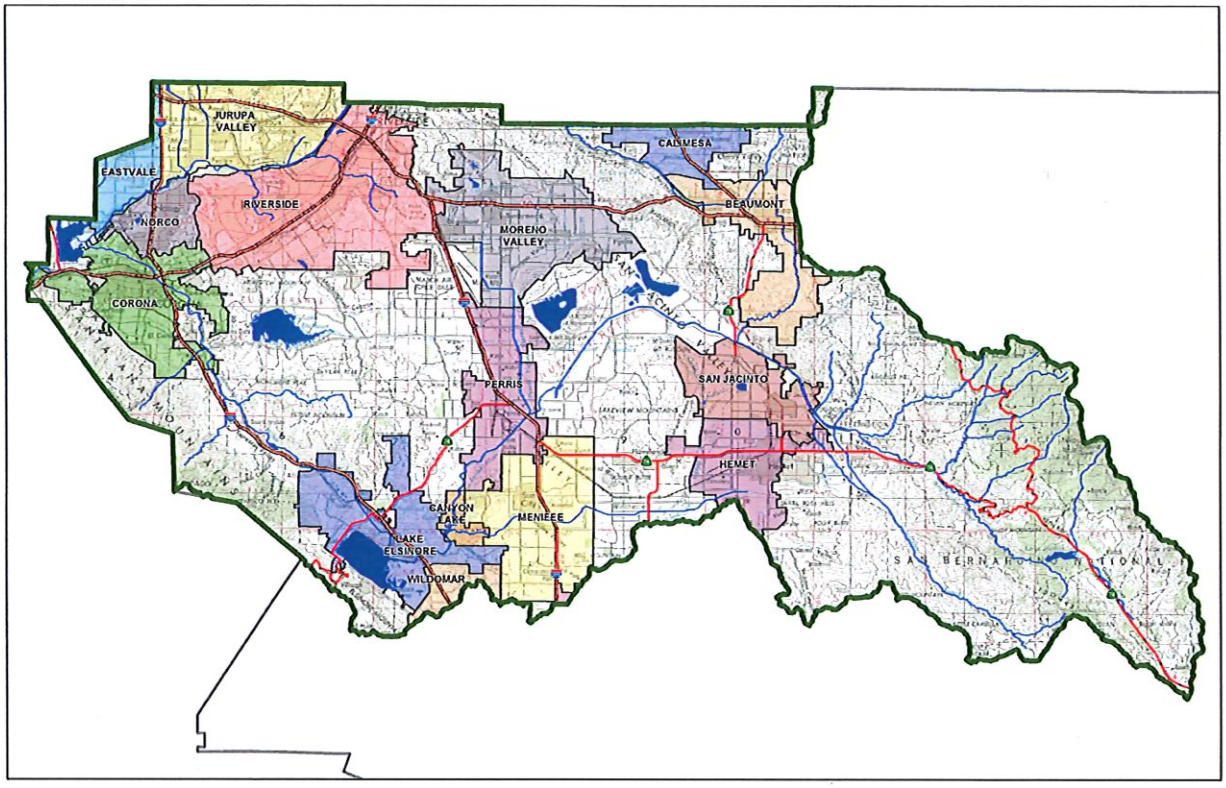
Project Specific Water Quality Management Plan

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

Project Title: Redlands Industrial Facility

Development No: Redlands Avenue & Placentia Avenue

Design Review/Case No: P22-00008



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☒ **Preliminary**
☐ **Final**

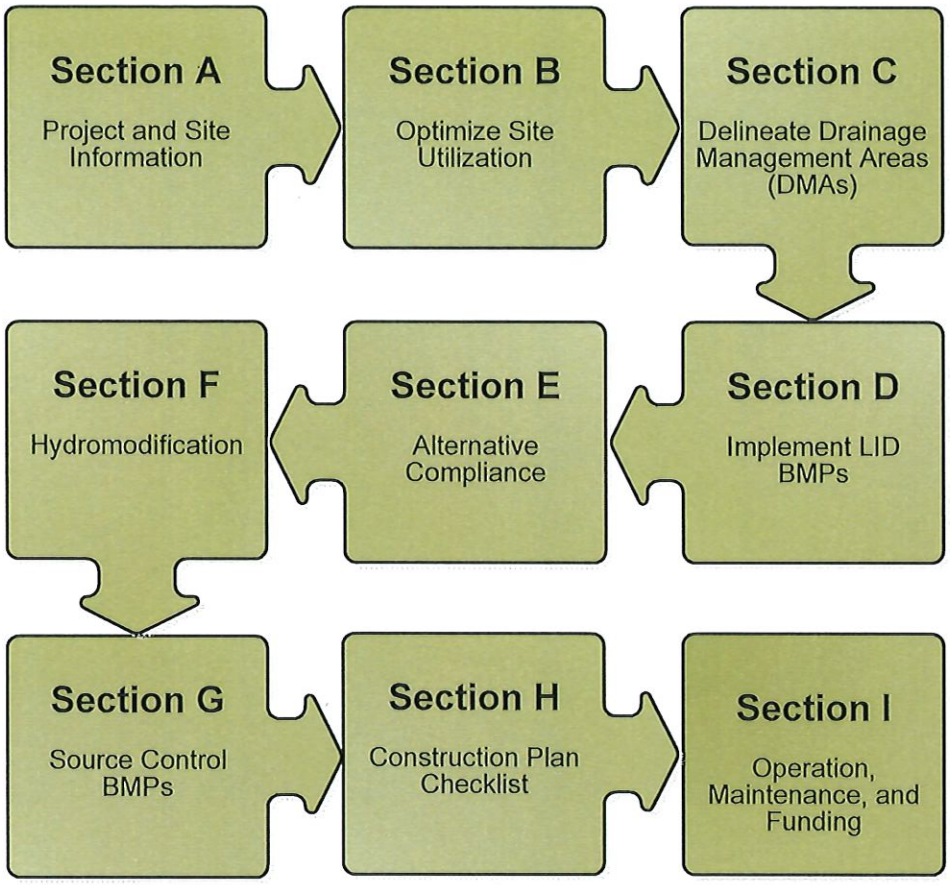
Original Date Prepared: 1/26/2022

Revision Date(s): 5/16/2022

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

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 Dedeaux Properties by Joseph C. Truxaw & Associates, Inc. for the Redlands Industrial Facility project (P22-00008).

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

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Perris Water Quality Ordinance (Municipal Code Section 1194).

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

Owner's Signature

9/28/22
Date

Benjamin M. Horning
Owner's Printed Name

Director of Development
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

9-26-22
Date

Craig Di Bias
Preparer's Printed Name

President
Preparer's Title/Position

Preparer's Licensure:

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 LOS ANGELES)

On September 28, 2022, before me, Jessica M. Pisula, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

JESSICA M. PISULA
Notary Public - California
Los Angeles County
Commission # 2367197
My Comm. Expires Jul 22, 2025

Signature _____

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	6 +/- acres
Community Name:	N/A
Development Name:	Redlands Industrial Facility
PROJECT LOCATION	
Latitude & Longitude (DMS): 33° 49' 24.57"N 117° 12' 58.63"W	
Project Watershed and Sub-Watershed: Santa Ana Watershed	
Gross Acres: 6.1 acres	
APN(s): 300-210-010 & 300-210-022	
Map Book and Page No.: Page 777 Grid H4	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Industrial
Proposed or Potential SIC Code(s)	T.B.D.
Area of Impervious Project Footprint (SF)	217,708 sf
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	217,708 sf
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)	1,490 sf
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)	B
What is the Water Quality Design Storm Depth for the project?	0.65

A.1 Project Summary

The subject project is known as the Redlands Industrial Facility and is located at the northeast corner of Redlands Avenue & Placentia Avenue in the City of Perris, County of Riverside, State of California. Latitude, and longitude of the site are 33° 49' 25" N and 117° 12' 59" W, respectively. The site is currently undeveloped, approximately 99% pervious, and is 6.213 acres in size prior to dedications required along both Redlands Avenue and Placentia Avenue frontages, and 6.1 acres net after dedications. The proposed development includes the construction of a 117,100 square foot (gross)concrete tilt-up building that includes 113,100 SF of warehouse space, 4,000 SF of office space and 4,000 SF of mezzanine space. The building will have 16 dock-high truck positions. The site will include landscape areas, a concrete paved truck court for trailer parking and truck circulation, and AC paved automobile parking and drive areas. The proposed development will yield an impervious footprint of approximately 217,708 SF or 5.0 acres with a landscape area of approximately 1.1 acres.

The site has been broken down into four drainage management areas. DMA 1A is located along the southern half of the building and the eastern parking area. DMA-1A is 92% impervious and approximately 2.136 acres in size. DMA-1B is 97% impervious and approximately 3.117 acres in size. DMA 1B encompasses the northern half of the

building and the northern parking area. DMA'S 2, 3, and 4 are landscape areas located along the western and southern parts of the site. These areas will discharge to Redlands Avenue & Placentia Avenue, respectively.

The site discharges to on-site grated inlets, which lead to an underground infiltration system sized for the post construct volume requirements. Overflows will discharge to Placentia Avenue, which lead to the Perris Valley Storm Drain, then to San Jacinto River, then to Canyon Lake, and ultimately to Lake Elsinore. The difference between the existing and proposed flows are shown in the table below as extracted from the Hydrology and Hydraulic Analysis as prepared for this project.

DISCHARGE SUMMARY

STORM EVENT	Exiting Flow (cfs)	Proposed Flow (cfs)	Proposed Flow (cfs)	Proposed Flow (cfs)	Increased Flow (cfs)
		DMA 1A	DMA 1B	Total	
10	4.14	3.85	5.54	9.39	5.25
100	8.83	6.74	9.70	16.44	7.61

As quantified by the infiltration test report as prepared by Sladden Engineering and included in Appendix 3 of this report, the site was determined to be a good candidate for using infiltration to address storm water treatment. The proposed site layout does not provide adequate space for the implementation of an infiltration basin, so an underground infiltration gallery was selected. The project is proposing the use of a Cultec Recharger 150XLHD system. Full particulars are included in Appendix 6 of this report.

A.2 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.3 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 Storm Drain	NA	NA	NA
San Jacinto River –Reach 3	NA	MUN, ARG,GWR, REC1, REC2, WARM, WILD, RARE	3.6 Miles
Canyon Lake	Nutrients, Pathogens	MUN, ARG, REC1, REC2, WARM, WILD	8 Miles
Lake Elsinore	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs (Polychlorinated Biphenyls), Sediment Toxicity, Unknown Toxicity	REC1, REC2, WARM, WILD	13 Miles

A.4 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 type of tenants)	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* Grading Permit	☒ Y	☐ N

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

Section B: Optimize Site Utilization (LID Principles)

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?

The current undeveloped site sheet flow in a eastern direction to the adjacent property, then to Placentia Ave. The proposed site will discharge to an underground infiltration system. Overflow will discharge to Placentia Ave. via a parkway drain located at the southeast corner of the site.

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

The undeveloped site consist of mostly dirt and weeds, therefore protecting the existing vegetation is not feasible.

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

The existing infiltration rates for the two test location are 1.08 in/hr and 0.61 in/hr. The natural infiltration capacity will be preserved and utilized for the underground infiltration system.

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

The landscape areas on-site have been maximized thereby minimizing the impervious area.

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

Runoff from the site will be directed to the underground infiltration system designed to capture the VBMP. The underground system has a pervious bottom.

Section C: Delineate Drainage Management Areas (DMAs)

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

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
DMA-1A	Concrete/Asphalt & Roofs	85,970 sf	Type D
DMA-1A	Ornamental Landscaping	7,057 sf	Type D
DMA-1B	Concrete/Asphalt & Roofs	131,738 sf	Type D
DMA-1B	Ornamental Landscaping	4,019 sf	Type D
DMA-2	Ornamental Landscaping	2,781 sf	Type A
DMA-3	Ornamental Landscaping	33,410 sf	Type A
DMA-4	Ornamental Landscaping	758 sf	Type A

[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)
DMA-2	2,781 sf	T.B.D.	T.B.D.
DMA-3	33,410 sf	T.B.D.	T.B.D.
DMA-4	758 sf	T.B.D.	T.B.D.

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]

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

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

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

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

DMA Name or ID	BMP Name or ID
DMA-1A & DMA-1B	Underground Infiltration System (Cultec Stormwater System)

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Geotechnical Report

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site...	YES	NO
...have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
...have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
...have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
...have measured in-situ infiltration rates of less than 1.6 inches / hour?		X
If Yes, list affected DMAs:		
...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: N/A

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

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

Total Area of Impervious Surfaces: N/A

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: 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 irrigated area that would be required.

Minimum required irrigated area: N/A

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

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
N/A	N/A

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: N/A

Project Type: 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 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: N/A

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: 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 toilet users that would be required.

Minimum number of toilet users: N/A

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

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
N/A	N/A

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	
DMA-1A & DMA-1B	☒	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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 Co-permittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Co-permittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Cultec Underground Infiltration System*		
	[A]		[B]	[C]	[A] x [C]			
DMA-1A	85,970	Concrete or Asphalt or Roofs	1	0.89	76,685.2			
DMA-1A	7,057	Ornamental Landscaping	0.1	0.11	779.5			
DMA-1B	131,738	Concrete or Asphalt or Roofs	1	0.89	117,510.3			
DMA-1B	4,019	Ornamental Landscaping	0.1	0.11	443.9	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	228,784				195,418.9	0.65	$[F] = \frac{[D]x[E]}{12}$ 10,585.19	10,762.2

[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 ft²)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft²)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft²)	P[6]	P	P[1]	P[1]	P[4]	P[1]	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☒	☒	☒	☒	☒	☒	☒

P = Potential

N = Not Potential

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

[2] A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

[3] A potential Pollutant is land use involving animal waste

[4] Specifically petroleum hydrocarbons

[5] Specifically solvents

[6] Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

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

[1]Cannot Exceed 50%

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

E.3 Sizing Criteria

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

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
N/A						*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

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

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

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

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

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

E.4 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

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

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

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

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

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

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

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

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (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:

According to the updated HCOC Applicability Map provided in Appendix 7, the project site is not a susceptible area and does not needs to be mitigated for hydromodification impacts, therefore HCOC Exemption 3 now applies to the project. In addition, the site discharges to an engineered, earthen, and maintained channel (Perris Valley Storm Drain).

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 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 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".

		Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Landscape/Outdoor Pesticide Use	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. 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 interaction.	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/
Refuse Areas	Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar. Refuse areas will be designed with permanent covers.	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

Industrial Processes	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 Handbook at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for; Industrial, Commercial Facilities" at http://rcflood.org/stormwater/
Loading Docks		Move loaded and unloaded items indoors as soon and possible. See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Roofing, gutters, and trim	Avoid roofing, gutters and trim made of copper or other unprotected metals that may leach into runoff.	
Plaza, 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.

Section H: Construction Plan Checklist

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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BMP-1A and 1B	Underground Infiltration System (Cultec Stormwater System)	Preliminary Grading Plan & WQMP Plan	33° 49' 26.07" N 117° 12' 55.44" W

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism: Dedeaux Properties

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

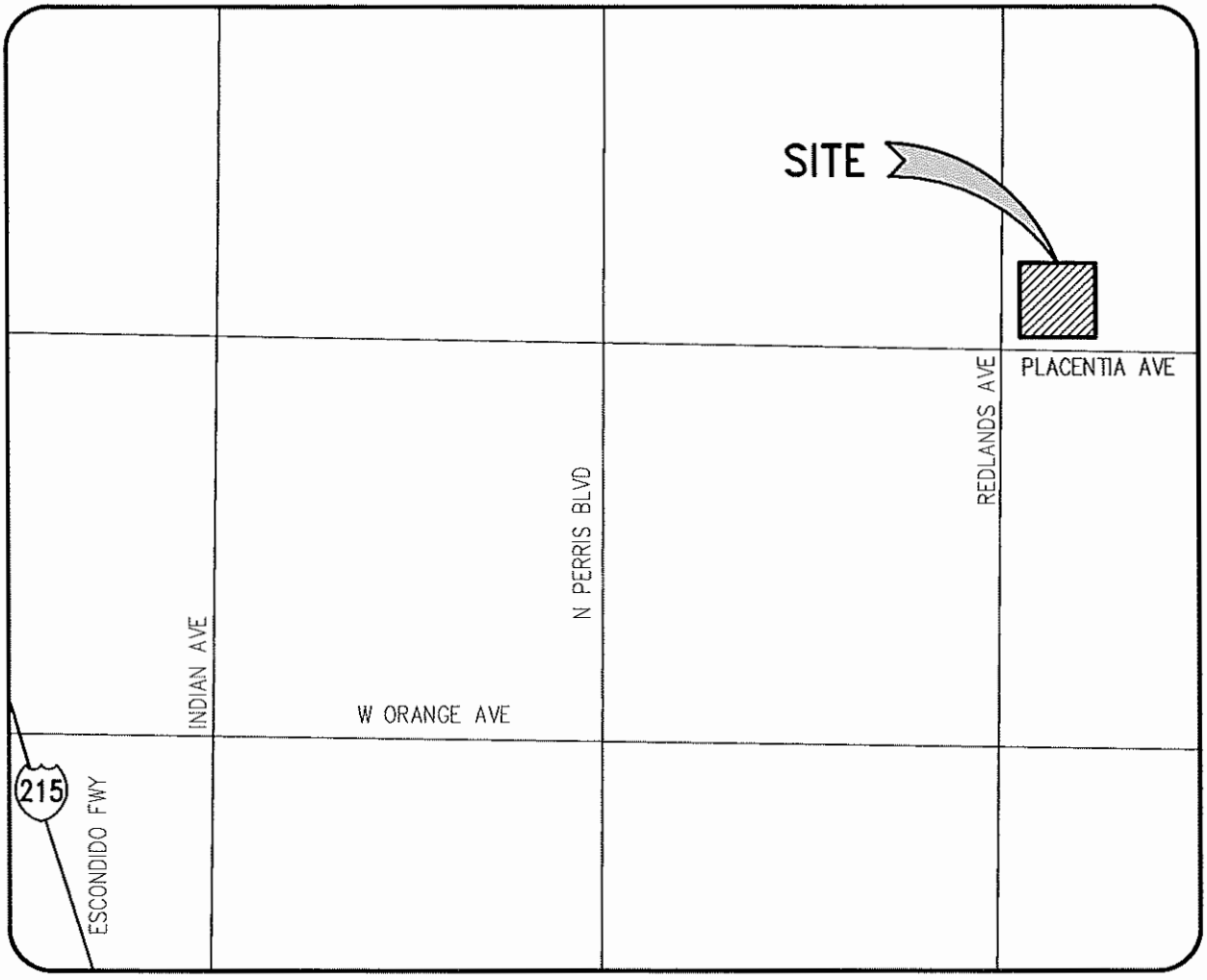
☐ Y ☒ N

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

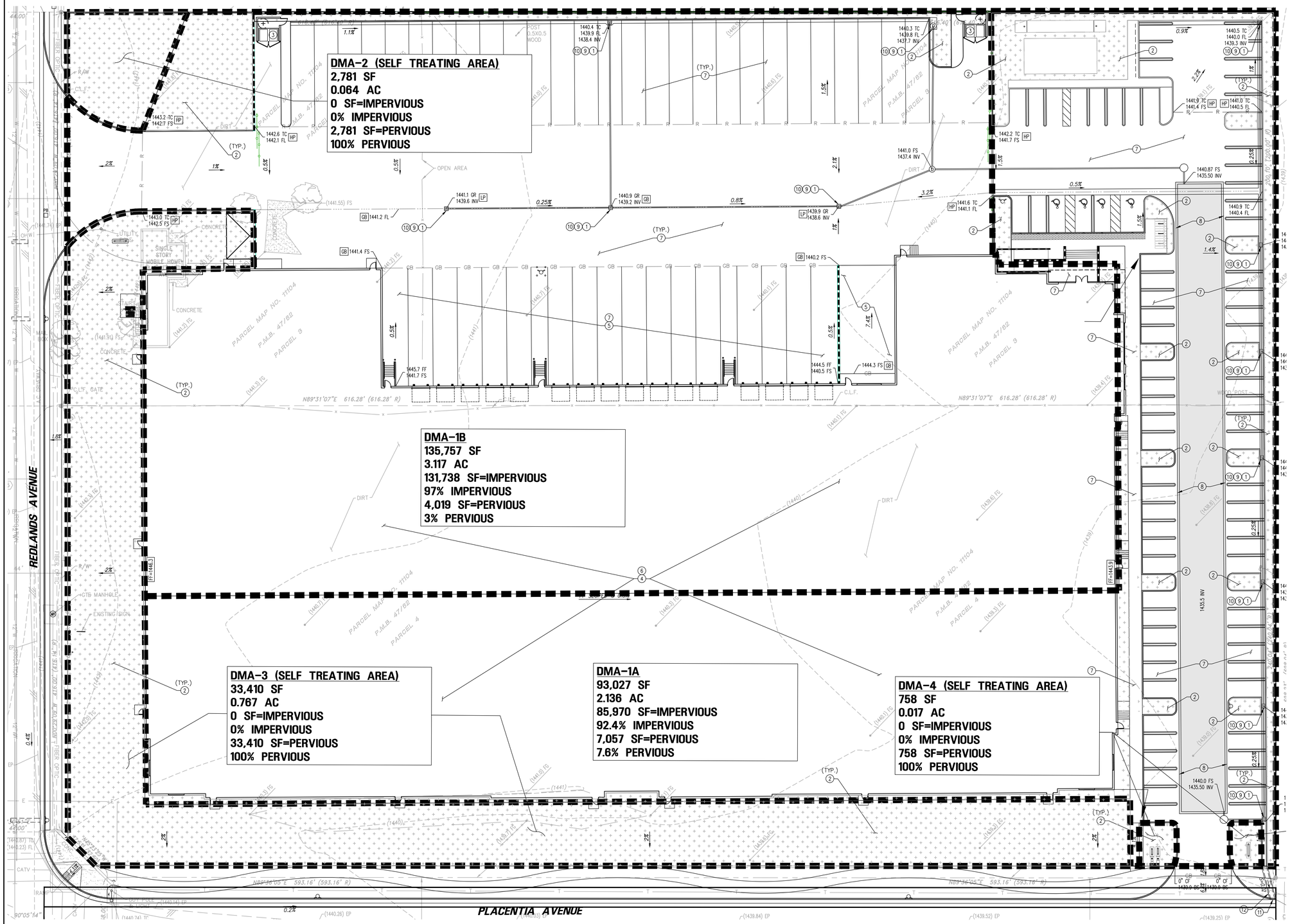
TO BE COMPLETED AT TIME OF FWQMP.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



VICINITY MAP
NOT TO SCALE



LEGEND

DMA-1	DRAINAGE AREA NAME
16,784 SF	DRAINAGE AREA (SF)
0.385 AC	DRAINAGE AREA (ACRES)
7.11 SF=IMPERVIOUS	IMPERVIOUS AREA (SF)
4% IMPERVIOUS	IMPERVIOUS AREA PERCENTAGE
16,073 SF=PERVIOUS	PERVIOUS AREA (SF)
96% PERVIOUS	PERVIOUS AREA PERCENTAGE

PATH OF FLOW

STORM DRAIN

DRAINAGE SUBAREA BOUNDARY

DRAINAGE BOUNDARY

IMPERVIOUS AREA (BUILDING, TRASH ENCLOSURE, AC PAVEMENT, SIDEWALK)

PERVIOUS AREA (LANDSCAPE)

CULTEC UNDERGROUND INFILTRATION SYSTEM

STRUCTURAL & SOURCE CONTROL BMPs

1. ON-SITE STORM DRAIN INLETS
2. LANDSCAPE/OUTDOOR PESTICIDES USE
3. REFUSE AREAS. SEE TRASH ENCLOSURE DETAIL ON SHEET 2.
4. INDUSTRIAL PROCESSES
5. LOADING DOCKS
6. TYPICAL DOUWNSPOUT DETAIL ON SHEET 2.
7. PLAZA, SIDEWALKS, AND PARKING LOTS
8. CULTEC UNDERGROUND INFILTRATION SYSTEM (10,762.2 cu.ft.) PER DETAIL ON SHEET 2.
9. INSTALL OLDCASTLE FLOGARD FOSSIL FILTER INSERT PER DETAIL ON SHEET 2.
10. STENCIL "NO DUMPING-DRAINS TO RIVER"
11. DISCHARGE POINT.
12. PARKWAY CULVERT.

REGISTERED PROFESSIONAL ENGINEER — CRAIG S. DI RITO — No. 76920 — CIVIL — STATE OF CALIFORNIA

20 10 0 20 40 60
SCALE: 1"=20'

THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

NO.	REVISIONS	DATE

Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1915 W. Orangewood Ave., Suite 101, Orange, CA 92868 (714) 935-0265 Truxaw.com

POST CONSTRUCTION BMP SITE PLAN
REDLANDS INDUSTRIAL FACILITY
P22-00008
NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE
IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

DATE	5-19-22
DRAWN BY	MLD
CHECKED BY	CDB
JOB NO.	DED21077
SHEET NO.	1 OF 2 SHEETS

CULTEC Stormwater Design Calculator

Date:	February 02, 2022

Project Information:

Redlands Industrial Facility
NEC of Redlans Ave. and Placentia Ave.
Perris
CA
Riverside

Project Number:	DED21077

Calculations Performed By:

Michael DeLaGarza
Joseph C. Truxaw & Associates, Inc.
1915 W. Orangewood Ave., Suite 101
Orange CA
92868
Orange
714-935-0125
Michael DeLaGarza@truxaw.com

RECHARGER 150XLHD

Recharger 150XLHD Chamber Specifications

Height	**18.5**	inches
Width	**33.0**	inches
Length	**11.00**	feet
Installed Length	**10.25**	feet
Bare Chamber Volume	**27.19**	cu. feet
Installed Chamber Volume	**47.31**	cu. feet

Breakdown of Storage Provided by Recharger 150XLHD Stormwater System

Within Chambers	**5,914.86**	cu. feet
Within Feed Connectors	**5.46**	cu. feet
Within Stone	**4,841.84**	cu. feet
Total Storage Provided	**10,762.2**	**cu. feet**
Total Storage Required	10585.19	cu. feet

Materials List

Recharger 150XLHD

Total Number of Chambers Required	**217**	**pieces**
Separator Row Chambers	**31**	pieces
Starter Chambers	**7**	pieces
Intermediate Chambers	**203**	pieces
End Chambers	**7**	pieces
HVLV FC-24 Feed Connectors	**12**	pieces
CULTEC No. 410 Non-Woven Geotextile	**2402**	sq. yards
CULTEC No. 4800 Woven Geotextile	**384**	feet
Stone	**512**	cu. yards

Separator Row Qty Included in Total

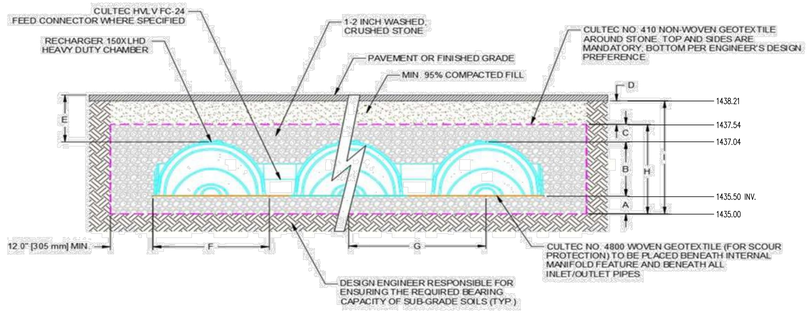
Based on 2 Internal Manifolds

Bed Detail

Bed Layout Information

Number of Rows Wide	**7**	pieces
Number of Chambers Long	**31**	pieces
Chamber Row Width	**22.25**	feet
Chamber Row Length	**318.50**	feet
Bed Width	**24.25**	feet
Bed Length	**320.50**	feet
Bed Area Required	**7772.13**	sq. feet
Length of Separator Row	**318.50**	feet

Bed detail for reference only. Not project specific. Not to scale.



Conceptual graphic only. Not job specific.

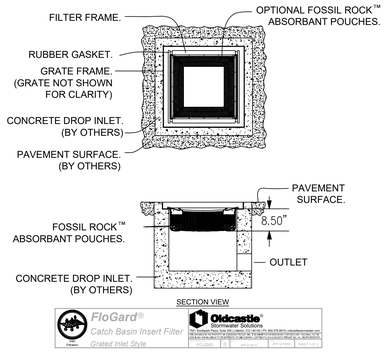
Cross Section Table Reference

A	Depth of Stone Base	**6.0**	inches
B	Chamber Height	**18.5**	inches
C	Depth of Stone Above Units	**6.0**	inches
D	Depth of 95% Compacted Fill	**8.0**	inches
E	Max. Depth Allowed Above the Chamber	**12.00**	feet
F	Chamber Width	**33.0**	inches
G	Center to Center Spacing	**3.25**	feet
H	Effective Depth	**2.54**	feet
I	Bed Depth	**3.21**	feet

CULTEC, Inc.
P.O. Box 280
Brookfield, CT 06804 USA

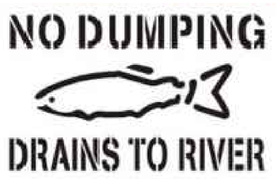
Phone: 203-775-4416
tech@cultec.com
www.cultec.com

8 CULTEC INFILTRATION SYSTEM SECTION

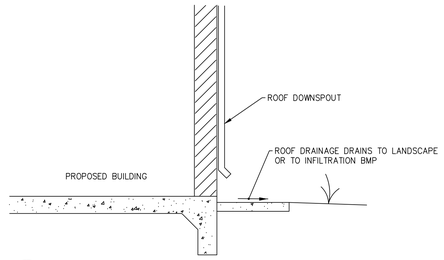


MODEL FG-M24

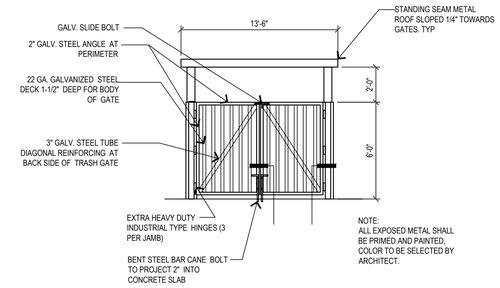
9 CATCH BASIN FOSSIL FILTER INSERTS



10 STORM DRAIN STENCILING



6 TYPICAL DOWNSPOUT DETAIL



3 TRASH ENCLOSURE DETAIL

THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

NO.	REVISIONS	DATE

Prepared by:
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POST CONSTRUCTION BMP SITE PLAN
REDLANDS INDUSTRIAL FACILITY
P22-00008
NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE
IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

DATE	5-19-22
DRAWN BY	MLD
CHECKED BY	CDB
JOB NO.	DED21077
SHEET NO.	2

OF 2 SHEETS

DMA-2 (SELF TREATING AREA)
2,781 SF
0.064 AC
0 SF=IMPERVIOUS
0% IMPERVIOUS
2,781 SF=PERVIOUS
100% PERVIOUS

DMA-1B
135,757 SF
3.117 AC
131,738 SF=IMPERVIOUS
97% IMPERVIOUS
4,019 SF=PERVIOUS
3% PERVIOUS

DMA-3 (SELF TREATING AREA)
33,410 SF
0.767 AC
0 SF=IMPERVIOUS
0% IMPERVIOUS
33,410 SF=PERVIOUS
100% PERVIOUS
TYP.

DMA-1A
93,027 SF
2.136 AC
85,970 SF=IMPERVIOUS
92.4% IMPERVIOUS
7,057 SF=PERVIOUS
7.6% PERVIOUS

DMA-4 (SELF TREATING AREA)
758 SF
0.017 AC
0 SF=IMPERVIOUS
0% IMPERVIOUS
758 SF=PERVIOUS
100% PERVIOUS

UNDERGROUND DETENTION SYSTEM

REDLANDS AVENUE

PLACENTIA AVENUE

LEGEND

DMA-1	SHADING AREA BASE
10,784 SF	SHADING AREA (SF)
0.386 AC	SHADING AREA (ACRE)
7.11 SF=IMPERVIOUS	IMPERVIOUS AREA (SF)
4% IMPERVIOUS	IMPERVIOUS AREA PERCENTAGE
10,073 SF=PERVIOUS	PERVIOUS AREA (SF)
96% PERVIOUS	PERVIOUS AREA PERCENTAGE

HYDROLOGY BOUNDARIES

LANDSCAPE AREA

DMA ID	DMA TYPE	DMA AREA (SF)	DCV (CF)	PROPOSE VOLUME (CF)
DMA-1A	TYPE-D	93,027	4,198	10,752.2
DMA-1B	TYPE-D	135,757	6,389	10,752.2
DMA-2	TYPE-A	2,781	N/A	N/A
DMA-3	TYPE-A	33,410	N/A	N/A
DMA-4	TYPE-A	758	N/A	N/A

20 10 0 20 40 60
SCALE: 1"=20'

THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

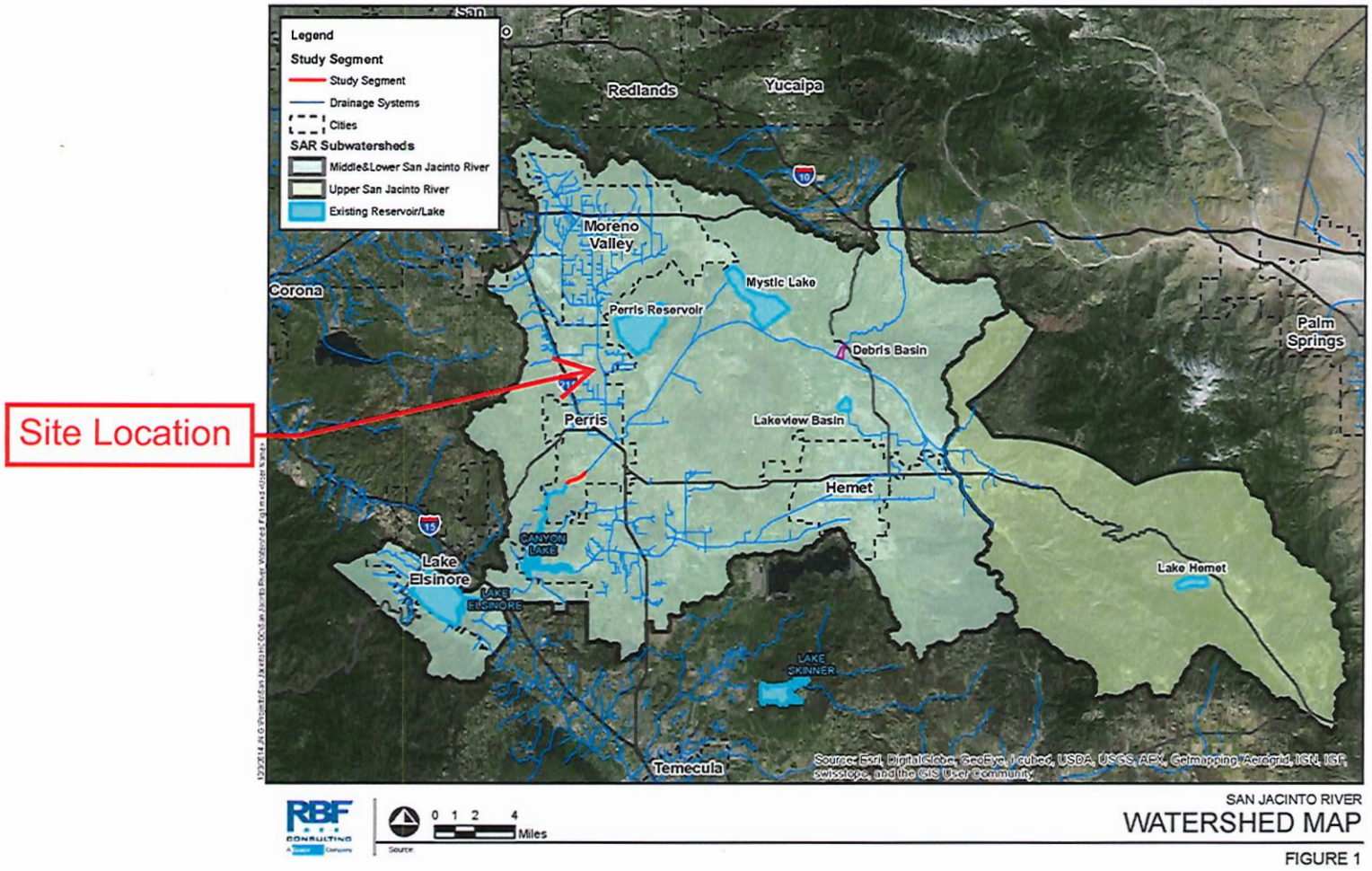
DATE
REVISIONS
NO.

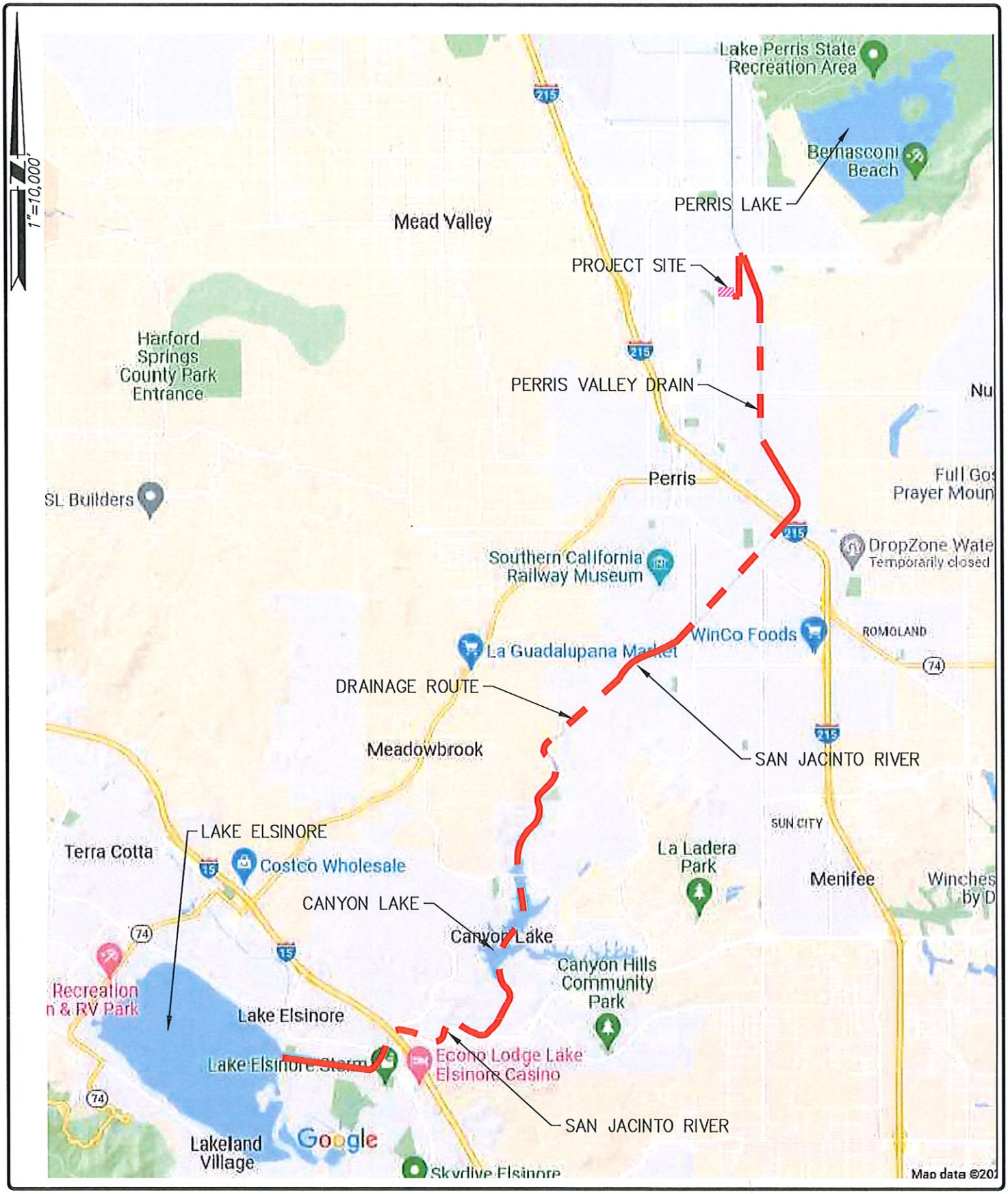
Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1915 W. Orangewood Ave., Suite 101, Orange, CA 92868 (714) 935-0255 Truxaw.com

DMA PLAN
REDLANDS INDUSTRIAL FACILITY
P22-00008
NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE
IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

DATE 5-19-22
DRAWN BY MLD
CHECKED BY CDB
JOB NO. 0621077
SHEET NO. 1
OF 1 SHEETS

Figure 1 - Watershed Map





Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1915 W. Orangewood Ave., Suite 101, Orange, CA 92868
(714) 935-0265 Truxaw.com

RECEIVING WATERS MAP
CITY OF PERRIS

DRAWN: KDL	CHKD: CDB		
DATE: 5/19/22	DATE: 5/19/22		


Redlands Ave
Placentia Ave
Lake View Dr
Redlands Ave
Placentia Ave
Placentia Ave
Placentia Ave
Google Earth
300 ft
N

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCEL MAY NOT COMPLY WITH LOCAL LOT-SPLIT OR BUILDING SITE ORDINANCES.

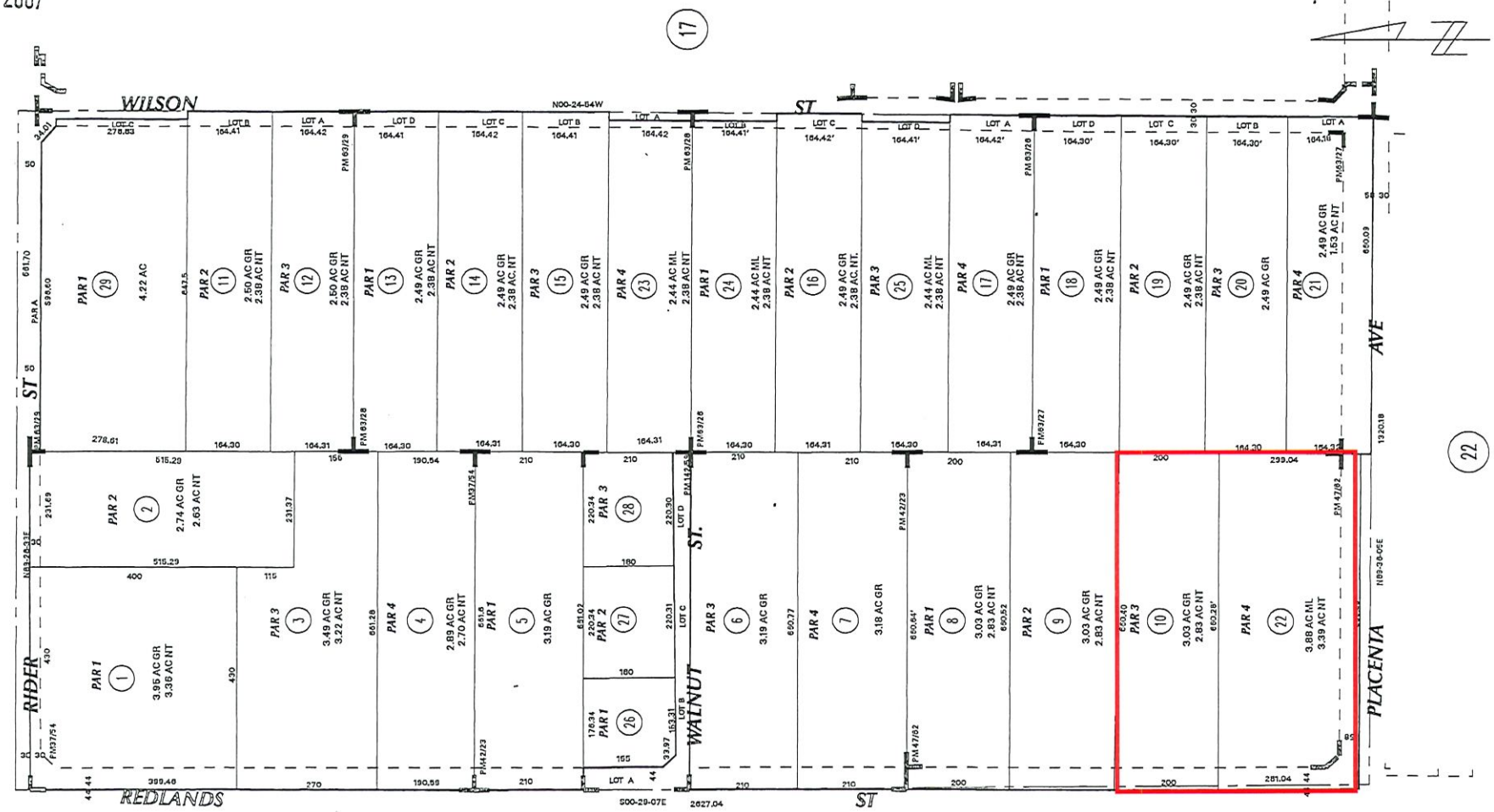
OCT 1 0 2007

POR.PROTRACTED SEC. 17 T.4S.,R.3W
CITY OF PERRIS

T.R.A. 008-804

300-21
306-38

1" = 200'
ANGLE = 90



PM 37/54 PARCEL MAP NO 7470
PM 42/23 PARCEL MAP NO 10,002
PM 47/62 PARCEL MAP NO 11,104
PM 63/26 PARCEL MAP NO 12,169
PM 63/27 PARCEL MAP NO 11,979
PM 142/58 PARCEL MAP NO 16395

ASSESSOR'S MAP BK300 PG.21
Riverside County, Calif.

Jul 2007

Appendix 2: Construction Plans

Grading and Drainage Plans

GENERAL NOTES

1. ALL WORK TO BE PERFORMED PER CITY OF PERRIS, RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT (R.C.T.D.), EASTERN MUNICIPAL WATER DISTRICT (E.M.W.D.), CALTRANS AND THE 2014 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) STANDARDS WITH CALIFORNIA SUPPLEMENT.
2. NOTIFY CITY ENGINEER, CITY OF PERRIS, AT (951) 943-6504, AT LEAST 24 HOURS PRIOR TO START OF CONSTRUCTION.
3. CONTRACTOR IS REQUIRED TO LOCATE AND ADJUST TO GRADE ALL EXISTING MANHOLES, METERS, AND VALVE COVERS FOR WATER, SEWER, TELEPHONE, ELECTRIC, CABLE TV AND OTHER FACILITIES AS REQUIRED (WHETHER CALLED-OUT OR NOT ON PLANS)
4. ALL STRIPING & LEGENDS SHALL BE REPLACED IN ACCORDANCE WITH THE STRIPING PLANS HEREIN. ALL STRIPING TO BE PAINT (TWO COATS) AND ALL MARKINGS (INCLUDING CROSSWALKS) TO BE THERMOPLASTIC. ALL STRIPING AND PAVEMENT MARKINGS TO BE PER 2014 M.U.T.C.D. STANDARDS WITH CALIFORNIA SUPPLEMENT.
5. ALL EXISTING A.C. AND CONCRETE TO BE SAW-CUT WHERE WIDENING IS TO TAKE PLACE OR ADJACENT TO WHERE CONCRETE IS TO BE CONSTRUCTED (1' MINIMUM).
6. ANY STOCKPILE OR STORAGE YARD ON PRIVATE PROPERTY MUST HAVE CITY'S AND OWNERS APPROVAL.
7. THE CITY INSPECTOR WILL MARK ALL CONCRETE REMOVALS PRIOR TO CONSTRUCTION. ALL CONCRETE WILL BE SAW-CUT WHERE REQUIRED PRIOR TO BEING REMOVED.
8. CONTRACTOR SHALL VERIFY THE EXISTENCE OF EXISTING SURVEY MONUMENTS AND PROTECT THEM IN PLACE. ANY SURVEY MONUMENTS MISSING AND/OR DAMAGED DURING CONSTRUCTION WILL HAVE TO BE RESET PRIOR TO PROJECT COMPLETION BY A QUALIFIED REGISTERED SURVEYOR.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT THE NEW WORK FROM VANDALISM UNTIL THE IMPROVEMENTS HAVE BEEN ACCEPTED BY THE CITY AND A NOTICE OF COMPLETION HAS BEEN FILED.
10. ALL ASPHALT REMOVALS TO BE MARKED BY THE CITY INSPECTOR PRIOR TO CONTRACTOR BEGINNING WORK ON THAT PARTICULAR STREET SEGMENT.
11. CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA AND OTHER UTILITY COMPANIES AS NEEDED TO COORDINATE FOR PROTECTION AND/OR ADJUSTMENTS OF UTILITIES, AS REQUIRED.
12. CONTRACTOR TO VISIT THE SITE AND FAMILIARIZE HIMSELF WITH THE WORK AND AREA PRIOR TO BIDDING AND NOTIFY THE ENGINEER OF RECORD OF DISCREPANCIES.
13. ALL DIMENSIONS ARE APPROXIMATE. CONTRACTOR TO VERIFY IN FIELD.
14. CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL TRAFFIC CONTROL DEVICES AS NEEDED AND PROVIDE TWO WAY ACCESS AT ALL TIMES THROUGH THE SITE. THE CONTRACTOR SHALL MAINTAIN THESE DEVICES AT ALL TIMES INCLUDING HOLIDAYS AND WEEKENDS. FLAGMAN SHALL BE UTILIZED AS REQUIRED TO PROVIDE TWO WAY TRAFFIC DURING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL IN COMPLIANCE WITH WATCH MANUAL, 2006 M.U.T.C.D., AND THE TRAFFIC PLANS PROVIDED PER SEPARATE PLANS.
16. THE CONTRACTOR SHALL APPLY TO, AND BE ISSUED AN ENCROACHMENT PERMIT BY THE CITY OF PERRIS BEFORE BEGINNING ANY WORK WITHIN AN EXISTING, CITY MAINTAINED PUBLIC STREET AND FOR UTILITY WORK WITHIN OFFERS OF DEDICATION FOR PUBLIC USE.
17. EXISTING PUBLIC STREETS, SHALL REMAIN OPEN TO THE PUBLIC DURING CONSTRUCTION AND SHALL BE MAINTAINED BY THE CONTRACTOR, UNLESS OTHERWISE PROVIDED IN THE PLANS AND SPECIFICATIONS. PUBLIC INCONVENIENCE WILL BE MINIMIZED AT ALL TIMES AND SUCH STREETS SHALL BE LEFT FREE OF DIRT AND DEBRIS AT THE END OF EACH WORKING DAY UNLESS PERMISSION IS OTHERWISE GRANTED BY THE CITY ENGINEER.
18. THE CONTRACTOR IS RESPONSIBLE FOR CLEARING AND GRUBBING THE PROPOSED WORK AREA AND DISPOSAL OF EXCESS OR UNDESIRABLE MATERIAL. CONTRACTOR SHALL RELOCATE OR CAUSE TO BE RELOCATED EXISTING CONFLICTING UTILITIES IF REQUIRED BY CONTRACT.
19. ANY PROPOSED DEVIATION FROM THESE PLANS BY THE CONTRACTOR MUST MEET CITY'S APPROVAL. THE CONTRACTOR IS RESPONSIBLE TO REIMBURSE THE CITY FOR ANY RELATED COST TO THE CITY ASSOCIATED WITH SUCH CHANGE. IN THIS EVENT, NO INCREASE IN CONTRACTOR'S COST WILL BE APPROVED.
20. CONTRACTOR IS REQUIRED TO INSTALL BLUE REFLECTIVE PAVEMENT MARKERS AT ALL FIRE HYDRANT LOCATIONS WITHIN THE PROJECT.
21. THE CONTRACTOR IS REQUIRED TO REMOVE ALL CONFLICTING STRIPING AND LEGENDS BY WET SANDBLASTING OR OTHER APPROVED METHODS.
22. APPLY WEED KILL TO ALL EXISTING WEEDS BETWEEN 1-3 WEEKS PRIOR TO CONSTRUCTION AND REMOVE WEEDS. WEEDS SHALL BE REMOVED FROM ALL EXISTING PAVEMENT, MEDIANS, CURB AND GUTTER, SIDEWALK (BETWEEN CURB AND SIDEWALK) AND WHEREVER IMPROVEMENTS ARE PROPOSED, AND UP TO 4.0' BEHIND E.P. OR CURB WHEN NO SIDEWALK EXISTS.
23. CONTRACTOR SHALL REPLACE ALL STRIPING, LEGENDS, AND SIGNS IF THEY ARE DAMAGED DURING CONSTRUCTION AT NO EXTRA COST TO THE CITY. EXISTING STRIPING WITHIN PROJECT VICINITY THAT BECOME DULL, SHALL BE REFRESHED AS DIRECTED BY THE CITY ENGINEER.
24. EXISTING TO PROPOSED CONCRETE PAVEMENT JOINTS SHALL BE CONSTRUCTED PER CALTRANS REVISED STANDARD PLAN RSP P10. ONE INCH MINIMUM DIAMETER DOWEL BARS SHALL BE USED AND AS APPROVED BY THE CITY ENGINEER. ANY CONFLICTING STRIPING SHALL BE REMOVED BY SANDBLASTING OR OTHER APPROVED METHOD.
25. ALL GRADING AND CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECTS SWPPP AND NOI. REFER TO NPDES NOTES ON EROSION CONTROL PLANS. CONSTRUCTION ACTIVITIES SHALL BE LIMITED FROM 7:00 AM TO 6:00 PM MONDAY TO FRIDAY.
26. ALL STREET SECTIONS ARE MINIMUM REQUIREMENTS, ADDITIONAL SOILS TESTS SHALL BE TAKEN AFTER ROUGH GRADING TO DETERMINE THE RECOMMENDED STREET SECTIONS REQUIREMENTS. USE RIVERSIDE COUNTY STD 401 IF EXPANSIVE SOILS ARE ENCOUNTERED.
27. ON-SITE LIGHTING, LANDSCAPE AND ADA LAYOUT TO BE APPROVED BY THE CITY OF PERRIS PLANNING DEPARTMENT.
28. WALLS/FENCE REQUIRE A SEPARATE PERMIT.
29. CONTRACTOR SHALL SUBMIT HAULING ROUTE FOR APPROVAL BY THE CITY ENGINEER PRIOR TO STARTING IMPORTATION/EXPORTATION OF DIRT.
30. VIDEO OF STORM DRAINAGE PIPES SHALL BE SUBMITTED FOR REVIEW BY THE CITY ENGINEER PRIOR TO PAVEMENT CAPPING AND CONCRETING.

GRADING NOTES

GRADING

1. ALL GRADING SHALL CONFORM TO THE 2016 CALIFORNIA BUILDING CODE CHAPTERS 17, 18 & APPENDIX CHAPTER J AS AMENDED BY ORD. 457.
2. ALL PROPERTY CORNERS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION/GRADING.
3. ALL WORK UNDER THIS GRADING PERMIT SHALL BE LIMITED TO WORK WITHIN THE PROPERTY LINES. ALL WORK WITHIN THE ROAD RIGHT-OF-WAY WILL REQUIRE SEPARATE PLANS AND SEPARATE REVIEW, APPROVAL (PERMIT) FROM THE TRANSPORTATION DEPARTMENT.
4. GRADING SHALL BE DONE UNDER THE SUPERVISION OF A SOILS ENGINEER IN CONFORMANCE WITH RECOMMENDATIONS OF THE PRELIMINARY SOILS INVESTIGATION BY NORCAL ENGINEERING DATED FEBRUARY 2, 2016.
5. COMPACTED FILL TO SUPPORT ANY STRUCTURES SHALL COMPLY WITH CBC SECTION 1803.5. PROJECTS WITHOUT PRELIMINARY SOILS REPORTS SHALL HAVE DETAILED SPECIFICATIONS SATISFYING THE REQUIREMENTS IN CBC SECTION 1803.5 PREPARED BY THE ENGINEER ON RECORD.
6. THE CONTRACTOR SHALL NOTIFY THE BUILDING AND SAFETY DEPARTMENT AT LEAST 24 HOURS IN ADVANCE TO REQUEST FINISH LOT GRADE AND DRAINAGE INSPECTION. THIS INSPECTION MUST BE APPROVED PRIOR TO BUILDING PERMIT FINAL INSPECTION FOR EACH LOT.
7. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT, TWO DAYS BEFORE DIGGING AT 1-800-422-4133.

CUT / FILL

8. MAXIMUM CUT AND FILL SLOPE = 2:1.
9. NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL AND OTHER DELETERIOUS MATERIAL. FILLS SHOULD BE PLACED IN THIN LIFTS (8-INCH MAX OR AS RECOMMENDED IN SOILS REPORT), COMPACTED AND TESTED AS GRADING PROGRESSES UNTIL FINAL GRADES ARE ATTAINED. ALL FILLS ON SLOPES STEEPER THAN 5 TO 1 (H/V) AND A HEIGHT GREATER THAN 5 FEET SHALL BE KEYED AND BENCHED INTO FIRM NATURAL SOIL FOR FULL SUPPORT. THE BENCH UNDER THE TOE MUST BE 10 FEET WIDE MIN.
10. THE SLOPE STABILITY FOR CUT AND FILL SLOPES OVER 30' IN VERTICAL HEIGHT, OR SLOPES STEEPER THAN 2:1 HAVE BEEN VERIFIED WITH A FACTOR OF SAFETY OF AT LEAST 1.5.
11. NO ROCK OR SIMILAR IRREDUCIBLE MATERIAL WITH A MAXIMUM DIMENSION GREATER THAN 12 INCHES SHALL BE BURIED OR PLACED IN FILLS CLOSER THAN 10 FEET TO THE FINISHED GRADE.

DRAINAGE AND EROSION/ DUST CONTROL

12. DRAINAGE ACROSS THE PROPERTY LINE SHALL NOT EXCEED THAT WHICH EXISTED PRIOR TO GRADING. EXCESS OR CONCENTRATED DRAINAGE SHALL BE CONTAINED ON SITE OR DIRECTED TO AN APPROVED DRAINAGE FACILITY.
13. PROVIDE A SLOPE INTERCEPTOR DRAIN ALONG THE TOP OF CUT SLOPES WHERE THE DRAINAGE PATH IS GREATER THAN 40 FEET TOWARDS THE CUT SLOPE.
14. PROVIDE 5 ' WIDE BY 1' HIGH BERM ALONG THE TOP OF ALL FILL SLOPES STEEPER THAN 3:1.
15. THE GROUND IMMEDIATELY ADJACENT TO THE BUILDING FOUNDATION SHALL BE SLOPED AWAY WITH 5% MIN. FOR A MIN. DISTANCE OF 10 HORIZONTAL FEET. SWALES WITHIN 10 FEET FROM BUILDING SHALL HAVE 2% MINIMUM SLOPE.
16. NO OBSTRUCTION OF NATURAL WATER COURSES SHALL BE PERMITTED.
17. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL (BEST MANAGEMENT PRACTICES, BMPS) SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
18. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS.
19. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST CONTINUE TO FUNCTION, PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT ADJOINING PROPERTIES DURING GRADING OPERATIONS.
20. FOR SLOPES 3 TO 1 (H/V) OR STEEPER:
    ALL SLOPES EQUAL TO OR GREATER THAN 3 ' IN VERTICAL HEIGHT, ARE REQUIRED TO BE PLANTED WITH GRASS OR ROSEA ICE PLANT (OR EQUAL) GROUND COVER AT A MAXIMUM SPACING OF 12" ON CENTER. SLOPES EXCEEDING 15 ' IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED SHRUBS NOT TO EXCEED 10' ON CENTER, OR TREES SPACED NOT TO EXCEED 20 ' ON CENTER OR SHRUBS NOT TO EXCEED 10 ', OR A COMBINATION OF SHRUBS AND TREES NOT TO EXCEED 15 '. IN ADDITION TO THE GRASS OR GROUND COVER. SLOPES THAT REQUIRE PLANTING SHALL BE PROVIDED WITH AN IN-GROUND IRRIGATION SYSTEM EQUIPPED WITH AN APPROPRIATE BACKFLOW DEVICE PER U.P.C., CHAPTER 10. THE SLOPE PLANTING AND IRRIGATION SYSTEM SHALL BE INSTALLED PRIOR TO PRECISE GRADING FINAL.

COMPLETION OF WORK

21. A REGISTERED CIVIL ENGINEER SHALL PREPARE FINAL COMPACTION REPORT/GRADING REPORT AND IT SHALL BE SUBMITTED FOR REVIEW AND APPROVAL. THE REPORT SHALL ALSO PROVIDE BUILDING FOUNDATION DESIGN PARAMETERS INCLUDING ALLOWABLE SOILS PRESSURES, EXPANSION INDEX AND REMEDIAL MEASURES IF EI>20, WATER SOLUBLE SULFATE CONTENT, CORROSIVITY AND REMEDIAL MEASURES IF NECESSARY.
22. EXCEPT FOR NON-TRACT SINGLE RESIDENTIAL LOT GRADING, THE COMPACTION REPORT SHALL INCLUDE THE SPECIAL INSPECTION VERIFICATIONS LISTED IN TABLE 1704.7 OF 2007 CBC.
23. A REGISTERED CIVIL ENGINEER SHALL SUBMIT TO THE BUILDING AND SAFETY DEPARTMENT WRITTEN CERTIFICATION OF COMPLETION OF GRADING IN ACCORDANCE WITH THE APPROVED GRADING PLAN PRIOR TO REQUESTING INSPECTION AND ISSUANCE OF THE BUILDING PERMIT. CERTIFICATION SHALL INCLUDE LINE GRADE, SURFACE DRAINAGE, ELEVATION, AND LOCATION OF PERMITTED GRADING ON THE LOT.

MISC NOTES

1. FOR ANY GRADING >5000 CY, PRE-GRADING MEETING SHALL BE HELD WITH ATTENDANCE OF PLAN CHECK ENGINEER, CONTRACTOR, SOIL ENGINEER, AND CIVIL ENGINEER AT OWNER'S EXPENSE. ALSO, GRADING CONTRACTOR SHALL SUBMIT PRELIMINARY CONSTRUCTION SCHEDULE PRIOR TO STARTING GRADING WORK AND SUBMIT REVISED CONSTRUCTION SCHEDULE WHENEVER MAJOR CHANGES OCCURS.
2. ALL COLLUVIUM AND ANY UNDOCUMENTED FILL SHOULD BE REMOVED TO A DEPTH WHERE BEDROCK IS EXPOSED. ESTIMATED DEPTHS OF REMOVAL ARE ANTICIPATED TO RANGE FROM APPROXIMATELY 1 TO 7 FEET.

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY ALL EXISTING FIELD CONDITIONS AND NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO VERIFY POINTS OF CONNECTION TO PIPES, INLETS, CURBS, GUTTERS, ETC. AND NOTIFY TRUXAW AND ASSOCIATES OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
3. REFER TO ARCHITECTURAL PLANS FOR BUILDING DIMENSIONS, BUILDING SETBACKS, CONCRETE COLORS AND FINISHES, STRUCTURAL DETAILS, WALKWAYS, EXPANSION JOINT LOCATIONS, UTILITIES, ETC.
4. ALL WORK SHALL BE DONE IN STRICT CONFORMANCE WITH CURRENT CITY OF PERRIS AND SPPWC STANDARDS. WORK SHALL ALSO CONFORM TO APPLICABLE BUILDING CODES (CA BUILDING CODE, CA PLUMBING CODE, ETC.) AS INTERPRETED BY THE CITY OF LA MIRADA. ALL WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED AS PER CURRENT ADA (AMERICANS WITH DISABILITIES ACT) STANDARDS INCLUDING BUT NOT LIMITED TO SLOPE, TRUNCATED DOMES, ETC.
5. ALL CONTRACTORS PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE THEMSELVES WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM THEIR OPERATIONS, WHETHER OR NOT SHOWN ON THESE PLANS.
6. EXISTING UNDERGROUND UTILITY LINE LOCATIONS WERE TAKEN FROM AVAILABLE RECORDS. OTHER UTILITIES MAY EXIST THAT ARE NOT PLOTTED HEREON.
7. EXISTING UNDERGROUND UTILITIES ARE TO BE RELOCATED BY THE CONTRACTOR AS REQUIRED TO AVOID CONFLICT WITH PROPOSED STRUCTURES. REFER TO PLANS FOR DETAILS.
8. CALL UNDERGROUND SERVICE ALERT FOR UNDERGROUND LOCATIONS 48 HOURS BEFORE YOU DIG. 811.
9. THE CONTRACTOR SHALL RENEW OR REPLACE ANY EXISTING TRAFFIC STRIPING AND/OR PAVEMENT MARKINGS, WHICH DURING HIS OPERATIONS HAVE BEEN EITHER REMOVED OR THE EFFECTIVENESS OF WHICH HAS BEEN REDUCED.
10. THE CONTRACTOR SHALL COMPLY WITH THE SOILS REPORT (AND ADDENDA) FOR THIS PROJECT AND ALL RECOMMENDATIONS FROM THE SOILS ENGINEER. (SEE INFORMATION AT BOTTOM RIGHT)
11. ALL TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON WAS OBTAINED FROM AN ALTA/ACSM TITLE SURVEY DATED DECEMBER 6, 2021 BY TRUXAW AND ASSOCIATES, INC.
12. THESE PLANS ARE BASED ON THE SITE PLAN PROVIDED TO TRUXAW AND ASSOCIATES ON 02-10-22.
13. ALL STORM DRAIN AND SEWER PIPE SHALL BE PLACED BEGINNING AT THE DOWNSTREAM POINT OF CONNECTION AND CONTINUING TO THE UPSTREAM TERMINUS. PIPE PLACEMENT SHALL BE CONTINUOUS. DEVIATIONS FROM THIS SEQUENCE WILL NOT BE PERMITTED. POTHOLING INFORMATION, WHERE REQUIRED, SHALL BE OBTAINED AND PROVIDED TO TRUXAW AND ASSOCIATES PRIOR TO CONSTRUCTION.
14. ALL IMPROVEMENTS BEYOND THE LIMITS OF GRADING ARE TO BE PROTECTED IN PLACE UNLESS NOTED OTHERWISE.

* BENCHMARK

ECR OF SOUTH DRIVEWAY CURB RETURN AS SHOWN ON STREET IMPROVEMENT PLANS FOR TPM 33953 INDIAN PALMS BUSINESS PARK, INDIAN AVENUE, CITY OF PERRIS, CALIFORNIA, CITY FILE NO. P8-837, P-388

ELEVATION = 1456.53 FEET (NAVD 88)

* BASIS OF BEARINGS

THE BEARING OF S 0°27'00" E AS THE EASTERLY LINE OF PARCELS 3 AND 4 PER PARCEL MAP NO. 31104, BOOK 47, PAGE 82 WAS USED AS THE BASIS OF BEARINGS FOR THIS SURVEY.

* UTILITY PROVIDERS

SEWER .... EASTERN MUNICIPAL WATER DISTRICT .... (951) 928-3777
STORM DRAIN .... CITY OF PERRIS .... (951) 657-3280
WATER .... EASTERN MUNICIPAL WATER DISTRICT .... (951) 928-3777
ELECTRIC .... SOUTHERN CALIFORNIA EDISON .... (951) 928-8293
CABLE .... CHARTER COMMUNICATIONS .... (951) 405-1766
GAS .... SOUTHERN CALIFORNIA GAS .... (951) 436-1666
TELEPHONE .... FRONTIER COMMUNICATIONS .... (877) 462-8540

* FLOOD ZONE

COMMUNITY NUMBER: 060258 1430H, EFFECTIVE DATE: AUGUST 18, 2014
ZONE X: PROPERTY NOT IN A SPECIAL FLOOD HAZARD AREA. AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
FLOOD INSURANCE IS AVAILABLE, BUT NOT REQUIRED.
INFORMATION OBTAINED FROM CERTIFIED FLOOD SYSTEMS, INC. ON 11/10/2021

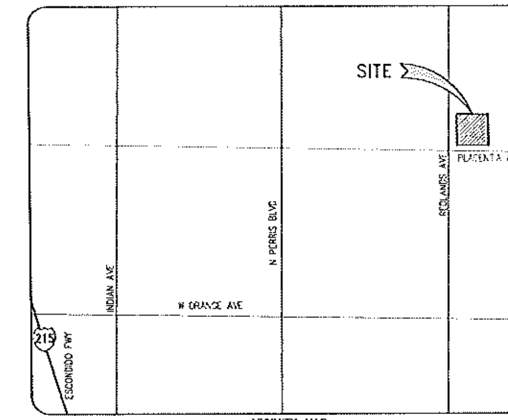
LEGEND

AB = AGGREGATE BASE
AC = ASPHALT CONCRETE
BLK = CONCRETE BLOCK
BS = BACK OF SIDEWALK
CB = CATCH BASIN
CF = CURB FACE
CL = CENTERLINE
CLF = CHAIN LINK FENCE
CO = CLEANOUT
DCV = DETECTOR CHECK VALVE
DS = ROOF DOWNSPOUT
EG = EDGE OF GUTTER
EP = EDGE OF PAVEMENT
FD = FOUND
FDC = FIRE DEPT. CONNECTION
FF = FINISHED FLOOR
FG = FINISHED GRADE
FH = FIRE HYDRANT
FL = FLOW LINE
FS = FINISHED SURFACE
GB = GRADE BREAK
GM = GAS METER
GR = TOP OF GRATE
GV = GAS VALVE
HP = HIGH POINT
HT = HEIGHT
ICV = IRRIGATION CONTROL VALVE
INV = INVERT
IP = IRON PIPE
LS = LIGHT STANDARD
L&T = LEAD & TAG
MH = MANHOLE
NG = NATURAL GROUND
N&T = NAIL & TAG
OHW = OVERHEAD WIRE
PB = PULL BOX
PCC = CONCRETE
PIV = POST INDICATOR VALVE
PL = PROPERTY LINE
RD = ROOF DRAIN
RWH = REDWOOD HEADER
SCB = SIGNAL CONTROL BOX
SMH = SEWER MANHOLE
SPK = SPIKE
SW = SIDEWALK
TC = TOP OF CURB
TE = TRASH ENCLOSURE
TP = TELEPHONE POLE
TRAN = TRANSITION
TRANS = TRANSFORMER
TRW = TOP OF RETAINING WALL
TW = TOP OF WALL
UG = UNDERGROUND
UP = UTILITY POLE
VAR = VARIABLE
W = WASHER
WDF = WOOD FENCE
WM = WATER METER
WV = WATER VALVE
N = NORTH
S = SOUTH
E = EAST
W = WEST
NLY = NORTHERLY
SLY = SOUTHERLY
ELY = EASTERLY
WLY = WESTERLY
N/O = NORTH OF
S/O = SOUTH OF
E/O = EAST OF
W/O = WEST OF
PL = PROPERTY LINE
CL = CENTERLINE
R/W = RIGHT OF WAY
Δ = DELTA
R = RADIUS
L = LENGTH
T = TANGENT
M = MEASURED DATA
C = CALCULATED DATA
(RAD) = RADIAL BEARING
PRO = PROPORTIONATE MEASUREMENT
(ZDZ'S' R) = RECORD DATA
2'02'S' M = MEASURED DATA
2'02'S' PRO = PRORATED DATA
2'02'S' C = CALCULATED DATA
(4270.0) TC = EXISTING ELEVATION
4270.0 TC = DESIGN ELEVATION
—— CATV —— = CABLE TV LINE
—— E —— = ELECTRICAL LINE
—— FW —— = FIRE WATER LINE
—— G —— = GAS LINE
—— GB —— GB —— = GRADE BREAK LINE
—— R —— R —— = RIDGE LINE
—— S —— = SEWER LINE
—— SD —— = STORM DRAIN LINE
—— T —— = TELEPHONE LINE
—— W —— = WATER LINE

SYMBOLS

FIRE HYDRANT
STREET LIGHT
TRAFFIC SIGNAL
TRAFFIC SIGNAL ARM & POLE
LIGHT STANDARD
UTILITY POLE
GUY WIRE & ANCHOR
WATER METER
GAS METER
WATER VALVE
GAS VALVE
PULL BOX
GRATE INLET
SIGN
VENT
SEWER MANHOLE
STORM DRAIN MANHOLE
TELEPHONE MANHOLE
MANHOLE
SEWER CLEANOUT
MONITORING WELL
HANDICAP PARKING STALL
LANDSCAPED AREA
PROTECT IN PLACE
REMOVE AND DISPOSE OFFSITE
RELOCATE
PLOTTABLE EASEMENT ITEM NO. PER TITLE REPORT
EXIST. CONTOUR
4270 DESIGN CONTOUR
TREE

* SOURCE OF TOPOGRAPHIC AND BOUNDARY INFORMATION	
INFORMATION SHOWN ON THESE PLANS WERE TAKEN FROM THE PLAN REFERENCED BELOW.	
DATE OF SURVEY:	DECEMBER 6, 2021
ALTA SURVEY BY:	TRUXAW AND ASSOCIATES, INC. 1915 W. ORANGEWOOD AVE, SUITE 101 ORANGE, CA 92868 (714) 935-0265 JOB # DED21077



VICINITY MAP
NOT TO SCALE

SHEET INDEX

C-1 TITLE SHEET
C-2 CONCEPTUAL GRADING PLAN
C-3 SECTIONS AND DETAILS
C-4 CONCEPTUAL UTILITY PLAN

SOILS ENGINEER

THESE PLANS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GEOTECHNICAL RECOMMENDATIONS MADE BY:

SLADDEN ENGINEERING
450 EGAN AVENUE
BEAUMONT, CA 92223
(951) 845-7743
PROJECT No. 644-21082
REPORT DATE: JANUARY 4, 2022

CONTRACTOR SHALL OBTAIN A COPY OF THIS REPORT AND FOLLOW THE RECOMMENDATIONS THEREIN. NOTIFY TRUXAW AND ASSOCIATES OF ANY DISCREPANCIES OR FIELD CHANGES PRIOR TO CONSTRUCTION.

EARTHWORK QUANTITY ESTIMATES

RAW CUT:	1,000	CU. YD.
RAW FILL:	19,000	CU. YD.

THE ABOVE QUANTITIES DO NOT REFLECT ANY SHRINKAGE, SHELLING, SUBSIDENCE, STRIPPING LOSS, OVER EXCAVATION, DEMOLITION LOSSES, FOOTING SPOILS, OR ANY SPECIAL CONDITIONS THAT MAY BE SPECIFIED IN THE APPLICABLE GEOTECHNICAL REPORTS AND ARE FOR REFERENCE AND FEE PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING HIS OWN QUANTITIES FOR CONSTRUCTION AND CONTRACT PURPOSES.

THESE QUANTITIES ARE APPROXIMATE ONLY AND DO NOT INCLUDE OVEREXCAVATION QUANTITIES, IMPORT OR EXPORT QUANTITIES.

THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

PLAN PREPARED FOR
DEDEAUX PROPERTIES
100 WILSHIRE BOULEVARD, SUITE 250
SANTA MONICA, CA 90401

ARCHITECT
ARCHITECTS ORANGE
144 NORTH ORANGE STREET
ORANGE, CA 92866

NO.	REVISIONS	DATE

Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1915 W. Orangewood Ave., Suite 101, Orange, CA 92868 (714) 935-0265 Truxaw.com

CONCEPTUAL GRADING PLAN

NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE

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

DATE: 5-19-22
DRAWN BY: KDL
CHECKED BY: CDB
JOB NO.: DED21077
SHEET NO.: C-1
OF 4 SHEETS

MATCHLINE-SEE BELOW RIGHT

MATCHLINE-SEE ABOVE LEFT

PROPOSED RAISED MEDIAN ISLAND PER PERRIS VALLEY COMMERCE CENTER SPECIFIC PLAN

PROPOSED STRIPING

PROPOSED STRIPING PER COMMERCE CENTER SPECIFIC PLAN

REDLANDS AVENUE

PLACENTIA AVENUE

LIMITS OF GRADING

TRUCK ACCESS ONLY

3' DEDICATION

PROPOSED R/W

PROPOSED 10'(W)X7'(H) DUAL R.C.B.

AUTO ACCESS ONLY

DIRECT ROOF DRAINS TO EAST SIDE OF BUILDING

UNDERGROUND DETENTION SYSTEM

(5) 6" STEPS

(7) 5" STEPS

FF VARIES FROM 1446.3 TO 1443.9

PROPOSED INDUSTRIAL BUILDING

NOTE: PRIOR TO GRADING, CONTRACTOR SHALL VERIFY THICKNESS OF BUILDING SLAB AND SAND SECTION WITH APPROVED FOUNDATION PLAN AND SOILS REPORT.

FF SLOPED @ 0.5%

THIS PLAN IS:

PRELIMINARY

(NOT FOR CONSTRUCTION)

NOTICE TO CONTRACTOR

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IMPORTANT NOTICE

Section 4216 of the Government Code requires a Dig Alert Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number call Underground Service Alert CALL 811 two working days before you dig.

CONSTRUCTION NOTES (PRIVATE IMPROVEMENTS):

1. CONSTRUCT 6-INCH CONCRETE CURB PER DETAIL ON SHEET 3.
2. CONSTRUCT 6-INCH CONCRETE CURB & GUTTER PER DETAIL ON SHEET 3.
3. CONSTRUCT CONCRETE V-GUTTER PER DETAIL ON SHEET 3.
4. PAVE WITH 7-INCH PCC CONCRETE OVER COMPACTED SUBGRADE PER THE RECOMMENDATIONS OF THE SOILS ENGINEER.
5. PAVE WITH 4-INCH AC OVER 6-INCH AB OVER COMPACTED SUBGRADE PER THE RECOMMENDATIONS OF THE SOILS ENGINEER. (DRIVE AISLE)
6. PAVE WITH 3-INCH AC OVER 4-INCH AB OVER COMPACTED SUBGRADE PER THE RECOMMENDATIONS OF THE SOILS ENGINEER. (PARKING STALLS)
7. CONSTRUCT CONCRETE SIDEWALK PER ARCHITECTURAL PLANS.
8. CONSTRUCT CONCRETE STAIRS PER ARCHITECTURAL PLANS.
9. CONSTRUCT CONCRETE RAMP C.B.C. REQUIREMENTS.
10. CONSTRUCT 24-INCH BY 24-INCH CONCRETE CATCH BASIN PER DETAIL ON SHEET 3.
11. UNDERGROUND STORMWATER INFILTRATION SYSTEM.
12. TRASH ENCLOSURE PER ARCHITECTURAL PLANS.
13. CONSTRUCT CONCRETE DOUBLE CURB & GUTTER.
14. CONSTRUCT RETAINING WALL PER STRUCTURAL PLANS. UNDER SEPARATE PLAN CHECK AND PERMIT.
15. INSTALL R35H "RIGHT TURN ONLY" SIGN.
16. NOT USED.
17. CONSTRUCT CONCRETE SCREEN WALL PER ARCHITECTURAL PLANS.
18. DECORATIVE PAVEMENT PER ARCHITECTURAL PLANS.
19. INSTALL BOLLARDS.
20. CONSTRUCT CONCRETE PAD.

CONSTRUCTION NOTES (PUBLIC IMPROVEMENTS):

50. SAWCUT AND REMOVE EXISTING CURB, GUTTER, CONCRETE SIDEWALK, A.C. PAVEMENT AND LANDSCAPE TO THE EXTENTS SHOWN.
51. CONSTRUCT 8-INCH CONCRETE CURB & GUTTER PER CITY OF RIALTO STANDARD NO. SC-200.
52. CONSTRUCT CONCRETE SIDEWALK PER CITY OF RIALTO STANDARD NO. SC-203.
53. CONSTRUCT CONCRETE DRIVEWAY APPROACH WITH CURB RETURNS PER COUNTY OF RIVERSIDE STANDARD NO. 207A.
54. PATCH WITH FULL-DEPTH (8-INCH MIN) AC PAVEMENT.
55. CONSTRUCT CURB OUTLET STRUCTURE (INLET TYPE 11) PER SAN BERNARDINO COUNTY TRANSPORTATION DEPARTMENT STANDARD 210.
57. CONSTRUCT 10'(W) X 7'(H) DUAL BOX CULVERT.
58. CONSTRUCT CURB RETURN PER COUNTY OF RIVERSIDE STANDARD NO. 855.
62. INSTALL R6-2R "ONE WAY" SIGN.
63. 14' WIDE PAINTED MEDIAN.

SCALE: 1"=20'

NO.	REVISIONS	DATE

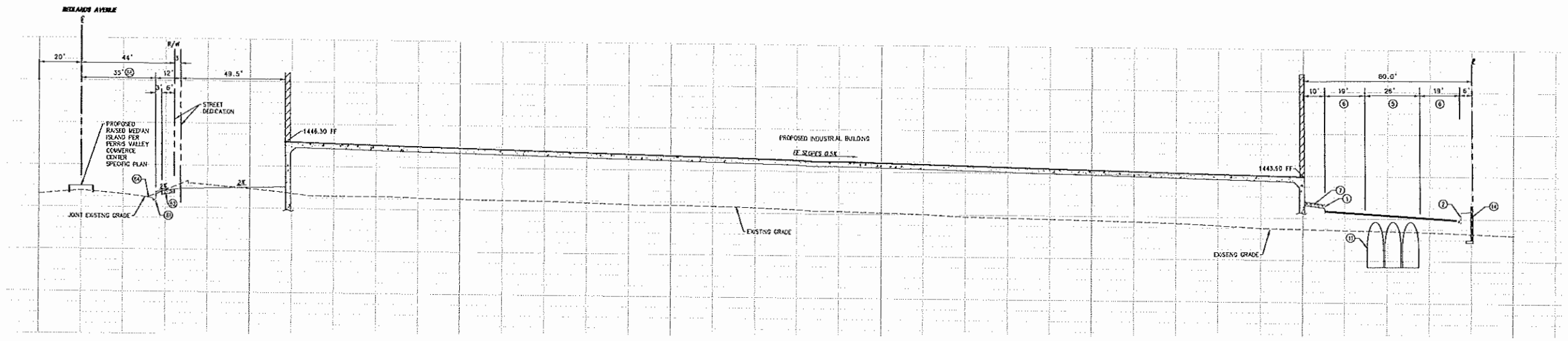
Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1515 W. Grangewood Ave., Suite 101, Orange, CA 92868 (714) 935-0265 Truxaw.com

CONCEPTUAL GRADING PLAN

NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE

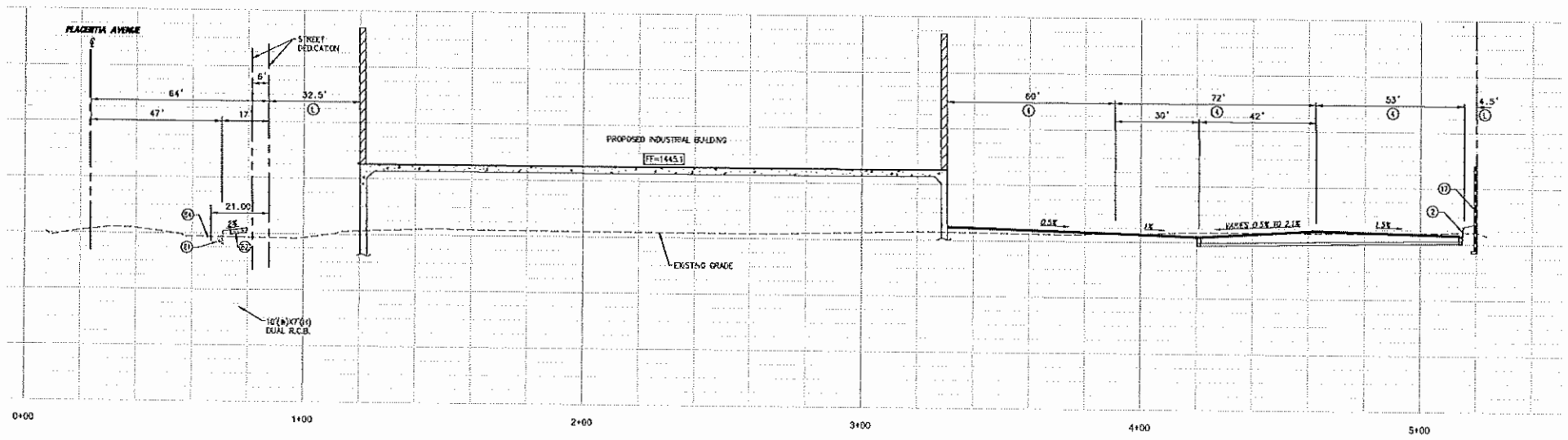
IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

DATE	5-19-22
DRAWN BY	KOL
CHECKED BY	CDB
JOB NO.	DED21077
SHEET NO.	C-2
	OF 4 SHEETS



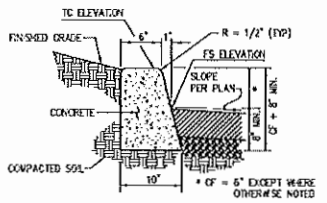
SECTION A–A

SCALE: 1"=20' (HORIZONTAL)
1"=4' (VERTICAL)



SECTION B–B

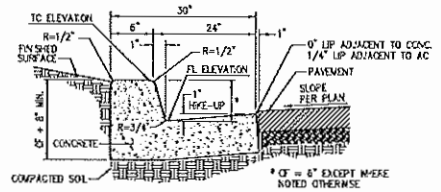
SCALE: 1"=20' (HORIZONTAL)
1"=4' (VERTICAL)



1. BOTTOM OF CURB TO BE SET ON COMPACTED SUB-GRADE OR NATURAL UNDISTURBED SOIL.
2. FINISH ALL EXPOSED CONCRETE SURFACES SMOOTH.
3. PROVIDE 1/2" EXPANSION JOINTS @ 25' O.C. MAXIMUM AT CURVES, TANGENTS AND CORNERS.
4. CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (THE GREEN BOOK) AND THE SPECIFIC REQUIREMENTS OF THE GOVERNING AGENCY.

6" CURB DETAIL ①

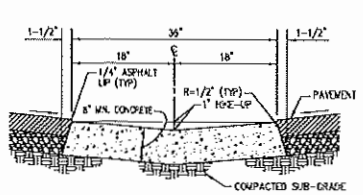
NOT TO SCALE



1. BOTTOM OF CURB TO BE SET ON COMPACTED SUB-GRADE OR NATURAL UNDISTURBED SOIL.
2. FINISH ALL EXPOSED CONCRETE SURFACES SMOOTH.
3. PROVIDE 1/2" EXPANSION JOINTS @ 25' O.C. MAXIMUM AT CURVES, TANGENTS AND CORNERS.
4. CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (THE GREEN BOOK) AND THE SPECIFIC REQUIREMENTS OF THE GOVERNING AGENCY.

6" CURB & 24" GUTTER DETAIL ②

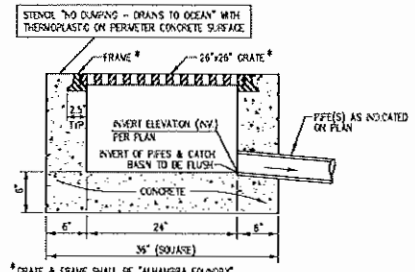
NOT TO SCALE



1. BOTTOM OF CONCRETE TO BE SET ON COMPACTED SUB-GRADE OR NATURAL UNDISTURBED SOIL.
2. FINISH ALL EXPOSED CONCRETE SURFACES SMOOTH.
3. PROVIDE 1/2" EXPANSION JOINTS @ 25' O.C. MAXIMUM AT CURVES, TANGENTS AND CORNERS.
4. CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (THE GREEN BOOK) AND THE SPECIFIC REQUIREMENTS OF THE GOVERNING AGENCY.

36" WIDE GUTTER DETAIL ③

NOT TO SCALE



* GRATE & FRAME SHALL BE "ALHAMBRA FOUNDRY" NO. A-2412 (TRAFFIC-TYPE, PEDESTRIAN & BICYCLE-PROOF) OR APPROVED EQUAL.

24"x24" CONCRETE CATCH BASIN BOX ⑩

NOT TO SCALE

NOTICE TO CONTRACTOR

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THIS PLAN IS:
PRELIMINARY
(NOT FOR CONSTRUCTION)

NO.	REVISIONS	DATE

Prepared by:
Joseph C. Truxaw and Associates, Inc.
Civil Engineers and Land Surveyors
1915 N. Orangemead Ave., Suite 101, Orange, CA 92865 (714) 935-0255 Truxinc.com

CONCEPTUAL GRADING PLAN

NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE
IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

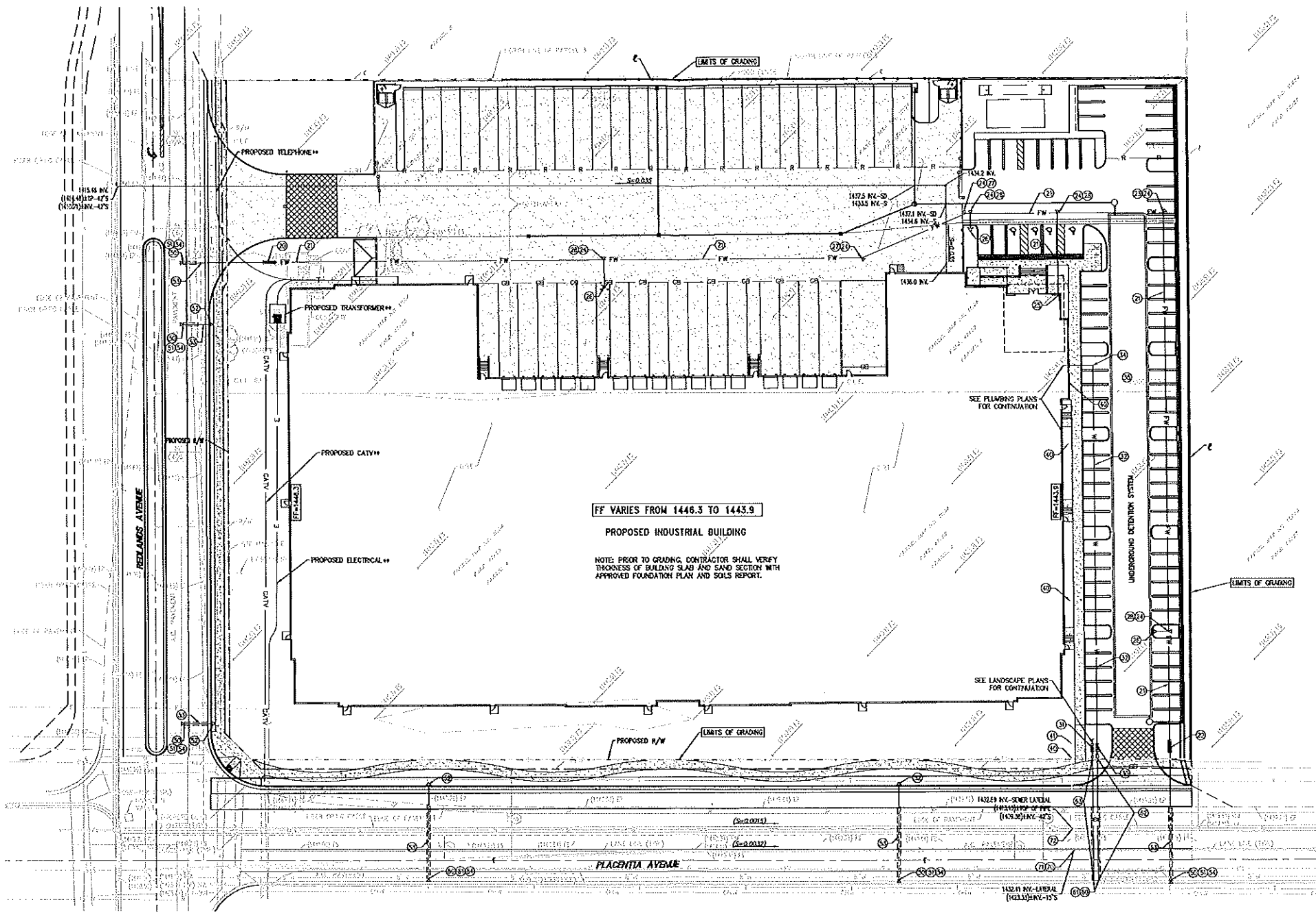
DATE	5-19-22
DRAWN BY	KDL
CHECKED BY	CDB
JOB NO.	DED21077
SHEET NO.	C-3
	OF 4 SHEETS

GENERAL WATER NOTES

1. ALL ON SITE WORK SHALL CONFORM TO THE STANDARDS & REQUIREMENTS OF THE CALIFORNIA PLUMBING CODE, UNIFORM PLUMBING CODE AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND CONFORMING WITH THE REQUIREMENTS OF THE ENCROACHMENT PERMIT REQUIRED FOR WORK IN THE PUBLIC RIGHT-OF-WAY.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND PROTECTION OF PEDESTRIANS. THIS RESPONSIBILITY SHALL BE CONTINUOUS.
4. PIPE BEDDING AND BACKFILL SHALL CONFORM TO THE REQUIREMENTS OF THE EASTERN MUNICIPAL WATER DISTRICT AND THE RECOMMENDATIONS OF THE SOILS ENGINEER.
5. NO ON-SITE PIPE MAY BE LAID UNTIL THE WATER CONNECTION AT THE PUBLIC MAIN HAS BEEN MADE.
6. FOR ALL EXISTING WATER SERVICES TO BE ABANDONED-SHUT OFF AT CORPORATION STOP AND RETURN METERS TO THE EASTERN MUNICIPAL WATER DISTRICT.

GENERAL SEWER NOTES

1. ALL ON SITE WORK SHALL CONFORM TO THE STANDARDS & REQUIREMENTS OF THE CALIFORNIA PLUMBING CODE, UNIFORM PLUMBING CODE AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND CONFORMING WITH THE REQUIREMENTS OF THE ENCROACHMENT PERMIT REQUIRED FOR WORK IN THE PUBLIC RIGHT-OF-WAY.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND PROTECTION OF PEDESTRIANS. THIS RESPONSIBILITY SHALL BE CONTINUOUS.
4. PIPE BEDDING AND BACKFILL SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF PERRIS AND THE RECOMMENDATIONS OF THE SOILS ENGINEER.
5. NO ON-SITE PIPE MAY BE LAID UNTIL THE SEWER CONNECTION AT THE PUBLIC MAIN HAS BEEN MADE.
6. PIPE IS TO BE PLACED BEGINNING AT THE DOWNSTREAM POINT OF CONNECTION AND CONTINUING UPSTREAM. DEVIATIONS FROM THIS SEQUENCE ARE NOT PERMITTED.



FIRE SERVICE CONSTRUCTION NOTES (ONSITE)

- ♦(26) INSTALL ..-INCH DOUBLE DETECTOR CHECK ASSEMBLY WITH FIRE DEPARTMENT CONNECTION PER EMWD STANDARD B-657.
- ♦(71) PLACE ..-INCH FIRE SERVICE WATER LINE WITH D.I. FITTINGS PER EMWD REGULATIONS. PIPE TRENCHING, BEDDING AND BACKFILL SHALL BE PER EMWD REQUIREMENTS.
- ♦(73) CONSTRUCT ..-INCH 90 DEGREE BEND.
- ♦(24) CONSTRUCT CONCRETE THRUST BLOCK PER EMWD STANDARD B-407.
- ♦(25) INSTALL ONE-PIECE STAINLESS STEEL FIRE RISER PER EMWD STANDARD B-668
- ♦(22) INSTALL FIRE HYDRANT PER EMWD STANDARD B-362
- ♦(27) CONSTRUCT ..-INCH 22.5 DEGREE BEND.
- ♦(28) CONSTRUCT ..-INCH RESTRAINT TEE PER EMWD STANDARD B-693.

♦CONTRACTOR TO VERIFY SIZE OF FIRE SERVICE APPURTENANCES PRIOR TO CONSTRUCTION

WATER CONSTRUCTION NOTES (ONSITE)

(30) INSTALL REDUCED PRESSURE DEVICE PER EMWD STANDARD B-597A. (DOMESTIC)

(31) INSTALL REDUCED PRESSURE DEVICE PER EMWD STANDARD B-597A. (IRRIGATION)

(32) PLACE ..-INCH SCH. 80 PVC. WATER LINE. PIPE BEDDING AND BACKFILL TO CONFORM TO THE RECOMMENDATIONS OF THE SOILS ENGINEER. (DOMESTIC)

(33) PLACE ..-INCH SCH. 80 PVC. WATER LINE. PIPE BEDDING AND BACKFILL TO CONFORM TO THE RECOMMENDATIONS OF THE SOILS ENGINEER. (IRRIGATION)

(34) CONSTRUCT ..-INCH 90 DEGREE BEND.

(35) CONSTRUCT CONCRETE THRUST BLOCK PER EMWD STANDARD B-407.

SEWER CONSTRUCTION NOTES (ONSITE)

(42) CONSTRUCT CLEANOUT PER CALIFORNIA BUILDING CODES AND EMWD STANDARD SS-52.

(11) PLACE ..-INCH SDR-35 P.V.C. SEWER PIPE PER EMWD REQUIREMENTS. PIPE BEDDING AND BACKFILL TO CONFORM TO THE RECOMMENDATIONS OF THE SOILS ENGINEER.

FIRE SERVICE CONSTRUCTION NOTES (OFFSITE)

- (50) POTHOLE AND VERIFY THE EXISTENCE, LOCATION, DEPTH, MATERIAL, SIZE AND CONDITION OF EXISTING WATER LINE. REPORT FINDINGS TO TRUXAW & ASSOCIATES PRIOR TO CONSTRUCTION.
- (51) CONNECT TO EXISTING WATER MAIN PER EMWD STANDARD B-658
- ♦(52) INSTALL FIRE HYDRANT PER EMWD STANDARD B-362
- ♦(53) PLACE ..-INCH FIRE SERVICE LATERAL PER EMWD STANDARD B-668
- ♦(54) CONSTRUCT CONCRETE THRUST BLOCK PER EMWD STANDARD B-407.

♦CONTRACTOR TO VERIFY SIZE OF FIRE SERVICE APPURTENANCES PRIOR TO CONSTRUCTION

WATER CONSTRUCTION NOTES (OFFSITE)

(59) POTHOLE AND VERIFY THE EXISTENCE, LOCATION, DEPTH, MATERIAL, SIZE AND CONDITION OF EXISTING WATER MAIN. REPORT FINDINGS TO TRUXAW & ASSOCIATES PRIOR TO CONSTRUCTION.

(61) CONNECT TO EXISTING 12-INCH WATER MAIN (HOT TAP) PER WEST VALLEY WATER DISTRICT STD. W-19.

(62) PLACE ..-INCH WATER METER AND SERVICE PER WEST VALLEY WATER DISTRICT STD. W-5. (DOMESTIC)

(63) PLACE ..-INCH WATER METER AND SERVICE PER WEST VALLEY WATER DISTRICT STD. W-4. (IRRIGATION)

SEWER CONSTRUCTION NOTES (OFFSITE)

(70) POTHOLE AND VERIFY THE EXISTENCE, LOCATION, DEPTH, MATERIAL, SIZE AND CONDITION OF EXISTING 15" SEWER MAIN. REPORT FINDINGS TO TRUXAW & ASSOCIATES PRIOR TO CONSTRUCTION.

(71) CONSTRUCT SEWER CHIMNEY LATERAL PER EMWD STANDARD SA-87.

(72) PLACE ..-INCH SEWER LATERAL PER EMWD STANDARD SS-177.

UTILITY NOTE

**PROPOSED ELECTRIC, TELEPHONE AND CATV ARE SHOWN HEREON FOR COORDINATION PURPOSES. CONTRACTOR TO VERIFY POINTS OF CONNECTION AND CONSTRUCT PROPOSED SERVICE LINES IN ACCORDANCE WITH SERVICE PLANNING DOCUMENTS PREPARED BY EACH RESPECTIVE UTILITY COMPANY.

THIS PLAN IS:

PRELIMINARY

(NOT FOR CONSTRUCTION)

SCALE: 1"=30'

NOTICE TO CONTRACTOR

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NO.	REVISIONS	DATE

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CONCEPTUAL UTILITY PLAN

NW CORNER OF PLACENTIA AVENUE AND REDLANDS AVENUE

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

DATE	5-19-22
DRAWN BY	KDL
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SHEET NO.	4

OF 4 SHEETS

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Appendix 4: Historical Site Conditions

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

Appendix Not Applicable to this Water Quality Management Plan

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix Not Applicable to this Water Quality Management Plan

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Site Location
0.65

0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.63 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S | T 02 S | T 03 S | T 04 S | T 05 S | T 06 S | T 07 S | T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Joseph C. Truxaw and Associates, Inc.	Date	2/1/2022
Designed by	Michael DeLaGarza	Case No	
Company Project Number/Name	DED21077		

BMP Identification

BMP NAME / ID: DMA-1A

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}= 0.65 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-1A	*85970*	*Concrete or Asphalt*	*1*	*0.89*	*76685.2*			
DMA-1A	*7057*	*Ornamental Landscaping*	*0.1*	*0.11*	*779.5*			
	93027	*Total*			*77464.7*	*0.65*	*4196*	*10752.2*

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	Joseph C. Truxaw and Associates, Inc.	Date	2/1/2022
Designed by	Michael DeLaGarza	Case No	
Company Project Number/Name	DED21077		

BMP Identification

BMP NAME / ID: DMA-1B

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}= 0.65 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA-1B	131738	Concrete or Asphalt	1	0.89	117510.3			
DMA-1B	4019	Ornamental Landscaping	0.1	0.11	443.9			
	135757	Total			117954.2	0.65	6389.2	10752.2

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID DMA-1A+B	Legend:	Required Entries / Calculated Cells
Company Name: Joseph C. Truxaw and Associates, Inc.		Date:	1/26/2022
Designed by: Michael DeLaGarza		County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea)	A_T =	6.1	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	10,752	ft^3

Maximum Depth

a) Infiltration rate	I =	0.845	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	1.7	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		30	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		30	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	19.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	1.7	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =		:1
b) Proposed basin depth (excluding freeboard)	d_B =		ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =		ft^2
d) Proposed Design Surface Area	A_D =		ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	54	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =		ft
c) Forebay surface area (minimum)	Area =		ft^2
d) Full height notch-type weir	Width (W) =		in

Notes:

CULTEC Stormwater Design Calculator

Date:	February 02, 2022

Project Information:

Redlands Industrial Facility
NEC of Redlans Ave. and Placentia Ave.
Perris
CA
Riverside

Project Number:	DED21077

Calculations Performed By:

Michael DeLaGarza
Joseph C. Truxaw & Associates, Inc.
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RECHARGER 150XLHD

Recharger 150XLHD Chamber Specifications

Height	18.5	inches
Width	33.0	inches
Length	11.00	feet
Installed Length	10.25	feet
Bare Chamber Volume	27.19	cu. feet
Installed Chamber Volume	47.31	cu. feet

Breakdown of Storage Provided by Recharger 150XLHD Stormwater System

Within Chambers	5,914.86	cu. feet
Within Feed Connectors	5.46	cu. feet
Within Stone	4,841.84	cu. feet
Total Storage Provided	**10,762.2**	**cu. feet**
Total Storage Required	10585.19	cu. feet

Materials List

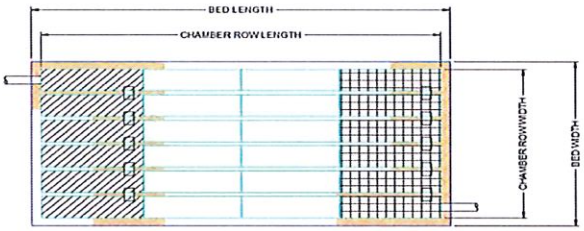
Recharger 150XLHD

Total Number of Chambers Required	**217**	**pieces**
Separator Row Chambers	31	pieces
Starter Chambers	7	pieces
Intermediate Chambers	203	pieces
End Chambers	7	pieces
HVLV FC-24 Feed Connectors	12	pieces
CULTEC No. 410 Non-Woven Geotextile	2402	sq. yards
CULTEC No. 4800 Woven Geotextile	384	feet
Stone	512	cu. yards

Separator Row Qty Included in Total

Based on 2 Internal Manifolds

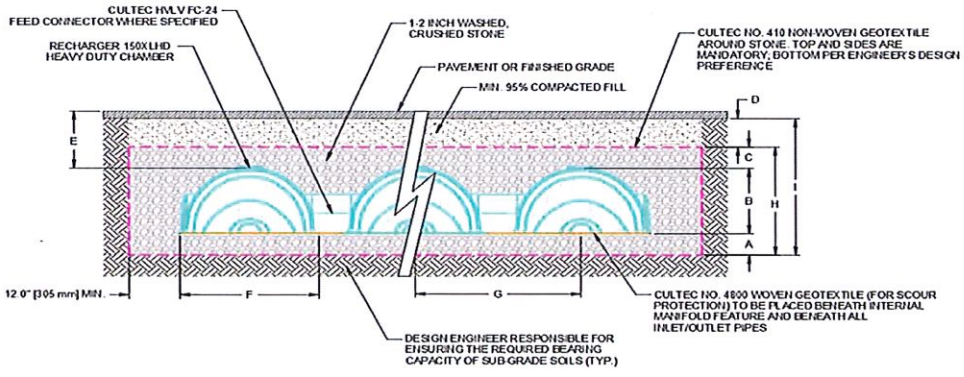
Bed Detail



Bed Layout Information

Number of Rows Wide	7	pieces
Number of Chambers Long	31	pieces
Chamber Row Width	22.25	feet
Chamber Row Length	318.50	feet
Bed Width	24.25	feet
Bed Length	320.50	feet
Bed Area Required	7772.13	sq. feet
Length of Separator Row	318.50	feet

Bed detail for reference only. Not project specific. Not to scale.



Conceptual graphic only. Not job specific.

Cross Section Table Reference

A	Depth of Stone Base	**6.0**	inches
B	Chamber Height	**18.5**	inches
C	Depth of Stone Above Units	**6.0**	inches
D	Depth of 95% Compacted Fill	**8.0**	inches
E	Max. Depth Allowed Above the Chamber	**12.00**	feet
F	Chamber Width	**33.0**	inches
G	Center to Center Spacing	**3.25**	feet
H	Effective Depth	**2.54**	feet
I	Bed Depth	**3.21**	feet

CULTEC Stage-Storage Calculations

Date:	February 2, 2022

Project Information:

Redlands Industrial Facility
NEC of Redlans Ave, and Placentia Ave,
Perris
CA 92571
Riverside

Project Number:

DED21077

	Recharger 150XLHD	
Chamber Model -		
Number of Rows-	7	units
Total Number of Chambers -	217	units
HVLV FC-24 Feed Connectors-	12	units
Stone Void -	35	%
Stone Base -	6	inches
Stone Above Units -	6	inches
Area -	7772.13	ft2
Base of Stone Elevation -	0.00	

Recharger 150XLHD Incremental Storage Volumes

Height of System		Chamber Volume		HVLV Feed Connector Volume		Stone Volume		Cumulative Storage Volume		Total Cumulative Storage Volume		Elevation		
in	mm	ft³	m³	ft3	m3	ft³	m³	ft³	m³	ft³	m³	ft	m	
30.5	775	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	10763.53	304.79	2.54	0.77	Top of Stone Elevation
29.5	749	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	10536.84	298.37	2.46	0.75	
28.5	724	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	10310.15	291.95	2.38	0.72	
27.5	699	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	10083.47	285.53	2.29	0.70	
26.5	673	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	9856.78	279.11	2.21	0.67	
25.5	648	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	9630.09	272.69	2.13	0.65	
24.5	622	13.4	0.4	0.0	0.0	108.7	3.1	122.039	3.5	9403.41	266.27	2.04	0.62	Top of Chamber Elevation
24.0	610	22.3	0.6	0.0	0.0	218.9	6.2	241.179	6.8	9281.37	262.82	2.00	0.61	
23.0	584	71.3	2.0	0.0	0.0	201.7	5.7	273.061	7.7	9040.19	255.99	1.92	0.58	
22.0	559	171.7	4.9	0.0	0.0	166.6	4.7	338.273	9.6	8767.13	248.26	1.83	0.56	
21.0	533	227.4	6.4	0.0	0.0	147.1	4.2	374.503	10.6	8428.85	238.68	1.75	0.53	
20.0	508	265.3	7.5	0.0	0.0	133.8	3.8	399.139	11.3	8054.35	228.07	1.67	0.51	
19.0	483	298.8	8.5	0.0	0.0	122.1	3.5	420.876	11.9	7655.21	216.77	1.58	0.48	
18.0	457	325.5	9.2	0.7	0.0	112.8	3.2	438.927	12.4	7234.34	204.85	1.50	0.46	
17.0	432	347.8	9.8	0.5	0.0	105.0	3.0	453.298	12.8	6795.41	192.42	1.42	0.43	
16.0	406	367.9	10.4	0.5	0.0	97.9	2.8	466.317	13.2	6342.11	179.59	1.33	0.41	
15.0	381	383.5	10.9	0.5	0.0	92.5	2.6	476.455	13.5	5875.80	166.38	1.25	0.38	
14.0	356	399.1	11.3	0.5	0.0	87.0	2.5	486.587	13.8	5399.34	152.89	1.17	0.36	
13.0	330	410.2	11.6	0.5	0.0	83.1	2.4	493.809	14.0	4912.75	139.11	1.08	0.33	
12.0	305	419.1	11.9	0.4	0.0	80.0	2.3	499.576	14.1	4418.94	125.13	1.00	0.30	
11.0	279	425.8	12.1	0.4	0.0	77.6	2.2	503.905	14.3	3919.37	110.98	0.92	0.28	
10.0	254	430.3	12.2	0.4	0.0	76.1	2.2	506.750	14.3	3415.46	96.71	0.83	0.25	
9.0	229	434.8	12.3	0.3	0.0	74.5	2.1	509.552	14.4	2908.71	82.37	0.75	0.23	
8.0	203	439.2	12.4	0.1	0.0	73.0	2.1	512.294	14.5	2399.16	67.94	0.67	0.20	
7.0	178	461.5	13.1	0.1	0.0	65.2	1.8	526.744	14.9	1886.87	53.43	0.58	0.18	
6.0	152	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	1360.12	38.51	0.50	0.15	Bottom of Chamber Elevation
5.0	127	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	1133.43	32.10	0.42	0.13	
4.0	102	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	906.75	25.68	0.33	0.10	
3.0	76	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	680.06	19.26	0.25	0.08	
2.0	51	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	453.37	12.84	0.17	0.05	
1.0	25	0.0	0.0	0.0	0.0	226.7	6.4	226.687	6.4	226.69	6.42	0.08	0.03	
0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00	0.00	0.00	0.00	Bottom of Stone Elevation

Recharger 150XLHD Incremental Storage Volumes

Height of System		Chamber Volume		HVLV Feed Connector Volume		Stone Volume		Cumulative Storage Volume		Total Cumulative Storage Volume		Elevation	
in	mm	ft³	m³	ft3	m3	ft³	m³	ft³	m³	ft³	m³	ft	m
0.0													
1.0													
2.0													
3.0													
4.0													
5.0													
6.0													
7.0													
8.0													
9.0													
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CULTEC Recharger® 150XLHD Stormwater Chamber

The Recharger® 150XLHD is an 18.5" (470 mm) tall, lower profile chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Recharger® 150XLHD has the side portal internal manifold feature. HVLV® FC-24 Feed Connectors are inserted into the side portals to create the internal manifold.

Size (L x W x H)	11' x 33" x 18.5"
	3.35 m x 838 mm x 470 mm
Installed Length	10.25'
	3.12 m
Length Adjustment per Run	0.75'
	0.23 m
Chamber Storage	2.65 ft³/ft
	0.25 m³/m
	27.16 ft³/unit
	0.77 m³/unit
Min. Installed Storage	4.89 ft³/ft
	0.45 m³/m
	50.17 ft³/unit
	1.42 m³/unit
Min. Area Required	33.31 ft²
	3.09 m²
Chamber Weight	51.0 lbs
	23.13 kg
Shipping	34 chambers/skid
	1,860 lbs/skid
	12 skids/48' flatbed
Min. Center-to-Center Spacing	3.25'
	0.99 m
Max. Allowable Cover	12'
	3.66 m
Max. Inlet Opening in End Wall	12" HDPE, 15" PVC
	300 mm HDPE, 375 mm PVC
Max. Allowable O.D. in Side Portal	10" HDPE, 10" PVC
	250 mm HDPE, 250 mm PVC
Compatible Feed Connector	HVLV FC-24 Feed Connector

Calculations are based on installed chamber length.
All above values are nominal.
Min. installed storage includes 6" (152 mm) stone base, 6" (152 mm) stone above crown of chamber and typical stone surround at 39"(991 mm) center-to-center spacing.

	Stone Foundation Depth		
	6"	12"	18"
	152 mm	305 mm	457 mm
Chamber and Stone Storage Per Chamber	50.17 ft³	56.83 ft³	63.49 ft³
	1.42 m³	1.61 m³	1.80 m³
Min. Effective Depth	2.54'	3.04'	3.54'
	0.77 m	0.93 m	1.08 m
Stone Required Per Chamber	2.13 yd³	2.75 yd³	3.36 yd³
	1.63 m³	2.10 m³	2.57 m³

Calculations are based on installed chamber length.
Includes 6" (305 mm) stone above crown of chamber and typical stone surround at 39"(991 mm) center-to-center spacing and stone foundation as listed in table.
Stone void calculated at 40%.

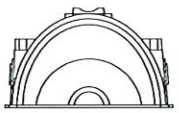
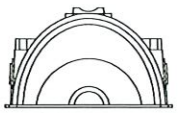
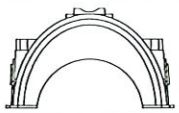
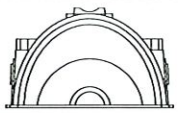
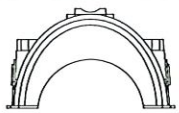
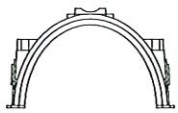
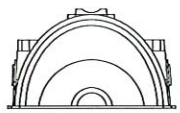
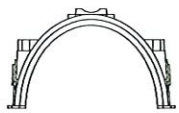
Recharger® 150XLHD Bare Chamber Storage Volumes

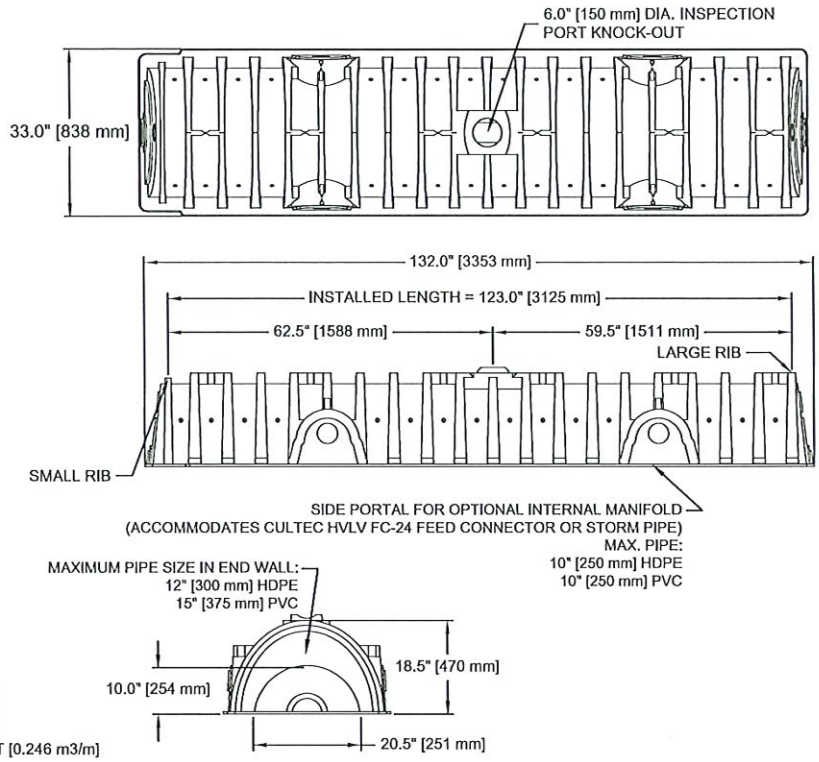
Elevation		Incremental Storage Volume				Cumulative Storage	
in.	mm	ft³/ft	m³/m	ft³	m³	ft³	m³
18.5	470	0.006	0.001	0.062	0.002	27.193	0.770
18	457	0.010	0.001	0.103	0.003	27.132	0.768
17	432	0.032	0.003	0.328	0.009	27.029	0.765
16	406	0.077	0.007	0.789	0.022	26.701	0.756
15	381	0.102	0.009	1.046	0.030	25.912	0.734
14	356	0.119	0.009	1.220	0.035	24.867	0.704
13	330	0.134	0.011	1.374	0.039	23.647	0.670
12	305	0.146	0.012	1.497	0.042	22.273	0.631
11	279	0.156	0.014	1.599	0.045	20.777	0.588
10	254	0.165	0.015	1.691	0.048	19.178	0.543
9	229	0.172	0.016	1.763	0.050	17.487	0.495
8	203	0.179	0.017	1.835	0.052	15.724	0.445
7	178	0.184	0.017	1.886	0.053	13.889	0.393
6	152	0.188	0.017	1.927	0.055	12.003	0.340
5	127	0.191	0.018	1.958	0.055	10.076	0.285
4	102	0.193	0.018	1.978	0.056	8.118	0.230
3	76	0.195	0.018	1.999	0.057	6.140	0.174
2	51	0.197	0.018	2.019	0.057	4.141	0.117
1	25	0.207	0.019	2.122	0.060	2.122	0.060
Total		**2.650**	**0.246**	**27.193**	**0.770**	**27.193**	**0.770**

Calculations are based on installed chamber length.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

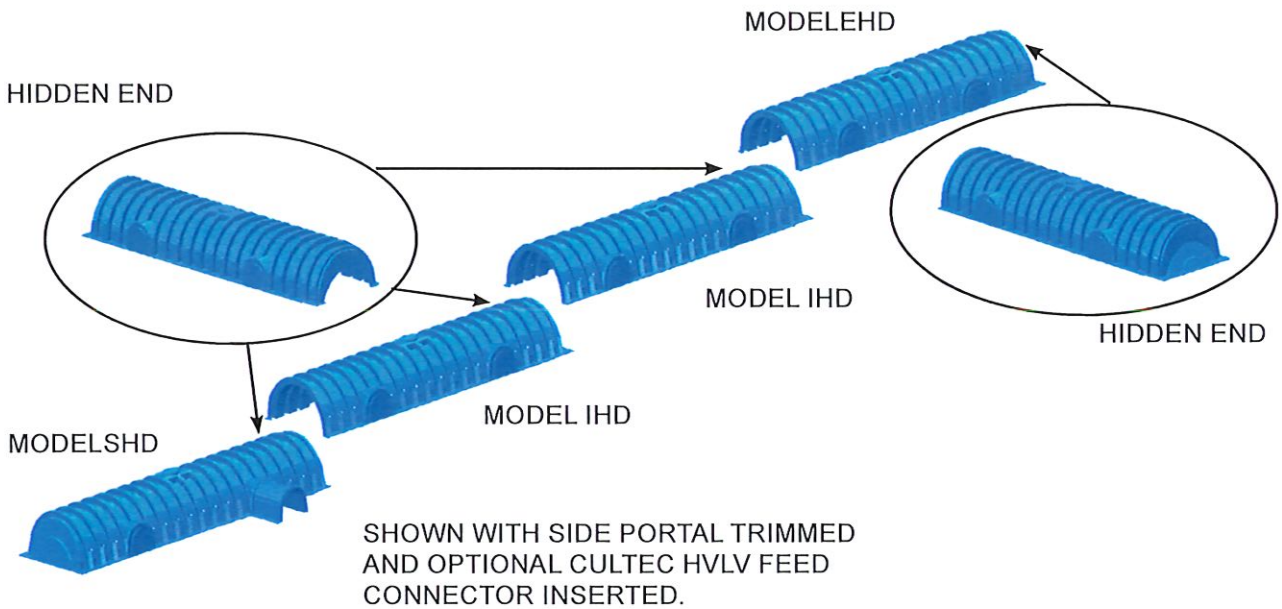
Three View Drawing

MODEL 150XLRHD STAND ALONE	
SMALL RIB	LARGE RIB
	
MODEL 150XLSHD STARTER	
SMALL RIB	LARGE RIB
	
MODEL 150XLIHD INTERMEDIATE	
SMALL RIB	LARGE RIB
	
MODEL 150XLEHD END	
SMALL RIB	LARGE RIB
	

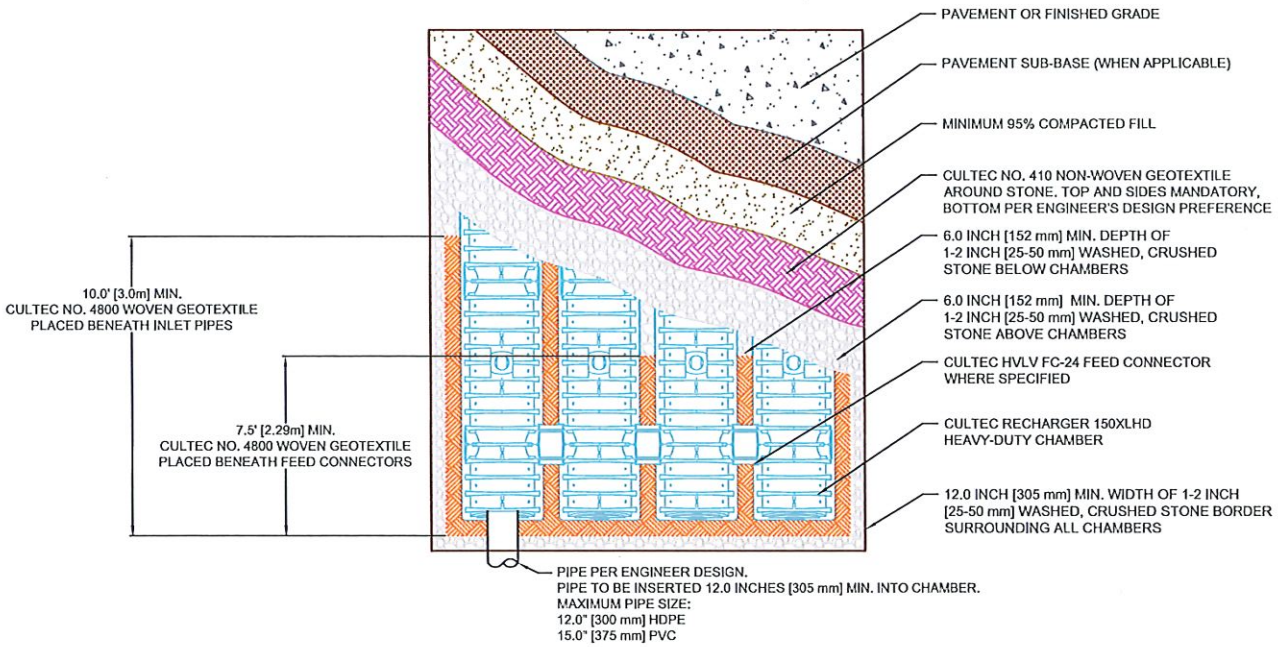


CULTEC RECHARGER 150XLHD CHAMBER STORAGE = 2.65 CF/FT [0.246 m3/m]
INSTALLED LENGTH ADJUSTMENT = 0.75' [0.23 m]

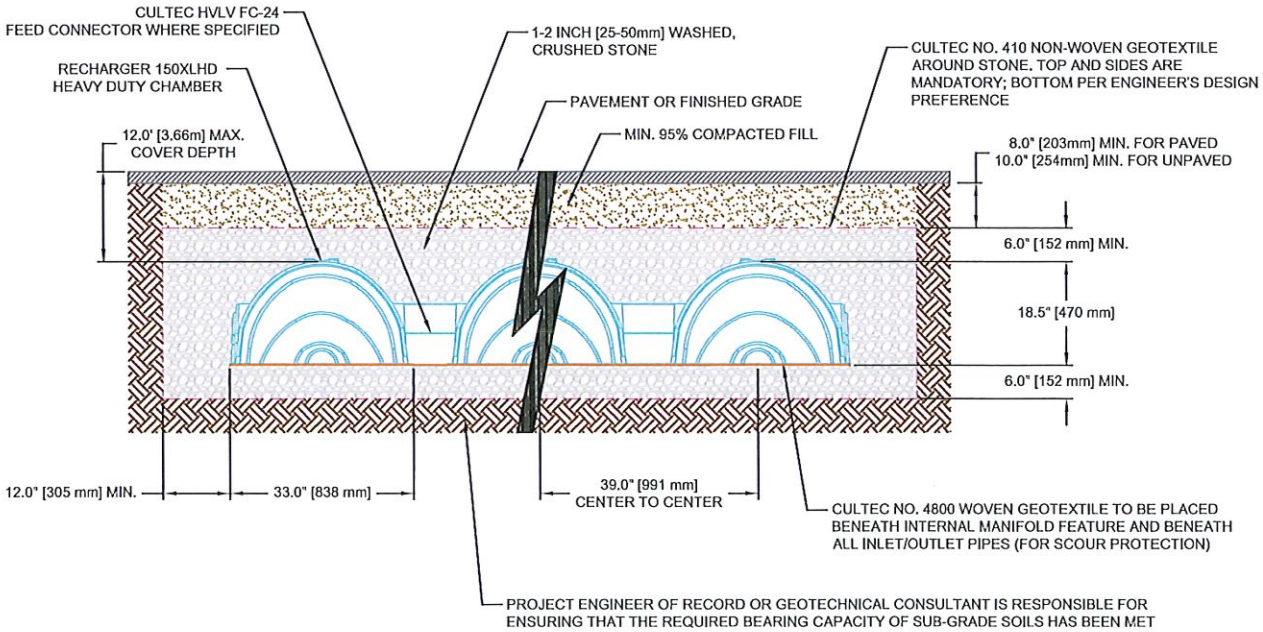
Typical Interlock Installation



Plan View Drawing



Typical Cross Section for Traffic Application



CULTEC Recharger® 150XLHD Specifications

GENERAL

CULTEC Recharger® 150XLHD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

1. The chambers shall be manufactured in the U.S.A. by CULTEC, Inc. of Brookfield, CT (cultec.com, 203-775-4416).
2. The chamber shall be vacuum thermoformed of polyethylene with a black interior and blue exterior.
3. The chamber shall be arched in shape.
4. The chamber shall be open-bottomed.
5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
6. The nominal chamber dimensions of the CULTEC Recharger® 150XLHD shall be 18.5 inches (470 mm) tall, 33 inches (838 mm) wide and 11 feet (3.35 m) long. The installed length of a joined Recharger® 150XLHD shall be 10.25 feet (3.12 m).
7. Maximum inlet opening on the chamber end wall is 12 inches (300 mm) HDPE and 15 inches (375 mm) PVC.
8. The chamber shall have two side portals to accept CULTEC HVLV® FC-24 Feed Connectors to create an internal manifold. The nominal I.D. dimensions of each side portal shall be 8.5 inches (216 mm) high by 12 inches (304 mm) wide. Maximum allowable O.D. in the side portal is 10 inches (250 mm) HDPE, PVC.
9. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (615 mm) long.
10. The nominal storage volume of the Recharger® 150XLHD chamber shall be 2.650 ft^3 / ft (0.246 m^3 / m) - without stone. The nominal storage volume of a single Recharger 150XLRHD Stand Alone unit shall be 29.15 ft^3 (0.83 m^3) - without stone. The nominal storage volume of a joined Recharger® 150XLIHD Intermediate unit shall be 27.16 ft^3 (0.77 m^3) - without stone. The nominal storage volume of the length adjustment amount per run shall be 1.99 ft^3 (0.18 m^3) - without stone.
11. The nominal storage volume of the HVLV® FC-24 Feed Connector shall be 0.913 ft^3 / ft (0.085 m^3 / m) - without stone.
12. The Recharger® 150XLHD chamber shall have thirty discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
13. The Recharger® 150XLHD chamber shall have 20 corrugations.
14. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
15. The Recharger® 150XLRHD Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
16. The Recharger® 150XLSHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one partially formed integral end wall with a lower transfer opening of 10 inches (254 mm) high x 20.5 inches (521 mm) wide.
17. The Recharger® 150XLIHD Intermediate unit must be formed as a whole chamber having one fully open end wall and one partially formed integral end wall with a lower transfer opening of 10 inches (254 mm) high x 20.5 inches (521 mm) wide.
18. The Recharger® 150XLEHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
19. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® 150XLHD and act as cross feed connections.
20. Chambers must have horizontal stiffening flex reduction steps between the ribs.
21. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
22. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
23. The chamber shall be manufactured in an ISO 9001:2015 certified facility.
24. The chamber shall be designed and manufactured to meet the material and structural requirements of IAPMO PS 63-2019, including resistance to AASHTO H-10 and H-20 highway live loads, when installed in accordance with CULTEC's installation instructions.
25. The chamber shall be designed and manufactured in accordance with the specifications of NSAI Irish Agrement Board Certificate for Cultec Attenuation and Infiltration.
26. Maximum allowable cover over the top of the chamber shall be 12' (3.66 m).
27. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

CONTACTOR® & RECHARGER®

STORMWATER CHAMBERS

Product Brochure

• RETENTION • DETENTION • INFILTRATION • WATER QUALITY

STORMWATER MANAGEMENT SOLUTIONS

CULTEC®

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www.cultec.com

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For technical support, please call (203)775-4416 ext. 203 or e-mail tech@cultec.com.

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May 2019

CULTEC has the solutions!

Managing high levels of stormwater is a challenge facing municipalities across the country. In built-up areas, buildings and paved surfaces inhibit the natural infiltration of stormwater into the ground. With expanding urbanization, existing infrastructure is unable to accommodate the increased peak flows and runoff volumes which lead to ponding and flooding problems. Conventional stormwater management systems such as ponds, swales, pipe and concrete structures capture water but are labor intensive, expensive to maintain and occupy valuable land. CULTEC Stormwater Chambers provide a cost-effective solution for underground detention and infiltration.

What sets us apart from other chambers? Stormwater chambers are our specialty.

As the founder of plastic chamber technology, CULTEC's expertise lies in the innovation and evolution of chamber systems. We are equipped to solve even the most challenging stormwater management assignments.

- The first stormwater chambers ever manufactured with installations dating back over 30 years.
- CULTEC stormwater chambers are designed to withstand AASHTO HS-25 defined loads when installed according to our recommended installation instructions.
- Most extensive product line in the industry. With chamber heights from 8.5" to 48" tall, CULTEC offers an extensive product line capable of accommodating both extreme low-profile limitations as well as high-volume demands.
- Our unique internal manifold feature allows for maximum design flexibility, provides a significant cost-savings to the overall project, and, in most applications, can also reduce the system footprint. It allows for placement of the manifold at any location within the system without interrupting the line of chambers and eliminates the requirement of manholes and/or extra fittings.
- Exceptional custom design services performed by stormwater chamber specialists.

Installations Worldwide

With installations dating back to over 30 years, CULTEC products have not only been installed nationally from coast-to-coast but also internationally in Canada, Mexico, Puerto Rico, Guam, the Caribbean, Africa, and Europe.
For a recent list of case studies, please visit us at www.cultec.com/case-studies/

Dry well Applications

Residential Drainage

Commercial Drainage

CULTEC Stormwater Systems 101 - The Basics

The CULTEC Contactor® and Recharger® chambers replace conventional stormwater retention/detention systems such as ponds, swales, pipe and stone trenches or beds, or concrete structures. The chambers may be used for dry wells. Infiltration contact area is maximized by the fully open bottoms.

Water is collected in a catch basin or other collective device followed by a CULTEC Separator™ Row to be treated. The water is then directed into the Contactor® or Recharger® chambers and distributed via the side portal internal manifold and crushed stone embedment. Depending on the system application, the water infiltrates into the ground, or it is detained and released.

Typical CULTEC stormwater systems are designed by using the largest chamber that meets the site's depth constraint and system requirements. By choosing the largest available chamber that meets the system's parameters, you reduce the number of chambers and land area required. The client is able to maximize storage volume at the given workable elevations.

Applications

- Retention Systems
- Detention Systems
- Infiltration Systems
- Reclamation
- Dry wells
- Conveyance
- Manage residential roof drain run-off
- Contain swimming pool or water conditioner backwash

Features

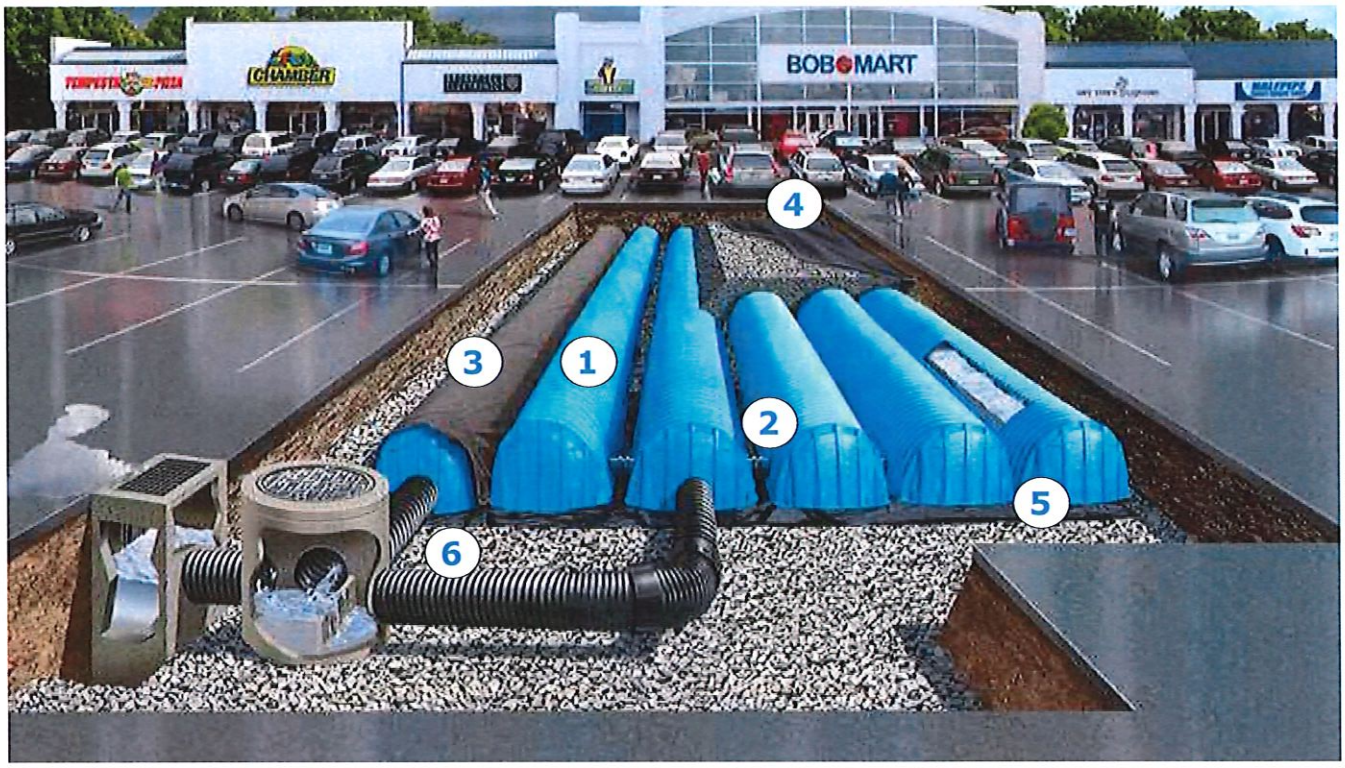
- Overlapping rib connection
- Unique in-line internal manifold
- High infiltrative capability
- Lightweight
- Variety of sizes
- Chemically resistant

System Benefits

- Maximum use of land area
- Store larger volumes in a lower profile than comparably sized pipe
- Ability to recharge water on-site
- Single or multi-level systems
- Less heavy equipment required
- The units nest on pallets for convenient shipping and stockpiling of material
- Allows for greater infiltration into the ground
- Permits further development
- Reduces insurance liabilities and potential breeding grounds for infectious mosquitoes associated with open ponds

CULTEC'S INTERNAL MANIFOLD ALLOWS FOR PLACEMENT OF MANIFOLD AT ANY LOCATION WITHIN SYSTEM WITHOUT BREAKING THE LINE.

Typical CULTEC Stormwater System Components



1. **CULTEC Stormwater Chamber** - used for retention, detention, reclamation

2. **CULTEC HVLV™ Feed Connector** - internal manifold component

3. **CULTEC Separator™ Row**- water quality filtration row

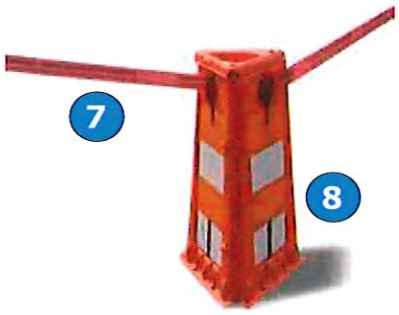
4. **CULTEC No. 410™ Non-woven Geotextile**- prevents soil intrusion into system

5. **CULTEC No. 4800™ Woven Geotextile**- placed under CULTEC manifold components, prevents scouring of stone base

6. **Stone** - used for stone base, embedment stone and stone above chambers

7. **CULTEC Warning Tape** - marks off location of underground CULTEC Stormwater System during construction to prevent vehicular traffic

8. **Multicade™ Pylon** - marks location of underground CULTEC Stormwater System during construction phase



For more information, contact CULTEC at (203) 775-4416 or visit www.cultec.com.

In urban areas, rising land costs require developers to look for innovative stormwater management products that optimize land usage and meet local environmental regulations.

CULTEC - The Founder of Plastic Chamber Technology

Back in 1986 CULTEC introduced its Contactor® and Recharger® septic and stormwater chambers to the industry and helped to begin a revolution towards the usage of plastic construction products. Since then, several product developments and strategic alliances have made CULTEC a cutting edge R&D-based manufacturer.

CULTEC's chambers are dome shaped, open-bottomed corrugated plastic structures. They function like conventional stormwater ponds and work in conjunction with existing storm sewer infrastructure to provide underground retention/ detention and infiltration of rainwater into the ground. Infiltration methods have been proven to be the most effective way to remove phosphorous, nitrogen, lead, zinc, suspended solids and organic carbon from water compared to wetlands, water quality ponds, filtering systems and water quality swales.

CULTEC Contactor® & Recharger® Chambers

CULTEC Contactor® and Recharger® chambers can be used as detention systems, infiltration systems or a combination of both. With a wide range of sizes and models available, their advanced design and ease of installation makes them an ideal alternative to ponds, swales, concrete structures or pipe installations. CULTEC chamber systems can be installed with a Separator™ Row, consisting of a row of chambers surrounded by geotextile on all sides.
It is designed to capture the first flush of a rain event and is a cost effective means of removing Total Suspended Solids (TSS) that may pass through the upstream water quality structures. In addition to removing solids and debris, the Separator Row provides easier access for inspection and maintenance of the total system.

TYPICAL APPLICATIONS

- Commercial Developments
- Residential Developments
- Industrial Areas
- Athletic Fields

QUALITY	EASE OF INSTALLATION	EASE OF TRANSPORTATION AND STORAGE	COST EFFECTIVE
• Made of durable and chemically resistant HDPE or impact-modified polypropylene • Open bottom maximizes infiltration capability and performance	• Lightweight components can be hand-carried into position • Overlapping ribs provide a fast and secure connection • Internal manifold system allows flexibility in design and on-site reconfiguration	• Units nest on pallets for convenient shipping and reduced freight costs • Less space required in staging areas	• Valuable land becomes available for further development • Less area and less crushed stone required for installation compared to conventional systems

CULTEC CHAMBERS STACK ON SKIDS FOR EASY LOADING, UNLOADING AND STOCKPILING

CULTEC CHAMBERS CAN BE HAND CARRIED FOR EASE OF INSTALLATION

CULTEC Stormwater Chambers

CONTACTOR® SERIES

The Contactor® series consists of lower profile chambers and are typically used for installations with depth restrictions or when a larger infiltrative area is required.

Sizes range from 8.5 - 12.5 inches (216 - 318 mm) in height.

Available models are the Contactor® Field Drain C-4HD and Contactor® 100HD.

THE CULTEC LOW PROFILE CONTACTOR SERIES CAN ACCOMMODATE SYSTEMS WITH HIGH WATER TABLES OR OTHER DEPTH CONSTRAINTS

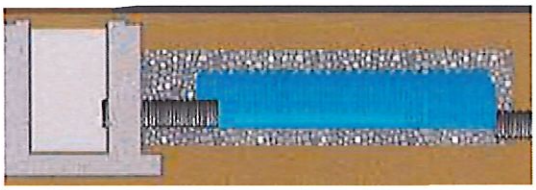
RECHARGER® SERIES

CULTEC's Recharger® series includes higher profile, larger capacity chambers. Sizes range from 18.5 - 48 inches (470 - 1219 mm) in height. Chamber capacities vary from 2.65 - 17.31 ft^3/ft (0.246 - 1.61 m^3/m).

Available models within this series are the Recharger® 150XLHD, 180HD, 280HD, 330XLHD, 360HD and 902HD.

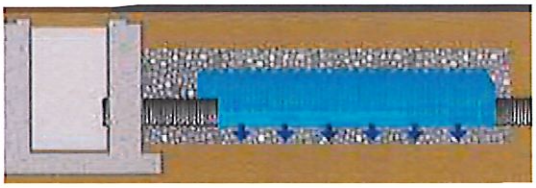
CULTEC'S RECHARGER SERIES ARE HIGHER PROFILE, LARGER CAPACITY CHAMBERS FOR MAXIMIZING STORAGE IN A SMALL FOOT PRINT

Detention Systems



Stormwater runoff exceeding a site's allowable discharge rate is temporarily stored in chambers connected to a control structure (manhole). Downstream flows are restricted to a set rate using an orifice.

Detention/ Infiltration Systems



Detention volume is set by the elevation of the outlet pipe to the control structure. Water remaining below the outlet pipe invert will infiltrate providing groundwater recharge.

Infiltration Systems

Water enters the chambers via the storm sewer network where it is held until the water infiltrates into the surrounding soils. Systems provide pollutant removal, total downstream volume reduction and temperature control of the downstream flow.

CULTEC Contactor® & Recharger® Chambers Specification Information

MODEL	Length	Width	Height	Installed Length	Chamber Storage		Compatible Internal Manifold Component
Contactor® Field Drain C-4HD	8.5' 2.59 m	48" 1219 mm	8.5" 216 mm	8' 2.44 m	1.69 ft³/ft 13.54 ft³/unit 101 gal	0.16 m³/m 0.38 m³/unit 383.28 L	N/A
Contactor® 100HD	8' 2.44 m	36" 914 mm	12.5" 318 mm	7.5' 2.29 m	1.87 ft³/ft 14.00 ft³/unit 105 gal	0.17 m³/m 0.40 m³/unit 396.88 L	HVLV SFCx2 Feed Connector
Recharger® 150XLHD	11' 3.35 m	33" 838 mm	18.5" 470 mm	10.25' 3.12 m	2.650 ft³/ft 27.16 ft³/unit 203 gal	0.25 m³/m 0.77 m³/unit 769.12 L	HVLV FC-24 Feed Connector
Recharger® 180HD	7.33' 2.23 m	36" 914 mm	20.5" 521 mm	6.33' 1.93 m	3.45 ft³/ft 21.81 ft³/unit 163 gal	0.32 m³/m 0.62 m³/unit 617.47 L	HVLV FC-24 Feed Connector
Recharger® 280HD	8' 2.44 m	47" 1194 mm	26.5" 673 mm	7' 2.13 m	6.079 ft³/ft 42.55 ft³/unit 318 gal	0.56 m³/m 1.21 m³/unit 1204.91 L	HVLV FC-24 Feed Connector
Recharger® 330XLHD	8.5' 2.59 m	52" 1321 mm	30.5" 775 mm	7' 2.13 m	7.459 ft³/ft 52.21 ft³/unit 391 gal	0.69 m³/m 1.48 m³/unit 1478.44 L	HVLV FC-24 Feed Connector
Recharger® 360HD	4.17' 1.27 m	60" 1525 mm	36" 914 mm	3.67' 1.12 m	10.00 ft³/ft 36.66 ft³/unit 274 gal	0.93 m³/m 1.04 m³/unit 1038.03 L	HVLV FC-48 Feed Connector
Recharger® 902HD	4.25' 1.30 m	78" 1981 mm	48" 1219 mm	3.67' 1.12 m	17.31 ft³/ft 63.47 ft³/unit 475 gal	1.61 m³/m 1.80 m³/unit 1798.07 L	HVLV FC-48 Feed Connector

NOTES:

- Based on installed length. Stone void is calculated at 40%. Most models include 6 inch (152 mm) stone base, 6 inch (152 mm) stone layer above chamber crown and stone around units based on typical minimum center-to-center spacing.
- Recharger 902HD assumes 9 inch (229 mm) stone base, 12 inch (305 mm) stone layer above and typical center-to-center spacing.
- Recharger models 360HD and 902HD chambers require a separate end cap.

MAINTENANCE

To ensure a well-functioning system, regularly scheduled cleaning of catch basins and pre-treatment devices is required. We suggest the inclusion of a CULTEC StormFilter® 330 or CULTEC Separator™ Row in the design for water quality and particulate removal.

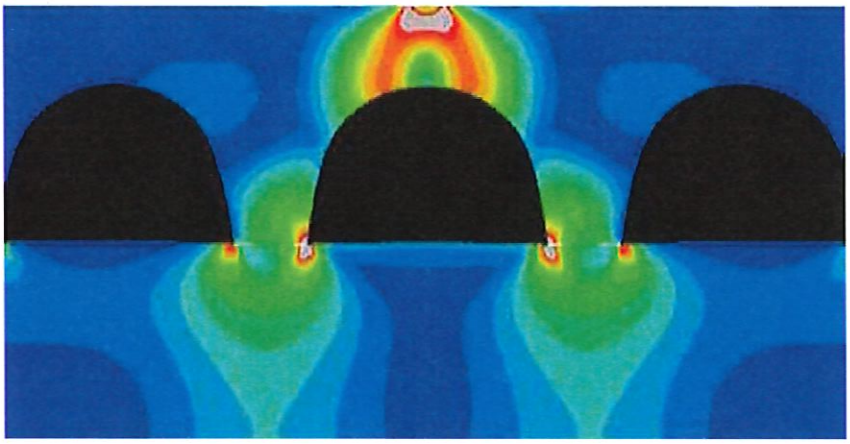
SAFETY FIRST!

Eliminate flooding with CULTEC stormwater chambers

- Reduce road accidents, washouts and driver delays
- Minimize building and property damage, sewer backup and foundation settlement
- Lower clean-up costs, health hazards and environmental damage

Chamber Design

The arched shape and corrugated design of the chamber effectively transfers live and dead loads to the subgrade. Stone columns between chamber rows also share in the load transfer. CULTEC chambers undergo rigorous testing. Select profiles meet the performance requirements of the American Society for Testing and Materials (ASTM) F2418, and meet the loads defined by the American Association of State Highway and Transportation Officials (AASHTO) (Section 12.12) Load Resistance Factor Design (LRFD) and the CAN/CSA-S6-14 CL-625 Design Truck. The Recharger 902HD has achieved third-party certification to the Canadian Standards Association (CSA) B184 standard for polymeric subsurface stormwater management structures. Chambers are constructed of impact-modified and long-term creep resistant polymers, ensuring that the chambers achieve a minimum 50-year service life.



CULTEC

Let us help you with your next project!

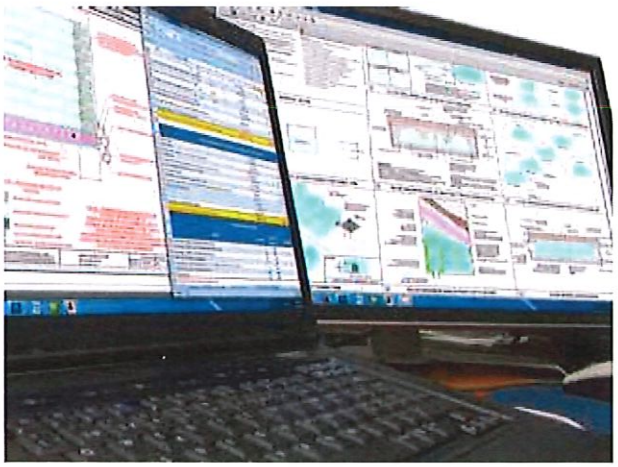
Contact a CULTEC Representative to arrange complimentary design assistance.

You'll receive project-specific stage-storage calculations, CAD layouts, details and product submittal packages.

CULTEC's intuitive design tools are also available to manually complete your design.

Download the CULTEC Stormwater Design Calculator, Incremental Storage Calculator and CAD design templates to complete an accurate, site-specific layout complete with stage-storage calculations.

Visit www.cultec.com/stormwater-design.html for design assistance.



Installation

Refer to CULTEC's most current installation instructions for further details including but not limited to acceptable fill materials and vehicle loads.

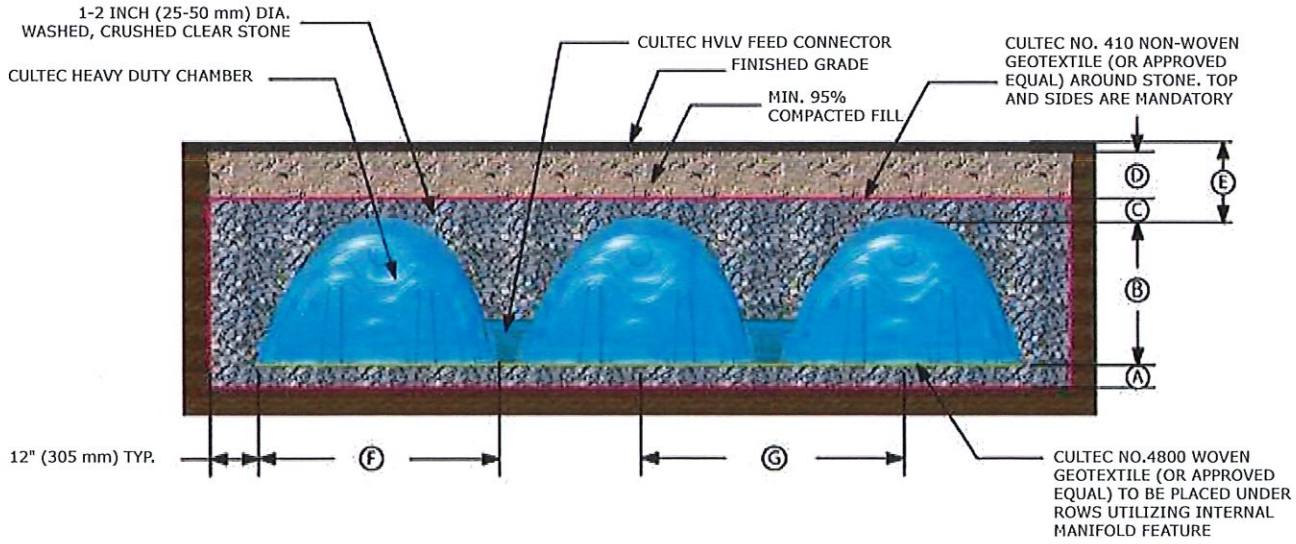
For design assistance, contact CULTEC's Technical Department at tech@cultec.com or 203-775-4416 ext. 203.

Table 1 - Minimum Fill Requirements for Traffic Applications

	Ref.	Contactor® Field Drain C-4HD	Contactor® 100HD	Recharger® 150XLHD	Recharger® 180HD	Recharger® 280HD	Recharger® 330XLHD	Recharger® 360HD	Recharger® 902HD
Min. depth of stone base	A	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	9" 229 mm
Chamber height	B	8.5" 216 mm	12.5" 318 mm	18.5" 470 mm	20.5" 521 mm	26.5" 673 mm	30.5" 775 mm	36" 914 mm	48" 1219 mm
Min. depth of stone required above units for traffic applications	C	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	6" 152 mm	12" 305 mm
Min. depth of 95% compacted fill required for paved traffic applications	D	8" 203 mm	8" 203 mm	8" 203 mm	8" 203 mm	8" 203 mm	10" 254 mm	12" 305 mm	12" 305 mm
Max. depth of cover allowed above crown of chamber	E	12' 3.66 m	12' 3.66 m	12' 3.66 m	12' 3.66 m	12' 3.66 m	12' 3.66 m	12' 3.66 m	8.3' 2.53 m
Chamber width	F	48" 1219 mm	36" 914 mm	33" 838 mm	36" 914 mm	47" 1194 mm	52" 1321 mm	60" 1525 mm	78" 1981 mm
Typical center-to-center spacing	G	48" 1219 mm	40" 1016 mm	39" 991 mm	39" 991 mm	52" 1321 mm	58" 1473 mm	69" 1753 mm	87" 2211 mm

NOTES:

- Structurally designed to withstand HS-20/HS-25 live loads in accordance with AASHTO



Find out how CULTEC's Stormwater Chamber Systems can be used on your next project.

Contact us today.

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WE HAVE SOLUTIONS


Commercial Drainage


Residential Drainage


Dry Well Applications


Internal Manifold


Stormwater Design Assistance

		Contactor Field Drain C-4 or C-4HD	Contactor 100	Contactor 100HD	Recharger 150XLHD	Recharger 180HD	Recharger 280HD	Recharger 330XLHD	Recharger 360HD	Recharger 902HD
Length	feet	8.5	8	8	11	7.33	8	8.5	4.17	4.10
Installed Length	feet	8	7.4	7.5	10.25	6.33	7	7	3.67	3.67
Width	inches	48	36	36	33	36	47	52	60	78
Height	inches	8.5	12.5	12.5	18.5	20.5	26.5	30.5	36	48
Bare Chamber Storage	ft^3/ft gal/ft	1.692 12.66	1.961 14.67	1.866 13.96	2.650 19.82	3.445 25.77	6.079 45.48	7.459 55.80	10.00 74.80	17.31 129.50
Intermediate	ft^3/unit gal./unit	13.54 101	14.51 109	14.00 105	27.16 203	21.81 163	42.55 318	52.21 391	36.66 274	64.75 484
Stand Alone	ft^3/unit gal./unit	14.38 108	15.69 117	14.93 112	29.15 218	25.25 189	48.63 364	63.40 474	49.58 371	70.27 526
Min. Installed Storage	ft^3/ft gal/ft	3.75 28	3.90 29	3.84 29	4.89 37	5.59 42	9.21 69	11.32 85	15.20 114	27.06 202
Intermediate	ft^3/unit gal./unit	29.99 224	28.85 216	28.81 216	50.17 375	35.39 265	64.46 482	79.26 593	55.73 417	99.22 742
Stand Alone	ft^3/unit gal./unit	31.86 238	31.19 233	30.73 230	53.84 403	40.96 306	73.67 551	96.24 720	86.72 649	119.90 897

The Recharger 902HD only comes in only one model type and requires a separate end plate.
The Intermediate model for the Recharger model 360HD or 902HD in this case means a model which has an installed length of 3.67' (1.12 m) located in the middle of a row.
A stand alone model for the Recharger 360HD or 902HD is a single chamber with two end plates.
All other models as stand alone units shall be called Model R.

CULTEC CONTACTOR® & RECHARGER®

Plastic Chambers for Stormwater Management

CULTEC®

CULTEC CONTACTOR® & RECHARGER®

Plastic Chambers for Stormwater Management

From Design to Installation,
our client services are unmatched.

- Exceptional custom design services performed by stormwater chamber specialists.
- Most experienced project managers in the industry.
- Included in popular hydrology software.
- Free HydroCAD® CULTEC Edition available.
- Complimentary project-specific calculations and drawings.
- Single point of contact ensures your project goes smoothly from Start to Finish.

The first stormwater chambers manufactured
with installations dating back over 30 years.

- Chamber systems are the least expensive and most efficient underground storage option.
- Most extensive product line in the industry.
- Internal manifold saves $$$.
- Earn up to 22 LEED Credits.
- Maximized storage capability in minimized area.
- Less downtime during handling and placement.
- Minimized shipping costs and stockpile area requirements.
- Sizes to accommodate extremely low-profile depth constraints and high-volume demands.

Whether it is a single residential dry well application or a large commercial development, we've got you covered.

CONTACT US TODAY!

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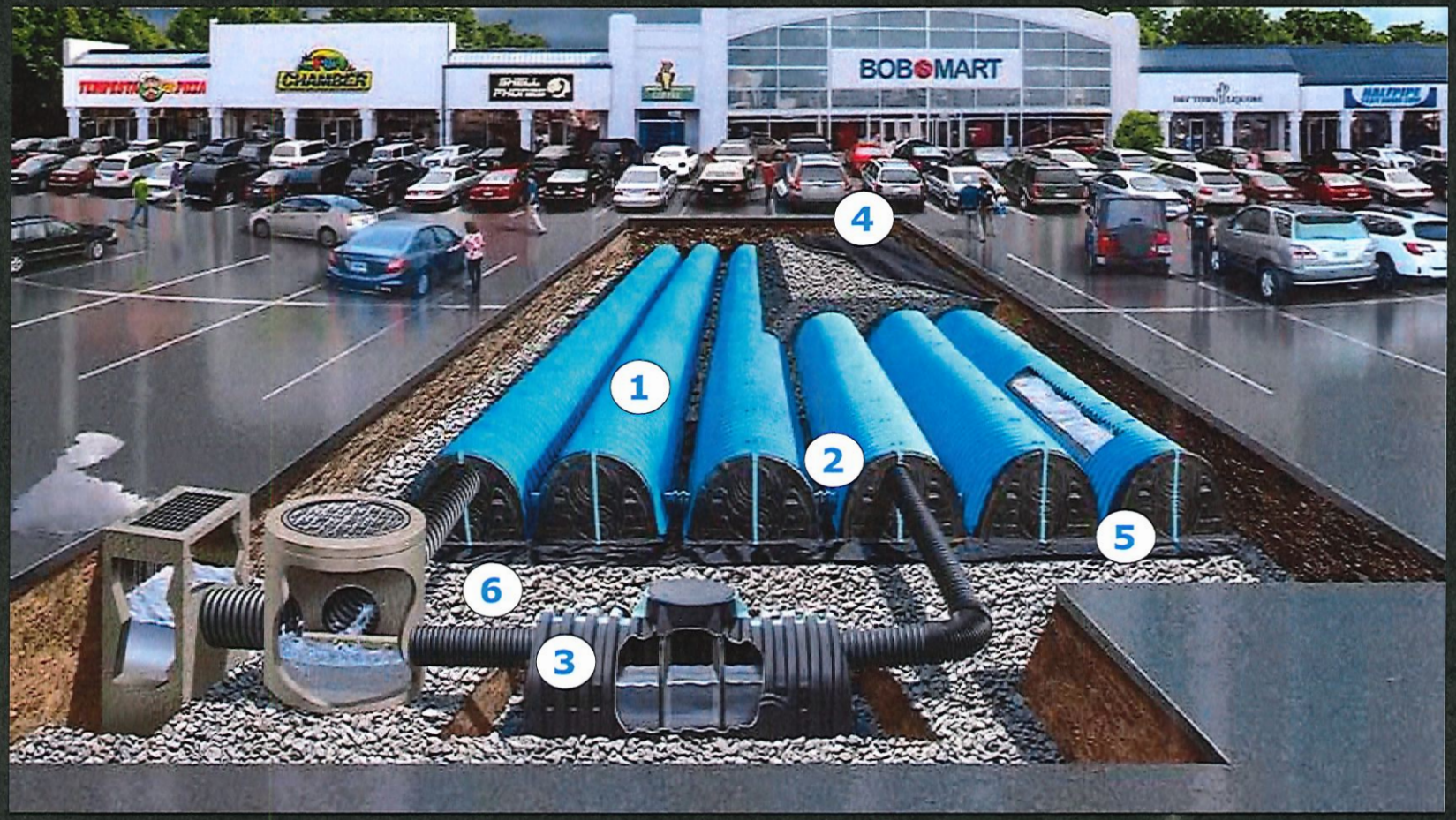
CULTEC®

Contactor® & Recharger®

Subsurface Stormwater Management Systems *Since 1986*



The Founder of Plastic Chamber Technology

CULTEC®

Contactor® & Recharger®

Subsurface Stormwater Management Systems *Since 1986*

Typical CULTEC Stormwater System Components

1. **CULTEC Stormwater Chamber** - used for retention, detention, reclamation
2. **CULTEC HVLV® Feed Connector** - internal manifold component
3. **CULTEC StormFilter® 330** - Water Quality Unit
4. **CULTEC No. 410™ Non-woven Geotextile** - prevents soil intrusion into system
5. **CULTEC No. 4800™ Woven Geotextile** - placed under CULTEC manifold components, prevents scouring of stone base
6. **Stone** - used for stone base, embedment stone and stone above chambers
7. **CULTEC Warning Tape** - marks off location of underground CULTEC Stormwater System during construction to prevent vehicular traffic
8. **Multicade Pylon** - marks location of underground CULTEC Stormwater System during construction phase

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CULTEC®

CULG011 10-18

Contactor® & Recharger®
Stormwater Chambers

Installation Instructions
for CULTEC Stormwater Management Systems

Contactor® Models Field Drain™ C-4HD™, 100HD™
Recharger® Models 150XLHD™, 180HD™, 280HD™, & 330XLHD™

The Founder of Plastic Chamber Technology

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Contact Information:
For general information on our other products and services, please contact our offices within the United States at (800)428-5832, (203)775-4416 ext. 202, or e-mail us at custservice@cultec.com.

For technical support, please call (203)775-4416 ext. 203 or e-mail tech@cultec.com.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

Doc ID: CULG012 12-17
December 2017
You are using version CULG012 12-17of our CULTEC Stormwater Installation Instructions for Contactor® Models Field Drain™ C-4HD™, 100HD™, Recharger® Models 150XLHD™, 280HD™, & 330XLHD™

These instructions are for single-layer traffic applications only. For multi-layer applications, contact CULTEC.
All illustrations and photos shown herein are examples of typical situations. Be sure to follow the engineer's drawings. Actual designs may vary.

Required Materials and Equipment

- Proper geotechnical soil evaluation by a qualified engineer or soil scientist to determine suitability of structural installation
- OSHA compliance
- CULTEC warning tape, or equivalent
- Assurances from local utilities that no underground gas, electrical or other potentially dangerous pipelines or conduits are already buried at the site
- Acceptable 1 – 2 inch (25 - 51 mm) washed, crushed stone as shown in Table 4, page 19. Cleanliness of stone to be verified by engineer.
- Acceptable fill material as shown in Table 5, page 20.
- CULTEC No. 410™ non-woven geotextile or equivalent (See Table 3, page 19).
- All CULTEC chambers and accessories as specified in the engineer's plans including CULTEC No. 410™ non-woven geotextile, CULTEC StormFilter® and CULTEC No. 66™ woven geotextile, where applicable. Check CULTEC chambers for damage prior to installation. Do not use damaged CULTEC chambers. Contact your supplier immediately to report damage or packing-list discrepancies.
- Reciprocating saw or router
- Stone bucket
- Stone conveyor and/or tracked excavator
- Transit or laser level measuring device
- Compaction equipment with maximum gross vehicle weight of 12,000 lbs (5,440 kgs).
- Vibratory rollers may only be used on the stone base prior to the installation of chambers.

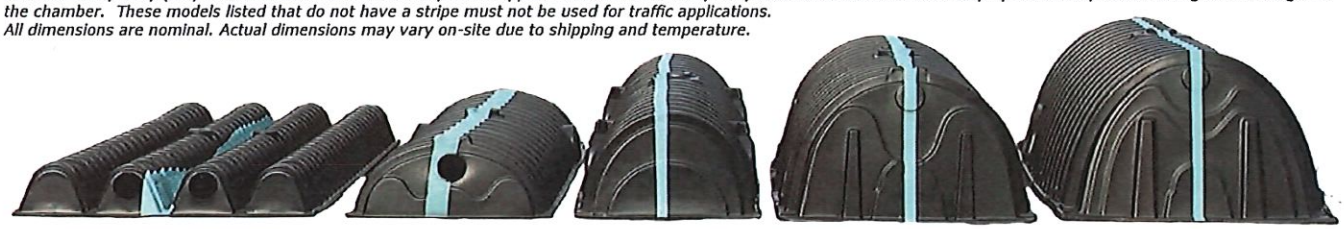
Requirements for CULTEC Chamber System Installations

- CULTEC systems must be designed and installed in accordance with CULTEC's minimum requirements. Failure to do so will void the limited warranty. To request a copy of the CULTEC limited warranty, call CULTEC at 203-775-4416 or visit www.cultec.com.
- Installing contractors are expected to comprehend and use the most current installation instructions prior to beginning a system installation. If there is any question as to whether these are the most current instructions, contact CULTEC at (203) 775-4416 or visit www.cultec.com.
- Contact CULTEC at least thirty days prior to system installation to arrange for a pre-construction meeting.
- All CULTEC system designs must be certified by a registered professional engineer.
- Use these installation instructions as a guideline only. Actual design may vary. Refer to approved construction drawings for job-specific details. Be sure to follow the engineer's drawings as your primary guide.
- System cover/backfill requirements will vary based on CULTEC chamber model. Please refer to Table 6 on page 20 and engineer's drawings.
- Any discrepancies with the system sub-grade soil's bearing capacity must be reported to the design engineer.
- CULTEC No. 410 non-woven geotextile must be used as specified in the engineer's drawings.
- CULTEC requires the contractor to refer to CULTEC's Installation Instructions Tables 1 - 6 shown on pages 18-20, concerning vehicular traffic. Responsibility for preventing vehicles that exceed CULTEC's requirements from traveling across or parking over the chamber system lies solely with the contractor throughout the entire site construction process. The placement of warning tape, temporary fencing, and/or appropriately located signs is highly recommended. Imprinted warning tape is available from CULTEC. For Acceptable Vehicle Load information, refer to Tables 1 and 2 on page 18.
- Erosion and sediment-control measures must meet local codes and the design engineer's specifications throughout the entire site construction process.

CULTEC Chamber Specification Information

	Size (LxWxH)	Installed Length	Length Adjust-ment	Max. Inlet in End Wall	Max. O.D. in Side Portal	Compatible Feed Connector
Contactor® Field Drain C-4HD	8.5′ x 48″ x 8.5″ 2.59 m x 1219 mm x 216 mm	8′ 2.44 m	0.5′ 0.15 m	4.5″ 114 mm	n/a	n/a
Contactor® 100HD	8′ x 36″ x 12.5″ 2.44 m x 914 mm x 318 mm	7.5′ 2.29 m	0.5′ 0.15 m	10″ 250 mm	6.9″ 175 mm	HVLV® SFCx2 Feed Connector
Recharger® 150XLHD	11′ x 33″ x 18.5″ 3.13 m x 838 mm x 470 mm	10.25′ 2.87 m	0.75′ 0.28 m	12″ 300 mm	10.25″ 260 mm	HVLV® FC-24 Feed Connector
Recharger® 180HD	7.33′ x 36″ x 20.5″ 2.33 m x 914 mm x 521 mm	6.33′ 1.93 m	1′ 0.30 m	15″ 375 mm	12.25″ 311 mm	HVLV® FC-24 Feed Connector
Recharger® 280HD	8′ x 47″ x 26.5″ 2.44 m x 1194 mm x 673 mm	7′ 2.13 m	1′ 0.30 m	18″ 450 mm	12.25″ 311 mm	HVLV® FC-24 Feed Connector
Recharger® 330XLHD	8.5′ x 52″ x 30.5″ 2.59 m x 1321 mm x 775 mm	7′ 2.13 m	1.50′ 0.46 m	24″ 600 mm	11.75″ 298 mm	HVLV® FC-24 Feed Connector

CULTEC Heavy Duty (HD) chambers must be used for any traffic applications. CULTEC Heavy Duty chambers have a colored stripe permanently affixed along the full length of the chamber. These models listed that do not have a stripe must not be used for traffic applications.
All dimensions are nominal. Actual dimensions may vary on-site due to shipping and temperature.



Shown left-to-right: Contactor Field Drain C-4HD. Contactor 100HD, Recharger 150XLHD, Recharger 280HD, and Recharger 330XLHD.

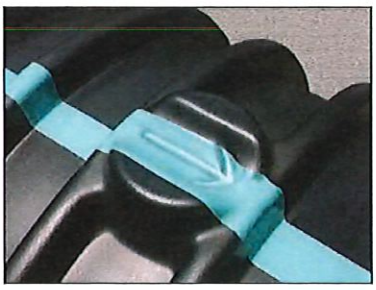
CULTEC HVLV Feed Connector Specification Information

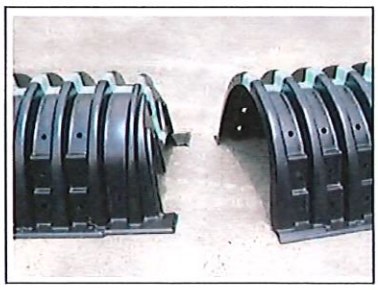
Model	Size (LxWxH)	Compatible Models	Installed Length (exposed)
HVLV® SFCx2 Feed Connector	19.7″ x 12″ x 7.6″ 500 mm x 305 mm x 194 mm	Contactor® 100HD	For Contactor 100HD: 4″ (102 mm) typ.
HVLV® FC-24 Feed Connector	12″ x 16″ x 24.2″ 305 mm x 406 mm x 614 mm	Recharger® 150XLHD Recharger® 180HD Recharger® 280HD Recharger® 330XLHD	For Recharger 150XLHD: 6″ (152 mm) typ. For Recharger 180HD: 3″ (76 mm) typ. For Recharger 280HD: 5″ (127 mm) typ. For Recharger 330XLHD: 6″ (152 mm) typ.

Shown left-to-right: HVLV SFCx2 Feed Connector and HVLV FC-24 Feed Connector

Site Preparation and Excavation

- Excavate and level the area per engineer's drawings. Refer to plan view and cross-section details and excavate bed to accommodate chambers and manifold system. Be sure to allow for a minimum 12 inch (305 mm) stone border around the perimeter of the system and unforeseen overages in your excavation calculations.
- Remove any standing water and maintain positive drainage of the site throughout the installation. Dewatering procedures must be used if necessary.
- Prepare the sub-grade soil for the chamber bed as specified by the engineer's drawings.
- Place CULTEC No. 410™ non-woven geotextile (or equivalent — see Table 3, page 19) on the excavated bed bottom and perimeter sidewalls as specified by the engineer's drawings. CULTEC No. 410 non-woven geotextile is required on the sides and over the top of the system. It is also recommended on the system bottom. Overlap the geotextile by at least 24 inches (610 mm) where the fabric edges meet.
- Disperse a level base of 1 to 2 inch (25 - 51 mm) diameter washed, crushed stone over the entire area of the bed bottom (see Table 4, page 19 for stone requirements). Refer to the engineer's drawings for sub-grade soil preparation and required stone foundation thickness.
- Compact the stone base to achieve a flat, level surface. Vibratory rollers may only be used on the stone base prior to the installation of chambers. Use of vibratory rollers is strictly prohibited on all other backfill layers.





Directional arrows located on the top of the chamber point towards the Small Rib End. The open end of the next chamber overlaps the small rib end of the preceding chamber.

End Detail Information for CULTEC Contactor® Models Field Drain C-4HD and 100HD

Directional arrows located on the top of the chamber point towards the Small Rib End.

Large Rib End Detail

Small Rib End Detail

Model RHD is a **starter / stand alone** unit with two full end walls. They are used to start lines or can be used singularly. They may also be trimmed into model type EHD.

Model RHD

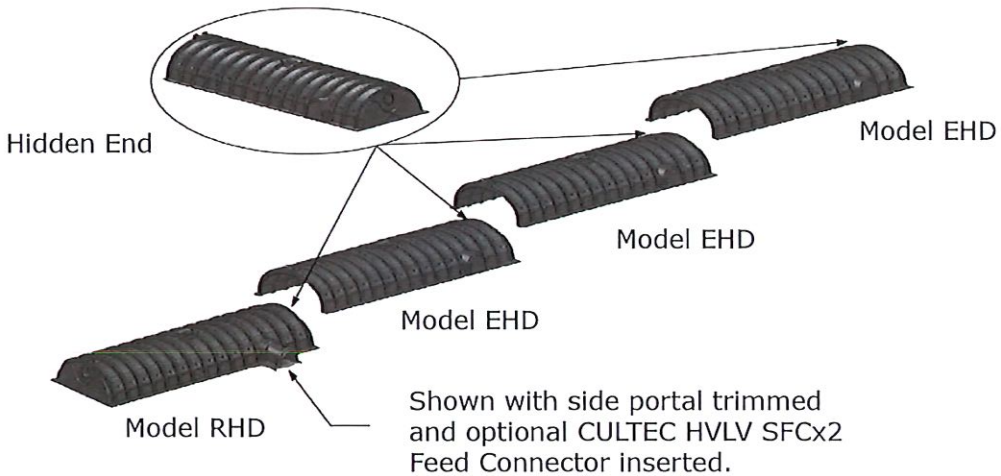
Model EHD is a **middle / end unit** with one closed end wall and one open end. They are used to continue lines and also used to end a line.

Model EHD

Typical Installation Method for CULTEC Contactor® Models Field Drain C-4HD and 100HD

Interlock Model RHD to EHD using the patented overlapping rib connection.

- Start each row with a Model RHD.
- Use Model EHD to continue the length of your row.
- End your row by using a Model EHD.



Shown with side portal trimmed and optional CULTEC HVLV SFCx2 Feed Connector inserted. (Side portal feature not available on Field Drain C-4HD.)

End Detail Information for CULTEC Recharger® Models 150XLHD, 180HD, 280HD, and 330XLHD

Directional arrows located on the top of the chamber point towards the Small Rib End.

Large Rib End Detail | Small Rib End Detail

Model RHD is a **stand alone** unit with two fully closed end walls. They are used when a single unit is required. They may also be trimmed into model types SHD, IHD, or EHD.

Model RHD

Model SHD is a **starter** unit with one closed end wall and one partially open end wall. They are used to start a chamber row.

Model SHD

Model IHD is an **intermediate** unit with one fully open end and one partially open end wall. They are used to continue the length of a line of chambers.

Model IHD

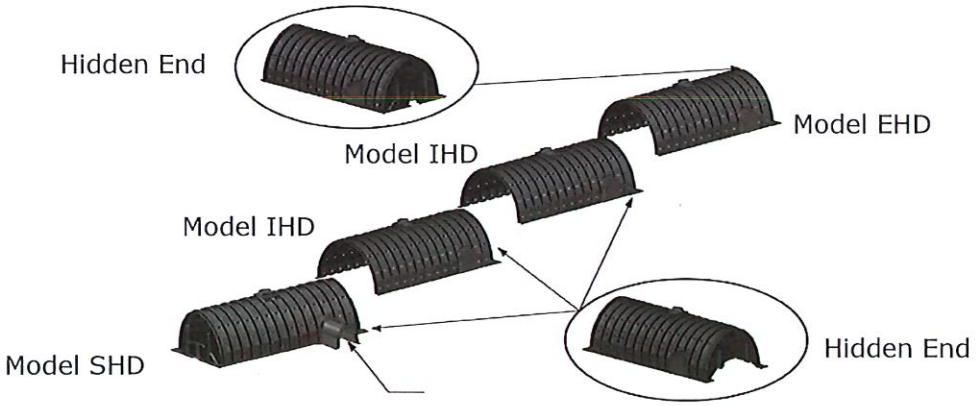
Model EHD is an **end unit** with one fully open end and one fully closed end wall. They are used to end a chamber run.

Model EHD

Typical Installation Method for CULTEC Recharger® Models 150XLHD, 180HD, 280HD, and 330XLHD

Interlock Model SHD to IHD using the patented overlapping rib connection. Finish the row with Model EHD.

- Start each row with a Model SHD.
- Use Model IHD to continue the length of your row.
- End your row by using a Model EHD.



Shown with side portal trimmed and optional CULTEC HVLV Feed Connector inserted.

Chamber Preparation and Installation

CULTEC Contactor® and Recharger® chambers have the distinctive features of a fully formed end wall and over-lapping rib connection. CULTEC chamber ribs are dimensionally sized with an open large rib and a closed smaller rib to allow for an easy interlocking rib connection.

- Identify and group the different chamber types to ensure proper placement and usage as outlined on pages 6 - 7.
- Place one Starter Unit (Model S for Recharger® series, Model R for Contactor® series) as designed for each row of units to be installed. Directional arrows point towards the small rib end of the chamber.
- If using the side portal internal manifold feature, trim the side portal(s) according to guidelines located on the sidewall of the chamber, as required - see page 11. Insert one end of the HVLV Feed Connector into the trimmed portal to create the internal manifold. Refer to Manifold Installation section on page 11.

- Place middle chamber (Model I for Recharger® series, Model E for Contactor® series) so the directional arrow located in the center of the unit points downstream towards the end of the line. Overlap the large open end rib over the small rib of the preceding chamber's end wall, interlocking the chambers together - see page 6 - 7. When placing chambers, take care to maintain center-to-center separation requirements, measuring from the base of the chamber.
- To ease backfilling requirements, only install as many middle chambers as the stone-laying bucket or conveyor can reach.
- Place stone as outlined on page 15 taking care not to drop stone over the last rib to be overlapped.

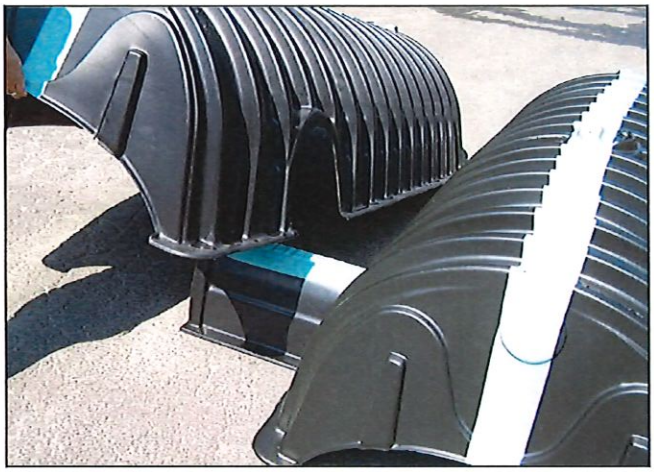
- Continue chamber and stone placement using middle chambers (Model I for Recharger® series, Model E for Contactor® series) to extend the length of the row.
- Model E chamber is used to end the line.
- Prior to the placement of the next line of chambers, the level and alignment of the chamber units shall be checked and corrected, where needed.

Installation of Manifold

Utilize the side portals located on the chamber as an internal manifold in locations where indicated on the engineer's drawings. HVLV® Feed Connectors are inserted into the portals to promote flow. An additional external manifold is not required unless specified by the engineer's design.

- CULTEC No. 66 woven geotextile is to be placed under all chambers utilizing the internal manifold feature and under all chambers accepting inlet/outlet pipe connections per engineer's drawings. If inserting a pipe 18" (450 mm)* diameter or larger into the CULTEC chamber, the use of CULTEC No. 66 woven geotextile is recommended to prevent washout. See detail on page 13.

- Most installations are designed with the internal manifold located at the ends of the chamber bed. However, the side portal internal manifold feature allows for the manifold to be located at any point within the chamber run. Refer to system design for manifold location(s). Install chambers according to directional arrows located in the top center of the unit.



- Using a reciprocating saw or router, trim the sidewall portals of the units that are to receive the HVLV Feed Connectors. Feed connectors may be placed on any chamber requiring a manifold, as indicated by the engineer's drawings. See page 11.

- Place the HVLV Feed Connectors into the side portal of the chambers per engineer's drawings.

- Check for correct center-to-center spacing of chamber runs according to engineer's drawings before proceeding to next row.

- Insert inflow/outflow pipe(s) into end wall or side portal as detailed on engineer's drawings. See page 4 for maximum inlet sizes for end wall and side portals. There is no need to feed every row if utilizing the internal manifold feature.

The side portal feature is not available on the Contactor Field Drain C-4HD. If manifold installation does not include CULTEC's side portal internal manifold, proceed according to the engineer's drawings for pipe manifold installation.

*Different chamber sizes accept varying maximum pipe connections. See page 4 for details.

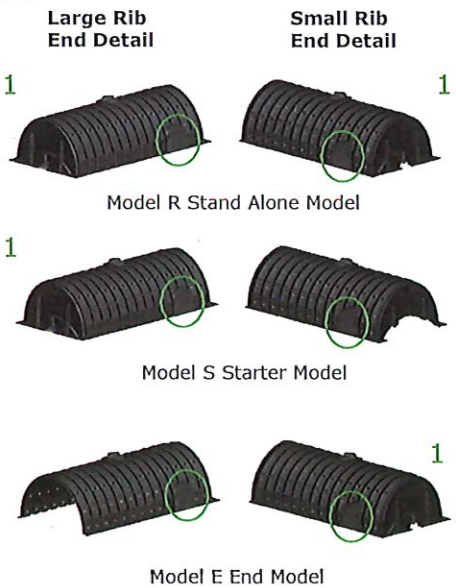
How to Trim the CULTEC Chamber to Accommodate Pipe on End Wall

When using a conventional pipe manifold or inlet / outlet pipes, the contractor is required to trim the CULTEC Chamber on site.

Here are some quick steps to ensure a successful outcome:

- Lay out chambers according to engineered plans.
- Directional arrows located at the top of the chamber point towards the small rib end.
- Line up the pipe on the chamber end wall to the designated pipe elevation as detailed on the engineer's drawing.
- Using a grease pen, outline the pipe on the end wall of the CULTEC chamber.
- Drill a hole on the chamber end wall large enough to accommodate a saw bit.
- Following the grease pen outline, use a reciprocating saw to trim out the opening to accommodate the pipe. Trimming should be within 1/4" (6 mm) tolerance of pipe O.D.
- Insert the pipe or fitting a minimum of 8" (203 mm) into the chamber. This is not required to be a watertight connection.
- Backfill as noted in the installation instructions and engineering details.

Fig. 1

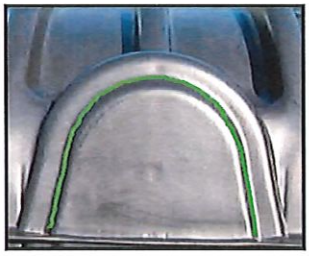


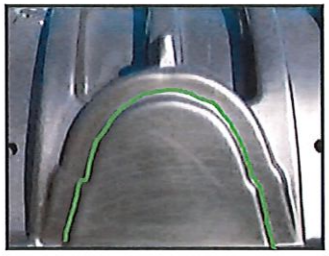
Trimming may only be performed on fully closed end walls (indicated by Number 1 in Fig. 1) or side portal areas (See green circles in Fig. 1 for side portal locations). Pipe may not be inserted into the sidewall of the chamber unless it is within the side portal trim lines. See page 11-12 for more information on trimming side portals.

How to Trim the Side Portal to Accommodate HVLV Feed Connector for Internal Manifold

When using the side portal internal manifold feature, the contractor is required to trim the side portal of the CULTEC Chamber on site.

- Following the guides on the side portal, use a reciprocating saw to trim out the opening to accommodate the HVLV Feed Connector. Trimming should be within 1/4" (6 mm) tolerance of the HVLV Feed Connector.
- Insert the HVLV Feed Connector a minimum of 8" (203 mm) into the chamber. This is not required to be a watertight connection.





Shown left-to-right: Guidelines to follow for correct trimming for SFCx2 and FC-24 portals. Do not cut outside of the side portal area guides.

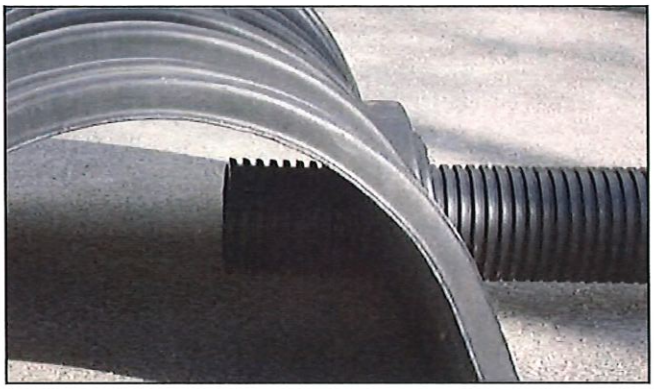
Trimming may only be performed on the side portal area. Side entry in any other location is unacceptable.

Model	Compatible Feed Connector
Contactor 100HD	HVLV SFCx2 Feed Connector
Recharger 150XLHD	HVLV FC-24 Feed Connector
Recharger 180HD	HVLV FC-24 Feed Connector
Recharger 280HD	HVLV FC-24 Feed Connector
Recharger 330XLHD	HVLV FC-24 Feed Connector

How to Trim the Side Portal to Accommodate Pipe for Side Entry

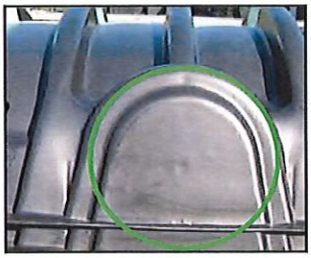
When using the side portal feature as an inlet /outlet location, the contractor is required to trim the side portal of the CULTEC Chamber on site.

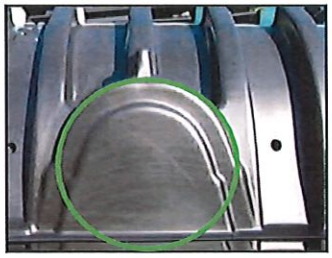
- Line up the pipe on the chamber side portal to the designated pipe elevation as detailed on the engineer's drawing. Pipe outside diameter (O.D.) may not exceed those listed in Table 1.
- Using a grease pen, outline the pipe on the side portal of the CULTEC chamber. See Fig. 1 for acceptable trim area.
- Drill a hole on the chamber side portal large enough to accommodate a saw bit.
- Following the grease pen outline, use a reciprocating saw to trim out the opening to accommodate the pipe. Trimming should be within 1/4" (6 mm) tolerance of pipe O.D.



- Insert the pipe or fitting a minimum of 8" (203 mm) into the chamber. This is not required to be a watertight connection.

Fig. 1





Shown left-to-right: Guidelines to follow for correct trimming for SFCx2 and FC-24 portals when using pipe. Do not cut outside of the side portal area guides.

Trimming may only be performed on the side portal area. Side entry in any other location is unacceptable.

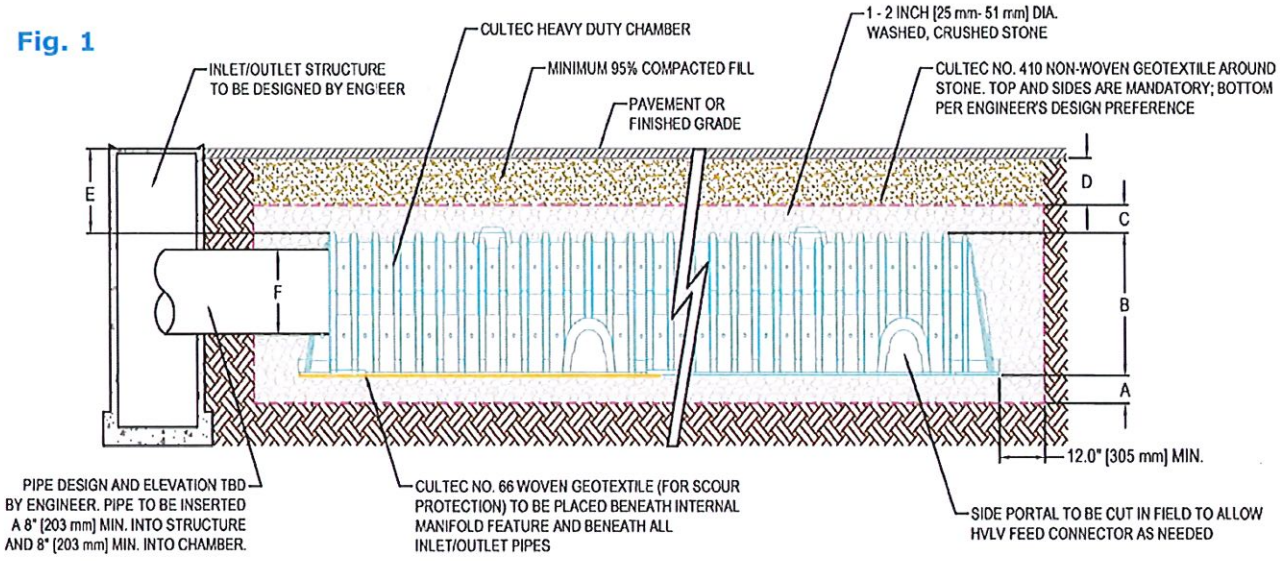
Table 1

Model	Max. Allowable O.D. in Side Portal	
Contactor 100HD	6.9"	175 mm
Recharger 150XLHD	10.25"	260 mm
Recharger 180HD	12.25"	311 mm
Recharger 280HD	12.25"	311 mm
Recharger 330XLHD	11.75"	298 mm

Typical Cross Section for Hi-Flow Pipes

18″ (450 mm) diameter or larger

Fig. 1



See Fig. 1	Description	Contactor 100HD	Recharger 150XLHD	Recharger 180HD	Recharger 280HD	Recharger 330XLHD
A	Min. depth of stone base	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm
B	Chamber Height	12.5″ 318 mm	18.5″ 470 mm	20.5″ 521 mm	26.5″ 673 mm	30.5″ 775 mm
C	Min. depth of stone required above units for traffic applications	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm
D	Min. depth of required 95% compacted fill:					
	For paved applications	8″ 203 mm	8″ 203 mm	8″ 203 mm	8″ 203 mm	10″ 254 mm
	For unpaved applications	10″ 254 mm	10″ 254 mm	10″ 254 mm	10″ 254 mm	12″ 305 mm
E	Max. depth of cover allowed above crown of chamber	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m
F	Max. inlet/outlet pipe size into the end wall of the chamber	10″ 250 mm	12″ 300 mm	15″ 375 mm	18″[1] 450 mm[1]	24″[1] 600 mm[1]

[1] For Recharger Models 280HD, and 330XLHD, CULTEC No. 66 woven geotextile to be placed beneath all chambers accepting inlet piping connections greater than 18″ (450 mm) diameter (see Fig. 1).

Inspection Port Detail for Paved Traffic Applications

Does not apply for Contactor C-4HD

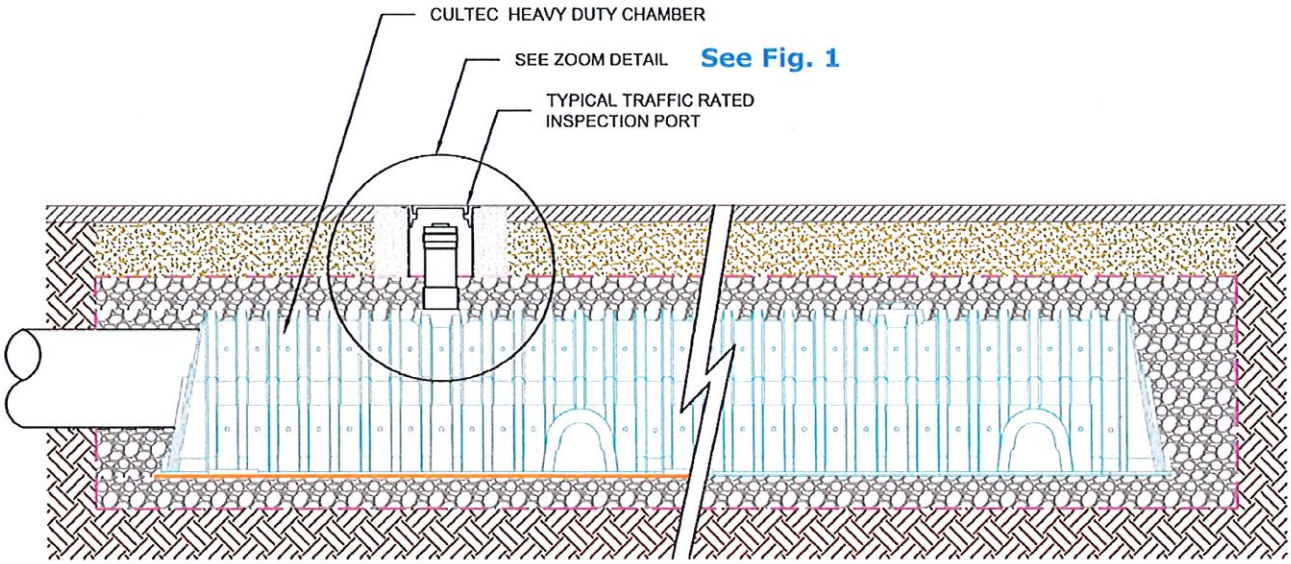
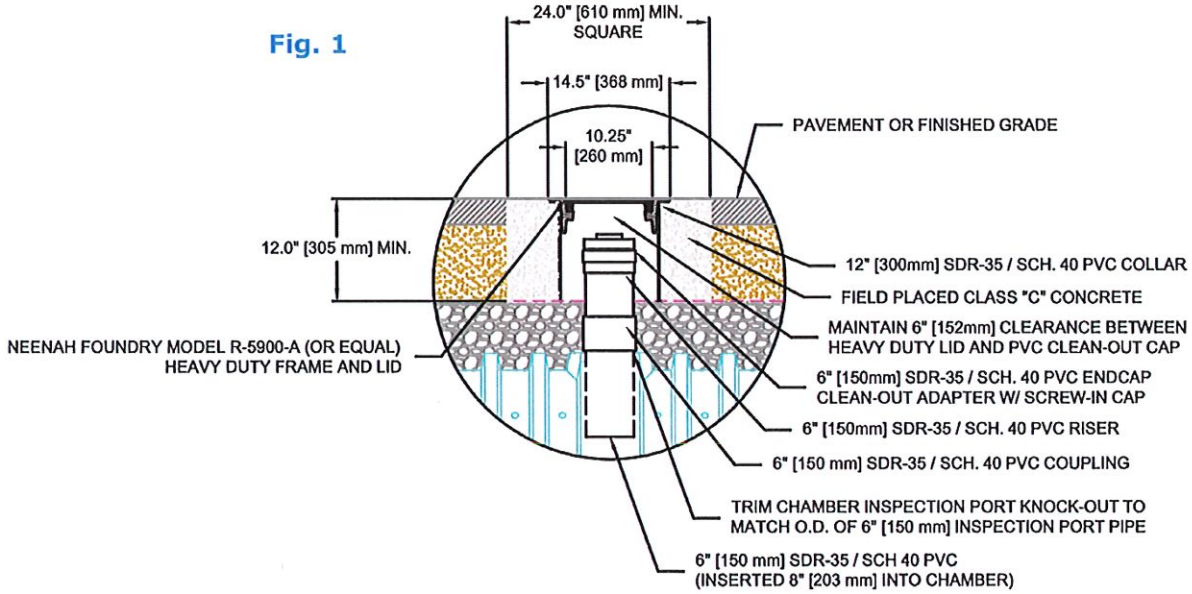


Fig. 1



Trim inspection port knock-out with reciprocating saw or hole-saw.
Corrugated pipe is not suitable for inspection port.
A belled end pipe may be used as replacement to configuration depicted. Belled-end may rest on outside of chamber.

Embedment Stone Backfill

Backfill using washed, crushed stone as specified in Table 4, page 19 and Table 5, page 20. To maintain row separation distance and prevent chamber displacement, slowly distribute stone on top of the center of the chamber crown so that stone trickles down and builds between chamber rows as required. Stone column differential should not exceed 12" (300 mm) between adjacent chamber rows or between chamber rows and perimeter.

Place the stone carefully over the centerline of the chamber crown. Embedment stone must only be placed by an excavator or telescoping conveyor boom. Placement of embedment stone with a bulldozer is not an acceptable method of installation and may cause damage to the chambers. Any chambers damaged using an unacceptable method of backfill are not covered under the CULTEC limited warranty.

Excavator-Placed Stone

Typically the most common method, excavator-placed stone is limited by the reach of the arm. To accommodate this issue with larger beds, it is common to prepare a bed by joining just a few chamber units at a time, then placing the stone and fabric before installing the next few units.

The excavator is usually operated within the excavation area. The excavator may work at grade level over recently placed chambers, provided coverage between the chambers and the excavator tracks meets the minimum requirements as shown in Table 2, page 18 and Table 6, page 20.

Telescoping Conveyor Boom Placement

With booms as much as 120-140 feet (36.6 - 42.7 meters) long, telescoping aggregate conveyors can greatly aid the process of stone placement.

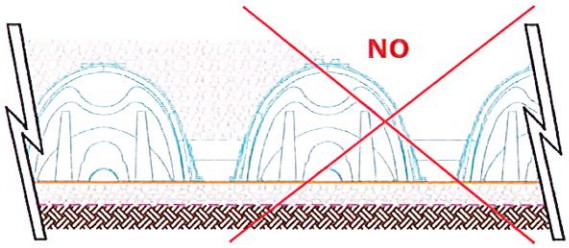
Once secured, stone may be placed to surround the chambers and fill the perimeter areas. System cover/backfill requirements will vary based on CULTEC chamber model and engineer's design. Refer to Table 6 on page 20 and engineer's drawings.

Do not allow equipment to drive over the chambers unless the minimum cover as shown in Table 6, page 20 is in place. Use a warning tape (available from CULTEC) to restrict access.

Repeat steps until the last chamber is in place. Be certain to use the Model E to end the line of chambers as specified by the drawings.

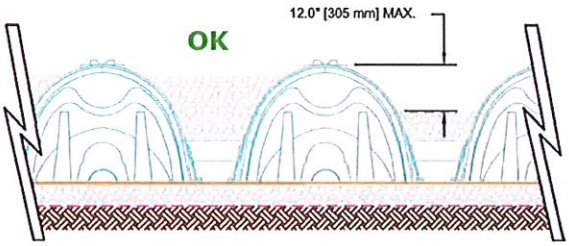
If a manifold system is designed on the back end of the chamber bed, follow manifold installation instructions as described previously.

Stone column height differential should never exceed 12 inches (300 mm) with adjacent chambers or between chamber rows and perimeter. Minimum depth of cover of properly compacted material must be met before allowing vehicles to drive over the bed. Avoid using large rocks and/or organic matter as backfill material. See Table 5, page 20 for acceptable cover materials, or contact the design engineer for approved fill types.



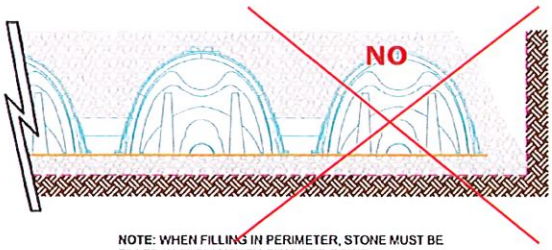
NOTE: CHAMBERS MUST BE BACKFILLED EVENLY.

UNEVEN BACKFILL - INCORRECT INSTALLATION



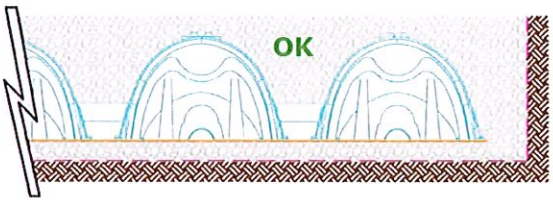
NOTE: STONE HEIGHT IN BETWEEN ROWS AND PERIMETER SHOULD NOT DIFFER BY MORE THAN 12" (300 mm).

EVEN BACKFILL - CORRECT INSTALLATION



NOTE: WHEN FILLING IN PERIMETER, STONE MUST BE FILLED IN EVENLY WITH CHAMBER ROWS.

PERIMETER NOT FULLY BACKFILLED
INCORRECT INSTALLATION

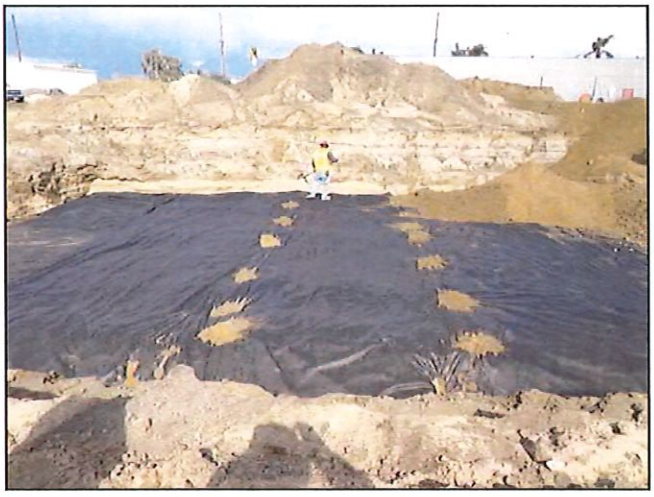


NOTE: PERIMETER MUST BE FULLY BACKFILLED WITH STONE AND EXTEND TO THE EXCAVATION WALL.

PERIMETER FULLY BACKFILLED
CORRECT INSTALLATION

Placement of Top Fabric Layer & System Backfill Process

- Place the stone over the entire bed area as described in previous section (See Item 2 in Fig. 1, page 21) per engineer's depth specifications.
- Cover the entire installation area with CULTEC No. 410 non-woven geotextile, starting from the perimeter and laying it atop the stone. The geotextile must overlap at least 24 inches (610 mm) at the edges.
- Fill the first 12 inches (305 mm) with enough material (See 3 in Fig. 1, page 21) to meet the requirements as shown in Table 5, page 20.
- Backfill over the top of the geotextile (See 3 in Fig. 1, page 21) in lifts that do not exceed 6 inches (152 mm), and disperse the fill with a vehicle that meets the maximum wheel loads or ground pressure limits as specified in Tables 1 & 2 on page 18.
- Compact each lift of backfill as specified in the engineer's drawings. CULTEC specifies compacting to a minimum of 95% of the standard proctor density using compaction equipment with a gross vehicle weight of less than of 12,000 lbs (5,400 kg). The use of vibratory equipment is strictly prohibited and will void any warranties.
- Backfill over the chamber bed (See 4 in Fig. 1, page 21) in 6-inch (152 mm) maximum lifts until the specified grade is achieved. CULTEC's cover requirements vary by model. See Table 3, page 19 for minimum and maximum coverage. For pavement sub-base or special fill requirements, see engineer's drawings.



NOTE:
Excavation alongside already installed chamber rows backfilled with stone is not acceptable. No chambers may be added or subtracted from previously installed systems.

Table 1: Maximum allowable axle loads for wheeled vehicles at various cover depths

	Fill Depth Over Chamber		Max. Axle Load	
	inches	mm	lbs	kN
All Models	6	152	8,000	35.6
All Models	9	305	16,000	71.2
Contactor® Field Drain C-4HD	14" with pavement 18" without pavement	356 mm with pavement 457 mm without pavement	40,000	177.9
Contactor® 100HD Recharger® 150XLHD Recharger® 180HD Recharger® 280HD	14" with pavement 16" without pavement	356 mm with pavement 406 mm without pavement	40,000	177.9
Recharger® 330XLHD	16" with pavement 18" without pavement	406 mm with pavement 457 mm without pavement	40,000	177.9

Any load which travels over the system that exceeds the maximum load allowed is strictly prohibited and will void the warranty.
All depths listed above are based on compacted fill and include min. 6" (152 mm) of stone above the crown of the unit as listed as 3 of Fig. 1, page 21.

Table 2: Maximum allowable ground pressures for various vehicle track widths and fill depths

Fill Depth Over Chamber		Track Width		Max. Ground Pressure[2]	
inches	mm	inches	mm	PSF	kPa
6	152	12	305	1070	51
		18	457	900	43
		24	610	800	38
		30	762	760	36
		36	914	720	34
12	305	12	305	1540	74
		18	457	1190	57
		24	610	1010	48
		30	762	910	43
		36	914	840	40
18	457	12	305	2010	96
		18	457	1480	71
		24	610	1220	58
		30	762	1060	51
		36	914	950	45

[2] Ground pressure is vehicle operating weight divided by total truck contact area for both tracks. Turning should be kept to a minimum.

The use of wheeled equipment without proper cover is strictly prohibited.

Table 3: CULTEC No. 410™ Non-Woven Geotextile Specification Information

Properties	Test Method	Test Results
Appearance		Black
Grab Tensile	D 4632	90 lbs 400 N
Elongation	D 4632	50%
Trapezoid Tear	D 4533	35 lbs 155 N
Puncture	D 4833	55 lbs 245 N
Mullen Burst	D 3786	175 psi 1205 kPa
AOS	D 4751	70 U.S. sieve .21 mm
Permittivity	D 4491	2.0 sec^{-1}
Permeability	D 4491	.2 cm/sec
Water Flow	D 4491	145 gal/min/sf 5908 l/min/sq.m
UV Stability	D 4355	70%

Substitutions must meet or exceed these minimums.
Geotextile placement is mandatory over top and sides of system. Coverage of system bottom is recommended. However, follow engineer's design preference.

Table 4: Criteria for acceptable 1 - 2 inch (25 - 51 mm) washed, crushed, angular stone

Washed Crushed Stone	Description	Criteria
Acceptable	Angular	Stones have sharp edges and relatively plane sides with unpolished surfaces
	Subangular	Stones are similar to angular description but may have slightly rounded edges
Unacceptable	Subrounded	Stones have nearly plane sides but have well-rounded corners and edges
	Rounded	Stones have smoothly curved sides and no edges

See 1 and 2 of Table 5 on page 20 for additional stone requirements.

Table 5: Acceptable Fill Materials

	Material Location	Description	AASHTO M43 Classification	Compaction/ Density Requirement
1	Foundation Stone below chambers per engineer's drawing 6" (152 mm) min. required for most models.	Washed, crushed stone with the majority of particles between 1" - 2" (25 - 51 mm)	3, 4	Plate compact or roll to achieve a 95% Standard Proctor density
2	Embedment Stone surrounding chambers and to a min. 6" (152 mm) elevation above chamber crown for most models.	Washed, crushed stone with the majority of particles between 1" - 2" (25 - 51 mm)	3, 4	No compaction required
3	Fill Material for Layer 3 starts from top of embedment stone (Layer 2) to minimum required depth above top of chamber. Refer to Table 6 page 20 for proper minimum fill requirements.	Granular well-graded soil/aggregate mixtures, <35% fines	3, 4, 5, 6, 7, 8, 9, 10, 56, 57, 67, 68, 78, 89, 467	Compact in 6" (152 mm) lifts to a minimum 95% Standard Proctor density. Roller gross vehicle weight not to exceed 12,000 lbs. (53 kN) Dynamic force not to exceed 20,000 lbs. (89 kN)
4	Fill Material for Layer 4 starts from the top of Layer 3 to the bottom of pavement or unpaved finished grade above. Refer to Table 6 page 20 for proper chamber model minimum fill requirements.	Any soil/rock materials, native soils or per engineer's plans. Check plans for pavement subgrade requirements.	Per engineer's drawings	Prepare per engineer's drawing. Paved installations may have strict material and preparation requirements

The listed AASHTO classifications are for gradations. The stone must be washed, crushed and angular. See Table 6, page 20. For example, the stone must be specified as washed, crushed No. 4 stone. Fill materials shall be free of debris, trash, frozen lumps and other deleterious matter. Contact CULTEC for gradation requirements for specific projects that do not fall within the above specifications.

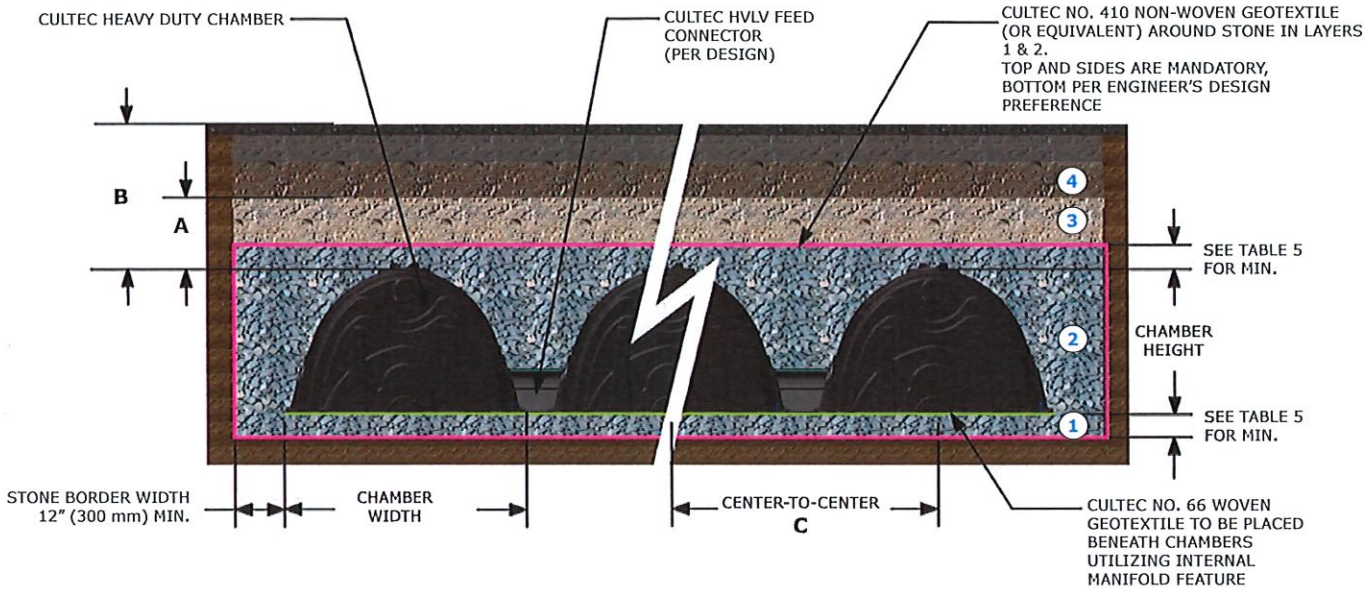
Table 6: Minimum and Maximum Fill and Separation Requirements for Traffic Installations

(See Fig. 1 on page 21)

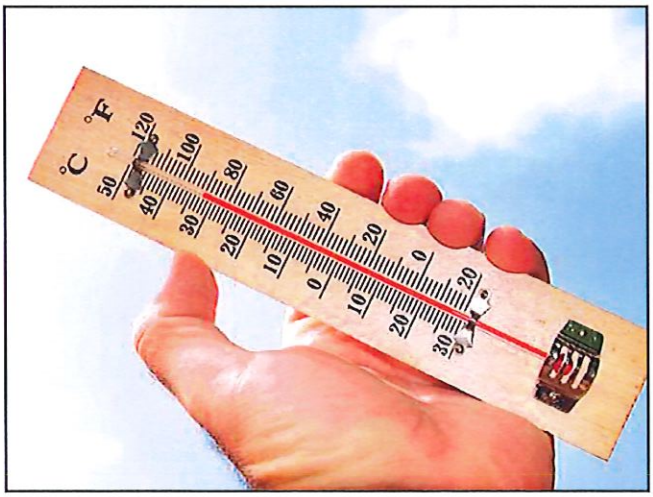
Model	A Minimum Fill Requirements				B Maximum Fill Requirements		C Center-to-Center Separation Requirement	
	For Paved inches	For Paved mm	For Unpaved inches	For Unpaved mm	feet	m	inches	mm
Contactor® Field Drain C-4HD	14	356	16	406	12	3.66	48	1219
Contactor® 100HD	14	356	16	406	12	3.66	40	1016
Recharger® 150XLHD	14	356	16	406	12	3.66	39	991
Recharger® 180HD	14	356	16	406	12	3.66	39	991
Recharger® 280HD	14	356	16	406	12	3.66	52	1321
Recharger® 330XLHD	16	406	18	457	12	3.66	58	1473

Refer to Table 4 on page 19, Table 5, page 20 and Fig. 1 on page 21 for acceptable fill requirements.
Table refers to Heavy Duty version only, requirements differ for Standard Duty version.
When fill requirements will exceed Maximum Fill Requirements listed above, contact CULTEC at 203-775-4416.
All depths listed above are based on compacted fill and include the required stone above the crown of the unit.

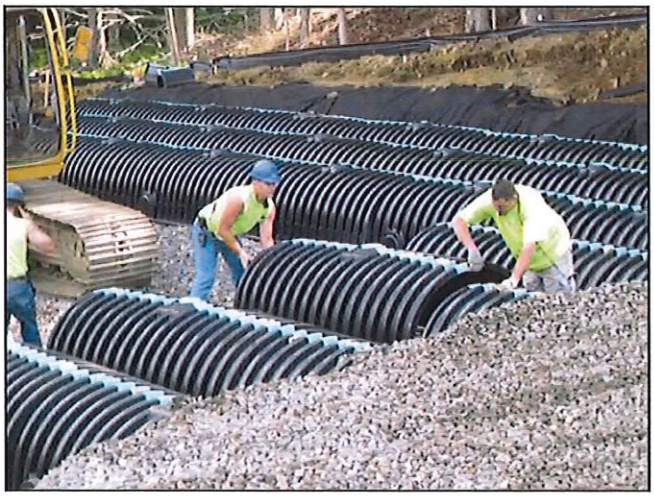
Fig. 1. Fill Material Locations – *refer to Tables 4, 5, and 6.*

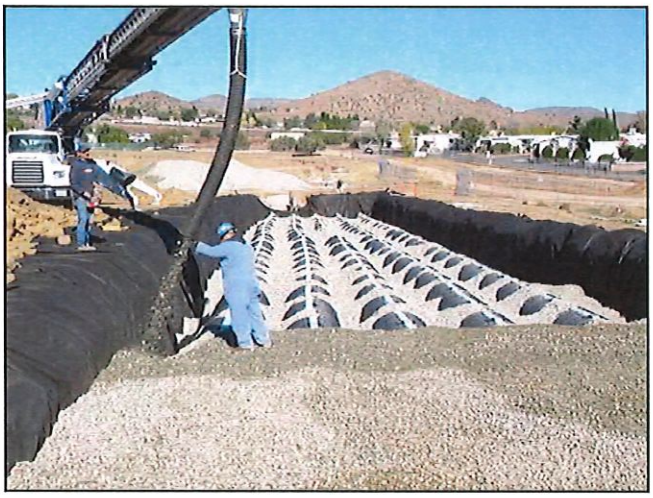


Special Handling Instructions for Polyethylene Chambers in Warmer Temperatures



CULTEC chambers are manufactured of high molecular weight polyethylene, which is inherently resistant to cold temperatures, corrosion and chemical breakdown. Additional UV inhibitors increase the chambers' resistance to sunlight and warm temperature degradation. However, CULTEC recommends that, when installed in warm temperatures above 85°F (29°C), the installer separate the units the day before installation and lay them on a flat surface (preferably not asphalt). This allows the chambers to cool and maintain their original shape as when formed. It is best practice to separate starters, intermediates and ends and lay them out individually and use those separated units rather than removing each off the stack individually. When possible, CULTEC recommends that the stone backfill be placed in temperatures less than 85°F (29°C) to minimize depressions or deflections. Also note that in sunny, warm temperatures, the chambers may be hot to the touch.





CULTEC

Awarded Certifications & Third-Party Verifications

ASTM International (American Society for Testing and Materials)

ASTM INTERNATIONAL

ASTM F3430 and F2418 are product standards that define the material and structural requirements of stormwater chambers. ASTM F2787 is the design standard specifying the structural performance requirements for these chambers in accordance with AASHTO LRFD Section 12.12.

- Standards: ASTM F3430, F2418, and F2787
- Third-party certification: Third-party engineering reports show that CULTEC chambers meet the performance requirements of these standards. Available upon request.
- Relevant to following CULTEC Chambers: Recharger® 360HD, Recharger® 902HD

CSA Group (Canadian Standards Association)

CSA B184 provides performance requirements for underground stormwater chambers, including those for short and long-term material properties, arch stiffness and flattening, structural live and dead loading per AASHTO LRFD Section 12.12, and manufacturing quality.

- Standard: CSA B184-17 Update 1: Polymeric Subsurface Stormwater Management Structures
- Third-party certification: Recharger® 360HD and 902HD - Yes, with Intertek. Models Recharger® 150XLHD and Recharger® 180HD are currently pending.
- Relevant to following CULTEC Chamber(s): Recharger® 150XLHD, Recharger® 180HD, Recharger® 360HD and Recharger® 902HD.

GPS (GLOBE Performance Solutions)

"When installed with Terratex HPG 550 and Terratex N10 geotextiles, and tested with silica sediment having a particle size distribution conforming to the Canadian Environmental Technology Verification Program Procedure for Laboratory Testing of Oil-Grit Separators, the CULTEC Recharger® 150XLHD Separator Row™ will remove at least the following fractions of suspended sediment at the corresponding flow rates: 80% at 24 gpm, 77% at 49 gpm, 73% at 73 gpm, 70% at 97 gpm, and 65% at 121 gpm. These performance claims are verified statistically at a 95% level of confidence."

- Environmental Technology Verification (ETV) Statement of Performance Claim of CULTEC Separator Row
- Third-party certification: Yes, GPS verified testing performed at Good Harbour Laboratories
- Relevant to following CULTEC Chambers: All models installed in Separator Row Configuration

IAPMO (International Association of Plumbing and Mechanical Officials)

The IAPMO standard sets forth requirements for plastic chambers intended for leaching wastewater into the ground. Minimum requirements include those for the plastic material, geotextile, molding process, minimum wall thickness and footprint, impact resistance, and AASHTO loading.

- Standard: IAPMO Standard PS 63-2019: Plastic Leaching Chambers
- Third-party certification: Yes, with IAPMO Research and Testing, Inc.
- Relevant to following CULTEC Chambers: Contactor® EZ24, Contactor® 100HD, Recharger® 150XLHD, Recharger® 180, Recharger® 280HD, and Recharger® 330XLHD

NSAI (National Standards Authority of Ireland)

NSAI reviewed third-party test data to verify the material and structural performance of the CULTEC chambers. Chambers meet the requirements set forth by Irish Building Regulations.

- European Technical Assessment in accordance with the Irish Building Regulations 1997 to 2017.
- Third-party certification: Yes, with NSAI
- Relevant to following CULTEC Chambers: Recharger® 150XLHD, Recharger® 330XLHD, and Recharger® 902HD

QUESTIONS?

Contact us at tech@cultec.com

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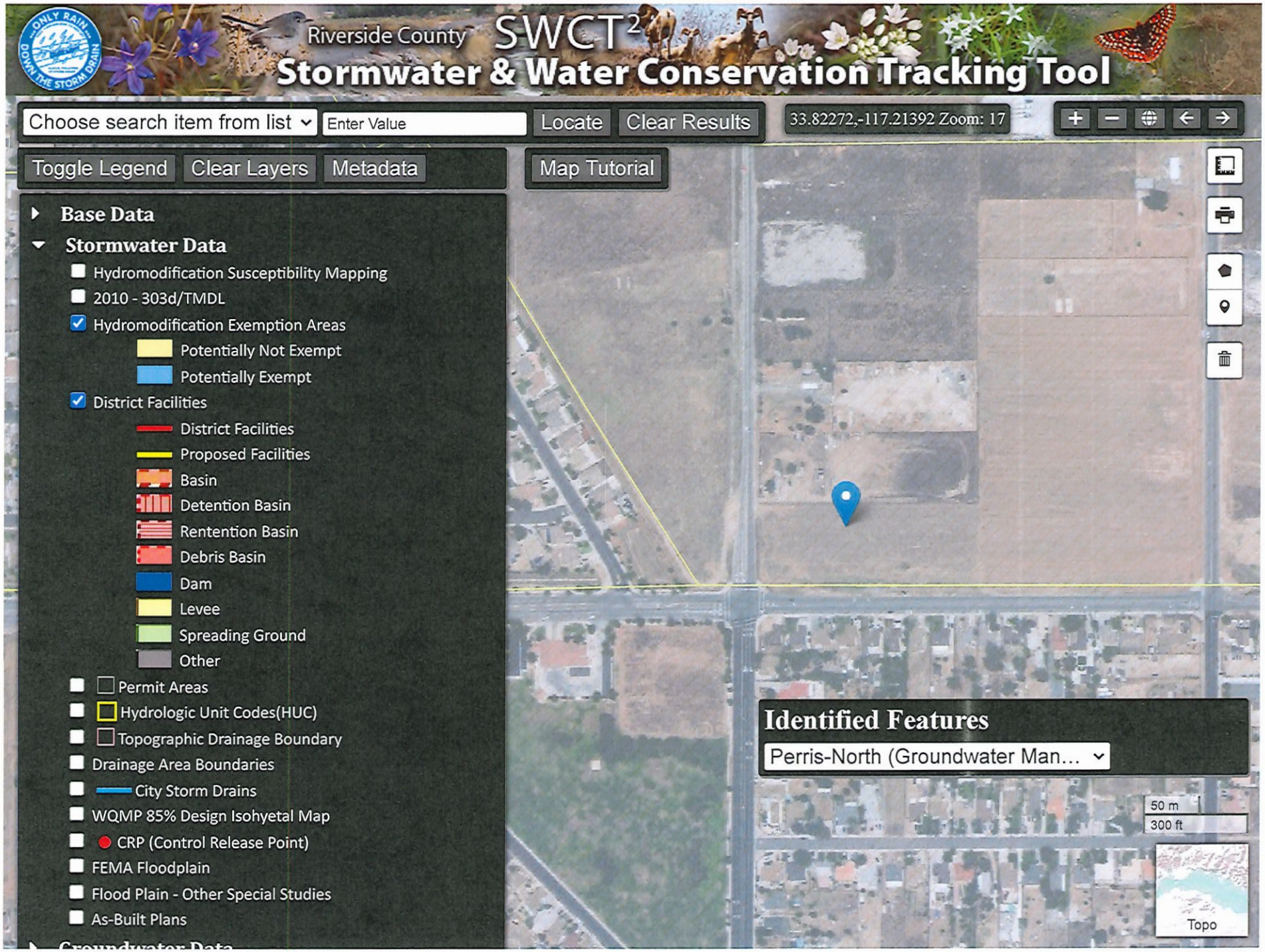
Appendix 7: Hydromodification

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
33.82272,-117.21392 Zoom: 17
Toggle Legend
Clear Layers
Metadata
Map Tutorial
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
2010 - 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
Identified Features
Perris-North (Groundwater Man...
50 m
300 ft
Topo

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 9: O&M

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

To Be Provided with Final WQMP

Appendix 10: Educational Materials

BMP Fact Sheets and Other End-User BMP Information

To Be Provided with Final WQMP