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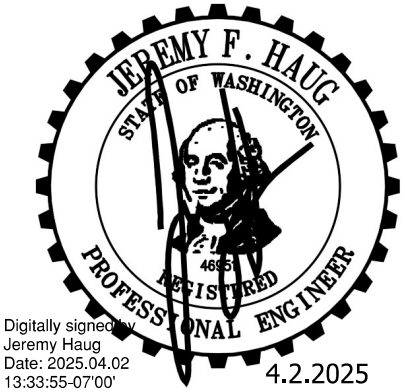
STORMWATER OPERATIONS AND MAINTENANCE MANUAL

FOR

BRADBURY PLACE APARTMENTS

CITY OF PUYALLUP, WASHINGTON



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4.2.2025

APRIL 2025

The O&M Manual uses City of Tacoma maintenance tables. Update to the City of Puyallup maintenance tables whcih can be found here: https://www.cityofpuyallup.org/2157/Operations-and-Maintenance

[O&M Manual, pg. 1]

Current Responsible Party:
Bradbury Place LLC
7809 Pacific Ave
Tacoma, WA 98408
(253) 318-5711

Prepared By:
Rex Henretta, E.I.T., Design Engineer

Approved By:
Jeremy Haug, P.E., Project Engineer

Project # 20-223

THIS MANUAL SHALL BE RETAINED ON-SITE OR WITHIN REASONABLE ACCESS TO THE SITE, AND SHALL BE TRANSFERRED WITH THE PROPERTY TO THE NEW OWNER.

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OPERATIONS AND MAINTENANCE MANUAL FOR STORMWATER CONVEYANCE AND TREATMENT SYSTEMS

Purpose and Scope

This operations and maintenance manual is to assist the owner(s) and/or owner(s) association of some maintenance practices necessary to maintain stormwater conveyance and water quality devices on-site for the Bradbury Place Apartments located in Puyallup, Washington 98374.

The *2019 Stormwater Management Manual for Western Washington* and the requirements of the City of Puyallup will establish the methodology and design criteria used for this project.

This operation and maintenance manual shall be kept on-site, and shall be made available for inspection by the City of Puyallup. The current responsible party is Genestar Properties LLC. The current responsible party shall be in charge of the maintenance of the onsite stormwater system.

Project Description

The site consists of two parcels totaling 2.68 acres, which will consist of 42 multi-family residences. On-site impervious surface area will be infiltrated through the use of an infiltration pond. Access will be provided by extending the existing right-of-way (ROW) of 5th Street SE to the end of the property line. Utilities including sewer, water, storm, and dry utilities will be extended along the proposed aisles. Sewer will service all proposed buildings and extend down 5th Street SE and connect to the existing sewer system located in 27th Ave SE. Additionally, the proposed sewer improvements will require to rip out existing sewer pipe located in 27th Ave SE and be replaced. Water will service all buildings in the site and connect to the existing water line located in 5th Street SE. Storm will collect and convey stormwater throughout the site and be routed to steel catch basins for treatment, then discharging to the proposed infiltration pond.

Parcel #: 0419036002
0419036003
Address: 2525 5th Street SE, Puyallup, WA 98374
Owner: Genestar Properties LLC

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Maintenance and Inspection

The maintenance and inspections of the various storm systems will be the sole responsibility of the owner(s) or owner(s) association, in addition to maintaining accurate records of inspections and maintenance actions are taken. The checklists and guidelines that follow should be utilized as a minimum guide to the maintenance procedures of the site. The following are all the components of the sites stormwater system that will require maintenance and suggested inspection interval:

- Catchbasin, roof drains, and Manholes
    - Before and after the rainfall seasons (April & November), and after any major storms (>1-inch within 24 hours)
- Grounds (Landscaping), Trees, & Amended Soils
    - Before and after the rainfall seasons (April & November), and after any major storms (>1-inch within 24 hours)
- ADS StreamFilter CBF-5 Catch Basin
    - When a BayFilter system is first installed, it is recommended that it be inspected every six (6) months.
    - When the filter system exhibits flows below design levels the system should be maintained.
    - Filter cartridge replacement should also be considered when sediment levels are at or above the level of the manifold system.
    - Please see the ADS BayFilter Inspection and Maintenance Manual in Appendix B for more information regarding the required maintenance regime.

See Appendix A for a figure illustrating the locations of all items to be maintained onsite. The city of Puyallup does not provide an Operation and Maintenance Checklist with the SWMM. All applicable City of Puyallup Stormwater Management Maintenance Checklists are included in Appendix B and are taken from the 2021 City of Tacoma SWMM. In the event additional checklists are required The City of Tacoma comprehensive list can be found in Volume 1, Appendix B of the City of Tacoma Stormwater Management Manual.

Instructions for Use of Maintenance Checklists

Appendix B contains maintenance checklists for the components that are part of your drainage system, as well as for some components that you may not have. Ignore the requirements that do not apply to your system. You should plan to complete a checklist for all system components based upon the suggested inspection intervals from the previous section. These intervals may be altered as site conditions allow. During inspections, check off the problems that you looked for and add comments discussing problems found and actions taken.

The owner/operator should familiarize themselves with the StormFilter product maintenance guides in Appendix B.

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Contech Steel Catch Basin Maintenance Requirements

The maintenance process comprises the removal and replacement of Contech Cartridges and the cleaning of the vault or manhole with a vactor truck. The basic maintenance cycle of these filters varies based on the suspended sediment loading, generally a maintenance interval of 6-12 months is expected in the northwest with an approximate cost of $250 per vault. Replacement of filter media and removing sediment from the separation chamber should occur every 12 to 24 months with an approximate cost of $1,250. Please see Appendix B for Contech Maintenance Schedule.

Landscaping and Grounds Requirements

There are many incremental maintenance items to consider when maintaining residential grounds and landscaping. Please refer to the following City of Tacoma Maintenance Checklists for recommended maintenance items and intervals; #21 – Maintenance Checklist for Grounds, #25 – Maintenance Checklist for Compost Amended Soil; #30 Maintenance Checklist for Trees. All Maintenance Checklist can be found in Appendix B of this Document. The cost of landscaping and grounds requirements should be covered under regular landscaping budget, the cost of these services will vary depending on the interval of care requested by property owner as well as the quantity of landscaping to tend to.

Catchbasin, roof drains, and Manhole Requirements

The maintenance process comprises of the removal and collected sediments within a catch basin or manhole. This usually includes the use of a vactor truck to remove any collect debris. This should be done every 1-2 years as expected in the northwest. Approximate cost of cleaning = $50 per catch basin/ manhole.

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MAINTENANCE PROGRAM

COVER SHEET

Inspection Period: _____

Number of Sheets Attached: _____

Date Inspected: _____

Name of Inspector: _____

Inspector's Signature: _____

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MAINTENANCE PROGRAM LOG SHEET

Use copies of this log sheet to keep track of when maintenance checks occur and what items, if any are repaired or replaced. The completed sheets will serve as a record of past maintenance activities and will provide valuable information on how your facilities are operating. Keep all log sheets in a designated area so other can easily access them.

Name of Inspector: _____

Inspector's Signature: _____

Date of Inspection: _____

Facility and Component Checked	Observations (list things that should be done)	Follow-up Actions Taken	Date Action Taken

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APPENDIX A

Vicinity map and Drainage Plan

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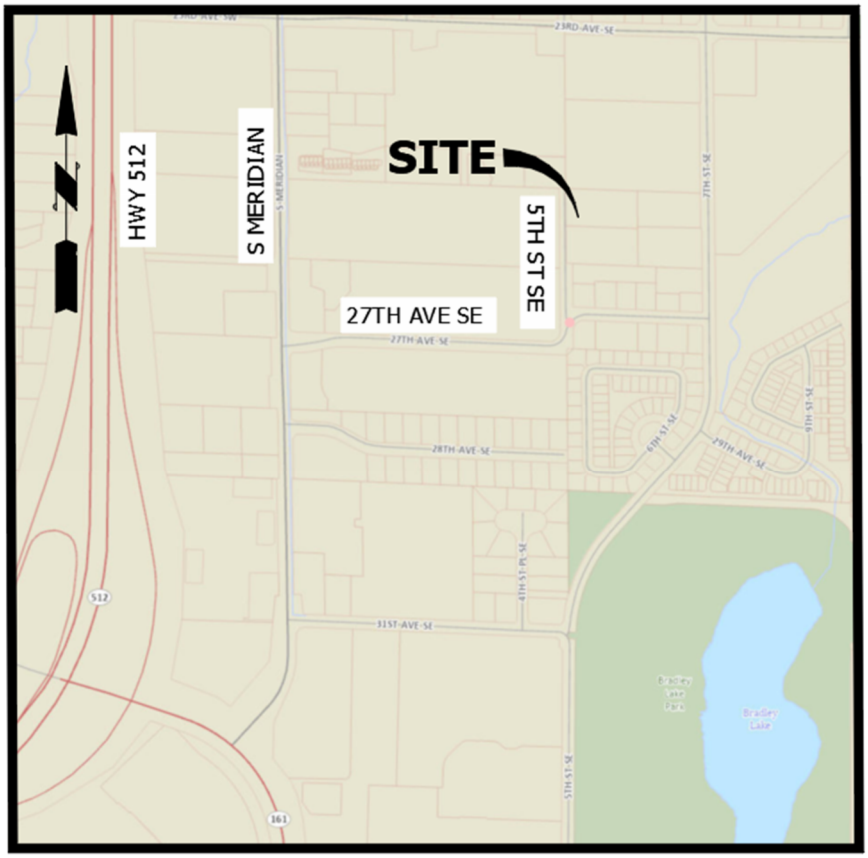

VICINITY MAP

NOT TO SCALE

GRAPHIC SCALE

0 40 80

1 INCH = 40 FEET (11"x17")

YARD DRAIN (TYP)

INFILTRATION POND

ADS STREAMFILTER
W/ 2 BAYFILTER
522 CARTRIDGES

AISLE B

STORM MAIN LINE

CATCH BASIN (TYP)

INFILTRATION TRENCH

ROOF DRAIN
PIPE (TYP)

5TH STREET SE

AISLE C

AISLE A

ROOF DRAIN
CLEANOUT (TYP)

BLD'G No.1
(4) TOWNHOMES

BLD'G No.2
(8) TOWNHOMES

BLD'G No.3
(8) TOWNHOMES

BLD'G No.4
(4) TOWNHOMES

BLD'G No.5
(7) TOWNHOMES

BLD'G No.6
(7) TOWNHOMES

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OPERATION AND MAINTENANCE MAP

BRADBURY PLACE APARTMENTS
PUYALLUP, WA

BY:	R. HENRETTA
PROJECT:	20-223
DATE:	2025.01.02
EXHIBIT NO.	1

APPENDIX B

Stormwater Infrastructure Maintenance Checklists

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#2 - Maintenance Standard for Infiltration Ponds/Basins

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Any trash and debris which exceeds 1 cubic feet per 1,000 square feet. In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
Annually (preferably Sept.)	General	Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or Local Regulations. (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Monthly from Oct. – Apr.	General	Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents removed and dam or berm repaired. (Coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
Monthly from Oct. – Apr.	General	Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is returned to design function. (Contact WDFW to identify the appropriate Nuisance Wildlife Control Operator)

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr.	Storage Area	Water Not Infiltrating	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration (24 hours or design infiltration time). (A percolation test pit or test of facility indicates facility is only working at 90 percent of its designed capabilities. If 2 inches or more sediment is present, remove).	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
Monthly from Oct. – Apr.	Ponds	Vegetation	Exceeds 18 inches.	Mow or remove vegetation as necessary. Remove all clippings.
Monthly from Oct. – Apr.	Ponds	Vegetation	Bare spots.	Revegetate and stabilize immediately. Do not apply fertilizers.
Monthly from Oct. – Apr.	Side Slopes of Pond	Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Pond Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or piping. A Washington State Licensed Professional Engineer should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
Annually (preferably Sept.)	Pond Berms (Dikes)	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Washington State Licensed Professional Engineer be called in to inspect and evaluate condition and recommend repair.)	Piping eliminated. Erosion potential eliminated.
Annually (preferably Sept.)	General	Hazard Trees	If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	Remove hazard trees
Annually (preferably Sept.)	General	Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Pond Berms (Dikes)	Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A Washington State Licensed Professional Engineer should be consulted for proper berm/spillway restoration.
Annually (preferably Sept.)	Emergency Overflow/ Spillway	Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A Washington State Licensed Professional Engineershould be consulted for proper berm/spillway restoration.
Annually (preferably Sept.)	Emergency Overflow/ Spillway	Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil at the top of out flowpath of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Emergency Overflow/ Spillway	Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a Washington State Licensed Professional Engineer should be consulted to resolve source of erosion.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#3 - Maintenance Standard for Infiltration Trenches

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash and debris in presettling basin, sump, or observation well/port.	Trash and debris cleared from site.
Annually (preferably Sept.)	General	Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or Local Regulations. (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr.	General	Water Not Infiltrating	Water ponding on surface or visible in observation well 24 hours after storm event.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design. Remove any sediment from surface inlet if applicable.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.) and after any major storm event (1" in 24 hours)	Trenches	Observation Well (Use surface of trench if well is not present)	Water ponds at surface during storm events. Water visible in observation well 48 hours after storm event.	Remove and Replace rock layer and geomembrane or clean rock and geomembrane. Check underdrain pipe for sediment accumulation and remove sediment.
Annually (preferably Sept.)	General	Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.
Annually (preferably Sept.)	Emergency Overflow/ Spillway	Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a Washington State Licensed Professional Engineer should be consulted to resolve source of erosion.
Monthly from Oct. – Apr.	Presettling Sump	Facility or sump filled with sediment and/or debris	6 inches or designed sediment trap depth of sediment.	Sediment is removed.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#6 - Maintenance Standard for Catch Basins/Manholes

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General	"Dump no pollutants" Stencil or stamp not visible	Stencil or stamp should be visible and easily read	Warning signs (e.g., "Dump No Waste-Drains to Stream") shall be painted or embossed on or adjacent to all storm drain inlets.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inlet capacity of the basin by more than 10 percent.	No trash or debris located immediately in front of catch basin or on grate opening.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Dead animals or vegetation that could generate odors and cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin.
Annually (preferably Sept.)	General	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
Annually (preferably Sept.)	General	Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
Annually (preferably Sept.)	General	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
Annually (preferably Sept.)	General	Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regrouted and secure at basin wall.
Annually (preferably Sept.)	General	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Annually (preferably Sept.)	Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place.	Catch basin cover is in place.
Annually (preferably Sept.)	Catch Basin Cover	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half-inch of thread.	Mechanism opens with proper tools.
Annually (preferably Sept.)	Catch Basin Cover	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Annually (preferably Sept.)	Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Annually (preferably Sept.)	Grates	Grate opening Unsafe	Grate with opening wider than seven-eighths of an inch.	Grate opening meets design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Grates	Trash and Debris	Trash and debris that is blocking more than 20 percent of grate surface inletting capacity.	Grate free of trash and debris.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Grates	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place , meets design standards, and is installed and aligned with flowpath.
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#19 - Maintenance Standard for Fencing/Shrubbery Screen/Other Landscaping

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	General	Missing or broken parts/ dead shrubbery	Any defect in the fence or screen that permits easy entry to a facility.	Fence is mended or shrubs replaced to form a solid barrier to entry.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Erosion	Erosion has resulted in an opening under a fence that allows entry by people or pets.	Replace soil under fence so that no opening exceeds 4 inches in height.
Monthly from Oct. – Apr.	General	Unruly Vegetation	Shrubbery is growing out of control or is infested with weeds.	Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.
Annually (preferably Sept.)	Fences	Damaged Parts	Posts out of plumb more than 6 inches.	Posts are within 1.5 inches of plumb.
Annually (preferably Sept.)	Fences	Damaged Parts	Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
Annually (preferably Sept.)	Fences	Damaged Parts	Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
Annually (preferably Sept.)	Fences	Damaged Parts	Missing or loose tension wire.	Tension wire in place and holding fabric.
Annually (preferably Sept.)	Fences	Damaged Parts	Missing or loose barbed wire that is sagging more than 2.5 inches between posts.	Barbed wire in place with less than three-fourth inch sag between posts.
Annually (preferably Sept.)	Fences	Damaged Parts	Extension arm missing, broken, or bent out of shape more than 1.5 inches.	Extension arm in place with no bends larger than three-fourth inch.
Annually (preferably Sept.)	Fences	Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

#21 - Maintenance Standard for Grounds (Landscaping)

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	General	Weeds (non-poisonous)	Weeds growing in more than 20 percent of the landscaped area (trees and shrubs only).	Weeds present in less than 5 percent of the landscaped area.
Biannually (Spring & Fall)	General	Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in State and Local Regulations. (Apply requirements of adopted integrated vegetation management (IVM) policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board). Complete eradication of noxious weeds may not be possible, however compliance with state or local eradication policies are required.
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Any trash and debris which exceeds 1 cubic feet per 1,000 square feet. In general, there should be no visual evidence of dumping.	Trash and debris cleared from site.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Erosion of Ground Surface	Noticeable rills are seen in landscaped areas.	Causes of erosion are identified and steps taken to slow down/ spread out the water. Eroded areas are filled, contoured, and seeded.
Annually (preferably Sept.)	Trees and shrubs	Damage	Limbs or parts of trees or shrubs that are split or broken which affect more than 25 percent of the total foliage of the tree or shrub.	Trim trees/shrubs to restore shape. Replace severely damaged trees/shrubs.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	Trees and shrubs	Damage	Trees or shrubs that have been blown down or knocked over.	Replant tree, inspecting for injury to stem or roots. Replace if severely damaged.
Annually (preferably Sept.)	Trees and shrubs	Damage	Trees or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Place stakes and rubber-coated ties around young trees/ shrubs for support.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#29 - General Maintenance Concerns for Stormwater Facilities

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Based on manufacturers instructions	Irrigation	Irrigation system (if any)	Irrigation system present.	Follow manufacturer's instructions for O&M.
Weekly (May – September)	Irrigation	Plant watering	Plant establishment period (1-3 years).	Water weekly during periods of no rain to ensure plant establishment.
As Needed	Irrigation	Plant watering	Longer term period (3+ years).	Water during drought conditions or more often if necessary to maintain plant cover.
Ongoing	Spill Prevention and Response	Spill prevention	Storage or use of potential contaminants in the vicinity of facility.	Exercise spill prevention measures whenever handling or storing potential contaminants.
As needed	Spill Prevention and Response	Spill response	Release of pollutants. Call to report any spill to City of Tacoma Source Control 253.502.2222.	Cleanup spills as soon as possible to prevent contamination of stormwater.
At startup	Training and Documentation	Training / written guidance	Training / written guidance is required for proper O&M.	Provide property owners and tenants with proper training and a copy of the O&M manual.
Annually (preferably Sept.)	Safety	Safety (slopes)	Erosion of sides causes slope to exceed 1:4 or otherwise becomes a hazard.	Restore to design slope.
Annually (preferably Sept.)	Safety	Safety (hydraulic structures)	Hydraulic structures (pipes, culverts, vaults, etc.) become a hazard to children playing in and around the facility.	Take actions to eliminate the hazard (such as covering and securing any openings).
Annually (preferably Sept.)	Safety	Line of sight	Vegetation causes some visibility (line of sight) or driver safety issues.	Prune or replace plants as necessary.
Annually (preferably Sept.)	Aesthetics	Aesthetics	Damage/vandalism/ debris accumulation.	Clean, repair, and restore facility to original aesthetic conditions.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Aesthetics	Grass/ vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions. (e.g., remove/replace plants, amend soil, etc.).
Annually (preferably Sept.)	Aesthetics	Edging	Grass is starting to encroach on facility.	Repair edging. Remove encroaching grass. Install additional measures to prevent encroachment.
Annually (preferably Sept.)	General	Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation may constitute a hazard to maintenance personnel or to the public. Any evidence of noxious weeds as defined by the State or local regulations. The Washington State Noxious Weed Control Board has a list of common noxious weeds at www.nwcb.wa.gov.	No danger of poisonous vegetation. Compliance with state or local eradication policies is required. Apply requirements of adopted integrated pest management plan as necessary.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#30 - Maintenance Standard for Trees

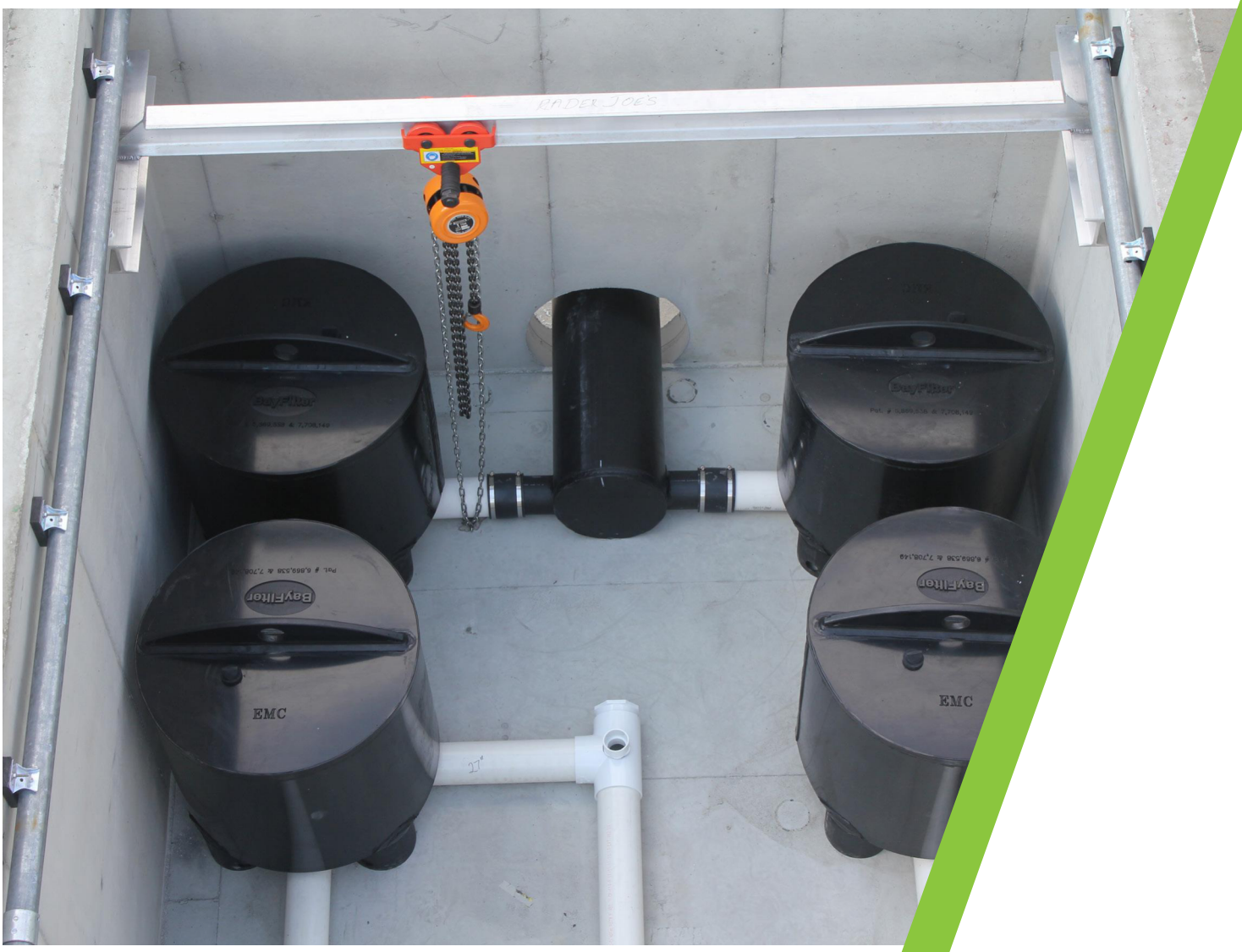
Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Once a year for the first three years	Trees	Future failure	Weak branch attachments; co-dominant stems.	Structural Pruning[a].
As needed	Trees	Threat to public safety	Low branches that may cause safety concerns if they remain.	Crown Raising[a].
As neeed, for safety	Trees	Threat to public safety	Dead, diseased and/or broken branches.	Pruning to remove dead, diseased and/or broken branches.
As needed	Trees	Threat to public safety	Dead, severely damaged or declining.	Replace per planting plan or acceptable substitute.

a. Trees shall be pruned according to industry standards, ANSI A300 Part 1 and the International Society of Arboriculture's Best Management Practices - Tree Pruning.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

BayFilter® Design Manual

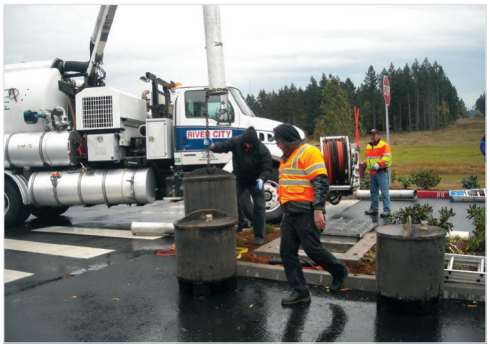


ADS™

- Hammer drill
- ¼" (6 mm) concrete drill bit for the trolley
- 7/16" (11 mm) wrench or deep socket ratchet for the trolley rail anchors
- 1/2" (13 mm) concrete drill bit for hold down bars
- ¾" (19 mm) wrench or deep socket ratchet for the hold down bar anchors

Pre-Assembled Manifold

In some areas the vaults can be provided with pre-installed manifold systems. Please contact your local ADS representatives for additional details.



BayFilter System Cleanout

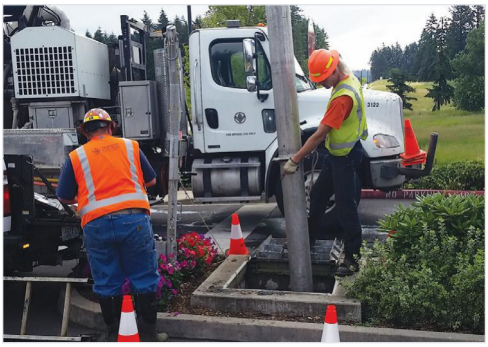
Inspection and Maintenance

The BayFilter system requires periodic maintenance to continue operating at the design efficiency. The maintenance process is comprised of the removal and replacement of each BayFilter cartridge, vertical drain down module; and the cleaning of the vault or manhole with a vacuum truck.

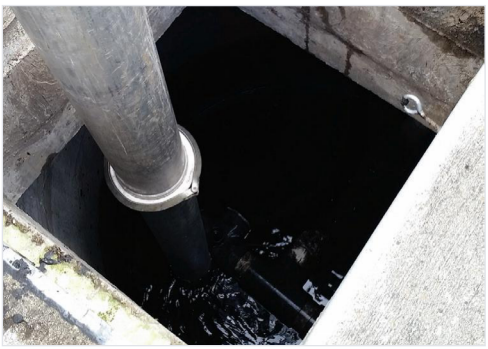
The maintenance cycle of the BayFilter system will be driven mostly by the actual solids load on the filter. The system should be periodically monitored to be certain it is operating correctly. Since stormwater solids loads can be variable, it is possible that the maintenance cycle could be more or less than the projected duration.

BayFilter systems in volume-based applications are designed to treat the WQv in 24 to 48 hours initially. Late in the operational cycle of the BayFilter, the flow rate will diminish as a result of occlusion. When the drain down exceeds the regulated standard, maintenance should be performed.

When a BayFilter system is first installed, it is recommended that it be inspected every six (6) months. When the filter system exhibits flows below design levels the system should be maintained. Filter cartridge replacement should also be considered when sediment levels are at or above the level of the manifold system. Please contact the ADS Engineering Department for maintenance cycle estimations or assistance at **800.229.7283**.



Vactor Truck Maintenance

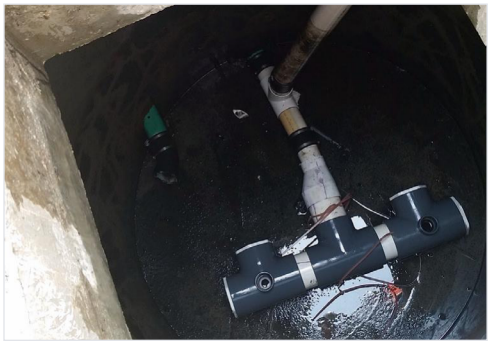


Jet Vactoring Through Access Hatch

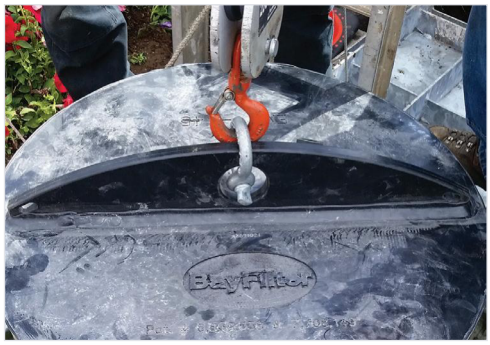
Maintenance Procedures

1. Contact ADS for replacement filter cartridge pricing and availability at 800-821-6710.
2. Remove the manhole covers and open all access hatches.

3. Before entering the system make sure the air is safe per OSHA Standards or use a breathing apparatus. Use low O_2, high CO, or other applicable warning devices per regulatory requirements.
4. Using a vacuum truck remove any liquid and sediments that can be removed prior to entry.
5. Using a small lift or the boom of the vacuum truck, remove the used cartridges by lifting them out.
6. Any cartridges that cannot be readily lifted can be easily slid along the floor to a location they can be lifted via a boom lift.
7. When all the cartridges have been removed, it is not practical to remove the balance of the solids and water. Loosen the stainless clamps on the Fernco couplings for the manifold and remove the drain pipes as well. Carefully cap the manifold and the Ferncos and rinse the floor, washing away the balance of any remaining collected solids.
8. Clean the manifold pipes, inspect, and reinstall.
9. Install the exchange cartridges and close all covers.
10. The used cartridges may be sent back to ADS for recycling.



Manifold Tee View of a Cleaned System



Cartridge Hoist Point

BayFilter Availability and Cost

BayFilter systems are available throughout the United States from ADS. Material, installation, and maintenance costs vary with location. For BayFilter pricing in your area, please contact ADS at 800-821-6710.

BayFilter cartridges and outlet components can be shipped anywhere in the world. Manholes and precast vaults are also supplied by ADS as part of a complete stormwater filtration system.

BayFilter Specifications

Products

A. Internal components: all components including concrete structure(s), PVC manifold piping and filter cartridges, shall be provided by ADS **800-821-6710**.
B. PVC manifold piping: all internal PVC pipe and fittings shall meet ASTM D1785. Manifold piping shall be provided to the contractor pre-cut and/or preassembled. Minor field modifications may be necessary.
C. Filter cartridges: external shell of the filter cartridges shall be substantially constructed of polyethylene or equivalent material acceptable to the manufacturer. Filtration media shall be arranged in a spiral layered fashion to maximize available filtration area.

adspipe.com

800-821-6710

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