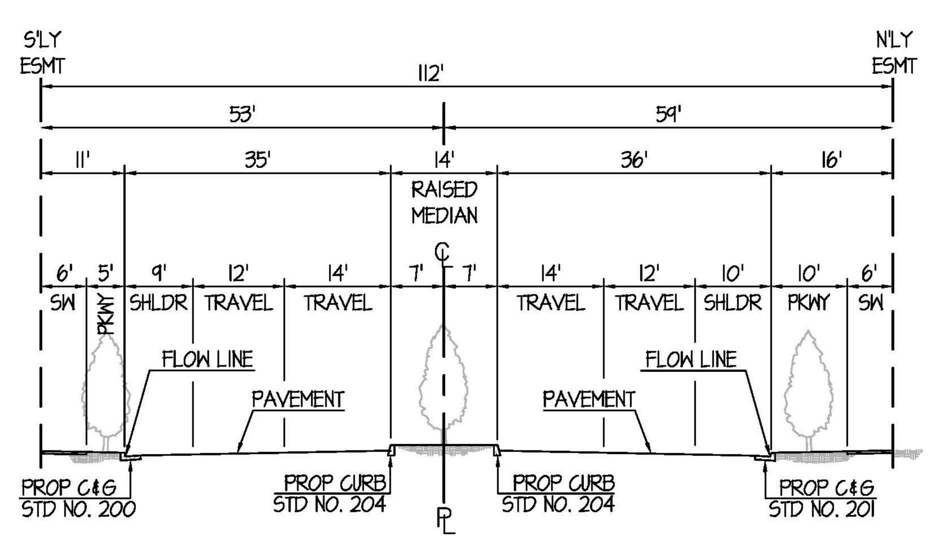
EARTHWORK ESTIMATE:

RAW CUT:	291,230 CY	
RAW FILL:	93,330 CY	
NET:	197,900 CY	EXPORT

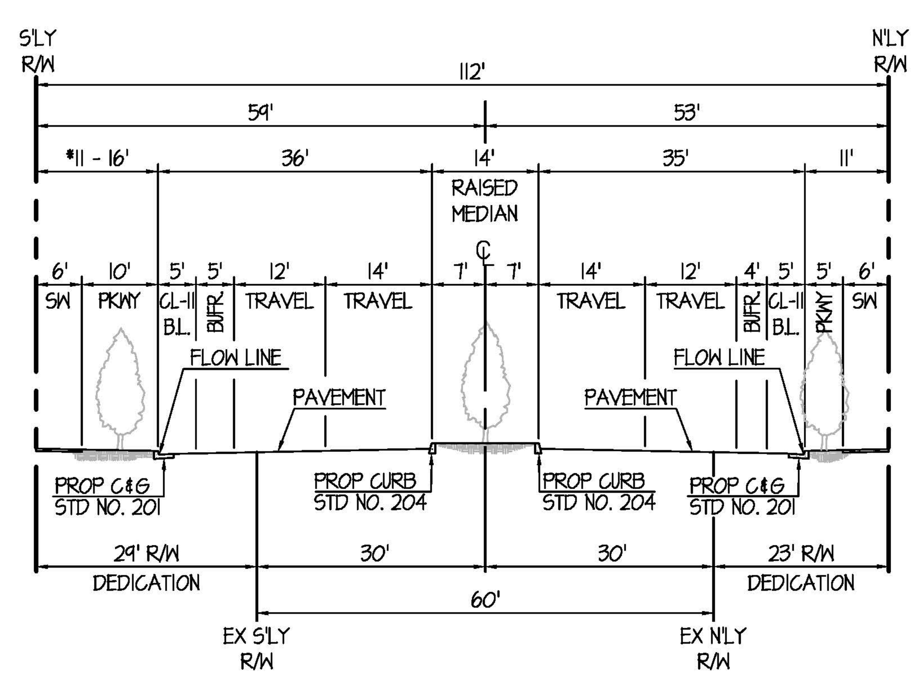
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 15,223



BARRETT AVE
(N'LY WALMART DWY - ORANGE AVE)
MAJOR COLLECTOR
(78'/56')

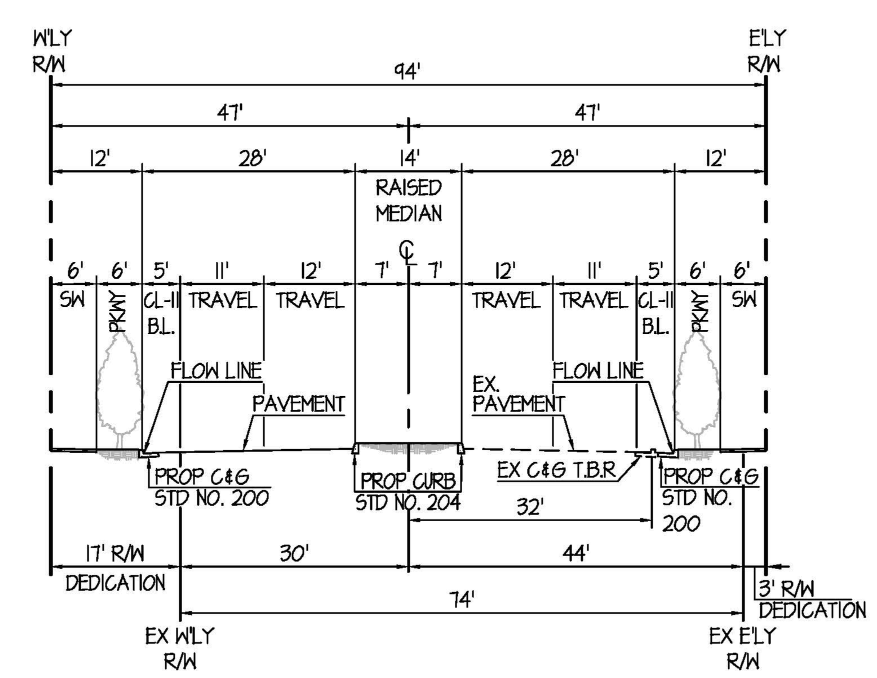


PRIVATE DRIVE "A"
SECONDARY ARTERIAL
(112'/85')



* PROPOSED 11' MINIMUM DIMENSIONS FOR ALL RIGHT TURN POCKETS AT INTERSECTIONS

ORANGE AVENUE
(WEST OF BARRETT AVE)
SECONDARY ARTERIAL
(112'/85')



INDIAN AVE
(NORTH OF ORANGE)
SECONDARY ARTERIAL
(94'/70')

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

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MURRIETA CA 92562
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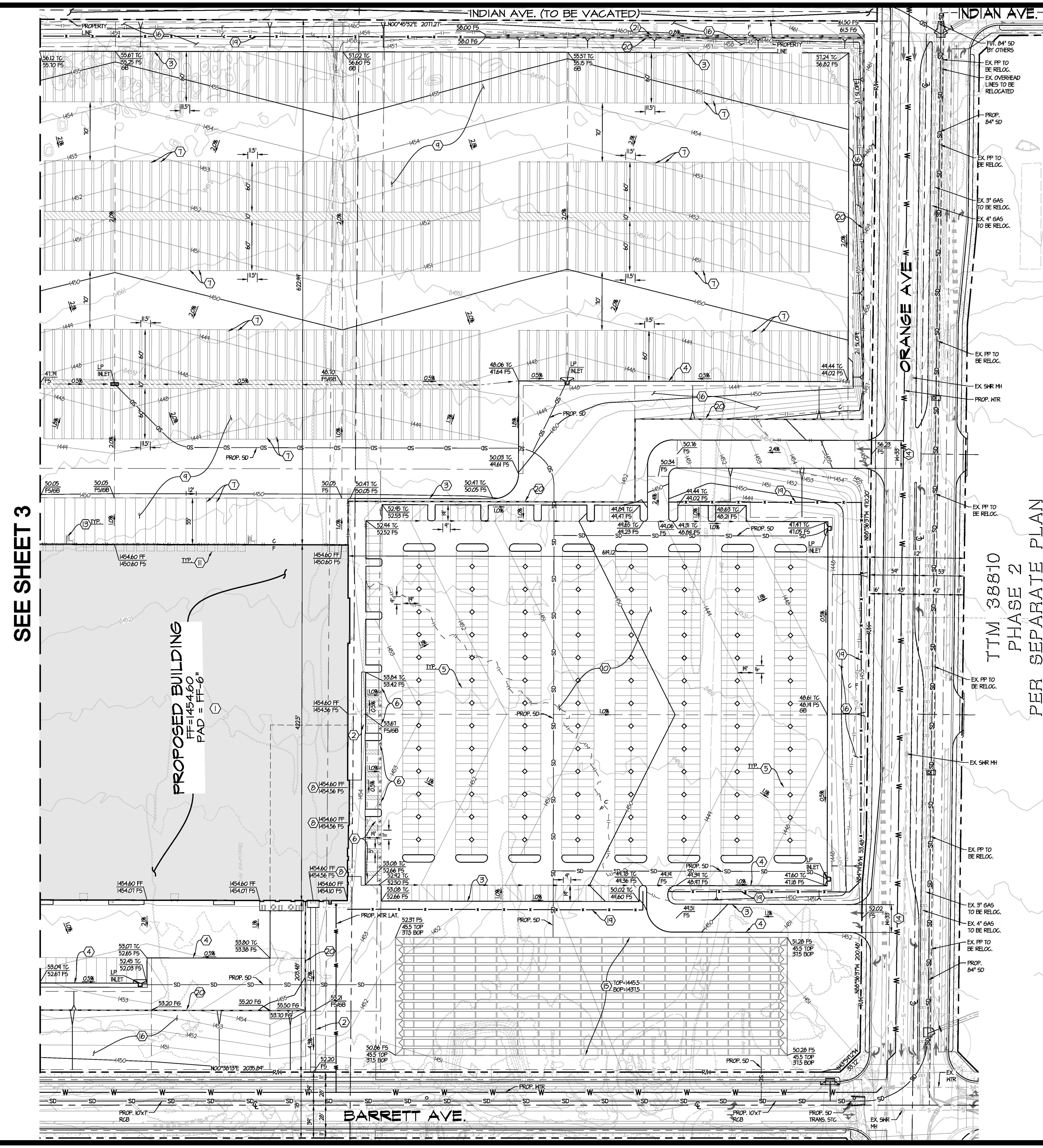
SHEET 1 OF 3 SHEETS



SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. CHAIN LINK FENCE PER ARCHITECT'S PLANS
20. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
21. CONCRETE RIBBON GUTTER/SWALE

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

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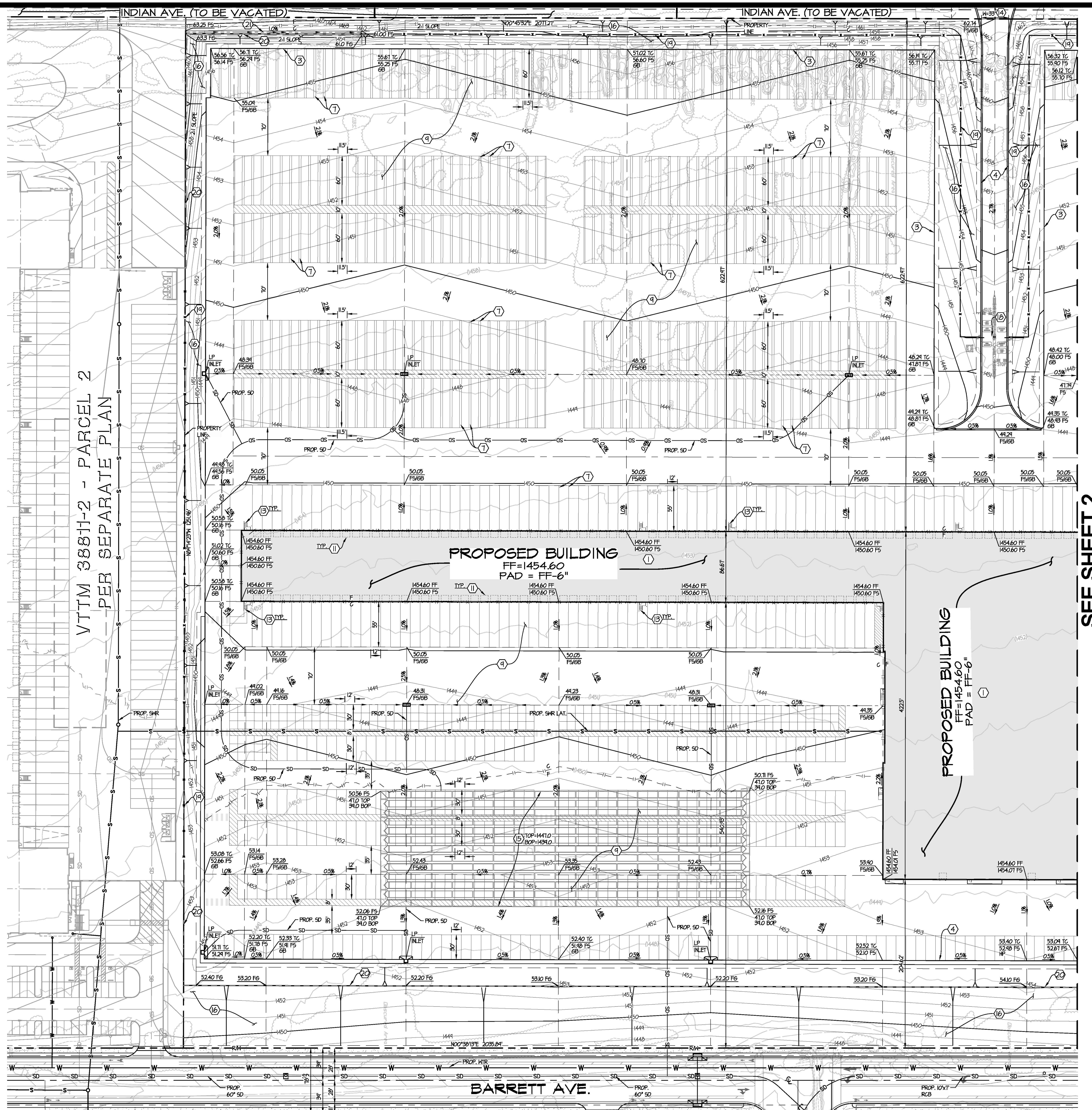
SHEET 2 OF 3 SHEETS



SITE PLAN KEYNOTES

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20. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
21. CONCRETE RIBBON GUTTER/SWALE

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #1 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 1

SCALE: AS SHOWN
DATE: OCT. 2024
DESIGNED: AJ
CHECKED: FM
PLN CK REF:

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SHEET 3 OF 3 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-1-FEDEX\20-001-CUP_BLD01_FEDEX-CG-01.DWG ALLAN 10/10/2024 4:01 PM

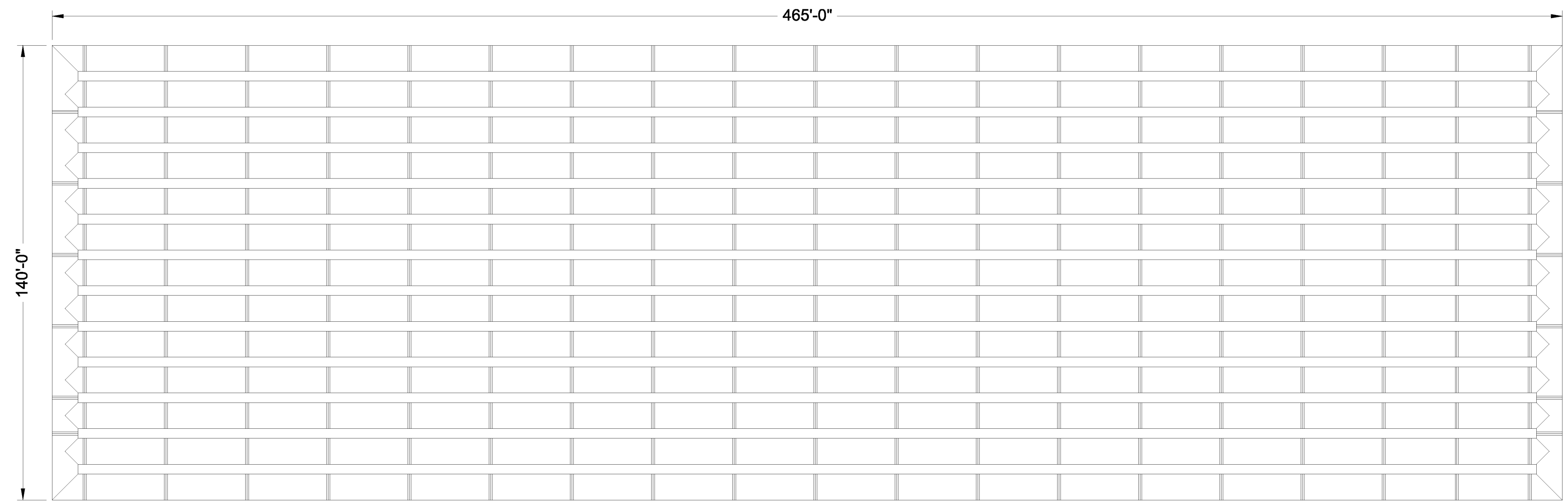
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 6,117 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 307,474 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 307,474 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 50'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

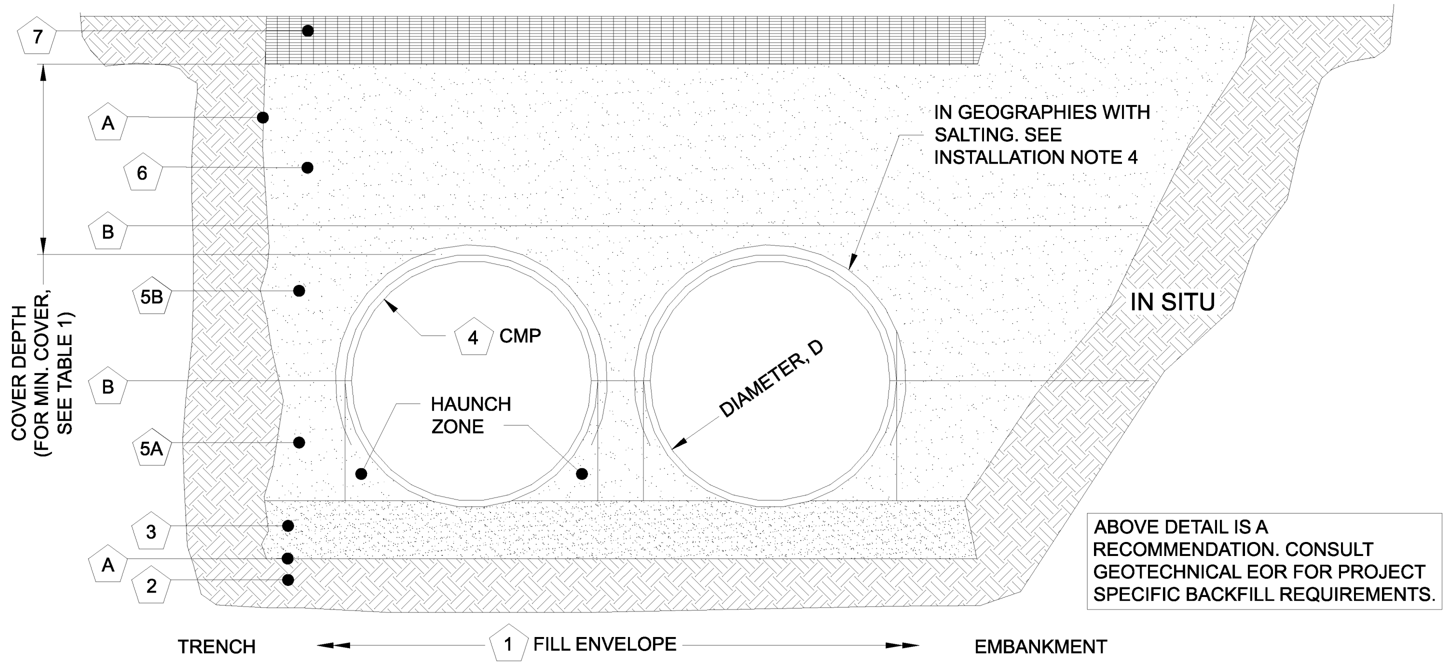
DYO36259 20-001 Harvest Landing Retail Center and Business Park
Site 1 - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24611	SEQ. No.: 36259	DATE: 10/4/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:

- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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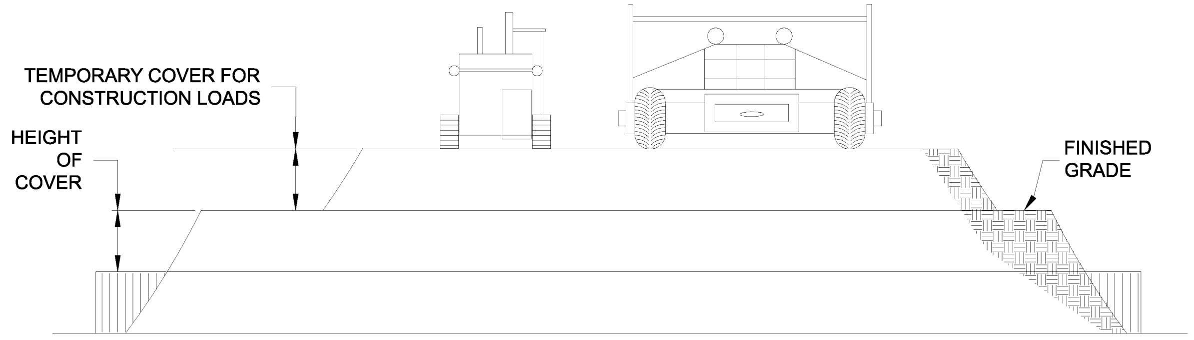

CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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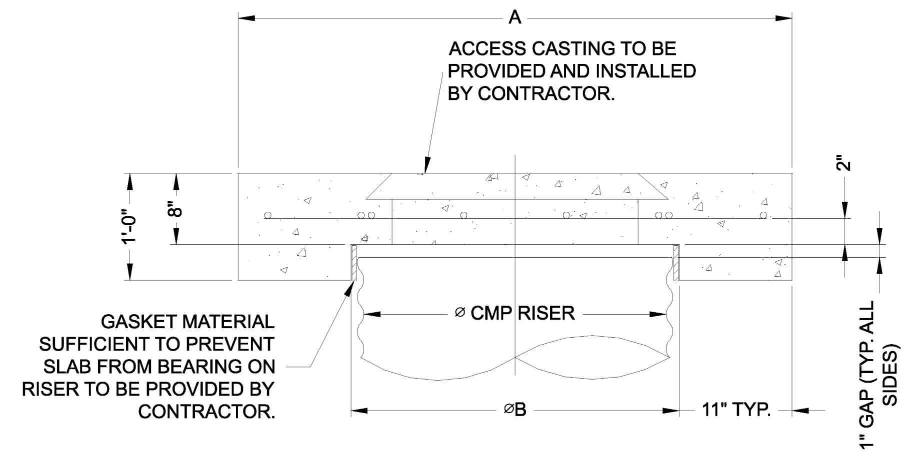
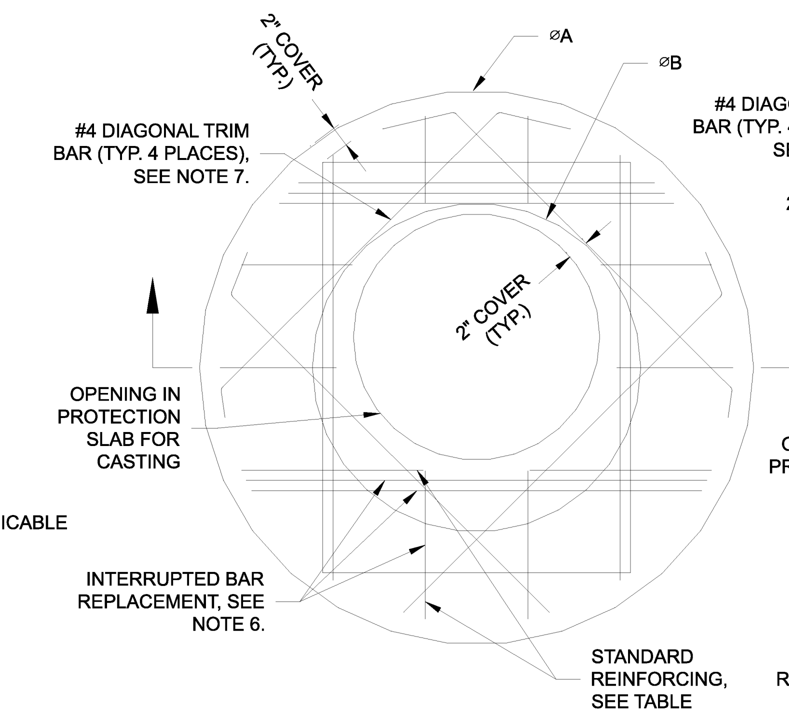


SECTION VIEW

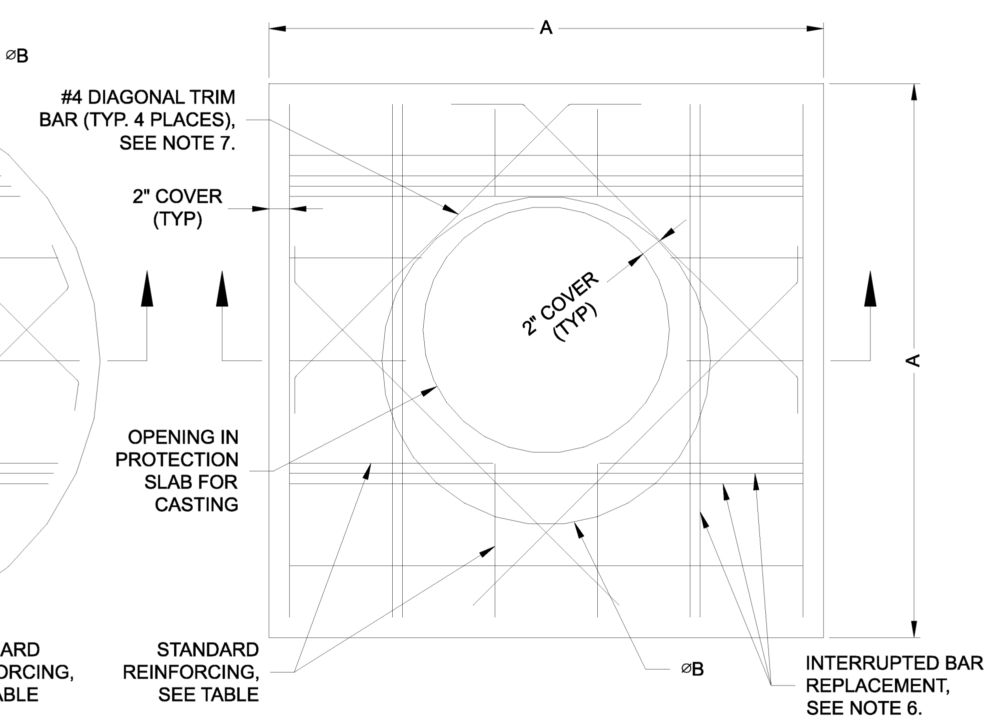
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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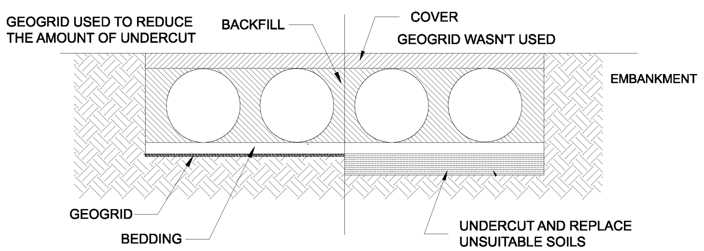
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

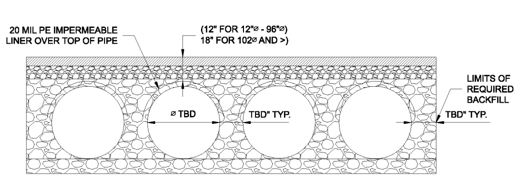
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

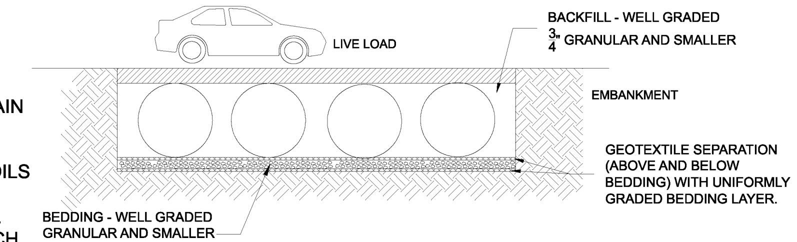
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

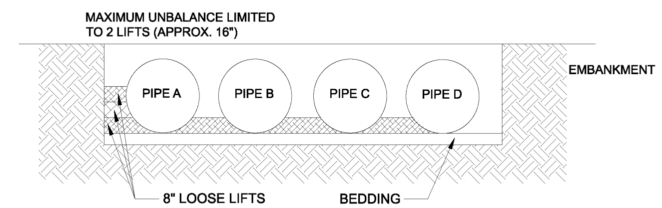
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

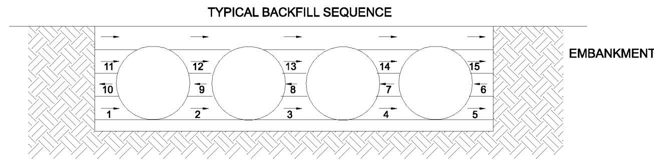
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



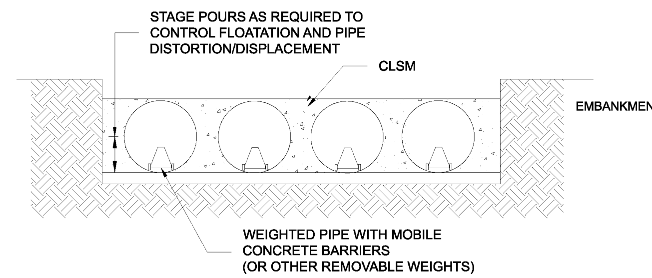
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

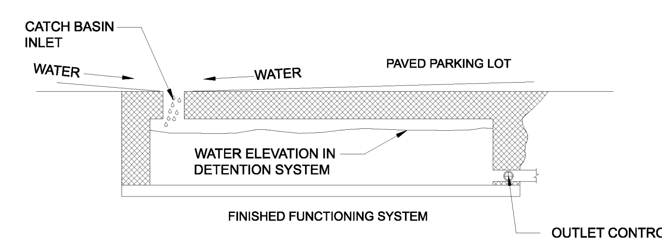


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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

CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36259 20-001 Harvest Landing Retail Center and Business Park
Site 1 - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24611	36259	10/4/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

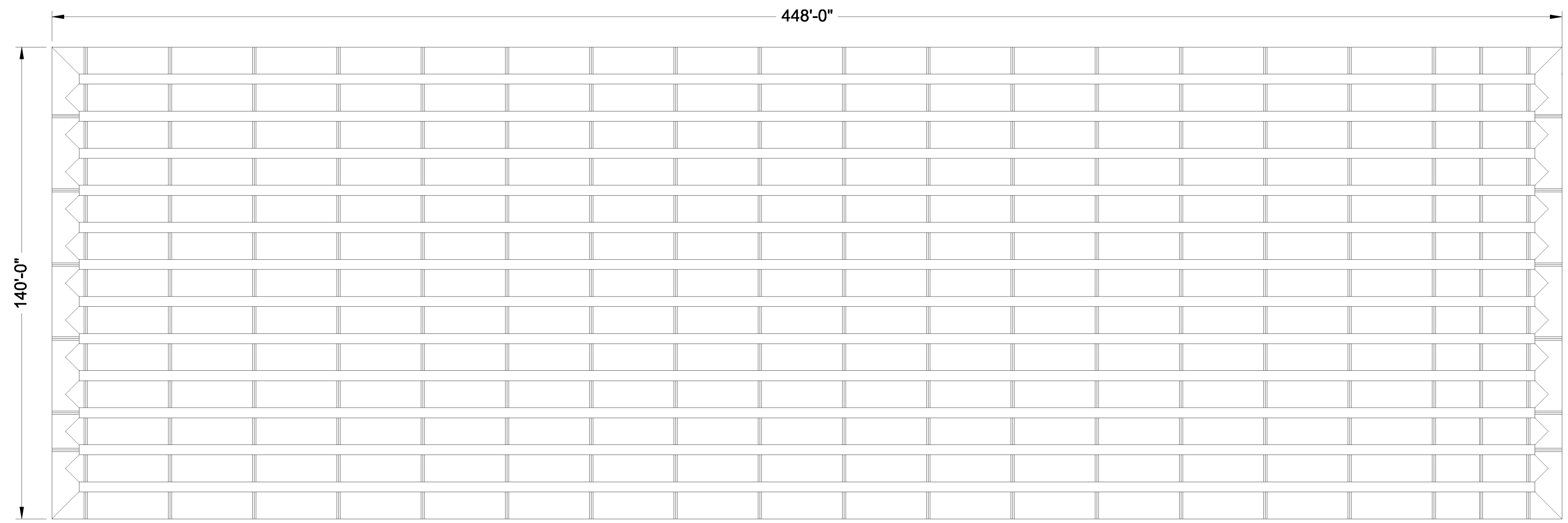
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 5,896 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 296,365 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 296,365 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 50'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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CONTECH® CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24609	36256	10/2/2024

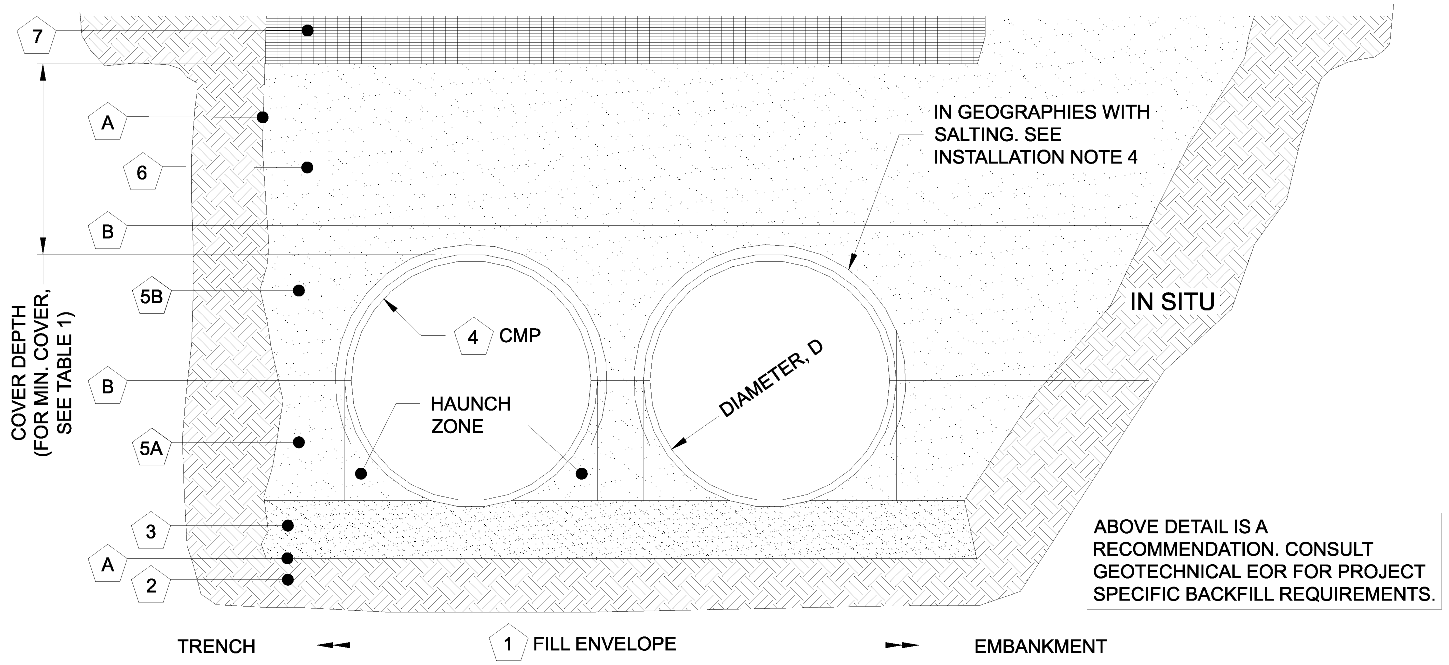
DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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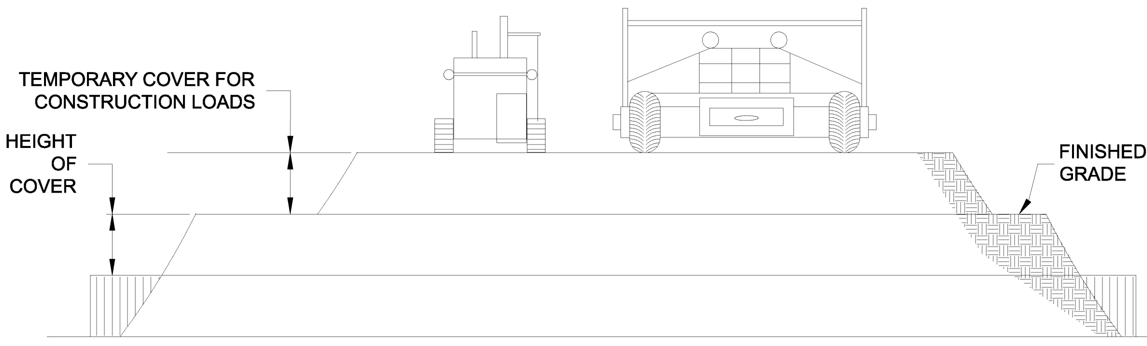
CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24609	SEQ. No.: 36256	DATE: 10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

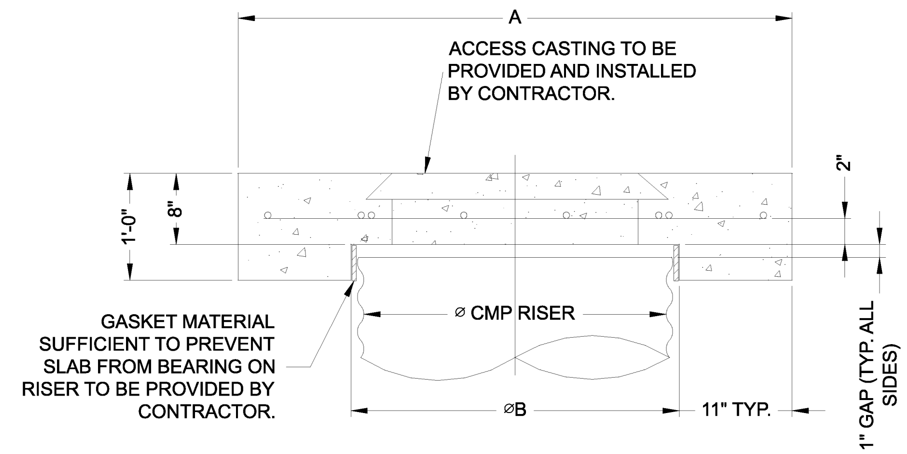
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

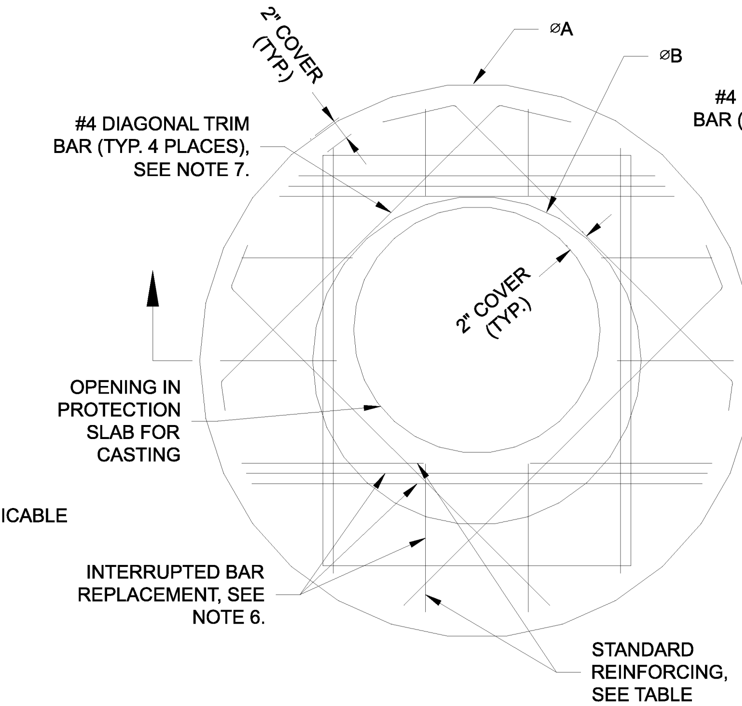


SECTION VIEW

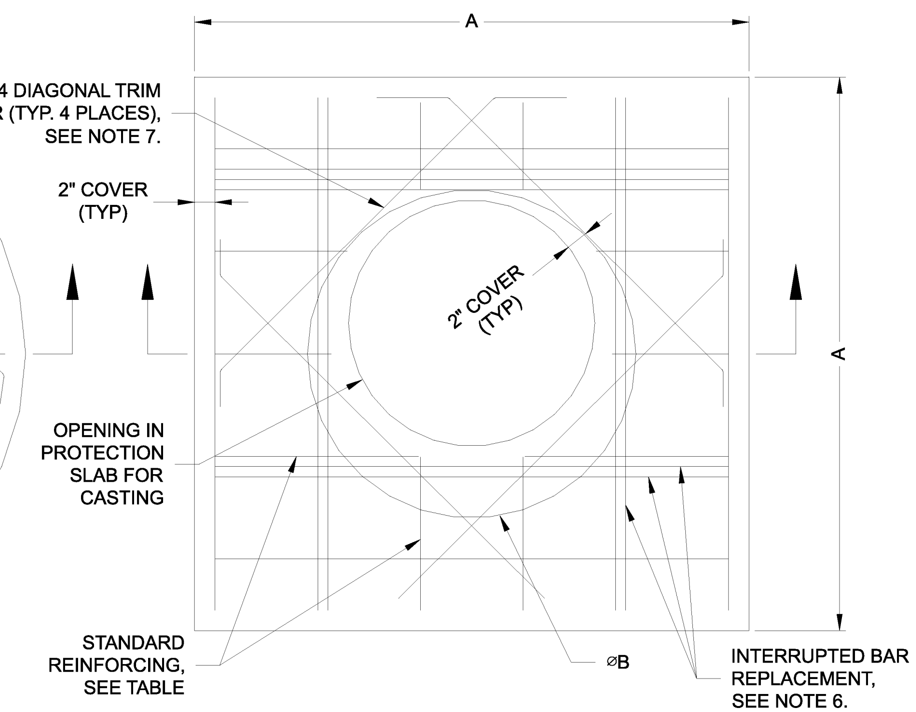
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24609	36256	10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

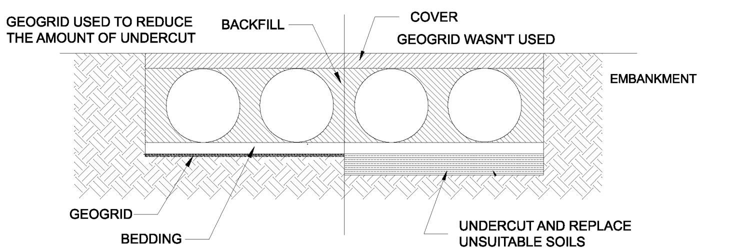
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

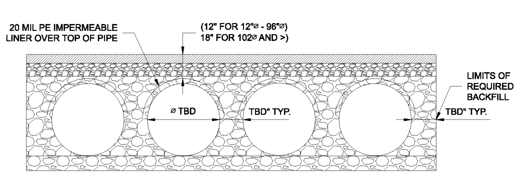
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

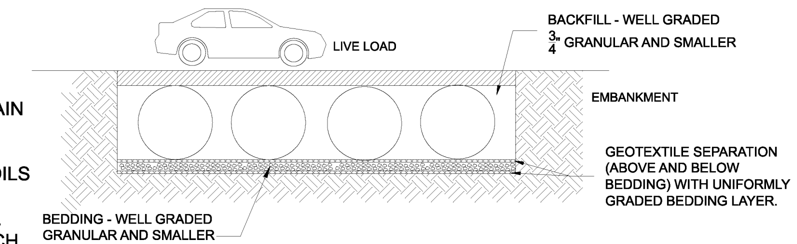
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

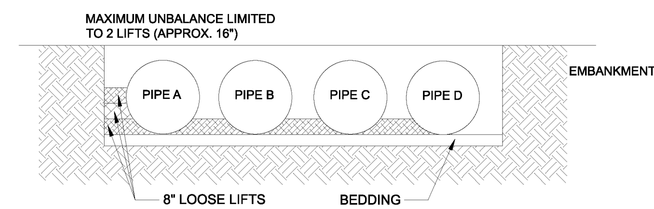
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

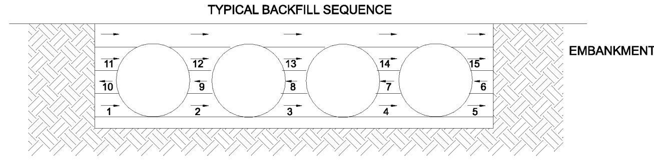
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



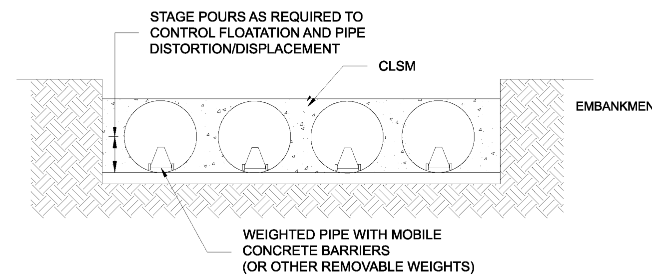
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

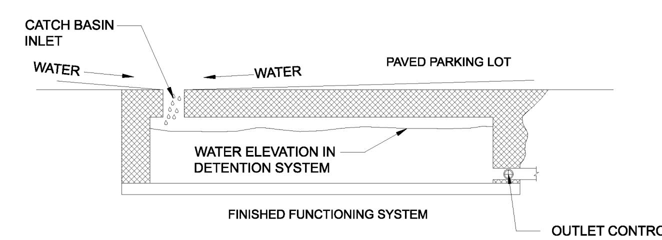


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36256 20-001 Harvest Landing Retail Center and Business Park
Site 1-Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24609	SEQ. No.: 36256	DATE: 10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

LEGEND

(1025)	EXISTING CONTOUR
1025	PROPOSED CONTOUR
	RETAINING WALL
	FENCE
	EDGE OF PAVEMENT
	SIGN
MH	MANHOLE
	RIGHT OF WAY
	EASEMENT
	PARCEL LINE
	PARCEL MAP BOUNDARY
	STREET CENTER LINE
	SCREEN WALL
	COMBINATION SCREEN/RETAINING WALL
	EXISTING LOT LINE
	RIDGE LINE
	RIBBON GUTTER
	FLOW ARROW
	PROPOSED EDGE OF PAVEMENT
W	EXISTING WATER LINE
W	PROPOSED WATER LINE
SS	EXISTING SWR LINE
SS	PROPOSED SEWER LINE
SD	EXISTING STORM DRAIN PIPE
SD	PROPOSED STORM DRAIN PIPE
E	EXISTING OVERHEAD LINES
	CUT/FILL LINE
	SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-100-028, 305-170-018, 305-100-008, & 305-100-009

LEGAL DESCRIPTION

PARCELS 2-5:
(APNS:305-100-028, 305-170-018, 305-100-008, 305-100-009)

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 4 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, WHICH LIES EASTERLY OF STATE HIGHWAY 395 AS CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED APRIL 28, 1952 AS INSTRUMENT NO. 18008.

EXCEPTING THE NORTH 30 FEET IN ORANGE AVENUE, THE EAST 30 FEET IN INDIAN AVENUE AND THE SOUTH 30 FEET IN CITRUS AVENUE.

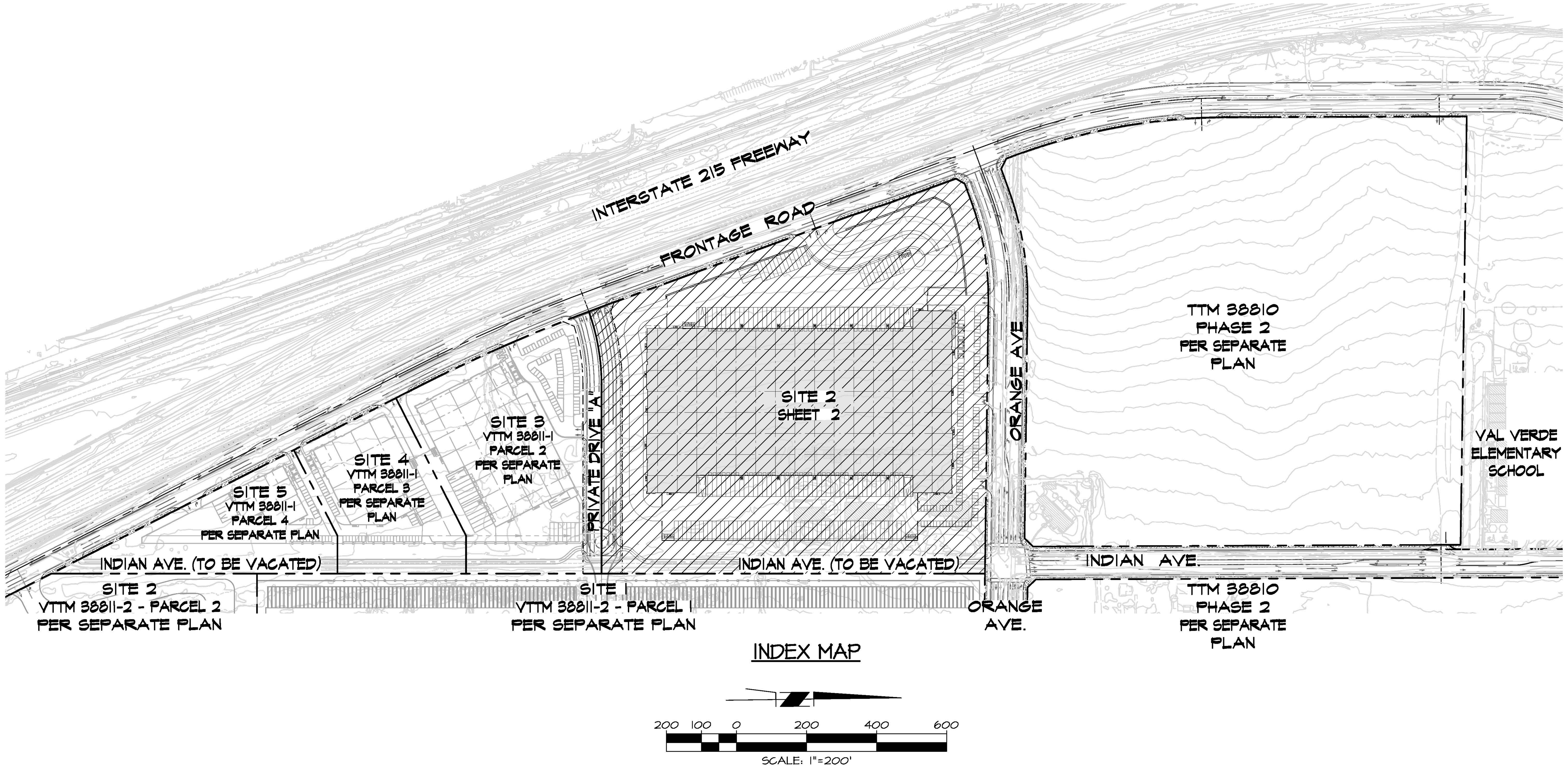
ALSO EXCEPTING THEREFROM THE PORTION DESCRIBED IN DEED RECORDED DECEMBER 21, 1965 AS INSTRUMENT NO. 142400 AND IN DEED RECORDED MARCH 13, 1969 AS INSTRUMENT NO. 24345, RECORDS OF RIVERSIDE COUNTY.

ALSO EXCEPTING THEREFROM THOSE PORTIONS CONVEYED TO THE STATE OF CALIFORNIA BY DEEDS RECORDED MARCH 22, 1992, AS INSTRUMENT NOS. 94602 AND 94603.

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

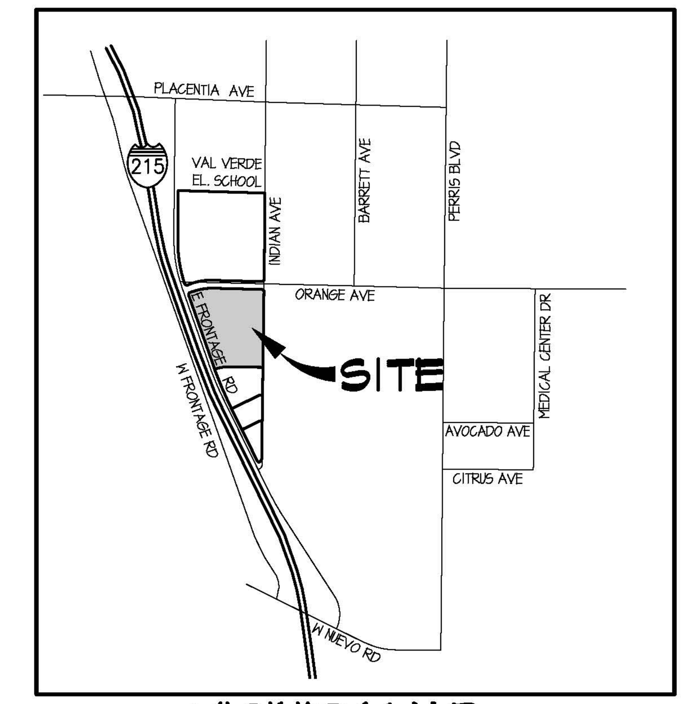
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #2 CONCEPTUAL GRADING & DRAINAGE PLAN

VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 1



INDEX MAP

SCALE: 1"=200'



VICINITY MAP

T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

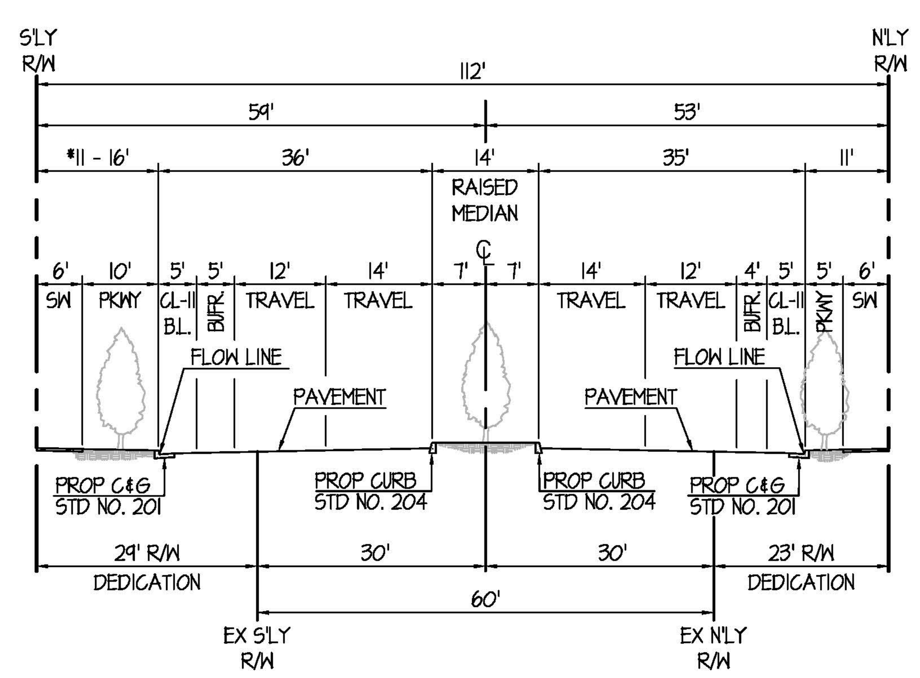
ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

EARTHWORK ESTIMATE:

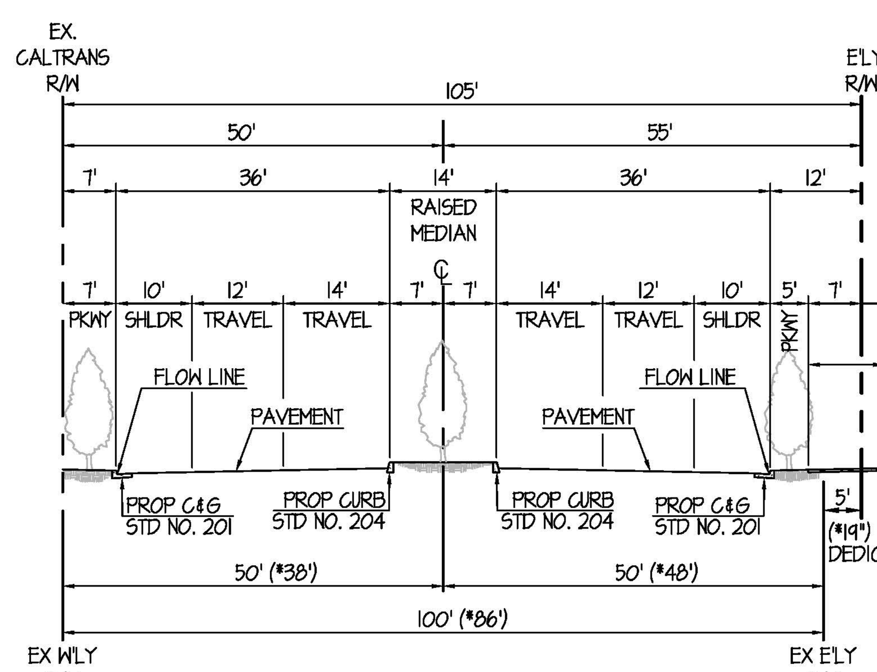
RAW CUT:	2,780 CY	
RAW FILL:	192,100 CY	
NET:	189,320 CY	IMPORT

HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 14,564



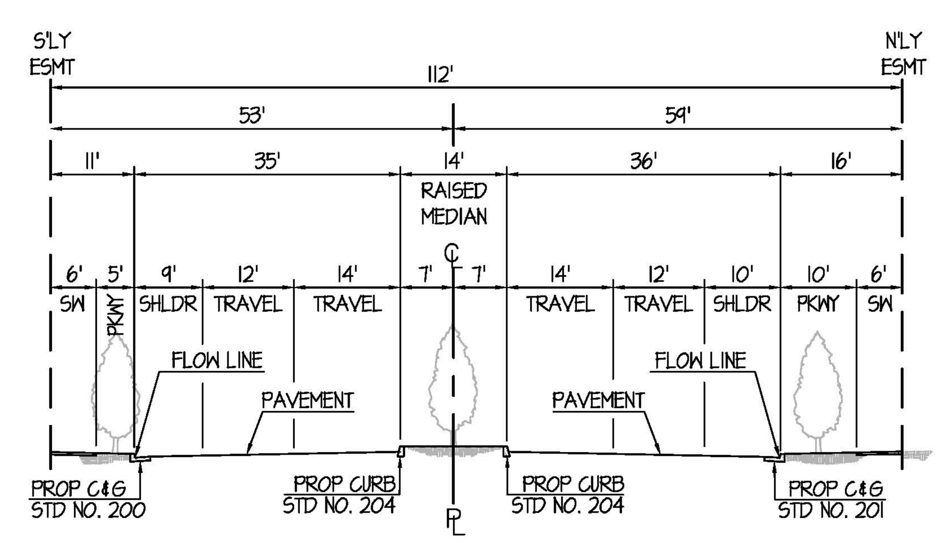
* PROPOSED 11' MINIMUM DIMENSIONS FOR ALL RIGHT TURN POCKETS AT INTERSECTIONS

ORANGE AVENUE
(WEST OF BARRETT AVE)
SECONDARY ARTERIAL
(112'/85')



*EXIST. DIMENSIONS FOR FRONTAGE SOUTH OF ORANGE AVE.

FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')



PRIVATE DRIVE "A"
SECONDARY ARTERIAL
(112'/85')

CITY OF PERRIS

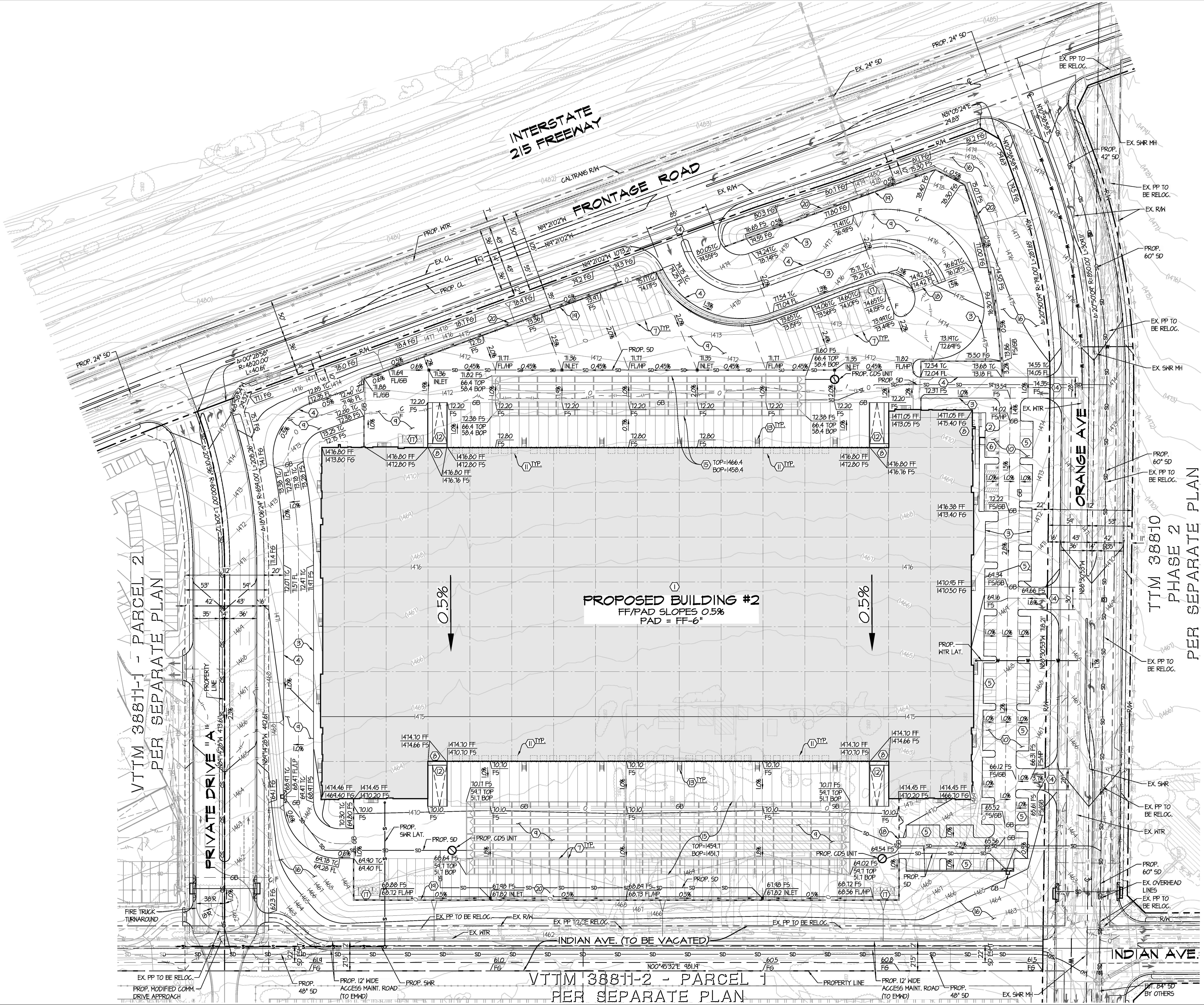
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #2 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 1

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA, CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 1 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-2\20-001-CUP_BLDG2-CG-01.DWG ALLAN 10/10/2024 3:29 PM



SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
20. CONCRETE RIBBON GUTTER/SWALE

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #2 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 1

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
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951.973.0202 - FMCIVIL.COM

SHEET 2 OF 2 SHEETS

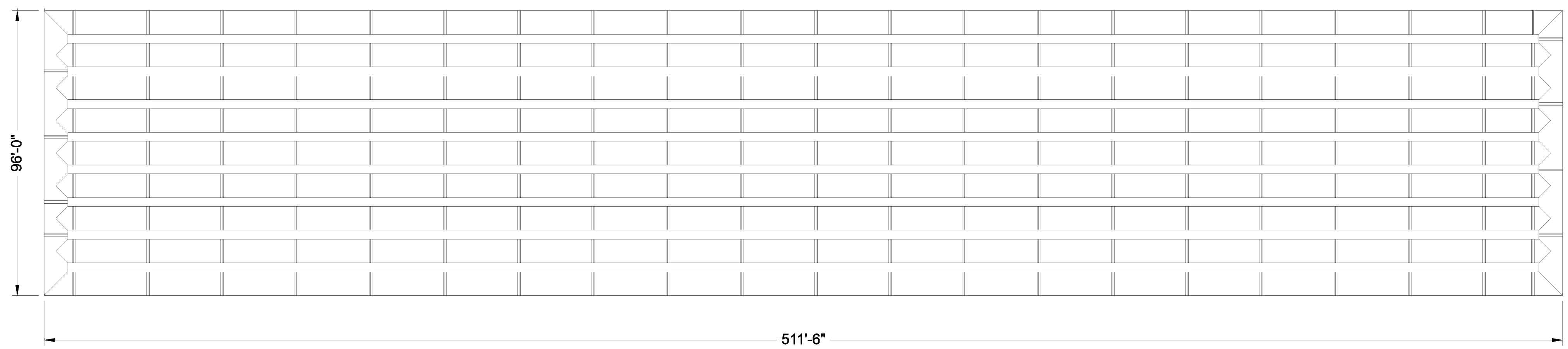
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 4,651 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 233,785 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 233,785 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 50'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

C:\EXPORTS\TEMPLATES\CMP_V8.DWG 10/18/2019 10:02 AM

DATE	REVISION DESCRIPTION	BY

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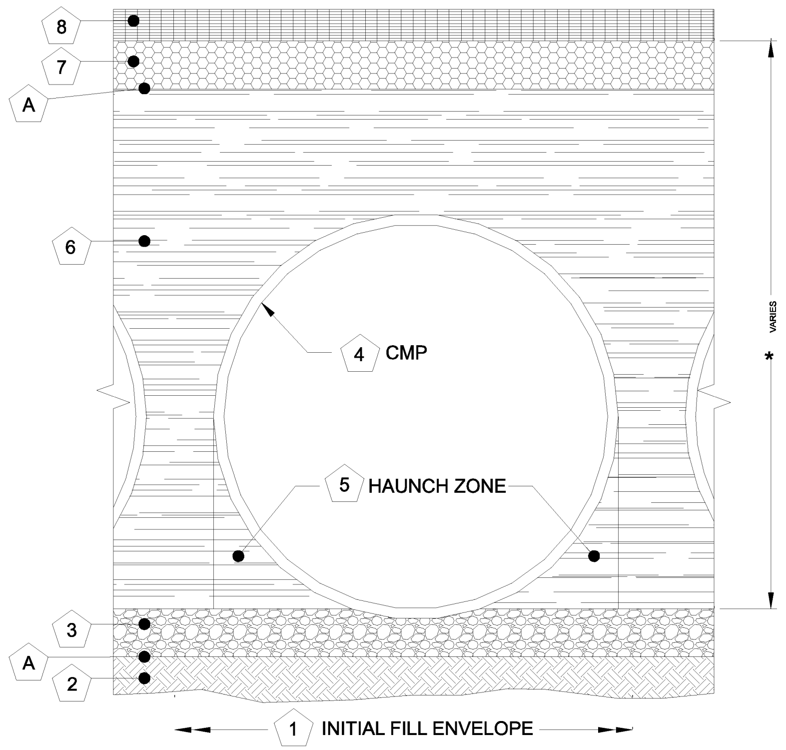
CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12847	SEQ. No.: 19813	DATE: 8/14/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE				
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

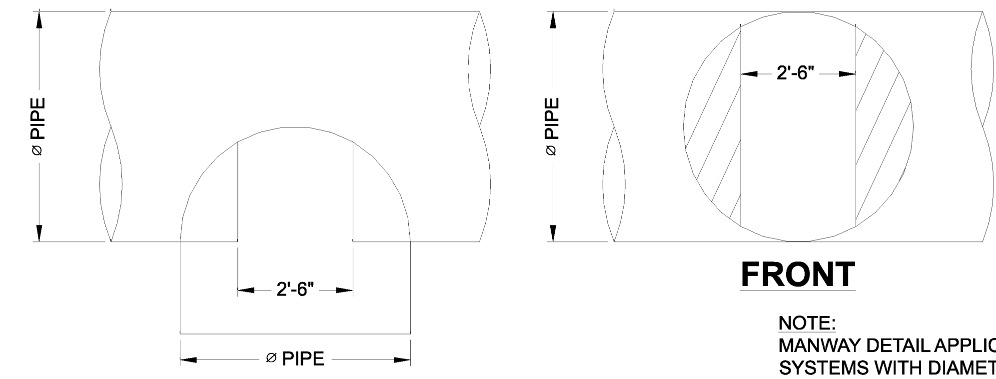
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



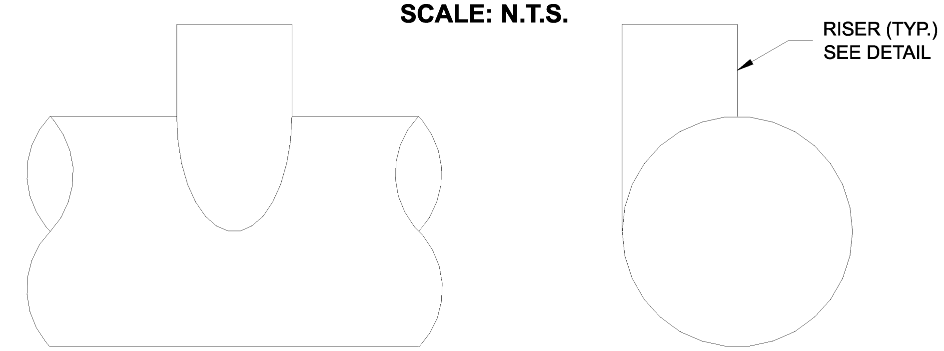
PLAN

FRONT

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



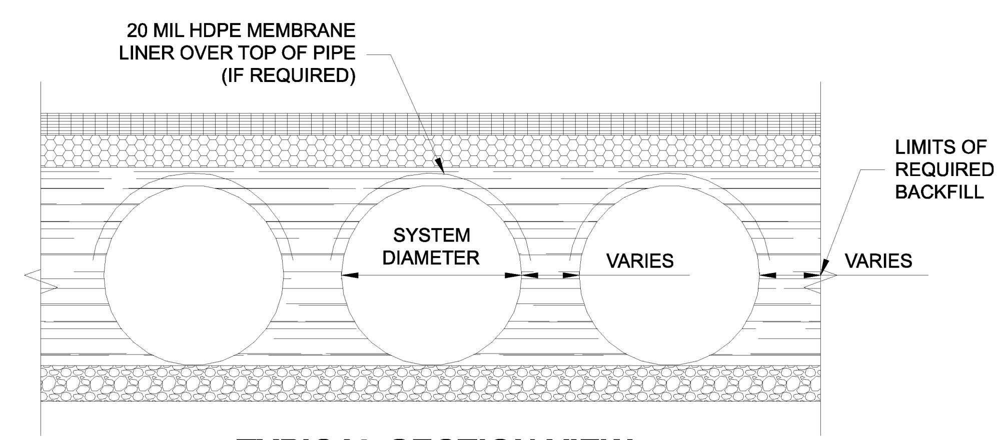
ELEVATION

END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
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DETENTION SYSTEM

PROJECT No.: 12847	SEQ. No.: 19813	DATE: 8/14/2022
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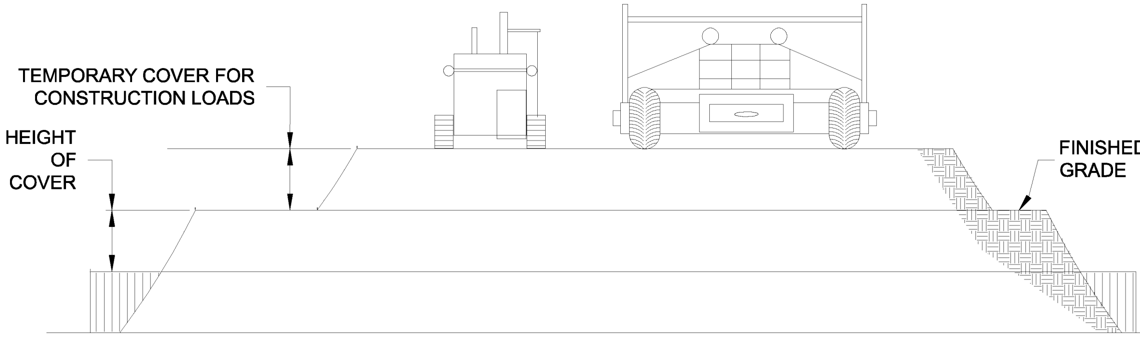


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

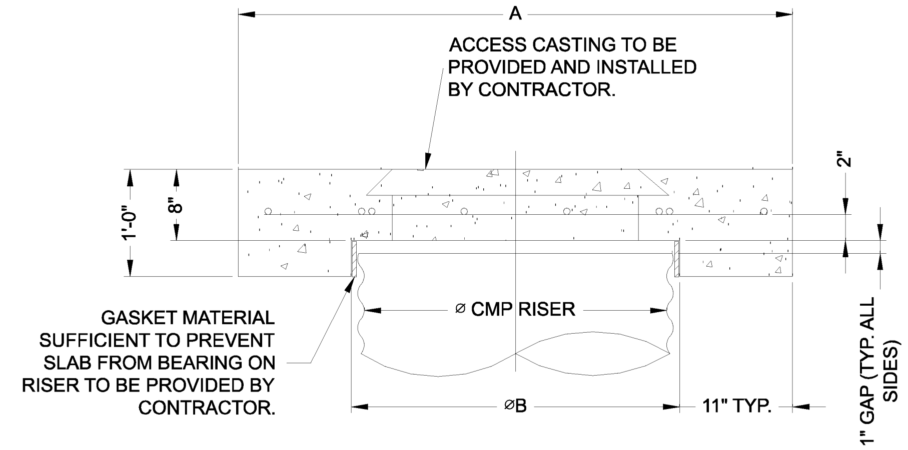
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

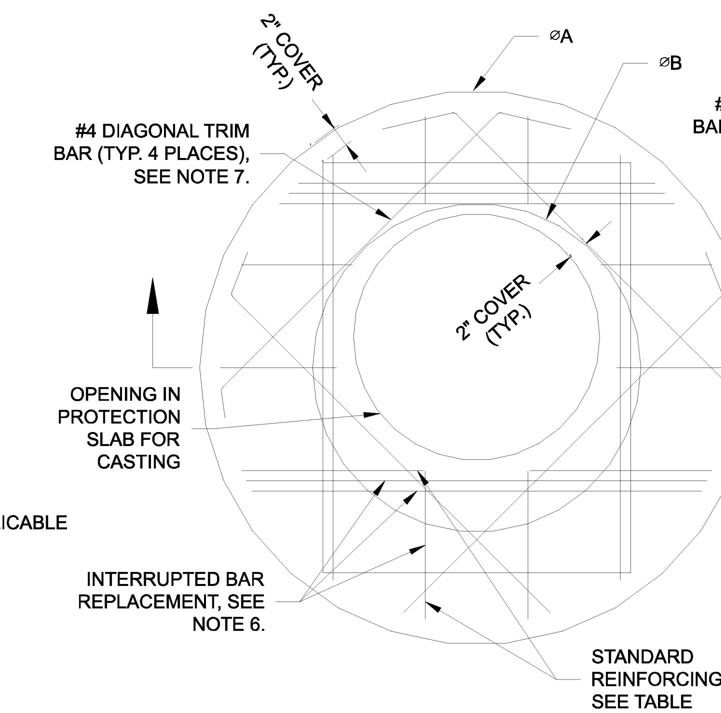


SECTION VIEW

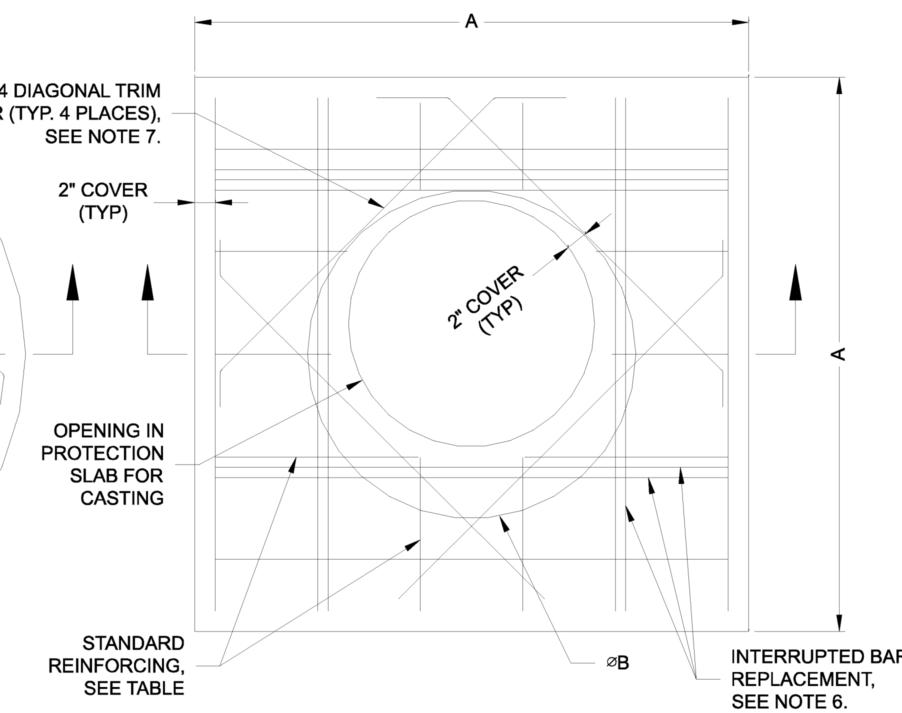
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12847	SEQ. No.: 19813	DATE: 8/14/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

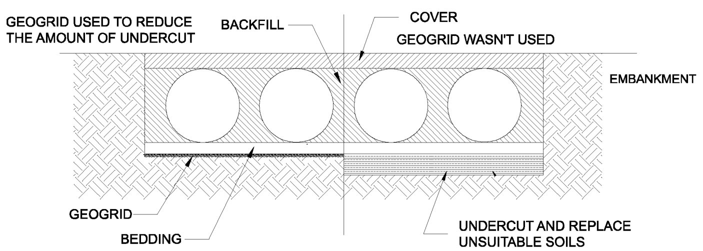
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

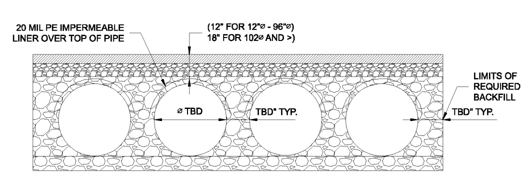


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

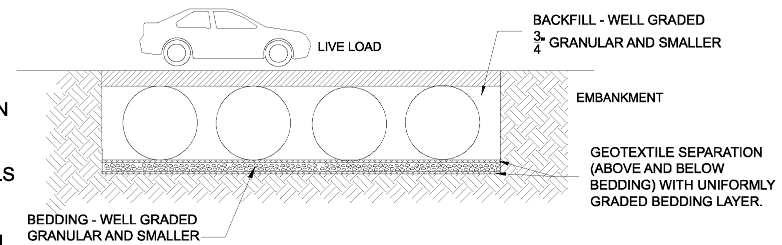
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

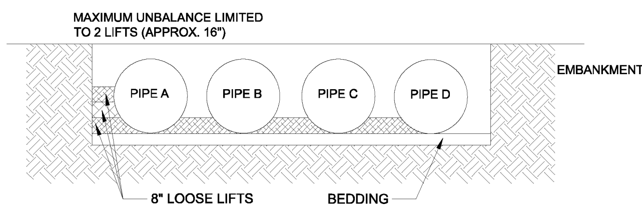
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

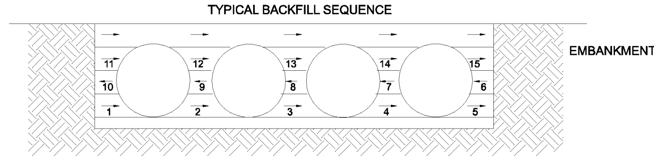
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



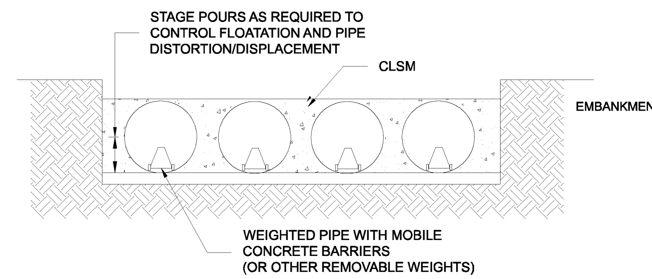
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

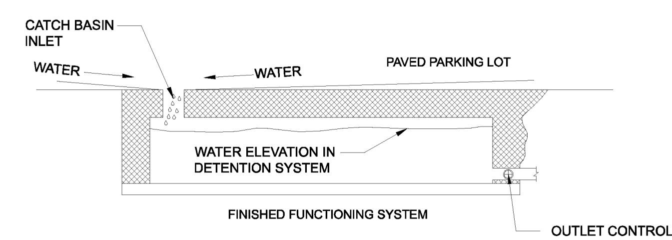


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

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CONTECH® CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
12847	19813	8/14/2022

DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1

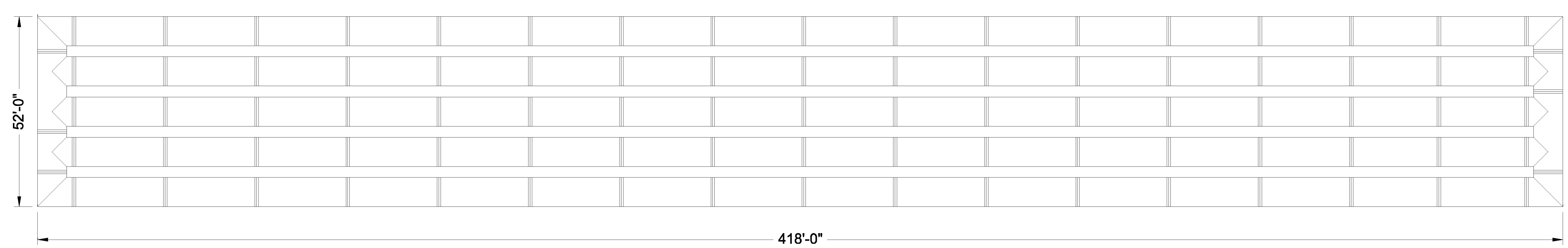
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,114 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 106,261 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 106,261 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 40'

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
13032	20080	8/9/2022

DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1

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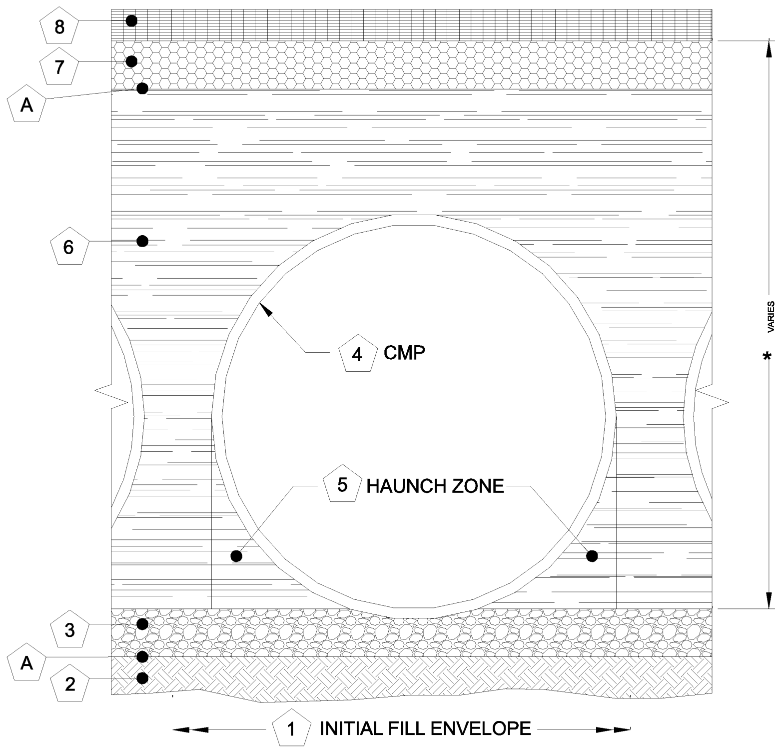


DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE

	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

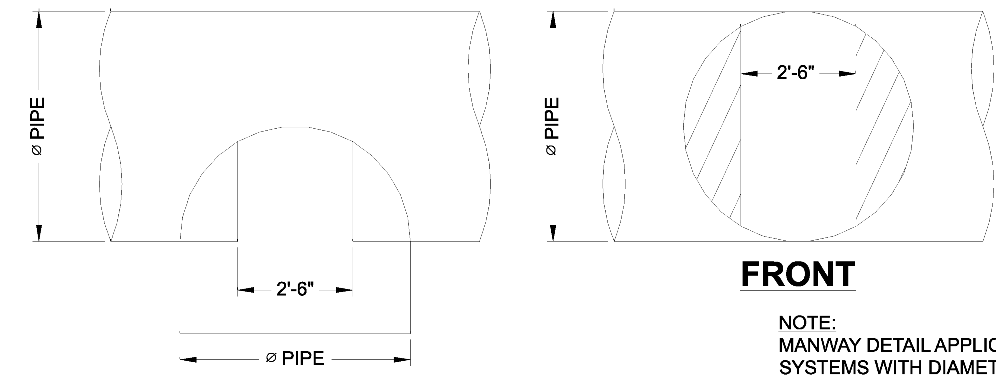
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



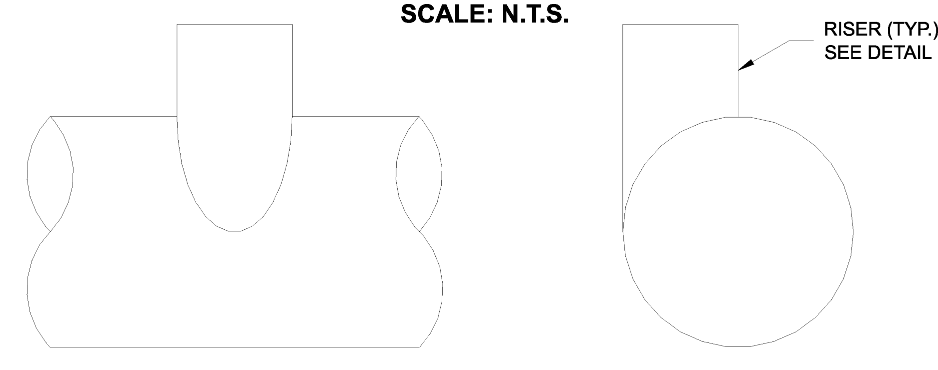
PLAN

FRONT

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



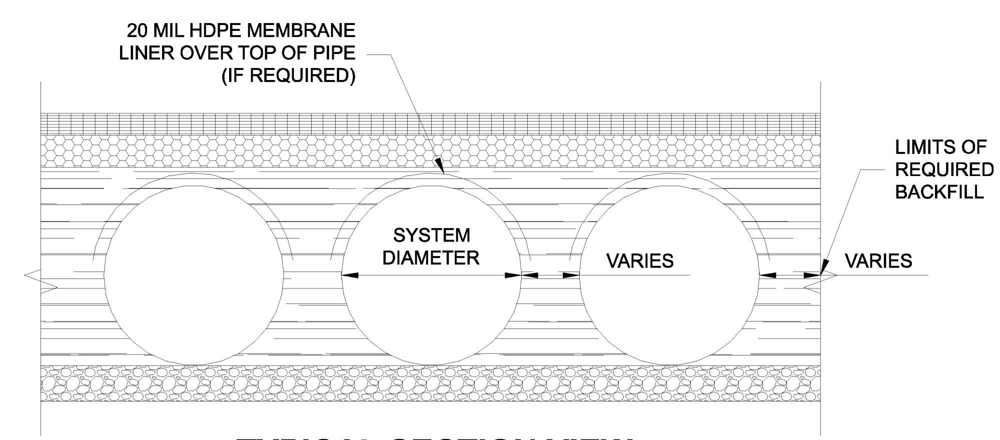
ELEVATION

END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

C:\EXPORTS\TEMPLATES\CMP_V8.DWG 10/18/2019 10:02 AM

DATE	REVISION DESCRIPTION	BY

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ENGINEERED SOLUTIONS LLC
www.ContechES.com
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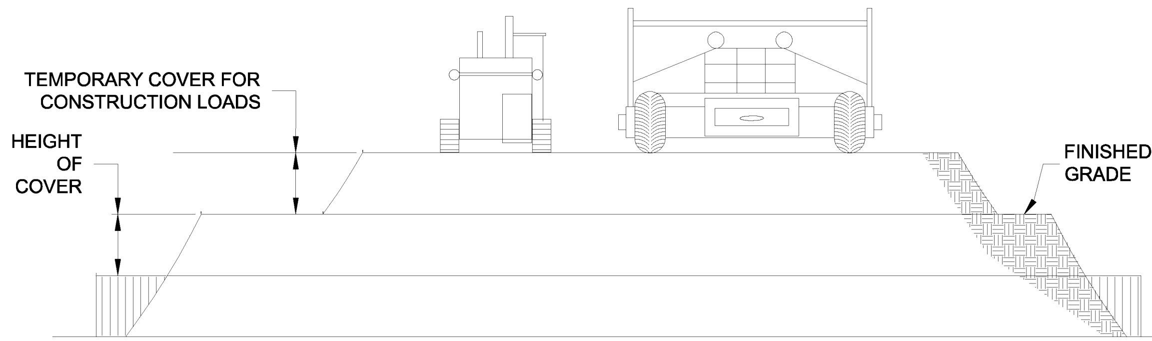
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH®
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.: 13032	SEQ. No.: 20080	DATE: 8/9/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.:		1



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

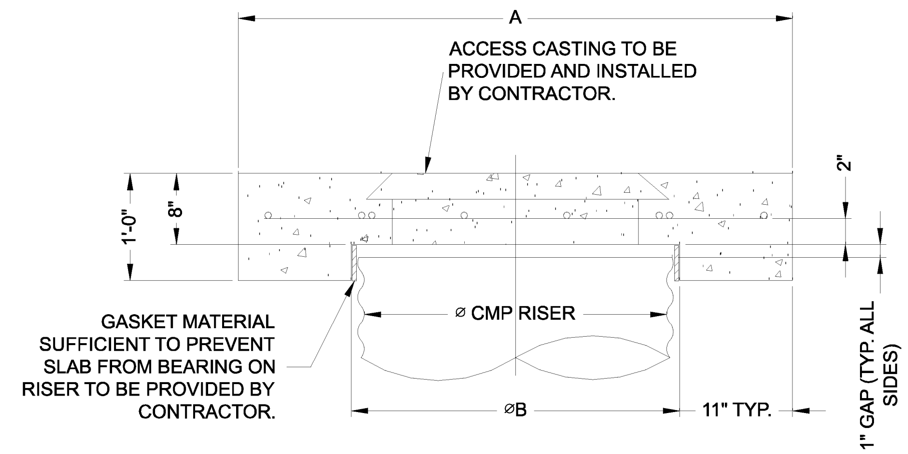
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

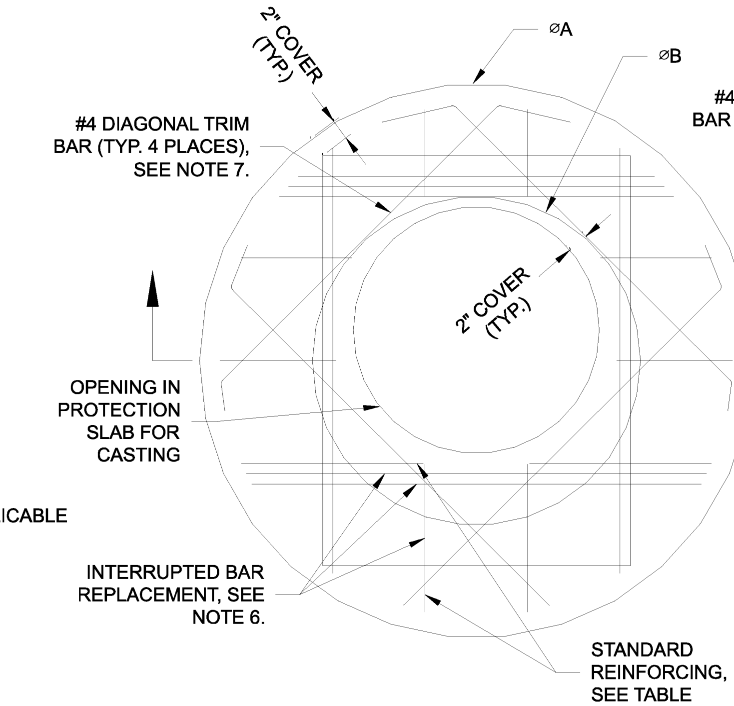


SECTION VIEW

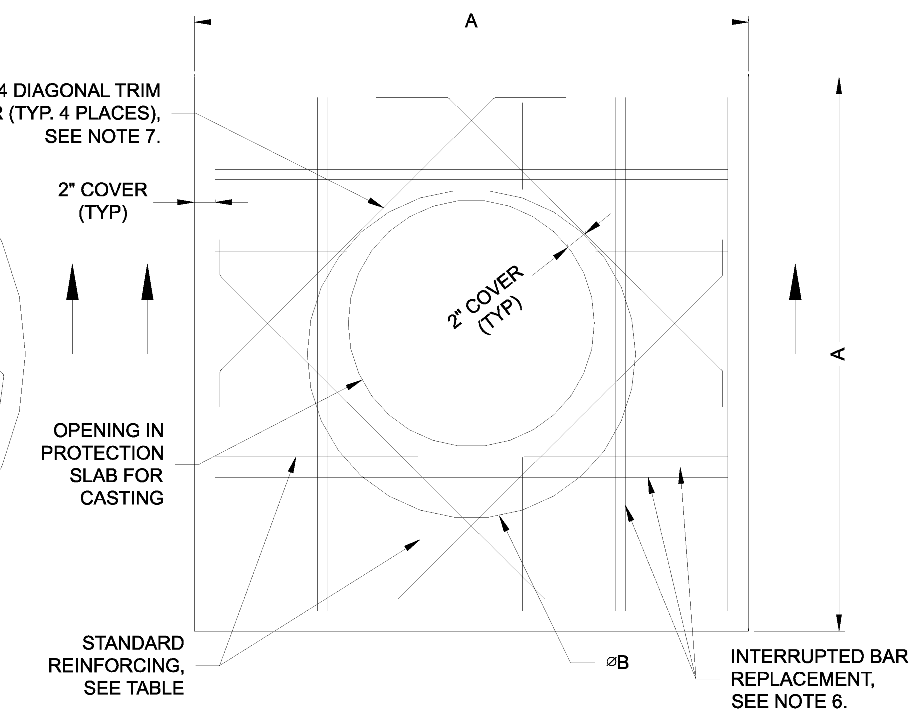
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
13032	20080	8/9/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

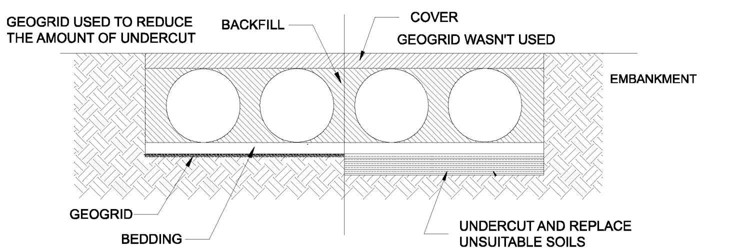
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

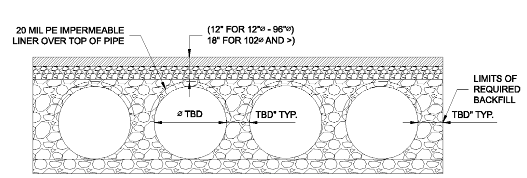


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

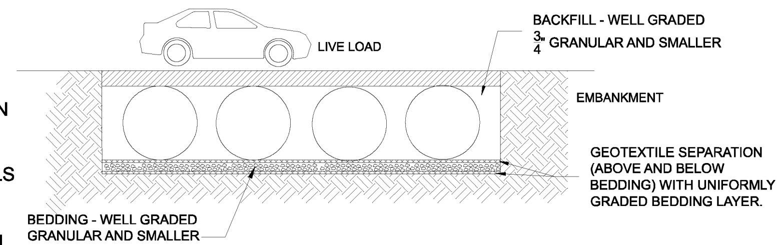
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

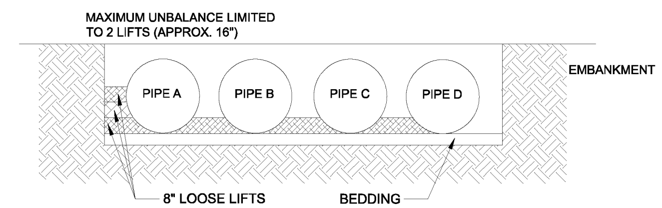
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



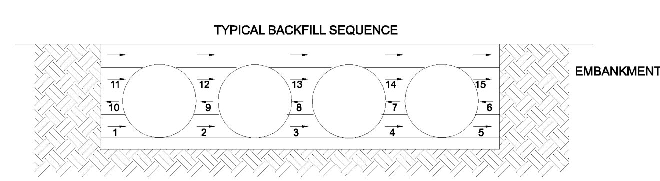
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

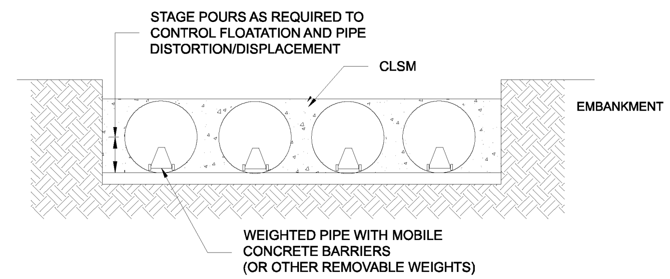


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

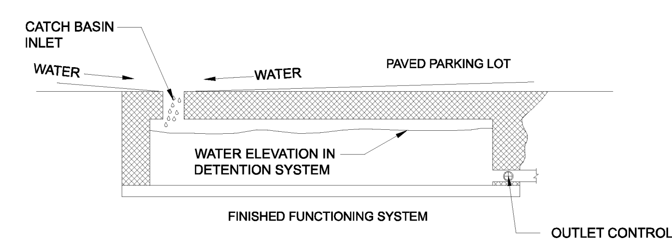


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

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CONTECH® CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.: 13032	SEQ. No.: 20080	DATE: 8/9/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #3 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 2

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- RETAINING WALL
- FENCE
- EDGE OF PAVEMENT
- SIGN
- MANHOLE
- RIGHT OF WAY
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- SCREEN WALL
- COMBINATION SCREEN/RETAINING WALL
- EXISTING LOT LINE
- RIDGE LINE
- RIBBON GUTTER
- FLOW ARROW
- PROPOSED EDGE OF PAVEMENT
- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING SWR LINE
- PROPOSED SEWER LINE
- EXISTING STORM DRAIN PIPE
- PROPOSED STORM DRAIN PIPE
- EXISTING OVERHEAD LINES
- CUT/FILL LINE
- SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-100-028, 305-170-018, 305-100-008, & 305-100-009

LEGAL DESCRIPTION

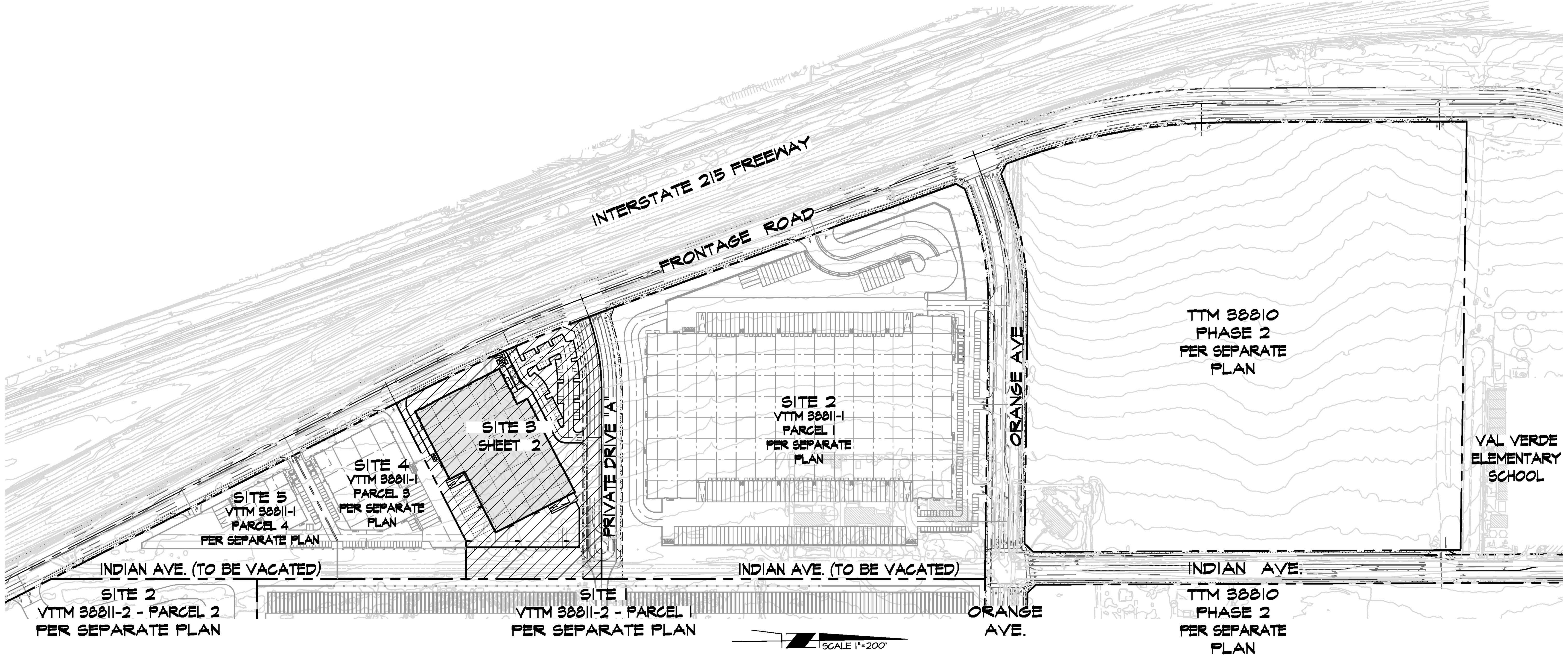
PARCELS 2-5:
(APNS:305-100-028, 305-170-018, 305-100-008, 305-100-009)

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 4 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, WHICH LIES EASTERLY OF STATE HIGHWAY 395 AS CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED APRIL 28, 1952 AS INSTRUMENT NO. 18008.

EXCEPTING THE NORTH 30 FEET IN ORANGE AVENUE, THE EAST 30 FEET IN INDIAN AVENUE AND THE SOUTH 30 FEET IN CITRUS AVENUE.

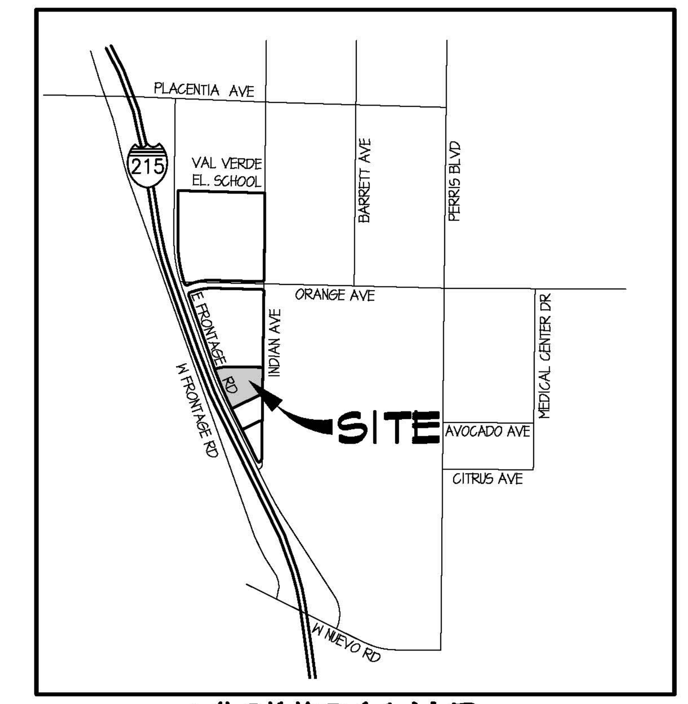
ALSO EXCEPTING THEREFROM THE PORTION DESCRIBED IN DEED RECORDED DECEMBER 21, 1965 AS INSTRUMENT NO. 142400 AND IN DEED RECORDED MARCH 13, 1969 AS INSTRUMENT NO. 24345, RECORDS OF RIVERSIDE COUNTY.

ALSO EXCEPTING THEREFROM THOSE PORTIONS CONVEYED TO THE STATE OF CALIFORNIA BY DEEDS RECORDED MARCH 22, 1992, AS INSTRUMENT NOS. 94602 AND 94603.



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

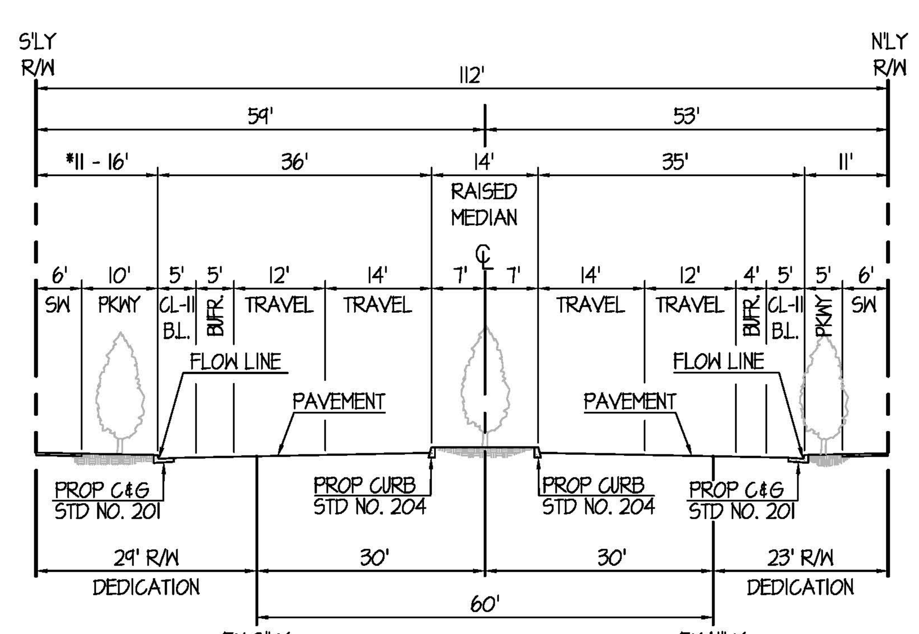
ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

EARTHWORK ESTIMATE:

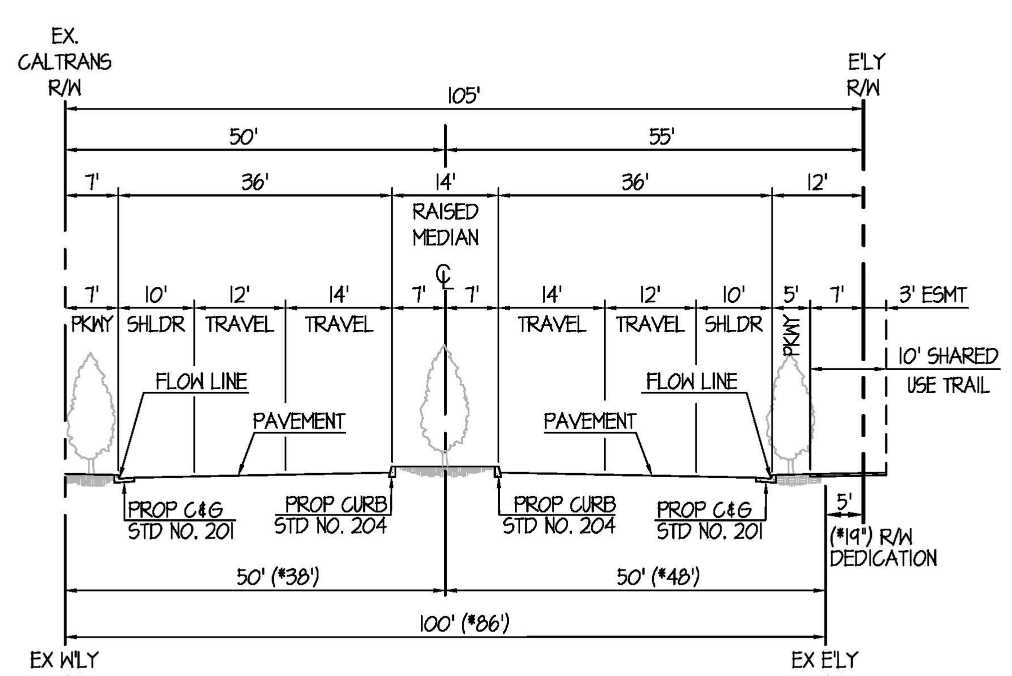
RAW CUT:	640 CY	
RAW FILL:	18,850 CY	
NET:	18,210 CY	IMPORT

HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 1,401



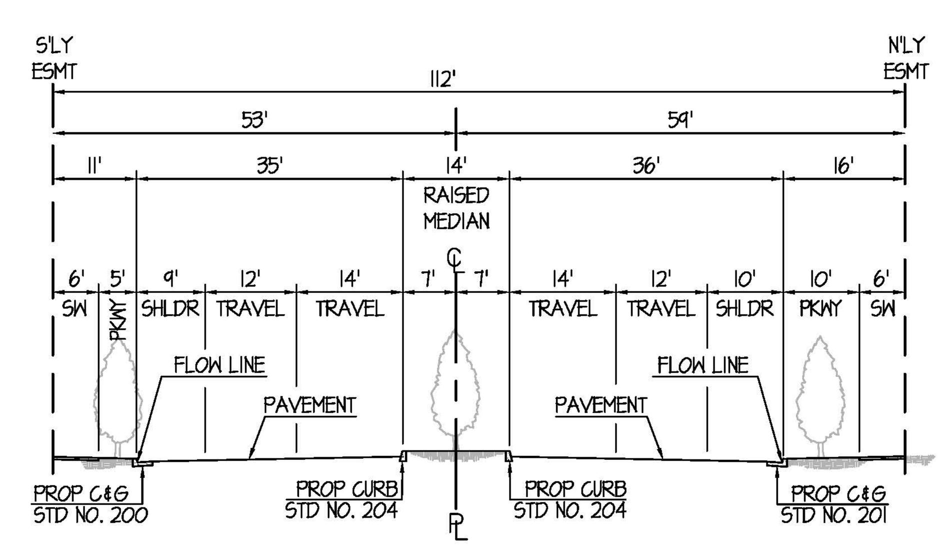
* PROPOSED 11' MINIMUM DIMENSIONS FOR ALL RIGHT TURN POCKETS AT INTERSECTIONS

ORANGE AVENUE
(WEST OF BARRETT AVE)
SECONDARY ARTERIAL
(112'/85')



*EXIST. DIMENSIONS FOR FRONTAGE SOUTH OF ORANGE AVE.

FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')



PRIVATE DRIVE "A"
SECONDARY ARTERIAL
(112'/85')

CITY OF PERRIS

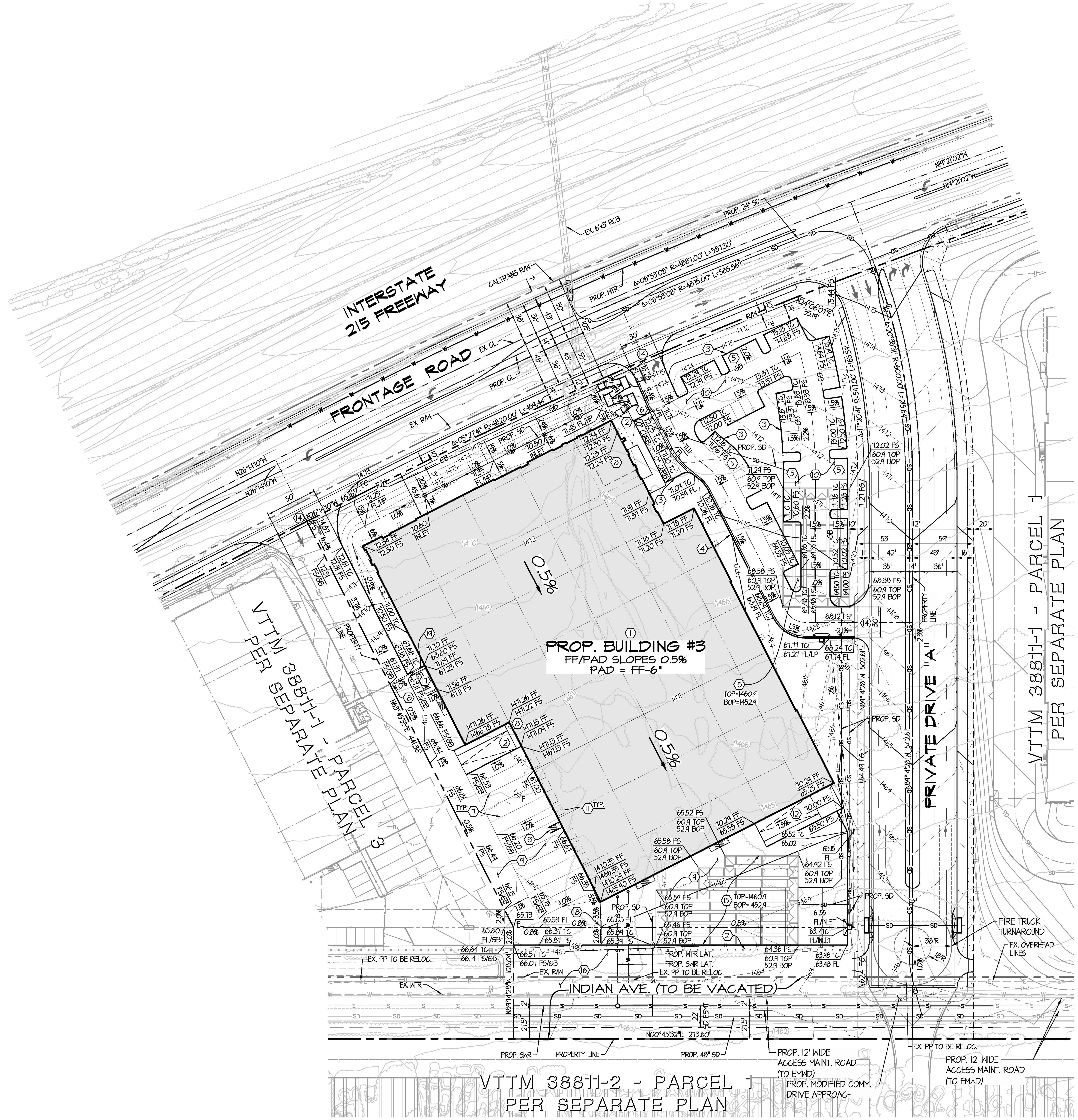
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #3 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 2

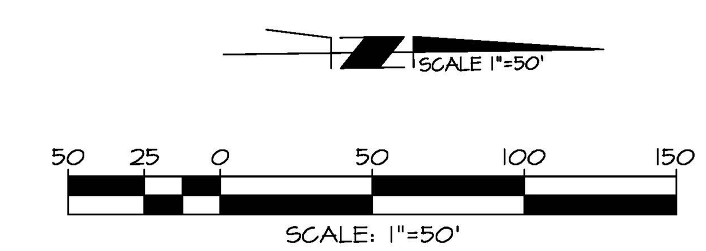
SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 1 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-3\20-001-CUP_BLDG3-CG-01.DWG JASON STOUFFER 10/10/2024 3:33 PM





SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
20. CONCRETE RIBBON GUTTER/SWALE

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #3 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 2

SCALE:	AS SHOWN
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SHEET 2 OF 2 SHEETS

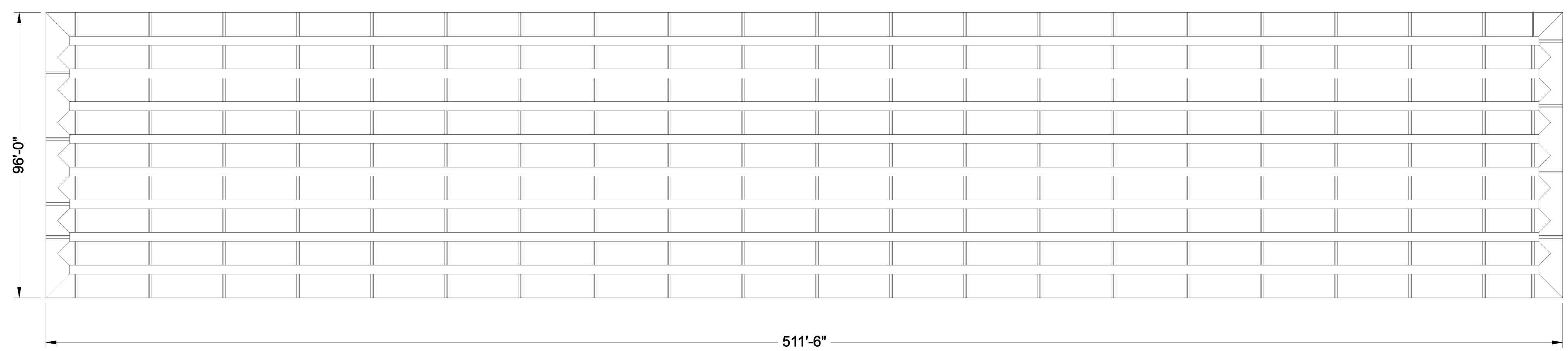
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 4,651 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 233,785 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 233,785 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 50'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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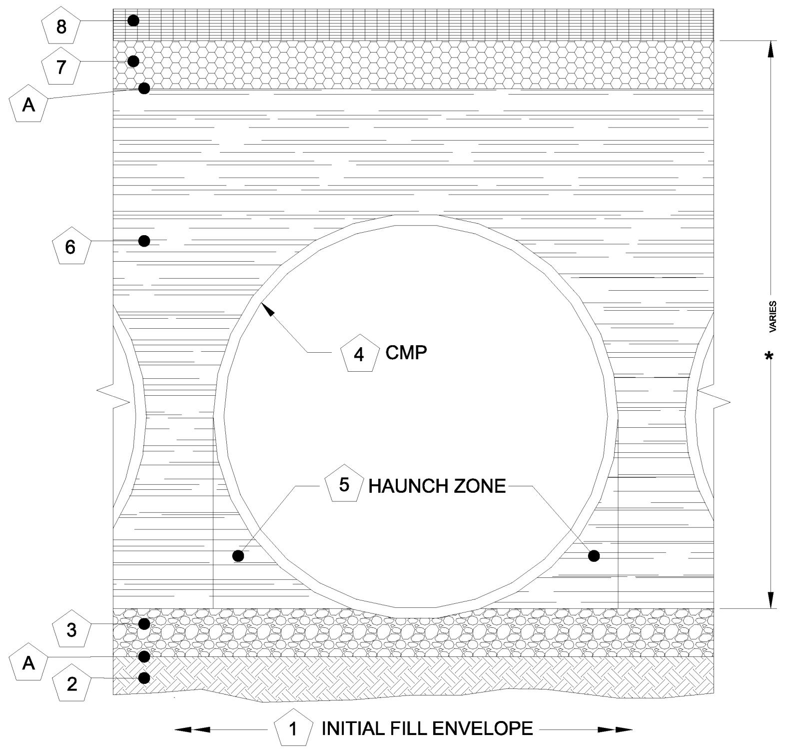
CONTECH®
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12847	SEQ. No.: 19813	DATE: 8/14/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.:		1



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE

	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

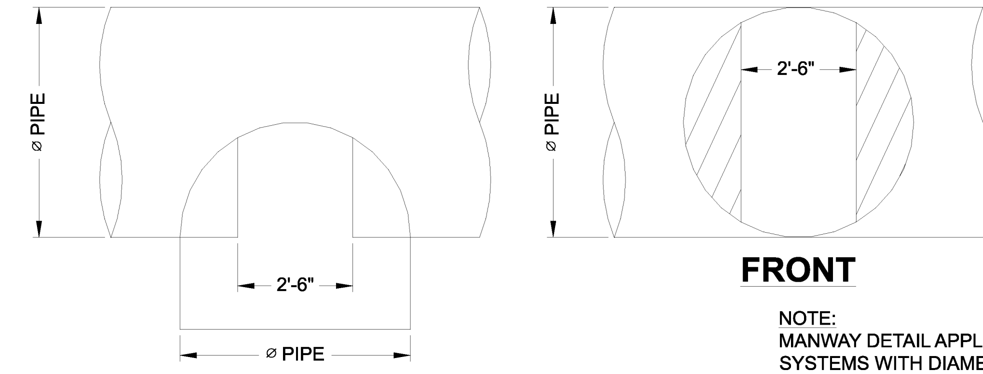
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.

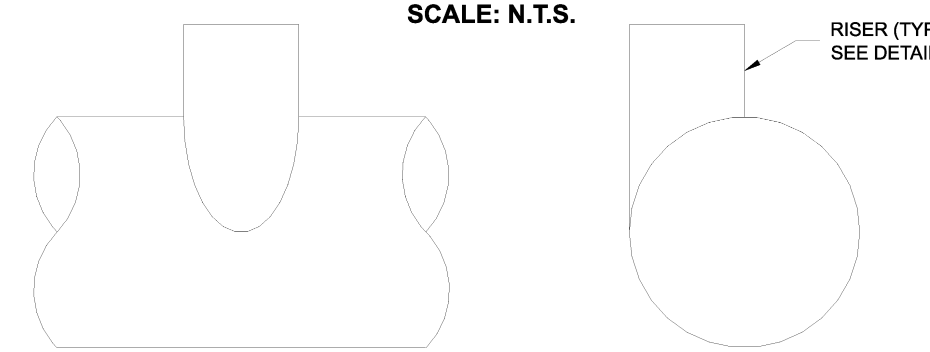


PLAN **FRONT**

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.

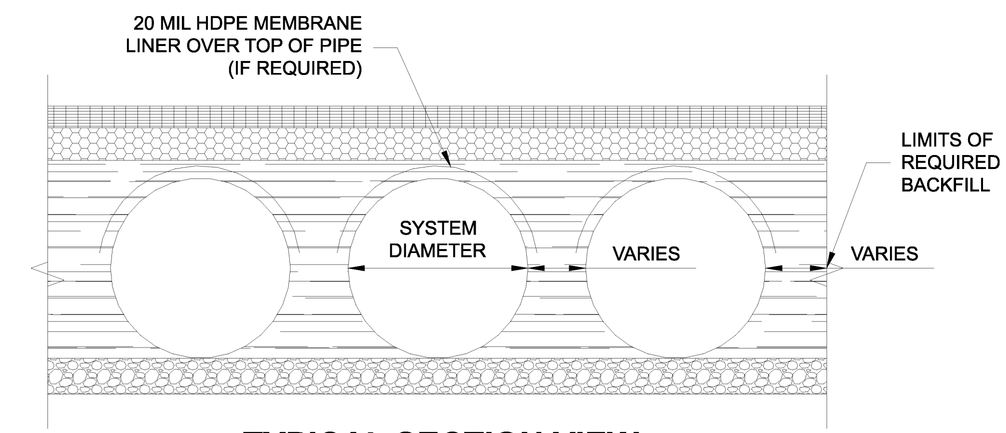


ELEVATION **END**

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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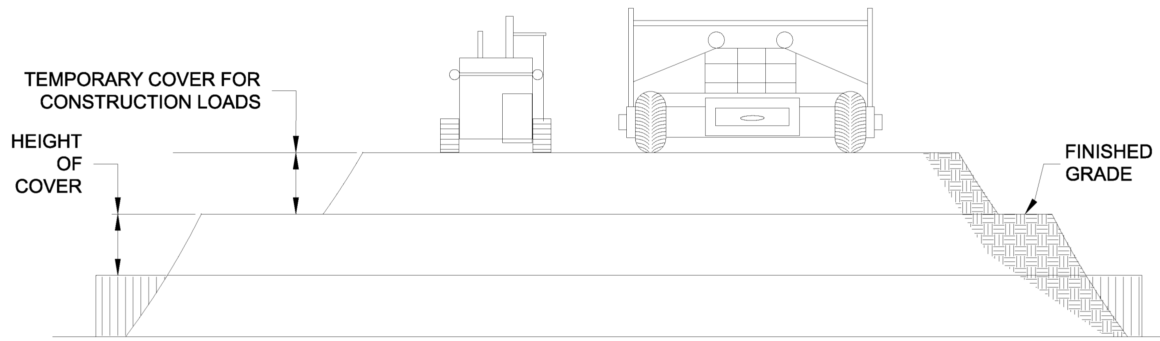
CONTECH CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
12847	19813	8/14/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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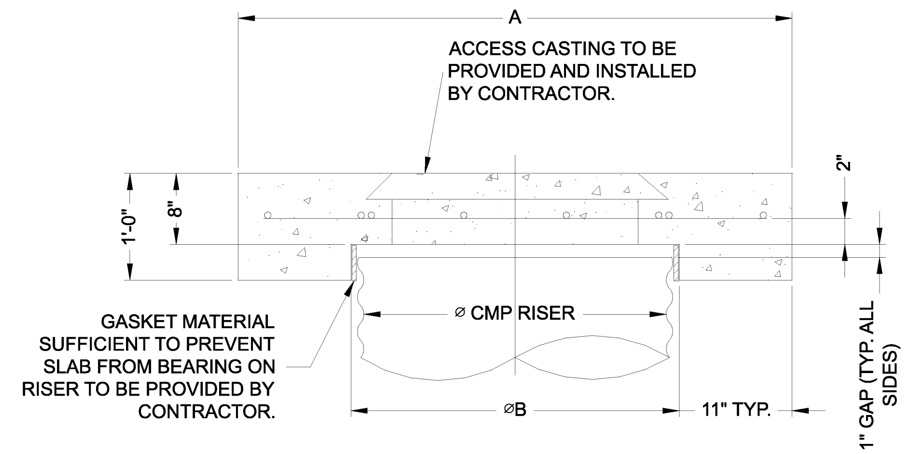
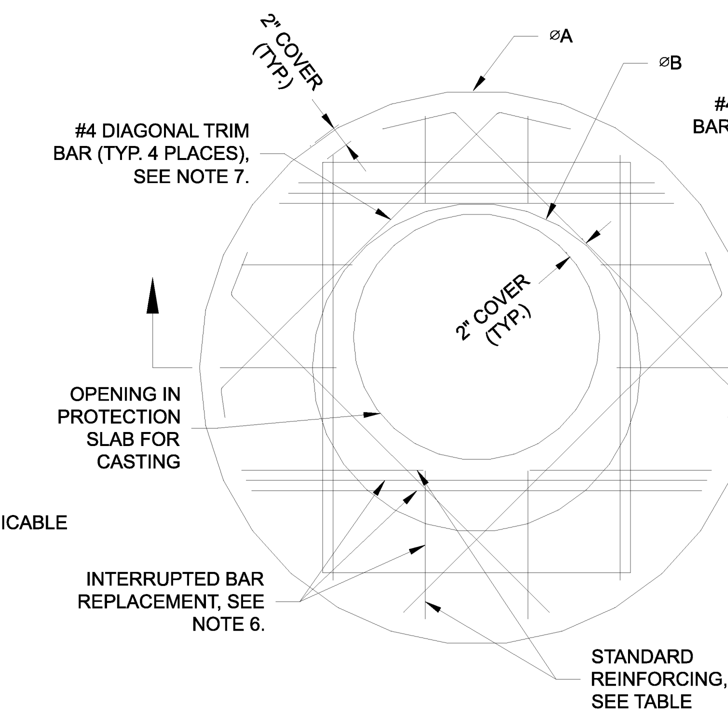


SECTION VIEW

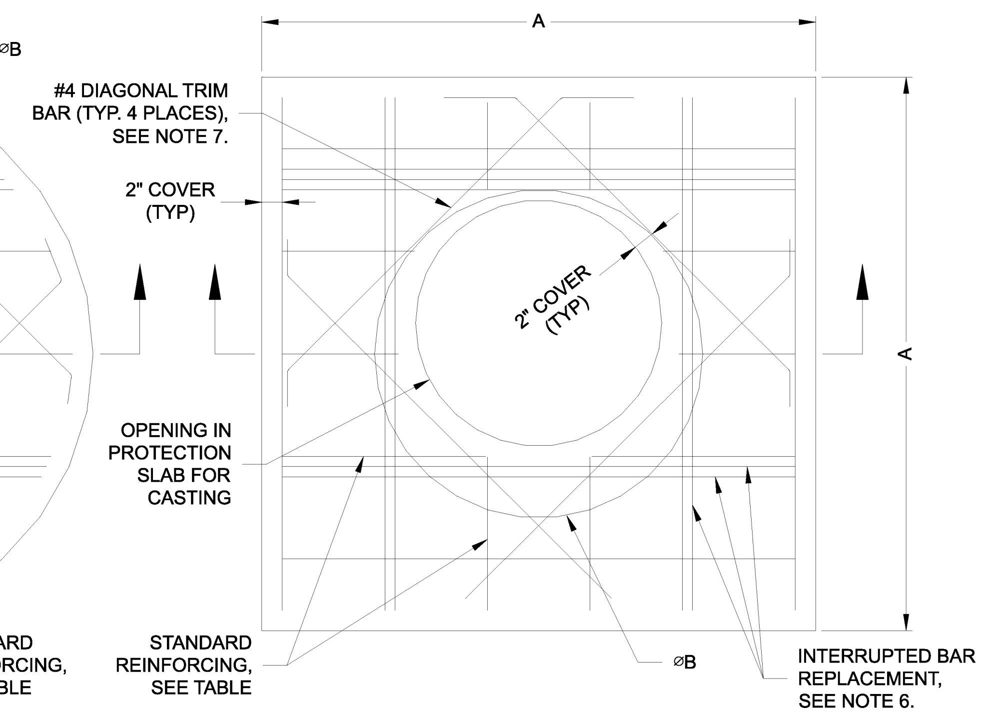
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
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DETENTION SYSTEM

PROJECT No.: 12847	SEQ. No.: 19813	DATE: 8/14/2022
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SHEET NO.: 1		

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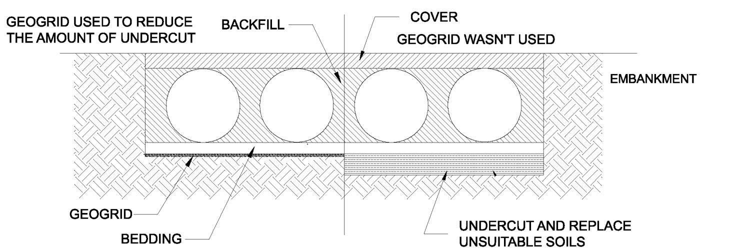
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

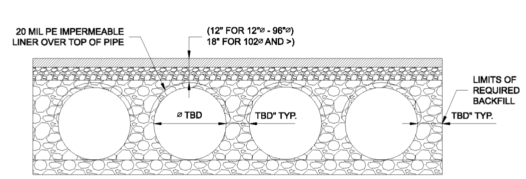


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

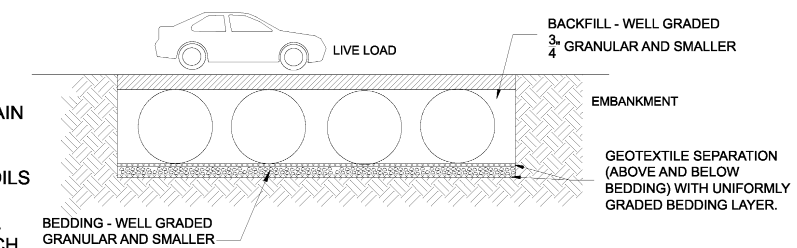
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

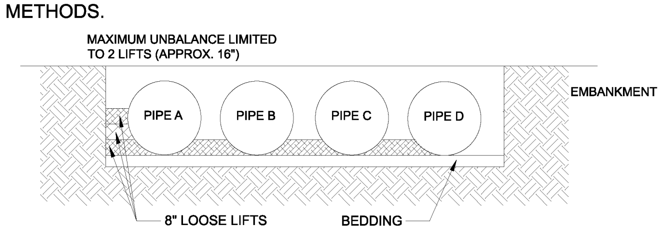
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

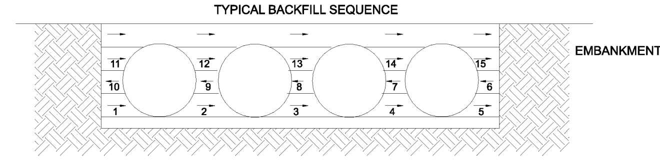
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



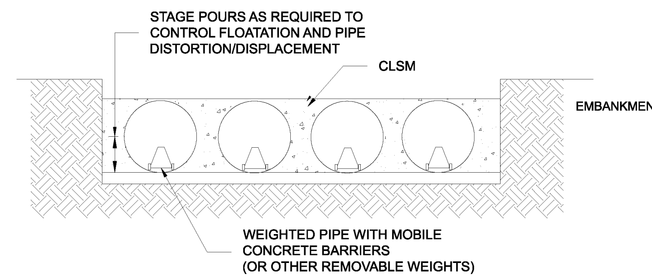
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

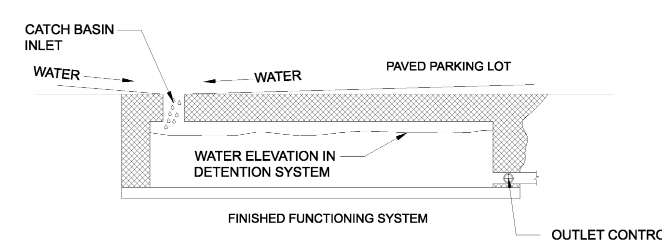


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO19813 20-001 Harvest Landing Site 2
Easterly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
12847	19813	8/14/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

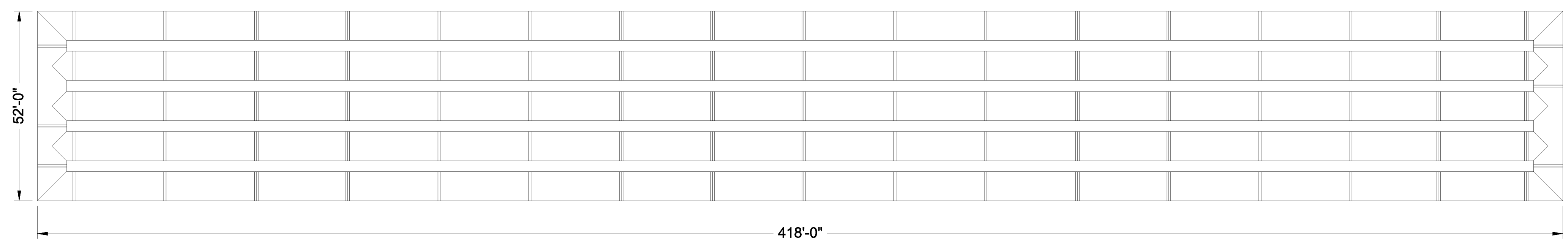
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,114 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 106,261 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 106,261 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 40'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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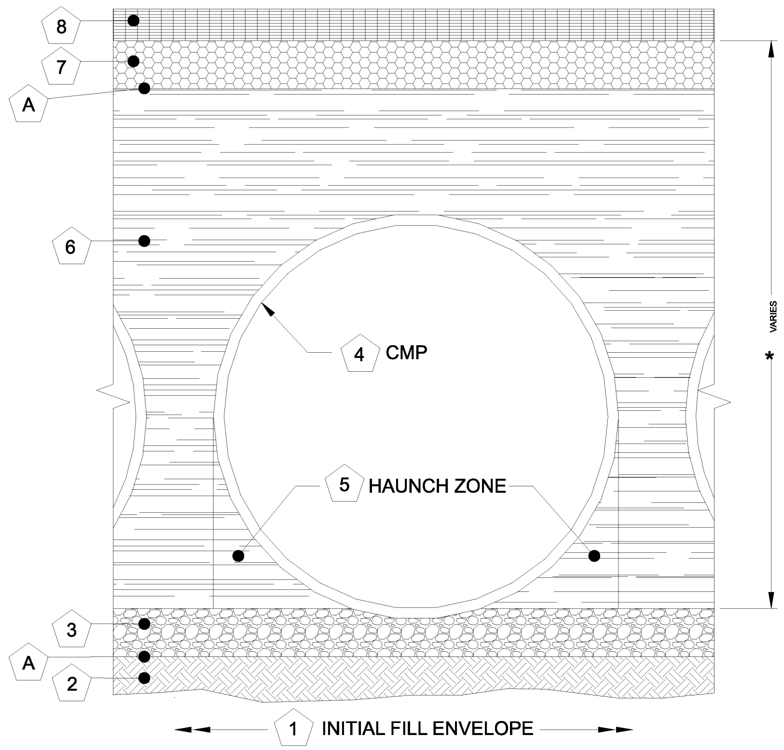
CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
13032	20080	8/9/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE				
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

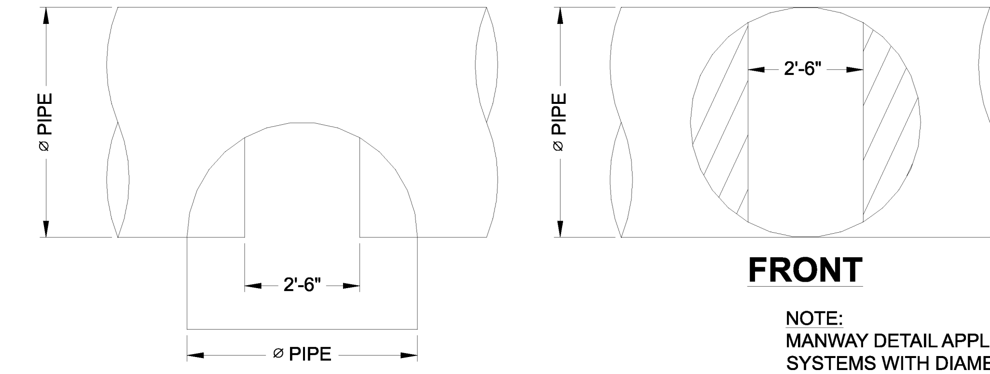
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



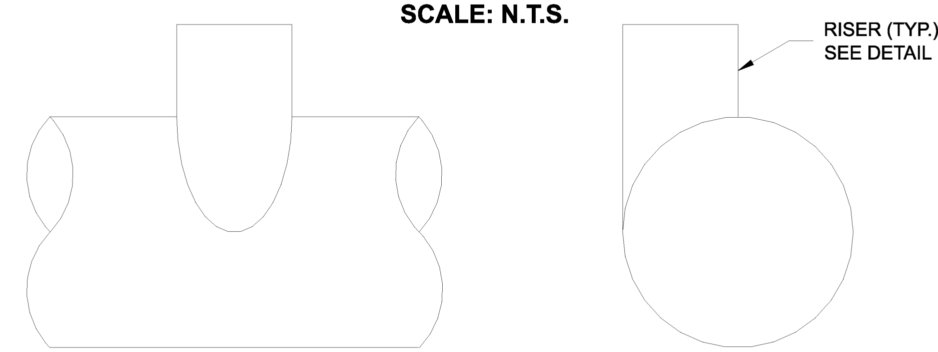
PLAN

FRONT

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



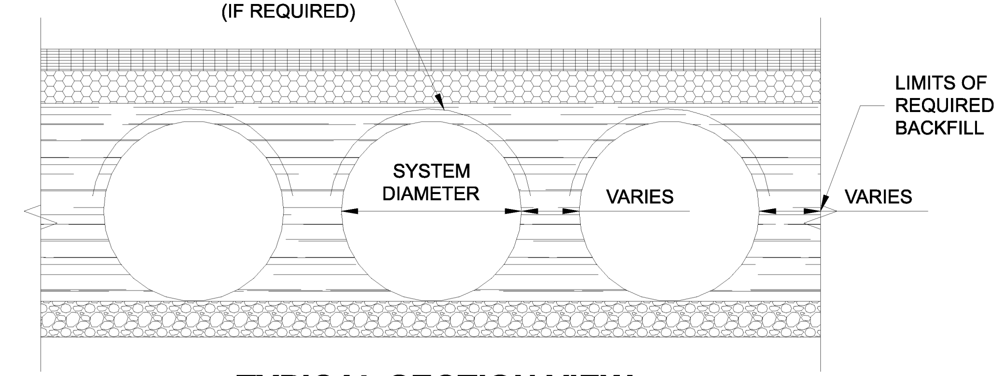
ELEVATION

END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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DYO20080 20-001 Harvest Landing Site 2
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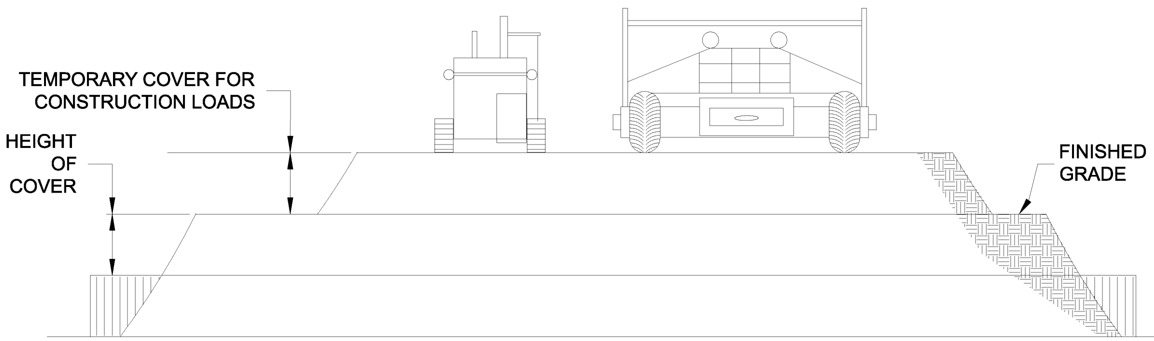


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

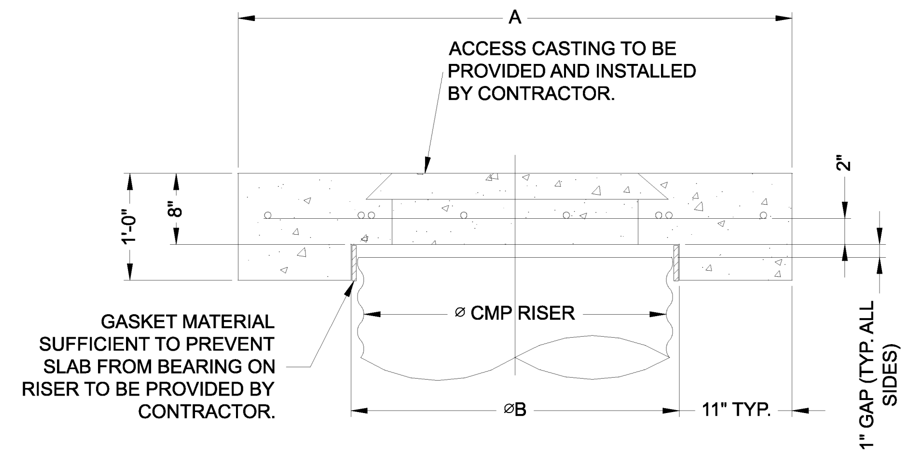
POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

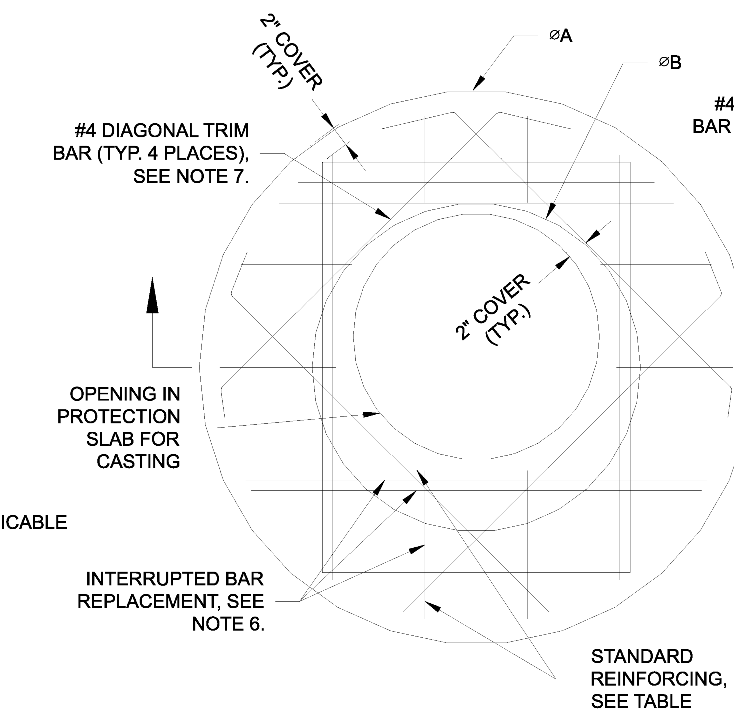


SECTION VIEW

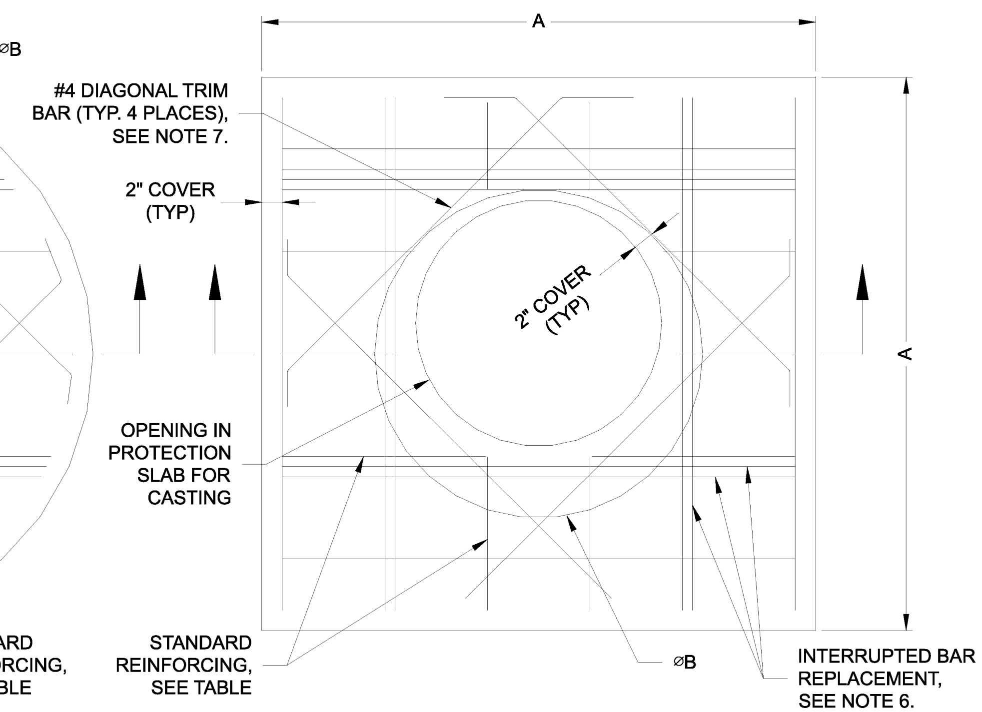
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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CONTECH® CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.: 13032	SEQ. No.: 20080	DATE: 8/9/2022
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SHEET NO.: 1		

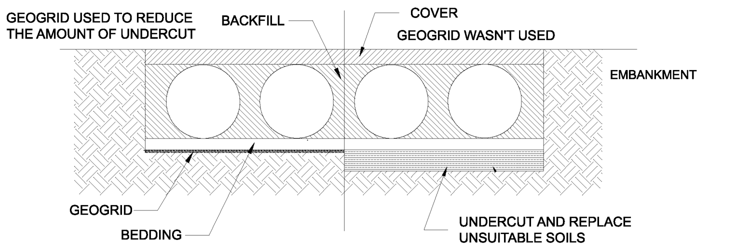
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

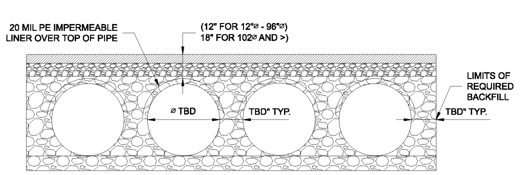


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

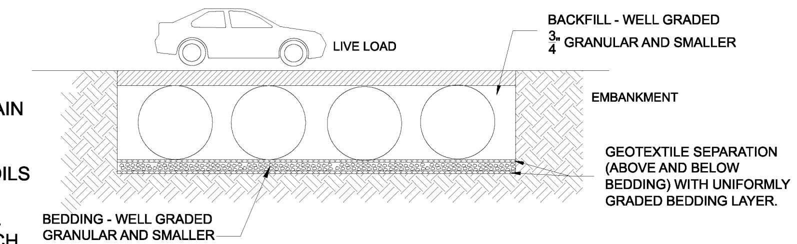
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

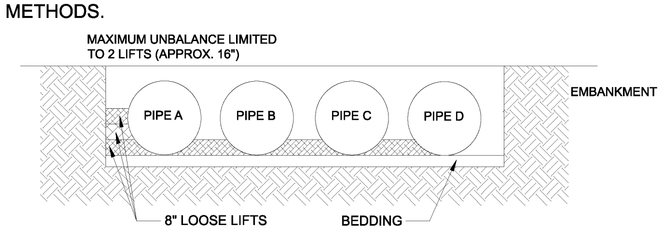
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

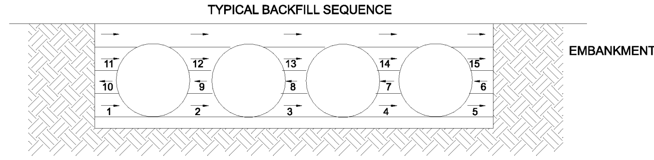
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



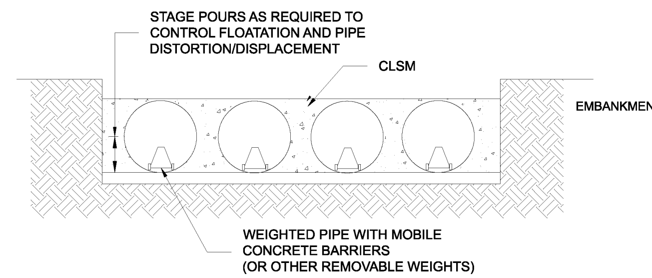
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

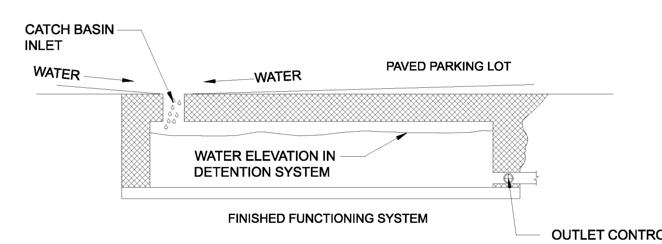


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

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CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO20080 20-001 Harvest Landing Site 2
Westerly System
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
13032	20080	8/9/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #4 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 3

LEGEND

(1025)	EXISTING CONTOUR
1025	PROPOSED CONTOUR
	RETAINING WALL
	FENCE
	EDGE OF PAVEMENT
	SIGN
MH	MANHOLE
	RIGHT OF WAY
	EASEMENT
	PARCEL LINE
	PARCEL MAP BOUNDARY
	STREET CENTER LINE
	SCREEN WALL
	COMBINATION SCREEN/RETAINING WALL
	EXISTING LOT LINE
	RIDGE LINE
	RIBBON GUTTER
	FLOW ARROW
	PROPOSED EDGE OF PAVEMENT
W	EXISTING WATER LINE
W	PROPOSED WATER LINE
SS	EXISTING SWR LINE
SS	PROPOSED SEWER LINE
SD	EXISTING STORM DRAIN PIPE
SD	PROPOSED STORM DRAIN PIPE
E	EXISTING OVERHEAD LINES
	CUT/FILL LINE
Y	SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-100-028, 305-170-018, 305-100-008, & 305-100-009

LEGAL DESCRIPTION

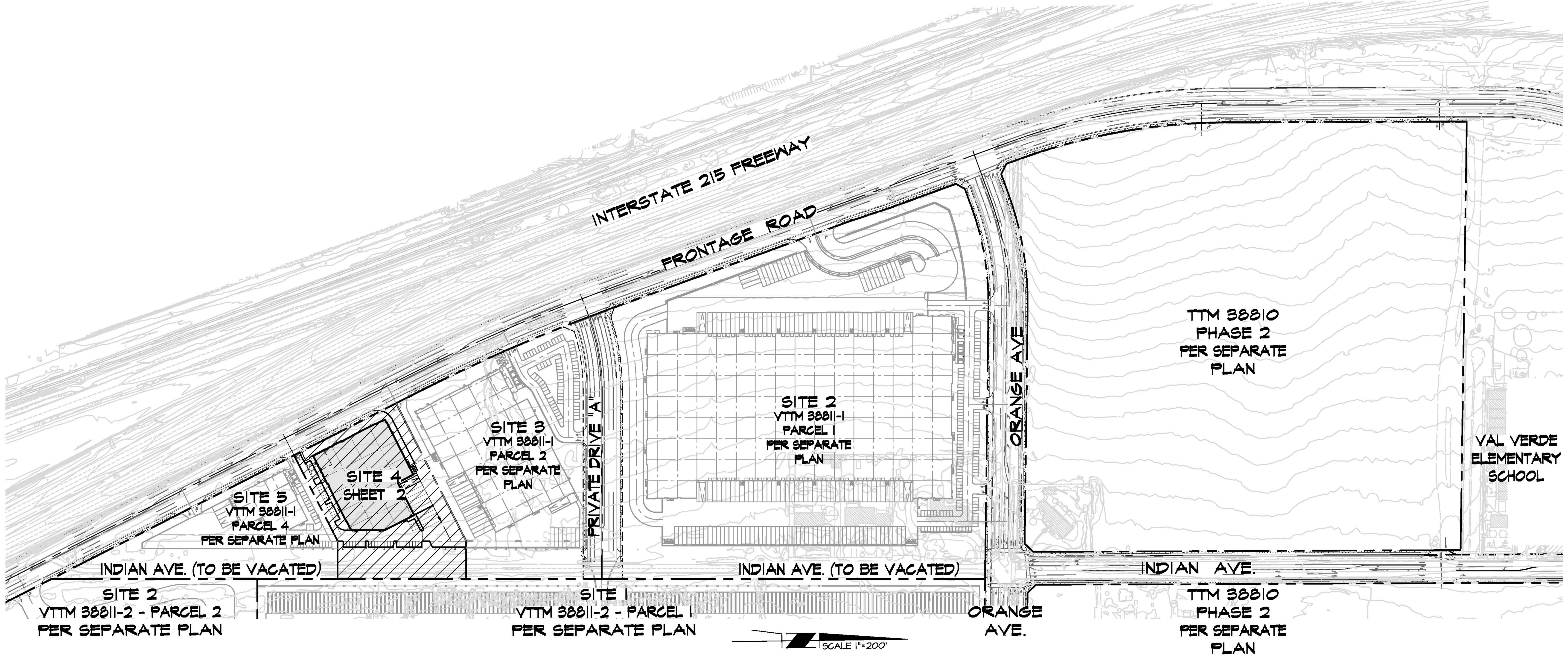
PARCELS 2-5:
(APNS:305-100-028, 305-170-018, 305-100-008, 305-100-009)

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 4 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, WHICH LIES EASTERLY OF STATE HIGHWAY 395 AS CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED APRIL 28, 1952 AS INSTRUMENT NO. 18008.

EXCEPTING THE NORTH 30 FEET IN ORANGE AVENUE, THE EAST 30 FEET IN INDIAN AVENUE AND THE SOUTH 30 FEET IN CITRUS AVENUE.

ALSO EXCEPTING THEREFROM THE PORTION DESCRIBED IN DEED RECORDED DECEMBER 21, 1965 AS INSTRUMENT NO. 142400 AND IN DEED RECORDED MARCH 13, 1964 AS INSTRUMENT NO. 24345, RECORDS OF RIVERSIDE COUNTY.

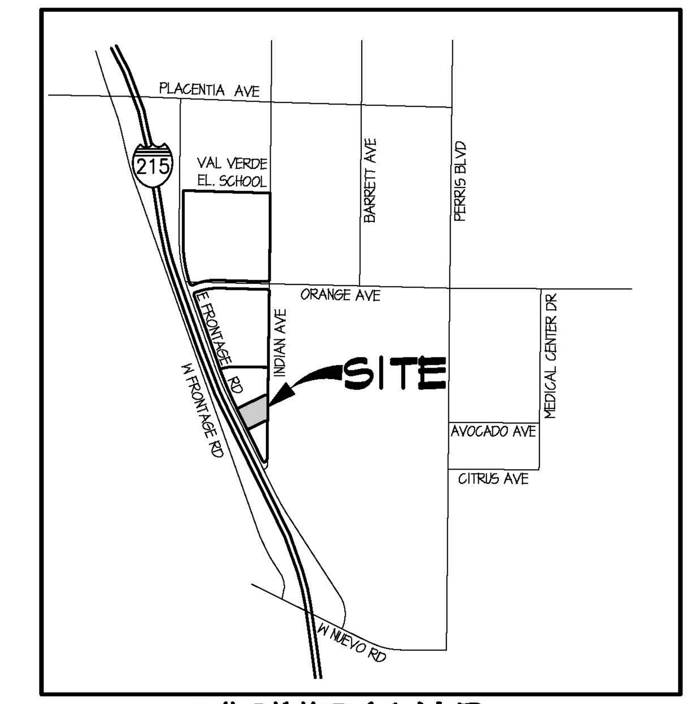
ALSO EXCEPTING THEREFROM THOSE PORTIONS CONVEYED TO THE STATE OF CALIFORNIA BY DEEDS RECORDED MARCH 22, 1912, AS INSTRUMENT NOS. 94602 AND 94603.



INDEX MAP

200 100 0 200 400 600

SCALE: 1"=200'



VICINITY MAP

T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

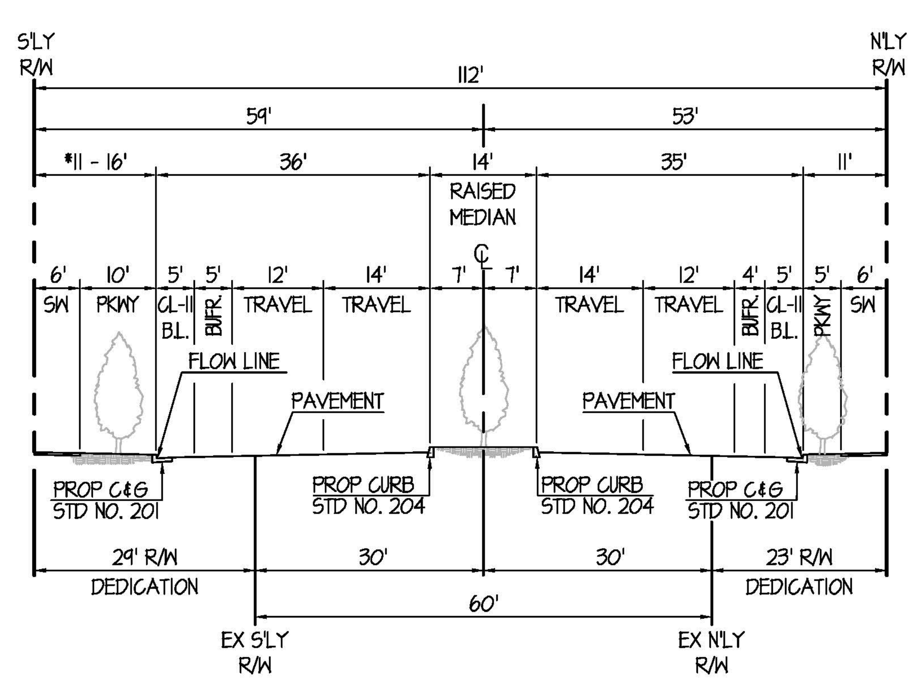
ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

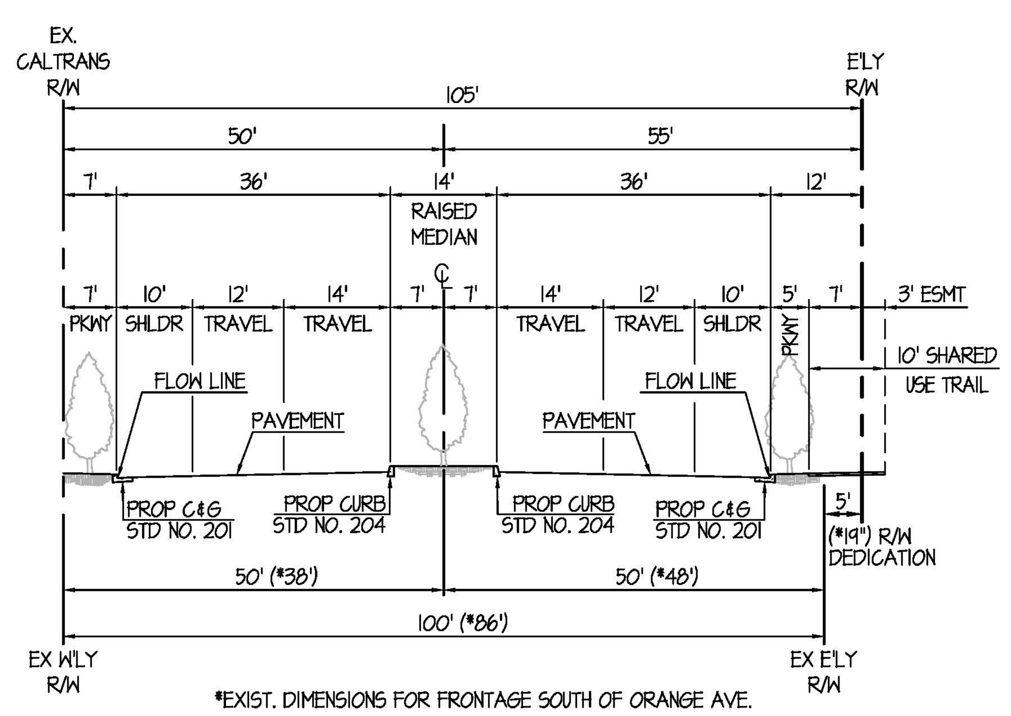
EARTHWORK ESTIMATE:

RAW CUT:	440 CY	
RAW FILL:	11,840 CY	
NET:	11,400 CY	IMPORT

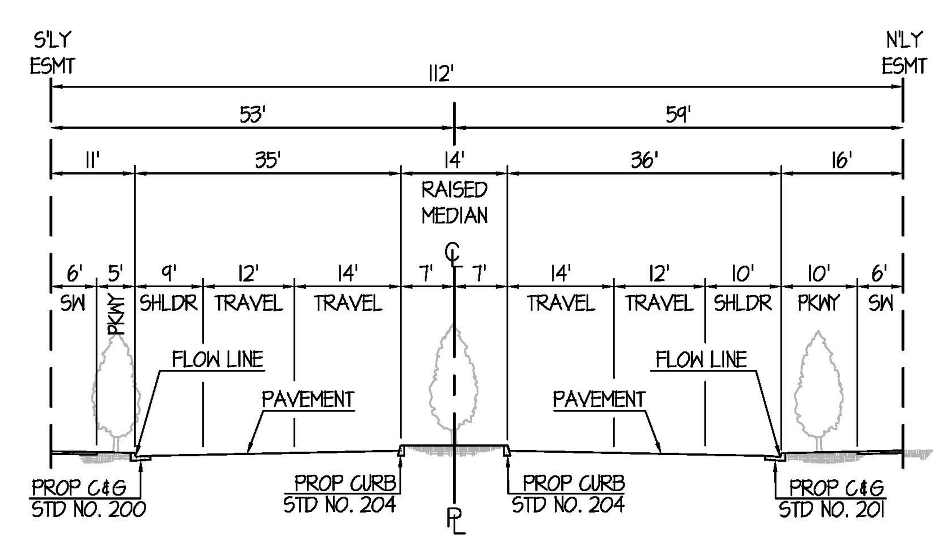
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 877



ORANGE AVENUE
(WEST OF BARRETT AVE)
SECONDARY ARTERIAL
(112'/85')



FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')



PRIVATE DRIVE "A"
SECONDARY ARTERIAL
(112'/85')

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #4 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 3

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

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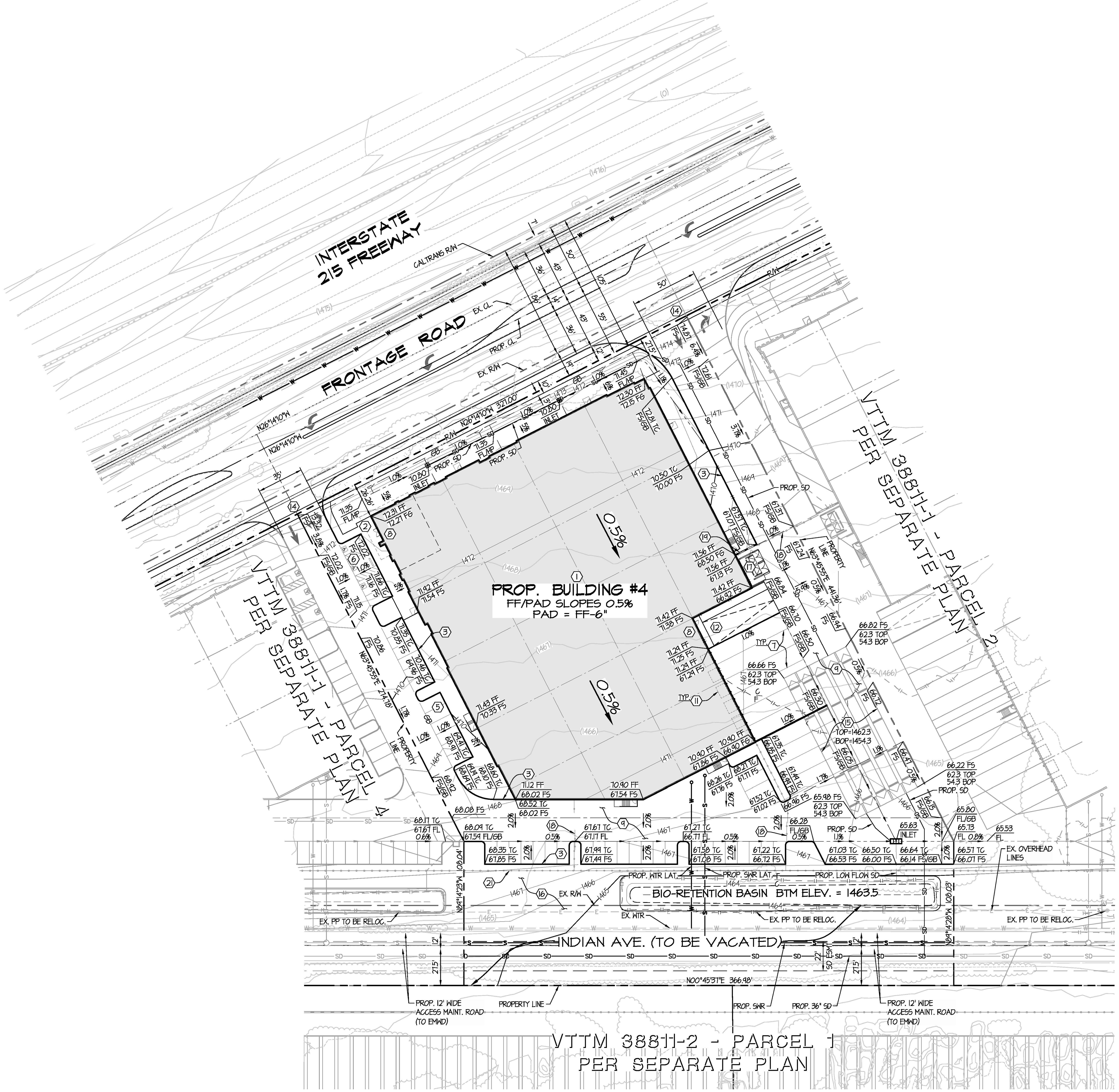
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM



SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
20. CONCRETE RIBBON GUTTER/SWALE
21. CHAIN LINK FENCE PER ARCHITECT'S PLANS

SCALE 1"=40'

40 20 0 40 80 120

SCALE: 1"=40'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #4 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 3

SCALE:	AS SHOWN
DATE:	OCT. 2024
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951.973.0202 - FMCIVIL.COM

SHEET 2 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-4\20-001-CUP_BLDG4-CG-01.DWG JASON STOUFFER 10/10/2024 3:36 PM

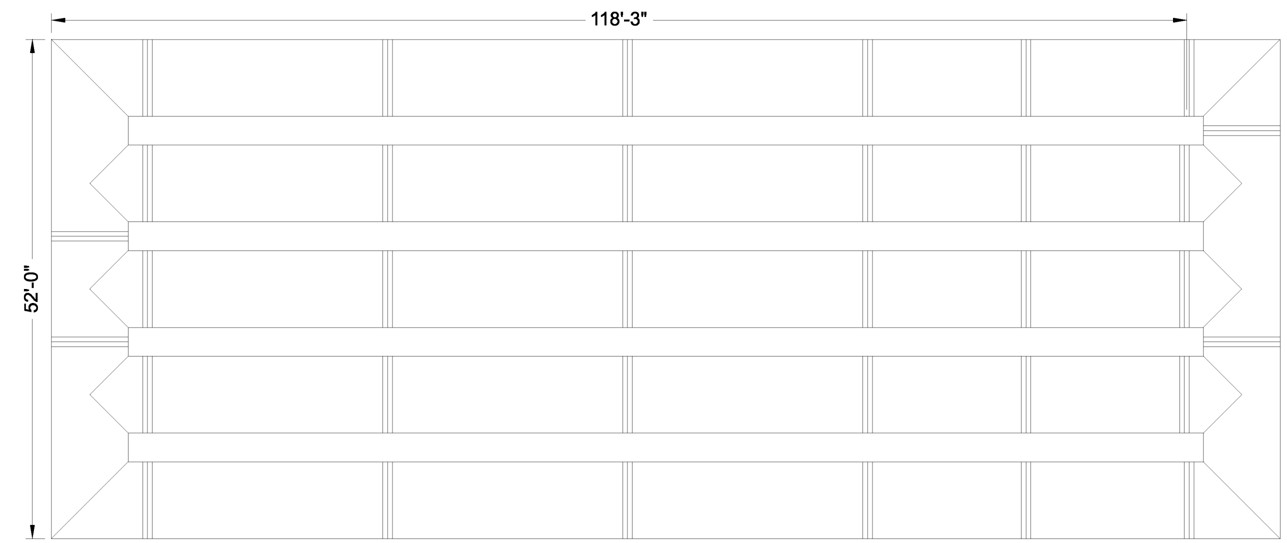
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 664 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 33,376 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 33,376 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 20'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

DATE	REVISION DESCRIPTION	BY

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CONTECH®
CMP DETENTION SYSTEMS

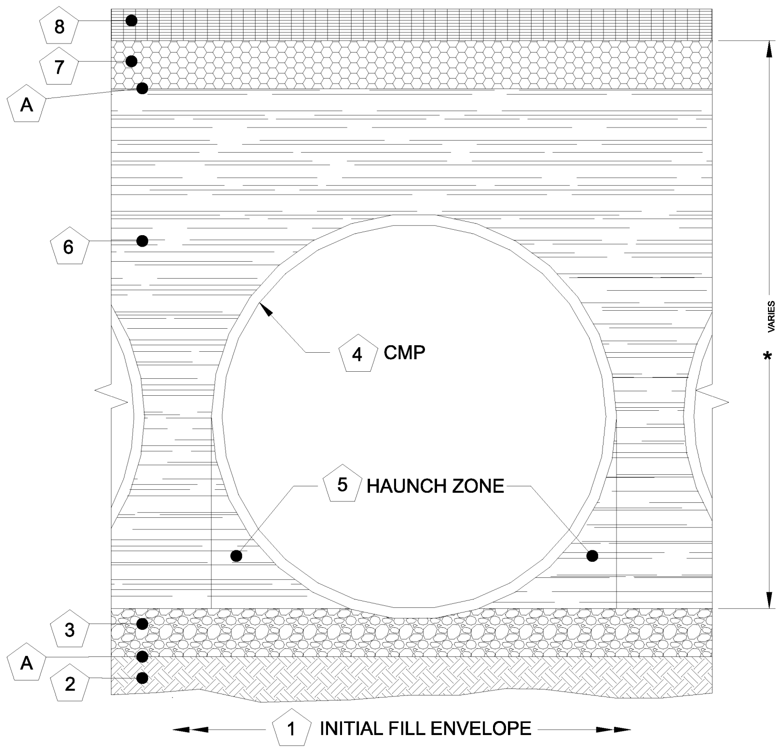
CONTECH
DYODS
DRAWING

DYO19778 20-001 Harvest Landing Site 4
Site 4 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
12820	19778	8/2/2022

DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1



	DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

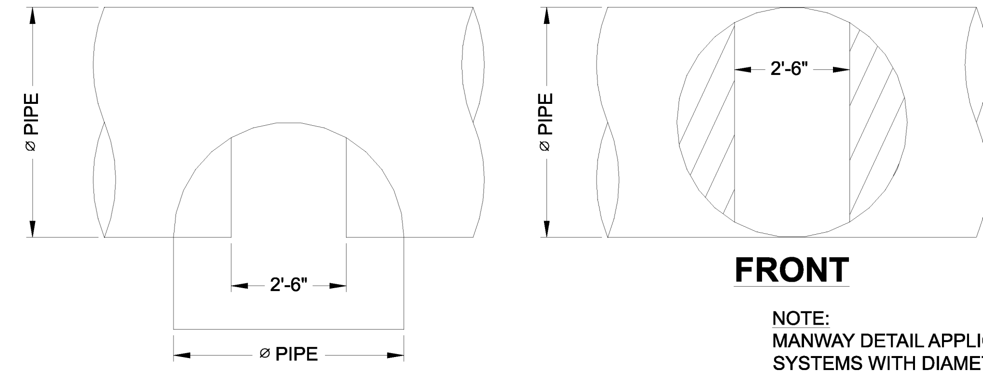
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



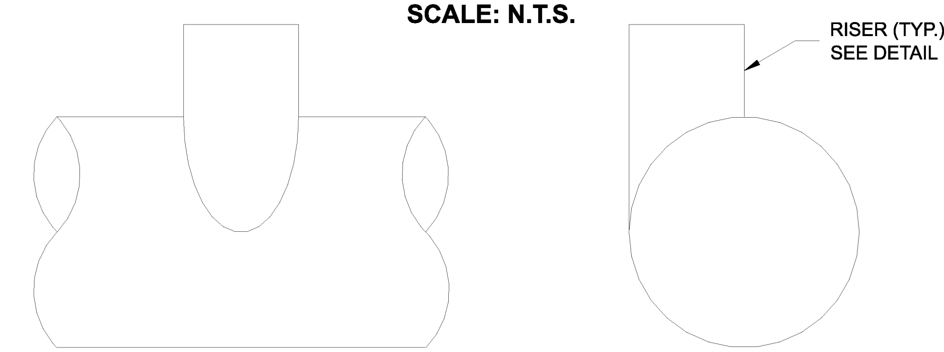
PLAN

FRONT

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



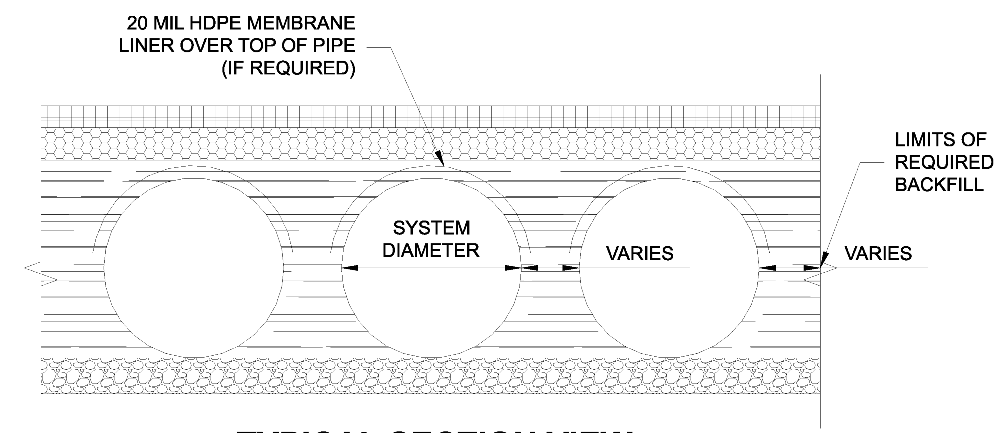
ELEVATION

END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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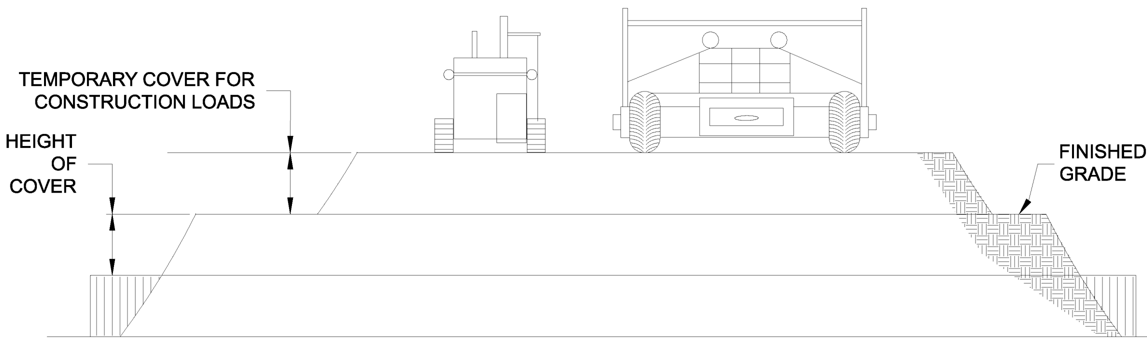
CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO19778 20-001 Harvest Landing Site 4
Site 4 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12820	SEQ. No.: 19778	DATE: 8/2/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

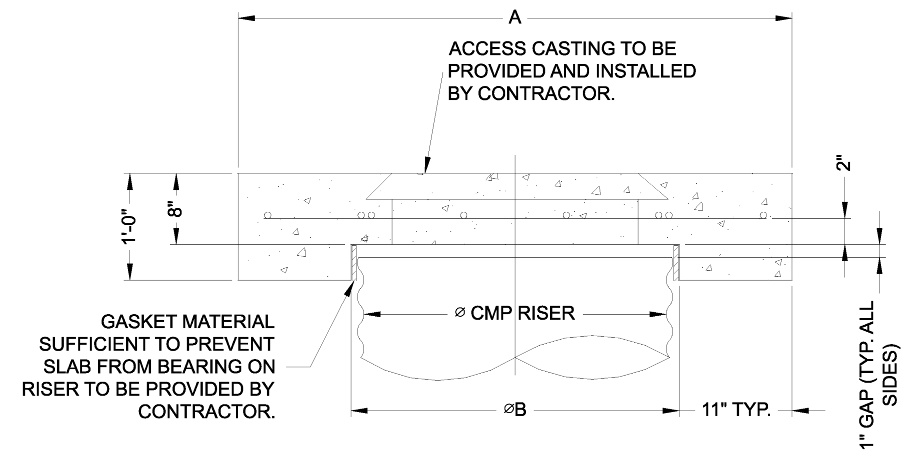
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

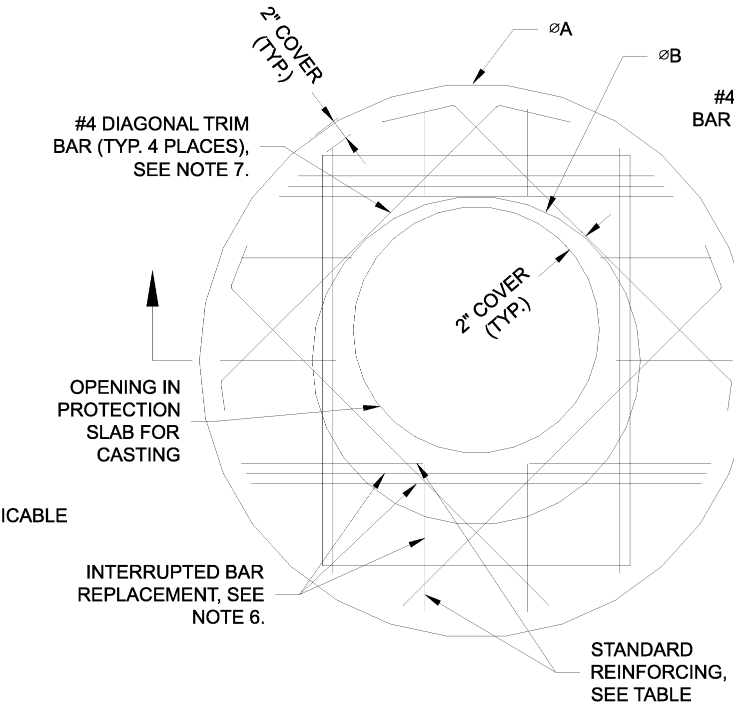


SECTION VIEW

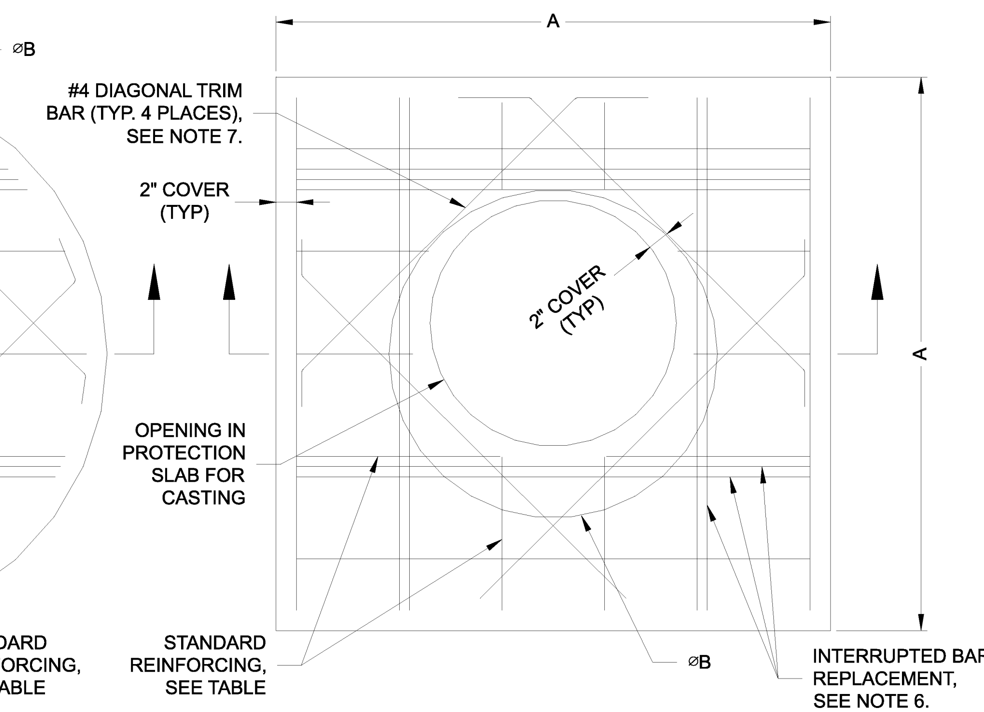
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO19778 20-001 Harvest Landing Site 4
Site 4 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12820	SEQ. No.: 19778	DATE: 8/2/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.:		1

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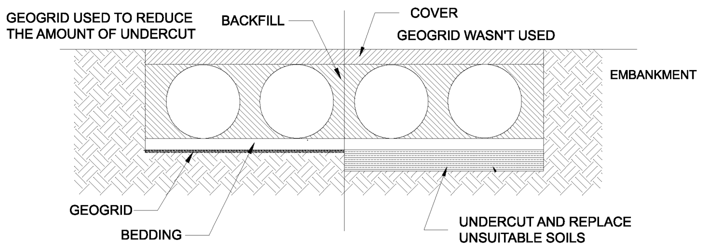
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

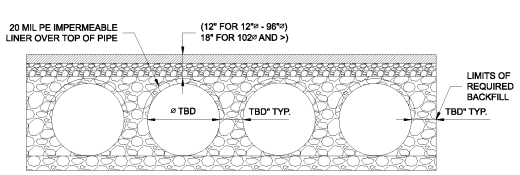


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

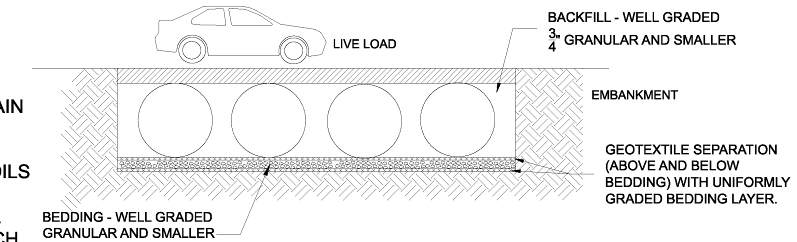
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

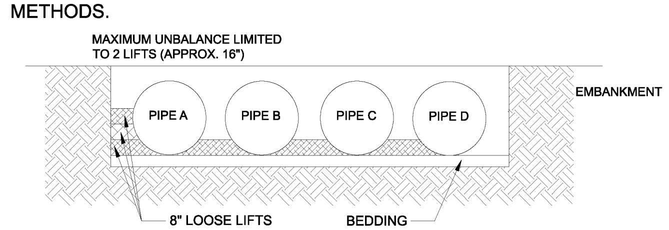
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

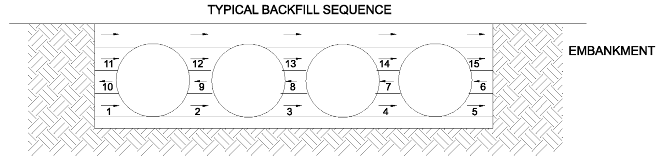
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



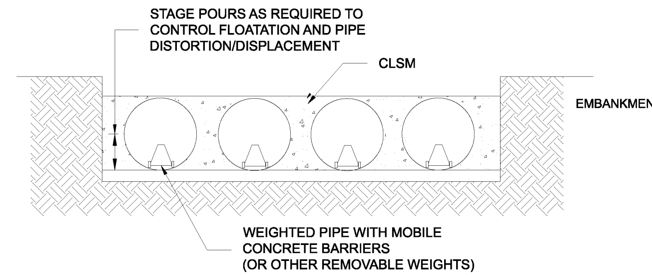
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

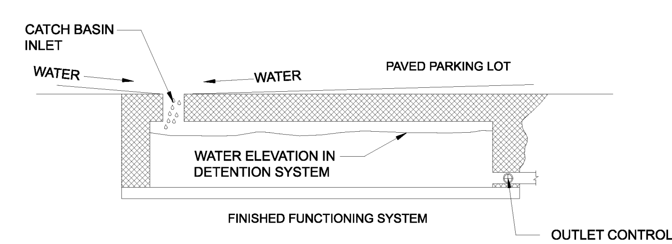


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO19778 20-001 Harvest Landing Site 4
Site 4 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12820	SEQ. No.: 19778	DATE: 8/2/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.:		1

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK SITE #5 CONCEPTUAL GRADING & DRAINAGE PLAN

VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 4

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- RETAINING WALL
- FENCE
- EDGE OF PAVEMENT
- SIGN
- MANHOLE
- RIGHT OF WAY
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- SCREEN WALL
- COMBINATION SCREEN/RETAINING WALL
- EXISTING LOT LINE
- RIDGE LINE
- RIBBON GUTTER
- FLOW ARROW
- PROPOSED EDGE OF PAVEMENT
- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING SWR LINE
- PROPOSED SEWER LINE
- EXISTING STORM DRAIN PIPE
- PROPOSED STORM DRAIN PIPE
- EXISTING OVERHEAD LINES
- CUT/FILL LINE
- SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-100-028, 305-170-018, 305-100-008, & 305-100-009

LEGAL DESCRIPTION

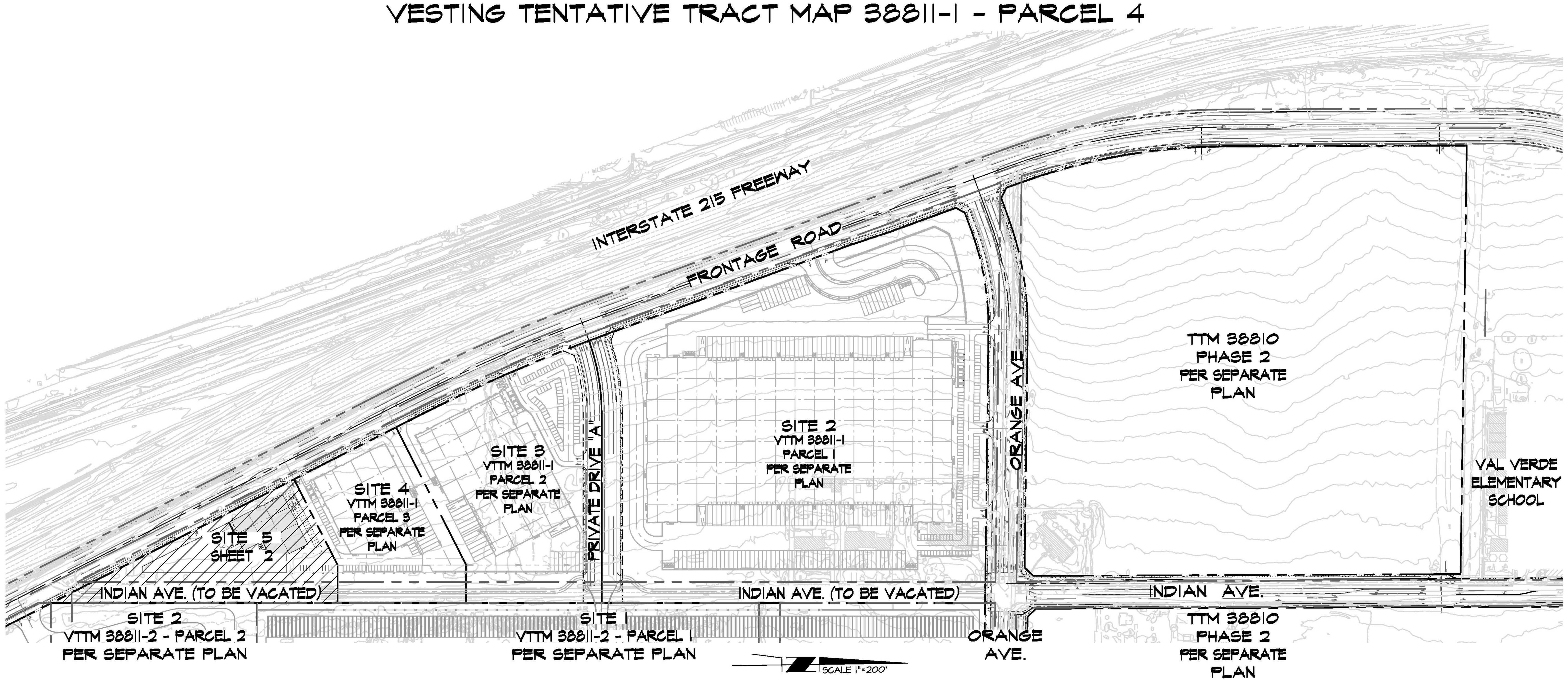
PARCELS 2-5:
(APNS:305-100-028, 305-170-018, 305-100-008, 305-100-009)

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 4 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, WHICH LIES EASTERLY OF STATE HIGHWAY 395 AS CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED APRIL 28, 1952 AS INSTRUMENT NO. 18008.

EXCEPTING THE NORTH 30 FEET IN ORANGE AVENUE, THE EAST 30 FEET IN INDIAN AVENUE AND THE SOUTH 30 FEET IN CITRUS AVENUE.

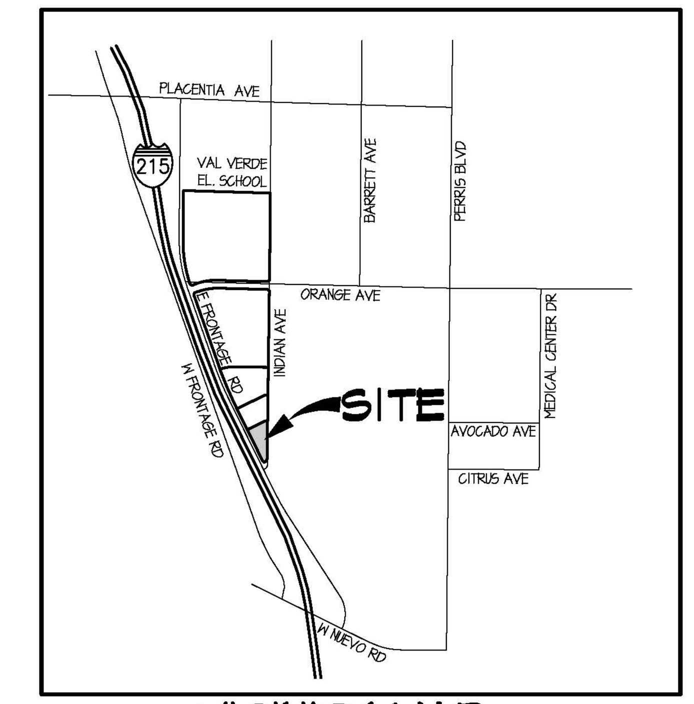
ALSO EXCEPTING THEREFROM THE PORTION DESCRIBED IN DEED RECORDED DECEMBER 21, 1965 AS INSTRUMENT NO. 142400 AND IN DEED RECORDED MARCH 13, 1964 AS INSTRUMENT NO. 24345, RECORDS OF RIVERSIDE COUNTY.

ALSO EXCEPTING THEREFROM THOSE PORTIONS CONVEYED TO THE STATE OF CALIFORNIA BY DEEDS RECORDED MARCH 22, 1992, AS INSTRUMENT NOS. 94602 AND 94603.



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

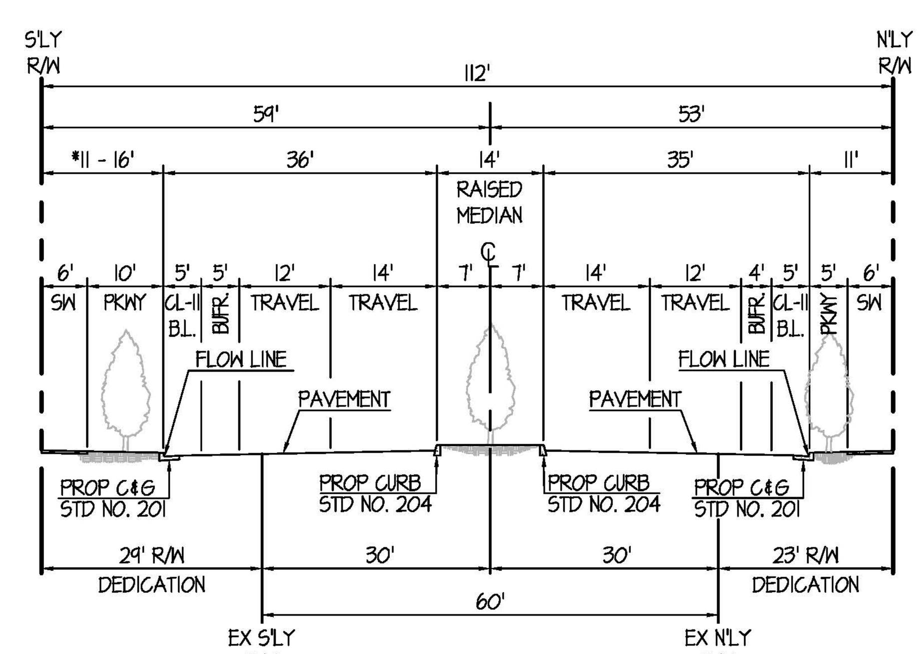
ARCHITECT

AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

EARTHWORK ESTIMATE:

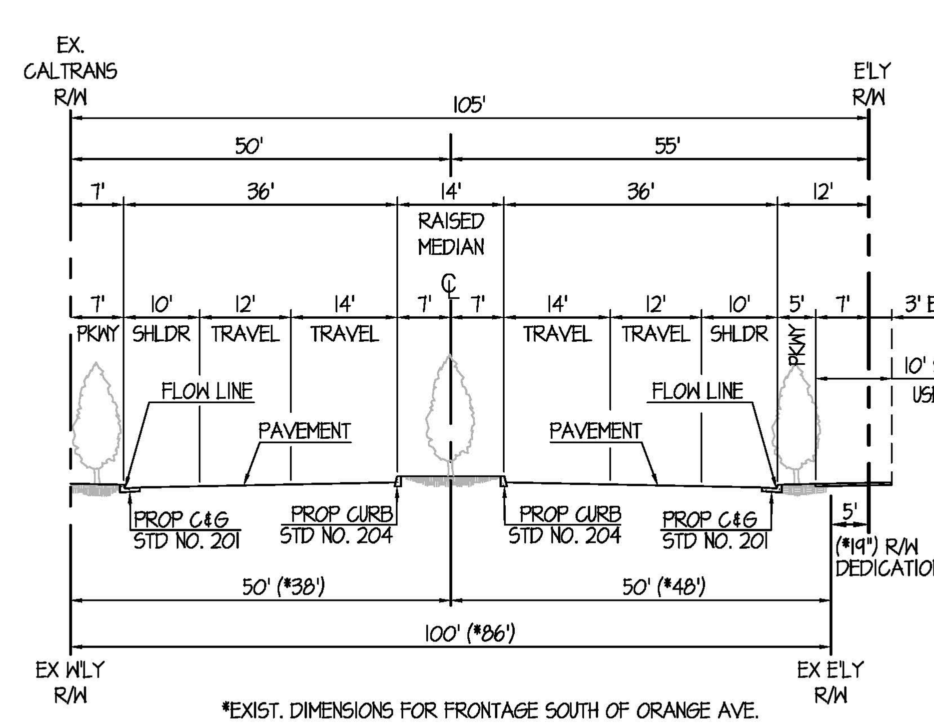
RAW CUT:	575 CY	
RAW FILL:	9,075 CY	
NET:	8,500 CY	IMPORT

HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 654



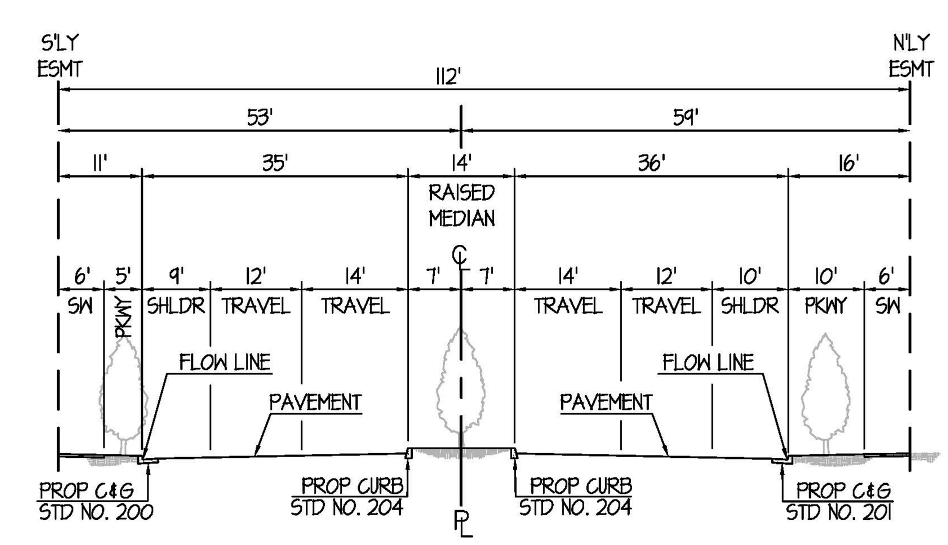
* PROPOSED 11' MINIMUM DIMENSIONS FOR ALL RIGHT TURN POCKETS AT INTERSECTIONS

ORANGE AVENUE
(WEST OF BARRETT AVE)
SECONDARY ARTERIAL
(112'/85')



*EXIST. DIMENSIONS FOR FRONTAGE SOUTH OF ORANGE AVE.

FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')



PRIVATE DRIVE "A"
SECONDARY ARTERIAL
(112'/85')

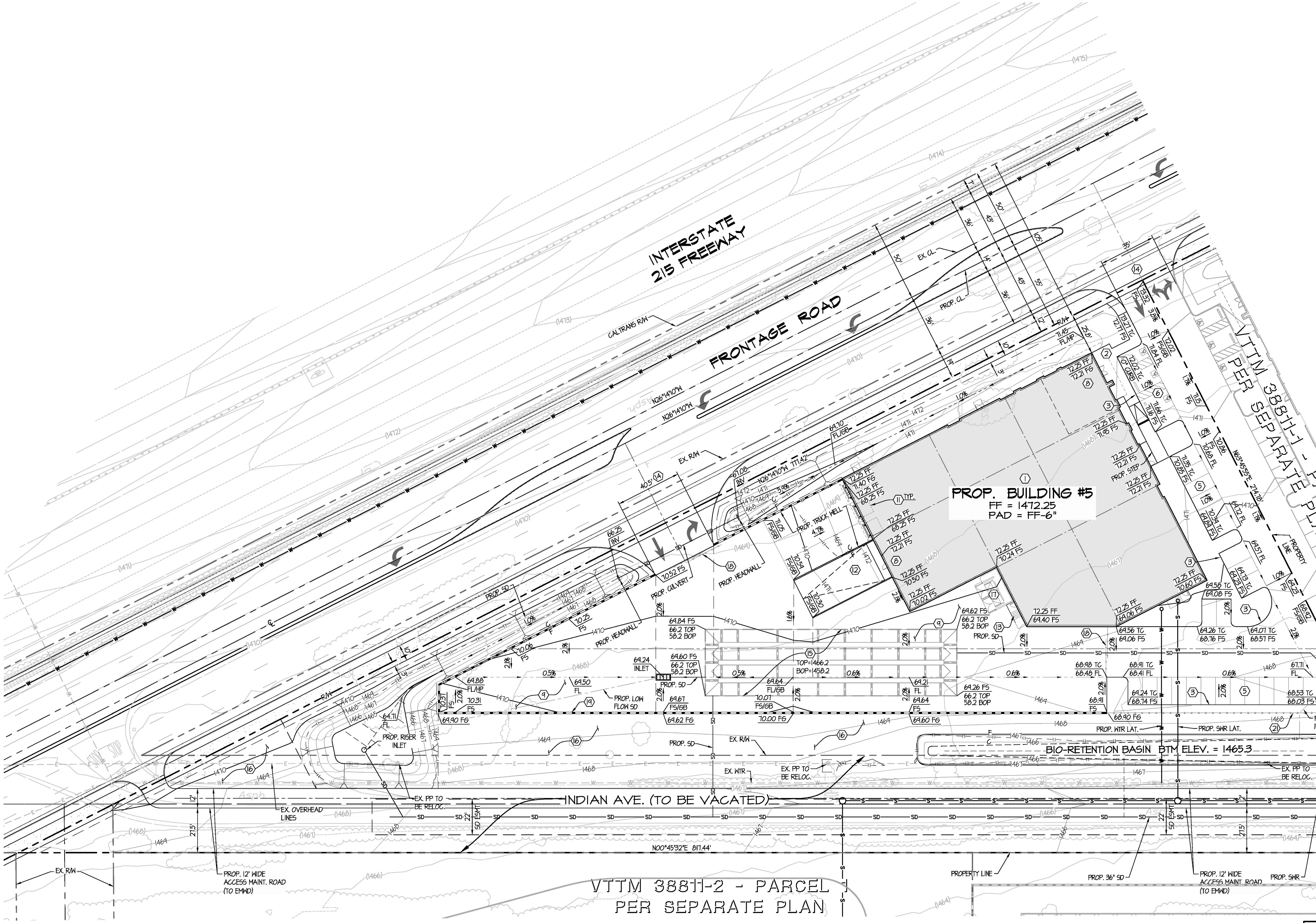
CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #5 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 4

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

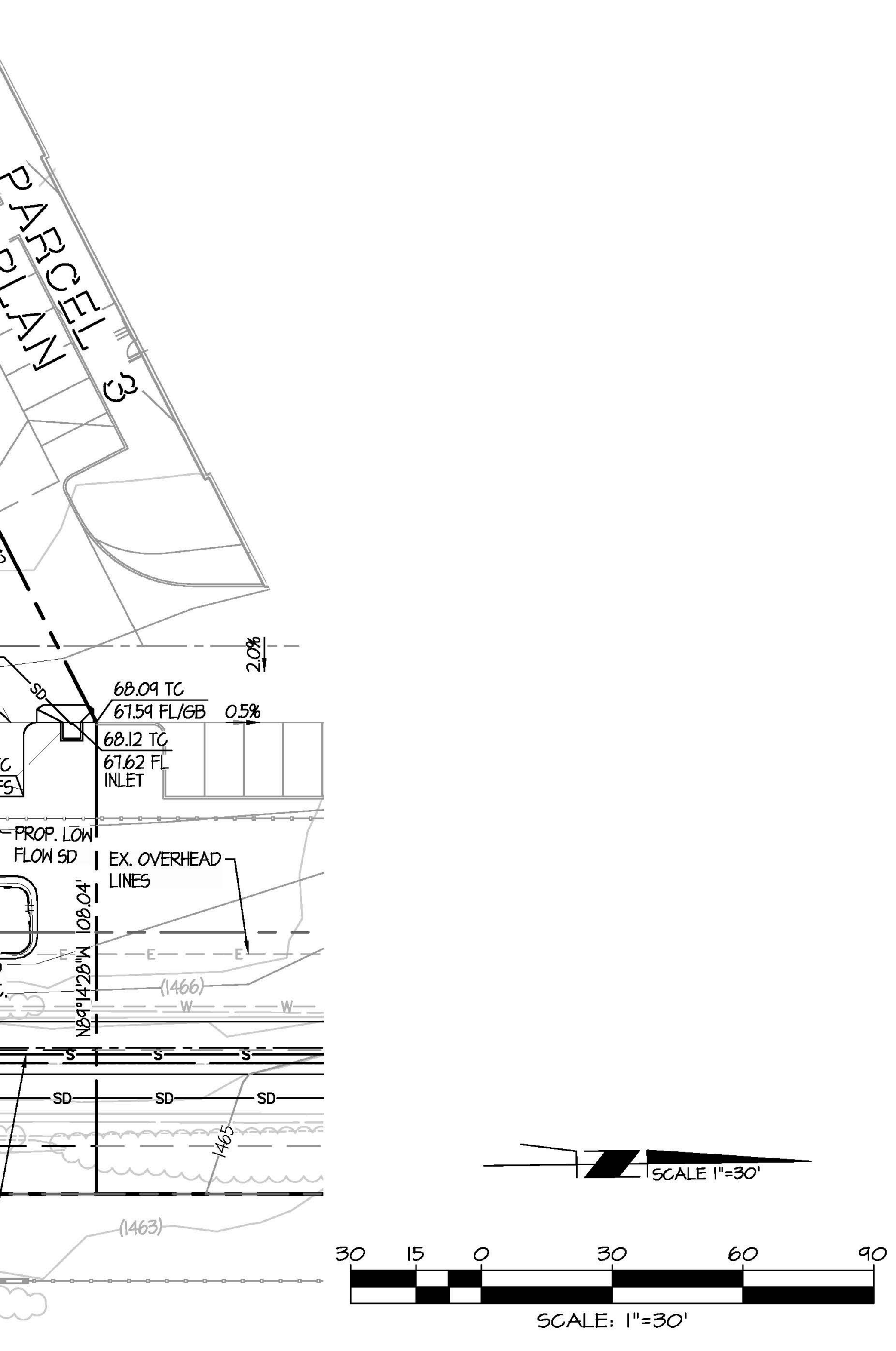
FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 1 OF 2 SHEETS



SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
20. CONCRETE RIBBON GUTTER/SWALE
21. CHAIN LINK FENCE PER ARCHITECT'S PLANS



CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #5 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-1 - PARCEL 4

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 2 OF 2 SHEETS

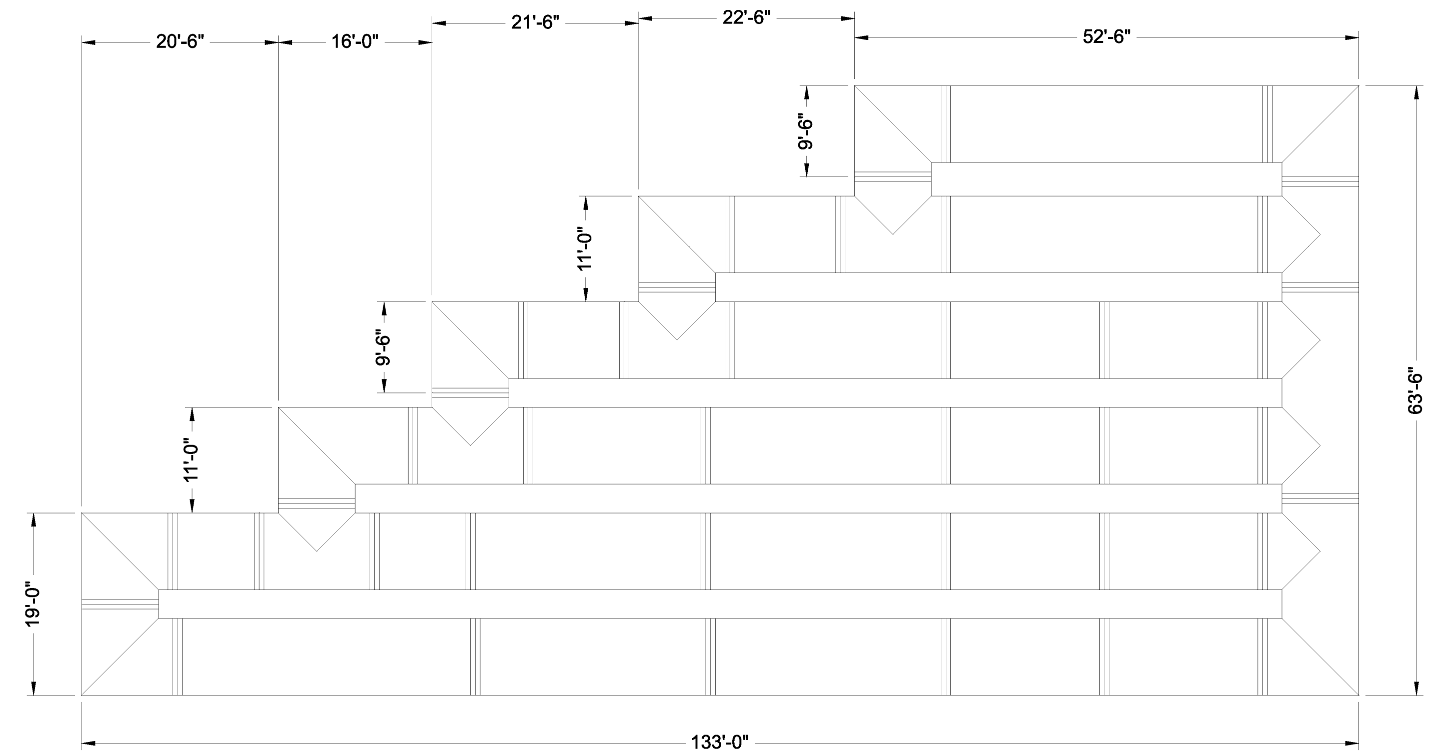
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 634 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 31,843 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 31,843 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 20'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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DATE	REVISION DESCRIPTION	BY

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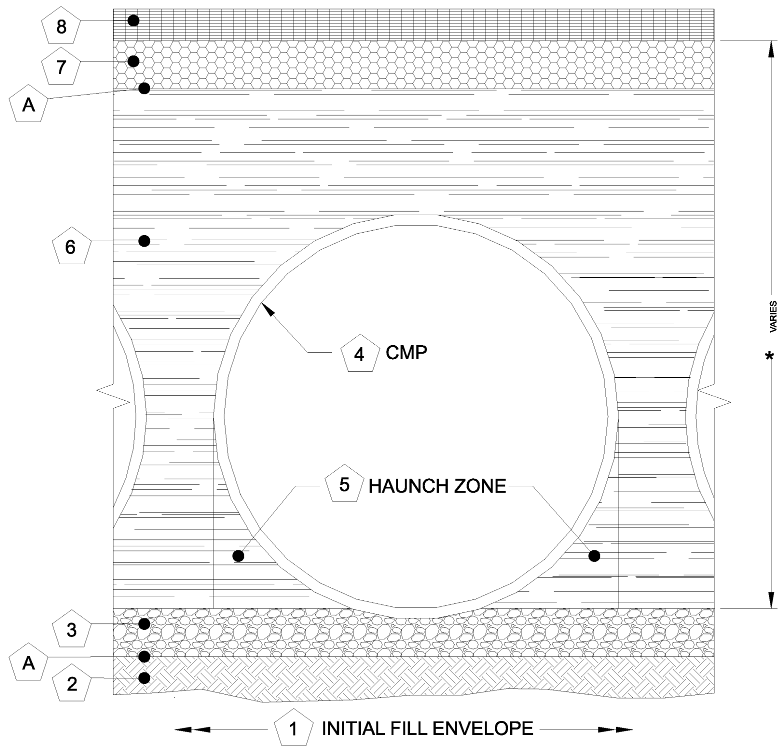
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH®
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO19782 20-001 Harvest Landing Site 5
Site 5 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
12823	19782	8/17/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



	DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

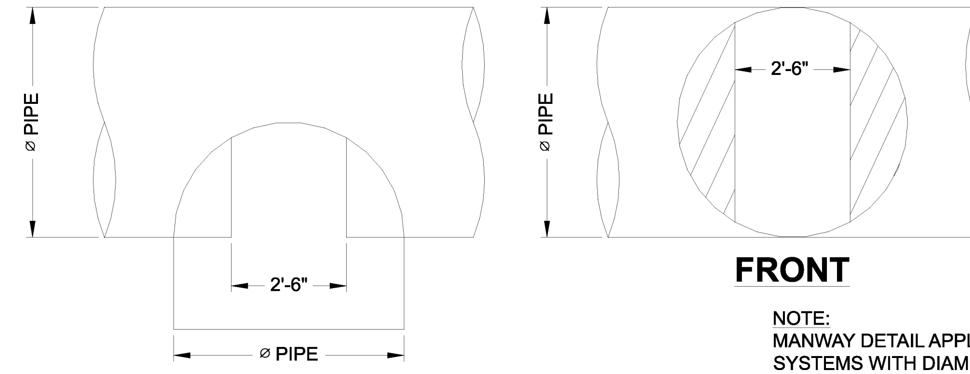
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



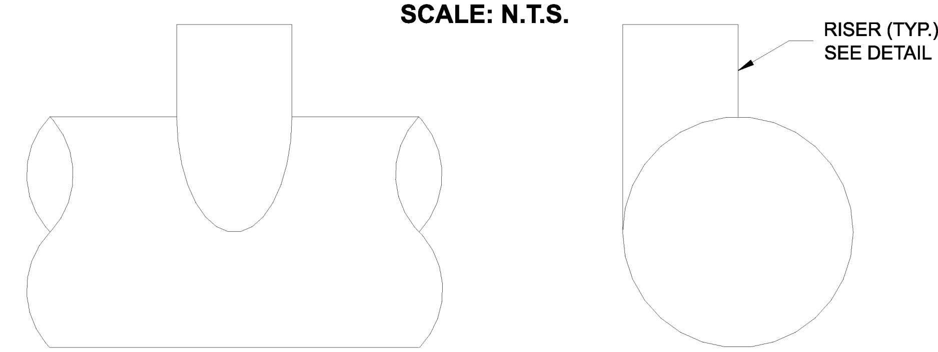
PLAN

FRONT

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



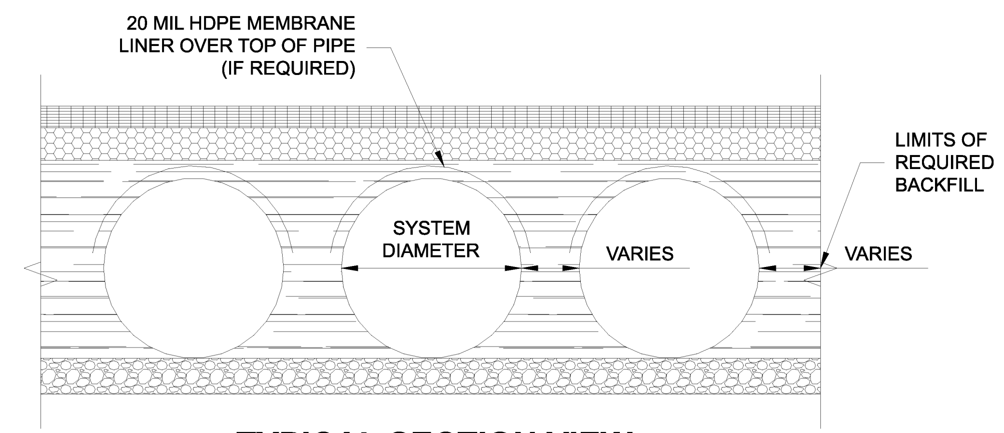
ELEVATION

END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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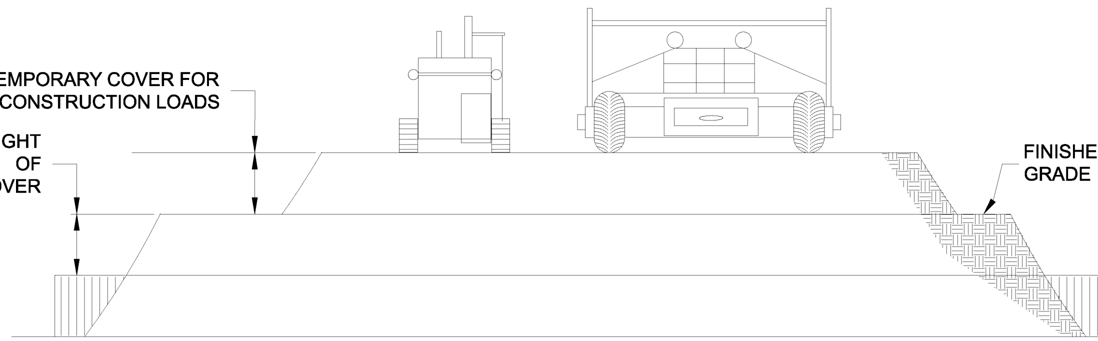
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO19782 20-001 Harvest Landing Site 5
Site 5 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
12823	19782	8/17/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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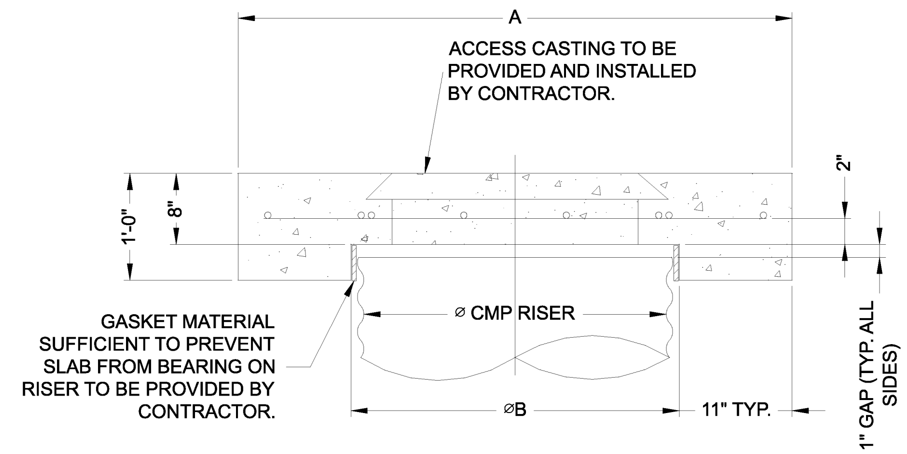
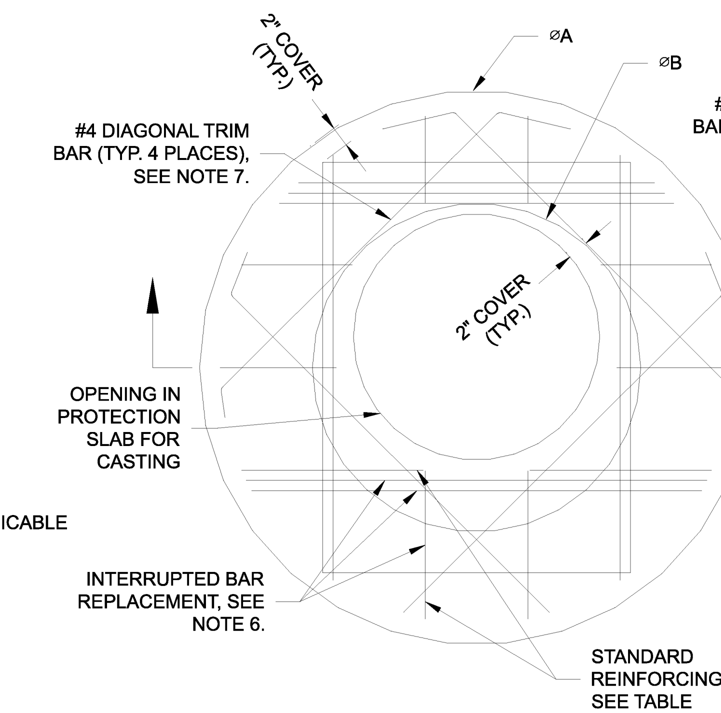


SECTION VIEW

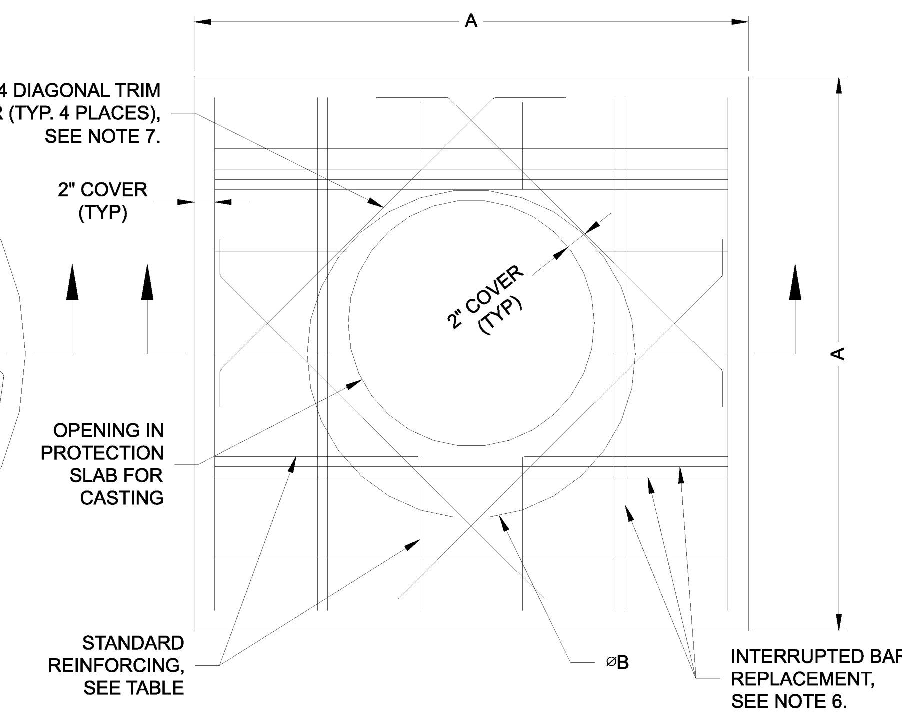
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO19782 20-001 Harvest Landing Site 5
Site 5 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12823	SEQ. No.: 19782	DATE: 8/17/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

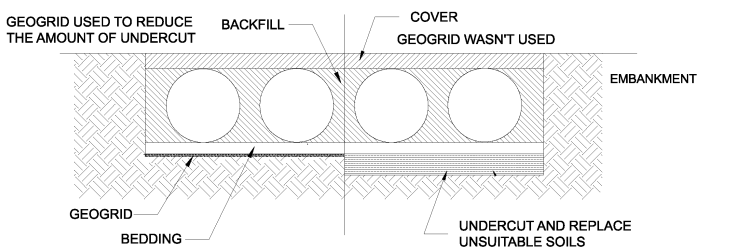
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

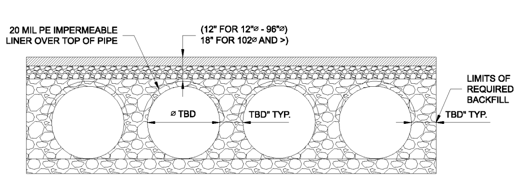


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

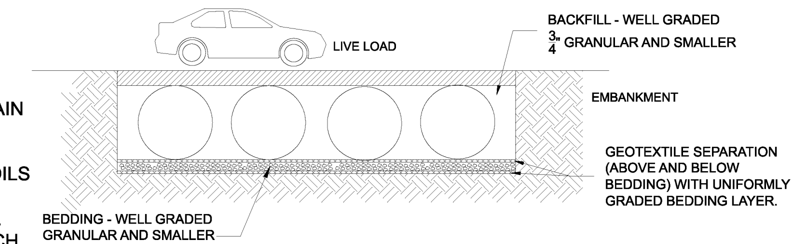
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

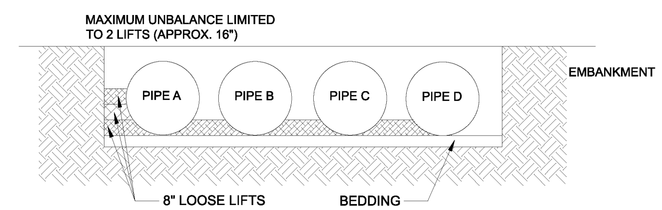
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

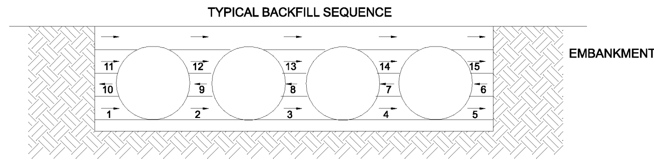
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



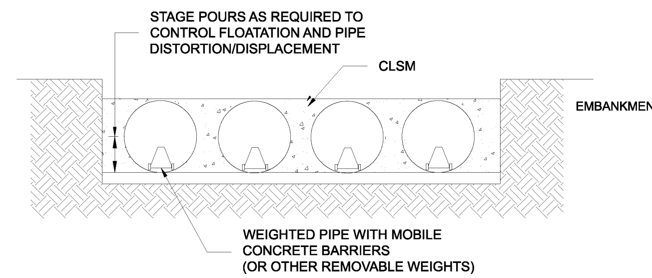
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

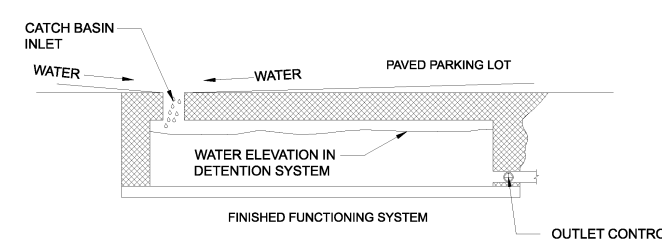


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO19782 20-001 Harvest Landing Site 5
Site 5 Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 12823	SEQ. No.: 19782	DATE: 8/17/2022
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

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IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #6 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 2

LEGEND

(1025)	EXISTING CONTOUR
1025	PROPOSED CONTOUR
	RETAINING WALL
	FENCE
	EDGE OF PAVEMENT
	SIGN
MH	MANHOLE
	RIGHT OF WAY
	EASEMENT
	PARCEL LINE
	PARCEL MAP BOUNDARY
	STREET CENTER LINE
	SCREEN WALL
	COMBINATION SCREEN/RETAINING WALL
	EXISTING LOT LINE
	RIDGE LINE
	RIBBON GUTTER
	FLOW ARROW
	PROPOSED EDGE OF PAVEMENT
W	EXISTING WATER LINE
W	PROPOSED WATER LINE
SS	EXISTING SWR LINE
SS	PROPOSED SEWER LINE
SD	EXISTING STORM DRAIN PIPE
SD	PROPOSED STORM DRAIN PIPE
E	EXISTING OVERHEAD LINES
	CUT/FILL LINE
Y	SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

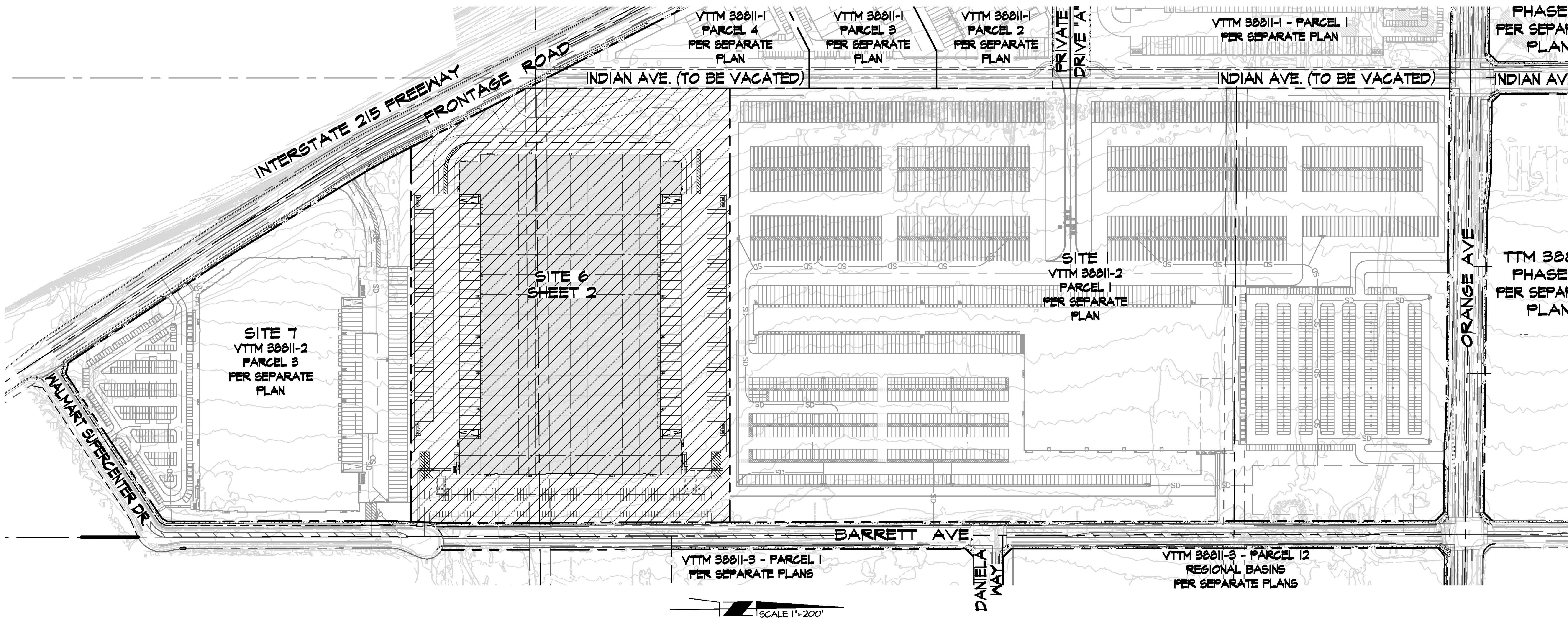
PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-120-004 thru 008, 020 thru 026, &
305-130-001 thru 006, 009, &
305-160-001 thru 003, 025 thru 030, &
305-190-014, 019, 020, 028 thru 031, &
305-220-011, 059 thru 062

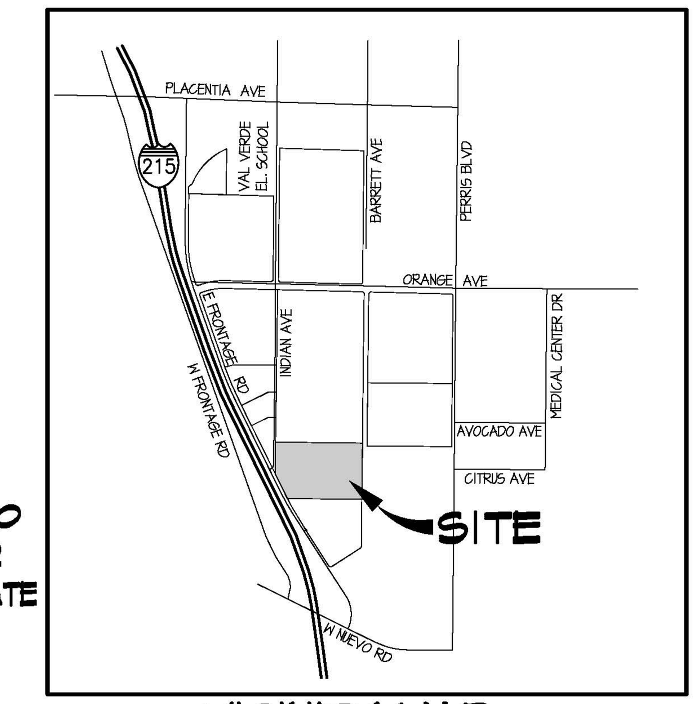
LEGAL DESCRIPTION

BLOCKS 1-4 OF FIGADOTA FARMS NO. 1A AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 68 TOGETHER WITH LOTS 1-8, AND 13-20 OF FIGADOTA FARMS AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 53 EXCEPTING THAT PORTION LYING WEST OF THE EASTERLY LINE OF THE FRONTAGE ROAD.



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER
HOWARD INDUSTRIAL PARTNERS
2244 NORTH PACIFIC STREET
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-637-3333

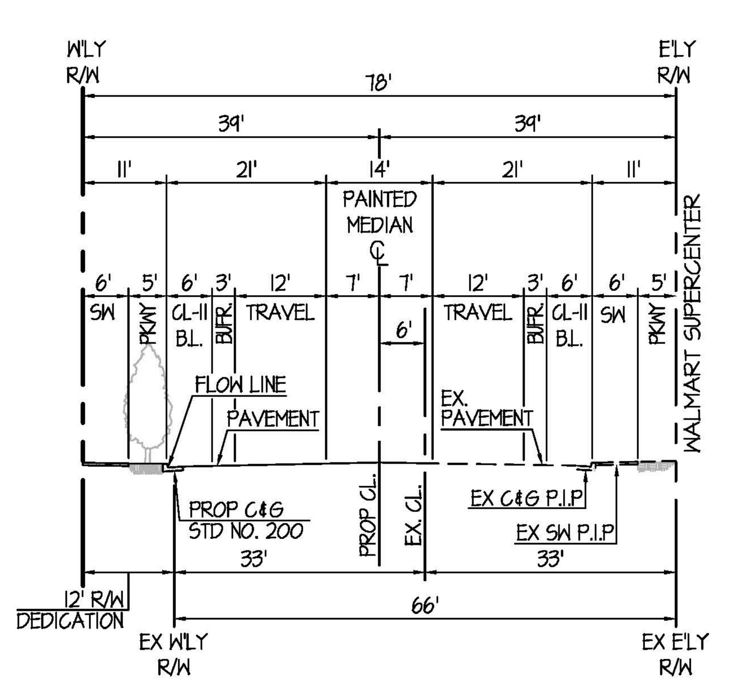
ENGINEER
FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

ARCHITECT
AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-639-9860

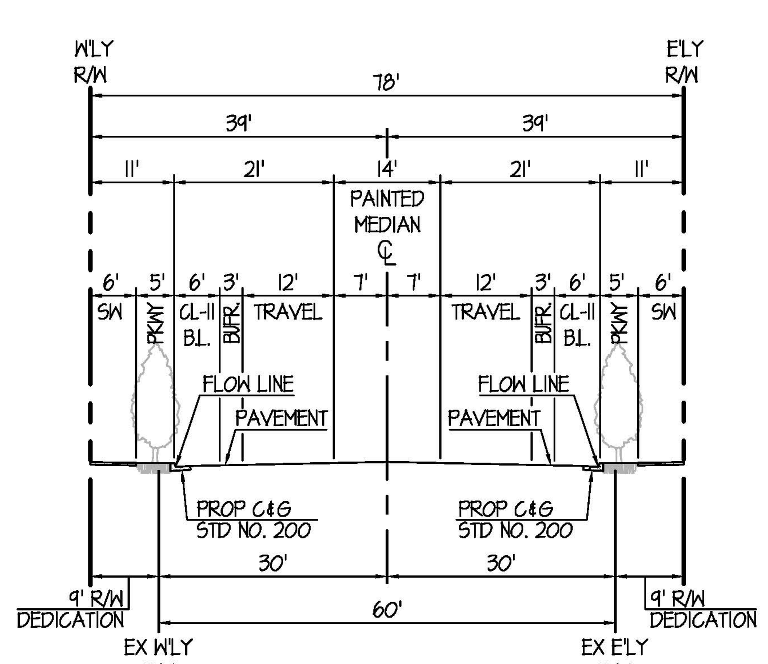
EARTHWORK ESTIMATE:

RAW CUT:	81,530	CY
RAW FILL:	61,100	CY
NET:	20,430	CY EXPORT

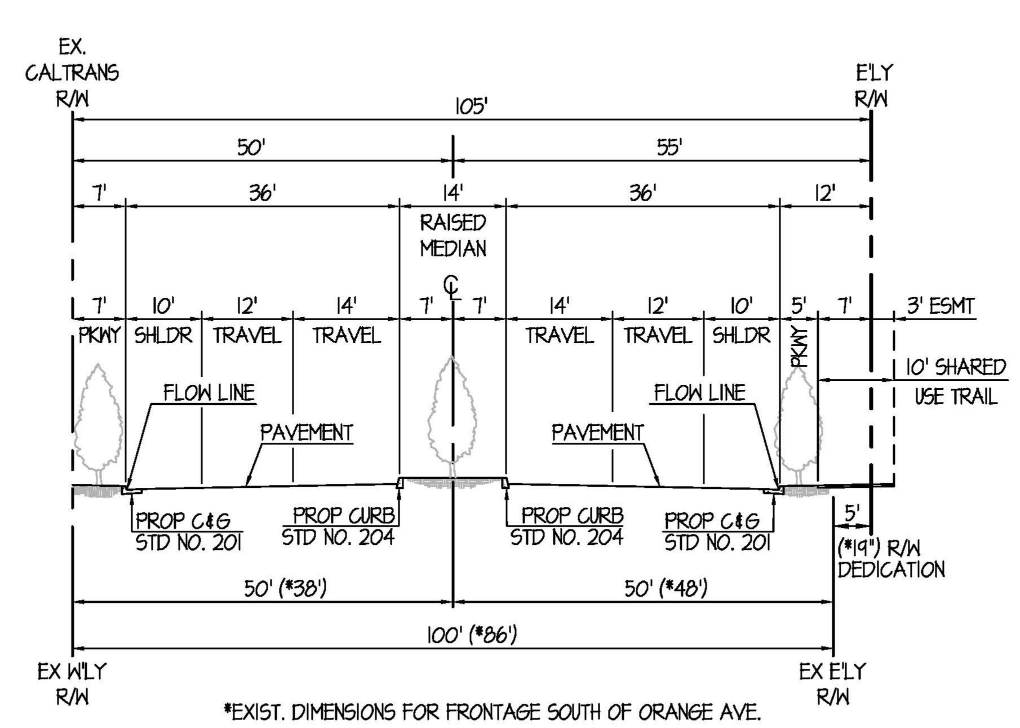
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 1,572



BARRETT AVE
(FRONTAGE RD. - N'LY WALMART DWY)
MAJOR COLLECTOR
(78'/56')



BARRETT AVE
(N'LY WALMART DWY - ORANGE AVE)
MAJOR COLLECTOR
(78'/56')



FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')

CITY OF PERRIS

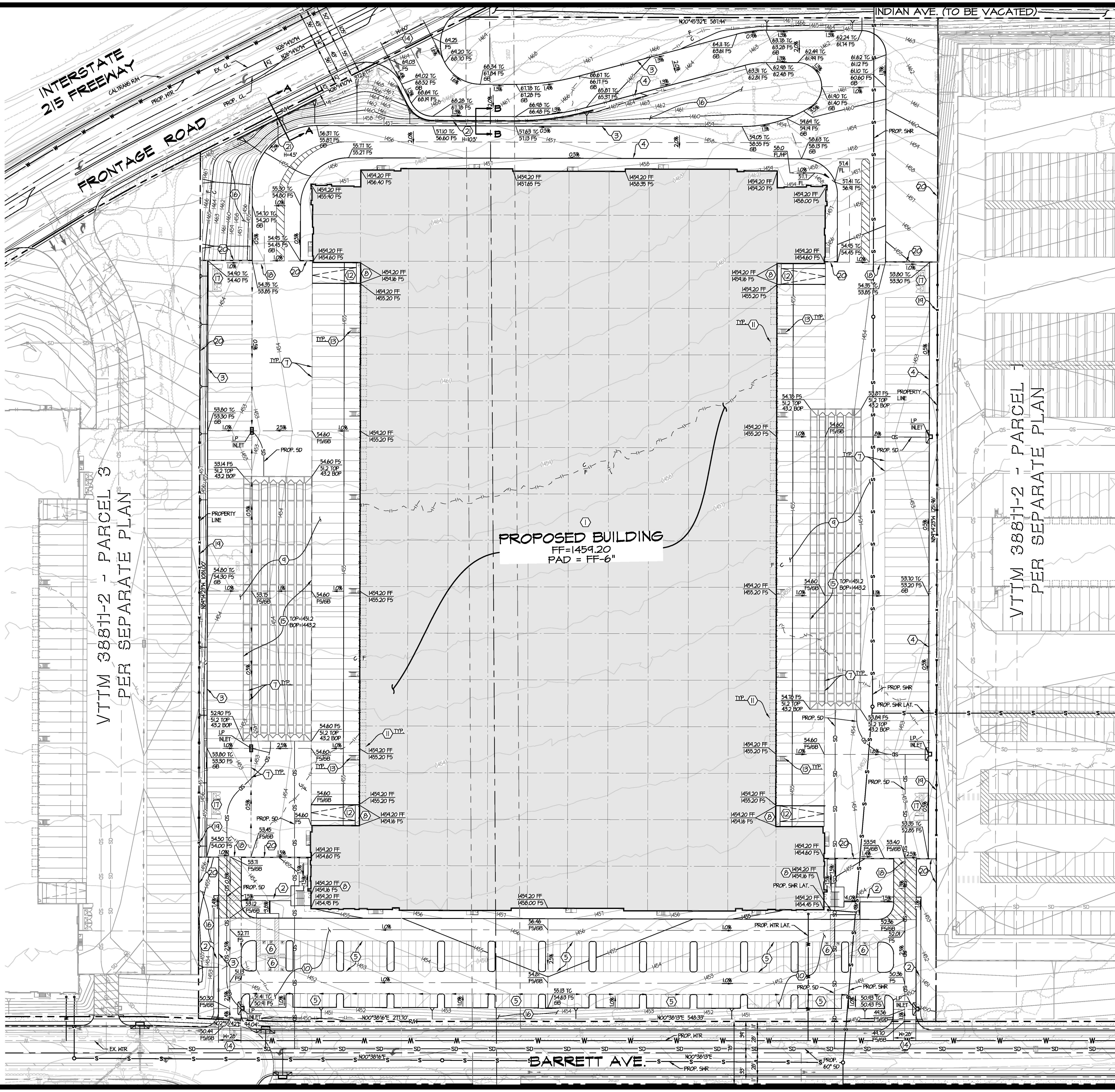
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #6 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 2

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

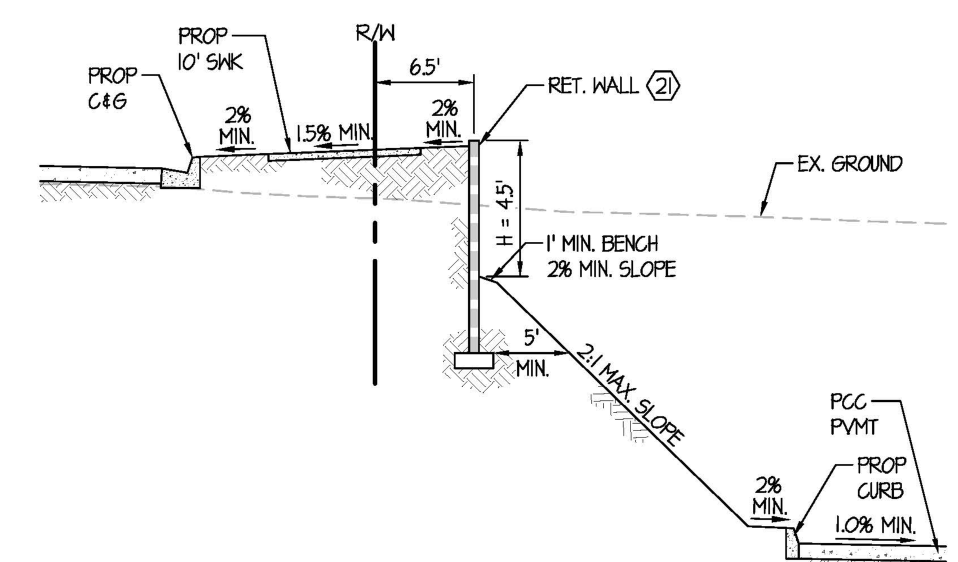
SHEET 1 OF 2 SHEETS

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\BLDG-6\20-001-CUP_BLDG6-CG-01.DWG JASON STOUFFER 10/10/2024 3:39 PM



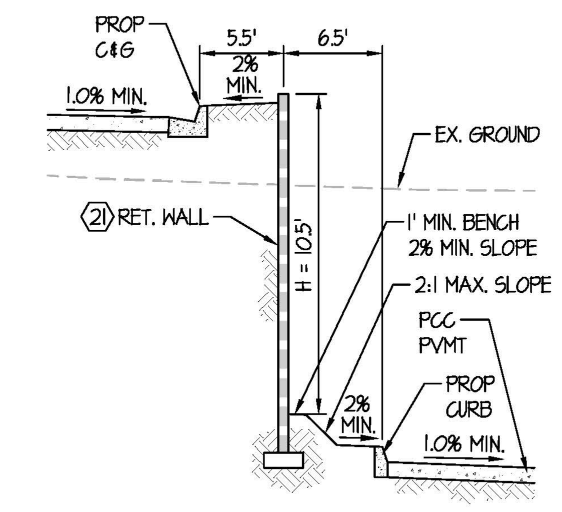
SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. CHAIN LINK FENCE PER ARCHITECT'S PLANS
20. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)
21. RETAINING WALL (H=APPROXIMATE MAXIMUM EXPOSED WALL FACE)



SECTION A-A

HOR. SCALE: 1"=10'



SECTION B-B

HOR. SCALE: 1"=10'

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #6 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 2

SCALE: AS SHOWN	FMCIVIL ENGINEERS INC. 41870 KALMIA STREET, SUITE 120 MURRIETA | CA 92562 951.973.0202 - FMCIVIL.COM	SHEET 2 OF 2 SHEETS
DATE: OCT. 2024		
DESIGNED: AJ		
CHECKED: FM		
PLN CK REF:		

PROJECT SUMMARY

CALCULATION DETAILS

- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,280 LF

STORAGE SUMMARY

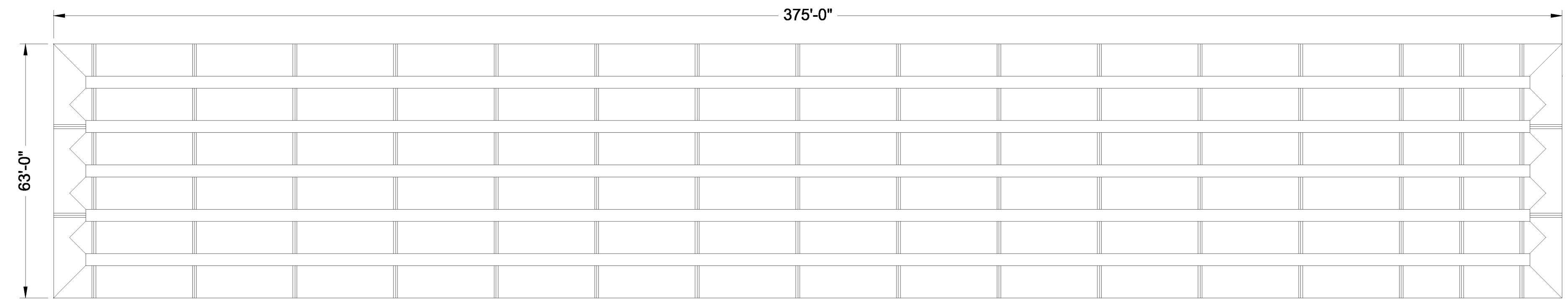
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 114,605 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 114,605 CF

PIPE DETAILS

- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS

- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY

SCALE: 1" = 40'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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DATE	REVISION DESCRIPTION	BY

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CONTECH®
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

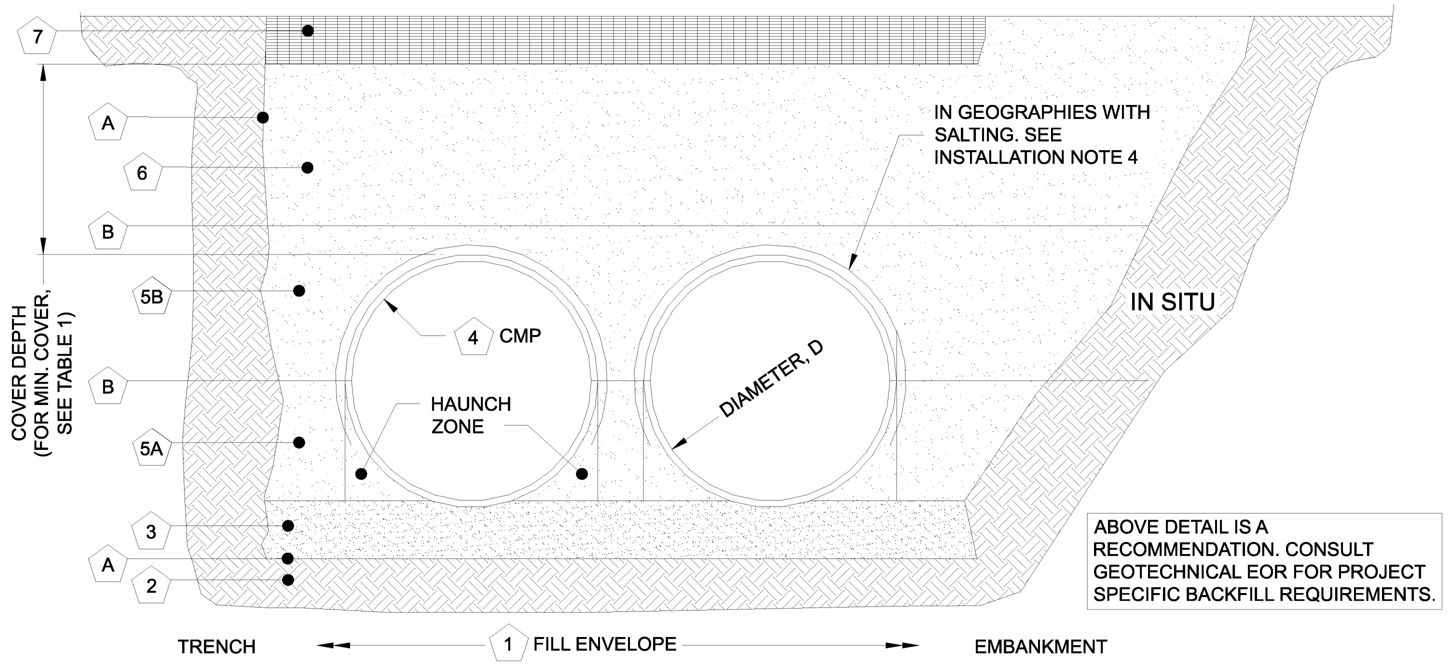
DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42824	SEQ. No.: 60538	DATE: 10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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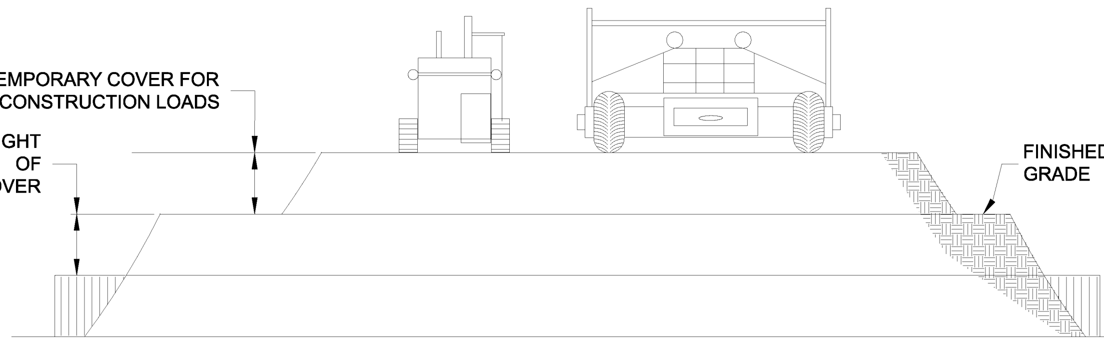
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42824	SEQ. No.: 60538	DATE: 10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

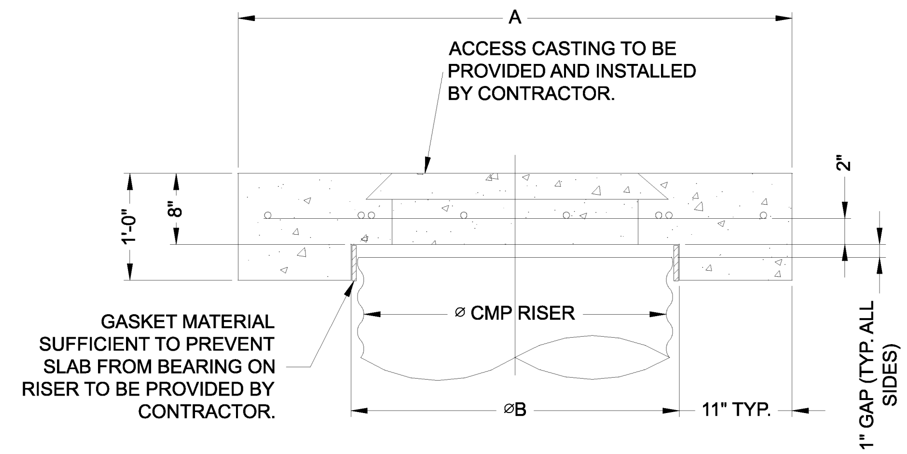
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

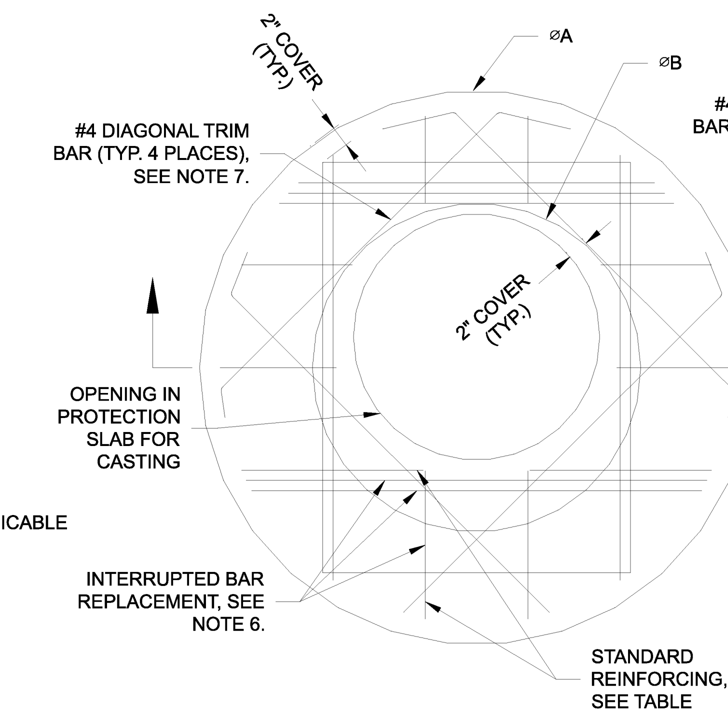


SECTION VIEW

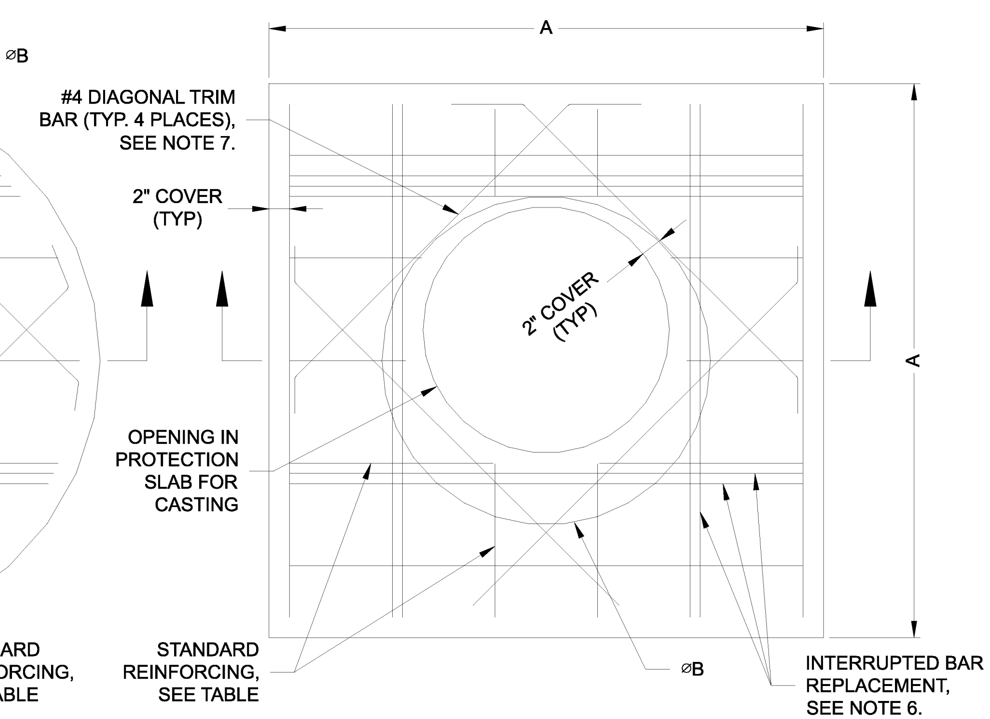
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

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CONTECH
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42824	SEQ. No.: 60538	DATE: 10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET No.: 1		

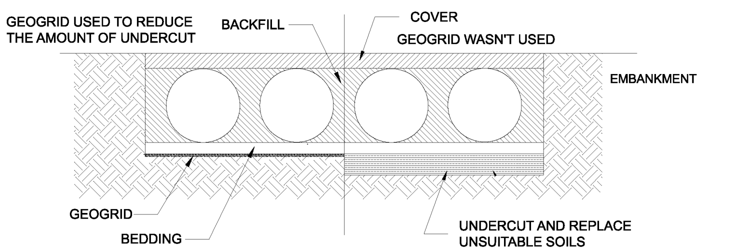
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

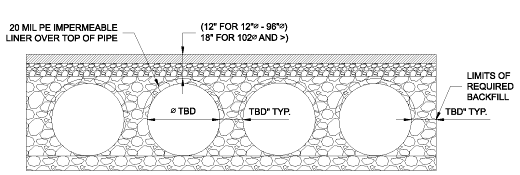
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

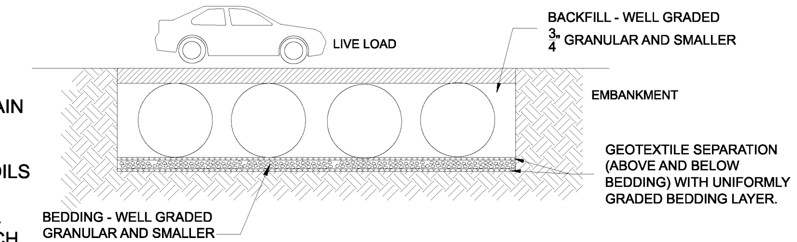
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

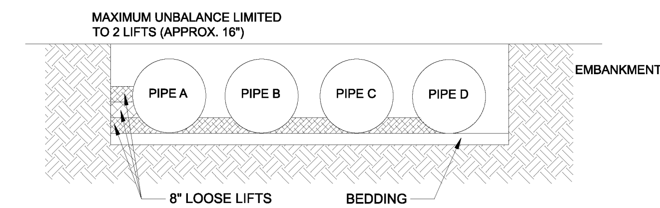
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

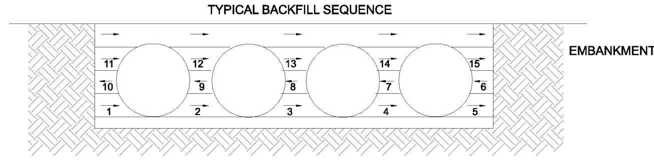
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



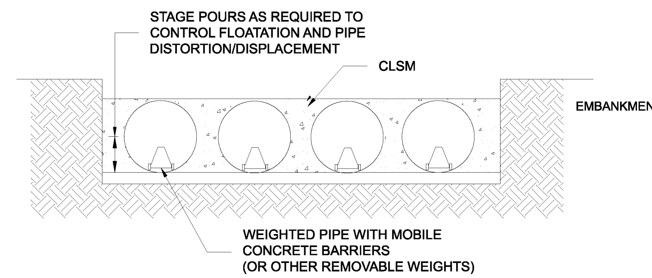
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

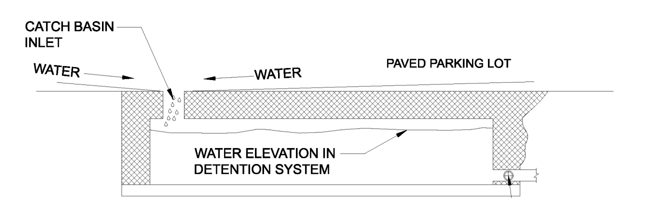


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



FINISHED FUNCTIONING SYSTEM

CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH® CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO60538 20-001 Harvest Landing Site 6
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42824	SEQ. No.: 60538	DATE: 10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

PROJECT SUMMARY

CALCULATION DETAILS

- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,682 LF

STORAGE SUMMARY

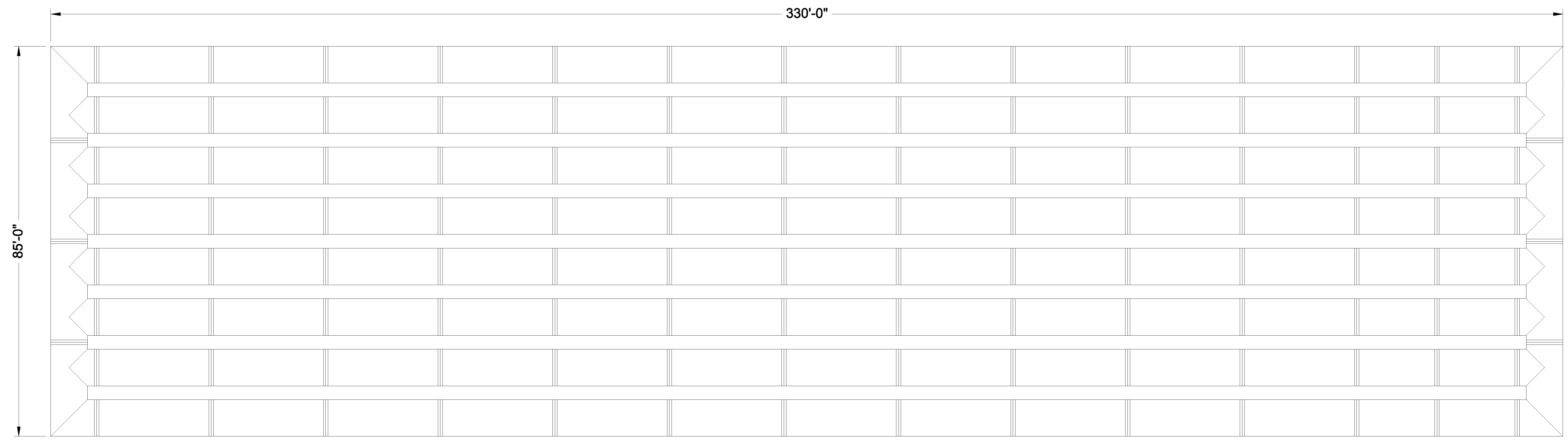
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 134,812 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 134,812 CF

PIPE DETAILS

- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS

- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY

SCALE: 1" = 30'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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CONTECH®
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

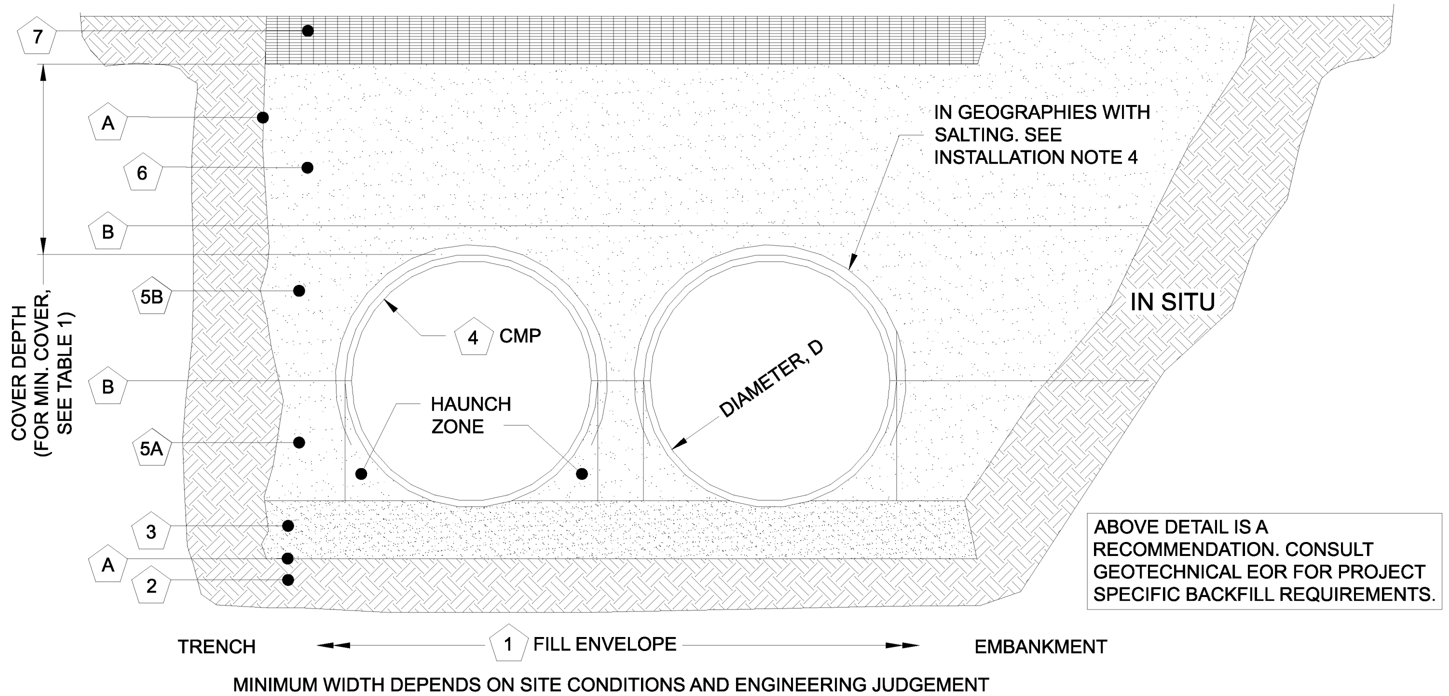
DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42826	60540	10/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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CONTECH CMP DETENTION SYSTEMS

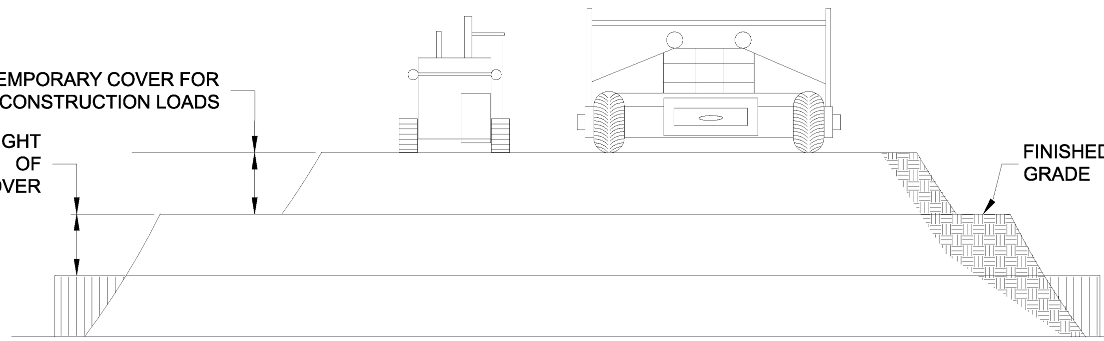
CONTECH DYODS DRAWING

DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42826	60540	10/2/2024

DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

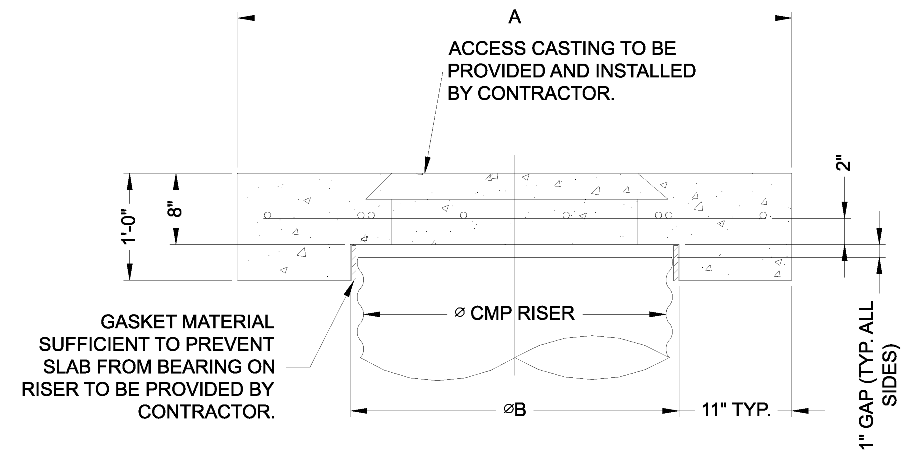
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

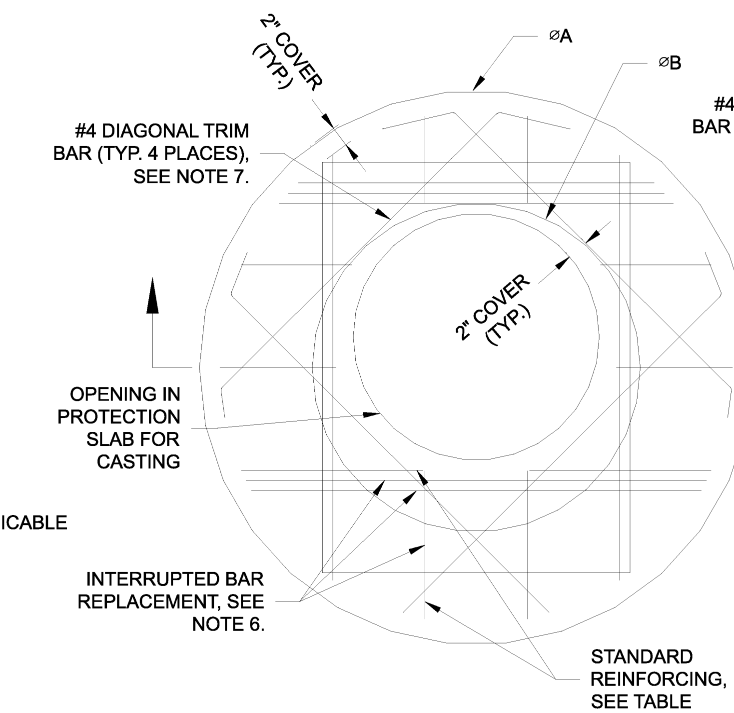


SECTION VIEW

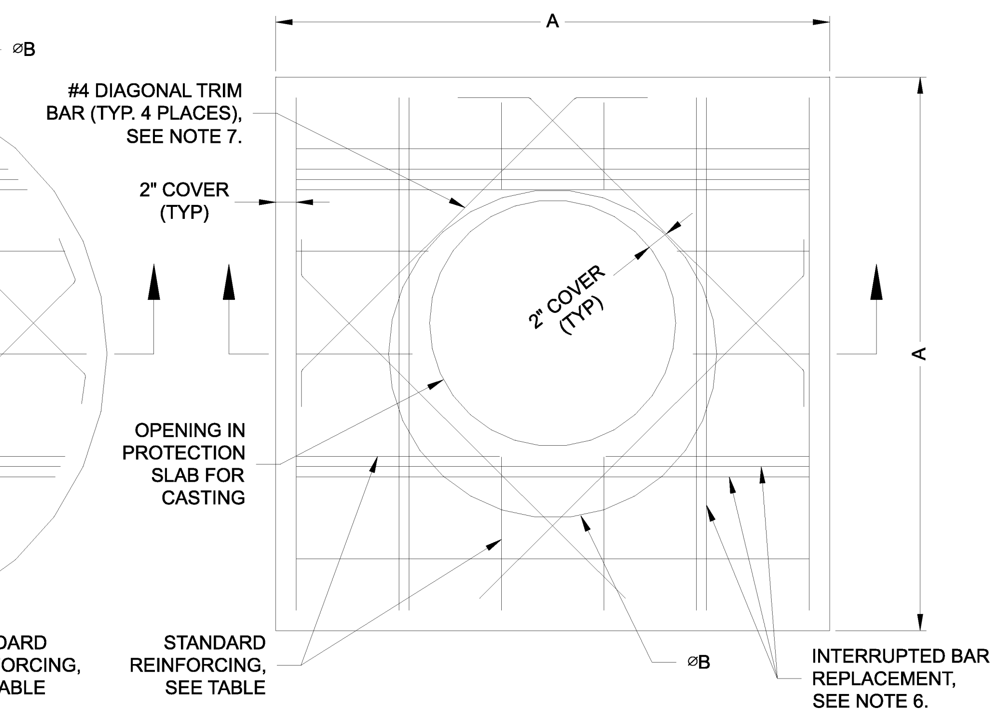
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42826	SEQ. No.: 60540	DATE: 10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET No.: 1		

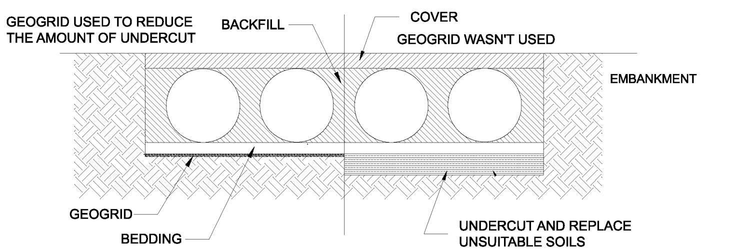
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

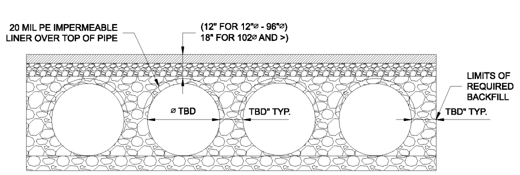
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

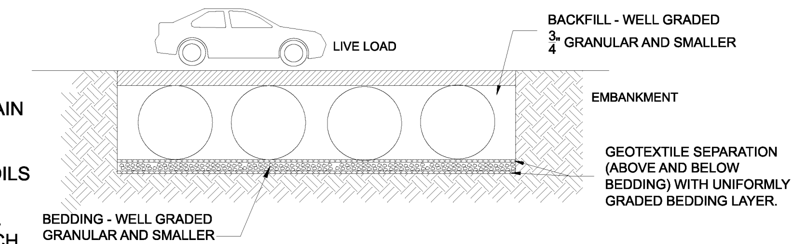
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

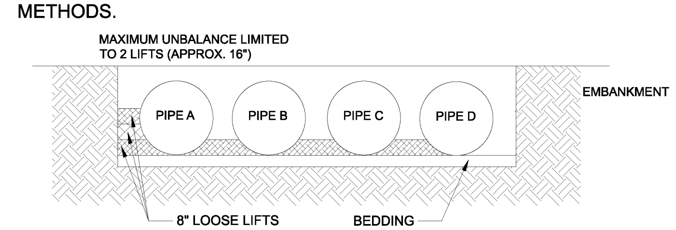
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



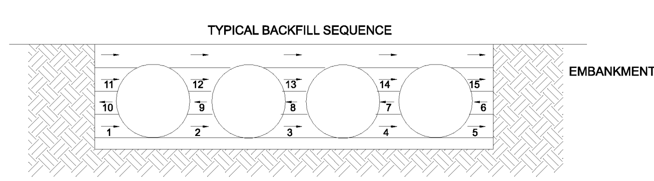
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

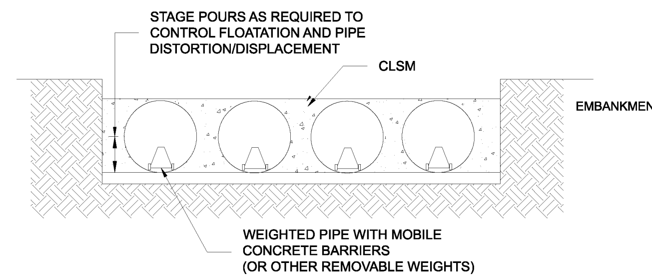


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

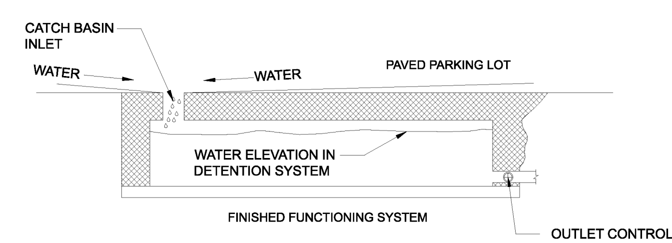


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO60540 20-001 Harvest Landing Site 6
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42826	SEQ. No.: 60540	DATE: 10/2/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.:		1

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #7 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 3

LEGEND

(1025)	EXISTING CONTOUR
1025	PROPOSED CONTOUR
	RETAINING WALL
	FENCE
	EDGE OF PAVEMENT
	SIGN
MH	MANHOLE
	RIGHT OF WAY
	EASEMENT
	PARCEL LINE
	PARCEL MAP BOUNDARY
	STREET CENTER LINE
	SCREEN WALL
	COMBINATION SCREEN/RETAINING WALL
	EXISTING LOT LINE
	RIDGE LINE
	RIBBON GUTTER
	FLOW ARROW
	PROPOSED EDGE OF PAVEMENT
W	EXISTING WATER LINE
W	PROPOSED WATER LINE
SS	EXISTING SWR LINE
SS	PROPOSED SEWER LINE
SD	EXISTING STORM DRAIN PIPE
SD	PROPOSED STORM DRAIN PIPE
E	EXISTING OVERHEAD LINES
	CUT/FILL LINE
Y	SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

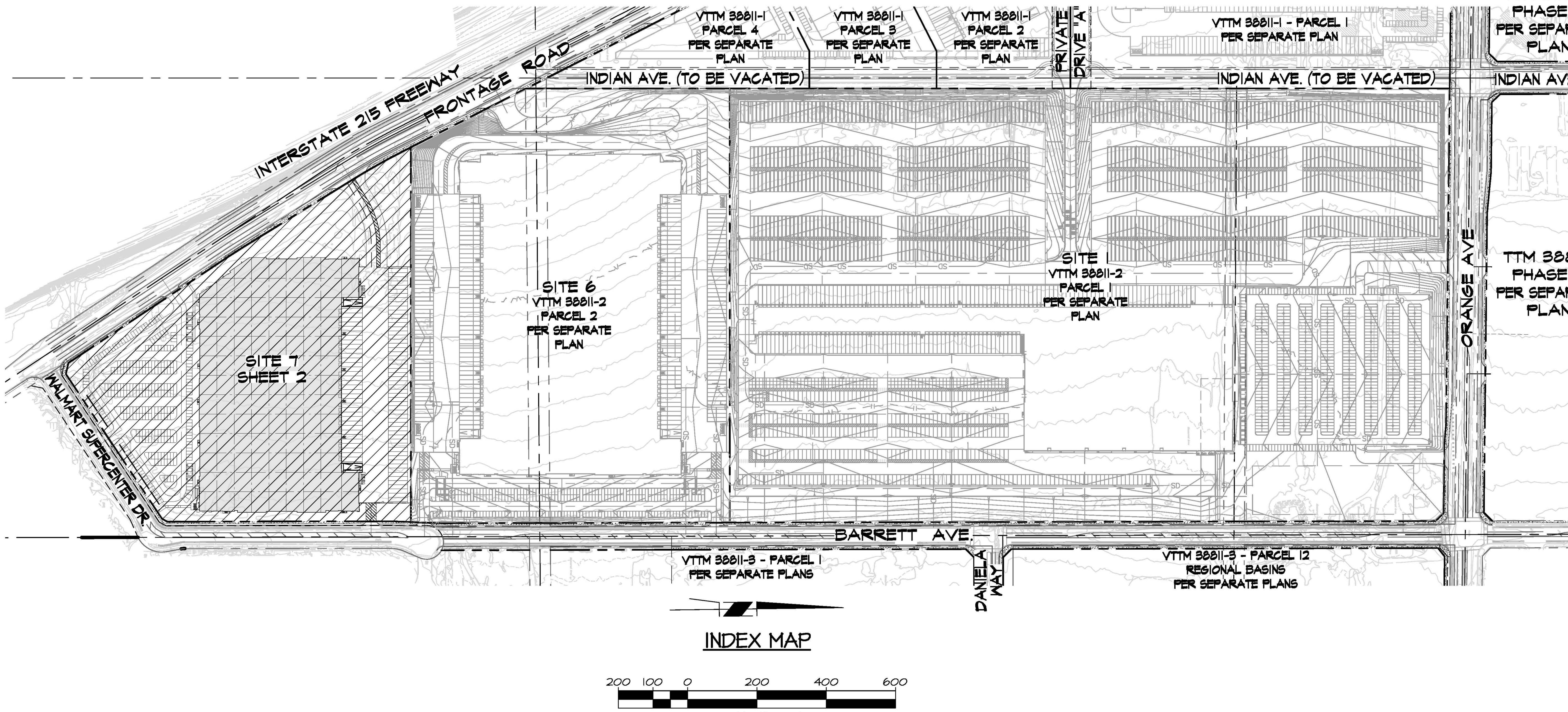
PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

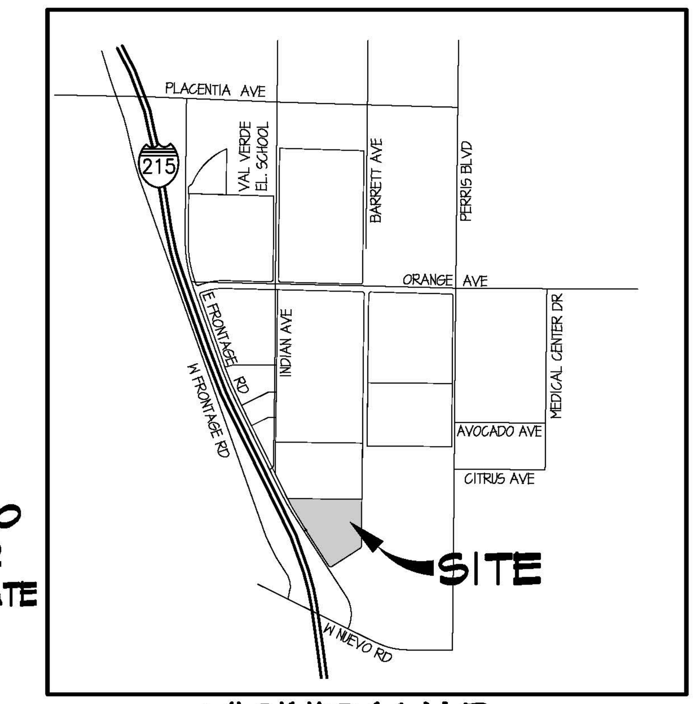
305-120-004 thru 008, 020 thru 026, &
305-130-001 thru 006, 009, &
305-160-001 thru 003, 025 thru 030, &
305-140-014, 019, 020, 028 thru 031, &
305-220-011, 054 thru 062

LEGAL DESCRIPTION

BLOCKS 1-4 OF FIGADOTA FARMS NO. 1A AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 68 TOGETHER WITH LOTS 1-8, AND 13-20 OF FIGADOTA FARMS AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 53 EXCEPTING THAT PORTION LYING WEST OF THE EASTERLY LINE OF THE FRONTAGE ROAD.



INDEX MAP



VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER
HOWARD INDUSTRIAL PARTNERS
2244 NORTH PACIFIC STREET
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-637-3333

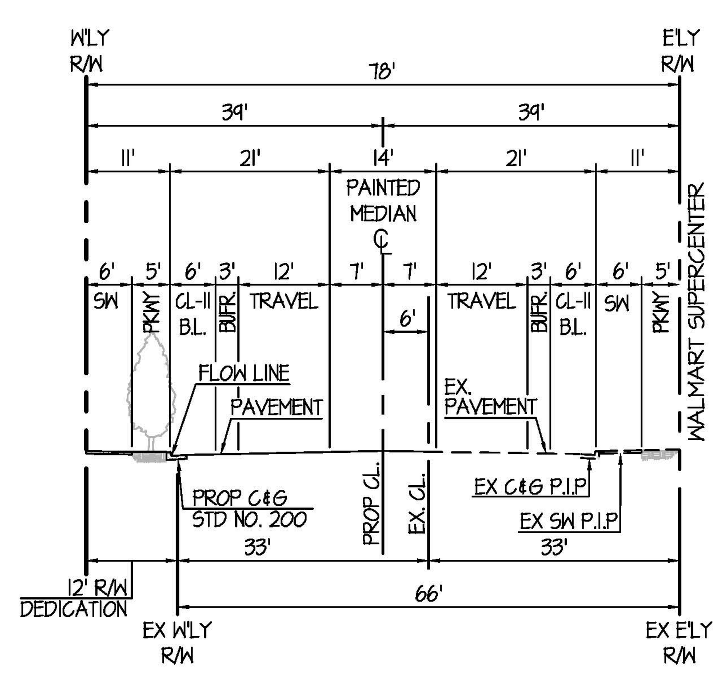
ENGINEER
FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

ARCHITECT
AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: DAN MACDAVID
(TEL)714-634-9860

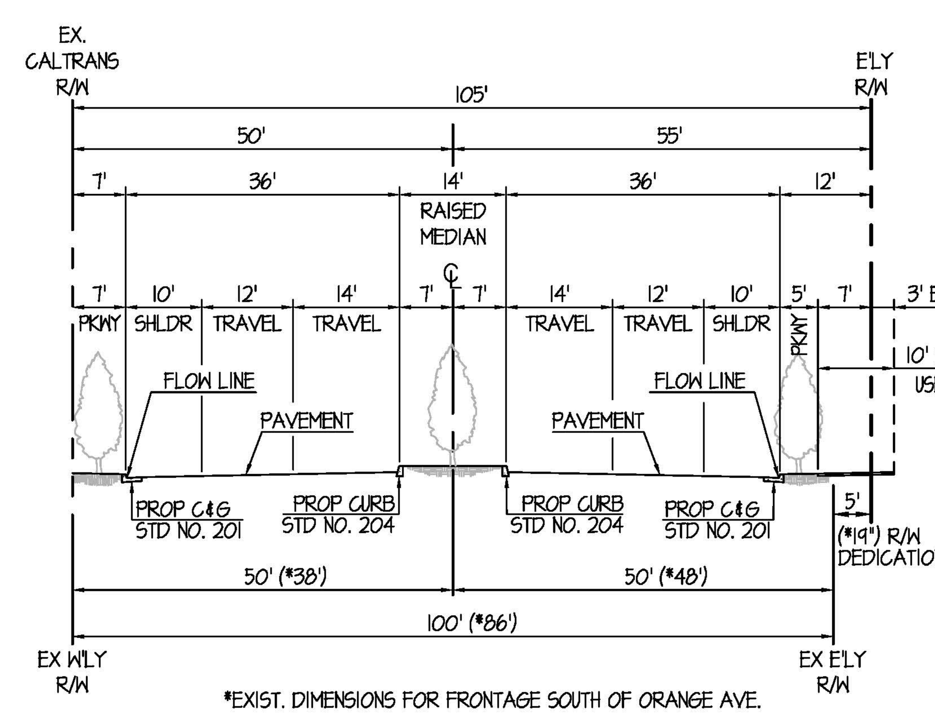
EARTHWORK ESTIMATE:

RAW CUT:	7,630 CY	
RAW FILL:	94,590 CY	
NET:	86,960 CY	IMPORT

HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 6,690



BARRETT AVE
(FRONTAGE RD. - N'LY WALMART DWY)
MAJOR COLLECTOR
(78'/56')



*EXIST. DIMENSIONS FOR FRONTAGE SOUTH OF ORANGE AVE.

FRONTAGE ROAD
SECONDARY ARTERIAL
(105'/84')

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #7 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 3

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 1 OF 2 SHEETS

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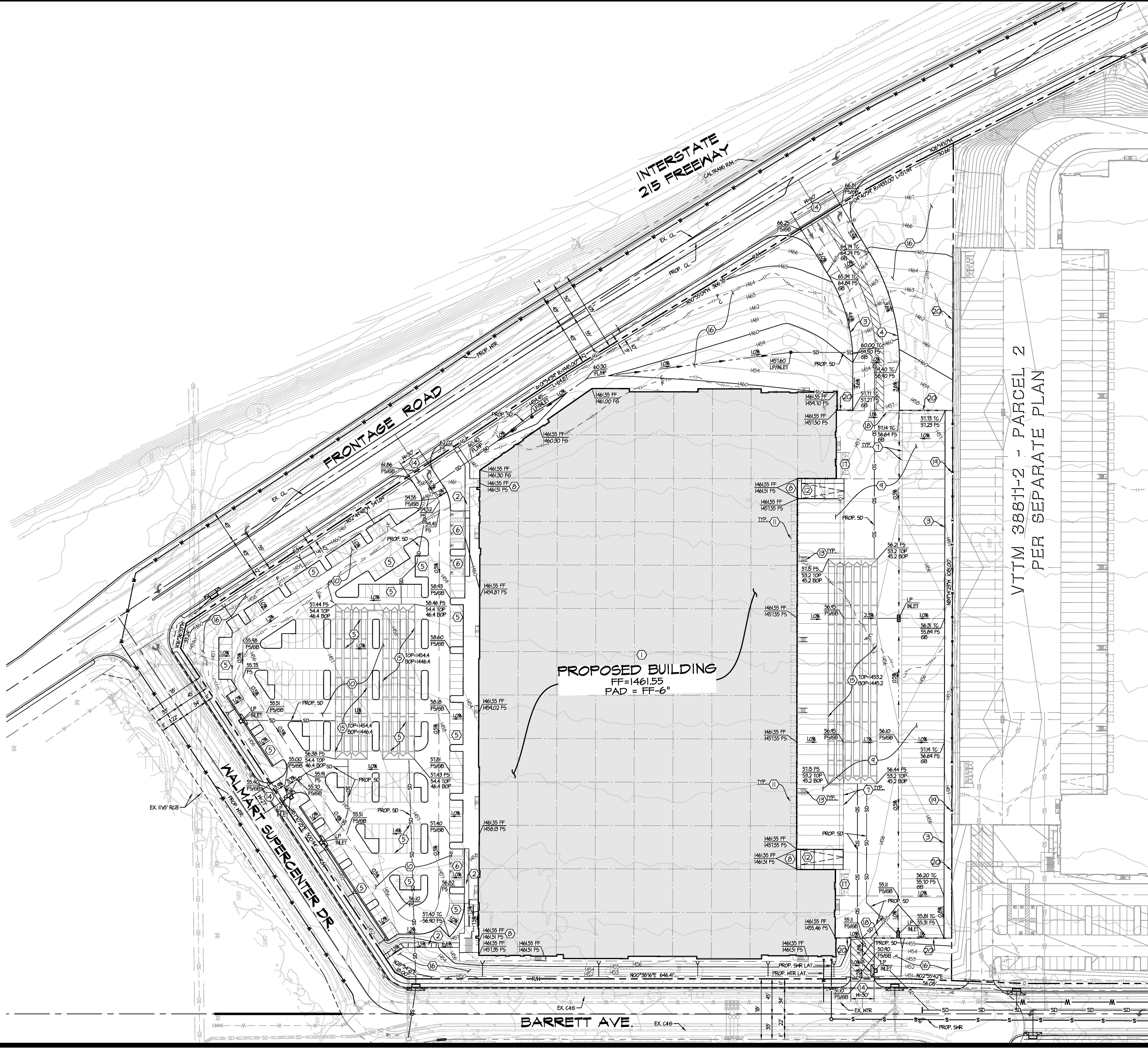


SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER / TRACTOR PARKING STALLS - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. PORTLAND CONC. CEMENT (PCC) PAVED AUTO PARKING ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD.207A, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
16. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
17. APPROXIMATE LOCATION OF TRASH ENCLOSURE
18. ENTRY GATE PER ARCHITECT'S PLANS
19. CHAIN LINK FENCE PER ARCHITECT'S PLANS
20. SCREEN WALL PER ARCHITECT'S PLANS (COMBO RETAINING)

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
SITE #7 CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-2 - PARCEL 3

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF.:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 2 OF 2 SHEETS

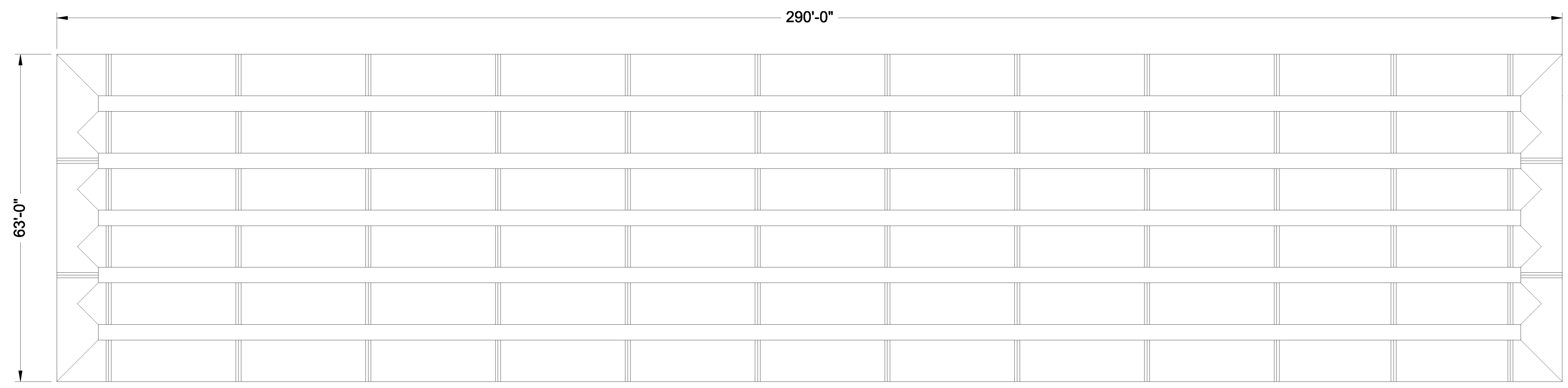
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 1,770 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 88,970 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 88,970 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 30'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH
CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO60569 20-001 Harvest Landing Retail Center and Business Park
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42851	60569	10/3/2024

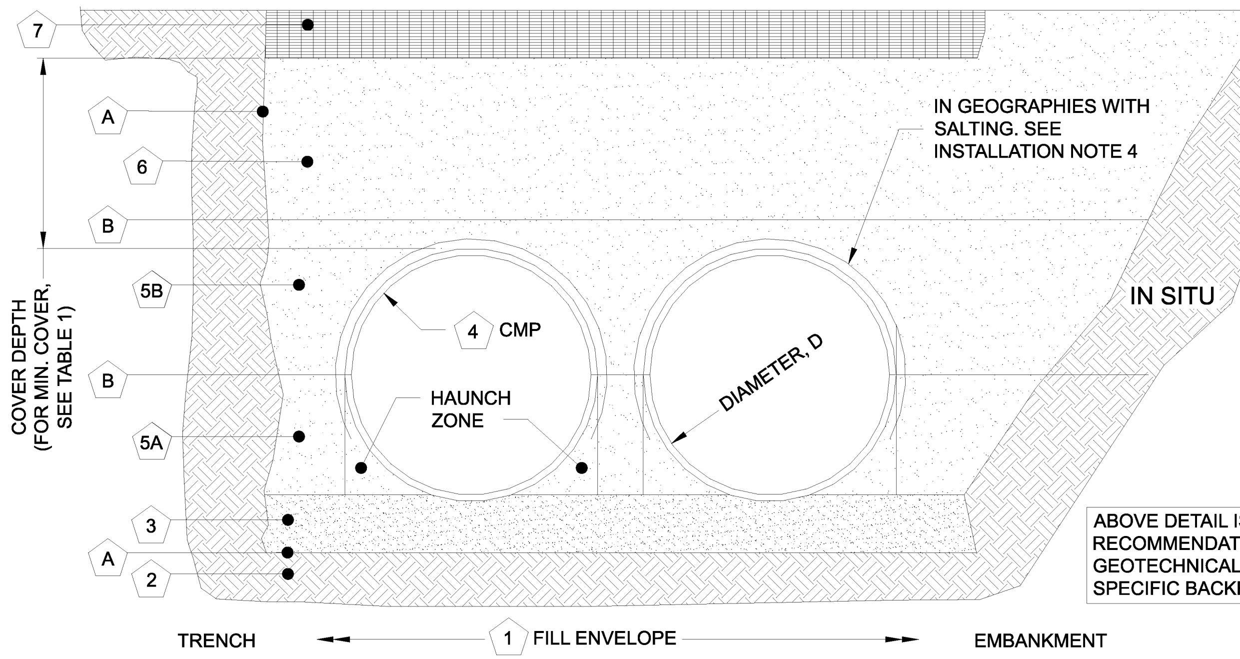
DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	**APPROVED:**
DYO	DYO

SHEET NO.: 1

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12" MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1
4	CORRUGATED METAL PIPE		
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**	
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
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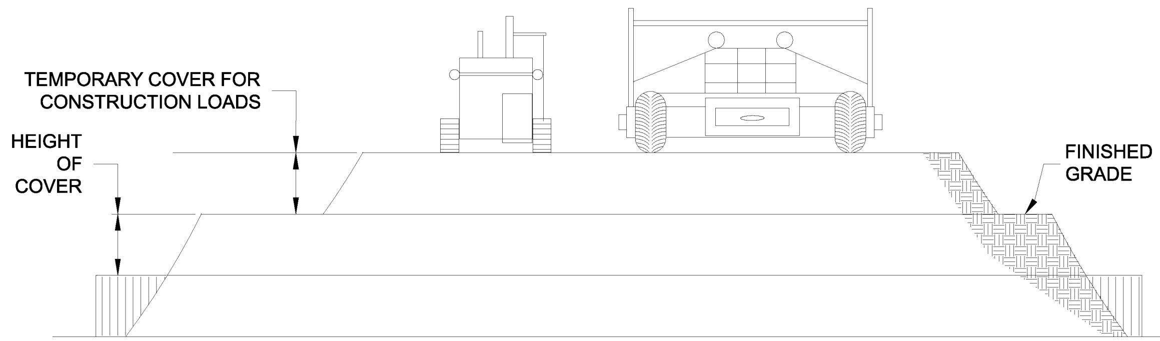
CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO60569 20-001 Harvest Landing Retail Center and Business Park
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42851	60569	10/3/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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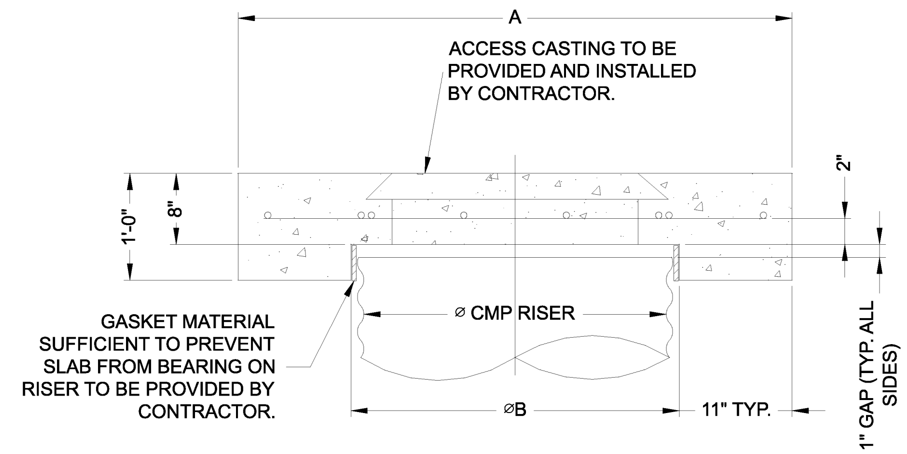
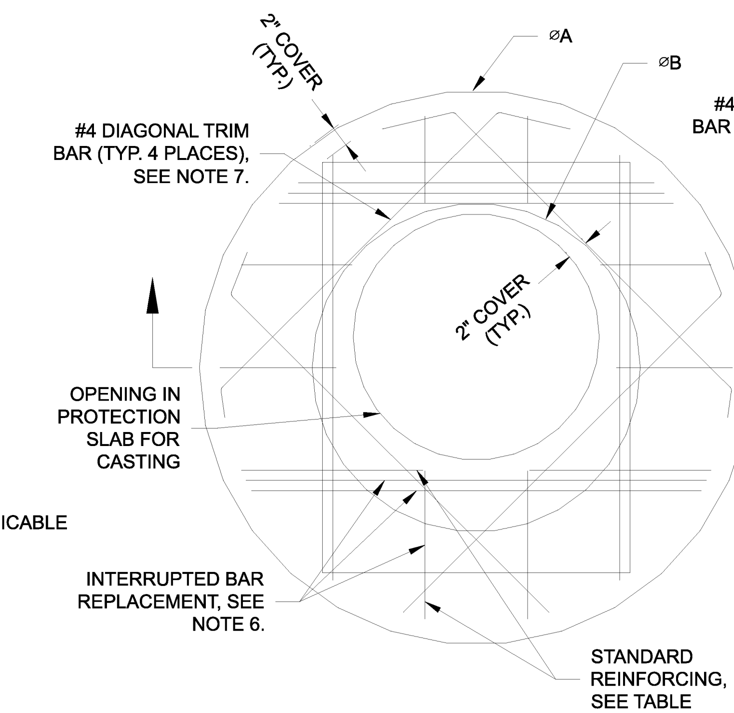


SECTION VIEW

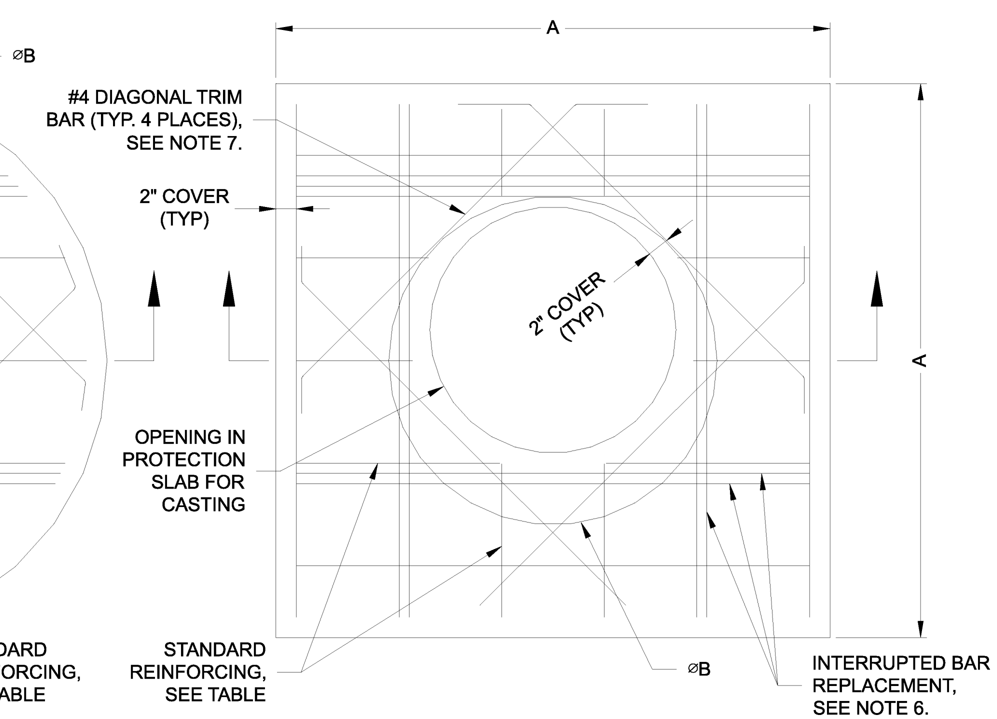
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO60569 20-001 Harvest Landing Retail Center and Business Park
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 42851	SEQ. No.: 60569	DATE: 10/3/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

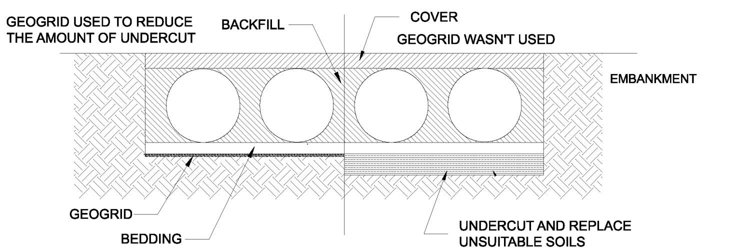
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

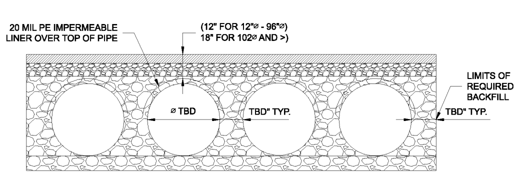
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

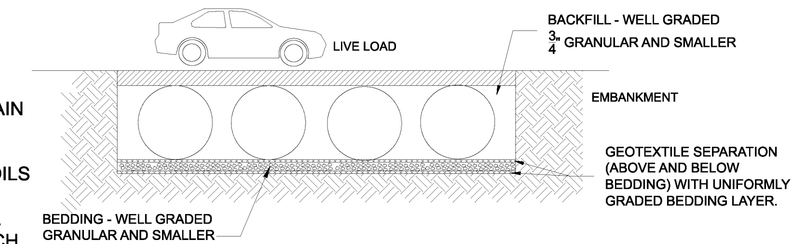
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

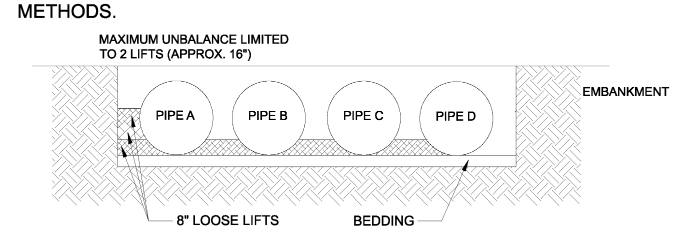
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



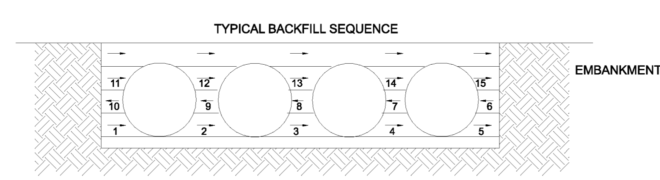
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

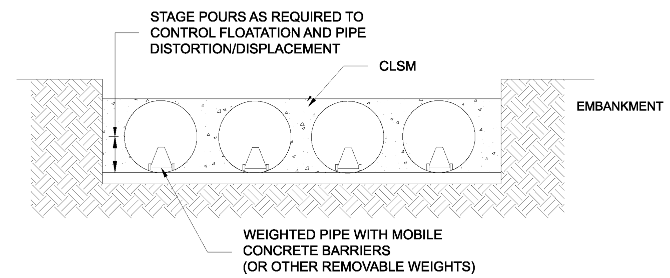


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

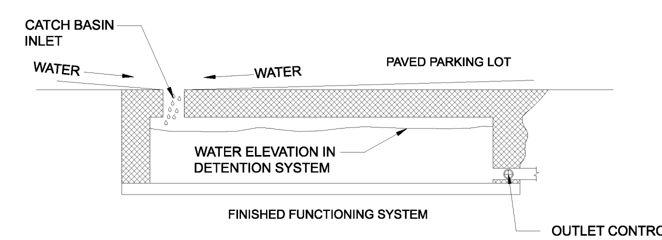


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO60569 20-001 Harvest Landing Retail Center and Business Park
Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42851	60569	10/3/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

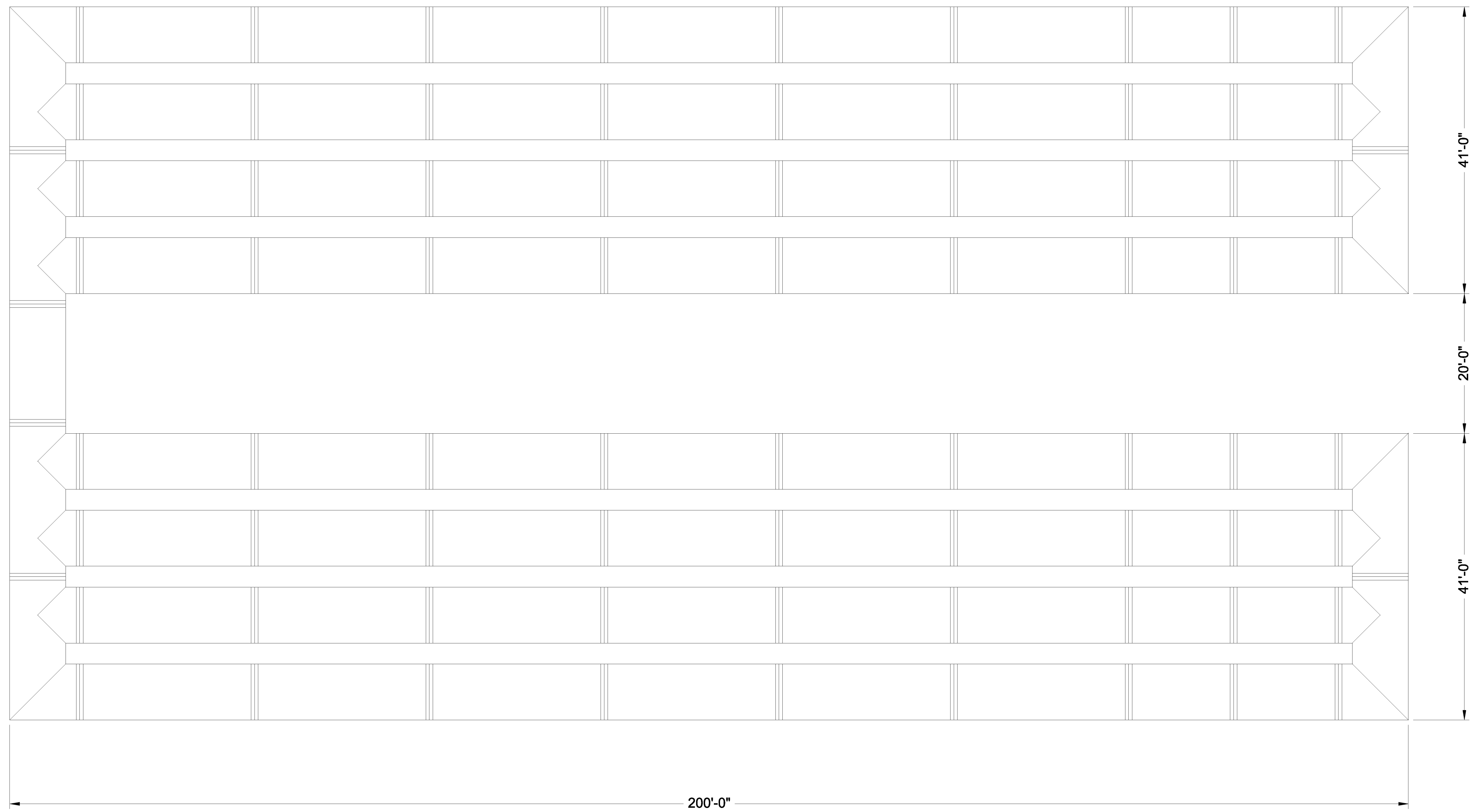
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 1,656 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 83,240 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 83,240 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 20'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO60570 20-001 Harvest Landing Retail Center and Business Park - Site 7
Southerly Chambers
Perris, CA
DETENTION SYSTEM

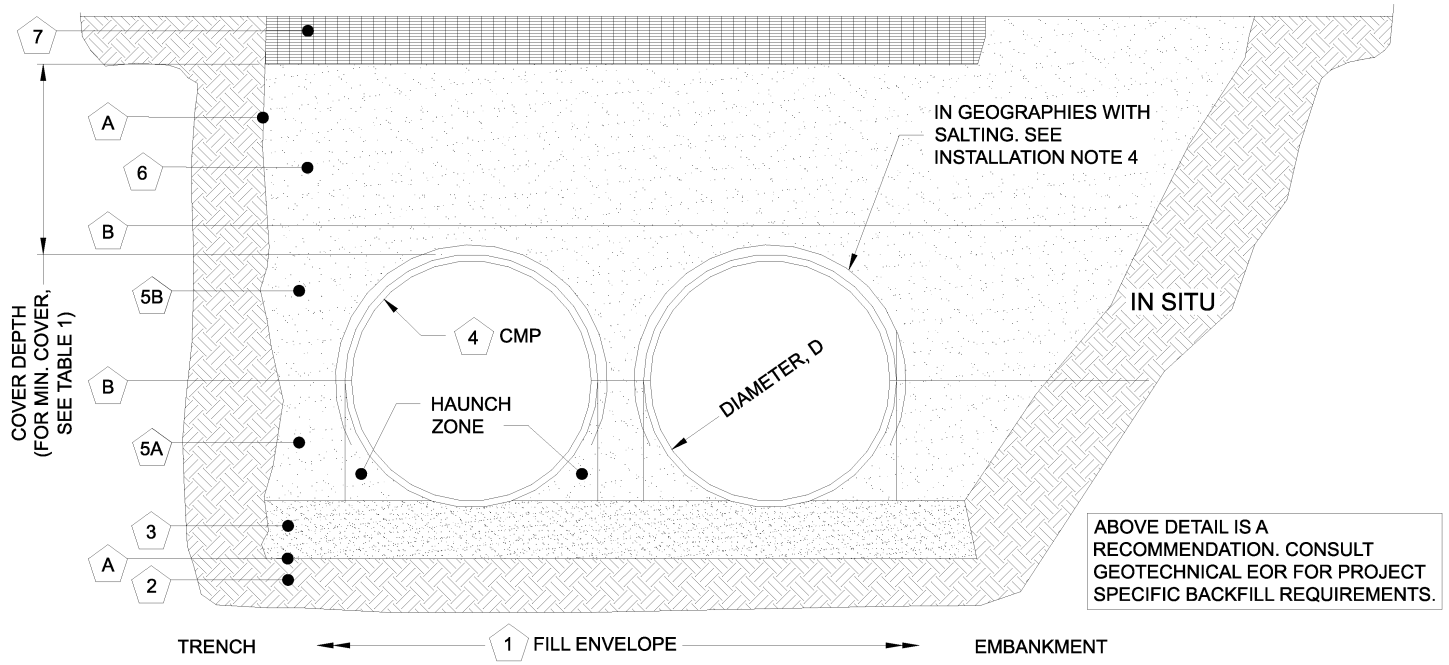
PROJECT No.:	SEQ. No.:	DATE:
42852	60570	10/3/2024

DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO
SHEET No.:	
	1

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12" MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1
4	CORRUGATED METAL PIPE		
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**	
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.

NOTES:

- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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CONTECH CMP DETENTION SYSTEMS

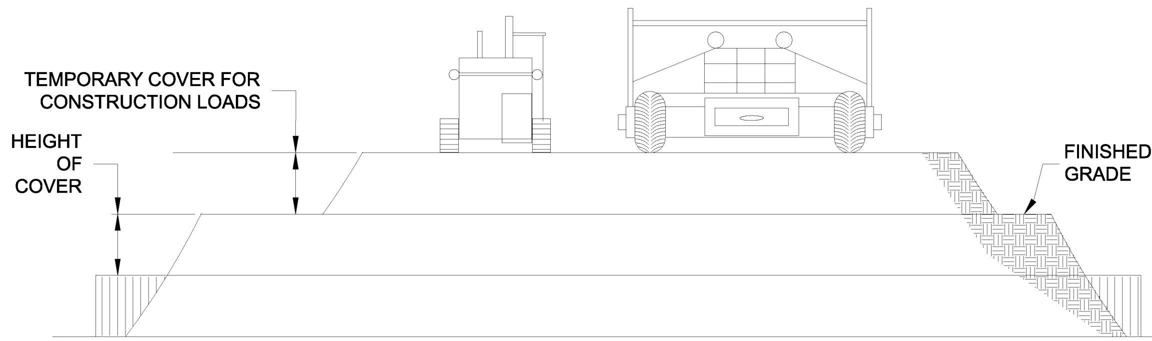
CONTECH DYODS DRAWING

DYO60570 20-001 Harvest Landing Retail Center and Business Park - Site 7
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42852	60570	10/3/2024

DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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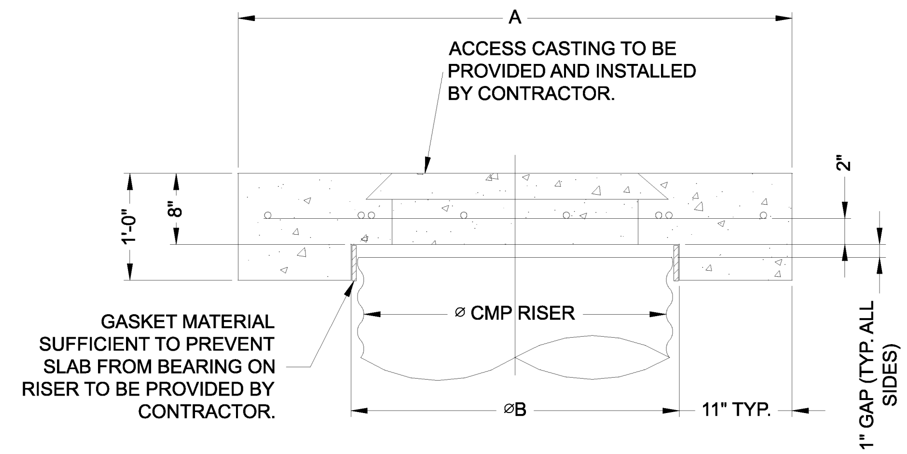
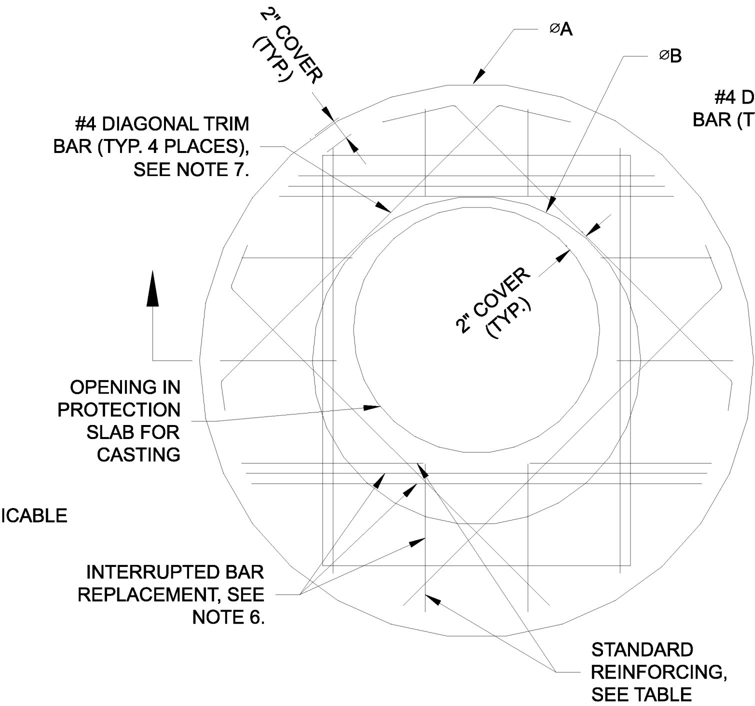


SECTION VIEW

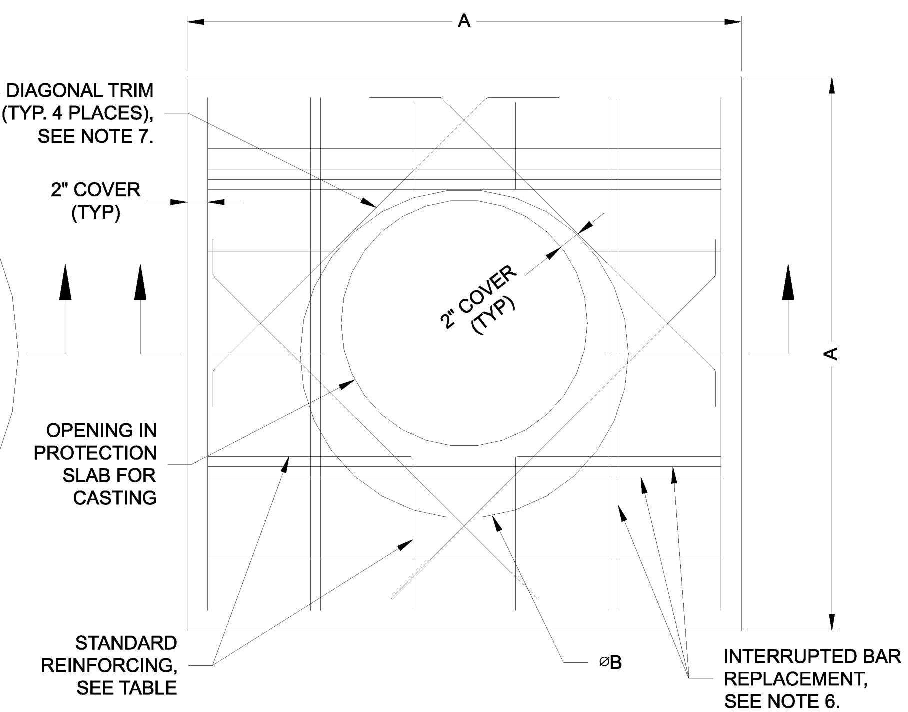
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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DYO60570 20-001 Harvest Landing Retail Center and Business Park - Site 7
Southerly Chambers
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DETENTION SYSTEM

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DESIGNED:	DRAWN:
DYO	DYO
CHECKED:	APPROVED:
DYO	DYO

SHEET NO.: 1

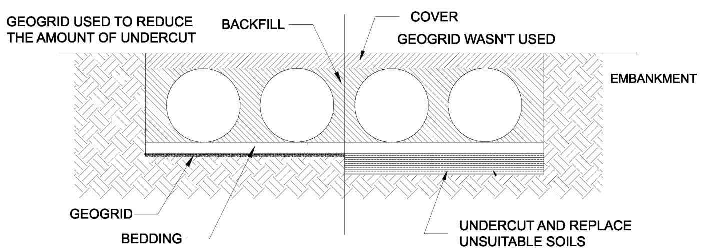
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

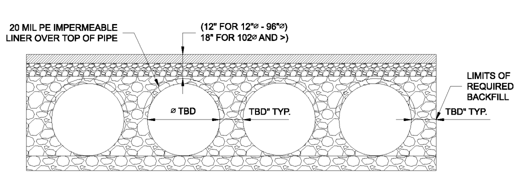
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

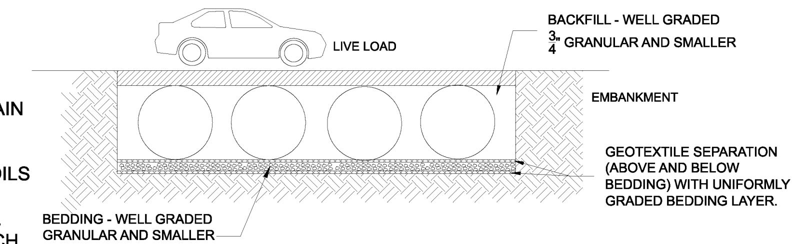
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

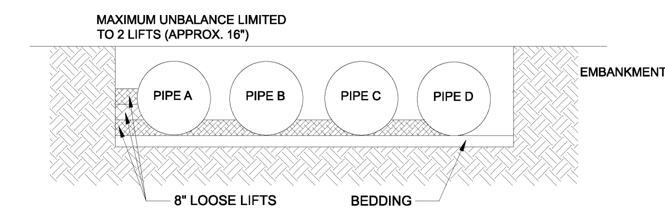
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

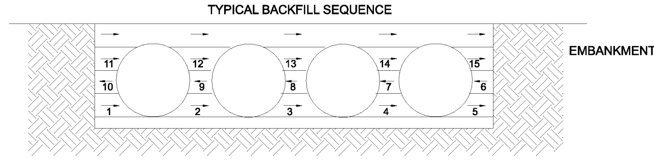
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



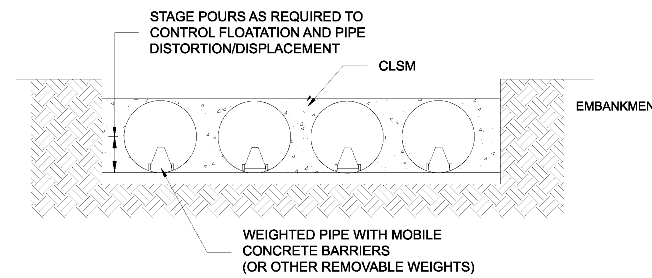
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

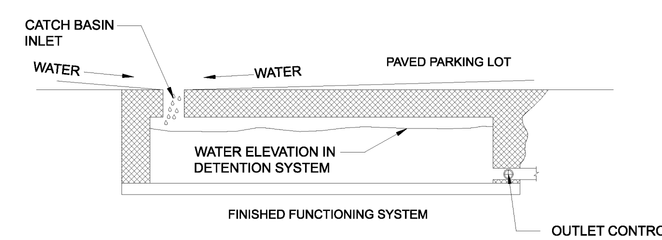


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO60570 20-001 Harvest Landing Retail Center and Business Park - Site 7
Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
42852	60570	10/3/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

LEGEND

(1025)	EXISTING CONTOUR
1025	PROPOSED CONTOUR
	RETAINING WALL
	FENCE
	EDGE OF PAVEMENT
	SIGN
MH	MANHOLE
	RIGHT OF WAY
	EASEMENT
	PARCEL LINE
	PARCEL MAP BOUNDARY
	STREET CENTER LINE
	SCREEN WALL
	COMBINATION SCREEN/RETAINING WALL
	EXISTING LOT LINE
	RIDGE LINE
	RIBBON GUTTER
	FLOW ARROW
	PROPOSED EDGE OF PAVEMENT
W	EXISTING WATER LINE
W	PROPOSED WATER LINE
SS	EXISTING SWR LINE
SS	PROPOSED SEWER LINE
SD	EXISTING STORM DRAIN PIPE
SD	PROPOSED STORM DRAIN PIPE
E	EXISTING OVERHEAD LINES
	CUT/FILL LINE
	SLOPE SYMBOL

ZONING ORDINANCE

EXISTING ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

PROPOSED ZONING:
HARVEST LANDING SPECIFIC PLANS - MULTIPLE BUSINESS USE (MBU)

ASSESSOR'S PARCEL NUMBERS:

305-110-015, 016, 022 thru 027, 032 thru 035, &
305-140-012, 024 thru 027, 031, 032, 034, 040, 041, 049 thru 050, 052 thru 061

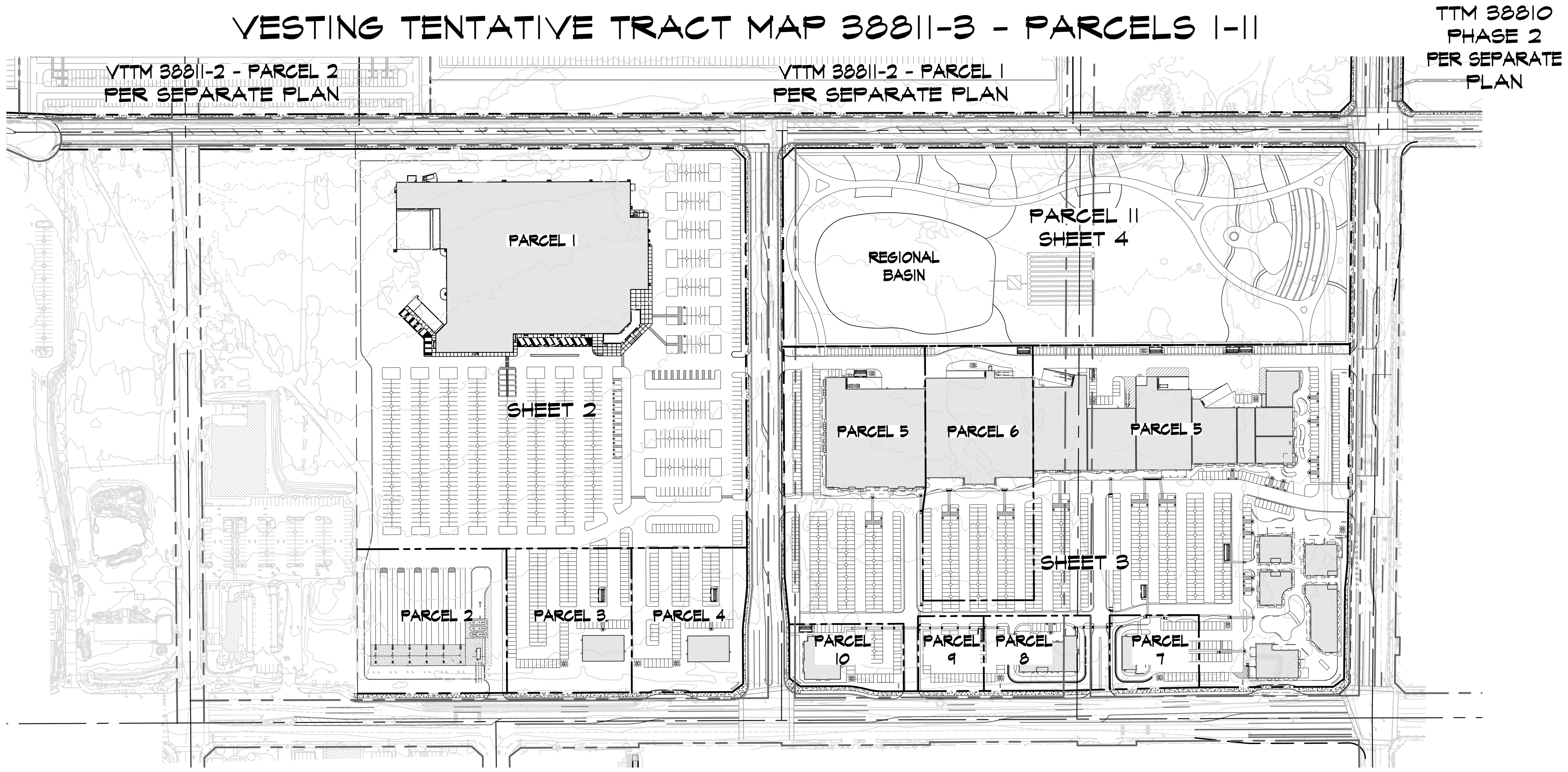
LEGAL DESCRIPTION

BLOCKS 1-3, 8-14, AND 19-20 OF FIGADOTA FARMS NO. 6 AS SHOWN BY MAP ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, IN BOOK 16 OF MAPS, PAGE 77.

IN THE CITY OF PERRIS,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

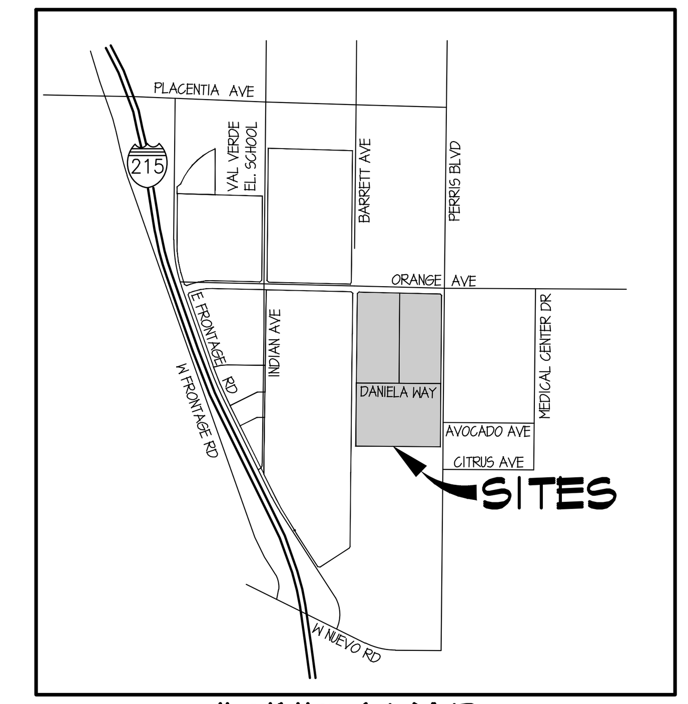
HARVEST LANDING RETAIL CENTER & BUSINESS PARK
CONCEPTUAL GRADING & DRAINAGE PLAN

VESTING TENTATIVE TRACT MAP 38811-3 - PARCELS 1-11



INDEX MAP

200 100 0 200 400 600
SCALE: 1"=200'



VICINITY MAP
T4S, R3W, SEC 19
NOT TO SCALE

APPLICANT/OWNER

HOWARD INDUSTRIAL PARTNERS
2244 NORTH PACIFIC STREET
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-637-3333

ENGINEER

FMCIVIL ENGINEERS INC.
41870 KALMIA ST., SUITE 120
MURRIETA, CA 92562
CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0202

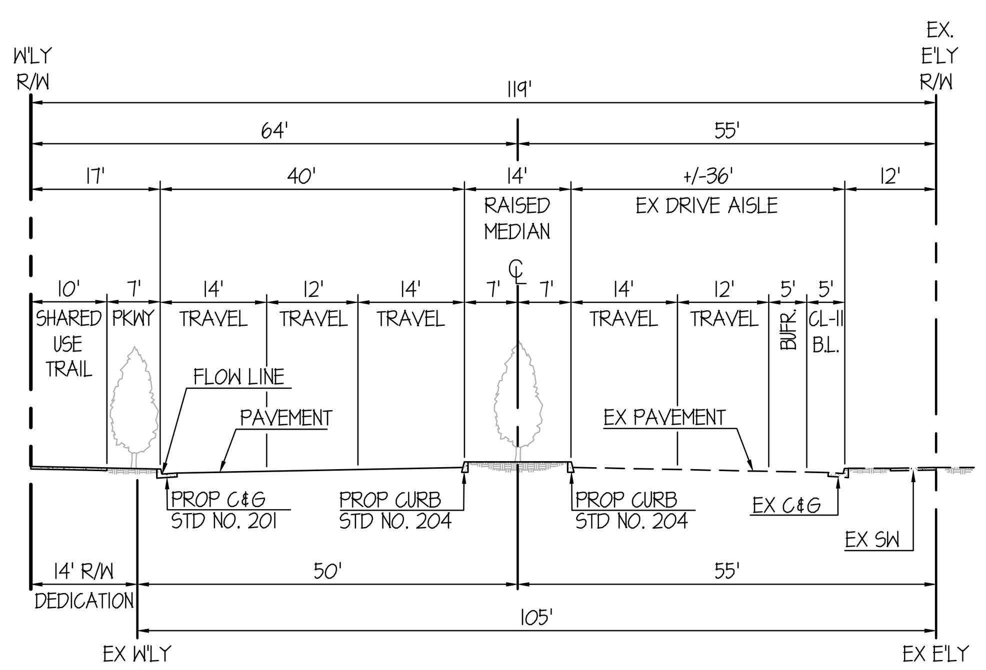
ARCHITECT

MMA ARCHITECTURE
120 WEST LIME AVE.
MONROVIA, CA 91016
CONTACT: DANIEL KIM
(TEL)626-583-8348

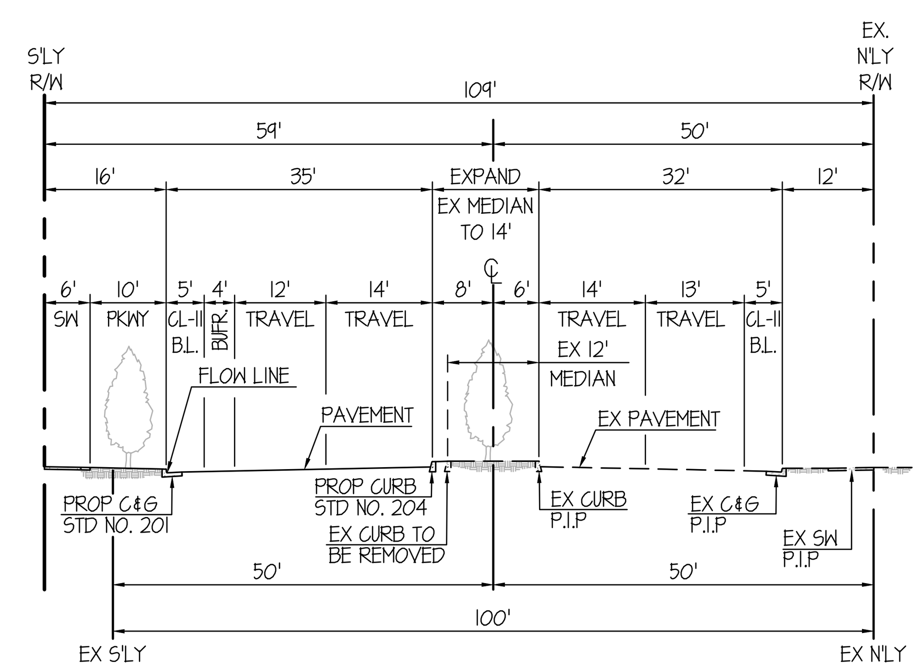
EARTHWORK ESTIMATE:

RAW CUT:	6,665 CY	
RAW FILL:	261,405 CY	
NET:	254,740 CY	IMPORT

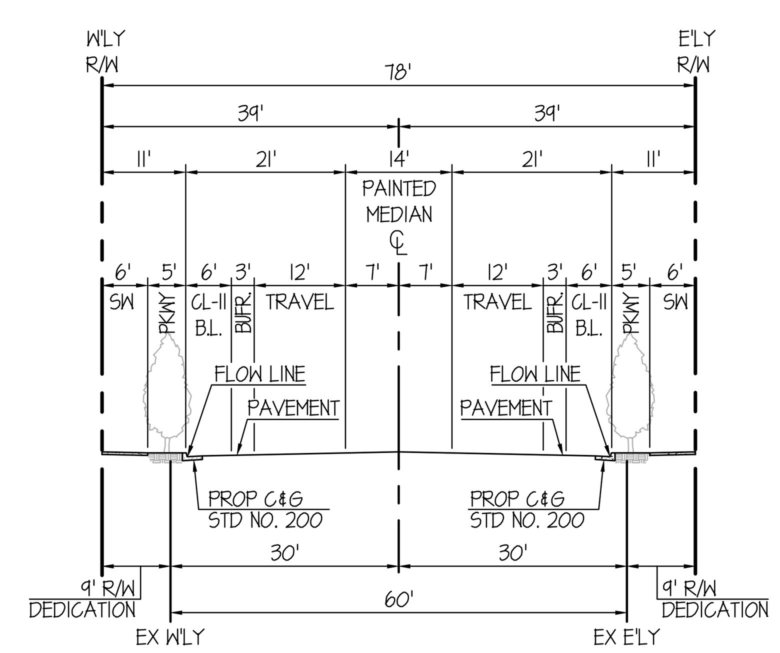
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 19,595



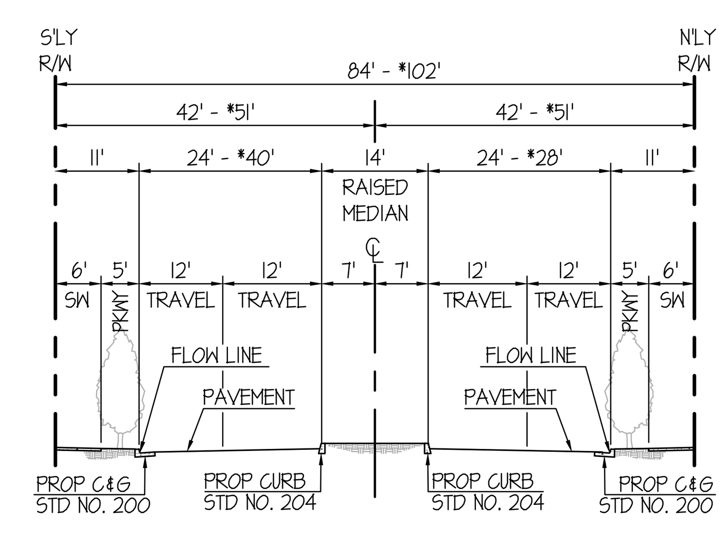
PERRIS BOULEVARD
PRIMARY ARTERIAL
(119'/90')



ORANGE AVENUE
(WEST OF PERRIS BLVD)
SECONDARY ARTERIAL
(109'/81')



BARRETT AVE
(N'LY WALMART DWY - ORANGE AVE)
MAJOR COLLECTOR
(78'/56')



*PROPOSED DIMENSIONS FOR INTERSECTION WITH PERRIS BLVD.

DANIELA WAY
MODIFIED COLLECTOR
(84'/62')

CITY OF PERRIS		
HARVEST LANDING RETAIL CENTER & BUSINESS PARK CONCEPTUAL GRADING & DRAINAGE PLAN VESTING TENTATIVE TRACT MAP 38811-3 - PARCELS 1-12		
SCALE: AS SHOWN DATE: OCT. 2024 DESIGNED: AJ CHECKED: FM PLN CK REF:	FMCIVIL ENGINEERS INC. 41870 KALMIA STREET, SUITE 120 MURRIETA CA 92562 951.973.0202 - FMCIVIL.COM	SHEET 1 OF 4 SHEETS

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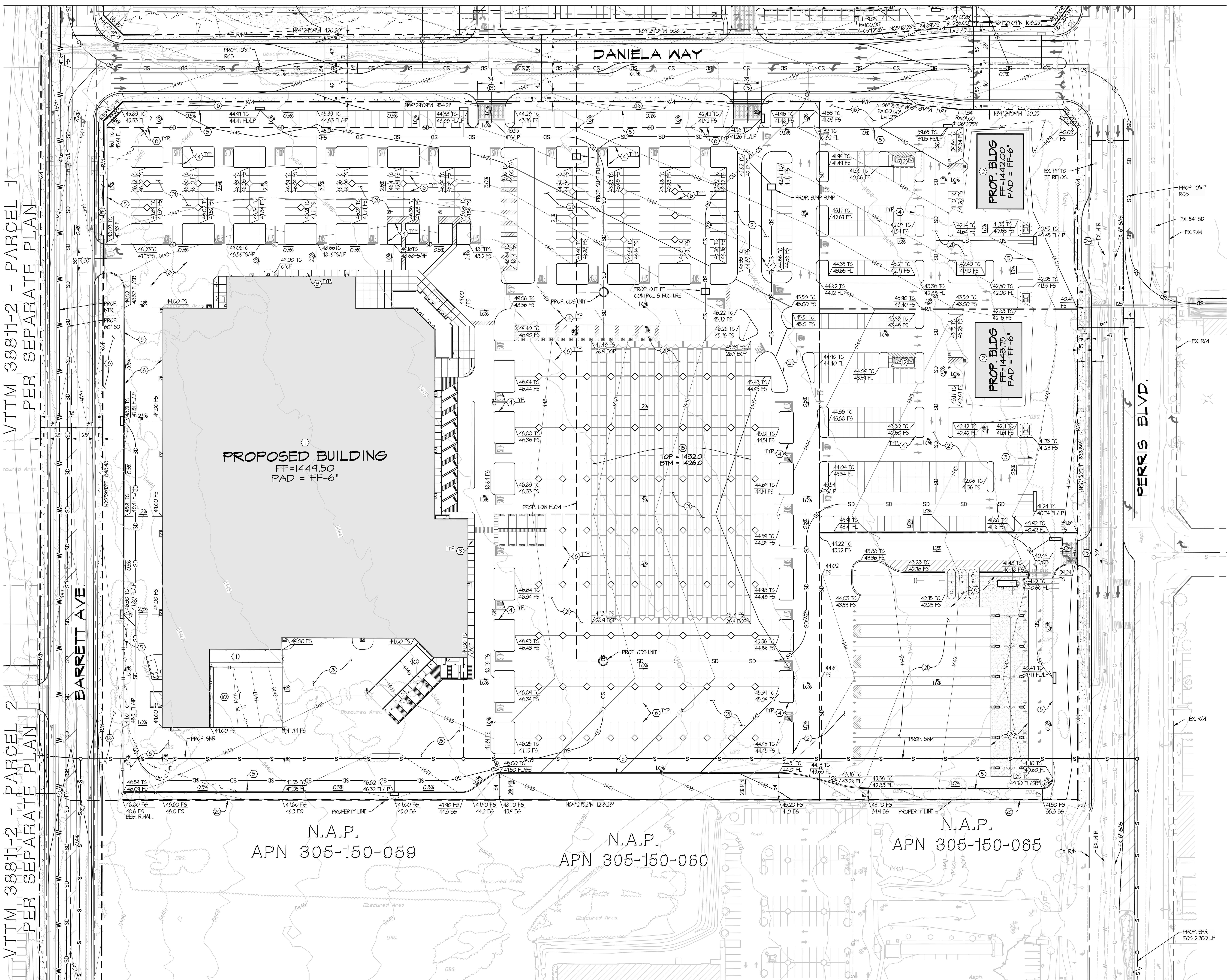
SEE SHEET 3



SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP RETAIL / RESTAURANT FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. PAINTED STUCCO FRAMING RETAIL / RESTAURANT FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
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4. CONCRETE CURB
5. CONCRETE CURB & GUTTER
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12. TRASH ENCLOSURES WITH ROOF PER ARCHITECT'S PLANS
13. COMMERCIAL DRIVEWAY APPROACH PER RIVERSIDE COUNTY STD. 207A
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15. UNDERGROUND DETENTION CHAMBER SYSTEM - 96" CMP - TOP AND BOTTOM OF PIPE (BOP) ELEVATION PER PLAN
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17. CHAIN LINK FENCE PER ARCHITECT'S PLANS
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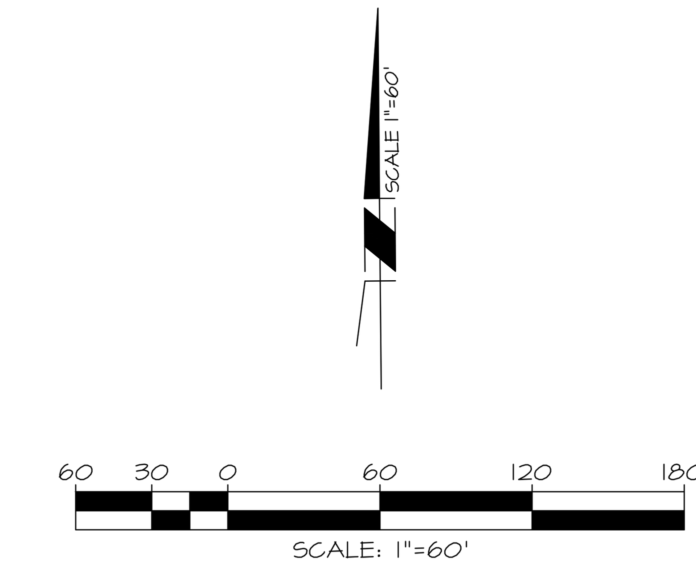
22. PROPOSED CONCRETE RIBBON GUTTER
23. COMPACT PARKING STALL STRIPING PER STANDARDS SHOWN ON ARCHITECT'S PLANS
24. BUS TURNOUT PER RIVERSIDE COUNTY STD. 814

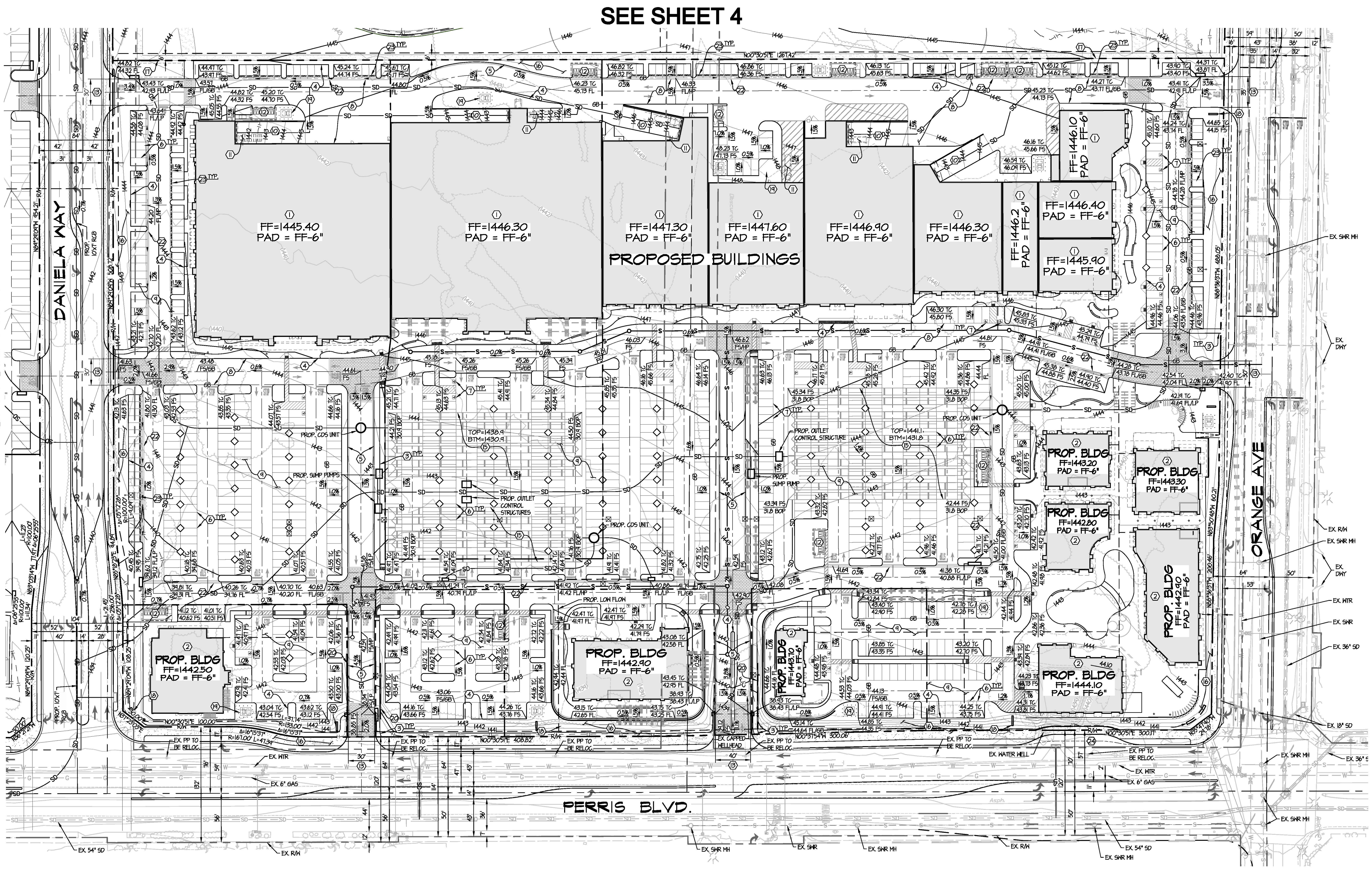


CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-3 - PARCELS 1-4

SCALE: AS SHOWN	FMCIVIL ENGINEERS INC. 41870 KALMIA STREET, SUITE 120 MURRIETA | CA 92562 951.973.0202 - FMCIVIL.COM	SHEET 2 OF 4 SHEETS
DATE: OCT. 2024		
DESIGNED: AJ		
CHECKED: FM		
PLN CK REF:		

H:\PDATA\20-001 HARVEST LANDING\DWGS\PLNG\ENTITLEMENT\CUP\ALT-3\RETAIL\20-001-CUP_RETAIL-CG-01.DWG ALLAN 10/10/2024 4:07 PM



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24. BUS TURNOUT PER RIVERSIDE COUNTY STD. 814

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-3 - PARCELS 5-10

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

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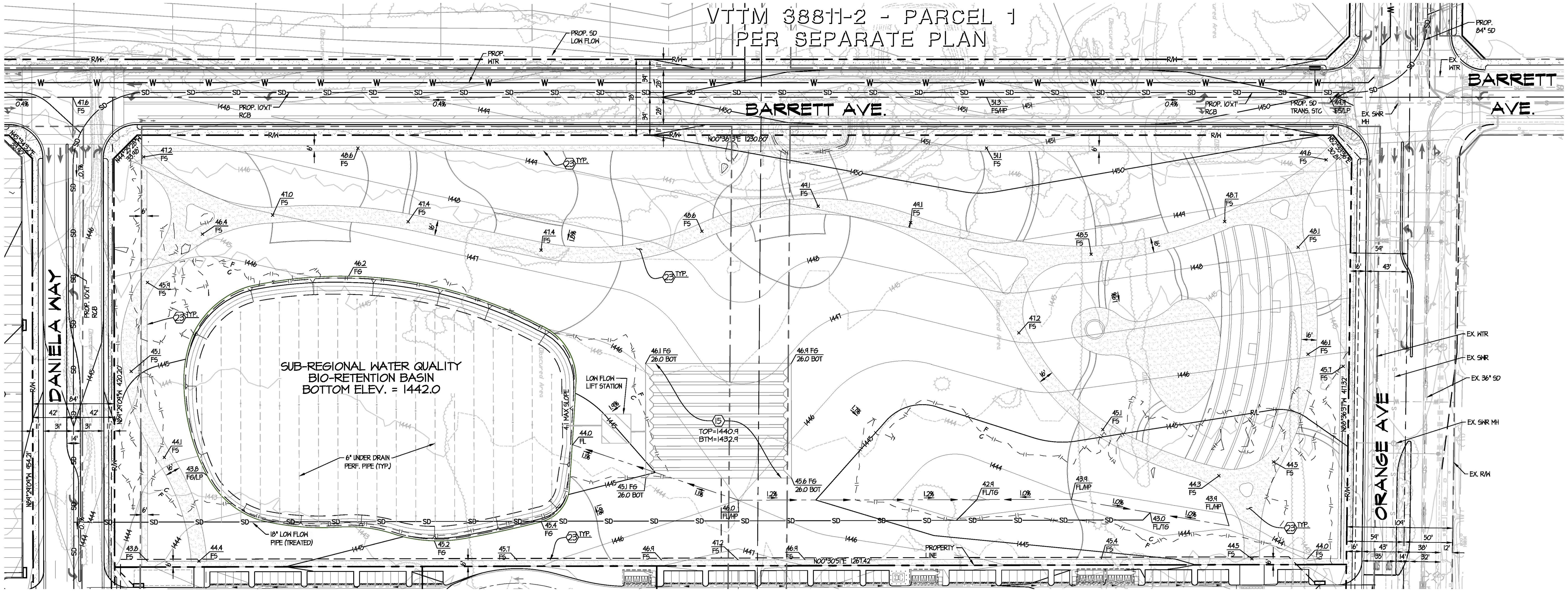
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 3 OF 4 SHEETS

SEE SHEET 2



SEE SHEET 3

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SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

CITY OF PERRIS

HARVEST LANDING RETAIL CENTER & BUSINESS PARK
CONCEPTUAL GRADING & DRAINAGE PLAN
VESTING TENTATIVE TRACT MAP 38811-3 - PARCEL 11

SCALE:	AS SHOWN
DATE:	OCT. 2024
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
41870 KALMIA STREET, SUITE 120
MURRIETA | CA 92562
951.973.0202 - FMCIVIL.COM

SHEET 4 OF 4 SHEETS

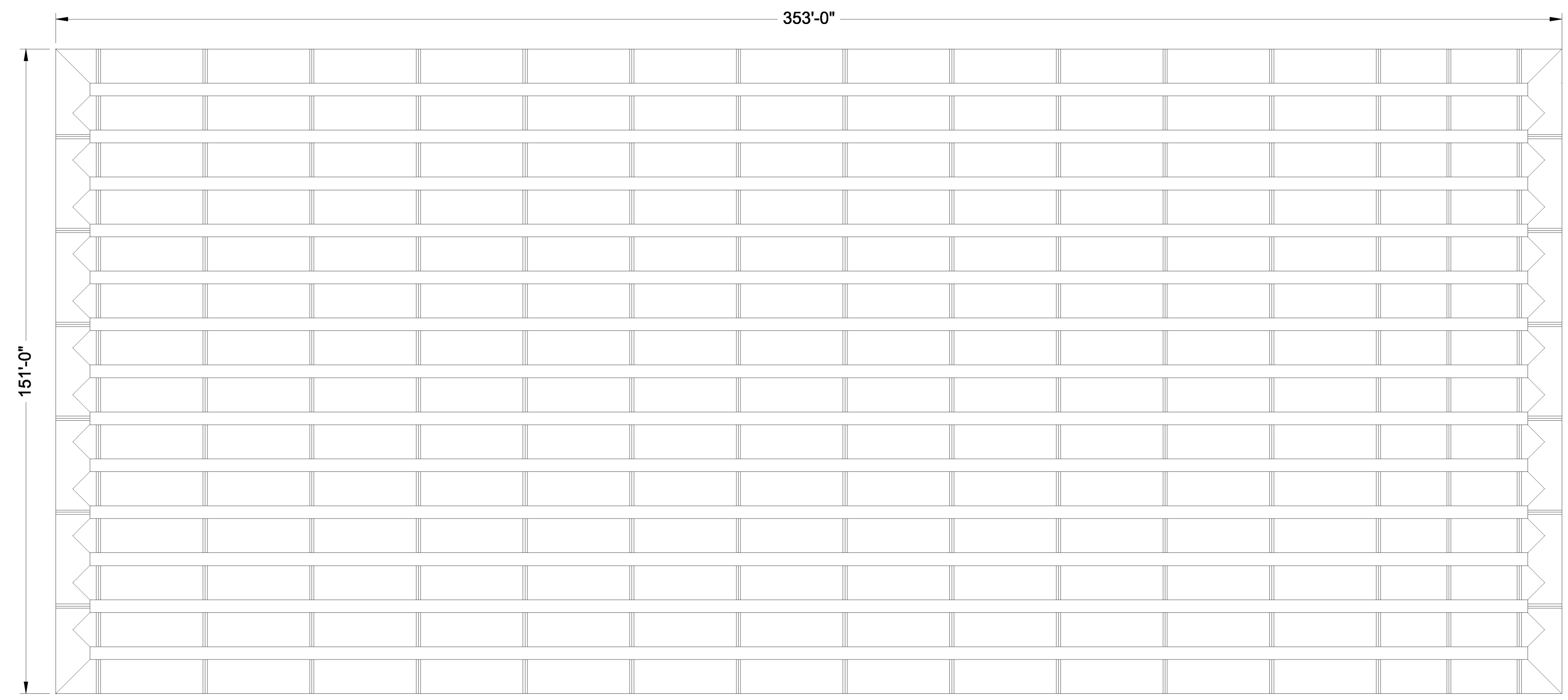
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 5,020 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 252,333 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 252,333 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 40'

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CONTECH® CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

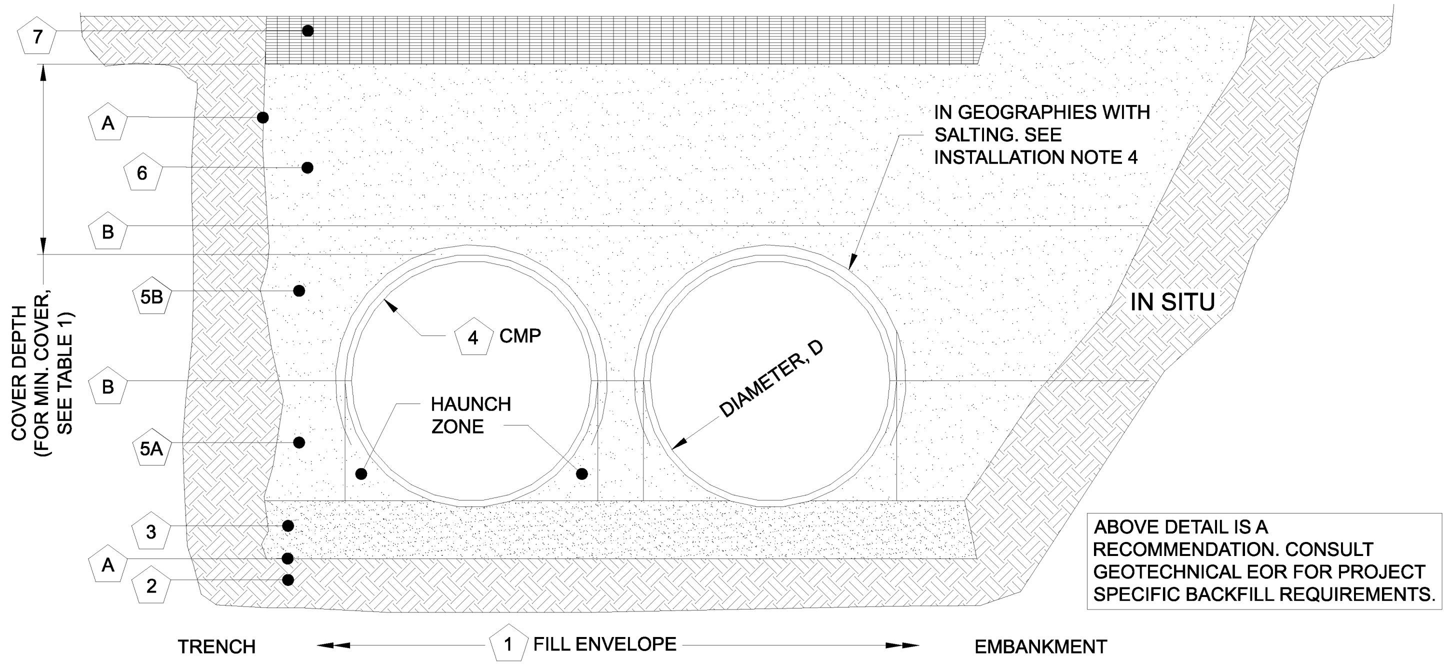
DYO36518 20-001 Harvest Landing Retail Center and Business Park
VTTM 38811-3, PARCELS 1-4
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24787	36518	10/3/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION



MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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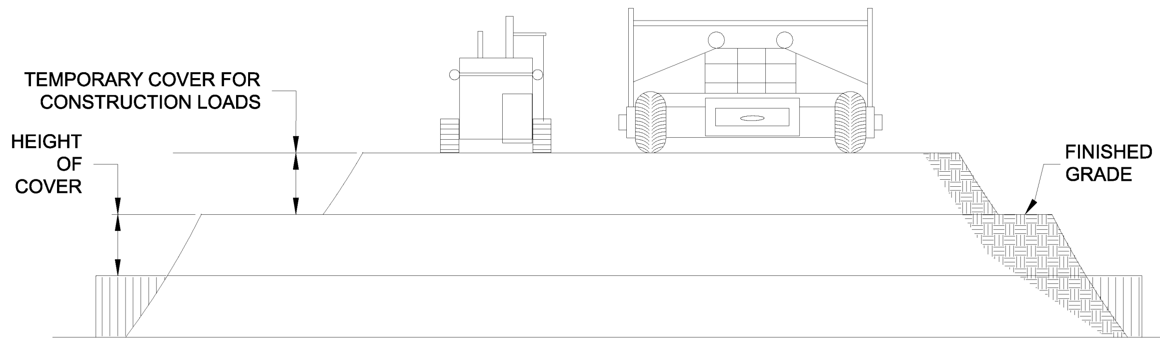
CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36518 20-001 Harvest Landing Retail Center and Business Park
VTTM 38811-3, PARCELS 1-4
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24787	SEQ. No.: 36518	DATE: 10/3/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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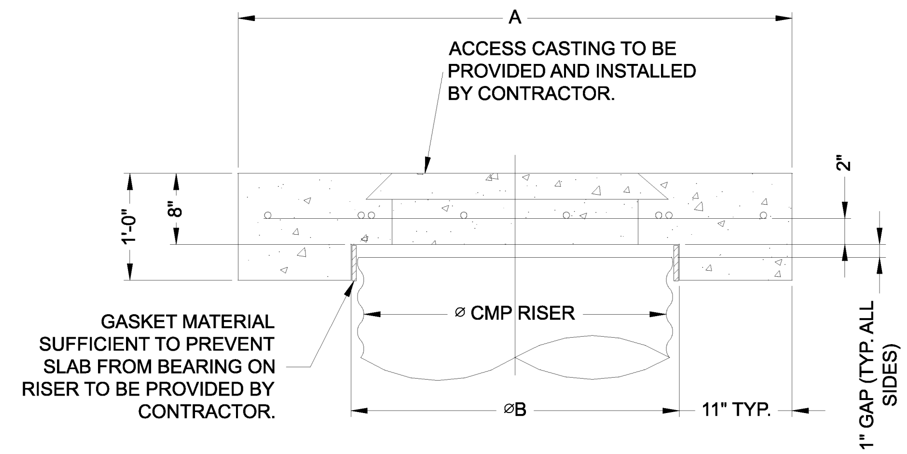
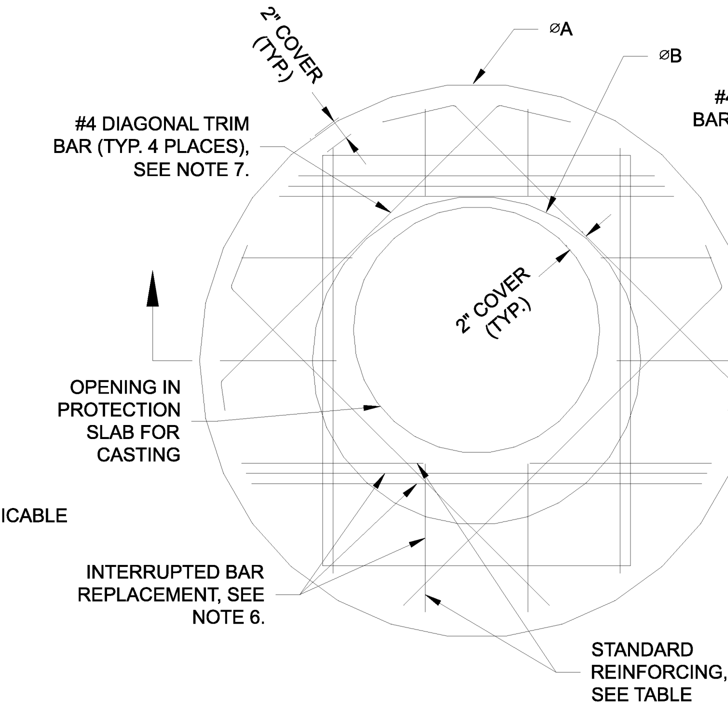


SECTION VIEW

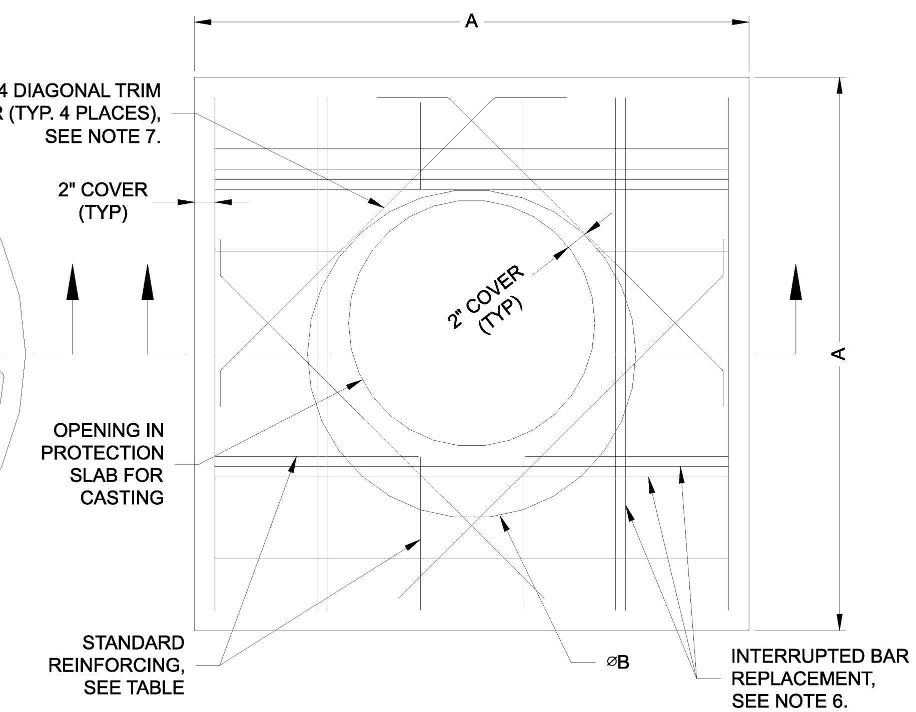
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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DYO36518 20-001 Harvest Landing Retail Center and Business Park
VTTM 38811-3, PARCELS 1-4
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DETENTION SYSTEM

PROJECT No.: 24787	SEQ. No.: 36518	DATE: 10/3/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

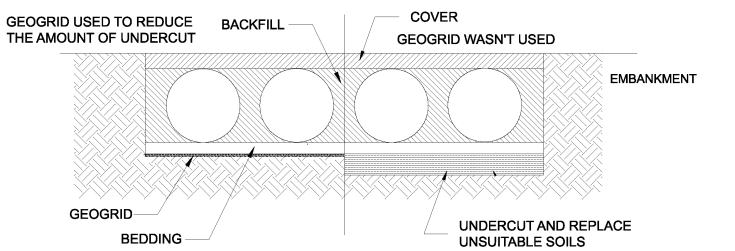
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

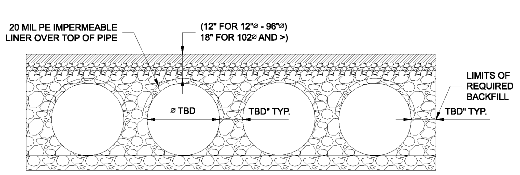
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

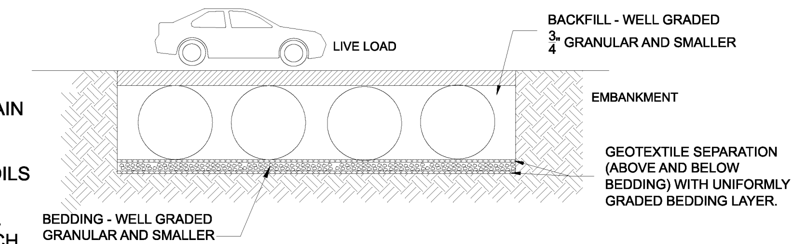
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

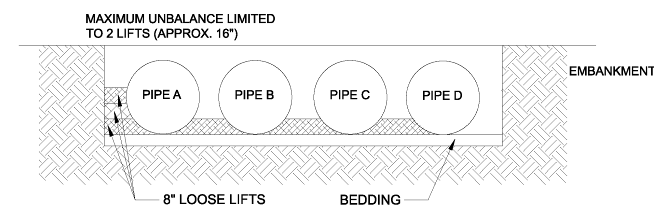
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



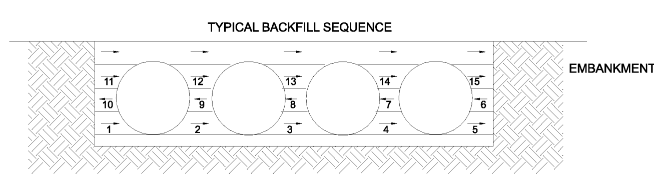
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

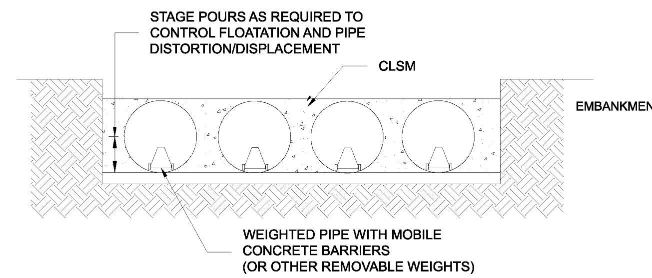


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

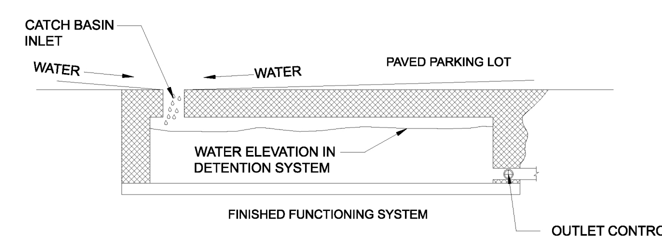


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO36518 20-001 Harvest Landing Retail Center and Business Park
VTTM 38811-3, PARCELS 1-4
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24787	SEQ. No.: 36518	DATE: 10/3/2024
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

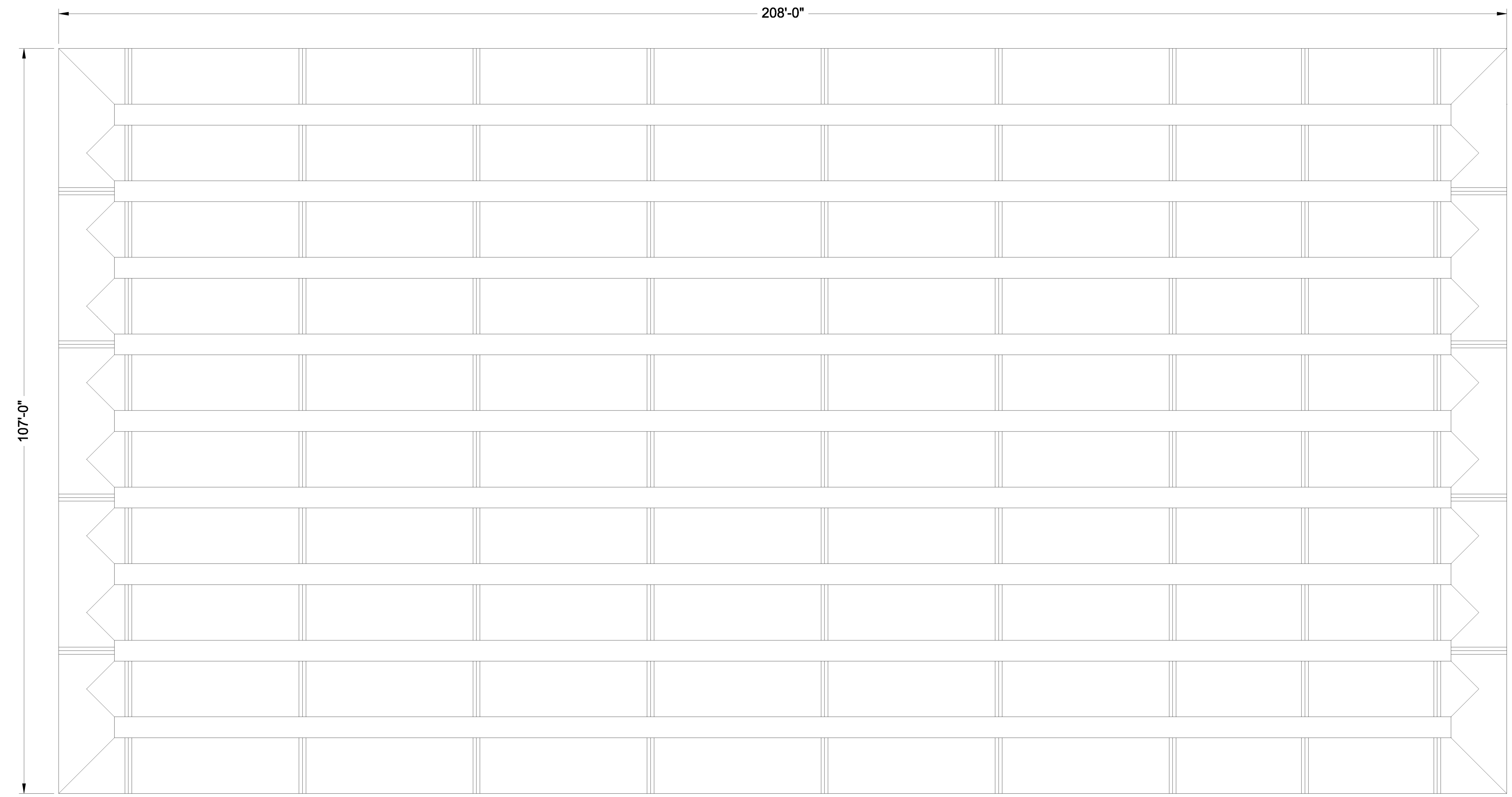
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,134 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 107,267 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 107,267 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 20'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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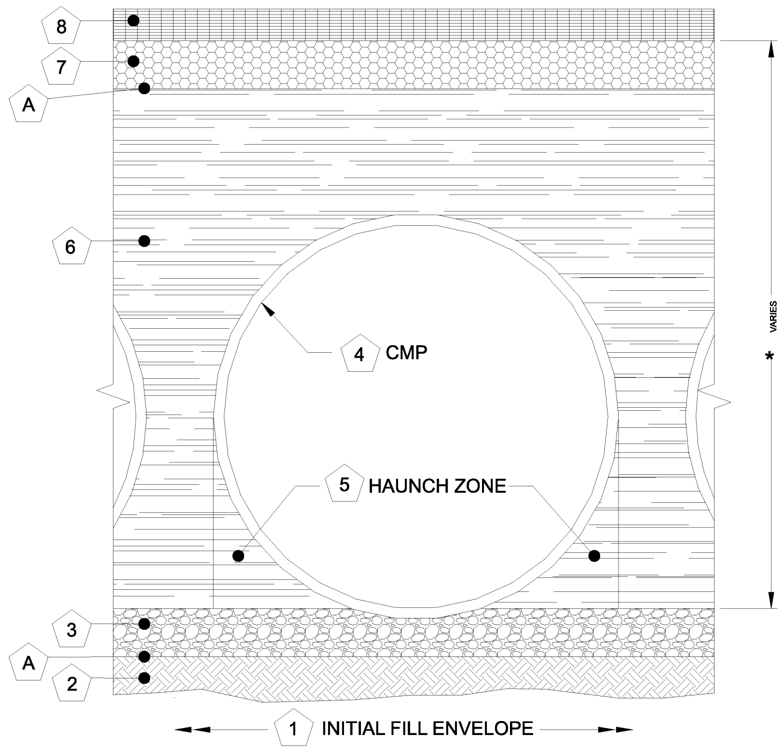
CONTECH® CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO36317 20-001 Harvest Landing Retail Center and Business Park
Retail System - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24648	SEQ. No.: 36317	DATE: 9/26/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



	DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

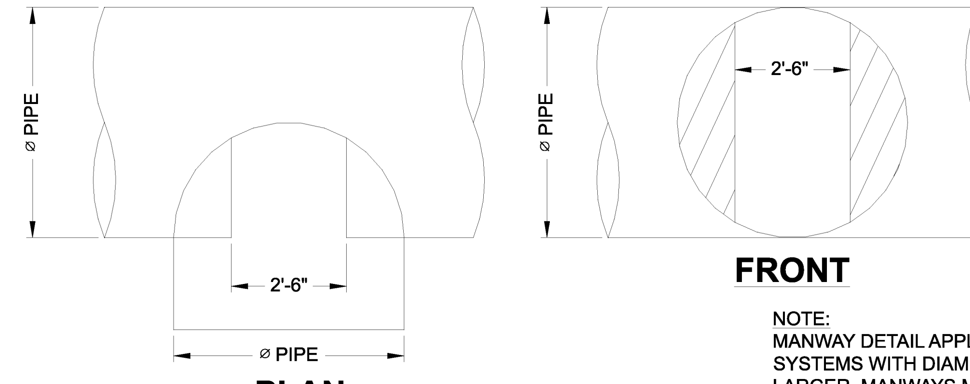
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



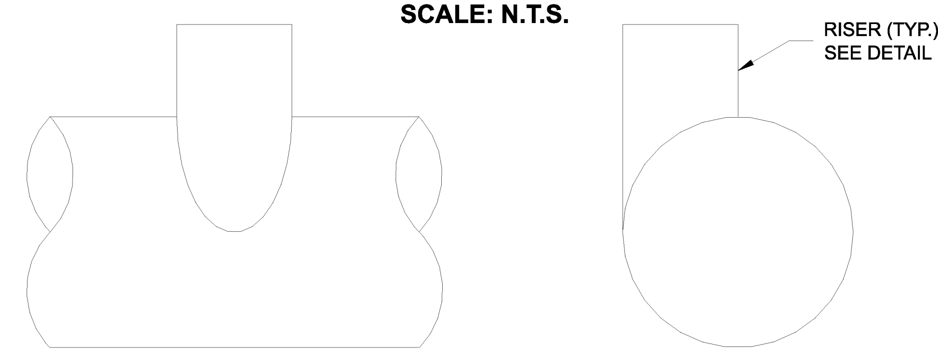
PLAN

FRONT

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



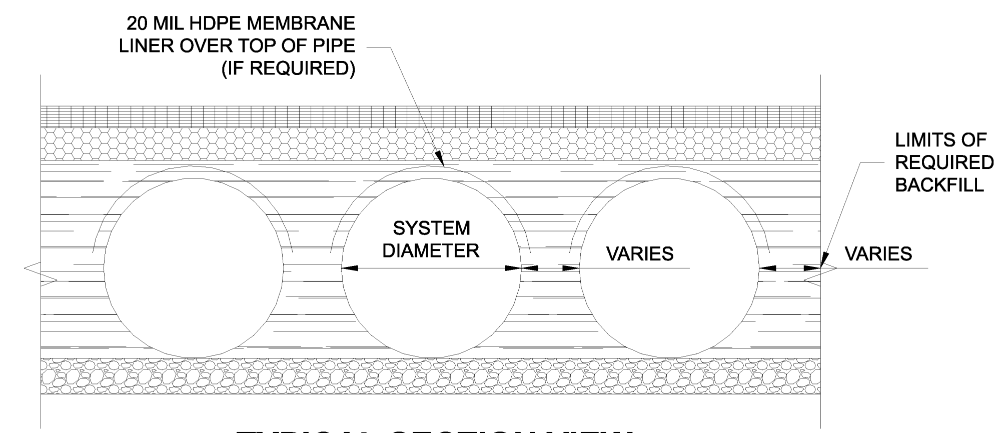
ELEVATION

END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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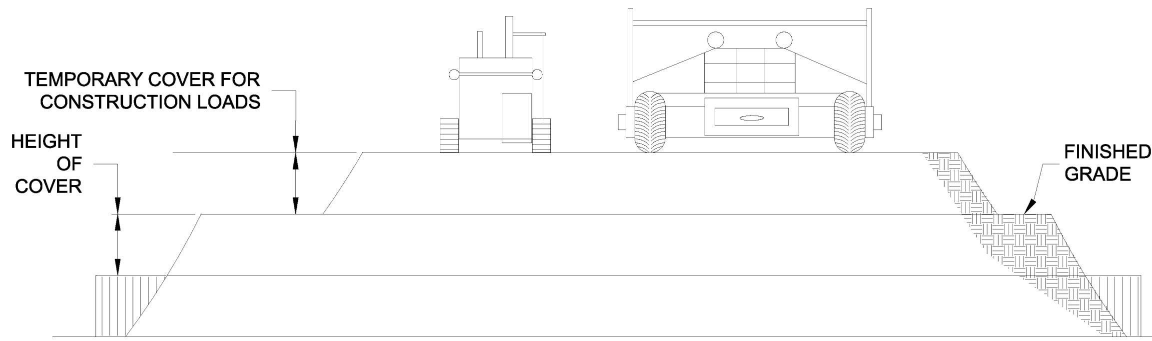
CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO36317 20-001 Harvest Landing Retail Center and Business Park
Retail System - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24648	36317	9/26/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		



CONSTRUCTION LOADS

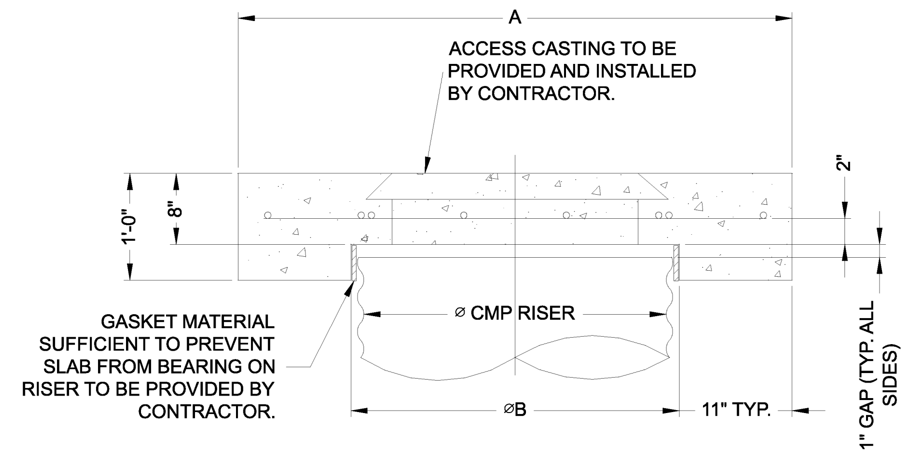
FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

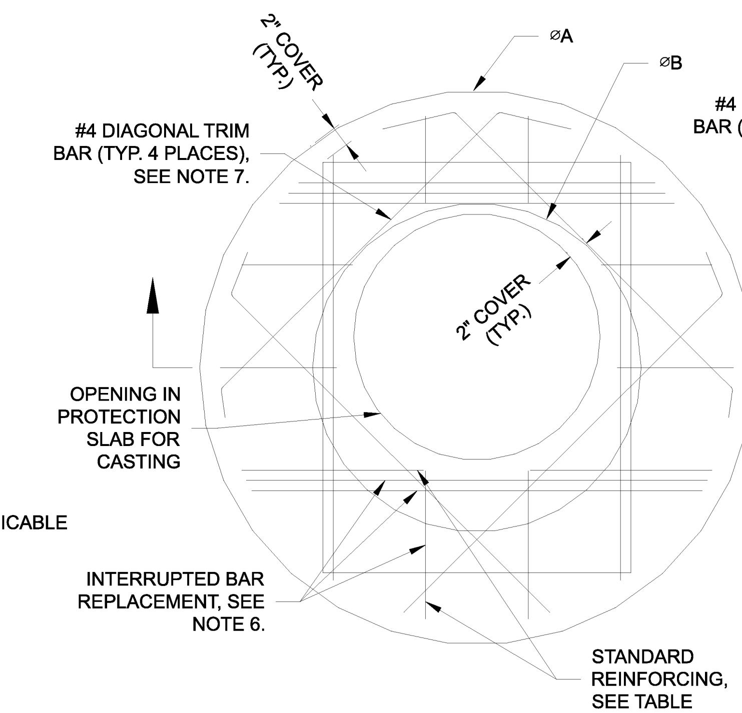


SECTION VIEW

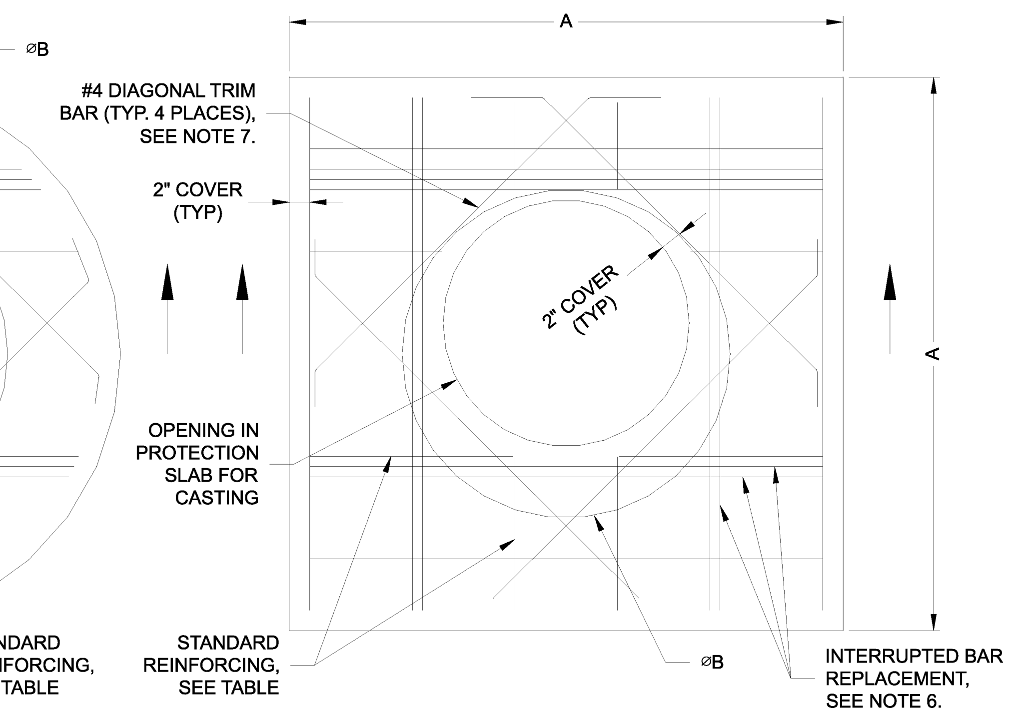
REINFORCING TABLE

⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36317 20-001 Harvest Landing Retail Center and Business Park
Retail System - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24648	36317	9/26/2023
DESIGNED: DYO		DRAWN: DYO
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SHEET NO.: 1		

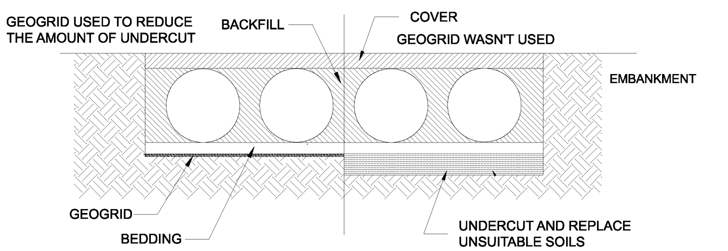
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

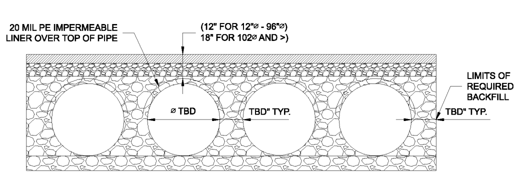


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

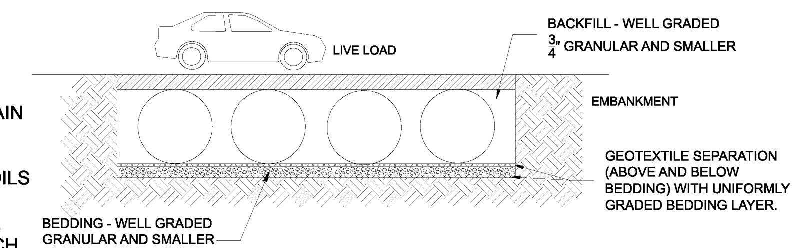
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

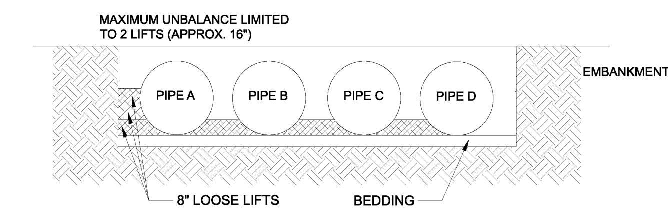
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

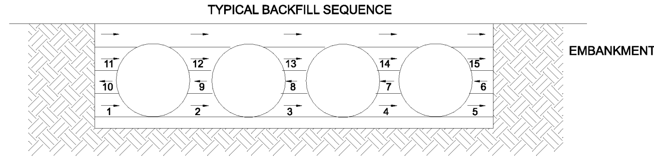
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



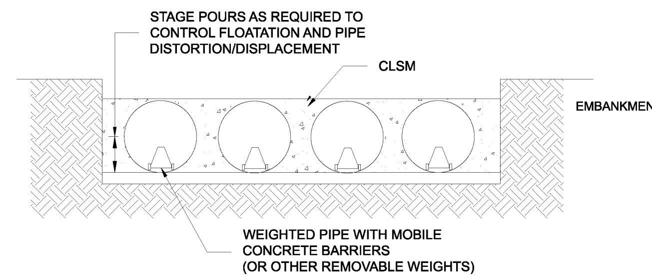
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

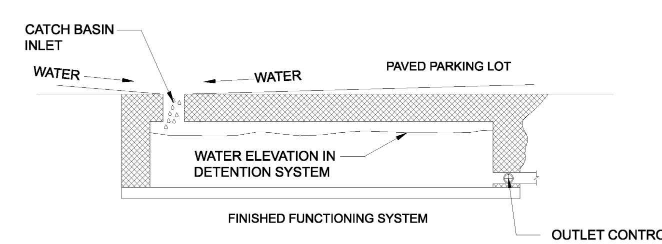


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO36317 20-001 Harvest Landing Retail Center and Business Park
Retail System - Northerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24648	36317	9/26/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

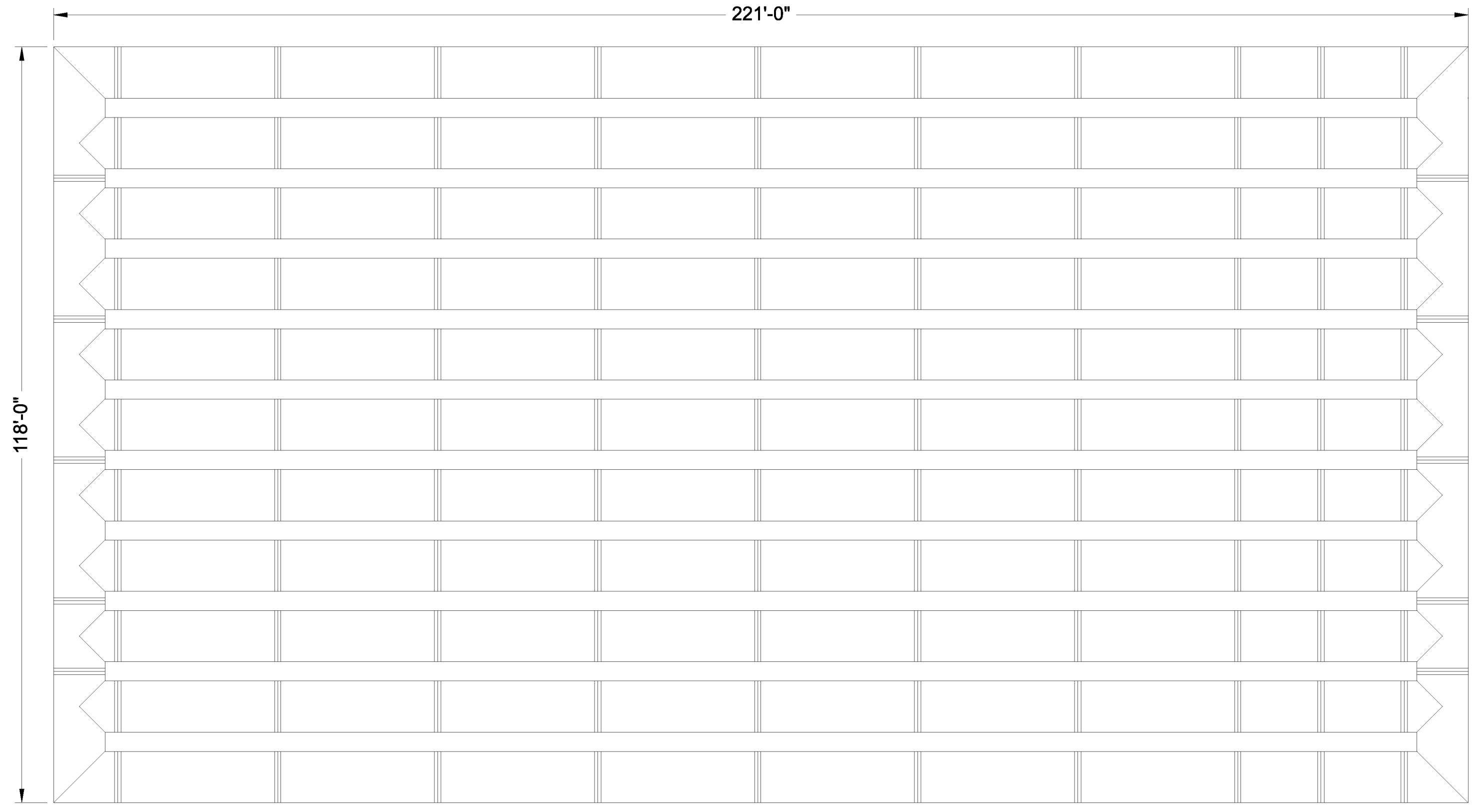
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,491 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 125,211 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 125,211 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



ASSEMBLY
SCALE: 1" = 30'

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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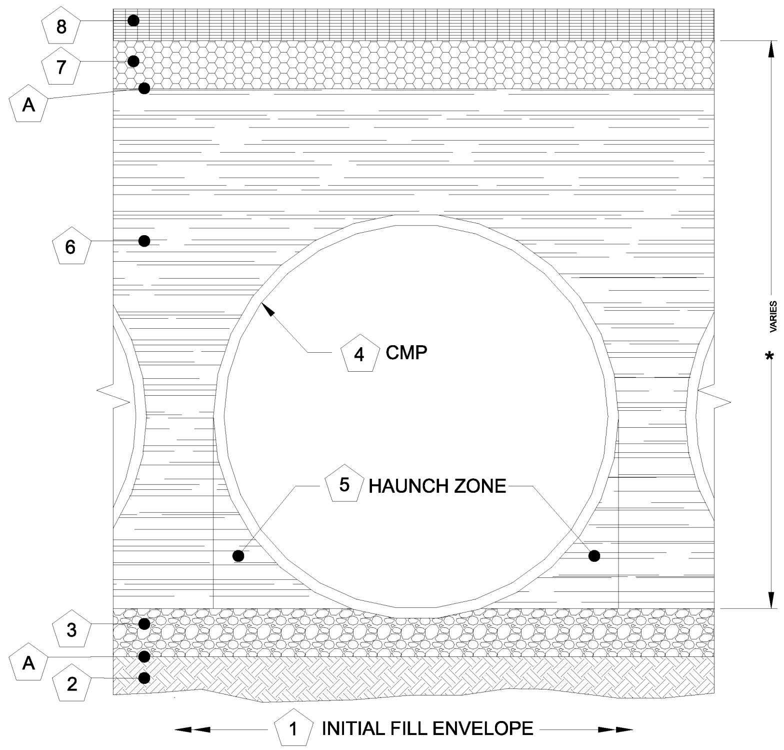
CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36322 20-001 Harvest Landing Retail Center and Business Park
Retail System - Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24651	36322	9/26/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE				
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

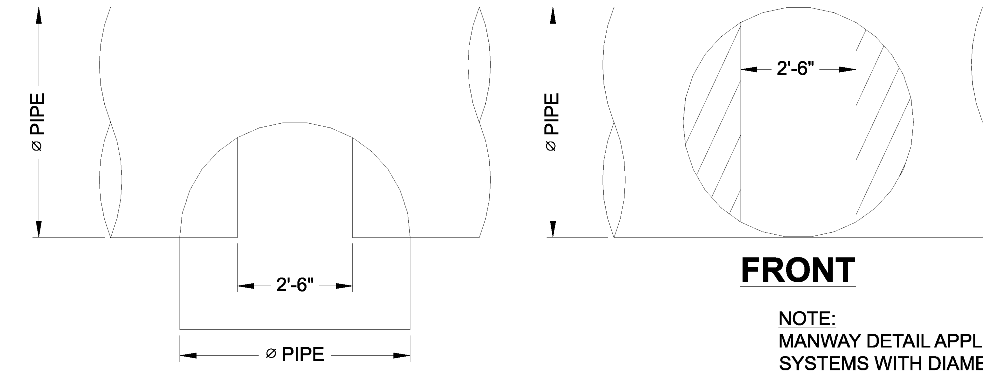
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

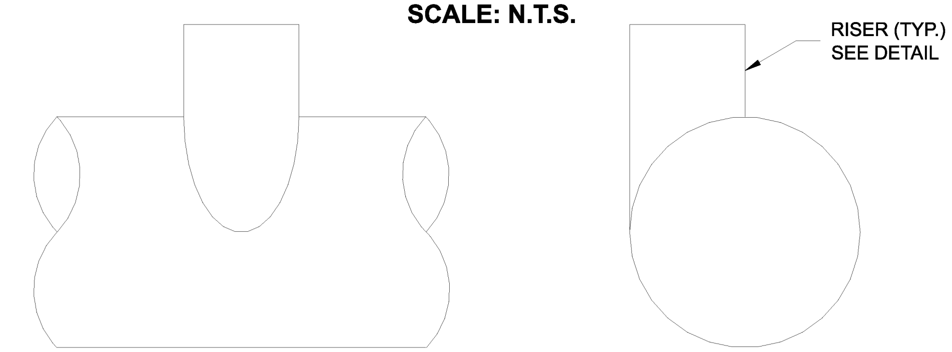
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.

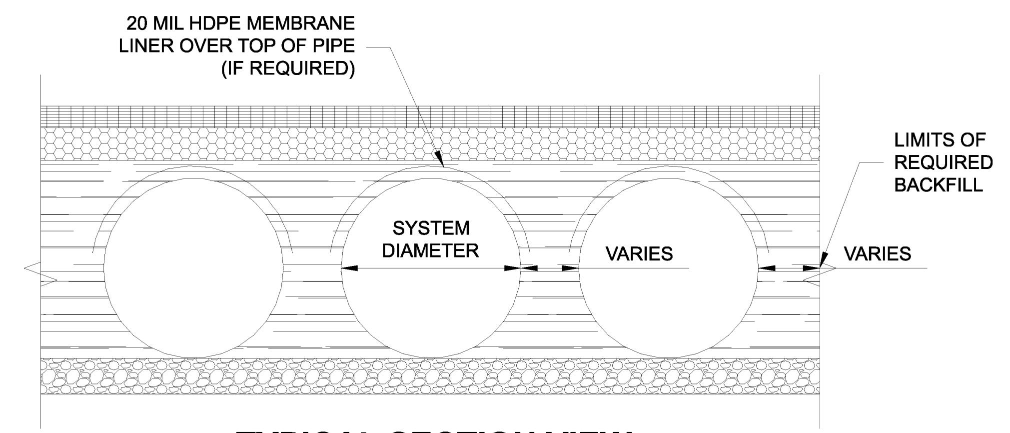


ELEVATION **END**

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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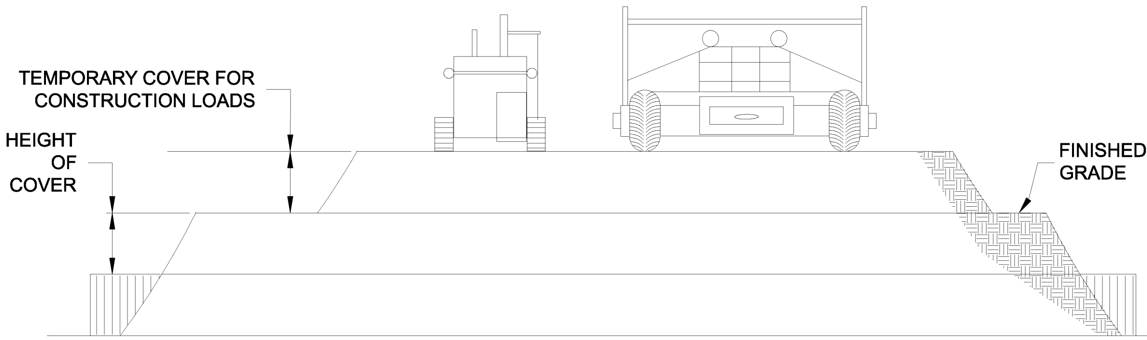
CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO36322 20-001 Harvest Landing Retail Center and Business Park
Retail System - Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24651	36322	9/26/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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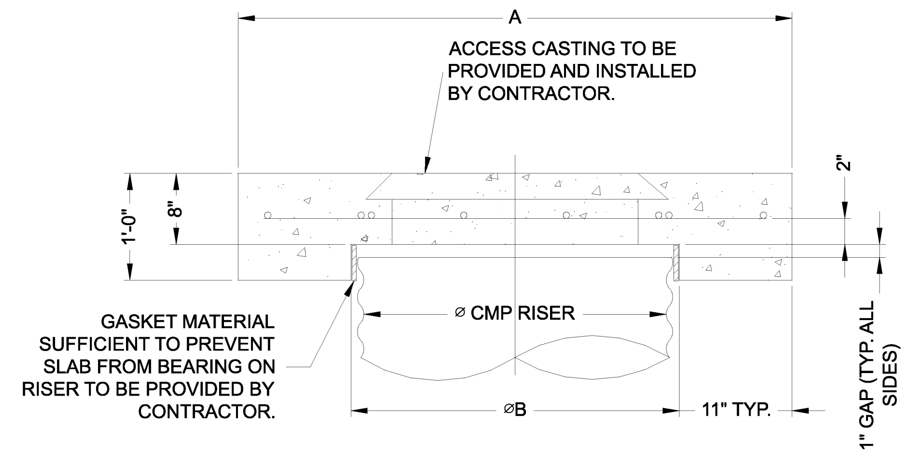
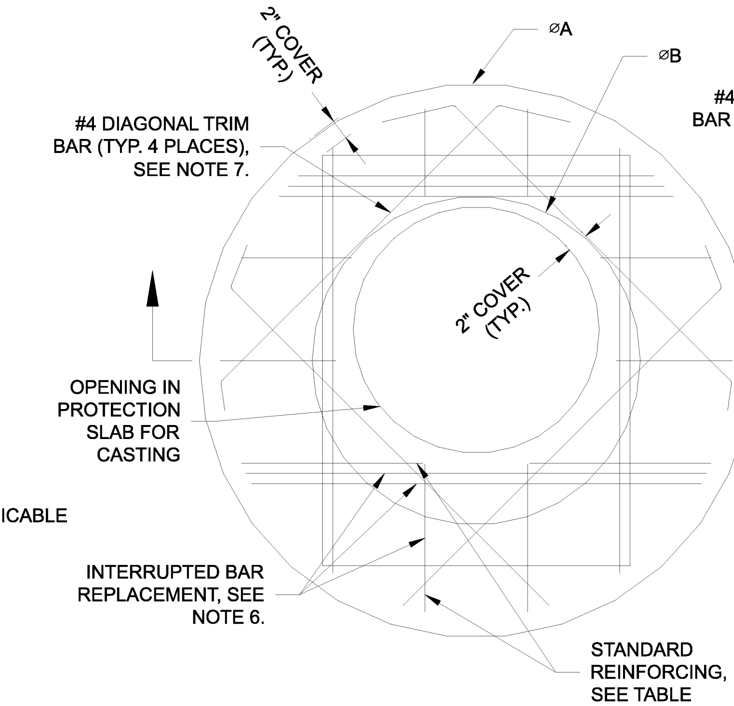


SECTION VIEW

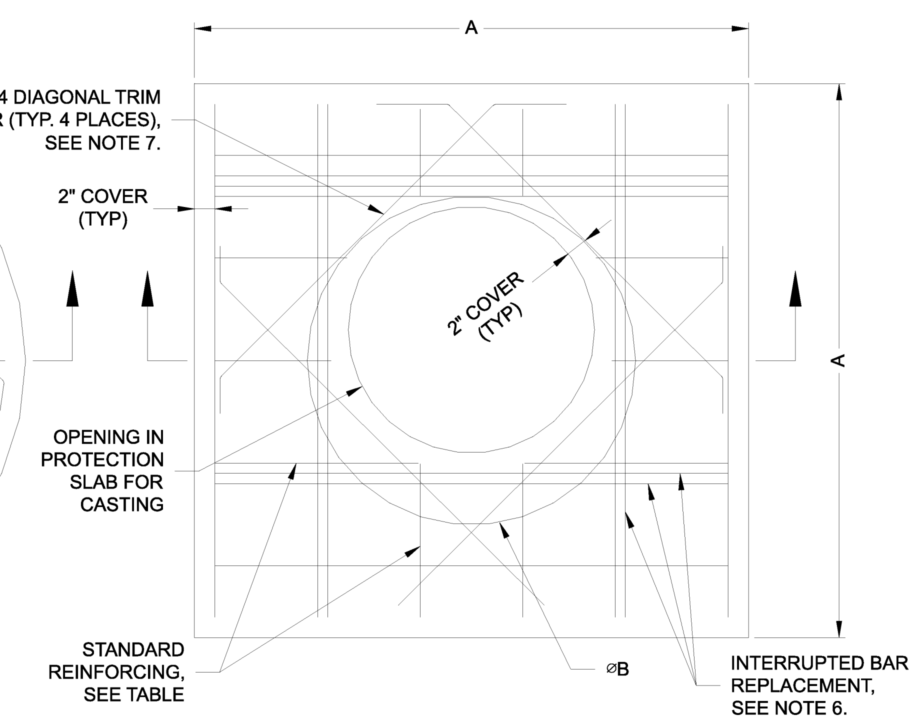
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO36322 20-001 Harvest Landing Retail Center and Business Park
Retail System - Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.: 24651	SEQ. No.: 36322	DATE: 9/26/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

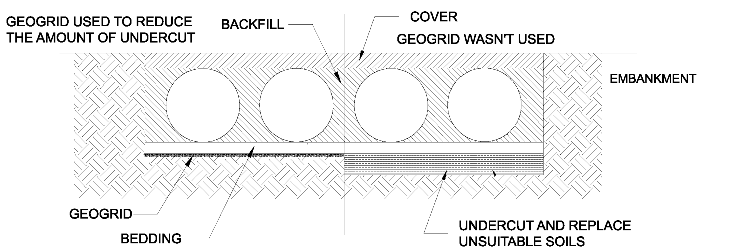
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

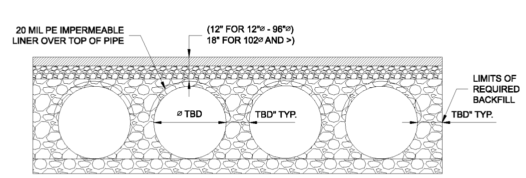


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

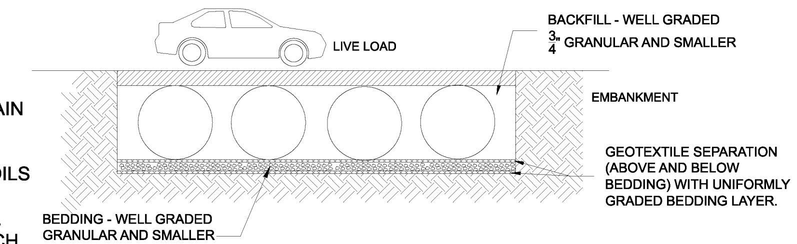
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

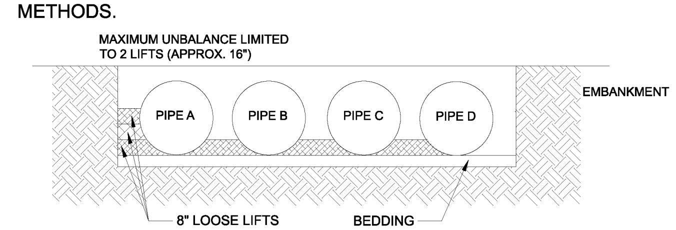
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



BACKFILL PLACEMENT

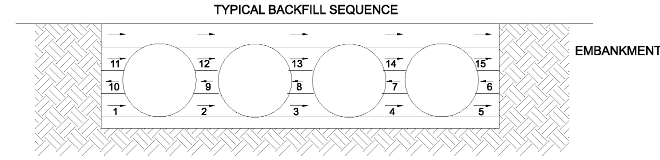
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.



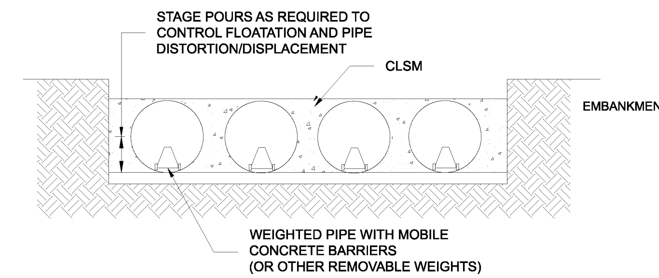
IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.

TYPICAL BACKFILL SEQUENCE



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

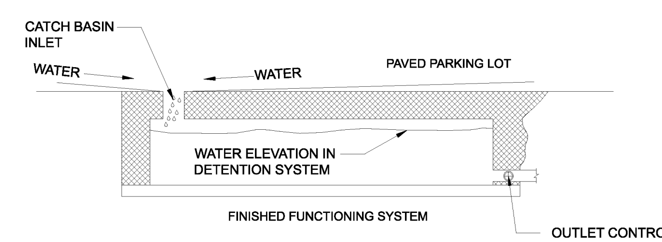


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

C:\EXPORTS\TEMPLATES\CMP_V8.DWG 10/18/2019 10:02 AM

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH DYODS DRAWING

DYO36322 20-001 Harvest Landing Retail Center and Business Park
Retail System - Southerly Chambers
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
24651	36322	9/26/2023
DESIGNED: DYO		DRAWN: DYO
CHECKED: DYO		APPROVED: DYO
SHEET NO.: 1		

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

September 20, 2023

Howard Industrial Partners
1944 North Tustin Street, Suite 122
Orange, California 92865

Attention: Mr. Mike Tunney
Vice President

Project No.: **22G183-4**

Subject: **Results of Additional Infiltration Testing**
Harvest Landing Industrial Development
Indian Avenue and Orange Avenue
Perris, California

Reference: 1) Geotechnical Investigation, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared for Howard Industrial Partners, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-1, dated June 13, 2022.

2) Results of Infiltration Testing, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-2, dated July 1, 2022.

3) Geotechnical Investigation, Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared for Howard Industrial Partners, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G183-3, dated September 21, 2023.

Mr. Tunney:

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

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 23P306R, dated August 9, 2023. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, prepared for the Riverside County Department of Environmental Health (RCDEH), dated December, 2013.

Site and Project Description

The site is located at the southwest corner of North Perris Boulevard and Orange Avenue in Perris, California. The site is bounded to the north by Orange Avenue, West Water Avenue, and vacant land, to the west by Interstate 215 Frontage Road and Freeway I-215, to the south by an existing commercial development and a vacant land, and to the east by an existing commercial development, North Perris Boulevard and Barrett Avenue. The western portion of the site is partially transected by Indian Avenue (trending north-south). Orange Avenue (trending east-west) separates the northern portion of the overall site (designated as Phase 2 on the site plans) from Phase 1 in the central to southern portions of the western portion of the overall site. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 in Appendix A of this report.

The site consists of several parcels, which total 214.82± acres in size. The west-central area of the site, is developed with four (4) single-family residences (SFRs) which range from approximately 1,200 to 6,160 ft² in size. The residences are of wood-frame and stucco construction and are assumed to be supported on conventional shallow foundations, with slab-on-grade floors. Ground surface cover surrounding the SFRs includes asphaltic concrete with Portland cement concrete driveways, exposed soil, and trees. The remaining areas of the site are vacant and undeveloped. Ground surface cover consists of exposed soil with sparse to moderate native grass and weed growth and occasional trees. A water pump is present approximately 200 feet south of the intersection of Perris Boulevard and Orange Avenue, within the site's boundary. A 3- to 4-foot deep drainage rut is present in the central-eastern area of the site, trending east-west between a dirt road located and the east boundary of the site. Many small stockpiles of plant material and woodchips are located along the eastern side of Indian Avenue, approximately 2 to 4-feet in height. Based on historic aerial photographs obtained from Google Earth, the site was previously used for farming activities. Due to previous tilling activities, the ground surface throughout the site is generally hummocky.

Detailed topographic information was obtained from the Exhibit A-Infiltration Testing Locations plan, prepared by FM Civil Engineers, Inc. Based on this plan, the overall site topography slopes downward to the east at a gradient of 1.5± percent.

Proposed Development

Based on a site plan prepared by RGA, the site will be developed with the following industrial/commercial buildings, located throughout the site.

Building Type	Building Name	Location	Size (ft²)
Industrial	1	Northwest	380,000
Industrial	2	West-Central	88,400
Industrial	3	West-Central	50,000
Industrial	4	Southwest	18,800

Distribution	5	Central	440,000
Commercial	Big Box Retail	Southeast	165,000
Commercial	Shopping Center	Northeast	150,000
Retail	Pad 1	Northeast	6,500
Retail	Pad 2	Northeast	6,500
Restaurant	Pad 3	East	2,305
Retail	Pad 4	East	9,000
Restaurant	Pad 5	Southeast	3,172

Building Nos. 1 through 4 - Industrial Buildings

Dock-high doors will be constructed along a portion of at least one building wall for each of the industrial buildings. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

Detailed structural information has not been provided. We assume the new industrial buildings will be single-story structures of tilt-up concrete construction, typically supported on conventional shallow foundation systems with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively.

Building No. 5 - Distribution Building

Dock-high doors will be constructed along portions of the east and west building walls. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout. Two ancillary buildings, 15,300± ft^2 and 3,300± ft^2 in size are located to the south of the main distribution building.

Detailed structural information has not been provided. We assume the new main distribution building will be a two-story structure of tilt-up concrete construction, typically supported on conventional shallow foundation system with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 700 to 900 kips and 4 to 7 kips per linear foot, respectively.

Commercial – Big Box Retail

Dock-high doors will be constructed along a portion of the east building wall. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout. This commercial development will include an automobile service station located east of the building. The service station will include a canopy, five (5) fuel pump islands, and underground storage tanks (USTs).

Detailed structural information has not been provided. We assume that the commercial building will be a single-story structure of tilt-up concrete construction, typically supported on conventional shallow foundation system with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively. The new pump island canopy is expected to be a steel frame structure, typically supported on deepened shallow foundations. Maximum column loads for the canopy are expected to be in the range of 20 kips, with significant overturning and/or uplift loads.

Commercial – Shopping Center

The shopping center building will consist of eight (8) suites ranging from 2,400± ft² to 54,000± ft² in size. Dock-high doors will be constructed along a portion of the west building walls for four (4) of the suites of the shopping center building. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

Detailed structural information has not been provided. We assume that the new shopping center building will be a single-story structure of wood frame or masonry block construction, typically supported on conventional shallow foundation systems with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 50 kips and 2 to 3 kips per linear foot, respectively.

Retail and Restaurant Buildings

The two fast-food restaurant buildings will include drive-thru lanes. Pad 4 will contain four (4) suites. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, concrete flatwork, and limited areas of landscape planters throughout.

Detailed structural information has not been provided. We assume that the new retail and restaurant buildings will be single-story structures of wood frame construction, typically supported on conventional shallow foundation systems with concrete slab-on-grade floors. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 20 kips and 1 to 3 kips per linear foot, respectively.

Streets

Barrett Avenue and two access streets will be constructed at the site. It is assumed that the new streets will consist of asphaltic concrete pavements.

General

No significant amounts of below-grade construction, such as basements or crawl spaces, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of up to 8 to 10± feet are expected to be necessary to achieve the proposed site grades throughout the site.

Streets

Barrett Avenue and two access streets will be constructed at the site. It is assumed that the new streets will consist of asphaltic concrete pavements.

Previous Studies

Southern California Geotechnical (SCG) previously conducted a geotechnical investigation at the subject site (Reference No. 1). As a part of this study, twenty-three (23) borings (Identified as Boring Nos. B-1 through B-23) were advanced to depths of 15 to 25± feet below the existing site grades. Native alluvium was encountered at each boring locations, extending to at least the maximum depth explored of 25± feet below existing site grades. The alluvium generally consists of medium dense to very dense silty sands to sandy silts, with trace to little clay content. Free water was not encountered during the drilling of the borings. Based on the lack of water within the borings and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 25± feet at the time of the subsurface exploration.

SCG also previously conducted infiltration testing at the subject site (Reference No. 2). The subsurface exploration performed for the infiltration testing consisted of six (6) shallow infiltration trenches (identified as Infiltration Trench Nos. I-1 through I-6) and four (4) deep infiltration borings (identified as Infiltration Boring Nos. I-7 through I-10). The infiltration trenches were excavated to a depth of 7± feet below existing site grades. The infiltration borings were extended to a depth of 50± feet below existing site grades. In addition, one (1) exploratory boring was extended to a depth of 60± feet below site grades. Artificial fill soils were encountered at the ground surface at Infiltration Test No. I-3, extending to a depth of 1± foot below existing site grades. The fill soils consisted of medium dense fine to medium sandy silts with trace quantities of clay and fine gravel. Native alluvium was encountered at the ground surface at all of the remaining boring and trench locations, extending to at least the maximum explored depth of 60± feet below existing site grades. The near-surface alluvium encountered at depths less than 25± feet below existing site grades consisted of medium dense to very dense fine to medium sandy silts, silty fine to medium sands, clayey fine to coarse sands, and hard fine to coarse sandy clays. At depths greater than 25± feet, the alluvium consisted of medium dense to very dense fine sandy silts, fine to medium sandy silts, silty fine to medium sands, and hard fine to medium sandy clays. Based on the results of the testing, SCG recommended infiltration rates of 0.9 to 3.6 inches per hour for the proposed chamber systems. Additionally, SCG did not recommend dry well infiltration at the subject site.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site (Reference No. 3). As a part of this study, forty-three (43) borings (identified as Boring Nos. B-25 through B-67) were advanced to depths of 10 to 50± feet below the existing site grades.

Younger native alluvium was encountered at the ground surface at Boring Nos. B-25, B-28, B-29, B-31, B-32, B-50, B-55 through B-58, B-60, B-64, and B-67, extending to depths of 2½ to 5½± feet below existing site grades. The alluvium generally consists of loose to medium dense silty fine sands, silty fine to medium sands, fine sandy silts, clayey fine sands. Occasional layers of very stiff fine sandy clays and silty clays. The younger native alluvial soils are classified as "alluvium" on the boring logs. Native older alluvium was encountered beneath the younger native alluvial soils (at the boring locations listed above) and at the ground surface at the remaining boring locations. All of the borings were terminated within the older alluvium, and the older alluvial soils extend to at least the maximum depth explored of 50± feet below ground surface. The older alluvial soils generally consist of medium dense to very dense well- to poorly-graded silty sands with varying clay content, well-graded to poorly-graded sandy silts with varying clay content, well-graded to poorly-graded clayey sands with varying silt content, and clayey silts. Additionally, layers of very stiff to hard fine sandy clays and silty clays were encountered. The older alluvium generally possesses weak to moderate cementation, and occasionally possesses trace to extensive calcareous nodules and veining.

Groundwater

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

Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well is located on the northeast corner of the site. Water level readings within this monitoring well indicates a groundwater level of 40± feet (March 2023) below the ground surface.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of thirty-seven (37) infiltration test borings, advanced to depths of 3 to 10½± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as Infiltration Test Nos. I-11 through I-37) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

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

Geotechnical Conditions

Native younger alluvium was encountered at the ground surface at Infiltration Test Nos. I-11, I-23, I-26 and I-39, extending to depths of 3 to 6± feet below the existing site grades. The younger alluvium generally consists of medium dense silty sands and sandy silts. Native older alluvium was encountered beneath the native younger alluvium and at the ground surface at the remaining infiltration test locations, extending to at least the maximum depth explored of 10½± feet. The older alluvium generally consists of medium dense to very dense silty sands and sandy silts with trace to little clay content. The older alluvium occasionally possesses weak cementation. The Infiltration Boring Logs, which illustrate the conditions encountered at each of the borings, are included with this report.

Infiltration Testing

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

Pre-soaking

In accordance with the county infiltration standards all of the infiltration test borings were pre-soaked prior to the infiltration testing. The pre-soaking process consisted of filling the test borings by inverting a full 5-gallon bottle of clear water supported over each hole so that the water level reaches a level of at least 5 times the hole's radius above the gravel at the bottom of each hole. The pre-soaking was completed after all of the water had percolated through each test hole or after 15 hours since initiating the pre-soak. Based on the results of the pre-soaking process, 30-minute readings were utilized during all of the infiltration tests, except for Infiltration Test Nos. I-24 and I-45. For Infiltration Test Nos. I-24 and I-45, 10-minute readings were utilized during the infiltration tests.

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of each test hole. In accordance with the Riverside County guidelines, in areas where "non-sandy soils" were encountered at the bottom of each infiltration test boring, (where 6 inches of water did not infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), readings were taken at 30-minute intervals for a total of 6 hours at the test locations. At Infiltration Test Nos. I-24 and I-45, "sandy-soils" were encountered at the bottom of the test borings, (where 6 inches of water did infiltrate into the surrounding soils in less than 25 minutes for two (2) consecutive readings), therefore, readings were taken at 10-minute intervals for 1 hour at the test locations. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

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

Infiltration Test No.	**Depth (feet)**	**Soil Description**	**Measured Infiltration Rate (inches/hour)**
I-11	4½	YOUNGER ALLUVIUM: Brown Silty fine to coarse Sand, trace Clay	0.2

I-12	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.2
I-13	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.2
I-14	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.2
I-15	10½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-16	9½	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.2
I-17	10	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace to little Clay, trace coarse Sand	0.0
I-18	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace to little Clay, trace coarse Sand	0.0
I-19	3	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-20	3	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-21	3½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand	0.4
I-22	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand	0.3
I-23	9	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-24	9	OLDER ALLUVIUM: Brown Silty fine to coarse Sand	1.7
I-25	9	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-26	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-27	7	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand	0.1
I-28	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.0
I-29	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-30	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay	0.1
I-31	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-32	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-33	6½	OLDER ALLUVIUM: Brown fine to medium Sandy Silt to Silty fine to medium Sand, trace Clay	0.1
I-34	5	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-35	4½	OLDER ALLUVIUM: Light Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-36	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.0
I-37	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1

I-38	6½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-39	7½	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-40	7½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.1
I-41	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand	0.0
I-42	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand	0.0
I-43	6	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.0
I-44	4½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-45	5	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.8
I-46	5½	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand	0.1
I-47	7	OLDER ALLUVIUM: Brown fine to medium Sandy Silt, little Clay	0.1

Laboratory Testing

Moisture Content

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

Grain Size Analysis

The grain size distribution of selected soils collected from the bottom of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-37 of this report.

Design Recommendations

Thirty-seven (37) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range between 0.0 and 1.7 inches per hour. The major factors affecting the lack of infiltration at these locations are the presence of very dense older alluvium with high contents of fine-grained soil. **Based on these conditions and the results of infiltration testing we recommend the following design infiltration rates to be utilized for the proposed infiltration systems:**

Infiltration System(s)	Infiltration Test Nos.	Infiltration Test Depth (ft)	Infiltration System Type	Infiltration System Location	Design Infiltration Rate (inches/hour)
"A"	I-11	4½	Bio-Retention Basin	West	Not Recommended
"B"	I-12	4½	Bio-Retention Basin	West	Not Recommended
"C"	I-13	5½	Below-Grade Chamber	West	Not Recommended
"D"	I-14	7½	Below-Grade Chamber	Northwest	Not Recommended
"E"	I-15 through I-17	9½ to 10½	Bio-Retention Basin	North	Not Recommended
"F"	I-18	7½	Below-Grade Chamber	North	Not Recommended
"G"	I-19 through I-22	3 to 4½	Bio-Retention Basin	South	Not Recommended
"H"	I-23, I-24	9	Bio-Retention Basin	South	Not Recommended
"I" & "J"	I-25 through I-33	5½ to 9	Bio-Retention Basin	Northeast	Not Recommended
"K"	I-34 through I-36	4½ to 5½	Below-Grade Chamber	Southeast	Not Recommended
"L"	I-37	6½	Below-Grade Chamber	Southeast	Not Recommended
"M"	I-38, I-39	6½ to 7½	Below-Grade Chamber	Southeast	Not Recommended
"N"	I-40	7½	Below-Grade Chamber	Northeast	Not Recommended
"O"	I-41	6	Below-Grade Chamber	Northeast	Not Recommended
"P"	I-42	6	Below-Grade Chamber	Northeast	Not Recommended
"Q"	I-43	6	Below-Grade Chamber	Northeast	Not Recommended
"R"	I-44	4½	Below-Grade Chamber	Northeast	Not Recommended*
"S"	I-45	5	Below-Grade Chamber	Northeast	Not Recommended
"T"	I-46	5½	Below-Grade Chamber	Northeast	Not Recommended
"U"	I-47	7	Below-Grade Chamber	Northeast	Not Recommended

*Although the test results indicate an infiltration rate of 0.8 in/hr at this location, the subsurface soil profile at this site includes many soil layers with low permeability. Soil layers with some capacity for infiltration, such as the silty sand layer encountered at Infiltration test-location I-44, are generally interbedded between low permeability soil layers, based on our review of the boring logs for the overall site. Therefore, long-term infiltration is not considered to feasible.

Although infiltration is not considered feasible, the client may desire to use storm water disposal systems that do not rely on infiltration at this site. The design of the proposed storm water disposal systems should be performed by the project civil engineer, in accordance with the City of Perris, and/or County of Riverside guidelines. However, it is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system.

Infiltration Rate Considerations

The infiltration rates presented herein were determined in accordance with the Riverside County guidelines and are considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rates presented above. The infiltration rates will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rates.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **Any proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

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

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

Closure

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

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

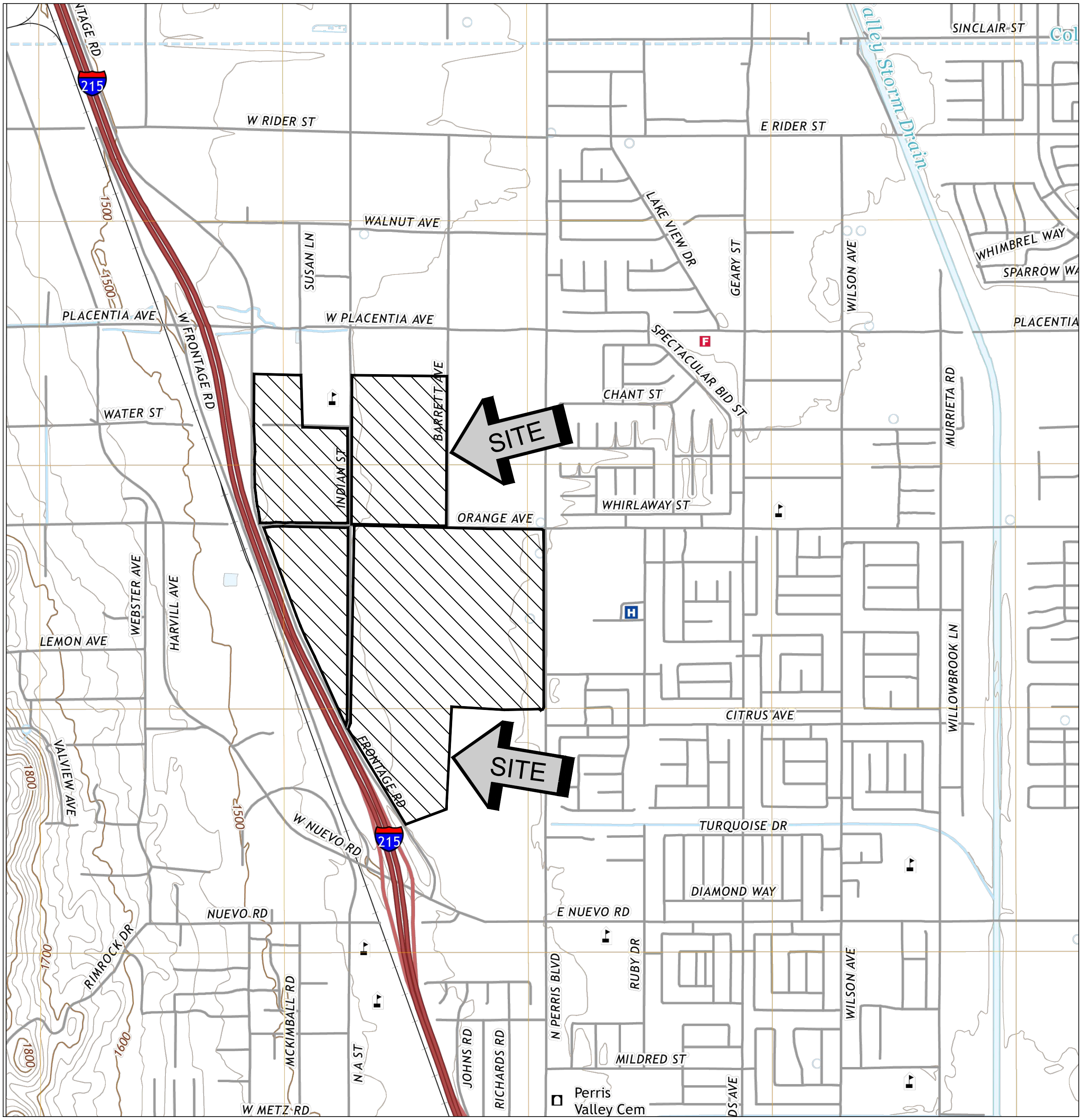
Ryan Bremer
Staff Geologist

Daniel W. Nielsen, GE 3166
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER DANIEL W. NIELSEN No. 3166 GEOTECHNICAL STATE OF CALIFORNIA

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs (39 pages)
Infiltration Test Results Spreadsheets (37 pages)
Grain Size Distribution Graphs (37 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA, 2021

SITE LOCATION MAP

HARVEST LANDING INDUSTRIAL DEVELOPMENT

PERRIS, CALIFORNIA

SCALE: 1" = 2000'

DRAWN: RB
CHKD: RGT

SCG PROJECT
22G183-4

PLATE 1

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- CONCURRENT BORING LOCATION (SCG PROJECT NO. 22G183-3)
- PREVIOUS BORING LOCATION (SCG PROJECT NO. 22G183-1)
- PREVIOUS INFILTRATION LOCATION (SCG PROJECT NO. 22G183-2)
- PREVIOUS INFILTRATION LOCATION (SCG PROJECT NO. 22G183-2)
- PREVIOUS BORING LOCATION (SCG PROJECT NO. 22G183-2)
- PROPOSED BUILDING
- PROPOSED INFILTRATION SYSTEM LOCATION
- EXISTING STRUCTURE

NOTE: CONCEPTUAL GRADING PLAN PREPARED BY FMCIVIL ENGINEERING.

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NORTH
SoCalGeo

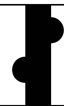
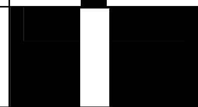
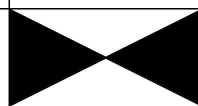
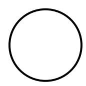
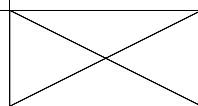
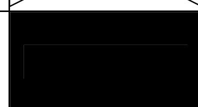
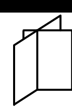
SCALE: 1" = 200'
DRAWN: RB
CHKD: RGT
SCG PROJECT 22G183-4

INFILTRATION TEST LOCATION PLAN

HARVEST LANDING INDUSTRIAL DEVELOPMENT
PERRIS, CALIFORNIA

PLATE 2

BORING LOG LEGEND

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

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

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

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

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

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

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

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

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

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

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

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. I-11

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

SURFACE ELEVATION: 1465.0 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	21			YOUNGER ALLUVIUM: Brown Silty fine Sand, little medium Sand, trace coarse Sand, trace fine Gravel, trace fine root fibers, trace Clay, medium dense-dry to damp		3					
	X	18			Brown Silty fine to coarse Sand, trace Clay, trace Calcareous veining, medium dense-dry to damp		3			29		

Boring Terminated @ 4½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-12

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1464.0 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, trace fine root fibers, dense-damp							
	X	33					4					
	X	32					3			41		
					Boring Terminated @ 4½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL

A California Corporation

BORING NO. I-13

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

SURFACE ELEVATION: 1465.0 feet MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	40			OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, little coarse Sand, little Clay, trace fine root fibers, dense-damp		4					
5	X	56			Brown Silty fine to medium Sand, little Clay, trace coarse Sand, little Calcareous veining, weakly cemented, very dense-damp		5			39		

Boring Terminated @ 5½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-14

JOB NO.: 22G183-4	DRILLING DATE: 8/14/23	WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Perris, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

SURFACE ELEVATION: 1471.2 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, little coarse Sand, little Clay, trace to little Calcareous veining, trace fine root fibers, dense-damp							
	X	44					5					
5												
	X	51			Brown Silty fine to medium Sand, little Clay, trace coarse Sand, very dense-damp		5			36		

Boring Terminated @ 7½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-15

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

SURFACE ELEVATION: 1455.6 feet MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand, little Calcareous veining, very dense-damp to moist							
	X	65/11"					4					
5												
	X	90/10"					6					
	X	83/11"					8			45		
10												

Boring Terminated @ 10½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-16

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1454.0 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace to little coarse Sand, little Clay, little Calcareous veining, dense-damp							
	X	35	2.5				4					
5												
					Dark Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, trace to little Calcareous veining, very dense-moist							
	X	56	4.0				14			44		
					Boring Terminated @ 9½ feet							

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-17

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1455.0 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace to little Clay, trace coarse Sand, trace to little Calcareous veining, medium dense to dense-damp to moist							
	X	32					6					
5												
	X	26					8					
	X	45					10			53		
10					Boring Terminated @ 10 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-18

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1455.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace to little Clay, trace coarse Sand, trace Calcareous veining, medium dense-damp							
	X	26					5					
5												
	X	38			@ 5½ feet, dense-moist		9			46		
					Boring Terminated @ 7½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-19

JOB NO.: 22G183-4	DRILLING DATE: 8/14/23	WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Perris, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1450.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	43			OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, trace fine root fibers, trace Calcareous veining, dense-damp		4			37		
					Boring Terminated @ 3 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-20

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1450.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
	X	55			OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand, trace Calcareous nodules, very dense-damp		4			45		
					Boring Terminated @ 3 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-21

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1451.0 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand, trace Calcareous veining, trace fine root fibers, dense-damp							
	X	45					4			36		
					Boring Terminated @ 3½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-22

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1452.0 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand, trace Calcareous veining, trace fine root fibers, dense-damp							
	X	44					3					
	X	37					4			35		
					Boring Terminated @ 4½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-23

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1455.2 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Calcareous veining, trace fine root fibers, medium dense-damp							
	X	14					3					
5												
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand, trace Calcareous veining, medium dense-damp to moist							
	X	47					6			40		

Boring Terminated @ 9 feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-24

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/14/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1455.0 feet MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, little coarse Sand, little Clay, little Calcareous veining and nodules, dense-damp							
	X	43					3					
5												
					Brown Silty fine to coarse Sand, medium dense-damp							
	X	20					3			19		

Boring Terminated @ 9 feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-25

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1445.2 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown fine to medium Sandy Silt, trace Clay, dense-moist							
5	X	46					8					
					Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, little Calcareous veining, very dense-moist							
	X	67					8			46		

Boring Terminated at 9'

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-26

JOB NO.: 22G183-4 | DRILLING DATE: 8/16/23 | WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: ---
LOCATION: Perris, California | LOGGED BY: Ryan Bremer | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1446.0 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, dense-damp							
	X	31					4					
5												
	X	85/11"			Brown Silty fine to medium Sand, little Clay, trace coarse Sand, weakly cemented, very dense-damp to moist		6			46		

Boring Terminated @ 7½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL

A California Corporation

BORING NO. I-27

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer

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

SURFACE ELEVATION: 1445.3 feet MSL

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG		DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
					OLDER ALLUVIUM: Brown fine Sandy Silt, trace medium Sand, very dense-damp							
	Bag						4					
5					Brown Silty fine to medium Sand, trace coarse Sand, very dense-damp							
		50/5"					5			44		

Boring Terminated @ 7 feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

JOB NO.: 22G183-4 | DRILLING DATE: 8/16/23 | WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: ---
LOCATION: Perris, California | LOGGED BY: Ryan Bremer | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1443.9 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, very dense-damp to moist							
5	X	77/11"					6			44		
					Boring Terminated @ 5½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-29

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1444.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand, weakly cemented, dense-damp							
5		32					5			38		
					Boring Terminated @ 6 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG **PLATE B-19**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-30

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1444.2 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, weakly cemented, very dense-damp							
5	X	68					6			47		
					Boring Terminated at 6 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-31

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442.8 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, very dense-damp							
5	X	62					6			50		
					Boring Terminated @ 6 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-32

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1442.5 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, dense-damp							
5	X	42					6					
					Boring Terminated @ 6½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

BORING NO. I-33

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 22G183-4	DRILLING DATE: 8/16/23	WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Perris, California	LOGGED BY: Ryan Bremer	READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1443.0 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
					OLDER ALLUVIUM: Brown fine to medium Sandy Silt to Silty fine to medium Sand, trace Clay, very dense-damp							
5		50/5"					6			50		
					Boring Terminated @ 6½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

BORING NO. I-34

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer

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

SURFACE ELEVATION: 1440.2 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, weakly cemented, very dense-damp to moist							
	X	61					6			44		
5												
					Boring Terminated @ 5 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-35

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1439.7 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Light Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, weakly cemented, very dense-damp							
	X	57					4			38		
					Boring Terminated @ 4½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 22G183-4	DRILLING DATE: 8/15/23	WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Perris, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

SURFACE ELEVATION: 1438.8 feet MSL

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG		DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, trace Calcareous veining, weakly cemented, medium dense to dense-moist							
	X	27					10					
5	X	34					11			37		
					Boring Terminated @ 5½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-37

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1438.0 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	44			OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace to little coarse Sand, trace Calcareous veining, weakly cemented, dense-damp		4					
5	X	50			Brown Silty fine to medium Sand, little Clay, trace coarse Sand, trace to little Calcareous veining, weakly cemented, very dense-moist		10			43		

Boring Terminated @ 6½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-38

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1438.6 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	42			OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand, trace Calcareous veining, dense-damp		5					
5	X	50			@ 4½ feet, weakly cemented, very dense		5			41		

Boring Terminated @ 6 feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-39

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: 1438.6 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Dark Brown fine to medium Sandy Silt, little coarse Sand, medium dense-moist							
5	X	16					10					
	X	37			OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, little Clay, trace coarse Sand, trace Calcareous veining, weakly cemented, dense-moist		9			39		

Boring Terminated @ 7½ feet

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-40

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1441.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace coarse Sand, dense-damp							
	X	42					5					
5												
	X	50/5"			Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, very dense-damp to moist		6			41		
					Boring Terminated @ 7½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-41

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/16/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442.2 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand, weakly cemented, very dense-damp							
5	X	73/11"					7			49		
					Boring Terminated at 6 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-42

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1434.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
	X	31			OLDER ALLUVIUM: Brown Silty fine to medium Sand, little coarse Sand, trace Clay, trace fine root fibers, dense-damp to moist		7					
5	X	40			Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand, trace Calcareous veining, dense-moist		9			52		
					Boring Terminated @ 6 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-43

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1438.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	46			OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, little Clay, trace to little coarse Sand, trace to little Calcareous veining, dense-damp		7					
5	X	45			Brown Silty fine to medium Sand, little Clay, trace coarse Sand, dense-damp		8			46		
					Boring Terminated @ 6 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-44

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1438.6 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace fine root fibers, dense-damp							
	X	39					3					
	X	40			@ 3 feet, trace Calcreous veining, little Clay		6			37		
					Boring Terminated @ 4½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-45

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1439.8 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	29			OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand, trace Calcareous veining, trace fine root fibers, medium dense-damp		4					
	X	53			@ 3½ feet, very dense		5			46		
5												
					Boring Terminated @ 5 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-46

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1439.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, trace fine root fibers, trace Calcareous veining, dense-damp to moist							
		34					7					
5		43			@ 4 feet, trace to little Calcareous veining, little Clay, moist		9			34		
					Boring Terminated @ 5½ feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

JOB NO.: 22G183-4
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 8/15/23
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Krizek

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

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 1440.0 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace to little Calcareous veining, trace to little coarse Sand, trace fine root fibers, dense-moist							
	X	36					9					
5					Brown fine to medium Sandy Silt, little Clay, little Calcareous veining, medium dense-moist							
	X	29	2.5				12			59		
					Boring Terminated @ 7 feet							

TBL 22G183-4.GPJ SOCALGEO.GDT 9/22/23

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	4.50	(ft)

Infiltration Test Hole	I-11

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:50 AM	25.00	1.75	4.68	NO	NON-SANDY SOILS
	Final	12:15 PM		2.14			
2	Initial	12:15 PM	25.00	2.14	3.24	NO	NON-SANDY SOILS
	Final	12:40 PM		2.41			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:40 PM	30.00	2.25	0.17	2.17	0.29
	Final	1:10 PM		2.42			
2	Initial	1:10 PM	30.00	2.20	0.21	2.20	0.36
	Final	1:40 PM		2.41			
3	Initial	1:40 PM	30.00	2.41	0.18	2.00	0.33
	Final	2:10 PM		2.59			
4	Initial	2:10 PM	30.00	2.23	0.18	2.18	0.31
	Final	2:40 PM		2.41			
5	Initial	2:40 PM	30.00	2.41	0.15	2.02	0.28
	Final	3:10 PM		2.56			
6	Initial	2:40 PM	30.00	2.22	0.15	2.21	0.25
	Final	3:10 PM		2.37			
7	Initial	3:10 PM	30.00	2.37	0.13	2.07	0.23
	Final	3:40 PM		2.50			
8	Initial	3:40 PM	30.00	2.24	0.13	2.20	0.22
	Final	4:10 PM		2.37			
9	Initial	4:10 PM	30.00	2.37	0.12	2.07	0.21
	Final	4:40 PM		2.49			
10	Initial	4:40 PM	30.00	2.25	0.13	2.19	0.22
	Final	5:10 PM		2.38			
11	Initial	5:10 PM	30.00	2.38	0.12	2.06	0.22
	Final	5:40 PM		2.50			
12	Initial	5:40 PM	30.00	2.50	0.11	1.95	0.21
	Final	6:10 PM		2.61			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	4.50	(ft)

Infiltration Test Hole	I-12

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:47 AM	25.00	1.96	3.72	NO	NON-SANDY SOILS
	Final	12:12 PM		2.27			
2	Initial	12:12 PM	25.00	2.27	3.00	NO	NON-SANDY SOILS
	Final	12:37 PM		2.52			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:37 PM	30.00	2.27	0.30	2.08	0.53
	Final	1:07 PM		2.57			
2	Initial	1:07 PM	30.00	2.31	0.20	2.09	0.35
	Final	1:37 PM		2.51			
3	Initial	1:37 PM	30.00	2.35	0.18	2.06	0.32
	Final	2:07 PM		2.53			
4	Initial	2:07 PM	30.00	2.53	0.16	1.89	0.31
	Final	2:37 PM		2.69			
5	Initial	2:37 PM	30.00	2.34	0.16	2.08	0.28
	Final	3:07 PM		2.50			
6	Initial	2:37 PM	30.00	2.50	0.16	1.92	0.31
	Final	3:07 PM		2.66			
7	Initial	3:07 PM	30.00	2.33	0.17	2.09	0.30
	Final	3:37 PM		2.50			
8	Initial	3:37 PM	30.00	2.50	0.15	1.93	0.29
	Final	4:07 PM		2.65			
9	Initial	4:07 PM	30.00	2.41	0.14	2.02	0.26
	Final	4:37 PM		2.55			
10	Initial	4:37 PM	30.00	2.55	0.14	1.88	0.27
	Final	5:07 PM		2.69			
11	Initial	5:07 PM	30.00	2.41	0.13	2.03	0.24
	Final	5:37 PM		2.54			
12	Initial	5:37 PM	30.00	2.26	0.14	2.17	0.24
	Final	6:07 PM		2.40			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	5.59	(ft)

Infiltration Test Hole	I-13

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:44 AM	25.00	2.51	5.28	NO	NON-SANDY SOILS
	Final	12:09 PM		2.95			
2	Initial	12:09 PM	25.00	2.52	4.92	NO	NON-SANDY SOILS
	Final	12:34 PM		2.93			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:34 PM	30.00	2.93	0.34	2.49	0.51
	Final	1:04 PM		3.27			
2	Initial	1:04 PM	30.00	2.74	0.25	2.73	0.35
	Final	1:34 PM		2.99			
3	Initial	1:34 PM	30.00	2.99	0.18	2.51	0.27
	Final	2:04 PM		3.17			
4	Initial	2:04 PM	30.00	3.17	0.14	2.35	0.22
	Final	2:34 PM		3.31			
5	Initial	2:34 PM	30.00	2.99	0.19	2.51	0.28
	Final	3:04 PM		3.18			
6	Initial	2:34 PM	30.00	3.18	0.16	2.33	0.26
	Final	3:04 PM		3.34			
7	Initial	3:04 PM	30.00	3.34	0.12	2.19	0.20
	Final	3:34 PM		3.46			
8	Initial	3:34 PM	30.00	2.78	0.14	2.74	0.19
	Final	4:04 PM		2.92			
9	Initial	4:04 PM	30.00	2.92	0.13	2.61	0.19
	Final	4:34 PM		3.05			
10	Initial	4:34 PM	30.00	3.05	0.13	2.48	0.20
	Final	5:04 PM		3.18			
11	Initial	5:04 PM	30.00	3.18	0.12	2.35	0.19
	Final	5:34 PM		3.30			
12	Initial	5:34 PM	30.00	3.04	0.13	2.49	0.20
	Final	6:04 PM		3.17			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	7.60	(ft)

Infiltration Test Hole	I-14

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:39 AM	25.00	5.48	3.00	NO	NON-SANDY SOILS
	Final	12:04 PM		5.73			
2	Initial	12:04 PM	25.00	5.49	1.68	NO	NON-SANDY SOILS
	Final	12:29 PM		5.63			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:29 PM	30.00	5.63	0.13	1.91	0.25
	Final	12:59 PM		5.76			
2	Initial	12:59 PM	30.00	5.55	0.14	1.98	0.26
	Final	1:29 PM		5.69			
3	Initial	1:29 PM	30.00	5.52	0.13	2.02	0.24
	Final	1:59 PM		5.65			
4	Initial	1:59 PM	30.00	5.55	0.13	1.99	0.24
	Final	2:29 PM		5.68			
5	Initial	2:29 PM	30.00	5.50	0.10	2.05	0.18
	Final	2:59 PM		5.60			
6	Initial	2:29 PM	30.00	5.60	0.09	1.96	0.17
	Final	2:59 PM		5.69			
7	Initial	2:59 PM	30.00	5.64	0.09	1.92	0.17
	Final	3:29 PM		5.73			
8	Initial	3:29 PM	30.00	5.53	0.10	2.02	0.18
	Final	3:59 PM		5.63			
9	Initial	3:59 PM	30.00	5.63	0.09	1.93	0.17
	Final	4:29 PM		5.72			
10	Initial	4:29 PM	30.00	5.72	0.08	1.84	0.16
	Final	4:59 PM		5.80			
11	Initial	4:59 PM	30.00	5.61	0.09	1.95	0.17
	Final	5:29 PM		5.70			
12	Initial	5:29 PM	30.00	5.70	0.09	1.86	0.17
	Final	5:59 PM		5.79			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	10.51	(ft)

Infiltration Test Hole	I-15

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:46 AM	25.00	7.50	4.80	NO	NON-SANDY SOILS
	Final	9:11 AM		7.90			
2	Initial	9:11 AM	25.00	7.60	0.00	NO	NON-SANDY SOILS
	Final	9:36 AM		7.60			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:37 AM	30.00	7.60	0.05	2.89	0.07
	Final	10:07 AM		7.65			
2	Initial	10:07 AM	30.00	7.65	0.02	2.85	0.03
	Final	10:37 AM		7.67			
3	Initial	10:37 AM	30.00	7.67	0.03	2.83	0.04
	Final	11:07 AM		7.70			
4	Initial	11:07 AM	30.00	7.70	0.01	2.81	0.01
	Final	11:37 AM		7.71			
5	Initial	11:37 AM	30.00	7.71	0.02	2.79	0.03
	Final	12:07 PM		7.73			
6	Initial	11:37 AM	30.00	7.73	0.02	2.77	0.03
	Final	12:07 PM		7.75			
7	Initial	12:07 PM	30.00	7.75	0.02	2.75	0.03
	Final	12:37 PM		7.77			
8	Initial	12:37 PM	30.00	7.77	0.03	2.73	0.04
	Final	1:07 PM		7.80			
9	Initial	1:07 PM	30.00	7.80	0.02	2.70	0.03
	Final	1:37 PM		7.82			
10	Initial	1:37 PM	30.00	7.71	0.01	2.80	0.01
	Final	2:07 PM		7.72			
11	Initial	2:07 PM	30.00	7.72	0.02	2.78	0.03
	Final	2:37 PM		7.74			
12	Initial	2:37 PM	30.00	7.74	0.01	2.77	0.01
	Final	3:07 PM		7.75			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	9.50	(ft)

Infiltration Test Hole	I-16

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:49 AM	25.00	6.24	1.92	NO	NON-SANDY SOILS
	Final	9:14 AM		6.40			
2	Initial	9:14 AM	25.00	6.40	2.52	NO	NON-SANDY SOILS
	Final	9:39 AM		6.61			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:40 AM	30.00	6.61	0.18	2.80	0.24
	Final	10:10 AM		6.79			
2	Initial	10:10 AM	30.00	6.79	0.15	2.64	0.21
	Final	10:40 AM		6.94			
3	Initial	10:40 AM	30.00	6.94	0.15	2.49	0.23
	Final	11:10 AM		7.09			
4	Initial	11:10 AM	30.00	7.09	0.12	2.35	0.19
	Final	11:40 AM		7.21			
5	Initial	11:40 AM	30.00	6.77	0.12	2.67	0.17
	Final	12:10 PM		6.89			
6	Initial	11:40 AM	30.00	6.89	0.12	2.55	0.18
	Final	12:10 PM		7.01			
7	Initial	12:10 PM	30.00	7.01	0.10	2.44	0.15
	Final	12:40 PM		7.11			
8	Initial	12:40 PM	30.00	7.11	0.12	2.33	0.19
	Final	1:10 PM		7.23			
9	Initial	1:10 PM	30.00	7.23	0.10	2.22	0.17
	Final	1:40 PM		7.33			
10	Initial	1:40 PM	30.00	7.01	0.10	2.44	0.15
	Final	2:10 PM		7.11			
11	Initial	2:10 PM	30.00	7.11	0.10	2.34	0.16
	Final	2:40 PM		7.21			
12	Initial	2:40 PM	30.00	7.21	0.09	2.25	0.15
	Final	3:10 PM		7.30			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	10.10	(ft)

Infiltration Test Hole	I-17

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	9:52 AM	25.00	7.54	0.00	NO	NON-SANDY SOILS
	Final	10:17 AM		7.54			
2	Initial	10:17 AM	25.00	7.54	0.48	NO	NON-SANDY SOILS
	Final	10:42 AM		7.58			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	10:43 AM	30.00	7.58	0.05	2.50	0.08
	Final	11:13 AM		7.63			
2	Initial	11:13 AM	30.00	7.63	0.03	2.46	0.05
	Final	11:43 AM		7.66			
3	Initial	11:43 AM	30.00	7.66	0.03	2.43	0.05
	Final	12:13 PM		7.69			
4	Initial	12:13 PM	30.00	7.69	0.02	2.40	0.03
	Final	12:43 PM		7.71			
5	Initial	12:43 PM	30.00	7.71	0.02	2.38	0.03
	Final	1:13 PM		7.73			
6	Initial	12:43 PM	30.00	7.73	0.03	2.36	0.05
	Final	1:13 PM		7.76			
7	Initial	1:13 PM	30.00	7.76	0.04	2.32	0.06
	Final	1:43 PM		7.80			
8	Initial	1:43 PM	30.00	7.80	0.02	2.29	0.03
	Final	2:13 PM		7.82			
9	Initial	2:13 PM	30.00	7.64	0.03	2.45	0.05
	Final	2:43 PM		7.67			
10	Initial	2:43 PM	30.00	7.67	0.02	2.42	0.03
	Final	3:13 PM		7.69			
11	Initial	3:13 PM	30.00	7.69	0.02	2.40	0.03
	Final	3:43 PM		7.71			
12	Initial	3:43 PM	30.00	7.71	0.02	2.38	0.03
	Final	4:13 PM		7.73			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	7.40	(ft)

Infiltration Test Hole	I-18

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:55 AM	25.00	4.20	3.72	NO	NON-SANDY SOILS
	Final	9:20 AM		4.51			
2	Initial	9:20 AM	25.00	4.14	0.84	NO	NON-SANDY SOILS
	Final	9:45 AM		4.21			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:46 AM	30.00	4.21	0.03	3.18	0.04
	Final	10:16 AM		4.24			
2	Initial	10:16 AM	30.00	4.24	0.03	3.15	0.04
	Final	10:46 AM		4.27			
3	Initial	10:46 AM	30.00	4.27	0.03	3.12	0.04
	Final	11:16 AM		4.30			
4	Initial	11:16 AM	30.00	4.30	0.05	3.08	0.06
	Final	11:46 AM		4.35			
5	Initial	11:46 AM	30.00	4.35	0.03	3.04	0.04
	Final	12:16 PM		4.38			
6	Initial	11:46 AM	30.00	4.38	0.03	3.01	0.04
	Final	12:16 PM		4.41			
7	Initial	12:16 PM	30.00	4.41	0.02	2.98	0.03
	Final	12:46 PM		4.43			
8	Initial	12:46 PM	30.00	4.24	0.02	3.15	0.02
	Final	1:16 PM		4.26			
9	Initial	1:16 PM	30.00	4.26	0.03	3.13	0.04
	Final	1:46 PM		4.29			
10	Initial	1:46 PM	30.00	4.29	0.02	3.10	0.02
	Final	2:16 PM		4.31			
11	Initial	2:16 PM	30.00	4.31	0.04	3.07	0.05
	Final	2:46 PM		4.35			
12	Initial	2:46 PM	30.00	4.35	0.02	3.04	0.02
	Final	3:16 PM		4.37			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	3.00	(ft)

Infiltration Test Hole	I-19

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	9:02 AM	25.00	0.82	1.20	NO	NON-SANDY SOILS
	Final	9:27 AM		0.92			
2	Initial	9:27 AM	25.00	0.92	0.72	NO	NON-SANDY SOILS
	Final	9:52 AM		0.98			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:53 AM	30.00	0.98	0.07	1.99	0.13
	Final	10:23 AM		1.05			
2	Initial	10:23 AM	30.00	1.05	0.08	1.91	0.15
	Final	10:53 AM		1.13			
3	Initial	10:53 AM	30.00	1.13	0.07	1.84	0.14
	Final	11:23 AM		1.20			
4	Initial	11:23 AM	30.00	1.01	0.07	1.96	0.13
	Final	11:53 AM		1.08			
5	Initial	11:53 AM	30.00	1.08	0.06	1.89	0.12
	Final	12:23 PM		1.14			
6	Initial	11:53 AM	30.00	1.14	0.07	1.83	0.14
	Final	12:23 PM		1.21			
7	Initial	12:23 PM	30.00	1.03	0.07	1.94	0.13
	Final	12:53 PM		1.10			
8	Initial	12:53 PM	30.00	1.10	0.08	1.86	0.16
	Final	1:23 PM		1.18			
9	Initial	1:23 PM	30.00	1.18	0.07	1.79	0.14
	Final	1:53 PM		1.25			
10	Initial	1:53 PM	30.00	1.02	0.06	1.95	0.11
	Final	2:23 PM		1.08			
11	Initial	2:23 PM	30.00	1.08	0.06	1.89	0.12
	Final	2:53 PM		1.14			
12	Initial	2:53 PM	30.00	1.14	0.05	1.84	0.10
	Final	3:23 PM		1.19			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	3.00	(ft)

Infiltration Test Hole	I-20

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:55 AM	25.00	0.95	3.84	NO	NON-SANDY SOILS
	Final	9:20 AM		1.27			
2	Initial	9:20 AM	25.00	1.13	1.44	NO	NON-SANDY SOILS
	Final	9:45 AM		1.25			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:45 AM	30.00	1.25	0.11	1.70	0.24
	Final	10:15 AM		1.36			
2	Initial	10:15 AM	30.00	1.36	0.09	1.60	0.20
	Final	10:45 AM		1.45			
3	Initial	10:45 AM	30.00	1.14	0.09	1.82	0.18
	Final	11:15 AM		1.23			
4	Initial	11:15 AM	30.00	1.15	0.07	1.82	0.14
	Final	11:45 AM		1.22			
5	Initial	11:45 AM	30.00	1.22	0.07	1.75	0.15
	Final	12:15 PM		1.29			
6	Initial	11:45 AM	30.00	1.13	0.08	1.83	0.16
	Final	12:15 PM		1.21			
7	Initial	12:15 PM	30.00	1.14	0.07	1.83	0.14
	Final	12:45 PM		1.21			
8	Initial	12:45 PM	30.00	1.21	0.06	1.76	0.12
	Final	1:15 PM		1.27			
9	Initial	1:15 PM	30.00	1.16	0.06	1.81	0.12
	Final	1:45 PM		1.22			
10	Initial	1:45 PM	30.00	1.22	0.07	1.75	0.15
	Final	2:15 PM		1.29			
11	Initial	2:15 PM	30.00	1.14	0.06	1.83	0.12
	Final	2:45 PM		1.20			
12	Initial	2:45 PM	30.00	1.20	0.05	1.78	0.10
	Final	3:15 PM		1.25			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	3.50	(ft)

Infiltration Test Hole	I-21

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:58 AM	25.00	0.87	5.88	NO	NON-SANDY SOILS
	Final	9:23 AM		1.36			
2	Initial	9:23 AM	25.00	1.10	4.32	NO	NON-SANDY SOILS
	Final	9:48 AM		1.46			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:48 AM	30.00	1.46	0.51	1.79	1.05
	Final	10:18 AM		1.97			
2	Initial	10:18 AM	30.00	1.46	0.51	1.79	1.05
	Final	10:48 AM		1.97			
3	Initial	10:48 AM	30.00	1.23	0.51	2.02	0.94
	Final	11:18 AM		1.74			
4	Initial	11:18 AM	30.00	1.20	0.49	2.06	0.88
	Final	11:48 AM		1.69			
5	Initial	11:48 AM	30.00	1.40	0.48	1.86	0.95
	Final	12:18 PM		1.88			
6	Initial	11:48 AM	30.00	1.15	0.45	2.13	0.79
	Final	12:18 PM		1.60			
7	Initial	12:18 PM	30.00	1.14	0.47	2.13	0.82
	Final	12:48 PM		1.61			
8	Initial	12:48 PM	30.00	1.24	0.39	2.07	0.70
	Final	1:18 PM		1.63			
9	Initial	1:18 PM	30.00	1.25	0.36	2.07	0.64
	Final	1:48 PM		1.61			
10	Initial	1:48 PM	30.00	1.61	0.26	1.76	0.54
	Final	2:18 PM		1.87			
11	Initial	2:18 PM	30.00	1.41	0.25	1.97	0.47
	Final	2:48 PM		1.66			
12	Initial	2:48 PM	30.00	1.66	0.21	1.74	0.44
	Final	3:18 PM		1.87			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	4.50	(ft)

Infiltration Test Hole	I-22

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:52 AM	25.00	2.17	4.08	NO	NON-SANDY SOILS
	Final	9:17 AM		2.51			
2	Initial	9:17 AM	25.00	2.16	3.48	NO	NON-SANDY SOILS
	Final	9:42 AM		2.45			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:42 AM	30.00	2.45	0.40	1.85	0.79
	Final	10:12 AM		2.85			
2	Initial	10:12 AM	30.00	2.28	0.35	2.05	0.63
	Final	10:42 AM		2.63			
3	Initial	10:42 AM	30.00	2.23	0.32	2.11	0.56
	Final	11:12 AM		2.55			
4	Initial	11:12 AM	30.00	2.30	0.28	2.06	0.50
	Final	11:42 AM		2.58			
5	Initial	11:42 AM	30.00	2.22	0.26	2.15	0.45
	Final	12:12 PM		2.48			
6	Initial	11:42 AM	30.00	2.48	0.21	1.92	0.40
	Final	12:12 PM		2.69			
7	Initial	12:12 PM	30.00	2.19	0.25	2.19	0.43
	Final	12:42 PM		2.44			
8	Initial	12:42 PM	30.00	2.44	0.23	1.95	0.44
	Final	1:12 PM		2.67			
9	Initial	1:12 PM	30.00	2.20	0.21	2.20	0.36
	Final	1:42 PM		2.41			
10	Initial	1:42 PM	30.00	2.41	0.20	1.99	0.37
	Final	2:12 PM		2.61			
11	Initial	2:12 PM	30.00	2.31	0.20	2.09	0.35
	Final	2:42 PM		2.51			
12	Initial	2:42 PM	30.00	2.51	0.17	1.91	0.33
	Final	3:12 PM		2.68			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	9.00	(ft)

Infiltration Test Hole	I-23

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:49 AM	25.00	5.17	3.84	NO	NON-SANDY SOILS
	Final	9:14 AM		5.49			
2	Initial	9:14 AM	25.00	5.05	2.40	NO	NON-SANDY SOILS
	Final	9:39 AM		5.25			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:39 AM	30.00	5.24	0.13	3.70	0.13
	Final	10:09 AM		5.37			
2	Initial	10:09 AM	30.00	5.37	0.13	3.57	0.14
	Final	10:39 AM		5.50			
3	Initial	10:39 AM	30.00	5.50	0.11	3.45	0.12
	Final	11:09 AM		5.61			
4	Initial	11:09 AM	30.00	5.61	0.09	3.35	0.10
	Final	11:39 AM		5.70			
5	Initial	11:39 AM	30.00	5.31	0.11	3.64	0.12
	Final	12:09 PM		5.42			
6	Initial	11:39 AM	30.00	5.42	0.10	3.53	0.11
	Final	12:09 PM		5.52			
7	Initial	12:09 PM	30.00	5.52	0.08	3.44	0.09
	Final	12:39 PM		5.60			
8	Initial	12:39 PM	30.00	5.60	0.08	3.36	0.09
	Final	1:09 PM		5.68			
9	Initial	1:09 PM	30.00	5.68	0.08	3.28	0.09
	Final	1:39 PM		5.76			
10	Initial	1:39 PM	30.00	5.33	0.08	3.63	0.08
	Final	2:09 PM		5.41			
11	Initial	2:09 PM	30.00	5.41	0.07	3.56	0.08
	Final	2:39 PM		5.48			
12	Initial	2:39 PM	30.00	5.48	0.07	3.49	0.08
	Final	3:09 PM		5.55			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	9.00	(ft)

Infiltration Test Hole	I-24

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:46 AM	25.00	6.00	15.72	YES	SANDY SOILS
	Final	9:11 AM		7.31			
2	Initial	9:11 AM	25.00	6.20	10.20	YES	SANDY SOILS
	Final	9:36: AM		7.05			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	11:16 AM	10.00	6.55	0.48	2.21	2.42
	Final	11:26 AM		7.03			
2	Initial	11:27 AM	10.00	6.50	0.55	2.23	2.76
	Final	11:37 AM		7.05			
3	Initial	11:37 AM	10.00	6.50	0.47	2.27	2.32
	Final	11:47 AM		6.97			
4	Initial	11:48 AM	10.00	6.97	0.34	1.86	2.01
	Final	11:58 AM		7.31			
5	Initial	11:58 AM	10.00	6.58	0.39	2.23	1.96
	Final	12:08 PM		6.97			
6	Initial	12:08 PM	10.00	6.97	0.29	1.89	1.70
	Final	12:18 PM		7.26			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	9.00	(ft)

Infiltration Test Hole	I-25

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:49 AM	25.00	6.80	9.60	YES	SANDY SOILS
	Final	9:14 AM		7.60			
2	Initial	9:14 AM	25.00	6.50	2.16	NO	NON-SANDY SOILS
	Final	9:39 AM		6.68			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:39 AM	30.00	6.68	0.18	2.23	0.30
	Final	10:09 AM		6.86			
2	Initial	10:09 AM	30.00	6.60	0.17	2.32	0.27
	Final	10:39 AM		6.77			
3	Initial	10:39 AM	30.00	6.77	0.14	2.16	0.24
	Final	11:09 AM		6.91			
4	Initial	11:09 AM	30.00	6.91	0.11	2.04	0.20
	Final	11:39 AM		7.02			
5	Initial	11:39 AM	30.00	6.75	0.13	2.19	0.22
	Final	12:09 PM		6.88			
6	Initial	11:39 AM	30.00	6.88	0.11	2.07	0.20
	Final	12:09 PM		6.99			
7	Initial	12:09 PM	30.00	6.99	0.08	1.97	0.15
	Final	12:39 PM		7.07			
8	Initial	12:39 PM	30.00	7.07	0.09	1.89	0.18
	Final	1:09 PM		7.16			
9	Initial	1:09 PM	30.00	6.77	0.09	2.19	0.15
	Final	1:39 PM		6.86			
10	Initial	1:39 PM	30.00	6.86	0.08	2.10	0.14
	Final	2:09 PM		6.94			
11	Initial	2:09 PM	30.00	6.94	0.08	2.02	0.15
	Final	2:39 PM		7.02			
12	Initial	2:39 PM	30.00	7.02	0.07	1.95	0.13
	Final	3:09 PM		7.09			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	7.41	(ft)

Infiltration Test Hole	I-26

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	12:07 PM	25.00	4.65	1.92	NO	NON-SANDY SOILS
	Final	12:32 PM		4.81			
2	Initial	12:32 PM	25.00	4.41	0.60	NO	NON-SANDY SOILS
	Final	12:57 PM		4.46			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:57	30.00	4.46	0.07	2.92	0.09
	Final	1:27 PM		4.53			
2	Initial	1:27 PM	30.00	4.53	0.05	2.86	0.07
	Final	1:57 PM		4.58			
3	Initial	1:57 PM	30.00	4.58	0.04	2.81	0.05
	Final	2:27 PM		4.62			
4	Initial	2:27 PM	30.00	4.62	0.03	2.78	0.04
	Final	2:57 PM		4.65			
5	Initial	2:57 PM	30.00	4.65	0.03	2.75	0.04
	Final	3:27 PM		4.68			
6	Initial	2:57 PM	30.00	4.68	0.03	2.72	0.04
	Final	3:27 PM		4.71			
7	Initial	3:27 PM	30.00	4.71	0.03	2.69	0.04
	Final	3:57 PM		4.74			
8	Initial	3:57 PM	30.00	4.74	0.03	2.66	0.04
	Final	4:27 PM		4.77			
9	Initial	4:27 PM	30.00	4.77	0.01	2.64	0.01
	Final	4:57 PM		4.78			
10	Initial	4:57 PM	30.00	4.78	0.02	2.62	0.03
	Final	5:27 PM		4.80			
11	Initial	5:27 PM	30.00	4.80	0.03	2.60	0.04
	Final	5:57 PM		4.83			
12	Initial	5:57 PM	30.00	4.83	0.02	2.57	0.03
	Final	6:27 PM		4.85			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	7.00	(ft)

Infiltration Test Hole	I-27

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:31 AM	25.00	4.15	3.36	NO	NON-SANDY SOILS
	Final	8:56 AM		4.43			
2	Initial	8:56 AM	25.00	3.98	5.64	NO	NON-SANDY SOILS
	Final	9:21 AM		4.45			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:24	30.00	4.45	0.27	2.42	0.42
	Final	9:54 AM		4.72			
2	Initial	9:54 AM	30.00	4.72	0.14	2.21	0.24
	Final	10:24 AM		4.86			
3	Initial	10:24 AM	30.00	4.86	0.07	2.11	0.12
	Final	10:54 AM		4.93			
4	Initial	10:54 AM	30.00	4.93	0.06	2.04	0.11
	Final	11:24 AM		4.99			
5	Initial	11:24 AM	30.00	4.99	0.05	1.99	0.09
	Final	11:54 AM		5.04			
6	Initial	11:24 AM	30.00	5.04	0.05	1.94	0.10
	Final	11:54 AM		5.09			
7	Initial	11:54 AM	30.00	5.09	0.04	1.89	0.08
	Final	12:24 PM		5.13			
8	Initial	12:24 PM	30.00	5.13	0.03	1.86	0.06
	Final	12:54 PM		5.16			
9	Initial	12:54 PM	30.00	4.66	0.06	2.31	0.10
	Final	1:24 PM		4.72			
10	Initial	1:24 PM	30.00	4.72	0.04	2.26	0.07
	Final	1:54 PM		4.76			
11	Initial	1:54 PM	30.00	4.76	0.04	2.22	0.07
	Final	2:24 PM		4.80			
12	Initial	2:24 PM	30.00	4.80	0.03	2.19	0.05
	Final	2:54 PM		4.83			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	5.51	(ft)

Infiltration Test Hole	I-28

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:34 AM	25.00	3.40	2.64	NO	NON-SANDY SOILS
	Final	8:59 AM		3.62			
2	Initial	8:59 AM	25.00	3.53	0.36	NO	NON-SANDY SOILS
	Final	9:24 AM		3.56			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:25 AM	30.00	3.56	0.01	1.95	0.02
	Final	9:55 AM		3.57			
2	Initial	9:55 AM	30.00	3.57	0.01	1.94	0.02
	Final	10:25 AM		3.58			
3	Initial	10:25 AM	30.00	3.58	0.01	1.93	0.02
	Final	10:55 AM		3.59			
4	Initial	10:55 AM	30.00	3.59	0.01	1.92	0.02
	Final	11:25 AM		3.60			
5	Initial	11:25 AM	30.00	3.60	0.00	1.91	0.00
	Final	11:55 AM		3.60			
6	Initial	11:25 AM	30.00	3.60	0.01	1.91	0.02
	Final	11:55 AM		3.61			
7	Initial	11:55 AM	30.00	3.61	0.01	1.90	0.02
	Final	12:25 PM		3.62			
8	Initial	12:25 PM	30.00	3.62	0.00	1.89	0.00
	Final	12:55 PM		3.62			
9	Initial	12:55 PM	30.00	3.62	0.00	1.89	0.00
	Final	1:25 PM		3.62			
10	Initial	1:25 PM	30.00	3.62	0.01	1.89	0.02
	Final	1:55 PM		3.63			
11	Initial	1:55 PM	30.00	3.63	0.00	1.88	0.00
	Final	2:25 PM		3.63			
12	Initial	2:25 PM	30.00	3.63	0.00	1.88	0.00
	Final	2:55 PM		3.63			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.01	(ft)

Infiltration Test Hole	I-29

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	12:11 PM	25.00	3.01	3.96	NO	NON-SANDY SOILS
	Final	12:36 PM		3.34			
2	Initial	12:36 PM	25.00	3.15	1.56	NO	NON-SANDY SOILS
	Final	1:01 PM		3.28			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	1:02 PM	30.00	3.28	0.10	2.68	0.14
	Final	1:32 PM		3.38			
2	Initial	1:32 PM	30.00	3.38	0.06	2.60	0.09
	Final	2:02 PM		3.44			
3	Initial	2:02 PM	30.00	3.44	0.07	2.54	0.10
	Final	2:32 PM		3.51			
4	Initial	2:32 PM	30.00	3.51	0.05	2.48	0.08
	Final	3:02 PM		3.56			
5	Initial	3:02 PM	30.00	3.56	0.04	2.43	0.06
	Final	3:32 PM		3.60			
6	Initial	3:02 PM	30.00	3.60	0.05	2.39	0.08
	Final	3:32 PM		3.65			
7	Initial	3:32 PM	30.00	3.65	0.04	2.34	0.06
	Final	4:02 PM		3.69			
8	Initial	4:02 PM	30.00	3.69	0.02	2.31	0.03
	Final	4:32 PM		3.71			
9	Initial	4:32 PM	30.00	3.71	0.03	2.29	0.05
	Final	5:02 PM		3.74			
10	Initial	5:02 PM	30.00	3.74	0.03	2.26	0.05
	Final	5:32 PM		3.77			
11	Initial	5:32 PM	30.00	3.77	0.03	2.23	0.05
	Final	6:02 PM		3.80			
12	Initial	6:02 PM	30.00	3.80	0.02	2.20	0.03
	Final	6:32 PM		3.82			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.47	(ft)

Infiltration Test Hole	I-30

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:35 AM	25.00	3.35	0.96	NO	NON-SANDY SOILS
	Final	9:00 AM		3.43			
2	Initial	9:00 AM	25.00	3.43	1.44	NO	NON-SANDY SOILS
	Final	9:25 AM		3.55			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:26 AM	30.00	3.55	0.17	2.84	0.23
	Final	9:56 AM		3.72			
2	Initial	9:56 AM	30.00	3.72	0.11	2.70	0.15
	Final	10:26 AM		3.83			
3	Initial	10:26 AM	30.00	3.83	0.10	2.59	0.15
	Final	10:56 AM		3.93			
4	Initial	10:56 AM	30.00	3.93	0.08	2.50	0.12
	Final	11:26 AM		4.01			
5	Initial	11:26 AM	30.00	4.01	0.07	2.43	0.11
	Final	11:56 AM		4.08			
6	Initial	11:26 AM	30.00	4.08	0.06	2.36	0.09
	Final	11:56 AM		4.14			
7	Initial	11:56 AM	30.00	4.14	0.06	2.30	0.10
	Final	12:26 PM		4.20			
8	Initial	12:26 PM	30.00	4.20	0.05	2.25	0.08
	Final	12:56 PM		4.25			
9	Initial	12:56 PM	30.00	4.25	0.05	2.20	0.08
	Final	1:26 PM		4.30			
10	Initial	1:26 PM	30.00	3.84	0.06	2.60	0.09
	Final	1:56 PM		3.90			
11	Initial	1:56 PM	30.00	3.90	0.05	2.55	0.07
	Final	2:26 PM		3.95			
12	Initial	2:26 PM	30.00	3.95	0.04	2.50	0.06
	Final	2:56 PM		3.99			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.00	(ft)

Infiltration Test Hole	I-31

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:39 AM	25.00	3.35	21.71	YES	SANDY SOILS
	Final	9:04 AM		5.16			
2	Initial	9:04 AM	25.00	3.40	1.08	NO	NON-SANDY SOILS
	Final	9:29 AM		3.49			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:31 AM	30.00	3.49	0.14	2.44	0.21
	Final	10:01 AM		3.63			
2	Initial	10:01 AM	30.00	3.63	0.09	2.33	0.14
	Final	10:31 AM		3.72			
3	Initial	10:31 AM	30.00	3.72	0.11	2.23	0.18
	Final	11:01 AM		3.83			
4	Initial	11:01 AM	30.00	3.83	0.08	2.13	0.14
	Final	11:31 AM		3.91			
5	Initial	11:31 AM	30.00	3.91	0.09	2.05	0.16
	Final	12:01 PM		4.00			
6	Initial	11:31 AM	30.00	4.00	0.07	1.97	0.13
	Final	12:01 PM		4.07			
7	Initial	12:01 PM	30.00	4.07	0.07	1.90	0.14
	Final	12:31 PM		4.14			
8	Initial	12:31 PM	30.00	4.14	0.07	1.83	0.14
	Final	1:01 PM		4.21			
9	Initial	1:01 PM	30.00	3.84	0.08	2.12	0.14
	Final	1:31 PM		3.92			
10	Initial	1:31 PM	30.00	3.92	0.07	2.05	0.13
	Final	2:01 PM		3.99			
11	Initial	2:01 PM	30.00	3.99	0.07	1.98	0.13
	Final	2:31 PM		4.06			
12	Initial	2:31 PM	30.00	4.06	0.05	1.92	0.10
	Final	3:01 PM		4.11			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.53	(ft)

Infiltration Test Hole	I-32

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	12:14 PM	25.00	3.43	3.48	NO	NON-SANDY SOILS
	Final	12:39 PM		3.72			
2	Initial	12:39 PM	25.00	3.23	2.16	NO	NON-SANDY SOILS
	Final	1:04 PM		3.41			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	1:05 PM	30.00	3.47	0.13	3.00	0.16
	Final	1:35 PM		3.60			
2	Initial	1:35 PM	30.00	3.60	0.09	2.89	0.12
	Final	2:05 PM		3.69			
3	Initial	2:05 PM	30.00	3.69	0.08	2.80	0.11
	Final	2:35 PM		3.77			
4	Initial	2:35 PM	30.00	3.77	0.07	2.73	0.10
	Final	3:05 PM		3.84			
5	Initial	3:05 PM	30.00	3.84	0.07	2.66	0.10
	Final	3:35 PM		3.91			
6	Initial	3:05 PM	30.00	3.91	0.06	2.59	0.09
	Final	3:35 PM		3.97			
7	Initial	3:35 PM	30.00	3.97	0.05	2.54	0.07
	Final	4:05 PM		4.02			
8	Initial	4:05 PM	30.00	4.02	0.05	2.49	0.08
	Final	4:35 PM		4.07			
9	Initial	4:35 PM	30.00	4.07	0.05	2.44	0.08
	Final	5:05 PM		4.12			
10	Initial	5:05 PM	30.00	4.12	0.06	2.38	0.09
	Final	5:35 PM		4.18			
11	Initial	5:35 PM	30.00	4.18	0.04	2.33	0.06
	Final	6:05 PM		4.22			
12	Initial	6:05 PM	30.00	4.22	0.04	2.29	0.07
	Final	6:35 PM		4.26			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.60	(ft)

Infiltration Test Hole	I-33

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:39 AM	25.00	4.20	1.68	NO	NON-SANDY SOILS
	Final	9:04 AM		4.34			
2	Initial	9:04 AM	25.00	4.34	0.72	NO	NON-SANDY SOILS
	Final	9:29 AM		4.40			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:29 AM	30.00	4.40	0.03	2.19	0.05
	Final	9:59 AM		4.43			
2	Initial	9:59 AM	30.00	4.43	0.08	2.13	0.14
	Final	10:29 AM		4.51			
3	Initial	10:29 AM	30.00	4.51	0.04	2.07	0.07
	Final	10:59 AM		4.55			
4	Initial	10:59 AM	30.00	4.55	0.03	2.04	0.05
	Final	11:29 AM		4.58			
5	Initial	11:29 AM	30.00	4.58	0.03	2.01	0.06
	Final	11:59 AM		4.61			
6	Initial	11:29 AM	30.00	4.61	0.03	1.98	0.06
	Final	11:59 AM		4.64			
7	Initial	11:59 AM	30.00	4.64	0.03	1.95	0.06
	Final	12:29 PM		4.67			
8	Initial	12:29 PM	30.00	4.44	0.04	2.14	0.07
	Final	12:59 PM		4.48			
9	Initial	12:59 PM	30.00	4.48	0.04	2.10	0.07
	Final	1:29 PM		4.52			
10	Initial	1:29 PM	30.00	4.52	0.04	2.06	0.07
	Final	1:59 PM		4.56			
11	Initial	1:59 PM	30.00	4.56	0.03	2.03	0.05
	Final	2:29 PM		4.59			
12	Initial	2:29 PM	30.00	4.59	0.03	2.00	0.06
	Final	2:59 PM		4.62			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	5.00	(ft)

Infiltration Test Hole	I-34

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:52 AM	25.00	2.97	0.72	NO	NON-SANDY SOILS
	Final	9:17 AM		3.03			
2	Initial	9:17 AM	25.00	3.00	0.96	NO	NON-SANDY SOILS
	Final	9:42 AM		3.08			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:42 AM	30.00	3.08	0.11	1.87	0.22
	Final	10:12 AM		3.19			
2	Initial	10:12 AM	30.00	3.19	0.09	1.77	0.19
	Final	10:42 AM		3.28			
3	Initial	10:42 AM	30.00	3.28	0.09	1.68	0.20
	Final	11:12 AM		3.37			
4	Initial	11:12 AM	30.00	3.04	0.09	1.92	0.17
	Final	11:42 AM		3.13			
5	Initial	11:42 AM	30.00	3.13	0.08	1.83	0.16
	Final	12:12 PM		3.21			
6	Initial	11:42 AM	30.00	3.21	0.06	1.76	0.12
	Final	12:12 PM		3.27			
7	Initial	12:12 PM	30.00	3.27	0.06	1.70	0.13
	Final	12:42 PM		3.33			
8	Initial	12:42 PM	30.00	3.11	0.07	1.86	0.14
	Final	1:12 PM		3.18			
9	Initial	1:12 PM	30.00	3.18	0.06	1.79	0.12
	Final	1:42 PM		3.24			
10	Initial	1:42 PM	30.00	3.24	0.05	1.74	0.11
	Final	2:12 PM		3.29			
11	Initial	2:12 PM	30.00	3.29	0.05	1.69	0.11
	Final	2:42 PM		3.34			
12	Initial	2:42 PM	30.00	3.15	0.06	1.82	0.12
	Final	3:12 PM		3.21			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	4.50	(ft)

Infiltration Test Hole	I-35

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	10:31 AM	25.00	2.32	5.76	NO	NON-SANDY SOILS
	Final	10:56 AM		2.80			
2	Initial	10:56 AM	25.00	2.33	4.44	NO	NON-SANDY SOILS
	Final	11:21 AM		2.70			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	11:24 AM	30.00	2.41	0.25	1.97	0.47
	Final	11:54 AM		2.66			
2	Initial	11:54 AM	30.00	2.49	0.19	1.92	0.37
	Final	12:24 PM		2.68			
3	Initial	12:24 PM	30.00	2.68	0.15	1.75	0.31
	Final	12:54 PM		2.83			
4	Initial	12:54 PM	30.00	2.45	0.15	1.98	0.28
	Final	1:24 PM		2.60			
5	Initial	1:24 PM	30.00	2.60	0.13	1.84	0.26
	Final	1:54 PM		2.73			
6	Initial	1:24 PM	30.00	2.73	0.11	1.72	0.23
	Final	1:54 PM		2.84			
7	Initial	1:54 PM	30.00	2.46	0.10	1.99	0.19
	Final	2:24 PM		2.56			
8	Initial	2:24 PM	30.00	2.56	0.11	1.89	0.21
	Final	2:54 PM		2.67			
9	Initial	2:54 PM	30.00	2.67	0.08	1.79	0.16
	Final	3:24 PM		2.75			
10	Initial	3:24 PM	30.00	2.75	0.06	1.72	0.13
	Final	3:54 PM		2.81			
11	Initial	3:54 PM	30.00	2.40	0.09	2.06	0.16
	Final	4:24 PM		2.49			
12	Initial	4:24 PM	30.00	2.49	0.07	1.98	0.13
	Final	4:54 PM		2.56			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	5.50	(ft)

Infiltration Test Hole	I-36

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	10:31 AM	25.00	2.95	0.00	NO	NON-SANDY SOILS
	Final	10:56 AM		2.95			
2	Initial	10:56 AM	25.00	2.95	0.00	NO	NON-SANDY SOILS
	Final	11:21 AM		2.95			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	11:22 AM	30.00	2.95	0.00	2.55	0.00
	Final	11:52 AM		2.95			
2	Initial	11:52 AM	30.00	2.95	0.01	2.55	0.01
	Final	12:22 PM		2.96			
3	Initial	12:22 PM	30.00	2.96	0.00	2.54	0.00
	Final	12:52 PM		2.96			
4	Initial	12:52 PM	30.00	2.96	0.00	2.54	0.00
	Final	1:22 PM		2.96			
5	Initial	1:22 PM	30.00	2.96	0.01	2.54	0.01
	Final	1:52 PM		2.97			
6	Initial	1:22 PM	30.00	2.97	0.00	2.53	0.00
	Final	1:52 PM		2.97			
7	Initial	1:52 PM	30.00	2.97	0.00	2.53	0.00
	Final	2:22 PM		2.97			
8	Initial	2:22 PM	30.00	2.97	0.01	2.53	0.01
	Final	2:52 PM		2.98			
9	Initial	2:52 PM	30.00	2.98	0.00	2.52	0.00
	Final	3:22 PM		2.98			
10	Initial	3:22 PM	30.00	2.98	0.00	2.52	0.00
	Final	3:52 PM		2.98			
11	Initial	3:52 PM	30.00	2.98	0.01	2.52	0.01
	Final	4:22 PM		2.99			
12	Initial	4:22 PM	30.00	2.99	0.00	2.51	0.00
	Final	4:52 PM		2.99			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.50	(ft)

Infiltration Test Hole	I-37

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	9:00 AM	25.00	3.46	1.68	NO	NON-SANDY SOILS
	Final	9:25 AM		3.60			
2	Initial	9:25 AM	25.00	3.40	1.44	NO	NON-SANDY SOILS
	Final	9:50 AM		3.52			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:51 AM	30.00	3.52	0.11	2.93	0.14
	Final	10:21 AM		3.63			
2	Initial	10:21 AM	30.00	3.63	0.07	2.84	0.09
	Final	10:51 AM		3.70			
3	Initial	10:51 AM	30.00	3.70	0.05	2.78	0.07
	Final	11:21 AM		3.75			
4	Initial	11:21 AM	30.00	3.75	0.05	2.73	0.07
	Final	11:51 AM		3.80			
5	Initial	11:51 AM	30.00	3.80	0.06	2.67	0.08
	Final	12:21 PM		3.86			
6	Initial	11:51 AM	30.00	3.86	0.05	2.62	0.07
	Final	12:21 PM		3.91			
7	Initial	12:21 PM	30.00	3.91	0.04	2.57	0.06
	Final	12:51 PM		3.95			
8	Initial	12:51 PM	30.00	3.95	0.04	2.53	0.06
	Final	1:21 PM		3.99			
9	Initial	1:21 PM	30.00	3.99	0.04	2.49	0.06
	Final	1:51 PM		4.03			
10	Initial	1:51 PM	30.00	4.03	0.03	2.46	0.05
	Final	2:21 PM		4.06			
11	Initial	2:21 PM	30.00	4.06	0.04	2.42	0.06
	Final	2:51 PM		4.10			
12	Initial	2:51 PM	30.00	4.10	0.04	2.38	0.06
	Final	3:21 PM		4.14			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.41	(ft)

Infiltration Test Hole	I-38

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	10:24 AM	25.00	3.76	4.08	NO	NON-SANDY SOILS
	Final	10:49 AM		4.10			
2	Initial	10:49 AM	25.00	3.86	1.92	NO	NON-SANDY SOILS
	Final	11:14 AM		4.02			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	11:17 AM	30.00	3.90	0.13	2.45	0.20
	Final	11:47 AM		4.03			
2	Initial	11:47 AM	30.00	3.98	0.25	2.31	0.40
	Final	12:17 PM		4.23			
3	Initial	12:17 PM	30.00	4.02	0.23	2.28	0.38
	Final	12:47 PM		4.25			
4	Initial	12:47 PM	30.00	4.25	0.15	2.09	0.27
	Final	1:17 PM		4.40			
5	Initial	1:17 PM	30.00	4.01	0.12	2.34	0.19
	Final	1:47 PM		4.13			
6	Initial	1:17 PM	30.00	4.13	0.12	2.22	0.20
	Final	1:47 PM		4.25			
7	Initial	1:47 PM	30.00	4.25	0.09	2.12	0.16
	Final	2:17 PM		4.34			
8	Initial	2:17 PM	30.00	4.34	0.08	2.03	0.15
	Final	2:47 PM		4.42			
9	Initial	2:47 PM	30.00	4.12	0.09	2.25	0.15
	Final	3:17 PM		4.21			
10	Initial	3:17 PM	30.00	4.21	0.07	2.17	0.12
	Final	3:47 PM		4.28			
11	Initial	3:47 PM	30.00	4.28	0.07	2.10	0.12
	Final	4:17 PM		4.35			
12	Initial	4:17 PM	30.00	4.16	0.06	2.22	0.10
	Final	4:47 PM		4.22			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	7.42	(ft)

Infiltration Test Hole	I-39

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	10:42 AM	25.00	4.81	0.12	NO	NON-SANDY SOILS
	Final	11:07 AM		4.82			
2	Initial	11:07 AM	25.00	4.82	0.24	NO	NON-SANDY SOILS
	Final	11:32 AM		4.84			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	11:32 AM	30.00	4.84	0.02	2.57	0.03
	Final	12:02 PM		4.86			
2	Initial	12:02 PM	30.00	4.86	0.01	2.56	0.01
	Final	12:32 PM		4.87			
3	Initial	12:32 PM	30.00	4.87	0.02	2.54	0.03
	Final	1:02 PM		4.89			
4	Initial	1:02 PM	30.00	4.89	0.01	2.53	0.01
	Final	1:32 PM		4.90			
5	Initial	1:32 PM	30.00	4.90	0.01	2.52	0.01
	Final	2:02 PM		4.91			
6	Initial	1:32 PM	30.00	4.91	0.03	2.50	0.05
	Final	2:02 PM		4.94			
7	Initial	2:02 PM	30.00	4.94	0.01	2.48	0.02
	Final	2:32 PM		4.95			
8	Initial	2:32 PM	30.00	4.95	0.01	2.47	0.02
	Final	3:02 PM		4.96			
9	Initial	3:02 PM	30.00	4.96	0.01	2.46	0.02
	Final	3:32 PM		4.97			
10	Initial	3:32 PM	30.00	4.97	0.01	2.45	0.02
	Final	4:02 PM		4.98			
11	Initial	4:02 PM	30.00	4.98	0.02	2.43	0.03
	Final	4:32 PM		5.00			
12	Initial	4:32 PM	30.00	5.00	0.01	2.42	0.02
	Final	5:02 PM		5.01			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	7.40	(ft)

Infiltration Test Hole	I-40

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:43 AM	25.00	4.86	3.24	NO	NON-SANDY SOILS
	Final	9:08 AM		5.13			
2	Initial	9:08 AM	25.00	4.93	0.48	NO	NON-SANDY SOILS
	Final	9:33 AM		4.97			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:34 AM	30.00	4.97	0.09	2.39	0.14
	Final	10:04 AM		5.06			
2	Initial	10:04 AM	30.00	5.06	0.04	2.32	0.06
	Final	10:34 AM		5.10			
3	Initial	10:34 AM	30.00	5.10	0.05	2.28	0.08
	Final	11:04 AM		5.15			
4	Initial	11:04 AM	30.00	5.15	0.04	2.23	0.07
	Final	11:34 AM		5.19			
5	Initial	11:34 AM	30.00	4.99	0.04	2.39	0.06
	Final	12:04 PM		5.03			
6	Initial	11:34 AM	30.00	5.03	0.03	2.36	0.05
	Final	12:04 PM		5.06			
7	Initial	12:04 PM	30.00	5.06	0.03	2.33	0.05
	Final	12:34 PM		5.09			
8	Initial	12:34 PM	30.00	5.09	0.04	2.29	0.07
	Final	1:04 PM		5.13			
9	Initial	1:04 PM	30.00	5.13	0.03	2.26	0.05
	Final	1:34 PM		5.16			
10	Initial	1:34 PM	30.00	5.01	0.03	2.38	0.05
	Final	2:04 PM		5.04			
11	Initial	2:04 PM	30.00	5.04	0.04	2.34	0.06
	Final	2:34 PM		5.08			
12	Initial	2:34 PM	30.00	5.08	0.03	2.31	0.05
	Final	3:04 PM		5.11			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.04	(ft)

Infiltration Test Hole	I-41

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:43 AM	25.00	3.60	0.48	NO	NON-SANDY SOILS
	Final	9:08 AM		3.64			
2	Initial	9:08 AM	25.00	3.50	0.48	NO	NON-SANDY SOILS
	Final	9:33 AM		3.54			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:33 AM	30.00	3.54	0.07	2.47	0.11
	Final	10:03 AM		3.61			
2	Initial	10:03 AM	30.00	3.61	0.06	2.40	0.09
	Final	10:33 AM		3.67			
3	Initial	10:33 AM	30.00	3.67	0.04	2.35	0.06
	Final	11:03 AM		3.71			
4	Initial	11:03 AM	30.00	3.71	0.04	2.31	0.06
	Final	11:33 AM		3.75			
5	Initial	11:33 AM	30.00	3.75	0.04	2.27	0.07
	Final	12:03 PM		3.79			
6	Initial	11:33 AM	30.00	3.79	0.03	2.24	0.05
	Final	12:03 PM		3.82			
7	Initial	12:03 PM	30.00	3.82	0.03	2.21	0.05
	Final	12:33 PM		3.85			
8	Initial	12:33 PM	30.00	3.85	0.04	2.17	0.07
	Final	1:03 PM		3.89			
9	Initial	1:03 PM	30.00	3.89	0.03	2.14	0.05
	Final	1:33 PM		3.92			
10	Initial	1:33 PM	30.00	3.92	0.02	2.11	0.04
	Final	2:03 PM		3.94			
11	Initial	2:03 PM	30.00	3.94	0.03	2.09	0.05
	Final	2:33 PM		3.97			
12	Initial	2:33 PM	30.00	3.97	0.02	2.06	0.04
	Final	3:03 PM		3.99			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.10	(ft)

Infiltration Test Hole	I-42

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	12:21 PM	25.00	3.50	1.68	NO	NON-SANDY SOILS
	Final	12:46 PM		3.64			
2	Initial	12:46 PM	25.00	3.41	1.20	NO	NON-SANDY SOILS
	Final	1:11 PM		3.51			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	1:11 PM	30.00	3.51	0.08	2.55	0.12
	Final	1:41 PM		3.59			
2	Initial	1:41 PM	30.00	3.59	0.06	2.48	0.09
	Final	2:11 PM		3.65			
3	Initial	2:11 PM	30.00	3.65	0.06	2.42	0.09
	Final	2:41 PM		3.71			
4	Initial	2:41 PM	30.00	3.71	0.04	2.37	0.06
	Final	3:11 PM		3.75			
5	Initial	3:11 PM	30.00	3.53	0.04	2.55	0.06
	Final	3:41 PM		3.57			
6	Initial	3:11 PM	30.00	3.57	0.04	2.51	0.06
	Final	3:41 PM		3.61			
7	Initial	3:41 PM	30.00	3.61	0.03	2.48	0.05
	Final	4:11 PM		3.64			
8	Initial	4:11 PM	30.00	3.64	0.03	2.45	0.05
	Final	4:41 PM		3.67			
9	Initial	4:41 PM	30.00	3.67	0.03	2.42	0.05
	Final	5:11 PM		3.70			
10	Initial	5:11 PM	30.00	3.70	0.03	2.39	0.05
	Final	5:41 PM		3.73			
11	Initial	5:41 PM	30.00	3.73	0.02	2.36	0.03
	Final	6:11 PM		3.75			
12	Initial	6:11 PM	30.00	3.75	0.03	2.34	0.05
	Final	6:41 PM		3.78			

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)

ΔH = Change in Height (Water Level) over the time interval

r = Test Hole (Borehole) Radius

Δt = Time Interval

H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.09	(ft)

Infiltration Test Hole	I-43

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:26 AM	25.00	4.01	0.72	NO	NON-SANDY SOILS
	Final	11:51 AM		4.07			
2	Initial	11:51 AM	25.00	4.07	0.48	NO	NON-SANDY SOILS
	Final	12:16 PM		4.11			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:16 PM	30.00	4.11	0.03	1.97	0.06
	Final	12:46 PM		4.14			
2	Initial	12:46 PM	30.00	4.14	0.03	1.94	0.06
	Final	1:16 PM		4.17			
3	Initial	1:16 PM	30.00	4.17	0.03	1.91	0.06
	Final	1:46 PM		4.20			
4	Initial	1:46 PM	30.00	4.20	0.03	1.88	0.06
	Final	2:16 PM		4.23			
5	Initial	2:16 PM	30.00	4.23	0.02	1.85	0.04
	Final	2:46 PM		4.25			
6	Initial	2:16 PM	30.00	4.25	0.01	1.84	0.02
	Final	2:46 PM		4.26			
7	Initial	2:46 PM	30.00	4.26	0.02	1.82	0.04
	Final	3:16 PM		4.28			
8	Initial	3:16 PM	30.00	4.28	0.02	1.80	0.04
	Final	3:46 PM		4.30			
9	Initial	3:46 PM	30.00	4.30	0.02	1.78	0.04
	Final	4:16 PM		4.32			
10	Initial	4:16 PM	30.00	4.32	0.02	1.76	0.04
	Final	4:46 PM		4.34			
11	Initial	4:46 PM	30.00	4.34	0.02	1.74	0.04
	Final	5:16 PM		4.36			
12	Initial	5:16 PM	30.00	4.36	0.01	1.73	0.02
	Final	5:46 PM		4.37			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	4.50	(ft)

Infiltration Test Hole	I-44

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:17 AM	25.00	1.92	3.84	NO	NON-SANDY SOILS
	Final	11:42 AM		2.24			
2	Initial	11:42 AM	25.00	1.92	3.60	NO	NON-SANDY SOILS
	Final	12:07 PM		2.22			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:07 PM	30.00	2.22	0.18	2.19	0.31
	Final	12:37 PM		2.40			
2	Initial	12:37 PM	30.00	2.40	0.11	2.05	0.20
	Final	1:07 PM		2.51			
3	Initial	1:07 PM	30.00	2.51	0.04	1.97	0.07
	Final	1:37 PM		2.55			
4	Initial	1:37 PM	30.00	2.55	0.07	1.92	0.13
	Final	2:07 PM		2.62			
5	Initial	2:07 PM	30.00	2.25	0.08	2.21	0.13
	Final	2:37 PM		2.33			
6	Initial	2:07 PM	30.00	2.33	0.06	2.14	0.10
	Final	2:37 PM		2.39			
7	Initial	2:37 PM	30.00	2.39	0.06	2.08	0.11
	Final	3:07 PM		2.45			
8	Initial	3:07 PM	30.00	2.45	0.05	2.03	0.09
	Final	3:37 PM		2.50			
9	Initial	3:37 PM	30.00	2.50	0.05	1.98	0.09
	Final	4:07 PM		2.55			
10	Initial	4:07 PM	30.00	2.55	0.04	1.93	0.08
	Final	4:37 PM		2.59			
11	Initial	4:37 PM	30.00	2.31	0.05	2.17	0.09
	Final	5:07 PM		2.36			
12	Initial	5:07 PM	30.00	2.36	0.04	2.12	0.07
	Final	5:37 PM		2.40			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	5.00	(ft)

Infiltration Test Hole	I-45

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:13 AM	25.00	2.00	7.68	YES	SANDY SOILS
	Final	11:38 AM		2.64			
2	Initial	11:38 AM	25.00	2.44	6.96	YES	SANDY SOILS
	Final	12:03 PM		3.02			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	12:33 PM	10.00	3.02	0.22	1.87	1.30
	Final	12:43 PM		3.24			
2	Initial	12:43 PM	10.00	3.24	0.18	1.67	1.18
	Final	12:53 PM		3.42			
3	Initial	12:53 PM	10.00	3.06	0.19	1.85	1.13
	Final	1:03 PM		3.25			
4	Initial	1:03 PM	10.00	3.25	0.15	1.68	0.98
	Final	1:13 PM		3.40			
5	Initial	1:13 PM	10.00	3.12	0.13	1.82	0.79
	Final	1:23 PM		3.25			
6	Initial	1:13 PM	10.00	3.25	0.12	1.69	0.78
	Final	1:23 PM		3.37			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	5.50	(ft)

Infiltration Test Hole	I-46

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	11:09 AM	25.00	2.75	1.44	NO	NON-SANDY SOILS
	Final	11:34 AM		2.87			
2	Initial	11:34 AM	25.00	2.87	2.40	NO	NON-SANDY SOILS
	Final	11:59 AM		3.07			

Test Data

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	11:59 AM	30.00	3.07	0.15	2.36	0.24
	Final	12:29 PM		3.22			
2	Initial	12:29 PM	30.00	3.03	0.15	2.40	0.23
	Final	12:59 PM		3.18			
3	Initial	12:59 PM	30.00	3.29	0.11	2.16	0.19
	Final	1:29 PM		3.40			
4	Initial	1:29 PM	30.00	3.11	0.11	2.34	0.18
	Final	1:59 PM		3.22			
5	Initial	1:59 PM	30.00	3.22	0.09	2.24	0.15
	Final	2:29 PM		3.31			
6	Initial	1:59 PM	30.00	3.31	0.10	2.14	0.17
	Final	2:29 PM		3.41			
7	Initial	2:29 PM	30.00	3.41	0.09	2.05	0.16
	Final	2:59 PM		3.50			
8	Initial	2:59 PM	30.00	3.50	0.07	1.97	0.13
	Final	3:29 PM		3.57			
9	Initial	3:29 PM	30.00	3.57	0.07	1.90	0.14
	Final	3:59 PM		3.64			
10	Initial	3:59 PM	30.00	3.22	0.08	2.24	0.13
	Final	4:29 PM		3.30			
11	Initial	4:29 PM	30.00	3.30	0.08	2.16	0.14
	Final	4:59 PM		3.38			
12	Initial	4:59 PM	30.00	3.38	0.07	2.09	0.12
	Final	5:29 PM		3.45			

Per County Standards, Infiltration Rate calculated as follows:

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

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

INFILTRATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, California
Project Number	22G183-4
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	6.94	(ft)

Infiltration Test Hole	I-47

Soil Criteria Test

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (in)	Did 6 inches of water seep away in less than 25 minutes?	Sandy Soils or Non-Sandy Soils?
1	Initial	8:49 AM	25.00	4.65	0.84	NO	NON-SANDY SOILS
	Final	9:14 AM		4.72			
2	Initial	9:14 AM	25.00	4.72	0.60	NO	NON-SANDY SOILS
	Final	9:39 AM		4.77			

Test Data

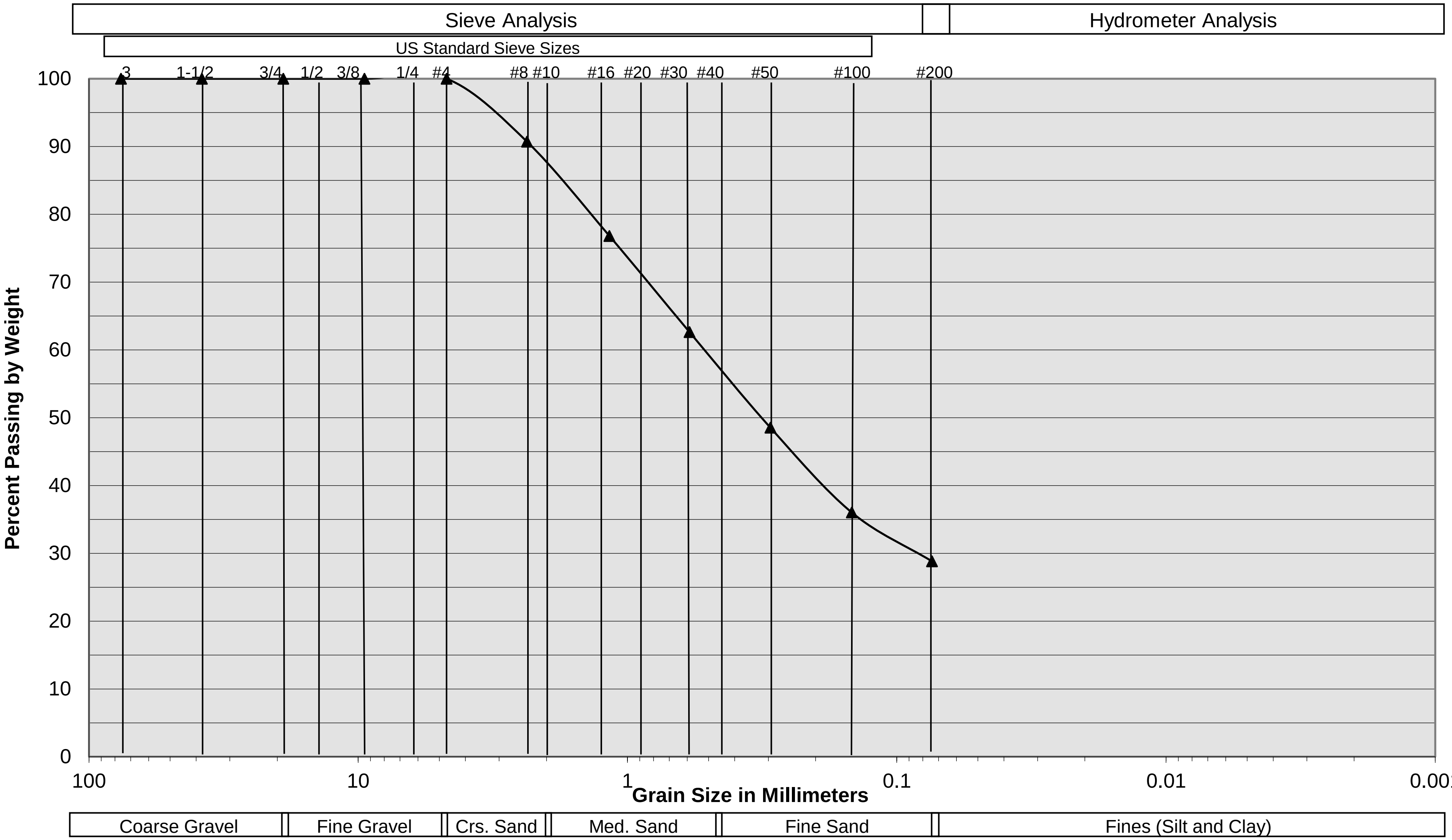
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)
1	Initial	9:39 AM	30.00	4.77	0.21	2.07	0.38
	Final	10:09 AM		4.98			
2	Initial	10:09 AM	30.00	4.72	0.08	2.18	0.14
	Final	10:39 AM		4.80			
3	Initial	10:39 AM	30.00	4.80	0.12	2.08	0.21
	Final	11:09 AM		4.92			
4	Initial	11:09 AM	30.00	4.92	0.12	1.96	0.23
	Final	11:39 AM		5.04			
5	Initial	11:39 AM	30.00	5.04	0.09	1.86	0.18
	Final	12:09 PM		5.13			
6	Initial	11:39 AM	30.00	5.13	0.09	1.77	0.19
	Final	12:09 PM		5.22			
7	Initial	12:09 PM	30.00	5.22	0.06	1.69	0.13
	Final	12:39 PM		5.28			
8	Initial	12:39 PM	30.00	5.28	0.06	1.63	0.13
	Final	1:09 PM		5.34			
9	Initial	1:09 PM	30.00	5.34	0.07	1.57	0.16
	Final	1:39 PM		5.41			
10	Initial	1:39 PM	30.00	5.41	0.05	1.51	0.12
	Final	2:09 PM		5.46			
11	Initial	2:09 PM	30.00	5.46	0.05	1.46	0.12
	Final	2:39 PM		5.51			
12	Initial	2:39 PM	30.00	5.51	0.05	1.41	0.13
	Final	3:09 PM		5.56			

Per County Standards, Infiltration Rate calculated as follows:

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

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

Grain Size Distribution



Sample Description	I-11 @ 3 to 4½ feet
Soil Classification	YOUNGER ALLUVIUM: Brown Silty fine to coarse Sand, trace Clay

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 1

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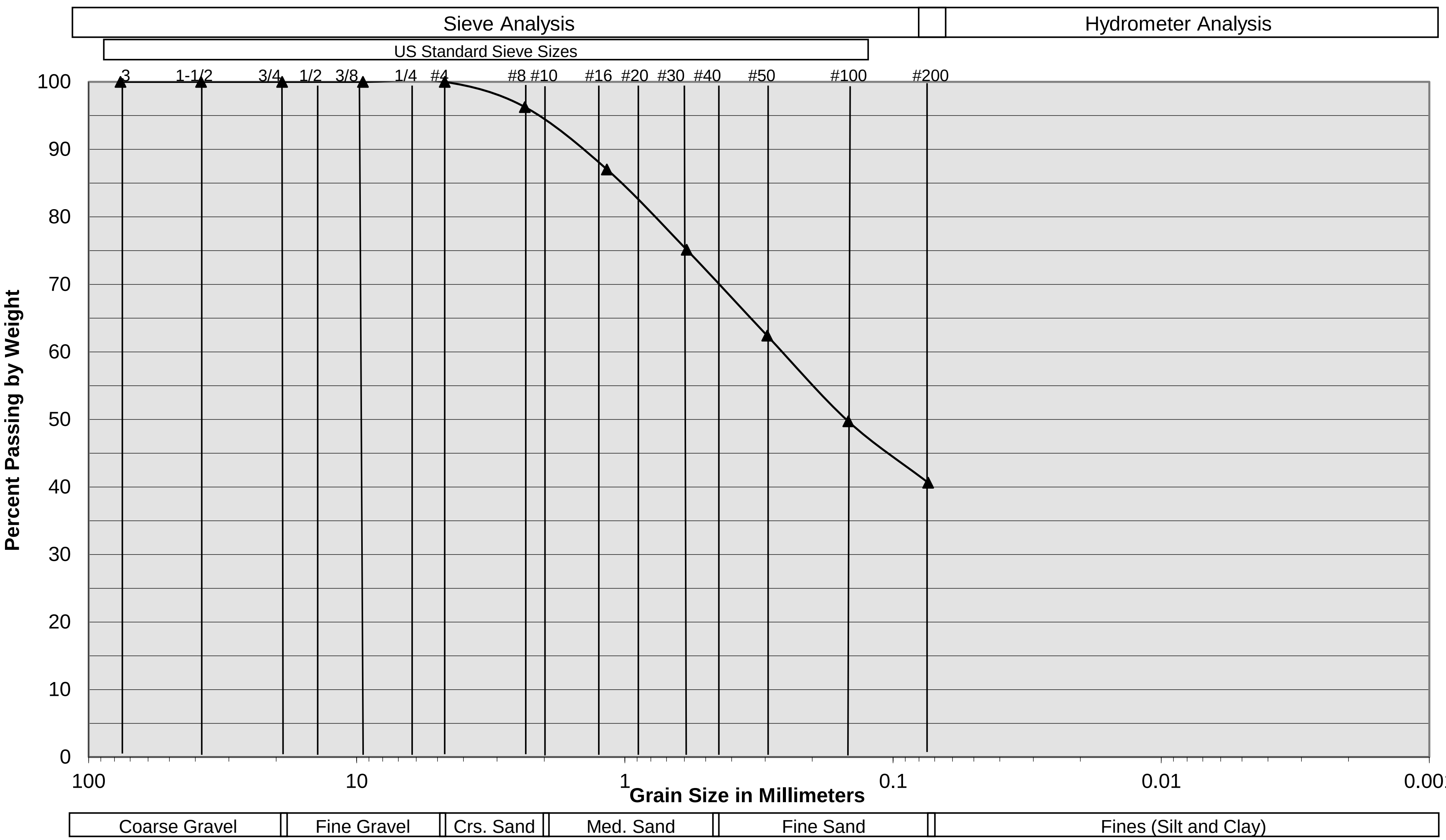
Grain Size Distribution



Sample Description	I-12 @ 3 to 4½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 2

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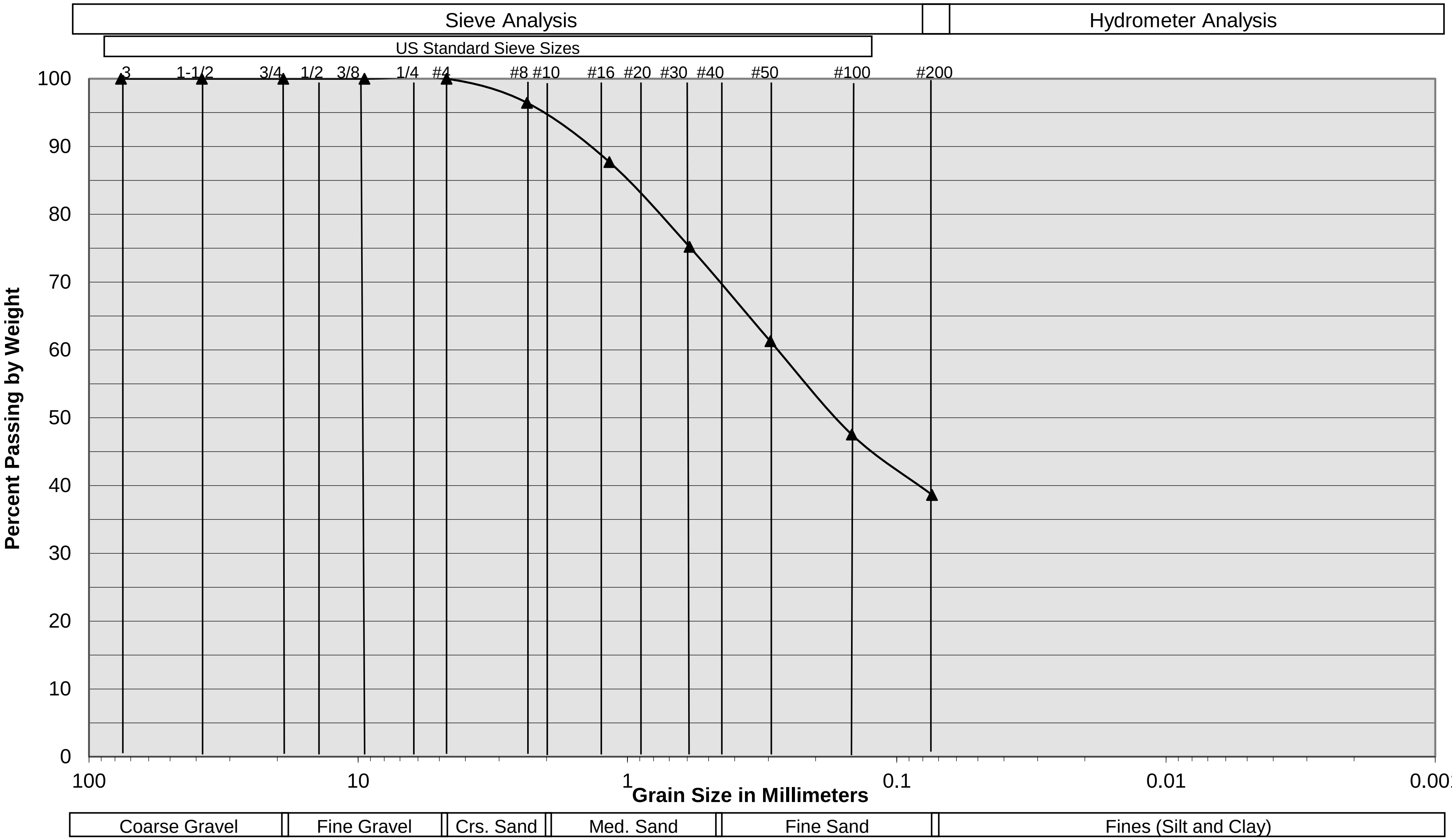
Grain Size Distribution



Sample Description	I-13 @ 4 to 5½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 3

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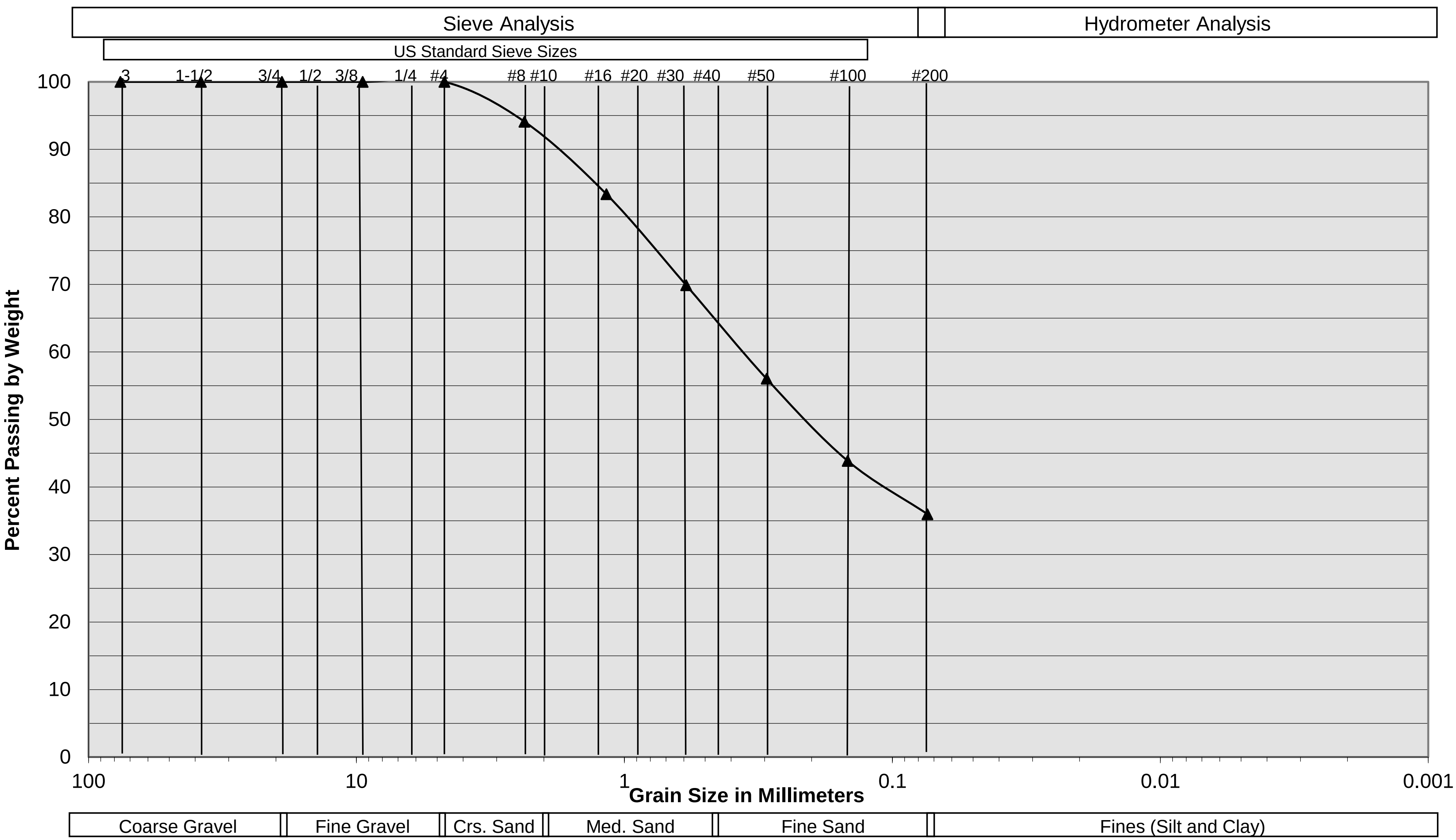
Grain Size Distribution



Sample Description	I-14 @ 6 to 7½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 4

SOUTHERN CALIFORNIA GEOTECHNICAL
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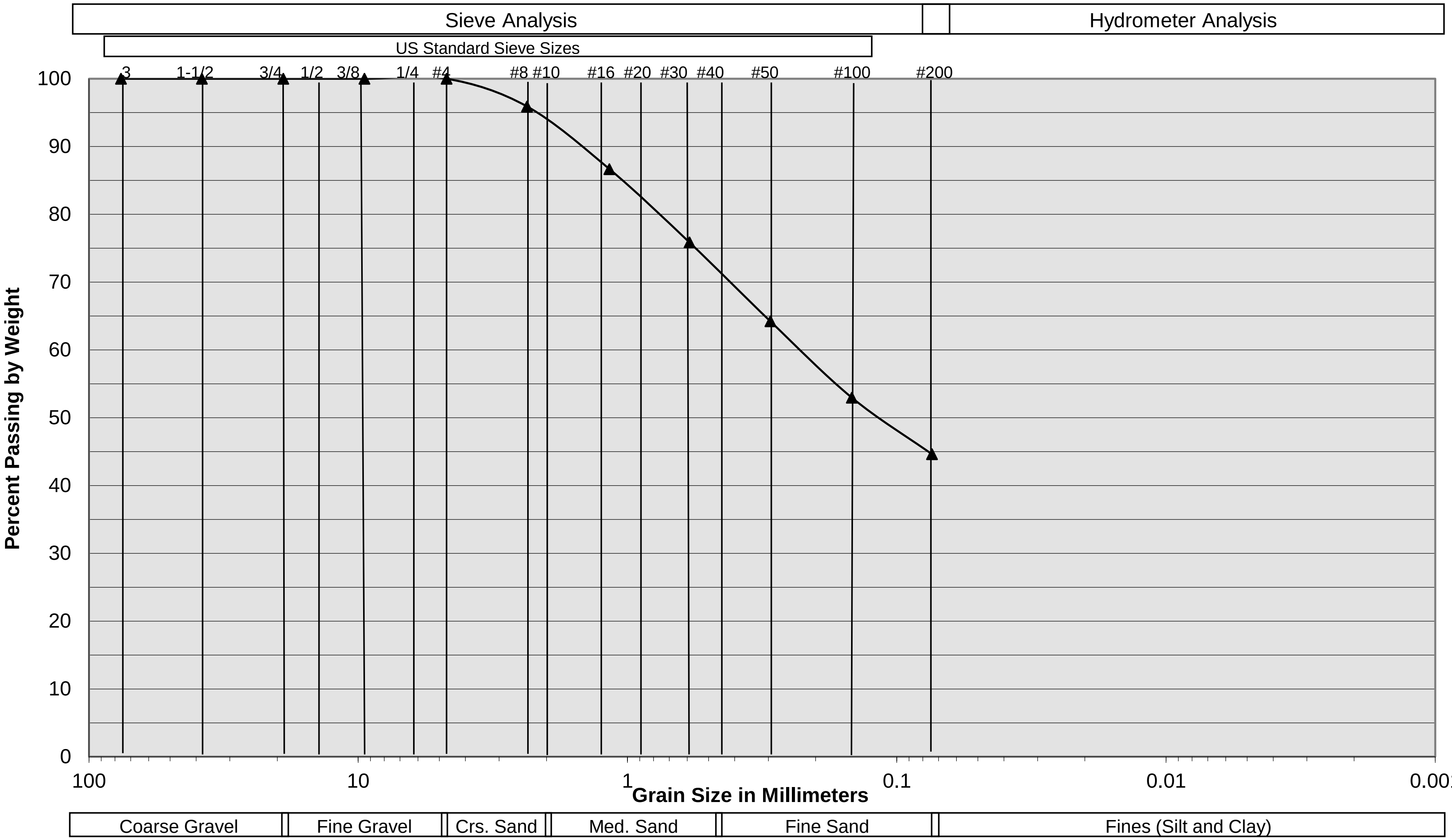
Grain Size Distribution



Sample Description	I-15 @ 9 to 10½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 5

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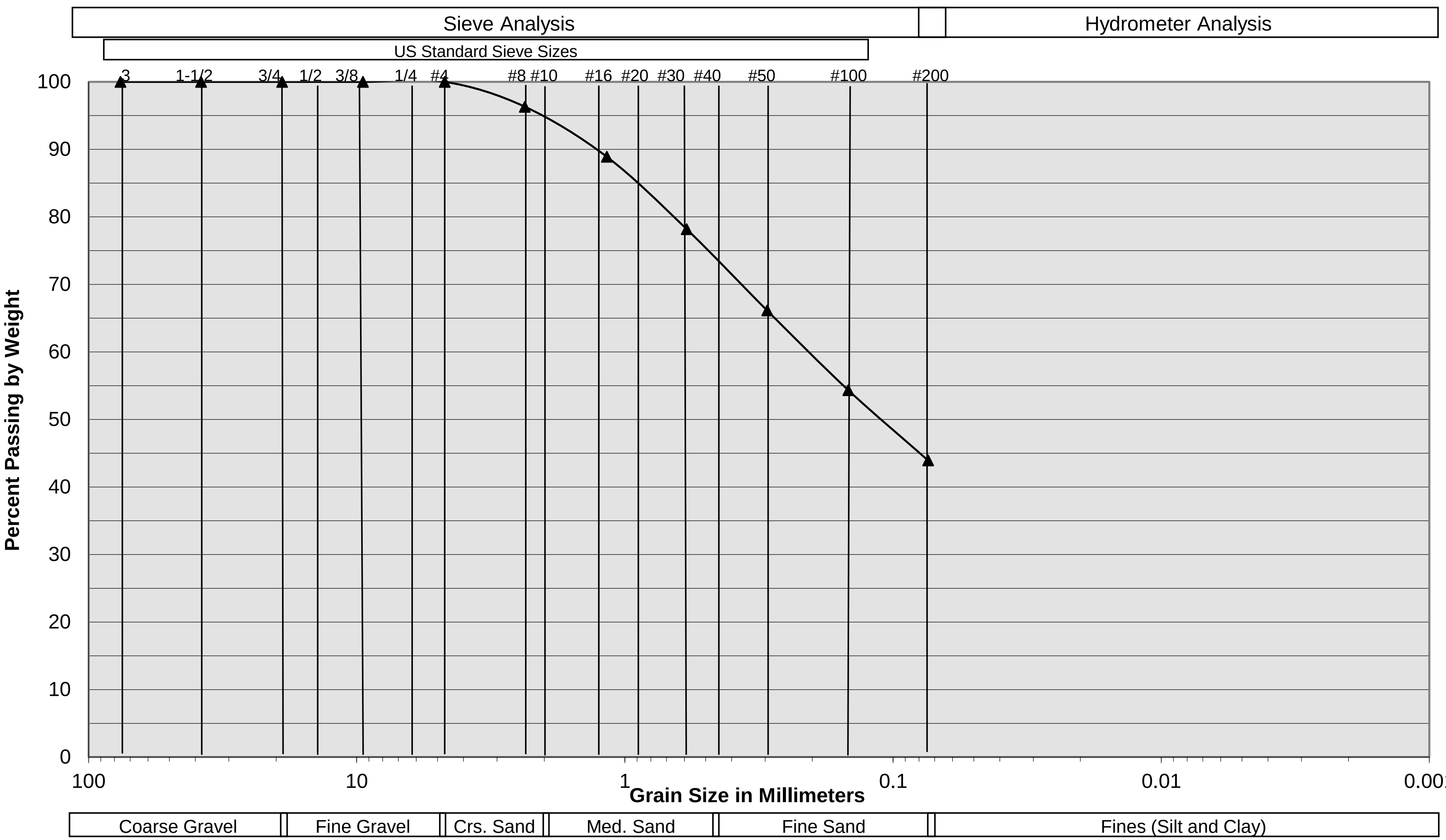
Grain Size Distribution



Sample Description	I-16 @ 8 to 9½ feet
Soil Classification	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 6

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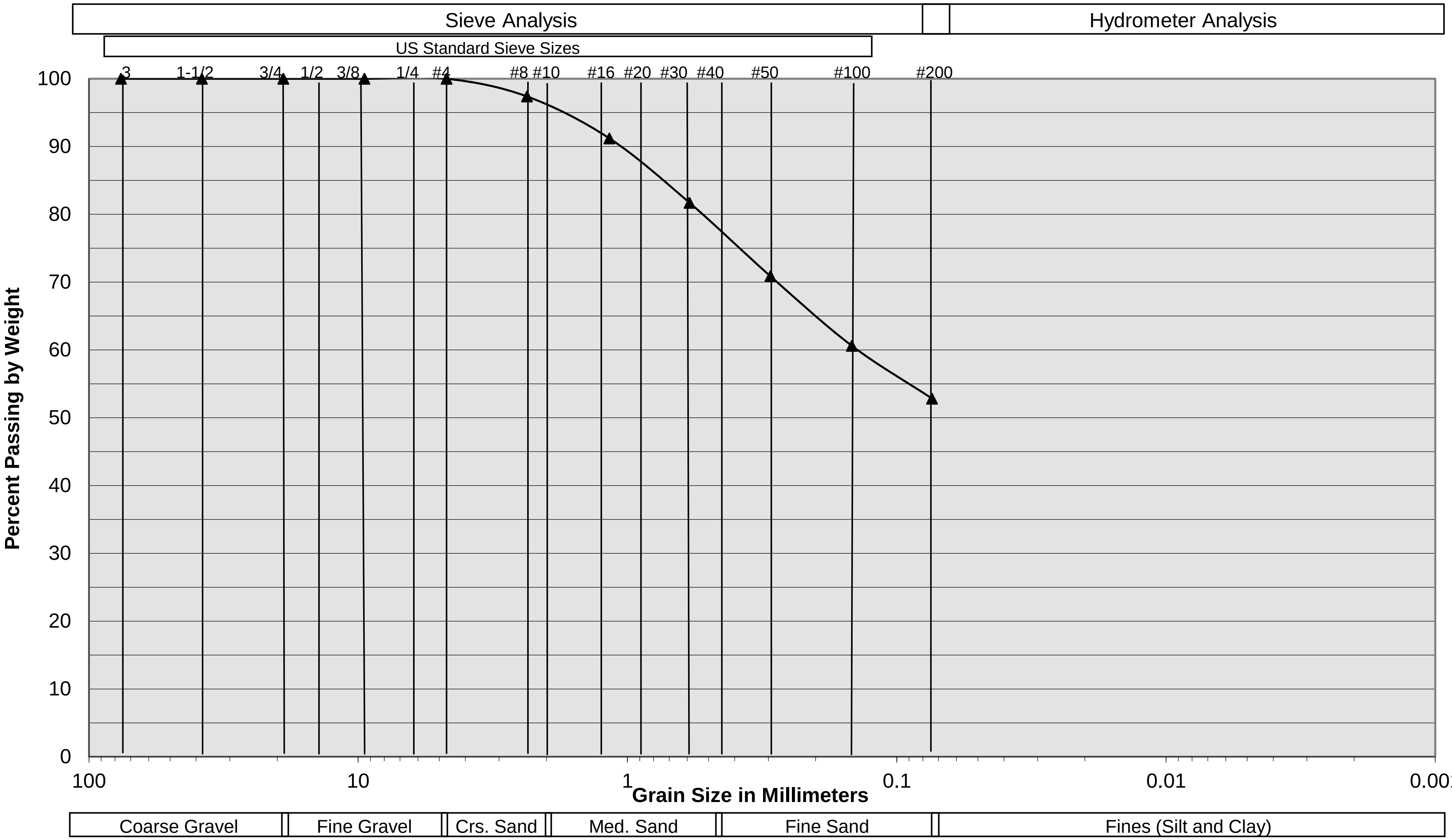
Grain Size Distribution



Sample Description	I-17 @ 8½ to 10 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace to little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 7

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
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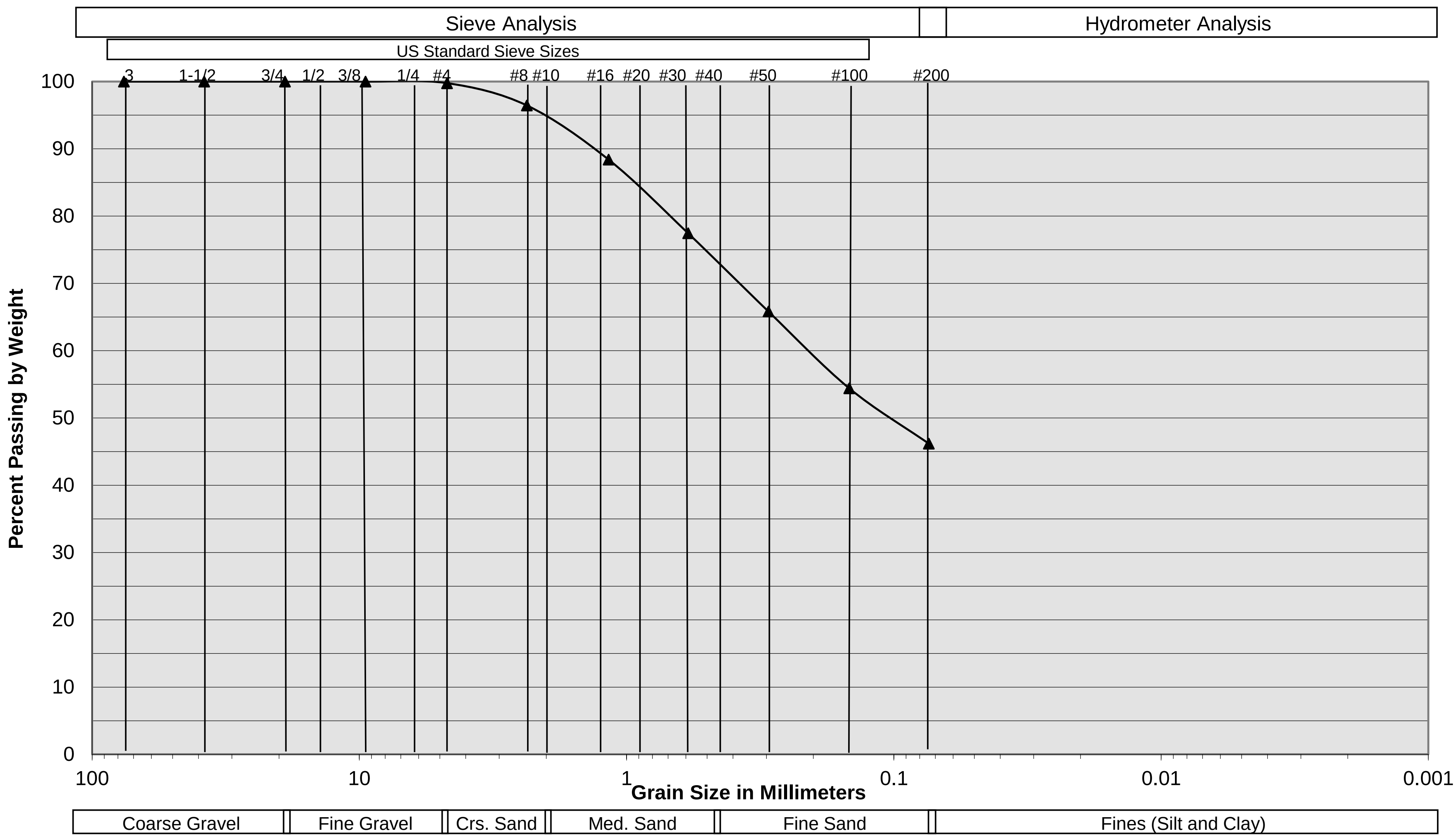
Grain Size Distribution



Sample Description	I-18 @ 6 to 7½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace to little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 8

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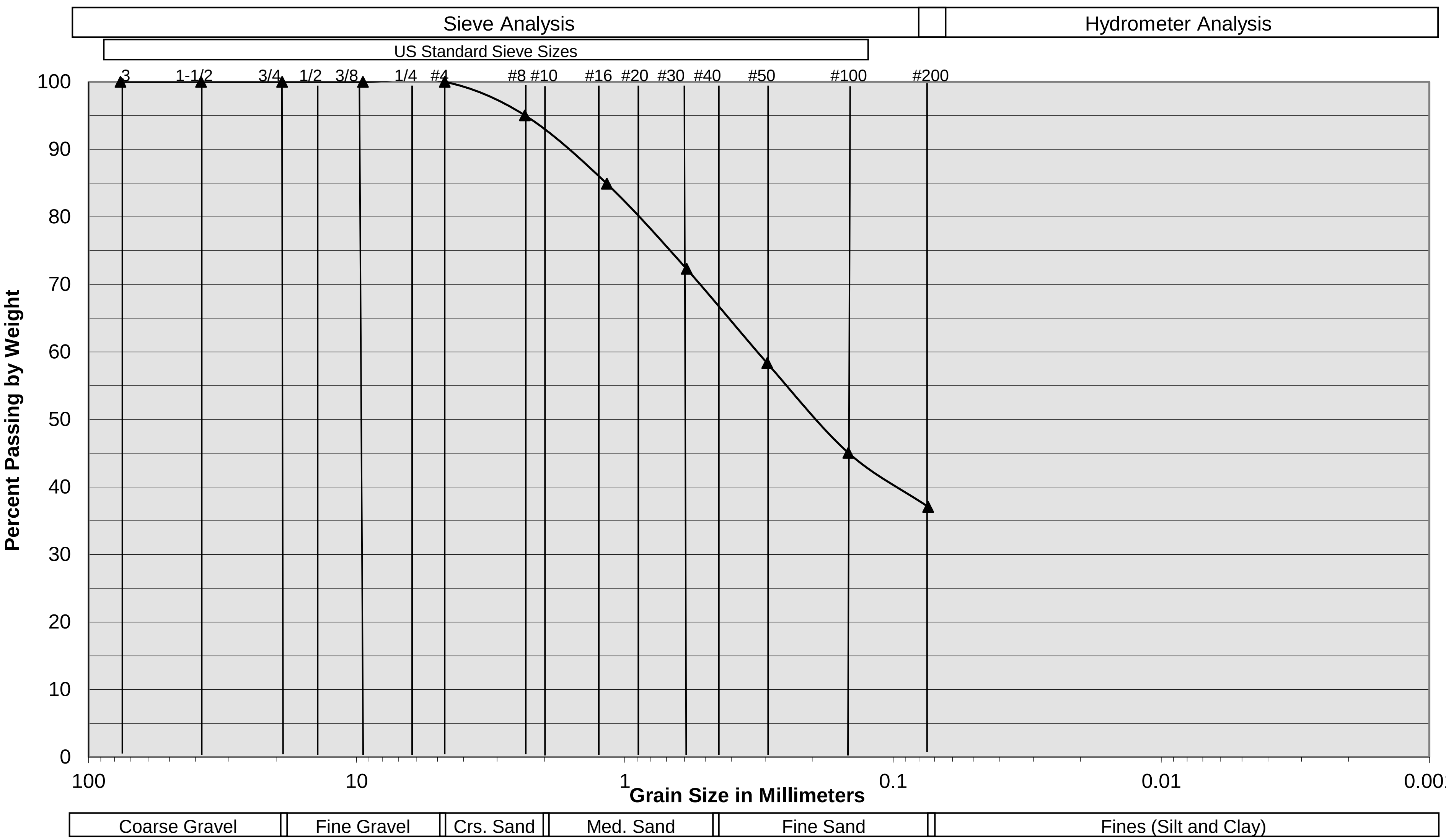
Grain Size Distribution



Sample Description	I-19 @ 1½ to 3 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 9

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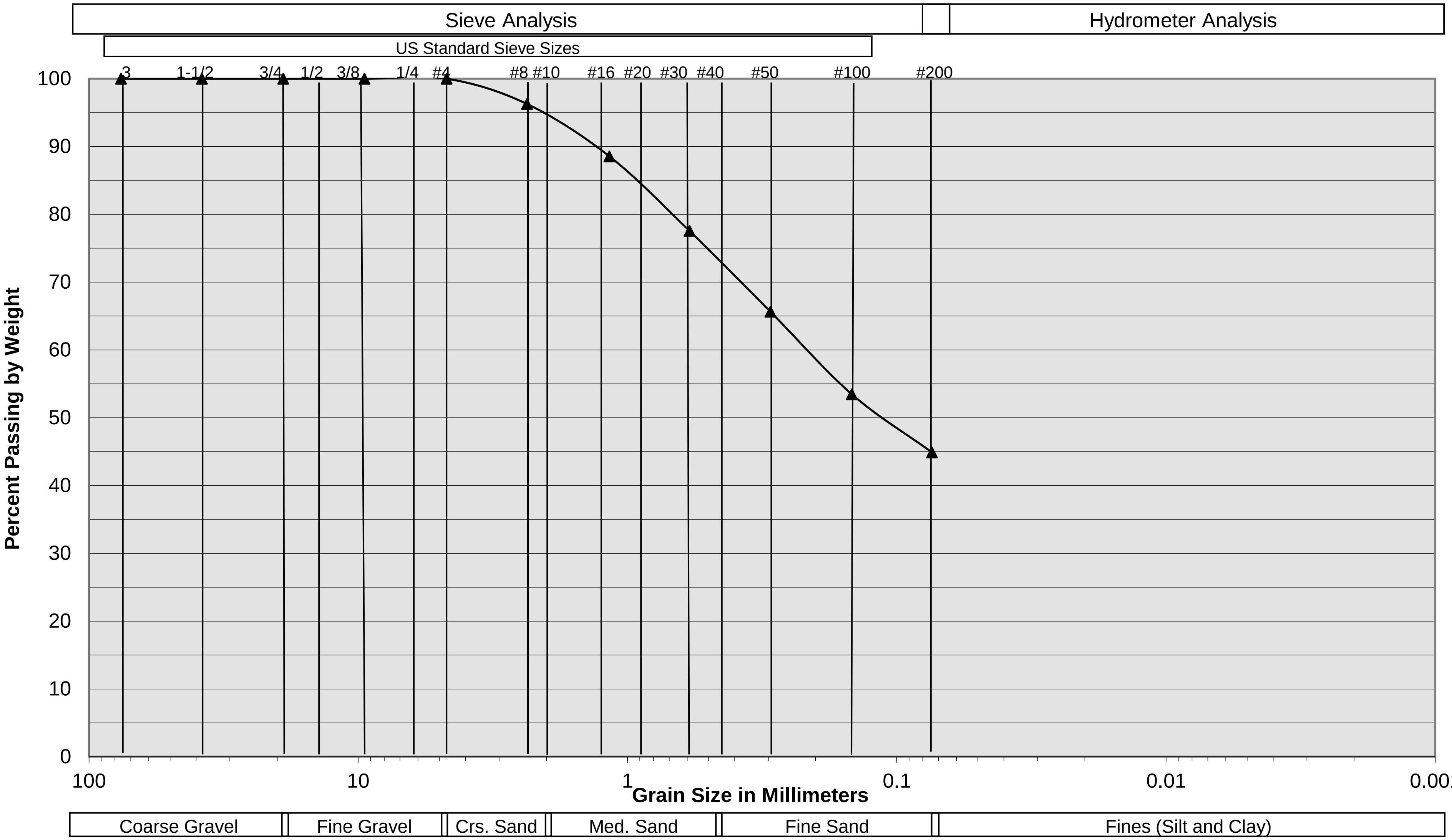
Grain Size Distribution



Sample Description	I-20 @ 1½ to 3 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 10

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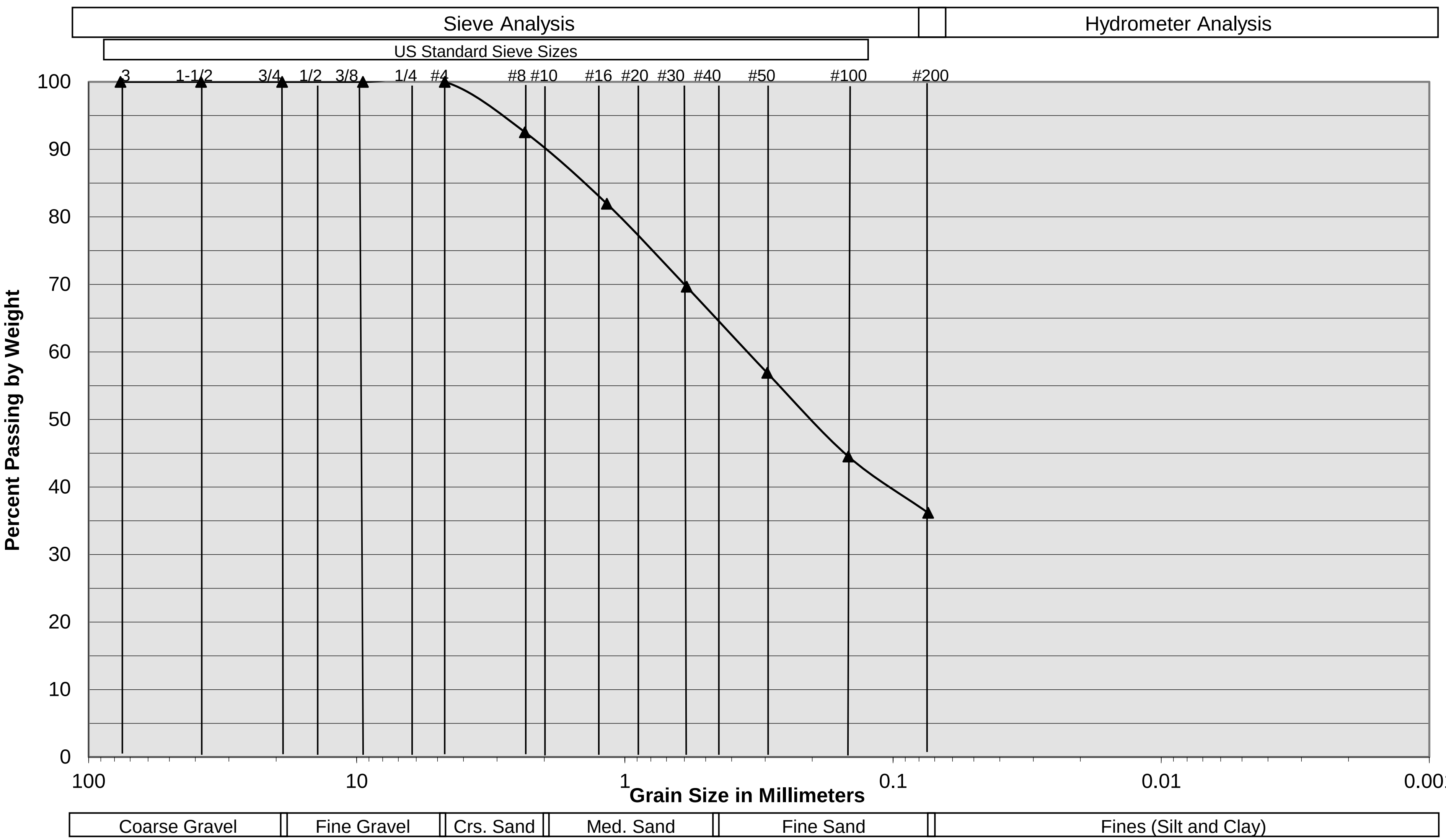
Grain Size Distribution



Sample Description	I-21 @ 2 to 3½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
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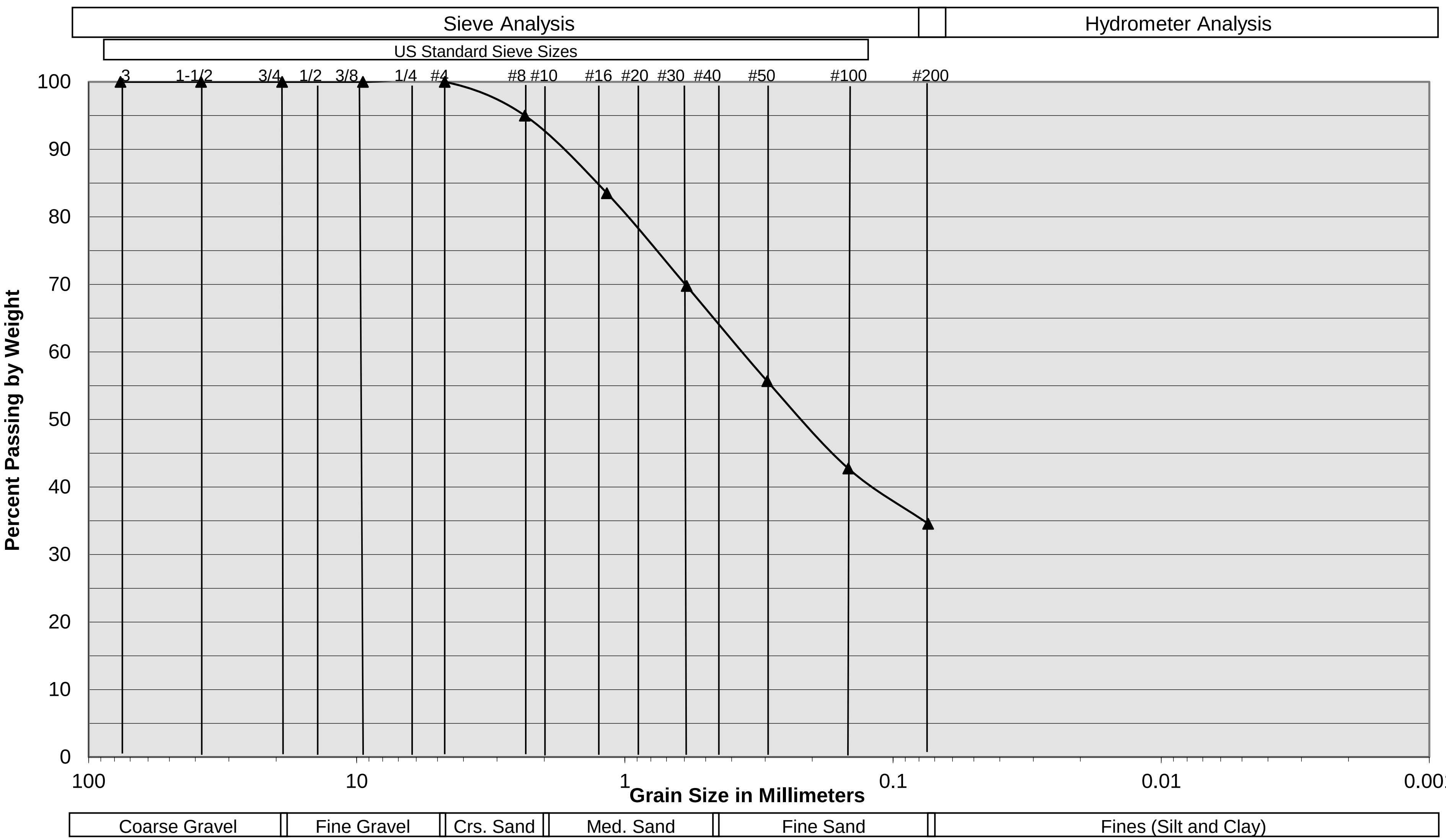
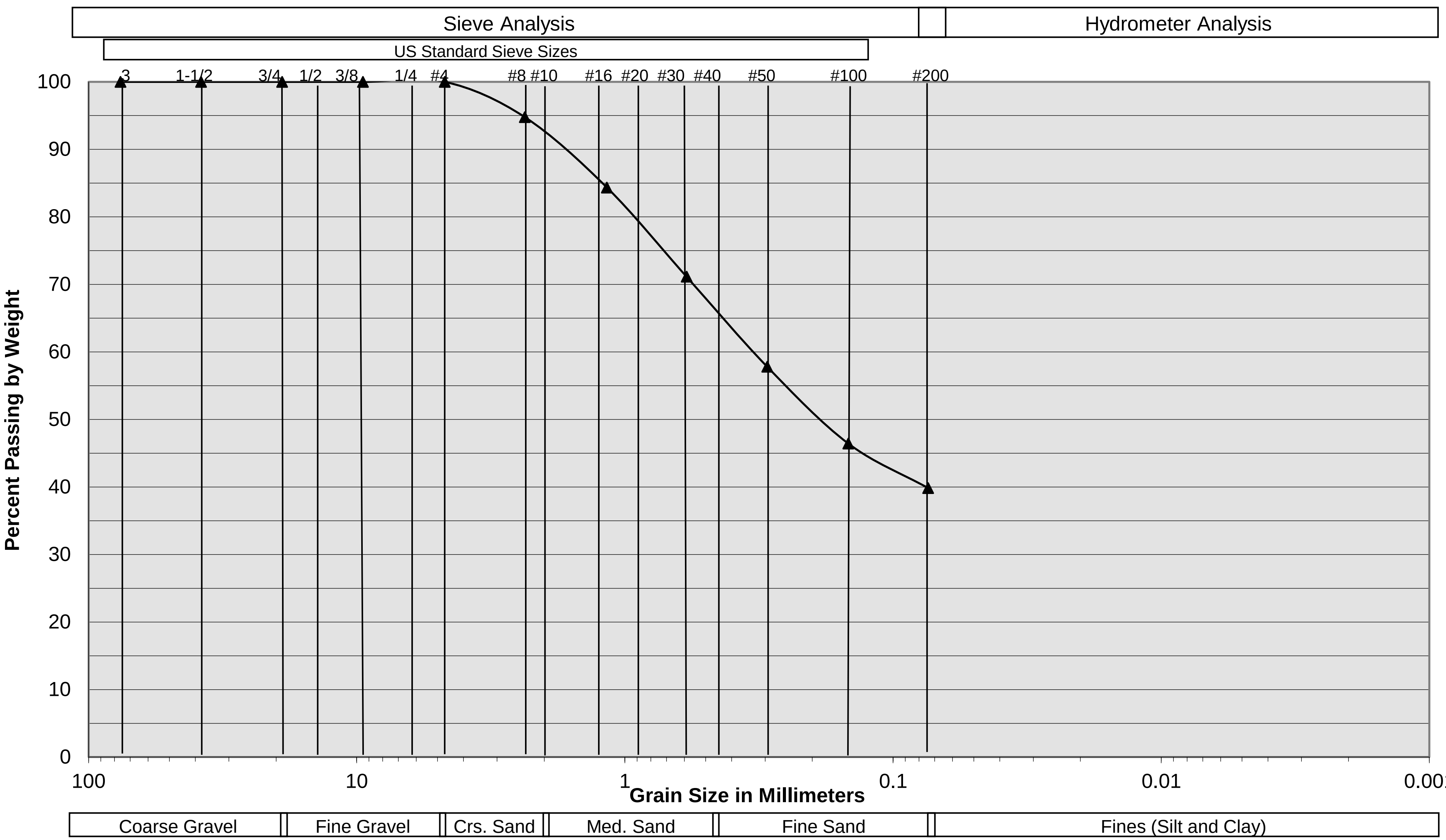
Grain Size Distribution



Sample Description	I-22 @ 3 to 4½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, little coarse Sand

Harvest Landing Industrail Development Perris, California Project No. 22G183-4 **PLATE C- 12**		SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

Grain Size Distribution



Sample Description	I-23 @ 7½ to 9 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
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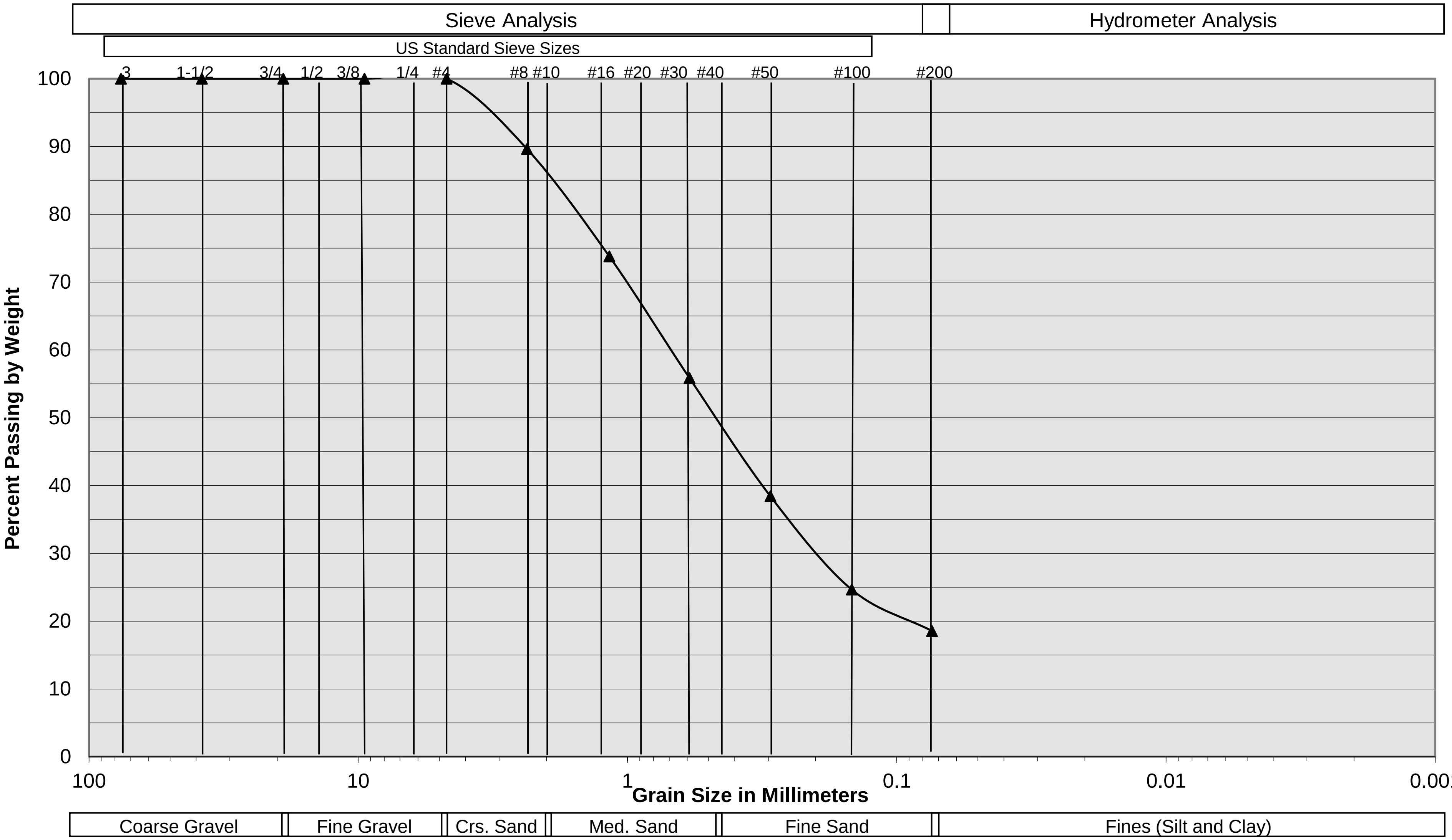
Grain Size Distribution



Sample Description	I-24 @ 7½ to 9 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 14

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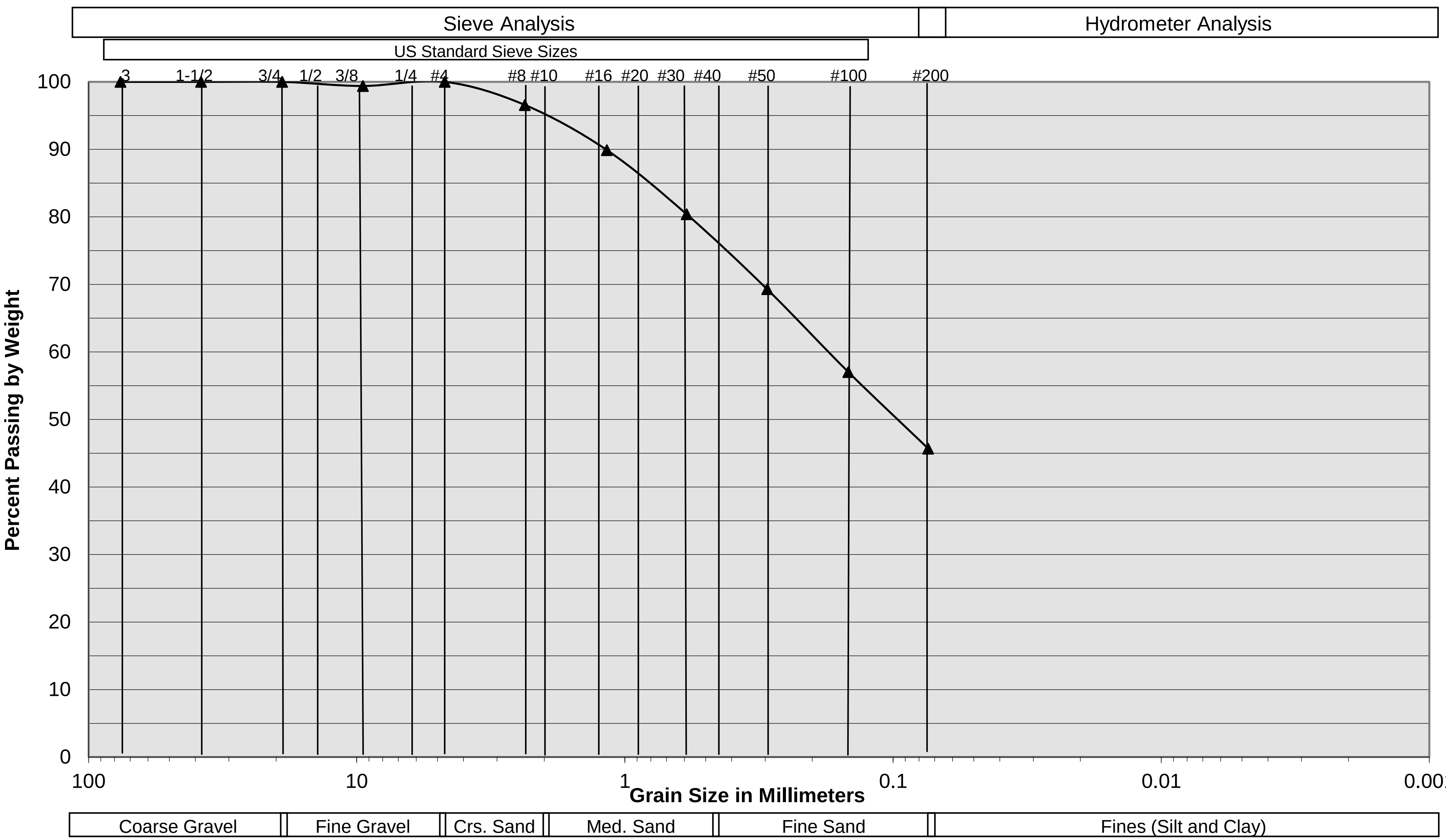
Grain Size Distribution



Sample Description	I-25 @ 7½ to 9 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 15

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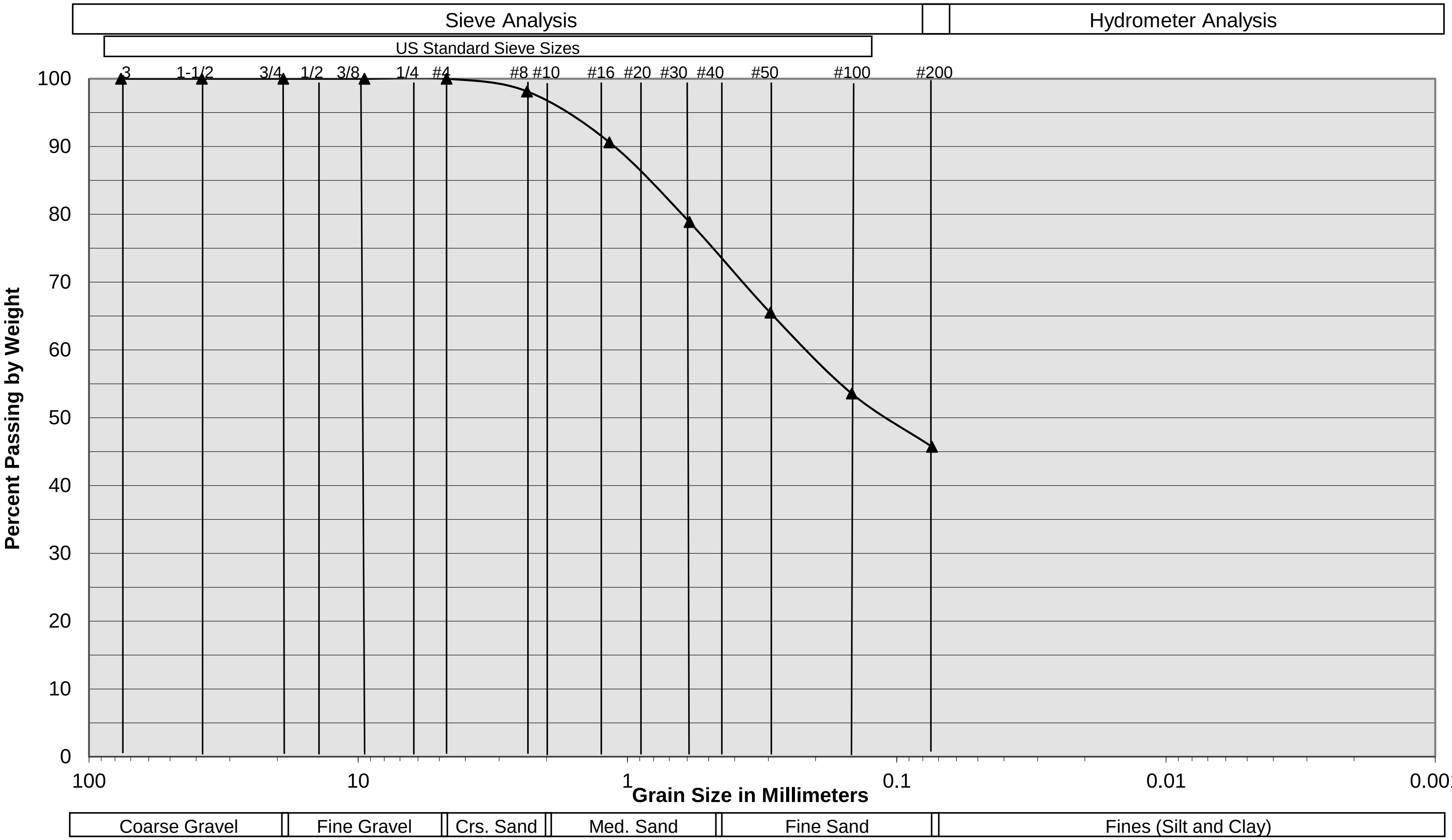
Grain Size Distribution



Sample Description	I-26 @ 6 to 7½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 16

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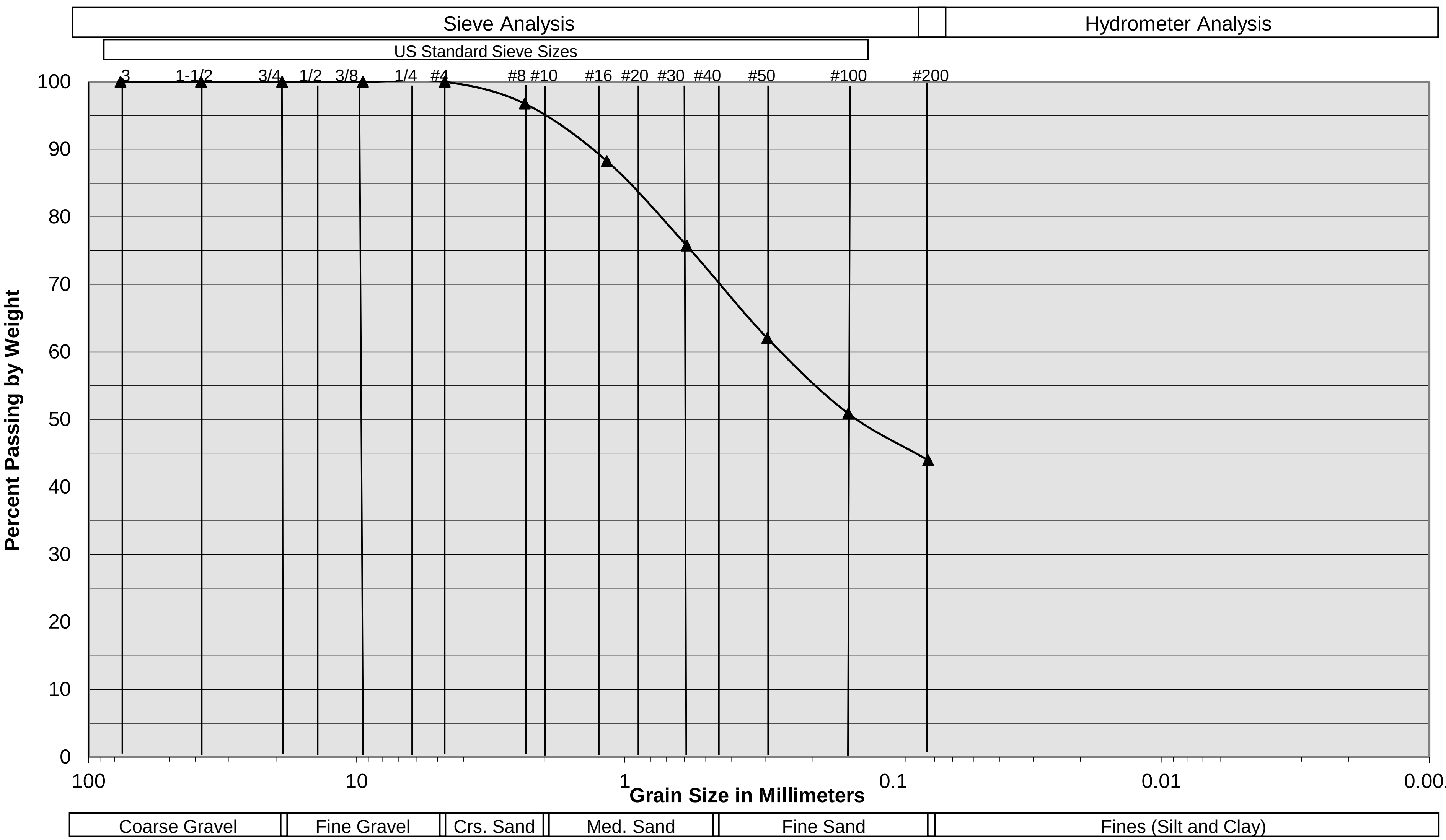
Grain Size Distribution



Sample Description	I-27 @ 5½ to 7 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
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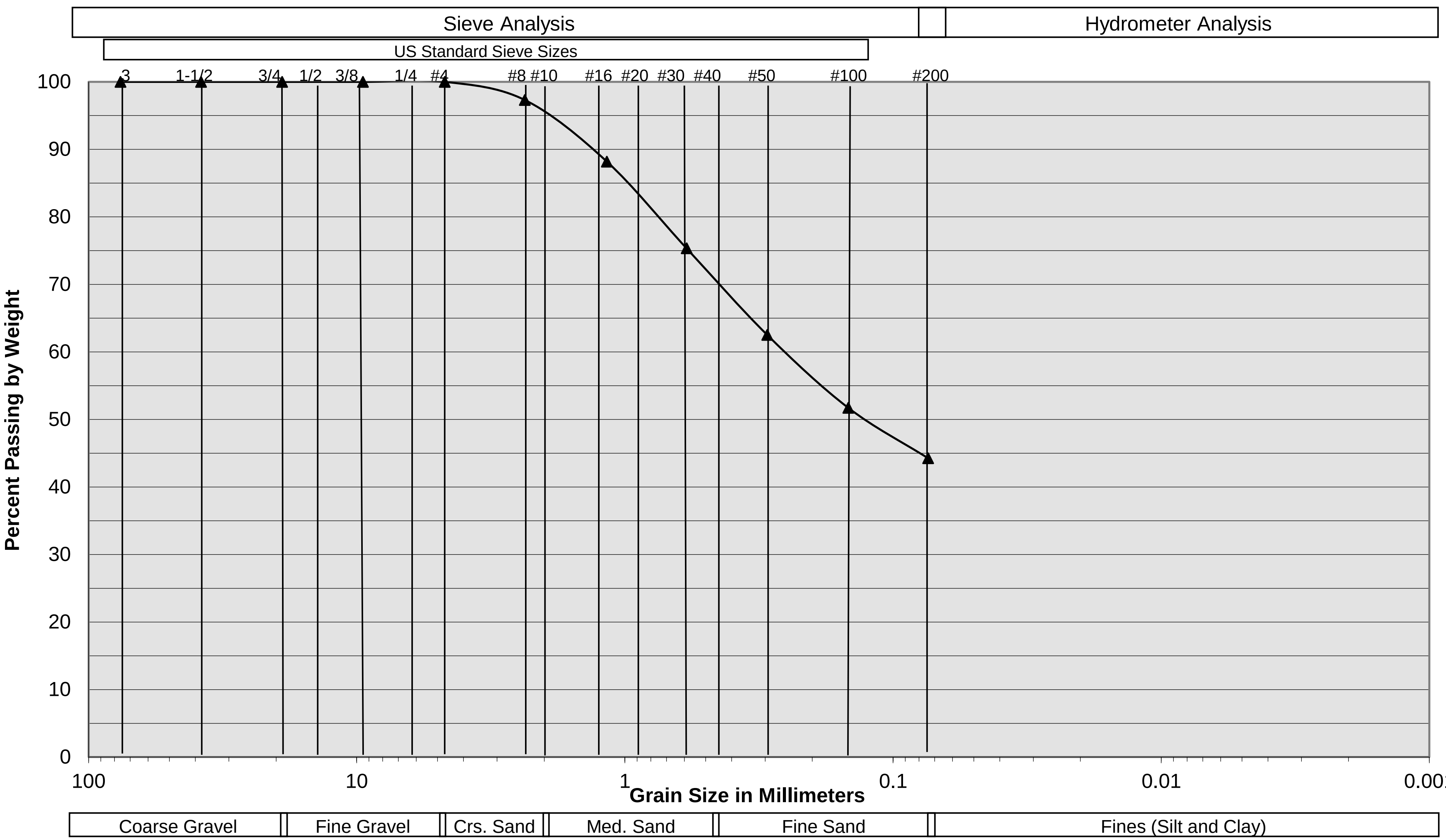
Grain Size Distribution



Sample Description	I-28 @ 4 to 5½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 18

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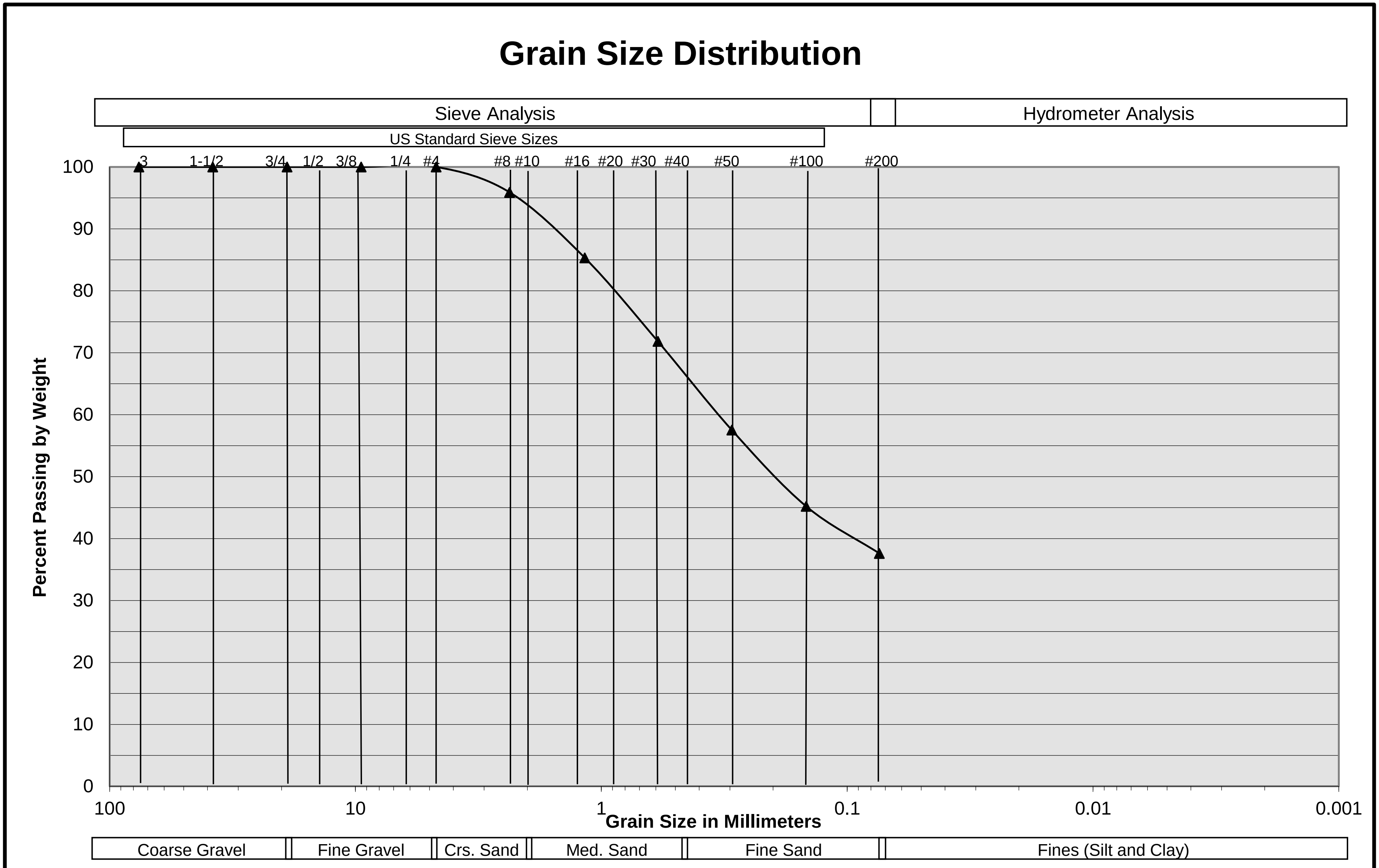
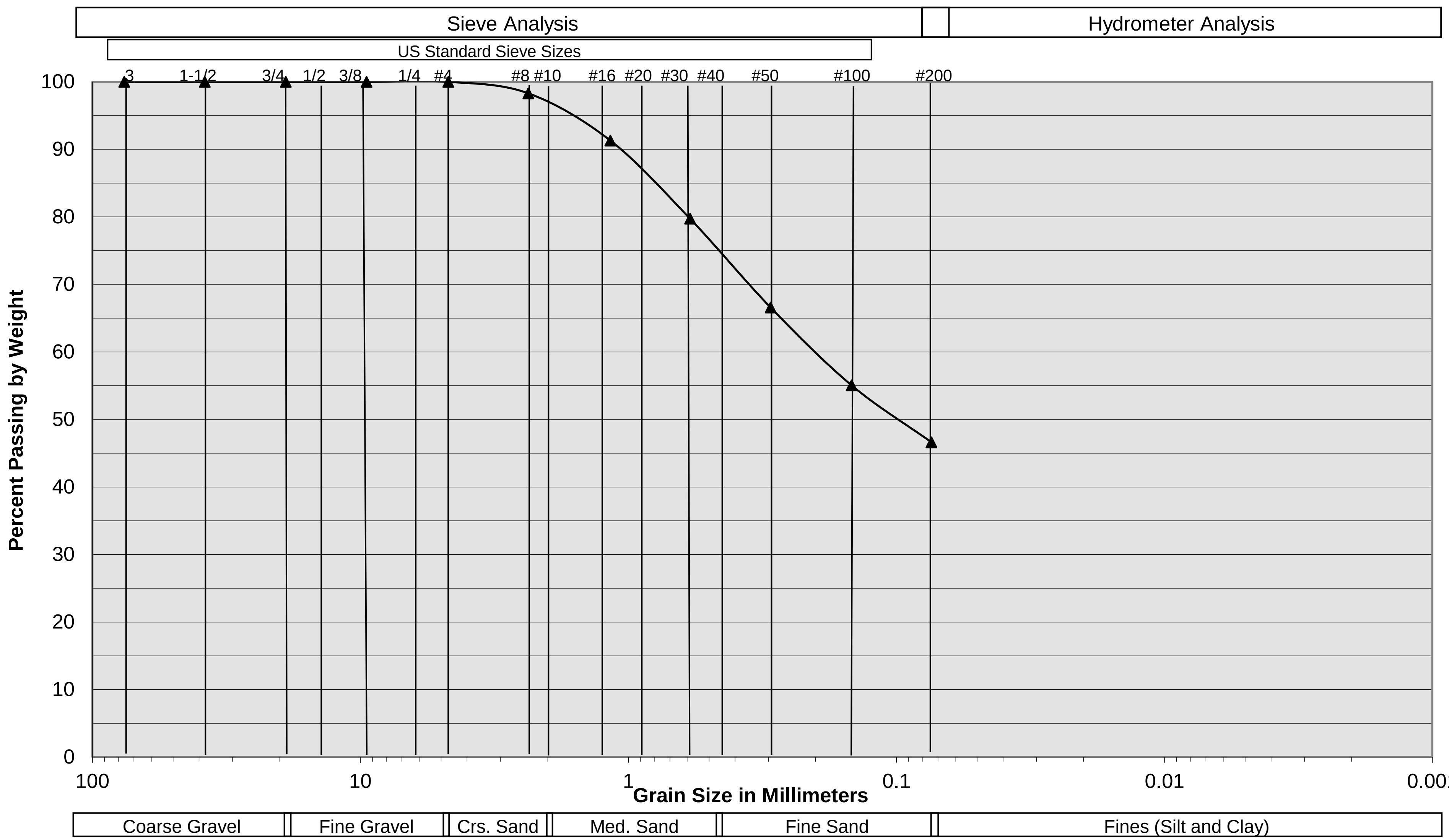


Sample Description	I-29 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 19

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

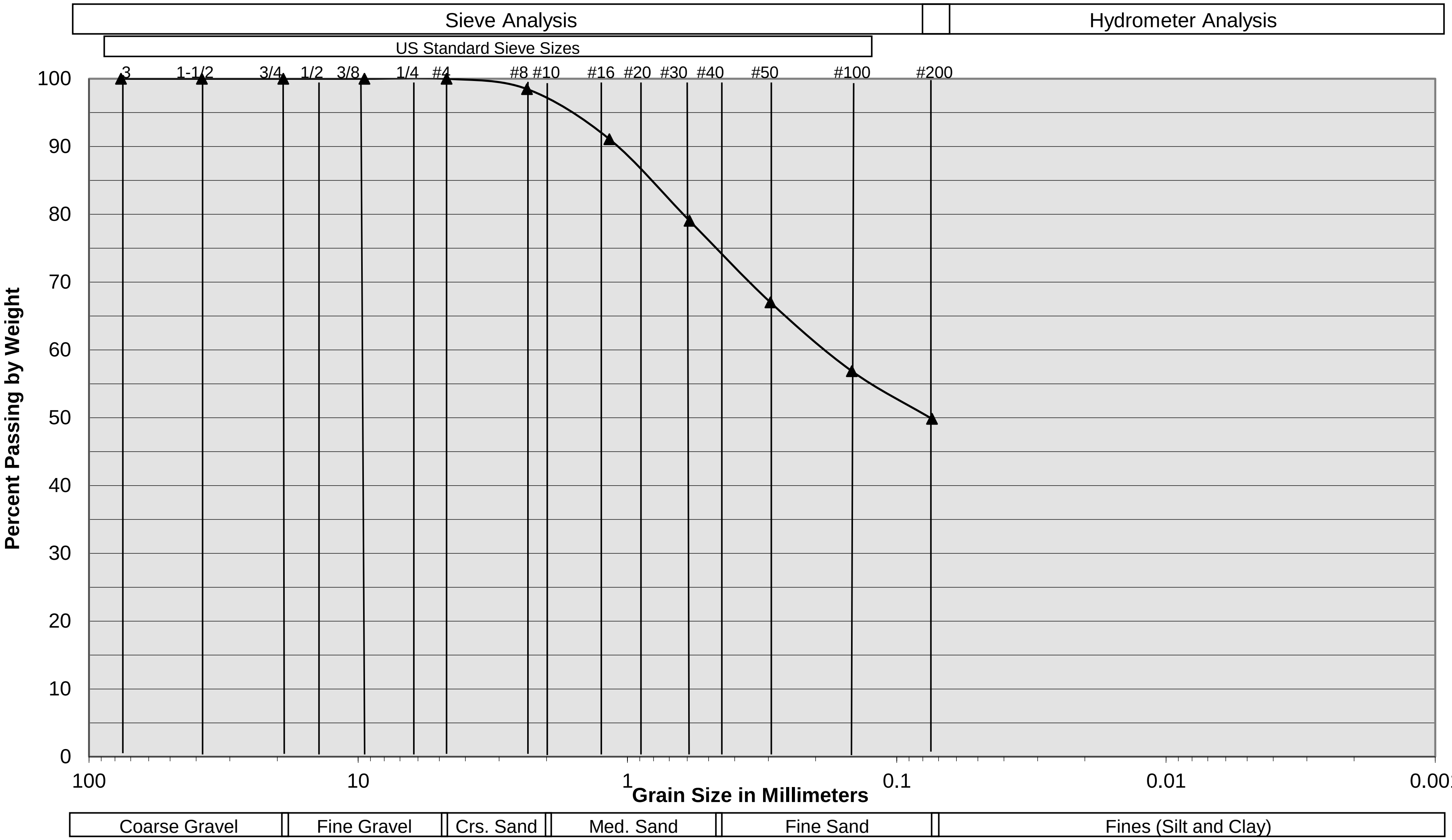


Sample Description	I-30 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sand Silt, trace Clay

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 20

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

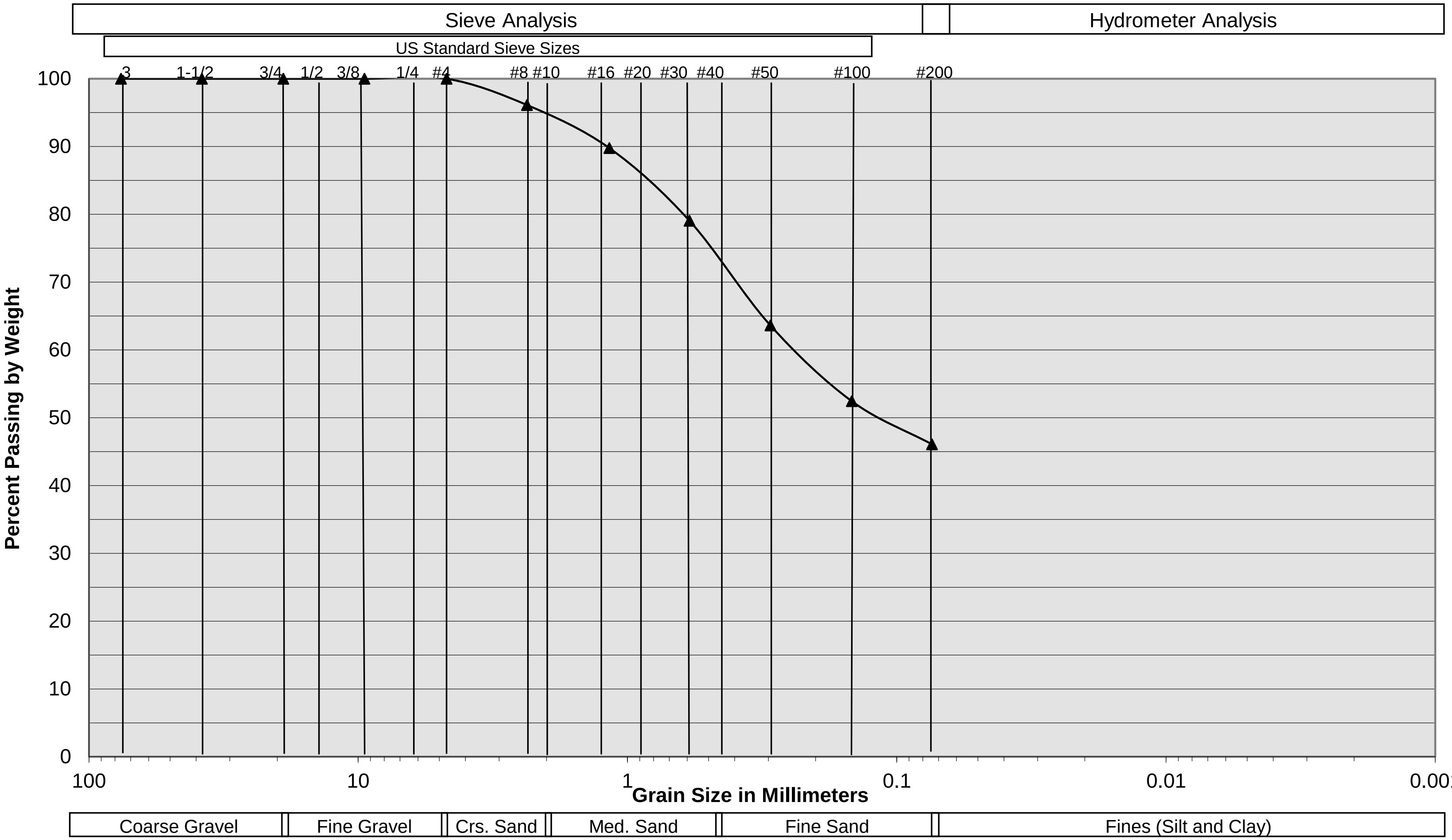


Sample Description	I-31 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 21

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

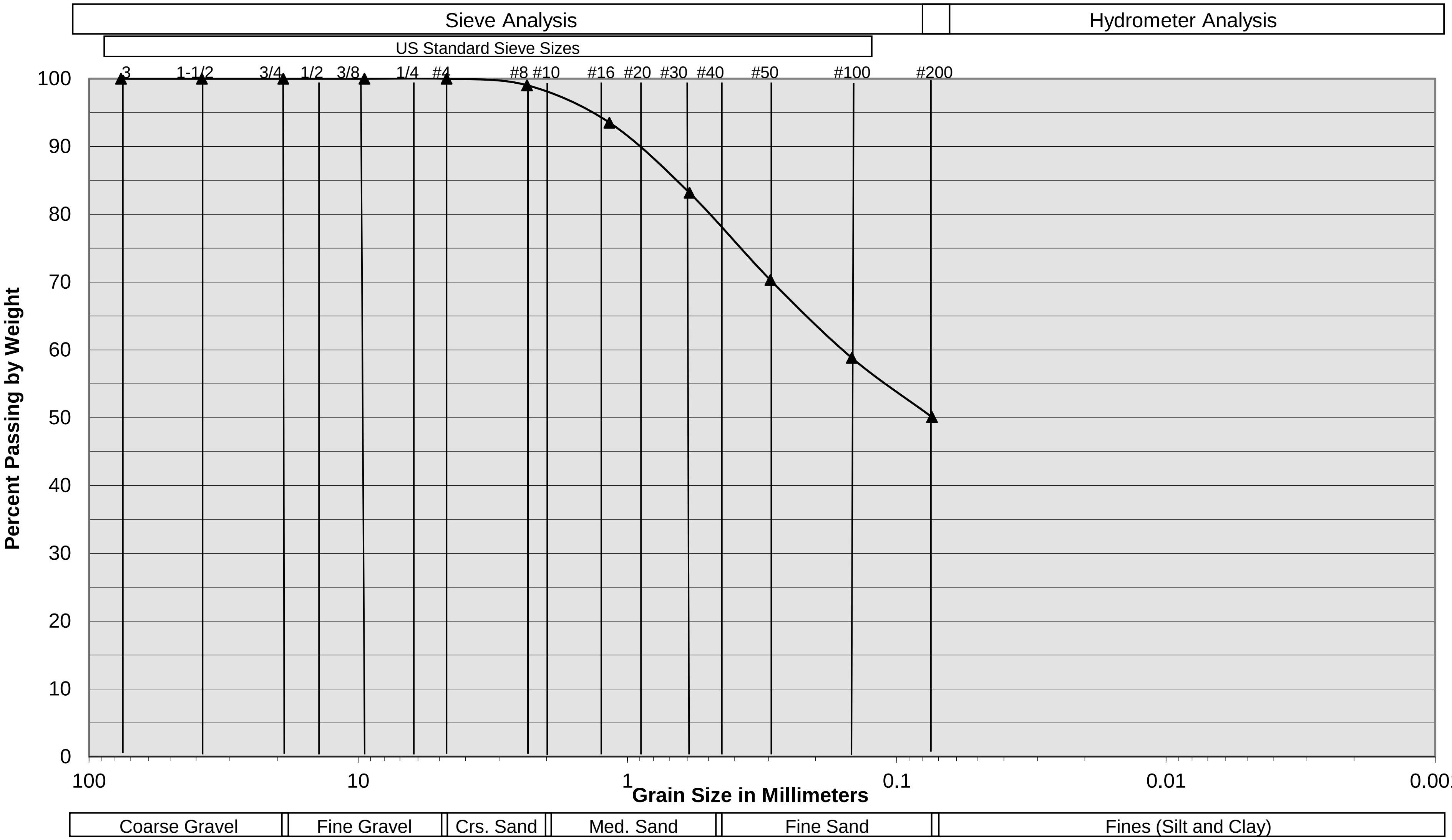


Sample Description	I-32 @ 5 to 6½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 22

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

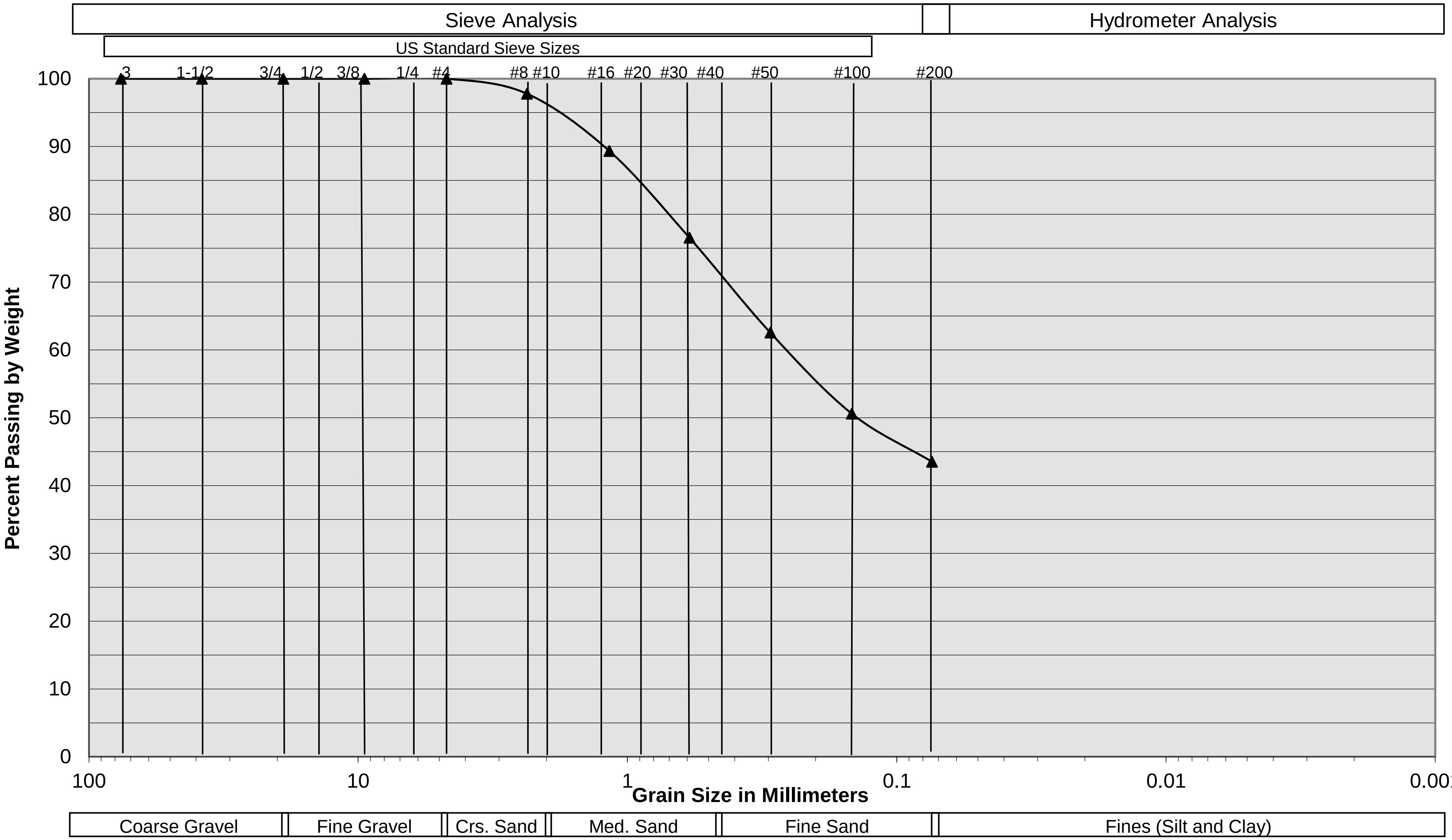


Sample Description	I-33 @ 5 to 6½ feet
Soil Classification	OLDER ALLUVIUM: Brown fine to medium Sandy Silt to Silty fine to medium Sand, trace Clay

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 23

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

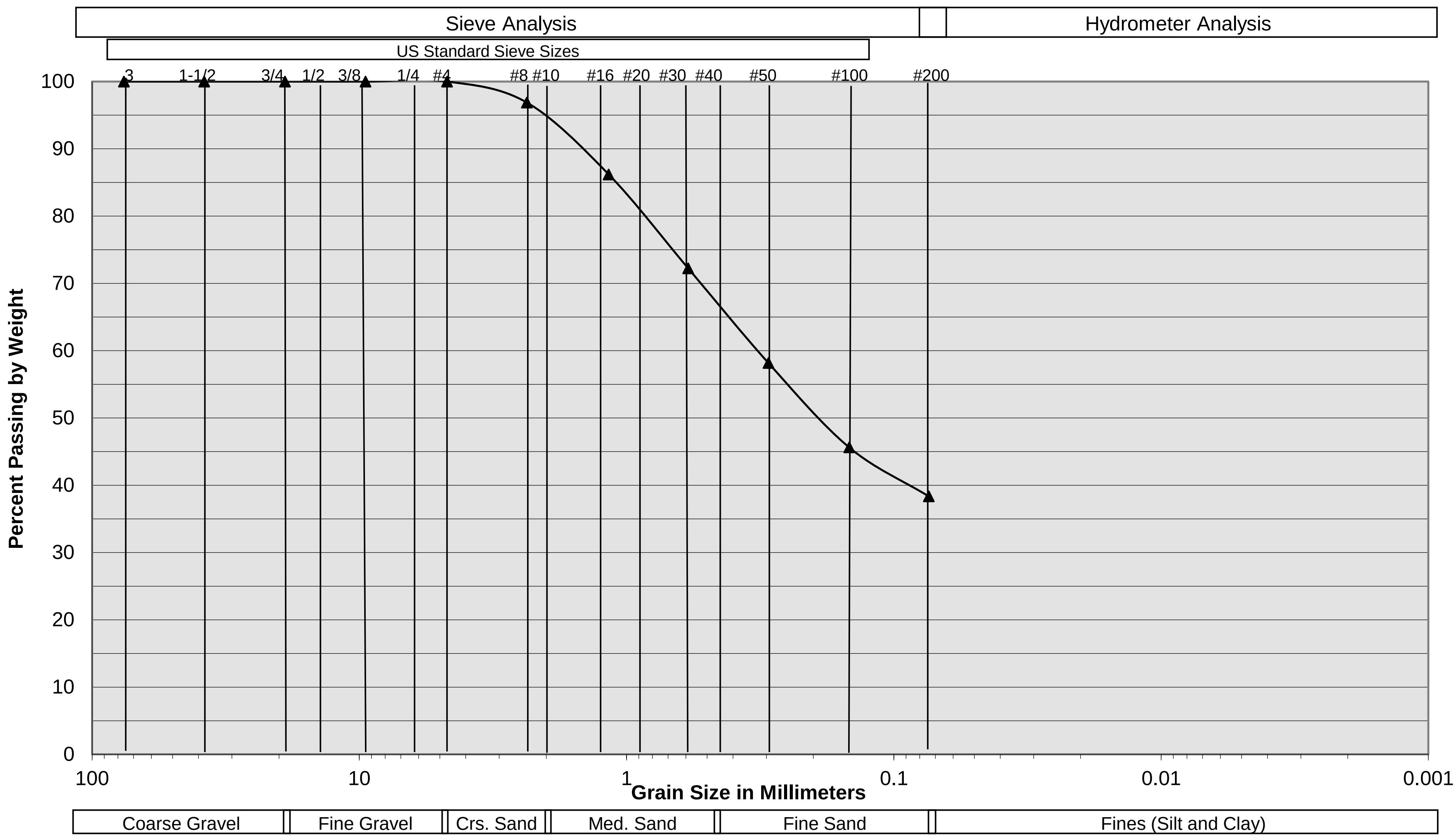


Sample Description	I-34 @ 3½ to 5 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 24

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

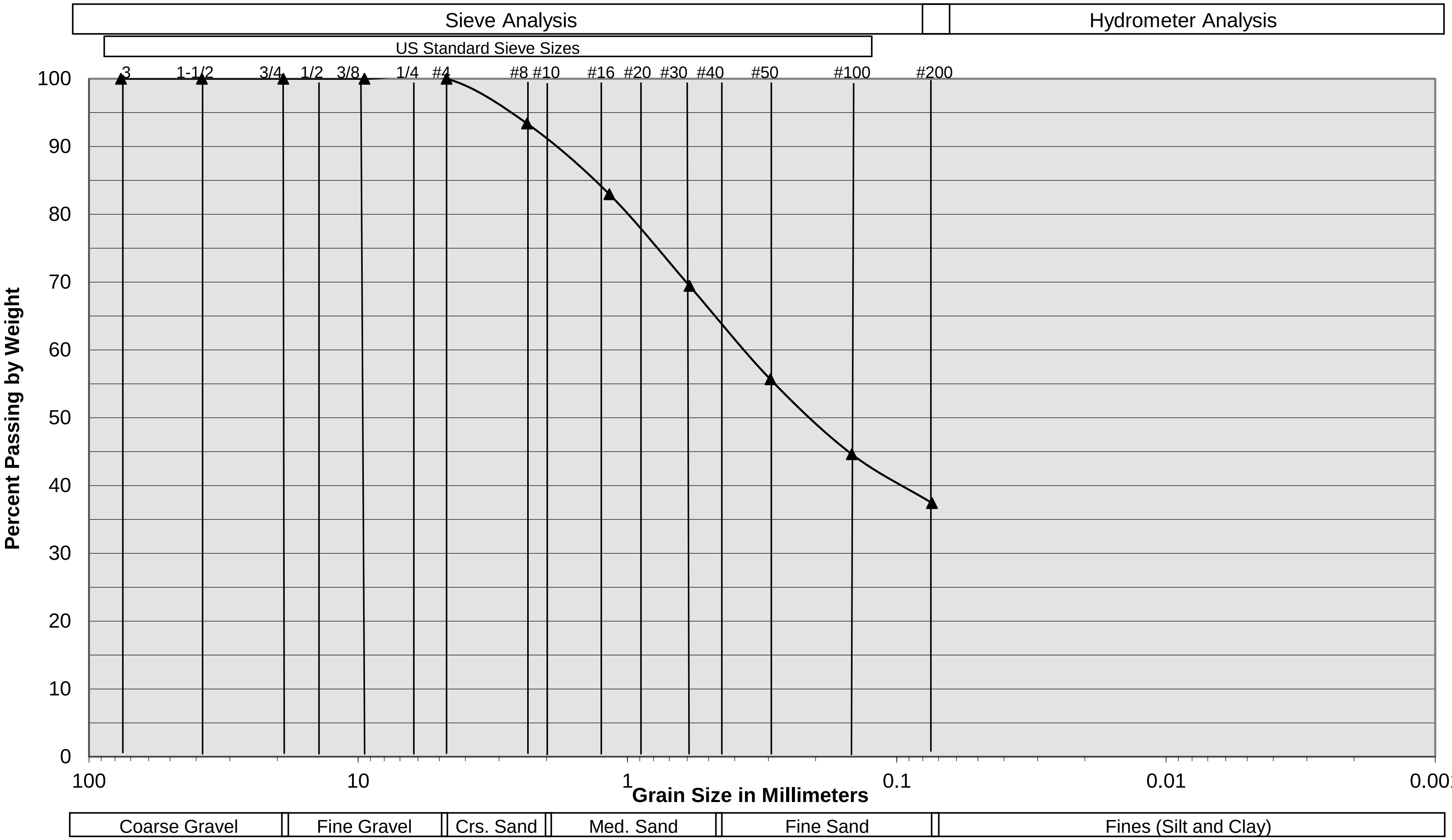


Sample Description	I-35 @ 3 to 4½ feet
Soil Classification	OLDER ALLUVIUM: Light Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 25

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL *A California Corporation*

Grain Size Distribution

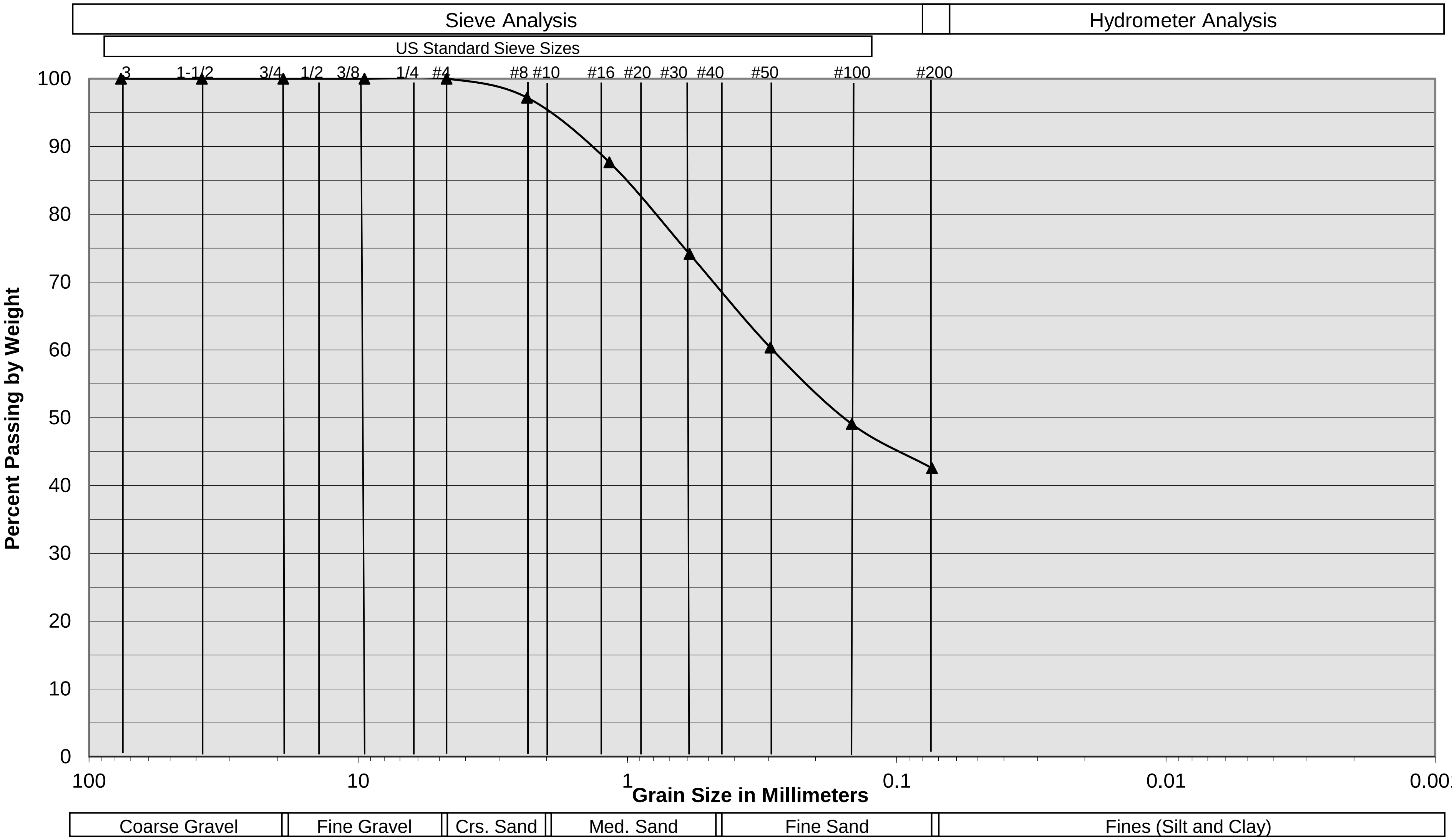


Sample Description	I-36 @ 4 to 5½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 26

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

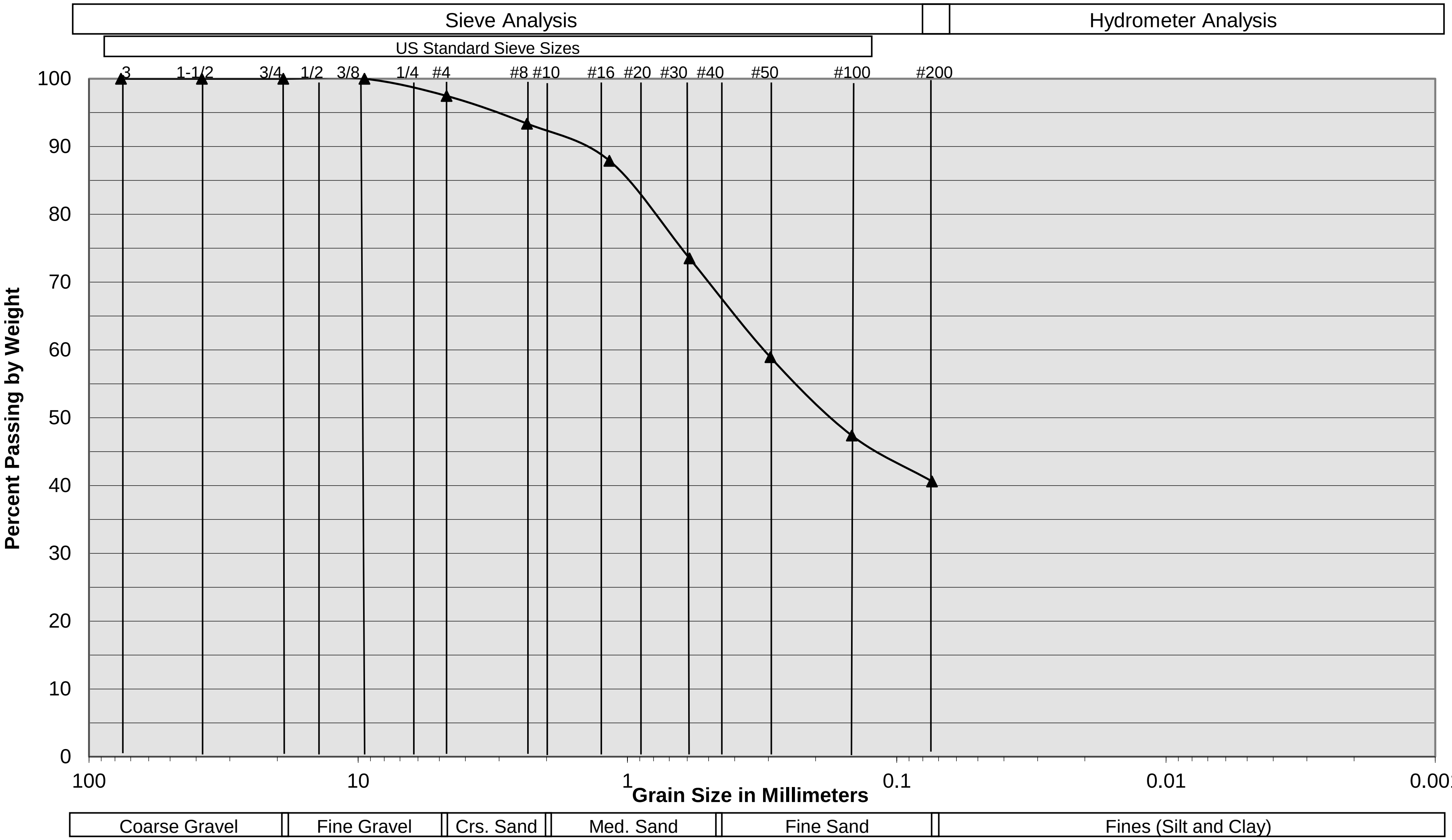


Sample Description	I-37 @ 5 to 6½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 27

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

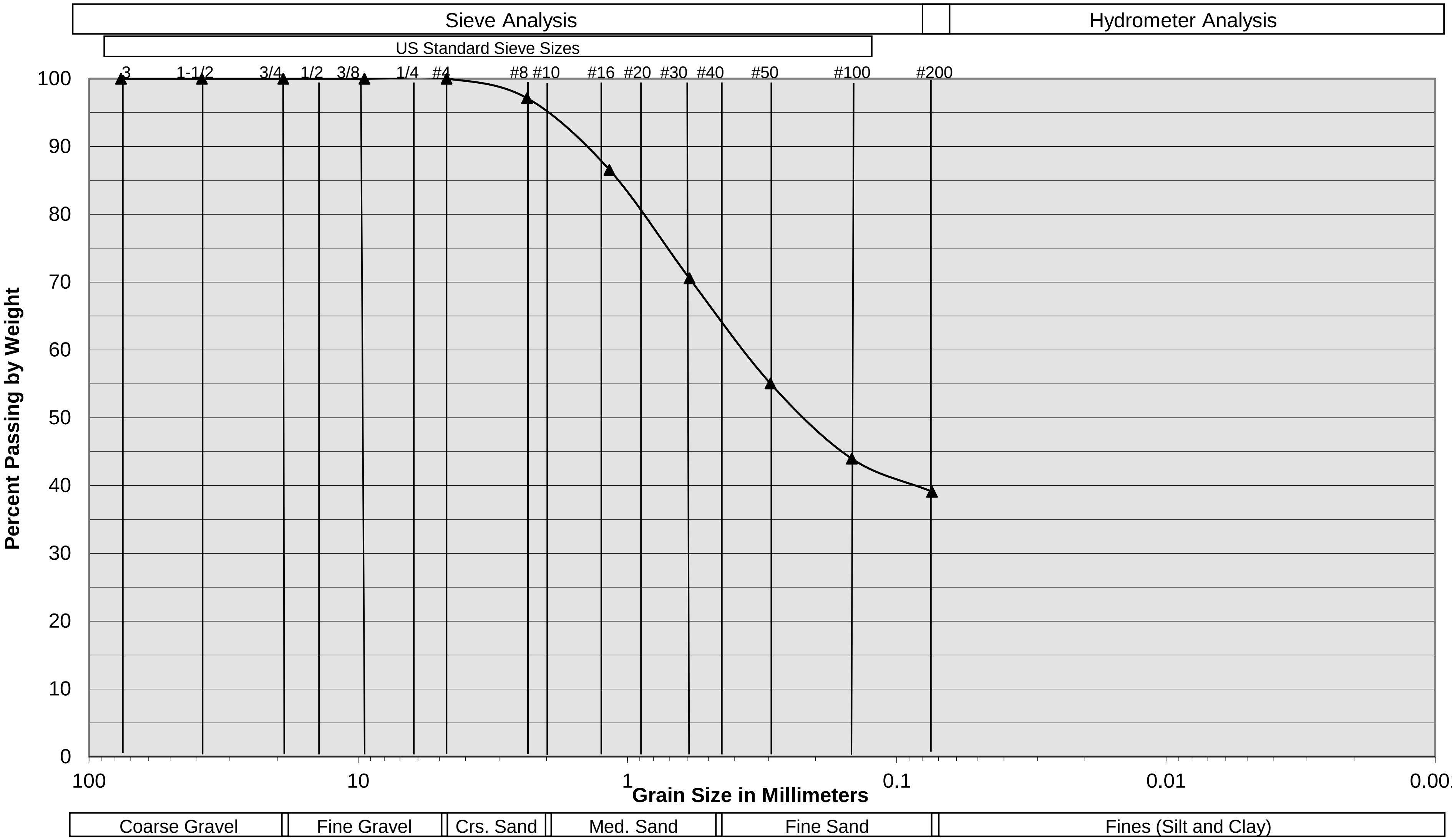


Sample Description	I-38 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 28

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

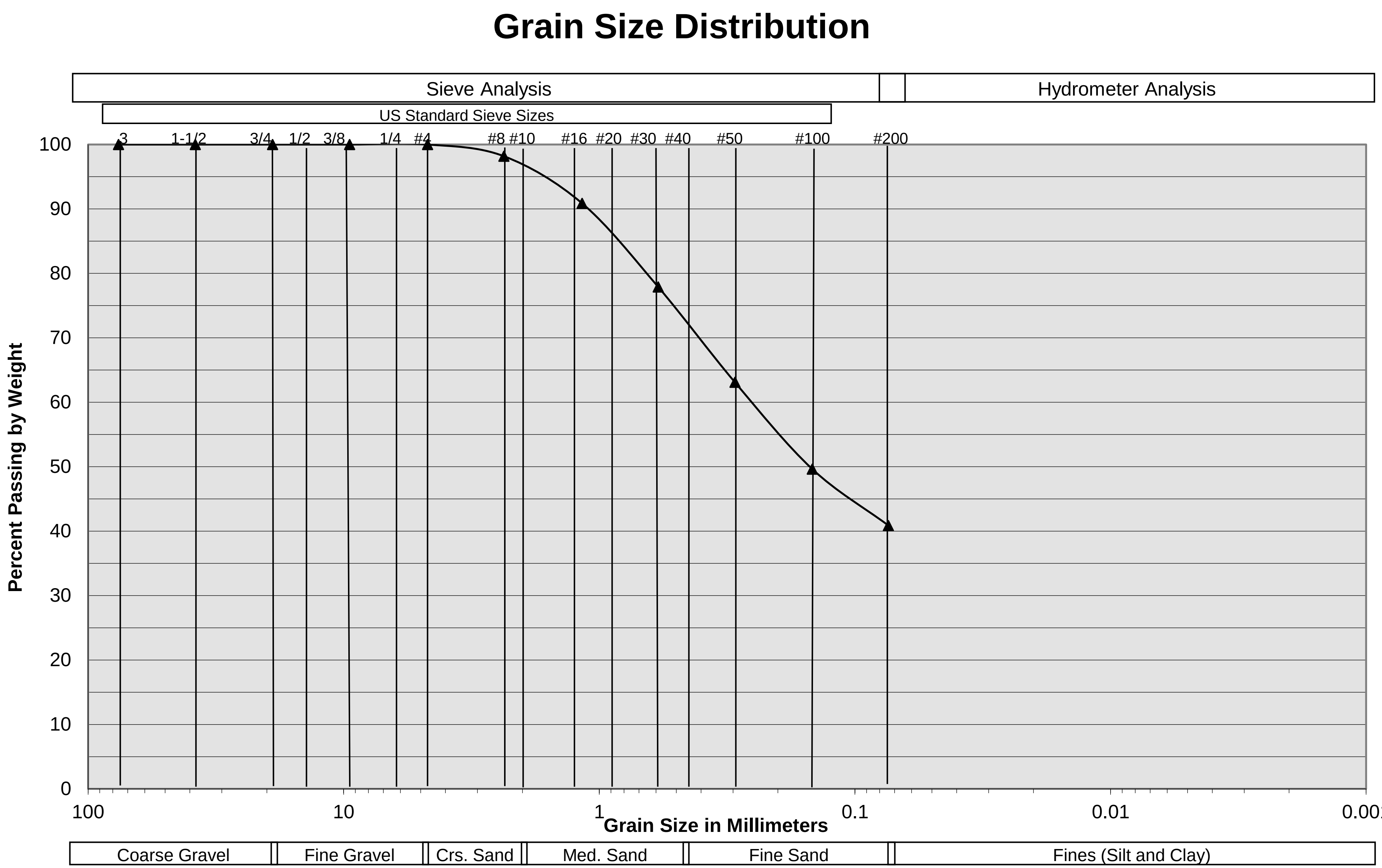
Grain Size Distribution



Sample Description	I-39 @ 6 to 7½ feet
Soil Classification	OLDER ALLUVIUM: Dark Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 29

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

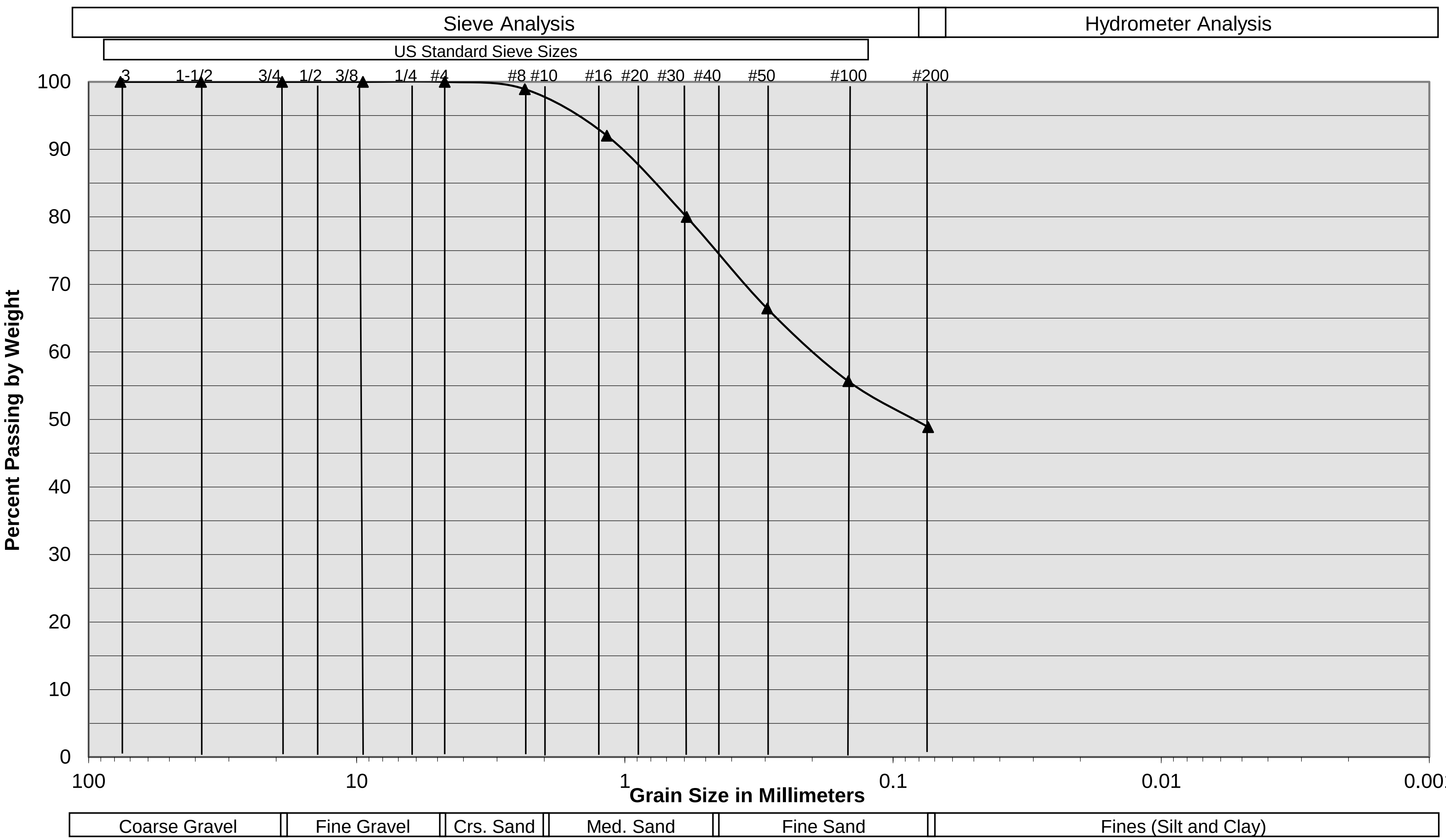


Sample Description	I-40 @ 6 to 7½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 30

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

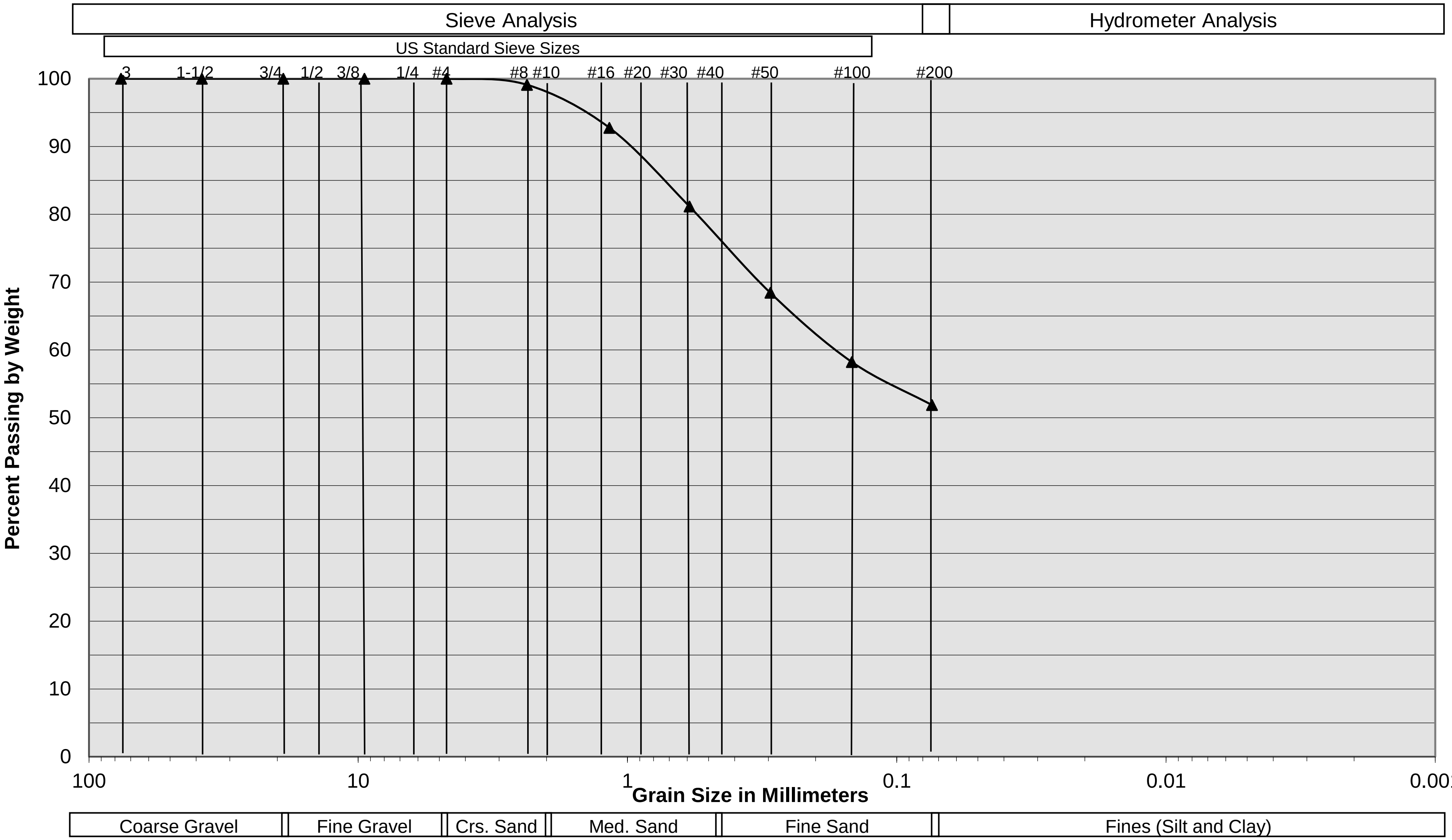


Sample Description	I-41 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 31

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

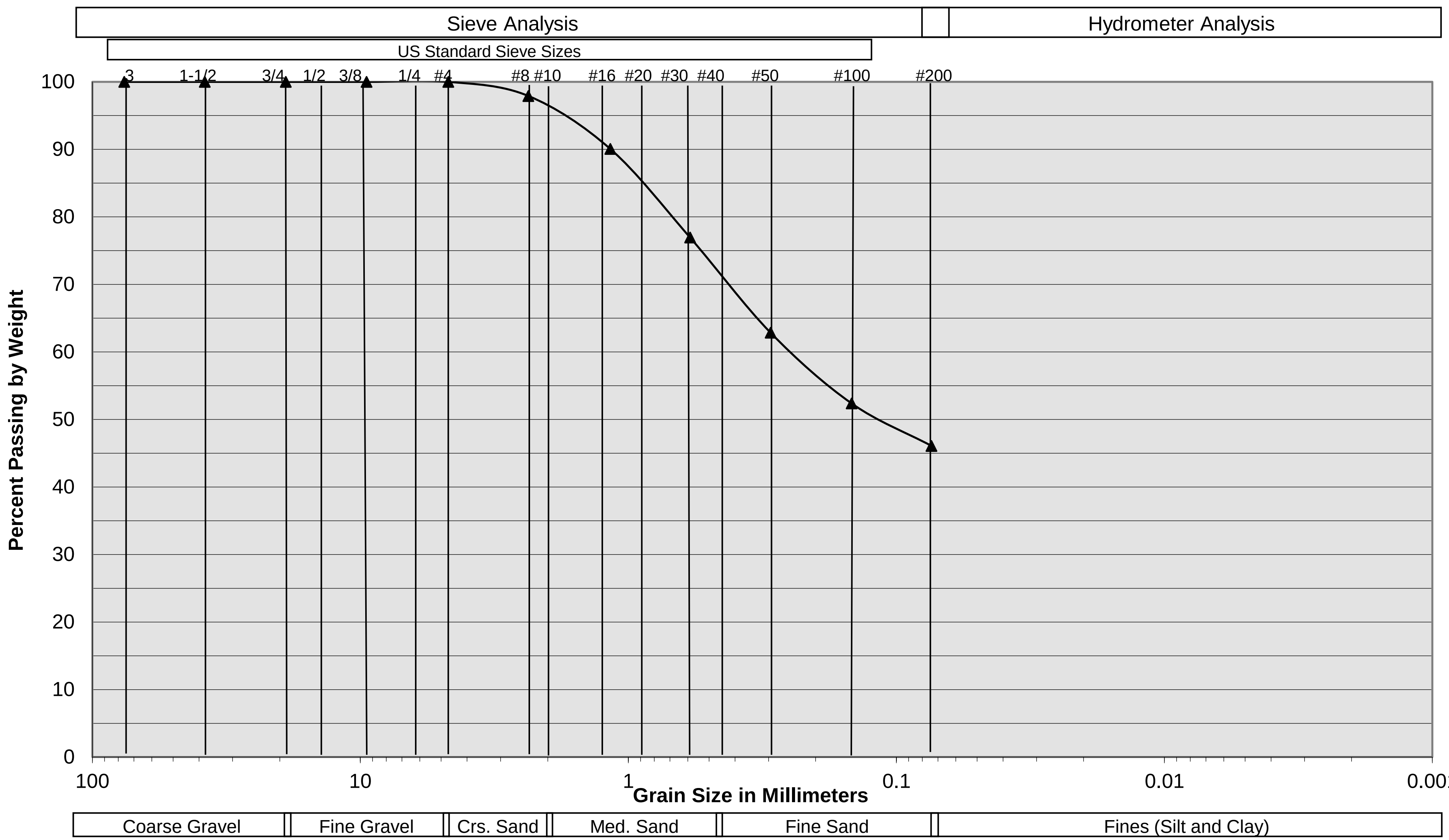


Sample Description	I-42 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 32

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

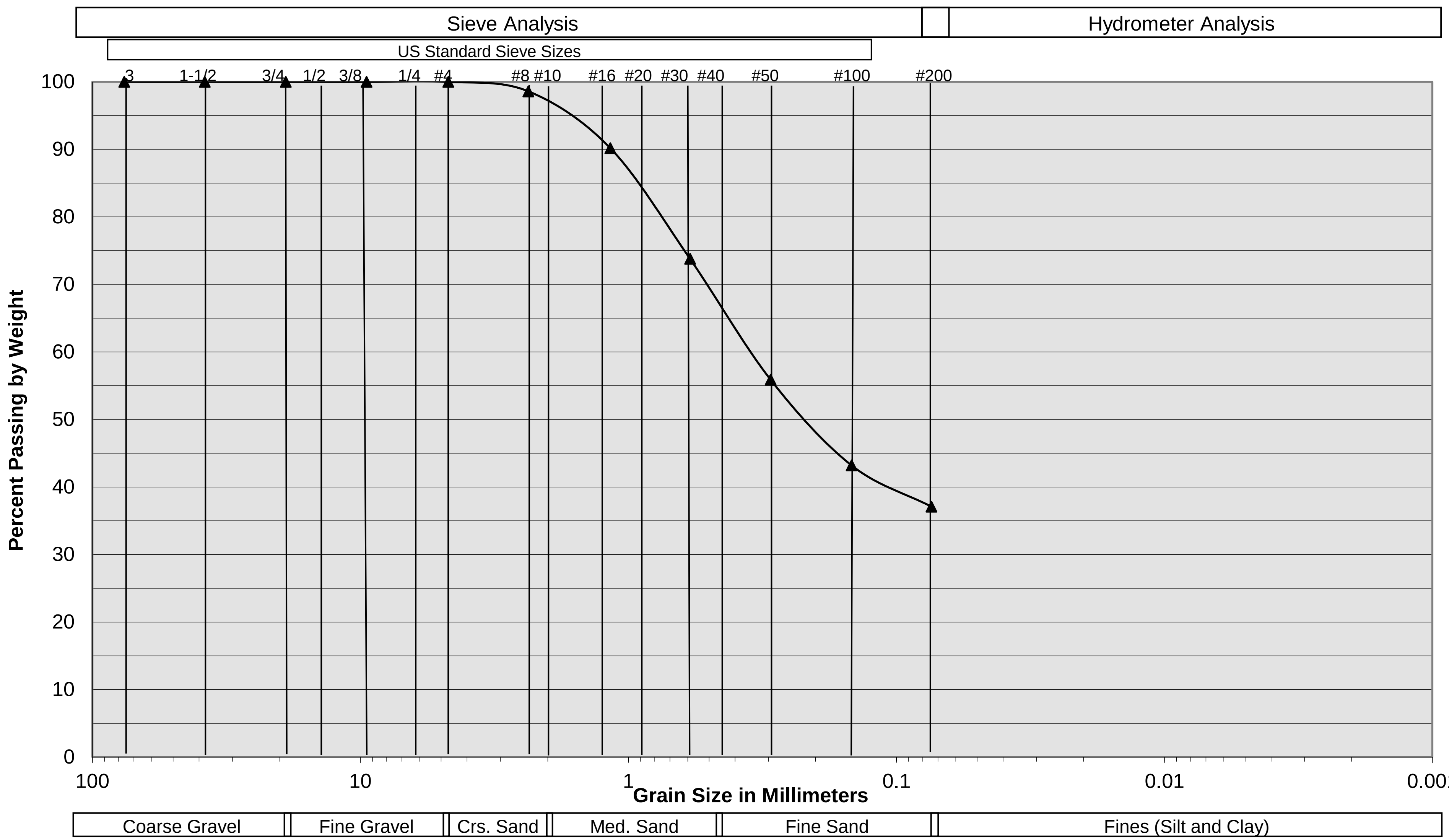


Sample Description	I-43 @ 4½ to 6 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 33

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

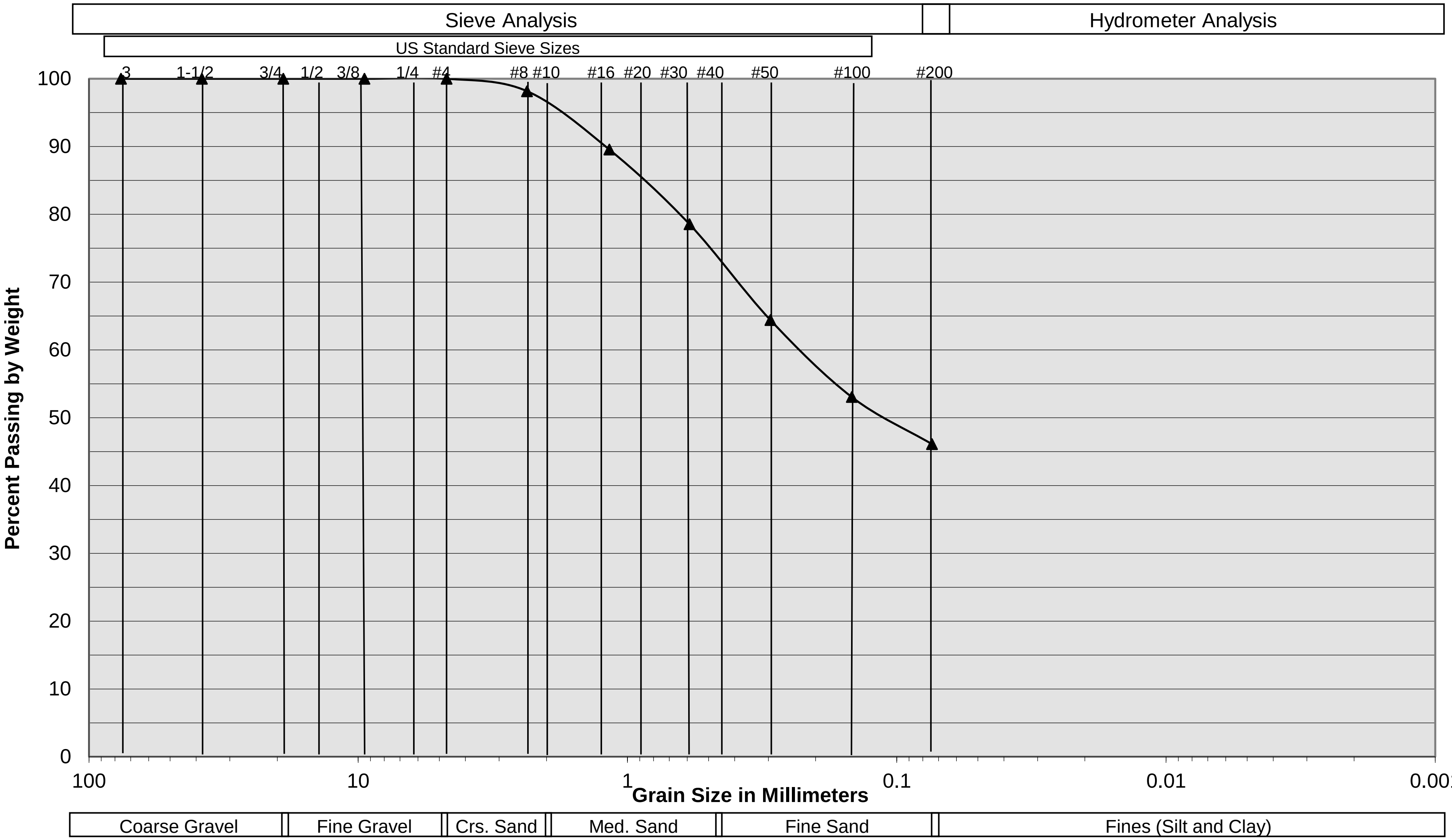


Sample Description	I-44 @ 3 to 4½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 34

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

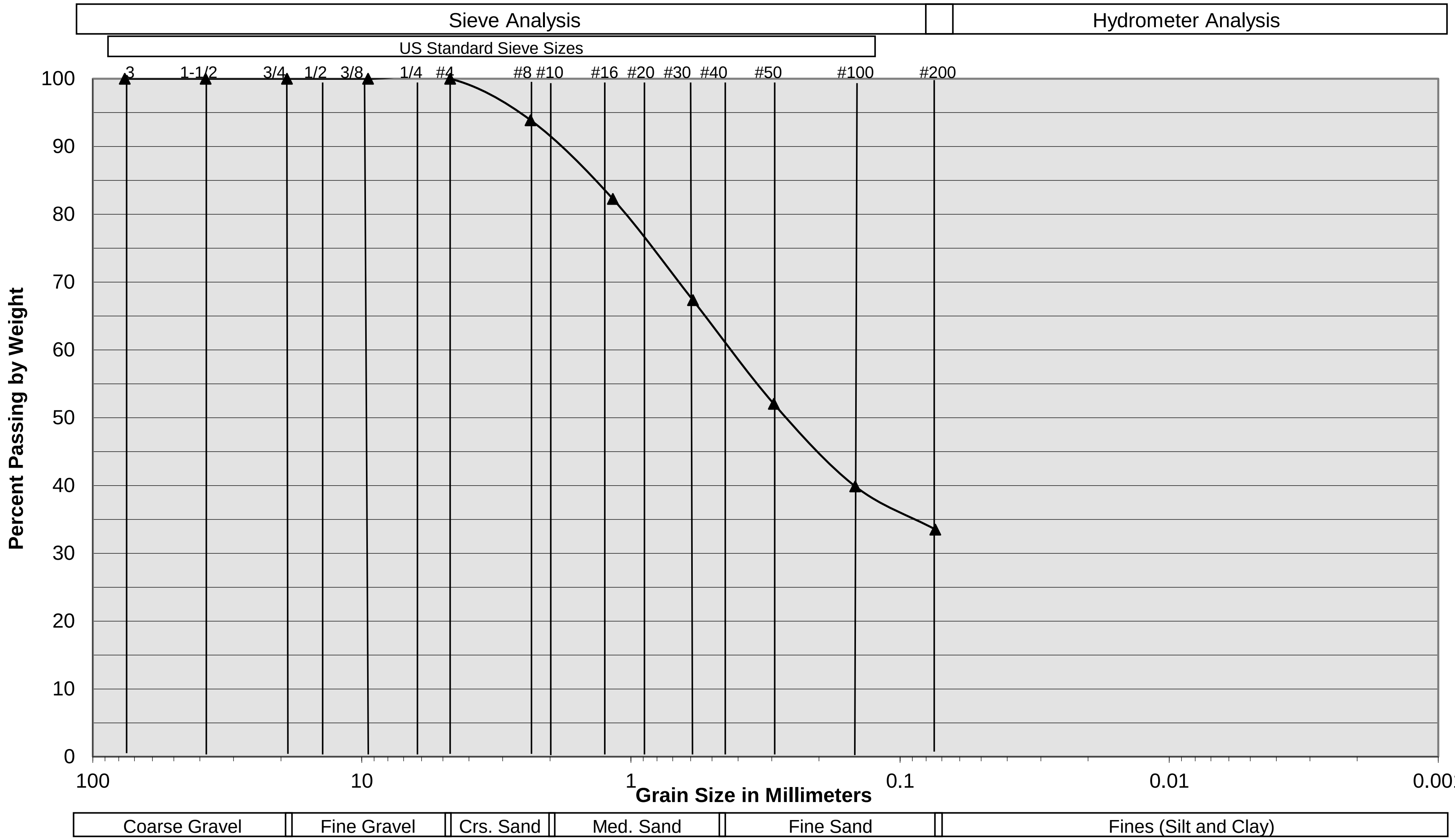


Sample Description	I-45 @ 3½ to 5 feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 35

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

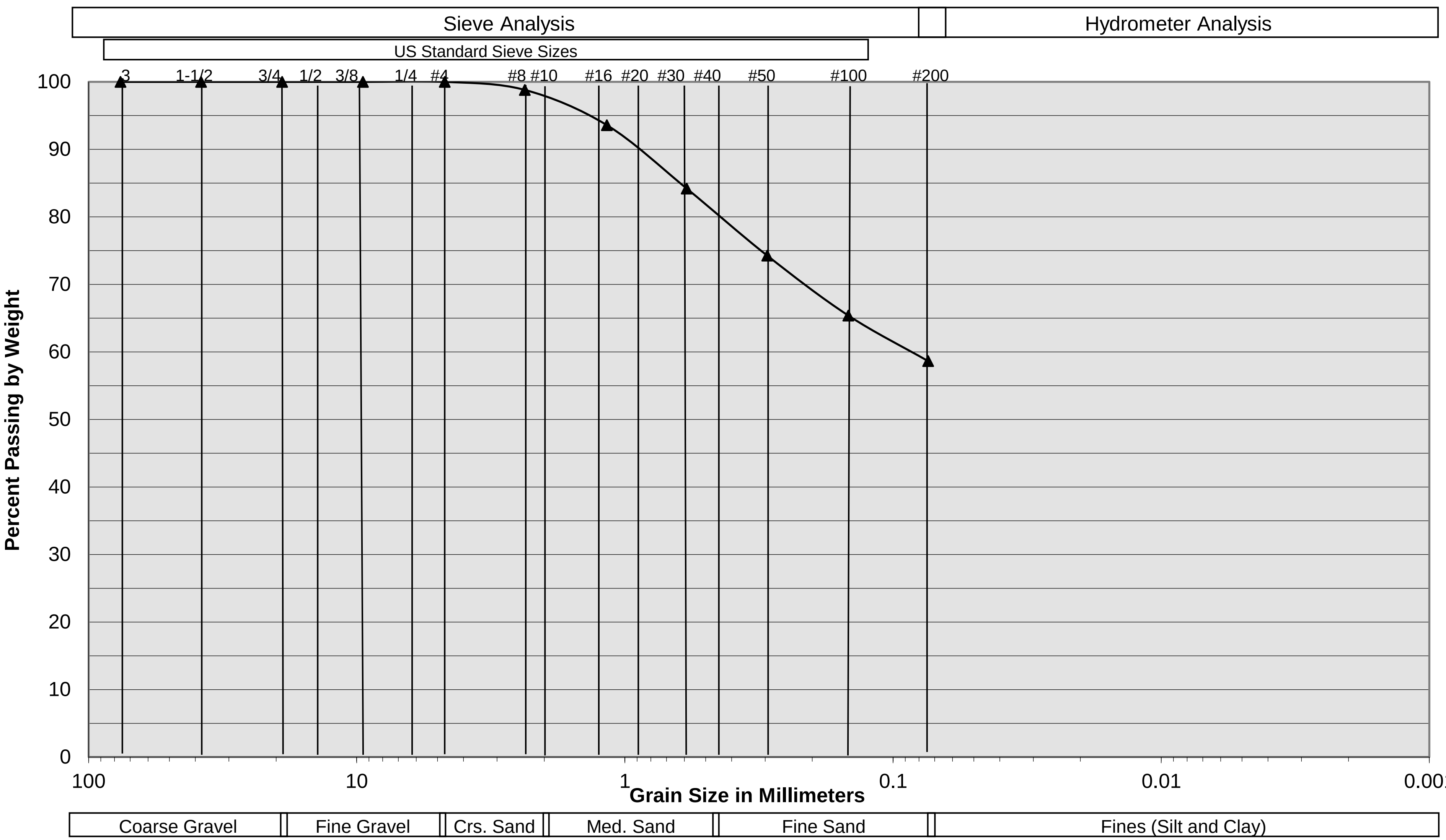


Sample Description	I-46 @ 4 to 5½ feet
Soil Classification	OLDER ALLUVIUM: Brown Silty fine to medium Sand, little Clay, trace coarse Sand

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 36

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-47 @ 5½ to 7 feet
Soil Classification	OLDER ALLUVIUM: Brown fine to medium Sandy Silt, little Clay

Harvest Landing Industrail Development
Perris, California
Project No. 22G183-4
PLATE C- 37

SOUTHERN CALIFORNIA GEOTECHNICAL
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A California Corporation

July 1, 2022

Howard Industrial Partners
1944 North Tustin Street, Suite 122
Orange, California 92865

Attention: Mr. Mike Tunney
Vice President

Project No.: **22G183-2**

Subject: **Results of Infiltration Testing**
Proposed Harvest Landing Industrial Development
Indian Avenue and Orange Avenue
Perris, California

Reference: Geotechnical Investigation, Proposed Harvest Landing Industrial Development, Indian Avenue and Orange Avenue, Perris, California, prepared by Southern California Geotechnical, Inc. (SCG) for Howard Industrial Partners, SCG Project No. 22G183-1, dated June 13, 2022.

Mr. Tunney:

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

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 22P206R, dated April 28, 2022 and Change Order No. 22G183-CO, dated June 8, 2022. The scope of services included visual site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils for the stormwater disposal systems. The infiltration borings were tested using a modified constant-head infiltration test as requested by the project civil engineer. The double ring infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Site and Project Description

The site is located at the northwest and southwest corners of Indian Avenue and Orange Avenue in Perris, California. The site is bounded to the north by Val Verde Elementary School, to the west and south by Interstate 215 Frontage Road, and to the east by Indian Avenue. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 of this report.

The site consists of several parcels, which total 73.68± acres in size. The east-central area of the site is developed with four (4) single-family residences. These residences are assumed to be single-story structures of wood frame and stucco construction and supported on conventional shallow foundations with concrete slab-on-grade floors. The residences are surrounded by concrete flatwork, turf grass, exposed soil, and trees. The remaining areas of the site are vacant and undeveloped. The ground surface in these areas consists of exposed soil with sparse to moderate native grass and weed growth.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth, and visual observations made at the time of the subsurface investigation, the overall site topography is generally flat and moderately slopes to the east at a gradient of approximately 2± percent.

Proposed Development

Based on the conceptual site plan provided to our office by the client, the site will be developed with five (5) industrial buildings:

Building No.	Location	Size (ft^2)
1	North	647,000
2	North-Central	389,000
3	Central	91,000
4	South-Central	52,000
5	South	22,000

Each building includes a mezzanine and dock-high doors will be constructed along a portion of at least one building wall for each of the buildings. The building is anticipated to be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

The proposed development will include on-site infiltration for stormwater disposal. Based on the information provided by representatives of FMCivil Engineers, Inc., the project civil engineer, the infiltration systems will consist of four (4) shallow below-grade chamber systems (identified as Infiltration System "A" through Infiltration System "D") and/or four (4) deep dry-well systems (identified as Infiltration System "E" thought Infiltration System "H"). The infiltration systems will be located in the eastern area of the site. The bottoms of the below-grade chamber systems will extend to depths of 7± feet below existing site grades and the dry wells will extend to a depth of 50± feet below existing site grades.

Concurrent Studies

SCG performed a geotechnical investigation at the subject site, referenced above. As a part of this investigation, twenty-three (23) borings were advanced to depths of 15 to 25± feet below the previously existing site grades. Native alluvium was encountered at each boring location, extending to at least the maximum depth explored of 25± feet below existing site grades. The alluvium generally consists of medium dense to very dense silty sands to sandy silts, with trace to little clay content.

Free water was not encountered during the drilling of the borings. Based on the lack of water within the borings and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 25± feet at the time of the subsurface exploration. Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well is located approximately 0.5 miles east from the site. Water level readings within this monitoring well indicates a groundwater level of 44± feet below the ground surface in March 2022.

Subsurface Exploration

Scope of Exploration

The subsurface exploration performed for the infiltration testing consisted of six (6) shallow infiltration trenches (identified as Infiltration Trench Nos. I-1 through I-6) and four (4) deep infiltration borings (identified as Infiltration Boring Nos. I-7 through I-10). The infiltration trenches were excavated using a rubber-tire backhoe to a depth of 7± feet. The infiltration borings were extended to a depth of 50± feet below existing site grades. In addition to the infiltration testing, one (1) exploratory boring was extended to a depth of 60± feet below site grades to confirm the underlying soil types and verify that groundwater was at a depth greater than 10± feet below the bottom of the proposed dry well infiltration systems. The borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow-stem augers and were logged during drilling by a member of our staff. The approximate locations of the boring, infiltration borings, and infiltration trenches are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Artificial fill soils were encountered at the ground surface at Infiltration Test No. I-3, extending to a depth of 1± foot below existing site grades. The fill soils consist of medium dense fine to medium sandy silts with trace quantities of clay and fine gravel. Native alluvium was encountered at the ground surface at all of the remaining boring and trench locations, extending to at least the maximum explored depth of 60± feet below existing site grades. The near-surface alluvium encountered at depths less than 25± feet below existing site grades consists of medium dense to very dense fine to medium sandy silts, silty fine to medium sands, clayey fine to coarse sands, and hard fine to coarse sandy clays. At depths greater than 25± feet, the alluvium consists of medium dense to very dense fine sandy silts, fine to medium sandy silts, silty fine to medium sands, and hard fine to medium sandy clays. The Boring Logs and Trench Logs, which illustrate the conditions encountered at each of the borings, are included with this report.

Free water was not encountered during drilling of any of the borings. Based on the lack of water within the borings, the static groundwater table was considered to have existed at a depth in excess of 60± feet at the time of our subsurface exploration.

Shallow Infiltration Testing – Double Ring Infiltration

The infiltration testing for the proposed shallow infiltration chambers was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Two stainless steel infiltration rings were used for the infiltration testing. The outer infiltration ring is 2 feet in diameter and 20 inches in height. The inner infiltration ring is 1 foot in diameter and 20 inches in height. At the test locations, the outer ring was driven 3± inches into the soil at the base of each trench. The inner ring was centered inside the outer ring and subsequently driven 3± inches into the soil at the base of the trench. The rings were driven into the soil using a ten-pound sledge hammer. The soil surrounding the wall of the infiltration rings was only slightly disturbed during the driving process.

Infiltration Testing Procedure

Infiltration testing was performed at all of the trench locations. The infiltration testing consisted of filling the inner ring and the annular space (the space between the inner and outer rings) with water, approximately 3 to 4 inches above the soil. To prevent the flow of water from one ring to the other, the water level in both the inner ring and the annular space between the rings was maintained using constant-head float valves. The volume of water that was added to maintain a constant head in the inner ring and the annular space during each time interval was determined and recorded. A cap was placed over the rings to minimize the evaporation of water during the tests.

The schedule for readings was determined based on the observed soil type at the base of each backhoe-excavated trench. Based on the existing soils at the trench locations, the volumetric measurements were made at 10-minute intervals at Infiltration Trench No I-3 and 15-minute increments at the remaining trench locations. The water volume measurements are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on these spreadsheets.

The infiltration rates for the infiltration tests are calculated in centimeters per hour and then converted to inches per hour. The rates are summarized below:

Infiltration Test No.	**Depth (feet)**	**Soil Description**	**Measured Infiltration Rate (inches/hour)**
I-1	7	Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	0.8
I-2	7	Brown Silty fine to medium Sand, trace coarse Sand, trace Clay	1.0
I-3	7	Brown Silty fine to medium Sand, little coarse Sand	6.8
I-4	7	Brown Silty fine to medium Sand, trace to little coarse Sand, trace Clay	0.3
I-5	7	Brown Silty fine to medium Sand, trace coarse Sand, trace Clay	0.9
I-6	7	Brown Silty fine to medium Sand, trace Clay, trace coarse Sand	1.3

Percolation Testing – Dry Wells

The dry well infiltration testing was performed in accordance with a modified constant-head infiltration test as requested by the project civil engineer, the designer of the proposed dry well system.

Upon the completion of the drilling for the infiltration borings, a sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was installed in the annulus surrounding the PVC casing.

Pre-soaking

The pre-soaking process consisted of filling the test borings with water to approximately 10± feet below the ground surface. The pre-soaking was completed after all of the water had percolated through the test hole, at least 15 hours since initiating the pre-soak.

Infiltration Testing Procedure

Following the pre-soaking process, the constant-head infiltration test method was utilized to test the infiltration rates of deeper soils. This method consisted of filling the borings to a maximum water level of 10± feet below the ground surface, based on the soil conditions encountered. Once the hole was filled, the inflow of water was controlled via a ball valve in order to maintain the water level constant below ground surface. It was necessary to constantly monitor this depth due to varying inflows from the water source and the change in infiltration rate with time. Readings were taken every ten minutes using a water level meter. The ball valve was used to make adjustments by increasing or decreasing the inflow of water when slight changes in depth occurred. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the deep infiltration tests are tabulated in gallons per square foot per day.

Infiltration Test No.	**Depth (feet)**	**Measured Infiltration Rate (Inches per Hour)**
I-7	51	<0.1
I-8	49	0.2
I-9	51	0.1
I-10	51	0.3

Laboratory Testing

Moisture Content

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

Grain Size Analysis

The grain size distribution of selected soils collected from each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-41 of this report.

Design Recommendations

A total of ten (10) total infiltration tests were performed at the subject site. As noted above, the double ring infiltration testing resulted in measured infiltration rates ranging from 0.3 to 6.8 inches per hour. The dry well infiltration testing resulted in measured infiltration rates ranging from 0.0 to 0.3 inches per hour. The primary factors affecting the infiltration rates are the silt content of the encountered soils, which vary at different depths and locations at the subject site. Based on the results of the infiltration testing, we recommend the following infiltration rates to be utilized for the design of the proposed infiltration systems:

Infiltration Test No.	Infiltration System	Infiltration System Type	Depth (feet)	Location	Infiltration Rate (inches per hour)
I-1 and I-2*	A	Chamber System	7	Northeast	0.9
I-3 and I-4*	B	Chamber System	7	Central-East	3.6
I-5	C	Chamber System	7	South-Central	0.9
I-6	D	Chamber System	7	Southeast	1.3

Infiltration Test No.	Infiltration System	Infiltration System Type	Depth (feet)	Location	Infiltration Rate (inches per hour)
I-7	E	Dry Well	50	Northeast	0.0
I-8	F	Dry Well	50	Central-East	0.2
I-9	G	Dry Well	50	Central-East	0.1
I-10	H	Dry Well	50	Southeast	0.3

NOTE: *Indicates an average infiltration rate was used in the design infiltration rate.

Due to the low infiltration rates for the deep dry well infiltration systems, dry well infiltration is not recommended for this project.

The design of the proposed storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Perris and/or County of Riverside guidelines. However, it is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such materials would decrease the effective infiltration rate. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rates recommended above are based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rates.** It should be noted that the recommended infiltration rates are based on infiltration testing at ten (10) discrete locations and the overall infiltration rates of the storm water infiltration systems could vary considerably.

Infiltration Rate Considerations

The infiltration rates presented herein was determined in accordance with the Riverside County guidelines and are considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rates presented above. The infiltration rates will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rates.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Construction Considerations

The infiltration rates presented in this report are specific to the tested locations and tested depths. Infiltration rates can be significantly reduced if the soils are exposed to excessive disturbance or compaction during construction. Compaction of the soils at the bottom of the infiltration system can significantly reduce the infiltration ability of the basins. Therefore, the subgrade soils within proposed infiltration system areas should not be over-excavated, undercut or compacted in any significant manner. **It is recommended that a note to this effect be added to the project plans and/or specifications.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each system. It should be confirmed that the soils at the base of the proposed infiltration systems correspond with those presented in this report to ensure that the performance of the systems will be consistent with the rates reported herein.

We recommend that scrapers and other rubber-tired heavy equipment not be operated on the basin bottom, or at levels lower than 2 feet above the bottom of the system, particularly within basins. As such, the bottom 24 inches of the infiltration systems should be excavated with non-rubber-tired equipment, such as excavators.

Infiltration Chamber Maintenance

The proposed project may include infiltration chambers. Water flowing into chambers will carry some level of sediment. This layer has the potential to significantly reduce the infiltration rate of the chamber subgrade soils. Therefore, a formal chamber maintenance program should be established to ensure that these silt and clay deposits are removed from the chamber on a regular basis.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **The proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

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

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

Closure

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

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

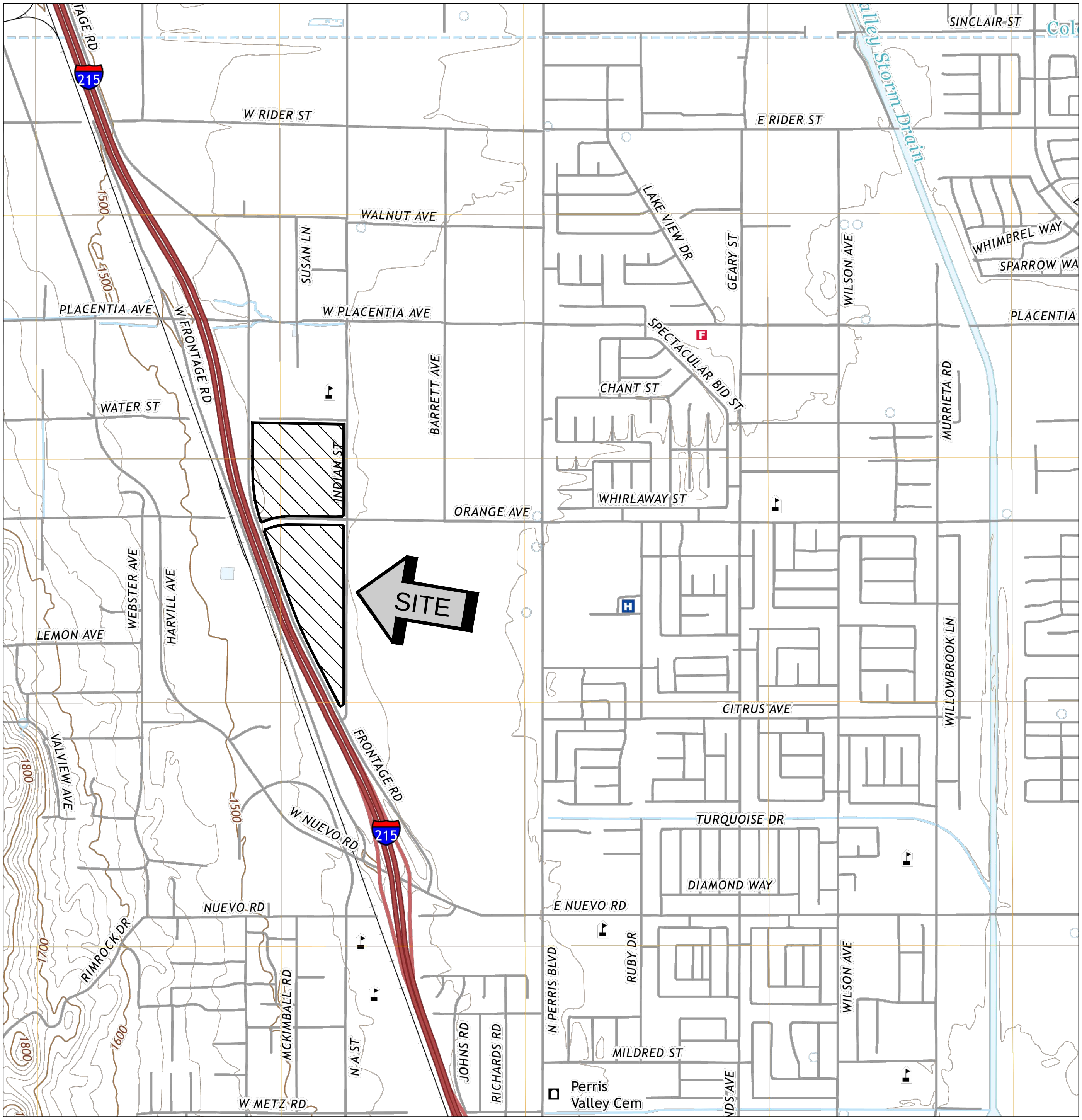
Ryan Bremer
Staff Geologist

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

Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Trench Log Legend and Logs (8 pages)
Boring Log Legend and Logs (12 pages)
Infiltration Test Results Spreadsheets (10 pages)
Grain Size Distribution Graphs (41 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA, 2021

SITE LOCATION MAP

HARVEST LANDING INDUSTRIAL DEVELOPMENT

PERRIS, CALIFORNIA

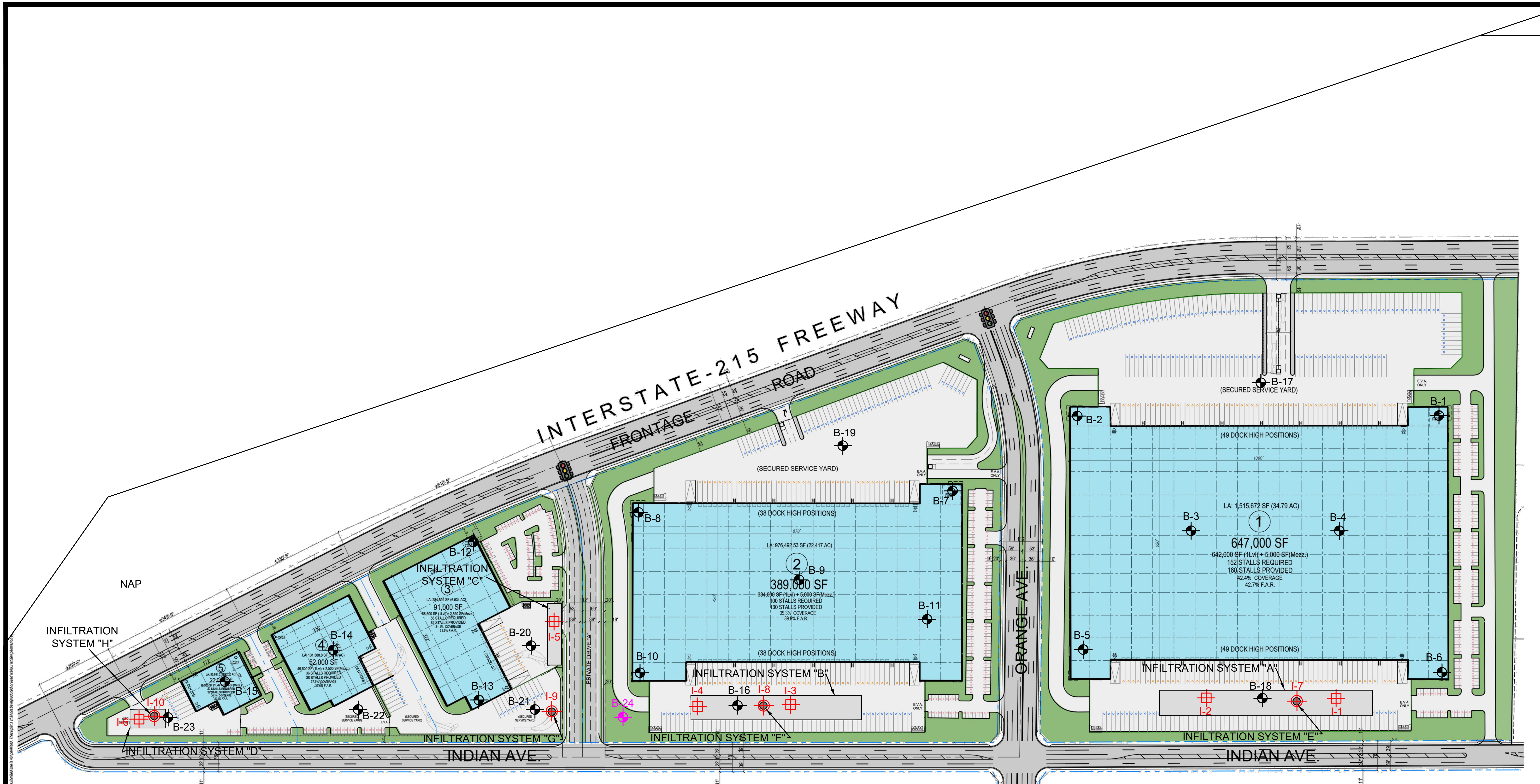
SCALE: 1" = 2000'

DRAWN: OS
CHKD: RGT

SCG PROJECT
22G183-2

PLATE 1

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

- APPROXIMATE SHALLOW-INFILTRATION TEST LOCATION (DOUBLE-RING INFILTROMETER)
- APPROXIMATE DEEP-INFILTRATION TEST LOCATION (CONSTANT-HEAD)
- APPROXIMATE BORING LOCATION
- APPROXIMATE BORING LOCATION (SCG PROJECT NO. 22G183-1)
- APPROXIMATE BELOW-GRADE CHAMBER LOCATION
- APPROXIMATE DRY WELL SYSTEM LOCATION

NORTH
SoCalGeo

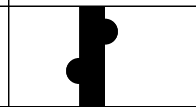
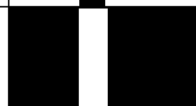
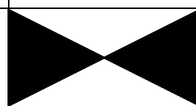
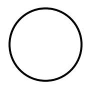
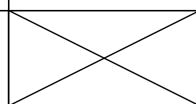
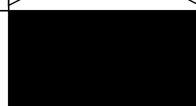
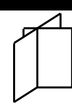
NOTE: CONCEPTUAL PLAN PROVIDED BY AO ARCHITECTS

INFILTRATION TEST LOCATION PLAN
HARVEST LANDING INDUSTRIAL DEVELOPMENT
PERRIS, CALIFORNIA

SCALE: 1" = 250'
DRAWN: RB
CHKD: RGT
SCG PROJECT 22G183-2
PLATE 2

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH LOG LEGEND

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

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

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

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

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

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

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

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

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

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

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

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-1

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
EXCAVATION DATE: 5/4/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Joey Hernandez
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown fine to medium Sandy Silt, trace Clay, trace coarse Sand, trace fine root fibers, dense-dry							
					Brown Silty fine to medium Sand, trace coarse Sand, trace Clay, trace Calcareous nodules, dense-dry							
5												
							2					
					Trench Terminated at 7'							

TBL 22G183-2 (INFIL TRENCHES).GPJ SOCALGEO.GDT 6/24/22

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-2

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

EXCAVATION DATE: 5/5/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Joey Hernandez

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown fine Sandy Silt, trace medium to coarse Sand, trace Clay, trace fine root fibers, trace Calcareous nodules, dense-dry							
5					Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, little Calcareous nodules, dense-dry							
							1					
					Trench Terminated at 7'							

TBL 22G183-2 (INFIL TRENCHES).GPJ SOCALGEO.GDT 6/24/22

TEST TRENCH LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-3

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

EXCAVATION DATE: 5/4/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Caleb Brackett

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown fine to medium Sandy Silt, trace Clay, trace coarse Sand, trace fine Gravel, trace fine root fibers, medium dense-damp							
					ALLUVIUM: Brown Silty fine to medium Sand, little coarse Sand, trace Calcareous nodules, medium dense to dense-dry to damp							
5												
							3					
					Trench Terminated at 7'							

TBL 22G183-2 (INFIL TRENCHES).GPJ SOCALGEO.GDT 6/24/22

TEST TRENCH LOG **PLATE B-3**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-4

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
EXCAVATION DATE: 5/4/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Joey Hernandez
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown fine to medium Sandy Silt, trace Clay, trace coarse Sand, trace fine root fibers, medium dense-dry to damp							
					Brown Silty fine to medium Sand, trace Clay, trace to little coarse Sand, trace Calcareous nodules, dense to very dense-dry							
5												
							2					
					Trench Terminated at 7'							

TBL 22G183-2 (INFIL TRENCHES).GPJ SOCALGEO.GDT 6/24/22

TEST TRENCH LOG **PLATE B-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-5

JOB NO.: 22G183-2 EXCAVATION DATE: 5/5/22 WATER DEPTH: Dry
PROJECT: Harvest Landing Industrial Development EXCAVATION METHOD: Backhoe CAVE DEPTH: ---
LOCATION: Perris, California LOGGED BY: Joey Hernandez READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown fine Sandy Silt, trace Clay, trace medium to coarse Sand, little fine root fibers, dense-dry							
					Brown Silty fine to medium Sand, trace coarse Sand, trace Clay, little Calcareous nodules, very dense-damp							
5												
							4					
					Trench Terminated at 7'							

TBL 22G183-2 (INFIL TRENCHES).GPJ SOCALGEO.GDT 6/24/22

TEST TRENCH LOG **PLATE B-5**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-6

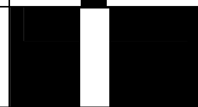
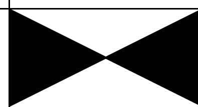
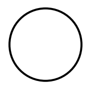
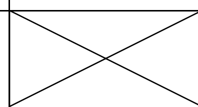
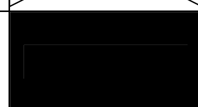
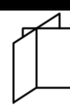
JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
EXCAVATION DATE: 5/5/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Joey Hernandez
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown fine to medium Sandy Silt, trace coarse Sand, trace Clay, trace Calcareous nodules, trace fine root fibers, porous, dense-damp							
					Brown Silty fine to medium Sand, trace Clay, trace coarse Sand, little Calcareous nodules, dense to very dense-dry							
5												
							2					
					Trench Terminated at 7'							

TBL 22G183-2 (INFIL TRENCHES).GPJ SOCALGEO.GDT 6/24/22

TEST TRENCH LOG **PLATE B-6**

BORING LOG LEGEND

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

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

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

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

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

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

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

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

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

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

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

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-7

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
0					ALLUVIUM: Brown Silty fine to medium Sand, dense-damp							
5	X	46					5					
7					Brown fine to medium Sandy Silt, trace Clay, dense to very dense-damp to moist							
10	X	30					4					
15	X	50/5"					9			57		
20	X	50/5"			@ 18½', little Clay		10			54		
25	X	50			@ 23½', little Calcareous veining, no Clay		4			62		
27					Brown Silty fine to medium Sand, trace to little coarse Sand, dense-moist							
30	X	42					9			42		
32					Brown fine Sandy Silt, trace medium Sand, very dense-dry to damp							
35	X	50/5"					3			64		

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-7

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Brown fine to medium Sandy Silt, dense to very dense-moist							
	X	45					10			54		
40												
	X	50/5"										@ 43½', no sample recovery
45												
					Brown fine Sandy Silt, trace medium Sand, very dense-damp							
	X	50/4"					5			67		
50												
					Boring Terminated at 50'							

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-8

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: --- MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
0					ALLUVIUM: Brown fine to medium Sandy Silt, medium dense-damp							
5	X	19					5					
7					Brown fine Sandy Silt, trace Clay, trace Calcareous veining, dense-damp							
10	X	42					9					
12					Brown Silty fine to medium Sand, trace coarse Sand, dense-damp to moist							
15	X	34					11			35		
20	X	46			@ 18½', little coarse Sand		9			39		
25	X	38					8			35		
30	X	47			@ 28½', trace Clay		10			34		
	X	38					9			37		

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-8

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
40	X	34			@ 38½', no coarse Sand		8			35		
					Brown fine to medium Sandy Silt, very dense-very moist							
45	X	54					17			53		
					Brown Silty fine to medium Sand, very dense-moist							
50	X	50/5"					12			43		
					Boring Terminated at 50'							

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

BORING NO. I-9

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza

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

SURFACE ELEVATION: --- MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine to medium Sand, trace fine root fibers, medium dense-damp							
	X	21					3					
5												
					Brown fine to coarse Sandy Clay, hard-damp							
	X	58	4.5				7					
10												
					Brown Clayey fine to coarse Sand, trace Silt, dense-dry to damp							
	X	33					3			23		
15												
					Brown fine to medium Sandy Clay, trace coarse Sand, very stiff to hard-damp to moist							
	X	23	4.0				13			40		
20												
	X	43	3.5				8			42		
25												
					Brown fine to medium Sandy Silt, trace Clay, dense-moist							
	X	32					10			53		
30												
					Brown Silty fine to medium Sand, trace coarse Sand, trace Clay, dense-damp to moist							
	X	49					9			28		

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-9

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	38					7			37		
40												
	X	43					7			31		
45												
	X	34			@ 48½', trace to little coarse Sand, no Clay		9			26		
50												
					Boring Terminated at 50'							

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-10

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

SURFACE ELEVATION: --- MSL

FIELD RESULTS: DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS: DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown Silty fine to medium Sand, dense to very dense-damp to moist							
5	X	17			@ 3½ to 5', medium dense		3					
10	X	38			@ 8½', trace coarse Sand, trace Clay		5					
15	X	39			@ 13½ to 47', no Clay		9			43		
20	X	38					6			35		
25	X	59					5			42		
30	X	59					5			30		
	X	52					5			45		

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-10

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California
DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza
WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	27					5			27		
40												
	X	41			@ 43½', trace to little coarse Sand		4			21		
45												
	X	42			@ 48½', trace Clay		7					
50												
					Boring Terminated at 50'							

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

TEST BORING LOG

BORING NO. B-24

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza

WATER DEPTH: Dry
CAVE DEPTH: 48 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
0					ALLUVIUM: Brown fine to medium Sandy Silt, trace fine root fibers, dense-dry							
5	X	48					2					
					Brown fine Sandy Silt, trace medium Sand, dense to very dense-damp							
10	X	50/5"					6					
15												
20	X	45			@ 18½', little medium Sand, trace Clay		7			57		
25					Brown Silty fine to medium Sand, medium dense to dense-damp							
30	X	20			@ 28½', trace coarse Sand		7			39		

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

TEST BORING LOG

PLATE B-1a

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-24

JOB NO.: 22G183-2
PROJECT: Harvest Landing Industrial Development
LOCATION: Perris, California

DRILLING DATE: 6/9/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Michelle Esparza

WATER DEPTH: Dry
CAVE DEPTH: 48 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
	X	38					7			34		
40												
45												
	X	40			@ 48½', trace Clay, trace coarse Sand, trace Calcareous veining, dense-moist		9			33		
50												
55					Light Brown fine to medium Sandy Clay, trace Silt, hard-very moist							
	X	46	4.5				21			59		
60					Boring Terminated at 60'							

TBL 22G183-2 (BORINGS).GPJ SOCALGEO.GDT 7/1/22

INFILTRATION CALCULATIONS

Project Name	Proposed Harvest Landing
Project Location	Perris, CA
Project Number	22G183-2
Engineer	CB

Infiltration Test No	I-1

Constants			
	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

				Flow Readings				Infiltration Rates			
Test Interval		Time (hr)	Interval **Elapsed** (min)	Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	11:25 AM	15	0	450	0	3000	2.47	5.48	0.97	2.16
	Final	11:40 AM	**15**	450		3000					
2	Initial	11:40 AM	15	0	400	0	1600	2.19	2.92	0.86	1.15
	Final	11:55 AM	**30**	400		1600					
3	Initial	11:55 AM	15	0	350	0	1200	1.92	2.19	0.76	0.86
	Final	12:10 PM	**45**	350		1200					
4	Initial	12:10 PM	15	0	400	0	1500	2.19	2.74	0.86	1.08
	Final	12:25 PM	**60**	400		1500					
5	Initial	12:25 PM	15	0	400	0	1300	2.19	2.38	0.86	0.94
	Final	12:40 PM	**75**	400		1300					
6	Initial	12:40 PM	15	0	350	0	1500	1.92	2.74	0.76	1.08
	Final	12:55 PM	**90**	350		1500					

INFILTRATION CALCULATIONS

Project Name	Proposed Harvest Landing
Project Location	Perris, CA
Project Number	22G183-2
Engineer	CB

Infiltration Test No: I-2

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	12:00 PM	15	0	950	0	3000	5.21	5.48	2.05	2.16
	Final	12:15 PM	**15**	950		3000					
2	Initial	12:15 PM	15	0	550	0	2000	3.02	3.65	1.19	1.44
	Final	12:30 PM	**30**	550		2000					
3	Initial	12:30 PM	15	0	450	0	1500	2.47	2.74	0.97	1.08
	Final	12:45 PM	**45**	450		1500					
4	Initial	12:45 PM	15	0	450	0	1200	2.47	2.19	0.97	0.86
	Final	1:00 PM	**60**	450		1200					
5	Initial	1:00 PM	15	0	450	0	1400	2.47	2.56	0.97	1.01
	Final	1:15 PM	**75**	450		1400					
6	Initial	1:15 PM	15	0	450	0	1200	2.47	2.19	0.97	0.86
	Final	1:30 PM	**90**	450		1200					

INFILTRATION CALCULATIONS

Project Name	Proposed Harvest Landing
Project Location	Perris, CA
Project Number	22G183-2
Engineer	CB

Infiltration Test No: I-3

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	8:19 AM	10	0	4000	0	13000	32.89	35.63	12.95	14.03
	Final	8:29 AM	**10**	4000		13000					
2	Initial	8:30 AM	10	0	3500	0	12000	28.78	32.89	11.33	12.95
	Final	8:40 AM	**21**	3500		12000					
3	Initial	8:42 AM	10	0	2850	0	10500	23.44	28.78	9.23	11.33
	Final	8:52 AM	**33**	2850		10500					
4	Initial	8:53 AM	10	0	2500	0	9800	20.56	26.86	8.09	10.58
	Final	9:03 AM	**44**	2500		9800					
5	Initial	9:05 AM	10	0	2100	0	8500	17.27	23.30	6.80	9.17
	Final	9:15 AM	**56**	2100		8500					
6	Initial	9:20 AM	10	0	2200	0	8300	18.09	22.75	7.12	8.96
	Final	9:30 AM	**71**	2200		8300					
7	Initial	9:45 AM	10	0	2100		8500	17.27	23.30	6.80	9.17
	Final	9:55 AM	**96**	2100		8500					

INFILTRATION CALCULATIONS

Project Name	Proposed Harvest Landing
Project Location	Perris, CA
Project Number	22G183-2
Engineer	CB

Infiltration Test No: I-4

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

				Flow Readings				Infiltration Rates			
Test Interval		Time (hr)	Interval **Elapsed** (min)	Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	9:40 AM	15	0	250	0	1000	1.37	1.83	0.54	0.72
	Final	9:55 AM	**15**	250		1000					
2	Initial	10:00 AM	15	0	300	0	700	1.64	1.28	0.65	0.50
	Final	10:15 AM	**35**	300		700					
3	Initial	10:15 AM	15	0	150	0	800	0.82	1.46	0.32	0.58
	Final	10:30 AM	**50**	150		800					
4	Initial	10:31 AM	15	0	150	0	850	0.82	1.55	0.32	0.61
	Final	10:46 AM	**66**	150		850					
5	Initial	10:47 AM	15	0	150	0	700	0.82	1.28	0.32	0.50
	Final	11:02 AM	**82**	150		700					
6	Initial	11:03 AM	15	0	150	0	700	0.82	1.28	0.32	0.50
	Final	11:18 AM	**98**	150		700					

INFILTRATION CALCULATIONS

Project Name	Proposed Harvest Landing
Project Location	Perris, CA
Project Number	22G183-2
Engineer	CB

Infiltration Test No: I-5

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	8:50 AM	15	0	500	0	2300	2.74	4.20	1.08	1.65
	Final	9:05 AM	**15**	500		2300					
2	Initial	9:06 AM	15	0	500	0	1100	2.74	2.01	1.08	0.79
	Final	9:21 AM	**31**	500		1100					
3	Initial	9:22 AM	15	0	450	0	1300	2.47	2.38	0.97	0.94
	Final	9:37 AM	**47**	450		1300					
4	Initial	9:38 AM	15	0	400	0	1200	2.19	2.19	0.86	0.86
	Final	9:53 AM	**63**	400		1200					
5	Initial	9:54 AM	15	0	400	0	1300	2.19	2.38	0.86	0.94
	Final	10:09 AM	**79**	400		1300					
6	Initial	10:10 AM	15	0	400	0	1300	2.19	2.38	0.86	0.94
	Final	10:25 AM	**95**	400		1300					

INFILTRATION CALCULATIONS

Project Name	Proposed Harvest Landing
Project Location	Perris, CA
Project Number	22G183-2
Engineer	CB

Infiltration Test No I-6

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	10:15 AM	15	0	1450	0	3700	7.95	6.76	3.13	2.66
	Final	10:30 AM	**15**	1450		3700					
2	Initial	10:31 AM	15	0	850	0	3400	4.66	6.21	1.83	2.45
	Final	10:46 AM	**31**	850		3400					
3	Initial	10:46 AM	15	0	650	0	3000	3.56	5.48	1.40	2.16
	Final	11:01 AM	**46**	650		3000					
4	Initial	11:02 AM	15	0	650	0	2900	3.56	5.30	1.40	2.09
	Final	11:17 AM	**62**	650		2900					
5	Initial	11:18 AM	15	0	650	0	3000	3.56	5.48	1.40	2.16
	Final	11:33 AM	**78**	650		3000					
6	Initial	11:34 AM	15	0	600	0	3000	3.29	5.48	1.30	2.16
	Final	11:49 AM	**94**	600		3000					

PERCOLATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, CA
Project Number	22G183-2
Engineer	JJH/OS

Borehole Diameter	8
Borehole Depth	51
Water Depth from Ground Surface	9.9

Percolation Boring No.	I-7

Interval Number		Time	Time Interval (hrs)	Avergae Wetted Depth for Interval (ft)	Inflow Meter Readings (gallons)	Volume of Outflow (gallons)	Percolation Rate Q (gallons/minute)	Percolation Rate Q (gal/ft^2/day)
1	Initial	8:50 AM	0.1667	41.10	3582.1	0.6	0.06	1.00
	Final	9:00 AM			3582.7			
2	Initial	9:00 AM	0.1667	41.10	3582.7	0.7	0.07	1.17
	Final	9:10 AM			3583.4			
3	Initial	9:10 AM	0.1667	41.10	3583.4	0.6	0.06	1.00
	Final	9:20 AM			3584.0			
4	Initial	9:20 AM	0.1667	41.10	3584.0	0.5	0.05	0.84
	Final	9:30 AM			3584.5			
5	Initial	9:30 AM	0.1667	41.10	3584.5	0.5	0.05	0.84
	Final	9:40 AM			3585.0			
6	Initial	9:40 AM	0.1667	41.10	3585.0	0.4	0.04	0.67
	Final	9:50 AM			3585.4			

Rate	2.4	gal/hr
Rate	0.32	ft3/hr
Surface Area	86.78	ft2
Rate/Surface Area	0.00	ft/hr
Rate	**0.04**	**in/hr**

PERCOLATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, CA
Project Number	22G183-2
Engineer	JJH/OS

Borehole Diameter	8
Borehole Depth	49
Water Depth from Ground Surface	10.6

Percolation Boring No.	I-8

Interval Number		Time	Time Interval (hrs)	Avergae Wetted Depth for Interval (ft)	Inflow Meter Readings (gallons)	Volume of Outflow (gallons)	Percolation Rate Q (gallons/minute)	Percolation Rate Q (gal/ft^2/day)
1	Initial	2:33 PM	0.1667	38.40	3674.0	2.9	0.29	5.19
	Final	2:43 PM			3676.9			
2	Initial	2:43 PM	0.1667	38.40	3676.9	2.9	0.29	5.19
	Final	2:53 PM			3679.8			
3	Initial	2:53 PM	0.1667	38.40	3679.8	2.1	0.21	3.76
	Final	3:03 PM			3681.9			
4	Initial	3:03 PM	0.1667	38.40	3681.9	1.9	0.19	3.40
	Final	3:13 PM			3683.8			
5	Initial	3:13 PM	0.1667	38.40	3683.8	1.5	0.15	2.69
	Final	3:23 PM			3685.3			
6	Initial	3:23 PM	0.1667	38.40	3685.5	1.4	0.14	2.51
	Final	3:33 PM			3686.9			
7	Initial	3:33 PM	0.1667	38.40	3686.9	1.4	0.14	2.51
	Final	3:43 PM			3688.3			

Rate	8.4	gal/hr
Rate	1.12	ft3/hr
Surface Area	81.12	ft2
Rate/Surface Area	0.01	ft/hr
Rate	**0.17**	**in/hr**

PERCOLATION CALCULATIONS

Project Name	Harvest Landing Industrial Development
Project Location	Perris, CA
Project Number	22G183-2
Engineer	JJH/OS

Borehole Diameter	8
Borehole Depth	51
Water Depth from Ground Surface	9.9

Percolation Boring No.	I-9

Interval Number		Time	Time Interval (hrs)	Avergae Wetted Depth for Interval (ft)	Inflow Meter Readings (gallons)	Volume of Outflow (gallons)	Percolation Rate Q (gallons/minute)	Percolation Rate Q (gal/ft^2/day)
1	Initial	11:50 AM	0.1667	41.10	3619.0	3.0	0.30	5.02
	Final	12:00 PM			3622.0			
2	Initial	12:00 PM	0.1667	41.10	3622.0	2.5	0.25	4.18
	Final	12:10 PM			3624.5			
3	Initial	12:10 PM	0.1667	41.10	3624.5	2.0	0.20	3.35
	Final	12:20 PM			3626.5			
4	Initial	12:20 PM	0.1667	41.10	3626.5	1.4	0.14	2.34
	Final	12:30 PM			3627.9			
5	Initial	12:30 PM	0.1667	41.10	3627.9	1.2	0.12	2.01
	Final	12:40 PM			3629.1			
6	Initial	12:40 PM	0.1667	41.10	3629.1	1.0	0.10	1.67
	Final	12:50 PM			3630.1			

Rate	6.0	gal/hr
Rate	0.80	ft3/hr
Surface Area	86.78	ft2
Rate/Surface Area	0.01	ft/hr
Rate	**0.11**	**in/hr**

PERCOLATION CALCULATIONS

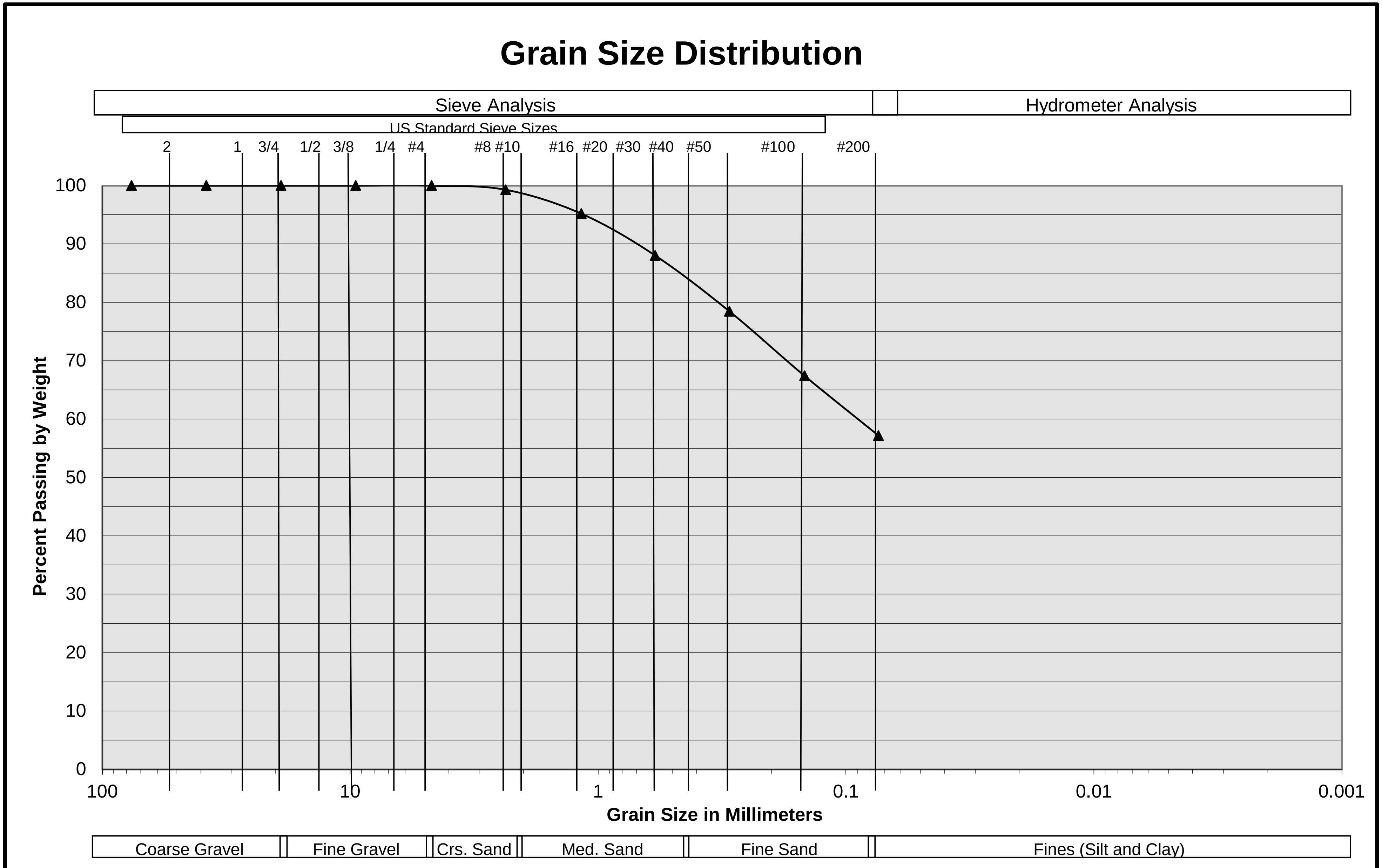
Project Name	Harvest Landing Industrial Development
Project Location	Perris, CA
Project Number	22G183-2
Engineer	JJH/OS

Borehole Diameter	8
Borehole Depth	51
Water Depth from Ground Surface	9.9

Percolation Boring No.	I-10

Interval Number		Time	Time Interval (hrs)	Avergae Wetted Depth for Interval (ft)	Inflow Meter Readings (gallons)	Volume of Outflow (gallons)	Percolation Rate Q (gallons/minute)	Percolation Rate Q (gal/ft^2/day)
1	Initial	8:54 AM	0.1667	41.10	3487.0	3.4	0.34	5.69
	Final	9:04 AM			3490.4			
2	Initial	9:04 AM	0.1667	41.10	3490.4	2.8	0.28	4.68
	Final	9:14 AM			3493.2			
3	Initial	9:14 AM	0.1667	41.10	3493.2	2.6	0.26	4.35
	Final	9:24 AM			3495.8			
4	Initial	9:24 AM	0.1667	41.10	3495.8	2.4	0.24	4.01
	Final	9:34 AM			3498.2			
5	Initial	9:34 AM	0.1667	41.10	3498.2	2.4	0.24	4.01
	Final	9:44 AM			3500.6			
6	Initial	9:44 AM	0.1667	41.10	3500.6	2.3	0.23	3.85
	Final	9:54 AM			3502.9			

Rate	13.8	gal/hr
Rate	1.84	ft3/hr
Surface Area	86.78	ft2
Rate/Surface Area	0.02	ft/hr
Rate	**0.26**	**in/hr**



Sample Description	B-24 @ 18.5 to 20'
Soil Classification	ALLUVIUM: Brown fine Sandy Silt, little medium Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 1

SOUTHERN CALIFORNIA GEOTECHNICAL
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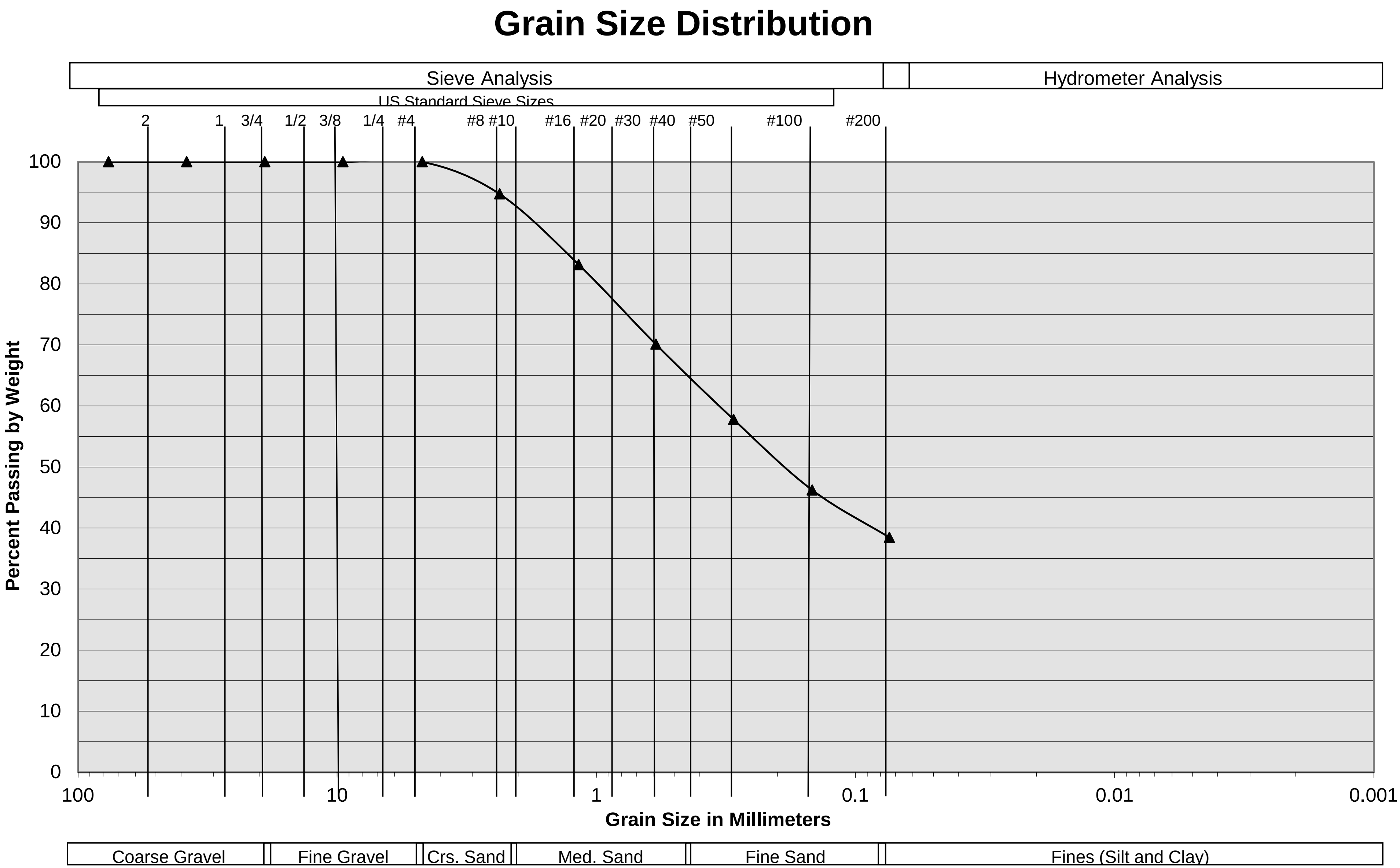
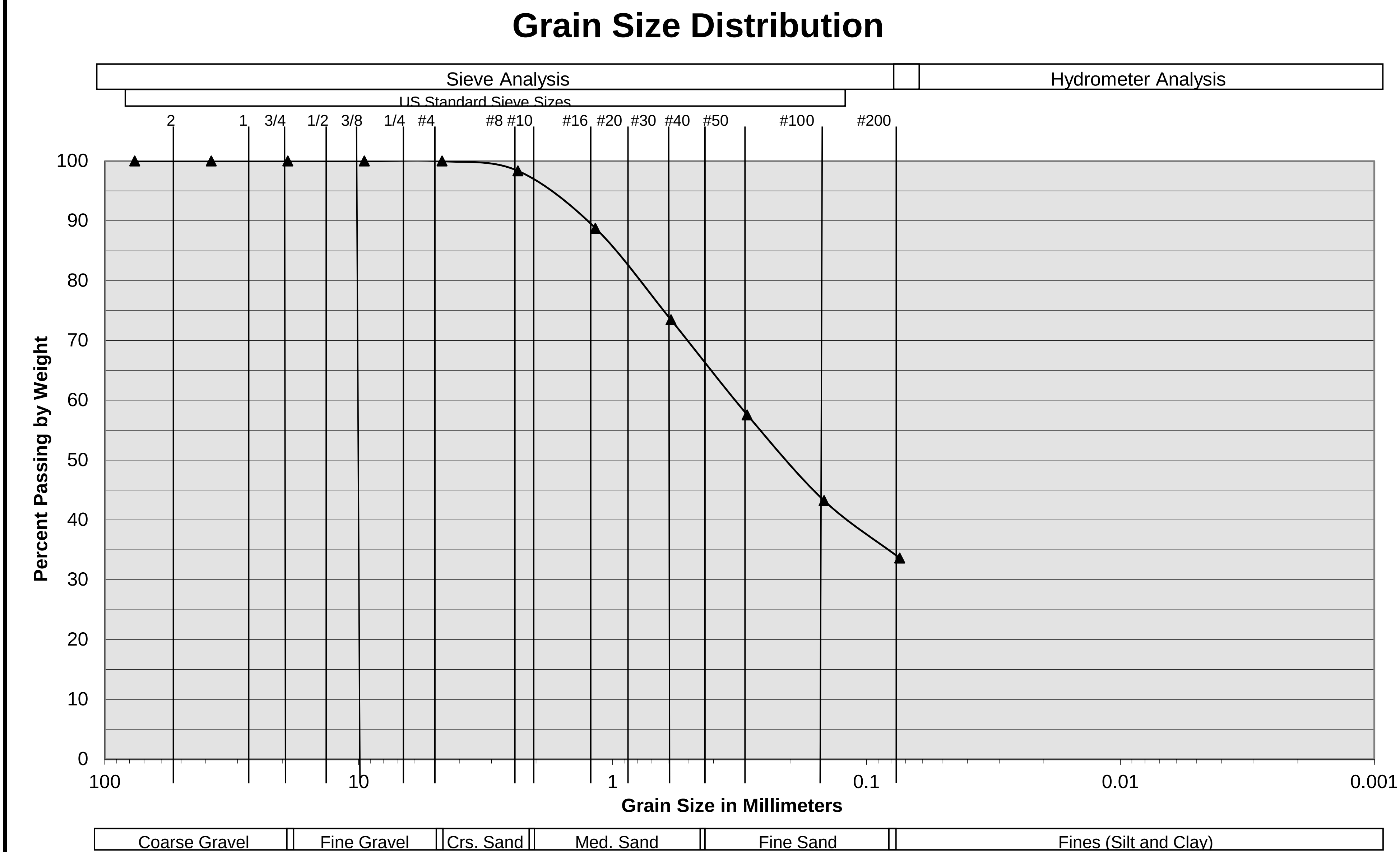


Sample Description	B-24 @ 28.5 to 30'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 2

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

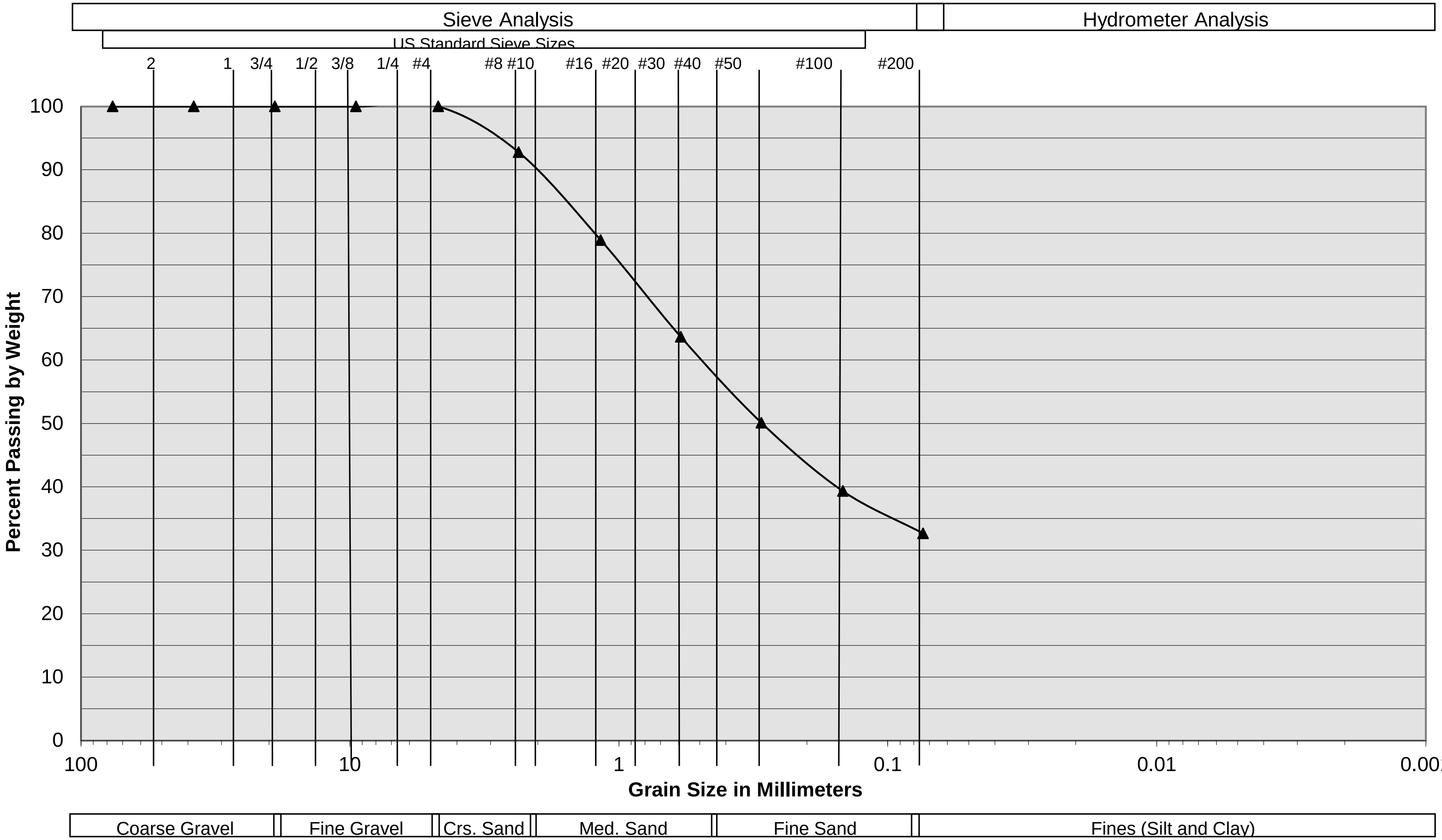


Sample Description	B-24 @ 38.5 to 40'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 3

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

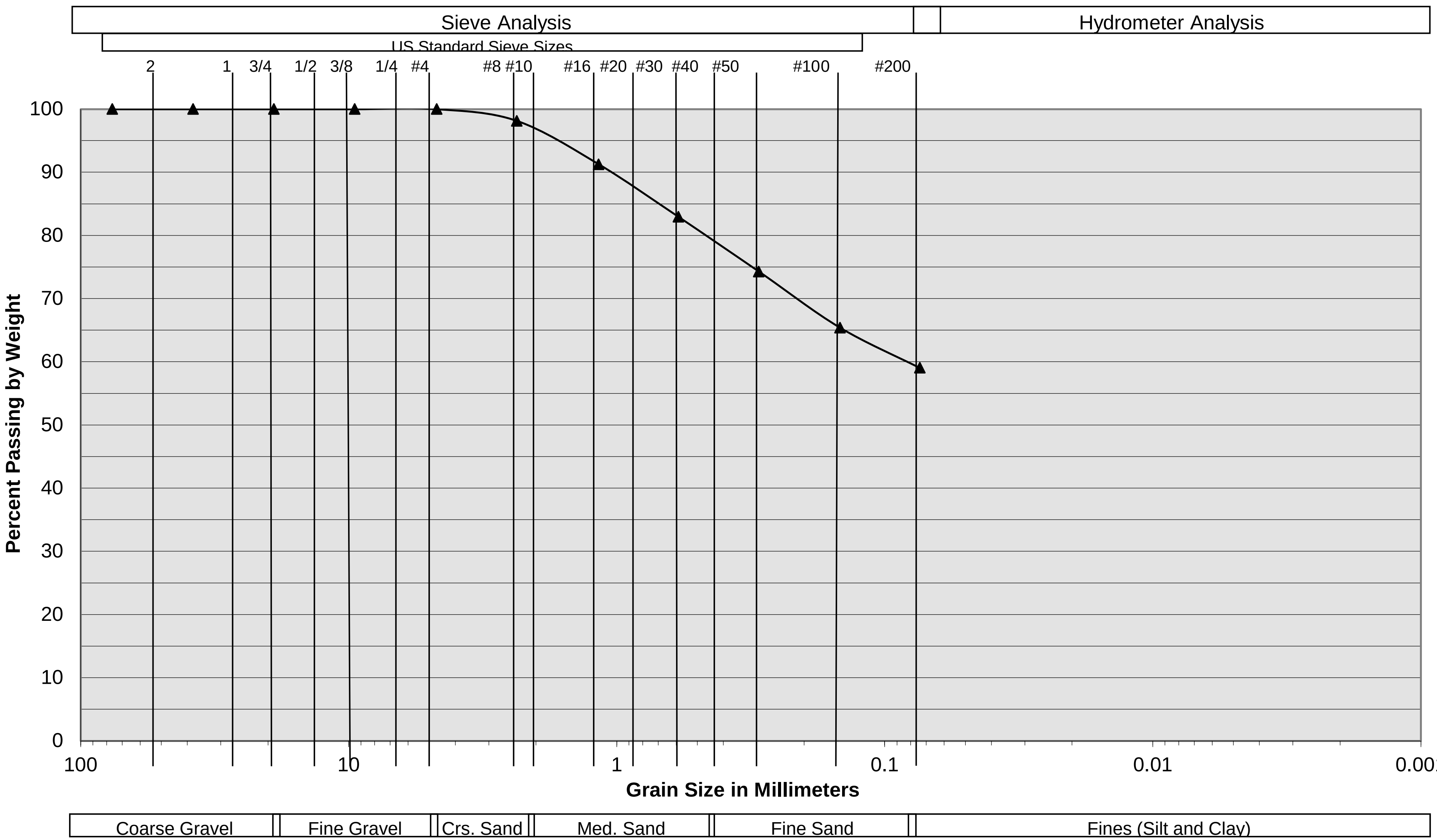


Sample Description	B-24 @ 48.5 to 50'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 4

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

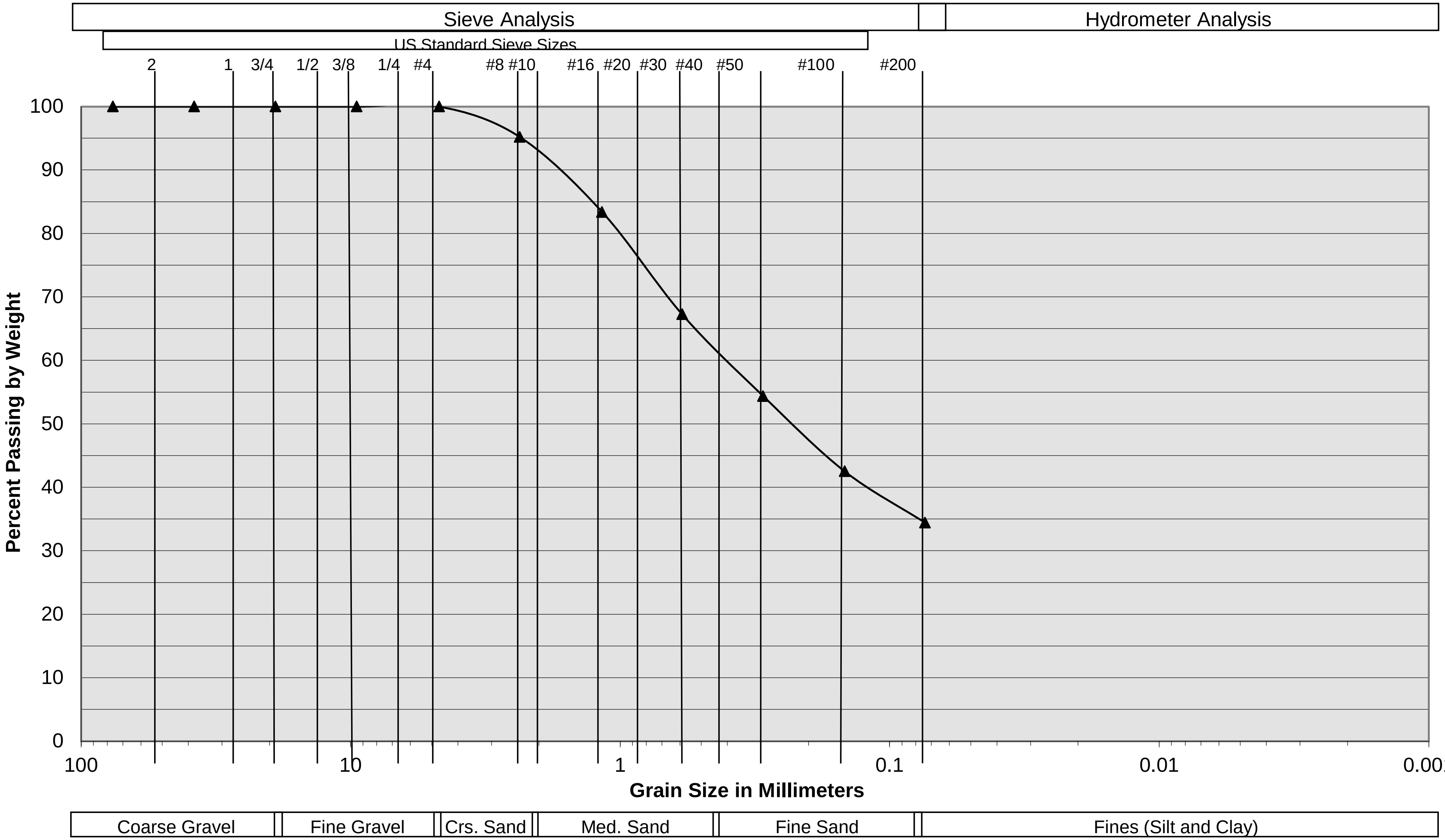


Sample Description	B-24 @ 58.5 to 60'
Soil Classification	ALLUVIUM: Light Brown fine to medium Sandy Clay, trace Silt

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 5

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

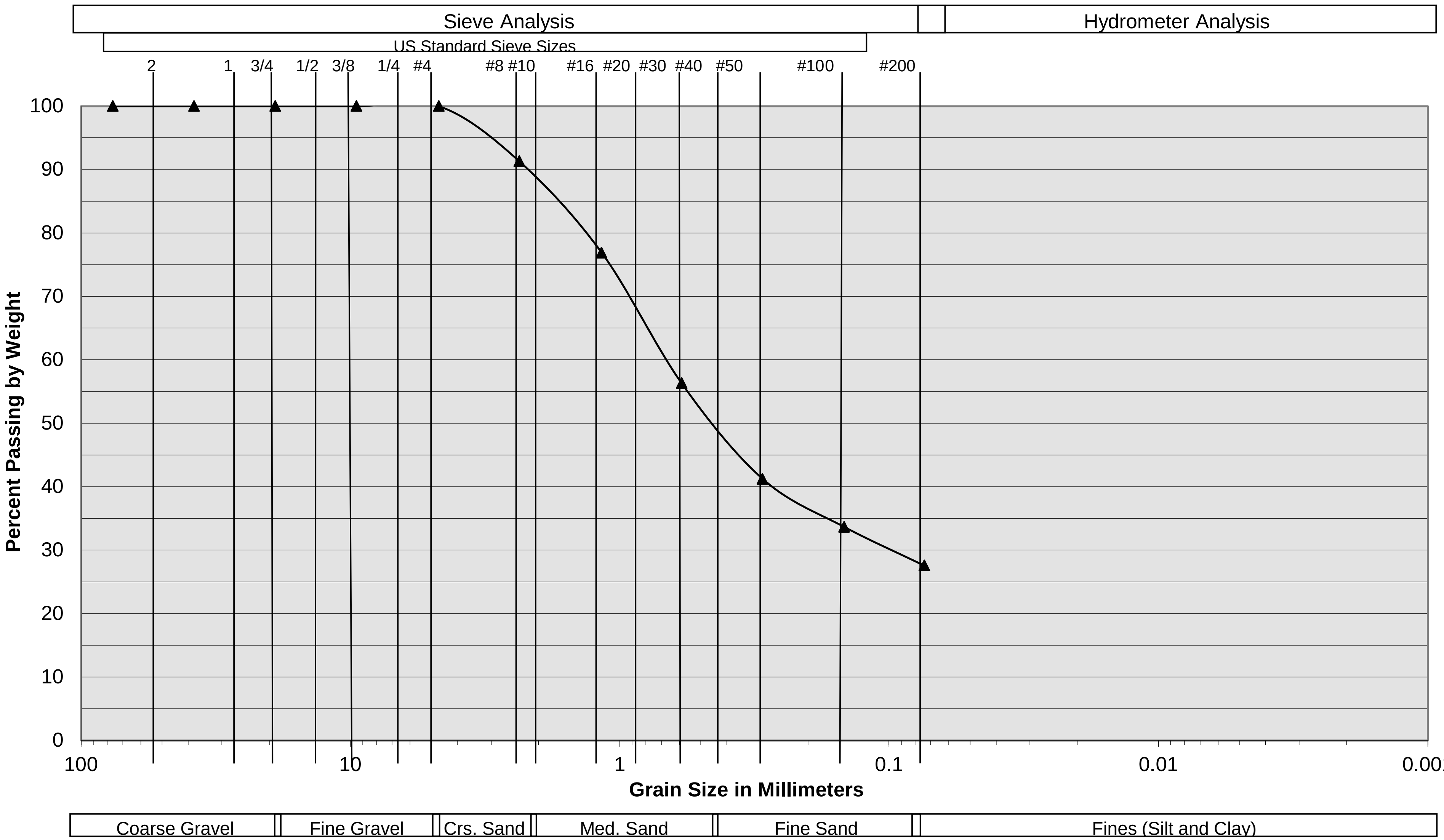


Sample Description	I-1 @ 6 to 7'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 6

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

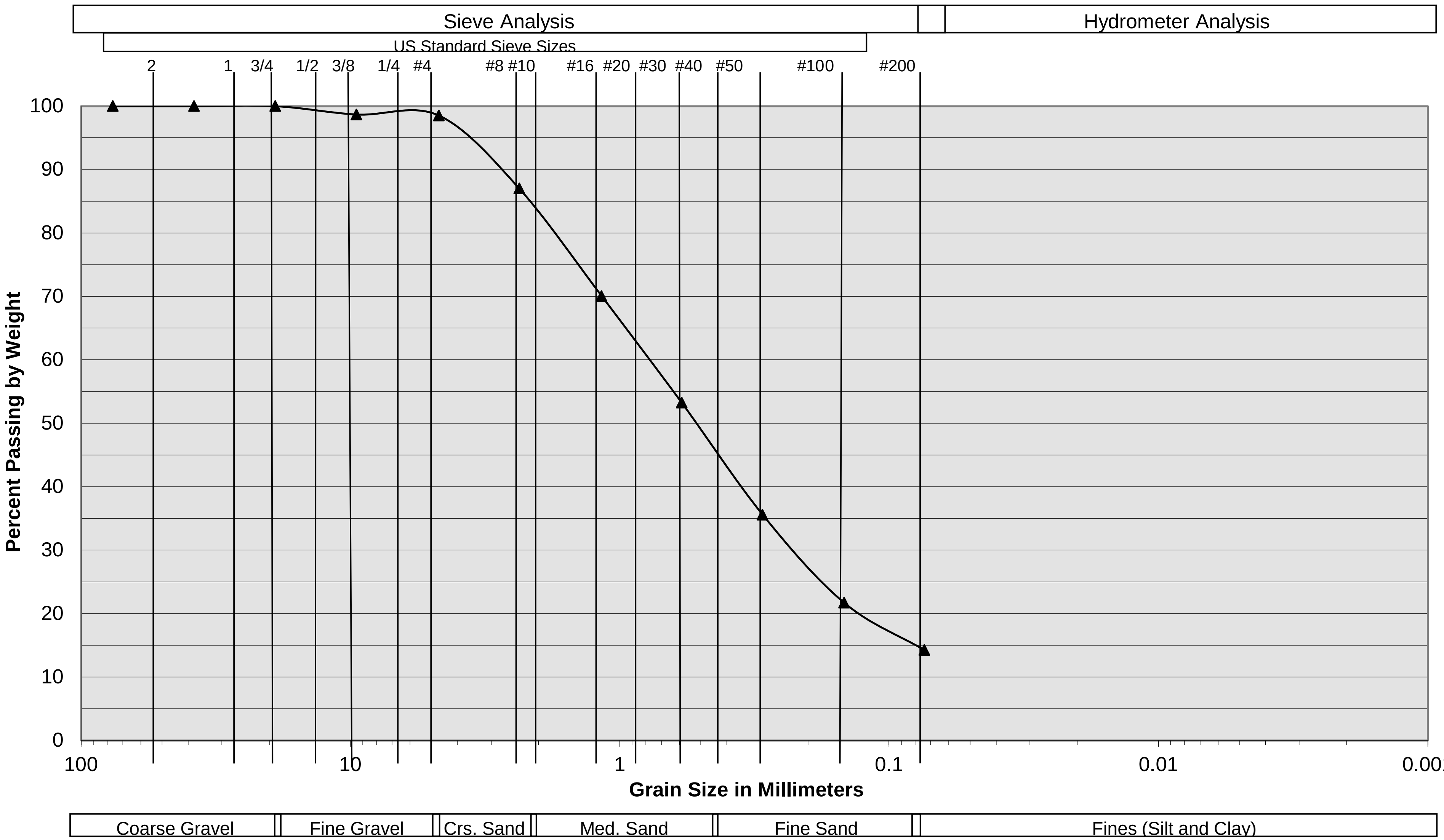


Sample Description	I-2 @ 6 to 7'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 7

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

Grain Size Distribution



Sample Description	I-3 @ 6 to 7'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, little coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 8

SOUTHERN CALIFORNIA GEOTECHNICAL
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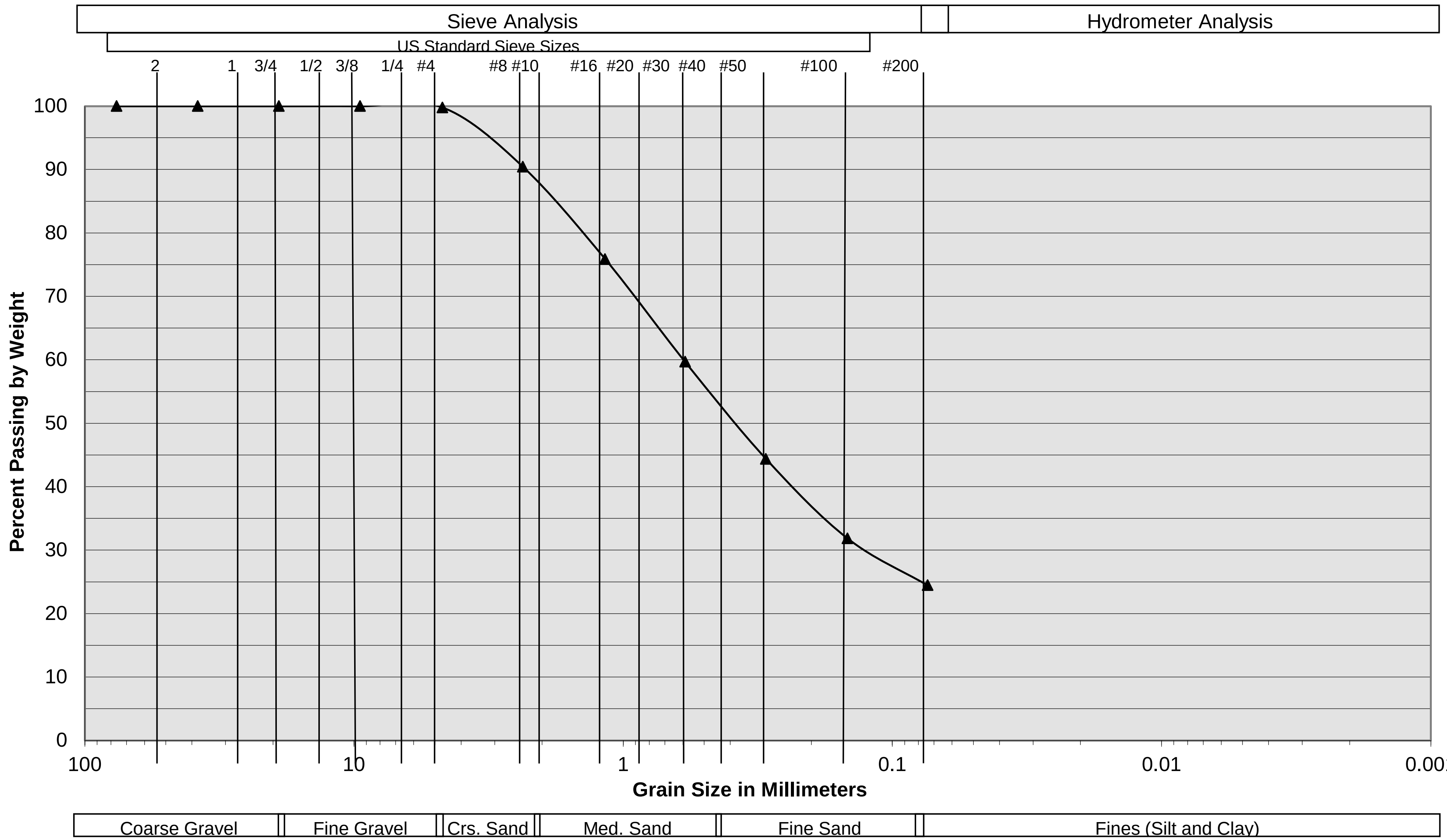
Grain Size Distribution



Sample Description	I-4 @ 6 to 7'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace to little coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 9

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
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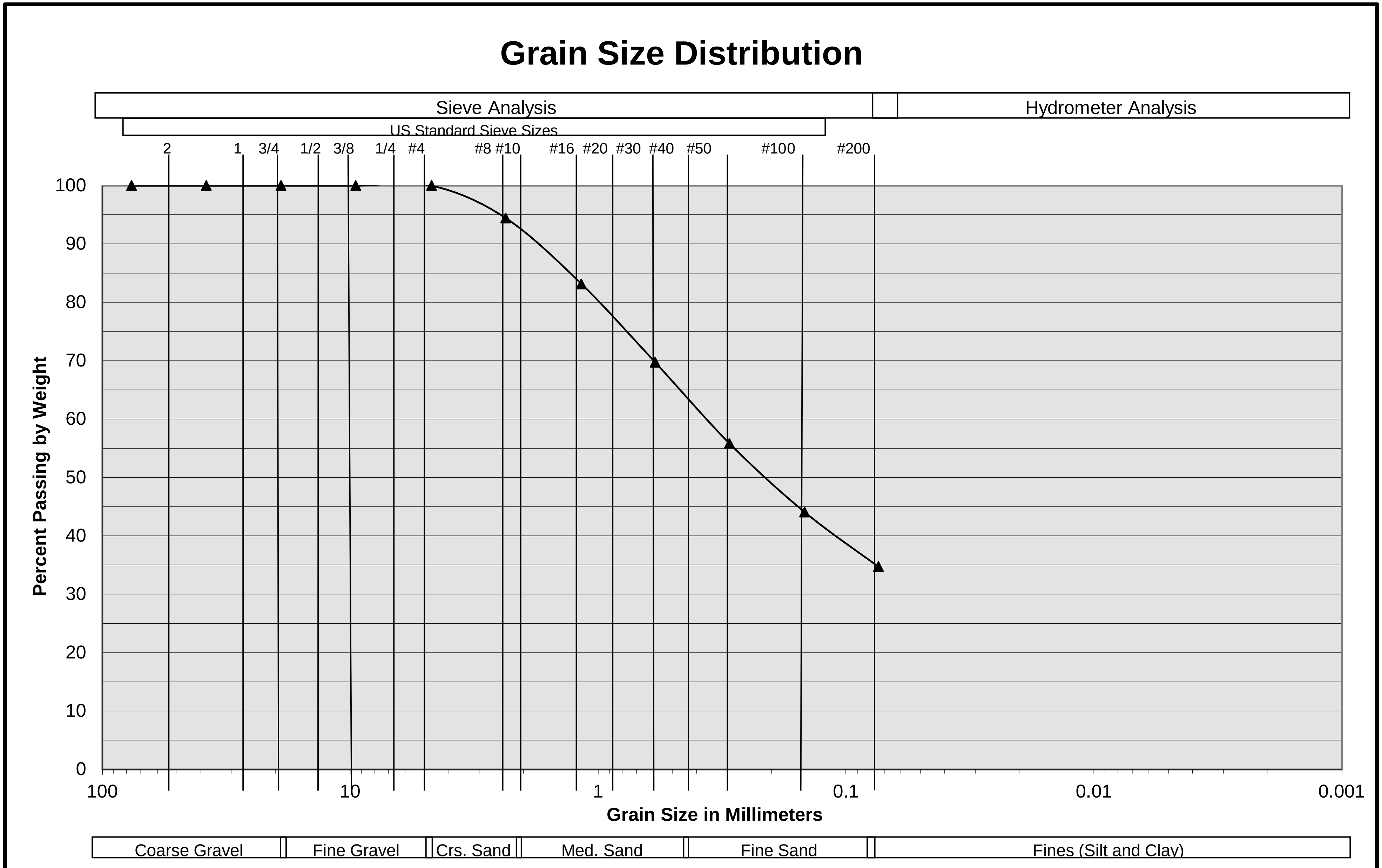

Sample Description	I-5 @ 6 to 7'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 10

SOUTHERN CALIFORNIA GEOTECHNICAL
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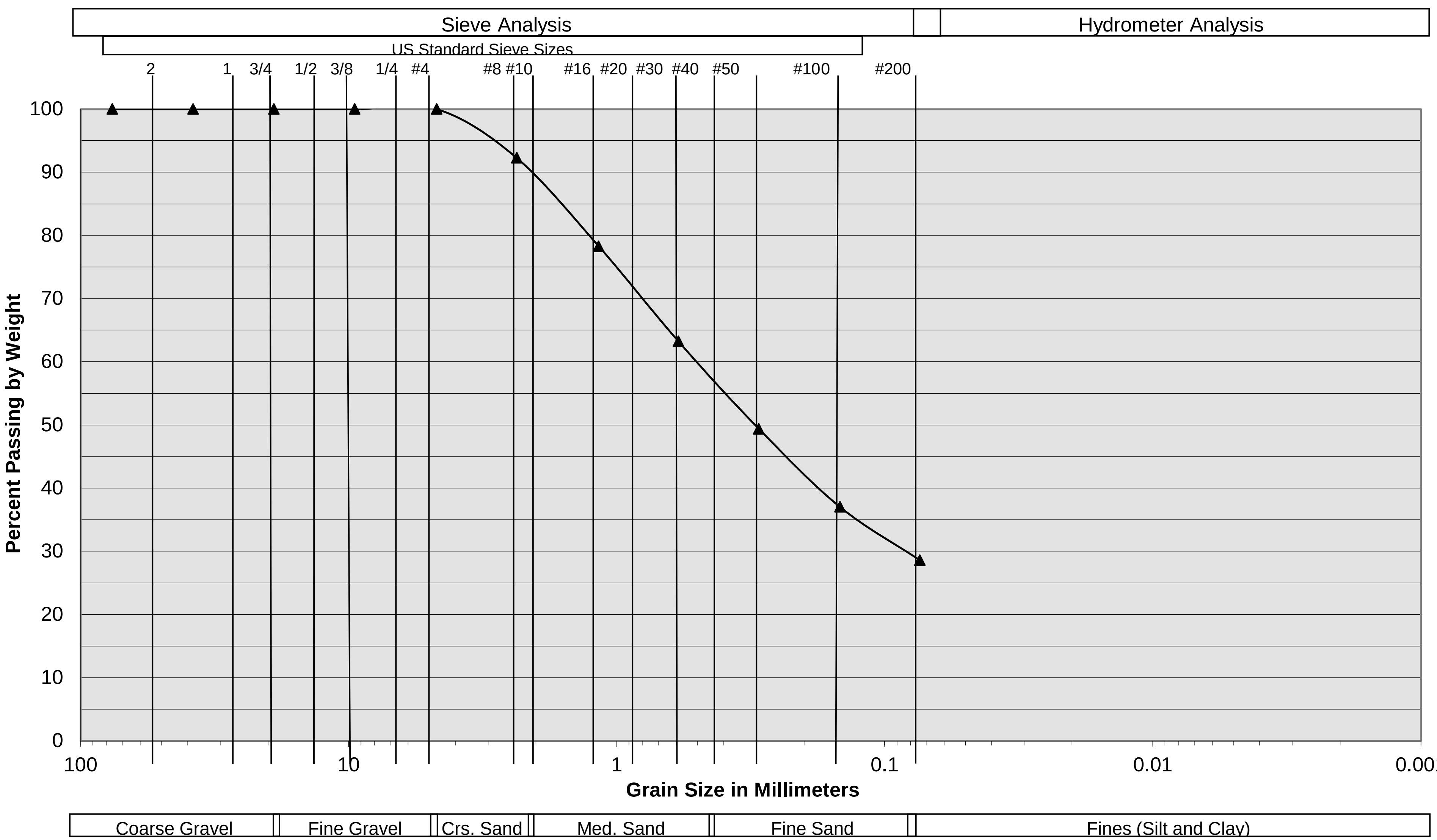
Grain Size Distribution

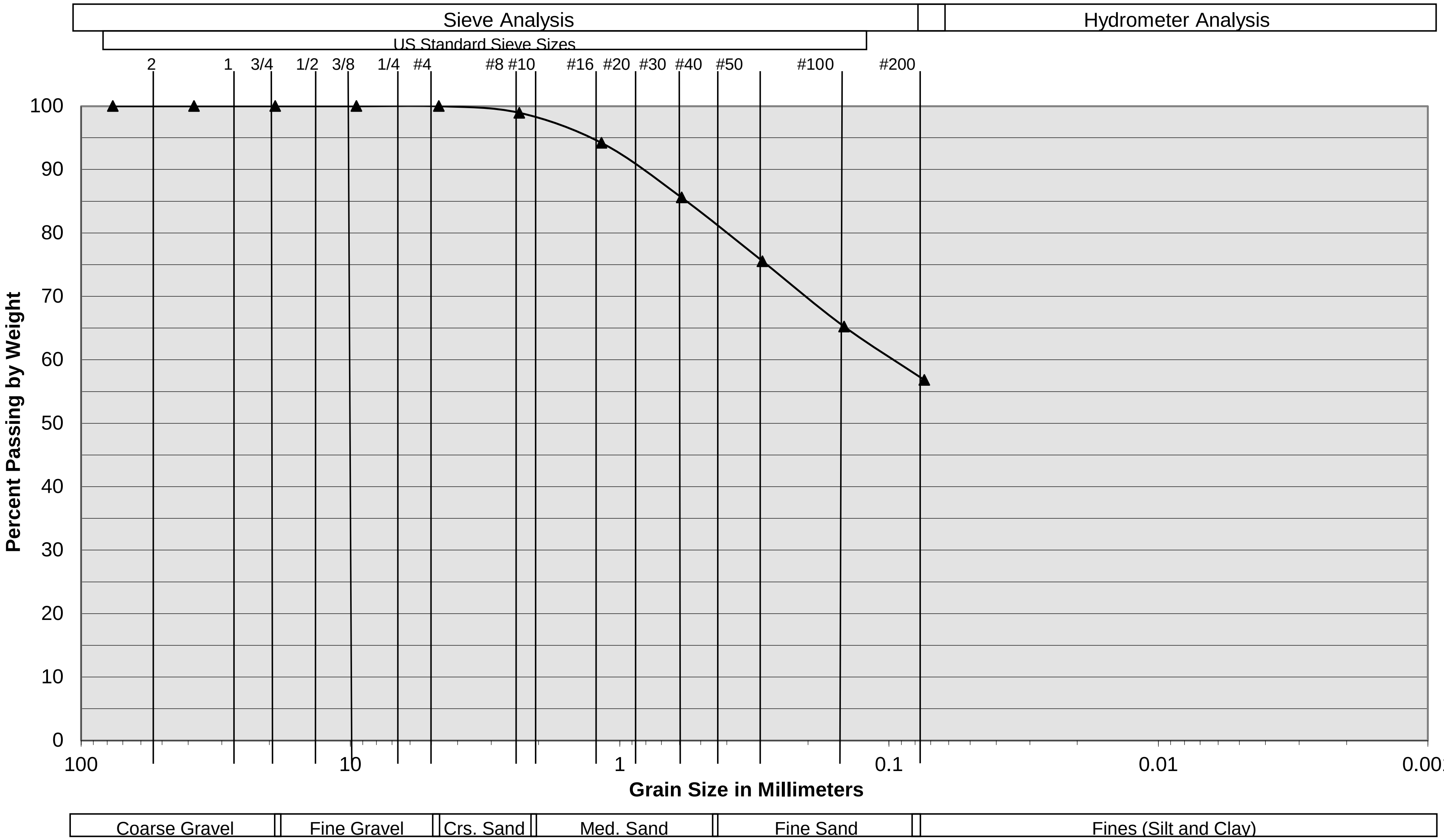


Sample Description	I-6 @ 6 to 7'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 11

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

Grain Size Distribution



Sample Description	I-7 @ 13.5 to 15'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183
PLATE C- 12

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
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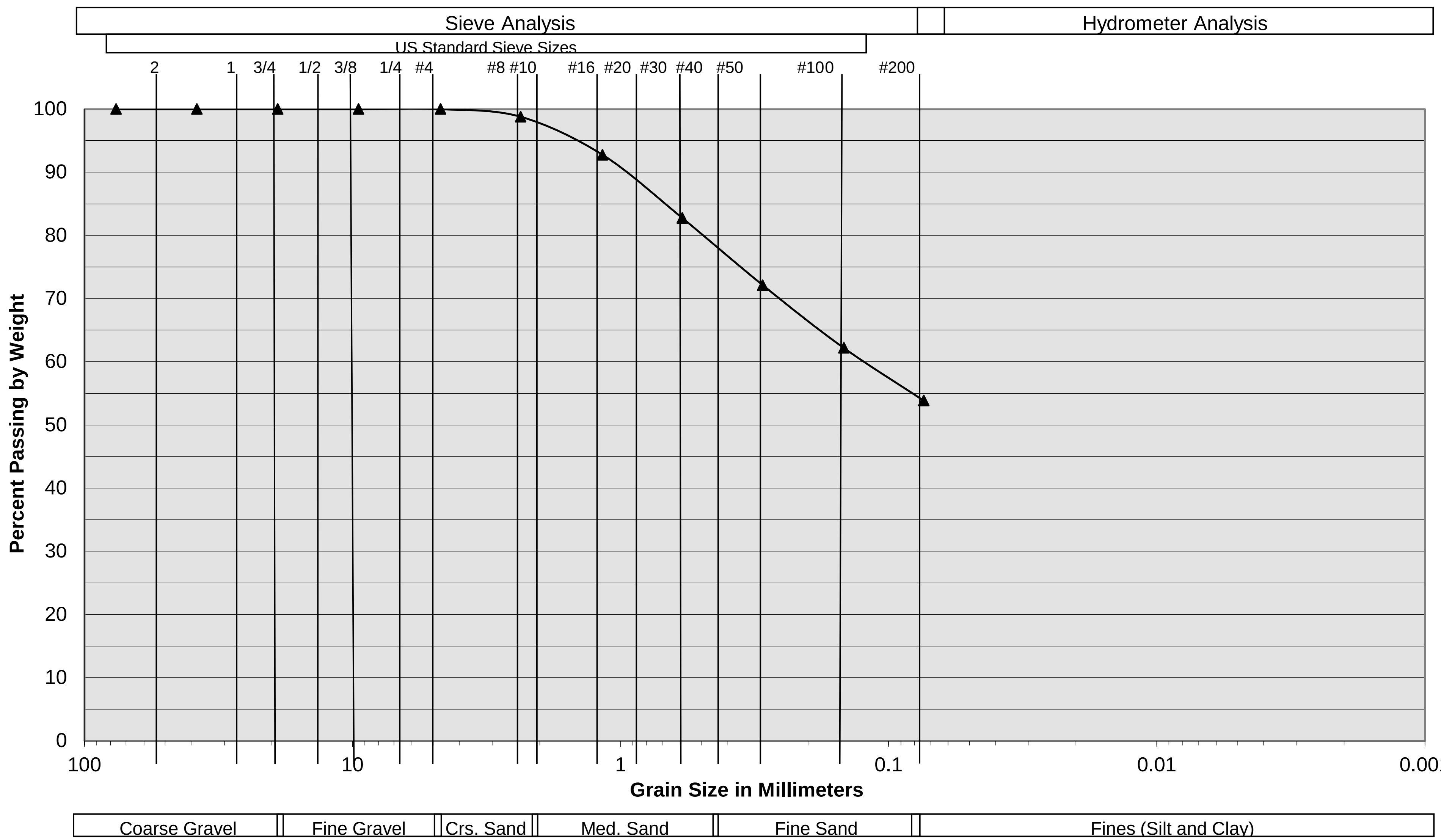
Grain Size Distribution

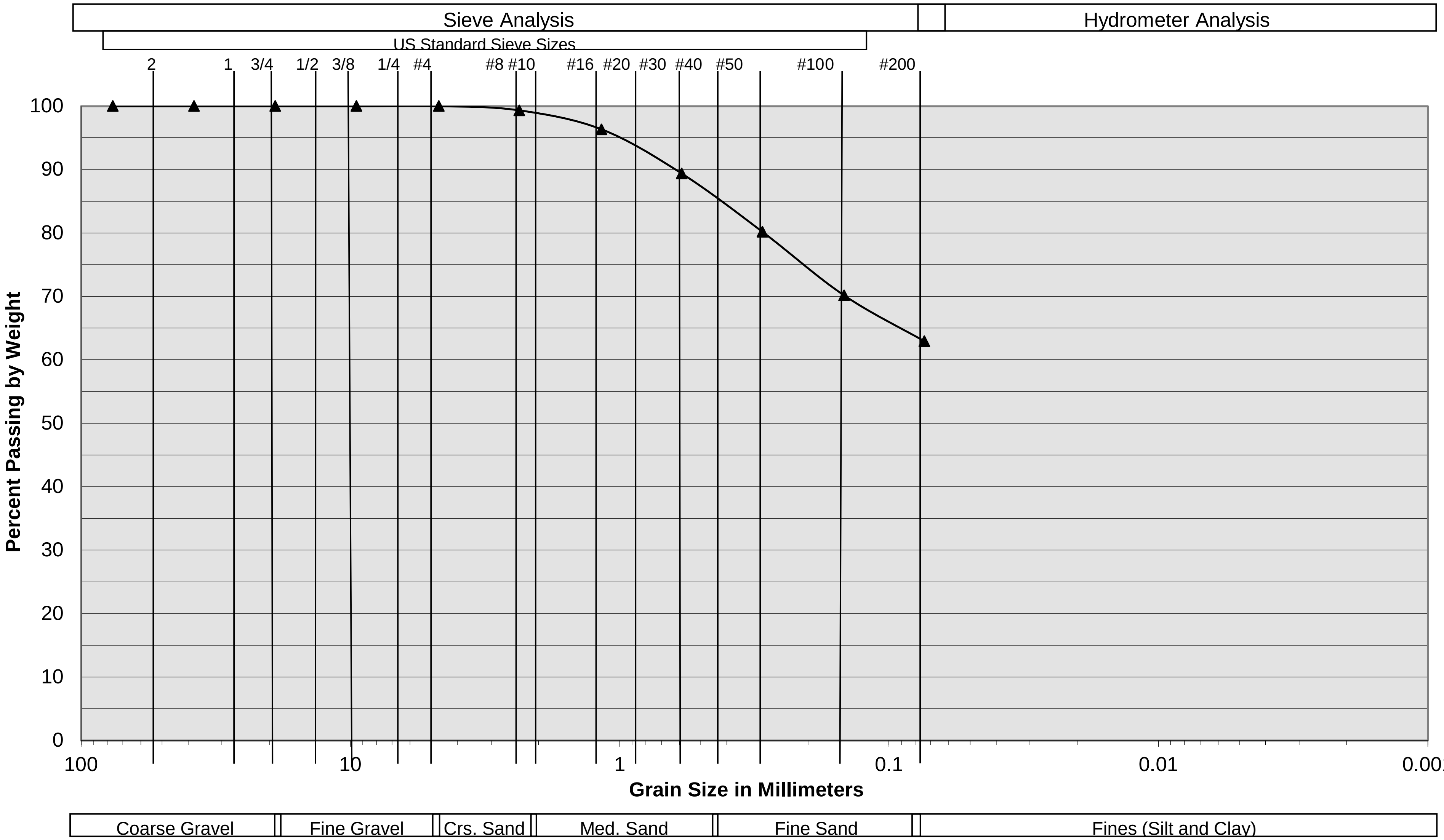


Sample Description	I-7 @ 18.5 to 20'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt, little Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 13

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

Grain Size Distribution



Sample Description	I-7 @ 23.5 to 25'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 14

SOUTHERN CALIFORNIA GEOTECHNICAL
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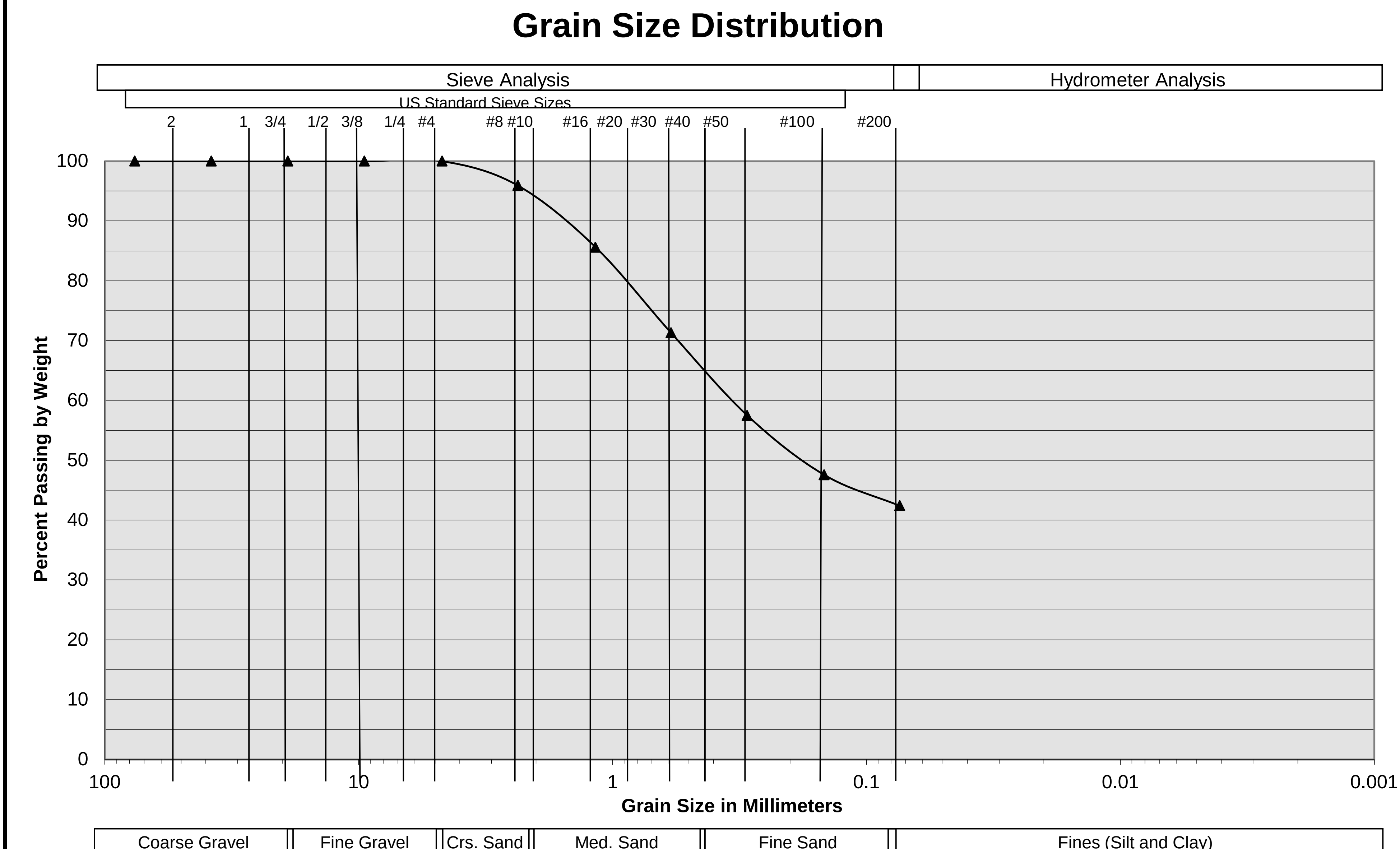

Sample Description	I-7 @ 28.5 to 30'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace to little coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 15

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

Sample Description	I-7 @ 33.5 to 35'
Soil Classification	ALLUVIUM: Brown fine Sandy Silt, trace medium Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 16

SOUTHERN CALIFORNIA GEOTECHNICAL
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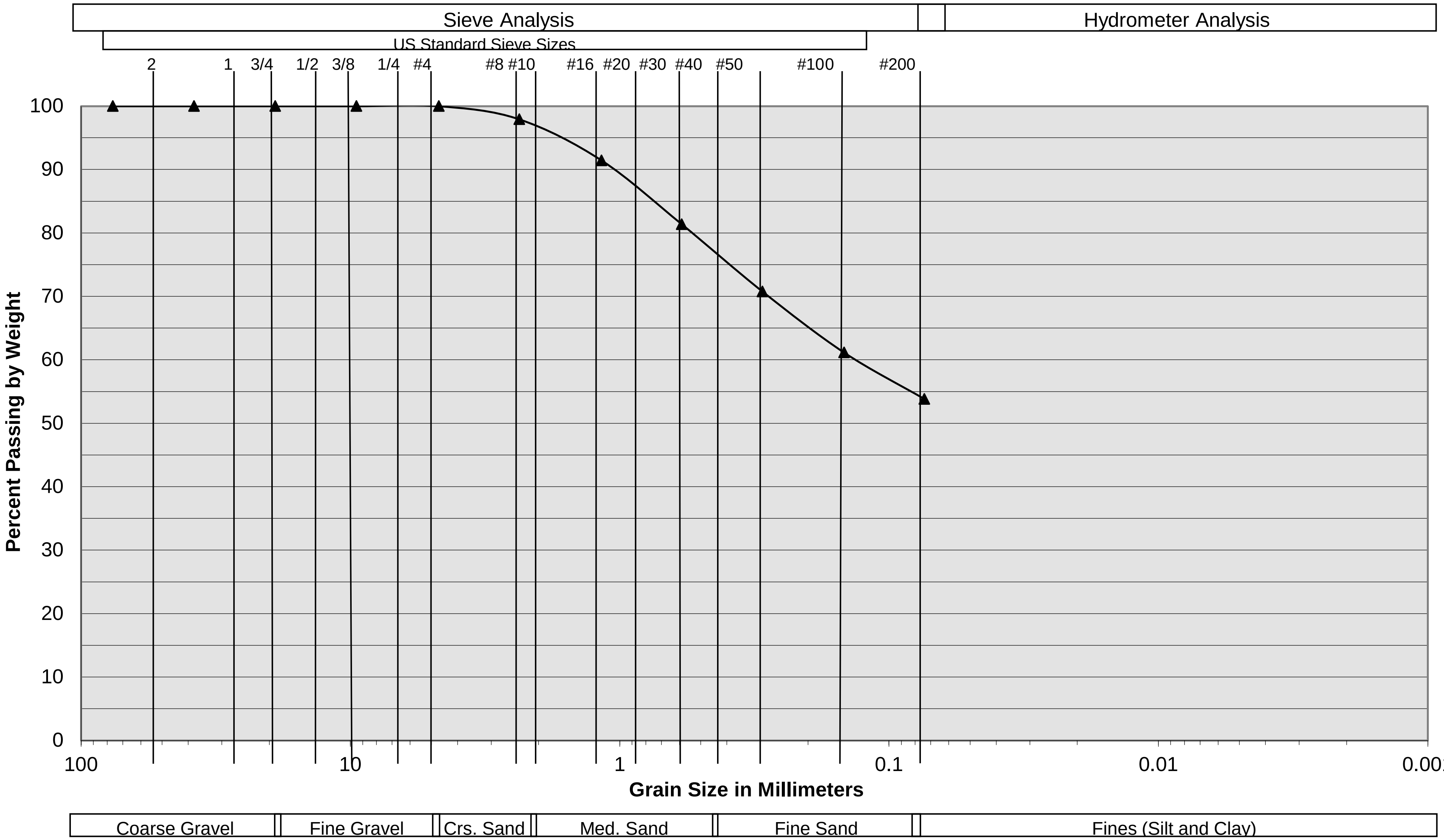
Grain Size Distribution



Sample Description	I-7 @ 38.5 to 40'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 17

SOUTHERN CALIFORNIA GEOTECHNICAL
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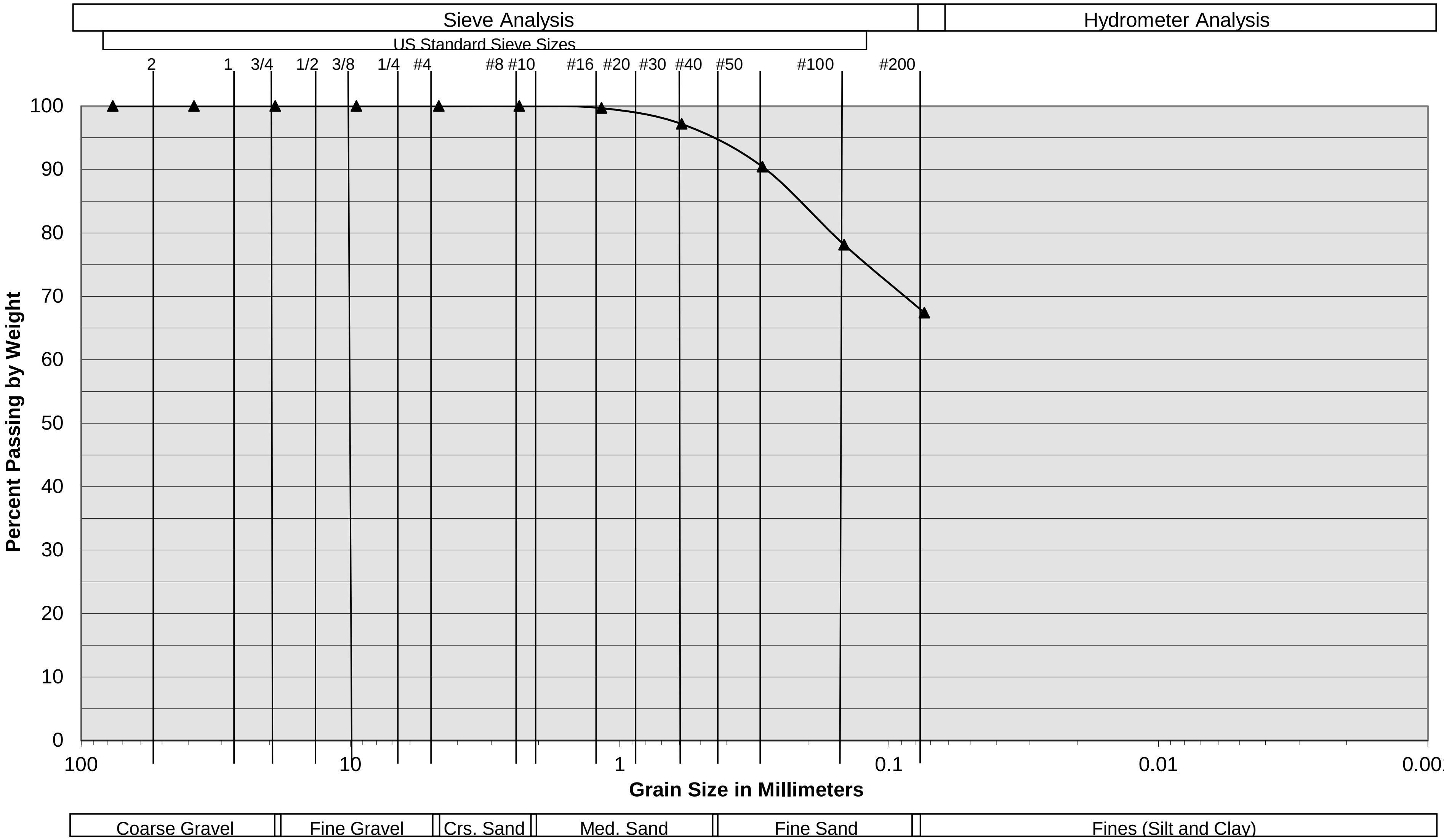
Grain Size Distribution

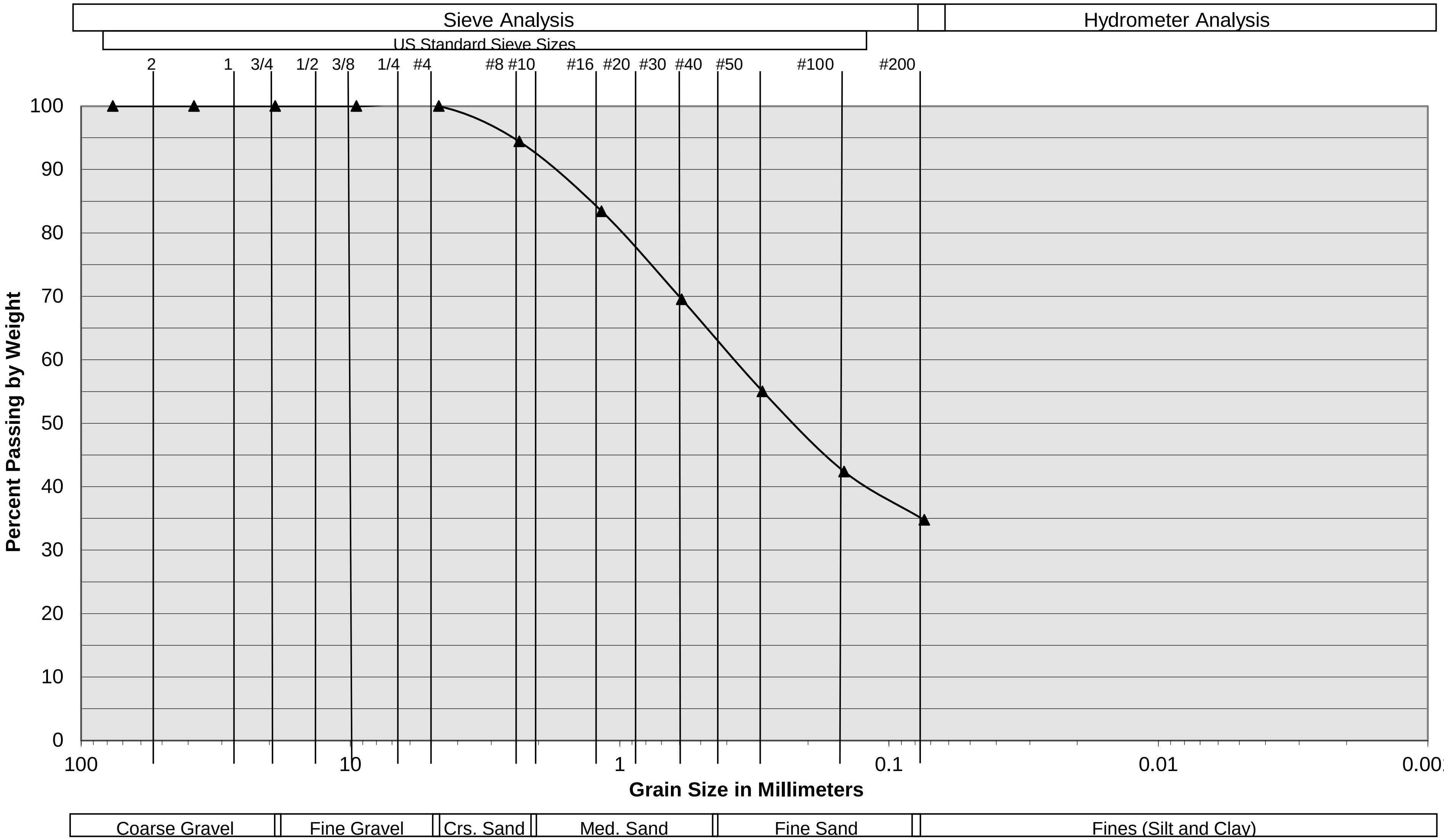


Sample Description	I-7 @ 48.5 to 50'
Soil Classification	ALLUVIUM: Brown fine Sandy Silt, trace medium Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 18

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-8 @ 13.5 to 15'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 19

SOUTHERN CALIFORNIA GEOTECHNICAL
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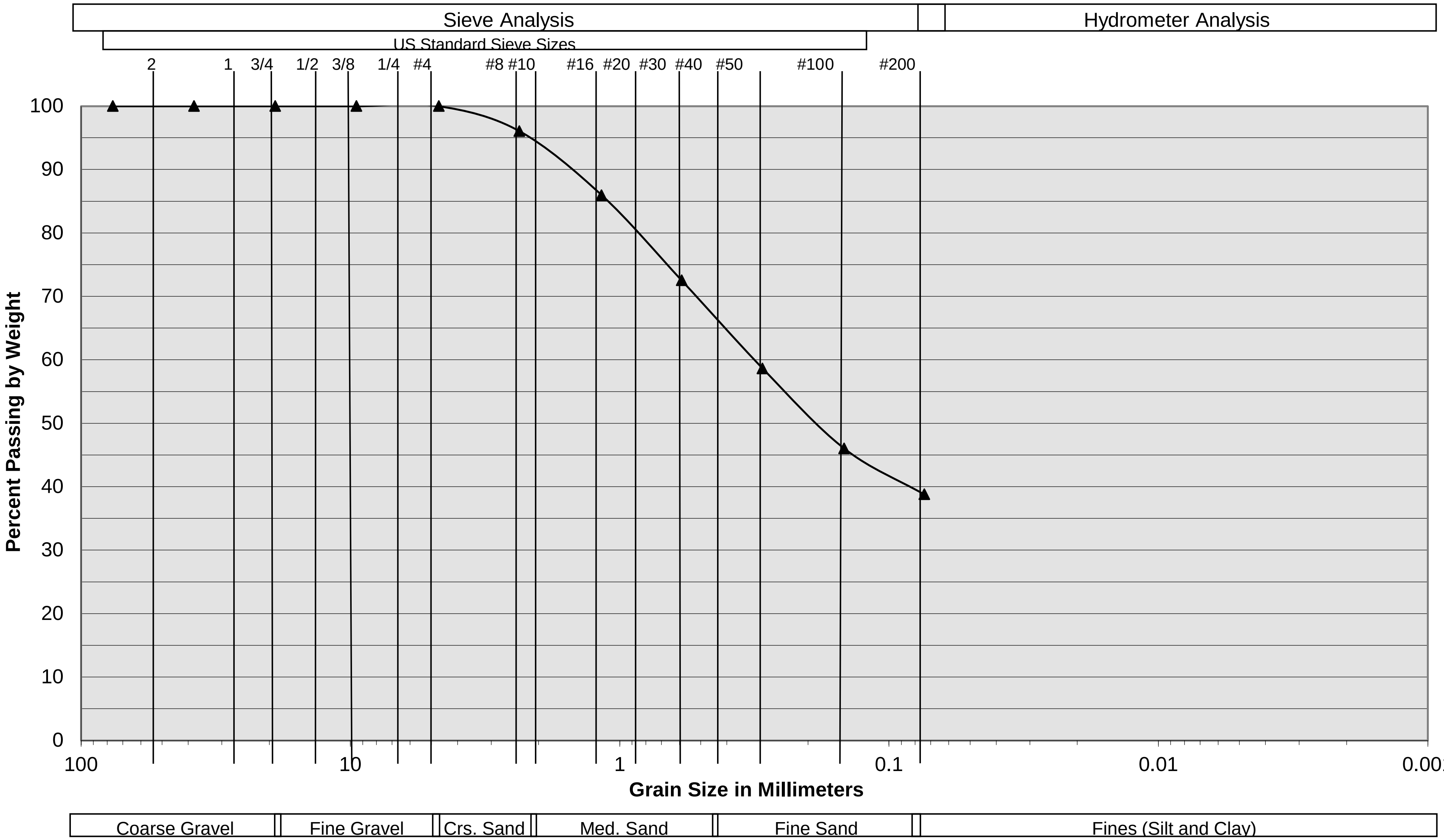
Grain Size Distribution



Sample Description	I-8 @ 18.5 to 20'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, little coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 20

SOUTHERN CALIFORNIA GEOTECHNICAL
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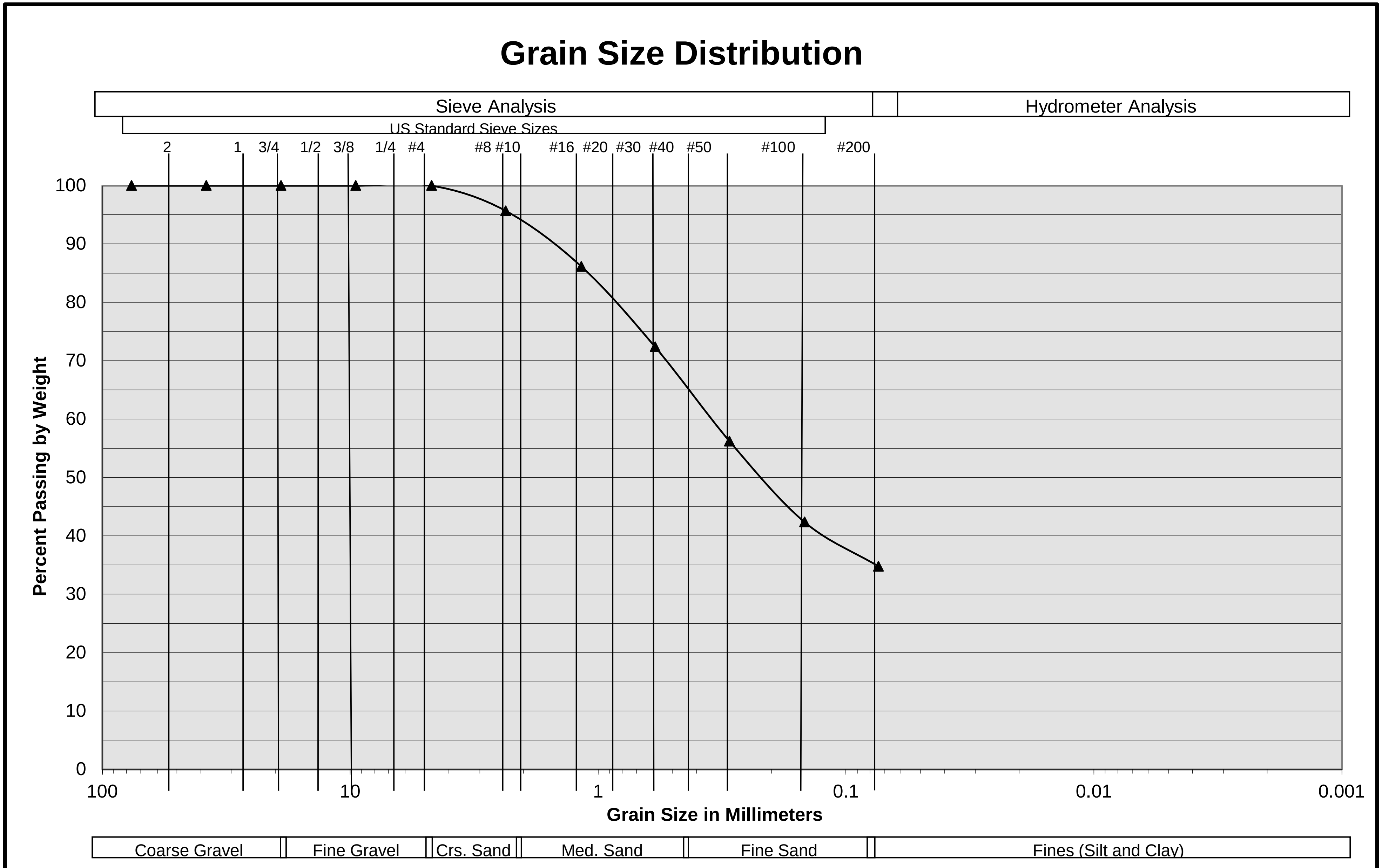
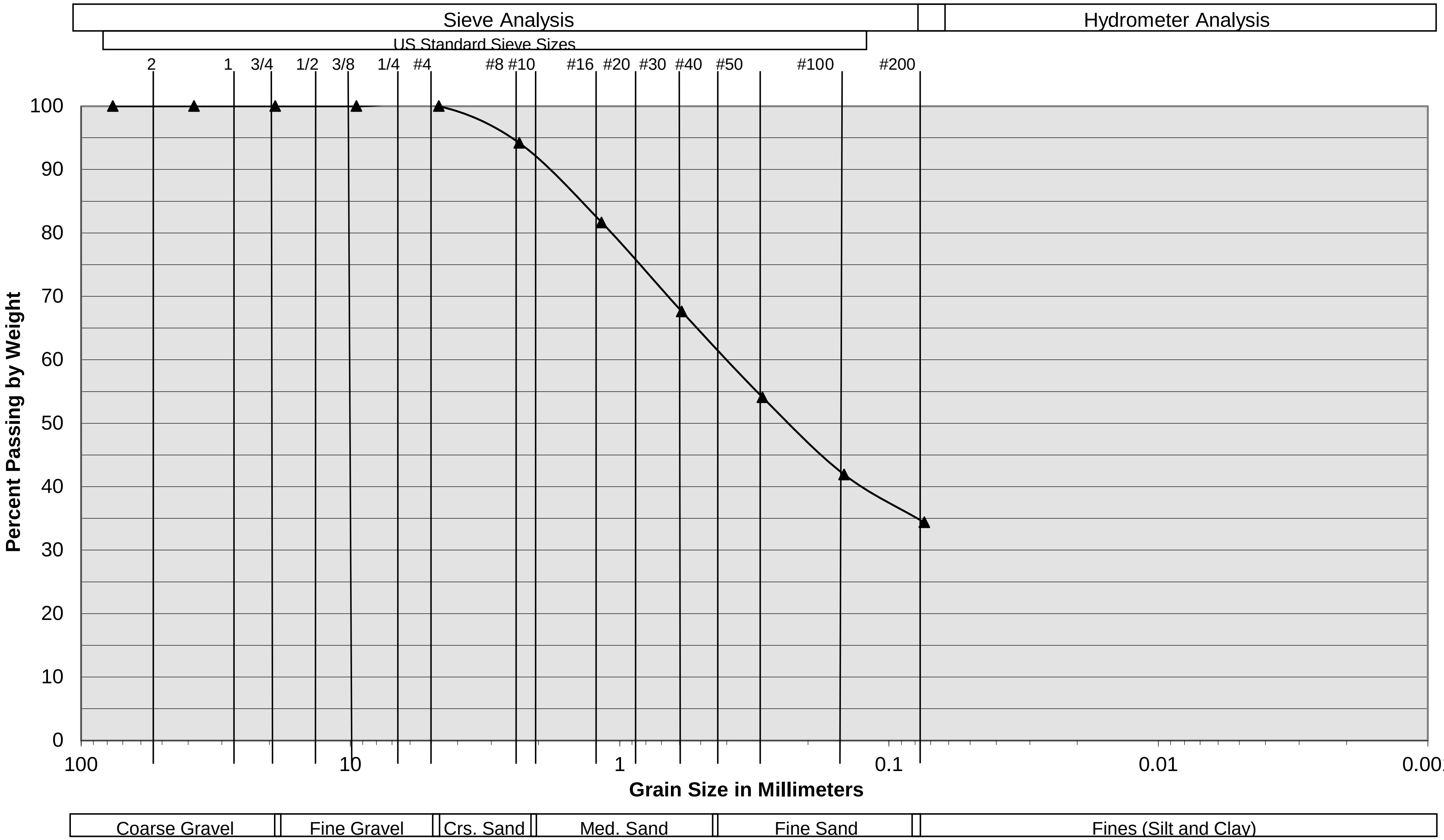


Sample Description	I-8 @ 23.5 to 25'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 21

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

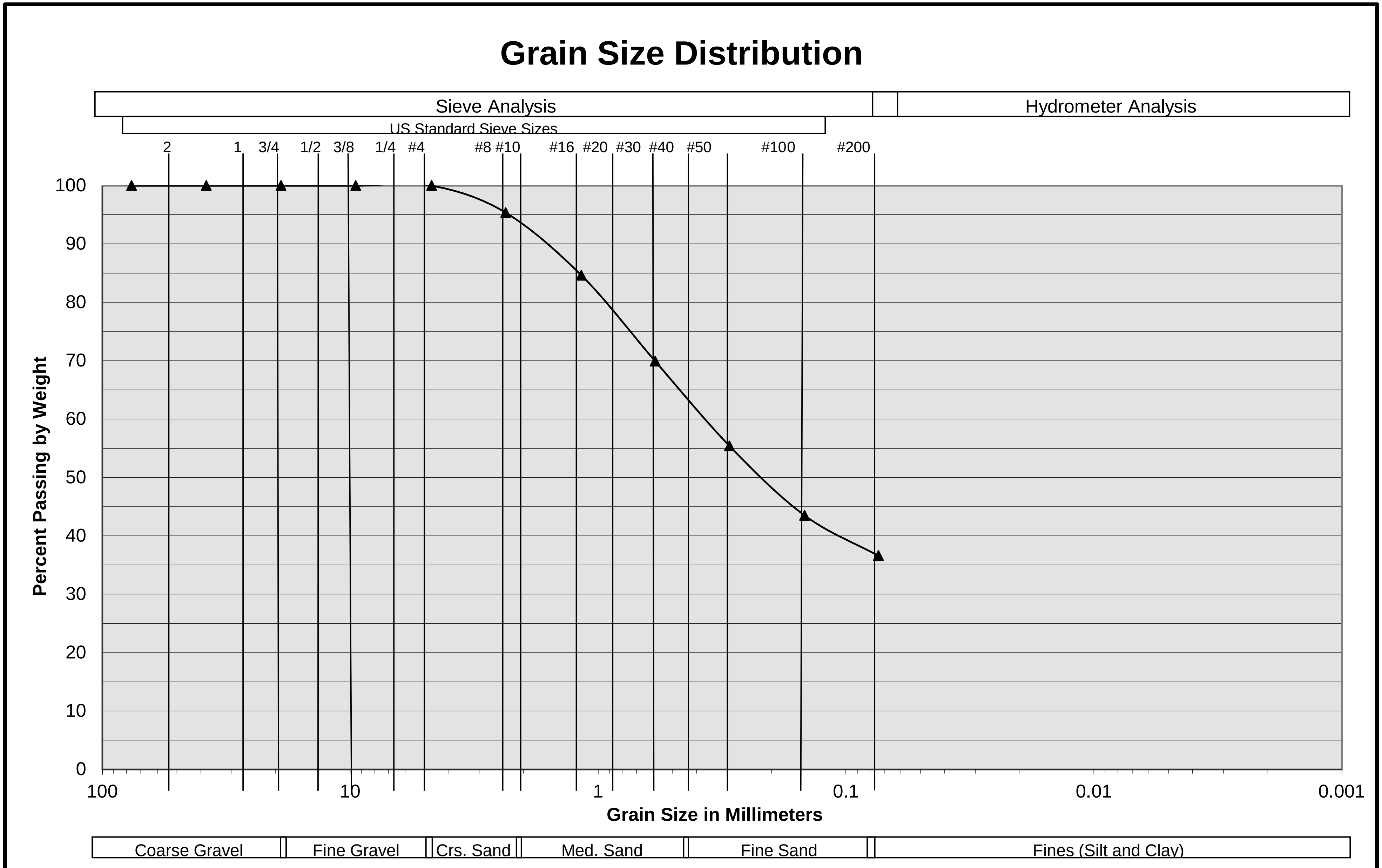
Grain Size Distribution



Sample Description	I-8 @ 28.5 to 30'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 22

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

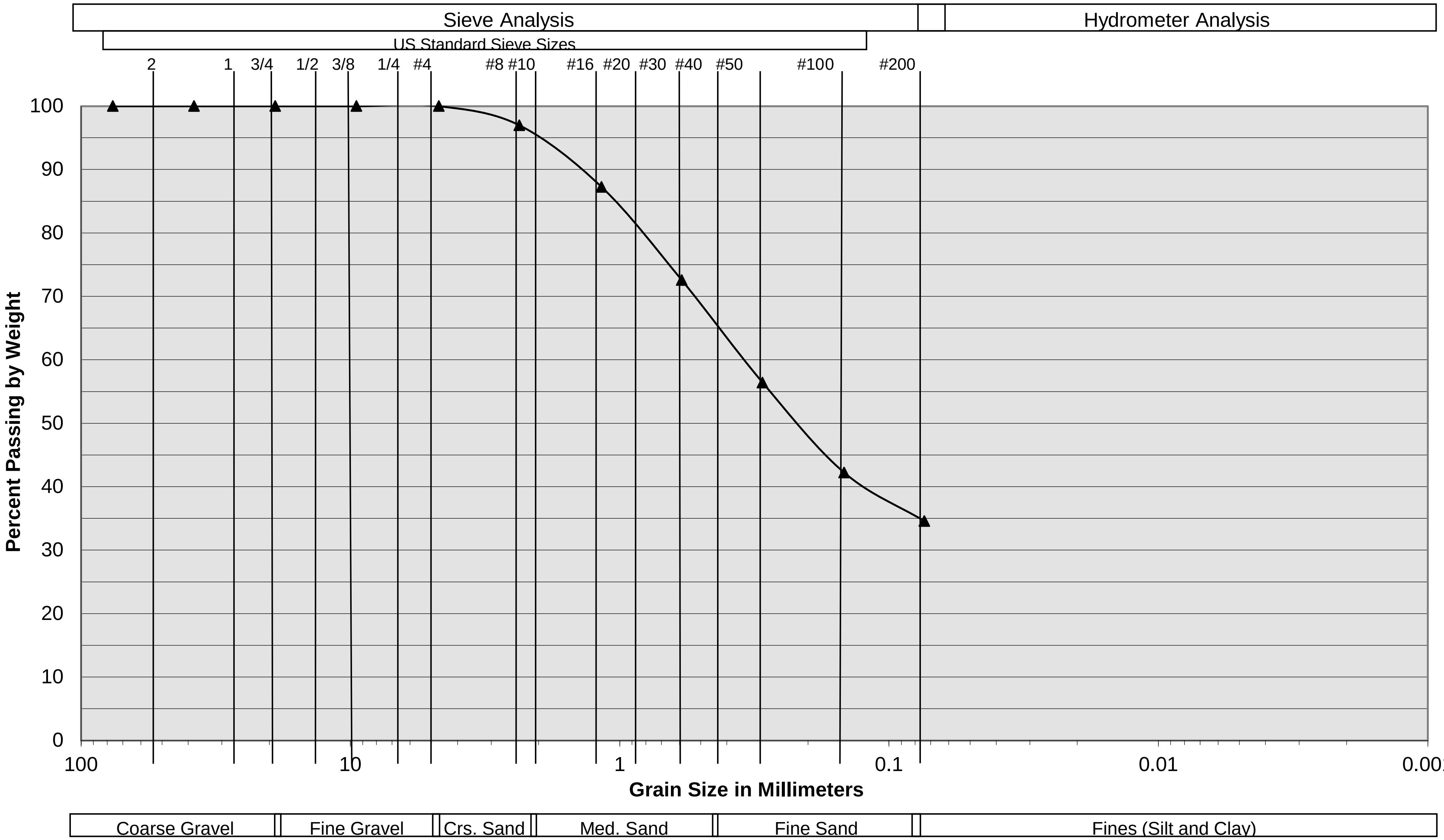


Sample Description	I-8 @ 33.5 to 35'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 23

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

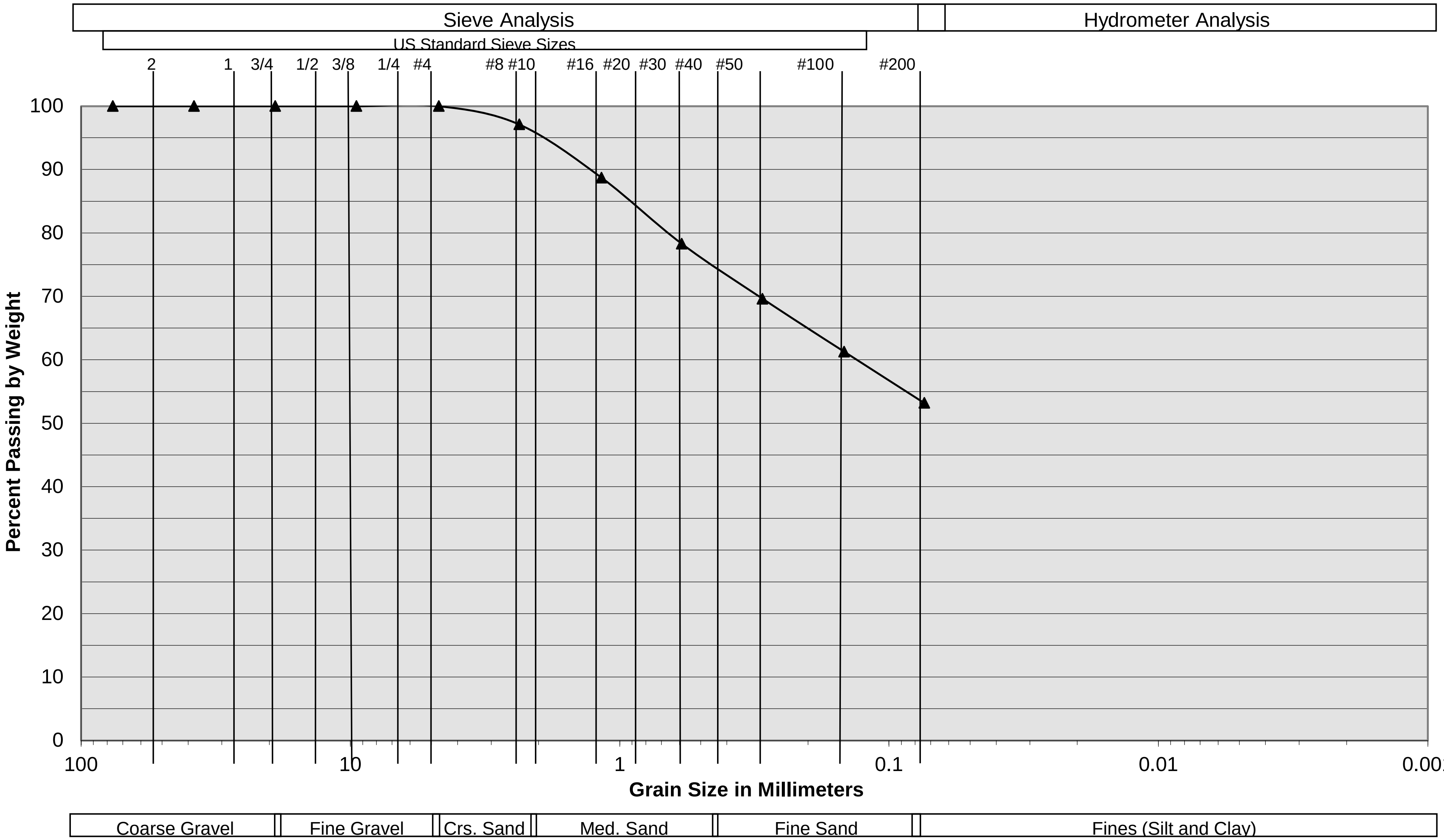


Sample Description	I-8 @ 38.5 to 40'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 24

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

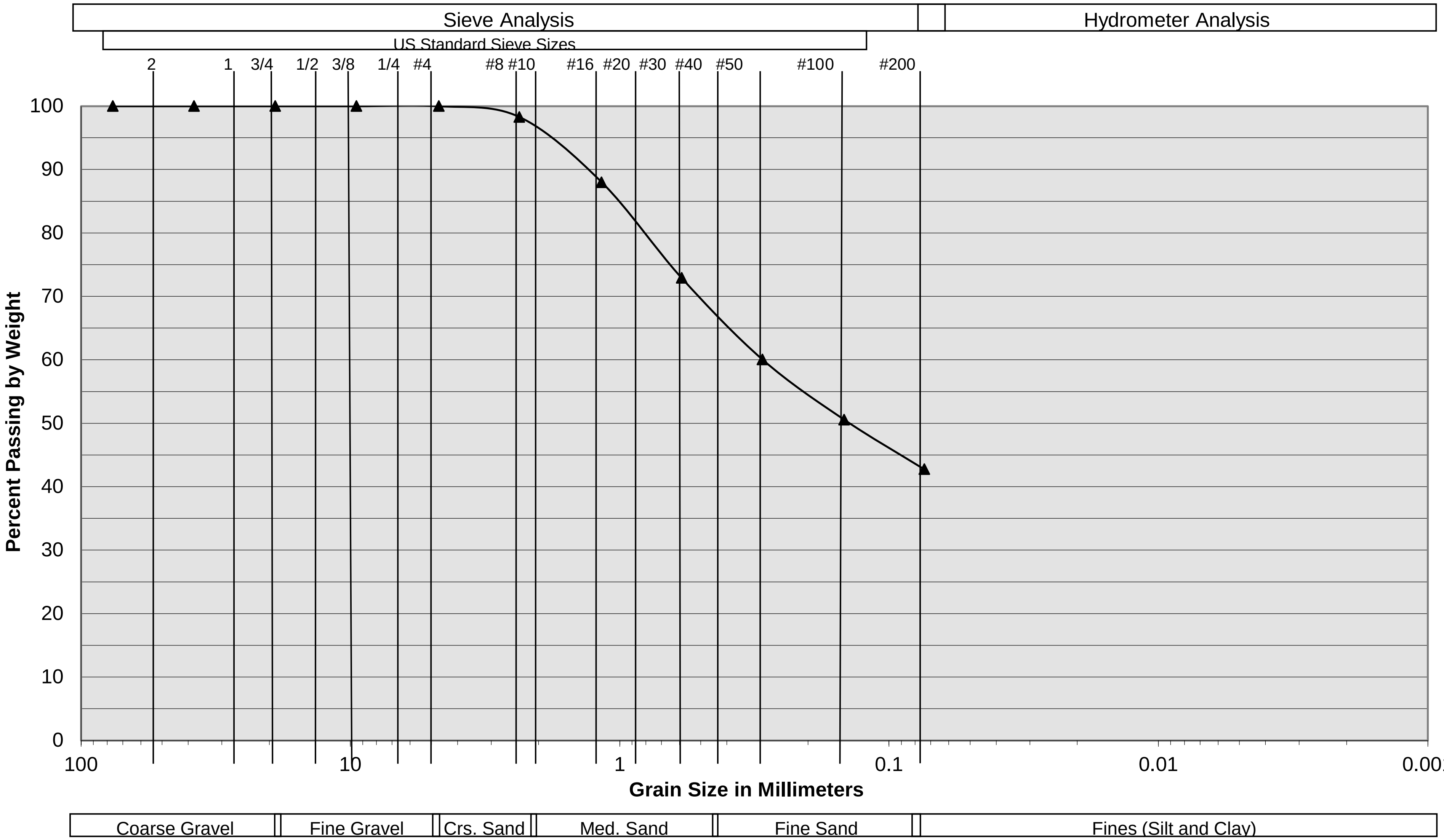


Sample Description	I-8 @ 43.5 to 45'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 25

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

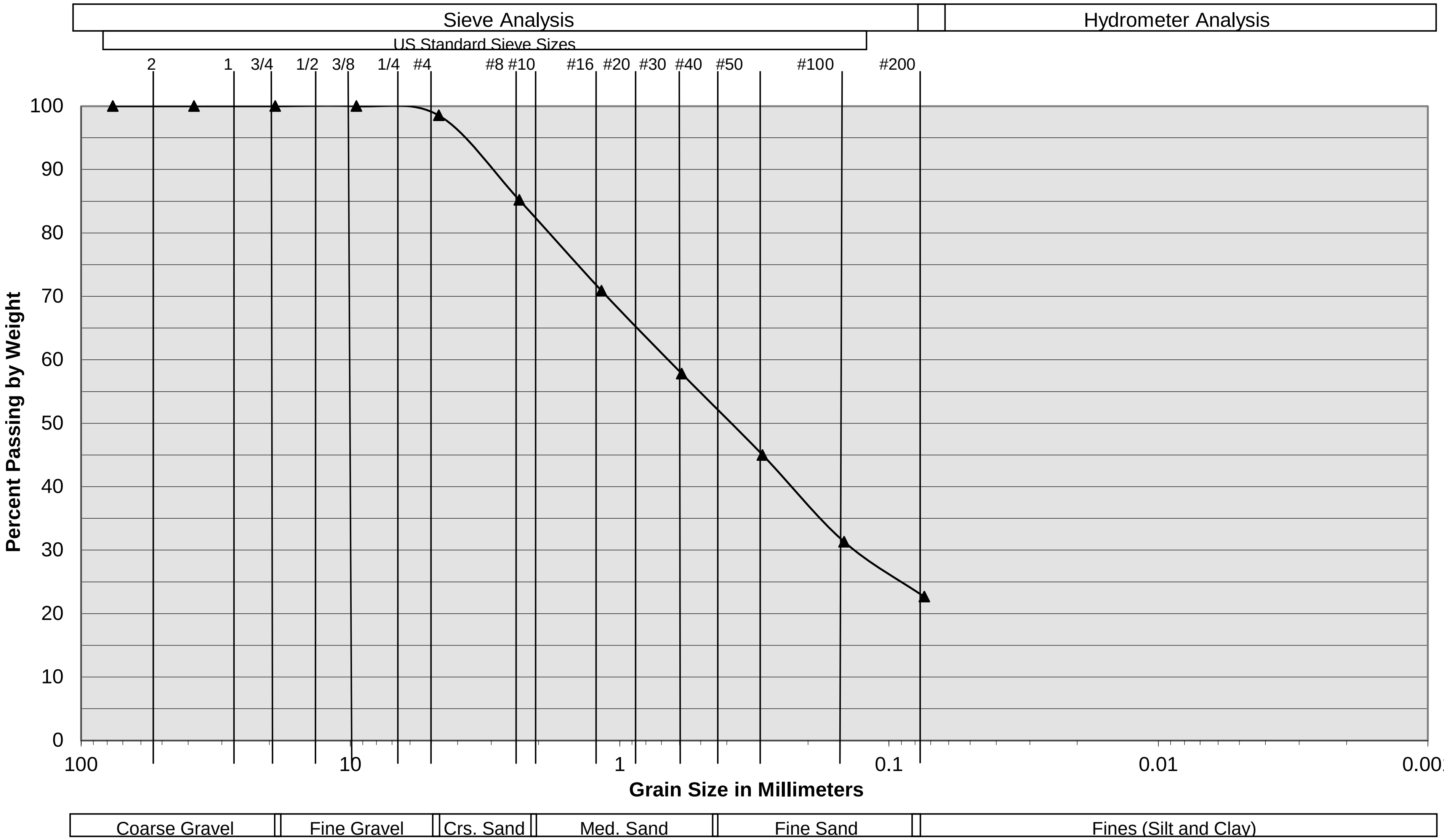


Sample Description	I-8 @ 48.5 to 50'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 26

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

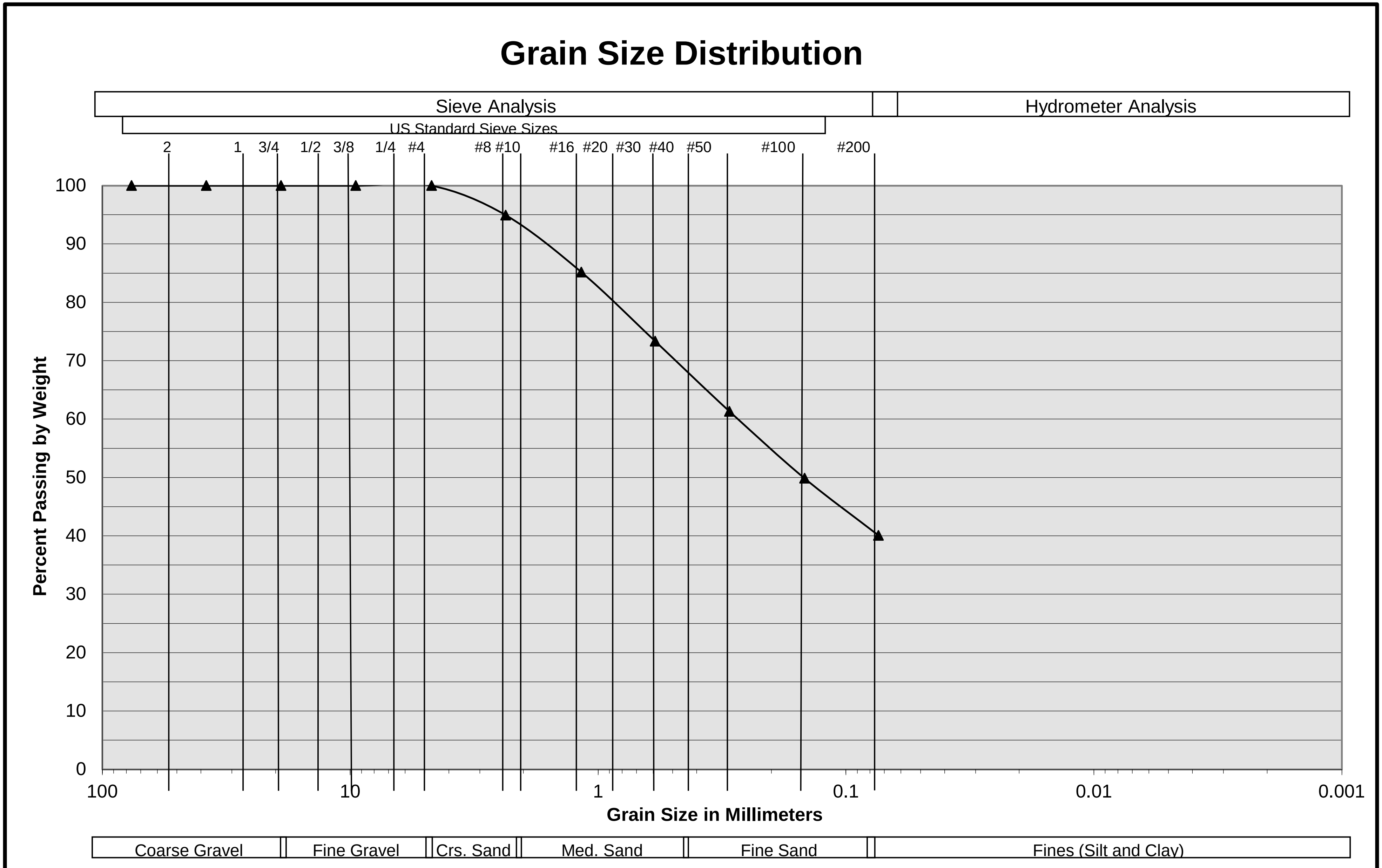
Grain Size Distribution



Sample Description	I-9 @ 13.5 to 15'
Soil Classification	ALLUVIUM: Brown Clayey fine to coarse Sand, trace Silt

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 27

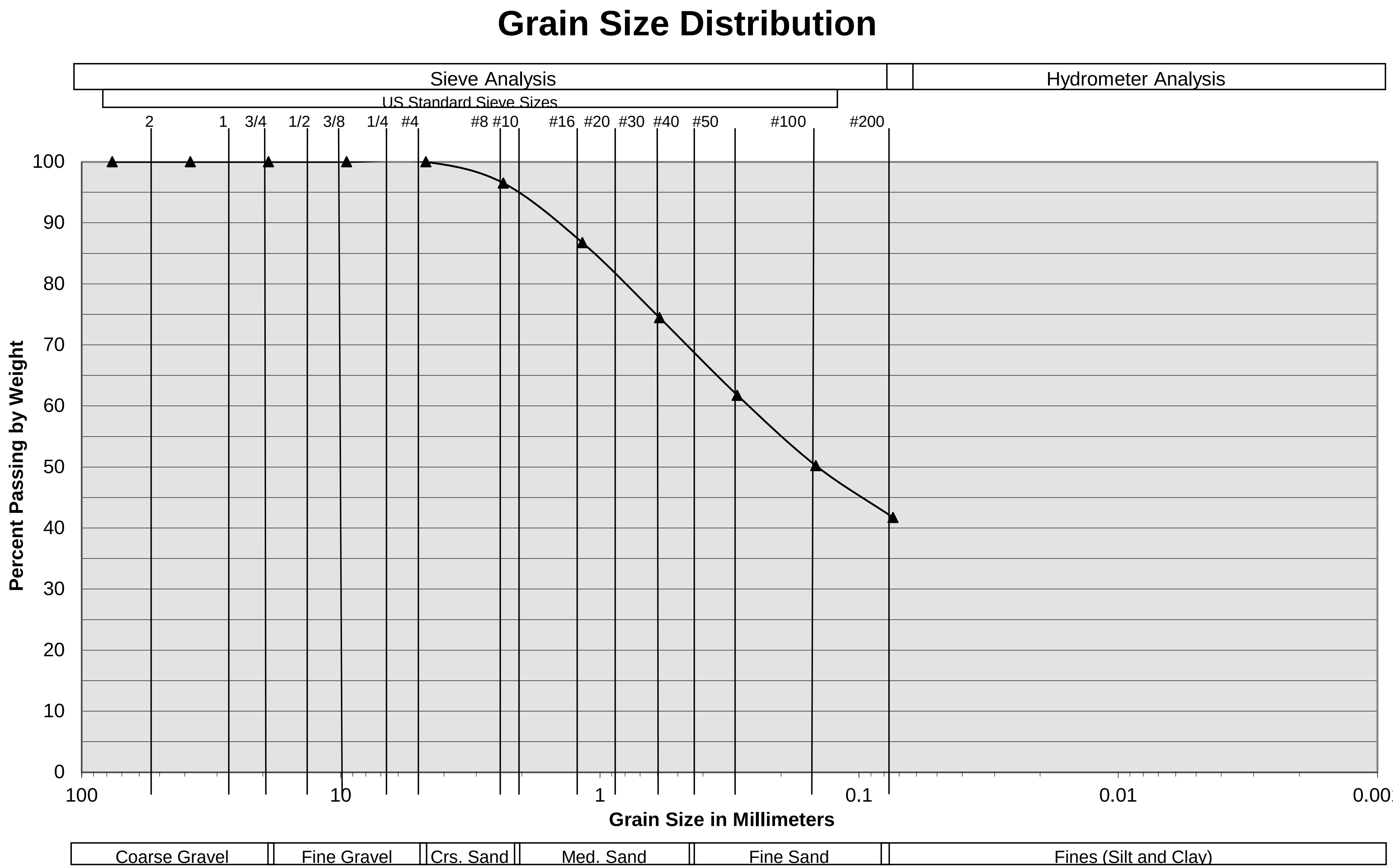
SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation



Sample Description	I-9 @ 18.5 to 20'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Clay, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 28

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

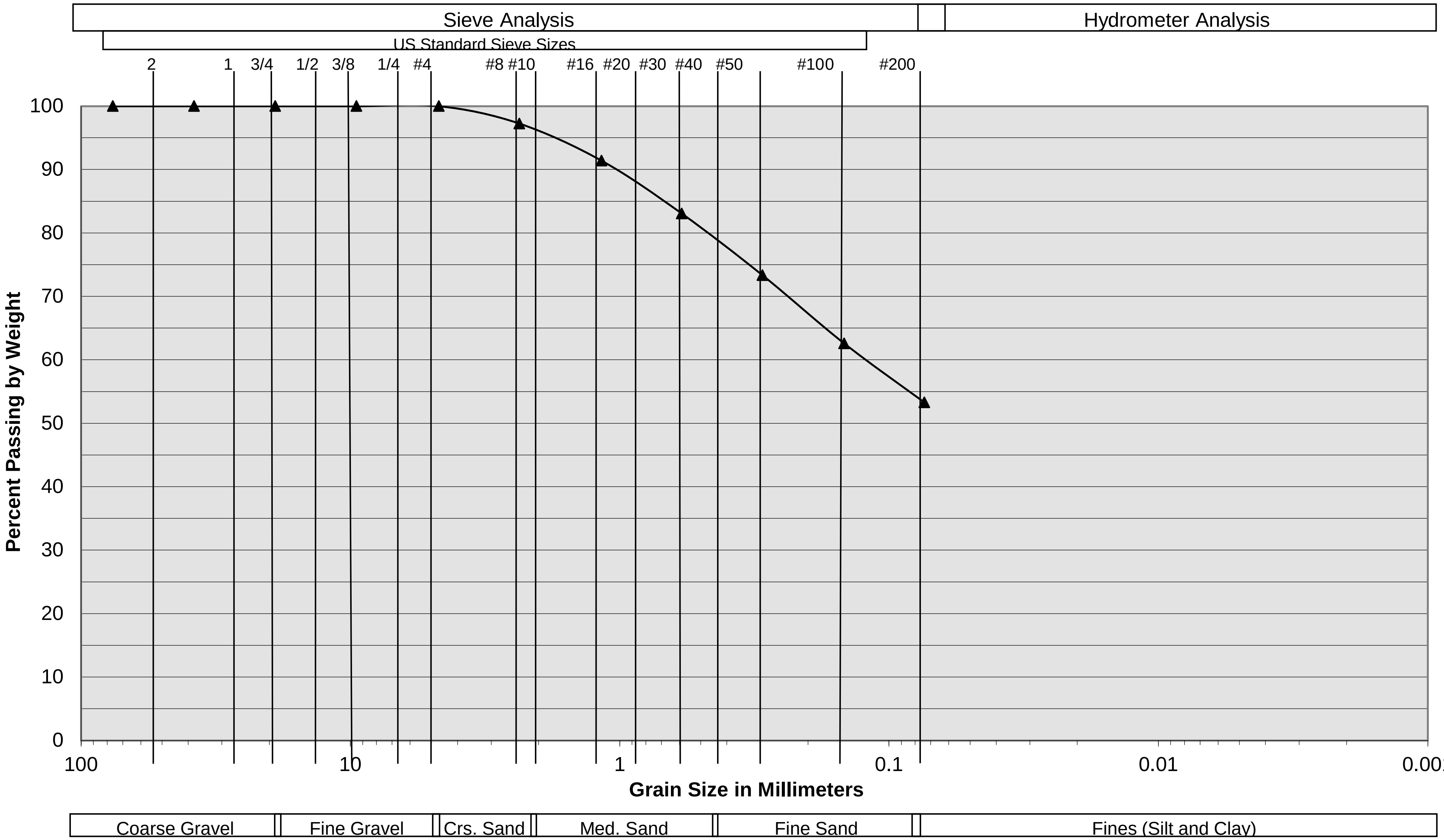


Sample Description	I-9 @ 23.5 to 25'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Clay, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 29

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

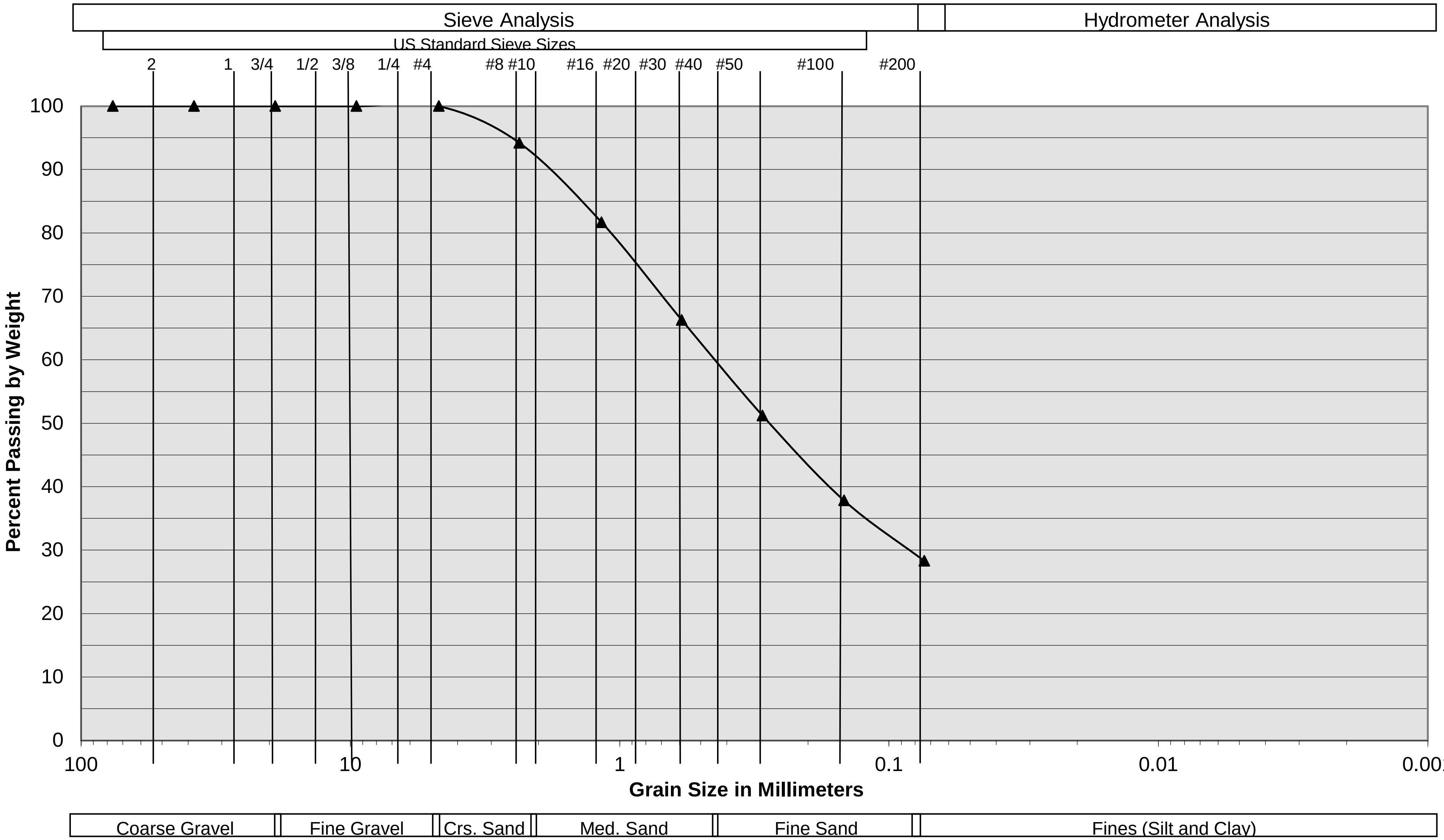


Sample Description	I-9 @ 28.5 to 30'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 30

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL *A California Corporation*

Grain Size Distribution

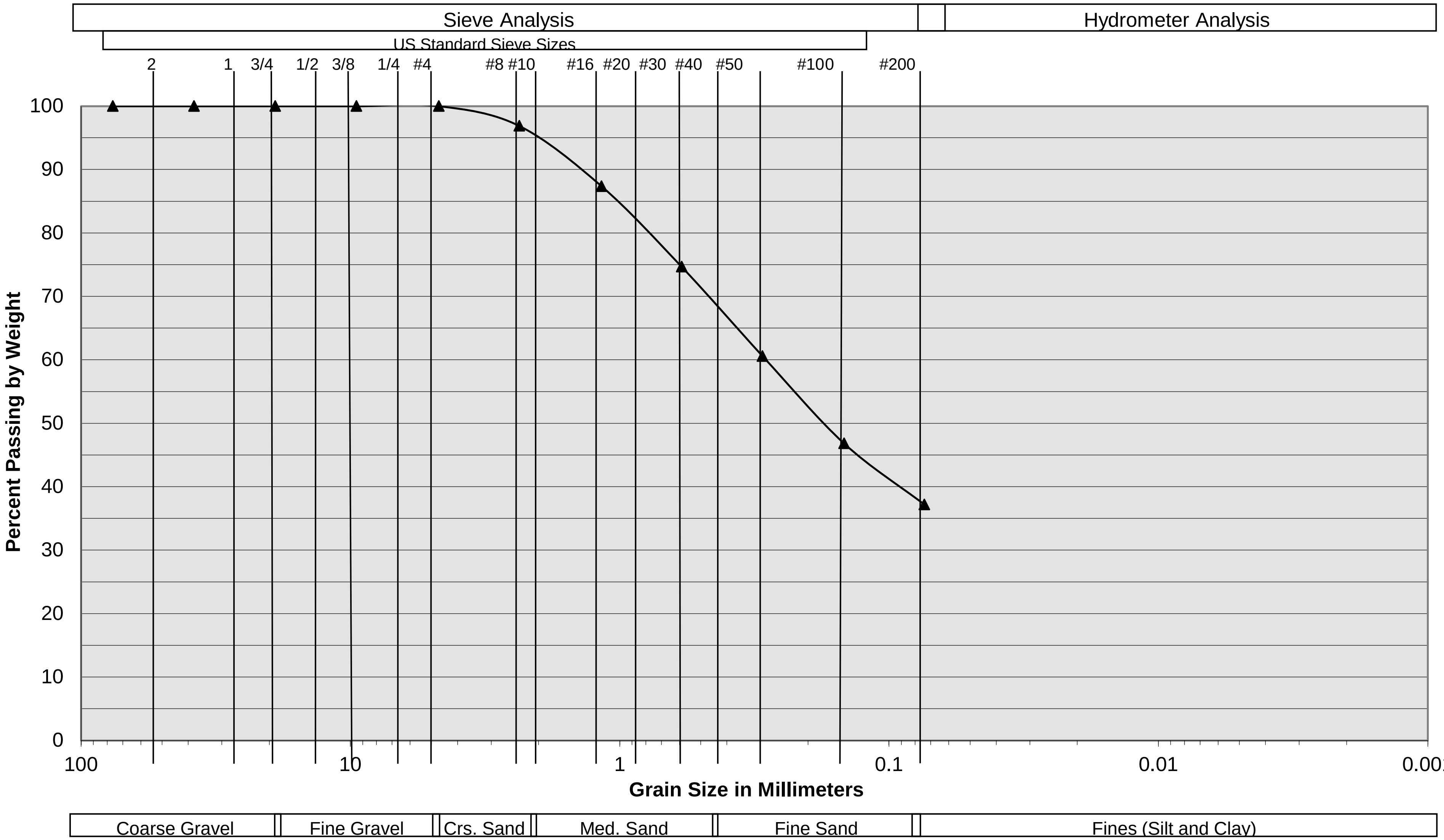


Sample Description	I-9 @ 33.5 to 35'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 31

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

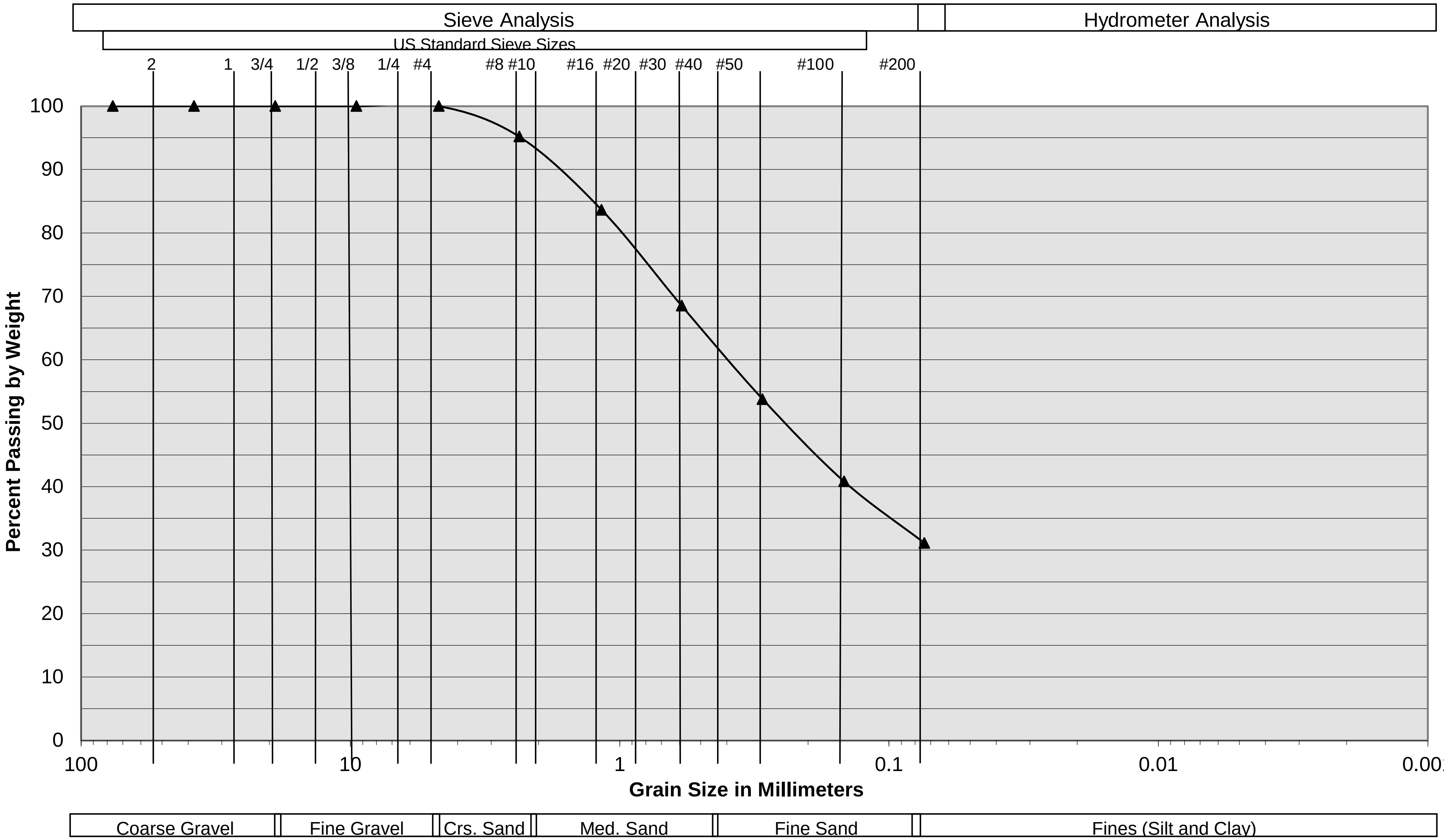


Sample Description	I-9 @ 38.5 to 40'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 32

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

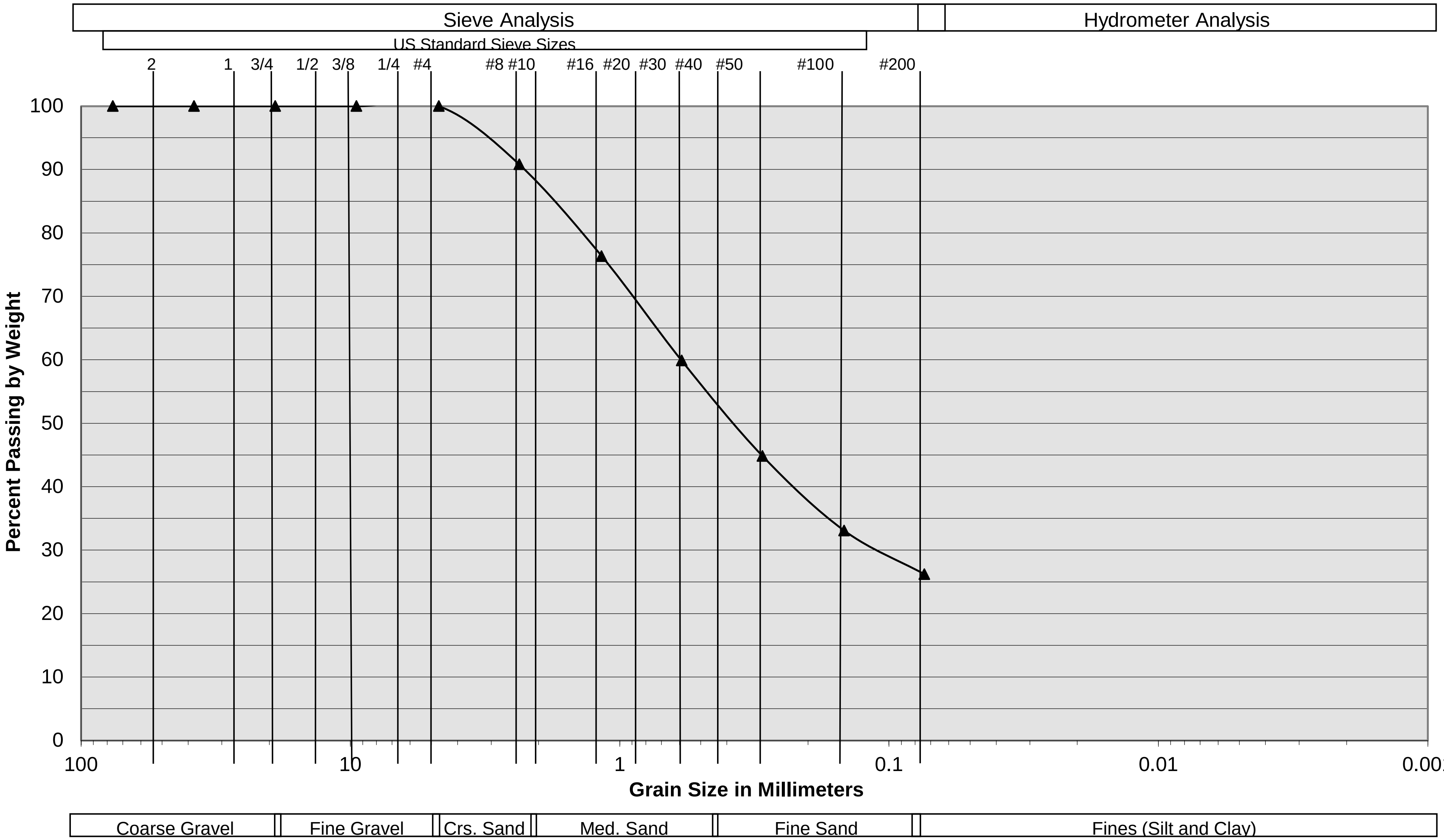


Sample Description	I-9 @ 43.5 to 45'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 33

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

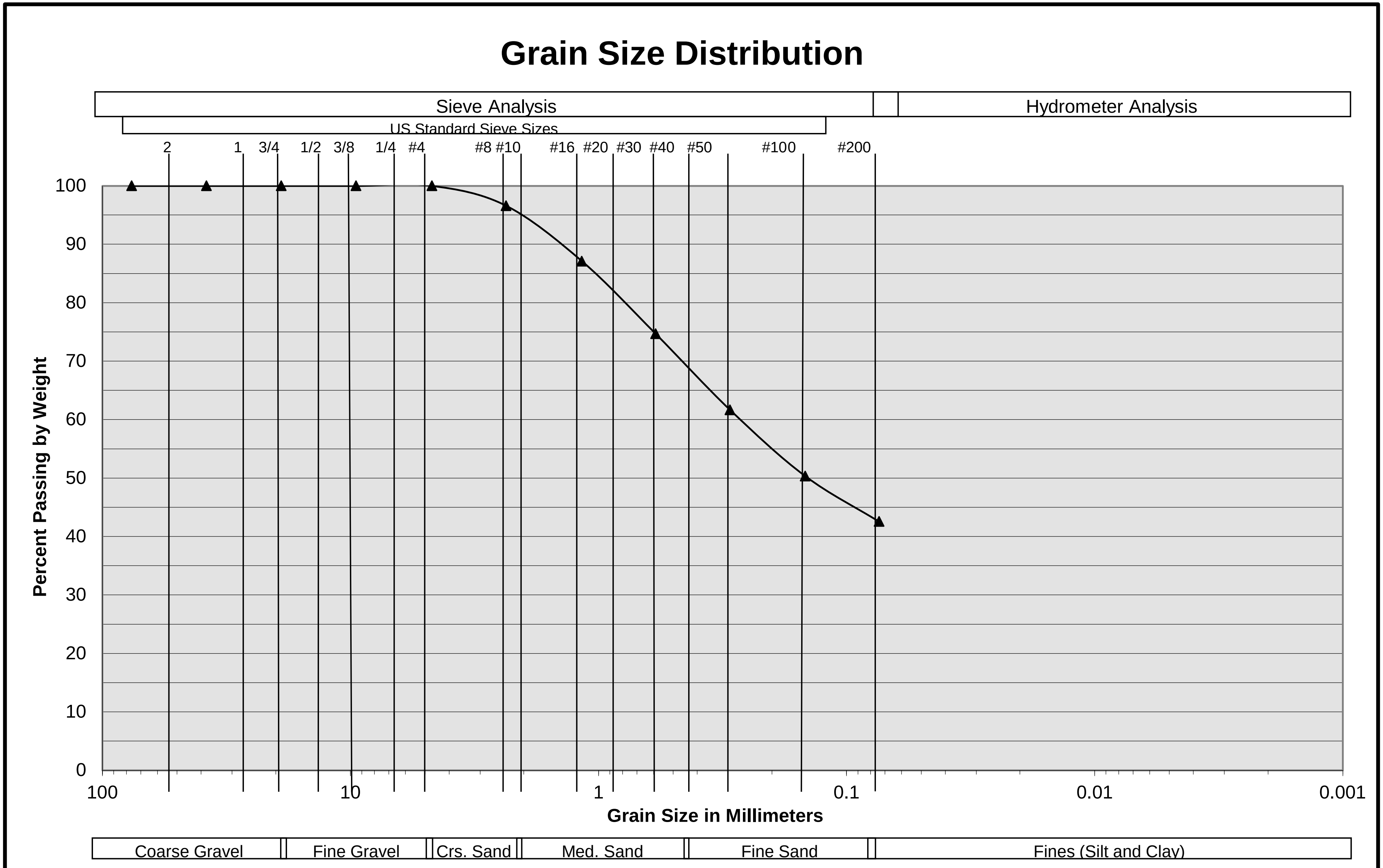
Grain Size Distribution



Sample Description	I-9 @ 48.5 to 50'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace to little coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 34

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

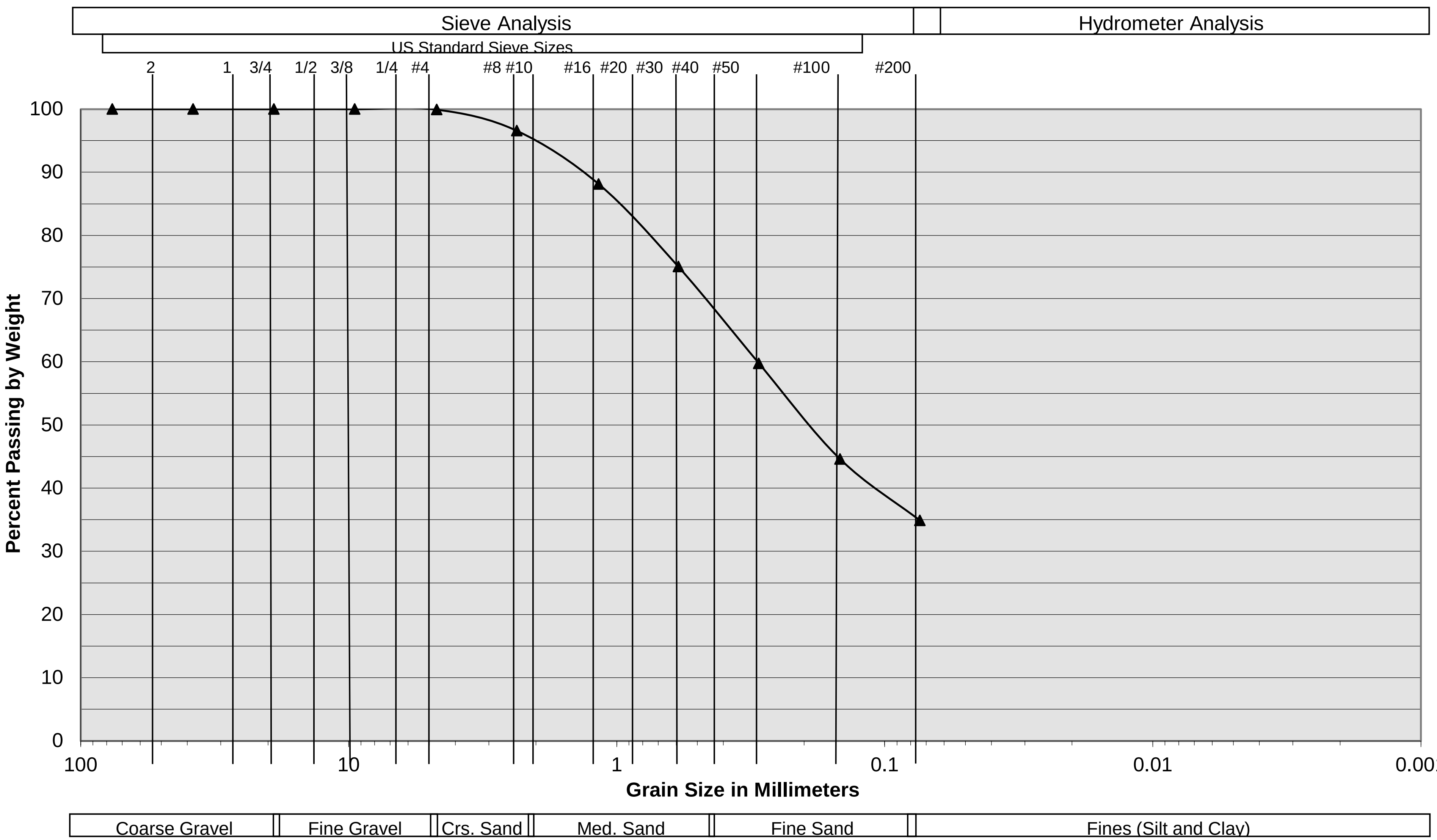


Sample Description	I-10 @ 13.5 to 15'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 35

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

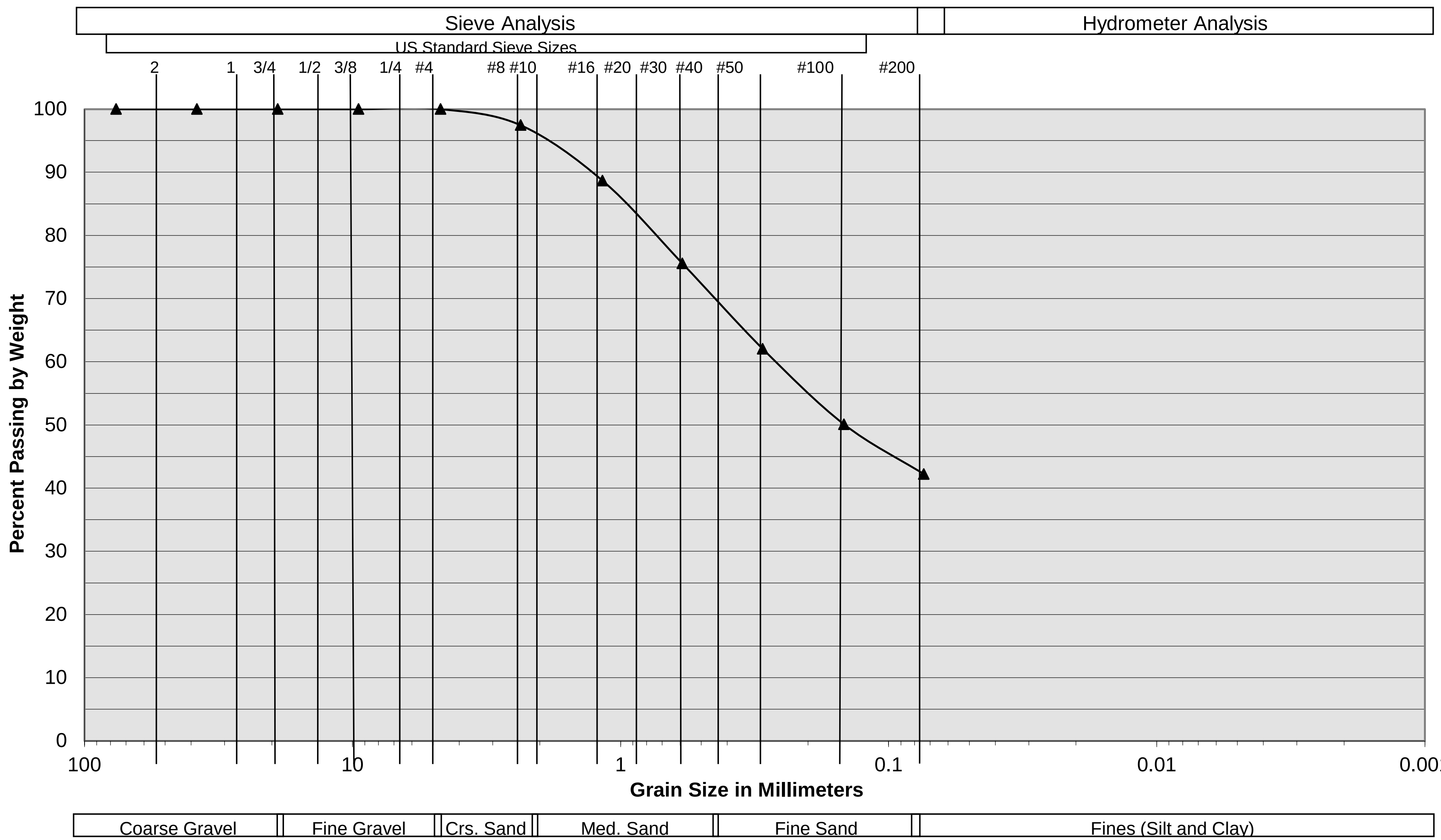


Sample Description	I-10 @ 18.5 to 20'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 36

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

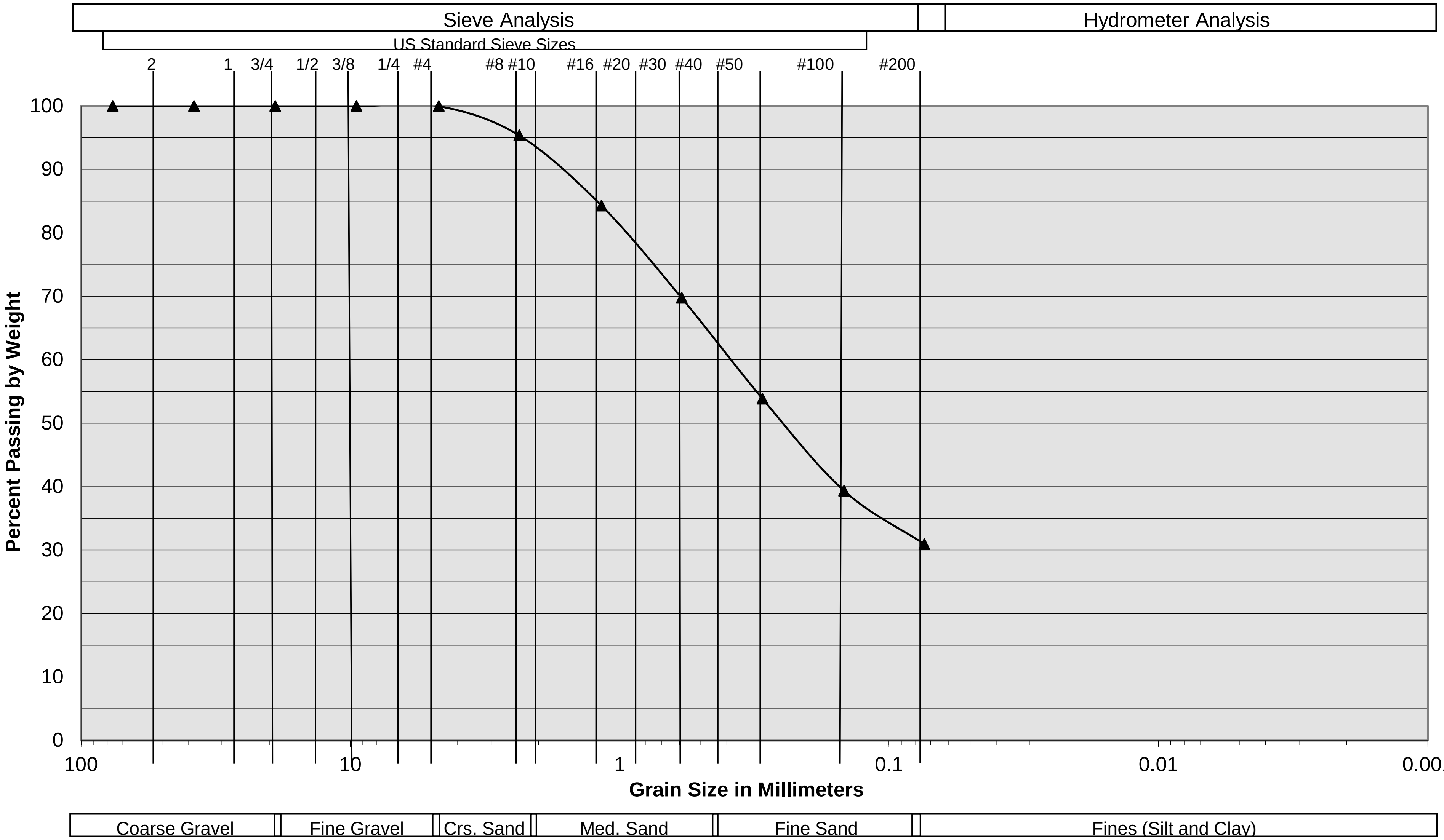


Sample Description	I-10 @ 23.5 to 25'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 37

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

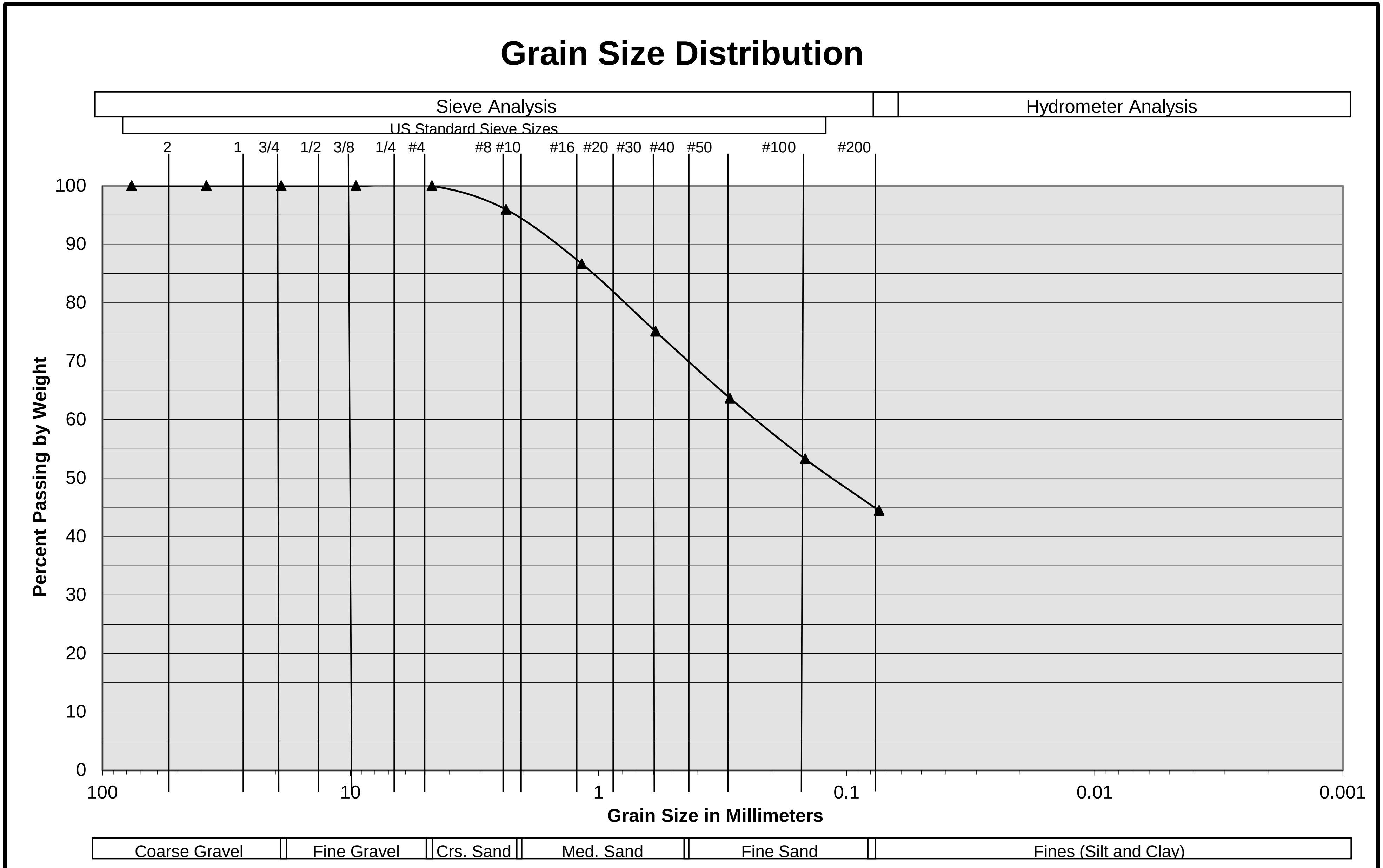
Grain Size Distribution



Sample Description	I-10 @ 28.5 to 30'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 38

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

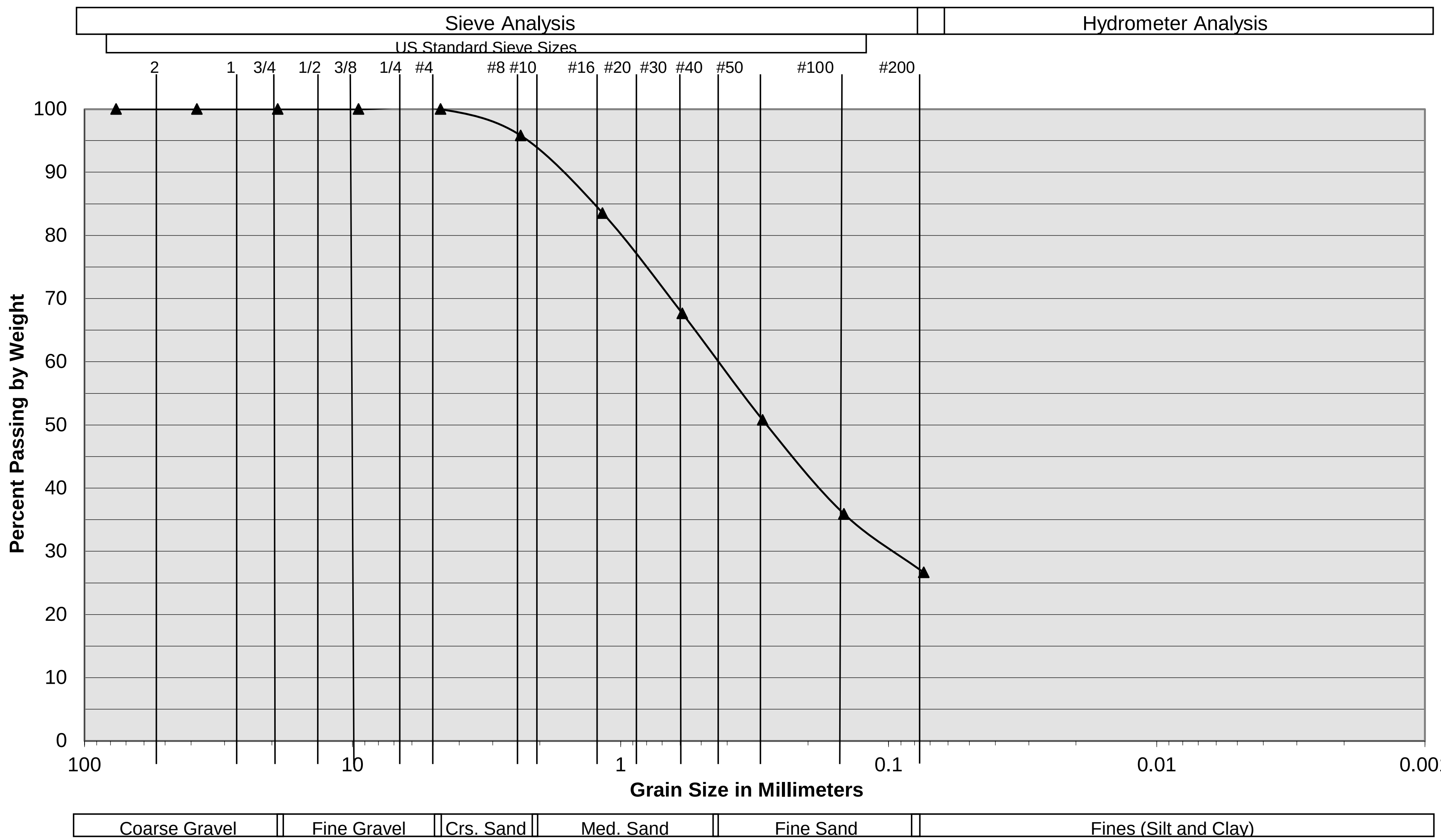


Sample Description	I-10 @ 33.5 to 35'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 39

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL A California Corporation

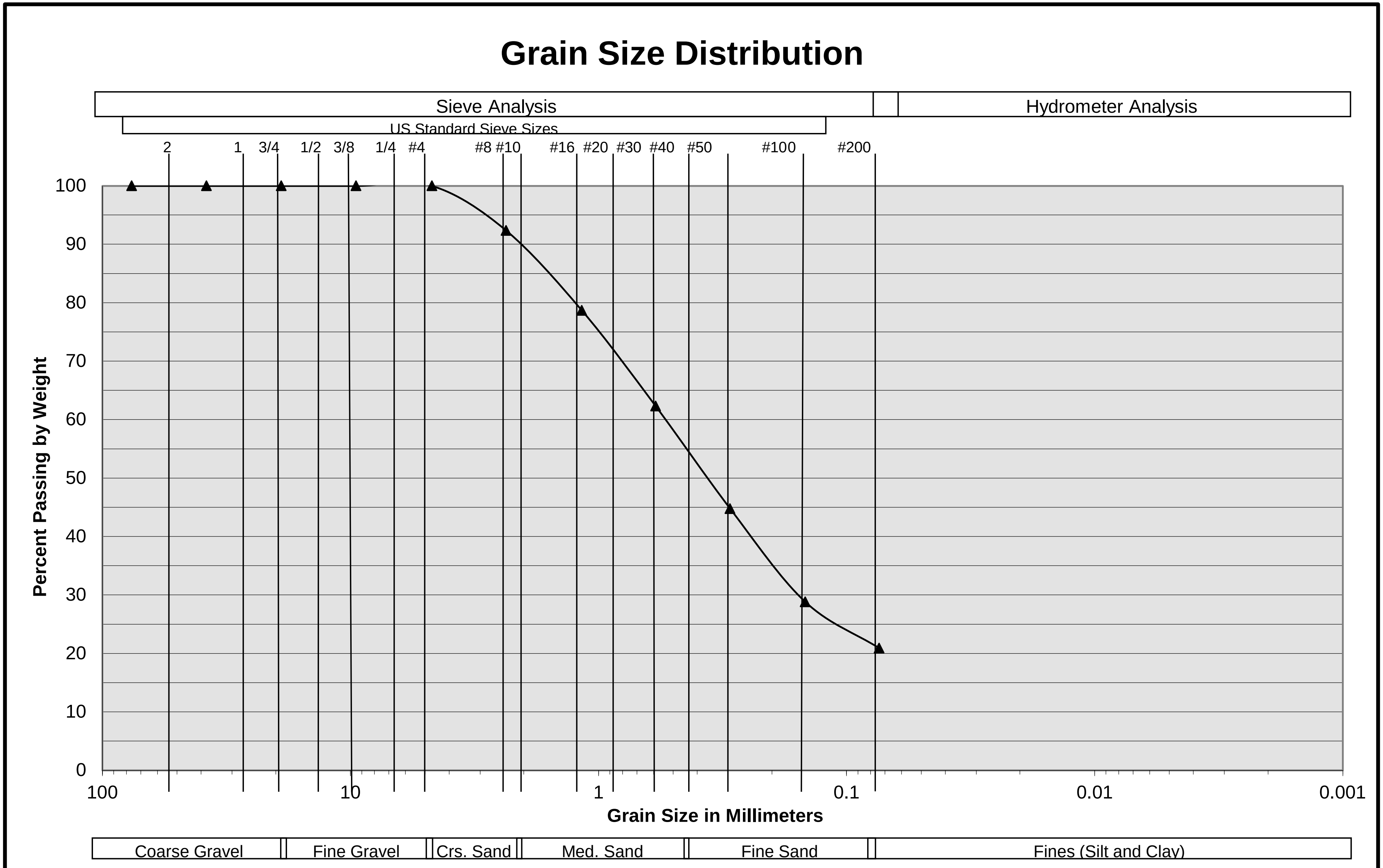
Grain Size Distribution



Sample Description	I-10 @ 38.5 to 40'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 40

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation



Sample Description	I-10 @ 43.5 to 45'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand, trace to little coarse Sand

Harvest Landing Industrial Development
Perris, California
Project No. 22G183-2
PLATE C- 41

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Appendix 4: Historical Site Conditions

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

Phase I Environmental Site Assessment

Proposed Harvest Landing Project Area
325-Acre Site Near Indian Avenue and Orange Avenue
Perris, California 92571

Howard Industrial Partners
1944 North Tustin Street, #122
Orange, California 92865
(949)338-9007

SCS ENGINEERS

Project No. 01219066.00 | May 2019

3900 Kilroy Airport Way, Suite 100
Long Beach, California 90806
(562) 426-9544

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Section Page

Appendices

This Phase I Environmental Site Assessment Report for the Harvest Landing Project area, a 325-Acre assemblage of land parcels near Indian Avenue and Orange Avenue in Perris, California, dated May 2019, was prepared by Justin Rauzon and reviewed by Kevin Green.

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312. The resumes for the individuals below are included in **Appendix F**. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Justin Rauzon, R.E.P.A.
Project Manager
SCS ENGINEERS

Kevin W. Green, P.G.
Project Director
SCS ENGINEERS

EXECUTIVE SUMMARY

SCS Engineers (SCS) was retained by Howard Industrial Partners (the “User”) to prepare a Phase I Environmental Site Assessment (Phase I ESA) of the Harvest Landing Project area located near the intersection of Indian Avenue and Orange Avenue, in Perris, California (the “Property”). This assessment was performed in conformance with 40 CFR 312, Standards for Conducting All Appropriate Inquiries, and in general conformance with ASTM E1527-13.

The Property comprises 105 contiguous land parcels situated near the intersection of Indian Avenue and Orange Avenue. It is bounded to the west by Interstate 215 and its Frontage Road and to the east by North Perris Boulevard and Barnett Avenue. Indian Avenue, Orange Avenue, and some dirt roads cross and border the Property. It comprises 325.45 acres of primarily vacant farmland. A single-story residence and associated garage (2364 Indian Avenue) are located at the southwestern corner of the intersection between Indian Avenue and Orange Avenue. Concrete pads associated with former farmhouse/dairy buildings are located at the northeastern corner of the intersection between Indian Avenue and Orange Avenue.

As early as 1901, the Property was developed with agricultural land and a few rural structures, likely small farmhouses. Since that time, most of the Property has been cultivated farmland. Various small residential-type structures and farm outbuildings have been located on the Property. The single-family residence at the southwestern corner of Indian and Orange Avenues (2364 Indian Avenue) was developed in the mid-1960s. A small cluster of structures was located across the street to the southeast of this residence from at least 1938 to the mid-1990s. City directories indicated that between at least 1975 and 1992, this address (21580 Indian Avenue) was occupied by Dick Evans Transportation. A small cluster of buildings located at the northeastern corner of Indian Avenue and Orange Avenue between the 1930s and 1990s was reportedly a small family-run dairy. Only the concrete pads from the former dairy buildings remain. At times there were unnamed dirt roads and small irrigation ponds on parts of the Property.

Most of the Property is currently fallow agricultural land. A vacant fenced area at the northeastern portion of the Property was historically used by a nearby business to store finished modular structures (offices, portable classrooms, etc.). Other than common household chemicals stored in the garage and residence, no hazardous materials or hazardous wastes were observed at during the site inspection. No indications of landfilled materials were noted on the Property. No storage tanks are currently located on the Property. The owner reported that bulk pesticide/herbicide storage containers have never been stored on the Property.

Evans Transportation, a small business historically located at 1936 Indian Street, near the center of the Property was identified in regulatory databases and regulatory agency files as the location of two former fuel underground storage tanks (USTs), one that stored gasoline and the other diesel. The USTs were removed in 1992 and initial testing indicated the presence of total petroleum hydrocarbons (TPH) and fuel-related volatile organic compounds (VOCs) in soil samples collected from beneath the tanks. Approximately 100 tons of soil were subsequently excavated and removed from the former tank pit area to a landfill. Confirmation soil sampling showed remaining TPH concentrations from 15 to 28 milligrams per kilogram and no detectable concentrations of fuel-related VOCs. The remaining TPH concentrations are far below current regulatory screening levels. On June 17, 1993, the Riverside County Department of Environmental Health closed the case file related to the leaking UST. Based on the information reviewed and the case status, the past release of TPH from the USTs at the Evans Transportation facility constitutes a historical recognized environmental condition REC (HREC).

Regulatory database information identified few known and suspected contamination sites in the area surrounding the Property. It is unlikely that any of these sites have negatively affected the environmental condition of the Property.

Conclusions

In the opinion of the Environmental Professionals, this assessment has revealed evidence of conditions indicative of a historical recognized environmental conditions in connection with the Property, as discussed above. Additional investigation of the Property is not warranted or recommended.

1 INTRODUCTION

SCS Engineers (SCS) was retained by Howard Industrial Partners (the "User") to prepare a Phase I Environmental Site Assessment (Phase I ESA) of the Harvest Landing Project area located near the intersection of Indian Avenue and Orange Avenue, in Perris, California (the "Property"). The Property comprises 105 land parcels totaling approximately 325 acres. A location map for the Property is presented as Figure 1 in Appendix A. This assessment was performed in conformance with 40 CFR 312, Standards for Conducting All Appropriate Inquiries (AAI), and in general conformance with ASTM E1527-13.

2 PURPOSE

This Phase I ESA is intended to constitute appropriate inquiry into the previous ownership and uses of the Property, as required to support the assertion of the innocent landowner, contiguous property owner, and/or bona fide prospective purchaser defenses to liability (collectively the landowner liability protections, or LLPs) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA a.k.a. Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the Small Business Liability Relief and Brownfields Revitalization Act of 2002.

The purpose of this investigation was to identify conditions indicative of releases or threatened releases of hazardous substances as defined in CERCLA Section 101, and petroleum products, on, at, in, or to the Property.

If known or suspected contamination is identified, Users seeking to maintain LLPs have responsibilities in addition to completion of an AAI-compliant Phase I ESA. These "continuing obligations" include taking "appropriate care" and "reasonable steps" with respect to known or suspected releases of hazardous substances during the term of property ownership. In addition to these requirements under federal law, there are different requirements under state law with respect to liability protections. On request, SCS can provide support for clients with continuing obligations, as appropriate.

3 SCOPE OF SERVICES

This Phase I ESA is based on:

- Interviews with past and/or present owners, operators, and/or occupants of the Property.
- Reviews of federal, tribal, state, and local government records.
- Visual inspections of the Property and adjoining properties performed on March 15, 2019.
- Review of historical Property use information (topographic maps, aerial photographs, fire insurance maps, existing reports, etc.).
- Commonly known or reasonably ascertainable information about the Property (e.g., interviews with appropriate regulatory agency personnel and review of agency files review of available documents, interviews with other knowledgeable persons).
- Degree of obviousness of the presence or likely presence of contamination at the Property, and the ability to detect the contamination by appropriate investigation.

- Information provided as a result of the additional inquiries conducted by the User.

4 SPECIAL TERMS AND CONDITIONS

This Phase I ESA for the Harvest Landing Project area, located in Perris, California, has been prepared specifically for Howard Industrial Partners. The report has been prepared in accordance with the care and skill generally exercised by reputable professionals, under similar circumstances, in this or similar localities. No other warranty, express or implied, is made as to the professional opinions presented herein.

No other party, known or unknown to SCS, is intended as a beneficiary of this work product, its content, or information embedded therein. Third parties use this report at their own risk. Third party reliance letters may be issued on request to SCS subject to approval of Howard Industrial Partners and payment to SCS of a fee for such letters.

5 LIMITATIONS AND ASSUMPTIONS

The investigation focuses on releases and threatened releases of hazardous substances or petroleum products that could be considered a recognized environmental condition (REC) and/or a liability due to their possible presence in significant concentrations (e.g., above acceptable limits set by the federal or state government) or due to the potential for contaminant migration through exposure pathways (e.g., soil vapor migration or groundwater ingestion). Materials that may contain substances which are not currently deemed hazardous by the U.S. Environmental Protection Agency (EPA) or California Environmental Protection Agency (CalEPA) were not considered as part of this study.

Unless specifically included in our scope of services, formal surveys for asbestos-containing materials, lead-based paints, fire safety, vapor intrusion, indoor air quality, mold, and similar matters were not part of this assessment. The Property was not evaluated for compliance with land use, zoning, wetlands, or similar laws. This report is not intended to be an environmental compliance audit.

Hazardous substances naturally occurring in plants, soils, and rocks (e.g., heavy metals, naturally occurring asbestos, or radon) are not typically considered in these investigations. Similarly, construction debris (e.g., discarded concrete, asphalt, etc.) is not considered to be of concern unless observations suggest that hazardous substances are likely to be present in significant concentrations.

Unless otherwise noted, sampling and laboratory analyses of soil, water, air, building materials, or other media, were not performed as part of this investigation. Positive identification of hazardous substances can only be accomplished through sampling and appropriate laboratory analysis.

SCS Engineers assumes no responsibility for the accuracy of information obtained from, compiled by, or provided by third-party sources, such as regulatory agency listings. Unless obviously inaccurate or if information exists to the contrary, SCS Engineers assumes that information collected during this environmental site assessment is accurate and correct. Unless warranted, information collected has not been independently validated as part of this assessment.

The following information is the responsibility of the User (40 CFR 312.22) and is not included in this Phase I ESA:

- Specialized knowledge or experience of the User.
- The relationship of the purchase price to the fair market value of the Property. The purchaser of a Property is required to consider whether any differential between the purchase price and the fair market value of the Property is due to the presence of releases or potential releases of hazardous substances at the Property.

Certain other limitations could affect the accuracy and completeness of this report, as follows:

- Site Access Limitations – None.
- Physical Obstructions to Observations – None.
- Outstanding Information Requests – None.
- Historical Data Sources Failure – None.
- Other Limitations – None.

6 GENERAL SITE CHARACTERISTICS

SITE LOCATION

The Property comprises 105 contiguous land parcels situated near the intersection of Indian Avenue and Orange Avenue. It is bounded to the west by Interstate 215 and its Frontage Road and to the east by North Perris Boulevard and Barnett Avenue. Indian Avenue, Orange Avenue, and some dirt roads cross and border the Property. A list of the assessor's parcel numbers (APNs) and associated areas in acres is provided in **Appendix A**. A Google Earth aerial image showing the Property area is provided as **Figure 2** in **Appendix A**. Note that there are three residential enclave parcels located near the intersection of Indian Avenue and Orange Avenue that are not part of the Property.

GENERAL SITE DESCRIPTION

The Property comprises 325.45 acres of primarily vacant farmland. It includes one single-story residence and associated garage (2364 Indian Avenue) located at the southwestern corner of the intersection between Indian Avenue and Orange Avenue. Concrete pads associated with former farmhouse/dairy buildings are located at the northeastern corner of the intersection between Indian Avenue and Orange Avenue.

ADJOINING PROPERTY USE

- North – Val Verde Elementary School is located to the north of the western portion of the Property (2656 Indian Avenue). Single-family residences (2756 and 2726 Indian Avenue) are also located to the northwest of the Property. West Placentia Avenue adjoins the northern end of the Property to the north. Silver Creek Industries, Inc. occupies a complex of industrial buildings across the street to the north (2830 Barrett Avenue). This company manufactures modular buildings. Some of the modular structures are stored across the street.

- South – Undeveloped land and a Regency movie theater (1688 North Perris Boulevard) adjoin the Property to the south.
- East – Barrett Avenue adjoins the northern half of the Property to the east. Scrap metal and equipment are stored across the street from the northern end of the Property. Undeveloped land and the Spectrum commercial shopping center (2560 North Perris Boulevard) are also located to the east of the northern half of the Property. North Perris Boulevard adjoins the southern half of the Property to the east. Undeveloped land, a carwash and auto service center (2252 through 2309 North Perris Boulevard), a retirement home (2225 North Perris Boulevard), another carwash (2131 North Perris Boulevard), and a medical clinic (2055 North Perris Boulevard) are located across the street to the east of the southern half of the Property. Undeveloped land and a Walmart Supercenter (1800 North Perris Boulevard) are located to the east of the southern end of the Property.
- West – Interstate 215 and the I-215 Frontage Road adjoin the Property immediately to the west. Undeveloped land is located across the frontage road to the west of the northern end of the Property (still on the eastern side of the freeway). A railroad right-of-way and commercial business buildings are located across the freeway to the west. The businesses include El Dorado Stone, The Salvation Army, Luxury Mattress Outlet, and self-storage buildings.
- Enclave Parcels – Three single-family residential sites are situated on enclave parcels located within the exterior boundary of the Property. One is located at the northwestern corner of Indian and Orange Avenues (2411 Indian Avenue) and two are located to the south of the residence that is on the Property (2334 and 2304 Indian Avenue).

7 PHYSICAL SETTING

PHYSIOGRAPHIC SETTING

According to the U.S. Geological Survey (USGS), Perris, California 7.5-minute topographic maps, the Property is located at an elevation of approximately 1,460 feet above mean sea level in Rancho las Perris. Site topography is generally flat with a slight regional slope to the east-southeast. The Property is situated approximately 3.25 miles northeast of the foothills of the Santa Ana Mountains and approximately 3.5 miles southwest of the Perris Lake reservoir.

GEOLOGY AND SOILS

The Property is situated within the Peninsular Ranges geomorphic province of southern California, which is primarily characterized by northwest trending mountain ranges. Surficial sediments in the Property area have been mapped as alluvial/fluvial deposits consisting of sand, silt, and clay (California Groundwater Bulletin 118).

GROUNDWATER

The Property is located within the Perris South Groundwater Management Zone (GMZ) of the San Jacinto Groundwater Basin. There are four groundwater wells located on the Property. According to the site contact, the water supply well located at 2364 Indian Avenue is drilled to a depth of 240 feet below ground surface (bgs). Based on a review of information on the State Water Resources Control Board (SWRCB) GeoTracker website for the Nuevo AM/PM Arco service station site located approximately 0.35 miles south of the Property, first groundwater is estimated to occur approximately 75 feet bgs (GeoTracker ID: T0606568183). The anticipated flow direction is to the east-southeast, following the natural surface topography, however, regional groundwater pumping and the Perris Lake reservoir are known to affect groundwater flow direction in the valley. Groundwater flow direction at the Nuevo AM/PM Arco site has been determined to be towards the south-southwest.

RADON

According to the California Department of Public Health's February 2016 Radon Program report, screening in the area of the Property (92571 zip code and nearby zip code 92570) found no locations (out of six) where buildings had radon levels greater than or equal to 4 picocuries per liter (pCi/L), the EPA action level. The maximum radon result for the Property's zip code was 2.8 pCi/L. The alluvial geology of the Perris area is not normally associated with elevated radon levels. Note that elevated radon levels may also be attributed to other radon sources such as leaking natural gas or numerous building products such as drywall, cinderblock, concrete floors, brick, or stone products. Based on the available information, therefore, elevated radon gas is not expected in the area of the Property.

8 SITE INSPECTION

Justin Rauzon of SCS conducted an inspection of the Property and surrounding area on March 15, 2019. Photographs of the Property are provided in **Appendix B**.

Mr. Darrell Smith, whose wife's family has owned the Property for several generations, provided access to the residence located at 2364 Indian Avenue and provided historical information about the Property. Most of the Property is fallow agricultural land. The residence and garage are the only structures currently on the Property. Mr. Smith reported that concrete foundations located to the northeast of the intersection between Indian and Orange Avenues were part of a small, family-run dairy. A fenced area at the northeastern corner of the Property, along the western side of Barrett Avenue, was historically used by an adjoining business to store modular buildings (offices, portable classrooms, etc.). No manufacturing operations reportedly occurred at this area. It was partially covered with more native vegetation.

HAZARDOUS SUBSTANCES

Small quantities of household hazardous materials in the garage and house at 2364 Indian Avenue. No other hazardous materials or hazardous wastes were observed on the Property. According to the site contact, pesticides and herbicides were not historically stored or mixed on the Property.

NATURAL DRAINAGE

Remnants of small historical water courses are present on the southern half of the Property. Heavy rains reportedly lead to pooling at a few areas, with limited water flow in these otherwise dry former creek beds. Pooled water was observed to the south of the intersection of Orange and Barrett Avenues at the time of the site inspection.

DISTURBED AREAS

No obvious disturbed areas were noted. There was no evidence of landfilled materials.

ELEVATORS AND OTHER HYDRAULIC EQUIPMENT

No elevators or other hydraulic equipment are located on the Property.

WELLS

There are four groundwater supply wells located on the Property. One active well is located on the southeastern portion of the 2364 Indian Avenue parcel. This well is drilled to a depth of 240 feet bgs and provides drinking water to the residence. Three irrigation wells (one active and two inactive) are located on the central-eastern portion of the Property. One is located on the eastern side of a dirt road extending south from Barrett Avenue. The other two irrigation wells are located to the west of North Perris Boulevard, south of Orange Avenue. Mr. Smith did not know the depths of these wells, but indicated that they were drilled deeper than the drinking water well.

ELECTRICAL EQUIPMENT

Two pole-mounted Southern California Edison (SCE) electrical transformers are located along the southern boundary of the Property between 2334 and 2364 Indian Avenue. SCE has stated that they have never specified the purchase of distribution transformers utilizing PCBs as the insulating/cooling fluid. SCE transformers utilize mineral oil exclusively. In a statistically valid test of over 20,000 SCE distribution transformers, SCE determined that the concentrations of PCBs in the mineral oils was less than 50 parts per million (ppm) in over 96 percent of the units. Based on the available information, no significant environmental impact to the Property is anticipated from this transformer.

WASTEWATER

Industrial wastewater is not generated at the Property. Sanitary wastewater from the residence at 2364 Indian Avenue is directed to a septic system located outside the southeastern corner of the residence.

DRINKING WATER

Drinking water is not supplied to the Property. As noted above, a private drinking water supply well is located on the residential parcel. The well is reportedly drilled to a depth of 240 feet bgs.

STORAGE TANKS

No evidence (fill ports, vent lines, or dispensers) of underground storage tanks (USTs) was observed on the Property. No aboveground storage tanks (ASTs) were observed on the Property.

A discussion of two fuel USTs removed from a historical address located on the Property is presented in Sections 11 and 12.

VISUAL INSPECTION OF ADJOINING SITES

No obvious evidence of a REC or indications of contamination (e.g. remediation equipment, staining, underground storage tanks, etc.), were observed on adjoining sites during the site inspection.

9 INTERVIEWS

SCS interviewed Mr. Smith during the site inspection. Mr. Smith indicated that the single-family residence at 2364 Indian Avenue was constructed in 1965 and that his family sold the adjoining enclave parcels to friends in the ensuing years. Information provided during the interview is discussed in the appropriate section of this report.

10 SITE HISTORY

Site history was evaluated from the following sources:

- Historical USGS topographic maps provided by Environmental Data Resources (EDR) (February 25, 2019).
- Historical aerial photographs provided by EDR (February 27, 2019).
- A search was made of EDR-Sanborn collection and no maps of the Property were found (February 25, 2019).
- A City Directory review report provided by EDR (February 28, 2019).

Copies of topographic maps, historical aerial photographs, city directories, and the Sanborn map report showing no coverage are included in **Appendix C**.

Year	Description	Source
1901	The Property was largely undeveloped land located in Rancho las Perris. A few rural structures were located on the central portions of the Property, near the intersection of dirt roads that would become Indian and Orange Avenues. Indian Avenue, Orange Avenue, and a former road (crossing the northern end) were present within the exterior boundary of the Property. A few rural structures were also depicted on adjoining sites. Other rural roads were also developed in the immediately surrounding area. A railroad right-of-way adjoined the Property to the west.	Topographic map

Year	Description	Source
1938	The Property was mostly cultivated agricultural land covered with row crops. Dirt roads corresponding to Orange and Indian Avenues, as well as smaller dirt pathways, were located within the exterior boundary of the Property. Two small, rural residential-type structures were located near the center of the Property, to the north of Orange Avenue west of Indian Avenue and on the eastern side of Indian Avenue, south of Orange Avenue. A cluster of farmhouse buildings was located at the northeastern corner of Orange and Indian Avenues. Another farm-related structure was located on the central-eastern portion of the Property. Irrigation ponds were noted on the northern and central portions of the Property. The railroad right-of-way adjoined the Property to the west. The rest of the surrounding area was developed with agricultural land and sporadic rural structures (residences and small farm buildings).	Aerial photo
1942 and 1943	Most of the Property was depicted as undeveloped land, likely agricultural. Two irrigation ponds and three structures (to the north of Orange Avenue west and east of Indian Avenue) were depicted on the Property. A dirt road was located on the southeastern portion of the Property. Highway 395 and the Atchison, Topeka, and Santa Fe railroad right-of-way adjoined the Property to the west. A few additional structures, dirt roads, and irrigation ponds were developed on adjoining sites.	Topographic maps and Aerial photos
1949	No significant changes from the 1938 aerial photos was noted on the Property. A few farm-related equipment storage areas (with small structures) were added offsite to the south-southwest of the Property.	Aerial photo

Year	Description	Source
1953	No significant changes from the 1949 aerial photo were noted on the Property or adjoining sites. A few residential structures were removed from on the Property. The topographic map showed one irrigation pond on the north-central portion of the Property, a few structures near the intersection of Orange and Indian Avenues, and a few structures on the southern portion of the Property. A few additional structures and water tanks were depicted on adjoining sites. Otherwise, no significant changes from the 1943 topographic map were noted in the immediately surrounding area.	Aerial photo
1961	No significant changes from the 1953 aerial photo were noted on the Property or adjoining sites. Mr. Smith indicated that the cluster of buildings at the northeastern corner of the intersection between Orange and Indian Avenues was a small dairy.	Aerial photo
1967	A few more structures on the Property were removed and a few new dirt roads and farm-related structures were added. The residence at 2364 Indian Avenue was developed. A well was depicted on the eastern side of the Property. Two enclave residences were developed at the northwestern corner of Indian and Orange Avenues and immediately to the south of 2364 Indian Avenue (2334 and 2411 Indian Avenue). Some of the dairy buildings were removed. The Val Verde School was constructed to the north of the Property. The rest of the surrounding area remained agricultural land with a few structures, water wells, and a water tank.	Aerial photo and Topographic map
1973	With the exception of the addition of a few small structures, no significant changes from the 1967 topographic map were noted on the Property or adjoining sites.	Topographic map

Year	Description	Source
1974	A few new, small, farm-related buildings were added on or near the southern portion of the Property. Otherwise no significant changes were noted on the Property. A new residence was added to the enclave located to the south of 2364 Indian Avenue (2304 Indian Avenue).	Aerial photo
1975	John Coudures was listed at 21011 Indian Avenue on the Property. Dick Evans Diesel & Trucking was located at 21580 Indian Avenue, a historical address located on the eastern side of Indian Avenue, to the south of Orange Avenue. Private individuals were listed at addresses possibly associated with the enclave parcels (20890, 21020, 21031, and 21101 Indian Avenue). Val Verde School District and Val Verde School were listed at 20751 Indian Avenue, north of the Property. Harvill Machine Inc. was listed at 24201 Orange Avenue, across the freeway to the west of the Property.	City directories
1979	No significant changes from the 1973 topographic map were noted on the Property or adjoining sites.	Topographic map
1980	John Coudures was listed at 21011 Indian Avenue, a historical address associated with the residence on the Property. Dick Evans Transportation was still located at 21580 Indian Avenue. Harvill Machine Inc. and Lomas Industries were listed across the freeway to the west of the Property (24201 Orange Avenue). Val Verde School District and Val Verde School were listed at 20751 Indian Avenue, north of the Property.	City directories
1985	No significant changes from the 1974 aerial photo were noted on the Property. Navajo Trailer Sales was listed at 21555 Indian Avenue, which may have been associated with the Property. Dick Evans Transportation was still located at 21580 Indian Avenue. A residential neighborhood was developed across the street to the southeast of the Property.	Aerial photo and City directories

Year	Description	Source
1989	No significant changes from the 1985 aerial photo were noted on the Property. An industrial building was developed to the north of the Property (2830 Barrett Avenue). An outdoor storage yard associated with some industrial-type buildings was located to the east of the northern end of the Property. Otherwise, much of the surrounding area remained agricultural with limited residential development.	Aerial photo
1992	John Coudures was listed at 2364 Indian Street (*sic*), the current address associated with the single-family residence on the Property. Dick Evans Transportation was still located at 21580 Indian Avenue. Private individuals were listed at the enclave residential parcel addresses (2304, 2334, and 2411 Indian Street). A private individual was also listed at 2416 Indian Street, which may have been an address associated with the former dairy at the northeastern corner of Orange and Indian Avenues.	City directories
1995	John Coudures was listed at 2364 Indian Street (*sic*). Private individuals were still listed at the enclave addresses. Modtech Inc. was listed at 2830 Barrett Avenue, to the north of the Property.	City directories
1997	No significant changes from the 1989 aerial photo were noted on the Property. The freeway was expanded to the west of the Property. Commercial buildings were developed to the northeast of the Property (2560 North Perris Boulevard). A retirement home, carwash, and medical building were developed to the east of the Property (2225, 2131, and 2055 North Perris Boulevard). A movie theater was developed to the south-southeast of the Property (1688 North Perris Boulevard).	Aerial photo
2000	John Coudures was listed at 2364 Indian Street (*sic*). Val Verde Unified School District was listed at 2656 Indian Street and Modtech Hodlings Inc. was listed at 2830 Barrett Avenue.	City directories

Year	Description	Source
2002	The northeastern portion of the Property was being used to store modular buildings. According to Mr. Smith, no manufacturing activities were done on this portion of the Property, only finished product storage. Some of the former dairy structures located at the northeastern portion of Indian and Orange Avenues were demolished, leaving behind only concrete pads. Otherwise no significant changes were noted on the Property or immediately adjoining sites.	Aerial photo
2005	There was no listing for 2364 Indian Avenue. Arizona Millwork Inc., Pacific Continental Modulars, QED Industries, and Modtech Holdings Inc. were listed at 2830 Barrett Avenue.	City directories
2006	The rest of the former dairy structures were demolished, leaving behind only the concrete pads. No significant changes from the 2002 aerial photo were noted on the Property or adjoining sites.	Aerial photo
2009	No significant changes from the 2009 aerial photo were noted on the Property or adjoining sites.	Aerial photo
2010	John Coudures was again listed at 2364 Indian Avenue. Private individuals were still listed at the enclave parcels and the school was listed at 2656 Indian Avenue. Ecocore LLC, Pacific Continental Modulars, and Southern Modular Industries were listed at 2830 Barrett Avenue.	City directories
2012	No significant changes from the 2009 aerial photo were noted on the Property or adjoining sites. The 2012 topographic map does not include site-specific details. A few named dirt roads are depicted on the Property, including Arnold Avenue and Barrett Avenue.	Topographic Maps
2014	John Coudures was listed at the Property address. Silver Creek Construction, Silver Creek Industries, Inc., and Southern Modular Industries were listed at 2830 Barrett Avenue, to the north of the Property.	City directories

Year	Description	Source
2016	The modular buildings were no longer being stored on the northeastern portion of the Property. A Walmart Supercenter was constructed to the east of the southern end of the Property (1800 North Perris Boulevard).	Aerial photo

HISTORICAL USE SUMMARY

As early as 1901, the Property was developed with agricultural land and a few rural structures, likely small farmhouses. Since that time, most of the Property has been cultivated farmland. Various small residential-type structures and farm outbuildings have been located on the Property. The single-family residence at the southwestern corner of Indian and Orange Avenues (2364 Indian Avenue) was developed in the mid-1960s. A small cluster of structures was located across the street to the southeast of this residence from at least 1938 to the mid-1990s. City directories indicated that between at least 1975 and 1992, this address (21580 Indian Avenue) was occupied by Dick Evans Transportation. A small cluster of buildings located at the northeastern corner of Indian Avenue and Orange Avenue between the 1930s and 1990s was reportedly a small family-run dairy. Only the concrete pads from the former dairy buildings remain. At times there were unnamed dirt roads and small irrigation ponds on parts of the Property.

The existence of past agricultural activities on the Property and in adjacent areas indicates a potential for pesticide and/or heavy metal (associated with dusting powders) contamination. In SCS's experience, it is not uncommon to find trace levels of pesticides in soils at former agricultural areas in Southern California. However, these trace concentrations are rarely cause for environmental concern. It is our opinion that, without specific evidence of pesticide storage or mismanagement on the Property, past use for agricultural purposes is considered to be a *de minimis condition* and collection and analysis of soil samples for pesticides is unwarranted.

HISTORICAL USE OF ADJOINING SITES

As early as 1901 most of the immediately surrounding area was also undeveloped or agricultural land, with sparse residential/farmhouse development. A frontage road, a highway (later expanded to Interstate 215), and a railroad right-of-way have adjoined the Property to the west since the early 1900s. The Val Verde School was developed to the north in the mid-1960s. In the 1960s and 1970s, the enclave parcels near the center of the Property were developed with single-family residences. Commercial/industrial buildings were developed across the highway to the west beginning in the 1970s. A modular building construction company has occupied the site to the north (2830 Barrett Avenue) since at least 1989. A commercial shopping center and other commercial buildings were developed to the east of the Property in the 1990s and 2000s. A Walmart Supercenter was constructed to the southeast in 2016.

11 COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION

In order to identify commonly known or reasonably ascertainable information about the Property, SCS attempted to review previous environmental reports and various regulatory agency files and interviewed regulatory agency personnel. The following information was identified.

PREVIOUS ENVIRONMENTAL REPORTS

No previous environmental reports were provided to SCS for review.

REGULATORY AGENCY RECORDS

Regulatory agencies and other sources were contacted in an effort to identify any known or suspected contamination sites or incidents of hazardous waste storage or disposal which might have resulted in soil and/or groundwater contamination, or VOC (volatile organic compound) vapor migration to the Property. Generally, this includes records for the Property and adjacent parcels, although relevant information for other sites of possible interest in the area (up to one mile) may also be included. Within the City of Perris, the Riverside County Department of Environmental Health (RCDEH) generally acts as the lead enforcement agency for UST compliance. If a tank has leaked and groundwater contamination is suspected, the Santa Ana Regional Water Quality Control Board (SARWQCB) generally becomes the lead agency in supervising contaminant characterization and cleanup.

California Environmental Protection Agency Files

One address associated with the Property appears as a listed site on the California Environmental Protection Agency (CalEPA) Regulated Site Portal website (**Appendix D**). Evans Transport (1936 Indian Street [*sic*]) is listed as a Leaking Underground Storage Tank (LUST) site. This listing is discussed in greater detail below.

Santa Ana Regional Water Quality Control Board Files

Evans Transport (1936 Indian Street) appears in the SWRCB's GeoTracker website. The listing contains copies of RCDEH files that are included in **Appendix D**. According to the information in the file, the RCDEH was notified of an unauthorized release from USTs at the Evans Transport site in October 1992. Environmental Profiles, Inc. (EPI) prepared a site remediation work plan in November 1992, which showed that a 2,000-gallon gasoline UST and 8,000-gallon diesel UST were removed from an area to the north of the Evans Transportation maintenance area in August 1992. At the time the tanks were removed, soil samples were collected 2 and 6 feet below the bottoms of both tanks. Laboratory analytical results showed total petroleum hydrocarbons (TPH; EPA Method 8015M) in four of six soil samples at concentrations ranging from 1.2 to 131 milligrams per kilogram (mg/kg), equivalent to parts per million (ppm). Using EPA Method 418.1, the TPH concentrations ranged from 72 to 21,700 mg/kg in four of six samples. Benzene was not detected in any of the soil samples analyzed using EPA Method 8020. Toluene, ethylbenzene, and/or total xylenes were detected in four of six soil samples at concentrations ranging from 18 to 3,110 micrograms per kilogram (µg/kg), equivalent to parts per billion (ppb).

In March 1993, EPI implemented the work plan, excavating approximately 100 tons of soil at the Property. TPH was detected in five of six confirmation soil samples at concentrations ranging from

15 to 28 mg/kg. Fuel-related VOCs were not detected in any of the confirmation soil samples. Composite soil samples of the excavated stockpile of soil had TPH concentrations of 81 and 426 mg/kg and total xylenes detected at 1,790 mg/kg. The excavated soil was reportedly transported to the Lamb Canyon Sanitary Landfill for disposal. On June 17, 1993, the RCDEH closed the case file related to this LUST investigation/remediation. The analytical results meet current regulatory screening levels for soil. Based on the information reviewed and the case status, the past release of TPH from the USTs at the Evans Transportation facility constitutes a historical REC (HREC).

Department of Toxic Substances Control Files

The Property does not appear in the California Department of Toxic Substances Control (DTSC) EnviroStor website. Recent DTSC case files, if any, would be listed on this website (**Appendix D**).

South Coast Air Quality Management District Files

The Property does not appear as a listed facility on the South Coast Air Quality Management District (AQMD) online Facility INformation Detail (FIND) website.

12 REVIEW OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENT DATABASES

A database search for sites listed on various federal, state, tribal, and local databases in the area around the Property was obtained from EDR (February 27, 2019). A description of each of the databases searched is included in the report, which is attached as **Appendix E**. Among the databases included in the EDR report are NPL (federal, tribal, and state-equivalent), proposed and delisted NPL, CORRACTS (RCRA facilities subject to corrective actions), hazardous waste sites identified for investigation or remediation (SEMS [Superfund Enterprise Management System, formerly known as CERCLIS], State CERCLIS, VCP, Brownfields Calsites, etc.), LUST, sites with engineering controls, former CERCLIS (NFRAP), RCRA and state hazardous waste generators, ERNS, SWLF, USTs, and Toxic Pits.

Review of these records satisfies all requirements as set forth in 40 CFR Section 312.26 (b) and (c) with regard to the review of federal, tribal, and state government records of databases of such government records and local government records and databases of such records pertaining to both the Property and the nearby or adjoining properties. Further, the search distances for each particular database are as specified in 40 CFR 312.26 and ASTM E1527-13.

Any known or suspected contaminated sites included on these lists within 0.25 miles of the Property are discussed in the following text. As a general rule, sites beyond 0.25 miles are not anticipated to impact a site significantly. Any sites beyond 0.25 miles with a high potential to impact the Property are also discussed. (Please note: the distances and directions listed in this report have been field verified and might not always match those in the EDR report.)

Sites such as TSD facilities, hazardous waste generators, HAZNET, FINDS, SQGs, LQGs, USTs, HIST UST, RCRA violations, and TRIS facilities with toxic chemical releases (generally in accordance with permitting requirements - into the air, water, or land as reported under SARA Title III) use or store hazardous materials and thus may pose a potential problem in the event of a spill or leak. However, unless these sites also appear in an agency list of contaminated sites, there is no evidence of any problems at this time. Therefore, sites on these lists will not be discussed unless on or in close proximity to the Property.

Please refer to **Appendix E** for further information on these sites.

PROPERTY LISTINGS

John Coudures Company (2634 Indian Avenue) appears in the CIWQS, SWEEPS UST, and CA FID UST databases. The CIWQS listing is associated with a former storm water construction permit. The UST database listings refer to one 550-gallon gasoline UST and two 10,000-gallon diesel USTs that were active in 1992. Mr. Smith indicated that these listings pertained to USTs stored at a ranch on Morgan Street, three miles from the Property, but were identified with the Property because the mailing address for the ranch was the residence located on the Property. Based on the available information, these listings are not indicative of a REC.

Evans Transport (1936 Indian Street) was listed in the LUST and HIST CORTESE databases. As discussed above, this case was closed on June 17, 1993. Based on the case status, fall under the category of HREC.

ADJACENT SITE LISTINGS

The following adjacent sites appear in the EDR database report:

Val Verde Elementary School Addition, 2656 Indian Avenue (adjacent to the north) – ENVIROSTOR, SCH, HAZNET, FINDS, FTTS, and HIST FTTS – This school site has operated since 1959. Two 1,000-gallon fuel USTs (one gasoline and one diesel) were removed from this site in 1993. Following excavation and remediation activities conducted in 2000, RCDEH and DTSC concurred that no further action was necessary at the site. The HAZNET listings are related to asbestos-containing waste, waste oil and mixed oil, empty containers, inorganic solid waste, PCB-containing waste, and other unspecified hazardous wastes removed from the school site between 1993 and 2013.

Christine Leinen, 2304 Indian Avenue (adjacent enclave site) – HAZNET – According to this HAZNET listing, asbestos containing waste was removed from this site in 2015.

Econo Lube N' Tune #97/Meineke Econo Lube #4097, 2309 Perris Boulevard (adjacent to the east) – UST, SWEEPS UST, RCRA-SQG, FINDS, and ECHO – This facility is listed as a current UST site with one 500-gallon waste oil UST. There are no indications of known past releases from the UST. The facility also generates small quantities of ignitable hazardous waste. Based on the available information, it is unlikely that this site has negatively affected the environmental condition of the Property.

Golden Star Dry Cleaners, 2131 North Perris Boulevard (adjacent to the east) – EDR Hist Cleaner – This facility was listed as dry cleaners between 2006 and 2013. It is situated downgradient of the Property and there are no reported releases from the facility. Based on the available information, SCS considers it unlikely that this site has negatively affected the environmental condition of the Property.

Modtech, Inc./Silver Creek Ind. Inc., 2830 Barrett Avenue (adjacent to the north) – RCRA-SQG, EMI, NPDES, WDS, and CIWQS – These facilities have manifested various hazardous wastes including: ignitable wastes, aqueous solutions with organic residues, waste oil and mixed oil, oil/water separation sludge, acidic waste, and mercury. Silver Creek has also reported generating air emissions and has an active stormwater permit. None of these listings are indicative of a chemical release and, based on the available information, this site is not considered an environmental risk to the Property.

Harvill Machine Inc./The Salvation Army, 24201 Orange Avenue (adjacent to the west) – HIST UST and RCRA-LQG -- Harvill is listed as the historical location of two USTs installed in 1966. No information about their status is reported, but there was no report of a release from these tanks. Based on the absence of a reported release and distance, SCS considers it unlikely that this site poses an environmental risk to the Property. The Salvation Army has reported generating ignitable and mercury wastes and is also not considered an environmental risk to the Property.

Walmart Store #1747/Spectrum Cleaners/Dryclean Express, 2560 North Perris Boulevard (adjacent to the east) – AST, SWEEPS UST, CA FID UST, and DRYCLEANERS – The Walmart listing is associated with a 2,400-gallon AST of unspecified contents. It contains no indications of a past release. The Spectrum Cleaners listing is associated with a drycleaner facility with active permits to use perchloroethylene (PCE) as part of its dry cleaning process. This facility is listed downgradient, approximately 250 feet across Barrett Avenue to the east of the northern portion of the Property. There are no reported releases of dry cleaning solvent from this facility. Based on the available information, SCS considers it unlikely that this site has negatively affected the environmental condition of the Property. Its distance and location relatively downgradient imply the risk of vapor intrusion at the Property, in the event of a solvent release, is low.

Dollar Tree #02980, 2560 North Perris Boulevard (adjacent to the east) – RCRA NonGen/NLR, FINDS, SWRCY, HAZNET, and NPDES – This business has manifested numerous hazardous wastes, including chlorinated solvents like PCE. However, these database listings are not associated with documented chemical releases and this business is not expected to affect the environmental condition of the Property.

Walmart Supercenter #1747, 1800 North Perris Boulevard (adjacent to the south) – RCRA-SQG – This facility has generated numerous hazardous wastes, including chlorinated solvents like PCE. However, this listing contains no information about documented chemical releases and this business is not expected to affect the environmental condition of the Property.

Other Database Sites

The EDR report provides a summary table of regulatory database sites within specified distances of the Property, including standard environmental records, additional environmental records, high risk historical records, and recovered governmental records. This summary table is provided beginning on Page 4 of the EDR report (**Appendix E**). In addition to the Property and adjacent site listings discussed above, SCS identified the following sites of concern within 0.25 miles of the Property:

Other sites located within 0.25 miles of the Property with known releases of hazardous substances such as LUST and ENVIROSTOR sites are located cross- or downgradient, or based on case status and/or distance, are not anticipated to negatively affect the environmental condition of the Property. Several sites located within 0.25 miles appear in databases not typically associated with documented releases, such as AST, EMI, NPDES, WDS, CIWQS, HIST UST, RCRA-SQG, RCRA NonGen/NLR, SWEEPS UST, CA FID UST, FINDS, ECHO, EMI, HAZNET, and DRYCLEANERS. Based on a review of the database information, none of these sites are known to have any contamination at this time; therefore, none are anticipated to have negatively affected the environmental condition of the Property. Similarly, none of the sites situated beyond 0.25 miles are anticipated to have impacted the Property.

Unmappable or Orphan Sites

Two unmappable sites were identified in the EDR report. Unmappable sites cannot be plotted due to inaccurate or incomplete addresses. Based on review of the provided data, including the estimated locations of the unmappable sites in relation to the Property, it appears unlikely that the unmappable sites have adversely affected the environmental condition of the Property.

LANDFILLS

According to the EDR-provided review of the California Department of Resources Recycling and Recovery (CalRecycle) Solid Waste Information System, no active or inactive landfills were identified within 0.5 miles of the Property. Based on the available information, it is unlikely that landfills have adversely affected the environmental condition of the Property.

OIL AND GAS WELLS

Available oil and gas well maps from the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) were reviewed to identify oil and gas wells on the Property or in the nearby area. According to the DOGGR Well Finder online database, the property is not located within the boundaries of a delineated oil and gas field. A DOGGR map showing that the Property is not located within one mile of any oil or gas wells is provided in Appendix D.

NATIONAL PIPELINE MAPPING SYSTEM

SCS reviewed the National Pipeline Mapping System (NPMS) website for the Property and surrounding area to identify any hazardous materials pipelines. The NPMS is a geographic information system (GIS) created by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), and Office of Pipeline Safety (OPS) in cooperation with other federal and state governmental agencies and the pipeline industry. The NPMS consists of geospatial data, attribute data, public contact information, and metadata pertaining to the interstate and intrastate hazardous liquid trunklines and hazardous liquid low-stress lines as well as gas transmission pipelines, liquefied natural gas (LNG) plants, and hazardous liquid breakout tanks (tanks that receive and store liquids transported by pipeline) jurisdictional to PHMSA. The nominal accuracy of geospatial data in the NPMS is +/-500 feet. The NPMS does not contain information on interconnects, pump and compressor stations, valves, direction of flow, capacity, throughput, or operating pressure. In addition, distribution and gathering pipelines are not included in the NPMS.

The NPMS is built from data submitted by pipeline, LNG plant, and breakout tank facility operators. Since 2002, transmission pipeline and LNG plant facility operators are required to submit mapping information to the NPMS and to update their submissions annually. Breakout tank operators are able to submit data to the NPMS on a voluntary basis.

Based on review of the NPMS website, there are no hazardous materials pipelines within one mile of the Property.

13 USER PROVIDED INFORMATION

A User Questionnaire was not returned to SCS for inclusion in the report. The User provided no information beyond what is discussed above.

TITLE RECORDS

No title report was provided to SCS for review.

ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

No information regarding environmental liens or activity and use limitations was provided to SCS. No environmental liens or activity/use limitations were identified by SCS during the course of this assessment.

SPECIALIZED KNOWLEDGE

No specialized knowledge regarding the Property was provided to SCS by the User.

VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

No property valuation information was provided to SCS.

14 DEGREE OF OBVIOUSNESS OF THE PRESENCE/LIKELY PRESENCE OF CONTAMINATION ON THE PROPERTY

As discussed above, most of the Property has been agricultural land since at least 1901. A few historical residences, farm-related structures, and a small dairy have been located on the Property, mostly near the intersection of Indian and Orange Avenues. The historical presence of these structures and activities are not anticipated to negatively affect the environmental condition of the Property. As noted above, a small transportation business historically operated at 1936 Indian Avenue, near the center of the Property. Two USTs were removed from the area along with approximately 100 tons of affected soil in the early 1990s. Based on the confirmation analytical results reviewed and regulatory closure, the former USTs represent an HREC. Additional investigation of this area is not warranted or recommended.

15 DATA GAPS

A data gap represents an inability on the part of the environmental professional to obtain information required by the standards and practices of 40 CFR 312 to fully identify conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the Property.

No data gaps were identified during the preparation of this Phase I ESA.

16 FINDINGS AND OPINIONS

Based on the scope of work performed, SCS finds the following:

The Property comprises 105 contiguous land parcels situated near the intersection of Indian Avenue and Orange Avenue. It is bounded to the west by Interstate 215 and its Frontage Road and to the east by North Perris Boulevard and Barnett Avenue. Indian Avenue, Orange Avenue, and some dirt roads cross and border the Property. It comprises 325.45 acres of primarily vacant farmland. A single-story residence and associated garage (2364 Indian Avenue) are located at the southwestern corner of the intersection between Indian Avenue and Orange Avenue. Concrete pads associated with former farmhouse/dairy buildings are located at the northeastern corner of the intersection between Indian Avenue and Orange Avenue.

As early as 1901, the Property was developed with agricultural land and a few rural structures, likely small farmhouses. Since that time, most of the Property has been cultivated farmland. Various small residential-type structures and farm outbuildings have been located on the Property. The single-family residence at the southwestern corner of Indian and Orange Avenues (2364 Indian Avenue) was developed in the mid-1960s. A small cluster of structures was located across the street to the southeast of this residence from at least 1938 to the mid-1990s. City directories indicated that between at least 1975 and 1992, this address (21580 Indian Avenue) was occupied by Dick Evans Transportation. A small cluster of buildings located at the northeastern corner of Indian Avenue and Orange Avenue between the 1930s and 1990s was reportedly a small family-run dairy. Only the concrete pads from the former dairy buildings remain. At times there were unnamed dirt roads and small irrigation ponds on parts of the Property.

Most of the Property is currently fallow agricultural land. A vacant fenced area at the northeastern portion of the Property was historically used by a nearby business to store finished modular structures (offices, portable classrooms, etc.). Other than common household chemicals stored in the garage and residence, no hazardous materials or hazardous wastes were observed at during the site inspection. No indications of landfilled materials were noted on the Property. No storage tanks are currently located on the Property. The owner reported that bulk pesticide/herbicide storage containers have never been stored on the Property.

Evans Transportation, a small business historically located at 1936 Indian Street, near the center of the Property was identified in regulatory databases and regulatory agency files as the location of two former fuel underground storage tanks (USTs), one that stored gasoline and the other diesel. The USTs were removed in 1992 and initial testing indicated the presence of total petroleum hydrocarbons (TPH) and fuel-related volatile organic compounds (VOCs) in soil samples collected from beneath the tanks. Approximately 100 tons of soil were subsequently excavated and removed from the former tank pit area to a landfill. Confirmation soil sampling showed remaining TPH concentrations from 15 to 28 milligrams per kilogram and no detectable concentrations of fuel-related VOCs. The remaining TPH concentrations are far below current regulatory screening levels. On June 17, 1993, the Riverside County Department of Environmental Health closed the case file related to the leaking UST. Based on the information reviewed and the case status, the past release of TPH from the USTs at the Evans Transportation facility constitutes a historical recognized environmental condition REC (HREC).

Regulatory database information identified few known and suspected contamination sites in the area surrounding the Property. It is unlikely that any of these sites have negatively affected the environmental condition of the Property.

In the opinion of the Environmental Professionals, this assessment has revealed evidence of conditions indicative of a historical recognized environmental conditions in connection with the Property, as discussed above. Additional investigation of the Property is not warranted or recommended.

17 REFERENCES

ASTM International, November 1, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E1527-13.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) Website: http://www.conservation.ca.gov/dog/Pages/Index.aspx.

California Department of Health Services (CDHS), Updated February 2016. *California Indoor Radon Test Results*: https://www.cdph.ca.gov/Programs/CEH/DRSEM/CDPH%20Document%20Library/EMB/Radon/Radon%20Test%20Results.pdf

California Department of Toxic Substance Control (DTSC) EnviroStor Website: https://www.envirostor.dtsc.ca.gov/public/.

California Department of Water Resources (CDWR), Updated 2003. South Coast Hydrologic Region, Los Angeles Subregion. Bulletin No. 118.

California Environmental Protection Agency (CalEPA), Site Portal Website: https://siteportal.calepa.ca.gov/nsite/.

California Environmental Protection Agency, State Water Resources Control Board (SWRCB), GeoTracker Website: http://geotracker.waterboards.ca.gov/.

Environmental Data Resources, Inc. (EDR), www.edrnet.com, (800) 352-0050.

Federal Register, The Daily Journal of the United States Government, November 1, 2005. Part III, Environmental Protection Agency, 40 CFR Part 312, Standards and Practices for All Appropriate Inquiry. Volume 70, No. 210. Amended December 30, 2013, Volume 78, No. 250.

National Pipeline Mapping System (NPMS) Website: https://www.npms.phmsa.dot.gov/PublicViewer/.

South Coast Air Quality Management District (AQMD), Facility INformation Detail (FIND) website: http://www3.aqmd.gov/webappl/fim/prog/search.aspx.

18 GLOSSARY/DEFINITIONS

AAI -- All Appropriate Inquiry

AUL -- Activity and Use Limitations

BTEX -- Benzene, toluene, ethylbenzene, and total xylenes

CERCLA -- Comprehensive, Environmental Response, Compensation, and Liability Act

CERCLIS -- Comprehensive Environmental Response, Compensation, and Liability Information System

CFR -- Code of Federal Regulations

CORRACTS -- Corrective Action Against Responsible Parties at a RCRA site

CREC -- A recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g., property use restrictions, AULs, or institutional or engineering controls).

DOGGR -- Department of Oil, Gas, and Geothermal Resources

De Minimis Condition -- A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis conditions* are not RECs or CRECs.

DTSC -- California EPA Department of Toxic Substances Control

EDR -- Environmental Data Resources, Inc.

EPA -- Environmental Protection Agency

ERNS -- Emergency Response Notification System

ESA -- Environmental Site Assessment

FINDS -- Facility Index System

HAZNET -- California EPA Hazardous Waste Facility and Manifest Data

HREC -- Historical Recognized Environmental Condition: A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls

LQG -- Large Quantity Hazardous Waste Generator

LUST -- Leaking Underground Storage Tank

MCL -- Maximum contaminant level

MTBE -- Methyl-tert-butyl-ether

NFA -- No Further Action determination

NFRAP -- No Further Remedial Action Planned

NPL -- National Priority List (Superfund)

PAHs -- Polynuclear aromatic hydrocarbons

PCBs -- Polychlorinated biphenyls

RCRA -- Resource Conservation and Recovery Act

RCRIS -- Resource Conservation and Recovery Information System

REC -- R*ecognized environmental condition* is defined by ASTM E 1527-13 as: "The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis conditions* are not *recognized environmental conditions*."

ROD -- Record of Decision

RBSLs -- Risk-based Screening Levels

RSLs – Regional Screening Levels

RWQCB -- Regional Water Quality Control Board

SARA -- Superfund Amendments and Reauthorization Act

SLIC -- Spills, Leaks, Investigations, and Cleanups database

SQG -- Small Quantity Hazardous Waste Generator

SWIS -- Solid Waste Information System

SWLF -- Solid Waste Facility/Landfills

TPH -- Total Petroleum Hydrocarbons

TRIS -- Toxic Release Inventory System

TSD -- Treatment, Storage, and/or Disposal Facility

User -- The person or persons seeking to establish the innocent landowner defense, bona fide prospective purchaser liability protection, and/or contiguous property owner liability protection pursuant to CERCLA sections 101 and 107.

USGS -- United States Geologic Survey

UST – Underground Storage Tank

VCP -- Voluntary Cleanup Program

VOCs -- Volatile organic compounds

****Figures and Appendices omitted from Phase 1 ESA Report for the Preliminary WQMP, will provided if requested****

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Section not applicable

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-1A	*40526.29*	*Roofs*	*1*	*0.89*	*36149.5*			
S1-1C	*277973.92*	*Concrete or Asphalt*	*1*	*0.892*	*247952.7*			
	318500.21	***Total***			**284102.2**	**0.20**	***1.30***	***1.386***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name FMCivil Engineers Inc — Date 10/14/2024

Designed by Hector Paez — Case No

Company Project Number/Name 20-001 - Site 1

BMP Identification

BMP NAME / ID S1-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-2A	*55315.38*	*Roofs*	*1*	*0.89*	*49341.3*			
S1-2C	*237178.68*	*Concrete or Asphalt*	*1*	*0.892*	*211563.4*			
	292494.06	***Total***			**260904.7**	**0.20**	***1.20***	***1.27***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024

Designed by: Hector Paez | Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*S1-3A*	*95990.6*	*Roofs*	*1*	*0.89*	*85623.6*			
	S1-3C	*254184.8*	*Concrete or Asphalt*	*1*	*0.892*	*226732.8*			
		350175.4	***Total***			**312356.4**	**0.20**	***1.43***	***1.501***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024
Designed by: Hector Paez — Case No:
Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-4A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-4C	*264175.33*	*Concrete or Asphalt*	*1*	*0.892*	*235644.4*			
	264175.33	***Total***			**235644.4**	**0.20**	**1.08**	**1.154**

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S1-5A	0	Roofs	1	0.89	0			
S1-5C	117505	Concrete or Asphalt	1	0.892	104814.5			
	117505	Total			104814.5	0.20	0.48	0.577

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name FMCivil Engineers Inc | Date 10/14/2024

Designed by Hector Paez | Case No

Company Project Number/Name 20-001 - Site 1

BMP Identification

BMP NAME / ID S1-6 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-6A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-6C	*130304.77*	*Concrete or Asphalt*	*1*	*0.892*	*116231.9*			
	130304.77	***Total***			**116231.9**	**0.20**	**0.53**	**0.577**

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID S1-7 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-7A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-7C	*140627.27*	*Concrete or Asphalt*	*1*	*0.892*	*125439.5*			
	140627.27	***Total***			**125439.5**	**0.20**	***0.58***	***0.577***

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID S1-8 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-8A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-8C	*124278.2*	*Concrete or Asphalt*	*1*	*0.892*	*110856.2*			
	124278.2	**Total**			**110856.2**	**0.20**	**0.51**	**0.577**

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024

Designed by: Hector Paez | Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-9 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-9A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-9C	*38340*	*Concrete or Asphalt*	*1*	*0.892*	*34199.3*			
	38340	***Total***			**34199.3**	**0.20**	***0.16***	***0.175***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name FMCivil Engineers Inc — Date 10/14/2024

Designed by Hector Paez — Case No

Company Project Number/Name 20-001 - Site 1

BMP Identification

BMP NAME / ID S1-10 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imprivious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-10A	*36878.51*	*Roofs*	*1*	*0.89*	*32895.6*			
S1-10C	*60733.1*	*Concrete or Asphalt*	*1*	*0.892*	*54173.9*			
	97611.61	***Total***			**87069.5**	**0.20**	***0.40***	***0.462***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024
Designed by: Hector Paez — Case No:
Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-11 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S1-11A	70795.56	Roofs	1	0.89	63149.6			
S1-11C	29593.31	Concrete or Asphalt	1	0.892	26397.2			
	100388.87	Total			89546.8	0.20	0.41	0.462

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID S1-12 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-12A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-12C	*23273.88*	*Concrete or Asphalt*	*1*	*0.892*	*20760.3*			
	23273.88	***Total***			**20760.3**	**0.20**	**0.10**	**0.115**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024

Designed by: Hector Paez | Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-13 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S1-13A	0	Roofs	1	0.89	0			
S1-13C	28300.75	Concrete or Asphalt	1	0.892	25244.3			
	28300.75	Total			25244.3	0.20	0.12	0.144

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 1		

BMP Identification

BMP NAME / ID: S1-14 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-14A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-14C	*8629.3*	*Concrete or Asphalt*	*1*	*0.892*	*7697.3*			
	8629.3	***Total***			**7697.3**	**0.20**	***0.04***	***0.052***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-15 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-15A	*0*	*Roofs*	*1*	*0.89*	*0*			
S1-15C	*0*	*Concrete or Asphalt*	*1*	*0.892*	*0*			
	0	***Total***			**0**	**0.20**		

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 1

BMP Identification

BMP NAME / ID: S1-16 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S1-16A	*19615*	*Roofs*	*1*	*0.89*	*17496.6*			
S1-16C	*337.89*	*Concrete or Asphalt*	*1*	*0.892*	*301.4*			
	19952.89	***Total***			**17798**	**0.20**	***0.08***	***0.115***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc
Date: 10/14/2024
Designed by: Hector Paez
Case No:
Company Project Number/Name: 20-001 - Site 2

BMP Identification

BMP NAME / ID: S2-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S2-1A	*0*	*Roofs*	*1*	*0.89*	*0*			
S2-1C	*186366.61*	*Concrete or Asphalt*	*1*	*0.892*	*166239*			
	186366.61	***Total***			**166239**	**0.20**	**0.76**	**0.808**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}
(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name FMCivil Engineers Inc — Date 10/14/2024
Designed by Hector Paez — Case No
Company Project Number/Name 20-001 - Site 2

BMP Identification

BMP NAME / ID S2-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S2-2A	*190057.62*	*Roofs*	*1*	*0.89*	*169531.4*			
S2-2C	*23066.2*	*Concrete or Asphalt*	*1*	*0.892*	*20575.1*			
	213123.82	***Total***			190106.5	0.20	*0.87*	*0.924*

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 2		

BMP Identification

BMP NAME / ID: S2-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S2-3A	*194209.17*	*Roofs*	*1*	*0.89*	*173234.6*			
S2-3C	*44222.67*	*Concrete or Asphalt*	*1*	*0.892*	*39446.6*			
	238431.84	***Total***			212681.2	0.20	*0.98*	*1.154*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 2

BMP Identification

BMP NAME / ID: S2-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S2-4A	0	Roofs	1	0.89	0			
S2-4C	129874.52	Concrete or Asphalt	1	0.892	115848.1			
	129874.52	Total			115848.1	0.20	0.53	0.577

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 2

BMP Identification

BMP NAME / ID: S2-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S2-25	0	Roofs	1	0.89	0			
S2-5C	17428.74	Concrete or Asphalt	1	0.892	15546.4			
	17428.74	Total			15546.4	0.20	0.07	0.073

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 2

BMP Identification

BMP NAME / ID: S2-6 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S2-6A	*0*	*Roofs*	*1*	*0.89*	*0*			
S2-6C	*31142.53*	*Concrete or Asphalt*	*1*	*0.892*	*27779.1*			
	31142.53	***Total***			**27779.1**	**0.20**	**0.13**	**0.144**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 3

BMP Identification

BMP NAME / ID: S3-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S3-1A	*82323.47*	*Roofs*	*1*	*0.89*	*73432.5*			
S3-1C	*49531.63*	*Concrete or Asphalt*	*1*	*0.892*	*44182.2*			
	131855.1	***Total***			**117614.7**	**0.20**	***0.54***	***0.577***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024
Designed by: Hector Paez — Case No:
Company Project Number/Name: 20-001 - Site 3

BMP Identification

BMP NAME / ID: S3-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S3-2A	*28787.68*	*Roofs*	*1*	*0.89*	*25678.6*			
S3-2C	*43453.31*	*Concrete or Asphalt*	*1*	*0.892*	*38760.4*			
	72240.99	***Total***			**64439**	**0.20**	***0.30***	***0.346***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 3		

BMP Identification

BMP NAME / ID S3-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S3-3A	*0*	*Roofs*	*1*	*0.89*	*0*			
S3-3C	*116.28*	*Concrete or Asphalt*	*1*	*0.892*	*103.7*			
	116.28	***Total***			**103.7**	**0.20**	***0.00***	***0***

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 3

BMP Identification

BMP NAME / ID: S3-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
DMAs	S3-4A	0	Roofs	1	0.89	0			
	S3-4C	4363.5	Concrete or Asphalt	1	0.892	3892.2			
		4363.5	Total			3892.2	0.20	0.02	0.052

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name FMCivil Engineers Inc | Date 10/14/2024
Designed by Hector Paez | Case No
Company Project Number/Name 20-001 - Site 3

BMP Identification

BMP NAME / ID S3-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S3-5A	0	Roofs	1	0.89	0			
S3-5C	28679.95	Concrete or Asphalt	1	0.892	25582.5			
	28679.95	Total			25582.5	0.20	0.12	0.144

DMAs

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024
Designed by: Hector Paez | Case No:
Company Project Number/Name: 20-001 - Site 4

BMP Identification

BMP NAME / ID: S4 Onsite Bioretention Basin

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4-1A	*57919.51*	*Roofs*	*1*	*0.89*	*51664.2*			
4-1C	*56064.51*	*Concrete or Asphalt*	*1*	*0.89*	*50009.5*			
	113984.02	***Total***			**101673.7**	**0.60**	***5083.7***	***5498***

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 5 DMA 1

BMP Identification

BMP NAME / ID: Onsite Bioretention Basin 5-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
5-1A	*18981.97*	*Roofs*	*1*	*0.89*	*16931.9*			
5-1C	*38716.49*	*Concrete or Asphalt*	*1*	*0.89*	*34535.1*			
	57698.46	**Total**			**51467**	**0.60**	**2573.4**	**4321**

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 5 DMA 2

BMP Identification

BMP NAME / ID: Onsite Bioretention Basin 5-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
5-2A	*3619.4*	*Roofs*	*1*	*0.89*	*3228.5*			
5-2C	*19057.84*	*Concrete or Asphalt*	*1*	*0.89*	*16999.6*			
	22677.24	***Total***			**20228.1**	**0.60**	**1011.4**	**1708**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name FMCivil Engineers Inc — Date 10/14/2024

Designed by Hector Paez — Case No

Company Project Number/Name 20-001 - Site 6

BMP Identification

BMP NAME / ID S6-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
DMAs	S6-1A	142737.57	Roofs	1	0.89	127321.9			
	S6-1C	114415.59	Concrete or Asphalt	1	0.892	102058.7			
		257153.16	Total			229380.6	0.20	1.05	1.154

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend:	
	Required Entries
	Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID S6-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*S6-2A*	*143823.86*	*Roofs*	*1*	*0.89*	*128290.9*			
	S6-2C	*127078.39*	*Concrete or Asphalt*	*1*	*0.892*	*113353.9*			
		270902.25	***Total***			**241644.8**	**0.20**	***1.11***	***1.154***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024
Designed by: Hector Paez | Case No:
Company Project Number/Name: 20-001 - Site 6

BMP Identification

BMP NAME / ID: S6-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-3A	*88575.34*	*Roofs*	*1*	*0.89*	*79009.2*			
S6-3C	*60762.75*	*Concrete or Asphalt*	*1*	*0.892*	*54200.4*			
	149338.09	***Total***			133209.6	0.20	*0.61*	*0.693*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 6

BMP Identification

BMP NAME / ID: S6-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-4A	*87541.33*	*Roofs*	*1*	*0.89*	*78086.9*			
S6-4C	*60000.62*	*Concrete or Asphalt*	*1*	*0.892*	*53520.6*			
	147541.95	***Total***			131607.5	0.20	***0.6***	***0.693***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 6		

BMP Identification

BMP NAME / ID: S6-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
S6-5A	20936.36	Roofs	1	0.89	18675.2			
S6-5C	47001.96	Concrete or Asphalt	1	0.892	41925.7			
	67938.32	Total			60600.9	0.20	0.28	0.346

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024

Designed by: Hector Paez | Case No:

Company Project Number/Name: 20-001 - Site 6

BMP Identification

BMP NAME / ID: S6-6 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S6-6A	*20934.5*	*Roofs*	*1*	*0.89*	*18673.6*			
S6-6C	*52272.3*	*Concrete or Asphalt*	*1*	*0.892*	*46626.9*			
	73206.8	***Total***			65300.5	0.20	*0.30*	*0.346*

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc
Date: 10/14/2024
Designed by: Hector Paez
Case No:
Company Project Number/Name: 20-001 - Site 7

BMP Identification

BMP NAME / ID: S7-1 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*S7-1A*	*57309.9*	*Roofs*	*1*	*0.89*	*51120.4*			
	S7-1C	*67852.19*	*Concrete or Asphalt*	*1*	*0.892*	*60524.2*			
		125162.09	***Total***			**111644.6**	**0.20**	**0.51**	**0.577**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024

Designed by: Hector Paez | Case No:

Company Project Number/Name: 20-001 - Site 7

BMP Identification

BMP NAME / ID: S7-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*S7-2A*	*17606*	*Roofs*	*1*	*0.89*	*15704.6*			
	S7-2C	*11967.73*	*Concrete or Asphalt*	*1*	*0.892*	*10675.2*			
		29573.73	***Total***			**26379.8**	**0.20**	***0.12***	***0.144***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 7

BMP Identification

BMP NAME / ID: S7-3 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S7-3A	*54098.5*	*Roofs*	*1*	*0.89*	*48255.9*			
S7-3C	*32139.36*	*Concrete or Asphalt*	*1*	*0.892*	*28668.3*			
	86237.86	***Total***			**76924.2**	**0.20**	***0.35***	***0.346***

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name FMCivil Engineers Inc

Date 10/14/2024

Designed by Hector Paez

Case No

Company Project Number/Name 20-001 - Site 7

BMP Identification

BMP NAME / ID S7-4 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S7-4A	*98582.75*	*Roofs*	*1*	*0.89*	*87935.8*			
S7-4C	*93880.34*	*Concrete or Asphalt*	*1*	*0.892*	*83741.3*			
	192463.09	***Total***			**171677.1**	**0.20**	**0.79**	**0.808**

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name FMCivil Engineers Inc | Date 10/14/2024

Designed by Hector Paez | Case No

Company Project Number/Name 20-001 - Site 7

BMP Identification

BMP NAME / ID S7-5 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*S7-5A*	*56184.36*	*Roofs*	*1*	*0.89*	*50116.4*			
	S7-5C	*43500.29*	*Concrete or Asphalt*	*1*	*0.892*	*38802.3*			
		99684.65	***Total***			**88918.7**	**0.20**	**0.41**	**0.462**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 7

BMP Identification

BMP NAME / ID: S7-6 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S7-6A	*6528.45*	*Roofs*	*1*	*0.89*	*5823.4*			
S7-6C	*1757.82*	*Concrete or Asphalt*	*1*	*0.892*	*1568*			
	8286.27	***Total***			**7391.4**	**0.20**	**0.03**	**0.052**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 7

BMP Identification

BMP NAME / ID: S7-7 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S7-7A	*13853.76*	*Roofs*	*1*	*0.89*	*12357.6*			
S7-7C	*126.23*	*Concrete or Asphalt*	*1*	*0.892*	*112.6*			
	13979.99	***Total***			12470.2	0.20	*0.06*	*0.073*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 7

BMP Identification

BMP NAME / ID: S7-8 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*S7-8A*	*0*	*Roofs*	*1*	*0.89*	*0*			
	S7-8C	*87.08*	*Concrete or Asphalt*	*1*	*0.892*	*77.7*			
		87.08	***Total***			**77.7**	**0.20**	***0***	***0***

Notes:

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

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 8

BMP Identification

BMP NAME / ID: Offsite Biorentention Basin

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
8-1A	*252423.02*	*Roofs*	*1*	*0.89*	*225161.3*			
8-1C	*601813.44*	*Concrete or Asphalt*	*1*	*0.89*	*536817.6*			
	854236.46	***Total***			**761978.9**	**0.60**	***38098.9***	***137,907***

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc — Date: 10/14/2024

Designed by: Hector Paez — Case No:

Company Project Number/Name: 20-001 - Site 9

BMP Identification

BMP NAME / ID: Offsite Bioretention Basin

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
9-1A	*166666.11*	*Roofs*	*1*	*0.89*	*148666.2*			
9-1C	*629913.07*	*Concrete or Asphalt*	*1*	*0.89*	*561882.5*			
	796579.18	***Total***			710548.7	0.60	35527.4	137,907

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name	FMCivil Engineers Inc	Date	10/14/2024
Designed by	Hector Paez	Case No	
Company Project Number/Name	20-001 - Site 9		

BMP Identification

BMP NAME / ID S9-2 Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
S9-2A	*0*	*Roofs*	*1*	*0.89*	*0*			
S9-2C	*87575.2*	*Concrete or Asphalt*	*1*	*0.892*	*78117.1*			
	87575.2	***Total***			**78117.1**	**0.20**	***0.36***	***0.462***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name FMCivil Engineers Inc — Date 10/14/2024

Designed by Hector Paez — Case No

Company Project Number/Name 20-001 - Barrett and Daniela

BMP Identification

BMP NAME / ID Streets Modular Wetlands

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Streets 1C	*346032.58*	*Concrete or Asphalt*	*1*	*0.892*	*308661.1*			
	346032.58	***Total***			308661.1	0.20	*1.42*	*1.73*

DMAs

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: FMCivil Engineers Inc | Date: 10/14/2024

Designed by: Hector Paez | Case No:

Company Project Number/Name: 20-001 - Phase II West

BMP Identification

BMP NAME / ID: Onsite Treatment (TBD)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
P2-1A	*1617036.74*	*Concrete or Asphalt*	*1*	*0.89*	*1442396.8*			
	1617036.74	***Total***			**1442396.8**	**0.60**	***72119.8***	***N/A***

Notes:

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

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name FMCivil Engineers Inc Date 10/14/2024
Designed by Hector Paez Case No
Company Project Number/Name 20-001 - Phase II East

BMP Identification

BMP NAME / ID Onsite Treatment (TBD)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.60 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
P2-2A	*2093617.786*	*Concrete or Asphalt*	*1*	*0.89*	*1867507.1*			
	2093617.786	***Total***			**1867507.1**	**0.60**	**93375.4**	**N/A**

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	Bioret Basin 4-1		Calculated Cells

Company Name: FMCivil Engineers Inc Date: 10/1/2024

Designed by: Hector Paez County/City Case No.:

Design Volume

Enter the area tributary to this feature A_T= 3.6 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 5,084 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 13.8 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 = 1.75 ft

Minimum Surface Area, A_m

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

A_M = 2,907 ft^2

Proposed Surface Area A= 3,142 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	Bioret Basin 5-1		Calculated Cells

Company Name:	FMCivil Engineers Inc	Date:	10/3/2024
Designed by:	Hector Paez	County/City Case No.:	

Design Volume

Enter the area tributary to this feature $A_T=$ 2.9 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook $V_{BMP}=$ 2,574 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer $d_S =$ 3.0 ft

Top Width of Bioretention Facility, excluding curb $w_T =$ 10.3 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ $d_E =$ 1.73 ft

Minimum Surface Area, A_m

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

$A_M =$ 1,487 ft^2

Proposed Surface Area $A=$ 2,498 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility $z =$ 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	Bioret Basin 5-2		Calculated Cells

Company Name:	FMCivil Engineers Inc	Date:	10/3/2024
Designed by:	Hector Paez	County/City Case No.:	

Design Volume

Enter the area tributary to this feature $A_T =$ 0.57 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook $V_{BMP} =$ 1,012 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer $d_S =$ 3.0 ft

Top Width of Bioretention Facility, excluding curb $w_T =$ 7.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ $d_E =$ 1.70 ft

Minimum Surface Area, A_m

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

$A_M =$ 596 ft^2

Proposed Surface Area $A =$ 1,005 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility $z =$ 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

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

Company Name:	FMCivil Engineers Inc	Date:	10/3/2024
Designed by:	Hector Paez	County/City Case No.:	Harvest

Design Volume

Enter the area tributary to this feature	A_T=	37.9	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	73,626	ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	220.0	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 =	1.80	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \dfrac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	40,976	ft^2
Proposed Surface Area	A=	76,615	ft^2

Bioretention Facility Properties

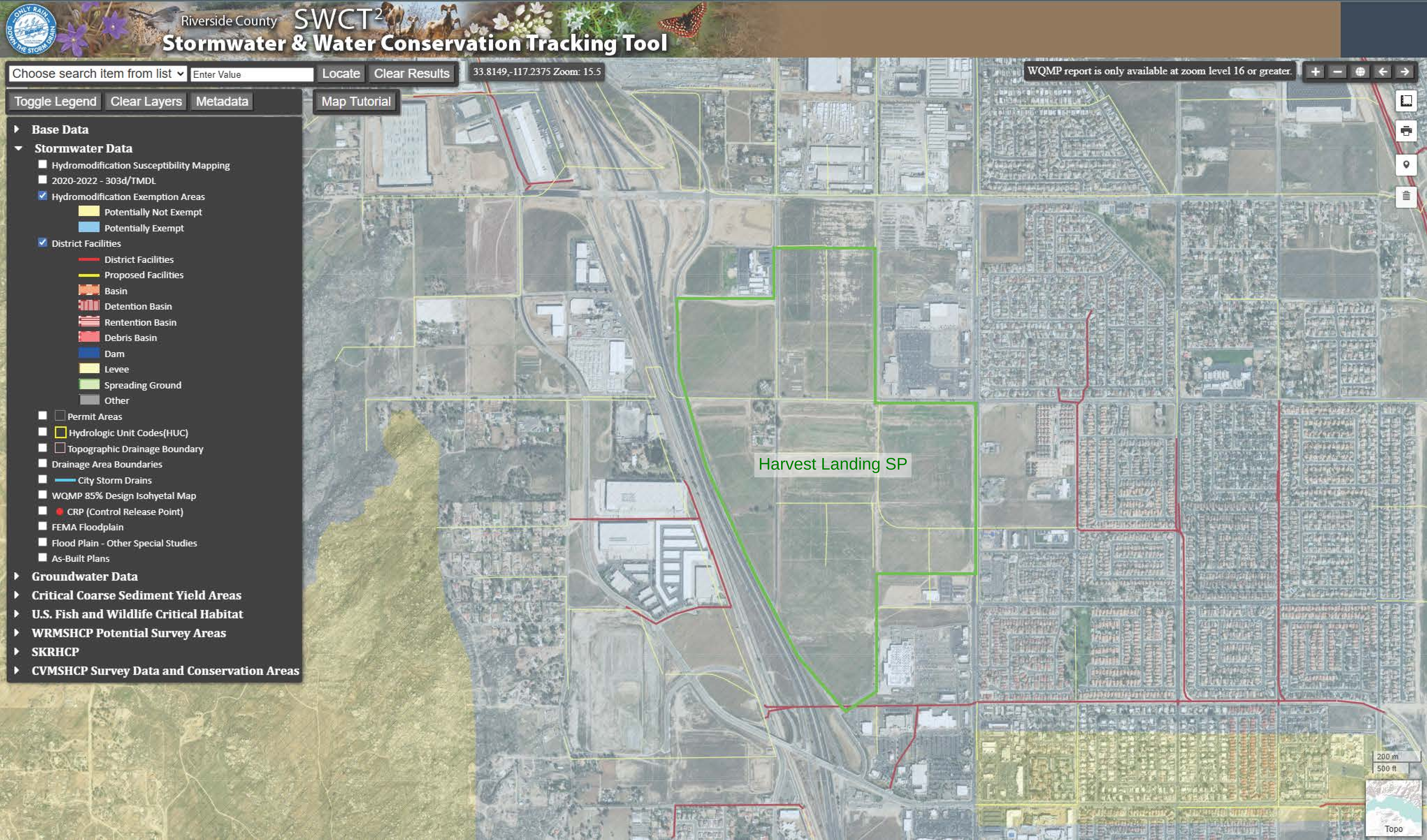
Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet

Describe Vegetation:

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



Riverside County SWCT2
Stormwater & Water Conservation Tracking Tool
Choose search item from list
Enter Value
Locate
Clear Results
33.8149,-117.2375 Zoom: 15.5
WQMP report is only available at zoom level 16 or greater.
Toggle Legend
Clear Layers
Metadata
Map Tutorial
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
2020-2022 - 303d/TMDL
Hydromodification Exemption Areas
Potentially Not Exempt
Potentially Exempt
District Facilities
District Facilities
Proposed Facilities
Basin
Detention Basin
Rentention Basin
Debris Basin
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
Harvest Landing SP
200 m
500 ft
Topo

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	☒ **Locations of inlets.**	☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☒ **Maintain and periodically repaint or replace inlet markings.** ☒ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☒ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☒ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ E. **Pools, spas, ponds, decorative fountains, and other water features.**	☐ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	☐ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ F. **Food service**	☐ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ☐ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	☐ **Describe the location and features of the designated cleaning area.** ☐ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	☐ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
☒ G. **Refuse areas**	☒ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ☒ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ☐ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☒ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☒ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☒ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at** www.cabmphandbooks.com

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

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

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

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

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

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

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☒ M. **Loading Docks**	☒ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ☒ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ☒ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		☒ **Move loaded and unloaded items indoors as soon as possible.** ☒ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
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☒ P. **Plazas, sidewalks, and parking lots.**			☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

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

Section to be completed during the Final WQMP

Appendix 10: Educational Materials

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

Section to be completed during the Final WQMP*