CP|H
CONSULTANTS

# Stormwater Pollution and Prevention Plan (SWPPP)

## Enumclaw Recycle
## CPH Project No. 0164-17-001

## King County, Washington

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May 31, 2018

# Stormwater Pollution Prevention Plan

**For**

# Enumclaw Recycling

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**Project Site Location**
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# 1.0 Introduction

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the Enumclaw Recycling commercial development project located in Enumclaw, Washington. Enumclaw Recycling proposes to clear and develop an existing parcel into a recycling center including paved processing rea, office, show, and associated access and laydown areas within unincorporated King County. The project is located approximately 4 miles north of the City of Enumclaw and to the west of SR 169. The site is also divided in two by Enumclaw Franklin Rd SE. There is no street address associated with the site (King County tax parcel nos. 362106-9004, 362106-9014, 3621069014). More generally, the site is located in the NW ¼ of the SE ¼ of Section 36 of Township 21 North, Range 6 East, in King County, Washington.

Construction activities will include approximately 41.41 acres of new impervious area in the form of asphalt pavement, ponds, buildings and septic tanks. The purpose of this SWPPP is to describe the proposed construction activities and all temporary and permanent erosion and sediment control (TESC) measures, pollution prevention measures, inspection/monitoring activities, and record keeping that will be implemented during the proposed construction project. The objectives of the SWPPP are to:

1. Implement Best Management Practices (BMPs) to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. Prevent violations of surface water quality, ground water quality, or sediment management standards.

3. Prevent, during the construction phase, adverse water quality impacts including impacts on beneficial uses of the receiving water by controlling peak flow rates and volumes of stormwater runoff at the Permittee's outfalls and downstream of the outfalls.

This SWPPP was prepared using the Ecology SWPPP Template downloaded from the Ecology website and modifying to be specific for this project. This SWPPP was prepared based on the requirements set forth in the Construction Stormwater General Permit and *Stormwater Management Manual for Western Washington* (SWMMWW 2012). The report is divided into seven main sections with several appendices that include stormwater related reference materials. The topics presented in the each of the main sections are:

- Section 1 – INTRODUCTION. This section provides a summary description of the project, and the organization of the SWPPP document.

- Section 2 – SITE DESCRIPTION. This section provides a detailed description of the existing site conditions, proposed construction activities, and calculated stormwater flow rates for existing conditions and post–construction conditions.

- Section 3 – CONSTRUCTION BMPs. This section provides a detailed description of the BMPs to be implemented based on the 12 required elements of the SWPPP (SWMMWW 2005).

- Section 4 – CONSTRUCTION PHASING AND BMP IMPLEMENTATION. This section provides a description of the timing of the BMP implementation in relation to the project schedule.

- Section 5 – POLLUTION PREVENTION TEAM. This section identifies the appropriate contact names (emergency and non-emergency), monitoring personnel, and the onsite temporary erosion and sedimentation control inspector

- Section 6 – INSPECTION AND MONITORING. This section provides a description of the inspection and monitoring requirements such as the parameters of concern to be monitored, sample locations, sample frequencies, and sampling methods for all stormwater discharge locations from the site.

- Section 7 – RECORDKEEPING. This section describes the requirements for documentation of the BMP implementation, site inspections, monitoring results, and changes to the implementation of certain BMPs due to site factors experienced during construction.

Supporting documentation and standard forms are provided in the following Appendices:

Appendix A – Erosion Control Plans
Appendix B – Construction BMPs
Appendix C – General Permit
Appendix D – Site Inspection Forms (and Site Log)

# 2.0 Site/Project Description

## 2.1 Existing Conditions

The project site is comprised of three parcels; totaling approximately 102.86 acres (King County tax parcel nos: 362103-9004,362106-9013, 362106-9014). The project is currently divided by the right-of-way of Enumclaw Franklin Road SE and located in the NW ¼ of the SE ¼ of Section 36 of Township 21 North, Range 6 East, in King County, Washington.

The parcels are currently zoned RA-5 and almost completely forested. A number of trees of varying type, age, and health condition exist on the site.

The soils of the area are characterized generally by the Natural Resource Conservation Services (NRCS) as Alderwood gravelly sandy loam (AgC), Alderwood and Kitsap soils (AkF), Everett very gravelly sandy loam (EvC), and Beausite gravelly sandy loam (BeC). Refer to Appendix A of the TIR for a site specific geotechnical report along with the NRCS data. Refer to Figure 3 in the TIR Appendix for a map of the existing site conditions and existing drainage basins.

## 2.2 Proposed Construction Activities

The proposed development will create a paved processing area, office, shop and associated access and laydown areas. Total Site impervious coverage is limited to 40%. The overall project will create and/or replace a total of approximately 41.41 acres of impervious surfaces.

The proposed construction activities include site preparation, TESC installation, pavement construction, sanitary septic system, stormwater conveyance system design, and stormwater flow control and water quality facility excavation. The schedule and phasing of BMPs during construction is provided in Section 4.0.

All of the storm water runoff from the improved site will be collected, controlled, and released by either dispersion devices or infiltration to the existing subsurface soil media. A series of on-site ditches, catch basin inlets, and underground pipes will collect and convey the surface water runoff on the west side of Enumclaw Franklin Rd SE south for the developed area to the presettling pond and infiltration/detention facility. On the east side of Enumclaw Franklin Rd SE the runoff will be collected from the roof area and conveyed south to dispersion devices; pollution generating areas such as parking areas and laydown areas will be collected and conveyed to a presettling pond and combined sand filters and infiltration ponds via ditches.

The developed site is required to provide Enhanced Basic Water Quality treatment in addition to Level 2 (i.e., conservation) flow control per current 2016 King County surface water standards. Water quality storm volumes are proposed to be treated by bioswales and combined infiltration pond/large sand filters as described in Section 4 of the TIR – Flow Control and Water Quality Facility Analysis and Design.

Stormwater runoff volumes were calculated using the Western Washington Hydrology Model 2012 (WWHM). Water quality treatment facilities were sized per the 2016 King County surface water standards as described in Section 4 of the TIR – Flow Control and Water Quality Facility Analysis and Design.

The following summarizes details regarding the site conditions:

- Total site area: 102.86 acres
- Percent impervious area before construction: 0.0 %
- Percent impervious area after construction: 33.5 %

East Basin

- Disturbed area during construction: 30.87 acres
- Disturbed area that is characterized as impervious (i.e., access roads, staging, parking): 26.90 acres

- 2-year stormwater runoff peak flow prior to construction (existing): 0.04 cfs
- 50-year stormwater runoff peak flow prior to construction (existing): 0.69 cfs
- 2-year stormwater runoff peak flow after construction 12.55 cfs
- 50-year stormwater runoff peak flow after construction 23.32 cfs

West Basin

- Disturbed area during construction: 17.05 acres
- Disturbed area that is characterized as impervious (i.e., access roads, staging, parking): 14.51 acres
- 2-year stormwater runoff peak flow prior to construction (existing): 0.14 cfs
- 50-year stormwater runoff peak flow prior to construction (existing): 0.64 cfs
- 2-year stormwater runoff peak flow after construction 6.79 cfs
- 50-year stormwater runoff peak flow after construction 12.66 cfs

# 3.0 Construction Stormwater BMPs

## 3.1 The 12 BMP Elements

### 3.1.1 Element #1 – Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Trees that are to be preserved, as well as all sensitive areas and their buffers, shall be clearly delineated, both in the field and on the plans. In general, natural vegetation and native topsoil shall be retained in an undisturbed state to the maximum extent possible. The BMPs relevant to marking the clearing limits that will be applied for this project include:

- Preserving Natural Vegetation Purpose (BMP C101)
- Construction Fence (BMP C103)

Tree protection will be provided for all trees to remain, including all trees adjacent to the work and outside the construction limits as noted on the drawings. The upstream boundaries of the site will be lined with construction fencing.

### 3.1.2 Element #2 – Establish Construction Access

Construction access shall be stabilized to minimize the tracking of sediment onto public roads; street sweeping shall be employed to prevent sediment from entering state waters. The specified BMPs related to establishing construction access that will be used on the project include:

- Stabilized Construction Entrance (BMP C105)

Construction access shall be established to prevent tracking any sediment onto City or State roads or onto the adjacent property. One construction entrance will be provided.

### 3.1.3 Element #3 – Control Flow Rates

In order to protect the properties and waterways downstream of the project site, stormwater discharges from the site will be controlled during construction. Flow rates during construction are proposed to be controlled using the temporary interceptor ditches, rock check dams, and a temporary sediment pond. In general, discharge rates of stormwater from the site will be controlled where increases in impervious area or soil compaction during construction could lead to downstream erosion, or where necessary to meet local agency stormwater discharge requirements. BMPs related to establishing construction access that will be used on the project include:

- Temporary Interceptor Ditches (BMP C200)
- Rock Check Dams (BMP C207)
- Temporary Sediment Trap (BMP C240)

### 3.1.4 Element #4 – Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to an infiltration facility. The specific BMPs to be used for controlling sediment on this project include:

- Outlet Protection (BMP C209)
- Storm Drain Inlet Protection (BMP C220)
- Silt Fence (BMP C233)

Outlet protection, storm drain inlet protection, and silt fence will be placed as shown on the plans or as directed by the City inspector.

In addition, sediment will be removed from paved areas in construction work areas manually or using mechanical sweepers, as needed, to minimize tracking of sediments on vehicle tires away from the site and to minimize wash off of sediments from adjacent streets in runoff.

Whenever possible, sediment laden water shall be discharged into onsite, relatively level, vegetated areas (BMP C240 paragraph 5, page 4-102). In some cases, sediment discharge in concentrated runoff can be controlled using permanent stormwater BMPs (e.g., infiltration swales, ponds, trenches). Sediment loads can limit the effectiveness of some permanent stormwater BMPs, such as those used for infiltration or biofiltration; however, those BMPs designed to remove solids by settling (wet vaults or detention tanks) can be used during the construction phase.

### 3.1.5 Element #5 – Stabilize Soils

Exposed and unworked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. The specific BMPs for soil stabilization that shall be used on this project include:

- Topsoiling (BMP C125)

In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be temporarily covered with plastic sheeting. All stockpiled soils shall be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

### 3.1.6 Element #6 – Protect Slopes

All cut and fill slopes will be designed, constructed, and protected in a manner than minimizes erosion. The following specific BMPs will be used to protect slopes for this project:

- Temporary and Permanent Seeding (BMP C120)
- Pipe Slope Drain (BMP C204)

Minimal construction is proposed for wet weather season and slope protection can be established with final landscaping.

### 3.1.7 Element #7 – Protect Drain Inlets

All storm drain inlets and culverts made operable during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. Storm Drain Inlet Protection (SWMMWW BMP C220) will be implemented for all drainage inlets and culverts that could potentially be impacted by sediment-laden runoff on and near the project site. The following inlet protection measures will be applied on this project:
*Drop Inlet Protection:*

- Catch Basin Filters

*Curb Inlet Protection:*

- Silt Fence wrapped over inlet
- Catch Basin Filters

### 3.1.8 Element #8 – Stabilize Channels and Outlets

Where site runoff is to be conveyed in channels, or discharged to a stream or some other natural drainage point, efforts will be taken to prevent downstream erosion. The specific BMPs for channel and outlet stabilization that shall be used on this project include:

- Interceptor Dike and Swale (BMP C200)
- Check Dams (BMP C207)
- Outlet Protection (BMP C209)
- Storm Drain Inlet Protection (BMP C220)
- Gravel Filter Berm (BMP C232)
- Sediment Trap (BMP C240)

All temporary on-site conveyance channels shall be designed, constructed, and stabilized to prevent erosion from the expected peak 10 minute velocity of flow from a Type 1A, 10-year, 24-hour recurrence interval storm for the developed condition. Alternatively, the 10-year, 1-hour peak flow rate indicated by an approved continuous runoff simulation model, increased by a factor of 1.6, shall be used. Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems. Refer to the Temporary and Erosion Sediment Control Plans for placement and location of these facilities.

### 3.1.9 Element #9 – Control Pollutants

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. If required, BMPs to be implemented to control specific sources of pollutants are discussed below:

*Vehicles, construction equipment, and/or petroleum product storage/dispensing:*

- All vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.
- On-site fueling tanks and petroleum product storage containers shall include secondary containment.
- Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.
- Contaminated surfaces shall be cleaned immediately following any discharge or spill incident.

*Chemical storage:*

- Any chemicals stored in the construction areas will conform to the appropriate source control BMPs listed in Volume IV of the Ecology stormwater manual. In Western WA, all chemicals shall have cover, containment, and protection provided on site, per BMP C153 for Material Delivery, Storage and Containment in SWMMWW 2005
- Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application procedures and rates shall be followed.

*Demolition:*

- Dust released from demolished sidewalks, buildings, or structures will be controlled using Dust Control measures (BMP C140).
- Storm drain inlets vulnerable to stormwater discharge carrying dust, soil, or debris will be protected using Storm Drain Inlet Protection (BMP C220 as described above for Element 7).
- Process water and slurry resulting from sawcutting and surfacing operations will be prevented from entering the waters of the State by implementing Sawcutting and Surfacing Pollution Prevention measures (BMP C152).

*Concrete and grout:*

- Process water and slurry resulting from concrete work will be prevented from entering downstream surface waters by implementing Concrete Handling measures (BMP C151).

*Sanitary wastewater:*

- Portable sanitation facilities will be firmly secured, regularly maintained, and emptied when necessary.

*Solid Waste:*

- Solid waste will be stored in secure, clearly marked containers.

*Spill Control:*

In order to reduce the risk of pollutants contaminating surrounding ecosystems, the following commercial BMP will be implemented:

- A-1: Required Best Management Practices for all Properties with Commercial Activities. Onsite storm drainage systems will be cleaned and maintained annually, a professional drainage contractor will be hired to inspect and maintain the system. Storm drain inlets on the property will be properly labeled to prevent improper disposal of pollutants. Illicit connections to the storm system are required to be eliminated and must be immediately removed, permanently plugged or re-plumbed.

- A-4: Outdoor Storage of Soil, Sand, and Other Erodible Materials. Stockpiled materials are to be covered and contained whenever possible. When considered infeasible additional erosion control practices may be employed. Routine maintenance will be required to ensure covers and additional BMPs are functioning properly.

- A-11: Cleaning or Washing of Tools and Equipment. Tool and equipment wash water is to be discharged to the sanitary sewer or a holding tank for offsite disposal. Wash water is not allowed to be discharged to any stormwater system or surface water.

- A-13: Vehicle Washing and Steam Cleaning: Car washing is to be done in a contained area where all water is collected and either recycled or discharged to the sanitary sewer. Oil changes or other engine maintenance procedures are not to be conducted in the designated wash area.

- A-18: Vehicle and Equipment Repair and Maintenance. All incoming vehicles and equipment are to be inspected for leaks and use drip pans/absorbent material if necessary while waiting for service. Work may only be done in an indoor or covered area, waste oil, antifreeze and other fluids must be covered and contained. Routine inspections will be required daily to check for leaks or drips

- A-20: Concrete and Asphalt Application: Nearby storm drains are required to be covered and contained at the beginning of the workday. All solids collected must be disposed of properly at the end of the workday prior to removing the containment/cover devices. An area is to be designated onsite where hand tools will be cleaned, and the water will be collected for disposal.

- A-24: Commercial Composting. Incoming waste is to be screened for dangerous materials and solid waste. Leachate will be collected with a dike, berm, or intercepting drains placed on the down slope side of the compost area prior to draining to a sanitary sewer, holding tank, or onsite treatment system. Outside runoff is to be directed away from the composting areas.

- A-26: Landscaping Activities and Vegetation Management. Fertilizers and pesticides are to be used properly and never applied if it is raining or about to rain. Additionally, pesticides are not to be used within 100 feet of surface waters unless the application is approved and permitted by the Washington State Department of Ecology.

- A-31: Vehicle and Equipment Parking and Storage. Parking areas are to be swept regularly and any wash water is to be discharged to the sanitary sewer or hauled offsite for disposal.

- A-41: Wheel Wash and Tire Bath Track Out Control. A portable or permanent wheel wash system is to be installed.

- A-44: Dust Control for Commercial Operations: Pavement areas are to be swept and vacuumed to minimize the generation of airborne dust. To reduce dust, and track out of material all vehicles and equipment are required to be cleaned prior to leaving the site.

- A-48: Mobile Fueling of Vehicles and Heavy Equipment. Drivers/operators must be present and constantly observe the fuel transfer to ensure the implementation of required fueling procedures. A mobile fueling plan will be developed which will include operational BMPs and spill response procedures.

*Other:*

- Other BMPs will be administered as necessary to address any additional pollutant sources on site.

As per the Federal regulations of the Clean Water Act (CWA) and according to Final Rule 40 CFR Part 112, as stated in the National Register, a Spill Prevention, Control, and Countermeasure (SPCC) Plan is required for construction activities. The Contractor shall prepare an SPCC Plan according to the Washington State Department of Transportation (WSDOT) Requirements (see the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction 2004) to address an approach to prevent, respond to, and report spills or releases to the environment that could result from construction activities. This Plan must:

- Be well thought out in accordance with good engineering;
- Achieve three objectives - prevent spills, contain a spill that occurs, and clean up the spill;
- Identify the name, location, owner, and type of facility;
- Include the date of initial operation and oil spill history;
- Name the designated person responsible;
- Show evidence of approval and certification by the person in authority; and
- Contain a facility analysis.

### 3.1.10 Element #10 – Control Dewatering

Any potential dewatering water from open cut excavation, tunneling, foundation work, trench, or underground vaults shall be discharged into a controlled conveyance system prior to discharge to a sediment trap or sediment pond. Channels will be stabilized, per Element #8. Clean, non-turbid dewatering water will not be routed through stormwater sediment ponds, and will be discharged directly to downstream systems in a manner that does not cause erosion, flooding, or a violation of State water quality standards in receiving waters. Highly turbid dewatering water from soils known or suspected to be contaminated, or from use of construction equipment, will require additional monitoring and treatment as required for the specific pollutants based on the receiving waters into which the discharge is occurring. Such monitoring is the responsibility of the contractor.

The dewatering of soils known to be free of contamination will trigger BMPs to trap sediment and reduce turbidity. At a minimum, geotextile fabric socks/bags/cells will be used to filter this material. Other BMPs to be used for sediment trapping and turbidity reduction include the following:

- Concrete Handling (BMP C151)

Concrete shall be managed in accordance with City and SWDOT standards. No washing out of concrete trucks shall be permitted on the project site.

### 3.1.11 Element #11 – Maintain BMPs

All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with each particular BMP's specifications. Visual monitoring of the BMPs will be conducted at least once every calendar week and within 24 hours of any rainfall event that causes a discharge from the site. If the site becomes inactive, and is temporarily stabilized, the inspection frequency will be reduced to once every month.

All temporary erosion and sediment control BMPs shall be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized.

### 3.1.12 Element #12 – Manage the Project

Erosion and sediment control BMPs for this project have been designed based on the following principles:

- Design the project to fit the existing topography, soils, and drainage patterns.
- Emphasize erosion control rather than sediment control.
- Minimize the extent and duration of the area exposed.
- Keep runoff velocities low.

- Retain sediment on site.
- Thoroughly monitor site and maintain all ESC measures.
- Schedule major earthwork during the dry season.

In addition, project management will incorporate the key components listed below:

*Phasing of Construction:*

- The construction project is being phased to the extent practicable in order to prevent excessive soil erosion, and, to the maximum extent possible, the transport of sediment from the site during construction.
- Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities during each phase of construction, per the Scheduling BMP (C162).

*Seasonal Work Limitations*

- From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the local permitting authority that silt-laden runoff will be prevented from leaving the site through a combination of the following:
  - Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters; and
  - Limitations on activities and the extent of disturbed areas; and
  - Proposed erosion and sediment control measures.

- Based on the information provided and/or local weather conditions, the local permitting authority may expand or restrict the seasonal limitation on site disturbance.
- The following activities are exempt from the seasonal clearing and grading limitations:
  - Routine maintenance and necessary repair of erosion and sediment control BMPs;
  - Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil; and
  - Activities where there is 100 percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

*Coordination with Utilities and Other Jurisdictions:*

- Care has been taken to coordinate with utilities, other construction projects, and the local jurisdiction in preparing this SWPPP and scheduling the construction work.

*Inspection and Monitoring:*

- All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections shall be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control. This person has the necessary skills to:
  - Assess the site conditions and construction activities that could impact the quality of stormwater, and
  - Assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.
- A Certified Erosion and Sediment Control Lead shall be on-site or on-call at all times per BMP (160).
- Whenever inspection and/or monitoring reveals that the BMPs identified in this SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMPs or design changes shall be implemented as soon as possible.

*Maintaining an Updated Construction SWPPP:*

- This SWPPP shall be retained on-site or within reasonable access to the site.
- The SWPPP shall be modified whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.
- The SWPPP shall be modified if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven (7) days following the inspection.

## 3.2 Site Specific BMPs

Site Specific BMPs are shown on the *Temporary Erosion and Sediment Control Plan* and details in Appendix A. The Certified Erosion and Sediment Control Lead will promptly implement one or more alternate BMP's after the first sign that existing BMPs are ineffective or failing.

# 4.0 Construction Phasing and BMP Implementation

The BMP implementation schedule will be driven by the construction schedule. The following provides a sequential list of the proposed construction schedule milestones and the corresponding BMP implementation schedule. The list contains key milestones for construction.

The BMP implementation schedule listed below is keyed to proposed phases of the construction project, and reflects differences in BMP installations and inspections that relate to wet season construction. The dry season is considered to be from May 1 to September 30 and the wet season is considered to be from October 1 to April 30. Most earthwork construction is anticipated to be completed during the dry season.

- Estimated Construction start date 08 / 15 / 2018
- Mobilize equipment on site: 08 / 15 / 2018
- Mobilize and store all ESC 08 / 09 / 2018
- Install ESC measures: 08 / 12 / 2018
- Install stabilized construction entrance: 08 / 12 / 2018
- Begin clearing and grubbing: 08 / 15 / 2018
- Site grading begins: 08 / 25 / 2018
- Install Sanitary Sewer and Storm Drainage: 09 / 10 / 2018
- Wet Season Starts: 10 / 01 / 2018
- Parking and roadway paving 03 / 15 / 2019
- Final landscaping and planting begins: 03 / 15 / 2019
- Permanent erosion control measures (hydroseeding): 03 / 20 / 2019
- Estimate of Building Construction finish date: 12 / 15 / 2019

# 5.0 Pollution Prevention Team

## 5.1 Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

- Certified Erosion and Sediment Control Lead (CESCL) – primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, etc.); to be called upon in case of failure of any ESC measures.

- Resident Engineer – For projects with engineered structures only (sediment ponds/traps, sand filters, etc.): site representative for the owner that is the project's supervising engineer responsible for inspections and issuing instructions and drawings to the contractor's site supervisor or representative.

- Emergency Ecology Contact – individual to be contacted at Ecology in case of emergency. Go to the following website to get the name and number for the Ecology contact information: http://www.ecy.wa.gov/org.html.

- Emergency Owner Contact – individual that is the site owner or representative of the site owner to be contacted in the case of an emergency.

- Non-Emergency Ecology Contact – individual that is the site owner or representative of the site owner than can be contacted if required.

- Monitoring Personnel – personnel responsible for conducting water quality monitoring; for most sites this person is also the Certified Erosion and Sediment Control Lead.

## 5.2 Team Members

Names and contact information for those identified as members of the pollution prevention team are provided in the following table.

| Title | Name(s) | Phone Number |
|---|---|---|
| Certified Erosion and Sediment Control Lead (CESCL) | Ron Shear | 253-223-8586 |
| Resident / Project Engineer | Jamie Schroeder, PE | 425-285-2390 |
| Emergency Ecology Contact | Ecology Office | 425-649-7000 |
| Emergency Owner Contact | Patrick Danner | 425-821-3400 |
| Non-Emergency Ecology Contact | Jamie Schroeder, PE | 425-285-2390 |
| | | |

# 6.0 Site Inspections and Monitoring

Monitoring includes visual inspection, monitoring for water quality parameters of concern and documentation of the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book. This SWPPP may function as the site log book if desired, or the forms may be separated and included in a separate site log book. However, if separated, the site log book but must be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

## 6.1 Site Inspection

All BMPs will be inspected, maintained, and repaired as needed to assure continued performance of their intended function. The inspector will be a Certified Erosion and Sediment Control Lead (CESCL) per BMP C160. The name and contact information for the CESCL is provided in Section 5 of this SWPPP.

Site inspection will occur in all areas disturbed by construction activities and at all stormwater discharge points. Stormwater will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen. The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of stormwater discharges. All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

### 6.1.1 Site Inspection Frequency

Site inspections will be conducted at least once a week and within 24 hours following any rainfall event which causes a discharge of stormwater from the site by a Certified Erosion and Sediment Control Lead (CESCL). For sites with temporary stabilization measures, the site inspection frequency can be reduced to once every month.

### 6.1.2 Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in Appendix C. The site inspection log forms may be separated from this SWPPP document, but will be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

## 6.2 Stormwater Quality Monitoring

### 6.2.1 Turbidity Sampling

Monitoring requirements for the proposed project will include turbidity sampling to monitor site discharges for water quality in compliance with the 2005 Construction Stormwater General Permit (Appendix C). Sampling will be done with a turbidity meter or transparency tube and conducted at all site discharge points at least once per calendar week.

Turbidity or transparency monitoring will follow the analytical methodologies described in Section S4 of the 2005 Construction Stormwater General Permit (Appendix C). The key benchmark values that require action include 25 NTU (equivalent to 32 cm transparency) and 250 NTU (equivalent to 6 cm transparency) for turbidity. If the 25 NTU benchmark for turbidity is exceeded, the following steps will be conducted:

1. Ensure all BMPs specified in this SWPPP are installed and functioning as intended.
2. Assess whether additional BMPs should be implemented and make revisions to the SWPPP as necessary.
3. Sample the discharge location daily until the analysis results are less than 25 NTU (turbidity) or greater than 32 cm (transparency).

If the turbidity is greater than 25 NTU (or transparency is less than 32 cm) but less than 250 NTU (transparency greater than 6 cm) for more than 3 days, additional treatment BMPs will be implemented within 24 hours of the third consecutive sample that exceeded the benchmark value. Additional treatment BMPs will include, but are not limited to, off-site treatment, infiltration, filtration and chemical treatment.

If the 250 NTU benchmark for turbidity (or less than 6 cm transparency) is exceeded at any time, the following steps will be conducted:

1. Notify Ecology by phone within 24 hours of analysis.
2. Continue daily sampling until the turbidity is less than 25 NTU.
3. Initiate additional treatment BMPs such as off-site treatment, infiltration, filtration and chemical treatment within 24 hours of the first 250 NTU exceedance.
4. Implement additional treatment BMPs as soon as possible, but within 7 days of the first 250 NTU exceedance.
5. Describe inspection results and remedial actions that are taken in the site log book and in monthly discharge monitoring reports.

### 6.2.2 pH Sampling

Stormwater runoff will be monitored for pH starting on the first day of any activity that includes more than 40 cubic yards of poured or recycled concrete, or after the application of any "Engineered Soils" such as, cement treated base, cement kiln dust, fly ash, etc. This does not

include fertilizers. For concrete work, pH monitoring will start the first day concrete is poured and continue until 3 weeks after the last pour. For engineered soils, the pH monitoring period begins when engineered soils are first exposed to precipitation and continue until the area is fully stabilized.

Stormwater samples will be collected daily from all points of discharge from the site and measured for pH using a calibrated pH meter, pH test kit, or wide range pH indicator paper. If the measured pH is 8.5 or greater, the following steps will be conducted:

1. Prevent the high pH water from entering storm drains or surface water.
2. Adjust or neutralize the high pH water if necessary using appropriate technology such as CO2 sparging (liquid or dry ice).
3. Contact Ecology if chemical treatment other than CO2 sparging is planned.

# 7.0 Reporting and Recordkeeping

## 7.1 Recordkeeping

### 7.1.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book.

### 7.1.2 Records Retention

Records of all monitoring information (site log book, inspection reports/checklists, etc.), this Stormwater Pollution Prevention Plan, and any other documentation of compliance with permit requirements will be retained during the life of the construction project and for a minimum of three years following the termination of permit coverage in accordance with permit condition S5.C.

### 7.1.3 Access to Plans and Records

The SWPPP, General Permit, Notice of Authorization letter, and Site Log Book will be retained on site or within reasonable access to the site and will be made immediately available upon request to Ecology or the local jurisdiction. A copy of this SWPPP will be provided to Ecology within 14 days of receipt of a written request for the SWPPP from Ecology. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with permit condition S5.G.

### 7.1.4 Updating the SWPPP

In accordance with Conditions S3, S4.B, and S9.B.3 of the General Permit, this SWPPP will be modified if the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect on the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination based on inspection(s) that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

## 7.2 Reporting

### 7.2.1 Discharge Monitoring Reports

Water quality sampling results will be submitted to Ecology monthly on Discharge Monitoring Report (DMR) forms in accordance with permit condition S5.B. If there was no discharge during a given monitoring period, the form will be submitted with the words "no discharge" entered in place of the monitoring results. If a benchmark was exceeded, a brief summary of inspection results and remedial actions taken will be included. If sampling could not be performed during a monitoring period, a DMR will be submitted with an explanation of why sampling could not be performed.

### 7.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit are not met, and it causes a threat to human health or the environment, the following steps will be taken in accordance with permit section S5.F:

1. Ecology will be immediately notified of the failure to comply.

2. Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.

3. A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

Any time turbidity sampling indicates turbidity is 250 nephelometric turbidity units (NTU) or greater or water transparency is 6 centimeters or less, the Ecology regional office will be notified by phone within 24 hours of analysis as required by permit condition S5.A (see Section 5.0 of this SWPPP for contact information).

In accordance with permit condition S4.D.5.b, the Ecology regional office will be notified if chemical treatment other than CO2 sparging is planned for adjustment of high pH water (see Section 5.0 of this SWPPP for contact information).

### 7.2.3 Permit Application and Changes

In accordance with permit condition S2.A, a complete application form will be submitted to Ecology and the appropriate local jurisdiction (if applicable) to be covered by the General Permit.

# Appendix A – Erosion and Sediment Control Plans

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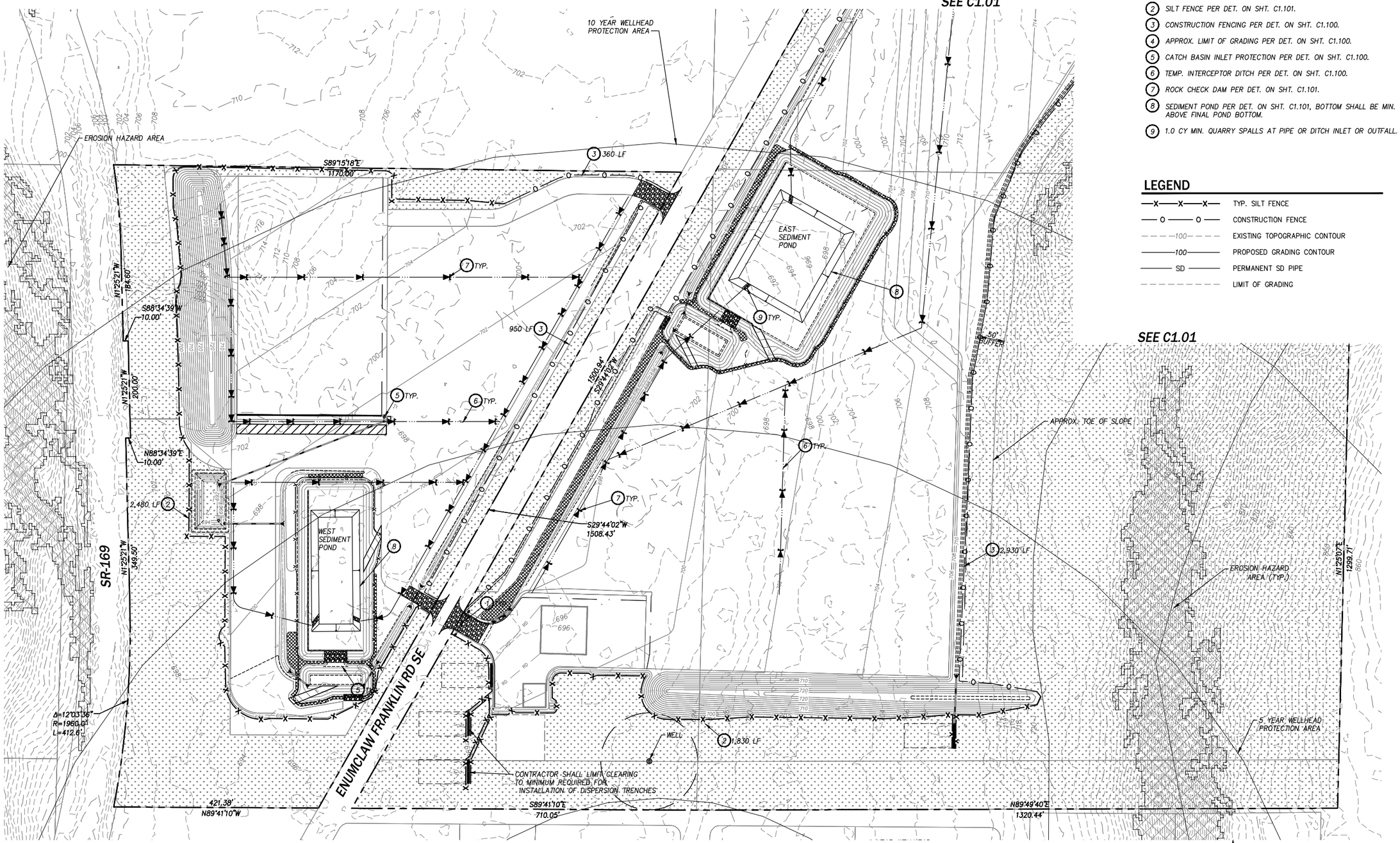
OTOP1641701
CSIT1641701
CGRD1641701
CUSD1641701
TESC1641701
OGIS1641701

SEC. 25, TWP 28 N, R4E W.M.




## CONSTRUCTION NOTES

1. STABILIZED CONSTRUCTION ENTRANCE PER DETAIL ON SHT. C3.101.
2. SILT FENCE PER DET. ON SHT. C1.101.
3. CONSTRUCTION FENCING PER DET. ON SHT. C1.100.
4. APPROX. LIMIT OF GRADING PER DET. ON SHT. C1.100.
5. CATCH BASIN INLET PROTECTION PER DET. ON SHT. C1.100.
6. TEMP. INTERCEPTOR DITCH PER DET. ON SHT. C1.100.
7. ROCK CHECK DAM PER DET. ON SHT. C1.101.
8. SEDIMENT POND PER DET. ON SHT. C1.101, BOTTOM SHALL BE MIN. 12" ABOVE FINAL POND BOTTOM.
9. 1.0 CY MIN. QUARRY SPALLS AT PIPE OR DITCH INLET OR OUTFALL.

## LEGEND

| | |
|---|---|
| —X—X—X— | TYP. SILT FENCE |
| —O—O— | CONSTRUCTION FENCE |
| - - - 100 - - - | EXISTING TOPOGRAPHIC CONTOUR |
| ——100—— | PROPOSED GRADING CONTOUR |
| ——SD—— | PERMANENT SD PIPE |
| - - - - - - - - | LIMIT OF GRADING |

| NO. | DATE | REVISION | BY | CK. |
|---|---|---|---|---|
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JAMIE B SCHROEDER
STATE OF WASHINGTON
37610
REGISTERED PROFESSIONAL ENGINEER
5-31-18

# ENUMCLAW RECYCLE

COMMERCIAL SITE DEVELOPMENT PERMIT

TESC PLAN

KING COUNTY WASHINGTON

CLIENT

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P.O BOX 1372
ENUMCLAW, WA 98022
PHONE: (253) 223-8586


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SHEET 8 OF 20

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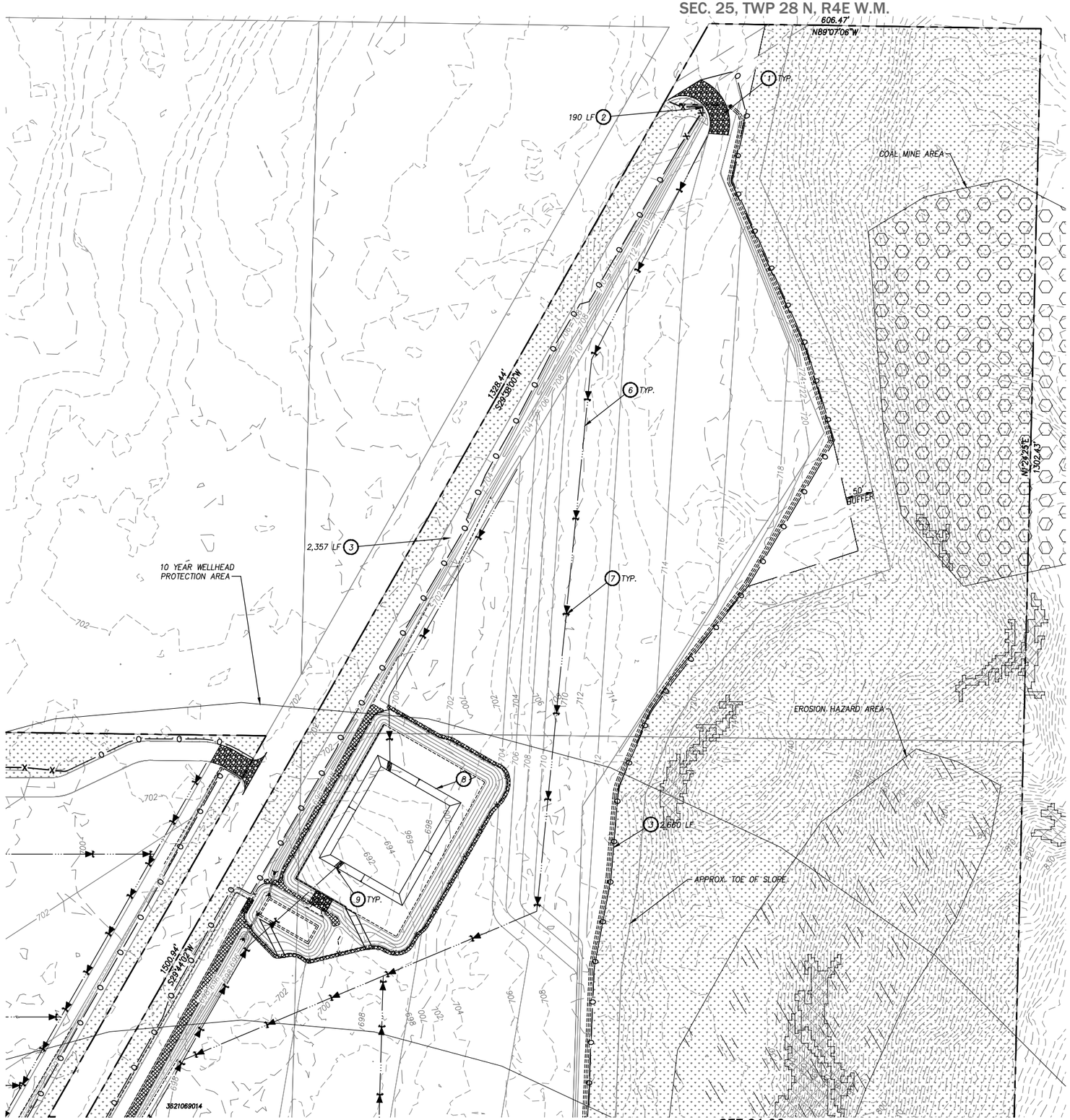
CGRD1641701
CUSD1641701
TESC1641701
OGIS1641701

## SEC. 25, TWP 28 N, R4E W.M.




SEE C1.00

## CONSTRUCTION NOTES

1. STABILIZED CONSTRUCTION ENTRANCE PER DETAIL ON SHT. C3.101.
2. SILT FENCE PER DET. ON SHT. C1.101.
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9. 1.0 CY MIN. QUARRY SPALLS AT PIPE OR DITCH INLET OR OUTFALL.

## LEGEND

| | |
|---|---|
| —X—X—X— | TYP. SILT FENCE |
| —O—O— | CONSTRUCTION FENCE |
| - - - 100 - - - | EXISTING TOPOGRAPHIC CONTOUR |
| ——100—— | PROPOSED GRADING CONTOUR |
| —— SD —— | PERMANENT SD PIPE |
| - - - - - - - - | LIMIT OF GRADING |

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JAMIE B. SCHROEDER
STATE OF WASHINGTON
37610
REGISTERED PROFESSIONAL ENGINEER
5-31-18

# ENUMCLAW RECYCLE

COMMERCIAL SITE DEVELOPMENT PERMIT

TESC PLAN

KING COUNTY WASHINGTON

CLIENT

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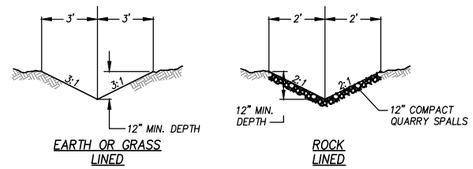



NOTES:

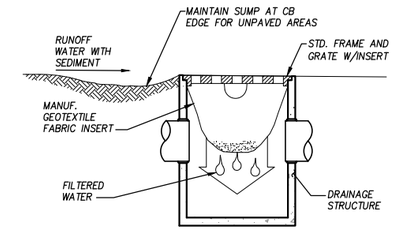
1. EARTH OR GRASS LINED DITCHES SHALL HAVE SLOPES OF 6% OR LESS AND A MAXIMUM FLOW VELOCITY OF 5FPS.
2. ROCK CHECK DAMS SHALL BE USED IN EARTH OR GRASS LINED DITCHES FOR SLOPES GREATER THAN 3%.
3. ROCK LINED DITCHES SHALL BE USED WHEN SLOPES EXCEED 6% OR FOR FLOW VELOCITY GREATER THAN 5FPS.

MAINTENANCE STANDARDS:

1. ANY SEDIMENT DEPOSITION OF MORE THAN 0.5 FEET SHALL BE REMOVED SO THAT THE CHANNEL IS RESTORED TO ITS DESIGN CAPACITY.
2. IF THE CHANNEL CAPACITY IS INSUFFICIENT FOR THE DESIGN STORM, IT MUST BE DETERMINED WHETHER THE PROBLEM IS LOCAL (E.G., A CONSTRICTION OR BEND) OR THE CHANNEL IS UNDERDESIGNED. IF THE PROBLEM IS LOCAL, THE CHANNEL CAPACITY MUST BE INCREASED THROUGH CONSTRUCTION OF A BERM(S) OR BY EXCAVATION. IF THE PROBLEM IS UNDERDESIGN, THE DESIGN ENGINEER SHALL BE NOTIFIED AND THE CHANNEL REDESIGNED TO A MORE CONSERVATIVE STANDARD TO BE APPROVED BY SNOHOMISH COUNTY.
3. THE CHANNEL SHALL BE EXAMINED FOR SIGNS OF SCOURING AND EROSION OF THE BED AND BANKS. IF SCOURING OR EROSION HAS OCCURRED, AFFECTED AREAS SHALL BE PROTECTED BY RIP-RAP OR AN EROSION CONTROL BLANKET OR NET.

## TEMPORARY INTERCEPTOR DITCH

NOT TO SCALE

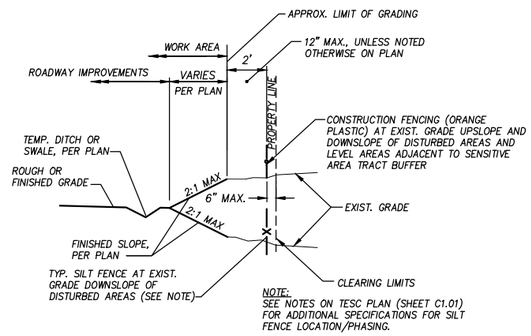



MAINTENANCE STANDARDS

1. ANY ACCUMULATED SEDIMENT ON OR AROUND INLET PROTECTION SHALL BE REMOVED IMMEDIATELY. SEDIMENT SHALL NOT BE REMOVED WITH WATER AND ALL SEDIMENT MUST BE DISPOSED OF AS FILL ON SITE OR HAULED OFF SITE.
2. ANY SEDIMENT IN THE CATCH BASIN INSERT SHALL BE REMOVED WHEN THE SEDIMENT HAS FILLED ONE THIRD OF THE AVAILABLE STORAGE. THE FILTER MEDIA FOR THE INSERT SHALL BE CLEANED OR REPLACE AT LEAST MONTHLY.
3. REGULAR MAINTENANCE IS CRITICAL FOR ALL FORMS OF CATCH BASIN/INLET PROTECTION. UNLIKE MANY FORMS OF PROTECTION THAT FAIL GRADUALLY. CATCH BASIN PROTECTION WILL FAIL SUDDENLY AND COMPLETELY IF NOT MAINTAINED.

## CATCH BASIN INLET PROTECTION

NOT TO SCALE

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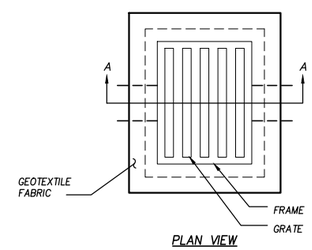
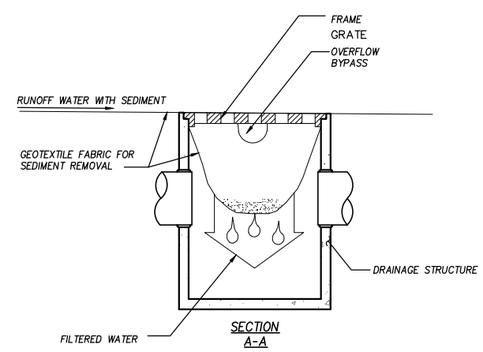



PLAN VIEW




ALTERNATE INLET PROTECTION

## CATCH BASIN PROTECTION

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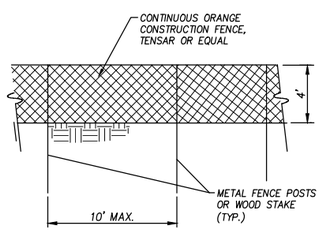


## CONSTRUCTION FENCE

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JAMIE B SCHROEDER
STATE OF WASHINGTON
37610
REGISTERED PROFESSIONAL ENGINEER
5-31-18

# ENUMCLAW RECYCLE

COMMERCIAL SITE DEVELOPMENT PERMIT

TESC DETAILS

KING COUNTY WASHINGTON

CLIENT

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PROJECT NO. 0164-17-001

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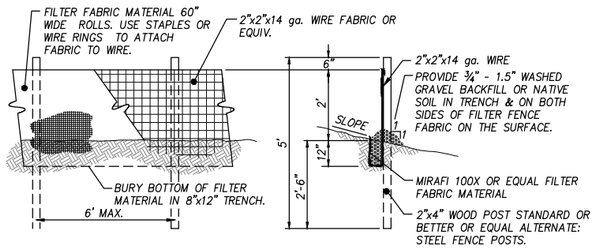



STANDARD NOTES:

A. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST.

B. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS (WHERE FEASIBLE). THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 30 INCHES).

C. A TRENCH SHALL BE EXCAVATED, ROUGHLY 8 INCHES WIDE AND 12 INCHES DEEP, UPSLOPE AND ADJACENT TO THE WOOD POST TO ALLOW THE FILTER FABRIC TO BE BURIED.

D. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST 1 INCH LONG, TIE WIRES OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 4 INCHES AND SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE.

E. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 20 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.

F. WHEN EXTRA-STRENGTH FILTER FABRIC AND CLOSER POST SPACING ARE USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE, THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POSTS WITH ALL OTHER PROVISIONS OF STANDARD NOTE E. APPLYING.

G. THE TRENCH SHALL BE BACKFILLED WITH ¾-INCH MINIMUM WASHED GRAVEL.

H. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

I. FILTER FABRIC FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

MAINTENANCE STANDARDS:

1. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.

2. IF CONCENTRATED FLOWS ARE EVIDENT UPHILL OF THE FENCE, THEY MUST BE INTERCEPTED AND CONVEYED TO A SEDIMENT TRAP OR POND.

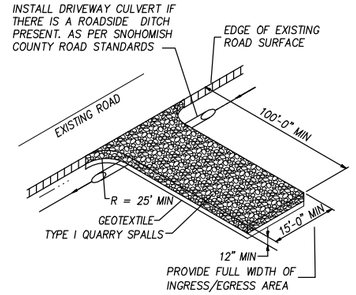
3. IT IS IMPORTANT TO CHECK THE UPHILL SIDE OF THE FENCE FOR SIGNS OF THE FENCE CLOGGING AND ACTING AS A BARRIER TO FLOW AND THEN CAUSING CHANNELIZATION OF FLOWS PARALLEL TO THE FENCE. IF THIS OCCURS, REPLACE THE FENCE OR REMOVE THE TRAPPED SEDIMENT.

4. SEDIMENT MUST BE REMOVED WHEN THE SEDIMENT IS 6 INCHES HIGH.

5. IF THE FILTER FABRIC (GEOTEXTILE) HAS DETERIORATED DUE TO ULTRAVIOLET BREAKDOWN, IT SHALL BE REPLACED.

## TYPICAL SILT FENCE

NOT TO SCALE




MAINTENANCE STANDARDS:

1. QUARRY SPALLS (OR HOG FUEL) SHALL BE ADDED IF THE PAD IS NO LONGER IN ACCORDANCE WITH THE SPECIFICATIONS.

2. IF THE ENTRANCE IS NOT PREVENTING SEDIMENT FROM BEING TRACKED ONTO PAVEMENT, THEN ALTERNATIVE MEASURES TO KEEP THE STREETS FREE OF SEDIMENT SHALL BE USED. THIS MAY INCLUDE STREET SWEEPING, AN INCREASE IN THE DIMENSIONS OF THE ENTRANCE, OR THE INSTALLATION OF A WHEEL WASH. IF WASHING IS USED, IT SHALL BE DONE ON AN AREA COVERED WITH CRUSHED ROCK, AND WASH WATER SHALL DRAIN TO A SEDIMENT TRAP OR POND.

3. ANY SEDIMENT THAT IS TRACKED ONTO PAVEMENT SHALL BE REMOVED IMMEDIATELY BY SWEEPING. THE SEDIMENT COLLECTED BY SWEEPING SHALL BE REMOVED OR STABILIZED ON-SITE. THE PAVEMENT SHALL NOT BE CLEANED BY WASHING DOWN THE STREET, EXCEPT WHEN SWEEPING IS INEFFECTIVE AND THERE IS A THREAT TO PUBLIC SAFETY. IF IT IS NECESSARY TO WASH THE STREETS, THE CONSTRUCTION OF A SMALL SUMP SHALL BE CONSIDERED. THE SEDIMENT WOULD THEN BE WASHED INTO THE SUMP.

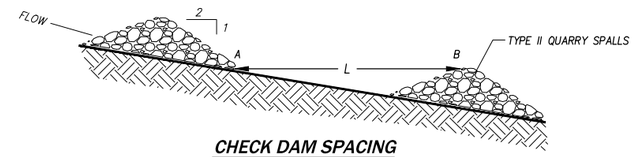
4. ANY ROCK SPALLS THAT ARE LOOSENED FROM THE PAD AND END UP ON THE ROADWAY SHALL BE REMOVED IMMEDIATELY.

5. IF VEHICLES ARE ENTERING OR EXITING THE SITE AT POINTS OTHER THAN THE CONSTRUCTION ENTRANCE(S), FENCING (SECTION 5.4.1) SHALL BE INSTALLED TO CONTROL TRAFFIC.

NOTE:
DRIVEWAYS SHALL BE PAVED TO THE EDGE OF ROW PRIOR TO INSTALLATION OF THE CONSTRUCTION ENTRANCE TO AVOID DAMAGING OF THE ROADWAY. IT IS RECOMMENDED THAT THE ENTRANCE BE CROWNED SO THAT RUNOFF DRAINS OFF THE PAD.

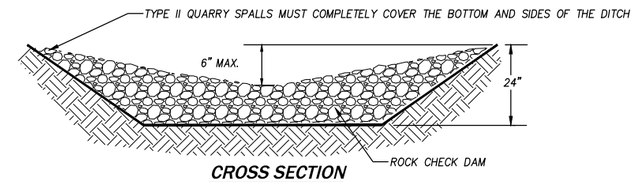
## STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE




### CHECK DAM SPACING

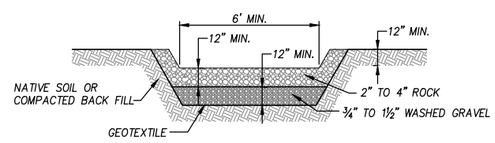
L=THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION



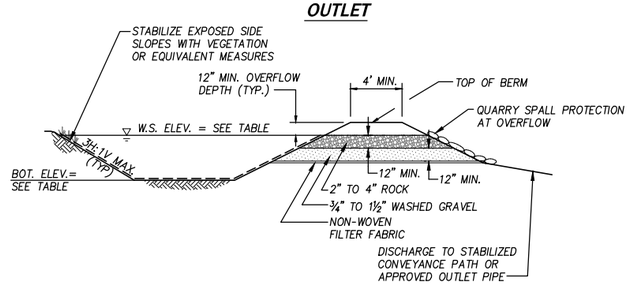

### CROSS SECTION

## ROCK CHECK DAM

NOT TO SCALE




### OUTLET




### SECTION

NOTES:
1. SQUARE FOOTAGE REQUIREMENT SHOWN AT WEIR WATER SURFACE ELEVATION.
2. POND MAY BE FORMED BY BERM OR BY PARTIAL OR COMPLETE EXCAVATION.
3. CONTRACTOR MAY PROPOSE ABOVE-GRADE TANK SYSTEM W/PUMP INTAKE AND OUTLET OR SIMILAR MANUFACTURED SEDIMENT REMOVAL/SETTLING SYSTEM EQUIVALENT TO THE DESIGN CAPACITY AND PERFORMANCE OF THE TYPICAL SEDIMENT POND FOR APPROVAL BY ENGINEER.

## TEMPORARY SEDIMENT POND

NOT TO SCALE

**WEST SEDIMENT POND SUMMARY TABLE**

| FACILITY NO. | IMPERVIOUS (AC.) | PERVIOUS (AC.) | TOTAL (AC.) | DESIGN $Q_{10}$ (CFS) | MINIMUM WATER SURFACE AREA (SF) | W.S. ELEV. (FT.) | BOT. ELEV. (FT.) |
|---|---|---|---|---|---|---|---|
| WEST SED. POND | 14.51 | 2.54 | 17.05 | 9.83 | 20,452 | 697.00 | 695.00 |

**EAST SEDIMENT POND SUMMARY TABLE**

| FACILITY NO. | IMPERVIOUS (AC.) | PERVIOUS (AC.) | TOTAL (AC.) | DESIGN $Q_{10}$ (CFS) | MINIMUM WATER SURFACE AREA (SF) | W.S. ELEV. (FT.) | BOT. ELEV. (FT.) |
|---|---|---|---|---|---|---|---|
| EAST SED. POND | 26.90 | 3.97 | 30.87 | 18.14 | 37,732 | 697.00 | 695.00 |

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JAMIE B SCHROEDER
STATE OF WASHINGTON
37610
REGISTERED PROFESSIONAL ENGINEER
5-31-18

ENUMCLAW RECYCLE
COMMERCIAL SITE DEVELOPMENT PERMIT
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KING COUNTY WASHINGTON

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PROJECT NO. 0164-17-001

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SHEET 11 OF 20

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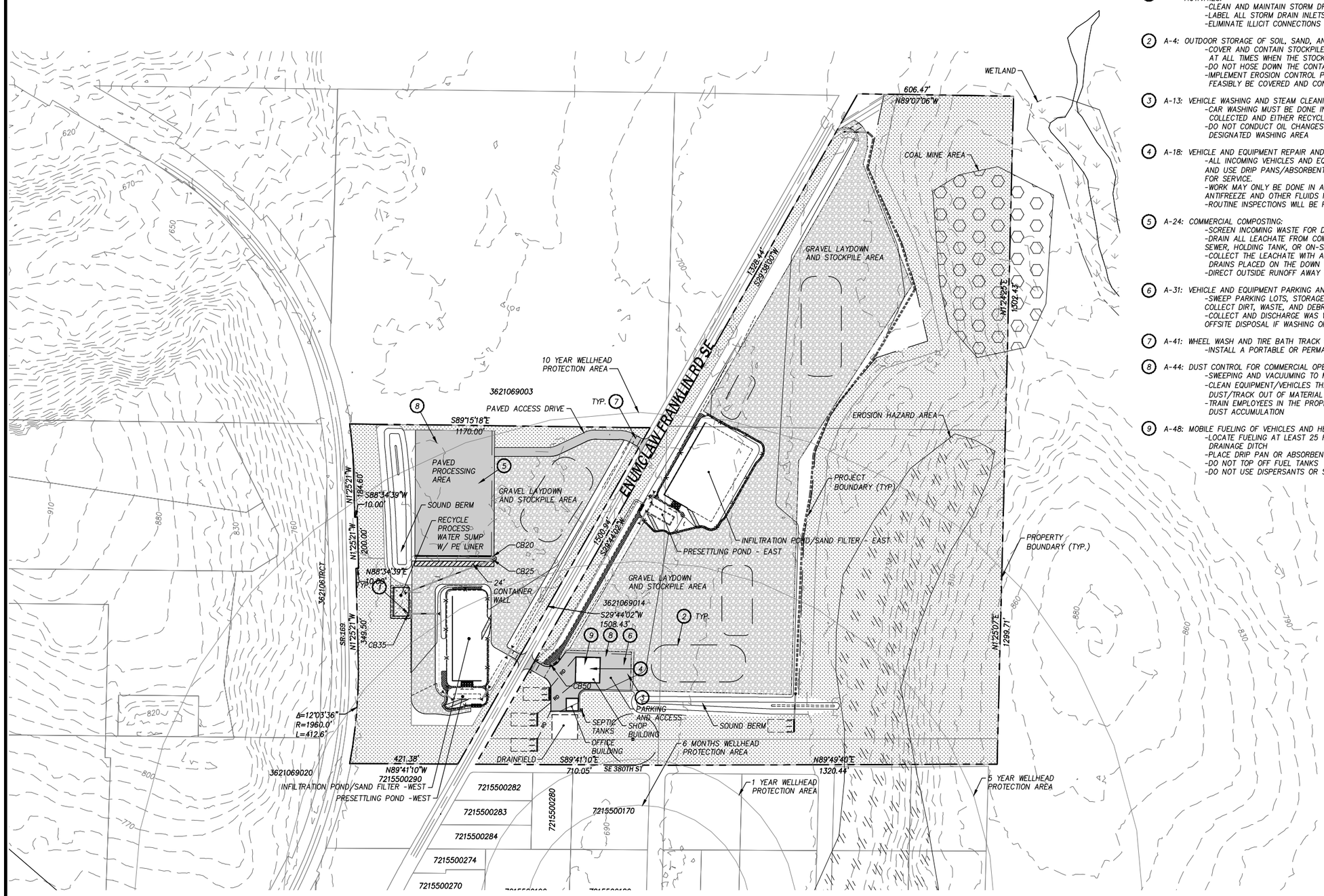


## CONSTRUCTION NOTES

1. A-1: REQUIRED BEST MANAGEMENT PRACTICES FOR ALL PROPERTIES WITH COMMERCIAL ACTIVITIES:
   - -CLEAN AND MAINTAIN STORM DRAINAGE SYSTEM
   - -LABEL ALL STORM DRAIN INLETS ON THE PROPERTY
   - -ELIMINATE ILLICIT CONNECTIONS TO THE STORM DRAINAGE SYSTEM
2. A-4: OUTDOOR STORAGE OF SOIL, SAND, AND OTHER ERODIBLE MATERIALS, SEE NOTE 1:
   - -COVER AND CONTAIN STOCKPILED MATERIALS, COVERS MUST IN PLACE AT ALL TIMES WHEN THE STOCKPILE IS NOT IN ACTIVE USE
   - -DO NOT HOSE DOWN THE CONTAINED STOCKPILE AREA
   - -IMPLEMENT EROSION CONTROL PRACTICES IF THE STOCKPILES CANNOT FEASIBLY BE COVERED AND CONTAINED
3. A-13: VEHICLE WASHING AND STEAM CLEANING, SEE NOTE 2:
   - -CAR WASHING MUST BE DONE IN A CONTAINED AREA WHERE ALL WATER IS COLLECTED AND EITHER RECYCLED OR DISCHARGED TO THE SANITARY SEWER
   - -DO NOT CONDUCT OIL CHANGES OR OTHER ENGINE MAINTENANCE IN THE DESIGNATED WASHING AREA
4. A-18: VEHICLE AND EQUIPMENT REPAIR AND MAINTENANCE:
   - -ALL INCOMING VEHICLES AND EQUIPMENT ARE TO BE INSPECTED FOR LEAKS AND USE DRIP PANS/ABSORBENT MATERIAL IF NECESSARY WHILE WAITING FOR SERVICE.
   - -WORK MAY ONLY BE DONE IN AN INDOOR OR COVERED AREA, WASTE OIL, ANTIFREEZE AND OTHER FLUIDS MUST BE COVERED AND CONTAINED.
   - -ROUTINE INSPECTIONS WILL BE REQUIRED DAILY TO CHECK FOR LEAKS.
5. A-24: COMMERCIAL COMPOSTING:
   - -SCREEN INCOMING WASTE FOR DANGEROUS MATERIALS AND SOLID WASTE.
   - -DRAIN ALL LEACHATE FROM COMPOSTING OPERATIONS TO A SANITARY SEWER, HOLDING TANK, OR ON-SITE TREATMENT SYSTEM.
   - -COLLECT THE LEACHATE WITH A DIKE OR BERM, OR INTERCEPTING DRAINS PLACED ON THE DOWN SLOPE SIDE OF THE COMPOST AREA
   - -DIRECT OUTSIDE RUNOFF AWAY FROM THE COMPOSTING AREAS
6. A-31: VEHICLE AND EQUIPMENT PARKING AND STORAGE:
   - -SWEEP PARKING LOTS, STORAGE AREAS, AND DRIVEWAY AS NEEDED TO COLLECT DIRT, WASTE, AND DEBRIS.
   - -COLLECT AND DISCHARGE WAS WATER TO A SANITARY SEWER OR HAUL FOR OFFSITE DISPOSAL IF WASHING OF THE LOT OCCURS.
7. A-41: WHEEL WASH AND TIRE BATH TRACK OUT CONTROL, APPROX. LOCATION SHOWN:
   - -INSTALL A PORTABLE OR PERMANENT WHEEL WASH SYSTEM
8. A-44: DUST CONTROL FOR COMMERCIAL OPERATIONS:
   - -SWEEPING AND VACUUMING TO MINIMIZE GENERATION OF AIRBORNE DUST
   - -CLEAN EQUIPMENT/VEHICLES THAT LEAVE THE PROPERTY TO PREVENT DUST/TRACK OUT OF MATERIAL
   - -TRAIN EMPLOYEES IN THE PROPER OPERATING PROCEDURES TO MINIMIZE DUST ACCUMULATION
9. A-48: MOBILE FUELING OF VEHICLES AND HEAVY EQUIPMENT:
   - -LOCATE FUELING AT LEAST 25 FEET FROM NEAREST STORMDRAIN OR DRAINAGE DITCH
   - -PLACE DRIP PAN OR ABSORBENT PAD UNDER EACH FUELING LOCATION
   - -DO NOT TOP OFF FUEL TANKS
   - -DO NOT USE DISPERSANTS OR SOAP TO CLEAN UP SPILLS OR SHEENS

NOTES:
1. OUTDOOR STORAGE LOCATIONS TO BE DOCUMENTED REGULARLY BY OPERATOR, APPROX. LOCATIONS SHOWN
2. VEHICLES AND EQUIPMENT WILL BE WASHED IN A DESIGNATED AREA BY A PRIVATE CONTRACTOR AND WASH WATER WILL BE COLLECTED BY THE WASH COMPANY AND DISPOSED OF OFF-SITE.
3. FOR ADDITIONAL INFORMATION REGARDING SOURCE CONTROL BMP'S SEE APPENDIX D OF THE TIR

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JAMIE B SCHROEDER
STATE OF WASHINGTON
37610
REGISTERED PROFESSIONAL ENGINEER
5-31-18

# ENUMCLAW RECYCLE

## COMMERCIAL SITE DEVELOPMENT PERMIT

SOURCE CONTROL BMP PLAN

KING COUNTY WASHINGTON

CLIENT

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SHEET 12 OF 17

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# Appendix B – Construction BMPs

The following includes a list of the BMPs to be implemented on the site. The fact sheets provide a descriptive narrative and construction/installation details for each BMP.

- Preserving Natural Vegetation Purpose (BMP C101)
- High Visibility Fence (BMP C103)
- Stabilized Construction Entrance (BMP C105)
- Wheel Wash (BMP C106)
- Temporary and Permanent Seeding (BMP C120)
- Topsoiling (BMP C125)
- Dust Control (BMP C140)
- Concrete Handling (BMP C151)
- Sawcutting and Surfacing Pollution Prevention (BMP C152)
- Contractor Erosion and Spill Control Lead (BMP C160)
- Scheduling (BMP C162)
- Interceptor Dike and Swale (BMP C200)
- Pipe Slope Drain (BMP C204)
- Check Dams (BMP C207)
- Outlet Protection (BMP C209)
- Storm Drain Inlet Protection (BMP C220)
- Gravel Filter Berm (BMP C232)
- Silt Fence (BMP C233)
- Sediment Trap (BMP C240

# BMP C101: Preserving Natural Vegetation

## *Purpose*

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

## *Conditions of Use*

Natural vegetation should be preserved on steep slopes, near perennial and intermittent watercourses or swales, and on building sites in wooded areas.

- As required by local governments.
- Phase construction to preserve natural vegetation on the project site for as long as possible during the construction period.

## *Design and Installation Specifications*

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

Plants need protection from three kinds of injuries:

- *Construction Equipment* - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- *Grade Changes* - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can typically tolerate fill of 6 inches or less. For shrubs

and other plants, the fill should be less.

When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. A tile system protects a tree from a raised grade. The tile system should be laid out on the original grade leading from a dry well around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

Lowering the natural ground level can seriously damage trees and shrubs. The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant.

- *Excavations* - Protect trees and other plants when excavating for drainfields, power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed:
    - Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint if roots will be exposed for more than 24-hours.
    - Backfill the trench as soon as possible.
    - Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots.

Some problems that can be encountered with a few specific trees are:

- Maple, Dogwood, Red alder, Western hemlock, Western red cedar, and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees.
- The windthrow hazard of Pacific silver fir and madrona is high, while that of Western hemlock is moderate. The danger of windthrow increases where dense stands have been thinned. Other species (unless they are on shallow, wet soils less than 20 inches deep) have a low windthrow hazard.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not.
- Thinning operations in pure or mixed stands of Grand fir, Pacific silver fir, Noble fir,

Sitka spruce, Western red cedar, Western hemlock, Pacific dogwood, and Red alder can cause serious disease problems. Disease can become established through damaged limbs, trunks, roots, and freshly cut stumps. Diseased and weakened trees are also susceptible to insect attack.

### *Maintenance Standards*

Inspect flagged and/or fenced areas regularly to make sure flagging or fencing has not been removed or damaged. If the flagging or fencing has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

- If tree roots have been exposed or injured, “prune” cleanly with an appropriate pruning saw or loppers directly above the damaged roots and recover with native soils. Treatment of sap flowing trees (fir, hemlock, pine, soft maples) is not advised as sap forms a natural healing barrier.

## BMP C102: Buffer Zones

### *Purpose*

Creation of an undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities.

### *Conditions of Use*

Natural buffer zones are used along streams, wetlands and other bodies of water that need protection from erosion and sedimentation. Vegetative buffer zones can be used to protect natural swales and can be incorporated into the natural landscaping of an area.

Critical-areas buffer zones should not be used as sediment treatment areas. These areas shall remain completely undisturbed. The local permitting authority may expand the buffer widths temporarily to allow the use of the expanded area for removal of sediment.

### *Design and Installation Specifications*

- Preserving natural vegetation or plantings in clumps, blocks, or strips is generally the easiest and most successful method.
- Leave all unstable steep slopes in natural vegetation.
- Mark clearing limits and keep all equipment and construction debris out of the natural areas and buffer zones. Steel construction fencing is the most effective method in protecting sensitive areas and buffers. Alternatively, wire-backed silt fence on steel posts is marginally effective. Flagging alone is typically not effective.
- Keep all excavations outside the dripline of trees and shrubs.
- Do not push debris or extra soil into the buffer zone area because it will cause

damage from burying and smothering.

- Vegetative buffer zones for streams, lakes or other waterways shall be established by the local permitting authority or other state or federal permits or approvals.

### *Maintenance Standards*

Inspect the area frequently to make sure flagging remains in place and the area remains undisturbed. Replace all damaged flagging immediately.

## BMP C103: High Visibility Fence

### *Purpose*

Fencing is intended to:

1. Restrict clearing to approved limits.
2. Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
3. Limit construction traffic to designated construction entrances, exits, or internal roads.
4. Protect areas where marking with survey tape may not provide adequate protection.

### *Conditions of Use*

To establish clearing limits plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

### *Design and Installation Specifications*

High visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high visibility orange. The fence tensile strength shall be 360 lbs./ft. using the ASTM D4595 testing method.

If appropriate install fabric silt fence in accordance with BMP C233: Silt Fence (p.367) to act as high visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirements of this BMP.

Metal fences shall be designed and installed according to the manufacturer's specifications.

Metal fences shall be at least 3 feet high and must be highly visible.

Fences shall not be wired or stapled to trees.

### *Maintenance Standards*

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

## BMP C105: Stabilized Construction Entrance / Exit

### *Purpose*

Stabilized Construction entrances are established to reduce the amount of sediment transported onto paved roads by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for construction sites.

### *Conditions of Use*

Construction entrances shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential construction provide stabilized construction entrances for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size/configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized entrances not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

### *Design and Installation Specifications*

See Figure II-4.1.1 Stabilized Construction Entrance (p.273) for details. Note: the 100' minimum length of the entrance shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction entrances with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction entrance stabilization because these products raise pH levels in stormwater and concrete discharge to surface waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the following standards:

| | |
|---|---|
| Grab Tensile Strength (ASTM D4751) | 200 psi min. |
| Grab Tensile Elongation (ASTM D4632) | 30% max. |
| Mullen Burst Strength (ASTM D3786-80a) | 400 psi min. |
| AOS (ASTM D4751) | 20-45 (U.S. standard sieve size) |

- Consider early installation of the first lift of asphalt in areas that will paved; this can be used as a stabilized entrance. Also consider the installation of excess concrete as a stabilized entrance. During large concrete pours, excess concrete is often available for this purpose.
- Fencing (see BMP C103: High Visibility Fence (p.269)) shall be installed as necessary to restrict traffic to the construction entrance.
- Whenever possible, the entrance shall be constructed on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance.
- Construction entrances should avoid crossing existing sidewalks and back of walk drains if at all possible. If a construction entrance must cross a sidewalk or back of walk drain, the full length of the sidewalk and back of walk drain must be covered and protected from sediment leaving the site.

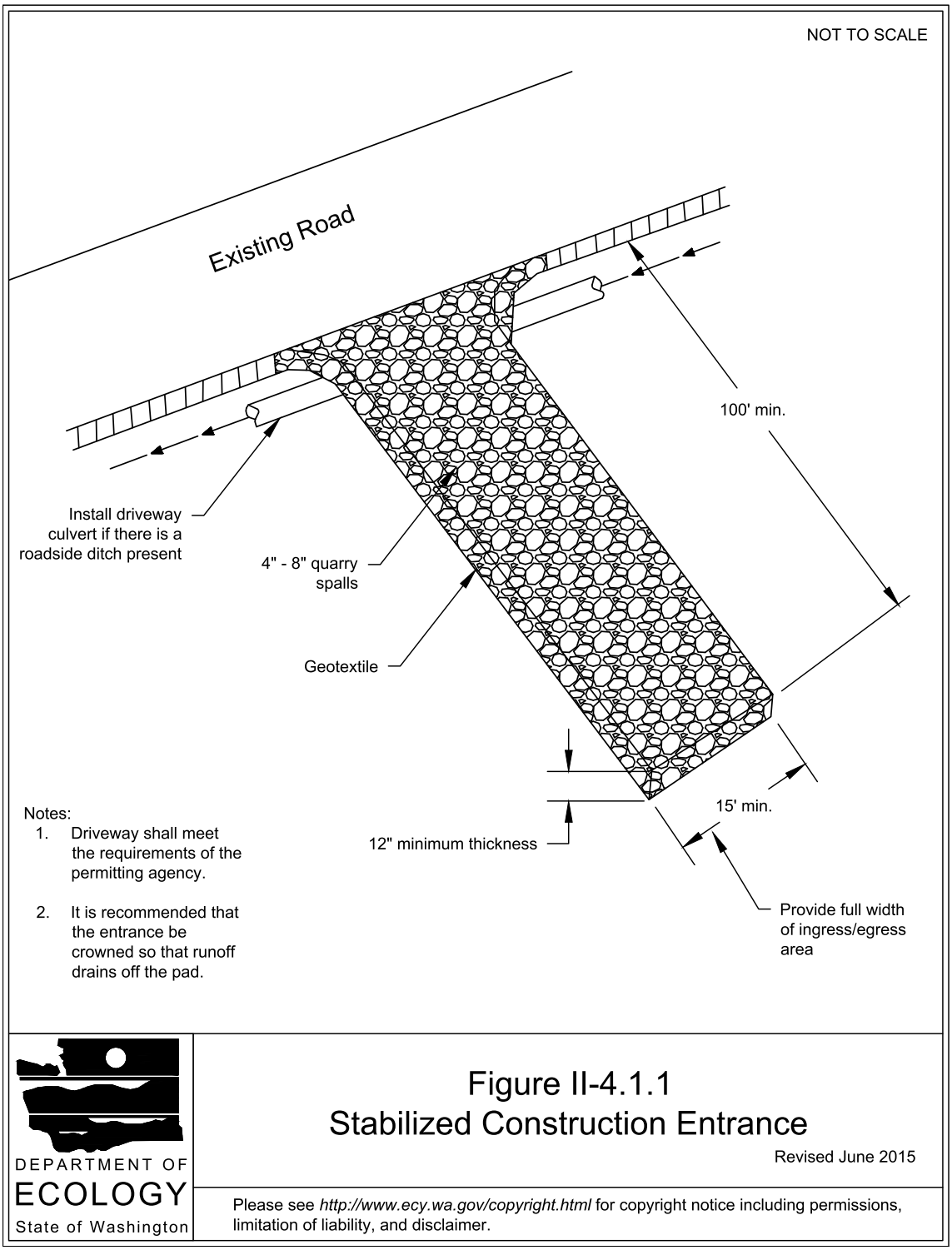
### *Maintenance Standards*

Quarry spalls shall be added if the pad is no longer in accordance with the specifications.

- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.

- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMP C103) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

## Figure II-4.1.1 Stabilized Construction Entrance



### *Approved as Equivalent*

Ecology has approved products as able to meet the requirements of BMP C105: Stabilized Construction Entrance / Exit. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

## BMP C106: Wheel Wash

### *Purpose*

Wheel washes reduce the amount of sediment transported onto paved roads by motor vehicles.

### *Conditions of Use*

When a stabilized construction entrance (see BMP C105: Stabilized Construction Entrance / Exit (p.270)) is not preventing sediment from being tracked onto pavement.

- Wheel washing is generally an effective BMP when installed with careful attention to topography. For example, a wheel wash can be detrimental if installed at the top of a slope abutting a right-of-way where the water from the dripping truck can run unimpeded into the street.
- Pressure washing combined with an adequately sized and surfaced pad with direct drainage to a large 10-foot x 10-foot sump can be very effective.
- Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with local sewer district approval.
- Wheel wash or tire bath wastewater should not include wastewater from concrete washout areas.

### *Design and Installation Specifications*

Suggested details are shown in Figure II-4.1.2 Wheel Wash (p.276). The Local Permitting Authority may allow other designs. A minimum of 6 inches of asphalt treated base (ATB) over crushed base material or 8 inches over a good subgrade is recommended to pave the wheel wash.

Use a low clearance truck to test the wheel wash before paving. Either a belly dump or lowboy will work well to test clearance.

Keep the water level from 12 to 14 inches deep to avoid damage to truck hubs and filling the truck tongues with water.

Midpoint spray nozzles are only needed in extremely muddy conditions.

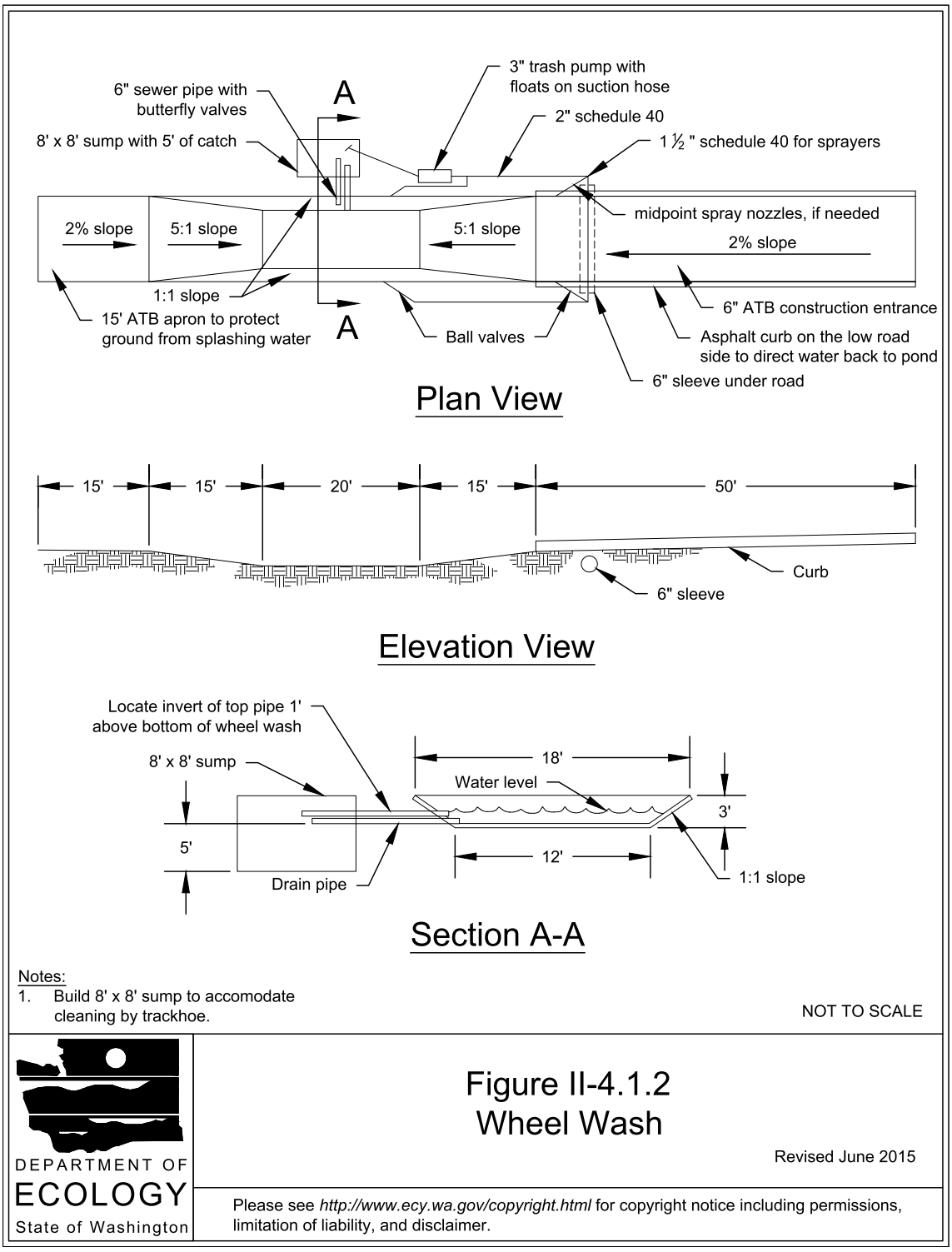
Wheel wash systems should be designed with a small grade change, 6- to 12-inches for a 10-foot-wide pond, to allow sediment to flow to the low side of pond to help prevent re-suspension of sediment. A drainpipe with a 2- to 3-foot riser should be installed on the low side of the pond to allow for easy cleaning and refilling. Polymers may be used to promote coagulation and flocculation in a closed-loop system. Polyacrylamide (PAM) added to the wheel wash water at a rate of 0.25 - 0.5 pounds per 1,000 gallons of water increases effectiveness and reduces cleanup time. If PAM is already being used for dust or erosion control and is being applied by a water truck, the same truck can be used to change the wash water.

### *Maintenance Standards*

The wheel wash should start out the day with fresh water.

The wash water should be changed a minimum of once per day. On large earthwork jobs where more than 10-20 trucks per hour are expected, the wash water will need to be changed more often.

## Figure II-4.1.2 Wheel Wash




Notes:
1. Build 8' x 8' sump to accomodate cleaning by trackhoe.

NOT TO SCALE

DEPARTMENT OF ECOLOGY State of Washington

Figure II-4.1.2
Wheel Wash

Revised June 2015

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- Storm drain inlets shall be protected to prevent sediment-laden water entering the storm drain system (see BMP C220: Storm Drain Inlet Protection (p.357)).

### *Maintenance Standards*

Inspect stabilized areas regularly, especially after large storm events.

Crushed rock, gravel base, etc., shall be added as required to maintain a stable driving surface and to stabilize any areas that have eroded.

Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

Perform street cleaning at the end of each day or more often if necessary.

## BMP C120: Temporary and Permanent Seeding

### *Purpose*

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

### *Conditions of Use*

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch with straw or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

- Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching (p.284) for specifications.
- Seed and mulch, all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent per-

manent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion.

## *Design and Installation Specifications*

Seed retention/detention ponds as required.

Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed before water flow; install sod in the channel bottom—over hydromulch and erosion control blankets.

- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching (p.284) for specifications.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application.
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:

  1. Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift.
  2. Phase 2- Install the rest of the mulch and tackifier over the first lift.

  Or, enhance vegetation by:

  1. Installing the mulch, seed, fertilizer, and tackifier in one lift.
  2. Spread or blow straw over the top of the hydromulch at a rate of 800-1000 pounds per acre.
  3. Hold straw in place with a standard tackifier.

  Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:

- Irrigation.
- Reapplication of mulch.
- Repair of failed slope surfaces.

This technique works with standard hydromulch (1,500 pounds per acre minimum) and BFM/MBFMs (3,000 pounds per acre minimum).

- Seed may be installed by hand if:
  - Temporary and covered by straw, mulch, or topsoil.
  - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
  - The seed mixes listed in the tables below include recommended mixes for both temporary and permanent seeding.
  - Apply these mixes, with the exception of the wetland mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used.
  - Consult the local suppliers or the local conservation district for their recommendations because the appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the local authority may be used.
  - Other mixes may be appropriate, depending on the soil type and hydrology of the area.
- Table II-4.1.2 Temporary Erosion Control Seed Mix (p.280) lists the standard mix for areas requiring a temporary vegetative cover.

**Table II-4.1.2 Temporary Erosion Control Seed Mix**

| | % Weight | % Purity | % Germination |
|---|---|---|---|
| Chewings or annual blue grass<br>*Festuca rubra var. commutata* or *Poa anna* | 40 | 98 | 90 |
| Perennial rye<br>*Lolium perenne* | 50 | 98 | 90 |
| Redtop or colonial bentgrass<br>*Agrostis alba* or *Agrostis tenuis* | 5 | 92 | 85 |
| White dutch clover<br>*Trifolium repens* | 5 | 98 | 90 |

- Table II-4.1.3 Landscaping Seed Mix (p.281) lists a recommended mix for landscaping seed.

### Table II-4.1.3 Landscaping Seed Mix

| | % Weight | % Purity | % Germination |
|---|---|---|---|
| Perennial rye blend<br>*Lolium perenne* | 70 | 98 | 90 |
| Chewings and red fescue blend<br>*Festuca rubra var. commutata* or *Festuca rubra* | 30 | 98 | 90 |

- Table II-4.1.4 Low-Growing Turf Seed Mix (p.281) lists a turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.

### Table II-4.1.4 Low-Growing Turf Seed Mix

| | % Weight | % Purity | % Germination |
|---|---|---|---|
| Dwarf tall fescue (several varieties)<br>*Festuca arundinacea var.* | 45 | 98 | 90 |
| Dwarf perennial rye (Barclay)<br>*Lolium perenne var. barclay* | 30 | 98 | 90 |
| Red fescue<br>*Festuca rubra* | 20 | 98 | 90 |
| Colonial bentgrass<br>*Agrostis tenuis* | 5 | 98 | 90 |

- Table II-4.1.5 Bioswale Seed Mix* (p.281) lists a mix for bioswales and other intermittently wet areas.

### Table II-4.1.5 Bioswale Seed Mix*

| | % Weight | % Purity | % Germination |
|---|---|---|---|
| Tall or meadow fescue<br>*Festuca arundinacea* or *Festuca elatior* | 75-80 | 98 | 90 |
| Seaside/Creeping bentgrass<br>*Agrostis palustris* | 10-15 | 92 | 85 |
| Redtop bentgrass<br>*Agrostis alba* or *Agrostis gigantea* | 5-10 | 90 | 80 |
| * Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix | | | |

- Table II-4.1.6 Wet Area Seed Mix* (p.282) lists a low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Apply

this mixture at a rate of 60 pounds per acre. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.

**Table II-4.1.6 Wet Area Seed Mix***

| | % Weight | % Purity | % Germination |
|---|---|---|---|
| Tall or meadow fescue<br>*Festuca arundinacea* or *Festuca elatior* | 60-70 | 98 | 90 |
| Seaside/Creeping bentgrass<br>*Agrostis palustris* | 10-15 | 98 | 85 |
| Meadow foxtail<br>*Alepocurus pratensis* | 10-15 | 90 | 80 |
| Alsike clover<br>*Trifolium hybridum* | 1-6 | 98 | 90 |
| Redtop bentgrass<br>*Agrostis alba* | 1-6 | 92 | 85 |
| * Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix | | | |

- Table II-4.1.7 Meadow Seed Mix (p.282) lists a recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.

**Table II-4.1.7 Meadow Seed Mix**

| | % Weight | % Purity | % Germination |
|---|---|---|---|
| Redtop or Oregon bentgrass<br>*Agrostis alba* or *Agrostis oregonensis* | 20 | 92 | 85 |
| Red fescue<br>*Festuca rubra* | 70 | 98 | 90 |
| White dutch clover<br>*Trifolium repens* | 10 | 98 | 90 |

- **Roughening and Rototilling:**
  - The seedbed should be firm and rough. Roughen all soil no matter what the slope. Track walk slopes before seeding if engineering purposes require

compaction. Backblading or smoothing of slopes greater than 4H:1V is not allowed if they are to be seeded.

- Restoration-based landscape practices require deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, initially rip the subgrade to improve long-term permeability, infiltration, and water inflow qualities. At a minimum, permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches complete the rototilling process in multiple lifts, or prepare the engineered soil system per specifications and place to achieve the specified depth.

- **Fertilizers:**
  - Conducting soil tests to determine the exact type and quantity of fertilizer is recommended. This will prevent the over-application of fertilizer.
  - Organic matter is the most appropriate form of fertilizer because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form.
  - In general, use 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer at a rate of 90 pounds per acre. Always use slow-release fertilizers because they are more efficient and have fewer environmental impacts. Do not add fertilizer to the hydromulch machine, or agitate, more than 20 minutes before use. Too much agitation destroys the slow-release coating.
  - There are numerous products available that take the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal provides a good source of long-term, slow-release, available nitrogen.

- **Bonded Fiber Matrix and Mechanically Bonded Fiber Matrix:**
  - On steep slopes use Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products. Apply BFM/MBFM products at a minimum rate of 3,000 pounds per acre of mulch with approximately 10 percent tackifier. Achieve a minimum of 95 percent soil coverage during application. Numerous products are available commercially. Installed products per manufacturer's instructions. Most products require 24-36 hours to cure before rainfall and cannot be installed on wet or saturated soils. Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.

- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
    - BFM and MBFMs do not require surface preparation.
    - Helicopters can assist in installing BFM and MBFMs in remote areas.
    - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
    - Installing BFM and MBFMs can save at least $1,000 per acre compared to blankets.

### *Maintenance Standards*

Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, or nets/blankets. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the local authority when sensitive areas would otherwise be protected.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

### *Approved as Equivalent*

Ecology has approved products as able to meet the requirements of BMP C120: Temporary and Permanent Seeding. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html.

## BMP C121: Mulching

### *Purpose*

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There is an enormous variety of mulches that can be used. This section discusses only the most common types of mulch.

### *Conditions of Use*

As a temporary cover measure, mulch should be used:

### *Maintenance Standards*

If the grass is unhealthy, the cause shall be determined and appropriate action taken to reestablish a healthy groundcover. If it is impossible to establish a healthy groundcover due to frequent saturation, instability, or some other cause, the sod shall be removed, the area seeded with an appropriate mix, and protected with a net or blanket.

## BMP C125: Topsoiling / Composting

### *Purpose*

Topsoiling and composting provide a suitable growth medium for final site stabilization with vegetation. While not a permanent cover practice in itself, topsoiling and composting are an integral component of providing permanent cover in those areas where there is an unsuitable soil surface for plant growth. Use this BMP in conjunction with other BMPs such as seeding, mulching, or sodding. Note that this BMP is functionally the same as BMP T5.13: Post-Construction Soil Quality and Depth (p.911) which is required for all disturbed areas that will be developed as lawn or landscaped areas at the completed project site.

Native soils and disturbed soils that have been organically amended not only retain much more stormwater, but they also serve as effective biofilters for urban pollutants and, by supporting more vigorous plant growth, reduce the water, fertilizer and pesticides needed to support installed landscapes. Topsoil does not include any subsoils but only the material from the top several inches including organic debris.

### *Conditions of Use*

- Permanent landscaped areas shall contain healthy topsoil that reduces the need for fertilizers, improves overall topsoil quality, provides for better vegetal health and vitality, improves hydrologic characteristics, and reduces the need for irrigation.
- Leave native soils and the duff layer undisturbed to the maximum extent practicable. Stripping of existing, properly functioning soil system and vegetation for the purpose of topsoiling during construction is not acceptable. Preserve existing soil systems in undisturbed and uncompacted conditions if functioning properly.
- Areas that already have good topsoil, such as undisturbed areas, do not require soil amendments.
- Restore, to the maximum extent practical, native soils disturbed during clearing and grading to a condition equal to or better than the original site condition's moisture-holding capacity. Use on-site native topsoil, incorporate amendments into on-site soil, or import blended topsoil to meet this requirement.
- Topsoiling is a required procedure when establishing vegetation on shallow soils, and soils of critically low pH (high acid) levels.

- Beware of where the topsoil comes from, and what vegetation was on site before disturbance, invasive plant seeds may be included and could cause problems for establishing native plants, landscaped areas, or grasses.
- Topsoil from the site will contain mycorrhizal bacteria that are necessary for healthy root growth and nutrient transfer. These native mycorrhiza are acclimated to the site and will provide optimum conditions for establishing grasses. Use commercially available mycorrhiza products when using off-site topsoil.

### *Design and Installation Specifications*

Meet the following requirements for disturbed areas that will be developed as lawn or landscaped areas at the completed project site:

- Maximize the depth of the topsoil wherever possible to provide the maximum possible infiltration capacity and beneficial growth medium. Topsoil shall have:
    - A minimum depth of 8-inches. Scarify subsoils below the topsoil layer at least 4-inches with some incorporation of the upper material to avoid stratified layers, where feasible. Ripping or re-structuring the subgrade may also provide additional benefits regarding the overall infiltration and interflow dynamics of the soil system.
    - A minimum organic content of 10% dry weight in planting beds, and 5% organic matter content in turf areas. Incorporate organic amendments to a minimum 8-inch depth except where tree roots or other natural features limit the depth of incorporation.
    - A pH between 6.0 and 8.0 or matching the pH of the undisturbed soil.
    - If blended topsoil is imported, then fines should be limited to 25 percent passing through a 200 sieve.
    - Mulch planting beds with 2 inches of organic material
- Accomplish the required organic content, depth, and pH by returning native topsoil to the site, importing topsoil of sufficient organic content, and/or incorporating organic amendments. When using the option of incorporating amendments to meet the organic content requirement, use compost that meets the compost specification for Bioretention (See BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959)), with the exception that the compost may have up to 35% biosolids or manure.
- Sections three through seven of the document entitled, *Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13 in WDOE Stormwater Management Manual for Western Washington*, provides useful guidance for implementing whichever option is chosen. It includes guidance for pre-approved default strategies and guidance for custom strategies. Check with your local jurisdiction

concerning its acceptance of this guidance. It is available through the organization, Soils for Salmon. As of this printing the document may be found at: http://www.soils-forsalmon.org/pdf/Soil_BMP_Manual.pdf.

- The final composition and construction of the soil system will result in a natural selection or favoring of certain plant species over time. For example, incorporation of topsoil may favor grasses, while layering with mildly acidic, high-carbon amendments may favor more woody vegetation.
- Allow sufficient time in scheduling for topsoil spreading prior to seeding, sodding, or planting.
- Take care when applying top soil to subsoils with contrasting textures. Sandy topsoil over clayey subsoil is a particularly poor combination, as water creeps along the junction between the soil layers and causes the topsoil to slough. If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. The best method to prevent a lack of bonding is to actually work the topsoil into the layer below for a depth of at least 6 inches.
- Field exploration of the site shall be made to determine if there is surface soil of sufficient quantity and quality to justify stripping. Topsoil shall be friable and loamy (loam, sandy loam, silt loam, sandy clay loam, and clay loam). Avoid areas of natural ground water recharge.
- Stripping shall be confined to the immediate construction area. A 4-inch to 6-inch stripping depth is common, but depth may vary depending on the particular soil. All surface runoff control structures shall be in place prior to stripping.
- Do not place topsoil while in a frozen or muddy condition, when the subgrade is excessively wet, or when conditions exist that may otherwise be detrimental to proper grading or proposed sodding or seeding.
- In any areas requiring grading remove and stockpile the duff layer and topsoil on site in a designated, controlled area, not adjacent to public resources and critical areas. Stockpiled topsoil is to be reapplied to other portions of the site where feasible.
- Locate the topsoil stockpile so that it meets specifications and does not interfere with work on the site. It may be possible to locate more than one pile in proximity to areas where topsoil will be used.

  Stockpiling of topsoil shall occur in the following manner:

  - Side slopes of the stockpile shall not exceed 2H:1V.
  - Between October 1 and April 30:

        - An interceptor dike with gravel outlet and silt fence shall surround all topsoil.
        - Within 2 days complete erosion control seeding, or covering stockpiles with clear plastic, or other mulching materials.
    - Between May 1 and September 30:
        - An interceptor dike with gravel outlet and silt fence shall surround all topsoil if the stockpile will remain in place for a longer period of time than active construction grading.
        - Within 7 days complete erosion control seeding, or covering stockpiles with clear plastic, or other mulching materials.
- When native topsoil is to be stockpiled and reused the following should apply to ensure that the mycorrhizal bacterial, earthworms, and other beneficial organisms will not be destroyed:
    1. Re-install topsoil within 4 to 6 weeks.
    2. Do not allow the saturation of topsoil with water.
    3. Do not use plastic covering.

### *Maintenance Standards*

- Inspect stockpiles regularly, especially after large storm events. Stabilize any areas that have eroded.
- Establish soil quality and depth toward the end of construction and once established, protect from compaction, such as from large machinery use, and from erosion.
- Plant and mulch soil after installation.
- Leave plant debris or its equivalent on the soil surface to replenish organic matter.
- Reduce and adjust, where possible, the use of irrigation, fertilizers, herbicides and pesticides, rather than continuing to implement formerly established practices.

## BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection

### *Purpose*

Polyacrylamide (PAM) is used on construction sites to prevent soil erosion.

Applying PAM to bare soil in advance of a rain event significantly reduces erosion and controls sediment in two ways. First, PAM increases the soil's available pore volume,

# BMP C140: Dust Control

## *Purpose*

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

## *Conditions of Use*

- In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

## *Design and Installation Specifications*

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to BMP C105: Stabilized Construction Entrance / Exit (p.270).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection (p.300)) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control. Use of PAM could be a cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use of paved roadways by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.
- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.

### *Maintenance Standards*

Respray area as necessary to keep dust to a minimum.

## BMP C150: Materials on Hand

### *Purpose*

Keep quantities of erosion prevention and sediment control materials on the project site at all times to be used for regular maintenance and emergency situations such as unexpected heavy summer rains. Having these materials on-site reduces the time needed to implement BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

# BMP C151: Concrete Handling

## *Purpose*

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the state.

## *Conditions of Use*

Any time concrete is used, utilize these management practices. Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

## *Design and Installation Specifications*

- Assure that washout of concrete trucks, chutes, pumps, and internals is performed at an approved off-site location or in designated concrete washout areas. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Refer to BMP C154: Concrete Washout Area (p.317) for information on concrete washout areas.
- Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete on site, except in designated concrete washout areas.
- Wash off hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels into formed areas only.
- Wash equipment difficult to move, such as concrete pavers in areas that do not directly drain to natural or constructed stormwater conveyances.
- Do not allow washdown from areas, such as concrete aggregate driveways, to drain directly to natural or constructed stormwater conveyances.
- Contain washwater and leftover product in a lined container when no formed areas

are available. Dispose of contained concrete in a manner that does not violate ground water or surface water quality standards.

- Always use forms or solid barriers for concrete pours, such as pilings, within 15-feet of surface waters.
- Refer to BMP C252: High pH Neutralization Using CO2 (p.409) and BMP C253: pH Control for High pH Water (p.412) for pH adjustment requirements.
- Refer to the Construction Stormwater General Permit for pH monitoring requirements if the project involves one of the following activities:
    - Significant concrete work (greater than 1,000 cubic yards poured concrete or recycled concrete used over the life of a project).
    - The use of engineered soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
    - Discharging stormwater to segments of water bodies on the 303(d) list (Category 5) for high pH.

### *Maintenance Standards*

Check containers for holes in the liner daily during concrete pours and repair the same day.

## BMP C152: Sawcutting and Surfacing Pollution Prevention

### *Purpose*

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate process water and slurry created through sawcutting or surfacing from entering waters of the State.

### *Conditions of Use*

Utilize these management practices anytime sawcutting or surfacing operations take place. Sawcutting and surfacing operations include, but are not limited to, the following:

- Sawing
- Coring
- Grinding
- Roughening

- Hydro-demolition
- Bridge and road surfacing

### *Design and Installation Specifications*

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance including stormwater systems. This may require temporarily blocking catch basins.
- Dispose of collected slurry and cuttings in a manner that does not violate ground water or surface water quality standards.
- Do not allow process water generated during hydro-demolition, surface roughening or similar operations to drain to any natural or constructed drainage conveyance including stormwater systems. Dispose process water in a manner that does not violate ground water or surface water quality standards.
- Handle and dispose cleaning waste material and demolition debris in a manner that does not cause contamination of water. Dispose of sweeping material from a pick-up sweeper at an appropriate disposal site.

### *Maintenance Standards*

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

## BMP C153: Material Delivery, Storage and Containment

### *Purpose*

Prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage. Minimize the storage of hazardous materials on-site, store materials in a designated area, and install secondary containment.

### *Conditions of Use*

**These procedures are suitable for use at all construction sites with delivery and storage of the following materials:**

# BMP C160: Certified Erosion and Sediment Control Lead

## *Purpose*

The project proponent designates at least one person as the responsible representative in charge of erosion and sediment control (ESC), and water quality protection. The designated person shall be the Certified Erosion and Sediment Control Lead (CESCL) who is responsible for ensuring compliance with all local, state, and federal erosion and sediment control and water quality requirements.

## *Conditions of Use*

A CESCL shall be made available on projects one acre or larger that discharge stormwater to surface waters of the state. Sites less than one acre may have a person without CESCL certification conduct inspections; sampling is not required on sites that disturb less than an acre.

- The CESCL shall:
  - Have a current certificate proving attendance in an erosion and sediment control training course that meets the minimum ESC training and certification requirements established by Ecology (see details below).

    Ecology will maintain a list of ESC training and certification providers at: http://www.ecy.wa.gov/programs/wq/stormwater/cescl.html

    **OR**
  - Be a Certified Professional in Erosion and Sediment Control (CPESC); for additional information go to: http://www.envirocertintl.org/cpesc/

## *Specifications*

- Certification shall remain valid for three years.
- The CESCL shall have authority to act on behalf of the contractor or developer and shall be available, or on-call, 24 hours per day throughout the period of construction.
- The Construction SWPPP shall include the name, telephone number, fax number, and address of the designated CESCL.
- A CESCL may provide inspection and compliance services for multiple construction projects in the same geographic region.

Duties and responsibilities of the CESCL shall include, but are not limited to the following:

- Maintaining permit file on site at all times which includes the Construction SWPPP and any associated permits and plans.
- Directing BMP installation, inspection, maintenance, modification, and removal.
- Updating all project drawings and the Construction SWPPP with changes made.
- Completing any sampling requirements including reporting results using WebDMR.
- Keeping daily logs, and inspection reports. Inspection reports should include:
    - Inspection date/time.
    - Weather information; general conditions during inspection and approximate amount of precipitation since the last inspection.
    - A summary or list of all BMPs implemented, including observations of all erosion/sediment control structures or practices. The following shall be noted:
        1. Locations of BMPs inspected.
        2. Locations of BMPs that need maintenance.
        3. Locations of BMPs that failed to operate as designed or intended.
        4. Locations of where additional or different BMPs are required.
    - Visual monitoring results, including a description of discharged stormwater. The presence of suspended sediment, turbid water, discoloration, and oil sheen shall be noted, as applicable.
    - Any water quality monitoring performed during inspection.
    - General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.
- Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.

## BMP C162: Scheduling

### *Purpose*

Sequencing a construction project reduces the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

### *Conditions of Use*

The construction sequence schedule is an orderly listing of all major land-disturbing activities together with the necessary erosion and sedimentation control measures

planned for the project. This type of schedule guides the contractor on work to be done before other work is started so that serious erosion and sedimentation problems can be avoided.

Following a specified work schedule that coordinates the timing of land-disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of surface ground cover leaves a site vulnerable to accelerated erosion. Construction procedures that limit land clearing provide timely installation of erosion and sedimentation controls, and restore protective cover quickly can significantly reduce the erosion potential of a site.

### *Design Considerations*

- Minimize construction during rainy periods.
- Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding in order to revegetate cut and fill slopes as the work progresses.

## II-4.2 Runoff Conveyance and Treatment BMPs

This section contains the standards and specifications for Runoff Conveyance and Treatment BMPs. Table II-4.2.1 Runoff Conveyance and Treatment BMPs by SWPPP Element (p.327), below, shows the relationship of the BMPs in II-4.2 Runoff Conveyance and Treatment BMPs to the Construction Stormwater Pollution Prevention Plan (SWPPP) Elements described in II-3.3.3 Step 3 - Construction SWPPP Development and Implementation (p.236).

**Table II-4.2.1 Runoff Conveyance and Treatment BMPs by SWPPP Element**

| BMP or Element Name | Element #3 Control Flow Rates | Element #4 Install Sediment Controls | Element #6 Protect Slopes | Element #7 Protect Drain Inlets | Element #8 Stabilize Channels and Outlets | Element #9 Control Pollutants | Element #10 Control Dewatering | Element #13 Protect Low Impact Development |
|---|---|---|---|---|---|---|---|---|
| BMP C200: Interceptor Dike and Swale (p.331) | | | ✓ | | | | | ✓ |

**Table II-4.2.1 Runoff Conveyance and Treatment BMPs by SWPPP Element (continued)**

| BMP or Element Name | Element #3 Control Flow Rates | Element #4 Install Sediment Controls | Element #6 Protect Slopes | Element #7 Protect Drain Inlets | Element #8 Stabilize Channels and Outlets | Element #9 Control Pollutants | Element #10 Control De-Watering | Element #13 Protect Low Impact Development |
|---|---|---|---|---|---|---|---|---|
| for High pH Water (p.412) | | | | | | | | |

## BMP C200: Interceptor Dike and Swale

### *Purpose*

Provide a ridge of compacted soil, or a ridge with an upslope swale, at the top or base of a disturbed slope or along the perimeter of a disturbed construction area to convey stormwater. Use the dike and/or swale to intercept the runoff from unprotected areas and direct it to areas where erosion can be controlled. This can prevent storm runoff from entering the work area or sediment-laden runoff from leaving the construction site.

### *Conditions of Use*

Where the runoff from an exposed site or disturbed slope must be conveyed to an erosion control facility which can safely convey the stormwater.

- Locate upslope of a construction site to prevent runoff from entering disturbed area.
- When placed horizontally across a disturbed slope, it reduces the amount and velocity of runoff flowing down the slope.
- Locate downslope to collect runoff from a disturbed area and direct water to a sediment basin.

### *Design and Installation Specifications*

- Dike and/or swale and channel must be stabilized with temporary or permanent vegetation or other channel protection during construction.
- Channel requires a positive grade for drainage; steeper grades require channel protection and check dams.
- Review construction for areas where overtopping may occur.
- Can be used at top of new fill before vegetation is established.

- May be used as a permanent diversion channel to carry the runoff.
- Sub-basin tributary area should be one acre or less.
- Design capacity for the peak volumetric flow rate calculated using a 10-minute time step from a 10-year, 24-hour storm, assuming a Type 1A rainfall distribution, for temporary facilities. Alternatively, use 1.6 times the 10-year, 1-hour flow indicated by an approved continuous runoff model. For facilities that will also serve on a permanent basis, consult the local government's drainage requirements.

**Interceptor dikes** shall meet the following criteria:

- Top Width: 2 feet minimum.
- Height: 1.5 feet minimum on berm.
- Side Slope: 2H:1V or flatter.
- Grade: Depends on topography, however, dike system minimum is 0.5%, and maximum is 1%.
- Compaction: Minimum of 90 percent ASTM D698 standard proctor.
- Horizontal Spacing of Interceptor Dikes:

| Average Slope | Slope Percent | Flowpath Length |
|---|---|---|
| 20H:1V or less | 3-5% | 300 feet |
| (10 to 20)H:1V | 5-10% | 200 feet |
| (4 to 10)H:1V | 10-25% | 100 feet |
| (2 to 4)H:1V | 25-50% | 50 feet |

- Stabilization: depends on velocity and reach
- Slopes <5%: Seed and mulch applied within 5 days of dike construction (see BMP C121: Mulching (p.284)).
- Slopes 5 - 40%: Dependent on runoff velocities and dike materials. Stabilization should be done immediately using either sod or riprap or other measures to avoid erosion.
- The upslope side of the dike shall provide positive drainage to the dike outlet. No erosion shall occur at the outlet. Provide energy dissipation measures as necessary. Sediment-laden runoff must be released through a sediment trapping facility.
- Minimize construction traffic over temporary dikes. Use temporary cross culverts for channel crossing.

**Interceptor swales** shall meet the following criteria:

- Bottom Width: 2 feet minimum; the cross-section bottom shall be level.
- Depth: 1-foot minimum.

- Side Slope: 2H:1V or flatter.
- Grade: Maximum 5 percent, with positive drainage to a suitable outlet (such as a sediment pond).
- Stabilization: Seed as per BMP C120: Temporary and Permanent Seeding (p.278), or BMP C202: Channel Lining (p.338), 12 inches thick riprap pressed into the bank and extending at least 8 inches vertical from the bottom.

Inspect diversion dikes and interceptor swales once a week and after every rainfall. Immediately remove sediment from the flow area.

Damage caused by construction traffic or other activity must be repaired before the end of each working day.

Check outlets and make timely repairs as needed to avoid gully formation. When the area below the temporary diversion dike is permanently stabilized, remove the dike and fill and stabilize the channel to blend with the natural surface.

## BMP C201: Grass-Lined Channels

### *Purpose*

To provide a channel with a vegetative lining for conveyance of runoff. See Figure II-4.2.1 Typical Grass-Lined Channels (p.336) for typical grass-lined channels.

### *Conditions of Use*

This practice applies to construction sites where concentrated runoff needs to be contained to prevent erosion or flooding.

- When a vegetative lining can provide sufficient stability for the channel cross section and at lower velocities of water (normally dependent on grade). This means that the channel slopes are generally less than 5 percent and space is available for a relatively large cross section.
- Typical uses include roadside ditches, channels at property boundaries, outlets for diversions, and other channels and drainage ditches in low areas.
- Channels that will be vegetated should be installed before major earthwork and hydroseeded with a bonded fiber matrix (BFM). The vegetation should be well established (i.e., 75 percent cover) before water is allowed to flow in the ditch. With channels that will have high flows, erosion control blankets should be installed over the hydroseed. If vegetation cannot be established from seed before water is allowed in the ditch, sod should be installed in the bottom of the ditch in lieu of hydromulch and blankets.

# BMP C204: Pipe Slope Drains

## *Purpose*

To use a pipe to convey stormwater anytime water needs to be diverted away from or over bare soil to prevent gullies, channel erosion, and saturation of slide-prone soils.

## *Conditions of Use*

Pipe slope drains should be used when a temporary or permanent stormwater conveyance is needed to move the water down a steep slope to avoid erosion (Figure II-4.2.4 Pipe Slope Drain (p.345)).

On highway projects, pipe slope drains should be used at bridge ends to collect runoff and pipe it to the base of the fill slopes along bridge approaches. These can be designed into a project and included as bid items. Another use on road projects is to collect runoff from pavement and pipe it away from side slopes. These are useful because there is generally a time lag between having the first lift of asphalt installed and the curbs, gutters, and permanent drainage installed. Used in conjunction with sand bags, or other temporary diversion devices, these will prevent massive amounts of sediment from leaving a project.

Water can be collected, channeled with sand bags, Triangular Silt Dikes, berms, or other material, and piped to temporary sediment ponds.

Pipe slope drains can be:

- Connected to new catch basins and used temporarily until all permanent piping is installed;
- Used to drain water collected from aquifers exposed on cut slopes and take it to the base of the slope;
- Used to collect clean runoff from plastic sheeting and direct it away from exposed soil;
- Installed in conjunction with silt fence to drain collected water to a controlled area;
- Used to divert small seasonal streams away from construction. They have been used successfully on culvert replacement and extension jobs. Large flex pipe can be used on larger streams during culvert removal, repair, or replacement; and,
- Connected to existing down spouts and roof drains and used to divert water away from work areas during building renovation, demolition, and construction projects.

There are now several commercially available collectors that are attached to the pipe inlet and help prevent erosion at the inlet.

## *Design and Installation Specifications*

Size the pipe to convey the flow. The capacity for temporary drains shall be sufficient to handle the peak volumetric flow rate calculated using a 10-minute time step from a 10-year, 24-hour storm event, assuming a Type 1A rainfall distribution. Alternatively, use 1.6 times the 10-year, 1-hour flow indicated by an approved continuous runoff model.

Consult local drainage requirements for sizing permanent pipe slope drains.

- Use care in clearing vegetated slopes for installation.
- Re-establish cover immediately on areas disturbed by installation.
- Use temporary drains on new cut or fill slopes.
- Use diversion dikes or swales to collect water at the top of the slope.
- Ensure that the entrance area is stable and large enough to direct flow into the pipe.
- Piping of water through the berm at the entrance area is a common failure mode.
- The entrance shall consist of a standard flared end section for culverts 12 inches and larger with a minimum 6-inch metal toe plate to prevent runoff from under-cutting the pipe inlet. The slope of the entrance shall be at least 3 percent. Sand bags may also be used at pipe entrances as a temporary measure.
- The soil around and under the pipe and entrance section shall be thoroughly compacted to prevent undercutting.
- The flared inlet section shall be securely connected to the slope drain and have watertight connecting bands.
- Slope drain sections shall be securely fastened together, fused or have gasketed watertight fittings, and shall be securely anchored into the soil.
- Thrust blocks should be installed anytime 90 degree bends are utilized. Depending on size of pipe and flow, these can be constructed with sand bags, straw bales staked in place, “t” posts and wire, or ecology blocks.
- Pipe needs to be secured along its full length to prevent movement. This can be done with steel “t” posts and wire. A post is installed on each side of the pipe and the pipe is wired to them. This should be done every 10-20 feet of pipe length or so, depending on the size of the pipe and quantity of water to divert.
- Interceptor dikes shall be used to direct runoff into a slope drain. The height of the dike shall be at least 1 foot higher at all points than the top of the inlet pipe.
- The area below the outlet must be stabilized with a riprap apron (see BMP C209: Outlet Protection (p.356), for the appropriate outlet material).
- If the pipe slope drain is conveying sediment-laden water, direct all flows into the

sediment trapping facility.

- Materials specifications for any permanent piped system shall be set by the local government.

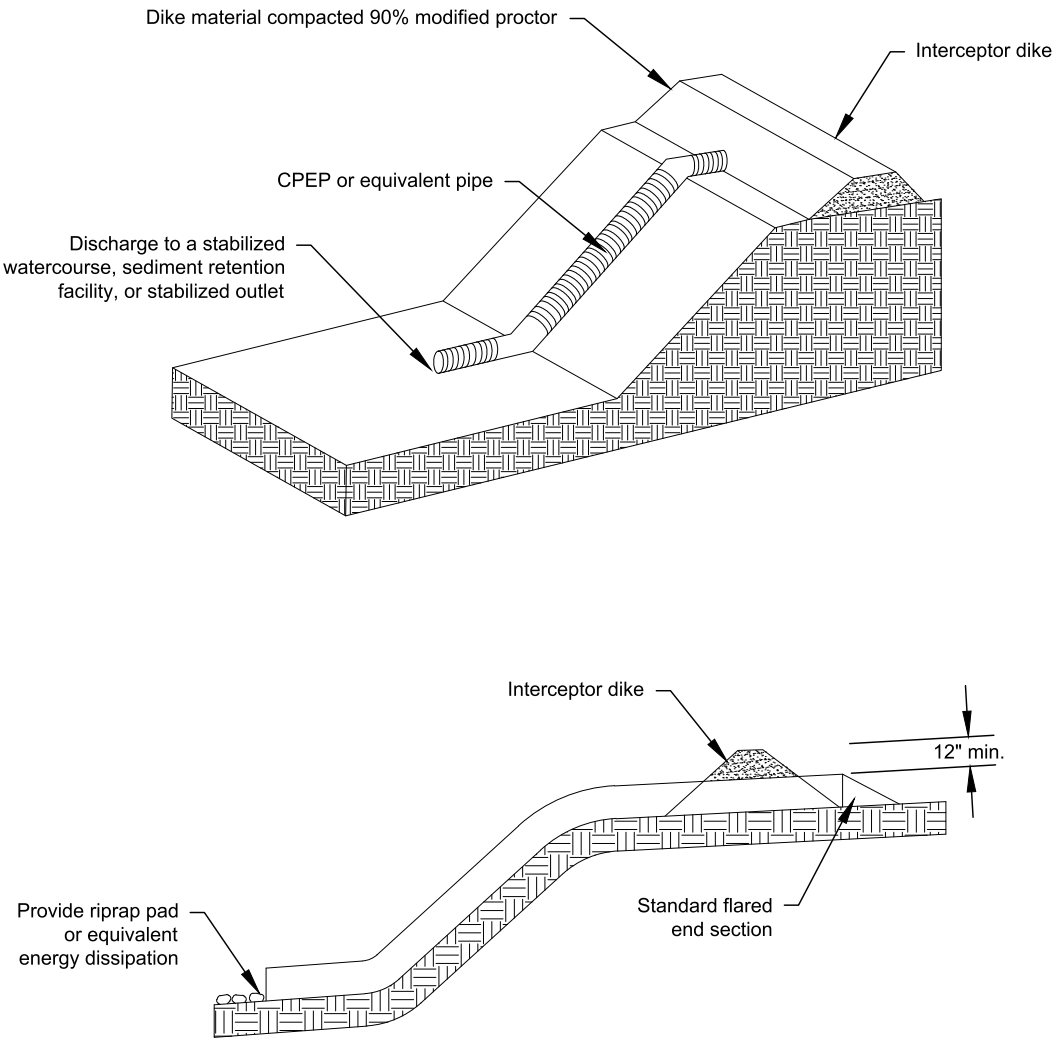
### *Maintenance Standards*

Check inlet and outlet points regularly, especially after storms.

The inlet should be free of undercutting, and no water should be going around the point of entry. If there are problems, the headwall should be reinforced with compacted earth or sand bags.

- The outlet point should be free of erosion and installed with appropriate outlet protection.
- For permanent installations, inspect pipe periodically for vandalism and physical distress such as slides and wind-throw.
- Normally the pipe slope is so steep that clogging is not a problem with smooth wall pipe, however, debris may become lodged in the pipe.

## Figure II-4.2.4 Pipe Slope Drain




Notes:

1. Inlet and all sections must be securely fastened together with gasketed watertight fittings

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Figure II-4.2.4
Pipe Slope Drain

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# BMP C207: Check Dams

## *Purpose*

Construction of small dams across a swale or ditch reduces the velocity of concentrated flow and dissipates energy at the check dam.

## *Conditions of Use*

Where temporary channels or permanent channels are not yet vegetated, channel lining is infeasible, and/or velocity checks are required.

- Check dams may not be placed in streams unless approved by the State Department of Fish and Wildlife. Check dams may not be placed in wetlands without approval from a permitting agency.
- Do not place check dams below the expected backwater from any salmonid bearing water between October 1 and May 31 to ensure that there is no loss of high flow refuge habitat for overwintering juvenile salmonids and emergent salmonid fry.
- Construct rock check dams from appropriately sized rock. The rock used must be large enough to stay in place given the expected design flow through the channel. The rock must be placed by hand or by mechanical means (no dumping of rock to form dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges.
- Check dams may also be constructed of either rock or pea-gravel filled bags. Numerous new products are also available for this purpose. They tend to be reusable, quick and easy to install, effective, and cost efficient.
- Place check dams perpendicular to the flow of water.
- The dam should form a triangle when viewed from the side. This prevents undercutting as water flows over the face of the dam rather than falling directly onto the ditch bottom.
- Before installing check dams impound and bypass upstream water flow away from the work area. Options for bypassing include pumps, siphons, or temporary channels.
- Check dams in association with sumps work more effectively at slowing flow and retaining sediment than just a check dam alone. A deep sump should be provided immediately upstream of the check dam.
- In some cases, if carefully located and designed, check dams can remain as permanent installations with very minor regrading. They may be left as either spillways, in which case accumulated sediment would be graded and seeded, or as

check dams to prevent further sediment from leaving the site.

- The maximum spacing between the dams shall be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
- Keep the maximum height at 2 feet at the center of the dam.
- Keep the center of the check dam at least 12 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the check dam at 2H:1V or flatter.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 18 inches to avoid washouts from overflow around the dam.
- Use filter fabric foundation under a rock or sand bag check dam. If a blanket ditch liner is used, filter fabric is not necessary. A piece of organic or synthetic blanket cut to fit will also work for this purpose.
- In the case of grass-lined ditches and swales, all check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale - unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.
- Ensure that channel appurtenances, such as culvert entrances below check dams, are not subject to damage or blockage from displaced stones. Figure II-4.2.7 Rock Check Dam (p.354) depicts a typical rock check dam.

### *Maintenance Standards*

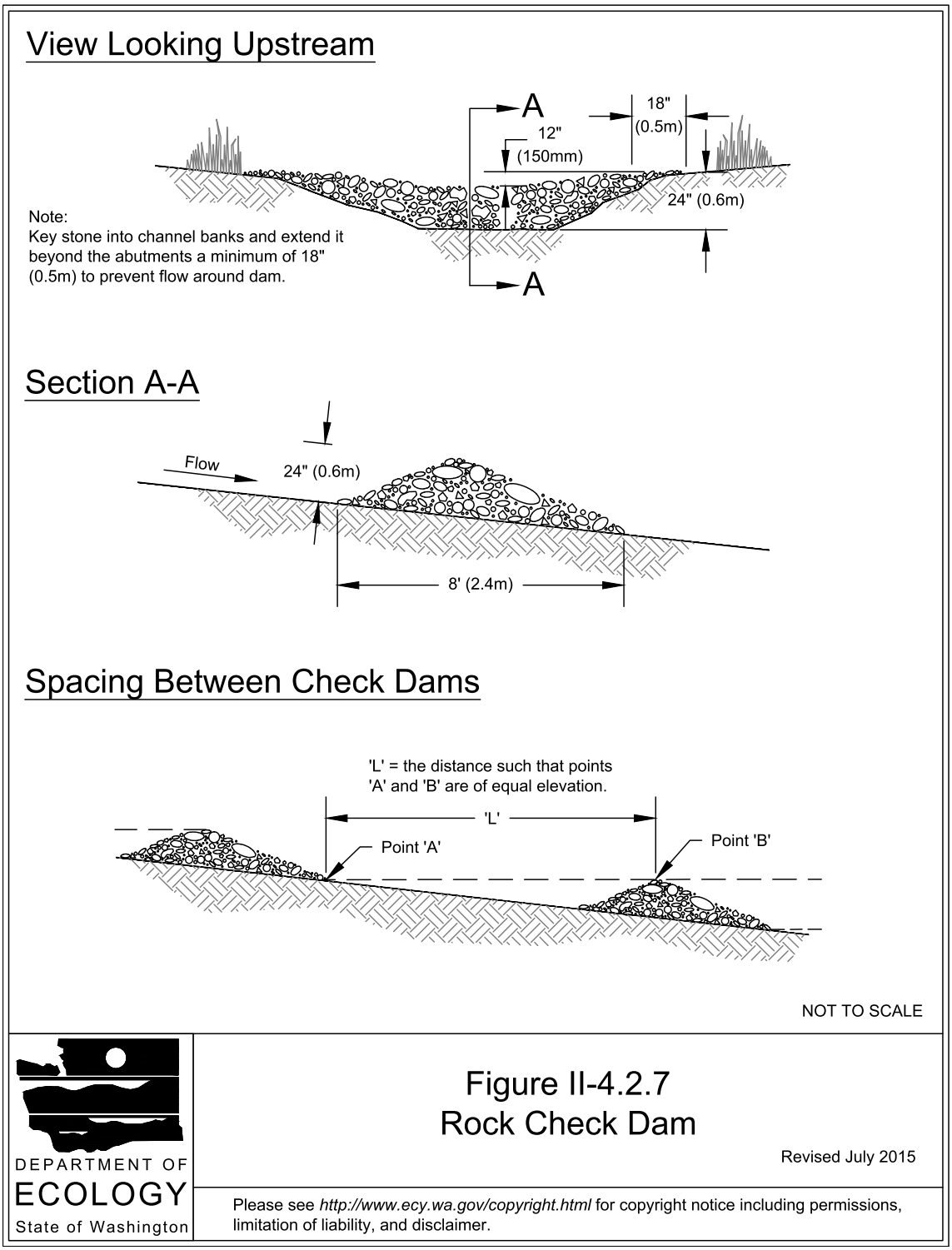
Check dams shall be monitored for performance and sediment accumulation during and after each runoff producing rainfall. Sediment shall be removed when it reaches one half the sump depth.

- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

### *Approved as Equivalent*

Ecology has approved products as able to meet the requirements of BMP C207: Check Dams. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov-/programs/wq/stormwater/newtech/equivalent.html

## Figure II-4.2.7 Rock Check Dam



- In the case of grass-lined ditches and swales, check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.

### *Maintenance Standards*

- Triangular silt dams shall be inspected for performance and sediment accumulation during and after each runoff producing rainfall. Sediment shall be removed when it reaches one half the height of the dam.
- Anticipate submergence and deposition above the triangular silt dam and erosion from high flows around the edges of the dam. Immediately repair any damage or any undercutting of the dam.

## BMP C209: Outlet Protection

### *Purpose*

Outlet protection prevents scour at conveyance outlets and minimizes the potential for downstream erosion by reducing the velocity of concentrated stormwater flows.

### *Conditions of Use*

Outlet protection is required at the outlets of all ponds, pipes, ditches, or other conveyances, and where runoff is conveyed to a natural or manmade drainage feature such as a stream, wetland, lake, or ditch.

### *Design and Installation Specifications*

The receiving channel at the outlet of a culvert shall be protected from erosion by rock lining a minimum of 6 feet downstream and extending up the channel sides a minimum of 1–foot above the maximum tailwater elevation or 1-foot above the crown, whichever is higher. For large pipes (more than 18 inches in diameter), the outlet protection lining of the channel is lengthened to four times the diameter of the culvert.

- Standard wingwalls, and tapered outlets and paved channels should also be considered when appropriate for permanent culvert outlet protection. (See WSDOT Hydraulic Manual, available through WSDOT Engineering Publications).
- Organic or synthetic erosion blankets, with or without vegetation, are usually more effective than rock, cheaper, and easier to install. Materials can be chosen using manufacturer product specifications. ASTM test results are available for most products and the designer can choose the correct material for the expected flow.
- With low flows, vegetation (including sod) can be effective.
- The following guidelines shall be used for riprap outlet protection:

1. If the discharge velocity at the outlet is less than 5 fps (pipe slope less than 1 percent), use 2-inch to 8-inch riprap. Minimum thickness is 1-foot.
2. For 5 to 10 fps discharge velocity at the outlet (pipe slope less than 3 percent), use 24-inch to 48-inch riprap. Minimum thickness is 2 feet.
3. For outlets at the base of steep slope pipes (pipe slope greater than 10 percent), an engineered energy dissipater shall be used.

- Filter fabric or erosion control blankets should always be used under riprap to prevent scour and channel erosion.
- New pipe outfalls can provide an opportunity for low-cost fish habitat improvements. For example, an alcove of low-velocity water can be created by constructing the pipe outfall and associated energy dissipater back from the stream edge and digging a channel, over-widened to the upstream side, from the outfall. Overwintering juvenile and migrating adult salmonids may use the alcove as shelter during high flows. Bank stabilization, bioengineering, and habitat features may be required for disturbed areas. This work may require a HPA. See Volume V (p.765) for more information on outfall system design.

### *Maintenance Standards*

- Inspect and repair as needed.
- Add rock as needed to maintain the intended function.
- Clean energy dissipater if sediment builds up.

## BMP C220: Storm Drain Inlet Protection

### *Purpose*

Storm drain inlet protection prevents coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

### *Conditions of Use*

Use storm drain inlet protection at inlets that are operational before permanent stabilization of the disturbed drainage area. Provide protection for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless conveying runoff entering catch basins to a sediment pond or trap.

Also consider inlet protection for lawn and yard drains on new home construction. These small and numerous drains coupled with lack of gutters in new home construction can add significant amounts of sediment into the roof drain system. If possible delay installing lawn and yard drains until just before landscaping or cap these drains to pre-

vent sediment from entering the system until completion of landscaping. Provide 18-inches of sod around each finished lawn and yard drain.

Table II-4.2.2 Storm Drain Inlet Protection (p.358) lists several options for inlet protection. All of the methods for storm drain inlet protection tend to plug and require a high frequency of maintenance. Limit drainage areas to one acre or less. Possibly provide emergency overflows with additional end-of-pipe treatment where stormwater ponding would cause a hazard.

**Table II-4.2.2 Storm Drain Inlet Protection**

| Type of Inlet Protection | Emergency Overflow | Applicable for Paved/ Earthen Surfaces | Conditions of Use |
|---|---|---|---|
| **Drop Inlet Protection** | | | |
| Excavated drop inlet protection | Yes, temporary flooding will occur | Earthen | Applicable for heavy flows. Easy to maintain. Large area Requirement: 30'x30'/acre |
| Block and gravel drop inlet protection | Yes | Paved or Earthen | Applicable for heavy concentrated flows. Will not pond. |
| Gravel and wire drop inlet protection | No | | Applicable for heavy concentrated flows. Will pond. Can withstand traffic. |
| Catch basin filters | Yes | Paved or Earthen | Frequent Maintenance required. |
| **Curb Inlet Protection** | | | |
| Curb inlet protection with wooden weir | Small capacity overflow | Paved | Used for sturdy, more compact installation. |
| Block and gravel curb inlet protection | Yes | Paved | Sturdy, but limited filtration. |
| **Culvert Inlet Protection** | | | |
| Culvert inlet Sediment trap | | | 18 month expected life. |

## *Design and Installation Specifications*

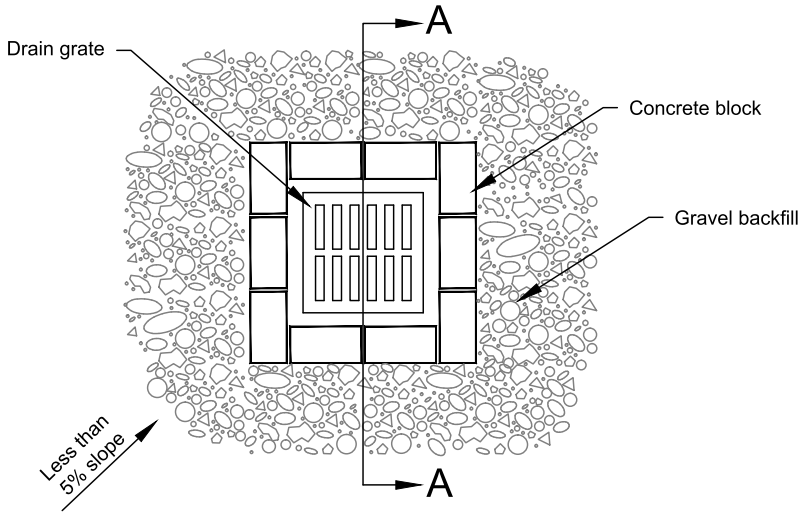
*Excavated Drop Inlet Protection* - An excavated impoundment around the storm drain. Sediment settles out of the stormwater prior to entering the storm drain.

- Provide a depth of 1-2 ft as measured from the crest of the inlet structure.
- Slope sides of excavation no steeper than 2H:1V.
- Minimum volume of excavation 35 cubic yards.
- Shape basin to fit site with longest dimension oriented toward the longest inflow area.
- Install provisions for draining to prevent standing water problems.
- Clear the area of all debris.
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.
- Build a temporary dike, if necessary, to the down slope side of the structure to prevent bypass flow.

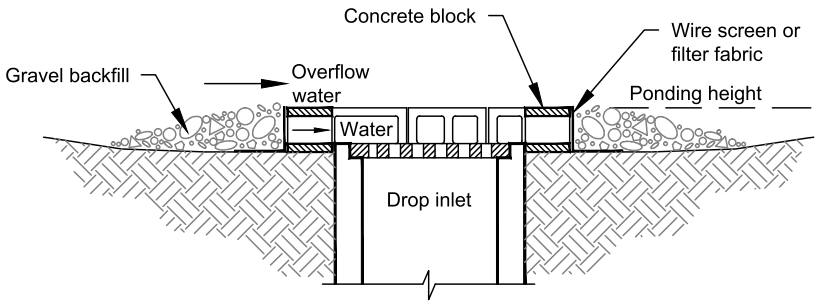
*Block and Gravel Filter* - A barrier formed around the storm drain inlet with standard concrete blocks and gravel. See Figure II-4.2.8 Block and Gravel Filter (p.360).

- Provide a height of 1 to 2 feet above inlet.
- Recess the first row 2-inches into the ground for stability.
- Support subsequent courses by placing a 2x4 through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel donut.
- Provide an inlet slope of 3H:1V.
- Provide an outlet slope of 2H:1V.
- Provide a1-foot wide level stone area between the structure and the inlet.
- Use inlet slope stones 3 inches in diameter or larger.
- Use gravel ½- to ¾-inch at a minimum thickness of 1-foot for the outlet slope.

## Figure II-4.2.8 Block and Gravel Filter




Plan View




Section A-A

Notes:

1. Drop inlet sediment barriers are to be used for small, nearly level drainage areas. (less than 5%)
2. Excavate a basin of sufficient size adjacent to the drop inlet.
3. The top of the structure (ponding height) must be well below the ground elevation downslope to prevent runoff from bypassing the inlet. A temporary dike may be necessary on the downslope side of the structure.

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Figure II-4.2.8
Block and Gravel Filter

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*Gravel and Wire Mesh Filter* - A gravel barrier placed over the top of the inlet. This structure does not provide an overflow.

- Use a hardware cloth or comparable wire mesh with ½-inch openings.
- Use coarse aggregate.
- Provide a height 1-foot or more, 18-inches wider than inlet on all sides.
- Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
- Overlap the strips if more than one strip of mesh is necessary.
- Place coarse aggregate over the wire mesh.
- Provide at least a 12-inch depth of gravel over the entire inlet opening and extend at least 18-inches on all sides.

*Catchbasin Filters* – Use inserts designed by manufacturers for construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. To reduce maintenance requirements combine a catchbasin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way.

- Provides 5 cubic feet of storage.
- Requires dewatering provisions.
- Provides a high-flow bypass that will not clog under normal use at a construction site.
- Insert the catchbasin filter in the catchbasin just below the grating.

*Curb Inlet Protection with Wooden Weir* – Barrier formed around a curb inlet with a wooden frame and gravel.

- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against wire/fabric.
- Place weight on frame anchors.

*Block and Gravel Curb Inlet Protection* – Barrier formed around a curb inlet with concrete blocks and gravel. See Figure II-4.2.9 Block and Gravel Curb Inlet Protection (p.363).

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

*Curb and Gutter Sediment Barrier* – Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure II-4.2.10 Curb and Gutter Barrier (p.364).

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the outside of the berm sized to sediment trap standards for protecting a culvert inlet.

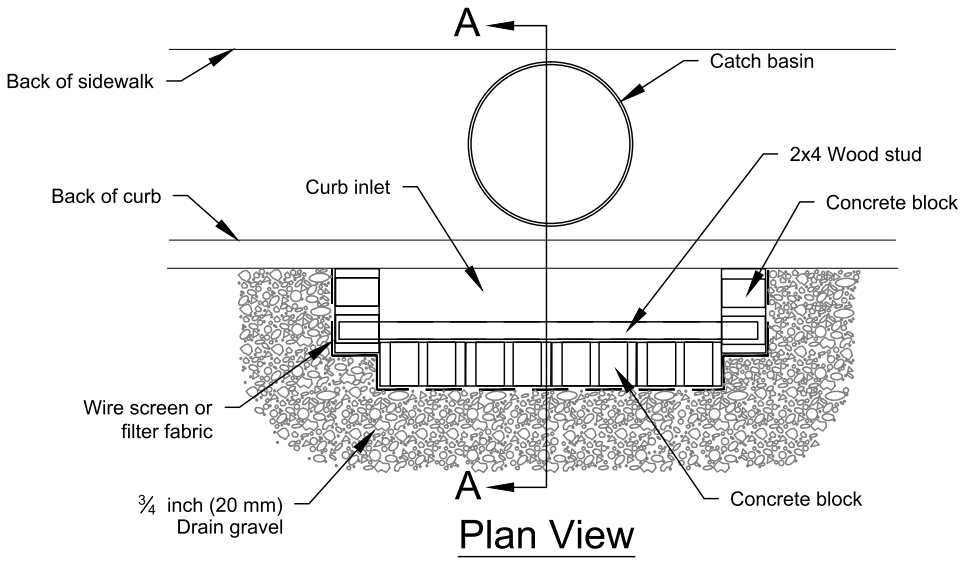
## Maintenance Standards

- Inspect catch basin filters frequently, especially after storm events. Clean and replace clogged inserts. For systems with clogged stone filters: pull away the stones from the inlet and clean or replace. An alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.
- Do not wash sediment into storm drains while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.

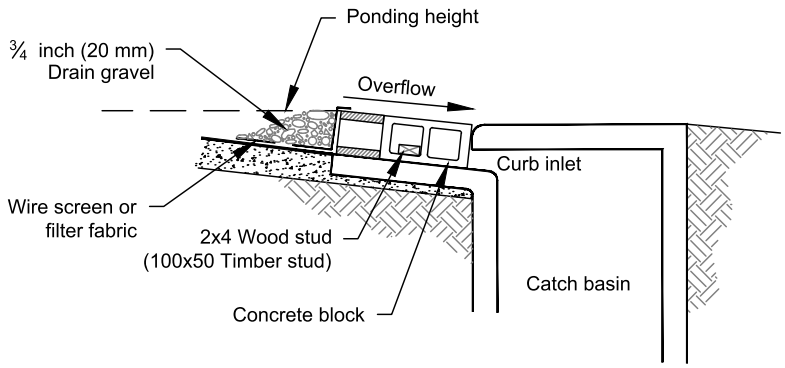
## Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C220: Storm Drain Inlet Protection. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

## Figure II-4.2.9 Block and Gravel Curb Inlet Protection




Plan View




Section A-A

Notes:

1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

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Figure II-4.2.9
Block and Gravel Curb Inlet Protection

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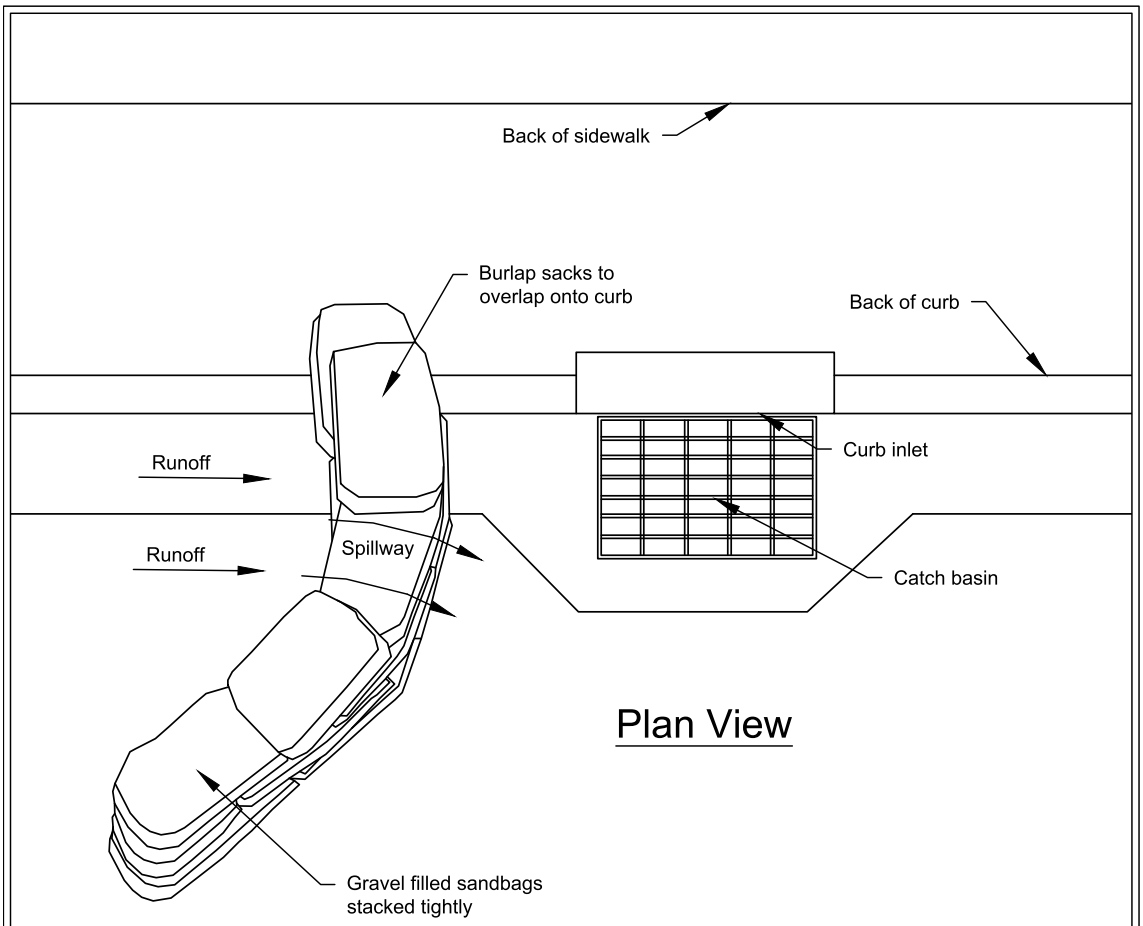
## Figure II-4.2.10 Curb and Gutter Barrier




Notes:

1. Place curb type sediment barriers on gently sloping street segments, where water can pond and allow sediment to separate from runoff.
2. Sandbags of either burlap or woven 'geotextile' fabric, are filled with gravel, layered and packed tightly.
3. Leave a one sandbag gap in the top row to provide a spillway for overflow.
4. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

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Figure II-4.2.10
Curb and Gutter Barrier

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## BMP C232: Gravel Filter Berm

### *Purpose*

A gravel filter berm is constructed on rights-of-way or traffic areas within a construction site to retain sediment by using a filter berm of gravel or crushed rock.

### *Conditions of Use*

Where a temporary measure is needed to retain sediment from rights-of-way or in traffic areas on construction sites.

### *Design and Installation Specifications*

- Berm material shall be ¾ to 3 inches in size, washed well-grade gravel or crushed rock with less than 5 percent fines.
- Spacing of berms:
  - Every 300 feet on slopes less than 5 percent
  - Every 200 feet on slopes between 5 percent and 10 percent
  - Every 100 feet on slopes greater than 10 percent
- Berm dimensions:
  - 1 foot high with 3H:1V side slopes
  - 8 linear feet per 1 cfs runoff based on the 10-year, 24-hour design storm

### *Maintenance Standards*

- Regular inspection is required. Sediment shall be removed and filter material replaced as needed.

## BMP C233: Silt Fence

### *Purpose*

Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure II-4.2.12 Silt Fence (p.369) for details on silt fence construction.

### *Conditions of Use*

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment pond.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

## Figure II-4.2.12 Silt Fence

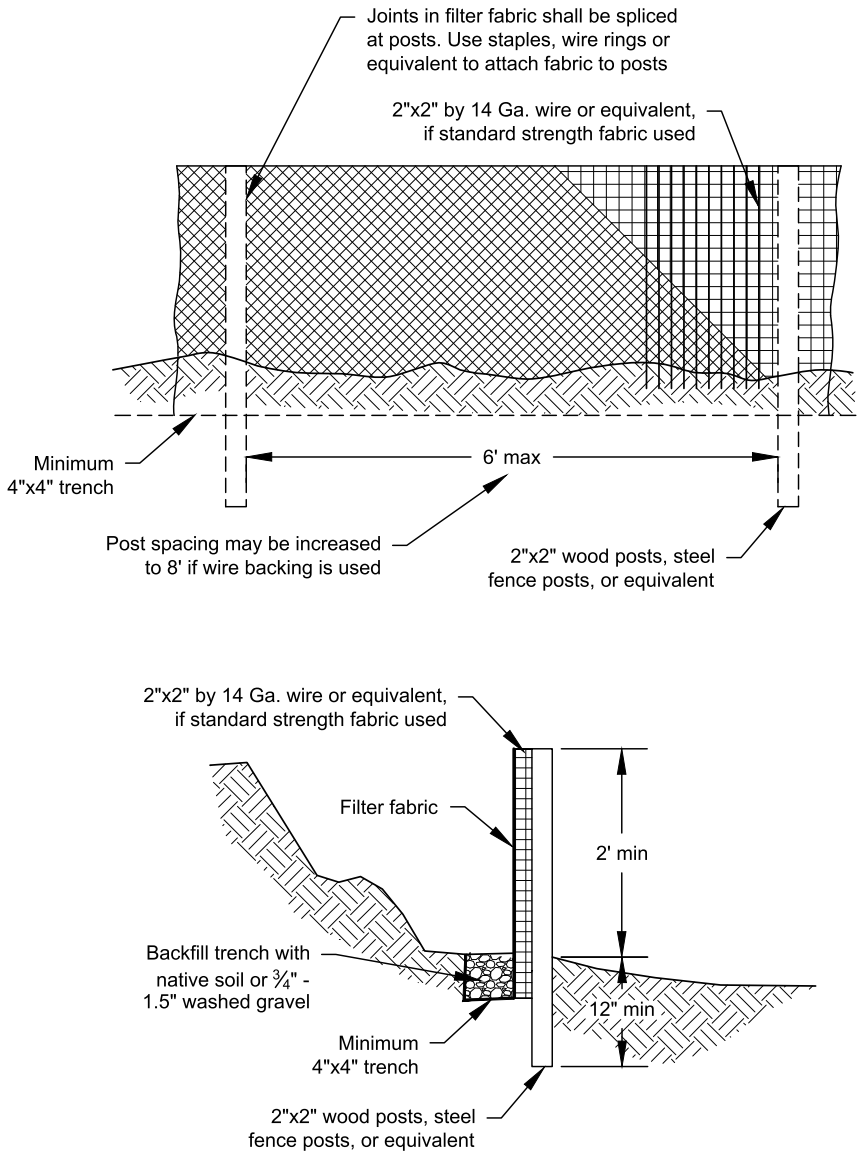


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Figure II-4.2.12
Silt Fence

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## *Design and Installation Specifications*

- Use in combination with sediment basins or other BMPs.
- Maximum slope steepness (normal (perpendicular) to fence line) 1H:1V.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table II-4.2.3 Geotextile Standards (p.370)):

**Table II-4.2.3 Geotextile Standards**

| | |
|---|---|
| Polymeric Mesh AOS (ASTM D4751) | 0.60 mm maximum for slit film woven (#30 sieve).<br>0.30 mm maximum for all other geotextile types (#50 sieve).<br>0.15 mm minimum for all fabric types (#100 sieve). |
| Water Permittivity (ASTM D4491) | 0.02 $sec^{-1}$ minimum |
| Grab Tensile Strength (ASTM D4632) | 180 lbs. Minimum for extra strength fabric.<br>100 lbs minimum for standard strength fabric. |
| Grab Tensile Strength (ASTM D4632) | 30% maximum |
| Ultraviolet Resistance (ASTM D4355) | 70% minimum |

- Support standard strength fabrics with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the fabric. Silt fence materials are available that have synthetic mesh backing attached.
- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F. to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations.
- Refer to Figure II-4.2.12 Silt Fence (p.369) for standard silt fence details. Include the following standard Notes for silt fence on construction plans and specifications:

1. The contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.
3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
4. The filter fabric shall be sewn together at the point of manufacture to form filter fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
5. Attach the filter fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the filter fabric to the posts in a manner that reduces the potential for tearing.
6. Support the filter fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the filter fabric up-slope of the mesh.
7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the filter fabric it supports.
8. Bury the bottom of the filter fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the filter fabric, so that no flow can pass beneath the fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.
9. Drive or place the fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
10. Use wood, steel or equivalent posts. The spacing of the support posts shall

be a maximum of 6-feet. Posts shall consist of either:

- Wood with dimensions of 2-inches by 2-inches wide min. and a 3-feet min. length. Wood posts shall be free of defects such as knots, splits, or gouges.
- No. 6 steel rebar or larger.
- ASTM A 120 steel pipe with a minimum diameter of 1-inch.
- U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
- Other steel posts having equivalent strength and bending resistance to the post sizes listed above.

11. Locate silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
12. If the fence must cross contours, with the exception of the ends of the fence, place gravel check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
    - Gravel check dams shall be approximately 1-foot deep at the back of the fence. Gravel check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
    - Gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Gravel check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to Figure II-4.2.13 Silt Fence Installation by Slicing Method (p.374) for slicing method details. Silt fence installation using the slicing method specifications:
  1. The base of both end posts must be at least 2- to 4-inches above the top of the filter fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
  2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
  3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the filter fabric, enabling posts to support the filter fabric from upstream water pressure.
  4. Install posts with the nipples facing away from the filter fabric.

5. Attach the filter fabric to each post with three ties, all spaced within the top 8-inches of the filter fabric. Attach each tie diagonally 45 degrees through the filter fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
6. Wrap approximately 6-inches of fabric around the end posts and secure with 3 ties.
7. No more than 24-inches of a 36-inch filter fabric is allowed above ground level.

   Compact the soil immediately next to the filter fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.

## Figure II-4.2.13 Silt Fence Installation by Slicing Method

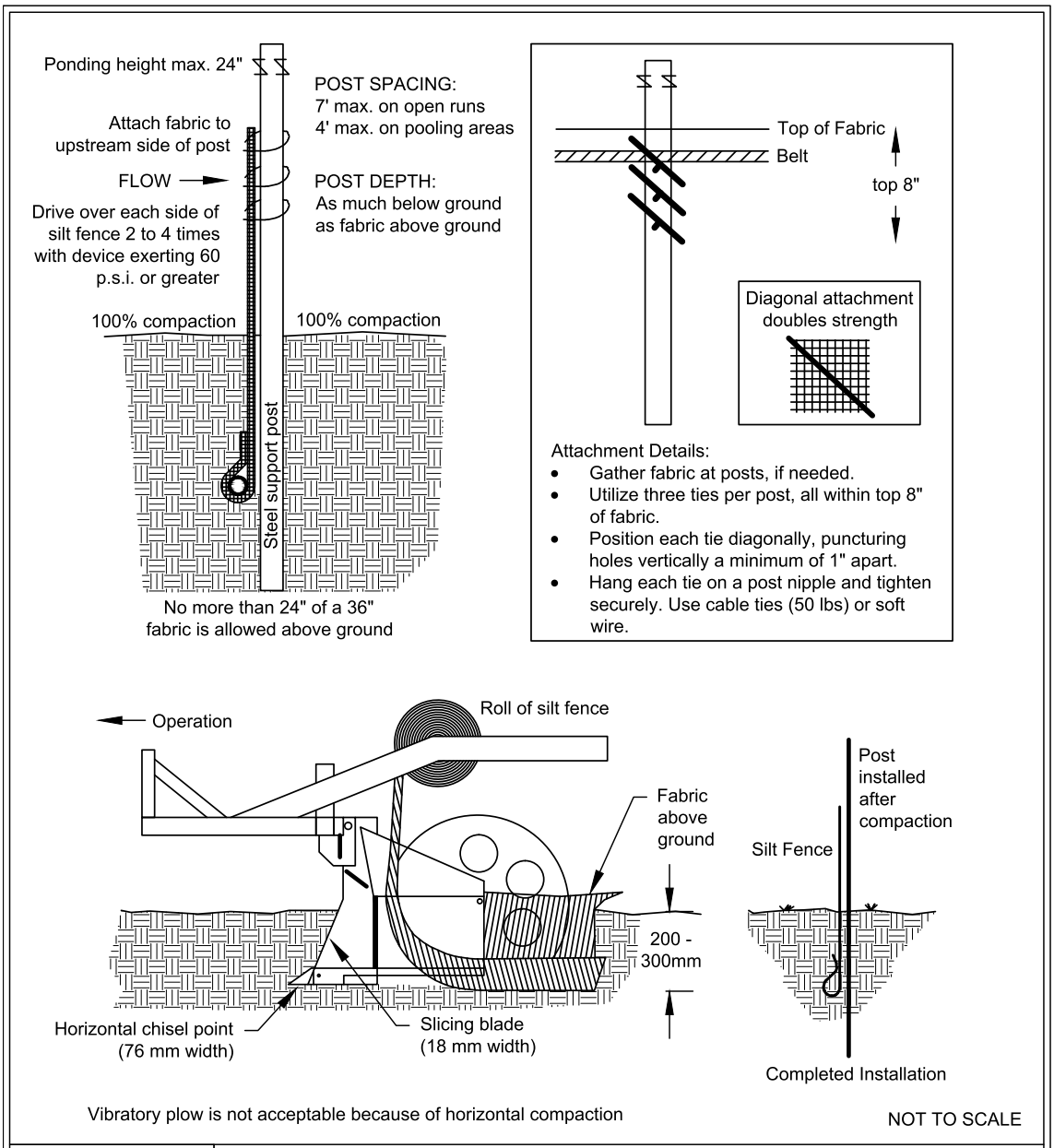


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Figure II-4.2.13
Silt Fence Installation by Slicing Method

Revised November 2015

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### *Maintenance Standards*

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

## BMP C234: Vegetated Strip

### *Purpose*

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

### *Conditions of Use*

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond. The only circumstance in which overland flow can be treated solely by a strip, rather than by a sediment pond, is when the following criteria are met (see Table II-4.2.4 Contributing Drainage Area for Vegetated Strips (p.375)):

**Table II-4.2.4 Contributing Drainage Area for Vegetated Strips**

| Average Contributing Area Slope | Average Contributing Area Percent Slope | Max Contributing area Flowpath Length |
|---|---|---|
| 1.5H : 1V or flatter | 67% or flatter | 100 feet |
| 2H : 1V or flatter | 50% or flatter | 115 feet |
| 4H : 1V or flatter | 25% or flatter | 150 feet |
| 6H : 1V or flatter | 16.7% or flatter | 200 feet |
| 10H : 1V or flatter | 10% or flatter | 250 feet |

# BMP C240: Sediment Trap

## *Purpose*

A sediment trap is a small temporary ponding area with a gravel outlet used to collect and store sediment from sites cleared and/or graded during construction. Sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.

## *Conditions of Use*

Prior to leaving a construction site, stormwater runoff must pass through a sediment pond or trap or other appropriate sediment removal best management practice. Non-engineered sediment traps may be used on-site prior to an engineered sediment trap or sediment pond to provide additional sediment removal capacity.

It is intended for use on sites where the tributary drainage area is less than 3 acres, with no unusual drainage features, and a projected build-out time of six months or less. The sediment trap is a temporary measure (with a design life of approximately 6 months) and shall be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Sediment traps and ponds are only effective in removing sediment down to about the medium silt size fraction. Runoff with sediment of finer grades (fine silt and clay) will pass through untreated, emphasizing the need to control erosion to the maximum extent first.

Whenever possible, sediment-laden water shall be discharged into on-site, relatively level, vegetated areas (see BMP C234: Vegetated Strip (p.375)). This is the only way to effectively remove fine particles from runoff unless chemical treatment or filtration is used. This can be particularly useful after initial treatment in a sediment trap or pond. The areas of release must be evaluated on a site-by-site basis in order to determine appropriate locations for and methods of releasing runoff. Vegetated wetlands shall not be used for this purpose. Frequently, it may be possible to pump water from the collection point at the downhill end of the site to an upslope vegetated area. Pumping shall only augment the treatment system, not replace it, because of the possibility of pump failure or runoff volume in excess of pump capacity.

All projects that are constructing permanent facilities for runoff quantity control should use the rough-graded or final-graded permanent facilities for traps and ponds. This includes combined facilities and infiltration facilities. When permanent facilities are used as temporary sedimentation facilities, the surface area requirement of a sediment trap or pond must be met. If the surface area requirements are larger than the surface area of the permanent facility, then the trap or pond shall be enlarged to comply with the surface

area requirement. The permanent pond shall also be divided into two cells as required for sediment ponds.

Either a permanent control structure or the temporary control structure (described in BMP C241: Temporary Sediment Pond (p.388)) can be used. If a permanent control structure is used, it may be advisable to partially restrict the lower orifice with gravel to increase residence time while still allowing dewatering of the pond. A shut-off valve may be added to the control structure to allow complete retention of stormwater in emergency situations. In this case, an emergency overflow weir must be added.

A skimmer may be used for the sediment trap outlet if approved by the Local Permitting Authority.

## *Design and Installation Specifications*

- See Figure II-4.2.16 Cross Section of Sediment Trap (p.386) and Figure II-4.2.17 Sediment Trap Outlet (p.387) for details.
- If permanent runoff control facilities are part of the project, they should be used for sediment retention.
- To determine the sediment trap geometry, first calculate the design surface area (SA) of the trap, measured at the invert of the weir. Use the following equation:

$$SA = FS(Q_2/V_s)$$

where

$Q_2$ = Design inflow based on the peak discharge from the developed 2-year runoff event from the contributing drainage area as computed in the hydrologic analysis. The 10-year peak flow shall be used if the project size, expected timing and duration of construction, or downstream conditions warrant a higher level of protection. If no hydrologic analysis is required, the Rational Method may be used.

$V_s$ = The settling velocity of the soil particle of interest. The 0.02 mm (medium silt) particle with an assumed density of 2.65 g/cm3 has been selected as the particle of interest and has a settling velocity (Vs) of 0.00096 ft/sec.

FS = A safety factor of 2 to account for non-ideal settling.

Therefore, the equation for computing surface area becomes:

$$SA = 2 \times Q_2/0.00096$$

or

2080 square feet per cfs of inflow

Note: Even if permanent facilities are used, they must still have a surface area that is at least as large as that derived from the above formula. If they do not, the pond must be enlarged.

- To aid in determining sediment depth, all sediment traps shall have a staff gauge with a prominent mark 1-foot above the bottom of the trap.
- Sediment traps may not be feasible on utility projects due to the limited work space or the short-term nature of the work. Portable tanks may be used in place of sediment traps for utility projects.

### *Maintenance Standards*

- Sediment shall be removed from the trap when it reaches 1-foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

## Figure II-4.2.16 Cross Section of Sediment Trap

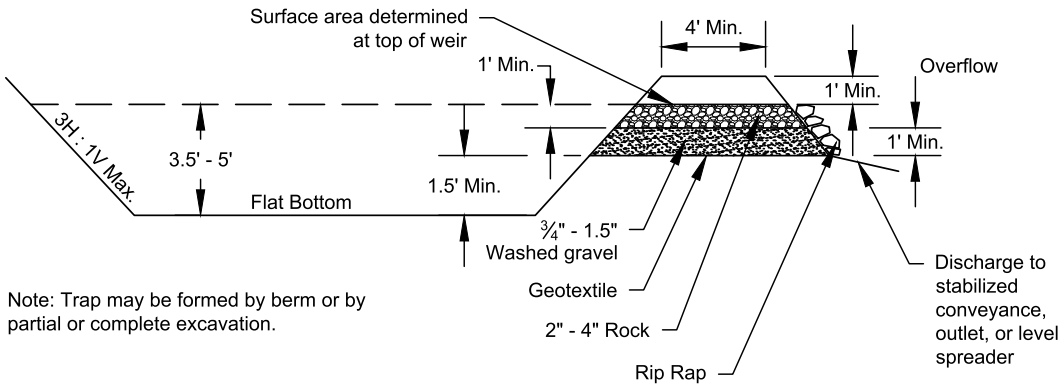


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Figure II-4.2.16
Cross Section of Sediment Trap

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## Figure II-4.2.17 Sediment Trap Outlet

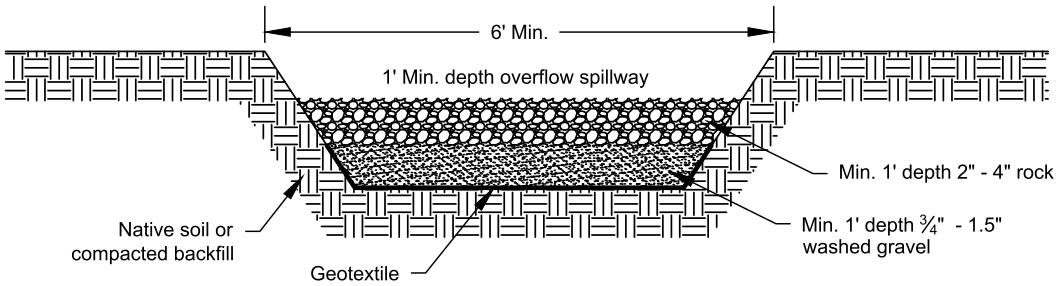


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Figure II-4.2.17
Sediment Trap Outlet

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The following list of commercial BMPs will also to be implemented on the site.

- A-1: Required Best Management Practices for all Properties with Commercial Activities
- A-4: Outdoor Storage of Soil, Sand and Other Erodible Materials
- A-11: Cleaning or Washing of Tools and Equipment
- A-13: Vehicle Washing and Steam Cleaning
- A-18: Vehicle and Equipment Repair and Maintenance
- A-20: Concrete and Asphalt Application
- A-24: Commercial Composting
- A-26: Landscaping Activities and Vegetation Management
- A-31: Vehicle and Equipment Parking and Storage
- A-41: Wheel Wash and Tire Bath Track Out Control
- A-44: Dust Control for Commercial Operations
- A-48: Mobile Fueling of Vehicles and Heavy Equipment

## A-1 Required Best Management Practices for all Properties with Commercial Activities

**The following Best Management Practices (BMPs) are required for all commercial, industrial, agricultural, public, or residential properties with commercial activities in unincorporated King County.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

### Required BMPs:

#### *Clean and Maintain Storm Drainage System*

- Evaluate the condition of the catch basin by checking the amount of sediment in the bottom of the sump. Catch basins must be cleaned out when the solids, trash, and debris in the sump reaches one–half of the depth between the bottom of the sump and the bottom of the lowest inflow or outflow pipe connected to the catch basin or is at least 6 inches below this point.
- Hire a professional drainage contractor to inspect and maintain your system or clean the system yourself. If there is sediment or other debris in the drainage pipes, then a professional contractor must be hired to flush or jet out the pipes.
- Small amounts of floating oil can be soaked up with oil absorbent pads, bagged and disposed of as solid waste.
- Up to one cubic yard of nonhazardous solid material may be disposed of as solid waste in your regular garbage. If you exceed this threshold hire a professional drainage contractor. All of the solids and stagnant water collected from catch basin sumps must be disposed of properly. None of the sump contents can be flushed into the catch basin outflow pipe. Depending on the nature of the pollutants in the sump, and the associated types of activities taking place on the site, the sump contents may need to be handled as contaminated waste. Contractors who perform catch basin clean–out services are required to follow appropriate disposal requirements.
- Clean and maintain catch basins annually. Sites with activities generating a lot of sediments and other debris will have to inspect and clean out their catch basins more often. Frequent sweeping of paved parking and storage areas will save time and money in maintaining the drainage system.
- Other components of drainage systems such as ponds, tanks, and bioswales must also be maintained. If this maintenance is beyond your ability, contractors are available to complete this work.

#### *Label All Storm Drain Inlets on Your Property*

- Stencil or apply storm drain markers adjacent to storm drains to help prevent the improper disposal of pollutants. If the storm drain grate is stamped with warnings against polluting, then additional marking may not be required if there is no evidence of pollutants being dumped or washed into the storm drain.

### *Eliminate Illicit Connections to the Storm Drainage System*

- Connections to the storm drainage system that convey substances other than stormwater are prohibited. Examples are connections from internal floor drains, HVAC systems, industrial processes, sinks, and toilets.
- Illicit connections must be immediately removed, permanently plugged or re–plumbed.
- The discharge must be re–plumbed so that it goes to the sanitary sewer, a septic system, an on–site treatment system, or a holding tank for off–site disposal. There are restrictions on what can be disposed of to the sanitary sewer and septic systems. You may be required to do additional investigation to determine where all stormwater and non–stormwater discharges go. This may include smoke, dye, and chemical testing or closed circuit television inspection.

## Additional Information:

- Drainage System Maintenance Contractors Information Sheet
- For stencils and instructions or to determine if you have an illicit connection, contact King County Stormwater Services at 206–477–4811 or *kingcounty.gov/stormwater*.

# A-4 Outdoor Storage of Soil, Sand, and Other Erodible Materials

**This activity covers both permanent and temporary sites.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Cover and contain the stockpiled materials, unless the material cannot wash into the storm drain system or surface waters and cannot be blown away by the wind.
- Covers must be in place at all times when the stockpile is not in active use.
- Do not hose down the contained stockpile area to the storm drainage system.
- Implement erosion control practices if the stockpiles cannot feasibly be covered and contained.
- Install catch basin inserts to collect excess sediment and debris if necessary.

## Required Routine Maintenance

- Sweep paved surfaces to collect solid materials. Do not hose down area to the storm drain system.
- Check covers over the stockpiles to ensure they are still functioning properly.
- Inspect and maintain catch basin inserts .

## More Detailed Information Can be Found at:

- Covering Information Sheet
- Containment Information Sheet
- Catch Basin Insert Information Sheet
- Erosion control practices – King County Surface Water Design Manual, Appendix D

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-11 Cleaning or Washing of Tools and Equipment

**This activity includes cleaning landscaping equipment such as lawn mowers and weed whackers; tools used at equipment repair shops; and, manufacturing equipment such as saws, grinders and screens.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Discharge tool and equipment wash water to the sanitary sewer or a holding tank for offsite disposal. Discharge of wash water to the storm drain system is not allowed without treatment and an Individual Wastewater Discharge permit from the Washington State Department of Ecology.
- Rinse lawnmowers with water only on a lawn or similar area where grass clippings will not get into the storm drain system or surface waters when it rains.
- Oily, soapy or otherwise dirty water is not allowed to discharge to any stormwater system or surface water.

## Additional Information:

- Disposal Information Sheet
- Ecology's Vehicle and Equipment Washwater Discharges/Best Management Practices Manual (*https://fortress.wa.gov/ecy/publications/summarypages/95056.html*)

You are encouraged to recycle your wash water with an enclosed loop system or use self–contained parts washers. Numerous products are commercially available that recycle and contain wash water and cleaning solvents.

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-13 Vehicle Washing and Steam Cleaning

**This applies to all vehicle washing including mobile vehicle washing services. For exterior vessel washing refer to A-30 Ships/Boats/Watercraft Building, Maintenance, and Repair.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Commercial car washing must be done in a contained area where all water is collected and either recycled or discharged to the sanitary sewer.
- Occasional vehicle washing with a mild (pH neutral) soap or detergent on gravel, grass, or loose soil is allowed as long as all the water soaks into the ground and you only wash the exterior of the vehicle.
- If your business is located in an area designated as a Critical Aquifer Recharge Area (CARA), infiltration may not be allowed.
- The use of "environmentally friendly", "nontoxic" or "biodegradable" soaps does NOT make it acceptable to discharge vehicle wash water to any storm drain system or surface waters. All soaps are harmful to aquatic organisms.
- Do not wash vehicles on paved areas or wash or rinse the engine compartment or the underside of vehicles, unless you do one of the following:
  - » Designate a wash area for all vehicles where the wash water is collected and discharged to the sanitary sewer or is processed through an enclosed recycling system;
  - » Use a portable collection system that captures all the wash water for proper disposal;
  - » Take the vehicles to a commercial car wash or use a mobile washer who collects the wash water for proper disposal; or
  - » Ensure that the paved area drains directly to grass, gravel or loose soil and there is no possibility of the wash water getting into the storm drain system;
- Do not conduct oil changes or other engine maintenance in the designated washing area.
- Rinsing the outside of a vehicle with water and without any soaps or detergents, is allowed as long as the water is filtered prior to discharge to the storm drain system.
- At multifamily properties it may be necessary to post signs at the designated wash areas, indicating where and how vehicle washing must be done.

## Additional Information:

- Disposal Information Sheet
- Catch Basin Insert Information Sheet
- Ecology's Vehicle and Equipment Washwater Discharges/ Best Management Practices Manual (*https://fortress.wa.gov/ecy/publications/summarypages/95056.html*)

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit *kingcounty.gov/stormwater*.**

# A-18 Vehicle and Equipment Repair and Maintenance

**This also applies to mobile vehicle and equipment repair and maintenance operations.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Inspect all incoming vehicles and equipment for leaks and use drip pans or absorbent material if necessary, while waiting for service.
- Clean up any spilled fluids immediately. The collected material and absorbents must be disposed of, reused, or recycled properly.
- Cover, contain, and label waste oil, antifreeze, and other fluids.
- Store batteries upright in a secure, contained, covered location (not outside on the ground). Check to ensure batteries are not damaged or leaking. Keep battery acid–neutralizing materials, such as baking soda, available near the storage area.
- Regular work at stationary locations must be done indoors or in a covered area using a tarp or drip pans beneath the vehicle or equipment to capture all spills and drips.
- Ensure that employees are familiar with the site's spill control and clean–up plans and are trained in the proper handling, storage, and disposal of all fluids.
- Store and maintain appropriate spill cleanup materials in an easily accessible location.

## Required Routine Maintenance

- Inspect parking and outside storage areas daily for leaks and drips.
- Sweep paved work areas as needed. Soak up vehicle fluids with rags or other absorbent material immediately. Never wash paved areas to a storm drain or the street.

## Supplemental BMPs:

- Absorbent material such as pillows or booms can be used around storm drains or in catch basins to absorb oil and other substances.
- A catch basin insert may be necessary. Catch basin inserts require frequent maintenance to be effective.

## Additional Information:

- Covering Information Sheet
  - » Containment Information Sheet
  - » Disposal Information Sheet
  - » Storage of Liquid Materials in Portable Containers – Activity Sheet A-3
  - » Catch Basin Insert Information Sheet

Call the Business Waste Line at 206–263–8899 or see *http://www.govlink.org/hazwaste/business/index.cfm* for information on the proper disposal and recycling of vehicle fluids, filters, batteries and used sorbent material.

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-20 Concrete and Asphalt Application

**This applies to sites where asphalt is applied or small amounts of concrete that is hand mixed on site. The application of premixed concrete must follow the standards in the King County Surface Water Design Manual.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required Best Management Practices (BMPs):

- Use drip pans, ground cloths, heavy cardboard or plywood wherever concrete, asphalt, asphalt emulsion and drips are likely to spill, such as beneath discharge points from equipment.
- Cover and contain all nearby storm drains at the beginning of the workday. Drain covers and other containment devices are commercially available to keep runoff out of the storm drainage system. All solids collected must be disposed of properly at the end of the workday (or more frequently) prior to removing the containment or cover device(s).
- Contain and collect the slurry from exposed aggregate washing. Never allow the slurry to get into a storm drain, ditch, roadway shoulder or gutter. Use a storm drain cover, inlet protection or other containment device, such as a hand–dug, lined sump to direct and contain slurry. All collected runoff must be disposed of properly.
- Do not discharge concrete, slurry, or rinse water into gutters, storm drains, or drainage ditches or onto the paved surface of a roadway or driveway.
- Designate an area onsite where hand tools will be cleaned and the water collected for disposal. Commercial products and services are also available for concrete, slurry, and rinse water containment and disposal.
- Do not use diesel fuel for cleaning or prepping asphalt tools and equipment.

## Required Routine Maintenance:

- Sweep the pouring area at the end of the job or more frequently if needed. Collect loose aggregate chunks and dust. Do not hose down the area to a storm drain.

## Supplemental BMPs:

- A catch basin insert may be necessary for sediment removal. Catch basin inserts require frequent maintenance to be effective.

## Additional Information:

- Covering Information Sheet
- Containment Information Sheet
- Disposal Information Sheet
- Catch Basin Insert Information Sheet
- King County Surface Water Design Manual Appendix D – Concrete Handling
- King County Surface Water Design Manual Appendix D – Concrete Washout Area

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-24 Commercial Composting

**This activity applies to commercial receiving and composting wastes.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Screen incoming waste for dangerous materials and solid waste. These materials may not be accepted for composting and must be properly disposed of.
- Locate composting areas on impervious surfaces.
- Drain all leachate from composting operations to a sanitary sewer, holding tank, or on–site treatment system. Leachate may not go to the storm drain system or groundwater.
- Collect the leachate with a dike or berm, or with intercepting drains placed on the down slope side of the compost area.
- Direct outside runoff away from the composting areas.

## Required Routine Maintenance:

- Clean up debris from yard areas as needed to prevent stormwater contamination.

## Supplemental BMPs:

- Install catch basin inserts to collect excess sediment and debris if necessary. Inspect and maintain catch basin inserts to ensure they are working correctly.

## Additional Information:

- Disposal Options Information Sheet
- Containment Information Sheet. Refer to the King County Health Code for full compliance.
- Catch Basin Insert Information Sheet

When stormwater is allowed to contact any active composting area, it becomes leachate and must be separated from stormwater runoff. All commercial–composting operations must comply with Seattle–King County Health Department requirements. Commercial composting operations require a National Pollutant Discharge Elimination System (NPDES) permit from the Department of Ecology.

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-26 Landscaping Activities and Vegetation Management

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Train employees on the proper use and application of fertilizers and pesticides.
- Never apply pesticides and fertilizers if it is raining or about to rain.
- Do not apply pesticides within 100 feet of surface waters such as lakes, ponds, wetlands, streams, and stormwater conveyance ditches unless the application is approved and permitted by the Washington State Department of Ecology.
- Determine the proper fertilizer application for the types of soil and vegetation involved. Follow manufacturers' recommendations and label directions.
- Clean up any spills immediately.
- Remove weeds/vegetation in stormwater ditches by hand or other mechanical means and only use chemicals as a last resort.
- Do not blow vegetation or other debris into the storm drain system, sidewalks, or street. Dispose of collected vegetation by recycling or composting.
- Use mulch or other erosion control measures when soils are exposed for more than one week during the dry season or two days during the rainy season.
- Ensure sprinkler systems do not "overspray" vegetated areas resulting in the excess water discharging into the storm drain system.
- New and expanding golf courses must have a Golf Course Management Plan as described in addressed in the *King County Golf Course BMP Manual*

## Supplemental BMPs:

- Use integrated pest management (IPM); a comprehensive approach to the use of pesticides is the most effective BMP measure that can be taken for herbicide, insecticide, and fungicide use.
- Test soils to determine the correct fertilizer application rates.
- Use mechanical methods of vegetation removal rather than applying herbicides.
- Use native plants in landscaping. Native plants do not require extensive fertilizer or pesticide applications.

## Additional Information:

- Storage of Pesticides and Fertilizers – Activity Sheets A-5
- Natural Yard Care Program:
  *http://your.kingcounty.gov/solidwaste/naturalyardcare/watering.asp*
- The King County Golf Course BMP Manual.
- The King County Noxious Weed Control Program provides best management practices for the removal of typical noxious weeds such as blackberry and purple loosestrife. Call 206–296–0290 or see:
  *http://www.kingcounty.gov/environment/animalsandplants/noxious–weeds/weed–control–practices.aspx* for more information.

Washington pesticide law requires most businesses that commercially apply pesticides to the property of another to be licensed as a Commercial Applicator from the Washington State Department of Agriculture.

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-31 Vehicle and Equipment Parking and Storage

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Sweep parking lots, storage areas, and driveways as needed to collect dirt, waste, and debris. Do not hose down the area to the storm drainage system.
- Clean up vehicle and equipment fluid drips and spills immediately.
- Place drip pans below inoperative or leaking vehicles and equipment, including employee vehicles.
- Collect and discharge wash water to a sanitary sewer or haul for offsite disposal if washing/pressure washing of the parking lot occurs. There are businesses that will clean parking lots and collect water for off–site disposal. Never drain wash water to the storm drainage system.
- Follow basic sediment controls as outlined in Appendix D ("Erosion and Sediment Control Standards") of the King County Surface Water Design Manual for gravel and dirt lots. These types of parking lots may require additional BMPs to prevent sediment laden water from leaving your site.

## Supplemental BMPs:

- Encourage employees to repair leaking personal vehicles.
- Encourage employees to carpool or use public transit through incentives.
- Encourage customers to use public transit by rewarding valid transit pass holders with discounts.
- Install catch basin inserts to collect excess sediment and oil if necessary. Inspect and maintain catch basin inserts to ensure they are working correctly.

## Additional Information:

- Disposal Information Sheet
- Catch Basin Insert Information Sheet

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-41 Wheel Wash and Tire Bath Track Out Control

**This activity applies to commercial and industrial operations where materials may be tracked off the property. If a rocked construction–type entrance for unpaved site, or routine sweeping/vacuuming of paved site, does not control mud and sediment track out; a wheel wash system must be installed.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required Best Management Practices (BMPs):

- Install a portable wheel wash system

  OR

- Permanent wheel wash system as described in Appendix D, Chapter D.3.4.3 of the King County Surface Water Design Manual

## Required Routine Maintenance:

- Change water as necessary. Dispose of wheel wash water to appropriate disposal location.
- Maintain the appropriate level of water per design.

## Additional Information:

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-44 Dust Control for Commercial Operations

**This activity applies to existing manufacturing and commercial operations as opposed to new construction or land development. Material handling activities may include concrete crushing, cement mixing, commercial composting, stone grinding, and wood milling.**

**Best Management Practices (BMPs) are required by King County Code 9.12. If the BMPs included here are not enough to prevent contamination of stormwater, you will be required to take additional measures.**

## Required BMPs:

- Sweep paved areas where dust and erodible materials accumulate. Use vacuum sweepers to minimize generation of airborne dust and for more efficient dust removal.
- Clean equipment and vehicles that leave the property to prevent dust and track out of material. Create a designated wash area to collect and properly dispose of the wash water. Never wash down equipment or vehicles to the storm drainage system.
- Train employees in the proper operating procedures to minimize dust accumulation.

## Supplemental BMPs–if the Above are Not Sufficient:

- Use dust filtration and collection systems such as bag house filters.
- Use water spray to flush dust accumulations to an approved treatment system or the sanitary sewer where available and allowed by the local sewer authority and the King County Industrial Waste Program.
- Use approved dust suppressants such as those listed in the King County Surface Water Design Manual, Appendix D, Erosion and Sediment Control Standards.
- When pH levels in stormwater rise above 8.5, the pH must be adjusted to the acceptable range of 6.5 to 8.5. Refer to the King County Surface Water Design Manual Appendix D Sections D.2.2.7 and D.2.2.8 for information on pH adjustment.

## Additional Information:

- Department of Ecology Publication "Techniques for Dust Prevention and Suppression," #96–433. Please note that not all dust suppressants are appropriate for use near storm drainage systems or surface waters.
- Contact Puget Sound Clean Air Agency and/or the Washington State Department of Ecology for air pollution control regulations.

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit** *kingcounty.gov/stormwater***.**

# A-48 Mobile Fueling of Vehicles and Heavy Equipment

**Mobile fueling, also known as fleet fueling, wet fueling, or wet hosing, is the practice of filling fuel tanks of vehicles or equipment by fuel tank trucks, tank trailers, and trucks with accessory fueling tanks that are driven to the yards or sites where the vehicles to be fueled are located.**

## Required Operational BMPs:

- Obtain approval from the local fire department. Comply with local and Washington State fire codes.
- The driver/operator must be present and constantly observe the fuel transfer to ensure the implementation of the following procedures at all fuel transfer locations:
  - » To the extent practical, locate the point of fueling at least 25 feet from the nearest stormdrain or drainage ditch, or inside an impervious containment with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume, or covering the stormdrain to prevent discharge of spilled or leaked fuel. Covers are not required for storm drains that convey the inflow to a spill control separator approved by the local jurisdiction and the fire department;
  - » Place a leak–proof drip pan or an absorbent pad under each fueling location prior to and during all dispensing operations. The pan or the absorbent pad must have a capacity of at least 5 gallons. There is no need to report spills retained in the drip pan or the pad;
  - » Manage the handling and operation of fuel transfer hoses and nozzle, drip pan(s), and absorbent pads as needed to prevent spills/leaks of fuel from reaching the ground, stormdrain, or surface waters;
  - » Do not extend fueling hoses across a traffic lane without fluorescent traffic cones, or equivalent devices, conspicuously placed to block all traffic from crossing the fuel hose;
  - » Remove the fill nozzle and cease filling the tank when the automatic shut–off valve engages. Do not lock automatic shutoff fueling nozzles in the open position;
  - » Do not "top off" the fuel tanks; and
  - » Do not use dispersants or soap to clean up spills or sheens.
- Develop and follow a mobile fueling plan that includes the required operational BMPs and spill response procedures.
- The responsible manager shall:
  - » Sign and date the mobile fueling plan;
  - » Distribute procedures to the operators; and
  - » Update and retain them in the organization files
- Immediately notify the local fire department (911) and Ecology in the event of any spill entering surface or ground waters. Establish a "call down list" to ensure the rapid and proper notification of management and government officials should any significant amount of product be lost off–site. Keep the list in a protected but readily accessible location in the mobile fueling truck. The "call down list" should also pre–identify spill response contractors available in the area to ensure the rapid removal of significant product spillage into the environment.

- Train the driver/operator upon hiring, and annually thereafter, on proper fueling procedures, spill prevention, cleanup measures, and emergency procedures. Make all employees aware of the significant liability associated with fuel spills.
- The driver/operator of the fueling vehicle must have:
  - » A current copy of the mobile fueling plan;
  - » Adequate flashlights or other mobile lighting to view fuel fill openings with poor accessibility; and
  - » Two–way communication with the operator's home base.
- Maintain a minimum of the following spill clean–up materials in all fueling vehicles, that are readily available for use:
  - » Non–water absorbents capable of absorbing at least 15 gallons of diesel fuel;
  - » A storm drain plug or cover kit
  - » Two, five–gallon buckets with lids or sealable disposal bags;
  - » A non–spark generating shovel; and
  - » For fuel tankers and trailers with fueling tanks greater than 100 gallons, a non–water absorbent containment boom, minimum 10 feet in length with a 12–gallon minimum absorbent capacity.
- Use automatic shutoff nozzles for dispensing the fuel. Replace automatic shut–off nozzles as recommended by the manufacturer.
- Maintain fueling equipment, particularly hoses and nozzles.
- Use an adequate lighting system at the filling point.

## Additional Information:

- Spill Response and Clean–up Plan Information Sheet

**For more information or assistance contact the King County Stormwater Services at 206–477–4811 and visit *kingcounty.gov/stormwater*.**

# Appendix C – General Permit

The approved NPDES General Construction Permit will be provided prior to the beginning of construction.

# Appendix D – Site Inspection Forms (and Site Log)

The results of each inspection shall be summarized in an inspection report or checklist that is entered into or attached to the site log book. It is suggested that the inspection report or checklist be included in this appendix to keep monitoring and inspection information in one document, but this is optional. However, it is mandatory that this SWPPP and the site inspection forms be kept onsite at all times during construction, and that inspections be performed and documented as outlined below.

At a minimum, each inspection report or checklist shall include:

a. Inspection date/times

b. Weather information: general conditions during inspection, approximate amount of precipitation since the last inspection, and approximate amount of precipitation within the last 24 hours.

c. A summary or list of all BMPs that have been implemented, including observations of all erosion/sediment control structures or practices.

d. The following shall be noted:
   i. locations of BMPs inspected,
   ii. locations of BMPs that need maintenance,
   iii. the reason maintenance is needed,
   iv. locations of BMPs that failed to operate as designed or intended, and
   v. locations where additional or different BMPs are needed, and the reason(s) why

e. A description of stormwater discharged from the site. The presence of suspended sediment, turbid water, discoloration, and/or oil sheen shall be noted, as applicable.

f. A description of any water quality monitoring performed during inspection, and the results of that monitoring.

g. General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.

h. A statement that, in the judgment of the person conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the SWPPP and the NPDES permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance, as well as a schedule of implementation.

i. Name, title, and signature of person conducting the site inspection; and the following statement: “I certify under penalty of law that this report is true, accurate, and complete, to the best of my knowledge and belief”.

When the site inspection indicates that the site is not in compliance with any terms and conditions of the NPDES permit, the Permittee shall take immediate action(s) to: stop, contain, and clean up the unauthorized discharges, or otherwise stop the noncompliance; correct the problem(s); implement appropriate Best Management Practices (BMPs), and/or conduct maintenance of existing BMPs; and achieve compliance with all applicable standards and permit conditions. In addition, if the noncompliance causes a threat to human health or the environment, the Permittee shall comply with the Noncompliance Notification requirements in Special Condition S5.F of the permit.

# Site Inspection Form

| General Information | | | |
|---|---|---|---|
| **Project Name:** | | | |
| **Inspector Name:** | | **Title:**<br>**CESCL # :** | |
| **Date:** | | **Time:** | |
| **Inspection Type:** | ◻ After a rain event<br>◻ Weekly<br>◻ Turbidity/transparency benchmark exceedance<br>◻ Other | | |
| **Weather** | | | |
| **Precipitation** | Since last inspection | In last 24 hours | |
| **Description of General Site Conditions:** | | | |

| Inspection of BMPs | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Element 1: Mark Clearing Limits*** | | | | | | | |
| BMP: | | | | | | | |
| Location | Inspected | | Functioning | | | | Problem/Corrective Action |
| | | Y | N | Y | N | NIP | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| BMP: | | | | | | | |
| Location | Inspected | | Functioning | | | | Problem/Corrective Action |
| | | Y | N | Y | N | NIP | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***Element 2: Establish Construction Access*** | | | | | | | |
| BMP: | | | | | | | |
| Location | Inspected | | Functioning | | | | Problem/Corrective Action |
| | | Y | N | Y | N | NIP | |
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| | | | | | | | |
| | | | | | | | |
| BMP: | | | | | | | |
| Location | Inspected | | Functioning | | | | Problem/Corrective Action |
| | | Y | N | Y | N | NIP | |

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***Element 3: Control Flow Rates***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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***Element 4: Install Sediment Controls***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | Functioning | Problem/Corrective Action |
|---|---|---|---|

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***Element 5: Stabilize Soils***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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***Element 6: Protect Slopes***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | Functioning | Problem/Corrective Action |
|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Y | N | | Y | N | NIP | |
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***Element 7: Protect Drain Inlets***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
| | | | | | | |
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| | | | | | | |

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
| | | | | | | |
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***Element 8: Stabilize Channels and Outlets***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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| | | | | | | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
| | | | | | | |
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***Element 9: Control Pollutants***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
| | | | | | | |
| | | | | | | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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***Element 10: Control Dewatering***

BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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| | | | | | | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
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BMP:

| Location | Inspected | | Functioning | | | Problem/Corrective Action |
|---|---|---|---|---|---|---|
| | Y | N | Y | N | NIP | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Stormwater Discharges From the Site | | | |
|---|---|---|---|
| | Observed? | | Problem/Corrective Action |
| | Y | N | |
| Location | | | |
| Turbidity | | | |
| Discoloration | | | |
| Sheen | | | |
| Location | | | |
| Turbidity | | | |
| Discoloration | | | |
| Sheen | | | |

| Water Quality Monitoring |
|---|
| Was any water quality monitoring conducted? ☐ Yes ☐ No<br>If water quality monitoring was conducted, record results here: |
| If water quality monitoring indicated turbidity 250 NTU or greater; or transparency 6 cm or less, was Ecology notified by phone within 24 hrs?<br>☐ Yes ☐ No |
| If Ecology was notified, indicate the date, time, contact name and phone number below:<br>Date:<br>Time:<br>Contact Name:<br>Phone #: |
| **General Comments and Notes**<br>Include BMP repairs, maintenance, or installations made as a result of the inspection. |
| Were Photos Taken? ☐ Yes ☐ No<br>If photos taken, describe photos below: |
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