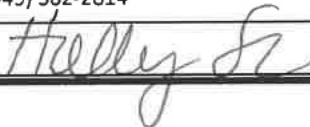


Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for Insert Owner/Developer Name by Insert Consulting/Engineering Firm Name. The WQMP is intended to comply with the requirements of the Insert Jurisdiction 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):	DRC 2018-00784 WQMP2019-00012 WDID 8 36C386035	Grading Permit Number(s):	PGR2019-00016
Tract/Parcel Map Number(s):	TRACT NO. 20241	Building Permit Number(s):	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: [REDACTED]
Owner's Signature			
Owner Name:	[REDACTED]		
Title	[REDACTED]		
Company	THE NEW HOME COMPANY		
Address	85 ENTERPRISE, SUITE 450, ALISO VIEJO, CA 92656		
Email	hslevcove@nwhm.com		
Telephone #	(949) 382-2814		
Signature			Date
			4/1/19

Preparer's Certification

Project Data			
Permit/Application Number(s):	DRC 2018-00784 WQMP2019-00012 WDID 8 36C386035	Grading Permit Number(s):	PGR2019-00016
Tract/Parcel Map Number(s):	TRACT NO. 20241	Building Permit Number(s):	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 0210-102-06-0000

“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: [REDACTED]	PE Stamp Below
Title [REDACTED]	[REDACTED]
Company [REDACTED]	
Address [REDACTED]	
Email [REDACTED]	
Telephone # [REDACTED]	
Signature [REDACTED]	
Date [REDACTED]	

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Appendix A - Final WQMP Site Map

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Appendix C - Soil and Infiltration Report

Appendix D - VORTSENTRY HS Clarifier by CONTECH

Appendix E - Maxwell IV Drywell System

Appendix F - Memorandum of Agreement

Appendix G - Education Materials

Appendix H - EPA Inventory of Class V Injection Wells

Appendix I - MS4 Groundwater Protection Compliance Summary

Appendix J - Conditions of Approval

Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name		NOVA AT THE RESORT			
Project Owner Contact Name:		[REDACTED]			
Mailing Address:	[REDACTED]	E-mail Address:	[REDACTED]	Telephone:	[REDACTED]
Permit/Application Number(s):	DRC 2018-00784 WQMP2019-00012 WDID 8 36C386035		Tract/Parcel Map Number(s):	TRACT NO. 20241	
Additional Information/ Comments:					
Description of Project:		<p>The site is located in the City of Rancho Cucamonga, San Bernardino County, California. The project site is located within the Empire Lakes Specific Plan. The Specific Plan was amended to remove the existing golf course and replace it with a mixed-use project.</p> <p>This project contains 5.12 acres of the golf courses original 160 acres. After removal all of the existing golf course improvements and mass grading the Resort, the proposed project will include 135 attached condominium units along with the adjacent access streets and infrastructure.</p> <p>The hydrology and storm water quality management for this site is included in the Tract 20073 & 20105 Mainline Storm Drainage Study prepared by Madole & Associates, Inc., dated October 12, 2017. This report includes the WQ/100yr mitigation for each drainage area for The Resort project and will include the installation of Type "A" and Type "B" configuration that includes dry wells and underground storage pipes.</p>			
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.		<p>The project site is within Subarea "H" of the Master Hydrology of 20.9 acres. The required water quality and 100-year Mitigation System for Subarea "H" includes two "Type A" and one "Type B". For this site, following this requirement by proration, the project will have one drywell and one storage pipe.</p> <p>Also See Appendix J for Conditions of Approval.</p>			

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):					
<input type="checkbox"/> Significant re-development involving the addition or replacement of 5,000 ft ² or more of impervious surface on an already developed site	<input checked="" type="checkbox"/> New development involving the creation of 10,000 ft ² or more of impervious surface collectively over entire site	<input type="checkbox"/> Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539	<input type="checkbox"/> Restaurants (with SIC code 5812) where the land area of development is 5,000 ft ² or more		
<input type="checkbox"/> Hillside developments of 5,000 ft ² or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	<input type="checkbox"/> Developments of 2,500 ft ² 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.	<input checked="" type="checkbox"/> Parking lots of 5,000 ft ² or more exposed to storm water	<input type="checkbox"/> Retail gasoline outlets that are either 5,000 ft ² or more, or have a projected average daily traffic of 100 or more vehicles per day		
<input type="checkbox"/> Non-Priority / Non-Category Project <i>May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements.</i>					
2 Project Area (ft ²):	228730	3 Number of Dwelling Units:	135	4 SIC Code:	N/A
5 Is Project going to be phased? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.</i>					
6 Does Project include roads? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)</i>					

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:

During construction, the owner/developer shall be responsible for installing, inspecting, and maintaining all onsite post-construction BMPs. The owner/developer shall also be responsible for the management of the project site plus implementation and maintenance of the BMPs required by this WQMP until such time as these responsibilities are turned over to and accepted for maintenance by the project's HOA. Post-construction, the HOA shall be responsible for long-term operation and maintenance, including funding of the project's post-construction BMPs.

The HOA shall be responsible for maintaining all common private areas within the site. The HOA shall retain all inspection and maintenance records for the project's BMPs for a period of 5 years as required by the by the adopted MS4 permit, after the recorded inspection date for the lifetime of the project and shall provide the records to the City of Rancho Cucamonga each January for the prior year.

All street improvements within the proposed Tract will be private and therefore maintained by the HOA. All proposed storm drain except for appurtenances connected to the proposed BMPs, will be maintained by the HOA.

The proposed catch basin, clarifier, underground retention and injection wells will be the maintenance responsibility of the HOA. There will be no public improvements will be transferred to the City of Rancho Cucamonga for Operation and Maintenance upon completion by the developer.

OWNER/DEVELOPER:

[REDACTED]

NOTE: A COPY OF A MAINTENANCE CONTRACT WITH A CERTIFIED MAINTENANCE COMPANY WILL NEED TO BE PROVIDED TO THE CITY OF RANCHO CUCAMONGA BUILDING AND SAFETY DEPARTMENT.

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 <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff pollutant from pavement and landscape areas.
Nutrients - Phosphorous	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff pollutants from landscape areas.
Nutrients - Nitrogen	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff pollutant from landscape areas.
Noxious Aquatic Plants	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Expected in attached residential development
Sediment	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff from pavement and landscape areas
Metals	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Not expected in attached residential development
Oil and Grease	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff from pavement areas.
Trash/Debris	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff from pavement and landscape areas.
Pesticides / Herbicides	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff from landscape areas.
Organic Compounds	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Common runoff from pavement areas.
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	

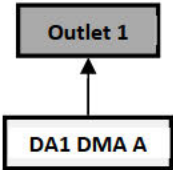
2.4 Water Quality Credits

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: <i>Select all that apply</i>			
<input type="checkbox"/> Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects <input type="checkbox"/> Vertical density [20%] <input type="checkbox"/> 7 units/ acre [5%] 135/5.18=26 UNITS/AC	<input type="checkbox"/> 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%]	<input type="checkbox"/> Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
<input type="checkbox"/> Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	<input type="checkbox"/> Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	<input type="checkbox"/> 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%]	<input type="checkbox"/> Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]
2 Total Credit % 20 <i>(Total all credit percentages up to a maximum allowable credit of 50 percent)</i>			
Description of Water Quality Credit Eligibility (if applicable)	135/5.18=26 UNITS/AC		

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 34.0791	Longitude -117.56496	Thomas Bros Map page 603 D4
¹ San Bernardino County climatic region: <input checked="" type="checkbox"/> Valley <input type="checkbox"/> Mountain			
² Does the site have more than one drainage area (DA): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>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</i>			
			
Example only – modify for project specific WQMP using additional form			
Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA		
DA1 DMA A to Outlet 1	Surface runoff will be collected by catch basin and routed to diversion structure. Low flow is diverted to clarifier to be pre-treated, and then directed to underground injection well with storage pipe for infiltration. High flow will bypass and continue flowing in the proposed storm drain pipe until joining the existing storm drain on The Resort Parkway.		

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A	DMA B	DMA C	DMA D
1 DMA drainage area (ft ²)	203,290			
2 Existing site impervious area (ft ²)	0			
3 Antecedent moisture condition <i>For desert areas, use</i> http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf	II			
4 Hydrologic soil group <i>Refer to Watershed Mapping Tool –</i> http://permitrack.sbcounty.gov/wap/	B			
5 Longest flowpath length (ft)	869			
6 Longest flowpath slope (ft/ft)	0.01			
7 Current land cover type(s) <i>Select from Fig C-3 of Hydrology Manual</i>	Graded			
8 Pre-developed pervious area condition: <i>Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating</i>	poor			

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 (use only as needed for additional DMA w/in DA 1)				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA E	DMA F	DMA G	DMA H
1 DMA drainage area (ft ²)	22,459			
2 Existing site impervious area (ft ²)	0			
3 Antecedent moisture condition <i>For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf</i>	II			
4 Hydrologic soil group <i>Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/</i>	B			
5 Longest flowpath length (ft)	973			
6 Longest flowpath slope (ft/ft)	0.011			
7 Current land cover type(s) <i>Select from Fig C-3 of Hydrology Manual</i>	Graded			
8 Pre-developed pervious area condition: <i>Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating</i>	poor			

Form 3-3 Watershed Description for Drainage Area	
Receiving waters <i>Refer to Watershed Mapping Tool -</i> http://permitrack.sbcounty.gov/wap/ See "Drainage Facilities" link at this website	Cucamonga Creek, Santa Ana River Reach 3, 2, 1, Newport Slough, Pacific Ocean
Applicable TMDLs <i>Refer to Local Implementation Plan</i>	Pathogens
303(d) listed impairments <i>Refer to Local Implementation Plan and Watershed Mapping Tool -</i> http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website - http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml	Nutrients, Pathogens, Metals
Environmentally Sensitive Areas (ESA) <i>Refer to Watershed Mapping Tool -</i> http://permitrack.sbcounty.gov/wap/	N/A
Unlined Downstream Water Bodies <i>Refer to Watershed Mapping Tool -</i> http://permitrack.sbcounty.gov/wap/	N/A
Hydrologic Conditions of Concern	<input type="checkbox"/> 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 <input checked="" type="checkbox"/> No
Watershed-based BMP included in a RWQCB approved WAP	<input type="checkbox"/> Yes Attach verification of regional BMP evaluation criteria in WAP <ul style="list-style-type: none"> • 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 <input checked="" type="checkbox"/> 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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Educational Materials will be available to homeowners thru HOA. HOA will periodically provide tenants with environmental awareness education materials which may include use of household chemicals, discharges of wastes via hosing or other direct discharge to gutters, catch basins and storm drains. See attached Education Materials in section 6.4 of the WQMP report.
N2	Activity Restrictions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	HOA and Homeowners will implement restrictions enacted thru the formation of conditions, covenants and restrictions (CCRs) to protect surface water runoff. Some of the activity restrictions that would help promote water quality protection for residential areas are: 1. Requirement to keep trash receptacles covered at all times 2. Prohibiting discharges of paint and masonry wastes to streets or storm drains 3. Prohibit connections of pool/spa draining to streets or storm drains 4. Prohibiting blowing or sweeping of debris into streets or storm drains. 5. Keep trash containers lids closed at all times
N3	Landscape Management BMPs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standard landscaping maintenance activities, including trash removal, proper replacement of landscaping as needed and regular trimming. See attached CASQA SD- 12 in section 6.4 of the WQMP Report. Proper irrigation practices should also be observed to prevent over-spraying. Proper sprinkler maintenance should be incorporated into landscape management. Landscape management shall commence immediately upon installation of landscaping and should be maintained twice a month. The HOA and homeowners will be responsible for landscape maintenance within exclusive use areas. All irrigation systems shall be AB 1881 Compliant.
N4	BMP Maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Maintenance of BMPs implemented at the project shall be performed at the frequency prescribed in this WQMP. Records of inspections and maintenance shall be maintained by the HOA and documented with the O & M of the WQMP. Records shall be available for review upon request.
N5	Title 22 CCR Compliance (How development will comply)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No significant hazardous wastes will be generated and/or stored for the residential areas. Typical household hazardous products shall be disposed of properly. Motor oils and oil filters from household shall be recycled in a recycling centers or motor oil collection centers. Other household hazardous wastes such as unused, unwanted or expired medications, fertilizers, bug sprays, paint or

Water Quality Management Plan (WQMP)

Form 4.1-1 Non-Structural Source Control BMPs				
				other paint materials, batteries, household cleaners etc., are to be disposed of in hazardous waste collection centers.
N6	Local Water Quality Ordinances	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Comply with Local Water Quality Ordinances & AB 1881
N7	Spill Contingency Plan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
N8	Underground Storage Tank Compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
N9	Hazardous Materials Disclosure Compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A

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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The developer will ensure all structures comply with Article 80 of the Uniform Fire Code, City codes, San Bernardino County Fire Department, and local standards.
N11	Litter/Debris Control Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Litter collection and removal shall be conducted on a bi-weekly basis by the HOA
N12	Employee Training	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All employees and any contractors will require training to ensure awareness of maintenance activities that may result in pollutants reaching the storm drain.
N13	Housekeeping of Loading Docks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No loading docks are present in this project.
N14	Catch Basin Inspection Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Per the O & M Manual, the HOA will maintain and inspect proposed catch basins on private streets. Cleaning shall be done in late summer/early fall prior to the start of the rainy season. Inspection shall also include storm drain pipes, inlets, and other storm drain appurtenances. A record of all employees or facility maintenance by HOA shall be logged and kept to closely monitor the inspection of catch basin and other drainage facilities connected to it to all proposed BMPs.
N15	Vacuum Sweeping of Private Streets and Parking Lots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The owner shall have vacuum sweeping of private streets and parking lots on a weekly basis or whenever necessary.
N16	Other Non-structural Measures for Public Agency Projects	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
N17	Comply with all other applicable NPDES permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The developer shall complete and file a SWPPP to the State Regional Board and forward a copy of NOI to the city.

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)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Storm drain system stencilling and signage will be applied/installed where necessary.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No outdoor material storage area in this project.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Trash storage areas will be designed and constructed to reduce pollution introduction per BMP handbook.
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)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	HOA and homeowner may employ any of the following: 1. Install rain shutoff devices to prevent irrigation after precipitation 2. Maintain and fix broken sprinklers or lines. 3. Implement landscape plan consistent with County Water Conservation Resolution or City Equivalent. 4. Group plants with similar water requirements. 5. Choose drought tolerant plants. 6. Design irrigation systems to each landscape area's specific water requirements. 7. Be AB 1881 compliant.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A note is included in the grading plan.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	HOA and Homeowners will protect sloping landscaped areas by maintaining landscape cover.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include dock areas.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include maintenance bays.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include vehicle wash areas.

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S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None is proposed in this project.
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)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include equipment wash areas.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include fueling areas.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include hillside landscaping.
S14	Wash water control for food preparation areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include food preparation areas.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project doesn't include community car wash racks.

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
<p>Site Design Practices <i>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</i></p>
<p>Minimize impervious areas: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: The project site proposes to construct high density residential thus minimizing impervious areas by increasing the floor to height ratio.</p>
<p>Maximize natural infiltration capacity: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: The project site proposes to use infiltration drywell BMPs thus promoting natural infiltration.</p>
<p>Preserve existing drainage patterns and time of concentration: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Proposed development will match the existing drainage pattern.</p>
<p>Disconnect impervious areas: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Parkway landscape are built throughout the site to reduce continuous impervious area.</p>
<p>Protect existing vegetation and sensitive areas: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: There is no vegetation or sensitive area in this site.</p>
<p>Re-vegetate disturbed areas: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Landscaped areas are proposed in th is project.</p>
<p>Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Underground infiltration area will have minimal required compaction.</p>
<p>Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: Site density and proximity to structures does not allow for drainage swales.</p>
<p>Stake off areas that will be used for landscaping to minimize compaction during construction : Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation Not applicable. Site has been compacted prior to the removal of the existing golf course.</p>

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 P₆ 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 mi²), 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 (DA 1)		
1 Project area DA 1 (ft ²): 228,730	2 Imperviousness after applying preventative site design practices (Imp%): 69.2	3 Runoff Coefficient (Rc): <u>0.486</u> $R_c = 0.858(Imp\%)^{0.3} - 0.78(Imp\%)^{0.2} + 0.774(Imp\%) + 0.04$
4 Determine 1-hour rainfall depth for a 2-year return period P _{2yr-1hr} (in): 0.58 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P ₆ , Mean 6-hr Precipitation (inches): 0.838 <i>P₆ = Item 4 * C₁, where C₁ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)</i>		
6 Drawdown Rate <i>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.</i>		24-hrs <input type="checkbox"/> 48-hrs <input checked="" type="checkbox"/>
7 Compute design capture volume, DCV (ft ³): 15,254 $DCV = 1/12 * [Item 1 * Item 3 * Item 5 * C_2]$, where C ₂ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963) <i>Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2</i>		

Form 4.2-2 Summary of HCOC Assessment (DA 1)

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

Go to: <http://permitrack.sbcounty.gov/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 _____ <i>Form 4.2-3 Item 12</i>	2 _____ <i>Form 4.2-4 Item 13</i>	3 _____ <i>Form 4.2-5 Item 10</i>
Post-developed	4 _____ <i>Form 4.2-3 Item 13</i>	5 _____ <i>Form 4.2-4 Item 14</i>	6 _____ <i>Form 4.2-5 Item 14</i>
Difference	7 _____ <i>Item 4 - Item 1</i>	8 _____ <i>Item 2 - Item 5</i>	9 _____ <i>Item 6 - Item 3</i>
Difference (as % of pre-developed)	10 _____% <i>Item 7 / Item 1</i>	11 _____% <i>Item 8 / Item 2</i>	12 _____% <i>Item 9 / Item 3</i>

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

Form 4.2-3 HCOC Assessment for Runoff Volume (DA 1)								
Weighted Curve Number Determination for: <u>Pre-developed DA</u>	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 <i>sum of areas of DMA should equal area of DA</i>	_____	_____	_____	_____	_____	_____	_____	_____
4a Curve Number (CN) <i>use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP</i>	_____	_____	_____	_____	_____	_____	_____	_____
Weighted Curve Number Determination for: <u>Post-developed DA</u>	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 <i>sum of areas of DMA should equal area of DA</i>	_____	_____	_____	_____	_____	_____	_____	_____
4b Curve Number (CN) <i>use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP</i>	_____	_____	_____	_____	_____	_____	_____	_____
5 Pre-Developed area-weighted CN: _____	7 Pre-developed soil storage capacity, S (in): _____ <i>S = (1000 / Item 5) - 10</i>				9 Initial abstraction, I _a (in): _____ <i>I_a = 0.2 * Item 7</i>			
6 Post-Developed area-weighted CN: _____	8 Post-developed soil storage capacity, S (in): _____ <i>S = (1000 / Item 6) - 10</i>				10 Initial abstraction, I _a (in): _____ <i>I_a = 0.2 * Item 8</i>			
11 Precipitation for 2 yr, 24 hr storm (in): _____ <i>Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html</i>								
12 Pre-developed Volume (ft ³): _____ <i>V_{pre} = (1 / 12) * (Item sum of Item 3) * [(Item 11 - Item 9)² / ((Item 11 - Item 9 + Item 7))</i>								
13 Post-developed Volume (ft ³): _____ <i>V_{pre} = (1 / 12) * (Item sum of Item 3) * [(Item 11 - Item 10)² / ((Item 11 - Item 10 + Item 8))</i>								
14 Volume Reduction needed to meet HCOC Requirement, (ft ³): _____ <i>V_{HCOC} = (Item 13 * 0.95) - Item 12</i>								

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

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 $I_{peak} = 10A(\text{LOG Form 4.2-1 Item 4} - 0.6 \text{ LOG Form 4.2-4 Item 5}/60)$	_____	_____	_____	_____	_____	_____
2 Drainage Area of each DMA (Acres) <i>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)</i>	_____	_____	_____	_____	_____	_____
3 Ratio of pervious area to total area <i>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)</i>	_____	_____	_____	_____	_____	_____
4 Pervious area infiltration rate (in/hr) <i>Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP</i>	_____	_____	_____	_____	_____	_____
5 Maximum loss rate (in/hr) $F_{w} = \text{Item 3} * \text{Item 4}$ <i>Use area weighted F_{w} 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)</i>	_____	_____	_____	_____	_____	_____
6 Peak Flow from DMA (cfs) $Q_p = \text{Item 2} * 0.9 * (\text{Item 1} - \text{Item 5})$	_____	_____	_____	_____	_____	_____
7 Time of concentration adjustment factor for other DMA to site discharge point <i>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)</i>	DMA A	n/a	_____	_____	n/a	_____
	DMA B	_____	n/a	_____	_____	n/a
	DMA C	_____	_____	n/a	_____	_____
8 Pre-developed Q_p at T_c for DMA A: _____ $Q_p = \text{Item } 6_{DMAA} + [\text{Item } 6_{DMAB} * (\text{Item } 1_{DMAA} - \text{Item } 5_{DMAB}) / (\text{Item } 1_{DMAB} - \text{Item } 5_{DMAB}) * \text{Item } 7_{DMAA/2}] + [\text{Item } 6_{DMAC} * (\text{Item } 1_{DMAA} - \text{Item } 5_{DMAC}) / (\text{Item } 1_{DMAC} - \text{Item } 5_{DMAC}) * \text{Item } 7_{DMAA/3}]$	9 Pre-developed Q_p at T_c for DMA B: _____ $Q_p = \text{Item } 6_{DMAB} + [\text{Item } 6_{DMAA} * (\text{Item } 1_{DMAB} - \text{Item } 5_{DMAA}) / (\text{Item } 1_{DMAA} - \text{Item } 5_{DMAA}) * \text{Item } 7_{DMAB/1}] + [\text{Item } 6_{DMAC} * (\text{Item } 1_{DMAB} - \text{Item } 5_{DMAC}) / (\text{Item } 1_{DMAC} - \text{Item } 5_{DMAC}) * \text{Item } 7_{DMAB/3}]$		10 Pre-developed Q_p at T_c for DMA C: _____ $Q_p = \text{Item } 6_{DMAC} + [\text{Item } 6_{DMAA} * (\text{Item } 1_{DMAC} - \text{Item } 5_{DMAA}) / (\text{Item } 1_{DMAA} - \text{Item } 5_{DMAA}) * \text{Item } 7_{DMAC/1}] + [\text{Item } 6_{DMAB} * (\text{Item } 1_{DMAC} - \text{Item } 5_{DMAB}) / (\text{Item } 1_{DMAB} - \text{Item } 5_{DMAB}) * \text{Item } 7_{DMAC/2}]$			
10 Peak runoff from pre-developed condition confluence analysis (cfs): _____ <i>Maximum of Item 8, 9, and 10 (including additional forms as needed)</i>						
11 Post-developed Q_p at T_c for DMA A: _____ <i>Same as Item 8 for post-developed values</i>	12 Post-developed Q_p at T_c for DMA B: _____ <i>Same as Item 9 for post-developed values</i>		13 Post-developed Q_p at T_c for DMA C: _____ <i>Same as Item 10 for post-developed values</i>			
14 Peak runoff from post-developed condition confluence analysis (cfs): _____ <i>Maximum of Item 11, 12, and 13 (including additional forms as needed)</i>						
15 Peak runoff reduction needed to meet HCOC Requirement (cfs): _____ $Q_{p-HCOC} = (\text{Item } 14 * 0.95) - \text{Item } 10$						

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: (attach)

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: (attach)

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 <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, complete Items 2-5; If no, proceed to Item 6</i>	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>
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) $V = \text{Item 2} * \text{Item 3} * (0.5/12)$, assuming retention of 0.5 inches of runoff	—	—	—
5 Sum of retention volume achieved from impervious area dispersion (ft ³): 0 $V_{\text{retention}} = \text{Sum of Item 4 for all BMPs}$			
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14</i>	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>
7 Pending surface area (ft ²)	—	—	—
8 Pending 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) $V = \text{---} - (\text{Item 7} * \text{Item 8}) + (\text{Item 9} * \text{Item 10} * \text{Item 11})$	—	—	—
13 Runoff volume retention from on-lot infiltration (ft ³): 0 $V_{\text{retention}} = \text{Sum of Item 12 for all BMPs}$			

Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 1)			
14 Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, complete Items 15-20. If no, proceed to Item 21</i>	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>
15 Rooftop area planned for ET BMP (ft²)	—	—	—
16 Average wet season ET demand (in/day) <i>Use local values, typical ~ 0.1</i>	—	—	—
17 Daily ET demand (ft³/day) <i>Item 15 * (Item 16 / 12)</i>	—	—	—
18 Drawdown time (hrs) <i>Copy Item 6 in Form 4.2-1</i>	—	—	—
19 Retention Volume (ft³) <i>V_{retention} = Item 17 * (Item 18 / 24)</i>	—	—	—
20 Runoff volume retention from evapotranspiration BMPs (ft ³): 0 <i>V_{retention} = Sum of Item 19 for all BMPs</i>			
21 Implementation of Street Trees: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete Items 22-25. If no, proceed to Item 26</i>	DA 1 DMA 1 BMP Type	DA DMA BMP Type	DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>
22 Number of Street Trees	138		
23 Average canopy cover over impervious area (ft ²)	250		
24 Runoff volume retention from street trees (ft ³) <i>V_{retention} = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches</i>	143		
25 Runoff volume retention from street tree BMPs (ft ³): 143 <i>V_{retention} = Sum of Item 24 for all BMPs</i>			
26 Implementation of residential rain barrel/cisterns: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, complete Items 27-29; If no, proceed to Item 30</i>	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>
27 Number of rain barrels/cisterns	—	—	—
28 Runoff volume retention from rain barrels/cisterns (ft³) <i>V_{retention} = Item 27 * 3</i>	—	—	—
29 Runoff volume retention from residential rain barrels/Cisterns (ft ³): 0 <i>V_{retention} = Sum of Item 28 for all BMPs</i>			
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs: 143 <i>Sum of Items 5, 13, 20, 25 and 29</i>			

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): 15,111 $V_{unmet} = \text{Form 4.2-1 Item 7} - \text{Form 4.3-2 Item 30}$			
BMP Type <i>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</i>	DA 1 BMP Type drywell	DMA 1 BMP Type	DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>
2 Infiltration rate of underlying soils (in/hr) <i>See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods</i>	28		
3 Infiltration safety factor <i>See TGD Section 5.4.2 and Appendix D</i>	1		
4 Design percolation rate (in/hr) $P_{design} = \text{Item 2} / \text{Item 3}$	28		
5 Ponded water drawdown time (hr) <i>Copy Item 6 in Form 4.2-1</i>	48		
6 Maximum ponding depth (ft) <i>BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details</i>	1.5		
7 Ponding Depth (ft) $d_{BMP} = \text{Minimum of } (1/12 * \text{Item 4} * \text{Item 5}) \text{ or Item 6}$	1.5		
8 Infiltrating surface area, SA_{BMP} (ft ²) <i>the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP</i>	3,668		
9 Amended soil depth, d_{media} (ft) <i>Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details</i>	N/A		
10 Amended soil porosity	N/A		
11 Gravel depth, d_{media} (ft) <i>Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details</i>	N/A		
12 Gravel porosity	N/A		
13 Duration of storm as basin is filling (hrs) <i>Typical ~ 3hrs</i>	3		
14 Above Ground Retention Volume (ft ³) $V_{retention} = \text{Item 8} * [\text{Item 7} + (\text{Item 9} * \text{Item 10}) + (\text{Item 11} * \text{Item 12}) + (\text{Item 13} * (\text{Item 4} / 12))]$	N/A		
15 Underground Retention Volume (ft ³) <i>Volume determined using manufacturer's specifications and calculations</i>	15,111		
16 Total Retention Volume from LID Infiltration BMPs: 15,111 <i>(Sum of Items 14 and 15 for all infiltration BMP included in plan)</i>			
17 Fraction of DCV achieved with infiltration BMP: 100% $\text{Retention\%} = \text{Item 16} / \text{Form 4.2-1 Item 7}$			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>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.</i>			

Worksheet H: Factor of Safety and Design Infiltration Rate and Worksheet

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25		
		Predominant soil texture	0.25		
		Site soil variability	0.25		
		Depth to groundwater / impervious layer	0.25		
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Tributary area size	0.25		
		Level of pretreatment/ expected sediment loads	0.25		
		Redundancy	0.25		
		Compaction during construction	0.25		
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{TOT} = S_A \times S_B$					
Measured Infiltration Rate, inch/hr, K_M (corrected for test-specific bias)					
Design Infiltration Rate, in/hr, $K_{DESIGN} = S_{TOT} \times K_M$					
Supporting Data					
Briefly describe infiltration test and provide reference to test forms:					

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

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): 0 <i>V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 - Form 4.3-3 Item 16</i>			
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 _____ <i>(Use additional forms for more BMPs)</i>
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) <i>Item 4 * (Item 5 / 12)</i>	_____	_____	_____
7 Drawdown time (hrs) <i>Copy Item 6 from Form 4.2-1</i>	_____	_____	_____
8 Retention Volume (ft ³) <i>V_{retention} = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))</i>	_____	_____	_____
9 Total Retention Volume (ft ³) from Harvest and Use BMP 0 <i>Sum of Item 8 for all harvest and use BMP included in plan</i>			
10 Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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)		
<p>1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft³): 0 Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9</p>	<p>List pollutants of concern <i>Copy from Form 2.3-1.</i> Pathogen, Phosphorous, Nitrogen, Sediment, Oil and Grease, Trash and Debris, Pesticides, PH</p>	
<p>2 Biotreatment BMP Selected <i>(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)</i></p>	<p style="text-align: center;">Volume-based biotreatment <i>Use Forms 4.3-6 and 4.3-7 to compute treated volume</i></p> <p><input type="checkbox"/> Bioretention with underdrain <input type="checkbox"/> Planter box with underdrain <input type="checkbox"/> Constructed wetlands <input type="checkbox"/> Wet extended detention <input type="checkbox"/> Dry extended detention</p>	<p style="text-align: center;">Flow-based biotreatment <i>Use Form 4.3-8 to compute treated volume</i></p> <p><input type="checkbox"/> Vegetated swale <input type="checkbox"/> Vegetated filter strip <input type="checkbox"/> Proprietary biotreatment</p>
<p>3 Volume biotreated in volume based biotreatment BMP (ft³): 0 Form 4.3-6 Item 15 + Form 4.3-7 Item 13</p>	<p>4 Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft³): 0 Item 1 – Item 3</p>	<p>5 Remaining fraction of LID DCV for sizing flow based biotreatment BMP: 0% Item 4 / Item 1</p>
<p>6 Flow-based biotreatment BMP capacity provided (cfs): <i>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)</i></p>		
<p>7 Metrics for MEP determination:</p> <ul style="list-style-type: none"> • 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: <input checked="" type="checkbox"/> <i>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.</i> 		

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

Biotreatment BMP Type <i>(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)</i>	DA _____ DMA _____ BMP Type _____	DA _____ DMA _____ BMP Type _____	DA _____ DMA _____ BMP Type _____ <i>(Use additional forms for more BMPs)</i>
1- Pollutants addressed with BMP <i>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</i>	_____	_____	_____
2- Amended soil infiltration rate <i>Typical ~ 5.0</i>	_____	_____	_____
3- Amended soil infiltration safety factor <i>Typical ~ 2.0</i>	_____	_____	_____
4- Amended soil design percolation rate (in/hr) $P_{design} = \text{Item 2} / \text{Item 3}$	_____	_____	_____
5- Ponded water drawdown time (hr) <i>Copy Item 5 from Form 4.2-1</i>	_____	_____	_____
6- Maximum ponding depth (ft) <i>see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
7- Ponding Depth (ft) $d_{sur} = \text{Minimum of } (1/12 * \text{Item 4} * \text{Item 5}) \text{ or Item 6}$	_____	_____	_____
8- Amended soil surface area (ft ²)	_____	_____	_____
9- Amended soil depth (ft) <i>see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
10- Amended soil porosity, n	_____	_____	_____
11- Gravel depth (ft) <i>see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
12- Gravel porosity, n	_____	_____	_____
13- Duration of storm as basin is filling (hrs) <i>Typical ~ 3hrs</i>	_____	_____	_____
14- Biotreated Volume (ft ³) $V_{biotreated} = \text{Item 8} * \{(\text{Item 7}/2) + (\text{Item 9} * \text{Item 10}) + (\text{Item 11} * \text{Item 12}) + (\text{Item 13} * (\text{Item 4} / 12))\}$	_____	_____	_____
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 0 <i>Sum of Item 14 for all volume-based BMPs included in this form</i>			

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

Biotreatment BMP Type <i>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.</i>	DA _____ DMA _____ BMP Type _____		DA _____ DMA _____ BMP Type _____ <i>(Use additional forms for more BMPs)</i>	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin <i>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</i>	_____	_____	_____	_____
2 Bottom width (ft)	_____	_____	_____	_____
3 Bottom length (ft)	_____	_____	_____	_____
4 Bottom area (ft ²) <i>A_{bottom} = Item 2 * Item 3</i>	_____	_____	_____	_____
5 Side slope (ft/ft)	_____	_____	_____	_____
6 Depth of storage (ft)	_____	_____	_____	_____
7 Water surface area (ft ²) <i>A_{surface} = (Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))</i>	_____	_____	_____	_____
8 Storage volume (ft ³) <i>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</i> <i>V = Item 6 / 3 * (Item 4 + Item 7 + (Item 4 * Item 7) / 0.5)</i>	_____	_____	_____	_____
9 Drawdown Time (hrs) <i>Copy Item 6 from Form 2.1</i>	_____	_____	_____	_____
10 Outflow rate (cfs) <i>Q_{outlet} = (Item 8_{forebay} + Item 8_{basin}) / (Item 9 * 3600)</i>	_____	_____	_____	_____
11 Duration of design storm event (hrs)	_____	_____	_____	_____
12 Biotreated Volume (ft ³) <i>V_{bio} = (Item 8_{forebay} + Item 8_{basin}) * (Item 10 * Item 11 * 3600)</i>	_____	_____	_____	_____
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : 0 <i>(Sum of Item 12 for all BMP included in plan)</i>				

Form 4.3-8 Flow Based Biotreatment (DA 1)			
Biotreatment BMP Type <i>Vegetated swale, vegetated filter strip, or other comparable proprietary BMP</i>	DA _____ DMA _____ BMP Type _____	DA _____ DMA _____ BMP Type _____	DA _____ DMA _____ BMP Type _____ <i>(Use additional forms for more BMPs)</i>
1- Pollutants addressed with BMP <i>List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5</i>	_____	_____	_____
2- Flow depth for water quality treatment (ft) <i>BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
3- Bed slope (ft/ft) <i>BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
4- Manning's roughness coefficient	_____	_____	_____
5- Bottom width (ft) $b = (\text{Form 4.3-5 Item 6} * \text{Item 4}) / (1.49 * \text{Item 2}^{41/62} * \text{Item 3}^{20/62})$	_____	_____	_____
6- Side Slope (ft/ft) <i>BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
7- Cross-sectional area (ft ²) $A = (\text{Item 5} * \text{Item 2}) + (\text{Item 6} * \text{Item 2}^{2/3})$	_____	_____	_____
8- Water quality flow velocity (ft/sec) $V = \text{Form 4.3-5 Item 6} / \text{Item 7}$	_____	_____	_____
9- Hydraulic residence time (min) <i>Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details</i>	_____	_____	_____
10- Length of flow based BMP (ft) $L = \text{Item 8} * \text{Item 9} * 60$	_____	_____	_____
11- Water surface area at water quality flow depth (ft ²) $SA = (\text{Item 5} + (2 * \text{Item 2} * \text{Item 6})) * \text{Item 10}$	_____	_____	_____

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 1)	
1	Total LID DCV for the Project DA-1 (ft ³): 15254 <i>Copy Item 7 in Form 4.2-1</i>
2	On-site retention with site design hydrologic source control LID BMP (ft ³): 143 <i>Copy Item 30 in Form 4.3-2</i>
3	On-site retention with LID infiltration BMP (ft ³): 15316 <i>Copy Item 16 in Form 4.3-3</i>
4	On-site retention with LID harvest and use BMP (ft ³): 0 <i>Copy Item 9 in Form 4.3-4</i>
5	On-site biotreatment with volume based biotreatment BMP (ft ³): 0 <i>Copy Item 3 in Form 4.3-5</i>
6	Flow capacity provided by flow based biotreatment BMP (cfs): 0 <i>Copy Item 6 in Form 4.3-5</i>
7	<p>LID BMP performance criteria are achieved if answer to any of the following is "Yes":</p> <ul style="list-style-type: none"> • Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>If yes, sum of Items 2, 3, and 4 is greater than Item 1</i> • 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 <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>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</i> ▪ 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 <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, Form 4.3-1 Items 7 and 8 were both checked yes</i>
8	<p>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:</p> <ul style="list-style-type: none"> • Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: <input type="checkbox"/> <i>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, $V_{alt} = (Item\ 1 - Item\ 2 - Item\ 3 - Item\ 4 - Item\ 5) * (100 - Form\ 2.4-1\ Item\ 2)\%$</i> • 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: <input type="checkbox"/> <i>Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed</i>

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)	
<p>1 Volume reduction needed for HCOC performance criteria (ft³): N/A (Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1</p>	<p>2 On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft³): N/A <i>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</i></p>
<p>3 Remaining volume for HCOC volume capture (ft³): N/A <i>Item 1 – Item 2</i></p>	<p>4 Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft³): N/A <i>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)</i></p>
<p>5 If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification <input type="checkbox"/> <i>Attach in-stream control BMP selection and evaluation to this WQMP</i></p>	
<p>6 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:</i></p> <ul style="list-style-type: none"> • Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP <input type="checkbox"/> <i>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)</i> • 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 <input type="checkbox"/> • 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 <input type="checkbox"/> 	
<p>7 Form 4.2-2 Item 12 less than or equal to 5%: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:</i></p> <ul style="list-style-type: none"> • Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs <input type="checkbox"/> <i>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)</i> • 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 <input type="checkbox"/> 	

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	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
N1 Education	HOA	Provide educational materials to homeowners and renters regarding their actions on storm water runoff and the quality of receiving waters.	Upon turn over to homeowners or lease agreement and June of each year
N2 Activity Restrictions	HOA	Vehicle washing, maintenance and storage of materials shall be prohibited	Daily
N11 Litter/Debris Program	HOA	Common areas shall be kept cleared of all litter and debris	Weekly
N12 Employee or HOA contractor Training/Education	HOA	Provide training regarding the impacts of improper disposal of hazardous and waste materials, improper watering, fertilizers, pesticides, and maintenance activities on water quality through the San Bernardino County Website.	Upon initial hiring and every June thereafter
N15 Street Sweeping	HOA	Sweep/vacuum all private streets	Weekly
S1 Storm drain Stenciling	Developer then HOA	Developer will provide initial stenciling and then City of Rancho Cucamonga will re-stencil as necessary to maintain legibility. Per CASQA Fact Sheet SD-13	As needed, or June of each odd year
S4 Landscape Planning and Site Design & Efficient	HOA/Homeowners (private) and LMD	Inspect all Common landscape areas and replace dead vegetation and remove trash. Properly manage pesticides and fertilizers per City Ordinances. Replace mulch as necessary. Inspect, adjust, and repair irrigation system. Planting will	Weekly

Water Quality Management Plan (WQMP)

Irrigation		comply with City Landscape Ordinance. Verify that runoff minimizing landscape design continues to function by checking that water sensors are functioning properly, that irrigation heads are adjusted properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather and day or night time temperatures.	
Maxwell Injection Wells	HOA	Inspect and remove litter and debris. Remove any trash causing any obstructions at the inlet, outlet, and orifice. Clean and inspect for accumulated sediment or trash that may cause clogging Per CASQA Fact Sheet TC-11	Inspect twice per year (beginning and end of rainy season, October and May) and after heavy
Contech Vortsentry HS or approved equal)	HOA	Remove debris and clean device, remove any sediments, or oil and greases accumulate hereon. See attached manufacturer's maintenance requirements for additional information	monthly
Catch basin	HOA	1. The catch basin grate shall be removed and set to one side. The catch basin shall be visually inspected for defects and possible illegal dumping. If illegal dumping has occurred, the proper authorities and property owner representative shall be notified as soon as practicable. 2. Using an industrial vacuum, the collected materials shall be removed from the liner	At least April, July, and October of each year

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

APPENDIX A

Final WQMP Site Map

APPENDIX B

Master Hydrology WQ/100-year Mitigation References

APPENDIX C

Soil and Infiltration Report

APPENDIX A

Laboratory Compaction Characteristics Test Data

APPENDIX B

Corrosivity Tests Data

APPENDIX C

Compaction Test Summaries

APPENDIX D

VORTSENTRY HS Clarifier By CONTECH

APPENDIX E

Maxwell IV Drywell System

APPENDIX F

Memorandum of Agreement

C.E. THEEL

RECORDING REQUESTED BY
City of Rancho Cucamonga
AND WHEN RECORDED MAIL DOCUMENT TO:

NAME City of Rancho Cucamonga
Engineering Services Dept.
STREET ADDRESS 10500 Civic Center Drive
CITY, STATE & ZIP CODE Rancho Cucamonga, CA 91730

Recorded in Official Records, County of San Bernardino



BOB DUTTON
ASSESSOR – RECORDER – CLERK

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Titles	1	Pages	11
Fees		44.00	
Taxes		0.00	
CA SB2 Fee		0.00	
Others		0.00	
Paid		\$44.00	

SPACE ABOVE FOR RECORDER'S USE ONLY

MEMORANDUM OF AGREEMENT OF
STORM WATER QUALITY MANAGEMENT PLAN

**EXHIBIT A
TO MASTER SUPPLEMENTAL DECLARATION
LIST OF BMP MAINTENANCE ITEMS**

EXHIBIT B
TO MASTER SUPPLEMENTAL DECLARATION
BMP SITE MAP

APPENDIX G

Education Materials

APPENDIX H

EPA Inventory of Class V Injection Wells

APPENDIX I

MS4 Groundwater Protection Compliance Summary

APPENDIX J

Conditions of Approval