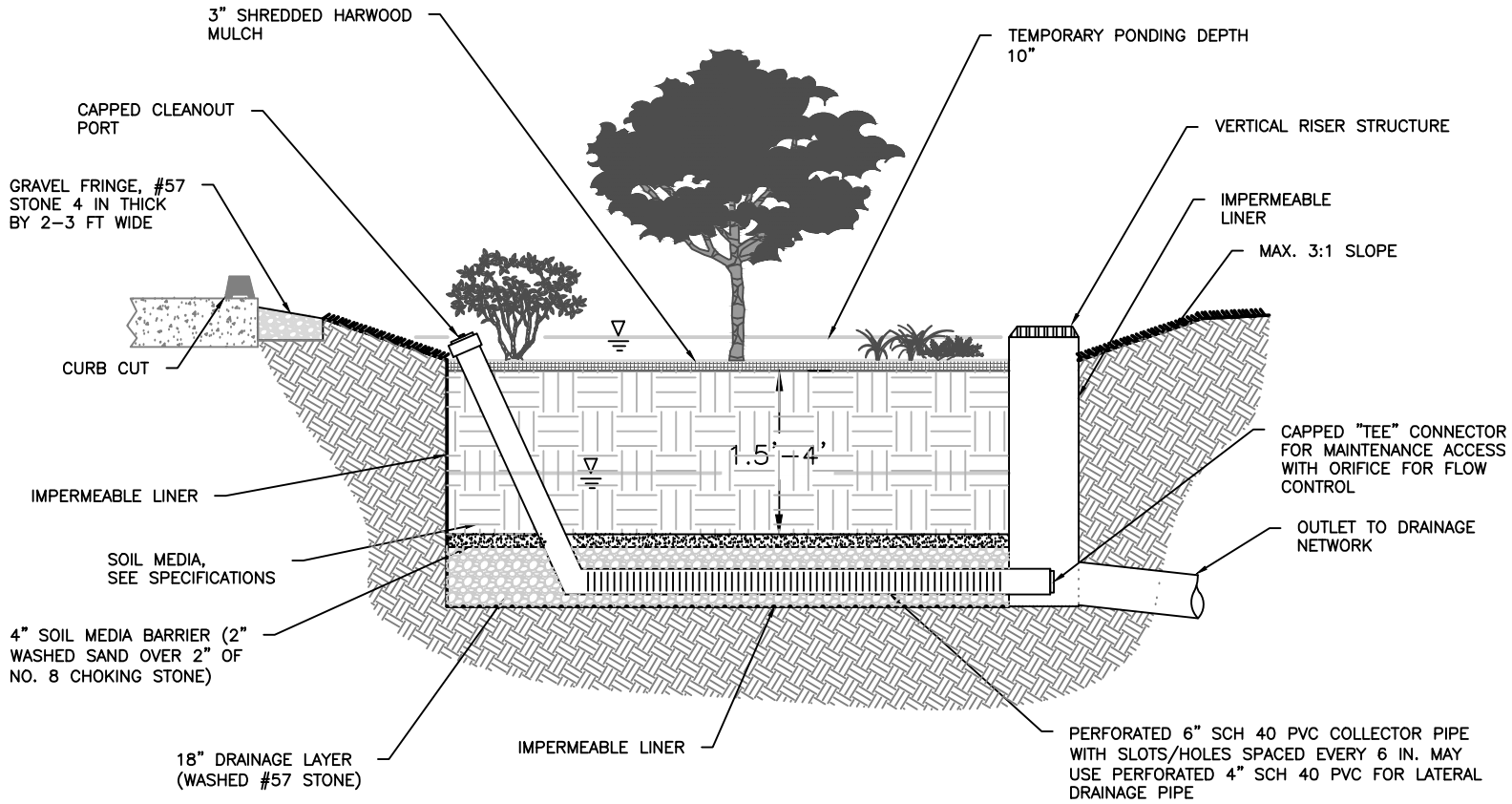
Appendix 4

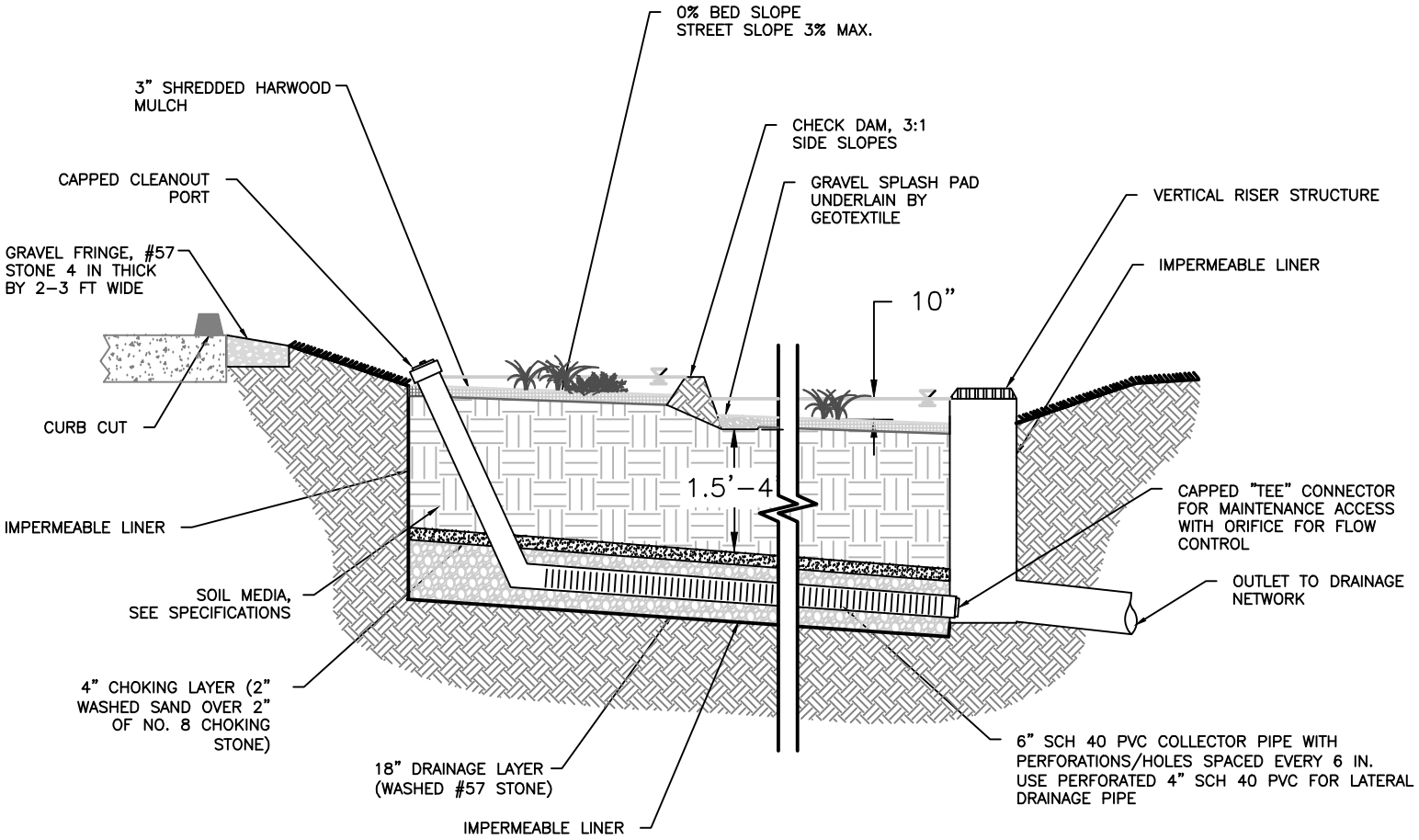
IMP Details and Specifications



FUSCOE ENGINEERING
full circle thinking

NEWLAND SIERRA
FLOW-THROUGH PLANTER BASIN

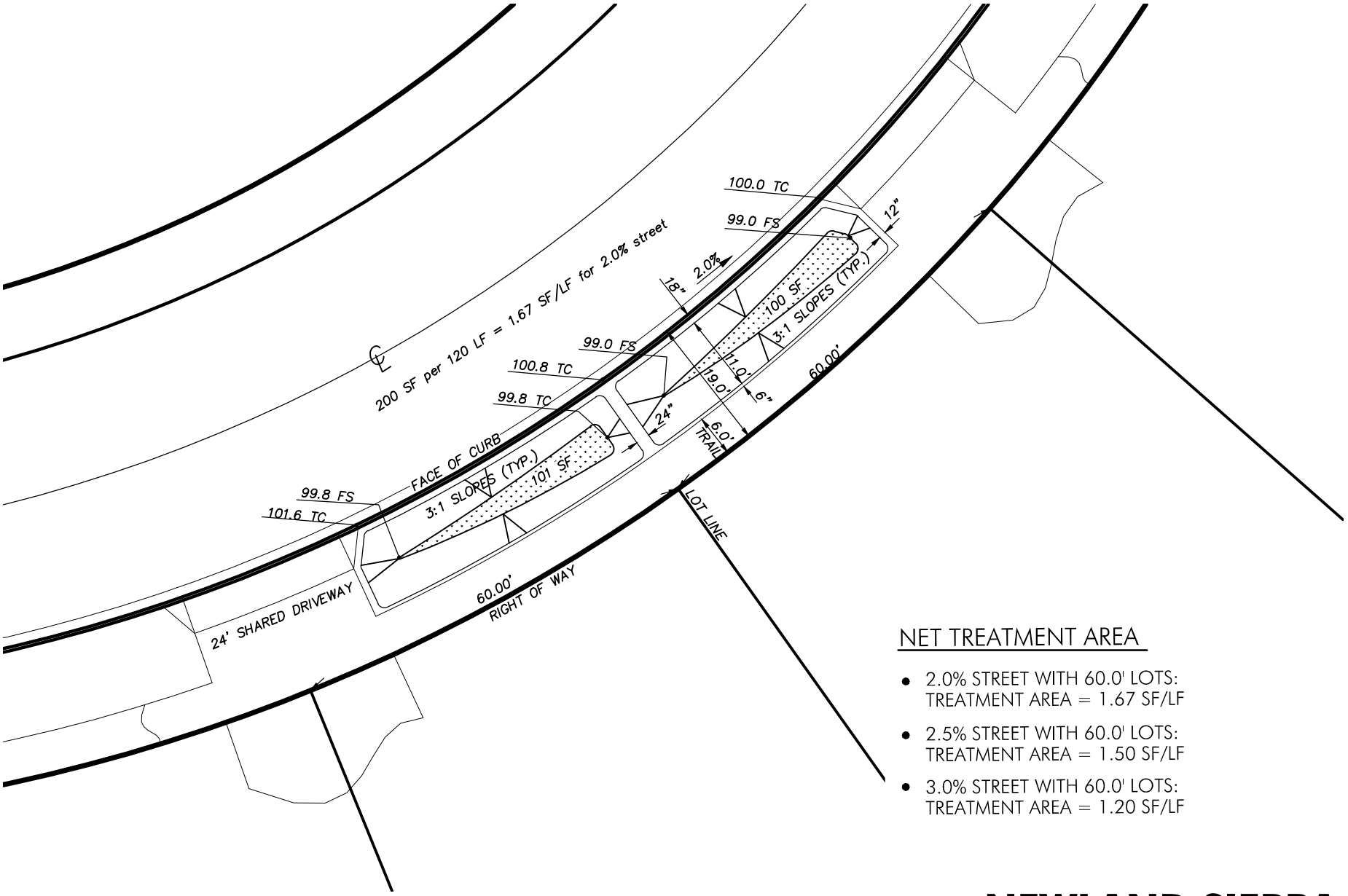
NOT TO SCALE



FUSCOE ENGINEERING
full circle thinking

NEWLAND SIERRA
ROADSIDE FLOW-THROUGH PLANTER

NOT TO SCALE



NET TREATMENT AREA

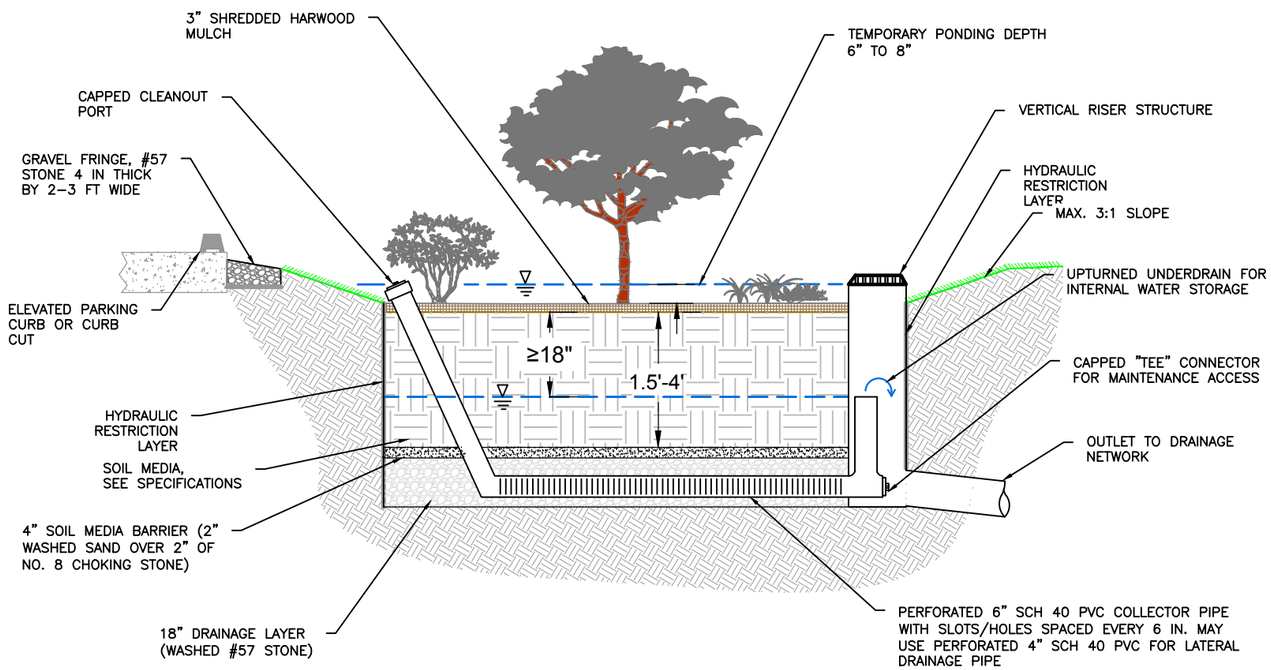
- 2.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.67 SF/LF
- 2.5% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.50 SF/LF
- 3.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.20 SF/LF

FUSCOE ENGINEERING
full circle thinking

NEWLAND SIERRA
ROADSIDE FLOW-THROUGH PLANTER
TREATMENT AREA CALCULATION

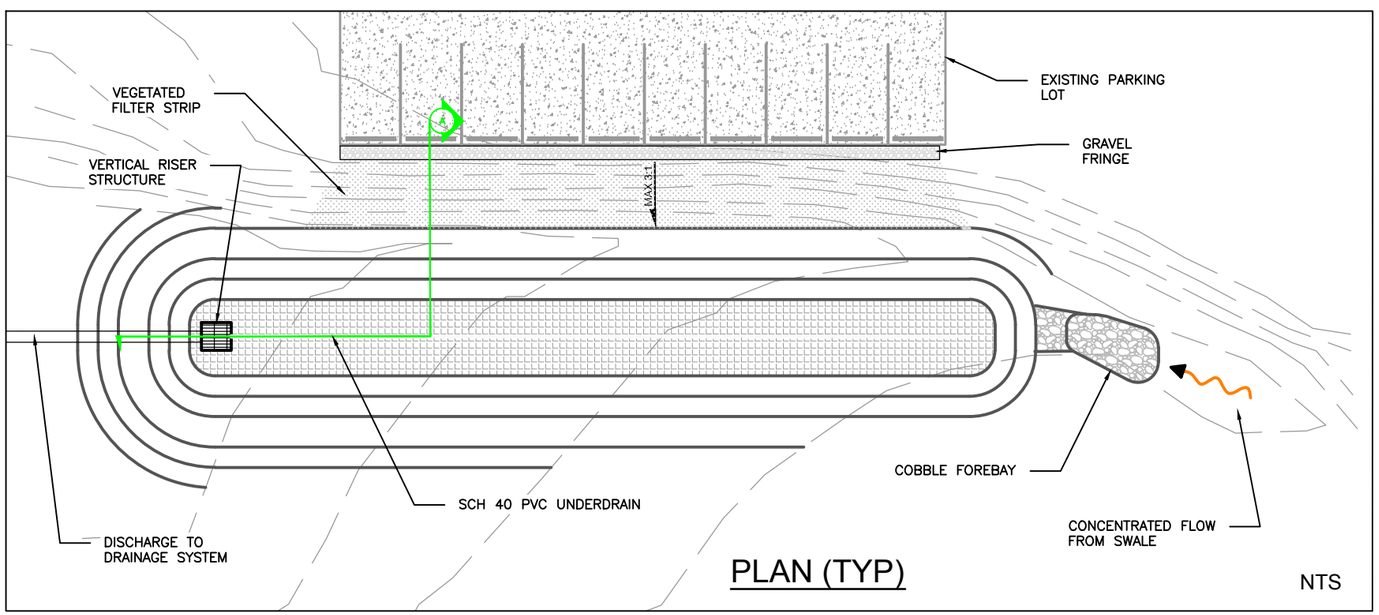
SCALE: 1"=20'

NOTE: IF NO IMPERMEABLE LINER IS REQUIRED, ENSURE THAT SUBGRADE COMPACTION IS MINIMIZED DURING CONSTRUCTION. SCARIFY OR RIP SUBGRADE TO A DEPTH OF 9–12".



PROFILE A W/ INTERNAL WATER STORAGE (TYP.)

NTS



PLAN (TYP)

NTS

SOIL MEDIA SPECIFICATIONS

TEXTURE AND COMPOSITION (BY VOLUME):

SOIL MEDIA SHOULD CONSIST OF A LOAMY SAND CONFORMING TO THE FOLLOWING SPECIFICATIONS:

- 65% SAND
- 20% SANDY LOAM
- 15% COMPOST

ORGANIC MATTER MATERIAL:

MAXIMUM 5% BY WEIGHT IN OVERALL SOIL MEDIA. ORGANIC MATTER SHOULD BASED FROM VEGETATION–BASED FEEDSTOCK AND INCLUDE NO ANIMAL MANURE OR BYPRODUCTS.

INFILTRATION RATES:

5 IN/HR INFILTRATION RATE FOR FLOW–BASED SUSMP METHOD (1–6 IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION.)

pH:

6 TO 8

CATION EXCHANGE CAPACITY (CEC):

GREATER THAN 5 MILLIEQUIVALENTS (MEQ)/100 GRAMS SOIL

PHOSPHORUS:

TOTAL PHOSPHORUS SHOULD NOT EXCEED 15 PPM

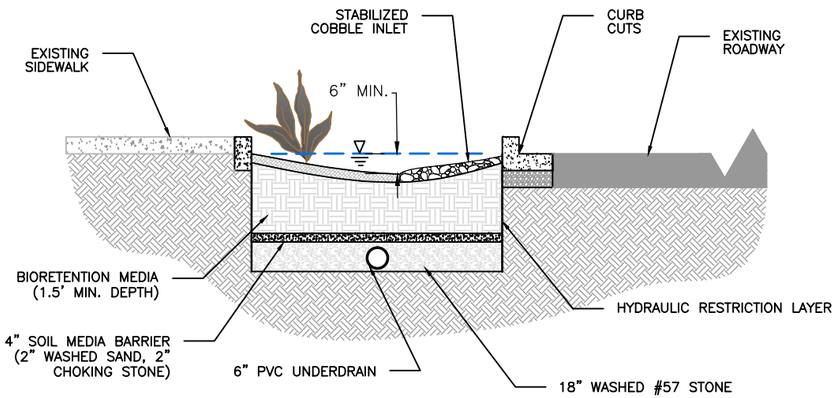
REFER TO THE COUNTY OF SAN DIEGO LID HANDBOOK APPENDIX G FOR FURTHER SOIL MEDIA SPECIFICATIONS.

VEGETATION SPECIFICATIONS

FOR BIORETENTION TO FUNCTION PROPERLY AS STORMWATER TREATMENT AND BLEND INTO THE LANDSCAPING, VEGETATION SELECTION IS CRUCIAL. APPROPRIATE VEGETATION WILL HAVE THE FOLLOWING CHARACTERISTICS:

1. PLANT MATERIALS MUST BE TOLERANT OF SUMMER DROUGHT, PONDING FLUCTUATIONS, AND SATURATED SOIL CONDITIONS FOR 10 TO 48 HOURS.
2. IF PLANT SPACING ALLOWS, IT IS RECOMMENDED THAT A MINIMUM OF THREE TREE SPECIES, THREE SHRUB SPECIES, AND THREE HERBACEOUS GROUNDCOVER SPECIES BE INCORPORATED TO PROTECT AGAINST FACILITY FAILURE FROM DISEASE AND INSECT INFESTATIONS OF A SINGLE SPECIES. PLANT ROOTING DEPTHS MUST NOT DAMAGE THE UNDERDRAIN, IF PRESENT. SLOTTED OR PERFORATED UNDERDRAIN PIPE MUST BE MORE THAN 5 FEET FROM TREE LOCATIONS (IF SPACE ALLOWS).
3. NATIVE PLANT SPECIES OR HARDY CULTIVARS THAT ARE NOT INVASIVE AND DO NOT REQUIRE CHEMICAL INPUTS ARE RECOMMENDED TO BE USED TO THE MAXIMUM EXTENT PRACTICABLE.
4. SHADE TREES SHOULD BE FREE OF BRANCHES BELOW 1/3 THEIR TOTAL HEIGHT.

NTS



CROSS SECTION: ROADSIDE BIORETENTION (TYP)

THE NOBLEST MOTIVE IS THE PUBLIC GOOD
COUNTY OF SAN DIEGO
MDCCCLI

CONSULTANT NAME
STREET NUMBER AND ADDRESS

SAN DIEGO COUNTY

BIORETENTION

___% SUBMITTAL	PROJECT NO.: _____		DATE: _____
DRWN. BY: ____	DSGN. BY: ____	CHKD. BY: _____	SHEET NO.: __OF__

Bioretention

Description

Bioretention areas are small-scale, vegetated depressions designed to provide stormwater storage and filtration through engineered media. Using detention, sedimentation, filtration and adsorption, bioretention enhances the removal of contaminants from stormwater by both plants and soils.

Bioretention can also incorporate pretreatment (i.e., vegetated filter strips, vegetated swales or settling forebays), allowing increased sedimentation and capture of debris from heavily trafficked areas. Finally, bioretention can be used in-line with traditional stormwater conveyance systems.

Treatment Efficiency	
Runoff Volume	High (unlined)/Low (lined)
Sediment	High
Nutrients	Medium
Pathogens	High
Metals	High
Oil & Grease	High
Organics	High

Siting and Suitability

Bioretention areas offer flexibility in design and can easily be incorporated into new or existing infrastructure such as parking lot islands and edges, street rights-of-way and medians, roundabouts, pedestrian walkways, public transit stops, or building drainage areas. The available space and site topography often dictate the geometry and size of the bioretention areas. Additional site objectives include incorporation into the site's natural hydrologic regime and further enhancement of natural landscape features in an urban setting. See Section 3 for details.

Drainage Area: Less than 5 acres and fully stabilized.

Head Requirements: Bioretention typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to bioretention should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and internal longitudinal slope should be 2% or less.

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

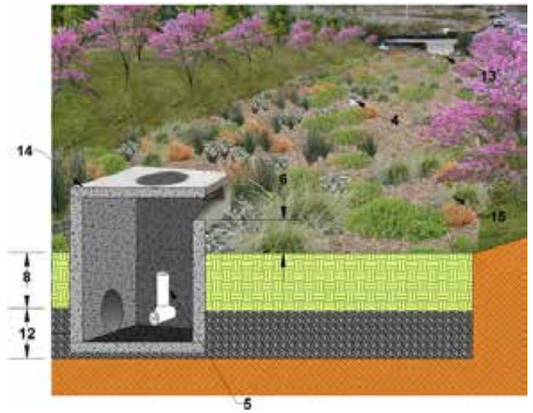
Soil Type: Bioretention can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or *hot spots*, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

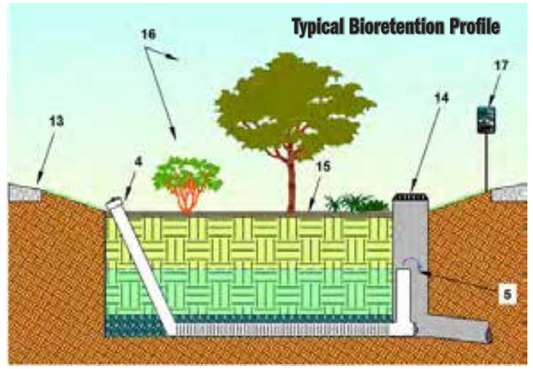
Design Considerations & Specifications *(see* Appendices A & G *for details)*

		Design Component	General Specification
Drainage Design	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral flows to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention to promote plant survival and treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	6–18 inches (6–12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12–96 hrs, Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	1.5–4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1–6 in/hr for alternative designs, as approved by local jurisdiction).
	11	Chemical Analysis	Total phosphorus < 15 ppm, pH 6–8, CEC > 5 meq/100 g soil. Organic Matter Content < 5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows, or vegetated swale.
	14	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	15	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3-inches-deep.
	16	Vegetation	Native, deep rooting, drought tolerant plants.
	17	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

Bioretention Area Cross Section
Seaside Ridge Development, San Diego, CA



A bioretention area intercepts and treats runoff from a residential development. IWS is demonstrated in the rendered cross section by upturning the underdrain in the outlet structure. Note: photograph was enhanced by rendering additional vegetation.



This diagram shows the major design components of bioretention. Underdrains should be excluded when subsoil infiltration rates are suitable. Additional hydromodification control can be provided by increasing surface storage volume or subsurface drainage layer storage depth.

Maintenance Considerations *(see* Appendix D *for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of bioretention	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1–2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	2–12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2–3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2–3 days for first 1–2 months	Until establishment and during severely-droughty weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH

Inspection and Maintenance Checklist

BIORETENTION

Permit no. _____

BMP location _____

Responsible party _____

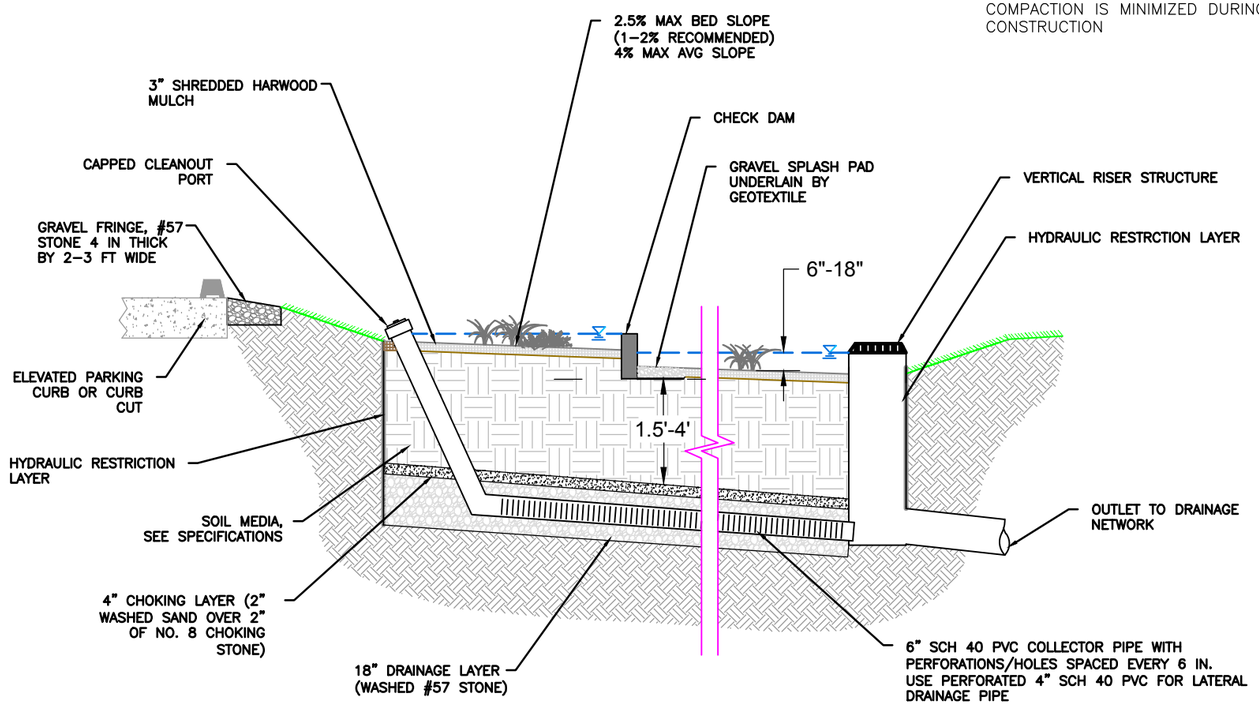
Phone number (____) _____ Email _____

Responsible party address _____

Date of inspection _____

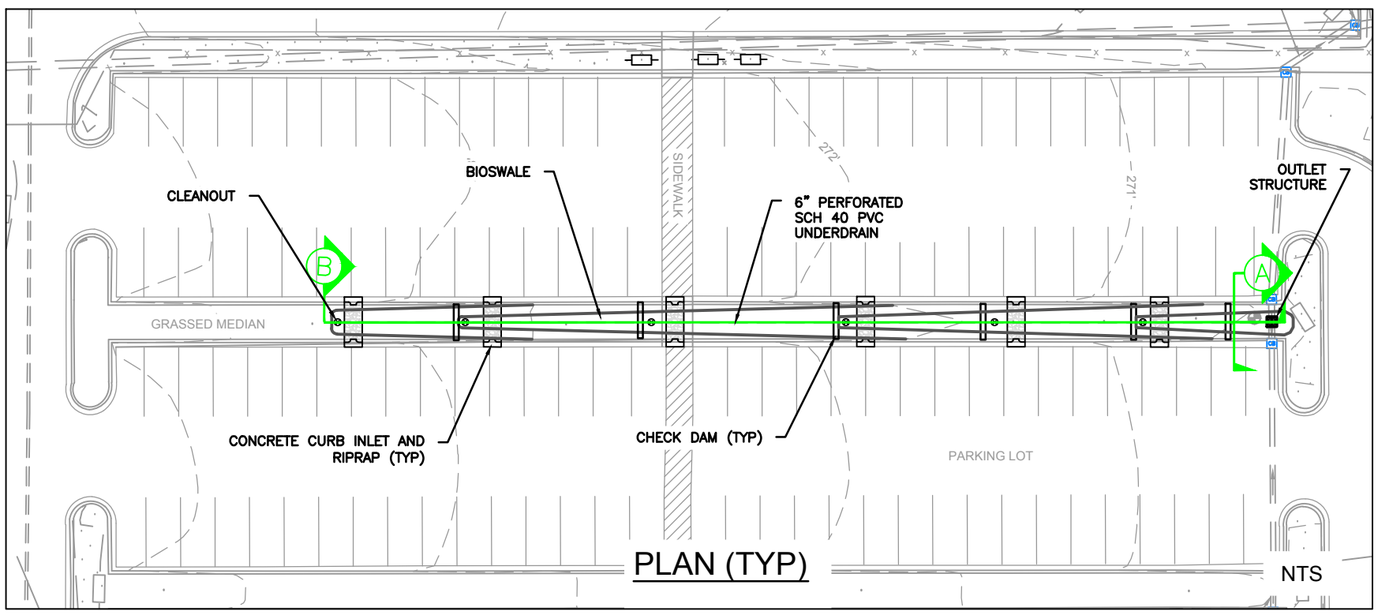
Defect	Conditions when maintenance is needed	Maintenance needed?	Date and description of maintenance conducted[a]	Results expected when maintenance is performed
1. Standing water	Water stands in the bioretention area between storms and does not drain within 24 hours after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following could apply: sediment or trash blockages removed, grade from head to foot of bioretention area improved, media surface scarified, underdrains flushed in manner that does not cause an illegal discharge.
2. Trash and debris	Trash and debris accumulated in the bioretention area and around the inlet and outlet.			Trash and debris removed from the bioretention area and disposed of properly.
3. Sediment	Evidence of accumulated sediment in the bioretention area.			Material removed so that there is no clogging or blockage. Material is disposed of properly.
4. Erosion	Channels have formed around inlets, there are areas of bare soil, or there is other evidence of erosion.			Obstructions and sediment removed so that water flows freely and disperses over a wide area. Obstructions and sediment are disposed of properly.
5. Vegetation	Vegetation is dead, diseased or overgrown.			Vegetation is healthy and attractive. Grass is maintained at least 3 inches in height.
6. Mulch	Mulch is missing or patchy. Areas of bare earth are exposed or mulch layer is less than 3 inches deep.			All bare earth is covered, except mulch is kept 6 inches away from trunks of trees and shrubs. Mulch is even at a depth of 3 inches.
7. Inlet/outlet	Sediment accumulations.			Inlet/outlet is clear of sediment and debris and allows water to flow freely.
8. Miscellaneous	Any condition not covered above that needs attention for the bioretention area to function as designed.			The design specifications are met.

a. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).



PROFILE B - BIORETENTION SWALE W/ CHECK DAMS

NTS



PLAN (TYP)

NTS

SOIL MEDIA SPECIFICATIONS

TEXTURE AND COMPOSITION (BY VOLUME):

SOIL MEDIA SHOULD CONSIST OF A LOAMY SAND CONFORMING TO THE FOLLOWING SPECIFICATIONS:

- 65% SAND
- 20% SANDY LOAM
- 15% COMPOST

ORGANIC MATTER MATERIAL:

MAXIMUM 5% BY WEIGHT IN OVERALL SOIL MEDIA. ORGANIC MATTER SHOULD BASED FROM VEGETATION–BASED FEEDSTOCK AND INCLUDE NO ANIMAL MANURE OR BYPRODUCTS.

INFILTRATION RATES:

5 IN/HR INFILTRATION RATE FOR FLOW–BASED SUSMP METHOD (1–6 IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION.)

pH:

6 TO 8

CATION EXCHANGE CAPACITY (CEC):

GREATER THAN 5 MILLIEQUIVALENTS (MEQ)/100 GRAMS SOIL

PHOSPHORUS:

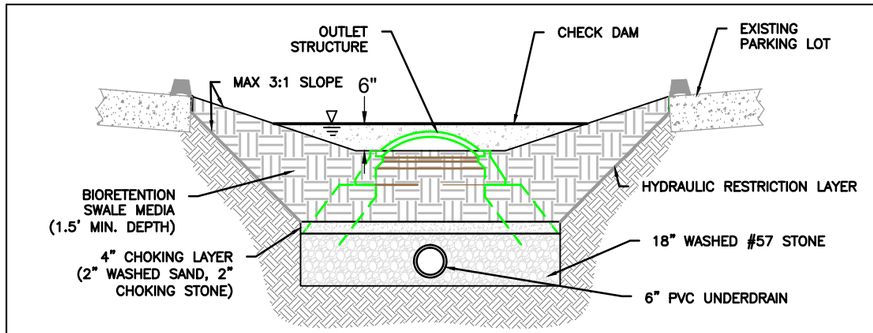
TOTAL PHOSPHORUS SHOULD NOT EXCEED 15 PPM

REFER TO THE COUNTY OF SAN DIEGO LID HANDBOOK APPENDIX G FOR FURTHER SOIL MEDIA SPECIFICATIONS.

VEGETATION SPECIFICATIONS

FOR BIORETENTION SWALES TO FUNCTION PROPERLY AS STORMWATER TREATMENT AND BLEND INTO THE LANDSCAPING, VEGETATION SELECTION IS CRUCIAL. APPROPRIATE VEGETATION WILL HAVE THE FOLLOWING CHARACTERISTICS:

1. PLANT MATERIALS MUST BE TOLERANT OF SUMMER DROUGHT, PONDING FLUCTUATIONS, AND SATURATED SOIL CONDITIONS FOR 10 TO 48 HOURS.
2. IF SPACE ALLOWS, IT IS RECOMMENDED THAT A MINIMUM OF THREE TREE SPECIES, THREE SHRUB SPECIES, AND THREE HERBACEOUS GROUNDCOVER SPECIES BE INCORPORATED TO PROTECT AGAINST FACILITY FAILURE FROM DISEASE AND INSECT INFESTATIONS OF A SINGLE SPECIES. PLANT ROOTING DEPTHS MUST NOT DAMAGE THE UNDERDRAIN, IF PRESENT. SLOTTED OR PERFORATED UNDERDRAIN PIPE MUST BE MORE THAN 5 FEET FROM TREE LOCATIONS (IF SPACE ALLOWS).
3. NATIVE PLANT SPECIES OR HARDY CULTIVARS THAT ARE NOT INVASIVE AND DO NOT REQUIRE CHEMICAL INPUTS ARE RECOMMENDED TO BE USED TO THE MAXIMUM EXTENT PRACTICABLE.
4. SHADE TREES SHOULD BE FREE OF BRANCHES BELOW 1/3 THEIR TOTAL HEIGHT.



SECTION A - BIORETENTION SWALE

NTS

CONSULTANT NAME
STREET NUMBER AND ADDRESS

SAN DIEGO COUNTY

BIORETENTION SWALE

___% SUBMITTAL	PROJECT NO.: _____		DATE: _____
DRWN. BY: _____	DSGN. BY: _____	CHKD. BY: _____	SHEET NO.: ___OF___

Bioretonention Swale

Siting and Suitability

Bioretention swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, bioretention swales can be integrated into site plans with various configurations and components. Ideal sites for bioretention swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Bioretention swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Bioretention swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to bioretention swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

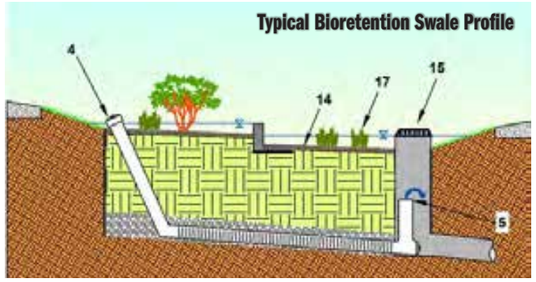
Soil Type: Bioretention swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or *hot spots*, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see* Appendices A & G *for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention to promote plant survival and treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6–18 inches (6–12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12–96 hrs, Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	2–4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1–6 in/hr for alternative designs, as approved by local jurisdiction)
	11	Chemical Analysis	Total phosphorus < 15 ppm, pH 6–8, CEC > 5 meq/100 g soil. Organic Matter Content < 5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3-inches-deep.
	17	Vegetation	Native, deep rooting, drought tolerant plants.
	18	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

This rendering demonstrates the application of bioretention swales as green street retrofits. Runoff enters the bioretention swale through curb cuts and is filtered vertically through the soil media. Lateral hydraulic restriction layers protect adjacent infrastructure from lateral seepage while allowing infiltration from the bottom of the bioretention swale. The underdrain is offset to avoid roots of existing vegetation.



This schematic shows the major design elements of a bioretention swale. IWS is incorporated for enhanced infiltration and water quality treatment by upturning the underdrain in the outlet structure. Check dams ensure capture of the water quality volume and slow surface flow during larger storms.

Maintenance Considerations *(see* Appendix D *for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of bioretention swale	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1–2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	2–12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2–3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2–3 days for first 1–2 months	Until establishment and during severely-droughty weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

Description

Bioretention swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Additionally, bioretention swales remove pollutants such as trash and debris by filtering water through vegetation within the channel. Swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a bioretention swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained bioretention swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

TETRA TECH

Inspection and Maintenance Checklist

BIORETENTION SWALE

Permit no. _____

BMP location _____

Responsible party _____

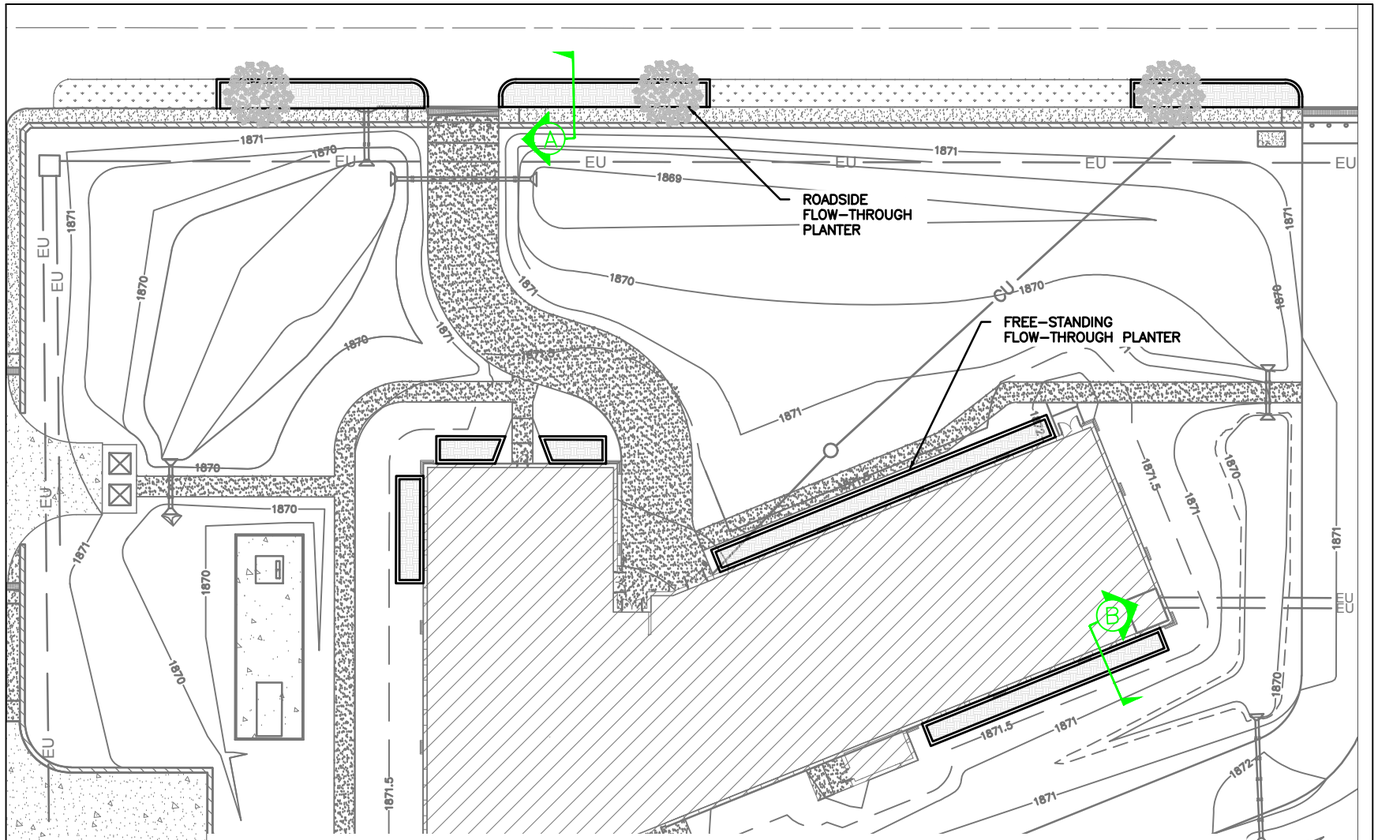
Phone number (____) _____ Email _____

Responsible party address _____

Date of inspection _____

Defect	Conditions when maintenance is needed	Maintenance needed?	Date and description of maintenance conducted[a]	Results expected when maintenance is performed
1. Standing water	Water stands in the bioretention swale between storms and does not drain within 24 hours after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following could apply: sediment or trash blockages removed, grade from head to foot of bioretention area improved, media surface scarified, underdrains flushed in manner that does not cause an illegal discharge.
2. Trash and debris	Trash and debris accumulated in the bioretention swale and around the inlet and outlet.			Trash and debris removed from the bioretention swale and disposed of properly.
3. Sediment	Evidence of accumulated sediment in the bioretention swale.			Material removed so that there is no clogging or blockage. Material is disposed of properly.
4. Erosion	Channels have formed around inlets, there are areas of bare soil, or there is other evidence of erosion.			Obstructions and sediment removed so that water flows freely and disperses throughout the bioretention swale. Obstructions and sediment are disposed of properly.
5. Vegetation	Vegetation is dead, diseased, or overgrown.			Vegetation is healthy and attractive. Grass is maintained at least 3 inches in height.
6. Mulch (if used)	Mulch is missing or patchy. Areas of bare earth are exposed or mulch layer is less than 3 inches deep.			All bare earth is covered, except mulch is kept 6 inches away from trunks of trees and shrubs. Mulch is even at a depth of 3 inches.
7. Inlet/outlet	Sediment or debris accumulations.			Inlet/outlet is clear of sediment and debris and allows water to flow freely.
8. Miscellaneous	Any condition not covered above that needs attention for the bioretention swale to function as designed.			The design specifications are met.

a. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).



PLAN WITH FLOW-THROUGH PLANTER CONFIGURATIONS (TYP.)

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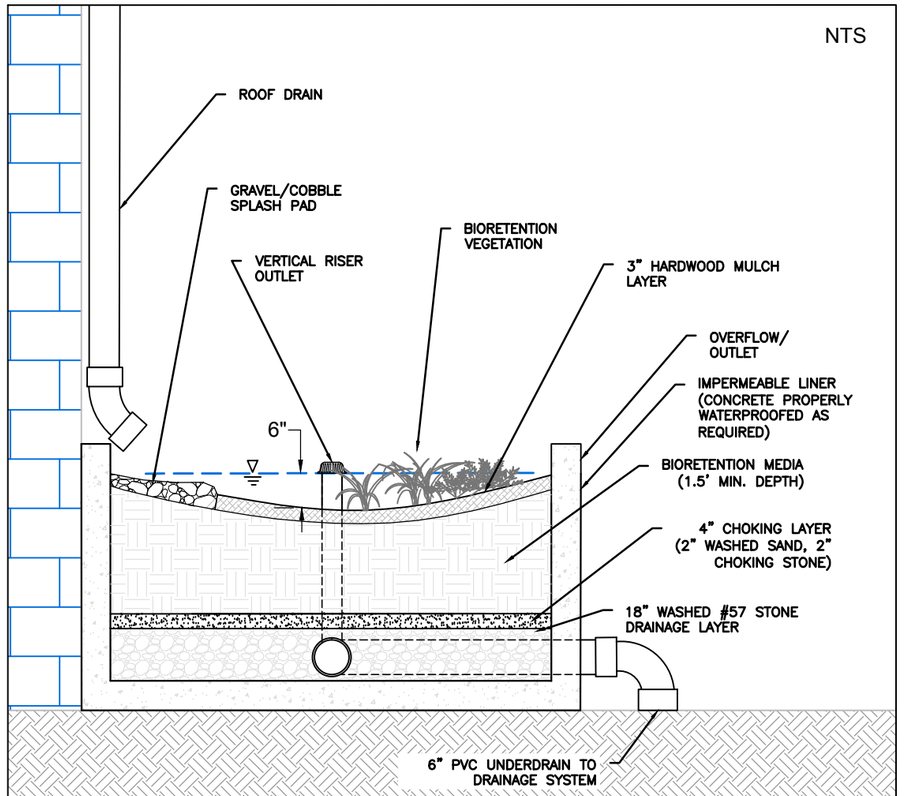

SECTION B - FREE-STANDING
FLOW-THROUGH PLANTER

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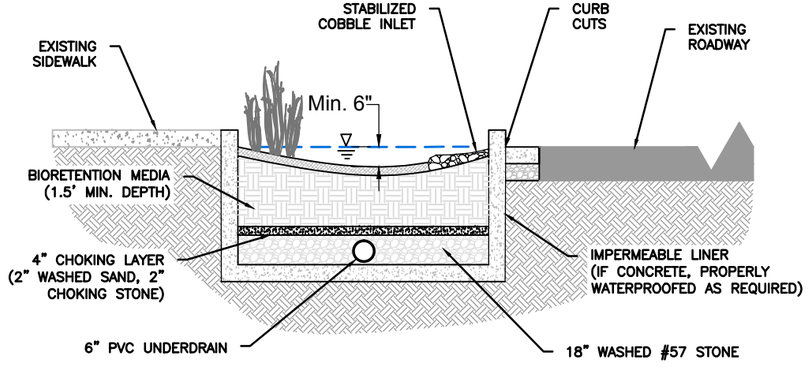


SECTION A - ROADSIDE FLOW-THROUGH PLANTER

SOIL MEDIA SPECIFICATIONS

TEXTURE AND COMPOSITION (BY VOLUME):

SOIL MEDIA SHOULD CONSIST OF A LOAMY SAND CONFORMING TO THE FOLLOWING SPECIFICATIONS:

- 65% SAND
- 20% SANDY LOAM
- 15% COMPOST

ORGANIC MATTER MATERIAL:

MAXIMUM 5% BY WEIGHT IN OVERALL SOIL MEDIA. ORGANIC MATTER SHOULD BASED FROM VEGETATION-BASED FEEDSTOCK AND INCLUDE NO ANIMAL MANURE OR BYPRODUCTS.

INFILTRATION RATES:

5 IN/HR INFILTRATION RATE FOR FLOW-BASED SUSMP METHOD (1-6 IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION.)

pH:

6 TO 8

CATION EXCHANGE CAPACITY (CEC):

GREATER THAN 5 MILLIEQUIVALENTS (MEQ)/100 GRAMS SOIL

PHOSPHORUS:

TOTAL PHOSPHORUS SHOULD NOT EXCEED 15 PPM

REFER TO THE COUNTY OF SAN DIEGO LID HANDBOOK APPENDIX G FOR FURTHER SOIL MEDIA SPECIFICATIONS.

CONSULTANT NAME
STREET NUMBER AND ADDRESS

SAN DIEGO COUNTY

FLOW-THROUGH PLANTERS

___% SUBMITTAL	PROJECT NO.: _____		DATE: _____
DRWN. BY: ____	DSGN. BY: _____	CHKD. BY: _____	SHEET NO.: __OF__

Flow-Through Planters

Description

Flow-through planters are vegetated IMP units that capture, temporarily store, and filter storm water runoff. The vegetation, ponding areas, and soil media in the flow-through planters remove contaminants and retain storm water flows from small drainage areas before directing the treated storm water to an underdrain system. Typically, Flow-through planters are completely contained systems; for this reason, they can be used in areas where geotechnical constraints prevent or limit infiltration or in areas of concern where infiltration should be avoided. Flow-through planters offer considerable flexibility and can be incorporated into small spaces, enhancing natural aesthetics of the landscape.

Treatment Efficiency			
Runoff Volume	Low	Metals	High
Sediment	High	Oil & Grease	High
Nutrients	Medium	Organics	High
Pathogens	High		

Siting and Suitability

Flow-through planters require relatively little space and can be easily adapted for urban retrofits such as building and rooftop runoff catchments or into new street and sidewalk designs. Because flow-through planters are typically fully-contained systems, available space presents the most significant limitation. To ensure healthy vegetation in the planter box, proper plant and media selection are important considerations for accommodating the drought, ponding fluctuations, and brief periods of saturated soil conditions. See Section 3 for details.

Drainage Area: To be less than 0.35 acres and fully stabilized.

Underground Utilities: Complete a utilities inventory to ensure that site development will not interfere with or affect the utilities.

Existing Buildings: Assess building effects (runoff, solar shadow) on the site. When completely contained, building setbacks are less of a concern.

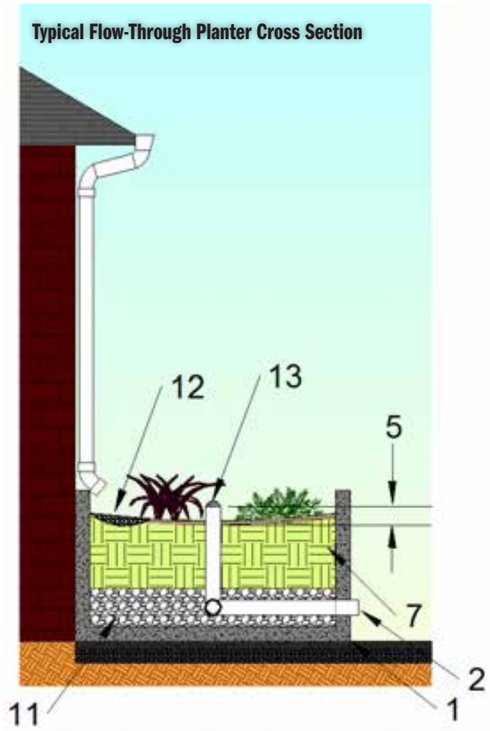
Water Table: Seasonal high water table should be located below the bottom of the planter.

Soil Type: Soils within the drainage area must be stabilized. If flow-through planters are fully contained, local soils must provide structural support.

Areas of Concern: Fully-contained flow-through planters can be used in areas with known soil contamination or in *hot spots*.

Design Considerations & Specifications *(see* Appendices A & G *for details)*

Design Component/ Consideration			General Specification
IMP Function	1	Impermeable liner	Planter boxes are typically contained within a concrete vault.
	2	Underdrain (required)	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully infiltrating, ensure that subgrade compaction is minimized.
	3	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	4	Internal Water Storage (IWS)	With careful plant selection, the outlet can be slightly elevated to create a sump for additional moisture retention to promote plant survival and enhanced treatment. Top of IWS should be greater than 18 inches below surface.
	5	Temporary Ponding Depth	Provide 6–18 inches surface ponding (6–12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	6	Drawdown Time	Surface drawdown: 12–96 hrs, Subsurface dewatering: 48 hrs.
Soil Media	7	Soil Media Depth	2–4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	8	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	9	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1–6 in/hr for alternative designs, as approved by local jurisdiction).
	10	Chemical Analysis	Total phosphorus < 15 ppm, pH 6–8, CEC > 5 meq/100 g soil. Organic Matter Content < 5% by weight.
	11	Drainage Layer	Separate soil media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone. Additional aggregate storage depth can be provided for hydromodification control.
Routing	12	Inlet/ Pretreatment	Provide stabilized inlets and energy dissipation. Install rock armored forebay, gravel splash pad, or upturn incoming pipes.
	13	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	14	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3-inches-deep.
	15	Vegetation	Native, deep rooting, drought tolerant plants.
	16	Multi-Use Benefits	Provide educational signage, artwork, or wildlife habitat.



This diagram shows the design elements of a flow-through planter installed for water quality control. Flow-through planters can be used in highly urbanized settings or areas where infiltration is restricted. Additional surface storage or subsurface aggregate storage can be provided for hydromodification control.

Maintenance Considerations *(see* Appendix D *for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of bioretention swale	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/ or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1–2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	2–12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2–3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2–3 days for first 1–2 months	Until establishment and during severely-droughty weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH

Inspection and Maintenance Checklist

FLOW THROUGH PLANTER BOX

Permit no. _____

BMP location _____

Responsible party _____

Phone number (____) _____ Email _____

Responsible party address _____

Date of inspection _____

Defect	Conditions when maintenance is needed	Maintenance needed?	Date and description of maintenance conducted[a]	Results expected when maintenance is performed
1. Standing water	When water stands in the planter box between storms and does not drain within 24 hours after rainfall.			There should be no areas of standing water after inflow has ceased. Any of the following could apply: sediment or trash blockages removed, mulch replaced, soil media surface scarified, underdrains flushed in manner that does not cause an illegal discharge.
2. Trash and debris	Trash and debris accumulated in the planter box and around the inlet and outlet.			Trash and debris removed and disposed of properly.
3. Sediment	Evidence of accumulated sediment in the planter box.			Material removed so that there is no clogging or blockage. Material is disposed of properly.
4. Erosion	Channels have formed around inlets, there are areas of bare soil, or there is other evidence of erosion.			Obstructions and sediment removed so that water flows freely and disperses over a wide area. Obstructions and sediment are disposed of properly.
5. Vegetation	Vegetation is dead, diseased, or overgrown.			Vegetation is healthy and attractive. Grass maintained at least 3 inches in height.
6. Mulch	Mulch is missing or patchy; areas of bare earth are exposed, or mulch layer is less than 3 inches deep.			All bare earth is covered, except mulch is kept 6 inches away from trunks of trees and shrubs. Mulch is even at a depth of 3 inches.
7. Inlet/outlet	Sediment or debris accumulations.			Inlet/outlet is clear of sediment and debris and allows water to flow freely.
8. Affected impervious areas or structures	Obvious effects on surrounding impervious areas or structures.			Hydraulic restriction layers prevent impacts from infiltration to surrounding structures.
9. Miscellaneous	Any condition not covered above that needs attention for the planter box to function as designed.			The design specifications are met.

a. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

G.1 Bioretention Soil Media (BSM) Example Specifications

Any bioretention facilities being installed in the County of San Diego should meet the following bioretention soil media (BSM) criteria.

G.1.1 General Requirements

BSM should achieve a long-term, in-place infiltration rate of 5 inches per hour, according to the County of San Diego 2012 Standard Urban Stormwater Mitigation Plan (SUSMP) requirements.

BSM should also support plant growth while providing pollutant treatment. In order to achieve these two goals, the BSM should be a mixture of sand, fines, and compost. The following composition includes the measurements for determining the BSM by volume and weight:

BSM Composition	Sand	Sandy Loam			Compost
		Sand	Silt	Clay	
Volume	65%	20%			15%
Weight	75–80%		10% max.	3% max.	9% max.[1]

[1]9% compost by weight results in approximately 5% organic matter by weight.

G.1.2 Submittals

Product Data: Submit manufacturer's product data and installation instructions. Include required substrate preparation, list of materials, application rate/testing, and permeability rates.

Verifications: Manufacturer shall submit a letter of verification that the products meet or exceed all physical property, endurance, performance and packaging requirements.

Tests should be conducted no more than 120 days prior to the delivery date of the BSM to the project site. Batch-specific test results and certification will be required for projects installing more than 100 cubic yards of BSM.

The applicant should submit the following to the municipality for approval if requested:

A. A sample of mixed BSM.

B. Grain size analysis results of the sand component performed in accordance with American Society for Testing and Materials (ASTM) D422, *Standard Test Method for Particle Size Analysis of Soils*.

C. Grain size analysis results of sandy loam soil component performed in accordance with ASTM D422., *Standard Test Method for Particle Size Analysis of Soils*.

D. Grain size analysis results of compost component performed in accordance with ASTM D422, *Standard Test Method for Particle Size Analysis of Soils*.

E. Organic matter content test results of compost. Organic matter content tests should be performed in accordance with ASTM F 1647, *Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes* or *Testing Methods for the Examination of Compost and Composting* (TMECC) 05.07A, *Loss-On-Ignition Organic Matter Method*.

F. A description of the equipment and methods used to mix the sand, sandy loam, and compost to produce BSM.

G. Constant head permeability results of the mixed BSM. Constant head permeability testing in accordance with ASTM D2434, *Standard Test Method for Permeability of Granular Soils (Constant Head)* should be conducted on a minimum of two samples with a 6-inch mold and vacuum saturation.

H. Provide the following information about the testing laboratory(ies) including:

1) Name of laboratory(ies)

2) Contact person(s)

3) Address(es)

4) Phone contact(s)

5) Email address(es)

6) Qualifications of laboratory(ies), including use of ASTM and U.S. Department of Agriculture (USDA) method of standards

G.1.3 Sand Specifications for BSM

G.1.3.1 Sand Quality

Sand should be thoroughly washed prior to delivery and free of wood, waste, and coatings such as clay, stone dust, carbonate, or any other deleterious material. All aggregate passing the No. 200 sieve size should be non-plastic.

G.1.3.2 Sand Texture

Sand for BSM should be analyzed by a qualified lab using #200, #100, #40, #30, #16, #8, #4, and 3/8-inch sieves (ASTM D422 or as approved by municipality) and meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min.	Max.
3/8 inch	100	100
No. 4	90	100
No. 8	70	100
No. 16	40	95
No. 30	15	70
No. 40	5	55
No. 100	0	15
No. 200	0	5

Note: all sands complying with ASTM C33, *Standard Specification for Concrete Aggregates* for fine aggregate comply with the above gradation requirements.

G.1.4 Sandy Loam Soil Specifications for BSM

G.1.4.1 Sandy Loam Soil Quality

Sandy loam soil for the BSM shall be free of wood, waste, coating such as stone dust, carbonate, etc., or any other deleterious material. All aggregate passing the No. 200 sieve size shall be non-plastic.

G.1.4.2 Sandy Loam Soil Texture

Sandy loam soil should comply with the following specifications by weight based on ASTM D422 (or as approved by municipality):

A. 50–74 percent sand

B. 0–48 percent silt

C. 2–15 percent clay

Note: these ranges were selected from the USDA soil textural classification for a sandy loam, such that clay content does not exceed 15 percent of sandy loam.

G.1.5 Compost Soil Specifications for BSM

G.1.5.1 Compost Texture

A qualified lab should analyze compost using No. 200 and 1/2-inch sieves (ASTM D422 or as approved by municipality), and meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min.	Max.
1/2 inch	97	100
No. 200	0	5

G.1.5.2 Compost Quality Testing

Compost should be a well-decomposed, stable, weed-free organic matter source derived from waste materials including yard debris, wood wastes or other organic materials, **not including manure or biosolids**. Compost shall have a dark brown color and a soil-like odor. Compost that is exhibiting a sour or putrid smell, contains recognizable grass or leaves, or is hot (120 degrees Fahrenheit) upon delivery or rewetting is not acceptable.

Compost shall be produced at a facility inspected and regulated by the Local Enforcement Agency for CalRecycle. The past three inspection reports shall be submitted verifying testing compliance with CalRecycle Title 14, *Process to Further Reduce Pathogens* (PFRP), and EPA 40 CFS 503.

Compost should comply with the following requirements:

Parameter	Method	Requirement	Units
Bulk Density	-	400–600	dry lbs/cubic yd
Moisture Content	Gravimetric	30%–60%	dry solids
Organic Matter	ASTM F 1647 Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes or Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method."	35%–75%	dry weight
pH	Saturation Paste	6.0–8.0	
Carbon:Nitrogen Ratio	-	15:1–25:1	
Maturity/Stability	Solvita®	> 5	Index value

Parameter	Method	Requirement	Units
Metals			
Arsenic	-	< 20	mg/kg dry weight
Cadmium		< 10	
Chromium		< 600	
Copper		< 750	
Lead		< 150	
Mercury		< 8	
Nickel		< 210	
Selenium		< 18	
Zinc		< 1400	
Pathogens			
Salmonella	-	< 3	MPN per 4 g
Fecal Coliform		< 1000	MPN per 1 g
Inert Material/Physical Contaminants			
Plastic, Metal, and Glass	-	< 1%	by weight
Sharps (% > 4mm)		0%	by weight

G.1.5.3 Alternative Organic Amendments

Alternative organic amendments (in lieu of previously defined compost) will be reviewed on a case-by-case basis. Organic amendments should make up no more than 5 percent of the BSM bulk volume, unless organic alternatives comply with the specifications of section G.1.5.2.

G.1.6 BSM Specifications

BSM shall be free of roots, clods stones larger than 1-inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush, and other litter. It shall not be infested with nematodes or undesirable disease-causing organisms such as insects and plant pathogens. BSM shall be friable and have sufficient structure in order to give good aeration to the soil. The following specifications should govern the bulk BSM.

G.1.6.1 BSM Texture

Gradation Limit: The definition of the soil should be the following USDA classification scheme by weight:

A. Sand: 85–90 percent

B. Silt: 10 percent maximum

C. Clay: 5 percent maximum

Compost should compose no more than 9 percent of the bulk BSM weight and should primarily fall into the sand component above (per section G.1.5.1 compost gradation limits).

G.1.6.2 BSM Quality Testing

In addition to the compost quality testing requirements outlined in section G.1.5.2, the final BSM should meet the following standards. Testing results from the following specifications shall be submitted for approval prior to BSM acceptance.

Parameter	Method	Requirement	Units
Organic Matter	Loss on Ignition	2%–5%	dry weight
pH	Saturation Paste	6.0–8.0	-
Carbon:Nitrogen Ratio	-	10:1–20:1	-
Cation Exchange Capacity (CEC)	-	≥ 5	meq/100 g of dry soil
Salinity (Electrical Conductivity)	Saturation Extract	0.5–3	dS/m
Boron	Saturation Extract	< 2.5	ppm
Chloride	Saturation Extract	< 150	ppm
Sodium Adsorption Rate (SAR)	-	< 3	-
Extractable Nutrients			
Phosphorus	Ammonium Bicarbonate/DPTA extraction method	< 15	mg/kg dry weight
Potassium		100–200	
Iron		24–35	
Manganese		0.6–6.0	
Zinc		1.0–8.0	
Copper		0.3–5.0	
Magnesium		50–150	
Sodium		0–100	
Sulfur		25–500	
Molybdenum		0.1–2.0	
Aluminum		< 3.0	

G.2 Alternative BSM Specifications

BSMs not meeting the above criteria may be evaluated on a case-by-case basis.

G.2.1 General Requirements

Alternative BSM should meet the following specifications:

A. Should be sufficiently permeable to infiltrate runoff at a minimum rate of 5 inches per hour during the life of the facility

B. Should provide sufficient retention of moisture and nutrients to support adequate vegetation while providing pollutant removal

C. Should meet the requirements of the compost chemical analysis outlined in section G.1.5.2 and the BSM quality testing in section G.1.6.2

The following guidance is offered to assist municipalities with verifying that alternative soil mixes meet the specifications.

G.2.2 Submittals

The applicant should submit the following to the municipality for approval:

A. A sample of alternative BSM.

B. Certification from the soil supplier that the BSM meets the requirements of these guidelines.

C. Constant head permeability results of the alternative BSM. Constant head permeability testing in accordance with ASTM D2434, *Standard Test Method for Permeability of Granular Soils (Constant Head)* should be conducted on a minimum of two samples with a 6-inch mold and vacuum saturation.

D. Organic matter content test results of BSM. Organic content test should be performed in accordance with ASTM F1647, *Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes or Testing Methods for the Examination of Compost and Composting* (TMECC) 05.07A, *Loss-On-Ignition Organic Matter Method*.

E. Grain size analysis results of alternative BSM performed in accordance with ASTM D422, *Standard Test Method for Particle Size Analysis of Soils*.

F. A description of the equipment and methods used to mix the sand and compost to produce alternative bioretention soil.

G. Provide the following information about the testing laboratory(ies):

   1) Name of laboratory(ies)

   2) Contact person(s)

   3) Address(es)

   4) Phone contact(s)

5) Email address(es)

6) Qualifications of laboratory(ies), including use of ASTM and USDA method of standards

G.2.3 Alternative BSM Texture

Alternative BSM should be analyzed by an accredited lab using No. 200 and 1/2-inch sieves (ASTM D422 or as approved by municipality) and should meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min.	Max.
1/2 inch	97	100
No. 200	2	5

G.3 Installation of BSM

The following section provides considerations for proper BSM installation.

G.3.1 Considerations Prior to BSM Installation

The following questions and guidelines should be discussed with the contractor prior to installing the BSM at the project site to prevent any confusion and errors.

A. Ensure that the contractor is familiar with constructing bioretention systems.

B. Plan how inspections will be handled as part of the construction process.

C. Verify BSM meets specification prior to delivery and placement in the facility.

D. Prevent over-compaction of native soils in areas of the basin where infiltration will occur. Delineate the facility area, and keep construction traffic off. Protect soils with fencing, plywood, etc.

E. Provide erosion control in the contributing drainage areas of the facility. Stabilize upslope areas.

F. Drainage should be directed away from bioretention facilities until upslope areas are stabilized. The concentration of fines could prevent post-construction infiltration and cause design failure.

G. If drainage is to be allowed through the facility during construction, leave or backfill at least 6 inches above the final grade. Temporarily cover the underdrain with plastic or fabric. Line or mulch the facility.

H. Bioretention facilities should remain outside the limit of disturbance to prevent soil compaction by heavy equipment. Protect bioretention areas with silt fence or construction fencing.

I. Verify installation of underdrain is correct prior to placing soil.

G.3.2 BSM Mixing and Placement

These guidelines should be followed to ensure proper BSM mixing and placement:

A. Erosion and sediment control practices during construction should be employed to protect the long-term functionality of the bioretention. The following practices shall be followed for this reason:

   1) Provide erosion control in the contributing drainage areas to the facility and stabilize upslope areas.

   2) Facilities should not be used as sediment control facilities, unless installation of all bioretention-related materials are withheld towards the end of construction, allowing the temporary use of the location as a sediment control facility, and appropriate excavation of sediment is provided prior to installation of bioretention materials.

B. Do not excavate, place soils, or amend soils during wet or saturated conditions.

C. Operate equipment adjacent to the facility. Equipment operation within the facility should be avoided to prevent soil compaction. If machinery must operate in the facility, use lightweight, low ground-contact pressure equipment.

D. If constructing an infiltrating facility, the subgrade should be ripped or scarified to a minimum depth of 9 inches on 3-foot centers to promote greater infiltration.

E. Consider the time of year and site working area when determining whether to mix BSM on-site or to import pre-mixed soil. It is recommended that the BSM should be mixed prior to being delivered to the site, and mixing is not allowed on-site during rainy season. If BSM mixing occurs on-site during the dry season, use an adjacent impervious area or mix BSM on plastic sheeting. (Mixing should not occur within the bioretention basin.)

F. Place soil in 6- to 12-inch lifts with machinery adjacent to the facility (to ensure equipment is not driven across soil). If working within the facility, to avoid over-compacting, place first lifts at far end from entrance and place backwards towards entrance.

G. Allow BSM lifts to settle naturally, lightly water to provide settlement and natural compaction between lifts. After lightly watering, allow soil to dry between lifts. Soil cannot be worked when saturated, so this method should be used with caution to ensure dry conditions. After all lifts are placed, wait a few days to check for settlement, and add additional media as needed. No mechanical compaction is allowed.

H. The long-term hydraulic conductivity rate should not be less than 5 inches per hour when tested with a double ring infiltrometer (in accordance with ASTM D3385, *Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer*), a single ring infiltrometer, a Modified Philip-Dunne Infiltrometer, or other approved methods.

I. Vehicular traffic and construction equipment shall not drive on, move onto, or disturb the BSM once placed and water-compacted.

J. Rake bioretention soil as needed to level out. Verify BSM elevations before applying mulch or installing plants.

Other Considerations:

- Protect adjacent infiltration systems including swales, soils, and porous pavement from sediment.
- Protect adjacent trees.

G.3.3 Mulch for Bioretention Facilities

According to the County of San Diego Water Conservation in Landscaping Ordinance (2010), a 2-inch layer of aged mulch shall be installed on the surface of the bioretention soil for planting of container stock and if no hydroseeding is to be installed.

Aged mulch reduces the ability of weeds to establish, keeps soil moist, and replenishes soil nutrients. Aged mulch can be obtained through soil suppliers or directly from commercial recycling yards. Apply 2 inches of well-aged shredded hardwood mulch once a year, preferably in June, after any weeding.

Compared to green wood chip or bark mulch, aged mulch has less of a tendency to float into overflow inlets during intense storms. Bark or wood chip mulch may be used on the side slopes of basins above the maximum water line. The project landscape architect may also specify another type of **non-floating** mulch, subject to approval by the local jurisdiction. Composted mulch should be avoided due to its potential to contribute pathogens and nutrients to the bioretention facility.

If hydroseeding is to be installed on the surface of the bioretention soil, no stabilized matrix shall be used in the hydroseed components or mix.

Appendix 5

BMP Sizing Spreadsheet Calculations

BMP INFORMATION AND SIZING SUMMARY
Newland Sierra Development
January 2015

BMP Name	Pervious	Impervious	Total Area (sf)	Total Area (ac)	BMP SIZING SPREADSHEET OUTPUT				BMP SIZE PROVIDED			
					Minimum BMP Area (sf)	Minimum Surface Volume (cf)	Minimum Subsurface Volume (cf)	Orifice Diameter (in)	Proposed BMP Area (sf)	Proposed BMP Surface Volume (cf)	Proposed BMP Subsurface Volume (cf)	Orifice Diameter (in)
Camino Mayor												
CM1	0	46,499	46,499	1.07	2,062	1,744	1,255	2.0	2,100	3,010	3,150	2.0
CM2	0	15,357	15,357	0.35	691	567	415	1.0	695	996	1,043	1.0
CM3	0	30,258	30,258	0.69	1,361	1,135	817	1.0	1,365	1,957	2,048	1.0
CM4	0	19,150	19,150	0.44	862	718	517	1.0	865	1,240	1,298	1.0
CM5	0	45,433	45,433	1.04	2,044	1,704	1,227	2.0	2,057	2,948	3,086	2.0
CM6	0	25,618	25,618	0.59	1,153	961	692	1.5	1,160	1,663	1,740	1.5
Hillside												
H1	23,964	44,505	68,469	1.57	2,110	1,759	1,266	2.0	2,120	3,039	3,180	2.0
H2	6,767	12,569	19,336	0.44	596	497	358	1.25	650	932	358	1.25
H3	41,200	76,514	117,714	2.70	3,629	3,024	5,475	3.5	3,650	5,232	5,475	3.5
H4	10,478	19,459	29,937	0.69	923	769	554	1.5	950	1,362	1,425	1.5
H5	10,478	19,458	29,936	0.69	923	769	554	1.5	950	1,362	1,425	1.5
H6	9,674	17,966	27,640	0.63	852	710	511	1.5	858	1,230	1,287	1.5
H7	8,593	15,957	24,550	0.56	757	631	454	1.5	760	1,089	1,140	1.5
H8	272,722	506,482	779,204	17.89	24,019	20,016	14,411	8.0	32,463	46,530	48,695	8.0
H9	45,260	141,515	186,775	4.29	6,572	5,477	3,943	4.0	7,425	10,643	11,138	4.0
H10	32,333	60,047	92,380	2.12	2,848	2,373	1,709	2.5	2,850	4,085	7,245	2.5
H11	18,314	34,012	52,326	1.20	1,613	1,344	968	2.0	1,650	2,365	2,475	2.0
H12	57,376	106,554	163,930	3.76	5,053	4,211	3,032	3.0	5,060	7,253	7,590	3.0
Knolls												
K1	66,437	66,437	132,874	3.05	3,289	2,741	1,973	3.0	3,300	4,730	4,950	3.0
K2	333,318	333,318	666,636	15.30	16,499	13,749	9,900	8.0	16,500	23,650	24,750	8.0
K3	82,147	82,147	164,294	3.77	4,066	3,389	2,440	4.0	4,068	5,831	6,102	4.0
K4	84,082	84,082	168,164	3.86	4,162	3,468	2,497	2.0	4,200	6,020	6,300	2.0
K5	90,852	90,852	181,704	4.17	4,497	3,748	2,698	4.0	4,500	6,450	6,750	4.0
K6	83,329	83,329	166,658	3.83	4,125	3,437	2,475	3.0	4,160	5,963	6,240	3.0
K7	86,850	86,850	173,700	3.99	4,299	3,583	2,579	3.0	4,300	6,163	6,450	3.0
K8	795,906	794,331	1,590,237	36.51	39,397	32,831	23,638	8.0	39,500	56,617	59,250	8.0
K9	315,977	35,109	351,086	8.06	3,002	2,502	1,801	5.0	3,007	4,310	4,511	5.0
Mesa												
M1	602,914	1,119,697	1,722,611	39.55	53,099	44,250	31,860	8.0	53,100	76,110	79,650	8.0
M2	200,818	372,949	573,767	13.17	7,686	14,739	10,612	6.0	17,690	25,356	26,535	6.0
M3	25,089	46,594	71,683	1.65	2,210	1,841	1,326	2.0	2,210	3,168	3,315	2.0
M4	44,607	82,841	127,448	2.93	3,928	3,274	2,357	3.0	3,930	5,633	5,895	3.0
M5	72,904	135,393	208,297	4.78	6,420	5,351	3,852	6.0	6,420	9,213	9,642	6.0
Summit												
S1	74,202	74,202	148,404	3.41	3,673	3,061	2,204	3.0	3,725	5,339	5,588	3.0
S2	216,739	216,739	433,478	9.95	10,729	8,940	6,437	4.0	13,250	18,992	19,875	4.0
S3	83,846	83,846	167,692	3.85	4,150	3,459	2,490	4.0	5,350	7,668	8,025	4.0
S4	66,142	66,142	132,284	3.04	3,275	2,728	1,964	3.0	3,380	4,845	5,070	3.0
S5	93,960	93,960	187,920	4.31	4,651	3,876	2,791	4.0	5,400	7,740	8,100	4.0
S6	65,064	65,064	130,128	2.99	3,220	2,684	1,932	4.0	3,400	4,873	5,100	4.0
S7	230,396	230,396	460,792	10.58	11,404	9,504	6,843	7.0	12,500	17,917	18,750	7.0
S8	126,345	126,345	252,690	5.80	6,254	5,212	3,752	4.0	6,400	9,173	9,600	4.0
S9	97,154	97,154	194,308	4.46	4,809	4,008	2,885	4.0	5,400	7,740	8,100	4.0
S10	6,005	54,048	60,053	1.38	2,459	2,049	1,476	2.0	2,700	3,870	4,050	2.0
Terraces												
T1	36,393	67,587	103,980	2.39	3,273	2,728	1,964	3.0	2,475	4,694	4,913	3.0
T2	4,264	38,375	42,639	0.98	1,746	1,455	1,048	4.0	1,750	2,508	2,625	4.0
T3	84,556	157,034	241,590	5.55	5,976	4,980	3,585	5.0	5,975	8,564	8,963	5.0
T4	34,530	64,126	98,656	2.26	3,097	2,581	1,858	3.0	3,100	4,443	4,650	3.0
T5	51,114	94,927	146,041	3.35	4,502	3,751	2,701	4.0	4,510	6,464	6,765	4.0
T6	94,869	176,184	271,053	6.22	8,355	6,963	5,013	5.0	8,355	11,976	12,533	5.0
T7	59,280	110,093	169,373	3.89	5,221	4,351	3,133	4.0	5,400	7,740	8,100	4.0
T8	30,651	91,953	122,604	2.81	4,276	3,563	2,565	3.0	4,315	6,185	6,473	3.0
T9	37,518	112,555	150,073	3.45	5,234	4,362	3,140	3.0	5,245	7,518	7,868	3.0

BMP INFORMATION AND SIZING SUMMARY
Newland Sierra Development
January 2015

Town Center												
TC1	128,315	128,315	256,629	5.89	6,723	5,605	4,034	3.0	6,740	9,661	10,110	3.0
TC2	96,682	179,552	276,234	6.34	8,515	7,095	5,109	4.0	8,515	12,205	12,773	4.0
TC3	35,794	202,835	238,629	5.48	10,272	8,566	6,163	5.0	10,280	14,735	15,420	5.0
TC4	8,292	46,989	55,281	1.27	2,391	1,994	1,435	3.0	2,400	3,440	3,600	5.0
TC5	12,154	68,874	81,028	1.86	3,795	3,247	2,337	2.0	3,930	5,633	5,895	2.0
TCR1	10,481	94,326	104,807	2.41	4,292	3,577	2,575	3.0	4,300	6,163	6,450	3.0
TCR2	16,220	145,984	162,204	3.72	6,950	5,794	4,170	3.0	7,580	10,865	11,370	3.0
TCR3	13,463	121,163	134,626	3.09	5,513	4,594	3,308	3.0	5,702	8,173	8,553	3.0
Valley												
V1	37,712	113,136	150,848	3.46	5,845	4,875	3,507	3.0	5,865	8,407	8,798	3.0
V2	37,675	113,025	150,700	3.46	5,840	4,870	3,504	3.0	8,540	8,371	8,760	3.0
V3	12,275	36,825	49,100	1.13	1,903	1,587	1,142	2.0	1,910	2,838	2,865	2.0
V4	18,137	54,412	72,549	1.67	2,811	2,345	1,687	2.5	2,820	4,042	4,230	2.5
V5	29,141	87,425	116,566	2.68	4,517	3,767	2,710	3.0	4,520	6,479	6,780	3.0
V6	11,927	35,783	47,710	1.10	1,849	1,542	1,109	2.0	1,850	2,652	2,775	2.0
V7	30,901	92,703	123,604	2.84	4,790	3,995	2,874	3.0	4,800	6,880	7,200	3.0
V8	56,224	56,224	112,448	2.58	3,092	2,579	1,855	3.0	3,100	4,443	4,650	3.0
V9	31,111	93,333	124,444	2.86	4,822	4,022	2,893	3.0	4,850	6,952	7,275	3.0
V10	108,438	325,315	433,753	9.96	16,802	14,013	10,081	5.0	16,800	24,080	25,200	5.0
V11	119,607	358,821	478,428	10.98	18,539	15,462	11,123	6.0	18,540	26,574	27,810	6.0
V12	9,881	9,881	19,762	0.45	543	453	326	1.0	545	781	818	1.0
V13	38,396	115,186	153,582	3.53	5,951	4,963	3,571	3.0	5,960	8,543	8,940	3.0
V14	56,011	168,029	224,040	5.14	8,659	7,221	5,195	4.0	8,660	12,413	12,990	4.0
V15	82,607	247,820	330,427	7.59	12,507	10,429	7,504	1.0	12,510	17,931	18,765	1.0
V16	59,728	59,728	119,456	2.74	3,285	2,740	1,971	2.0	3,300	4,730	4,950	2.0
VR1	13,154	118,382	131,536	3.02	5,985	4,991	3,591	5.0	5,985	8,579	8,978	5.0
VR2	4,378	39,402	43,780	1.01	1,991	1,661	1,195	5.0	2,000	2,867	3,000	5.0

CAMINO MAYOR
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM1-D-S-PP		D	Steep	Pervious	0.1	0.045	0.0375	0.027			
CM1-D-S-PI	46499	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2092	1744	1255
Total BMP Area	46499							Minimum BMP Size	2092.455	1744	1255
								Proposed BMP Size*	2100	3010	3150
								Minimum Ponding Depth		2.76	in
								Maximum Ponding Depth		254.08	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM1-D-S-PP		D	Scrub	Steep				
CM1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.067	0.187	**4.57**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.187	**4.57**	**2.41**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM2-D-S-PP		D	Steep	Pervious	0.1	0.045	0.0375	0.027			
CM2-D-S-PI	15357	D	Steep	Impervious	1.0	0.045	0.0375	0.027	691	576	415
Total BMP Area	15357										

Minimum BMP Size	691.065	576	415
Proposed BMP Size*	695	996	1043
Minimum Ponding Depth		2.74	in
Maximum Ponding Depth		191.93	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM2-D-S-PP		D	Scrub	Steep				
CM2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.353	0.062	**1.51**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.062	**1.51**	**1.39**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM3-D-S-PP		D	Steep	Pervious	0.1	0.045	0.0375	0.027			
CM3-D-S-PI	30258	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1362	1135	817
Total BMP Area	30258							Minimum BMP Size	1361.61	1135	817
								Proposed BMP Size*	1365	1957	2048
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		97.72	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM3-D-S-PP		D	Scrub	Steep				
CM3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.695	0.122	**2.98**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.122	**2.98**	**1.95**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	9.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM4-D-S-PP		D	Steep	Pervious	0.1	0.045	0.0375	0.027			
CM4-D-S-PI	19150	D	Steep	Impervious	1.0	0.045	0.0375	0.027	862	718	517
Total BMP Area	19150							Minimum BMP Size	861.75	718	517
								Proposed BMP Size*	865	1240	1298
									Minimum Ponding Depth	2.76	in
									Maximum Ponding Depth	154.21	in
									Selected Ponding Depth	10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM4-D-S-PP		D	Scrub	Steep				
CM4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.440	0.077	**1.88**

0.077	**1.88**	**1.55**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM5-D-S-PP		D	Steep	Pervious	0.1	0.045	0.0375	0.027			
CM5-D-S-PI	45433	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2044	1704	1227
Total BMP Area	45433							Minimum BMP Size	2044.485	1704	1227
								Proposed BMP Size*	2057	2948	3086
								Minimum Ponding Depth		2.74	in
								Maximum Ponding Depth		259.39	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM5-D-S-PP		D	Scrub	Steep				
CM5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.043	0.183	**4.47**

0.183	**4.47**	**2.39**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM4-D-S-PP		D	Steep	Pervious	0.1	0.045	0.0375	0.027			
CM4-D-S-PI	25618	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1153	961	692
Total BMP Area	25618							Minimum BMP Size	1152.81	961	692
								Proposed BMP Size*	1160	1663	1740
								Minimum Ponding Depth		2.74	in
								Maximum Ponding Depth		258.73	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM4-D-S-PP		D	Scrub	Steep				
CM4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.588	0.103	**2.52**

0.103	**2.52**	**1.79**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

HILLSIDE
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H1-D-S-PP	23964	D	Steep	Pervious	0.1	0.045	0.0375	0.027	108	90	65
H1-D-S-PI	44505	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2003	1669	1202
Total BMP Area	68469							Minimum BMP Size	2110.563	1759	1266
								Proposed BMP Size*	2120	3039	3180
								Minimum Ponding Depth		2.76	in
								Maximum Ponding Depth		251.68	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.550	0.097	**2.36**
H1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.022	0.179	**4.38**

0.276	**6.74**	**2.93**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H2-D-S-PP	3831	D	Steep	Pervious	0.1	0.045	0.0375	0.027	17	14	10
H2-D-S-PI	7116	D	Steep	Impervious	1.0	0.045	0.0375	0.027	320	267	192
H2-B-S-PP	2936	B	Steep	Pervious	0.1	N/A	N/A	N/A	N/A	N/A	N/A
H2-B-S-PI	5453	B	Steep	Impervious	1.0	N/A	N/A	N/A	N/A	N/A	N/A
Total BMP Area	19336							Minimum BMP Size	337.4595	281	202
								Proposed BMP Size*	400	573	600
								Minimum Ponding Depth		1.24	in
								Maximum Ponding Depth		521.05	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.088	0.015	**0.38**
H2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.163	0.029	**0.70**
H2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.067	0.009	**0.21**
H2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.125	0.016	**0.39**

0.068	**1.67**	**1.46**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.050	**1.23**	**1.25**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H3-B-S-PP	3551	B	Steep	Pervious	0.1	N/A	N/A	N/A	N/A	N/A	N/A
H3-B-S-PI	6595	B	Steep	Impervious	1.0	N/A	N/A	N/A	N/A	N/A	N/A
H3-D-S-PP	37951	D	Steep	Pervious	0.1	0.045	0.0375	0.027	171	142	102
H3-D-S-PI	70480	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3172	2643	1903
Total BMP Area	118577							Minimum BMP Size	3342.3795	2785	2005
								Proposed BMP Size*	3500	5017	5250
								Minimum Ponding Depth		2.35	in
								Maximum Ponding Depth		466.86	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.082	0.010	**0.25**
H3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.151	0.019	**0.47**
H3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.871	0.153	**3.73**
H3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.618	0.284	**6.93**

0.466	**11.39**	**3.81**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.394	**9.62**	**3.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.1

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H4-B-S-PP	10478	D	Steep	Pervious	0.1	0.045	0.0375	0.027	47	39	28
H4-B-S-PI	19459	D	Steep	Impervious	1.0	0.045	0.0375	0.027	876	730	525
Total BMP Area	29937							Minimum BMP Size	922.806	769	554
								Proposed BMP Size*	950	1362	1425
								Minimum Ponding Depth		2.51	in
								Maximum Ponding Depth		315.92	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H4-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.241	0.030	**0.74**
H4-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.447	0.057	**1.38**

0.087	**2.12**	**1.64**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H5-B-S-PP	10059	D	Steep	Pervious	0.1	0.045	0.0375	0.027	45	38	27
H5-B-S-PI	18681	D	Steep	Impervious	1.0	0.045	0.0375	0.027	841	701	504
Total BMP Area	28740										

Minimum BMP Size	885.9105	738	532
Proposed BMP Size*	1000	1433	1500
Minimum Ponding Depth		1.66	in
Maximum Ponding Depth		300.13	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.231	0.029	**0.71**
H5-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.429	0.054	**1.32**

0.083	**2.04**	**1.61**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H6-B-S-PP	9674	D	Steep	Pervious	0.1	0.045	0.0375	0.027	44	36	26
H6-B-S-PI	17966	D	Steep	Impervious	1.0	0.045	0.0375	0.027	808	674	485
Total BMP Area	27640							Minimum BMP Size	852.003	710	511
								Proposed BMP Size*	858	1230	1287
								Minimum Ponding Depth		2.73	in
								Maximum Ponding Depth		349.80	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H6-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.222	0.028	**0.69**
H6-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.412	0.052	**1.27**

0.080	**1.96**	**1.58**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H7-B-S-PP	8592	D	Steep	Pervious	0.1	0.045	0.0375	0.027	39	32	23
H7-B-S-PI	15958	D	Steep	Impervious	1.0	0.045	0.0375	0.027	718	598	431
Total BMP Area	24550										

Minimum BMP Size	756.774	631	454
Proposed BMP Size*	760	1089	1140
Minimum Ponding Depth		2.76	in
Maximum Ponding Depth		175.51	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H7-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.197	0.025	**0.61**
H7-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.366	0.046	**1.13**

0.071	**1.74**	**1.49**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H8-B-S-PP	234691	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1056	880	634
H8-B-S-PI	527434	D	Steep	Impervious	1.0	0.045	0.0375	0.027	23735	19779	14241
H8-D-S-PP	53712	D	Steep	Pervious	0.1	0.045	0.0375	0.027	242	201	145
H8-D-S-PI	141702	D	Steep	Impervious	1.0	0.045	0.0375	0.027	6377	5314	3826
Total BMP Area	957539										

Minimum BMP Size	31408.9335	26174	18845
Proposed BMP Size*	31450	45078	47175
Minimum Ponding Depth		2.79	in
Maximum Ponding Depth		271.44	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H8-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	5.388	0.682	**16.64**
H8-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	12.108	1.532	**37.40**
H8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.233	0.216	**5.28**
H8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	3.253	0.571	**13.94**

3.001	**73.27**	**9.66**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

2.058	**50.27**	**8.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H9-B-S-PP	12087	D	Steep	Pervious	0.1	0.045	0.0375	0.027	54	45	33
H9-B-S-PI	32946	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1483	1235	890
H9-D-S-PP	33615	D	Steep	Pervious	0.1	0.045	0.0375	0.027	151	126	91
H9-D-S-PI	108587	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4886	4072	2932
Total BMP Area	187235										

Minimum BMP Size	6574.644	5479	3945
Proposed BMP Size*	6930	9933	10395
Minimum Ponding Depth		2.29	in
Maximum Ponding Depth		307.97	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H9-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.277	0.035	**0.86**
H9-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.756	0.096	**2.34**
H9-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.772	0.135	**3.31**
H9-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.493	0.437	**10.68**

0.704	**17.18**	**4.68**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.1

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H10-B-S-PP	32333	D	Steep	Pervious	0.1	0.045	0.0375	0.027	145	121	87
H10-B-S-PI	60047	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2702	2252	1621
	32333										
Total BMP Area	124713										

Minimum BMP Size	2847.6135	2373	1709
Proposed BMP Size*	2875	4121	4313
Minimum Ponding Depth		2.70	in
Maximum Ponding Depth		289.98	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H10-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.742	0.094	**2.29**
H10-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.378	0.174	**4.26**
	Lake Wohlford					0.742		

0.268	**6.55**	**2.89**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H11	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H11-B-S-PP	18314	D	Steep	Pervious	0.1	0.045	0.0375	0.027	82	69	49
H11-B-S-PI	34012	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1531	1275	918
Total BMP Area	52326							Minimum BMP Size	1612.953	1344	968
								Proposed BMP Size*	2000	2867	3000
								Minimum Ponding Depth		0.86	in
								Maximum Ponding Depth		266.78	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H11	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H11-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.420	0.053	**1.30**
H11-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.781	0.099	**2.41**

0.152	**3.71**	**2.17**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H12	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H12-B-S-PP	6857	D	Steep	Pervious	0.1	0.045	0.0375	0.027	31	26	19
H12-B-S-PI	12735	D	Steep	Impervious	1.0	0.045	0.0375	0.027	573	478	344
H12-D-S-PP	49806	D	Steep	Pervious	0.1	0.045	0.0375	0.027	224	187	134
H12-D-S-PI	92498	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4162	3469	2497
Total BMP Area	161896										

Minimum BMP Size	4990.4685	4159	2994
Proposed BMP Size*	5630	8070	8445
Minimum Ponding Depth		1.66	in
Maximum Ponding Depth		213.23	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H12	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H12-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.157	0.020	**0.49**
H12-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.292	0.037	**0.90**
H12-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.143	0.201	**4.90**
H12-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.123	0.373	**9.10**

0.630	**15.39**	**4.43**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

KNOLLS
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K1-B-S-PP	66437	D	Steep	Pervious	0.1	0.045	0.0375	0.027	299	249	179
K1-B-S-PI	66437	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2990	2491	1794
Total BMP Area	132874							Minimum BMP Size	3288.6315	2741	1973
								Proposed BMP Size*	3300	4730	4950
								Minimum Ponding Depth		2.77	in
								Maximum Ponding Depth		363.79	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K1-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.525	0.268	**6.54**
K1-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.525	0.268	**6.54**

0.535	**13.07**	**4.08**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K2-D-S-PP	44850	D	Steep	Pervious	0.1	0.045	0.0375	0.027	202	168	121
K2-D-S-PI	44850	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2018	1682	1211
K2-B-S-PP	288468	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1298	1082	779
K2-B-S-PI	288468	D	Steep	Impervious	1.0	0.045	0.0375	0.027	12981	10818	7789
Total BMP Area	666636										

Minimum BMP Size	16499.241	13749	9900
Proposed BMP Size*	16500	23650	24750
Minimum Ponding Depth		2.80	in
Maximum Ponding Depth		517.39	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.030	0.181	**4.41**
K2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.030	0.181	**4.41**
K2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	6.622	0.838	**20.46**
K2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	6.622	0.838	**20.46**

2.037	**49.74**	**7.96**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

2.058	**50.27**	**8.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K3-B-S-PP	82147	D	Steep	Pervious	0.1	0.045	0.0375	0.027	370	308	222
K3-B-S-PI	82147	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3697	3081	2218
Total BMP Area	164294							Minimum BMP Size	4066.2765	3389	2440
								Proposed BMP Size*	4068	5831	6102
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		524.64	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K3-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.886	0.331	**8.08**
K3-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.886	0.331	**8.08**

0.662	**16.16**	**4.54**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K4-D-S-PP	10998	D	Steep	Pervious	0.1	0.045	0.0375	0.027	49	41	30
K4-D-S-PI	10998	D	Steep	Impervious	1.0	0.045	0.0375	0.027	495	412	297
K4-B-S-PP	73084	D	Steep	Pervious	0.1	0.045	0.0375	0.027	329	274	197
K4-B-S-PI	73084	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3289	2741	1973
Total BMP Area	168164										

Minimum BMP Size	4162.059	3468	2497
Proposed BMP Size*	4200	6020	6300
Minimum Ponding Depth		2.71	in
Maximum Ponding Depth		127.04	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.252	0.044	**1.08**
K4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.252	0.044	**1.08**
K4-B-S-PP	Lake Wohlford					1.678		
K4-B-S-PI	Lake Wohlford					1.678		

0.089	**2.16**	**1.66**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	7.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K5-D-S-PP	18640	D	Steep	Pervious	0.1	0.045	0.0375	0.027	84	70	50
K5-D-S-PI	18640	D	Steep	Impervious	1.0	0.045	0.0375	0.027	839	699	503
K5-B-S-PP	72212	D	Steep	Pervious	0.1	0.045	0.0375	0.027	325	271	195
K5-B-S-PI	72212	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3250	2708	1950
Total BMP Area	181704										

Minimum BMP Size	4497.174	3748	2698
Proposed BMP Size*	4500	6450	6750
Minimum Ponding Depth		2.79	in
Maximum Ponding Depth		474.27	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.428	0.075	**1.83**
K5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.428	0.075	**1.83**
K5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.658	0.210	**5.12**
K5-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.658	0.210	**5.12**

0.570	**13.91**	**4.21**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K6-B-S-PP	83329	D	Steep	Pervious	0.1	0.045	0.0375	0.027	375	312	225
K6-B-S-PI	83329	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3750	3125	2250
Total BMP Area	166658							Minimum BMP Size	4124.7855	3437	2475
								Proposed BMP Size*	4160	5963	6240
								Minimum Ponding Depth		2.72	in
								Maximum Ponding Depth		288.58	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K6-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.913	0.242	**5.91**
K6-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.913	0.242	**5.91**

0.484	**11.82**	**3.88**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K7-B-S-PP	86850	D	Steep	Pervious	0.1	0.045	0.0375	0.027	391	326	234
K7-B-S-PI	86850	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3908	3257	2345
Total BMP Area	173700							Minimum BMP Size	4299.075	3583	2579
								Proposed BMP Size*	4300	6163	6450
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		279.19	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K7-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.994	0.252	**6.16**
K7-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.994	0.252	**6.16**

0.504	**12.32**	**3.96**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K8-B-S-PP	794331	D	Steep	Pervious	0.1	0.045	0.0375	0.027	3574	2979	2145
K8-B-S-PI	794331	D	Steep	Impervious	1.0	0.045	0.0375	0.027	35745	29787	21447
K8-D-S-PP	1575	D	Steep	Pervious	0.1	0.045	0.0375	0.027	7	6	4
K8-D-S-PI	1575	D	Steep	Impervious	1.0	0.045	0.0375	0.027	71	59	43
Total BMP Area	1591812							Minimum BMP Size	39397.347	32831	23638
								Proposed BMP Size*	39500	56617	59250
								Minimum Ponding Depth		2.77	in
								Maximum Ponding Depth		216.13	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K8-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	18.235	2.307	**56.33**
K8-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	18.235	2.307	**56.33**
K8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.036	0.006	**0.15**
K8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.036	0.006	**0.15**

4.626	**112.97**	**11.99**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

2.058	**50.27**	**8.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K9-B-S-PP	315977	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1422	1185	853
K9-B-S-PI	35109	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1580	1317	948
Total BMP Area	351086							Minimum BMP Size	3001.8015	2502	1801
								Proposed BMP Size*	3007	4310	4511
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		1108.99	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K9-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	7.254	0.918	**22.41**
K9-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.806	0.102	**2.49**

1.020	**24.90**	**5.63**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	0.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

MESA
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M1-D-S-PP	12721	D	Steep	Pervious	0.1	0.045	0.0375	0.027	57	48	34
M1-D-S-PI	23625	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1063	886	638
M1-B-S-PP	590193	D	Steep	Pervious	0.1	0.045	0.0375	0.027	2656	2213	1594
M1-B-S-PI	1096072	D	Steep	Impervious	1.0	0.045	0.0375	0.027	49323	41103	29594
Total BMP Area	1722611										

Minimum BMP Size	53099.478	44250	31860
Proposed BMP Size*	53100	76110	79650
Minimum Ponding Depth		2.80	in
Maximum Ponding Depth		160.77	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.292	0.051	**1.25**
M1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.542	0.095	**2.32**
M1-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	13.549	2.378	**58.06**
M1-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	25.162	4.416	**107.83**
		D	Scrub	Steep				
		D	Scrub	Steep				

6.940	**169.47**	**14.69**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

2.058	**50.27**	**8.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M2-D-S-PP	74431	D	Steep	Pervious	0.1	0.045	0.0375	0.027	335	279	201
M2-D-S-PI	138230	D	Steep	Impervious	1.0	0.045	0.0375	0.027	6220	5184	3732
M2-B-S-PP	126387	D	Steep	Pervious	0.1	0.045	0.0375	0.027	569	474	341
M2-B-S-PI	234719	D	Steep	Impervious	1.0	0.045	0.0375	0.027	10562	8802	6337
Total BMP Area	573767										

Minimum BMP Size	17686.386	14739	10612
Proposed BMP Size*	17690	25356	26535
Minimum Ponding Depth		2.80	in
Maximum Ponding Depth		271.45	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.709	0.300	**7.32**
M2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	3.173	0.557	**13.60**
M2-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.901	0.509	**12.43**
M2-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	5.388	0.946	**23.09**

2.312	**56.45**	**8.48**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M3-B-S-PP	25089	D	Steep	Pervious	0.1	0.045	0.0375	0.027	113	94	68
M3-B-S-PI	46594	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2097	1747	1258
Total BMP Area	71683							Minimum BMP Size	2209.6305	1841	1326
								Proposed BMP Size*	2210	3168	3315
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		241.43	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M3-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.576	0.101	**2.47**
M3-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.070	0.188	**4.58**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.289	**7.05**	**3.00**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M4-B-S-PP	44607	D	Steep	Pervious	0.1	0.045	0.0375	0.027	201	167	120
M4-B-S-PI	82841	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3728	3107	2237
Total BMP Area	127448							Minimum BMP Size	3928.5765	3274	2357
								Proposed BMP Size*	3930	5633	5895
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		305.47	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M4-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.024	0.180	**4.39**
M4-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.902	0.334	**8.15**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.513	**12.54**	**4.00**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.1

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M5-D-S-PP	64113	D	Steep	Pervious	0.1	0.045	0.0375	0.027	289	240	173
M5-D-S-PI	119066	D	Steep	Impervious	1.0	0.045	0.0375	0.027	5358	4465	3215
M5-B-S-PP	8791	D	Steep	Pervious	0.1	0.045	0.0375	0.027	40	33	24
M5-B-S-PI	16327	D	Steep	Impervious	1.0	0.045	0.0375	0.027	735	612	441
Total BMP Area	208297										

Minimum BMP Size	6420.753	5351	3852
Proposed BMP Size*	6428	9213	9642
Minimum Ponding Depth		2.79	in
Maximum Ponding Depth		747.05	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.472	0.258	**6.31**
M5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.733	0.480	**11.71**
M5-B-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.202	0.035	**0.86**
M5-B-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.375	0.066	**1.61**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.839	**20.49**	**5.11**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

SUMMIT
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S1-D-S-PP	73821	D	Steep	Pervious	0.1	0.045	0.0375	0.027	332	277	199
S1-D-S-PI	73821	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3322	2768	1993
S1-B-S-PP	381	D	Steep	Pervious	0.1	0.045	0.0375	0.027	2	1	1
S1-B-S-PI	381	D	Steep	Impervious	1.0	0.045	0.0375	0.027	17	14	10
Total BMP Area	148404										

Minimum BMP Size	3672.999	3061	2204
Proposed BMP Size*	3725	5339	5588
Minimum Ponding Depth		2.66	in
Maximum Ponding Depth		322.28	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.695	0.297	**7.26**
S1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.695	0.297	**7.26**
S1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.009	0.001	**0.03**
S1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.009	0.001	**0.03**

0.597	**14.58**	**4.31**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S2-D-S-PP	186096	D	Steep	Pervious	0.1	0.045	0.0375	0.027	837	698	502
S2-D-S-PI	186096	D	Steep	Impervious	1.0	0.045	0.0375	0.027	8374	6979	5025
S2-B-S-PP	30643	D	Steep	Pervious	0.1	0.045	0.0375	0.027	138	115	83
S2-B-S-PI	30643	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1379	1149	827
Total BMP Area	433478										

Minimum BMP Size	10728.5805	8940	6437
Proposed BMP Size*	13250	18992	19875
Minimum Ponding Depth		0.90	in
Maximum Ponding Depth		161.07	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	4.272	0.750	**18.31**
S2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.272	0.750	**18.31**
S2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.703	0.089	**2.17**
S2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.703	0.089	**2.17**

1.678	**40.96**	**7.22**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S3-D-S-PP	83846	D	Steep	Pervious	0.1	0.045	0.0375	0.027	377	314	226
S3-D-S-PI	83846	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3773	3144	2264
Total BMP Area	167692										
								Minimum BMP Size	4150.377	3459	2490
								Proposed BMP Size*	5350	7668	8025
								Minimum Ponding Depth		0.56	in
								Maximum Ponding Depth		398.92	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.925	0.338	**8.25**
S3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.925	0.338	**8.25**

0.676	**16.50**	**4.58**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S4-D-S-PP	66142	D	Steep	Pervious	0.1	0.045	0.0375	0.027	298	248	179
S4-D-S-PI	66142	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2976	2480	1786
Total BMP Area	132284							Minimum BMP Size	3274.029	2728	1964
								Proposed BMP Size*	3380	4845	5070
								Minimum Ponding Depth		2.49	in
								Maximum Ponding Depth		355.18	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.518	0.266	**6.51**
S4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.518	0.266	**6.51**

0.533	**13.01**	**4.07**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S5-D-S-PP	93960	D	Steep	Pervious	0.1	0.045	0.0375	0.027	423	352	254
S5-D-S-PI	93960	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4228	3524	2537
Total BMP Area	187920										

Minimum BMP Size	4651.02	3876	2791
Proposed BMP Size*	5400	7740	8100
Minimum Ponding Depth		1.41	in
Maximum Ponding Depth		395.23	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.157	0.379	**9.24**
S5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.157	0.379	**9.24**

0.757	**18.49**	**4.85**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S6-D-S-PP	65064	D	Steep	Pervious	0.1	0.045	0.0375	0.027	293	244	176
S6-D-S-PI	65064	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2928	2440	1757
Total BMP Area	130128							Minimum BMP Size	3220.668	2684	1932
								Proposed BMP Size*	3400	4873	5100
								Minimum Ponding Depth		2.27	in
								Maximum Ponding Depth		627.72	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S6-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.494	0.262	**6.40**
S6-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.494	0.262	**6.40**

0.524	**12.80**	**4.04**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S7-D-S-PP	230396	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1037	864	622
S7-D-S-PI	230396	D	Steep	Impervious	1.0	0.045	0.0375	0.027	10368	8640	6221
Total BMP Area	460792										

Minimum BMP Size	11404.602	9504	6843
Proposed BMP Size*	12500	17917	18750
Minimum Ponding Depth		1.92	in
Maximum Ponding Depth		522.89	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S7-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	5.289	0.928	**22.67**
S7-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	5.289	0.928	**22.67**

1.856	**45.33**	**7.60**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.576	**38.48**	**7.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S8-D-S-PP	126345	D	Steep	Pervious	0.1	0.045	0.0375	0.027	569	474	341
S8-D-S-PI	126345	D	Steep	Impervious	1.0	0.045	0.0375	0.027	5686	4738	3411
Total BMP Area	252690							Minimum BMP Size	6254.0775	5212	3752
								Proposed BMP Size*	6400	9173	9600
								Minimum Ponding Depth		2.57	in
								Maximum Ponding Depth		333.47	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.900	0.509	**12.43**
S8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.900	0.509	**12.43**

1.018	**24.86**	**5.63**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S9-D-S-PP	97154	D	Steep	Pervious	0.1	0.045	0.0375	0.027	437	364	262
S9-D-S-PI	97154	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4372	3643	2623
Total BMP Area	194308							Minimum BMP Size	4809.123	4008	2885
								Proposed BMP Size*	5400	7740	8100
								Minimum Ponding Depth		1.71	in
								Maximum Ponding Depth		395.23	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S9-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.230	0.391	**9.56**
S9-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.230	0.391	**9.56**

0.783	**19.12**	**4.93**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S10-D-S-PP	6005	D	Steep	Pervious	0.1	0.045	0.0375	0.027	27	23	16
S10-D-S-PI	54048	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2432	2027	1459
Total BMP Area	60053							Minimum BMP Size	2459.1825	2049	1476
								Proposed BMP Size*	2700	3870	4050
								Minimum Ponding Depth		1.91	in
								Maximum Ponding Depth		197.61	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S10-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.138	0.024	**0.59**
S10-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.241	0.218	**5.32**

0.242	**5.91**	**2.74**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

TERRACES
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T1-C-S-PP	6952	C	Steep	Pervious	0.1	0.05	0.0417	0.03	35	29	21
T1-C-S-PI	12910	C	Steep	Impervious	1.0	0.05	0.0417	0.03	646	538	387
T1-D-S-PP	29441	D	Steep	Pervious	0.1	0.045	0.0375	0.027	132	110	79
T1-D-S-PI	54677	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2460	2050	1476
Total BMP Area	103980							Minimum BMP Size	3273.2095	2728	1964
								Proposed BMP Size*	3275	4694	4913
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		366.57	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T1-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.160	0.024	**0.59**
T1-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.296	0.045	**1.09**
T1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.676	0.119	**2.90**
T1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.255	0.220	**5.38**

0.408	**9.96**	**3.56**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T2-D-S-PP	4264	D	Steep	Pervious	0.1	0.045	0.0375	0.027	19	16	12
T2-D-S-PI	38375	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1727	1439	1036
Total BMP Area	42639							Minimum BMP Size	1746.063	1455	1048
								Proposed BMP Size*	1750	2508	2625
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		1219.56	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.098	0.017	**0.42**
T2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.881	0.155	**3.78**
		B	Scrub	Steep				
		B	Scrub	Steep				

0.172	**4.19**	**2.31**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	0.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T3-B-S-PP	16707	B	Steep	Pervious	0.1	N/A	N/A	N/A	N/A	N/A	N/A
T3-B-S-PI	31028	B	Steep	Impervious	1.0	N/A	N/A	N/A	N/A	N/A	N/A
T3-C-S-PP	20372	D	Steep	Pervious	0.1	0.045	0.0375	0.027	92	76	55
T3-C-S-PI	37834	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1703	1419	1022
T3-D-S-PP	47477	D	Steep	Pervious	0.1	0.045	0.0375	0.027	214	178	128
T3-D-S-PI	88172	D	Steep	Impervious	1	0.045	0.0375	0.027	3968	3306	2381
Total BMP Area	241590							Minimum BMP Size	5975.5905	4980	3585
								Proposed BMP Size*	5975	8564	8963
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		558.12	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.384	0.049	**1.18**
T3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.712	0.090	**2.20**
T3-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.468	0.071	**1.72**
T3-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.869	0.131	**3.20**
T3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.090	0.191	**4.67**
T3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.024	0.355	**8.67**

0.887	**21.66**	**5.25**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T4-D-S-PP	28812	D	Steep	Pervious	0.1	0.045	0.0375	0.027	130	108	78
T4-D-S-PI	53507	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2408	2007	1445
T4-C-S-PP	5718	C	Steep	Pervious	0.1	0.05	0.0417	0.03	29	24	17
T4-C-S-PI	10619	C	Steep	Impervious	1.0	0.05	0.0417	0.03	531	443	319
Total BMP Area	98656										

Minimum BMP Size	3097.009	2581	1858
Proposed BMP Size*	3100	4443	4650
Minimum Ponding Depth		2.79	in
Maximum Ponding Depth		387.26	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.661	0.116	**2.83**
T4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.228	0.216	**5.26**
T4-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.131	0.020	**0.48**
T4-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.244	0.037	**0.90**

0.388	**9.48**	**3.47**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T5-D-S-PP	49804	D	Steep	Pervious	0.1	0.045	0.0375	0.027	224	187	134
T5-D-S-PI	92494	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4162	3469	2497
T5-C-S-PP	1310	D	Steep	Pervious	0.1	0.045	0.0375	0.027	6	5	4
T5-C-S-PI	2433	D	Steep	Impervious	1.0	0.045	0.0375	0.027	109	91	66
Total BMP Area	146041										

Minimum BMP Size	4501.728	3751	2701
Proposed BMP Size*	4510	6464	6765
Minimum Ponding Depth		2.78	in
Maximum Ponding Depth		473.22	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.143	0.201	**4.90**
T5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.123	0.373	**9.10**
T5-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.030	0.005	**0.11**
T5-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.056	0.008	**0.21**

0.586	**14.32**	**4.27**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T6-D-S-PP	94230	D	Steep	Pervious	0.1	0.045	0.0375	0.027	424	353	254
T6-D-S-PI	174998	D	Steep	Impervious	1.0	0.045	0.0375	0.027	7875	6562	4725
T6-B-S-PP	639	D	Steep	Pervious	0.1	0.045	0.0375	0.027	3	2	2
T6-B-S-PI	1186	D	Steep	Impervious	1.0	0.045	0.0375	0.027	53	44	32
Total BMP Area	271053							Minimum BMP Size	8355.1905	6963	5013
								Proposed BMP Size*	8355	11976	12533
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		399.13	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T6-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.163	0.380	**9.27**
T6-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.017	0.705	**17.22**
T6-B-S-PP	Lake Wohlford					0.015		
T6-B-S-PI	Lake Wohlford					0.027		

1.085	**26.49**	**5.81**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T7-D-S-PP	11389	D	Steep	Pervious	0.1	0.045	0.0375	0.027	51	43	31
T7-D-S-PI	21152	D	Steep	Impervious	1.0	0.045	0.0375	0.027	952	793	571
T7-B-S-PP	47891	D	Steep	Pervious	0.1	0.045	0.0375	0.027	216	180	129
T7-B-S-PI	88941	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4002	3335	2401
Total BMP Area	169373										

Minimum BMP Size	5220.945	4351	3133
Proposed BMP Size*	5400	7740	8100
Minimum Ponding Depth		2.47	in
Maximum Ponding Depth		395.23	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T7-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.261	0.046	**1.12**
T7-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.486	0.085	**2.08**
T7-B-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	1.099	0.166	**4.05**
T7-B-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	2.042	0.308	**7.53**

0.605	**14.78**	**4.34**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T8-B-S-PP	30651	D	Steep	Pervious	0.1	0.045	0.0375	0.027	138	115	83
T8-B-S-PI	91953	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4138	3448	2483
Total BMP Area	122604							Minimum BMP Size	4275.8145	3563	2565
								Proposed BMP Size*	4315	6185	6473
								Minimum Ponding Depth		2.71	in
								Maximum Ponding Depth		278.22	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T8-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.704	0.089	**2.17**
T8-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.111	0.267	**6.52**

0.356	**8.69**	**3.33**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T9-B-S-PP	37518	D	Steep	Pervious	0.1	0.045	0.0375	0.027	169	141	101
T9-B-S-PI	112555	D	Steep	Impervious	1.0	0.045	0.0375	0.027	5065	4221	3039
Total BMP Area	150073							Minimum BMP Size	5233.806	4362	3140
								Proposed BMP Size*	5245	7518	7868
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		228.89	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T9-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.861	0.109	**2.66**
T9-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.584	0.327	**7.98**

0.436	**10.64**	**3.68**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

TOWN CENTER
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC1-B-S-PP	67602.5	C	Steep	Pervious	0.1	0.05	0.0417	0.03	338	282	203
TC1-B-S-PI	67602.5	C	Steep	Impervious	1.0	0.05	0.0417	0.03	3380	2819	2028
TC1-D-S-PP	60712	D	Steep	Pervious	0.1	0.045	0.0375	0.027	273	228	164
TC1-D-S-PI	60712	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2732	2277	1639
Total BMP Area	256629										

Minimum BMP Size	6723.3815	5605	4034
Proposed BMP Size*	6740	9661	10110
Minimum Ponding Depth		2.78	in
Maximum Ponding Depth		178.12	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC1-B-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	1.552	0.234	**5.72**
TC1-B-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	1.552	0.234	**5.72**
TC1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.394	0.245	**5.97**
TC1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.394	0.245	**5.97**

0.958	**23.39**	**5.46**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC2-D-S-PP	35412	D	Steep	Pervious	0.1	0.045	0.0375	0.027	159	133	96
TC2-D-S-PI	65766	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2959	2466	1776
TC2-B-S-PP	61270	D	Steep	Pervious	0.1	0.045	0.0375	0.027	276	230	165
TC2-B-S-PI	113786	D	Steep	Impervious	1.0	0.045	0.0375	0.027	5120	4267	3072
Total BMP Area	276234										

Minimum BMP Size	8514.909	7096	5109
Proposed BMP Size*	8515	12205	12773
Minimum Ponding Depth		2.80	in
Maximum Ponding Depth		250.64	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.813	0.143	**3.48**
TC2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.510	0.265	**6.47**
TC2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.407	0.178	**4.34**
TC2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.612	0.330	**8.07**

0.916	**22.37**	**5.34**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T3-B-S-PP	1700	D	Steep	Pervious	0.1	0.045	0.0375	0.027	8	6	5
T3-B-S-PI	9637	D	Steep	Impervious	1.0	0.045	0.0375	0.027	434	361	260
T3-C-S-PP	34094	C	Steep	Pervious	0.1	0.05	0.0417	0.03	170	142	102
T3-C-S-PI	193198	C	Steep	Impervious	1.0	0.05	0.0417	0.03	9660	8056	5796
Total BMP Area	238629							Minimum BMP Size	10271.685	8566	6163
								Proposed BMP Size*	10280	14735	15420
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		324.39	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.039	0.005	**0.12**
T3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.221	0.028	**0.68**
T3-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.783	0.118	**2.89**
T3-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	4.435	0.670	**16.35**

0.821	**20.04**	**5.05**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC4-C-S-PP	8292	C	Steep	Pervious	0.1	0.05	0.0417	0.03	41	35	25
TC4-C-S-PI	46989	C	Steep	Impervious	1.0	0.05	0.0417	0.03	2349	1959	1410
Total BMP Area	55281										
								Minimum BMP Size	2390.91	1994	1435
								Proposed BMP Size*	2400	3440	3600
									Minimum Ponding Depth	2.77	in
									Maximum Ponding Depth	1389.48	in
									Selected Ponding Depth	10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC4-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.190	0.024	**0.59**
TC4-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.079	0.136	**3.33**
		C	Scrub	Steep				
		C	Scrub	Steep				

0.161	**3.92**	**2.23**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	0.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	TC5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC5-B-S-PP	5387	D	Steep	Pervious	0.1	0.05	0.0417	0.03	27	22	16
TC5-B-S-PI	B	D	Steep	Impervious	1.0	0.05	0.0417	0.03	#VALUE!	#VALUE!	#VALUE!
TC5-C-S-PP	6767	C	Steep	Pervious	0.1	0.06	0.05	0.036	41	34	24
TC5-C-S-PI	38348	C	Steep	Impervious	1.0	0.06	0.05	0.036	2301	1917	1381
Total BMP Area	50502							Minimum BMP Size	#VALUE!	#VALUE!	#VALUE!
								Proposed BMP Size*	3930	5633	5895
								Minimum Ponding Depth		#VALUE!	in
								Maximum Ponding Depth		135.77	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	TC5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.124	0.009	**0.23**
TC5-B-S-PI	#VALUE!	B	Scrub	Steep	#VALUE!	#VALUE!	#VALUE!	**#VALUE!**
TC5-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.155	0.014	**0.34**
TC5-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.880	0.080	**1.95**

#VALUE!	**#VALUE!**	**#VALUE!**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	7.1

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC-road-1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC-road-1-B-S-PP	2307	D	Steep	Pervious	0.1	0.045	0.0375	0.027	10	9	6
TC-road-1-B-S-PI	20761	D	Steep	Impervious	1.0	0.045	0.0375	0.027	934	779	561
TC-road-1-D-S-PP	8174	D	Steep	Pervious	0.1	0.045	0.0375	0.027	37	31	22
TC-road-1-D-S-PI	73565	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3310	2759	1986
Total BMP Area	104807							Minimum BMP Size	4291.8345	3577	2575
								Proposed BMP Size*	4300	6163	6450
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		279.19	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC-road-1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC-road-1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.053	0.007	**0.16**
TC-road-1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.477	0.060	**1.47**
TC-road-1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.188	0.033	**0.80**
TC-road-1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.689	0.296	**7.24**

0.396	**9.68**	**3.51**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC-road-2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC-road-2-B-S-PP	9456	D	Steep	Pervious	0.1	0.045	0.0375	0.027	43	35	26
TC-road-2-B-S-PI	85105	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3830	3191	2298
TC-road-2-C-S-PP	6764	C	Steep	Pervious	0.1	0.05	0.0417	0.03	34	28	20
TC-road-2-C-S-PI	60879	C	Steep	Impervious	1.0	0.05	0.0417	0.03	3044	2539	1826
Total BMP Area	162204										

Minimum BMP Size	6950.047	5794	4170
Proposed BMP Size*	7580	10865	11370
Minimum Ponding Depth		1.97	in
Maximum Ponding Depth		158.38	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC-road-2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC-road-2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.217	0.027	**0.67**
TC-road-2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.954	0.247	**6.04**
TC-road-2-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.155	0.023	**0.57**
TC-road-2-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	1.398	0.211	**5.15**

0.509	**12.43**	**3.98**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.1

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC-road-3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC-road-3-C-S-PP	13463	D	Steep	Pervious	0.1	0.045	0.0375	0.027	61	50	36
TC-road-3-C-S-PI	121163	D	Steep	Impervious	1.0	0.045	0.0375	0.027	5452	4544	3271
Total BMP Area	134626							Minimum BMP Size	5512.9185	4594	3308
								Proposed BMP Size*	5702	8173	8553
								Minimum Ponding Depth		2.47	in
								Maximum Ponding Depth		210.54	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC-road-3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC-road-3-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.309	0.039	**0.95**
TC-road-3-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.782	0.352	**8.59**
		C	Scrub	Steep				
		C	Scrub	Steep				

0.391	**9.55**	**3.49**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

VALLEY
BMP SIZING CALCULATIONS

Newland Sierra Community
January 2015

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V1-C-S-PP	37712	C	Steep	Pervious	0.1	0.05	0.0417	0.03	189	157	113
V1-C-S-PI	113136	C	Steep	Impervious	1.0	0.05	0.0417	0.03	5657	4718	3394
Total BMP Area	150848							Minimum BMP Size	5845.36	4875	3507
								Proposed BMP Size*	5865	8407	8798
								Minimum Ponding Depth		2.77	in
								Maximum Ponding Depth		204.69	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V1-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.866	0.131	**3.19**
V1-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	2.597	0.392	**9.58**

0.523	**12.77**	**4.03**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V2-C-S-PP	37675	C	Steep	Pervious	0.1	0.05	0.0417	0.03	188	157	113
V2-C-S-PI	113025	C	Steep	Impervious	1.0	0.05	0.0417	0.03	5651	4713	3391
Total BMP Area	150700										

Minimum BMP Size	5839.625	4870	3504
Proposed BMP Size*	5840	8371	8760
Minimum Ponding Depth		2.81	in
Maximum Ponding Depth		205.57	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V2-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.865	0.131	**3.19**
V2-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	2.595	0.392	**9.57**

0.522	**12.76**	**4.03**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V3-C-S-PP	12275	C	Steep	Pervious	0.1	0.05	0.0417	0.03	61	51	37
V3-C-S-PI	36825	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1841	1536	1105
Total BMP Area	49100							Minimum BMP Size	1902.625	1587	1142
								Proposed BMP Size*	1910	2738	2865
								Minimum Ponding Depth		2.77	in
								Maximum Ponding Depth		279.35	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V3-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.282	0.043	**1.04**
V3-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.845	0.128	**3.12**

0.170	**4.16**	**2.30**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V4-C-S-PP	18137	C	Steep	Pervious	0.1	0.05	0.0417	0.03	91	76	54
V4-C-S-PI	54412	C	Steep	Impervious	1.0	0.05	0.0417	0.03	2721	2269	1632
Total BMP Area	72549										
								Minimum BMP Size	2811.285	2345	1687
								Proposed BMP Size*	2820	4042	4230
										Minimum Ponding Depth	2.78	in
										Maximum Ponding Depth	295.63	in
										Selected Ponding Depth	10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V4-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.416	0.063	**1.54**
V4-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	1.249	0.189	**4.61**

0.251	**6.14**	**2.80**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V5-C-S-PP	29141	C	Steep	Pervious	0.1	0.05	0.0417	0.03	146	122	87
V5-C-S-PI	87425	C	Steep	Impervious	1.0	0.05	0.0417	0.03	4371	3646	2623
Total BMP Area	116566							Minimum BMP Size	4516.955	3767	2710
								Proposed BMP Size*	4520	6479	6780
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		265.60	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V5-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.669	0.101	**2.47**
V5-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	2.007	0.303	**7.40**

0.404	**9.87**	**3.54**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V6-C-S-PP	11927	C	Steep	Pervious	0.1	0.05	0.0417	0.03	60	50	36
V6-C-S-PI	35783	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1789	1492	1073
Total BMP Area	47710										

Minimum BMP Size	1848.785	1542	1109
Proposed BMP Size*	1850	2652	2775
Minimum Ponding Depth		2.80	in
Maximum Ponding Depth		288.41	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V6-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.274	0.041	**1.01**
V6-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.821	0.124	**3.03**

0.165	**4.04**	**2.27**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V7-C-S-PP	30901	C	Steep	Pervious	0.1	0.05	0.0417	0.03	155	129	93
V7-C-S-PI	92703	C	Steep	Impervious	1.0	0.05	0.0417	0.03	4635	3866	2781
Total BMP Area	123604							Minimum BMP Size	4789.655	3995	2874
								Proposed BMP Size*	4800	6880	7200
								Minimum Ponding Depth		2.79	in
								Maximum Ponding Depth		250.11	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V7-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.709	0.107	**2.62**
V7-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	2.128	0.321	**7.85**

0.428	**10.46**	**3.65**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V8-C-S-PP	56224	C	Steep	Pervious	0.1	0.05	0.0417	0.03	281	234	169
V8-C-S-PI	56224	C	Steep	Impervious	1.0	0.05	0.0417	0.03	2811	2345	1687
Total BMP Area	112448							Minimum BMP Size	3092.32	2579	1855
								Proposed BMP Size*	3100	4443	4650
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		387.26	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V8-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.291	0.163	**3.99**
V8-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.291	0.163	**3.99**
		D	Scrub	Steep				
		D	Scrub	Steep				

0.327	**7.97**	**3.19**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V9-C-S-PP	31111	C	Steep	Pervious	0.1	0.05	0.0417	0.03	156	130	93
V9-C-S-PI	93333	C	Steep	Impervious	1.0	0.05	0.0417	0.03	4667	3892	2800
Total BMP Area	124444							Minimum BMP Size	4822.205	4022	2893
								Proposed BMP Size*	4850	6952	7275
								Minimum Ponding Depth		2.75	in
								Maximum Ponding Depth		247.53	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V9-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.714	0.090	**2.21**
V9-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.143	0.271	**6.62**

0.361	**8.82**	**3.35**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V10-C-S-PP	108083	C	Steep	Pervious	0.1	0.05	0.0417	0.03	540	451	324
V10-C-S-PI	324248	C	Steep	Impervious	1.0	0.05	0.0417	0.03	16212	13521	9727
V10-B-S-PP	355	D	Steep	Pervious	0.1	0.045	0.0375	0.027	2	1	1
V10-B-S-PI	1067	D	Steep	Impervious	1.0	0.045	0.0375	0.027	48	40	29
Total BMP Area	433753										

Minimum BMP Size	16802.4275	14013	10081
Proposed BMP Size*	16800	24080	25200
Minimum Ponding Depth		2.81	in
Maximum Ponding Depth		198.50	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V10-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	2.481	0.314	**7.66**
V10-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	7.444	0.942	**22.99**
V10-B-S-PP	Lake Wohlford					0.008		
V10-B-S-PI	Lake Wohlford					0.024		

1.256	**30.66**	**6.25**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V11	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V11-C-S-PP	119607	C	Steep	Pervious	0.1	0.05	0.0417	0.03	598	499	359
V11-C-S-PI	358821	C	Steep	Impervious	1.0	0.05	0.0417	0.03	17941	14963	10765
Total BMP Area	478428							Minimum BMP Size	18539.085	15462	11123
								Proposed BMP Size*	18540	26574	27810
								Minimum Ponding Depth		2.81	in
								Maximum Ponding Depth		259.01	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V11	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V11-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	2.746	0.347	**8.48**
V11-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	8.237	1.042	**25.45**

1.389	**33.93**	**6.57**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V12	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V12-C-S-PP	9881	C	Steep	Pervious	0.1	0.05	0.0417	0.03	49	41	30
V12-C-S-PI	9881	C	Steep	Impervious	1.0	0.05	0.0417	0.03	494	412	296
Total BMP Area	19762							Minimum BMP Size	543.455	453	326
								Proposed BMP Size*	545	781	818
									Minimum Ponding Depth	2.78	in
									Maximum Ponding Depth	244.75	in
									Selected Ponding Depth	10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V12	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V12-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.227	0.029	**0.70**
V12-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.227	0.029	**0.70**

0.057	**1.40**	**1.34**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	Vroad-1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Vroad-1-C-S-PP	13154	C	Steep	Pervious	0.1	0.05	0.0417	0.03	66	55	39
Vroad-1-C-S-PI	118382	C	Steep	Impervious	1.0	0.05	0.0417	0.03	5919	4937	3551
Total BMP Area	131536							Minimum BMP Size	5984.87	4991	3591
								Proposed BMP Size*	5985	8579	8978
								Minimum Ponding Depth		2.81	in
								Maximum Ponding Depth		557.18	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	Vroad-1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Vroad-1-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.302	0.038	**0.93**
Vroad-1-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.718	0.344	**8.39**

0.382	**9.33**	**3.45**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	Vroad-2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Vroad-1-C-S-PP	4378	C	Steep	Pervious	0.1	0.05	0.0417	0.03	22	18	13
Vroad-1-C-S-PI	39402	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1970	1643	1182
Total BMP Area	43780										

Minimum BMP Size	1991.99	1661	1195
Proposed BMP Size*	2000	2867	3000
Minimum Ponding Depth		2.77	in
Maximum Ponding Depth		1667.37	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	Vroad-2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Vroad-1-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.101	0.013	**0.31**
Vroad-1-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.905	0.114	**2.79**

0.127	**3.10**	**1.99**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	0.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V13	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V13-C-S-PP	38396	C	Steep	Pervious	0.1	0.05	0.0417	0.03	192	160	115
V13-C-S-PI	115186	C	Steep	Impervious	1.0	0.05	0.0417	0.03	5759	4803	3456
Total BMP Area	153582										
								Minimum BMP Size	5951.28	4963	3571
								Proposed BMP Size*	5960	8543	8940
									Minimum Ponding Depth	2.79	in
									Maximum Ponding Depth	201.43	in
									Selected Ponding Depth	10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V13	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V13-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.881	0.112	**2.72**
V13-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.644	0.335	**8.17**

0.446	**10.89**	**3.72**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V14	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V14-C-S-PP	54540	C	Steep	Pervious	0.1	0.05	0.0417	0.03	273	227	164
V14-C-S-PI	163618	C	Steep	Impervious	1.0	0.05	0.0417	0.03	8181	6823	4909
V14-B-S-PP	1471	D	Steep	Pervious	0.1	0.045	0.0375	0.027	7	6	4
V14-B-S-PI	4411	D	Steep	Impervious	1.0	0.045	0.0375	0.027	198	165	119
Total BMP Area	224040							Minimum BMP Size	8658.7145	7221	5195
								Proposed BMP Size*	8660	12413	12990
								Minimum Ponding Depth		2.81	in
								Maximum Ponding Depth		246.45	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V14	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V14-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.252	0.158	**3.87**
V14-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	3.756	0.475	**11.60**
V14-B-S-PP	Lake Wohlford					0.034		
V14-B-S-PI	Lake Wohlford					0.101		

0.634	**15.47**	**4.44**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V15	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V15-C-S-PP	63413	C	Steep	Pervious	0.1	0.05	0.0417	0.03	317	264	190
V15-C-S-PI	190240	C	Steep	Impervious	1.0	0.05	0.0417	0.03	9512	7933	5707
V15-B-S-PP	19194	D	Steep	Pervious	0.1	0.045	0.0375	0.027	86	72	52
V15-B-S-PI	57580	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2591	2159	1555
Total BMP Area	330427										

Minimum BMP Size	12506.538	10429	7504
Proposed BMP Size*	12510	17931	18765
Minimum Ponding Depth		2.80	in
Maximum Ponding Depth		10.66	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V15	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V15-C-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.456	0.184	**4.50**
V15-C-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	4.367	0.552	**13.49**
V15-B-S-PP	Lake Wohlford					0.441		
V15-B-S-PI	Lake Wohlford					1.322		

0.737	**17.99**	**4.79**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	90.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V16	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V16-C-S-PP	59728	C	Steep	Pervious	0.1	0.05	0.0417	0.03	299	249	179
V16-C-S-PI	59728	C	Steep	Impervious	1.0	0.05	0.0417	0.03	2986	2491	1792
Total BMP Area	119456										
								Minimum BMP Size	3285.04	2740	1971
								Proposed BMP Size*	3300	4730	4950
									Minimum Ponding Depth	2.76	in
									Maximum Ponding Depth	363.79	in
									Selected Ponding Depth	10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V16	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V16-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	1.371	0.207	**5.06**
V16-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	1.371	0.207	**5.06**

0.414	**10.11**	**3.59**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

Appendix 6

Hydromodification Management Exhibits

SEE SHEET 2

SEE SHEET 2

SEE SHEET 8

T6 TERRACES

T3

T7

T8

T9

BMP T6

BMP T7

BMP T8

BMP T9

STREET TC-4

MESA ROCK RD

POC 1905

BMP TC ROAD-3 + BMP T3 + BMP T5

TC-1

BMP TC-1

POC 2000.5

BMP TC2

STREET TC-3

TC-2

STREET TC-2

TOWN CENTER

TC-3

BMP TC3

STREET TC-1

TC-4

BMP TC4

MESA ROCK WAY

BMP TC ROAD-3

TC-5

BMP TC5

BMP TC ROAD-2

POC 2103

LEGEND

- DMA BOUNDARY
- PROPOSED INTEGRATED MANAGEMENT PRACTICE (IMP)
- PROPOSED LOTS – COMMERCIAL (85% IMPERVIOUS)
- PROPOSED LOTS – CONDOS (65% IMPERVIOUS)
- PROPOSED LOTS – SCHOOL (50% IMPERVIOUS)
- PROPOSED LOTS – TERRACES A (65% IMPERVIOUS)
- PROPOSED LOTS – TERRACES B (65% IMPERVIOUS)
- PROPOSED LOTS – TERRACES C (65% IMPERVIOUS)
- PROPOSED PARKS (50% IMPERVIOUS)
- POINT OF COMPLIANCE — POC #
- FLOW DIRECTION
- "CLEAN" STORM DRAIN
- "DIRTY" STORM DRAIN

N

SCALE: 1"=100'

0 25' 50' 100' 200'

GRAPHIC SCALE

INDEX MAP
NOT TO SCALE

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NEWLAND SIERRA
STORM WATER MANAGEMENT PLAN EXHIBIT & HYDROMODIFICATION MANAGAMENT EXHIBIT
JANUARY 2015

SHEET 1 OF 8

SEE SHEET 3

SEE SHEET 7

SEE SHEET 7

BMP ROAD

POC 2199.8

BMP T1

T1

T2

T3

T5

TERRACES

T9

STREET T-2

STREET T-1

MESA ROAD

BMP T2

BMP T3

BMP T8

BMP T7

T7

T8

T9

POC 1905

BMP TC ROAD-3 + BMP T3 + BMP T5

BMP TC-1

TC-1

POC 2000.5

BMP TC2

STREET TC-3

TOWN CENTER

TC-2

STREET TC-2

MESA ROAD

TC-3

BMP TC3

SEE SHEET 1

INDEX MAP
NOT TO SCALE

SCALE: 1"=100'
0 25' 50' 100' 200'
GRAPHIC SCALE

LEGEND

- DMA BOUNDARY
- PROPOSED INTEGRATED MANAGEMENT PRACTICE (IMP)
- PROPOSED LOTS – COMMERCIAL (85% IMPERVIOUS)
- PROPOSED LOTS – CONDOS (65% IMPERVIOUS)
- PROPOSED LOTS – SCHOOL (50% IMPERVIOUS)
- PROPOSED LOTS – TERRACES A (65% IMPERVIOUS)
- PROPOSED LOTS – TERRACES B (65% IMPERVIOUS)
- PROPOSED LOTS – TERRACES C (65% IMPERVIOUS)
- PROPOSED PARKS (50% IMPERVIOUS)
- POINT OF COMPLIANCE — POC #
- FLOW DIRECTION
- "CLEAN" STORM DRAIN
- "DIRTY" STORM DRAIN

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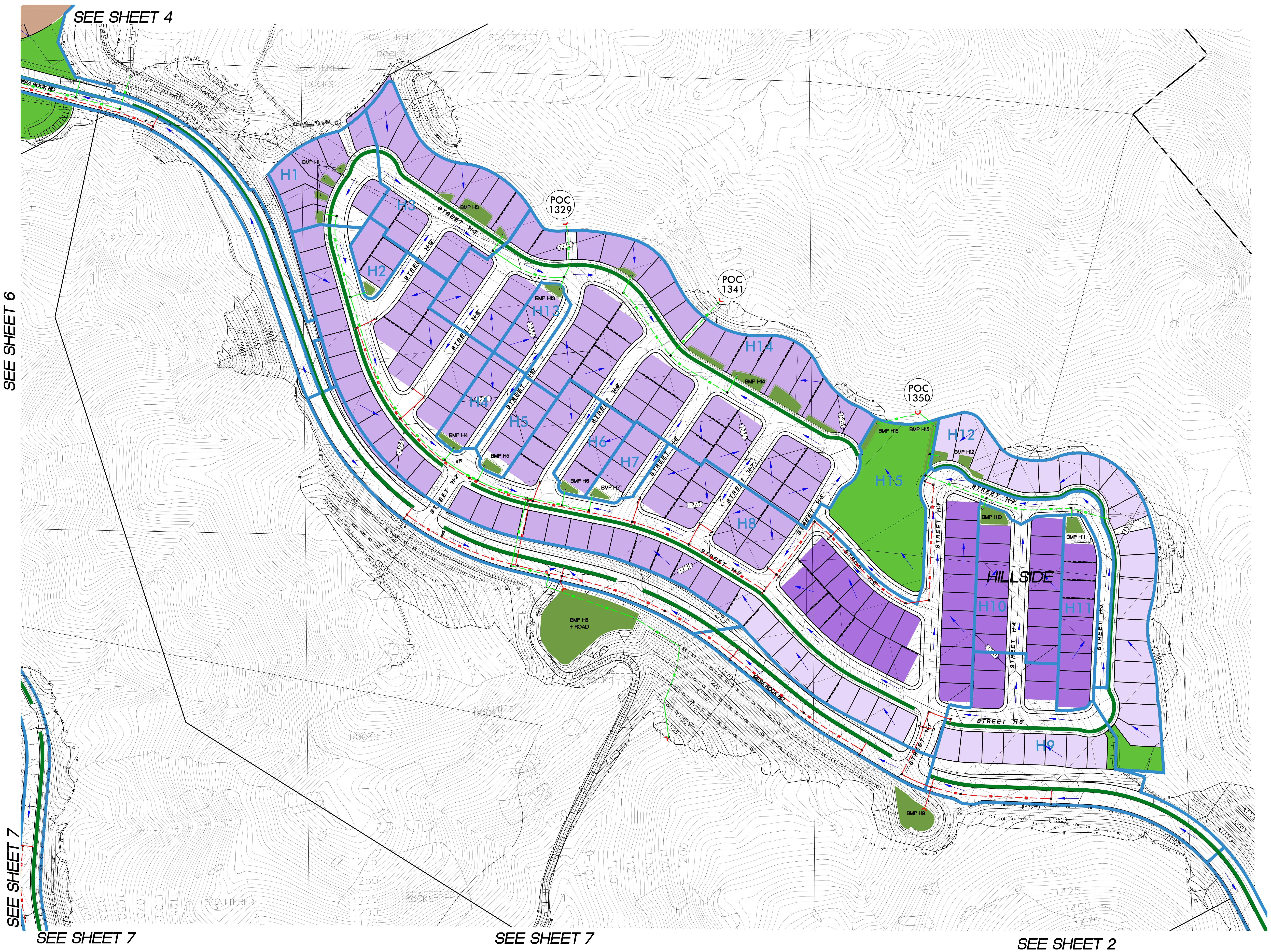
NEWLAND SIERRA
STORM WATER MANAGEMENT PLAN EXHIBIT & HYDROMODIFICATION MANAGAMENT EXHIBIT
JANUARY 2015



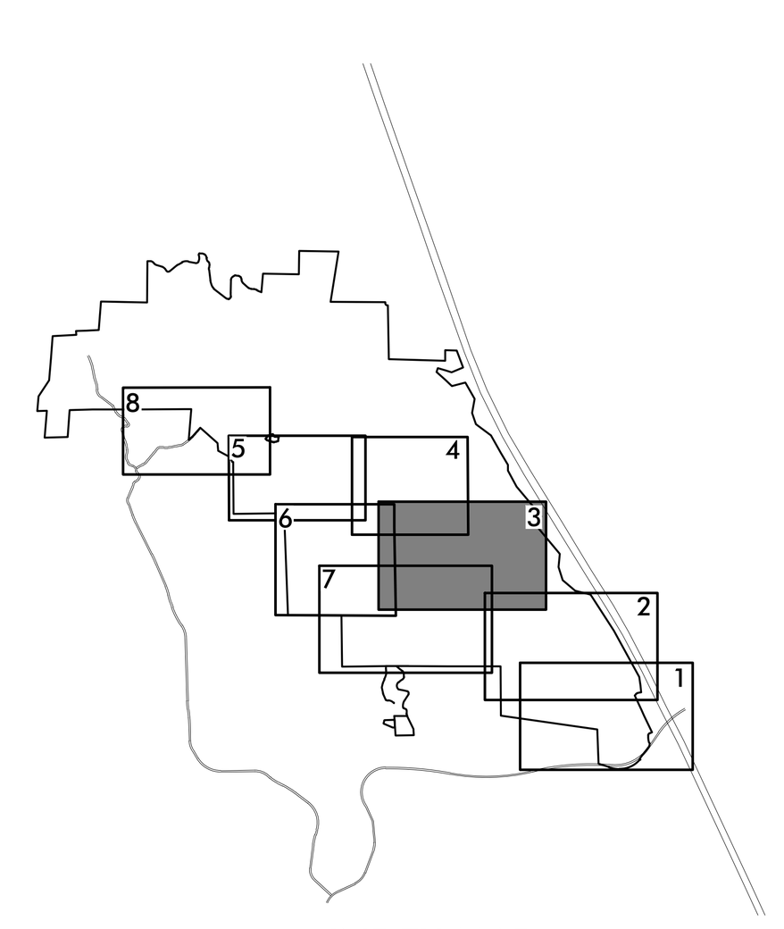
LEGEND

DMA BOUNDARY	
PROPOSED INTEGRATED MANAGEMENT PRACTICE (IMP)	
PROPOSED LOTS – HILLSIDE A (65% IMPERVIOUS)	
PROPOSED LOTS – HILLSIDE B (65% IMPERVIOUS)	
PROPOSED LOTS – HILLSIDE C (65% IMPERVIOUS)	
PROPOSED PARKS (50% IMPERVIOUS)	
POINT OF COMPLIANCE	POC #
FLOW DIRECTION	
"CLEAN" STORM DRAIN	SD
"DIRTY" STORM DRAIN	SD

N

SCALE: 1"=100'

GRAPHIC SCALE



INDEX MAP
NOT TO SCALE

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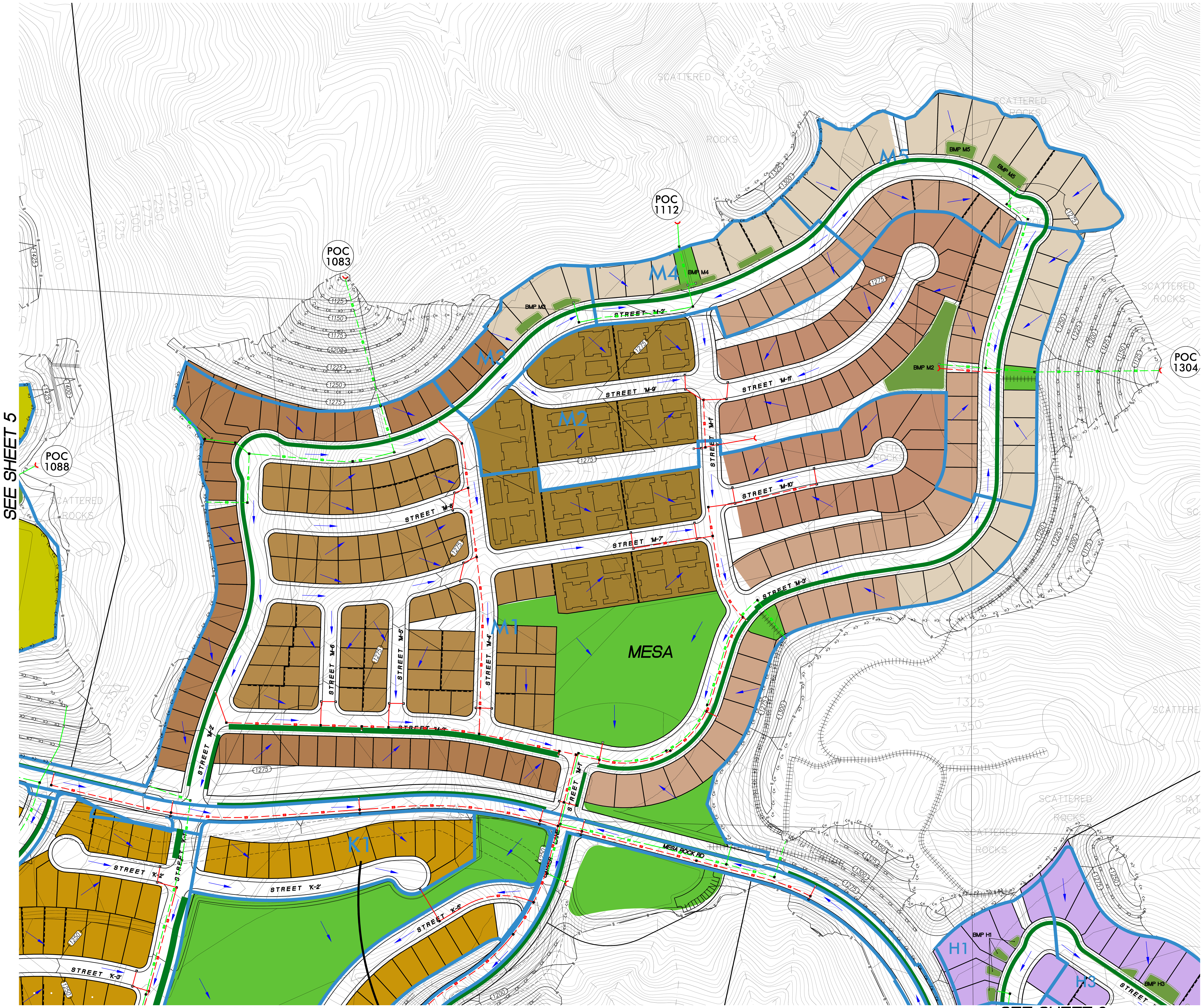
JANUARY 2015

SHEET 3 OF 8



LEGEND

DMA BOUNDARY	
PROPOSED INTEGRATED MANAGEMENT PRACTICE (IMP)	
PROPOSED LOTS – MESA A (65% IMPERVIOUS)	
PROPOSED LOTS – MESA B (65% IMPERVIOUS)	
PROPOSED LOTS – MESA C (65% IMPERVIOUS)	
PROPOSED LOTS – MESA D (65% IMPERVIOUS)	
PROPOSED LOTS – MESA E (65% IMPERVIOUS)	
PROPOSED LOTS – MESA F (65% IMPERVIOUS)	
PROPOSED LOTS – HILLSIDE A (65% IMPERVIOUS)	
PROPOSED LOTS – KNOLL A (50% IMPERVIOUS)	
PROPOSED LOTS – SUMMIT D (50% IMPERVIOUS)	
PROPOSED PARKS (50% IMPERVIOUS)	
POINT OF COMPLIANCE	POC #
FLOW DIRECTION	
"CLEAN" STORM DRAIN	SD
"DIRTY" STORM DRAIN	SD

N

SCALE: 1"=100'
GRAPHIC SCALE

INDEX MAP
NOT TO SCALE

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