Water Quality Management Plan

For:

Chino Parcel Delivery Facility

Prepared for:

Scannell Properties

8801 River Crossing Blvd., Suite 300

Indianapolis, IN 46240

Phone (317) 843-5959

Prepared by:

D and D Engineering, Inc.

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Submittal Date: _____January 16, 2018___

Revision Date: ____October 15, 2018_____

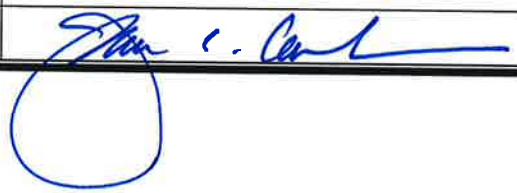
Approval Date: _____

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for Scannell Properties by D and D Engineering, Inc. The WQMP is intended to comply with the requirements of the City of Chino and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

Project Data			
Permit/Application Number(s):	N/A	Grading Permit Number(s):	N/A
Tract/Parcel Map Number(s):	N/A	Building Permit Number(s):	N/A
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			1054-391-02 and 1054-391-03

Owner's Signature			
Owner Name: James C. Carlino			
Title	Manager		
Company	Scannell Properties #209, LLC		
Address	8801 River Crossing Blvd. Suite 300, Indianapolis, IN 46240		
Email	JamesC@scannellproperties.com		
Telephone #	(317) 843-5959		
Signature		Date	10/15/18

Preparer's Certification

Project Data			
Permit/Application Number(s):	N/A	Grading Permit Number(s):	N/A
Tract/Parcel Map Number(s):	N/A	Building Permit Number(s):	N/A
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			1054-391-02 and 1054-391-03

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

Engineer: Henrik Nazarian		PE Stamp Below
Title	President	
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Telephone #	(424) 351-6800	
Signature		
Date		

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Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	Chino Parcel Delivery Facility				
Project Owner Contact Name:	Courtney Lehman				
Mailing Address:	8801 River Crossing Blvd., Suite 300, Indianapolis, IN 46240	E-mail Address:	CourtneyL@scannellproperties.com	Telephone:	317.843.5972
Permit/Application Number(s):	N/A		Tract/Parcel Map Number(s):	N/A	
Additional Information/ Comments:					
Description of Project:	The Chino Parcel Master Plan Area is located within the County of San Bernardino in the City of Chino. The project site is bounded by Merrill Avenue to the north, Remington Avenue to the south, Flight Avenue to the east, and Comet Avenue to the west. The property measures approximately ±75 acres and is intended to be developed into an industrial complex. The site is currently vacated.				
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	Project complies with WQMP by incorporating a large water quality basin and pre-treatment system to capture all the trash and debris from the site and filter the first flush runoff through engineered bioretention with under drain system before allowing the runoff to exit the site and drains into the storm drain system or infiltrating into the ground. The runoff gets collected through a network of inlets/catch basins and onsite storm drain pipes and drains to the water quality and flood control basins at the southeast corner of the site. The water quality is designed per County standard and procedure and flood control basin is designed to handle 100-year storm event.				

Section 2 Project Description

2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

Form 2.1-1 Description of Proposed Project

1 Development Category (Select all that apply):

☐ Significant re-development involving the addition or replacement of 5,000 ft² or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft² or more of impervious surface collectively over entire site	☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539	☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft² or more
☐ Hillside developments of 5,000 ft² or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	☐ Developments of 2,500 ft² of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters.	☒ Parking lots of 5,000 ft² or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft² or more, or have a projected average daily traffic of 100 or more vehicles per day

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

2 Project Area (ft2):	3,309,559	**3** Number of Dwelling Units:	0	**4** SIC Code:	1541

5 Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

6 Does Project include roads? Yes ☒ No ☐ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP) Per Section 1C of Appendix A of TGD for WQMP Transportation Project BMP Guidelines does not apply.*

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:
Maintenance of the WQMP facilities will be the sole responsibility of the owner/lessee. The owner may choose to contract out the maintenance of storm water facilities to a contractor with the proper equipment (IE Vac Truck). Owner will also be responsible to maintain bioretention basins. They will be required to be kept free of trash and debris to maintain the designed infiltration rate.

2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern			
Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	
Nutrients - Phosphorous	E ☒	N ☐	
Nutrients - Nitrogen	E ☒	N ☐	
Noxious Aquatic Plants	E ☐	N ☒	The proposed development does not include any areas where water will be standing long enough to allow the growth of aquatic plants.
Sediment	E ☒	N ☐	
Metals	E ☒	N ☐	
Oil and Grease	E ☒	N ☐	
Trash/Debris	E ☒	N ☐	
Pesticides / Herbicides	E ☒	N ☐	
Organic Compounds	E ☒	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

Form 2.4-1 Water Quality Credits

1 Project Types that Qualify for Water Quality Credits: *Select all that apply*			
☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects ☐ Vertical density [20%] ☐ 7 units/ acre [5%]	☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%]	☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%]	☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]
2 Total Credit % *(Total all credit percentages up to a maximum allowable credit of 50 percent)*			
Description of Water Quality Credit Eligibility (if applicable)	Not Applicable		

Section 3 Site and Watershed Description

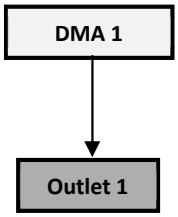
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet.***

Form 3-1 Site Location and Hydrologic Features

Site coordinates *take GPS measurement at approximate center of site*	Latitude 38°58'46.81"N	Longitude 117°37'17.27"N	Thomas Bros Map page 682

1 San Bernardino County climatic region: ☒ Valley ☐ Mountain

2 Does the site have more than one drainage area (DA): Yes☐ No☒ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*



Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA
DMA 1 to Outlet 1	*An onsite drainage system will relay flows to detention basin, which will overflow to existing DBL 10'Wx6'H RCB via a proposed RCP.*

Form 3-2 Existing Hydrologic Characteristics for Drainage Area

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DA 1	DA 2		
1 DMA drainage area (ft^2)	1,615,655	1,693,916		
2 Existing site impervious area (ft^2)	79,520	83,380		
3 Antecedent moisture condition *For desert areas, use* *http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	III	III		
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	A, B, C	B, C		
5 Longest flowpath length (ft)	2,874	2,860		
6 Longest flowpath slope (ft/ft)	0.0068	0.0066		
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Agriculture	Agriculture		
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Poor	Poor		

Form 3-3 Watershed Description for Drainage Area All

Receiving waters *Refer to Watershed Mapping Tool - http://sbcounty.permitrack.com/WAP See 'Drainage Facilities" link at this website*	Cucamonga Channel
Applicable TMDLs *Refer to Local Implementation Plan*	Middle Santa Ana River - High coliform count
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	Pathogens, Metals
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	Delhi Sands
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	Yes
Hydrologic Conditions of Concern	☐ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☒ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	General inormation will be provided to tenants on housekeeping practices that contribute to the protection of stormwater.
N2	Activity Restrictions	☒	☐	Building operators shall restrict tenants from performing activities that would have an negative impact on water quality.
N3	Landscape Management BMPs	☒	☐	Building operators will identify on going landscape maintenance requirements consistent with applicable local ordinances that may include fertilizer or pesticide.
N4	BMP Maintenance	☒	☐	The building operator shall prepare and implement a BMP Maintenance program in accordance with the recommendations of this WQMP.
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	The proposed development does not include the use of hazardous materials.
N6	Local Water Quality Ordinances	☐	☒	There are no additional local water quality ordinances applicable to this development.
N7	Spill Contingency Plan	☒	☐	Building operators shall prepare specific plans based on materials on site for the cleanup of spills. Plans shall mandate stock piling of cleanup materials, notification of agencies, disposal, documentation, ect.
N8	Underground Storage Tank Compliance	☐	☒	The proposed development does not include underground storage of materials.
N9	Hazardous Materials Disclosure Compliance	☒	☐	This project will be developed and operated in accordance with Permittee oridnances that are responsible for enforcing hazardous materials and hazardous waste handling and disposal regulations.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	This project will be developed and operated in accordance with Article 80 of the Uniform Fire Code.
N11	Litter/Debris Control Program	☒	☐	The building operator shall prepare and implement an employee training program. This program shall include but not be limited to instruction on spill cleanup, litter contol, and material storage procedures.
N12	Employee Training	☒	☐	The building operator shall prepare and implement employee training.
N13	Housekeeping of Loading Docks	☒	☐	Dock areas shall be swept regularly with litter control and cleanup procedures eliminating the use of water.
N14	Catch Basin Inspection Program	☒	☐	The building operator shall have the entire storm drain system inspected and cleaned a minimum of once annually pror to the start of the rainy season.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	Parking and dock areas will be swept regularly using a vacuum assisted sweeper. Frequency will depend on waste accumulations with a minimum of once annually prior to the start of the rainy season.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	This development is not part of a Public Agency Project.
N17	Comply with all other applicable NPDES permits	☒	☐	A SWPPP will be prepared and implemented as part of the construction.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13)	☒	☐	All storm drain inlets shall have Stenciling illustrating an anti-dumping message.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	This development does not include the storage of materials outdoors.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	The project will incorporate lined dumpsters to reduce leaking of liquid waste. Trash storage areas shall be located away from storm drain inlets.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	Irrigation systems will be designed to each landscaped area's specific water need. Irrigation controls shall include rain-triggered shutoff devices to prevent irrigation after precipitation.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscaped areas shall be below top of curb or walk.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☒	☐	All slopes shall be hard lined, rip-raped or vegetated to provide erosion protecion and prevent sediment transport.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☒	☐	Unloading of trucks trailers at docks will occur under cover of the building. It is not feasible to cover the entire loading area as it would be cost prohibitive.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	Maintenance bays are not proposed as part of this development.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	Vehicle wash areas are not provided as part of this development.
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	Outdoor processing is not associated with the proposed development.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	Outdoor equipment is not associated with the proposed development.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	Fueling areas are not included as part of this development.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	No hillsides will require re-vegetation as part of the proposed development.
S14	Wash water control for food preparation areas	☐	☒	The proposed development does not include food preparation areas.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	The proposed development does not include community car wash areas.

4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

Form 4.1-3 Preventative LID Site Design Practices Checklist

Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☐ No ☒ Explanation: Impervious areas will be minimized to the maximum extent practicable. The proposed development requires large areas for loading docks and building footprint.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: All pervious areas will be below adjacent impervious areas to maximize natural infiltration.
Preserve existing drainage patterns and time of concentration: Yes ☐ No ☒ Explanation: Because of the large impervious areas it is not possible to maintain the time of concentration and drainage patterns. The overall drainage pattern will remain the same (IE. North to South).
Disconnect impervious areas: Yes ☒ No ☐ Explanation: Drainage areas run through detention basin prior to discharging offsite.
Protect existing vegetation and sensitive areas: Yes ☐ No ☒ Explanation: Native vegetation has been mostly removed by agricultural activities.
Re-vegetate disturbed areas: Yes ☒ No ☐ Explanation: Any areas that are disturbed will be stabilized prior to project completion
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: Detention basin will be staked off after rough grading has been completed to prevent excessive compaction.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☒ No ☐ Explanation: Drainage swales will be used to convey runoff from small storms to the site discharge point
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐ Explanation: Landscaping areas will be staked off after rough grading has been completed to prevent excessive compaction.

4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the P_6 method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi^2), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume
Drainage Area A

1 Project area DA 1 (ft^2):	**2** Imperviousness after applying preventative site design practices (Imp%):	**3** Runoff Coefficient (Rc):
3,309,559	85%	0.66
4 Determine 1-hour rainfall depth for a 2-year return period P2yr-1hr (in):		0.569
5 Compute P_6, Mean 6-hr Precipitation (inches):		0.840
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3):		300,146

Form 4.2-2 Summary of HCOC Assessment

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☐ No ☒

Go to: http://sbcounty.permitrack.com/WAP

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below *(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)*

If "No," then proceed to Section 4.3 Project Conformance Analysis

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	**1** *Form 4.2-3 Item 12*	**2** *Form 4.2-4 Item 13*	**3** *Form 4.2-5 Item 10*
Post-developed	**4** *Form 4.2-3 Item 13*	**5** *Form 4.2-4 Item 14*	**6** *Form 4.2-5 Item 14*
Difference	**7** *Item 4 – Item 1*	**8** *Item 2 – Item 5*	**9** *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** *Item 7 / Item 1*	**11** *Item 8 / Item 2*	**12** *Item 9 / Item 3*

HCOC PROJECT SITE IS WITHIN HCOC EXEMPT AREAS.

Form 4.2-3 HCOC Assessment for Runoff Volume (DA 1)

Weighted Curve Number Determination for: Pre-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1a Land Cover type								
2a Hydrologic Soil Group (HSG)								
3a DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								
Weighted Curve Number Determination for: Post-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1b Land Cover type								
2b Hydrologic Soil Group (HSG)								
3b DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4b Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								

5 Pre-Developed area-weighted CN:	**7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10*	**9** Initial abstraction, I_a (in): *I_a = 0.2 * Item 7*
6 Post-Developed area-weighted CN:	**8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10*	**10** Initial abstraction, I_a (in): *I_a = 0.2 * Item 8*

11 Precipitation for 2 yr, 24 hr storm (in):
Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

12 Pre-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

13 Post-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

14 Volume Reduction needed to meet HCOC Requirement, (ft^3):
*V_{HCOC} = (Item 13 * 0.95) – Item 12*

Form 4.2-4 HCOC Assessment for Time of Concentration (DA 1)

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

Variables	Pre-developed DA1 *Use additional forms if there are more than 4 DMA*				Post-developed DA1 *Use additional forms if there are more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
1 Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition*								
2 Change in elevation (ft)								
3 Slope (ft/ft), S_o = *Item 2 / Item 1*								
4 Land cover								
5 Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP*								
6 Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet*								
7 Cross-sectional area of channel (ft^2)								
8 Wetted perimeter of channel (ft)								
9 Manning's roughness of channel (n)								
10 Channel flow velocity (ft/sec) V_{fps} = *(1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5*								
11 Travel time to outlet (min) T_t = *Item 6 / (Item 10 * 60)*								
12 Total time of concentration (min) T_c = *Item 5 + Item 11*								
13 Pre-developed time of concentration (min): *Minimum of Item 12 pre-developed DMA*								
14 Post-developed time of concentration (min): *Minimum of Item 12 post-developed DMA*								
15 Additional time of concentration needed to meet HCOC requirement (min): $T_{C\text{-}HCOC}$ = *(Item 13 * 0.95) – Item 14*								

Form 4.2-5 HCOC Assessment for Peak Runoff (DA 1)

Compute peak runoff for pre- and post-developed conditions

Variables		Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*			Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)*							
2 Drainage Area of each DMA (Acres) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
3 Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
4 Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted F_m from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
6 Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	DMA A	*n/a*			*n/a*		
	DMA B		*n/a*			*n/a*	
	DMA C			*n/a*			*n/a*

8 Pre-developed Q_p at T_c for DMA A: *Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAA/2}$] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAA/3}$]*	**9** Pre-developed Q_p at T_c for DMA B: *Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAB/1}$] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAB/3}$]*	**10** Pre-developed Q_p at T_c for DMA C: *Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAC/1}$] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAC/2}$]*
10 Peak runoff from pre-developed condition confluence analysis (cfs): *Maximum of Item 8, 9, and 10 (including additional forms as needed)*		
11 Post-developed Q_p at T_c for DMA A: *Same as Item 8 for post-developed values*	**12** Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	**13** Post-developed Q_p at T_c for DMA C: *Same as Item 10 for post-developed values*
14 Peak runoff from post-developed condition confluence analysis (cfs): *Maximum of Item 11, 12, and 13 (including additional forms as needed)*		
15 Peak runoff reduction needed to meet HCOC Requirement (cfs): *$Q_{p\text{-}HCOC}$ = (Item 14 * 0.95) – Item 10*		

4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). **Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment**.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☒ No ☐
Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: Project constructing fueling operations, large commercial parking lots, areas of industrial or light industrial activity, areas subject to high vehicular traffic (25,000 or more daily volume), car washes, fleet storage areas, nurseries, or any other land use of activity with a high threat to water quality, unless adequate pretreatment is provided.

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☒ No ☐

If Yes, Provide basis: Geotechnical Report (attached)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☒ No ☐
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☒ No ☐
If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP. If no, then proceed to Item 9, below.

[9] All answers to Item 1 through Item 6 are "No":
Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP. Proceed to Form 4.3-2, Hydrologic Source Control BMP.

4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)			
3 Ratio of pervious area receiving runoff to impervious area			
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*			
5 Sum of retention volume achieved from impervious area dispersion (ft^3):		$V_{retention}$ *=Sum of Item 4 for all BMPs*	
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3):		$V_{retention}$ *=Sum of Item 12 for all BMPs*	

Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 1)

14 Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Rooftop area planned for ET BMP (ft^2)			
16 Average wet season ET demand (in/day) *Use local values, typical ~ 0.1*			
17 Daily ET demand (ft^3/day) *Item 15 * (Item 16 / 12)*			
18 Drawdown time (hrs) *Copy Item 6 in Form 4.2-1*			
19 Retention Volume (ft^3) $V_{retention}$ *= Item 17 * (Item 18 / 24)*			
20 Runoff volume retention from evapotranspiration BMPs (ft^3):	$V_{retention}$ *=Sum of Item 19 for all BMPs*		
21 Implementation of Street Trees: Yes ☐ No ☒ *If yes, complete Items 22-25. If no, proceed to Item 26*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees			
23 Average canopy cover over impervious area (ft^2)			
24 Runoff volume retention from street trees (ft^3) $V_{retention}$ *= Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*			
25 Runoff volume retention from street tree BMPs (ft^3):	$V_{retention}$ *= Sum of Item 24 for all BMPs*		
26 Implementation of residential rain barrel/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
27 Number of rain barrels/cisterns			
28 Runoff volume retention from rain barrels/cisterns (ft^3) $V_{retention}$ *= Item 27 * 3*			
29 Runoff volume retention from residential rain barrels/Cisterns (ft3):	$V_{retention}$ *=Sum of Item 28 for all BMPs*		
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs:	*Sum of Items 5, 13, 20, 25 and 29*		

4.3.2 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix D of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*			
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*			
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*			
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*			
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*			
8 Infiltrating surface area, *SA_{BMP}* (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*			
9 Amended soil depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity			
11 Gravel depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*			
12 Gravel porosity			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*			

16 Total Retention Volume from LID Infiltration BMPs: *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*

17 Fraction of DCV achieved with infiltration BMP: % *Retention% = Item 16 / Form 4.2-1 Item 7*

18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☐

If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.

4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

Form 4.3-4 Harvest and Use BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16*			
BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Describe cistern or runoff detention facility			
3 Storage volume for proposed detention type (ft^3) *Volume of cistern*			
4 Landscaped area planned for use of harvested stormwater (ft^2)			
5 Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day			
6 Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*			
7 Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*			
8 Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*			
9 Total Retention Volume (ft^3) from Harvest and Use BMP *Sum of Item 8 for all harvest and use BMP included in plan*			
10 Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☐ *If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.*			

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA 1)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): 300,146 *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.* Pathogens, Nutrients, Sediment, Metals, Oil, Trash, Pesticides, & Organic Compounds	
2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☒ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☐ Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft^3): 312,824 *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): -12,678 *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: -4.2% *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*		
7 Metrics for MEP determination: • Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*		

Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 1 BMP Type	DA 2 BMP Type	DA 3 BMP Type
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Nutrients, Sediment, Metals, Oil and Grease, Trash/Debris, Pesticides/Herbicides & Organic Compounds		
2 Amended soil infiltration rate *Typical ~ 5.0*	5	5	5
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2	2	2
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5	2.5	2.5
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48	48	48
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	1.5	1.5	1.5
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	1.5	1.5	1.5
8 Amended soil surface area (ft^2)	17,136	16,128	20,608
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	3	3	3
10 Amended soil porosity, *n*	0.3	0.3	0.3
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	1	1	1
12 Gravel porosity, *n*	0.35	0.35	0.35
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	44,982	42,336	54,096
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 312,824 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 4 BMP Type	DA 5 BMP Type	DA 6 BMP Type
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Nutrients, Sediment, Metals, Oil and Grease, Trash/Debris, Pesticides/Herbicides & Organic Compounds		
2 Amended soil infiltration rate *Typical ~ 5.0*	5	5	5
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2	2	2
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5	2.5	2.5
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48	48	48
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	1.5	1.5	1.5
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	1.5	1.5	1.5
8 Amended soil surface area (ft^2)	17,696	7,283	23,632
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	3	3	3
10 Amended soil porosity, *n*	0.3	0.3	0.3
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	1	1	1
12 Gravel porosity, *n*	0.35	0.35	0.35
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	46,452	19,118	62,034
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 312,824 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 7 BMP Type		
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Nutrients, Sediment, Metals, Oil and Grease, Trash/Debris, Pesticides/Herbicides & Organic Compounds		
2 Amended soil infiltration rate *Typical ~ 5.0*	5		
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2		
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5		
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48		
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	1.5		
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	1.5		
8 Amended soil surface area (ft^2)	16,688		
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	3		
10 Amended soil porosity, *n*	0.3		
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	1		
12 Gravel porosity, *n*	0.35		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3		
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	43,806		
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 312,824 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-7 Volume Based Biotreatment (DA 1) – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	DA DMA BMP Type		DA DMA BMP Type *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft^2) A_{bottom} = *Item 2 * Item 3*				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft^2) $A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*				
8 Storage volume (ft^3) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details* V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]*				
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*				
10 Outflow rate (cfs) Q_{BMP} = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft^3) $V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : *(Sum of Item 12 for all BMP included in plan)*				

Form 4.3-8 Flow Based Biotreatment (DA 1)

Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary BMP*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5*			
2 Flow depth for water quality treatment (ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
3 Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
4 Manning's roughness coefficient			
5 Bottom width (ft) b_w *= (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)*			
6 Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*			
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*			
9 Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*			
11 Water surface area at water quality flow depth (ft^2) SA_{top} *= (Item 5 + (2 * Item 2 * Item 6)) * Item 10*			

4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA A)

1 Total LID DCV for the Project DA (ft^3): **300,146** *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): **0** *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): **0** *Copy Item 16 in Form 4.3-3*

4 On-site retention with LID harvest and use BMP (ft^3): **0** *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): **312,824** *Copy Item 3 in Form 4.3-5*

6 Flow capacity provided by flow based biotreatment BMP (cfs): **0** *Copy Item 6 in Form 4.3-5*

7 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☒ No ☐
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

8 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-10 Hydromodification Control BMPs (DA 1)

1 Volume reduction needed for HCOC performance criteria (ft^3): *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft^3): *Sum of Form 4.3-9 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction*
3 Remaining volume for HCOC volume capture (ft^3): *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)*

5 If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*

6 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☐
  BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

7 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☐
  BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and may require a Maintenance Agreement (consult the jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Onsite storm drain catch basins and piping	Property Owner	Onsite catch basins shall be inspected quarterly for debris buildup and evidence of illegal dumping and shall be cleaned whenever debris/sediment accumulates. Removal can be accomplished by vac-truck or other equally effective method	Quarterly
Bioswale/ Bioretention	Property Owner	Inspections and maintenance by owners contracted maintenance staff to ensure that water infiltrates into the subsurface completely in 48 hours or less. Visual inspection, landscape maintenance, debris removal and erosion damage repair.	Monthly, as needed before and after storm events
Anti-Dumping Stenciling & Signage	Property Owner	Visual inspection and replacement of damaged or illegible stenciling and signage over on-site catch basins	Annually
Pretreatment Unit	Property Owner	Inspections and maintenance by owners contracted maintenance staff to ensure that there are no blockages or obstructions in the inlet and separation screen. Pretreatment unit to be cleaned if sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons has accumulated. Cleaning can be accomplished by vac-truck or other equally effective method.	Inspections are to be biannually, cleaning as needed

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their local Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

6.3 Post Construction

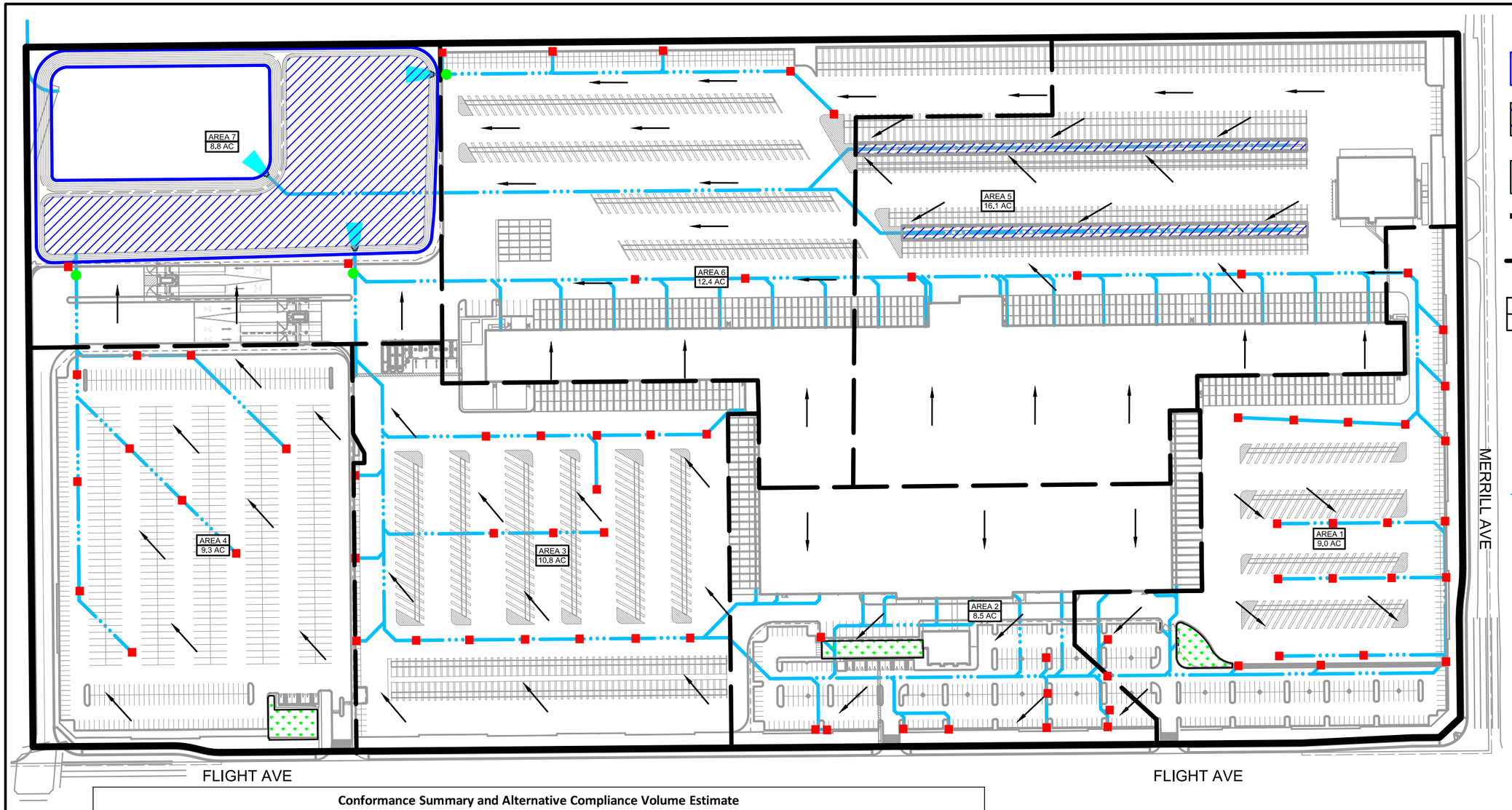
Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

6.4 Other Supporting Documentation

- BMP Educational Materials
- Activity Restriction – C, C&R's & Lease Agreements

FIGURES

1. Post-Development WQMP Site Plan
2. Existing Hydrologic Characteristics for Drainage Areas
3. Bioswale Detail



LEGEND

- FLOOD CONTROL BASIN
- POST CONSTRUCTION BIORETENTION BASIN/ BOISWALE
- LANDSCAPE
- DRAINAGE BOUNDARY
- SUB-AREA BOUNDARY FOR DRAINAGE AREAS
- AREA / AC — DRAINAGE AREA AND ACRES
- DIRECTION OF FLOW
- STORM DRAIN INLET/STENCIL
- PRETREATMENT UNIT
- STORM DRAIN LINE

EXPECTED POLLUTANTS

TRASH AND DEBRIS
OIL AND GREASE
ORGANIC COMPOUNDS
METALS
OXYGEN DEMANDING SUBSTANCES

POTENTIAL POLLUTANTS

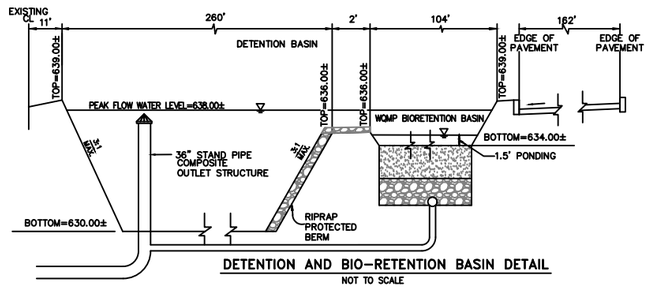
SEDIMENT/TURBIDITY
NUTRIENTS
ORGANIC COMPOUNDS
OXYGEN DEMANDING SUBSTANCES
PESTICIDES
METALS

BIOFILTRATION

PESTICIDES
NUTRIENTS
OXYGEN DEMANDING SUBSTANCES
METALS
ORGANIC COMPOUNDS
TRASH AND DEBRIS
OIL AND GREASE
SEDIMENT/TURBIDITY

Conformance Summary and Alternative Compliance Volume Estimate

Drainage Area ID	Acres	Imp%	Total LID DCV (ft^3)	On-site retention with site design hydrologic source control LID BMP (ft^3)	On-site retention with LID infiltration BMP (ft^3)	On-site retention with LID harvest and use BMP (ft^3)	On-site retention with volume based biotreatment BMP (ft^3)	Flow capacity provided by flow based biotreatment BMP (cfs)	LID BMP performance criteria achived?
A	75.9	85%	300,146	0	0	0	312,824	0	Yes



DETENTION AND BIO-RETENTION BASIN DETAIL
NOT TO SCALE

200 0 200 400
scale 1"= 200' feet

FIGURE 1

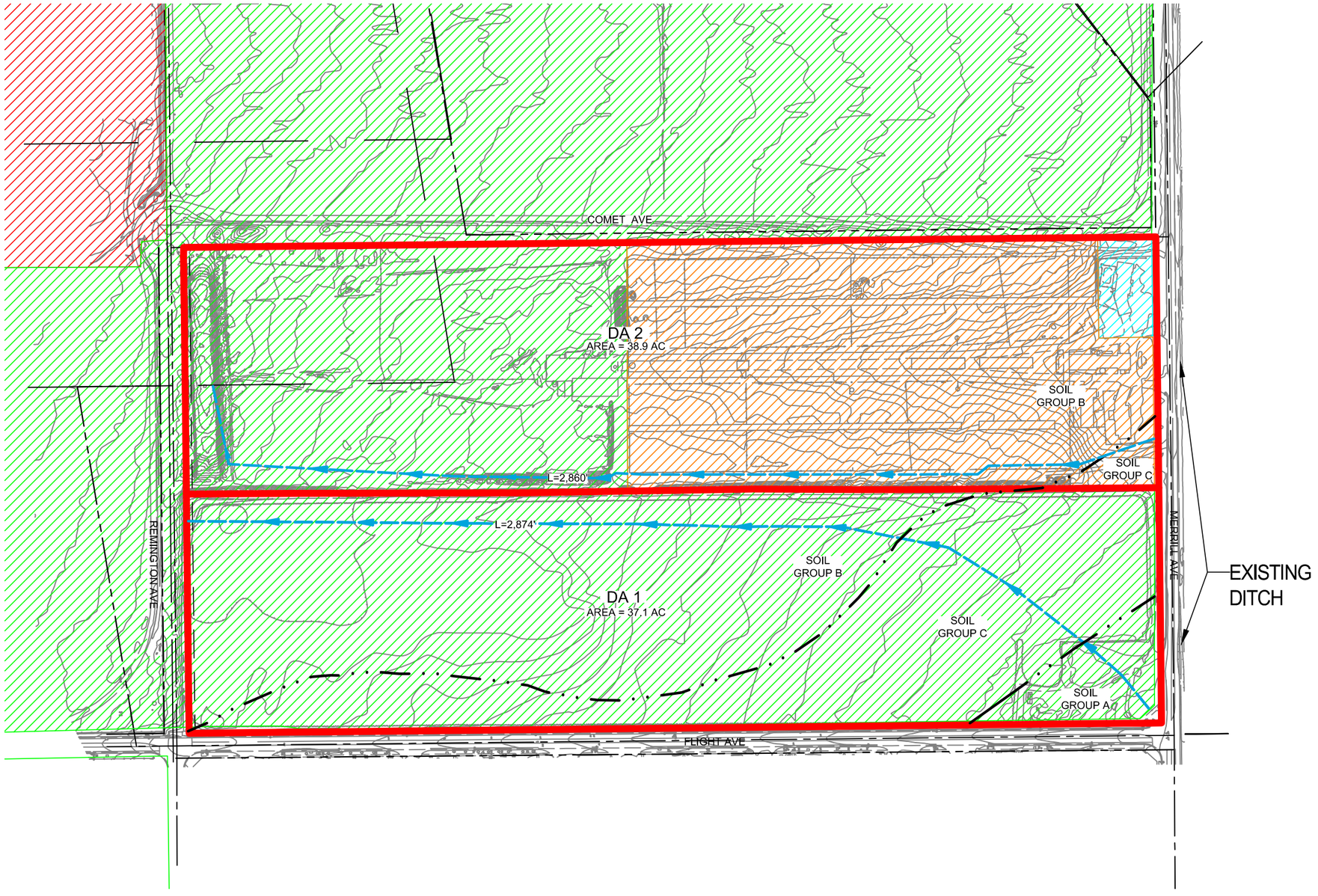
D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-351-6800

CHINO PARCEL DELIVERY FACILITY

POST-DEVELOPMEMT WQMP SITE PLAN

SCALE: 1" = 200'
DATE: 10/15/18
SHT NO.: 01 OF 01

Drawing Name: M:\17004\Eng\17004\Hm\WQMP\WQMP 2018-10-15 with 7 areas 11X17.dwg
Last Opened: Oct 15, 2018 - 2:43pm by: Erika



LEGEND

- NODE ID ELEVATION
- FLOWPATH
- EXISTING HYDROLOGY BOUNDARY
- EXISTING TOPO
- EXISTING CONTOUR
- SOIL GROUP LIMITS
- DA — DRAINAGE AREA

EXISTING LANDUSE 2012

- AIRPORT
- DAIRY & INTENSIVE LIVESTOCK
- IRRIGATED CROPLAND
- RURAL RES. LOW. DENS.

300 0 300 600
scale 1"= 300' feet

FIGURE 2

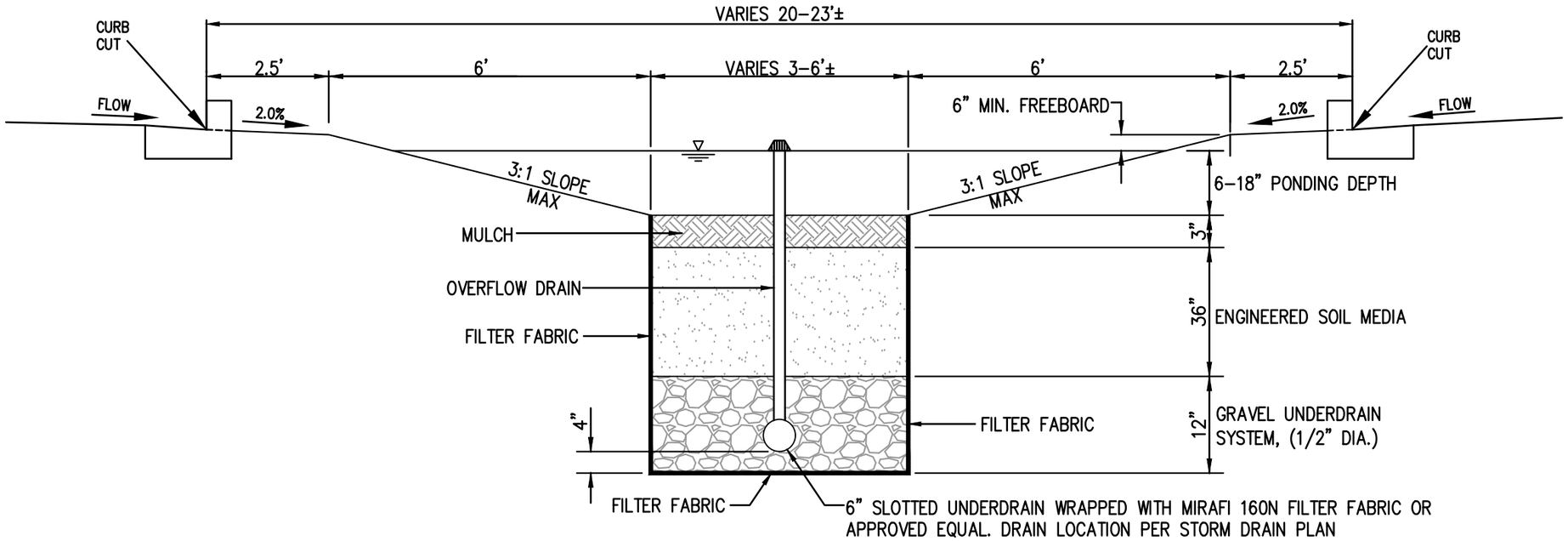
D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-393-4122

CHINO PARCEL DELIVERY FACILITY

EXISTING HYDROLOGIC CHARACTERISTICS FOR DRAINAGE AREA

SCALE: 1" = 300'
DATE: 05/02/18
SHT NO.: 01 OF 01

Drawing Name: M:\17004\Eng\17004\Hm\WQMP\WQMP Existing Hydrologic Characteristic for DA.dwg
Last Opened: May 04, 2018 - 2:58pm by: Erika



BIOSWALE DETAIL

NOT TO SCALE

FIGURE 3

D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-351-6800

CHINO PARCEL DELIVERY FACILITY

BIOSWALE DETAIL

SCALE: NTS
DATE: 10/03/18
SHT NO.: 01 OF 01

Drawing Name: M:\17004\Eng\17004\Exhibits\21_bioswale 10-3-18\bioswale detail.dwg
Last Opened: Oct 16, 2018 - 2:51pm by: Erika

Appendix A

Excerpt from Results of Additional Infiltration Testing

May 7, 2018

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Scannell Properties
c/o D & D Engineering, Inc.
8901 S. La Cienega Boulevard, Suite 106
Inglewood, California 90301

Attention: Mr. Henrik Nazarian, PE
President

Project No.: **18G132-2**

Subject: **Results of Additional Infiltration Testing**
Proposed Logistics Building
SWC Merrill Avenue and Flight Avenue
Chino, California

References: 1) Geotechnical Investigation, Proposed Commercial/Industrial Development, SWC Merrill Avenue and Flight Avenue, Chino, California, prepared by Southern California Geotechnical, Inc. (SCG) for David Evans & Associates, SCG Project No. 16G173-1, dated August 8, 2016.

2) Results of Infiltration Testing, Proposed Commercial/Industrial Development, SWC Merrill Avenue and Flight Avenue, Chino, California, prepared by SCG for David Evans & Associates, SCG Project No. 16G173-2, dated August 8, 2016.

3) Geotechnical Investigation, Proposed Logistics Building, SWC Merrill Avenue and Flight Avenue, Chino, California, prepared by SCG for Scannell Properties, SCG Project No. 18G132-1, dated May 7, 2018.

Gentlemen:

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

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 18P114R, dated March 8, 2018. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with the Technical Guidance Document for Water Quality Management Plans prepared for the County of San Bernardino Areawide Stormwater Program dated June 7, 2013. The San Bernardino County standards defer to guidelines published by Riverside County Department of Environmental Health (RCDEH).

Site and Project Description

The subject site is located at the southwest corner of Merrill Avenue and Flight Avenue in Chino, California. The site is bounded to the north by Merrill Avenue, to the west by an agricultural lot, to the south by Remington Avenue, and to the east by Flight Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The overall site consists of two (2) rectangular-shaped parcels, which total 70± acres in size. The northwestern portion of the site is presently developed as a dairy farm with cattle pens and multiple canopy structures. Two (2) single-family residences, a milking barn, and other structures associated with the dairy operation are located in the northern portion of the dairy farm. The buildings appear to be single-story structures of wood-frame construction and the canopies appear to be of metal frame construction. We expect that these structures are supported on conventional shallow foundations. The ground surface cover generally consists of turf grass, asphaltic concrete, and concrete pavements surrounding the farm houses and the other structures, manure in the cattle pen areas, and exposed soils with sparse native grass and weed growth in the remaining areas. The southern portion of the western parcel appears to be utilized as an infiltration field for the dairy operation, with the ground surface cover consisting of exposed soil with sparse to moderate native grass and weed growth. The eastern parcel is currently being utilized for agricultural purposes. Ground surface cover generally consists of row crops with limited areas of exposed soil. Several large trees are present in the northeast corner of the eastern parcel. An existing detention basin is located at the southwest region of the property.

Topographic information was obtained from a conceptual grading plan prepared by D & D Engineering, Inc. Based on the information provided, the site topography generally slopes downward to the south at a gradient of 1± percent, with the exception of some local variations in the existing dairy farm area. The existing grades range from a topographic elevation high of 659± feet mean sea level (msl) in the northwestern region of the site, to an elevation low of 636± feet msl in the southwest region of the site. However, the bottom of the existing basin is at an elevation of 626± feet msl.

Proposed Development

The site plan provided to our office by D & D Engineering, Inc., indicates that the new development will consist of an irregular-shaped logistics building, 458,537± ft² in size, located in the central region of the property. The northern and southern portions of the logistics building will be constructed in a cross-dock configuration and the north and south building walls will be constructed with dock high doors. An office building, identified as the 2-story gateway building, possessing a first-floor building footprint of 4,639± ft² in size, will be located east of the logistics building. A pedestrian bridge will connect the 2-strory gateway building with the logistics building. The proposed development will also include a vehicle maintenance garage, 15,665± ft² in size, located northwest of the logistics building. Two (2) guard shacks, approximately 220± ft^2 in size, will be constructed within the southwestern access drive of the site. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lane areas and Portland cement concrete pavements in the loading dock areas. It is also anticipated that several landscape planter areas will be located throughout the site.

We understand that the proposed development will include an additional on-site infiltration system to dispose of storm water. Based on the site plan provided to our office and conversations with the client, the additional infiltration system will consist of an infiltration basin located southwestern area of the site. As coordinated with the project civil engineer, one infiltration test was performed at a depth of 17± feet below existing site grades.

Previous Studies

Southern California Geotechnical, Inc. (SCG) previously performed a geotechnical investigation within the subject site, which is referenced above. It should be noted that the subject site at the time of the previous study included additional parcels located to the west, which are no longer part of the current subject site. As a part of this study, six (6) borings were advanced to depths of 20 to 50± feet below currently existing site grades. In addition to the six borings, four (4) trenches were excavated at the site to depths of 9 to 10± feet below existing site grades. Three (3) of the borings and two (2) of the trenches from the previous study are included within the current subject site area. Manure was present at the ground surface at one of the trench locations, which measured 3± inches in thickness. Artificial fill soils were encountered at the ground surface at four (4) of the boring and trench locations, extending to depths of ¼ to 5± feet below the existing site grades. The fill soils generally consisted of loose to medium dense silty fine sands, fine sandy silts, and fine sands Native alluvial soils were encountered at the ground surface at four (4) of the boring locations, beneath the fill soils, and beneath the manure materials, extending to the maximum depth explored of 50± feet. The alluvial soils generally consisted of medium stiff to very stiff fine sandy clays, loose to medium dense clayey fine sands, silty fine sands, fine sandy silts, and fine sands with varying amounts of medium to coarse sand, silt, and fine gravel. One of the borings encountered a cemented layer of dense sandy silt at depths of 3 to 4± feet below existing site grades. One boring encountered a layer of dense fine to medium sand with little coarse sand and trace gravel content at depths of 12 to 19½± feet. Free water was not encountered during the drilling of any of the borings.

SCG also previously performed infiltration testing within the subject site. The results of the previous infiltration testing were presented in the infiltration report referenced above. At the time of this study, the proposed infiltration systems for the development consisted of two (2) infiltration/detention basins and a below-grade chamber system located in the southern and western areas of the site. The previous infiltration study consisted of three (3) infiltration test borings, extending to depths of 10 to 20± feet below existing site grades. Only two (2) of the infiltration borings (identified as I-1 and I-2) from the previous infiltration study are located within the current subject site. Native alluvium was encountered at the ground surface at two (2) of the boring locations, extending to at least the maximum explored depth of 20± feet below existing site grades. The alluvial soils generally consisted of stiff fine sandy clays, stiff to very stiff clayey silts, loose to medium dense fine sandy silts, and medium dense to dense silty fine sands with little medium sand and varying clay content.

The infiltration test results indicated that the infiltration rates at the locations and depths tested, within the subject site area, were 0.2 and 0.3 inches per hour. Based on the infiltration test results from Infiltration Test Nos. I-1 and I-2, SCG recommended that no significant infiltration should be expected for the below-grade chamber system and a design rate of 0.3 inches per hour was feasible for the basin located in the southern area of the site. The approximate locations of the three (3) borings, two (2) trenches, and two (2) infiltration borings from the

previous studies are indicated on the Infiltration Test Location Plan, included as Plate 2 of this report.

Concurrent Study

SCG recently conducted a geotechnical investigation at the subject site, also referenced above. As a part of this study, five (5) borings were advanced to depths of 25 to 30± feet below existing site grades. Manure was present at the ground surface within the cattle pens at two of the boring locations, with thicknesses of 10 and 11± inches below existing site grades. Topsoil was encountered at the ground surface at the remaining boring locations with a thickness of 6± inches. Native alluvium was encountered beneath the manure and/or topsoil at all of the boring locations, extending to the maximum depth explored of 30± feet below existing site grades. Some of the borings encountered disturbed alluvium, extending to depths of 2½ to 3± feet below the existing site grades. These materials are expected to have been disturbed as part of the daily farm and agricultural operations and consist of loose to medium dense silty fine sands. Beneath these materials, the undisturbed alluvial soils consist of medium dense to dense silty fine sands and fine to medium sands with varying coarse sand, silt and gravel content, extending to the maximum depth explored of 30± feet. However, two of the borings encountered medium dense clayey fine sand and medium stiff to very stiff sandy clay and silty clay strata, varying at depths of 6½ to 27± feet below the existing site grades.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 30± feet at the time of the subsurface exploration. As part of our research, we reviewed available groundwater data in order to determine regional groundwater depths. Recent water level data was obtained from the California State Water Resources Control Board, GeoTracker, website, http://geotracker.waterboards.ca.gov/. Monitoring wells, located approximately within a one-mile radius of the site, indicate historic high groundwater levels ranging from 56 to 83± feet below ground surface.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of one (1) infiltration test boring, advanced to a depth 17± feet below the existing site grades as coordinated with the project civil engineer. The infiltration boring was advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers and was logged during drilling by a member of our staff. The approximate location of the infiltration boring (identified as I-4) is indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration boring, the bottom of the test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into the test hole so that the PVC casing extended from the bottom of the test hole

to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Native alluvial soils were encountered at the ground surface at the infiltration boring location, extending to at least 17± feet below existing site grades. The alluvial soils generally consist of very stiff clayey silts and medium dense to dense fine sandy silts, silty fine sands, and fine to medium sands with varying clay content. Free water was not encountered during the drilling of the infiltration boring. The Boring Log, which illustrates the conditions encountered at the boring location, is included with this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the proposed storm water infiltration system that will be used to dispose of storm water at the subject site. As previously mentioned, the infiltration testing was performed in general accordance with Technical Guidance Document for Water Quality Management Plans, prepared for the County of San Bernardino Areawide Stormwater Program.

Pre-soaking

In accordance with the county infiltration standards for sandy soils, the infiltration test boring was pre-soaked for 2 hours prior to infiltration testing or until all of the water had percolated through the test hole. The pre-soaking process consisted of filling the test boring by inverting a full 5-gallon bottle of clear water supported over the hole so that the water flow into the hole holds constant at a level at least 5 times the hole's radius above the gravel at the bottom of the hole. Pre-soaking was completed after all of the water had percolated through the test hole.

Infiltration Testing

Following the pre-soaking process of the infiltration test boring, SCG performed the infiltration testing. The test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of the test hole. In accordance with the San Bernardino County guidelines, since "sandy soils" were encountered at the bottom of the infiltration test boring (where 6 inches of water infiltrated into the surrounding soils for two consecutive 25-minute readings), readings were taken at 10-minute intervals for a total of 1 hour at the test location. After each reading, water was added to the boring so that the depth of the water was at least 5 times the radius of the hole. The water level readings are presented on the spreadsheet enclosed with this report. The infiltration rate for each of the timed intervals are also tabulated on the spreadsheets.

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

Infiltration Test No.	Depth (feet)	Soil Description	Infiltration Rate (inches/hour)
I-4	17	Fine to medium Sand, trace coarse Sand, trace Silt	13.0

Laboratory Testing

In-situ Moisture Content

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

Grain Size Analysis

The grain size distribution of selected soils taken from the base of the infiltration test boring has been determined using a range of wire mesh screens. The analysis was performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of the analysis are presented on Plate C-1 of this report.

Design Recommendations

One (1) infiltration test was performed at the subject site. As noted above, the infiltration rate at this location and depth tested is 13.0 inches per hour. **The test results from Infiltration Test No. I-4 indicate an infiltration rate of 13.0 inches per hour, however, based on the previous infiltration results and the underlying fine-grained cohesive soils encountered at depths below the bottom of the proposed basin, a design infiltration rate of 0.3 inches per hour is recommended.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each system. It should be confirmed that the soils at the base of the proposed infiltration systems correspond with those presented in this report to ensure that the performance of the systems will be consistent with the rates reported herein.

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Chino and/or County of San Bernardino guidelines. It is recommended that the systems be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rates recommended above are based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rates.** It should be noted that the recommended infiltration rate is based on infiltration testing at one (1) discrete location and that the overall infiltration rate of the proposed infiltration system could vary considerably.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rate presented herein was determined in accordance with the San Bernardino County guidelines and is considered valid for the time and place of the actual test. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration System

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of subgrade soils. **The proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the buildings, it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

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

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

Closure

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

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

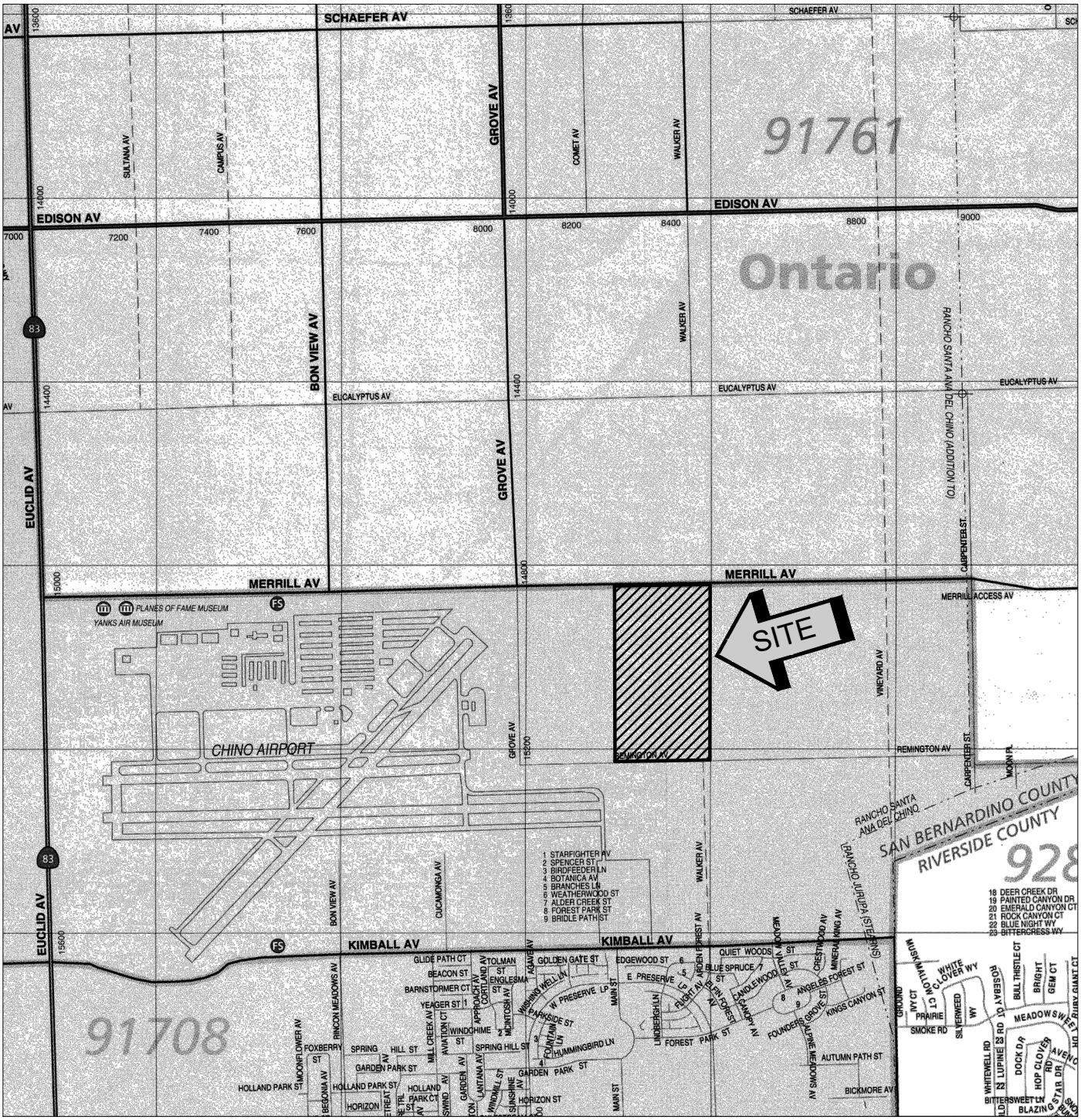
Scott McCann
Staff Scientist



Robert G. Trazo, GE 2655
Project Engineer

Distribution: (1) Addressee

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



SOURCE: SAN BERNARDINO COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED LOGISTICS BUILDING

CHINO, CALIFORNIA

SCALE: 1" = 2400'

DRAWN: □LH
CH□D: RGT

SCG PRO□ECT
18G132-2

PLATE 1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

I-2
PROPOSED DETENTION BASIN
629.00 FF
PROPOSED WQMP BASIN
634.00 FF
I-4
PROPOSED GUARD SHACKS
I-1
B-3
T-1
B-2
VEHICLE MAINTENANCE GARAGE
649.20 FF
B-6
T-3
B-10
B-7
PROPOSED LOGISTICS BUILDING
458,537± SQ. FT.
653.00 FF
B-9
B-11
B-8
2-STORY GATEWAY BUILDING
REMINGTON AVENUE
MERRILL AVENUE
FLIGHT AVENUE

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- PREVIOUS INFILTRATION TEST LOCATION □SCG PRO□ECT NO. 16G173-2□
- APPROXIMATE BORING LOCATION FROM CONCURRENT STUDY □SCG PRO□ECT NO. 18G132-1□
- APPROXIMATE BORING LOCATION FROM PREVIOUS STUDY □SCG PRO□ECT NO. 16G173-1□
- APPROXIMATE TRENCH LOCATION FROM PREVIOUS STUDY □SCG PRO□ECT NO. 16G173-1□

NORTH
SoCalGeo

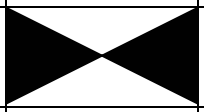
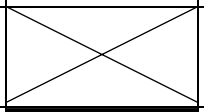
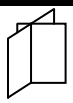
NOTE: SITE PLAN PREPARED BY D&D ENGINEERING, INC.

INFILTRATION TEST LOCATION PLAN
PROPOSED LOGISTICS BUILDING
CHINO, CALIFORNIA

SCALE: 1" = 180'	
DRAWN: PM CH□D: RGT	
SCG PRO□ECT 18G132-2	
PLATE 2	

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

BORING LOG LEGEND

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

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

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

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

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

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

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

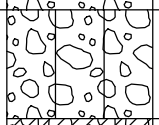
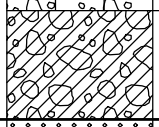
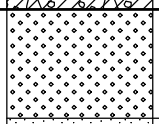
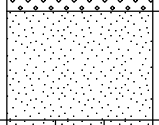
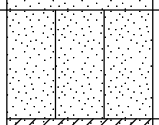
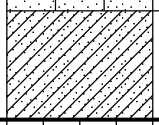
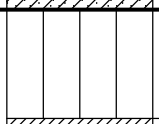
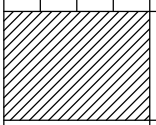
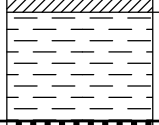
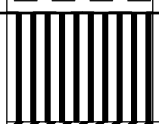
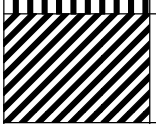
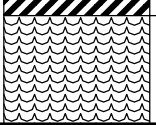
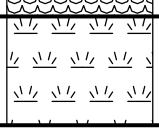
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

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

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

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

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-4

JOB NO.: 18G132-2
PROJECT: Proposed Logistics Building
LOCATION: Chino, California

DRILLING DATE: 4/17/18
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

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

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 641 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		20	4.5		ALLUVIUM: Gray Clayey Silt, abundant calcareous veining, trace fine root fibers, very stiff-moist		12					
		34			Gray Brown Silty fine Sand to fine Sandy Silt, trace Clay, little calcareous veining, dense-damp to moist		8					
5		11			Brown fine Sandy Silt, abundant calcareous nodules and veining, Iron oxide staining, medium dense-very moist		18					
		17			Gray Brown Silty fine Sand, little fine root fibers, trace Clay nodules, medium dense-moist		11					
10												
					Light Gray Brown fine to medium Sand, trace coarse Sand, trace Silt, medium dense-dry to damp							
15		20					3			5		
					Boring Terminated at 17'							

TBL 18G132-2.GPJ SOCALGEO.GDT 5/7/18

TEST BORING LOG

PLATE I-1

INFILTRATION CALCULATIONS

Project Name	Proposed Logistics Building
Project Location	Chino, CA
Project Number	18G132-2
Engineer	Aubrey Hodgins

Test Hole Radius	4	(in)
Test Depth	17.2	(ft)

Infiltration Test Hole	I-4

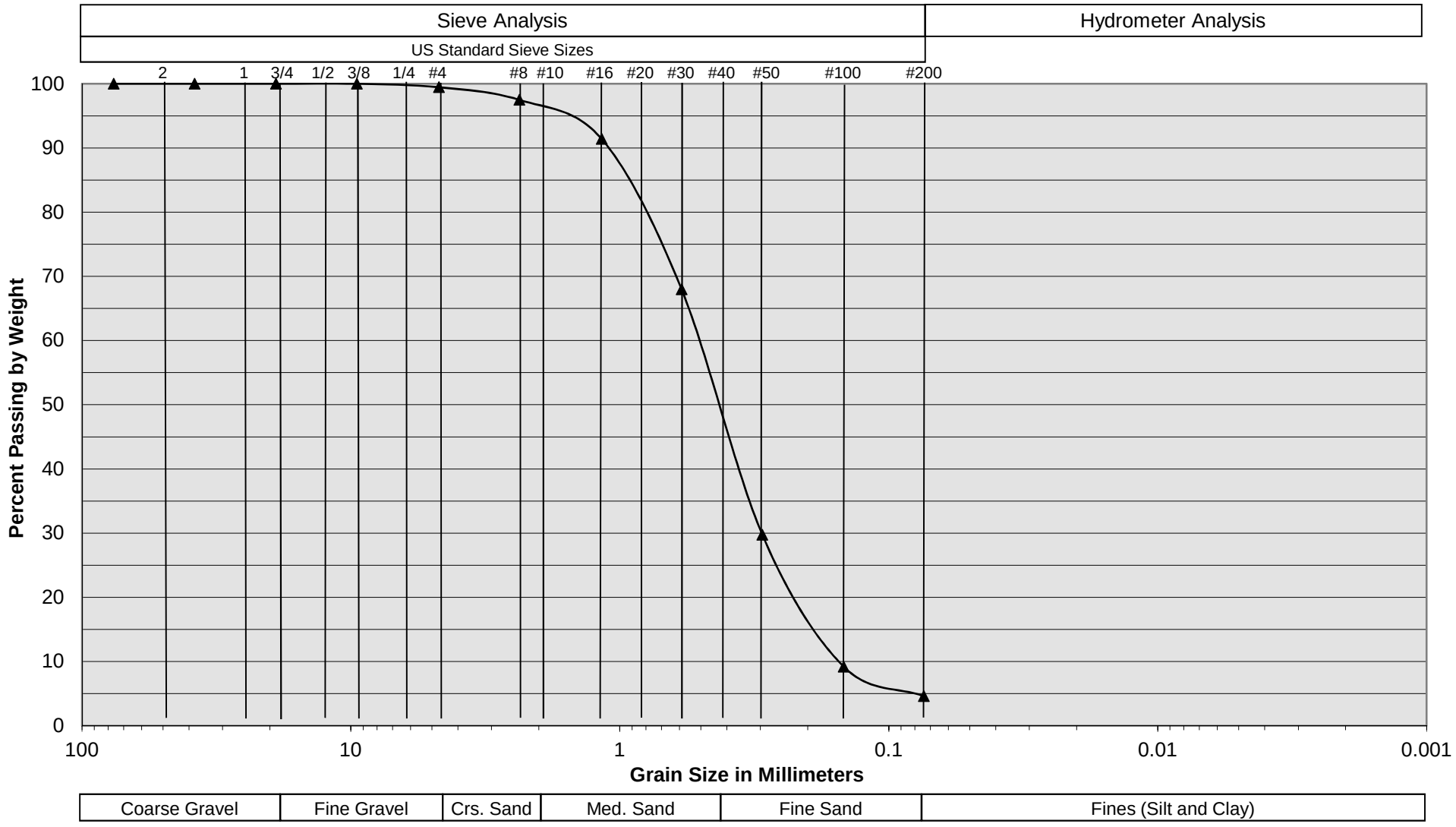
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	9:10 AM	25.0	15.00	2.20	1.10	8.34	Pre-Sat
	Final	9:35 AM		17.20				
P2	Initial	9:36 AM	25.0	15.00	2.14	1.13	7.92	
	Final	10:01 AM		17.14				
1	Initial	10:02 AM	10.0	15.00	1.63	1.39	12.61	Infiltration Testing
	Final	10:12 AM		16.63				
2	Initial	10:13 AM	10.0	15.00	1.62	1.39	12.49	
	Final	10:23 AM		16.62				
3	Initial	10:24 AM	10.0	15.00	1.62	1.39	12.49	
	Final	10:34 AM		16.62				
4	Initial	10:35 AM	10.0	15.00	1.60	1.40	12.26	
	Final	10:45 AM		16.60				
5	Initial	10:46 AM	10.0	15.20	1.52	1.24	12.97	
	Final	10:56 AM		16.72				
6	Initial	10:57 AM	10.0	15.30	1.45	1.18	12.97	
	Final	11:07 AM		16.75				

Per County Standards, Infiltration Rate calculated as follows:

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

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 1
H_{avg} = Average Head Height over the time interval

Grain Size Distribution



Sample Description	I-4 @ 15.5 to 17 feet
Soil Classification	Light Gray Brown fine to medium Sand, trace coarse Sand, trace Silt

Proposed Logistics Building
Chino, CA
Project No. 18G132-2
PLATE C-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Appendix B

Maintenance Agreement

1. Maintenance Agreement
2. Exhibit A – Legal Description
3. Exhibit B – BMP Site Plan

AND WHEN RECORDED MAIL TO

City Clerk
City of Chino
P.O. Box 667
Chino, CA 91708

SPACE ABOVE THIS LINE FOR RECORDER'S USE

WATER QUALITY MANAGEMENT PLAN AND STORMWATER BMP TRANSFER, ACCESS AND MAINTENANCE AGREEMENT

CITY OF CHINO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

This Agreement is made and entered into this _____ day of _____, 20___, by and between the CITY OF CHINO, a municipal corporation, hereinafter referred to as CITY, and James C. Carlino hereinafter referred to as OWNER.

WHEREAS, the Owner is the legal property owner of the real property situated in the State of California, County of San Bernardino, located at NW Remington & Flight in the City of Chino, more commonly referred to as San Bernardino County Tax Assessor Parcel No. 1054-391-02/03 described in Exhibit A and depicted in Exhibit B attached hereto and incorporated herein by this reference; and

WHEREAS, at the time of initial approval of the development project known as PL19-0719 Chino Parcel Delivery Facility within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs, " to minimize pollutants in urban runoff; and

WHEREAS, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP," to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff; and

WHEREAS, said WQMP has been certified by the Owner and reviewed and approved by the City; and

WHEREAS, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1. The Owner hereby provides the City or the City's designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's Director of Public Works with no advance notice, for the purpose of inspection, sampling, testing of the BMPs, and in case of emergency, to undertake all necessary repairs or other preventative measures at the owner's expense as provided in paragraph 3 below. The City shall make every effort at all times to minimize or avoid interference with the Owner's use of the Property.

2. The Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by the Owner and the Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. In the event the Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City, the City is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or the Owner's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.

4. The City may require the Owner to post security in form and for a time period satisfactory to the City to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under this Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of this Agreement. As an additional remedy, the Director may withdraw any previous stormwater-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as the Owner repays to the City its reasonable costs incurred in accordance with paragraph 3 above.

5. This Agreement shall be recorded in the Office of the Recorder of San Bernardino County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien against the Property.

8. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. The Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. The Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. The Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

9. Time is of the essence in the performance of this Agreement.

10. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

IF TO CITY:

Jose Alire

Assistant City Manager

13220 Central Avenue

Chino, CA 91710

IF TO OWNER:

James C. Carlino
Manager
Scannell Properties #209, LLC
8801 River Crossing Blvd Suite 300
Indianapolis, IN 46240

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

APPROVED AS TO FORM:

By: (Signature Not Required)
City Attorney

City of Chino

By:
Matthew C. Ballantyne
City Manager

ATTEST:

Angela Robles, City Clerk

APPROVED AS TO CONTENT:

By:
Jose Alire
Assistant City Manager
City of Chino

Owner: _____
(Company)

By: _____
(Signature and Date)

Name: _____
(Please Print or Type Name)

Title: _____
(Please Print or Type Title)

NOTE: OWNER'S SIGNATURE MUST BE NOTARIZED FOR RECORDATION

A.L.T.A. / N.S.P.S. LAND TITLE SURVEY

EXHIBIT A

TITLE INFORMATION:

TITLE INFORMATION SHOWN HEREON WAS DERIVED FROM PRELIMINARY TITLE REPORT ORDER NO. 700143-1, AMENDED JUNE 24, 2016, UPDATED OCTOBER 11,2016, UPDATED/AMENDED APRIL 10, 2017, UPDATED JANUARY 10, 2018 BY FIRST AMERICAN TITLE INSURANCE COMPANY.

NO RESPONSIBILITY FOR CONTENT, COMPLETENESS, OR ACCURACY OF SAID PRELIMINARY TITLE REPORT IS ASSUMED BY THIS MAP, THE SURVEYOR, OR DAVID EVANS & ASSOCIATES, INC.

INDICATES ITEM PLOTTED HEREON

1. General and special taxes and assessments for the fiscal year 2018-2019, a lien not yet due or payable.

2. General and special taxes and assessments for the fiscal year 2017-2018 are exempt. If the exempt status is terminated an additional tax may be levied. A.P. No.:1054-391-02-0-000.

   (Affects Parcels 2)

3. General and special taxes and assessments for the fiscal year 2017-2018 are exempt. If the exempt status is terminated an additional tax may be levied. A.P. No.: 1054-391-03-0-000.

   (Affects Parcel 1)

4. This item has been intentionally deleted.

5. This item has been intentionally deleted.

6. This item has been intentionally deleted.

7. This item has been intentionally deleted.

8. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

9. Water rights, claims or title to water, whether or not shown by the public records.

10. This item has been intentionally deleted.

11. An easement for pipelines, aqueducts and incidental purposes, recorded July 06, 1909 as Book 440 of Deeds, Page 373.
    In Favor of: Chino Land and Water Company
    Affects: As described therein

    Blanket in nature over Lots 37 through 39, 42 through 44, 53 and 54, 59 and 60, Subdivision of part of Rancho Santa Ana Del Chino recorded in Book 6, Page 15, records of San Bernardino County.

12. An easement for pipelines and incidental purposes, recorded June 26, 1950 as Book 2595, Page 506 of Official Records.
    In Favor of: Southern California Gas Company of California, a corporation and Southern Counties Gas Company of California, a corporation
    Affects: As described therein

13. This item has been intentionally deleted.

14. The effect of a map purporting to show the land and other property, filed Book 105, Page 53 of Record of Surveys.

15. Intentionally Deleted.

16. Intentionally Deleted.

17. Intentionally Deleted.

18. Rights of parties in possession.

19. An easement for public street and road purposes, public utilities, wires, cables, conduits, storm sewers, sanitary sewers, water pipelines and a right of way and incidental purposes, recorded June 02, 2015 as Instrument No. 2015-0227114 of Official Records.
    In Favor of: City of Chino, a political subdivision of the State of California
    Affects: as described therein

20. This item has been intentionally deleted.

21. This item has been intentionally deleted.

22. This item has been intentionally deleted.

23. This item has been intentionally deleted.

24. This item has been intentionally deleted.

25. This item has been intentionally deleted.

26. This item has been intentionally deleted.

27. This item has been intentionally deleted.

28. This item has been intentionally deleted.

29. This item has been intentionally deleted.

30. This item has been intentionally deleted.

31. This item has been intentionally deleted.

32. This item has been intentionally deleted.

33. This item has been intentionally deleted.

34. The terms and provisions contained in the document entitled "Certificate of Completion - LAFCO 2866 - City of Chino Annexation No. 99-02 (Chino Airport Area)" recorded October 24, 2000 as Instrument No.20000386609 of Official Records.

35. This item has been intentionally deleted.

36. This item has been intentionally deleted.

37. Rights of parties in possession.

38. Rights of the public in and to that portion of the land lying within Remington Avenue, Walker Avenue, and Comet Avenue.

LEGAL DESCRIPTION

PARCEL 1:

THE NORTH 147.16 FEET OF THE WEST 148 FEET OF LOT 38, IN SECTION 21, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF RANCHO SANTA ANA DEL CHINO, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 6, PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAN BERNARDINO COUNTY.

APN: 1054-391-03

PARCEL 2:

LOTS 37, 38, 43, 44, 53, 54, 59 AND 60, ALL IN SECTION 21, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF RANCHO SANTA ANA DEL CHINO, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 6, PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAN BERNARDINO COUNTY.

EXCEPT THAT PORTION OF LOT 38 LYING WITHIN PARCEL 1 SHOWN ABOVE.

APN: 1054-391-02

GENERAL NOTES

OWNER OF RECORD
COUNTY OF SAN BERNARDINO

PROPERTY ADDRESS
8375 MERRILL AVENUE, CHINO, CA 91710 (APN: 1054-391-03)
8315 MERRILL AVENUE, CHINO CA 91710 (APN: 1054-391-02)

BASIS OF BEARINGS
THE BEARINGS SHOWN HEREON ARE BASED ON THE LEGAL DESCRIPTIONS FOR THE SUBJECT PROPERTIES IN THE FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE ORDER NUMBER 700143-1 DATED JUNE 06, 2016. THE BEARING FOR THE WESTERLY LINE OF COMET AVENUE (SOUTH 00°37'16" EAST) AS SHOWN IN THE DESCRIPTION FOR PARCEL 3:CNO LEASE PARCEL 1 IS HELD AS THE BASIS OF BEARING FOR THIS MAP.

AREA NOTE

AREA SURVEYED:	PARCEL 1	=	21,760 SQ.FT.
	PARCEL 2	=	3,225,568 SQ.FT.
	TOTAL	=	3,247,328 SQ.FT.

FLOOD NOTE
PER FEMA MAP PANEL 9375 OF 9400, MAP NUMBER 06071C9375H DATED AUGUST 28, 2008, SUBJECT PROPERTY IS DETERMINED TO BE ZONE X — AREAS OF 0.2% ANNUAL CHANCE FLOOD, AREAS OF 1% ANNUAL CHANCE OF FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEE FROM 1% ANNUAL CHANCE OF FLOOD..

ZONING
PER CITY OF CHINO ZONING MAP:
SITE IS ZONED: PF (PUBLIC FACILITY) IN THE PRESERVE SPECIFIC PLAN

NO ZONING SPECIFICATIONS HAVE BEEN PROVIDED.

SURVEYOR'S NOTES

1. NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK.
2. NO OBSERVED EVIDENCE THAT THE SITE WAS USED AS A SOLID WASTE DUMP, SUMP, OR SANITARY LANDFILL.
3. DIMENSIONS SHOWN ARE IN FEET AND DECIMALS THEREOF. NO DISTANCES OR ANGLES SHOWN HEREON MAY BE ASSUMED BY SCALING.
4. VERTICAL RELIEF PROVIDED BY AERIAL PHOTOGRAPHY
5. FOUR BUILDING ARE LOCATED ON THE SITE. 2 ARE SINGLE FAMILY RESIDENCE, AND 2 ARE ENCLOSED WORK STRUCTURES.
6. NO EVIDENCE HAS BEEN PROVIDED FOR RECENT STREET OR SIDEWALK CONSTRUCTION.
7. NO WETLANDS HAVE BEEN DELINEATED.
8. UTILITY LOCATION PROVIDED BY OBSERVATION AND LOCATION EXHIBITS PROVIDED BY SoCalGas FOR THE GAS LINES, AND THE INVENTORY MAP PROVIDED BY SOUTHERN CALIFORNIA EDISON.

SURVEYOR'S CERTIFICATE

TO (I) SCANNELL PROPERTIES #209, LLC; (II) FEDEX GROUND PACKAGE SYSTEM, INC.; (III) COUNTY OF SAN BERNARDINO, CALIFORNIA;(IV) FIRST AMERICAN TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 5, 6(a), 8, 11, 13, 14, 15, 16, 17, 18, 19, AND 20, OF TABLE A THEREOF.

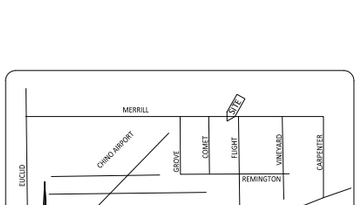
THE FIELD WORK WAS COMPLETED ON ARIL 2, 2018.

DATE OF PLAT OR MAP: APRIL 3, 2018.

SIGNED _____ DATE 4/3/2018
JOHN C BENTLEY, P.L.S. 7223

BEING A PROFESSIONAL LAND SURVEYOR IN THE STATE OF CALIFORNIA

PROFESSIONAL LAND SURVEYOR JOHN C. BENTLEY No. 7223 STATE OF CALIFORNIA



VICINITY MAP
NOT TO SCALE

DIGALERT
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 8-1-1
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NO.	DESCRIPTION	DATE	BY

REVISIONS

DAVID EVANS AND ASSOCIATES INC.
4141 Inland Empire Blvd., Suite 250
Ontario California 91764
Phone: 909.481.5750

ALTA / NSPS LAND TITLE SURVEY
CHINO AIRPORT, CHINO, CA

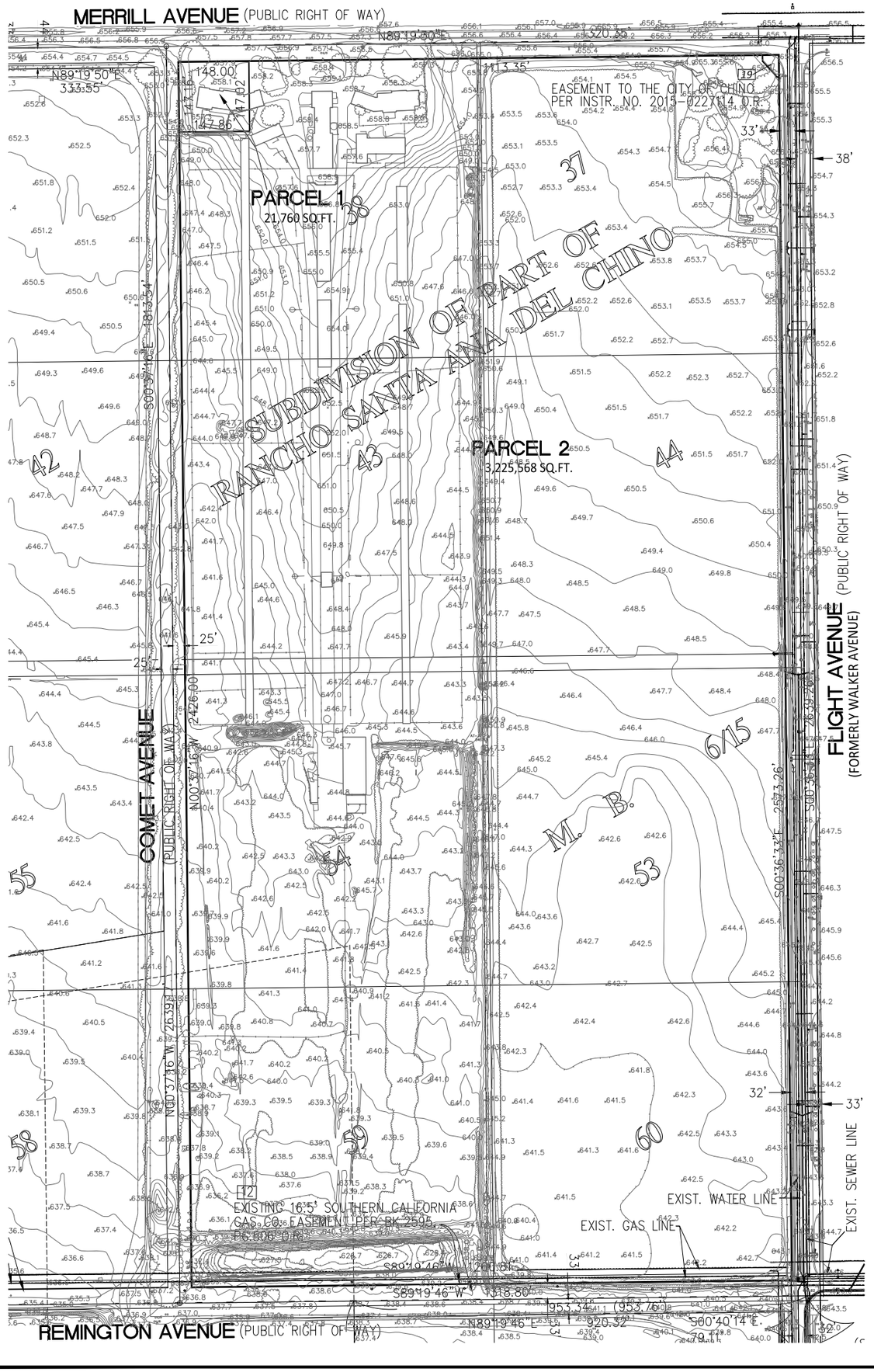
DRAWN BY: JCBE
ORDERED BY: C. SAALFRANK
CHECKED BY: DRCR

1054-391-02 AND 1054-391-03
FOR: SCANNELL PROPERTIES, INC.
800 E. 96TH STREET, SUITE 175
INDIANAPOLIS, IN 46240-3868

PROJECT: SCAN 0010
DATE: 04/03/2016
SHT NO.: 1 OF 2

Drawing Name: P:\SCAN00000010\0400CAD\SVY\CHKBRD\JCBE\Updated ALTA APN 1054-391-02 and 03 04-02-2018.dwg

A.L.T.A. / N.S.P.S. LAND TITLE SURVEY



LEGEND

- AERIAL PANELS
- PALM TREE
- SINGLE TREE
- FLAG
- GATE
- SIGNS
- BILLBOARD
- OVERHEAD SIGNS
- STREET SIGN
- POST / BOLLARD
- FIRE HYDRANT
- METER / UTILITY
- MANHOLE
- VALVE
- CATCH BASIN
- CULVERT
- UTILITY POLE
- TRANSMISSION
- TV DISH
- LIGHT POLE
- TRAFFIC SIGNAL
- PEDESTRIAN SIGNAL
- STREET LIGHT
- STRAIGHT ARROWS
- DIRECTIONAL ARROWS
- HANDICAP
- EXIT STOP — TRAFFIC PAINT
- AHEAD ONLY YIELD — TRAFFIC PAINT
- BUILDING
- SWIMMING POOL
- BRIDGE
- CANOPY
- ROCKS
- PARKING STRIPES
- ROAD / PAVEMENT
- DIRT ROAD / TRAIL
- CURB / GUTTER
- CONCRETE
- RAILROAD
- FENCE
- RETAINING WALL
- GUARD RAIL
- WASH / WATER
- VEGETATION LINE
- BLOW OFF
- BOLLARD
- CALIFORNIA TELEVISION PULL BOX
- ELECTRIC TRANSFORMER
- ELECTRICAL MANHOLE
- ELECTRICAL PULL BOX
- ELECTRICAL PULL BOX
- FIRE DEPARTMENT CONNECTION
- FIRE HYDRANT
- PARKING LIGHT
- SEWER MAN HOLE
- SEWER CLEAN OUT
- STREET LIGHT PULL BOX
- STORM DRAIN MAN HOLE
- TELEPHONE MANHOLE
- TELEPHONE PULL BOX
- TELEPHONE VAULT
- TRAFFIC SIGNAL PULL BOX
- WATER METER
- WATER VALVE
- UNKNOWN OBJECT
- (XX) RECORD DATA

N

100 50 0 100
1" = 100'

ABBREVIATIONS

APPROX	APPROXIMATE
BC	BEGINNING OF CURVE
BW	BACK OF WALK
CB	CATCH BASIN
CL	CENTER LINE
CONC	CONCRETE
E	EAST
ELEC	ELECTRIC CONDUIT
ESTD	ESTABLISHED
FD	FOUND
INT	INTERSECTION
LS	LAND SURVEYOR LICENSE
N	NORTH
PLTR	PLANTER
PL	PROPERTY LINE
PP	POWER POLE
RAD	RADIAL
R/W	RIGHT OF WAY
S	SOUTH
SD	STORM DRAIN
SL	STREET LIGHT
SLPB	STREET LIGHT PULLBOX
STEP	STEP
SWR	SEWER
S&W	SPIKE & WASHER
TS	TRAFFIC SIGNAL
TSPB	TRAFFIC SIGNAL PULLBOX
W	WEST
WTR	WATER

DIGALERT
DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 8-1-1
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DAVID EVANS AND ASSOCIATES INC.
4141 Inland Empire Blvd., Suite 250
Ontario California 91764
Phone: 909.481.5750

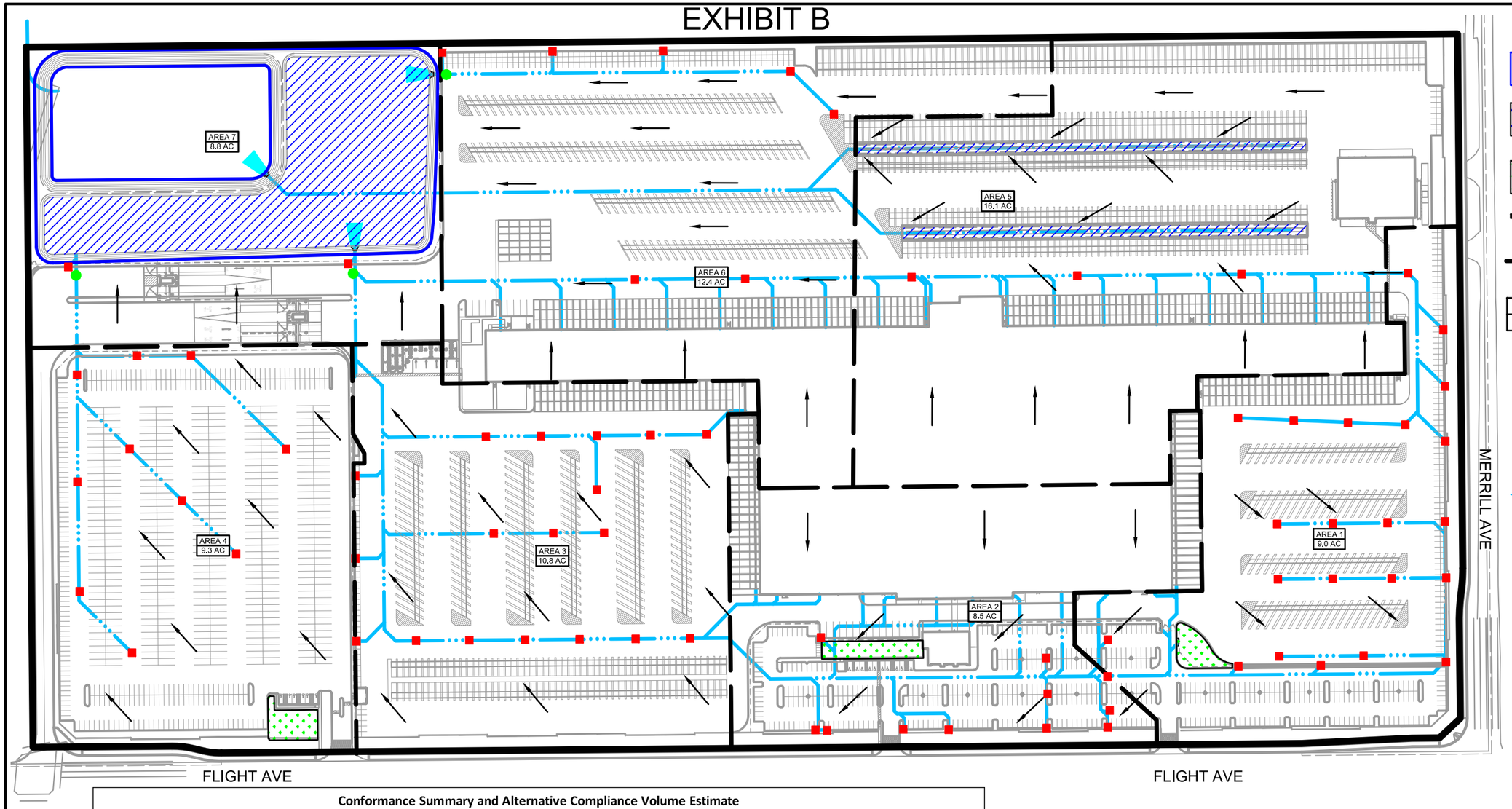
ALTA / NSPS LAND TITLE SURVEY
CHINO AIRPORT, CHINO, CA

APN: 1054-391-02 AND 1054-391-03
FOR: SCANNELL PROPERTIES, INC.
800 E. 96TH STREET, SUITE 175
INDIANAPOLIS, IN 46240-3868

DRAWN BY: JCBE
ORDERED BY: C. SAALFRANK
CHECKED BY: DRCR
PROJECT: SCAN 0010
DATE: 04/03/2018
SHT NO.: 2 OF 2

Drawing Name: P:\SCA\00000010\0400\4D\SV\CHKBRD\JCBE\Updated ALTA APN 1054-391-02 and 03 04-02-2018\Updated ALTA 04-02-2018.dwg

EXHIBIT B



LEGEND

- FLOOD CONTROL BASIN
- POST CONSTRUCTION BIORETENTION BASIN/ BOISWALE
- LANDSCAPE
- DRAINAGE BOUNDARY
- SUB-AREA BOUNDARY FOR DRAINAGE AREAS
- AREA / AC — DRAINAGE AREA AND ACRES
- DIRECTION OF FLOW
- STORM DRAIN INLET/STENCIL
- PRETREATMENT UNIT
- STORM DRAIN LINE

EXPECTED POLLUTANTS

TRASH AND DEBRIS
OIL AND GREASE
ORGANIC COMPOUNDS
METALS
OXYGEN DEMANDING SUBSTANCES

POTENTIAL POLLUTANTS

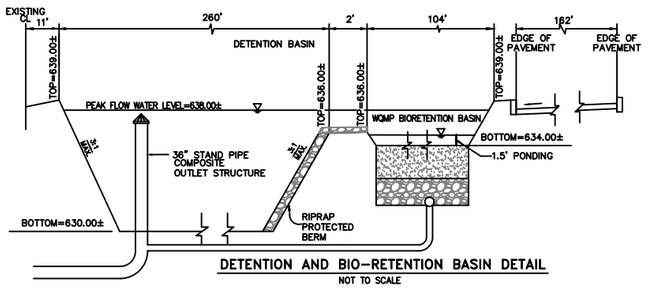
SEDIMENT/TURBIDITY
NUTRIENTS
ORGANIC COMPOUNDS
OXYGEN DEMANDING SUBSTANCES
PESTICIDES
METALS

BIOFILTRATION

PESTICIDES
NUTRIENTS
OXYGEN DEMANDING SUBSTANCES
METALS
ORGANIC COMPOUNDS
TRASH AND DEBRIS
OIL AND GREASE
SEDIMENT/TURBIDITY

Conformance Summary and Alternative Compliance Volume Estimate

Drainage Area ID	Acres	Imp%	Total LID DCV (ft^3)	On-site retention with site design hydrologic source control LID BMP (ft^3)	On-site retention with LID infiltration BMP (ft^3)	On-site retention with LID harvest and use BMP (ft^3)	On-site retention with volume based biotreatment BMP (ft^3)	Flow capacity provided by flow based biotreatment BMP (cfs)	LID BMP performance criteria achived?
A	75.9	85%	300,146	0	0	0	312,824	0	Yes



DETENTION AND BIO-RETENTION BASIN DETAIL
NOT TO SCALE

200 0 200 400
scale 1"= 200' feet

D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-351-6800

CHINO PARCEL DELIVERY FACILITY

POST-DEVELOPMEMT WQMP SITE PLAN

SCALE: 1" = 200'
DATE: 10/15/18
SHT NO.: 01 OF 01

Drawing Name: M:\17004\Eng\17004\Hm\WQMP\WQMP 2018-10-15 with 7 areas 11X17.dwg
Last Opened: Oct 15, 2018 - 2:45pm by: Erika

Appendix C

Educational Material

1. Commercial Landscape Maintenance
2. Commercial Trash Enclosures
3. Construction and Development
4. Gas Stations
5. General Industrial and Manufacturing Businesses
6. Landscape Maintenance
7. Mobile Vehicle Cleaning and Maintenance
8. Mobile Vehicle Maintenance
9. Regulatory Information
10. Stormwater Pollution Prevention
11. Stormwater Pollution Prevention – Construction
12. Stormwater Pollution Prevention – Excavation and Grading
13. Stormwater Pollution Prevention – Fresh Concrete and Mortar Application
14. Stormwater Pollution Prevention – Landscape Maintenance
15. Stormwater Pollution Prevention – Roadwork and Paving

SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION

Commercial landscape maintenance:

Yard waste, sediments and toxic lawn and garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution, protect public health and avoid fines or legal action.

- **Recycle Yard Waste:** Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Let your customers know about grass cycling --the natural recycling of grass by leaving clippings on the lawn when mowing instead of using a grass catcher. Grass clippings will quickly decompose, returning valuable nutrients to the soil. You can get more information at www.ciwmb.ca.gov/Organics.
- **Use Fertilizers, Herbicides & Pesticides Safely:** Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use natural, non-toxic alternatives to traditional garden chemicals. If you must use chemical fertilizers, herbicides, or pesticides spot apply rather than blanketing entire areas, avoid applying near curbs and driveways and never apply before a rain.
- **Recycle Hazardous Waste:** Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility. For information on proper disposal, call (909) 386-8401.
- **Use Water Wisely:** Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads.



- **Planting:** Plant native vegetation to reduce the need of water, fertilizers, herbicides and pesticides.
- **Prevent Erosion:** Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways. Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff. Avoid excavation or grading during wet weather.



- **Store Materials Safely:** Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials should be covered with plastic sheeting to protect from rain, wind and runoff.

For more information about how you can prevent stormwater pollution:

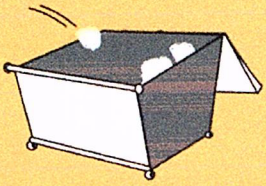
COMMERCIAL TRASH ENCLOSURES

FOLLOW THESE **REQUIREMENTS** TO **KEEP OUR WATERWAYS CLEAN**

Trash enclosures, such as those found in commercial and apartment complexes, typically contain materials that are intended to find their way to a landfill or a recycling facility. **These materials are NOT meant to go into our local lakes and rivers.**

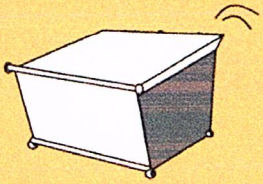
PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

PUT TRASH INSIDE



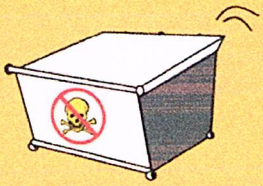
Place trash inside the bin (preferably in sealed bags)

CLOSE THE LID



Prevent rain from entering the bin in order to avoid leakage of polluted water runoff

KEEP TOXICS OUT



- Paint
- Grease, fats and used oils
- Batteries, electronics and fluorescent lights

SOME ADDITIONAL GUIDELINES, INCLUDE

✓ SWEEP FREQUENTLY

Sweep trash enclosure areas frequently, instead of hosing them down, to prevent pollated water from flowing into the streets and storm drains.

✓ FIX LEAKS

Address trash bin leaks immediately by using dry clean up methods and report to your waste hauler to receive a replacement.

✓ CONSTRUCT ROOF

Construct a solid cover roof over the existing trash enclosure structure to prevent rainwater from coming into contact with trash and garbage. Check with your local City/County for Building Codes.

In San Bernardino County, stormwater pollution is caused by food waste, landscape waste, chemicals and other debris that are washed into storm drains and end up in our waterways - untreated! You can be part of the solution by maintaining a water-friendly trash enclosure.

THANK YOU FOR HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!

To report illegal dumping **(877-WASTE18)** or
to find a household hazardous waste facility (800-OILY CAT): **sbcountystormwater.org**
To dispose of hazardous waste call the San Bernardino County Fire Dept. - CUPA Program **(909) 386-8401**

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Redlands • Rialto • San Bernardino • San Bernardino County • San Bernardino County Flood Control District • Upland • Yucaipa

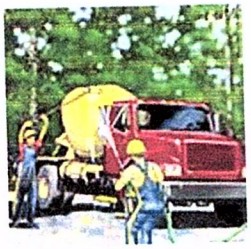
SAN BERNARDINO COUNTY STORMWATER POLLUTION PREVENTION

Construction & development:

Soil, cement wash, asphalt, oil and other hazardous debris from construction sites often make their way into the San Bernardino County storm drain system, and flow untreated into local waterways. Follow these best management practices to prevent pollution, protect public health and avoid fines or legal action.



- **Store Materials Safely:** Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.
- **Preventing Erosion:** Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydro mulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Use gravel approaches where truck traffic is frequent to reduce soil compaction and limit the tracking of sediment into the streets. For more information on erosion control, call (909) 799-7407.



- **Cleaning & Preventing Spills:** Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.
- **Maintaining Vehicles & Equipment:** Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, and brake and radiator fluids.
- **Ordering Materials & Recycling Waste:** Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Dispose of hazardous materials through a hazardous waste hauler or other means in accordance with the construction permit. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.
- **Concrete and mortar application:** Never dispose of cement washout into driveways, streets, gutters or drainage ditches. Wash concrete mixers and equipment only in specified washout areas, where the water flows into lined containment ponds. Cement wash water can be recycled by pumping it back into cement mixers for reuse.

For more information about how you can prevent stormwater pollution:

GAS STATIONS

AN ILLEGAL DISCHARGE INTO THE STORM DRAIN, ACCIDENTAL OR NOT, CAN LEAD TO ENFORCEMENT ACTIONS, WHICH CAN INCLUDE FINES.

These best management practices will help you **prevent polluted water and other materials from flowing into the street, gutter and storm drain.**

WHEN CLEANING, USE **DRY CLEAN-UP METHODS:**

SWEEP TO REMOVE LITTER AND DEBRIS



USE RAGS AND ABSORBENTS FOR LEAKS AND SPILLS



PLACE CLEAN UP MATERIALS IN THE TRASH OR DISPOSE OF PROPERLY



When pressure washing, ensure wash water does not leave the site or enter the storm drain by placing a capture device on or around the storm drain. Clean out the capture device and properly dispose of the wastes. To avoid fines, be sure to advise your pressure washers to comply with operating procedures for proper collection and disposal of wash water.

SPILL CLEAN-UP

- ✓ **Stop the source of the spill immediately.** Be aware of the nearest storm drain location and ensure nothing can enter or be discharged into it.
- ✓ **Contain the spill.** Spill kit location must be properly marked and easily accessible. Train your personnel.
- ✓ **Clean up the excess.** Applied absorbent materials must be collected for re-use or proper disposal.

Keep hazardous materials out of the trash by disposing of them properly, this includes absorbent materials used to clean up toxic waste spills. **Hazardous materials may include used motor oil and oil filters, antifreeze, batteries and gasoline.** Keep containers with hazardous waste stored under a cover and on secondary containment.

TRASH AREAS

- ✓ **Place trash inside the bin** (preferably in sealed bags).
- ✓ **Prevent rainwater** from entering trash bins by keeping lids closed at all times or by placing the bins under a solid roof.

Pollutants from gas stations may make their way into the storm drain system. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to comply with regulations, prevent pollution and protect public health.
For more information about BMPs for gasoline services, visit cabmphandbooks.com.

To report illegal dumping, call (877) WASTE18 or visit sbcountystormwater.org
To report toxic spills call 1(800) 33 TOXIC
To dispose of hazardous waste, call the San Bernardino County Fire Dept. - CUPA Program (909) 386-8401

sbcountystormwater.org

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SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION

General industrial & manufacturing businesses:

If you own, manage or help operate a business, especially an industrial or manufacturing company, you can help reduce storm water pollution. From environmentally friendly cleaning and maintenance activities, to recycling hazardous waste materials, businesses can do a lot to prevent storm water pollution.

- Review your cleaning and maintenance activities to look for ways to reduce runoff into the storm drain system, especially in outdoor areas like parking lots, loading docks and maintenance yards. Keep trash enclosure swept and trash bin lids closed.
- Train employees to wash vehicles and equipment indoors in a wash rack that is connected to the sanitary sewer or off-site at a commercial wash facility. Train janitorial staff to dispose of floor cleaning water in the sewer and not into the parking lot. Make sure that cooling towers, boilers, compressors, water softeners and other process equipment are connected to the sanitary sewer and do not discharge wastewater into the parking lot.
- If you use hazardous materials in your everyday business, like ink and solvents for commercial printing, or polishes and chemicals for car detailing or manufacturing after-market accessories, do not put these hazardous materials in the trash or pour them into the gutter. Take them to be recycled safely. Store chemicals, wastes, raw materials and contaminated equipment indoors or in a covered, spill contained area, to prevent exposure of these materials to storm water. For information on proper hazardous waste disposal, call (909)386-8401.
- Take advantage of less-toxic alternatives to dangerous chemicals. From detergents to drain openers, there are a lot of ways to get the same or better result without having to rely toxic substances.
- Looking for raw materials? San Bernardino County Materials Exchange Program, or SBCoMax is a partnership between the County and the California Integrated Waste Management Board, for businesses to provide used but usable materials to those interested in obtaining them. The program helps divert used materials from landfills, saves resources and can save you money.

LANDSCAPE MAINTENANCE

DISCHARGE TO THE STORM DRAIN, ACCIDENTAL OR NOT, COULD LEAD TO ENFORCEMENT ACTIONS, WHICH COULD INCLUDE FINES.

Follow the best practices below to **prevent water pollution from landscaping activities.**

RECYCLE YARD WASTE



- Recycle leaves, grass clippings and other yard waste.
- Do not blow, sweep, rake or hose yard waste into the street or catch basin.
- **Try grasscycling:** the natural recycling of grass by leaving clippings on the lawn when mowing.

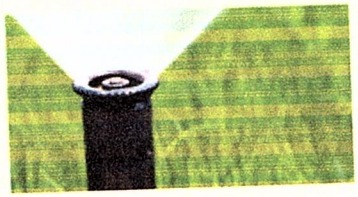
  For more information, please visit: **www.calrecycle.ca.gov/organics/grasscycling**

USE FERTILIZERS, HERBICIDES AND PESTICIDES SAFELY



- Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use natural and non-toxic alternatives as often as possible.
- If you must use chemical fertilizers, herbicides or pesticides:
  - Spot apply, rather than blanketing entire areas.
  - Avoid applying near curbs and driveways, and **never** before a rain.
  - Apply fertilizers as needed: when plants could best use it and when the potential runoff would be low.
  - Follow the manufacturer's instructions carefully—this will not only give the best results, but will save money.

USE WATER WISELY



- Control the amount of water and direction of sprinklers. Sprinklers should only be on long enough to allow water to soak into the ground, but not so long as to cause runoff.
- Periodically inspect, fix leaks and realign sprinkler heads.
- Plant native vegetation to reduce the need of water, fertilizers, herbicides and pesticides.

HOMEOWNERS

KEEP THESE TIPS IN MIND WHEN HIRING PROFESSIONAL LANDSCAPERS AND REMIND AS NECESSARY.

Leftover pesticides, fertilizers, and herbicides contaminate landfills and should be disposed of through a Hazardous Waste Facility.

For more information on proper disposal call,

(909) 382-5401 or 1-800-OILY CAT.

To report illegal dumping, call (877) WASTE18 or visit sbcountystormwater.org
To report toxic spills, call 1(800) 33 TOXIC
To dispose of hazardous waste, call 1(800) OILY CAT

sbcountystormwater.org

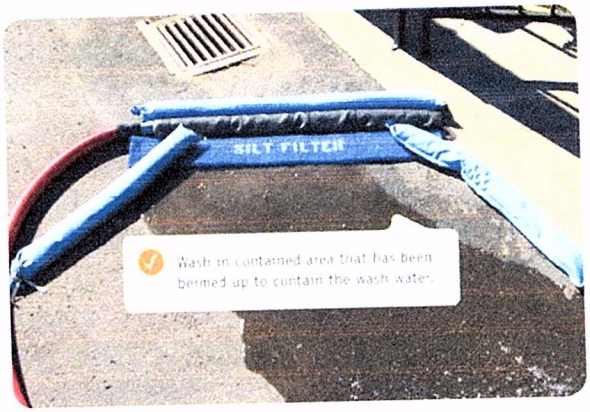
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MOBILE VEHICLE CLEANING & MAINTENANCE

DISCHARGE INTO THE STORM DRAIN, ACCIDENTAL OR NOT, CAN LEAD TO ENFORCEMENT ACTIONS, WHICH CAN INCLUDE FINES.

These best management practices will help you **prevent polluted water and other materials from flowing into the street, gutter and storm drain.**

WASH WATER DISPOSAL



- When washing items contaminated by hazardous materials, wash water should be collected and hauled off-site for proper disposal.
- Wash in customers wash bay or pump wastewater to the wash bays' pretreatment system.

Engine cleaning must be performed at a facility that has the equipment to properly process the contaminated wash water runoff.

HAZARDOUS WASTE SPILL CLEAN-UP & DISPOSAL



- If a spill occurs, use an absorbent material such as kitty litter or absorbent pads.
- Clean up the excess. Properly dispose of absorbent material used to clean up spills - contact an approved hauler for assistance/disposal. Sweep work area thoroughly after cleaning.
- Keep toxics out of the trash by disposing of them properly. This includes absorbent materials used to clean up toxic waste spills. Toxic materials may include used motor oil and oil filters, antifreeze, batteries and gasoline. Make sure to maintain hauling records for all hazardous waste.

To report illegal dumping, call (877) WASTE18 or visit sbcountystormwater.org
To report toxic spills call (800) 33 TOXIC
To dispose of hazardous waste, call the CUPA Program (909) 386-8401

sbcountystormwater.org

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SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION

Mobile vehicle maintenance

Wash in a designated area that has been bermed up to contain the wash water.

Common water control devices are: recycling systems: pretreatment or sewer discharge systems: limited recycling systems: wash pits(portable vinyl wash pads). vacuum sludge filtering systems: wet-dry vacuums. sump pumps: drain covers: portable dams: vacu-brooms: oil absorbent pads. booms. pillows. and tubes: plastic sheeting: filter tubs: buckets: pans: and squeegees.

When cleaning engines using chemical additives like soaps. solvents or degreasers. the cleaning must be performed at a facility that has the equipment to properly process the contaminated wastewater runoff. or using a leak-proof ground cover device that will catch and contain all contaminated wastewater runoff for later disposal in a manner that complies with city. county. state and federal codes.

Wastewater from cleaning equipment must be discharged into a sink. toilet. or other drain connected to the sanitary sewer

For more information about how you can prevent stormwater pollution:

SAN BERNARDINO COUNTY STORMWATER PROGRAM

WHERE WATER MEETS COMMUNITY

Regulatory Information

The Federal Water Pollution Control Act prohibits the discharge of any pollutant to navigable waters from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 passage of the Water Quality Act established NPDES permit requirements for discharges of storm water. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

Industrial facilities and construction sites are regulated by the Regional Water Quality Control Board and State Water Resources Control Board, through general storm water permits. Most industrial, manufacturing or transportation businesses that store materials, products or equipment outdoors, or conduct vehicle washing or process operations outdoors are required to obtain coverage under the State Water Resources Control Board's General Industrial Activities Stormwater Permit. For more information about this permit, visit *http://www.waterboards.ca.gov/centralcoast/water_issues/programs/stormwater/industrial.shtml* or contact your local storm water coordinator.

If your business conducts construction activities, including clearing, grading, stockpiling or excavation that results in soil disturbances of at least one acre, you are subject to the State Water Resources Control Board's General Construction Activities Stormwater Permit. To find out more about this storm water permit for construction, visit *https://www.waterboards.ca.gov/centralcoast/water_issues/programs/stormwater/construction_new.shtml.*
Cities and counties are regulated through permits issued by the Regional Boards. Since 1990 operators of large storm drain systems such as San Bernardino County's have been required to:

- Develop a storm water management program designed to prevent harmful pollutants from being dumped or washed by storm water runoff, into the storm water system, then discharged into local water bodies; and
- Obtain a National Pollutant Discharge Elimination System (NPDES) permit.

The NPDES permit programs in California are administered by the State Water Resources Control Board and by nine regional boards that issue NPDES permits and enforce regulations within their respective region.

San Bernardino County lies within the jurisdiction of the Santa Ana Region. This regional board issues a permit to the San Bernardino County Permittees, which includes the County of San Bernardino, San Bernardino County Flood Control District and incorporated cities of San Bernardino County. Since the program's inception, the County of San Bernardino has served as the principal permittee.

SAN BERNARDINO COUNTY STORMWATER PROGRAM

WHERE WATER MEETS COMMUNITY

Documents & Reports:

The following documents describe the regulations and programs for water quality in San Bernardino County. You can review the latest Basin Plan. National Pollutant Discharge Elimination System (NPDES) Permit and Drainage Area Management Plan (DAMP).

- **Basin Plans:** The document for each region of the State Water Quality Board's jurisdiction, including Santa Ana, is the Water Quality Control Plan, commonly referred to as the Basin Plan. It is the foundation for the regulatory programs of each regional board. The Basin Plan documents the beneficial uses of the region's ground and surface waters, existing water quality conditions, problems, and goals, and actions by the regional board and others that are necessary to achieve and maintain water quality standards.

Water Control Plan for the Santa Ana River Basin

- **Municipal National Pollutant Discharge Elimination System (NPDES) Permits:** The permits of each region outline additional steps for a storm water management program and specify requirements to help protect the beneficial uses of the receiving waters. They require permittees to develop and implement Best Management Practices (BMPs) to control/reduce the discharge of pollutants to waters of the United States to the maximum extent practicable (MEP).

Santa Ana Regional Water Quality Control Board Municipal NPDES Permit Order No. R8-2002-0Q12

- **Report of Waste Discharge:** The Report of Waste Discharge (ROWD) describes the San Bernardino Stormwater Program, implemented by the County and cities to comply with their jointly held stormwater permit. It is the principle policy and guidance document for the NPDES Stormwater Program.

Report of Waste Discharge 2000

- **San Bernardino County Storm Water Program Annual Status Report:** The Annual Status Report is a requirement of the NPDES permit for submittal to the Regional Boards and United States Environmental Protection Agency. The report presents an analysis and assessment of permit compliance activities.

Annual Report - will be posted soon

For more information about how you can prevent stormwater pollution:

www.sbcountystormwater.org

STORMWATER Pollution Prevention

INDUSTRIAL AND COMMERCIAL FACILITIES

Pollution Prevention STORMWATER

Important Phone Numbers

San Bernardino County Flood Control
(909) 387-8112

County of San Bernardino
(909) 387-8109

City of Big Bear Lake
(909) 866-5831

City of Chino (909) 591-9850

City of Chino Hills (909) 364-2722

City of Colton (909) 370-6128

City of Fontana (909) 350-6772

City of Grand Terrace
(909) 824-6671 x 226

City of Highland (909) 864-8732 x 230

City of Loma Linda (909) 799-4405

City of Montclair (909) 625-9470

City of Ontario (909) 395-2025

City of Rancho Cucamonga
(909) 477-2740 x 4063

City of Redlands (909) 798-7655

City of Rialto (909) 421-4921

City of San Bernardino (909) 384-5154

City of Upland (909) 931-4370

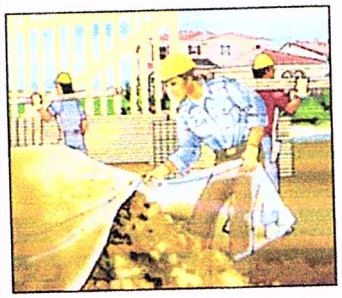
City of Yucaipa (909) 797-2489 x 243

San Bernardino County
Stormwater Program
825 East Third Street • Room 201
San Bernardino, CA 92415-0835

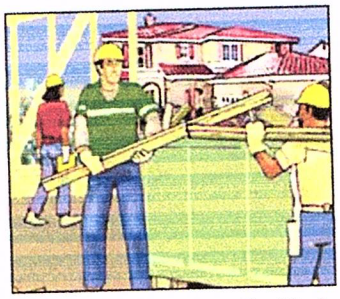
STORMWATER Pollution Prevention

CONSTRUCTION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Store Materials Safely
Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



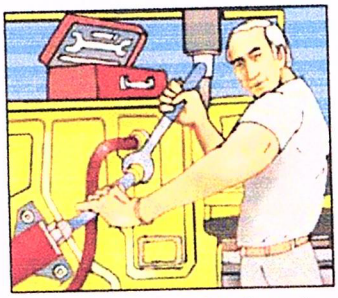
Ordering Materials & Recycling Waste
Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.



Cleaning & Preventing Spills
Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.



Preventing Erosion
Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydromulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Channels can be lined with grass or roughened pavement to reduce runoff velocity.



Maintaining Vehicles & Equipment
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.



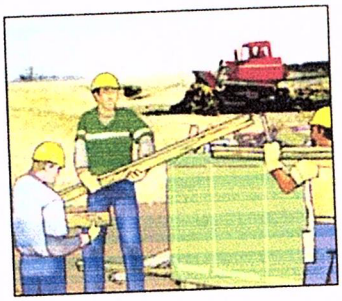
To report illegal dumping call
(877) WASTE18
sbcountystormwater.org

San Bernardino County STORMWATER PROGRAM

STORMWATER Pollution Prevention

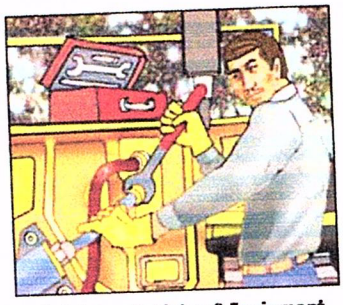
EXCAVATION AND GRADING

Sediment, cement wash, asphalt and vehicle fluids from soil excavation and grading often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



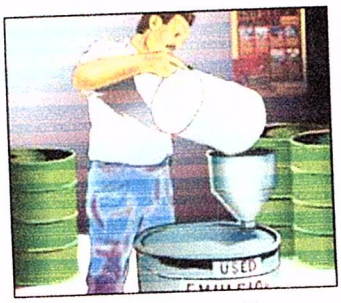
Recycling Waste

Recycle broken asphalt, concrete, wood, and cleared vegetation whenever possible. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.



Maintaining Vehicles & Equipment

Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutters and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks. Use gravel approaches where truck traffic is heavy to reduce soil compaction and limit the tracking of sediment into the street.



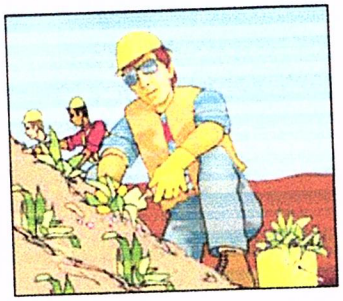
Cleaning & Preventing Spills

Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. Prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids. To report serious spills, call 911.



Storing Materials

Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



Preventing Erosion

Avoid excavation or grading during wet weather. Plant temporary vegetation on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff. Channels can be lined with grass or roughened pavement to reduce runoff velocity.

To report illegal dumping call

(877) WASTE18

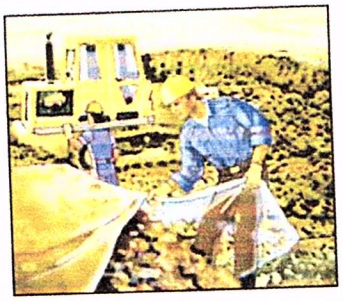
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San Bernardino County STORMWATER PROGRAM

STORMWATER Pollution Prevention

FRESH CONCRETE & MORTAR APPLICATION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



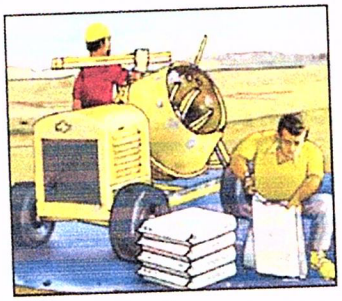
Storing Materials

Keep construction materials and debris away from the street, gutter and storm drains. Secure open bags of cement and cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



Ordering Materials & Recycling Waste

Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. When breaking up paving, recycle the pieces at a crushing company. You can also recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. Call (909) 386-8401 for recycling and disposal information.

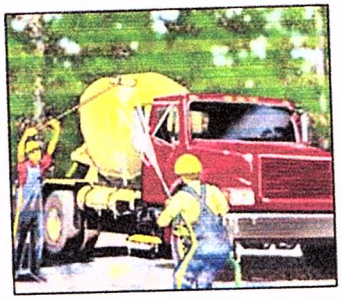


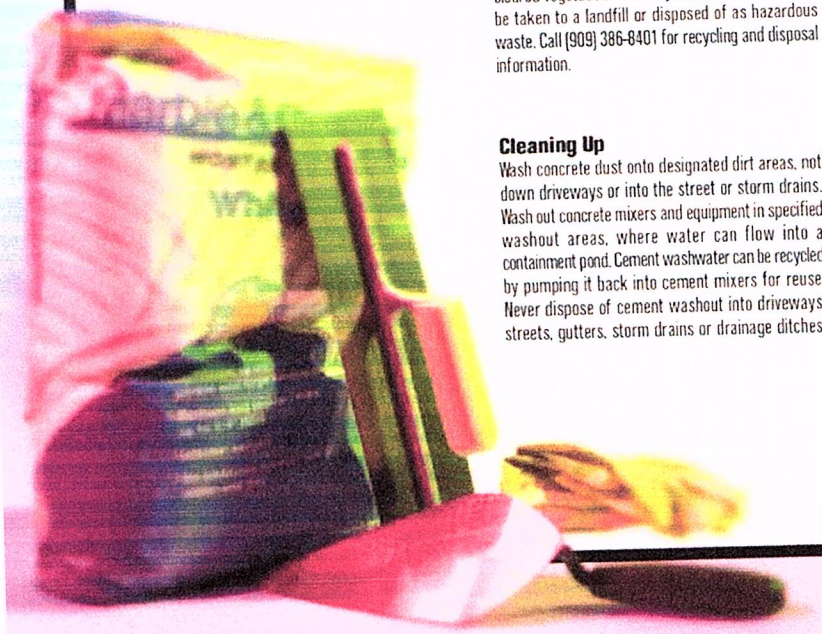
During Construction

Schedule excavation and grading during dry weather. Prevent mortar and cement from entering the street and storm drains by placing erosion controls. Setup small mixers on tarps or drop cloths, for easy cleanup of debris. Never bury waste material. Recycle or dispose of it as hazardous waste.

Cleaning Up

Wash concrete dust onto designated dirt areas, not down driveways or into the street or storm drains. Wash out concrete mixers and equipment in specified washout areas, where water can flow into a containment pond. Cement washwater can be recycled by pumping it back into cement mixers for reuse. Never dispose of cement washout into driveways, streets, gutters, storm drains or drainage ditches.





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San Bernardino County STORMWATER PROGRAM

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San Bernardino, CA 94215-0835

STORMWATER Pollution Prevention

LANDSCAPE MAINTENANCE



STORMWATER Pollution Prevention

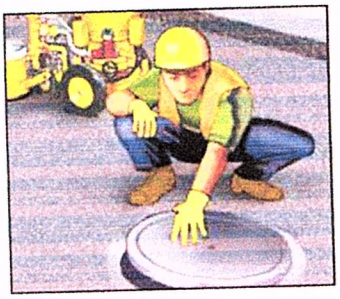
ROADWORK AND PAVING

Asphalt, saw-cut slurry and excavated materials from road paving, surfacing and pavement removal often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



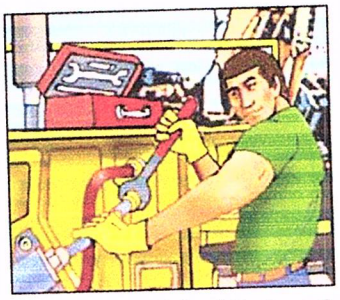
Preventing Erosion

Schedule excavation and grading work during dry weather. Develop and implement erosion and sediment control plans for excavated embankments. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



During Construction

Cover catch basins and maintenance holes when applying seal coat, slurry seal or fog seal. Use check dams, ditches or berms around excavations, and avoid over applying water for dust control. Never wash excess materials from exposed aggregate or concrete into the street, gutter or a storm drain.

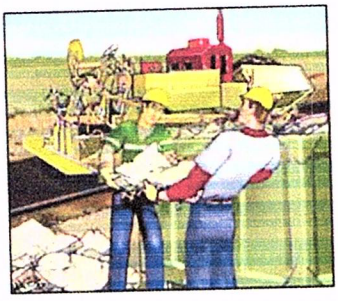


Maintaining Vehicles & Equipment

Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.

Asphalt & Concrete Removal

Barricade storm drain openings during saw-cutting, and recycle broken up pavement at a crushing company. For recycling information, call (909) 386-8401.



Cleaning & Preventing Spills

Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. Sweep up dry spills, instead of hosing. Prevent spills from paver machines by using drip pans, or by placing absorbent materials like cloths or rags under the machines when not in use. To report serious spills, call 911.



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