Stormwater Management Plan

Phase II Permit for Western Washington

Bellingham Technical College
Facilities Department
Bellingham, Washington 98225

In compliance with the requirements of the National Pollutant Discharge Elimination System and State Water Discharge General Permit for Discharges in Western Washington

Updated: August 2010
Revised: August 2015

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Acronyms and Definitions

BTC: Bellingham Technical College

Best Management Practices: (BMP) are the schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices approved by the Department that, when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.

CWA: Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972)

Ecology: Washington State Department of Ecology

EPA: Environmental Protection Agency

Illicit Discharge: Any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.

Municipal Separate Storm Sewer System (MS4) Conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

i. Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State Law) having jurisdiction over disposal of wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States.

ii. Designed or used for collecting or conveying stormwater.

iii. Which is not a combined sewer; and (iv) which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2. Bellingham Technical College stormwater system operates as an MS4

National Pollutant Discharge Elimination System (NPDES): National program for issuing, modifying, revoking, and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the state from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington Department of Ecology.

Point Source: Pollution that can be traced back to a single origin or source.

Secondary Permittee Operator of a regulated small MS4 that is not a city, town or county. Bellingham Technical College is a Secondary Permittee.

Small Municipal Separate Storm Sewer System (Small MS4): MS4 that is not defined as "large" or "medium" pursuant to 40 CFR 122.26(b) (4) & (7) or designated under 40 CFR 122.26 (a) (1) (v). Small MS4s include systems similar to separate storm sewer systems in municipalities such as: universities, large publicly owned hospitals, prison complexes, highways and other thoroughfares. Bellingham Technical College is a small MS4.

SWMP - Stormwater Management Plan

Permit Timeline

Permit Effective Date: February 16, 2007
Permit Expiration Date: February 15, 2012

Deadline	Task
February 16, 2008	• Prohibit illicit discharge and illegal dumping • Develop and implement an enforcement plan to ensure compliance
February 16, 2009	• Begin field inspections for illicit discharge • One third of known outfalls must be inspected annually
February 16, 2010	• 50% of stormwater inlets and oil-water separators shall be labeled • Annual education program shall begin • O&M Plan shall be developed and implemented
August 19, 2011	• All stormwater inlets shall be labeled • The latest updated version of the SWMP shall be made available to the public • The SWMP shall be fully implemented • A spill response plan shall be developed

Permit Report Submittals and Compliance Dates

Submittal and/or Compliance Requirements	Purpose	Frequency	Beginning	Send To
SWMP Annual Report *See Ecology Annual Report*	Determine compliance with the permit	Annually	March 31, 2008	Department of Ecology Water Quality Program Municipal Stormwater Permits PO Box 47696 Olympia WA 98504-7696
Notification of Spill	Make Ecology aware of a spill into a municipal storm sewer system which could constitute a threat to human health, welfare, or the environment	As needed	Immediately when known	Dept. of Ecology – Bellingham Field Office 360.715.5200 Dept. of Health, Environmental Health - Bellingham 360.676.6724 Dept. of Health, Shellfish Program 360.236.3330
Reapplication	Renew coverage under the permit	Once	August 19, 2011 180 days prior to Permit expiration date	Dept. of Ecology Water Quality Program Municipal Stormwater Permits PO Box 47696 Olympia WA 98504-7696

Permit Description and Summary

A. Background

The purpose of this document is to delineate the process by which Bellingham Technical College (BTC) shall comply with the National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Discharges from Small Separate Storm Sewers in Western Washington. This permit authorizes the discharge of stormwater to the waters of the state of Washington from municipal separate storm sewer systems (MS4s). Permitted MS4s must effectively prohibit non-stormwater discharges into the storm sewers and must apply stormwater management controls to the maximum extent practicable. BTC Personnel involved with the campus' stormwater system management are listed in Appendix 1: Contacts List.

B. Requirements

BTC is classified under the NPDES as a Secondary Permittee, which is an MS4 operator that is not a city, town or county. BTC is required to apply for and obtain coverage under the Western Washington NPDES permit. In order to qualify for that coverage, BTC shall implement the following actions and activities:

1. Public Education and Outreach- Educate Faculty, Staff, and Students on stormwater issues, through a variety of media including labeling storm drain inlets, to increase awareness on the public's role in water stewardship.

2. Public Involvement and Participation- Make the public aware of the program content and status of implementation via public notice.

3. Illicit Discharge Detection and Elimination- Establish and enforce a policy that prevents illicit discharge to the maximum extent practicable.

4. Construction Site Stormwater Runoff Control- Ensure that all construction projects comply with the NPDES and local ordinances, rules, and regulations.

5. Post-Construction Stormwater Management for New Development and Redevelopment- Ensure that completed projects comply with the NPDES and local ordinances, rules, and regulations.

6. Pollution Prevention and Good Housekeeping for Municipal Operations- Develop and implement an operation and maintenance (O&M) plan to minimize stormwater pollution.

C. Execution

The above actions and activities shall be carried out in accordance with stated deadlines, and they shall be fully implemented no later than 180 days prior to the expiration date of the permit (August 19, 2011).

Campus Description

Location: Located between the Birchwood Neighborhood in Northwest Bellingham, the BTC campus lies between the City and County boundaries. The eastern thirty acres is within the City limits while a recently acquired two (2) acres to the west of Little Squalicum Park lies within Whatcom County.

Property: The total area now owned by the College is 32.02 acres. The only existing easements on the property is the City's newly acquired maintenance easement for the fire protection water line and a street extension easement for diagonal parking along Lindbergh Avenue on the south, Illinois Avenue on the north, and Whatcom County limits on the west.

Topography: The Bellingham Technical College campus is located at the far downstream end of the developed portion of the Little Squalicum Creek Watershed. There are no other downstream developments to be affected by runoff leaving the college campus.

The majority of the campus is situated on a flat, city-block like plat. There is a steep bank behind Buildings U, K, J, and the bookstore which slops down into the general lower parking lot. The entire lower parking lot is roughly twelve (12) feet below the main campus. The topo rises again near DMC, (Desmond P. McArdle Technology Center) and MC (Morse Center) to the east. The undeveloped portion to the north is primarily flat at the same elevation of the main campus. Drainage from the Little Squalicum Creek system is evident on portions of the site.

Watershed: The Little Squalicum Creek Watershed consists of approximately 510 acres. Watershed zoning is roughly 70% Residential Single, 10% Residential Multiple, 10% Public (Bellingham Technical College and Birchwood Elementary School), and 10% Industrial. Aerial photos taken in 2002 by the City of Bellingham indicate that residential areas are fairly close to full build out, but at relatively low densities per acre. Most of the forested areas are cleared, industrial areas are half developed, and public areas are about two-thirds developed.

There are three (3) defined drainage basins forming the Little Squalicum Creek Watershed:

1. East Basin – 340 acres (Including northerly 16.2 acres of BTC campus)
2. West Basin – 135 acres
3. South Basin – 35 acres (including southerly 13.5 acres of BTC campus)

Total Little Squalicum Creek Watershed = 510 acres

The northerly 16.2 acres of the BTC campus in the East Basin will be developed gradually in accordance with the College's 20-Year Master Plan. The southerly 13.5 acres of campus in the South Basin is already fully developed.

Over the years, BTC's campus has also been studied and dissected into discreet basins for its own drainage studies to be used in long-range planning efforts. Appendix 2: BTC Campus Basin Map shows the following basins: Northwest, Northeast, West, East, Southwest, and Southeast.

Public Education and Outreach

A. General Summary

This section outlines methods BTC will take to educate the public, staff, and students on stormwater issues. Some elements are already in place and will be maintained while others may be modified or added as resources and needs arise to augment an ongoing effective program. Our intent is to increase our campus community's knowledge of stormwater issues and how we can improve stormwater quality at BTC and in the community at large through increased awareness of how we affect stormwater quality and what we can do through our actions to reduce our impact on stormwater quality.

B. Education & Outreach Strategies:

1. Storm Drain Inlet Marking:
   Storm drain inlets owned and operated by BTC located in maintenance yards, parking lots, along sidewalks and at pedestrian access points shall be clearly and permanently labeled with the message "Dump no waste" and indicate the point of discharge to the bay (Bellingham)

    a. While BTC originally marked roughly 90% of our inlets with paint by stencil, we have since moved to metal medallions installed at all inlet covers, including in landscaped areas, to improve consistency and reduce use of paint.

2. Stormwater Information Distribution:
   Educational information will be distributed regarding impacts of stormwater discharges on receiving waters and steps that can be taken to reduce pollutants in stormwater runoff. Sample topics to be covered include: Stormwater runoff affects on local water bodies; proper use of pesticides and fertilizers; benefits of well-adapted vegetation; alternative equipment washing practices; benefits of proper vehicle maintenance, proper vehicle waste disposal, local hazardous waste collection facilities, and alternative transportation options; Hazards associated with illicit connections; and Benefits of litter control and proper pet waste disposal.

    a. Electronic Bulletin Boards: Through the use of our campus-wide electronic bulletin board system, various slides on the subjects described above will be created and posted on a rotating basis to build awareness of issues and educate people on proper methods and resources available to reduce pollutants in stormwater.

Public Involvement and Participation

As part of the SWMP process, BTC will involve the public by providing access to the current SWMP via the campus' website and also soliciting public review of the SWMP either via the BTC website or by providing notice in a local newspaper.

Illicit Discharge Detection and Elimination

BTC shall comply with local ordinances, rules, and regulations that govern non-stormwater discharges. In 2008, Policy 260.1 was adopted by BTC as a means to enforce appropriate procedures prohibiting illicit discharges and illegal dumping. These procedures shall address, at the minimum: illicit connections, non-stormwater discharges and spilling, dumping, or otherwise improperly disposing of hazardous materials, pet waste, and litter.

A. The following sources may be discharged to the stormwater system:

1. Non-stormwater discharges covered by another NPDES permit
2. Discharges from emergency fire fighting activities
3. Diverted stream flows
4. Rising ground waters
5. Uncontaminated ground water infiltration
6. Foundation drains
7. Air conditioning condensation
8. Irrigation water from agricultural sources that is commingled with urban stormwater
9. Springs
10. Water from crawl space pumps
11. Footing drains
12. Flows from riparian habitats and wetlands.

B. The following sources are not allowed to discharge to the stormwater system, unless stated conditions are met:

1. Discharges from potable water sources, including water line flushing, hyper-chlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water, unless the water is de-chlorinated to 0.1 ppm or less, pH-adjusted if necessary, and controlled to prevent re-suspension of sediments in the stormwater system.

2. Discharges from lawn watering and other landscape irrigation runoff. These discharges are reduced through limited irrigation only during the summer months and ongoing water conservation efforts conducted by the Secondary Permittee and/or the local jurisdiction.

3. Street and sidewalk wash water, water used to control dust, and routine external building wash down that does not use detergents. The Secondary Permittee shall reduce these discharges through, at a minimum, public education activities and /or water conservation efforts conducted by the Secondary Permittee and/or the local jurisdiction. To avoid washing pollutants into the MS4, the Secondary Permittee shall minimize the amount of street wash and dust control water used. At active construction sites, street sweeping shall be performed prior to washing the street.

C. Facilities will complete a map of the storm sewer system that shows various components, such as, manholes, catch basins, inlets, detention vaults, filtration vaults, and other various components. BTC's system connects to the City of Bellingham's MS4 along Lindbergh avenue, Nome street, and near the Little Squalicum Creek park to the west.

D. Annually, Facilities shall inspection the system for general system integrity and to monitor for illicit discharges or connections. Illicit discharge is wastewater that enters the stormwater system without being treated and it occurs as a result of improper connections in the wastewater system. Hired contractors inspect the filtration vaults and cartridges at the west end of the lower lot at least twice per year, or more depending on storm conditions, to maintain proper filtration. Records shall be kept of inspections and follow-up activities.

E. Bellingham Technical College's Emergency Procedure Handbook, Waste Material Disposal Plan (Policy 260.0), Prohibit Illicit Discharges, Activities, and Connections to Separate Storm Sewer System (Policy 260.1) all aid in the Campus' spill response plan. A consolidated Spill Response plan and procedure document will be utilized to aid in the education and training of staff for appropriate spill response.

F. Facilities (Motor Pool, Grounds, Maintenance Services and pertinent Programs) will be trained in the prevention of spills and illicit discharges. Training will be as needed and may be presented in a variety of formats, including, but not limited to, pamphlets, classroom and video.

Construction Site Stormwater Runoff

It is anticipated that all construction activities that disturb one or more acres of land and require a Construction Stormwater General Permit will be undertaken by a contractor. Contract documents shall address the contractor's responsibility to obtain and comply with the Construction Stormwater General Permit. BTC Project Managers and Facility Manager (Stormwater Management Officer) will monitor compliance with the Construction Stormwater General permit for their projects and promptly notify the contractor of any deficiencies.

Post-Construction Stormwater Management

The college will comply with applicable regulations governing post construction stormwater pollution prevention.

Pollution Prevention and Good Housekeeping

The Stormwater System Operations & Maintenance (O&M) Plan has three components: a) O&M Plan; b) Education and Training; and c) Recordkeeping.

A. **Operations & Maintenance (O&M) Plan**:

1. *Stormwater collection and conveyance systems*

Stormwater collection and conveyance systems, including catch basins, stormwater sewer pipes, open channels, culverts, structural stormwater controls, and structural runoff treatment and/or flow control facilities will be inspected annually and maintained as needed. The Facilities department and Grounds unit are responsible for scheduling inspection and maintenance. Appendix 3: BTC O&M Reference Map is attached to help identify areas such as Stormwater Filtration vault and Bio-swale locations; Buildings related to O&M procedures; and general campus orientation.

Maintenance includes cleaning out debris, sediment removal, and any necessary repairs. Sediment is not typically a regulated waste under WAC 173-303 unless visibly contaminated with oil or other contaminates.

Appendix 4: Inspection and Maintenance Guidelines is attached for reference regarding some system components within our system. The 2005 Stormwater Management Manual for Western Washington, Volume V, Chapter 4.6 can be utilized for additional inspection and maintenance information.

Stormwater conveyances include:

a. Stormwater filtration systems near the northwest corner of the Lower lot and along Nome street northeast of the Morse Center building.
b. stormwater catch basins
c. drainage pipes, culverts and ditches
d. roof drains
e. bioswales to the east of H lot and in the center of College Services lot.

Facilities/Grounds will check stormwater treatment and flow control facilities following a 24 hour storm event with a 10-year or greater recurrence interval. These include stormwater filtration systems located at the west end of the Lower lot and northeast of Morse Center along Nome Street, as well as, the bio-swales located east of the H lot and in the center of the College Services lot.

2. *Roads and parking lots*

   The Grounds snow removal plan is incorporated by reference. Deicer is stored in K building and in various custodial lockers around campus and is applied primarily on walking surfaces when the temperature is predicted to drop below freezing. Sand is applied to both driving and walking surfaces to increase traction during winter inclement weather. Sand is cleaned up by hand as soon as practical. Grounds unit clean parking lots and roads routinely to remove trash, litter and vegetative debris. Vegetative debris is cleaned manually. Trash and litter is disposed with the landfill waste. Vegetative debris is disposed at the compost pile.

3. *Vehicle fleets*

   Facilities maintains BTC's fleet of official vehicles and they are stored in the B compound and the K maintenance yards. Vehicles are washed in commercial car washes or in the pervious K maintenance yards. Vehicles are fueled at commercial gas stations or by hand with 5-gallon gas cans. Vehicle repair takes place inside either M building (Automotive Repair) or K building. There are no floor drains in either building where repairs are performed and spills are promptly cleaned up.

4. *External building maintenance*

   Grounds is responsible for most exterior building maintenance. The exterior of the buildings are pressure washed with water as needed to maintain building integrity and appearance (i.e. painting, concrete sealers, and graffiti sealers). Focusing on water conservation and planning pressure washing to be done during summer months will limit the impact to the stormwater system. Grounds and Custodial units clean exterior windows and building entrances and, again with a focus on water conservation, neither activity is expected to impact the stormwater system.

5. *Parks and open spaces*

   Grounds maintain the exterior areas of campus. BTC limits pesticides and herbicides to maintain the grounds. Fertilizer and other soil treatments are judiciously applied to limit runoff. Trash cans are readily available outside, and garbage and litter are picked up on a regular basis. Grass clippings and vegetative debris are informally composted. Woody debris is placed on the vegetative debris area along West Illinois street.

6. *Material storage areas, heavy equipment storage areas, and maintenance areas.*

   Grounds' operating tractors, mowers, and other motorized equipment are stored inside K building or in exterior containers. Building K maintenance yards are pervious surfaces and should not impact stormwater. BTC maintains a stockpile of sand for winter inclement weather and is stored in a bunker within one of the K maintenance yards.

B. Staff Training and Education

All staff whose regular job duties may impact stormwater quality and relate to the construction, operations, or maintenance of the campus site and facilities, shall be educated in the following areas shown below (categories 1-5). As a minimum, training will include the Facilities department (Utility/Grounds, Maintenance, Custodial, and Warehouse staff) and will cover, but not be limited to, the following categories:

1. The importance of protecting water quality
2. The requirements of the Permit and the Operation and Maintenance Plan
3. Inspection Procedures
4. Ways to perform their job activities to prevent or minimize impacts to water quality
5. Procedures for reporting water quality concerns, including potential illicit discharges

C. Recordkeeping and Documentation

Facilities management and administration will work with staff to keep records for the following:

1) Preventative maintenance and repairs to stormwater systems
2) Scheduled inspections
3) Spill response
4) Other potential pollution incidents
5) Permit reporting as required

D. Review and modification of SWMP

As BTC continues to fulfill its operational mission and adapt to the environment influencing our operation, the College will continue to refine and modify our SWMP as needed to reduce stormwater pollutants through on-going stormwater awareness and maintaining conveyance systems to manage our impacts on local waterbodies.

Appendix 1

Contact List

David Jungkuntz, BTC Facilities Manager & Stormwater Management Officer
3028 Lindbergh Avenue – "K" Building
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Wendy Riedy, Assistant to Facilities Manager
3028 Lindbergh Avenue – "K" Building
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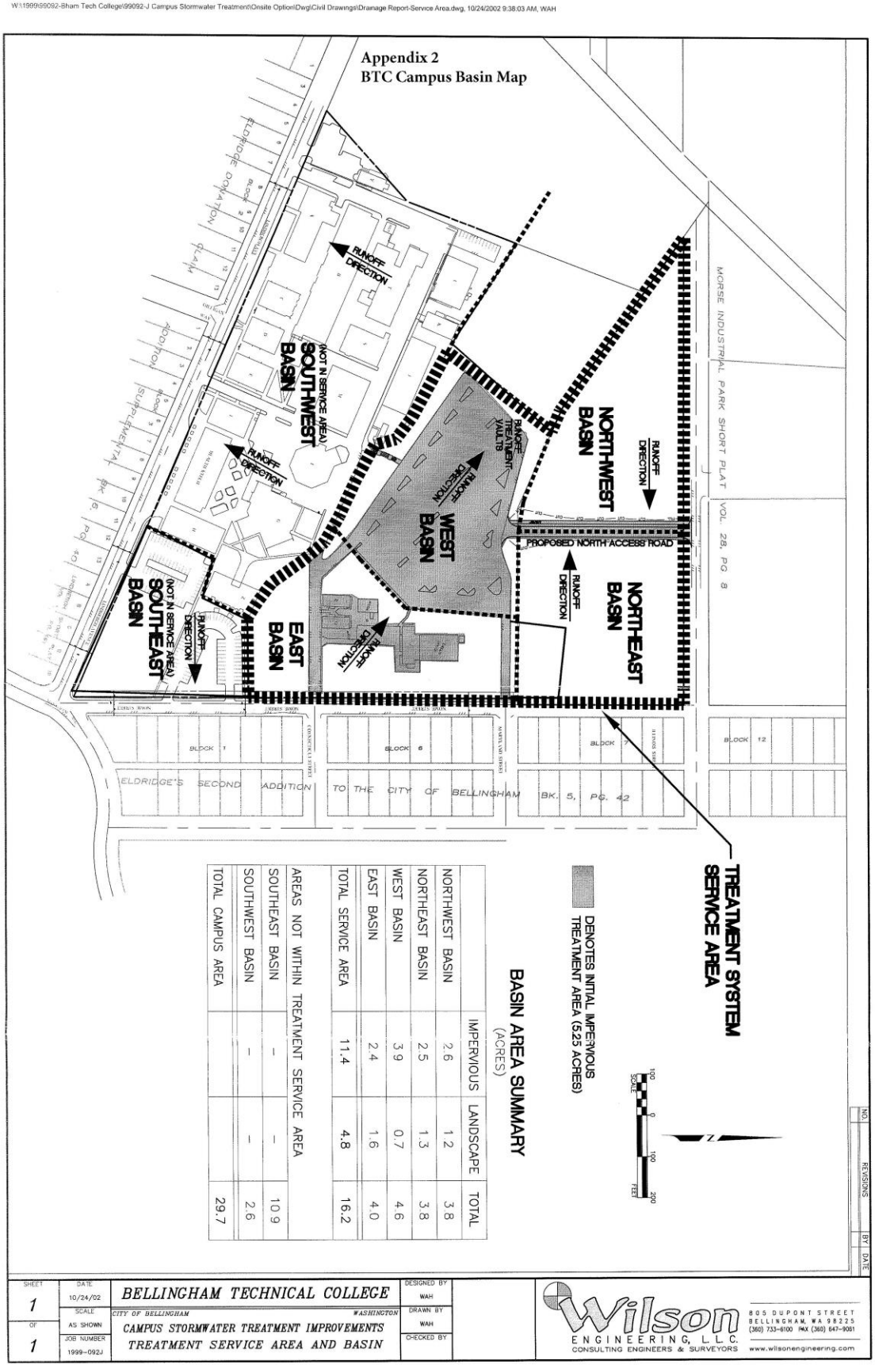
Appendix 2

BTC Campus Basin Map



Appendix 3

BTC O&M Reference Map

No. 5 – Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.	No Trash or debris located immediately in front of catch basin or on grate opening.
		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 six inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
		Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
	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
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 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.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
		Grout fillet has separated or cracked wider than 1/2 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.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.	No vegetation blocking opening to basin.
		Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation or root growth present.

No. 5 – Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	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.
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.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

No. 6 – Debris Barriers (e.g., Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4 inch.
		Bars are missing or entire barrier missing.	Bars in place according to design.
		Bars are loose and rust is causing 50% deterioration to any part of barrier.	Barrier replaced or repaired to design standards.
	Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

No. 8 – Typical Biofiltration Swale

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits on grass treatment area of the bio-swale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
	Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
	Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire swale width.
	Constant Baseflow	When small quantities of water continually flow through the swale, even when it has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or by-pass the baseflow around the swale.
	Poor Vegetation Coverage	When grass is sparse or bare or eroded patches occur in more than 10% of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals. Or re-seed into loosened, fertile soil.
	Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
	Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs and remove brushy vegetation on adjacent slopes.
	Inlet/Outlet	Inlet/outlet areas clogged with sediment and/or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
	Trash and Debris Accumulation	Trash and debris accumulated in the bio-swale.	Remove trash and debris from bioswale.
	Erosion/Scouring	Eroded or scoured swale bottom due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. If bare areas are large, generally greater than 12 inches wide, the swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.

No. 15 – Stormfilter™ (leaf compost filter)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Below Ground Vault	Sediment Accumulation on Media.	Sediment depth exceeds 0.25-inches.	No sediment deposits which would impede permeability of the compost media.
	Sediment Accumulation in Vault	Sediment depth exceeds 6-inches in first chamber.	No sediment deposits in vault bottom of first chamber.
	Trash/Debris Accumulation	Trash and debris accumulated on compost filter bed.	Trash and debris removed from the compost filter bed.
	Sediment in Drain Pipes/Clean-Outs	When drain pipes, clean-outs, become full with sediment and/or debris.	Sediment and debris removed.
	Damaged Pipes	Any part of the pipes that are crushed or damaged due to corrosion and/or settlement.	Pipe repaired and/or replaced.
	Access Cover Damaged/Not Working	Cover cannot be opened; one person cannot open the cover using normal lifting pressure, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
		Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
	Baffles	Baffles corroding, cracking warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.
Below Ground Cartridge Type	Compost Media	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.	Media cartridges replaced.
	Short Circuiting	Flows do not properly enter filter cartridges.	Filter cartridges replaced.

No. 2 – Infiltration

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Poisonous/Noxious Vegetation	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Contaminants and Pollution	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Rodent Holes	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1)
Storage Area	Sediment	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration. Treatment basins should infiltrate Water Quality Design Storm Volume within 48 hours, and empty within 24 hours after cessation of most rain events. (A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities. Test every 2 to 5 years. If two inches or more sediment is present, remove).	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
Filter Bags (if applicable)	Filled with Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Filter bag is replaced or system is redesigned.
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.
Side Slopes of Pond	Erosion	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
Emergency Overflow Spillway and Berms over 4 feet in height.	Tree Growth	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Piping	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
Emergency Overflow Spillway	Rock Missing	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
	Erosion	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
Pre-settling Ponds and Vaults	Facility or sump filled with Sediment and/or debris	6" or designed sediment trap depth of sediment.	Sediment is removed.