Preliminary Water Quality Management Plan (WQMP)

Project Name:

Autumn Care Residential Care Facility

Prepared for:

Autumn Care Development Partners, LLC

19101 Garfield Avenue

Huntington Beach, CA 92646

310-488-1777

Prepared by:

Waber Consultants, Inc.

Engineer Mahir Waber Registration No. C69050

3711 Long Beach Boulevard, Suite 1008

Long Beach, CA 90807

562-426-8283

Project Owner's Certification			
Permit/Application No.	13-05	Grading Permit No.	
Tract/Parcel Map No.	APN 153-201-27	Building Permit No.	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			CUP 13-05

This Water Quality Management Plan (WQMP) has been prepared for Autumn Care Development Partners, LLC by Waber Consultants, Inc. The WQMP is intended to comply with the requirements of the local NPDES Storm water Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: Bill Bujake			
Title			
Company	Autumn Care Development Partners, LLC.		
Address	2700 Mandeville Canyon Road		
Email	billbujake@whitewatercm.com		
Telephone #	310-488-1777		
Signature		Date	

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Attachments

Section I Discretionary Permit(s) and Water Quality Conditions

Provide discretionary permit and water quality information. *Refer to Section 2.1 in the Technical Guidance Document (TGD) available from the Orange County Stormwater Program (ocwatersheds.com).*

Project Infomation			
Permit/Application No.	13-05	Tract/Parcel Map No.	APN 153-201-27
Additional Information/ Comments:	The City of Huntington Beach Conditional Use Permit Number 13-05 is proposed for APN 153-201-27.		
Water Quality Conditions			
Water Quality Conditions (list verbatim)	N/A		
Watershed-Based Plan Conditions			
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	N/A		

Section II Project Description

II.1 Project Description

Provide a detailed project description including:

- Project areas;
- Land uses;
- Land cover;
- Design elements;
- A general description not broken down by drainage management areas (DMAs).

Include attributes relevant to determining applicable source controls. *Refer to Section 2.2 in the TGD for information that must be included in the project description.*

Description of Proposed Project				
Development Category (Verbatim from WQMP):	Residential Project			
Project Area (ft²): 30,000	Number of Dwelling Units: 38		SIC Code: 8051	
Narrative Project Description:	The project covers 30,000 square feet (0.69 acres). The project includes a construction of a new 2-story residential care facility over a basement parking lot. The existing lot is vacant covered with grass. The eastern side of the lot has existing fill that is approximately 9' higher than the western side of the lot. The underlying soil is Sandy Clay and Silty Clay material. Groundwater depth is approximately 7 feet in depth. The proposed building footprint is approximately 14,243 square feet. It is bound by landscape area to the east, asphalt-concrete surface to the north, and concrete sidewalk to the west and south. In addition, there is a proposed retaining wall along the west property line.			
Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	30,000 sq ft	100	0	0

Post-Project Conditions	4,400 sq ft	14.7	25,600 sq ft	85.3
Drainage Patterns/Connections	Runoff from the easterly half of the building roof drains into the pervious sidewalk pavement and landscape area. The pervious pavement and landscape areas have underdrain throughout their entire length. The underdrain eventually drains into a proposed Urbangreen Biofilter located at the northwest corner of property. Runoff from the westerly half of the building as well as the south and west of the property drain into the proposed pervious sidewalk and landscape areas and are captured by underdrain that is pumped into the Urbangreen Biofilter. Runoff from the parking lot area drains directly into the Urbangreen Biofilter. Effluent from the Urbangreen Biofilter drain into a 12" storm drain line provided by Walgreen.			

II.2 Potential Stormwater Pollutants

Determine and list expected stormwater pollutants based on land uses and site activities. *Refer to Section 2.2.2 and Table 2.1 in the TGD for guidance.*

Pollutants of Concern			
Pollutant	Circle One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	**E**	N	
Nutrients	**E**	N	
Heavy Metals	E	**N**	
Pathogens (Bacteria/Virus)	**E**	N	
Pesticides	**E**	N	
Oil and Grease	**E**	N	
Toxic Organic Compounds	E	**N**	
Trash and Debris	**E**	N	

II.3 Hydrologic Conditions of Concern

Determine if streams located downstream from the project area are determined to be potentially susceptible to hydromodification impacts. *Refer to Section 2.2.3.1 in the TGD for* NOC *or Section 2.2.3.2 for* <SOC>.

☒ No – Show map

☐ Yes – Describe applicable hydrologic conditions of concern below. *Refer to Section 2.2.3 in the TGD.*

Per Section 2.3.3 of the Model WQMP HCOCs are not considered to exist if all downstream conveyance channels that receive runoff from the project are engineered, hardened and regularly maintained to ensure design flow capacity, and no sensitive stream habitat areas will be affected. Stream susceptibility has been determined using the regional stream susceptibility map, Figure XVI.3e: North Orange County Hydromodification Susceptibility Maps, provided in Appendix XVI of the Technical Guidance Document (TGD). See Attachment C.

II.4 Post Development Drainage Characteristics

Describe post development drainage characteristics. *Refer to Section 2.2.4 in the TGD.*

Runoff from the easterly half of the building roof drains into the landscape area. The pervious sidewalk and landscape area has underdrain throughout its entire length. The underdrain eventually drains into a proposed Urbangreen Biofilter located at the northwest corner of property.

Runoff from the westerly half of the building as well as the south and west of the property drain into pervious sidewalk with underdrain that is pumped into the Urbangreen Biofilter.

Runoff from the parking lot area drains directly into the Urbangreen Biofilter. Effluent from the Urbangreen Biofilter drain into a 12" storm drain line provided by Walgreen.

II.5 Property Ownership/Management

Describe property ownership/management. *Refer to Section 2.2.5 in the TGD.*

Property owner is Autumn Care Development Partners, LLC. Owner will be responsible for the long-term maintenance of the project's stormwater facilities.

Section III Site Description

III.1 Physical Setting

Fill out table with relevant information. *Refer to Section 2.3.1 in the TGD.*

Planning Area/ Community Name	Commercial Neighborhood
Location/Address	19101 Garfield Avenue
	Huntington Beach, CA
Land Use	Commercial General
Zoning	CG
Acreage	0.69
Predominant Soil Type	Sandy Clay, Silty Clay

III.2 Site Characteristics

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. Refer to Section 2.3.2 in the TGD.

Precipitation Zone	*0.7 inches*
Topography	*Project has existing fill material with approximately 9' drop from the east to west sides of the property.*
Drainage Patterns/Connections	*Runoff from the easterly half of the building roof drains into the landscape area. The pervious sidewalk and landscape area has underdrain throughout its entire length. The underdrain eventually drains into a proposed Urbangreen Biofilter located at the northwest corner of property.* *Runoff from the westerly half of the building as well as the south and west of the property drain into pervious sidewalk with underdrain that is pumped into the Urbangreen Biofilter.* *Runoff from the parking lot area drains directly into the Urbangreen Biofilter. Effluent from the Urbangreen Biofilter drain into a 12" storm*

	drain line provided by Walgreen.
Soil Type, Geology, and Infiltration Properties	*Silty Clay and Sandy Clay with low infiltration rate*

Site Characteristics (continued)	
Hydrogeologic (Groundwater) Conditions	*Groundwater encountered at approximately 7 feet depth*
Geotechnical Conditions (relevant to infiltration)	*Low infiltration rate*
Off-Site Drainage	*There are no off-site run on to the site*
Utility and Infrastructure Information	*There are no underground utilities within the site*

III.3 Watershed Description

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. *Refer to Section 2.3.3 in the TGD.*

Receiving Waters	Huntington Beach State Park
303(d) Listed Impairments	Bacteria, PCBs
Applicable TMDLs	N/A
Pollutants of Concern for the Project	Bacteria, other organics
Environmentally Sensitive and Special Biological Significant Areas	N/A

Section IV Best Management Practices (BMPs)

IV. 1 Project Performance Criteria

Describe project performance criteria. Several steps must be followed in order to determine what performance criteria will apply to a project. These steps include:

- If the project has an approved WIHMP or equivalent, then any watershed specific criteria must be used and the project can evaluate participation in the approved regional or sub-regional opportunities. The local Permittee planning or NPDES staff should be consulted regarding the existence of an approved WIHMP or equivalent.
- Determine applicable hydromodification control performance criteria. *Refer to Section 7.II-2.4.2.2 of the Model WQMP.*
- Determine applicable LID performance criteria. *Refer to Section 7.II-2.4.3 of the Model WQMP.*
- Determine applicable treatment control BMP performance criteria. *Refer to Section 7.II-3.2.2 of the Model WQMP.*
- Calculate the LID design storm capture volume for the project. *Refer to Section 7.II-2.4.3 of the Model WQMP.*

(NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	N/A	

Project Performance Criteria (continued)	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	N/A
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	Biotreatment, Harvest and Use
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	Biotreatment
Calculate LID design storm capture volume for Project.	**Worksheet B: Simple Design Capture Volume Sizing Method** was used. See Attachment B for calculations. V_{design} = 432 cu-ft

IV.2. SITE DESIGN AND DRAINAGE PLAN

Describe site design and drainage plan including

- A narrative of site design practices utilized or rationale for not using practices;
- A narrative of how site is designed to allow BMPs to be incorporated to the MEP
- A table of DMA characteristics and list of LID BMPs proposed in each DMA.
- Reference to the WQMP plot plan.
- Calculation of Design Capture Volume (DCV) for each drainage area.
- A listing of GIS coordinates for LID and Treatment Control BMPs (unless not required by local jurisdiction).

Refer to Section 2.4.2 in the TGD.

LID infiltration is not a rational method for this project due to the existing clay material with low infiltration rate. In addition, it is not feasible to fully retain the runoff using infiltration BMPs.

All site runoffs are collected by the underground storm drain pipe lines which are routed downstream towards the proposed Urbangreen Biofilter unit. The Urbangreen Biofilter is a proprietary biofilter unit and is sized to accommodate flow based on The Capture Efficiency Method for Flow-Based BMPs.

Downstream of the Urbangreen Biofilter unit is a 12" storm drain line stub out constructed at the time of Walgreens construction. The 12" storm drain line eventually drains into an existing CDS unit within the Walgreens property.

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Each sub-section below documents that the proposed design features conform to the applicable project performance criteria via check boxes, tables, calculations, narratives, and/or references to worksheets. *Refer to Section 2.4.2.3 in the TGD for selecting LID BMPs and Section 2.4.3 in the TGD for conducting conformance analysis with project performance criteria.*

IV.3.1 Hydrologic Source Controls

If required HSCs are included, fill out applicable check box forms. If the retention criteria are otherwise met with other LID BMPs, include a statement indicating HSCs not required.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐
Other: Proprietary Biotreatment using Urbangreen Biofilter	☒
Other: Pervious areas with underdrain	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐

IV.3.2 Infiltration BMPs

Identify infiltration BMPs to be used in project. If design volume cannot be met state why BMPs cannot be met

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other: Proprietary Biotreatment using Urbangreen Biofilter	☒
Other: Pervious areas with underdrain	☒

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with infiltration BMPs. If not document how much can be met with infiltration and document why it is not feasible to meet the full volume with infiltration BMPs.

Pervious area with underdrain is used to capture the LID Design Storm Capture Volume.

Worksheet B: Simple Design Capture Volume Sizing Method was used. See Attachment B for calculations.

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, describe any evapotranspiration, rainwater harvesting BMPs.

Name	Included?
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☒
Above-ground cisterns and basins	☐
Underground detention	☐
Other: Pervious area with underdrain	☒
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with evapotranspiration, rainwater harvesting BMPs in combination with infiltration BMPs. If not document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with either of these BMPs categories.

Bioswale with underdrain is used to capture the LID Design Storm Capture Volume.

Worksheet B: Simple Design Capture Volume Sizing Method was used. See Attachment B for calculations.

IV.3.4 Biotreatment BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, and/or evapotranspiration and rainwater harvesting BMPs, describe biotreatment BMPs. Include sections for selection, suitability, sizing, and infeasibility, as applicable.

Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☒
Wet extended detention basin	☐
Dry extended detention basins	☐
Other: Pervious area with underdrain	☒
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with infiltration, evapotranspiration, rainwater harvesting and/or biotreatment BMPs. If not document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with either of these BMPs categories.

Bioswale with underdrain is used to capture the LID Design Storm Capture Volume.

Worksheet B: Simple Design Capture Volume Sizing Method was used. See Attachment B for calculations.

IV.3.5 Hydromodification Control BMPs

Describe hydromodification control BMPs. See Section 5 TGD. Include sections for selection, suitability, sizing, and infeasibility, as applicable. Detail compliance with Prior Conditions of Approval.

Hydromodification Control BMPs	
BMP Name	**BMP Description**
Pervious area underdrain	Adequate surface area and depth of underdrain is provided to capture the LID Design Storm Capture Volume for the project.
Urbangreen Biofilter	Proprietary vegetated biofilter system sized to capture the required treatment flow per **Worksheet D: Capture Efficiency Method for Flow-Based BMPs.**

IV.3.6 Regional/Sub-Regional LID BMPs

Describe regional/sub-regional LID BMPs in which the project will participate. *Refer to Section 7.II-2.4.3.2 of the Model WQMP.*

Regional/Sub-Regional LID BMPs
N/A

IV.3.7 Treatment Control BMPs

Treatment control BMPs can only be considered if the project conformance analysis indicates that it is not feasible to retain the full design capture volume with LID BMPs. Describe treatment control BMPs including sections for selection, sizing, and infeasibility, as applicable.

Treatment Control BMPs	
BMP Name	**BMP Description**

IV.3.8 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non-structural source controls were not used.

Non-Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	No hazardous waste will be generated onsite
N6	Local Industrial Permit Compliance	☐	☒	Project is not a industrial site
N7	Spill Contingency Plan	☐	☒	No hazardous or industrial waste will be generated onsite
N8	Underground Storage Tank Compliance	☐	☒	No underground storage is proposed at site
N9	Hazardous Materials Disclosure Compliance	☐	☒	No hazardous waste will generated onsite
N10	Uniform Fire Code Implementation	☒	☐	
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☐	☒	No loading dock proposed at site
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	Multi-unit residential project

IV.3.9 Structural Source Control BMPs

Fill out structural source control check box forms or provide a brief narrative explaining if Structural source controls were not used.

Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	Residential Project.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☐	☒	Proposed site is relatively flat.
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☐	
S6	Dock areas	☐	☒	Residential Project.
S7	Maintenance bays	☐	☒	Residential Project.
S8	Vehicle wash areas	☐	☒	Residential Project.
S9	Outdoor processing areas	☐	☒	Residential Project.
S10	Equipment wash areas	☐	☒	Residential Project.
S11	Fueling areas	☐	☒	Residential Project.
S12	Hillside landscaping	☐	☒	Proposed site is relatively flat.
S13	Wash water control for food preparation areas	☐	☒	Residential Project.
S14	Community car wash racks	☐	☒	Residential Project.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

IV.4.1 Water Quality Credits

Determine if water quality credits are applicable for the project. *Refer to Section 3.1 of the Model WQMP for description of credits and Appendix VI of the TGD for calculation methods for applying water quality credits.*

<table>
<tr><th colspan="5">Description of Proposed Project</th></tr>
<tr><td colspan="5">Project Types that Qualify for Water Quality Credits (Select all that apply):</td></tr>
<tr><td colspan="2">☐Redevelopment projects that reduce the overall impervious footprint of the project site.</td><td colspan="2">☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.</td><td>☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).</td></tr>
<tr><td colspan="2">☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).</td><td colspan="2">☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned</td><td>☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).</td></tr>
<tr><td>☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.</td><td>☐ Developments in a city center area.</td><td>☐ Developments in historic districts or historic preservation areas.</td><td>☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.</td><td>☒In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.</td></tr>
<tr><td>Calculation of Water Quality Credits
(if applicable)</td><td colspan="4">N/A</td></tr>
</table>

IV.4.2 Alternative Compliance Plan Information

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. *Refer to Section 7.II 3.0 in the WQMP.*

N/A

Section V Inspection/Maintenance Responsibility for BMPs

Fill out information in table below. Prepare and attach an Operation and Maintenance Plan. Identify the mechanism through which BMPs will be maintained. Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies. *Refer to Section 7.II 4.0 in the Model WQMP.*

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
N1-Education for Property Owners, Tenants and Occupants	Owner	Ensure employees responsible for the maintenance of BMPs are familiar with the requirements of the WQMP.	All new employees within 1 month of hire. Annual retraining required.
N3-Common Area Landscape Management	Owner	Inspect the sprinkler system to correct overspray and detect broken sprinkler heads.	Three times per year
N4-BMP Maintenance	Owner	Inspect the structural control devices to ensure they are not more than 20% clogged or contain any pollutants of concern.	Quarterly and prior to, during, and following the rainy season
N14-Common Area Catch Basin Inspection	Owner	Inspect all catch basins in the project area to ensure they are not more than 20% clogged or contain any pollutants of concern.	Three times per year with one inspection just prior to rainy season (October 1 through April 30).
N15-Street Sweeping Private Streets and Parking Lots	Owner	Sweep paved areas to assure litter and debris do not accumulate.	Weekly

Private Storm Drain System Stencilling and Signage	Owner	Inspect catch basin labels to ensure legibility.	Three times per year.

Section VI Site Plan and Drainage Plan

VI.1 SITE PLAN AND DRAINAGE PLAN

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

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

Section VII Educational Materials

Refer to the Orange County Stormwater Program (ocwatersheds.com) for a library of materials available. For the copy submitted to the Permittee, only attach the educational materials specifically applicable to the project. Other materials specific to the project may be included as well and must be attached.

Education Materials			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☐	Proper Maintenance Practices for Your Business	☐
Household Tips	☐	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☒		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☐		☐
Sewer Spill	☐		☐
Tips for the Home Improvement Projects	☒		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☐		☐
Tips for Pool Maintenance	☒		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☐		☐
Tips for Projects Using Paint	☐		☐

UrbanGreen™

Biofiltration Products

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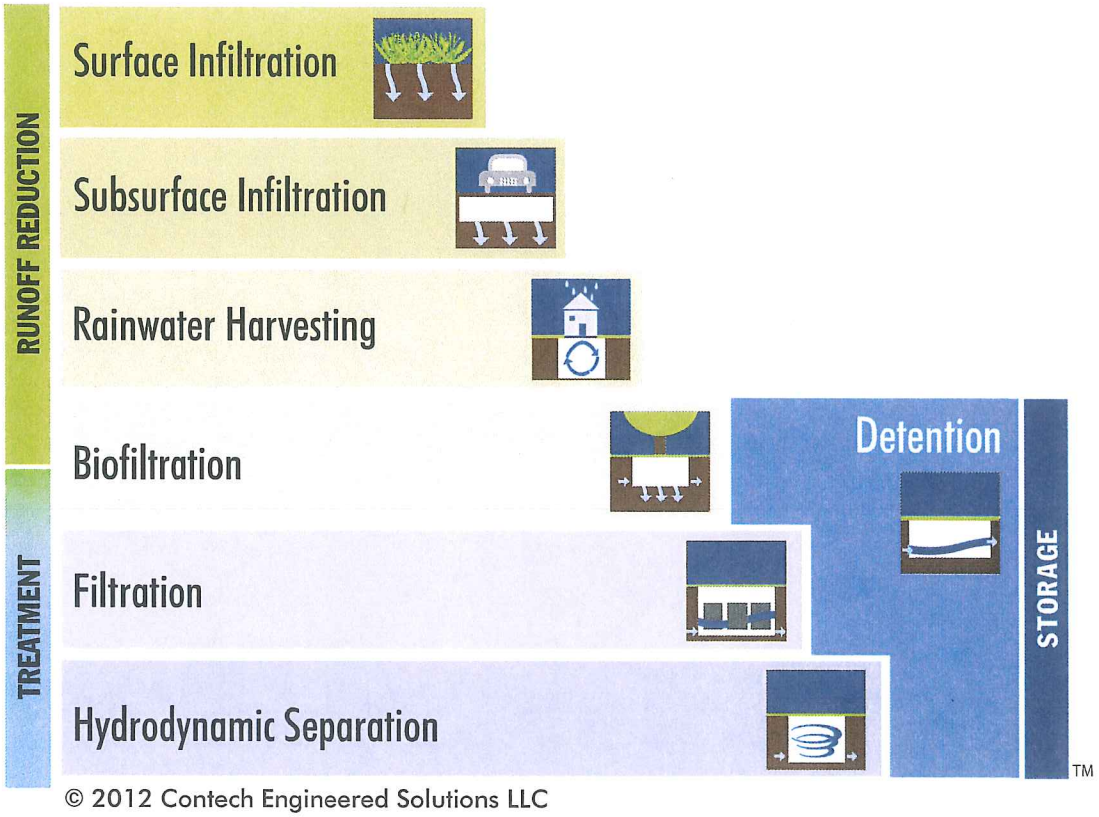
CONTECH®
ENGINEERED SOLUTIONS

UrbanGreen™ Stormwater Solutions from Contech®

Selecting the Right Stormwater Solution Just Got Easier...

It's simple to choose the right low impact development (LID) solution to achieve your runoff reduction goals with the Contech UrbanGreen Staircase. First, select the runoff reduction practices that are most appropriate for your site, paying particular attention to pretreatment needs. If the entire design storm cannot be retained, select a treatment best management practice (BMP) for the balance. Finally, select a detention system to address any outstanding downstream erosion.

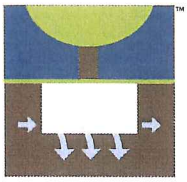


Learn more about all of our stormwater technologies at www.ContechES.com/urbangreen

UrbanGreen™ BioFilter

Filtration and Biological Treatment in One System

Where stormwater runoff mitigation goals can't be met through infiltration and rainwater harvesting, biofiltration can provide a high level of treatment and reduction of runoff volume due to soil saturation. The UrbanGreen BioFilter is a compact, versatile and reliable alternative to conventional designs.



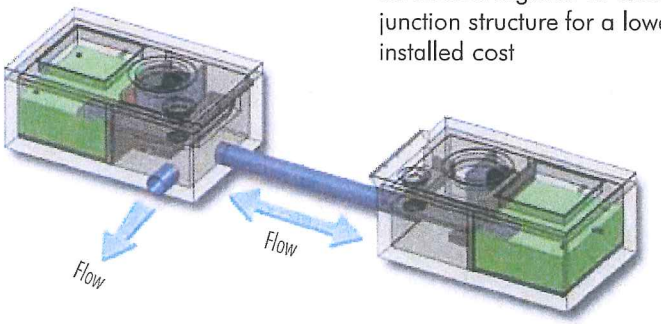
The UrbanGreen BioFilter soil media is optimized for pollutant removal, hydraulic conductivity and plant vitality. Pollutants are primarily removed by filtration during a storm event and are transformed, assimilated and/or absorbed between runoff events by the microbiology within a soil ecosystem. The UrbanGreen BioFilter may also include one or more StormFilter cartridges which provide reliable pollutant removal for the portion of the design storm that exceeds the capacity of the biofilter bay.

Benefits:

- Two well-known and accepted practices in one system – Biofiltration and media filtration
- Proven removal capability – >95% solids removal (mean particle size 25 um)
- Integrated bypass – eliminates cost of an additional bypass inlet. Offline designs also available.
- Easy installation – Delivered on-site with all internal components installed, ready to lift and place
- Multiple inline and offline sizes available to meet site-specific needs
- Aesthetic landscape solutions will enhance the site

Optional Feature:

Inline and Inline XP units can be connected together to eliminate junction structure for a lower installed cost



Learn more at www.ContechES.com/biofilter

Four Levels of Treatment in One – Inline Models

1 Evapotranspiration:

- Dry weather runoff and small storms are absorbed by the biofiltration media and returned to the atmosphere

2 Biofiltration:

- Medium size storms are treated by biofiltration and released downstream

3 Media Filtration:

- Remaining water quality flow is treated with the StormFilter cartridges

4 Bypass:

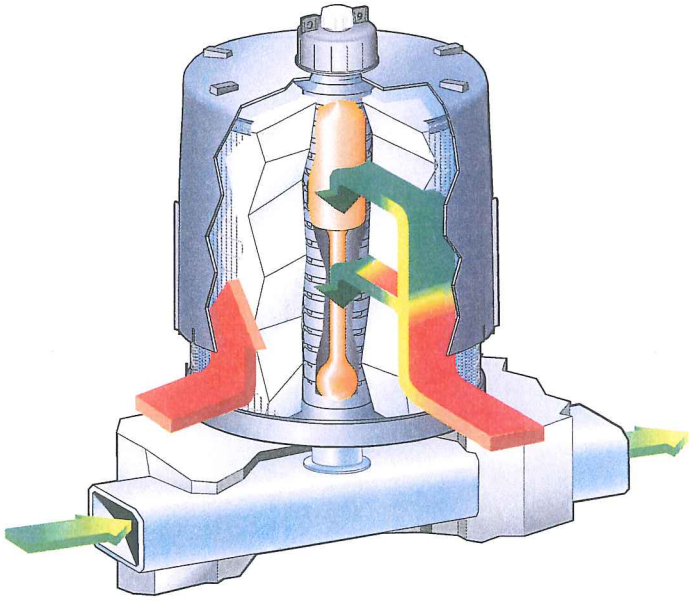
- Peak events are bypassed before reaching the treatment bays

Optional Feature:

With multiple sizes and add-on filtration options, you can easily specify the right system for your site.

Stormwater Management StormFilter® Cartridges:

- Expand capacity to reduce system size
- Extend life between maintenance events



The UrbanGreen BioFilter Delivers...

- Optional infiltration rates from 5 to100 in/hr (125 to 2540 mm/hr) to meet approval standards.
- Flow controlled outlet to maximize system longevity and performance.
- Vertical drop into the system to collect debris without clogging inlet opening.
- Optimized media to meet standard guidelines for easy approval.
- Integrated bypass reduces cost by eliminating downstream structures. Optional offline sizes without integrated bypass available.

Learn more about the StormFilter at www.ContechES.com/stormfilter

Capacity

Curb Inlet Capacity is the amount of flow that can enter through a curb inlet. This is based on local requirements and site conditions including depth of flow in the gutter, curb opening width, roadway and gutter design and location of the curb inlet (sag or on-grade).

Integrated Bypass Capacity is the amount of flow that can be conveyed directly from the inlet tray to the outlet chamber without affecting the BioFilter or StormFilter components and without backing water up at the gutter.

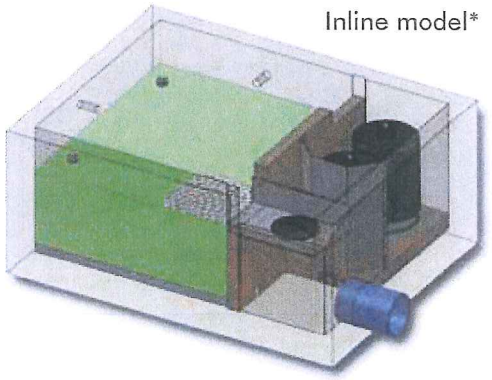
Sizing Chart

Inline – Model contains an integrated bypass that routes peak flows around the treatment components.							
Vault Size	**Rim to Invert**	**Media Surface Area**	**StormFilter Cartridges**	**Treatment Capacity***		**Integrated Bypass Capacity**	**Throat Length**
(in)	(in)	(ft^2)		(gpm)	(cfs)	(cfs)	(ft)
Biofiltration Only							
4X6	49	17	None	17.7	0.039	2	2.33
6X8	49	41	None	42.6	0.095	2 or 3.4	2.33 or 5.33
6X12	49	65	None	67.6	0.151	2 or 3.4	2.33 or 5.33
8X16	49	121	None	125.8	0.280	2 or 3.4	2.33 or 5.33
Biofiltration & Filtration							
4X6	49	13	1-27" Tall	36	0.080	2	2.33
6X8	49	32	2-27" Tall	77	0.172	2 or 3.4	2.33 or 5.33
6X12	49	56	2-27" Tall	101	0.225	2 or 3.4	2.33 or 5.33
8X16	49	107	3-27" Tall	174	0.338	2 or 3.4	2.33 or 5.33

NOTE: Non-standard/custom depths and configurations available. Contact your local Contech representative for more information.

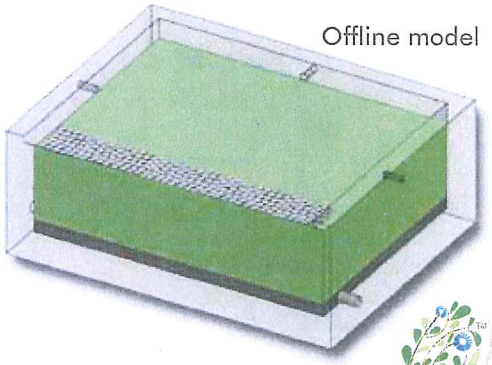
Offline – Bypass flows are routed externally. All depths are 42" Rim to Invert.				
Vault Size	**Media Surface Area**	**Treatment Capacity***		**Throat Length**
(in)	(ft^2)	(gpm)	(cfs)	(ft)
4X4	16	16	0.036	4
4X6	24	24	0.054	6 or 4
4X8	32	32	0.071	8 or 4
6X6	36	36	0.080	6
4X12	48	48	0.107	12 or 4
6X8	48	48	0.107	8 or 6
6X10	60	60	0.134	10 or 6
6X12	72	72	0.161	12 or 6
7X13	91	91	0.203	13 or 7

Inline model*



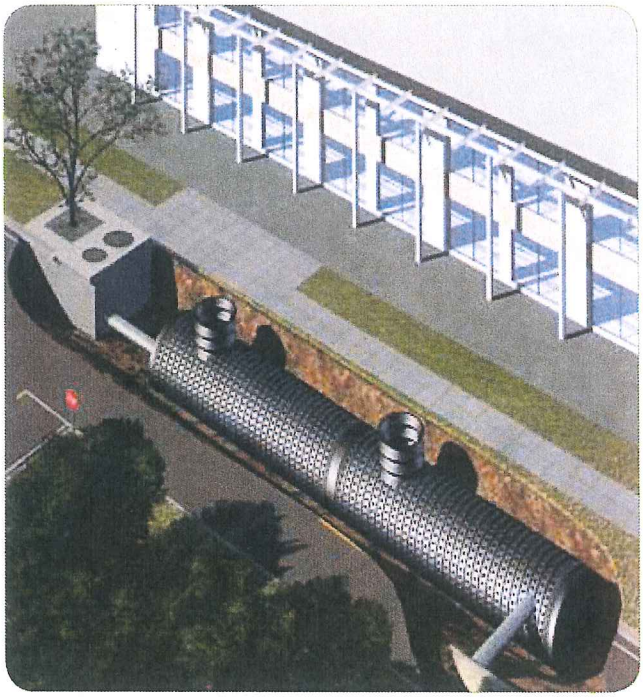
*Cartridges are optional for these models

Offline model



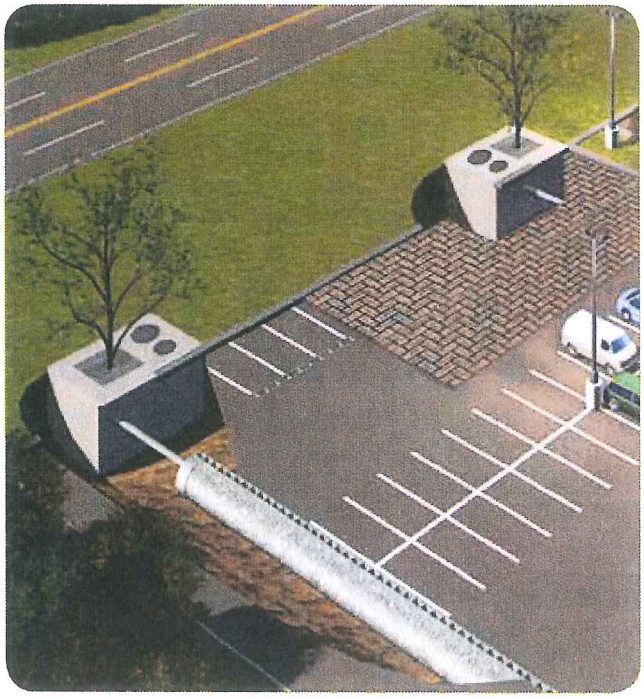
Learn more at www.ContechES.com/biofilter

Biofiltration Applications



Combine biofiltration with subsurface infiltration to expand runoff reduction capacity.

Create small drainage areas and use multiple units in parking lots.



Add volume storage upstream; Slotted Drain™ and pervious pavers can extend the inlet capacity and inlet location for challenging drainage areas.

Multiple offline models are also available where separate high flow bypass drainage inlets may be required.

Installation and Maintenance

we make it easy for you...

- On-site planting and activation included with every system
- Straightforward and simple to maintain
  - Clean biofiltration bay with simple landscape tools (rake and shovel)
- Extended maintenance interval
  - Biofiltration extends cartridge maintenance intervals to 2 - 3 years
- No confined space entry required
  - Everything can be accessed from the surface

Installation and Maintenance Manuals available
www.ContechES.com/biofilter

An elementary school utilizes the UrbanGreen BioFilter in a busy parking lot.

Learn more at www.ContechES.com/biofilter

Next Steps

Learn more

Read Biofiltration – Design, Operation and Maintenance Considerations available at www.ContechES.com/urbangreen

Connect with us

We're always available to make your job easier. Search for your local rep at www.ContechES.com. While you're there, be sure to check out our upcoming seminar schedule or request an in-house technical presentation.

Start a project

If you are ready to begin a project, you can find the UrbanGreen BioFilter specification, standard details, design guide and more on our website at www.ContechES.com/biofilter.

Links to Stormwater Tools:

To use the *Land Value Calculator,* visit:
www.ContechES.com/lvc
(Please scroll to the bottom right to download the *Land Value Calculator)*

To use the *Design Your Own Detention System* tool, visit:
www.ContechES.com/dyods

To use the *Rain Water Harvesting Runoff Reduction Calculator* tool, visit:
www.ContechES.com/rwh-calculator

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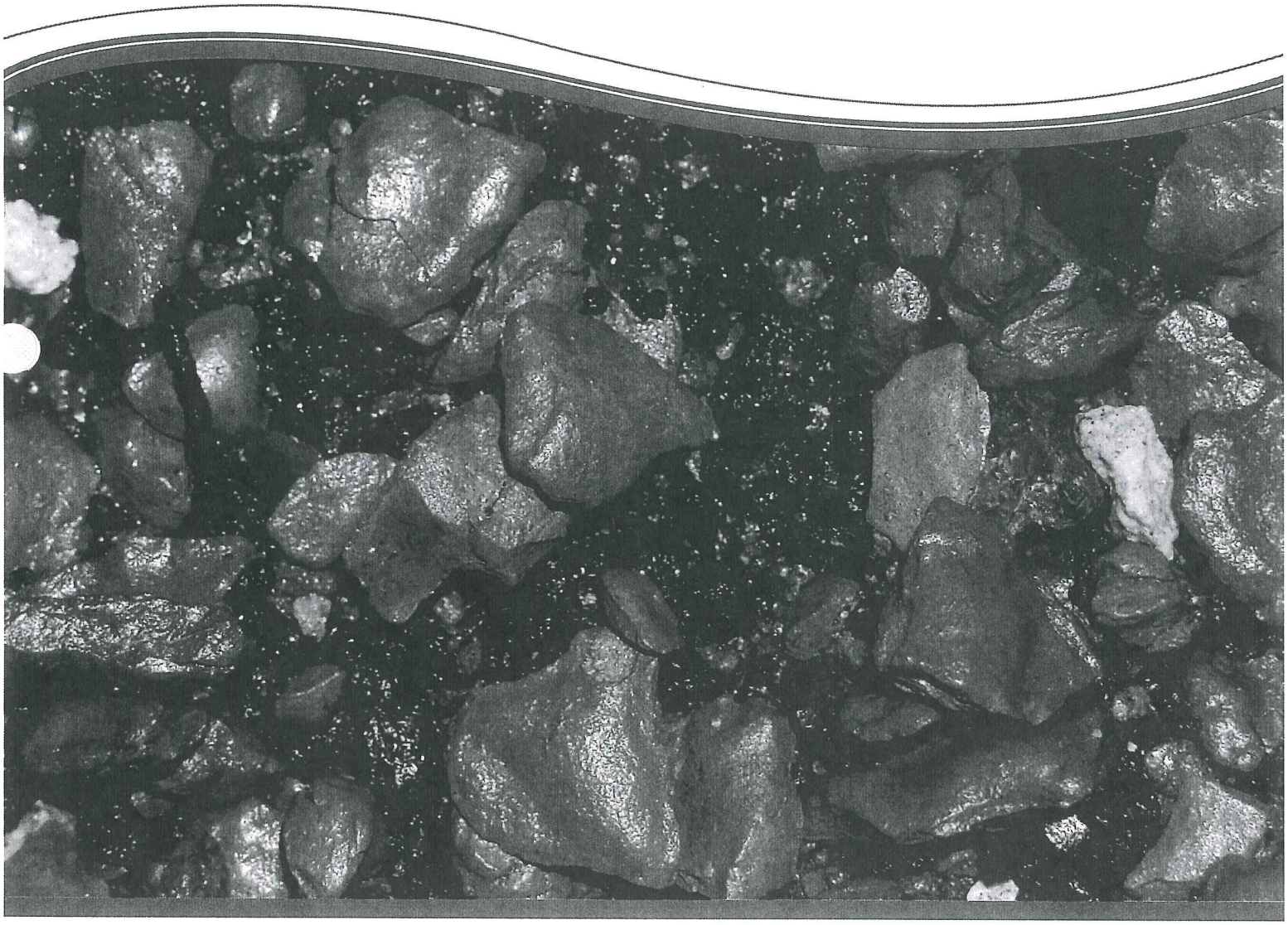
BioFilter Maintenance Manual



BioFilter

UrbanGreen BioFilter™ Inspection and Maintenance

The UrbanGreen™ BioFilter should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit (i.e. unstable soils or heavy winter sanding will cause the system to fill more quickly but regular sweeping will slow accumulation).

Maintenance of the UrbanGreen BioFilter should be performed by a qualified professional who has experience with maintenance of stormwater management systems.

For more information, please contact CONTECH at 800.338.1122 or info@contech-cpi.com.

Inspection and Routine Maintenance

Inspection is the key to effective maintenance. Inspect annually unless local regulations or site conditions require more frequent inspection. Routine maintenance, defined as trash and debris removal and general upkeep, should be performed during each inspection if necessary.

First record the height, width and condition of the tree. A sample log is provided. Once these recordings have been taken, the tree grate should be removed to observe the bioretention bay. Any trash and debris that has collected here should be removed and disposed of appropriately.

As with all media filtration systems, captured pollutants and sediments will accumulate on the surface of the engineered soil mixture over time, reducing the treatment capacity of the system. If captured pollutants are observed to have occluded the media surface, or if standing water is present in the biofiltration bay during dry periods, then maintenance of the top layer of soil mixture is required. Studies have shown that the majority of all captured pollutants reside in the top 2-3 inches of soil and therefore it is likely that only this layer needs to be replaced. (California Stormwater Quality Association (CASQA), New Development and Redevelopment Handbook, January 2003).

Replacement soil is available from CONTECH. Please note that when replacing the engineered soil mixture, the energy dissipation rocks which protect the inlet from scour should be collected and set aside for use with the new soil. Once the new soil has been installed, the energy dissipation rocks should be placed back at the inlet.

Once the bioretention bay has been inspected and maintenance procedures completed, the tree grate placed should be put securely back in place.

As part of the standard terms of system purchase, CONTECH will supply routine maintenance services as described herein within approximately 1 year of system activation. Associated maintenance log records will be made available to the owner upon request.

Inspection and maintenance of the media cartridge bay are also critical to the overall performance of the system. Inspection should be performed at the same time as inspection of the bioretention bay. Remove the cover over the media cartridge bay and observe the accumulated pollutants within the chamber. If more than three inches of sediment is found on the chamber floor or on the tops of the cartridges, then cartridge replacement should be performed. Additionally, if standing water resides in the chamber for greater than twenty-four hours after a storm event, then cartridge replacement should be performed.

Depending on site and climatic conditions, maintenance frequency of the media cartridges should range from 3 to 5 years. Instructions for cartridge replacement are provided in the Non-Routine Maintenance section below. All observations from inspection of the media cartridge bay should be recorded in the maintenance log.

Non-Routine Maintenance

Non-routine maintenance is defined as clean-out of the media cartridge bay and replacement of cartridges. Replacement cartridges can be ordered by contacting CONTECH at 800.338.1122.

The first step in the clean-out of the media cartridge bay is to remove the sediment and debris that has collected in this chamber. A vacuum truck or manual operation can be used for this procedure. Once the sediment and debris has been removed, the existing cartridges should be removed from the system. Cartridges are connected to the underdrain manifold by a simple quarter-turn connection and are easily disconnected.

Once the cartridges are removed from the vault, any remaining sediment and/or debris should be cleaned out. The final step in the cartridge replacement process is to install the replacement cartridges. Replacement cartridges should be installed securely to the quarter-turn connection system and the cover placed securely back over the media cartridge bay.

General Maintenance Notes

All OSHA standards for health and safety should be followed at all times when inspecting or maintaining the UrbanGreen BioFilter. Furthermore, disposal of pollutants removed from the UrbanGreen BioFilter should be performed in accordance with all regulatory requirements.

UrbanGreen BioFilter Inspection & Maintenance Log

Project Name:

Date of Installation:

Location:

Date	Tree Height/Width/ Condition	Bioretention Bay Routine Maintenance Performed	Media Cartridge Bay Observations	Media Cartridge Bay Maintenance Performed

UrbanGreen BioFilter Inspection & Maintenance Log

Project Name: Walmart

Date of Installation: 10/01/05

Location: Anywhere, USA

Date	Tree Height/Width/ Condition	Bioretention Bay Routine Maintenance Performed	Media Cartridge Bay Observations	Media Cartridge Bay Maintenance Performed
12/01/06	36"/24"/good condition	Removed debris from chamber	Slight Sediment layer on floor	None required
12/01/07	38"/28"/good condition	Removed debris /replaced soil top layer	1" of sediment on floor	None required
12/01/08	42"/32"/needs irrigation	Removed debris from chamber	1 1/2" of sediment on floor	None required
12/01/09	47"/38"/good condition	Removed debris from chamber	2" of sediment on floor	None required
12/01/10	50"/39"/good condition	Removed debris /replaced soil top laye	2 1/4" of sediment on floor	None required
12/01/11	52"/42"/needs irrigation	Removed debris from chamber	2 1/2" of sediment on floor	None required
12/01/12	54"/40"/good condition	Removed debris from chamber / replaced soil top laye	3" of sediment on floor	Chamber cleaned/ cartridges replaced

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CONTECH Engineered Solutions, LLC. provides site solutions for the civil engineering industry. CONTECH's portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other CONTECH division offerings, visit contech-cpi.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

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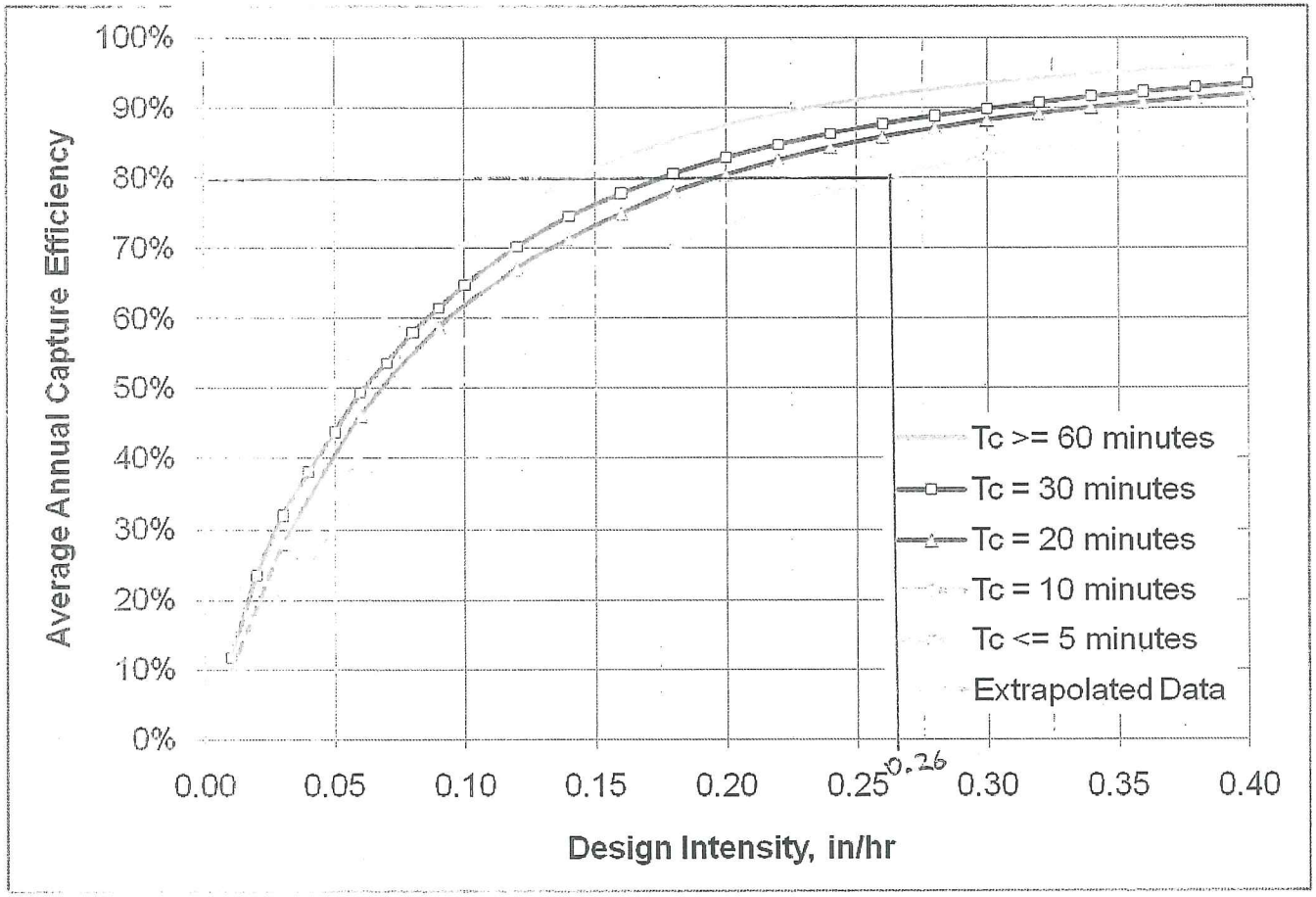
Worksheet B: Simple Design Capture Volume Sizing Method

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.7	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=		inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=		inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	0.27	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.64	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.63	
4	Calculate runoff volume, V_{design}= *(C x* $d_{remainder}$ *x A x 43560 x (1/12))*	V_{design}=	432	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII)	$K_{measured}$=		In/hr
2	Enter combined safety factor from Worksheet H, S_{final} (unitless)	S_{final}=		
3	Calculate design infiltration rate, $K_{design} = K_{measured} \times S_{final}$	K_{design}=	0.1	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	48	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	0.4	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	1,080	sq-ft

Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See **Appendix** IV.2)	T_c=	4.9	
2	Using **Figure III.4**, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.26	in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (**Worksheet A**)	d_{HSC}=		inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (**Worksheet A**)	Y_2=		%
5	Using **Figure III.4**, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=		
6	Determine the design intensity that must be provided by BMP, $I_{design}= I_1-I_2$	I_{design}=		
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	0.69	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.86	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.795	
4	Calculate design flowrate, $Q_{design}= (C \times i_{design} \times A)$	Q_{design}=	0.14	cfs
Supporting Calculations				
Describe system:				
Provide time of concentration assumptions:				

Figure III.4. Capture Efficiency Nomograph for Off-line Flow-based Systems in Orange County



PRELIMINARY HYDROLOGY REPORT

For

AUTUMN CARE RESIDENTIAL CARE FACILITY

19101 Garfield Avenue
Huntington Beach, CA

Prepared For:

AUTUMN CARE DEVELOPMENT PARTNERS
(Developer)
2700 Mandeville Canyon Road
Los Angeles, CA 90049

Prepared By:

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING

Waber Consultants, Inc.
3711 Long Beach Blvd, Suite 1008
Long Beach, CA, 90807
(562) 426-8283

May, 2013

This Drainage Report was prepared under my supervision:

By: _____ Date: May, 2013

HYDROLOGY ANALYSIS

The Orange County Hydrology Manual was used to determine the proposed peak flows. Figures and Tables below are referenced to that Manual.

Proposed Site

$Q=0.9(I-Fm)A$ *(Formula D.4)*

Area 1

A=30,000 sf (0.69 acres)
4,400 sf (0.10 Ac. Pervious (Prop.)
$a_{p(prop)}$= 0.10/0.69 = 0.14

Tc=4.9 min. *(Figure D-1)*
$I(t)=at^b$
$I_2=(5.702)(4.9)^{-0.574}$ = 2.29 in/hr *(Figure B-3)*
$I_{10}=(10.209)(4.9)^{-0.573}$ = 4.11 in/hr *(Figure B-3)*

F_p= 0.20 *(Table C.2)*

$F_{m(prop)}=a_{p(prop)}F_p$ = 0.14(0.20)=0.028 *(Formula C.7)*

$Q_{2(prop)}$=0.9(2.29-0.028)(0.69)=1.40 cfs

$Q_{10(prop)}$=0.9(4.11-0.028)(0.69)=2.53 cfs

Underdrain Design

Infiltration rate of the underlying soil is not known, therefore, I = 0.1 in/hr

Depth that can be infiltrated in 48 hr = 0.1 in/hr x 48 hr = 4.8 in
Gravel depth = 4.8 in / 0.4 = 12 in