

Storm Water Pollution Prevention Plan
(SWPPP, SWP, SPPP, SP3)

Statement by Preparer

The development of the Storm Water Pollution Prevention Plan (SWP) for:

CARRIER

Toll Brothers' Community Name

was guided by:

1. The requirements of Paragraph 11.c of the Consent Decree in the matter U.S. v. Toll Brothers, Inc., E.D.PA, case no. 2:12-CV-03489-MSG (Consent Decree);
2. Appendix B, the National SWP Criteria, of the Consent Decree; and
3. The applicable National Pollutant Discharge Elimination System construction permit (Applicable Permit).

Item Nos. 1 and 2, above were provided to me by a Toll Brothers employee.

This SWP:

- Complies with the terms and conditions of the Applicable Permit, and the Consent Decree;
- Is site specific;
- Identifies the BMPs that will be used for each anticipated major phase of construction;
- Incorporates the inspection frequency and routine maintenance deadlines under the Applicable Permit; and
- Includes clear, concise descriptions of the site-specific BMPs to implement the requirements of the Applicable Permit and to guide those responsible for overseeing implementation of the SWP at each stage of construction.

BRETT PUDISTS

SWP Preparer's Printed Name



SWP Preparer's Signature

05/10/2019

Date

THE BLUELINE GROUP

SWP Preparation Company Name

Construction Stormwater General Permit

Stormwater Pollution Prevention Plan (SWPPP)

for
Carrier Sammamish Plat
Permit No: SDP2018-06254

The owner is responsible for all errors or omissions. The City of Sammamish assumes no liability for errors or omissions.
REVIEWED FOR CODE COMPLIANCE
per 13.20 SMC, 14.01 SMC, and 16.15 SMC,
subject to field inspection and correction.

hstrasbourger08/09/2019
City of Sammamish Public Works Department

Prepared for:
The Washington State Department of Ecology
Northwest Regional Office

SDP2018-06254

Permittee / Owner	Developer	Operator / Contractor
Toll Brothers, Inc.	Toll Brothers, Inc.	TBD

742 214th Ave SE, Sammamish, WA 98074

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
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SWPPP Prepared By

Name	Organization	Contact Phone Number
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SWPPP Preparation Date

05-10-2019

Project Construction Dates

Activity / Phase	Start Date	End Date
Clearing / Start	May 2019	October 2021

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- H.** Engineering Calculations

List of Acronyms and Abbreviations

Acronym / Abbreviation	Explanation
303(d)	Section of the Clean Water Act pertaining to Impaired Waterbodies
BFO	Bellingham Field Office of the Department of Ecology
BMP(s)	Best Management Practice(s)
CESCL	Certified Erosion and Sediment Control Lead
CO₂	Carbon Dioxide
CRO	Central Regional Office of the Department of Ecology
CSWGP	Construction Stormwater General Permit
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERO	Eastern Regional Office of the Department of Ecology
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
GULD	General Use Level Designation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWRO	Northwest Regional Office of the Department of Ecology
pH	Power of Hydrogen
RCW	Revised Code of Washington
SPCC	Spill Prevention, Control, and Countermeasure
su	Standard Units
SWMMEW	Stormwater Management Manual for Eastern Washington
SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
SWRO	Southwest Regional Office of the Department of Ecology
TMDL	Total Maximum Daily Load
VFO	Vancouver Field Office of the Department of Ecology
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation
WWHM	Western Washington Hydrology Model

1 Project Information

Project/Site Name: Carrier Plat
 Street/Location: 742 214th Ave SE
 City: Sammamish State: WA Zip code: 98074
 Receiving waterbody: Lake Sammamish

1.1 Existing Conditions

Total acreage (including support activities such as off-site equipment staging yards, material storage areas, borrow areas).

Total acreage: 15.03 ac
 Disturbed acreage: 6.94 ac
 Existing structures: 1
 Landscape topography: The site contains slopes between 5 and 10%.
 Drainage patterns: Flat/mod pasture and forested area, mature trees, impervious surface and upstream forested and residential areas drain to wetlands along the central portion of site.
 Existing Vegetation: Flat/mod pasture along the eastern portion of the site and forested area with mature trees along the central and western portions of the site.
 Critical Areas (wetlands, streams, high erosion risk, steep or difficult to stabilize slopes): Two on-site wetlands and stream.

List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody: Bioassessment.

Table 1 includes a list of suspected and/or known contaminants associated with the construction activity.

Table 1 – Summary of Site Pollutant Constituents

Constituent (Pollutant)	Location	Depth	Concentration
N/A	N/A	N/A	N/A

1.2 Proposed Construction Activities

Description of site development (example: subdivision):
 Subdivision - Single-family residential development.

Description of construction activities (example: site preparation, demolition, excavation):
 The project proposes to remove a single-family residence with associated residential structures and impervious surfaces in order to create 35 residential lots. Proposed improvements also

include the installation of new public roadway and a storm drainage facilities to serve the development.

Construction activities will include site preparation, TESC installation, demolition of existing structures, excavation for utilities and foundations, grading, utility installation, asphalt paving, concrete pours, and landscaping.

Land cover on the site consists of landscape/lawn, tree cover, and impervious surfaces associated with an existing residence. Runoff from the site generally sheet flows southwesterly. The site downstream flow path is conveyed via Ebright Creek where it eventually outlets into Lake Sammamish.

Description of final stabilization (example: extent of revegetation, paving, landscaping):
In final conditions the developed site will be fully stabilized with paving of roadways, driveways to each unit, with associated cement concrete sidewalks and seeding and sodding of all exposed and bare dirt disturbed during construction. Storm drainage infrastructure will collect and treat surface runoff from pervious and impervious surfaces. Runoff from the development area will be treated by onsite stormwater facilities and discharge to the natural locations. The existing hydrology to the wetlands will be maintained via dispersion BMPs and sheet flow.

Contaminated Site Information:

Proposed activities regarding contaminated soils or groundwater (example: on-site treatment system, authorized sanitary sewer discharge): None.

2 Construction Stormwater Best Management Practices (BMPs)

Refer to the project's proposed TESC plans included in the Appendix A. Alternate City approved BMPs shall be utilized in the event the BMP(s) listed below are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix C). To avoid potential erosion and sediment control issues that may cause violation(s) of the NPDES Construction Stormwater permit, the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of alternative BMPs after the first sign that existing BMPs are ineffective or failing.

The SWPPP is a living document reflecting current conditions and changes throughout the life of the project. These changes may be informal (i.e., hand-written notes and deletions). Update the SWPPP when the CESCL has noted a deficiency in BMPs or deviation from original design.

2.1 The 13 Elements

2.1.1 Element 1: Preserve Vegetation / 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 and said areas marked with stakes and construction fencing. The BMPs relevant to marking the clearing limits that will be applied for this project include:

Applicable BMPs:

- BMP C101: Preserving Natural Vegetation
- BMP C102: Buffer Zones
- BMP C103: High Visibility Fence

Installation Schedules: Start of project and replaced as needed and at start of wet season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.2 Element 2: Establish Construction Access

Construction access or activities occurring on unpaved areas shall be minimized, yet where necessary, access points shall be stabilized to minimize the tracking of sediment onto public roads. Construction vehicle access and exit shall be limited to one route, if possible. Wheel washing, street sweeping, and street cleaning may be necessary if the stabilized construction access is not effective. All wash wastewater shall be controlled on site and cannot be discharged into waters of the State. If sediment is tracked off site, roads shall be cleaned thoroughly at the end of each day, or more frequently during wet weather. Sediment shall be removed from roads by shoveling or pickup sweeping and shall be transported to a controlled sediment disposal area.

The specific BMPs related to establishing construction access that will be used on this project are listed below:

Applicable BMPs:

- BMP C105: Stabilized Construction Entrance/Exit
- BMP C107: Construction Road/Parking Area Stabilization

Installation Schedules: Start of project and replaced as needed and at start of dry season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.3 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. 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 (e.g. discharge to combined sewer systems).

Will you construct stormwater retention and/or detention facilities?

Yes No

Will you use permanent infiltration ponds or other low impact development (example: rain gardens, bio-retention, porous pavement) to control flow during construction?

Yes No

A temporary sediment trap will be installed per Section 2.1.4 (below) in the southwest portion of the site and the southeast portion of the site. The trap will be fed via temporary interceptor swales. A permanent stormwater vault will then be constructed. Runoff will then be routed to the vault. From the vault, runoff will discharge to the existing wetland along the western portion of the site.

During construction, runoff will be conveyed via interceptor swales to the sediment trap. Silt fence will act as a barrier between the runoff generated onsite and properties and waterways downstream of the project site. The specific BMPs for flow control that shall be used on this project include:

Applicable BMPs:

- BMP C200: Interceptor Dikes and Swales
- BMP C207: Check Dams
- BMP C233: Silt Fence
- BMP C240: Sediment Trap

Installation Schedules: Start of project and replaced as needed and at start of dry season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.4 Element 4: Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through appropriate sediment removal BMPs before leaving the construction site. BMPs will be constructed as one of the first steps of grading and will be functional before other land disturbing activities take place.

In addition, sediment will be removed from paved areas in and adjacent to 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 washoff of sediments from adjacent streets in runoff.

When permanent stormwater BMPs will be used to control sediment discharge during construction, the structure will be protected from excessive sedimentation with adequate erosion and sediment control BMPs. Any accumulated sediment shall be removed after construction is complete and the permanent stormwater BMP will be restabilized with vegetation per applicable design requirements once the remainder of the site has been stabilized.

Applicable BMPs:

- BMP C200: Interceptor Dikes and Swales
- BMP C207: Check Dams
- BMP C220: Storm Drain Inlet Protection
- BMP C233: Silt Fence
- BMP C240: Sediment Trap

Two sediment traps will be utilized to reduce sediment and flows leaving the site. Sediment traps will be located so that there is no more than 3 acres tributary to each trap. The surface area for the sediment trap is determined by calculating the runoff rate of the 10-year return period developed storm event using KCRTS at a 15 minute timestep.

Sediment traps may be revised during construction as needed, provided that no more than 3 acres is tributary to a single trap, and the trap provides 1,345 sf surface area for every acre tributary, as determined below.

The surface area of the sediment trap is determined by calculating the runoff rate of the 10-year, return period developed storm event. A sediment trap will be provided for both the east and the west development areas which include tributary areas of 1.89 ac and 2.37 ac, respectively. The following equation shows the calculated required surface area.

$$\text{Surface Area (SF)} = 2,080 * Q_x$$

where: Q_x = design inflow for the developed site (cfs)

The 10-year return period developed flow rate for the west basin is 1.22 cfs. The minimum required surface area for the temporary sediment trap on site is $2,080 * 1.22 = 2,542$ square feet, using the equations specified on page 4-106 of the 2005 DOE Manual, Volume II.

The 10-year return period developed flow rate for the east basin is 1.53 cfs. The minimum required surface area for the temporary sediment trap on site is $2,080 * 1.53 = 3,188$ square feet.

A minimum of 1,345 sf per tributary ac is required for each trap.

West sediment trap: $2,542 \text{ sf} / 1.89 \text{ ac} = 1,345 \text{ sf/ac}$

East sediment trap: $3,188 \text{ sf} / 2.37 \text{ ac} = 1,345 \text{ sf/ac}$

For specific sediment trap details, see Construction Plans in Appendix A of this report.

Installation Schedules: Start of project and replaced as needed and at start of dry season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.5 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.

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.

Earthwork quantities: 39,058 CF Cut / 9,642 CF Fill

West of the Cascade Mountains Crest

Season	Dates	Number of Days Soils Can be Left Exposed
During the Dry Season	May 1 – September 30	7 days
During the Wet Season	October 1 – April 30	2 days

Soils must be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.

Anticipated project dates: Start date: May 2019 End date: October 2021

Will you construct during the wet season?

Yes No

Applicable BMPs:

Element 5: Stabilize Soils

- BMP C120: Temporary and Permanent Seeding
- BMP C121: Mulching
- BMP C123: Plastic Covering
- BMP C130: Surface Roughening
- BMP C140: Dust Control
- BMP C235: Straw Wattles
- Early application of gravel base on areas to be paved.

Installation Schedules: Start of project and replaced as needed and at start of dry season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.6 Element 6: Protect Slopes

Will steep slopes be present at the site during construction?

Yes No

Cut and fill slopes within the site will be designed, constructed, and protected in a manner than minimizes erosion. The BMPs to be used to protect slopes for this project are listed below.

Applicable BMPs:

- BMP C120: Temporary and Permanent Seeding
- BMP C121: Mulching
- BMP C123: Plastic Covering
- BMP C130: Surface Roughening

Installation Schedules: Start of project and replaced as needed and at start of dry season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.7 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. However, the first priority is to keep all access roads clean of sediment and keep street wash water separate from entering storm drains until treatment can be provided. Inlet protection 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:

Applicable BMPs:

- BMP C220: Storm Drain Inlet Protection

Installation Schedules: Start of project and replaced as needed and at start of wet season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.8 Element 8: Stabilize Channels and Outlets

Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches, will be installed at the outlets of all conveyance systems.

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:

Applicable BMPs:

- Check Dams (BMP C207)
- Outlet Protection (BMP C209)

Installation Schedules: Start of project and replaced as needed and at start of wet season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.9 Element 9: Control Pollutants

The following pollutants are anticipated to be present on-site:

Table 2 – Pollutants

Pollutant (List pollutants and source, if applicable)
Concrete
Diesel Fuel
Asphalt
Residential building, insulation, and roofing materials

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. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris. If required, BMPs to be implemented to control specific sources of pollutants are discussed below.

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.

Excavation and tunneling spoils dewatering waste:

- Dewatering BMPs and BMPs specific to the excavation and tunneling (including handling of contaminated soils) are discussed under Element 10.

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 the waters of the State by implementing Concrete Handling measures (BMP C151). Concrete wash out areas shall not be allowed on bare dirt or allowed to drain to bare dirt or the storm system.

Sanitary wastewater:

- Portable sanitation facilities will be firmly secured, regularly maintained, and emptied when necessary.
- Wheel wash or tire bath wastewater shall be discharged to a separate onsite treatment system or to the sanitary sewer as part of Wheel Wash implementation (BMP C106).

Solid Waste:

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

Other:

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

The facility does not require a Spill Prevention, Control, and Countermeasure (SPCC) Plan under the Federal regulations of the Clean Water Act (CWA).

Installation Schedules: Start of project and replaced as needed and at start of wet season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

Will maintenance, fueling, and/or repair of heavy equipment and vehicles occur on-site?

Yes No

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

- All vehicles, equipment, and petroleum product storage/dispensing area 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.
- In order to perform emergency repairs on site, temporary plastic will be placed beneath and, if raining, over the vehicle.
- Contaminated surfaces shall be cleaned immediately following any discharge or spill incident.

Applicable BMPs:

- Material Delivery, Storage and Containment (BMP C153)

Fuel onsite will be comprised of fuel tanks in operating equipment ranging between 50-100 gallons of off road diesel fuel. The BMPs listed below as well as procedures described above should be followed with refueling equipment. Spill kits should be kept on hand and accessible during refueling activities.

Installation Schedules: Start of project and replaced as needed and at start of wet season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

Will wheel wash or tire bath system BMPs be used during construction?

Yes No

If discharging to the sanitary sewer, include the approval letter from your local sewer district under Correspondence in Appendix C.

Applicable BMPs: n/a

Installation Schedules: n/a

Inspection and Maintenance plan: n/a

Responsible Staff: n/a

Will pH-modifying sources be present on-site?

Yes No

Table 3 – pH-Modifying Sources

<input type="checkbox"/>	None
<input type="checkbox"/>	Bulk cement
<input type="checkbox"/>	Cement kiln dust
<input type="checkbox"/>	Fly ash
<input checked="" type="checkbox"/>	Other cementitious materials
<input type="checkbox"/>	New concrete washing or curing waters

<input type="checkbox"/>	Waste streams generated from concrete grinding and sawing
<input type="checkbox"/>	Exposed aggregate processes
<input checked="" type="checkbox"/>	Dewatering concrete vaults
<input checked="" type="checkbox"/>	Concrete pumping and mixer washout waters
<input type="checkbox"/>	Recycled concrete
<input type="checkbox"/>	Other (i.e., calcium lignosulfate) [please describe:]

Applicable BMPs:

- Monitoring should be performed to ensure concrete placement does not result in excessively high pH in stormwater runoff. pH testing should be performed on a weekly basis, from the start of concrete work until pH drops below 8.5 su.

Concrete and grout:

- Process water and slurry resulting from concrete work will be prevented from entering the waters of the State by implementing Concrete Handling measures (BMP C151). Concrete wash out areas shall not be allowed on bare dirt or allowed to drain to bare dirt or the storm system.

Installation Schedules: Start of project and replaced as needed and at start of wet season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

Adjust pH of stormwater if outside the range of 6.5 to 8.5 su.

Obtain written approval from Ecology before using chemical treatment with the exception of CO₂ or dry ice to modify pH.

Concrete trucks must not be washed out onto the ground, or into storm drains, open ditches, streets, or streams. Excess concrete must not be dumped on-site, except in designated concrete washout areas with appropriate BMPs installed.

2.1.10 Element 10: Control Dewatering

All 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. Channels will be stabilized, per Element #8.

Clean, non-turbid dewatering water will be routed through the sediment trap, and will be discharged to systems tributary to the receiving waters of the State in a manner that does not cause erosion, flooding, or a violation of State water quality standards in the receiving water.

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 installation of the sanitary sewer and water line through the wetland located in the central portion of the site will be completed via boring. The work will be completed during the summer months when groundwater seepage is anticipated to be minimal. Bore pits will be excavated on the sending and receiving ends, and in the event that dewatering of the bore pits is required, the dewatering will be managed in accordance with the techniques described in this section and BMPs listed below.

Dewatering of soils known to be free of contamination will trigger BMPs to trap sediment and reduce turbidity. Other BMPs to be used for sediment trapping and turbidity reduction include the following:

Table 4 – Dewatering BMPs

<input type="checkbox"/>	Infiltration
<input checked="" type="checkbox"/>	Transport off-site in a vehicle (vacuum truck for legal disposal)
<input type="checkbox"/>	Ecology-approved on-site chemical treatment or other suitable treatment technologies
<input type="checkbox"/>	Sanitary or combined sewer discharge with local sewer district approval (last resort)
<input checked="" type="checkbox"/>	Use of sedimentation bag with discharge to ditch or swale (small volumes of localized dewatering)

Installation Schedules: Start of project and replaced as needed and at start of dry season.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

2.1.11 Element 11: Maintain BMPs

All temporary and permanent Erosion and Sediment Control (ESC) BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

Maintenance and repair shall be conducted in accordance with each particular BMP specification (see *Volume II of the SWMMWW* or *Chapter 7 of the SWMMEW*).

Visual monitoring of all BMPs installed at the site will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive and is temporarily stabilized, the inspection frequency may be reduced to once every calendar month.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be stabilized on-site or removed. Disturbed soil resulting from removal of either BMPs or vegetation shall be permanently stabilized.

Additionally, protection must be provided for all BMPs installed for the permanent control of stormwater from sediment and compaction. BMPs that are to remain in place following completion of construction shall be examined and restored to full operating condition. If sediment enters these BMPs during construction, the sediment shall be removed, and the facility shall be returned to conditions specified in the construction documents.

2.1.12 Element 12: Manage the Project

The project will be managed based on the following principles:

- Projects will be phased to the maximum extent practicable and seasonal work limitations will be taken into account.
- Inspection and monitoring:
 - Inspection, maintenance and repair of all BMPs will occur as needed to ensure performance of their intended function.
 - Site inspections and monitoring will be conducted in accordance with Special Condition S4 of the CSWGP. Sampling locations are indicated on the Site Map. Sampling station(s) are located in accordance with applicable requirements of the CSWGP.
- Maintain an updated SWPPP.
 - The SWPPP will be updated, maintained, and implemented in accordance with Special Conditions S3, S4, and S9 of the CSWGP.

As site work progresses the SWPPP will be modified routinely to reflect changing site conditions. The SWPPP will be reviewed monthly to ensure the content is current.

Table 5 – Management

<input checked="" type="checkbox"/>	Design the project to fit the existing topography, soils, and drainage patterns
<input checked="" type="checkbox"/>	Emphasize erosion control rather than sediment control
<input checked="" type="checkbox"/>	Minimize the extent and duration of the area exposed
<input checked="" type="checkbox"/>	Keep runoff velocities low
<input checked="" type="checkbox"/>	Retain sediment on-site
<input checked="" type="checkbox"/>	Thoroughly monitor site and maintain all ESC measures
<input checked="" type="checkbox"/>	Schedule major earthwork during the dry season
<input type="checkbox"/>	Other (please describe)

2.1.13 Element 13: Protect Low Impact Development (LID) BMPs

Infiltration was found infeasible. Basic dispersion will occur to yard drains areas and will sheet flow into non-disturbed vegetated areas. Compaction of the future installation areas should be avoided, as feasible. The BMPs relevant to protecting LID facilities that will be applied for this project include:

Applicable BMPs:

- BMP C101: Preserving Natural Vegetation
- BMP C102: Buffer Zones
- BMP C103: High Visibility Fence

Installation Schedules: Start of project and replaced as needed.

Inspection and Maintenance plan: Responsible staff to make weekly site walks and inspections to identify deficiencies in onsite BMPs and anticipate potential problems and remedies.

Responsible Staff: Identified Certified Erosion and Sediment Control Lead in Section 3 of this SWPPP.

3 Pollution Prevention Team

Table 7 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	Aaron Kopet	(425) 825-1955
Resident Engineer	Brett Pudists, PE	(425) 250-7247
Emergency Ecology Contact	Tracie Walters	(425)-649-4484
Emergency Permittee/ Owner Contact	Jeff Peterson	(425) 825-1955
Non-Emergency Owner Contact	Jeff Peterson	(425) 825-1955
Monitoring Personnel	Aaron Kopet	(425) 825-1955
Ecology Regional Office	Northwest Region	(425) 649-7000
Pollution Prevention Team	Regular Work Hours After Work and Weekend Hours	(425-295-0500) (425-295-0700)

4 Monitoring and Sampling Requirements

Monitoring includes visual inspection, sampling for water quality parameters of concern, and documentation of the inspection and sampling 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
- Stormwater sampling data

See form in Appendix D.

The site log book must be maintained on-site within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

Numeric effluent limits may be required for certain discharges to 303(d) listed waterbodies. See CSWGP Special Condition S8 and Section 5 of this template.

4.1 Site Inspection

Site inspections will be conducted at least once every calendar week and within 24 hours following any discharge from the site. For sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

The discharge point(s) are indicated on the Site Map (see Appendix A) and in accordance with the applicable requirements of the CSWGP.

4.2 Stormwater Quality Sampling

4.2.1 Turbidity Sampling

Requirements include calibrated turbidity meter or transparency tube to sample site discharges for compliance with the CSWGP. Sampling will be conducted at all discharge points at least once per calendar week.

Method for sampling turbidity:

Table 8 – Turbidity Sampling Method

<input checked="" type="checkbox"/>	Turbidity Meter/Turbidimeter (required for disturbances 5 acres or greater in size)
<input type="checkbox"/>	Transparency Tube (option for disturbances less than 1 acre and up to 5 acres in size)

The benchmark for turbidity value is 25 nephelometric turbidity units (NTU) and a transparency less than 33 centimeters.

If the discharge's turbidity is 26 to 249 NTU or the transparency is less than 33 cm but equal to or greater than 6 cm, the following steps will be conducted:

1. Review the SWPPP for compliance with Special Condition S9. Make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.
2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary

treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

3. Document BMP implementation and maintenance in the site log book.

If the turbidity exceeds 250 NTU or the transparency is 6 cm or less at any time, the following steps will be conducted:

1. Telephone the applicable Ecology Region's Environmental Report Tracking System (ERTS) number within 24 hours.
 - **Central Region** (Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima): (509) 575-2490
 - **Eastern Region** (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
 - **Northwest Region** (King, Kitsap, Island, San Juan, Skagit, Snohomish, Whatcom): (425) 649-7000
 - **Southwest Region** (Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum,): (360) 407-6300
2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period
3. Document BMP implementation and maintenance in the site log book.
4. Continue to sample discharges daily until one of the following is true:
 - Turbidity is 25 NTU (or lower).
 - Transparency is 33 cm (or greater).
 - Compliance with the water quality limit for turbidity is achieved.
 - 1 - 5 NTU over background turbidity, if background is less than 50 NTU
 - 1% - 10% over background turbidity, if background is 50 NTU or greater
 - The discharge stops or is eliminated.

4.2.2 pH Sampling

pH monitoring is required for “Significant concrete work” (i.e., greater than 1000 cubic yards poured or recycled concrete over the life of the project). The use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD] or fly ash) also requires pH monitoring.

For significant concrete work, pH sampling will start the first day concrete is poured and continue until it is cured, typically three (3) weeks after the last pour.

For engineered soils, pH sampling begins when engineered soils are first exposed to precipitation and continues until the area is fully stabilized.

If the measured pH is 8.5 or greater, the following measures will be taken:

1. Prevent high pH water from entering storm sewer systems or surface water.
2. Adjust or neutralize the high pH water to the range of 6.5 to 8.5 su using appropriate technology such as carbon dioxide (CO₂) sparging (liquid or dry ice).
3. Written approval will be obtained from Ecology prior to the use of chemical treatment other than CO₂ sparging or dry ice.

Method for sampling pH:

Table 9 – pH Sampling Method

<input type="checkbox"/>	pH meter
<input type="checkbox"/>	pH test kit
<input type="checkbox"/>	Wide range pH indicator paper
<input checked="" type="checkbox"/>	To be determined

5 Discharges to 303(d) or Total Maximum Daily Load (TMDL) Waterbodies

5.1 303(d) Listed Waterbodies

Is the receiving water 303(d) (Category 5) listed for turbidity, fine sediment, phosphorus, or pH?

Yes No

List the impairment(s):

None.

5.2 TMDL Waterbodies

Waste Load Allocation for CWSGP discharges:

N/A

List and describe BMPs:

N/A

Discharges to TMDL receiving waterbodies will meet in-stream water quality criteria at the point of discharge.
--

The Construction Stormwater General Permit Proposed New Discharge to an Impaired Water Body form is included in Appendix F.

6 Reporting and Record Keeping

6.1 Record Keeping

6.1.1 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
- Sample logs

6.1.2 Records Retention

Records will be retained during the life of the project and for a minimum of three (3) years following the termination of permit coverage in accordance with Special Condition S5.C of the CSWGP.

Permit documentation to be retained on-site:

- CSWGP
- Permit Coverage Letter
- SWPPP
- Site Log Book

Permit documentation will be provided within 14 days of receipt of a written request from Ecology. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with Special Condition S5.G.2.b of the CSWGP.

6.1.3 Updating the SWPPP

The SWPPP will be modified if:

- Found ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site.
- There is a change in 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 will be modified within seven (7) days if inspection(s) or investigation(s) determine additional or modified BMPs are necessary for compliance. An updated timeline for BMP implementation will be prepared.

6.2 Reporting

6.2.1 Discharge Monitoring Reports

Cumulative soil disturbance is one (1) acre or larger; therefore, Discharge Monitoring Reports (DMRs) will be submitted to Ecology monthly. If there was no discharge during a given monitoring period the DMR will be submitted as required, reporting “No Discharge”. The DMR due date is fifteen (15) days following the end of each calendar month.

DMRs will be reported online through Ecology’s WQWebDMR System.

To sign up for WQWebDMR go to:

<http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html>

6.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit is not met, and the resulting noncompliance may cause a threat to human health or the environment, the following actions will be taken:

1. Ecology will be immediately notified of the failure to comply by calling the applicable Regional office ERTS phone number (Regional office numbers listed below).
2. Immediate action will be taken to prevent the discharge/pollution or otherwise stop or correct the noncompliance. 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.

Specific information to be included in the noncompliance report is found in the Special Condition S5.F.3 of the CSWGP.

Anytime turbidity sampling indicates turbidity is 250 NTUs or greater, or water transparency is 6 cm or less, the Ecology Regional office will be notified by phone within 24 hours of analysis as required by Special Condition S5.A of the CSWGP.

- **Central Region** at (509) 575-2490 for Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, or Yakima County
- **Eastern Region** at (509) 329-3400 for Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, or Whitman County
- **Northwest Region** at (425) 649-7000 for Island, King, Kitsap, San Juan, Skagit, Snohomish, or Whatcom County
- **Southwest Region** at (360) 407-6300 for Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, or Wahkiakum

Include the following information:

1. Your name and / Phone number
2. Permit number
3. City / County of project
4. Sample results
5. Date / Time of call
6. Date / Time of sample
7. Project name

In accordance with Special Condition S4.D.5.b of the CSWGP, the Ecology Regional office will be notified if chemical treatment other than CO₂ sparging is planned for adjustment of high pH water.

A. Site Map

CARRIER SE 8TH SUBDIVISION

BASIS OF BEARING

MERIDIAN: WASHINGTON STATE PLAN COORDINATE SYSTEM - NORTH ZONE (NAD 83/91)

DATUM

ORIGINATING BENCHMARK:
KING COUNTY MONUMENT DESIGNATION 1940, AS PUBLISHED IN WGS SURVEY DATA WAREHOUSE.
VERTICAL DATUM: NAVD '88

LEGAL DESCRIPTION

TPN: 1240700035
THE WEST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 25 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON;

EXCEPT THE SOUTHERLY 30 FEET FOR COUNTY ROAD;
(ALSO KNOWN AS THE WESTERLY HALF OF TRACT 16 OF THE UNRECORDED PLAT OF BURKE & FARRAR'S KIRKLAND ADDITION, DIVISION NO. 18)

TOGETHER WITH THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 25 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON;

EXCEPT THE SOUTH 30 FEET AND THE WEST 30 FEET FOR ROADS;
(ALSO KNOWN AS TRACT 7 OF THE UNRECORDED PLAT OF BURKE & FARRAR'S ADDITION TO KIRKLAND DIVISION NO. 18)

SITUATE IN THE CITY OF SAMMAMISH, COUNTY OF KING, STATE OF WASHINGTON.

- ### REFERENCES
- RECORD OF SURVEY FOR THE CITY OF SAMMAMISH REC. IN VOL. 155 OF SURVEYS, PGS. 22 AND 22A, REC. NO. 2002091090001.
 - RECORD OF SURVEY FOR CHAFFEY HOMES, INC. REC. IN VOL. 167 OF SURVEYS, PG. 166, REC. NO. 2004020990002.

BENCHMARKS

ORIGINAL BM: TOP OF CONC MON WITH 3" BRASS DISC STAMPED "KING COUNTY SURVEY MONUMENT 1940" DOWN 0.75" IN CASE AT THE INTERSECTION OF SE 8TH ST. AND 212TH AVE. SE. SW CORNER SEC. 33, TWP. 25N., RGE. 6E., W.M. WGS SURVEY DATA WAREHOUSE POINT NO. 1429. ELEV.=393.25
TBM - A: WEST CAP BOLT OF FIRE HYDRANT 8.5' NORTH OF NORTH EDGE OF ASPHALT, SE 8TH ST. AND ABOUT 140' EAST OF THE INTERSECTION OF SE 8TH ST. AND 214TH AVE. SE. ELEV.=389.10

SCHEDULE B SPECIAL EXCEPTIONS

- SUBJECT TO THE NOTICE OF TAP OR CONNECTION CHARGES DUE OR SHALL BE DUE WITH DEVELOPMENT OR RE-DEVELOPMENT TO SAMMAMISH PLATEAU WATER AND SEWER DISTRICT AS RECORDED UNDER RECORDING NUMBERS: 9011150905, 9307301617, 9811051383, 9901150606, 20040414020665, 20041201000040, 20060126001770, 20110106000751, 20110106000800, 20110106000801, 20110106000802, 20130917002142, 0130917002143, 20130917002144, 20130917002145, 20141201000777, 20141201000778, 20141201000779 AND 20141201000780.
- SUBJECT TO SEWER CAPACITY CHARGES LEVIED BY KING COUNTY AND/OR THE CITY OF SAMMAMISH DUE IN CONNECTION WITH THE DEVELOPMENT OF SAID PREMISES.
- SUBJECT TO EXCEPTIONS AND RESERVATIONS IN DEED FROM WEYERHAEUSER TIMBER CO. UNDER REC. NO. 382528, RESERVING RIGHTS TO ALL ORES AND MINERALS.

NOTES

- THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF A SURVEY MADE ON THE DATE INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITION EXISTING AT THAT TIME.
- UNDERGROUND UTILITIES WERE LOCATED BASED ON THE SURFACE EVIDENCE OF UTILITIES (I.E. PAINT MARKS, SAW CUTS IN PAVEMENT, COVERS, LIDS ETC.) THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, ELEVATION AND SIZE OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
- NO PROPERTY CORNERS WERE SET IN CONJUNCTION WITH THIS SURVEY.

SITE AREAS

LOT AREA:	178,578 SF	(4.05 AC)
ACCESS/UTILITY: (TRACT A)	2,154 SF	(0.05 AC)
ACCESS/UTILITY: (TRACT B)	2,149 SF	(0.05 AC)
RECREATION SPACES: (TRACT C)	13,811 SF	(0.32 AC)
CRITICAL AREA: (TRACT D)	320,446 SF	(7.36 AC)
ACCESS/UTILITY: (TRACT E)	2,583 SF	(0.06 AC)
PUBLIC ACCESS: (TRACT F)	502 SF	(0.01 AC)
RECREATION SPACE: (TRACT G)	14,434 SF	(0.33 AC)
OPEN SPACE: (TRACT H)	30,943 SF	(0.71 AC)
ROW DEDICATION:	52,273 SF	(1.20 AC)
TOTAL SITE AREA:	615,872 SF	(14.14 AC)

DENSITY CALCULATIONS

GROSS AREA:	615,872 SF
EXISTING CRITICAL AREAS & BUFFERS:	305,102 SF
ROW DEDICATION:	52,273 SF
OTHER ROADS (TRACTS A & E):	4,737 SF

NET SITE AREA: 253,761 SF (5.83 AC)
MAX DENSITY: 6 DU/AC X 5.83 AC = 34.98 UNITS
PROPOSED UNITS: 35

*SEE SHEET EC-01

SHEET INDEX

1	CV-01	COVER SHEET
2	CA-01	CONDITIONS OF APPROVAL
3	GN-01	GENERAL NOTES, DETAILS & LEGEND
4	EC-01	EXISTING CONDITIONS & DEMO PLAN
5	BA-01	BUFFER AVERAGING PLAN
6	TP-01	TESC PLAN
7	TD-01	TESC DETAILS
8	TD-02	TESC DETAILS & NOTES
9	GP-01	GRADING & WALL PLAN
10	GD-02 TO GD-02	ROCKERY DETAILS (BY GEOTECH)
12	AL-01	ALIGNMENT & MAILBOX PLAN
13	CR-01	CURB RAMP DETAILS
14	CR-02	CUL-DE-SAC DETAILS
15	RD-01	ROAD SECTIONS
16	CU-01	COMPOSITE UTILITY PLAN
17-20	RS-01 TO RS-04	ROAD & STORM DRAINAGE PLAN
21-25	RP-01 TO RP-05	ROAD PROFILES
26-27	ESD-01 TO ESD-02	ENTERING SIGHT DISTANCE
28	SSD-01	STOPPING SIGHT DISTANCE
29	CH-01	CHANNELIZATION PLAN
30	VT-01	WEST VAULT PLAN
31	VT-02	WEST VAULT SECTIONS & DETAILS
32	VT-03	EAST VAULT PLAN
33	VT-04	EAST VAULT SECTIONS & DETAILS

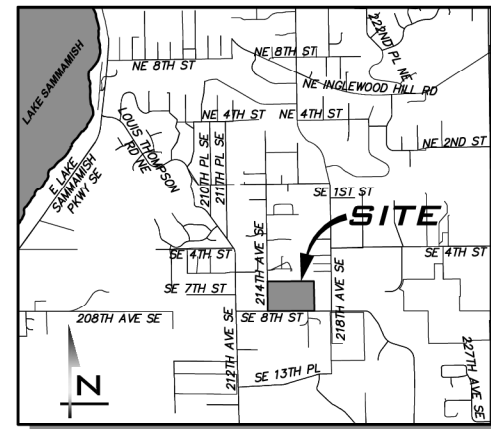
34	SD-01	STORM FILTER / STORM DRAIN DETAILS
35	SD-02	STORM DRAIN / LID NOTES & DETAILS
36-39	DT-01 TO DT-04	DETAILS
40-43	TR-01 TO TR-05	TREE RETENTION PLANS
44	TR-05	TREE RETENTION CALC
45	LS-01	TREE RESTORATION PLAN
46	LS-02	VAULT TRACT PLANING PLANS
47	LS-03	NOTES & PLANTING DETAILS
FINAL MITIGATION PLAN		
1-3	W1-W3	FINAL MITIGATION PLAN
RED-ROCK WALL DETAILS		
1		ROADWAY B REDI-ROCK WALL PROFILE
2		TYPICAL RED-ROCK SECTION DETAIL
3		REDI-ROCK WALL DETAILS
4-5		REDI-ROCK BLOCK LAYOUT DETAILS
STREET LIGHTING PLANS		
IL1-IL2		STREET LIGHTING PLANS

VESTING INFORMATION

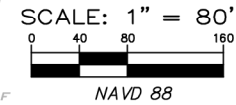
PER HE DECISION, PROJECT VESTING DATE IS 2/2/2016.
• 2009 KCSWDM (LEVEL 3 DETENTION, SENSITIVE LAKE WQ.)
• APRIL 2000 INTERIM PUBLIC WORKS STANDARDS

U. S. POSTAL SERVICE

APPROVED FOR MAILBOX LOCATION(S)
BY: KENNETH STEVENS
US POSTAL SERVICE (ORIGINAL SIGNATURE IN FILE)
DATE: 04/17/2019



VICINITY MAP
NOT TO SCALE



PROJECT TEAM

APPLICANT

TOLL BROTHERS, INC.
8815 122ND AVE NE, SUITE 200
KIRKLAND, WA 98033
CONTACT: JEFF PETERSON
(425) 825-1955

CIVIL ENGINEER

THE BLUELINE GROUP
25 CENTRAL WAY, SUITE 400
KIRKLAND, WA 98033
CONTACT: BRETT K PUDISTS, PE
(425) 250-7247

GEOTECH ENGR

ROBINSON NOBLE
2105 SOUTH C STREET
TACOMA, WASHINGTON
CONTACT: RICK B POWELL, PE
(253) 475-7711

UTILITY PURVEYORS

WATER SUPPLY:	SAMMAMISH PLATEAU WATER & SEWER DISTRICT	425-392-4931
SANITARY SEWER:	SAMMAMISH PLATEAU WATER & SEWER DISTRICT	425-392-4931
FIRE DISTRICT:	EASTSIDE FIRE AND RESCUE	425-313-3200
SCHOOL DISTRICT:	LAKE WASHINGTON #414	425-936-1200
POWER:	PUGET SOUND ENERGY	253-437-6771
GAS:	PUGET SOUND ENERGY	253-437-6771
CABLE:	COMCAST COMMUNICATIONS	425-263-5353
TELEPHONE:	FRONTIER COMMUNICATIONS	425-263-4023
PUBLIC WORKS INSPECTION:		425-295-0625

SITE DATA

SITE ADDRESS:	742 214TH AVE SE SAMMAMISH, WA
TAX ACCOUNT NUMBERS:	1240700035 & 1240700086
EXISTING ZONING:	R6
PROPOSED ZONING:	R6
GROSS SITE AREA:	615,872 SF (14.14 AC)
AVERAGE LOT SIZE:	5,030 SF
MINIMUM LOT SIZE:	4,297 SF (LOT 15)
REC SPACE REQUIRED:	35 X 390 = 13,650 SF REQUIRED
REC SPACE PROVIDED:	27,799 SF (TRACT C + TRACT G)
SETBACKS:	
STREET:	10'
GARAGE:	20'
INTERIOR:	5'
FROM CAT:	15'

UTILITY BORE

SEE SEWER AND WATER PLANS, UNDER SEPARATE COVER, FOR DETAILS ON UTILITY BORING BENEATH TRACT D.

EROSION CONTROL SUPERVISOR

CONTACT: AARON KOPEL PHONE: (425) 825-1955 EXT 124

CITY OF SAMMAMISH

APPROVAL BLOCK

CITY FILE NO: SDP 2018-06254

UNDERGROUND UTILITY NOTE

UNDERGROUND UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATION. THERE IS NO GUARANTEE THAT ALL UTILITY LINES ARE SHOWN, OR THAT THE LOCATION, SIZE AND MATERIAL IS ACCURATE. THE CONTRACTOR SHALL UNCOVER ALL INDICATED PIPING WHERE CROSSING, INTERFERENCES OR CONNECTIONS OCCUR PRIOR TO TRENCHING OR EXCAVATION FOR ANY PIPE OR STRUCTURES, TO DETERMINE ACTUAL LOCATIONS, SIZE AND MATERIAL. THE CONTRACTOR SHALL MAKE THE APPROPRIATE PROVISION FOR PROTECTION OF SAID FACILITIES. THE CONTRACTOR SHALL NOTIFY ONE CALL AT 8-1-1 (WASHINGTON811.COM) AND ARRANGE FOR FIELD LOCATION OF EXISTING FACILITIES BEFORE CONSTRUCTION.



BLUELINE

25 CENTRAL WAY, SUITE 400,
KIRKLAND, WA 98033
P: 425.216.4051 F: 425.216.4052
WWW.THEBLUELINEGROUP.COM

SCALE:

AS NOTED

PROJECT MANAGER:

BRETT K PUDISTS, PE

PROJECT ENGINEER:

BRETT K PUDISTS, PE

DESIGNER:

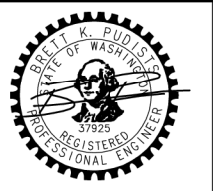
AARON C LANCE

ISSUE DATE:

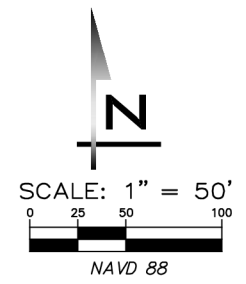
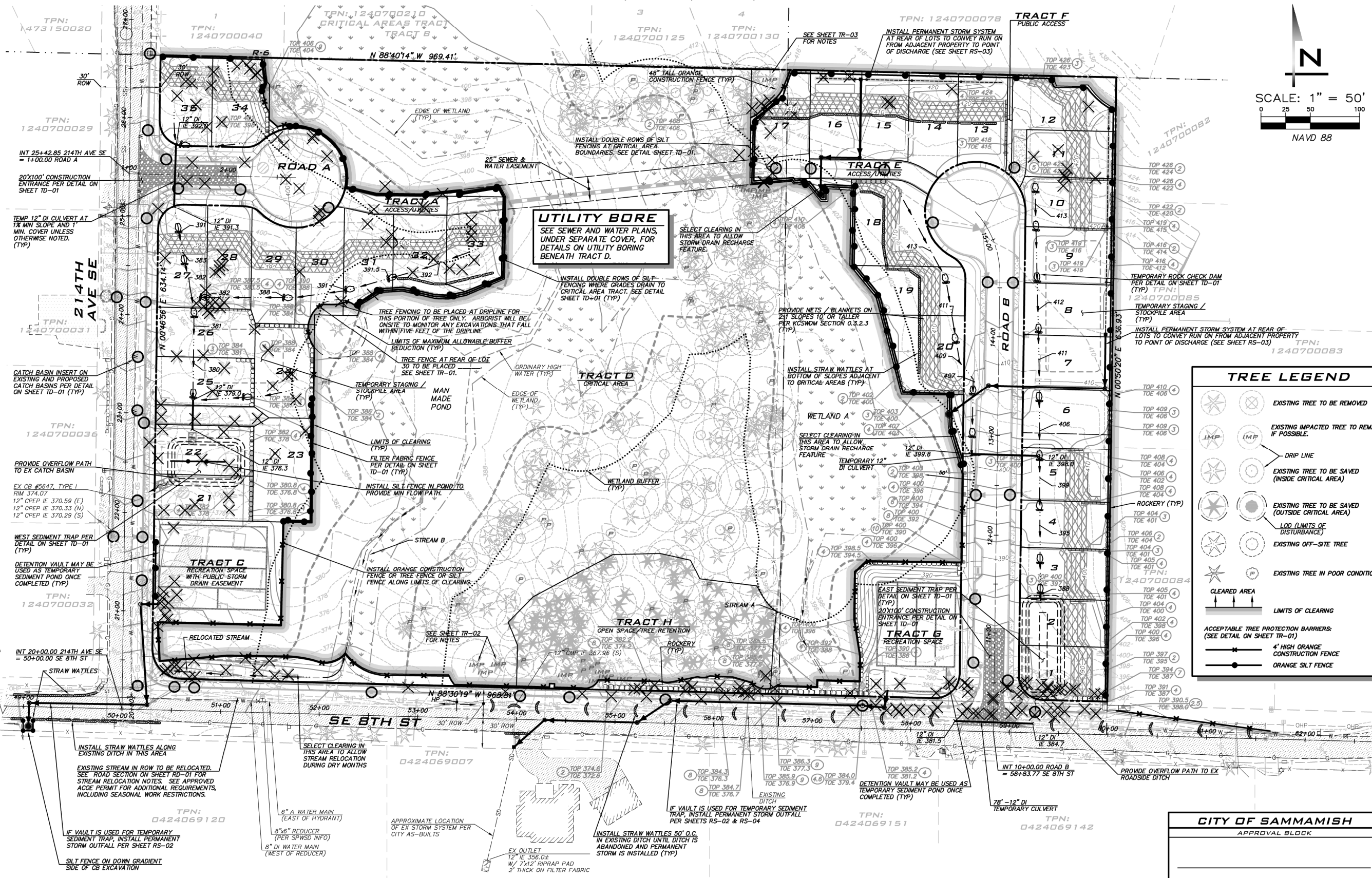
5/10/2019

NO	DATE	BY	REVISIONS
1	5/10/19	RAB	REVISED PER CITY COMMENTS

COVER SHEET
CARRIER SE 8TH SUBDIVISION
ROAD & STORM PLANS
CITY OF SAMMAMISH
WASHINGTON



5/10/19
JOB NUMBER:
15-111
SHEET NAME:
CV-01
SHT 1 OF 48

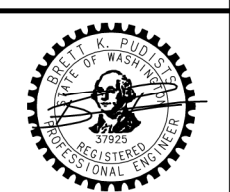


25 CENTRAL WAY, SUITE 400,
KIRKLAND, WA 98033
P: 425.216.4051 F: 425.216.4052
WWW.THEBLUELINEGROUP.COM

SCALE:
AS NOTED
PROJECT MANAGER:
BRETT K PUDISTS, PE
PROJECT ENGINEER:
BRETT K PUDISTS, PE
DESIGNER:
AARON C LANCE
ISSUE DATE:
5/10/2019

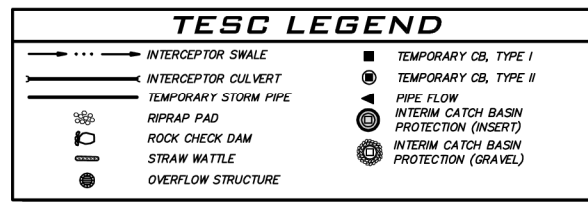
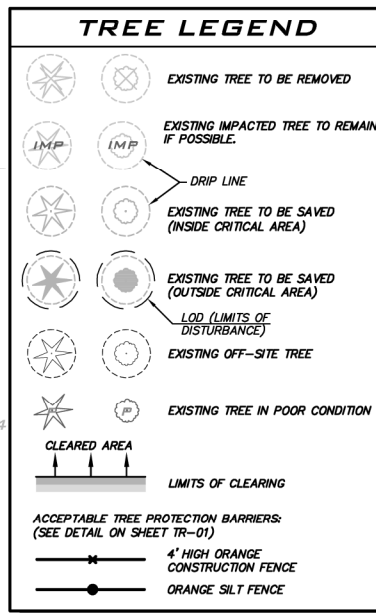
NO	DATE	BY	REVISIONS
1	5/10/19	RAB	REVISED PER CITY COMMENTS

TESC PLAN
 CARRIER SE 8TH SUBDIVISION
 ROAD & STORM PLANS
 CITY OF SAMMAMISH
 WASHINGTON



5/10/19
JOB NUMBER:
15-111
SHEET NAME:
TP-01
SHT 6 OF 48

UTILITY BORE
SEE SEWER AND WATER PLANS,
UNDER SEPARATE COVER, FOR
DETAILS ON UTILITY BORING
BENEATH TRACT D.



DEMO NOTE
SEE SHEET EC-01 FOR ITEMS TO BE REMOVED.

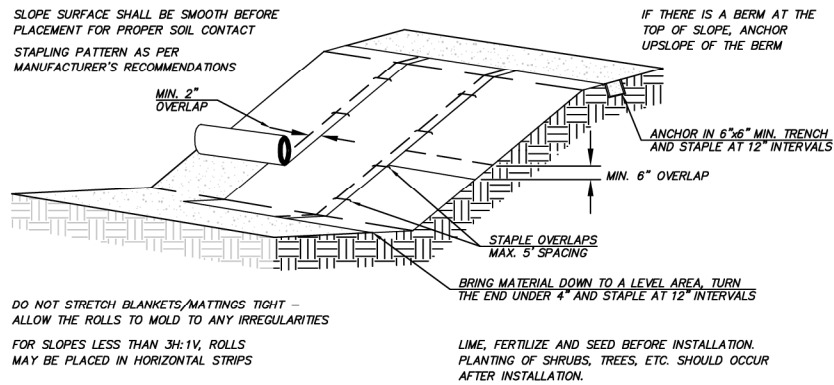
CLEARING LIMITS NOTES
ONSITE DISTURBED AREA: 6.2± ACRES
LIMITS OF CLEARING ALONG CRITICAL AREA TRACT D TO BE DELINEATED BY ONE OF THE FOLLOWING:
• WHERE TRACT D IS DOWN GRADIENT, INSTALL 2 ROWS OF ORANGE SILT FENCE.
• WHERE TRACT D IS UP GRADIENT, INSTALL EITHER 48" TALL ORANGE CONSTRUCTION FENCE OR ORANGE SILT FENCE.

TREE NOTES
SEE SHEETS TR-01 TO TR-02 AND LS-01 THROUGH LS-03 FOR TREE RELATED INFORMATION INCLUDING NOTES REGARDING REMOVAL OF SELECT TREES LOCATED BEHIND CLEARING LIMITS.

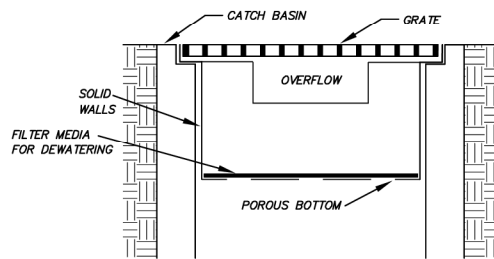
SWPPP NOTE
THIS TESC PLAN AND THE SWPPP REPORT UNDER SEPARATE COVER COMPRISE THE SWPPP PLAN. THE TEMPORARY MEASURES INCLUDED IN THIS PLAN ARE CONSIDERED THE MINIMUM NECESSARY FOR CONSTRUCTION. ADDITIONAL BMP'S MAY BE NEEDED, AS DETERMINED BY THE SITE CESL. THE BMP'S SHOWN ON THIS PLAN MAY REQUIRE RELOCATION DURING CONSTRUCTION, AS DETERMINED BY THE SITE CESL.

UNDERGROUND UTILITY NOTE
UNDERGROUND UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATION. THERE IS NO GUARANTEE THAT ALL UTILITY LINES ARE SHOWN, OR THAT THE LOCATION, SIZE AND MATERIAL IS ACCURATE. THE CONTRACTOR SHALL UNCOVER ALL INDICATED PIPING WHERE CROSSING, INTERFERING, OR CONNECTIONS OCCUR PRIOR TO TRENCHING OR EXCAVATION FOR ANY PIPE OR STRUCTURES, TO DETERMINE ACTUAL LOCATIONS, SIZE AND MATERIAL. THE CONTRACTOR SHALL MAKE THE APPROPRIATE PROVISION FOR PROTECTION OF SAID FACILITIES. THE CONTRACTOR SHALL NOTIFY ONE CALL AT 8-1-1 (WASHINGTON811.COM) AND ARRANGE FOR FIELD LOCATION OF EXISTING FACILITIES BEFORE CONSTRUCTION.

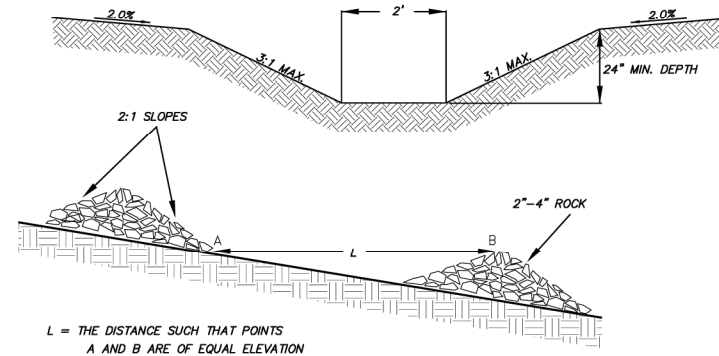
CITY OF SAMMAMISH
APPROVAL BLOCK



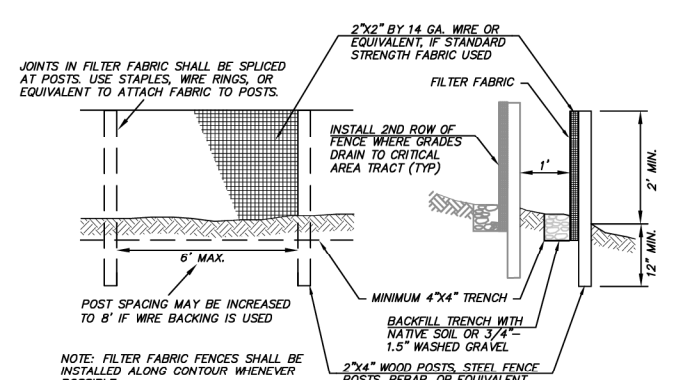
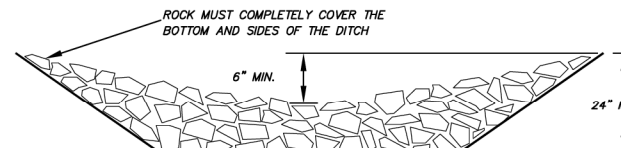
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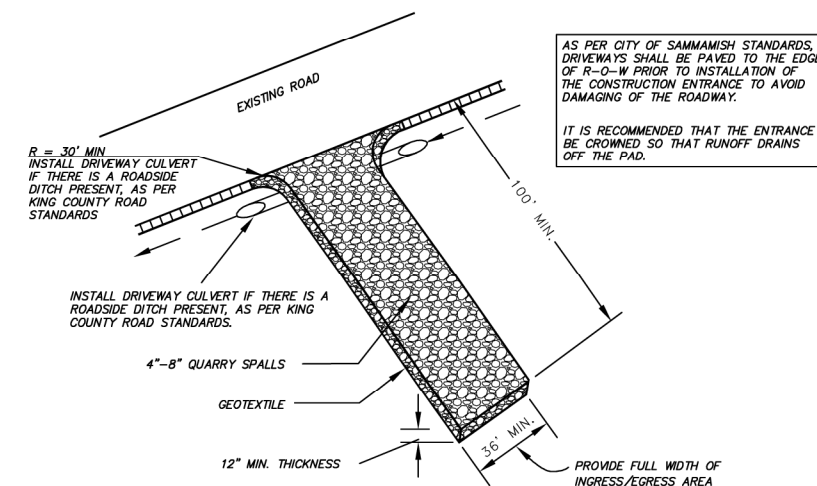
CATCH BASIN INSERT
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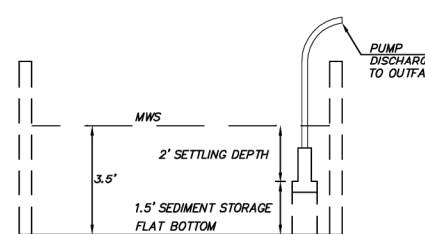
TEMPORARY INTERCEPTOR SWALE WITH ROCK CHECK DAMS
NOT TO SCALE



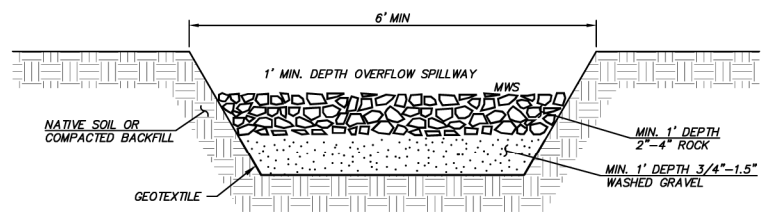
FILTER FABRIC FENCE
NOT TO SCALE



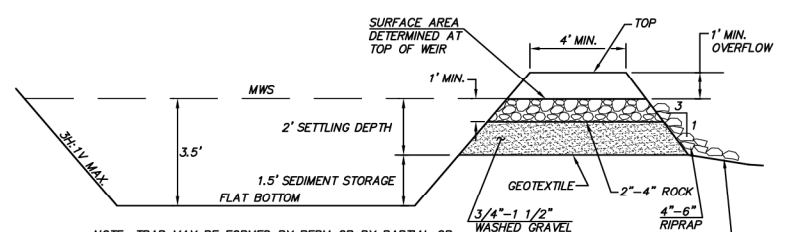
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



VAULT SEDIMENT TRAP
NOT TO SCALE



SEDIMENT TRAP OUTLET
NOT TO SCALE

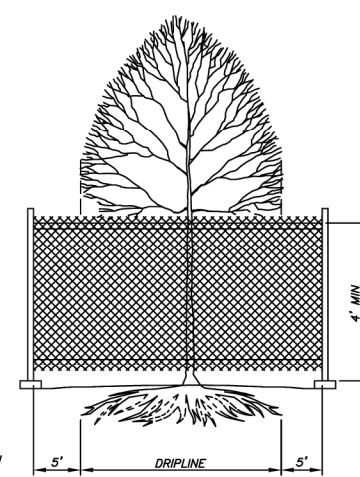


SEDIMENT TRAP CROSS SECTION
NOT TO SCALE

TRAP	TOP	MWS	BOTTOM	REQUIRED AREA @ MWS	DIM @ MWS	PROVIDED AREA @ MWS
EAST	387.00	386.00	382.50	3,229	95x35'	3,325
WEST	379.00	378.00	374.50	2,745	70x40*	2,800

NOTE: CONFIGURATION OF SEDIMENT TRAPS MAY BE MODIFIED GIVEN THAT 1,345 SF OF SEDIMENT TRAP SURFACE AREA IS PROVIDED PER 1 ACRE OF TRIBUTARY AREA.
* INSTALL SILT FENCE LONGITUDINALLY ALONG CENTER OF SEDIMENT TRAP PER PLAN TO PROVIDE REQUIRED FLOW PATH.

- NOTES**
- 4' HIGH ORANGE CONSTRUCTION FENCE OR SILT FENCE SHALL BE PLACED 5' FROM DRIPLINE OF TREE TO BE SAVED UNLESS OTHERWISE NOTED. FENCE SHALL COMPLETELY ENIRCLE TREE(S) WITH SIGNS READING "TREE SAVE AREA". INSTALL FENCE POSTS USING PIER BLOCKS ONLY. AVOID DRIVING POSTS OR STAKES INTO MAJOR ROOTS.
 - TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER 1" IN DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND COVERED WITH SOIL AS SOON AS POSSIBLE.
 - NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.



TREE PROTECTION BARRIER
NOT TO SCALE

CITY OF SAMMAMISH
APPROVAL BLOCK

BLUELINE
25 CENTRAL WAY, SUITE 400, KIRKLAND, WA 98033
P: 425.216.4051 F: 425.216.4052 WWW.THEBLUELINEGROUP.COM

SCALE: AS NOTED
PROJECT MANAGER: BRETT K PUDISTS, PE
PROJECT ENGINEER: BRETT K PUDISTS, PE
DESIGNER: AARON C LANCE
ISSUE DATE: 5/10/2019

NO	DATE	BY	REVISIONS
1	5/10/19	RAB	REVISED PER CITY COMMENTS

TESS DETAILS
CARRIER SE 8TH SUBDIVISION
ROAD & STORM PLANS
CITY OF SAMMAMISH WASHINGTON

5/10/19
JOB NUMBER: 15-111
SHEET NAME: TD-01
SHT 7 OF 48

BMP MAINTENANCE NOTE
MAINTENANCE STANDARDS FOR EROSION CONTROL BMPs ARE PROVIDED ON SHEET TD-02

EROSION/SEDIMENTATION CONTROL PLAN NOTES

- APPROVAL OF THIS ESC PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
- THE IMPLEMENTATION OF THIS ESC PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/ESC SUPERVISOR UNTIL ALL CONSTRUCTION IS APPROVED.
- THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED BY SURVEY TAPES OR FENCING PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, DISTURBANCE BEYOND THE CLEARING LIMITS IS NOT PERMITTED. THE CLEARING LIMITS SHALL BE MAINTAINED BY THE APPLICANT/ESC SUPERVISOR FOR THE DURATION OF CONSTRUCTION.
- STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES, SUCH AS CONSTRUCTED WHEEL WASH SYSTEMS OR WASH PADS, MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN AND TRACK OUT TO ROAD RIGHT-OF-WAY DOES NOT OCCUR FOR THE DURATION OF THE PROJECT.
- THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, FLOW CONTROL BMP LOCATIONS (EXISTING AND PROPOSED), AND ADJACENT PROPERTIES IS MINIMIZED.
- THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS (E.G., ADDITIONAL COVER MEASURES, ADDITIONAL SUMP PUMPS, RELOCATION OF DITCHES AND SILT FENCES, PERIMETER PROTECTION ETC.) OR AS DIRECTED BY THE CITY.
- THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/ESC SUPERVISOR DURING NON-RAINFALL PERIODS, EVERY HOUR (DAYLIGHT) DURING A RAINFALL EVENT, AND AT THE END OF EVERY RAINFALL, AND MAINTAINED TO ENSURE THEIR CONTINUED PROPER FUNCTIONING. IN ADDITION, TEMPORARY SILTATION PONDS AND ALL TEMPORARY SILTATION CONTROLS SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED, PERMANENT DRAINAGE FACILITIES ARE OPERATIONAL, AND THE POTENTIAL FOR EROSION HAS PASSED. WRITTEN RECORDS SHALL BE KEPT OF WEEKLY REVIEWS OF THE ESC FACILITIES DURING THE WET SEASON (OCT. 1 TO APRIL 30), AND OF MONTHLY REVIEWS DURING THE DRY SEASON (MAY 1 TO SEPT 30).
- ANY AREAS OF EXPOSED SOILS, INCLUDING ROADWAY EMBANKMENTS, THAT WILL NOT BE DISTURBED FOR TWO CONSECUTIVE DAYS DURING THE WET SEASON OR SEVEN DAYS DURING THE DRY SEASON SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED ESC COVER METHODS (E.G., SEEDING, MULCHING, PLASTIC COVERING, ETC.).
- ANY AREA NEEDING ESC MEASURES THAT DO NOT REQUIRE IMMEDIATE ATTENTION SHALL BE ADDRESSED WITHIN SEVEN (7) DAYS.
- THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH (MORE FREQUENTLY AS REQUIRED BY THE PUBLIC WORKS CONSTRUCTION INSPECTOR) OR WITHIN TWENTY-FOUR (24) HOURS FOLLOWING A STORM EVENT.
- AT NO TIME SHALL MORE THAN ONE (1) FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.
- ANY PERMANENT RETENTION/DETENTION FACILITY USED AS A TEMPORARY SETTLING BASIN SHALL BE MODIFIED WITH THE NECESSARY EROSION CONTROL MEASURES AND SHALL PROVIDE ADEQUATE STORAGE CAPACITY. IF THE FACILITY IS TO FUNCTION ULTIMATELY AS AN INFILTRATION SYSTEM, THE PERMANENT FACILITY SHALL NOT BE USED AS A TEMPORARY SETTLING BASIN, ELSE THE TEMPORARY FACILITY MUST BE GRADED SO THAT THE BOTTOM AND SIDES ARE AT LEAST THREE FEET ABOVE THE FINAL GRADE OF THE PERMANENT FACILITY. NO UNDERGROUND DETENTION TANK, DETENTION VAULT, OR SYSTEM WHICH BUCKS UNDER OR INTO A POND SHALL BE USED AS A TEMPORARY SETTLING BASIN. FLOW CONTROL BMP AREAS (EXISTING OR PROPOSED) SHALL NOT BE USED AS TEMPORARY FACILITIES AND SHALL BE PROTECTED FROM SEDIMENTATION AND INTRUSION.
- COVER MEASURES WILL BE APPLIED IN CONFORMANCE WITH APPENDIX D OF THE KING COUNTY SURFACE WATER DESIGN MANUAL.
- PRIOR TO THE BEGINNING OF THE WET SEASON (OCTOBER 1) OF EACH YEAR, ALL DISTURBED AREAS SHALL BE REVIEWED TO IDENTIFY WHICH ONES CAN BE SEEDED IN PREPARATION FOR THE WINTER RAINS. THE IDENTIFIED DISTURBED AREA SHALL BE SEEDED WITHIN ONE WEEK AFTER OCTOBER 1. A SKETCH MAP DEPICTING THE AREAS TO BE SEEDED AND THE AREAS TO REMAIN UNCOVERED SHALL BE SUBMITTED TO THE PUBLIC WORKS CONSTRUCTION INSPECTOR. THE INSPECTOR MAY REQUIRE SEEDING OF ADDITIONAL AREAS IN ORDER TO PROTECT SURFACE WATERS, ADJACENT PROPERTIES, OR

DRAINAGE FACILITIES:

- ALL EROSION/SEDIMENTATION CONTROL PONDS WITH A DEAD STORAGE DEPTH EXCEEDING SIX INCHES (6") MUST HAVE A HIGHLY VISIBLE PERIMETER FENCE WITH A MINIMUM HEIGHT OF THREE FEET (3').
- ALL LOTS ADJOINING OR HAVING ANY NATIVE GROWTH PROTECTION EASEMENTS (NOPE) OR SENSITIVE AREA TRACT SHALL HAVE A MINIMUM FOUR-FOOT (4') HIGH TEMPORARY CONSTRUCTION FENCE (CYCLONE OR PLASTIC MESH) SEPARATING THE LOT (OR BUILDABLE PORTIONS OF THE LOT) FROM THE AREA RESTRICTED BY THE NOPE AND SHALL BE INSTALLED PRIOR TO ANY GRADING OR CLEARING AND REMAIN IN PLACE UNTIL A DWELLING IS CONSTRUCTED AND OWNERSHIP TRANSFERRED TO THE FIRST OWNER/OCCUPANT.
- CLEARING LIMITS SHALL BE DELINEATED WITH A CLEARING CONTROL FENCE. THE CLEARING CONTROL FENCE SHALL CONSIST OF A FOUR-FOOT (4') HIGH TEMPORARY CONSTRUCTION FENCE. CLEARING CONTROL FENCES ALONG WETLAND OR STREAM BUFFERS OR SLOPES OF SENSITIVE SLOPES SHALL BE ACCOMPANIED BY TWO ROWS OF EROSION CONTROL FENCE. IF DETERMINED APPROPRIATE BY CITY OF SAMMAMISH A SIX-FOOT (6') HIGH CHAIN LINK FENCE MAY BE REQUIRED.
- IF SEDIMENT IS TRACKED OFFSITE, PUBLIC ROADS SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY, OR MORE FREQUENTLY DURING WET WEATHER, IF NECESSARY TO PREVENT SEDIMENT FROM ENTERING WATERS OF THE STATE. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR PICKUP SWEEPING AND SHALL BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA. STREET WASHING WILL BE ALLOWED AFTER SEDIMENT IS REMOVED IN THIS MANNER. STREET WASH WASTEWATER SHALL BE CONTROLLED BY PUMPING BACK ONSITE, OR OTHERWISE BE PREVENTED FROM DISCHARGING INTO DRAINAGE SYSTEMS TRIBUTARY TO SURFACE WATERS.
- ANY CATCH BASINS COLLECTING RUNOFF FROM THE SITE, WHETHER THEY ARE ON OR OFF THE SITE, SHALL HAVE THEIR GRATES COVERED WITH FILTER FABRIC DURING CONSTRUCTION. CATCH BASINS DIRECTLY DOWNSTREAM OF THE CONSTRUCTION ENTRANCE OR ANY OTHER CATCH BASIN AS DETERMINED BY THE PUBLIC WORKS CONSTRUCTION INSPECTOR SHALL BE PROTECTED WITH A FILTER FABRIC SOCK OR EQUIVALENT. AT NO TIME SHALL MORE SEDIMENT THAN ONE-THIRD (1/3) OF THE AVAILABLE STORAGE BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN INSERT. SEE SECTION D.2.1.5.3 OF THE 2016 KCSWM APPENDIX D.
- THE WASHED GRAVEL BACKFILL ADJACENT TO THE FILTER FABRIC FENCE SHALL BE REPLACED AND THE FILTER FABRIC CLEANED IF IT IS NONFUNCTIONAL BY EXCESSIVE SILT ACCUMULATION AS DETERMINED BY THE CITY OF SAMMAMISH PUBLIC WORKS CONSTRUCTION INSPECTOR. ALL INTERCEPTOR SWALES SHALL BE CLEANED IF SILT ACCUMULATION EXCEEDS ONE-HALF FOOT (0.5') DEPTH.
- ROCK FOR EROSION PROTECTION OF ROADWAY DITCHES, WHERE REQUIRED, MUST BE OF SOUND QUARRY ROCK PLACED TO DEPTH OF 1' AND MUST MEET WSDOT SPECIFICATIONS 4"-8" ROCK/40%-70% PASSING; 2"-4" ROCK/30%-40% PASSING; AND 1"-2" ROCK/10%-20% PASSING.
- FLUSHING CONCRETE BY-PRODUCTS OR TRUCKS NEAR OR INTO THE STORM DRAINAGE SYSTEM SHALL NOT BE ALLOWED. IF EXPOSED AGGREGATE IS FLUSHED INTO THE STORM SYSTEM, IT MAY RESULT IN RE-INSPECTION AND RE-CLEANING THE ENTIRE AFFECTED DOWNSTREAM STORM SYSTEM, OR POSSIBLY RE-LAYING THE STORM LINE.
- MAXIMUM RELEASE RATE FROM THE SITE AT ANY TIME DURING CONSTRUCTION AND DURING THE MAINTENANCE AND DEFECT PERIOD SHALL BE NO MORE THAN ONE-HALF OF THE 2-YEAR PEAK FLOW WHEN THE FLOW CONTROL STRUCTURE IS BYPASSED.
- DURING THE WET SEASON (OCTOBER 1 - APRIL 30) NOTES:
 - THE ALLOWED TIME THAT A DISTURBED AREA MAY REMAIN UNWORKED WITHOUT COVER MEASURES IS REDUCED TO TWO CONSECUTIVE WORKING DAYS, RATHER THAN SEVEN (SECTION D.2.1.2).
 - STOCKPILES AND STEEP CUT AND FILL SLOPES ARE TO BE PROTECTED IF UNWORKED FOR MORE THAN 12 HOURS (SECTION D.2.1.2).
 - COVER MATERIALS SUFFICIENT TO COVER ALL DISTURBED AREAS SHALL BE STOCKPILED ON SITE (SECTION D.2.1.2).
 - ALL AREAS THAT ARE TO BE UNWORKED DURING THE WET SEASON SHALL BE SEEDED WITHIN ONE WEEK OF THE BEGINNING OF THE WET SEASON (SECTION D.2.1.2.2).
 - MULCH IS REQUIRED TO PROTECT ALL SEEDING AREAS (SECTION D.2.1.2.2).
 - FIFTY LINEAR FEET OF SILT FENCE (AND THE NECESSARY STAKES) PER ACRE OF DISTURBANCE MUST BE STOCKPILED ON SITE (SECTION D.2.1.3.1).
 - CONSTRUCTION ROAD AND PARKING LOT STABILIZATION ARE REQUIRED FOR ALL SITES UNLESS THE SITE IS UNDERLAIN BY COARSE-GRAINED SOIL (SECTION D.2.1.4.2).
 - SEDIMENT RETENTION IS REQUIRED UNLESS NO OFFSITE DISCHARGE IS ANTICIPATED FOR THE

SPECIFIED DESIGN FLOW (SECTION D.2.1.5):

- SURFACE WATER CONTROLS ARE REQUIRED UNLESS NO OFFSITE DISCHARGE IS ANTICIPATED FOR THE SPECIFIED DESIGN FLOW (SECTION D.2.1.6).
 - PHASING AND MORE CONSERVATIVE BMPs MUST BE EVALUATED FOR CONSTRUCTION ACTIVITY NEAR SURFACE WATERS (SECTION D.2.4.3).
 - ANY RUNOFF GENERATED BY DEWATERING MAY BE REQUIRED TO DISCHARGE TO THE SANITARY SEWER (WITH APPROPRIATE DISCHARGE AUTHORIZATION), PORTABLE SAND FILTER SYSTEMS, OR HOLDING TANKS (SECTION D.2.2).
 - WHEN LOCATED WITHIN AN ENVIRONMENTALLY CRITICAL AREA, A WET SEASON PERMIT IS REQUIRED.
26. A DETAILED CONSTRUCTION SEQUENCE IS REQUIRED TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE APPLIED AT THE APPROPRIATE TIMES. A CONSTRUCTION SEQUENCE TEMPLATE IS PROVIDED BELOW, TO BE UPDATED TO SPECIFICALLY MATCH THE PROJECT:
- PRE-CONSTRUCTION MEETING.
 - POST SIGN WITH NAME AND PHONE NUMBER OF CSWPP/ESC SUPERVISOR.
 - FLAG OR FENCE CLEARING LIMITS.
 - INSTALL CATCH BASIN PROTECTION, IF REQUIRED.
 - GRADE AND INSTALL CONSTRUCTION ENTRANCE(S).
 - INSTALL PERIMETER PROTECTION (SILT FENCE, BRUSH BARRIER, ETC.).
 - CONSTRUCT SEDIMENT PONDS AND TRAPS.
 - GRADE AND STABILIZE CONSTRUCTION ROADS.
 - CONSTRUCT SURFACE WATER CONTROLS (INTERCEPTOR DIKES, PIPE SLOPE DRAINS, ETC.) SIMULTANEOUSLY WITH CLEARING AND GRADING FOR PROJECT DEVELOPMENT.
 - MAINTAIN EROSION CONTROL MEASURE IN ACCORDANCE WITH CITY PUBLIC WORKS STANDARDS AND MANUFACTURER'S RECOMMENDATIONS.
 - RELOCATE EROSION CONTROL MEASURES OR INSTALL NEW MEASURES SO THAT AS SITE CONDITIONS CHANGE, THE EROSION AND SEDIMENT CONTROL IS ALWAYS IN ACCORDANCE WITH THE CITY ESC MINIMUM REQUIREMENTS.
 - COVER ALL AREAS WITHIN THE SPECIFIED TIME FRAME WITH STRAW, WOOD FIBER MULCH, COMPOST, PLASTIC SHEETING, CRUSHED ROCK OR EQUIVALENT.
 - STABILIZE ALL AREAS THAT REACH FINAL GRADE WITHIN SEVEN (7) DAYS.
 - NEED OR SOO ANY AREAS TO REMAIN UN-WORKED FOR MORE THAN THIRTY (30) DAYS.
 - UPON COMPLETION OF THE PROJECT, ALL DISTURBED AREAS MUST BE STABILIZED AND BEST MANAGEMENT PRACTICES (BMPs) REMOVED IF APPROPRIATE.

BMP MAINTENANCE NOTES

STABILIZED CONSTRUCTION ENTRANCE:

- QUARRY SPALLS (OR HOG FUEL) 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 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.
- ANY SEDIMENT THAT IS TRACKED ONTO PAVEMENT SHALL BE REMOVED IMMEDIATELY BY SWEEPING. THE SEDIMENT COLLECTED BY SWEEPING SHALL BE REMOVED OR STABILIZED ONSITE. 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, A SMALL SUMP MUST BE CONSTRUCTED. THE SEDIMENT WOULD THEN BE WASHED INTO THE SUMP WHERE IT CAN BE CONTROLLED. WASH WATER MUST BE PUMPED BACK ONTO THE SITE AND CAN NOT DISCHARGE TO SYSTEMS TRIBUTARY TO SURFACE WATERS.
- ANY QUARRY SPALLS THAT ARE LOOSEENED FROM THE PAD AND END UP ON THE ROADWAY SHALL BE REMOVED IMMEDIATELY.

MULCHING:

- THE THICKNESS OF THE MULCH COVER MUST BE MAINTAINED.
- ANY AREAS THAT EXPERIENCE EROSION SHALL BE RE-MULCHED AND/OR PROTECTED WITH A NET OR BLANKET. IF THE EROSION PROBLEM IS DRAINAGE RELATED, THEN THE DRAINAGE PROBLEM SHALL BE ASSESSED AND ALTERNATE DRAINAGE SUCH AS INTERCEPTOR SWALES MAY BE NEEDED TO FIX THE PROBLEM AND THE ERODED AREA RE-MULCHED.

MARK CLEARING LIMITS:

- FENCING SHALL BE INSPECTED REGULARLY AND REPAIRED OR REPLACED AS NEEDED.
- IF CONCENTRATED FLOWS ARE EVIDENT UPHILL OF THE FENCE, THEY MUST BE INTERCEPTED AND CONVEYED TO A SEDIMENT TRAP OR POND.
- 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.
- SEDIMENT MUST BE REMOVED WHEN THE SEDIMENT IS 6 INCHES HIGH.
- IF THE FILTER FABRIC (GEOTEXTILE) HAS DETERIORATED DUE TO ULTRAVIOLET BREAKDOWN, IT SHALL BE REPLACED.

STORM DRAIN INLET PROTECTION:

- 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.
- 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 REPLACED AT LEAST MONTHLY.

INTERCEPTOR DIKES AND SWALES:

- DAMAGE RESULTING FROM RUNOFF OR CONSTRUCTION ACTIVITY SHALL BE REPAIRED IMMEDIATELY.
- IF THE FACILITIES DO NOT REGULARLY RETAIN STORM RUNOFF, THE CAPACITY AND/OR FREQUENCY OF THE DIKES/SWALES SHALL BE INCREASED.

JUTE MATTING

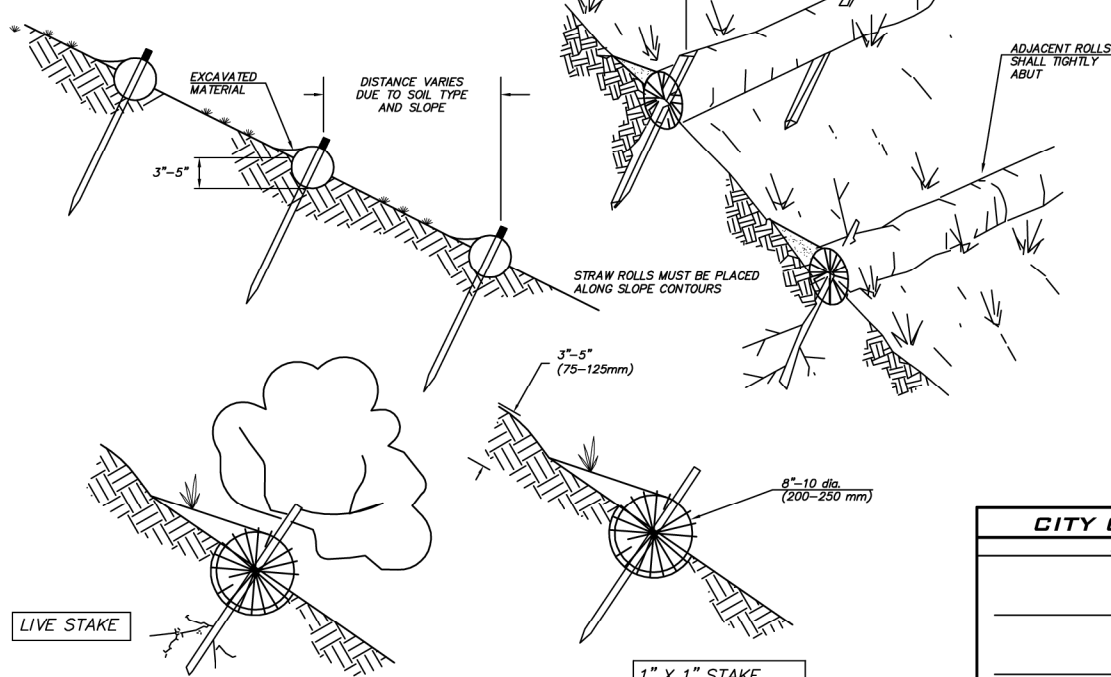
- GOOD CONTACT WITH THE GROUND MUST BE MAINTAINED, AND THERE MUST NOT BE EROSION BENEATH THE NET OR BLANKET.
- ANY AREAS OF THE NET OR BLANKET THAT ARE DAMAGED OR NOT IN CLOSE CONTACT WITH THE GROUND SHALL BE REPAIRED AND STAPLED.
- IF EROSION OCCURS DUE TO POORLY CONTROLLED DRAINAGE, THE PROBLEM SHALL BE FIXED AND THE ERODED AREA PROTECTED.

SEDIMENT TRAP

- SEDIMENT SHALL BE REMOVED FROM THE TRAP WHEN IT REACHES 1 FOOT IN DEPTH.
- ANY DAMAGE TO THE TRAP EMBANKMENTS OR SLOPES SHALL BE REPAIRED.

SWPPS PLAN NOTES

- ALL POLLUTANTS, INCLUDING WASTE MATERIALS, THAT OCCUR ONSITE SHALL BE HANDLED AND DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORMWATER.
- COVER, CONTAINMENT, AND PROTECTION FROM VANDALISM SHALL BE PROVIDED FOR ALL CHEMICALS, LIQUID PRODUCTS, PETROLEUM PRODUCTS, AND NON-INERT WASTES PRESENT ON THE SITE (SEE CHAPTER 173-304 WAC FOR THE DEFINITION OF INERT WASTE). ONSITE FUELING TANKS SHALL INCLUDE SECONDARY CONTAINMENT.
- MAINTENANCE AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES INVOLVING OIL CHANGES, HYDRAULIC SYSTEM DRAIN DOWN, SOLVENT AND DE-GREASING CLEANING OPERATIONS, FUEL TANK DRAIN DOWN AND REMOVAL, AND OTHER ACTIVITIES WHICH MAY RESULT IN DISCHARGE OR SPILLAGE OF POLLUTANTS TO THE GROUND OR INTO STORMWATER RUNOFF MUST BE CONDUCTED USING SPILL PREVENTION MEASURES, SUCH AS DRIP PANS. CONTAMINATED SURFACES SHALL BE CLEANED IMMEDIATELY FOLLOWING ANY DISCHARGE OR SPILL INCIDENT. EMERGENCY REPAIRS MAY BE PERFORMED ONSITE USING TEMPORARY PLASTIC PLACED BENEATH AND, IF RAINING, OVER THE VEHICLE.
- 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. MANUFACTURER'S RECOMMENDATIONS FOR APPLICATION RATES AND PROCEDURES SHALL BE FOLLOWED.
- MEASURES SHALL BE USED TO PREVENT OR TREAT CONTAMINATION OF STORMWATER RUNOFF BY PH MODIFYING SOURCES. THESE SOURCES INCLUDE, BUT ARE NOT LIMITED TO, BULK CEMENT, CEMENT KILN DUST, FLY ASH, NEW CONCRETE WASHING AND CURING WATERS, WASTE STREAMS GENERATED FROM CONCRETE GRINDING AND SAWING, EXPOSED AGGREGATE PROCESSES, AND CONCRETE PUMPING AND MIXER WASHOUT WATERS. STORMWATER DISCHARGES SHALL NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE WATER QUALITY STANDARD FOR PH IN THE RECEIVING WATER.



STRAW WATTLES
NOT TO SCALE

UNDERGROUND UTILITY NOTE

UNDERGROUND UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATION. THERE IS NO GUARANTEE THAT ALL UTILITY LINES ARE SHOWN, OR THAT THE LOCATION, SIZE AND MATERIAL IS ACCURATE. THE CONTRACTOR SHALL UNCOVER ALL INDICATED PIPING WHERE CROSSING, INTERFERENCES, OR CONNECTIONS OCCUR PRIOR TO TRENCHING OR EXCAVATION FOR ANY PIPE OR STRUCTURES, TO DETERMINE ACTUAL LOCATIONS, SIZE AND MATERIAL. THE CONTRACTOR SHALL MAKE THE APPROPRIATE PROVISION FOR PROTECTION OF SAID FACILITIES. THE CONTRACTOR SHALL NOTIFY ONE CALL AT 8-1-1 (WASHINGTON811.COM) AND ARRANGE FOR FIELD LOCATION OF EXISTING FACILITIES BEFORE CONSTRUCTION.



Notice of Construction Activity Signs

Requirements
A Notice-of-Construction signboard is required for all formal subdivisions, grading permits subject to SEPA and Building permits subject to SEPA. The sign must be prepared and posted for any of these projects prior to the start of any work. The notice board shall be constructed and displayed to the specifications described below.

Notice Board Construction Specifications:

- The notice board shall be constructed with 4' x 4' x 1/2" plywood, exterior grade, good surface one side. Professionally prepared plastic board overlays, permanently affixed to the board are permissible. The notice board shall display the information as shown in the figure and as specified at the pre-construction meeting. Notice boards may be reused, but they must be clean and show no evidence of former wording.
- Lettering style: Helvetica or similar typeface
 - Lettering size: Title should be 3" capital letters (NOTICE OF PROPOSED CONSTRUCTION ACTIVITY). Other letters should be 1.5" letters and the "Emergency" text and phone may be 4" letters. The size of the City logo shall fit the available space as shown. Border area and lines of text shall be evenly spaced to approximate the sample shown.
 - Lettering: Black (permanent ink or silk-screen)
 - Background Color: White
 - Logo: City of Sammamish emblem, in black

The applicant/developer shall erect the notice board by solidly setting two 4" x 4" posts a minimum of 24 inches into the ground; or structurally attaching it to an existing building. Post length shall be at least 7 feet above the ground. Two 2" x 4" diagonal braces should be nailed to the inside back of the posts and staked at the ground to provide stability against wind or soft soil conditions if posts are less than 24 inches into the ground. The notice board shall be attached to the posts with four lag bolts and washers (3/8" diameter and 3" long).

Notice Board Location:

- The notice board shall be located:
- At the midpoint on the site street frontage or as otherwise directed by City staff to maximize visibility.

- At a location 5 feet inside the street property line; a notice board structurally attached to an existing building shall be exempt from the setback provisions, provided that the notice board is located not more than 5 feet from the property line without approval from City staff.
- So that the top of the notice board is between 7 to 9 feet above grade.
- So that it is totally visible to pedestrians.

Maintenance and Removal of Notice Board:
The applicant/developer shall maintain the notice board in good condition throughout the site improvement construction period, which shall extend through the time of final construction approval by City. The notice board shall be removed within 14 days after final construction approval.



APPLICANT: TOLL BROTHERS, INC.
TYPE OF ACTION: SITE DEVELOPMENT PERMIT
PROJECT NO: SDP 2019-06254
DESCRIPTION: 35 LOT SUBDIVISION
ESTIMATED COMPLETION DATE: 7/2020
HOURS OF CONSTRUCTION: 7:00 AM TO 8:00 PM M-F
9:00 AM TO 6:00 PM Saturday
No work permitted on Sunday
CITY CONTACT: HAIM STRASBURGER, PE, 425-295-0562
DEVELOPER CONTACT: ERIC WEINSTEIN, 908-892-2873
TESC SUPERVISOR: AARON KOPET, 425-825-1955, EXT 124
AFTER HOURS FOR ENVIRONMENTAL OR SAFETY RELATED EMERGENCIES: 911

- NOTE:**
- STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" (75-125MM) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

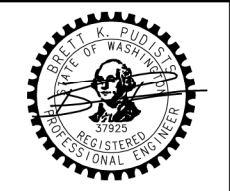


25 CENTRAL WAY, SUITE 400,
KIRKLAND, WA 98033
P: 425.216.4051 F: 425.216.4052
WWW.THEBLUELINEGROUP.COM

SCALE: AS NOTED
PROJECT MANAGER: BRETT K PUDISTS, PE
PROJECT ENGINEER: BRETT K PUDISTS, PE
DESIGNER: AARON K LANCE
ISSUE DATE: 5/10/2019

NO	DATE	BY	REVISIONS
1	5/10/19	RAB	REVISED PER CITY COMMENTS

TESC DETAILS & NOTES
CARRIER SE BTH SUBDIVISION
ROAD & STORM PLANS
CITY OF SAMMAMISH WASHINGTON



5/10/19
JOB NUMBER: 15-111
SHEET NAME: TD-02
SHT 8 OF 48

B. BMP Detail

4.1 Source Control BMPs

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.

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 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.

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 madronna 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*** 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. 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.

BMP C103: High Visibility Plastic or Metal 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 or roads; and, (4) protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use To establish clearing limits, plastic 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.
- 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

Purpose Construction entrances are stabilized to reduce the amount of sediment transported onto paved roads by vehicles or equipment by constructing a stabilized pad of quarry spalls at entrances to construction sites.

Conditions of Use Construction entrances shall be stabilized wherever traffic will be leaving a construction site and traveling on paved roads or other paved areas within 1,000 feet of the site.

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 4.2 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').
- 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.
- Hog fuel (wood-based mulch) may be substituted for or combined with quarry spalls in areas that will not be used for permanent roads. Hog fuel is generally less effective at stabilizing construction entrances and should be used only at sites where the amount of traffic is very limited. Hog fuel is not recommended for entrance stabilization in urban areas. The effectiveness of hog fuel is highly variable and it generally requires more maintenance than quarry spalls. The inspector may at any time require the use of quarry spalls if the hog fuel is not preventing sediment from being tracked onto pavement or if the hog fuel is being carried onto pavement. Hog fuel is prohibited in permanent roadbeds because organics in the subgrade soils cause degradation of the subgrade support over time.
- Fencing (see BMPs C103 and C104) shall be installed as necessary to restrict traffic to the construction entrance.

Maintenance Standards

- 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.
- Quarry spalls (or hog fuel) 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 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 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 where it can be controlled.
- 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 BMPs C103 and C104) 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.

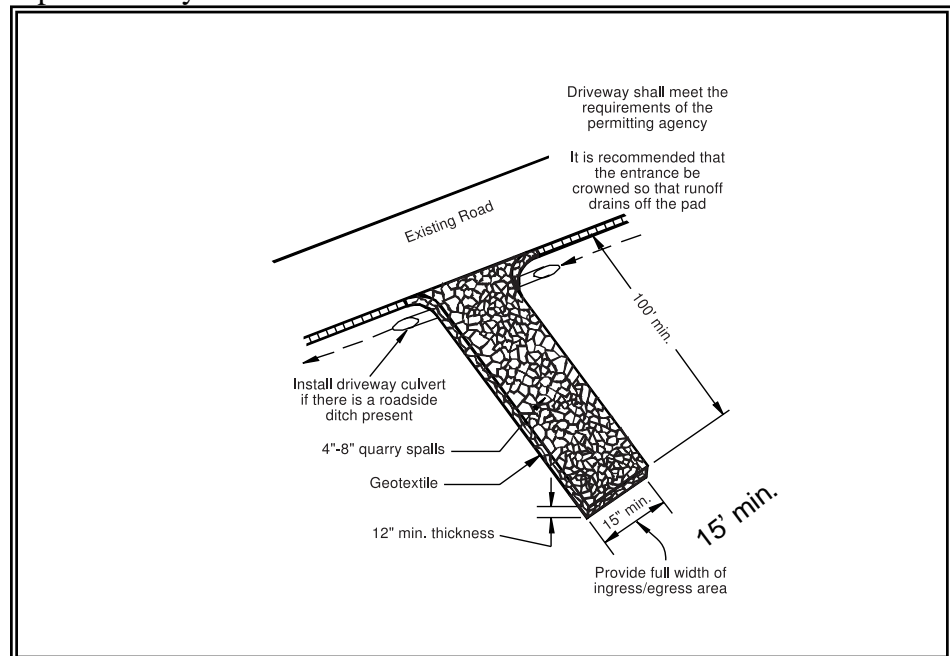


Figure 4.2 – Stabilized Construction Entrance

BMP C106: Wheel Wash

<i>Purpose</i>	Wheel washes reduce the amount of sediment transported onto paved roads by motor vehicles.
<i>Conditions of Use</i>	<p>When a stabilized construction entrance (see BMP C105) is not preventing sediment from being tracked onto pavement.</p> <ul style="list-style-type: none">• 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.
<i>Design and Installation Specifications</i>	<p>Suggested details are shown in Figure 4.3. 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.</p> <p>Use a low clearance truck to test the wheel wash before paving. Either a belly dump or lowboy will work well to test clearance.</p> <p>Keep the water level from 12 to 14 inches deep to avoid damage to truck hubs and filling the truck tongues with water.</p> <p>Midpoint spray nozzles are only needed in extremely muddy conditions.</p> <p>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.</p>
<i>Maintenance Standards</i>	<p>The wheel wash should start out the day with fresh water.</p> <p>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.</p> <p>Wheel wash or tire bath wastewater shall be discharged to a separate on-site treatment system, such as closed-loop recirculation or land application, or to the sanitary sewer with proper local sewer district approval.</p>

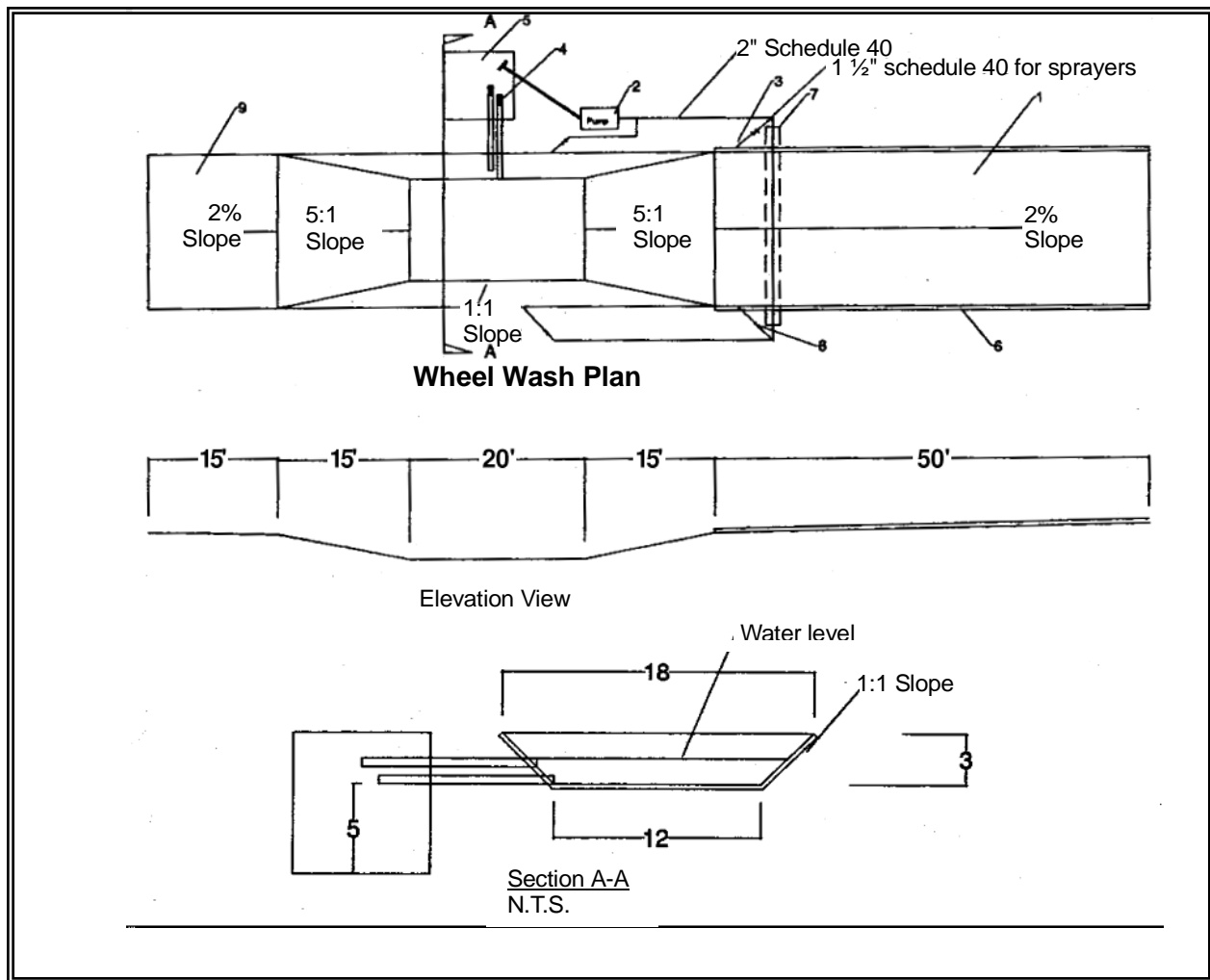


Figure 4.3 Wheel Wash

Notes:

1. Asphalt construction entrance 6 in. asphalt treated base (ATB).
2. 3-inch trash pump with floats on the suction hose.
3. Midpoint spray nozzles, if needed.
4. 6-inch sewer pipe with butterfly valves. Bottom one is a drain. Locate top pipe's invert 1 foot above bottom of wheel wash.
5. 8 foot x 8 foot sump with 5 feet of catch. Build so can be cleaned with trackhoe.
6. Asphalt curb on the low road side to direct water back to pond.
7. 6-inch sleeve under road.
8. Ball valves.
9. 15 foot. ATB apron to protect ground from splashing water.

BMP C107: Construction Road/Parking Area Stabilization

Purpose

Stabilizing subdivision roads, parking areas, and other onsite vehicle transportation routes immediately after grading reduces erosion caused by construction traffic or runoff.

Conditions of Use

- Roads or parking areas shall be stabilized wherever they are constructed, whether permanent or temporary, for use by construction traffic.
- Fencing (see BMPs C103 and C104) shall be installed, if necessary, to limit the access of vehicles to only those roads and parking areas that are stabilized.

Design and Installation Specifications

- On areas that will receive asphalt as part of the project, install the first lift as soon as possible.
- A 6-inch depth of 2- to 4-inch crushed rock, gravel base, or crushed surfacing base course shall be applied immediately after grading or utility installation. A 4-inch course of asphalt treated base (ATB) may also be used, or the road/parking area may be paved. It may also be possible to use cement or calcium chloride for soil stabilization. If cement or cement kiln dust is used for roadbase stabilization, pH monitoring and BMPs are necessary to evaluate and minimize the effects on stormwater. If the area will not be used for permanent roads, parking areas, or structures, a 6-inch depth of hog fuel may also be used, but this is likely to require more maintenance. Whenever possible, construction roads and parking areas shall be placed on a firm, compacted subgrade.
- Temporary road gradients shall not exceed 15 percent. Roadways shall be carefully graded to drain. Drainage ditches shall be provided on each side of the roadway in the case of a crowned section, or on one side in the case of a super-elevated section. Drainage ditches shall be directed to a sediment control BMP.
- Rather than relying on ditches, it may also be possible to grade the road so that runoff sheet-flows into a heavily vegetated area with a well-developed topsoil. Landscaped areas are not adequate. If this area has at least 50 feet of vegetation, then it is generally preferable to use the vegetation to treat runoff, rather than a sediment pond or trap. The 50 feet shall not include wetlands. If runoff is allowed to sheetflow through adjacent vegetated areas, it is vital to design the roadways and parking areas so that no concentrated runoff is created.

Maintenance Standards

- Storm drain inlets shall be protected to prevent sediment-laden water entering the storm drain system (see BMP C220).
- Inspect stabilized areas regularly, especially after large storm events.
- Crushed rock, gravel base, hog fuel, 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.

BMP C120: Temporary and Permanent Seeding

Purpose

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

Conditions of Use

- Seeding may be used throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.
- Channels that will be vegetated should be installed before major earthwork and hydroseeded with a Bonded Fiber Matrix. 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 over hydromulch and blankets.
- Retention/detention ponds should be seeded as required.
- Mulch is required at all times because it protects seeds from heat, moisture loss, and transport due to runoff.
- All disturbed areas shall be reviewed in late August to early September and all seeding should be completed by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.
- At final site stabilization, all disturbed areas not otherwise vegetated or stabilized shall be seeded and mulched. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions or geotextiles) which will prevent erosion.

Design and Installation Specifications

- Seeding should be done during those seasons most conducive to growth and will vary with the climate conditions of the region. Local experience should be used to determine the appropriate seeding periods.
- The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1. Seeding that occurs between July 1 and August 30 will require irrigation until 75 percent grass cover is established. Seeding that occurs between October 1 and March 30 will require a mulch or plastic cover until 75 percent grass cover is established.
- To prevent seed from being washed away, confirm that all required surface water control measures have been installed.

- The seedbed should be firm and rough. All soil should be roughened no matter what the slope. If compaction is required for engineering purposes, slopes must be track walked before seeding. Backblading or smoothing of slopes greater than 4:1 is not allowed if they are to be seeded.
- New and more effective restoration-based landscape practices rely on deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical the subgrade should be initially ripped 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 the rototilling process should be done in multiple lifts, or the prepared soil system shall be prepared properly and then placed to achieve the specified depth.
- Organic matter is the most appropriate form of “fertilizer” because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form. A natural system typically releases 2-10 percent of its nutrients annually. Chemical fertilizers have since been formulated to simulate what organic matter does naturally.
- In general, 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer can be used at a rate of 90 pounds per acre. Slow-release fertilizers should always be used because they are more efficient and have fewer environmental impacts. It is recommended that areas being seeded for final landscaping conduct soil tests to determine the exact type and quantity of fertilizer needed. This will prevent the over-application of fertilizer. Fertilizer should not be added to the hydromulch machine and agitated more than 20 minutes before it is to be used. If agitated too much, the slow-release coating is destroyed.
- There are numerous products available on the market 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 is a good source of long-term, slow-release, available nitrogen.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. Mulch may be made up of 100 percent: cottonseed meal; fibers made of wood, recycled cellulose, hemp, and kenaf; compost; or blends of these. Tackifier shall be plant-based, such as guar or alpha plantago, or chemical-based such as polyacrylamide or polymers. Any mulch or tackifier product used shall be installed per manufacturer’s instructions. Generally, mulches come in 40-50 pound bags. Seed and fertilizer are added at time of application.

- Mulch is always required for seeding. Mulch can be applied on top of the seed or simultaneously by hydroseeding.
- On steep slopes, Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products should be used. BFM/MBFM products are applied at a minimum rate of 3,000 pounds per acre of mulch with approximately 10 percent tackifier. Application is made so that a minimum of 95 percent soil coverage is achieved. Numerous products are available commercially and should be installed per manufacturer's instructions. Most products require 24-36 hours to cure before a rainfall and cannot be installed on wet or saturated soils. Generally, these products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.

BFMs and MBFMs have some advantages over blankets:

- No surface preparation required;
- Can be installed via helicopter in remote areas;
- On slopes steeper than 2.5:1, blanket installers may need to be roped and harnessed for safety;
- They are at least \$1,000 per acre cheaper installed.

In most cases, the shear strength of blankets is not a factor when used on slopes, only when used in channels. BFMs and MBFMs are good alternatives to blankets in most situations where vegetation establishment is the goal.

- 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. One way to overcome this is to increase seed quantities by up to 50 percent.
- Vegetation establishment can also be enhanced 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.

An alternative is to install the mulch, seed, fertilizer, and tackifier in one lift. Then, spread or blow straw over the top of the hydromulch at a rate of about 800-1000 pounds per acre. 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:

1. Irrigation
2. Reapplication of mulch
3. 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).

- Areas to be permanently landscaped shall provide a 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. This can be accomplished in a number of ways:

Recent research has shown that the best method to improve till soils is to amend these soils with compost. The optimum mixture is approximately two parts soil to one part compost. This equates to 4 inches of compost mixed to a depth of 12 inches in till soils. Increasing the concentration of compost beyond this level can have negative effects on vegetal health, while decreasing the concentrations can reduce the benefits of amended soils. Please note: The compost should meet specifications for Grade A quality compost in Ecology Publication 94-038.

Other soils, such as gravel or cobble outwash soils, may require different approaches. Organics and fines easily migrate through the loose structure of these soils. Therefore, the importation of at least 6 inches of quality topsoil, underlain by some type of filter fabric to prevent the migration of fines, may be more appropriate for these soils.

Areas that already have good topsoil, such as undisturbed areas, do not require soil amendments.

- Areas that will be seeded only and not landscaped may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Native topsoil should be re-installed on the disturbed soil surface before application.
- Seed that is installed as a temporary measure may be installed by hand if it will be covered by straw, mulch, or topsoil. Seed that is installed as a permanent measure may be installed by hand on small areas (usually less than 1 acre) that will be covered with mulch, topsoil, or erosion blankets. The seed mixes listed below include recommended mixes for both temporary and permanent seeding. These mixes, with the exception of the wetland mix, shall be applied at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used. Local suppliers or the local conservation district should be consulted 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.

Table 4.1 represents the standard mix for those areas where just a temporary vegetative cover is required.

Table 4.1 Temporary Erosion Control Seed Mix			
	% Weight	% Purity	% Germination
Chewings or annual blue grass <i>Festuca rubra var. commutata</i> or <i>Poa anna</i>	40	98	90
Perennial rye - <i>Lolium perenne</i>	50	98	90
Redtop or colonial bentgrass <i>Agrostis alba</i> or <i>Agrostis tenuis</i>	5	92	85
White dutch clover <i>Trifolium repens</i>	5	98	90

Table 4.2 provides just one recommended possibility for landscaping seed.

Table 4.2 Landscaping Seed Mix			
	% Weight	% Purity	% Germination
Perennial rye blend <i>Lolium perenne</i>	70	98	90
Chewings and red fescue blend <i>Festuca rubra var. commutata</i> or <i>Festuca rubra</i>	30	98	90

This turf seed mix in Table 4.3 is for dry situations where there is no need for much water. The advantage is that this mix requires very little maintenance.

Table 4.3 Low-Growing Turf Seed Mix			
	% Weight	% Purity	% Germination
Dwarf tall fescue (several varieties) <i>Festuca arundinacea var.</i>	45	98	90
Dwarf perennial rye (Barclay) <i>Lolium perenne var. barclay</i>	30	98	90
Red fescue <i>Festuca rubra</i>	20	98	90
Colonial bentgrass <i>Agrostis tenuis</i>	5	98	90

Table 4.4 presents a mix recommended for bioswales and other intermittently wet areas.

Table 4.4 Bioswale Seed Mix*			
	% Weight	% Purity	% Germination
Tall or meadow fescue <i>Festuca arundinacea</i> or <i>Festuca elatior</i>	75-80	98	90
Seaside/Creeping bentgrass <i>Agrostis palustris</i>	10-15	92	85
Redtop bentgrass <i>Agrostis alba</i> or <i>Agrostis gigantea</i>	5-10	90	80

* Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix

The seed mix shown in Table 4.5 is a recommended low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Other mixes may be appropriate, depending on the soil type and hydrology of the area. Recent research suggests that bentgrass (agrostis sp.) should be emphasized in wet-area seed mixes. Apply this mixture at a rate of 60 pounds per acre.

Table 4.5 Wet Area Seed Mix*			
	% Weight	% Purity	% Germination
Tall or meadow fescue <i>Festuca arundinacea</i> or <i>Festuca elatior</i>	60-70	98	90
Seaside/Creeping bentgrass <i>Agrostis palustris</i>	10-15	98	85
Meadow foxtail <i>Alepcurus pratensis</i>	10-15	90	80
Alsike clover <i>Trifolium hybridum</i>	1-6	98	90
Redtop bentgrass <i>Agrostis alba</i>	1-6	92	85

* Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix

The meadow seed mix in Table 4.6 is recommended for areas that will be maintained infrequently or not at all and 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. The appropriateness of clover in the mix may need to be considered, as this can be a fairly invasive species. If the soil is amended, the addition of clover may not be necessary.

Table 4.6 Meadow Seed Mix			
	% Weight	% Purity	% Germination
Redtop or Oregon bentgrass <i>Agrostis alba</i> or <i>Agrostis oregonensis</i>	20	92	85
Red fescue <i>Festuca rubra</i>	70	98	90
White dutch clover <i>Trifolium repens</i>	10	98	90

Maintenance Standards

- Any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows) shall be reseeded. If reseeding is ineffective, an alternate method, such as sodding, mulching, or nets/blankets, shall be used. 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.

- After adequate cover is achieved, any areas that experience erosion shall be reseeded and protected by mulch. If the erosion problem is drainage related, the problem shall be fixed and the eroded area reseeded and protected by mulch.
- Seeded areas shall be supplied with adequate moisture, but not watered to the extent that it causes runoff.

BMP C121: Mulching

Purpose

The purpose of mulching soils is to provide 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. Only the most common types are discussed in this section.

Conditions of Use

As a temporary cover measure, mulch should be used:

- On disturbed areas that require cover measures for less than 30 days.
- As a cover for seed during the wet season and during the hot summer months.
- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.
- Mulch may be applied at any time of the year and must be refreshed periodically.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see Table 4.7. Note: Thicknesses may be increased for disturbed areas in or near sensitive areas or other areas highly susceptible to erosion.

Mulch used within the ordinary high-water mark of surface waters should be selected to minimize potential flotation of organic matter. Composted organic materials have higher specific gravities (densities) than straw, wood, or chipped material.

Maintenance Standards

- The thickness of the cover must be maintained.
- Any areas that experience erosion shall be remulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

**Table 4.7
Mulch Standards and Guidelines**

Mulch Material	Quality Standards	Application Rates	Remarks
Straw	Air-dried; free from undesirable seed and coarse material.	2"-3" thick; 5 bales per 1000 sf or 2-3 tons per acre	Cost-effective protection when applied with adequate thickness. Hand-application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. In windy areas straw must be held in place by crimping, using a tackifier, or covering with netting. Blown straw always has to be held in place with a tackifier as even light winds will blow it away. Straw, however, has several deficiencies that should be considered when selecting mulch materials. It often introduces and/or encourages the propagation of weed species and it has no significant long-term benefits. Straw should be used only if mulches with long-term benefits are unavailable locally. It should also not be used within the ordinary high-water elevation of surface waters (due to flotation).
Hydromulch	No growth inhibiting factors.	Approx. 25-30 lbs per 1000 sf or 1500 - 2000 lbs per acre	Shall be applied with hydromulcher. Shall not be used without seed and tackifier unless the application rate is at least doubled. Fibers longer than about ¾-1 inch clog hydromulch equipment. Fibers should be kept to less than ¾ inch.
Composted Mulch and Compost	No visible water or dust during handling. Must be purchased from supplier with Solid Waste Handling Permit (unless exempt).	2" thick min.; approx. 100 tons per acre (approx. 800 lbs per yard)	More effective control can be obtained by increasing thickness to 3". Excellent mulch for protecting final grades until landscaping because it can be directly seeded or tilled into soil as an amendment. Composted mulch has a coarser size gradation than compost. It is more stable and practical to use in wet areas and during rainy weather conditions.
Chipped Site Vegetation	Average size shall be several inches. Gradations from fines to 6 inches in length for texture, variation, and interlocking properties.	2" minimum thickness	This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by runoff. It is not recommended within 200 feet of surface waters. If seeding is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment.
Wood-based Mulch	No visible water or dust during handling. Must be purchased from a supplier with a Solid Waste Handling Permit or one exempt from solid waste regulations.	2" thick; approx. 100 tons per acre (approx. 800 lbs. per cubic yard)	This material is often called "hog or hogged fuel." It is usable as a material for Stabilized Construction Entrances (BMP C105) and as a mulch. The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).

BMP C123: Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

- Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.
- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. Note: The relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for long-term (greater than six months) applications.
- Clear plastic sheeting can be used over newly-seeded areas to create a greenhouse effect and encourage grass growth if the hydroseed was installed too late in the season to establish 75 percent grass cover, or if the wet season started earlier than normal. Clear plastic should not be used for this purpose during the summer months because the resulting high temperatures can kill the grass.
- Due to rapid runoff caused by plastic sheeting, this method shall not be used upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- While plastic is inexpensive to purchase, the added cost of installation, maintenance, removal, and disposal make this an expensive material, up to \$1.50-2.00 per square yard.
- Whenever plastic is used to protect slopes, water collection measures must be installed at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to convey clean rainwater away from bare soil and disturbed areas. At no time is clean runoff from a plastic covered slope to be mixed with dirty runoff from a project.
- Other uses for plastic include:
 1. Temporary ditch liner;
 2. Pond liner in temporary sediment pond;
 3. Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored;
 4. Emergency slope protection during heavy rains; and,
 5. Temporary drainpipe (“elephant trunk”) used to direct water.

***Design and
Installation
Specifications***

- Plastic slope cover must be installed as follows:
 1. Run plastic up and down slope, not across slope;
 2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet;
 3. Minimum of 8-inch overlap at seams;
 4. On long or wide slopes, or slopes subject to wind, all seams should be taped;
 5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath;
 6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and pound a wooden stake through each to hold them in place;
 7. Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil which causes extreme erosion;
 8. Sandbags may be lowered into place tied to ropes. However, all sandbags must be staked in place.
- Plastic sheeting shall have a minimum thickness of 0.06 millimeters.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

***Maintenance
Standards***

- Torn sheets must be replaced and open seams repaired.
- If the plastic begins to deteriorate due to ultraviolet radiation, it must be completely removed and replaced.
- When the plastic is no longer needed, it shall be completely removed.
- Dispose of old tires appropriately.

BMP C130: Surface Roughening

Purpose

Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity, increases infiltration, and provides for sediment trapping through the provision of a rough soil surface. Horizontal depressions are created by operating a tiller or other suitable equipment on the contour or by leaving slopes in a roughened condition by not fine grading them.

Conditions for Use

- All slopes steeper than 3:1 and greater than 5 vertical feet require surface roughening.
- Areas with grades steeper than 3:1 should be roughened to a depth of 2 to 4 inches prior to seeding.
- Areas that will not be stabilized immediately may be roughened to reduce runoff velocity until seeding takes place.
- Slopes with a stable rock face do not require roughening.
- Slopes where mowing is planned should not be excessively roughened.

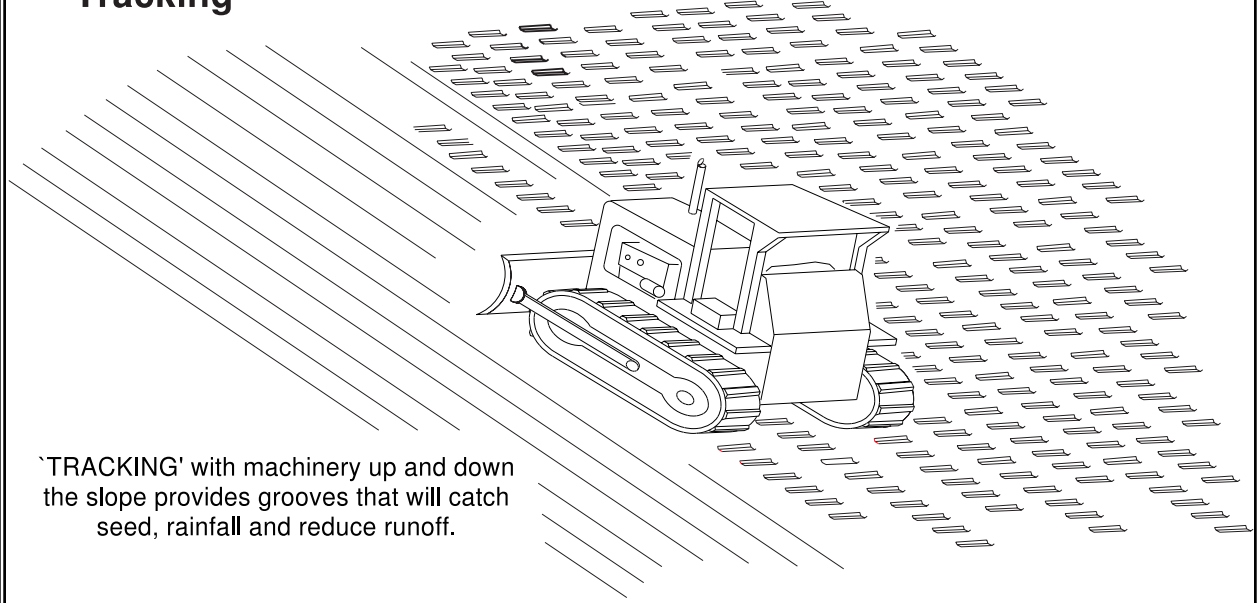
Design and Installation Specifications

There are different methods for achieving a roughened soil surface on a slope, and the selection of an appropriate method depends upon the type of slope. Roughening methods include stair-step grading, grooving, contour furrows, and tracking. See Figure 4.6 for tracking and contour furrows. Factors to be considered in choosing a method are slope steepness, mowing requirements, and whether the slope is formed by cutting or filling.

- Disturbed areas that will not require mowing may be stair-step graded, grooved, or left rough after filling.
- Stair-step grading is particularly appropriate in soils containing large amounts of soft rock. Each "step" catches material that sloughs from above, and provides a level site where vegetation can become established. Stairs should be wide enough to work with standard earth moving equipment. Stair steps must be on contour or gullies will form on the slope.
- Areas that will be mowed (these areas should have slopes less steep than 3:1) may have small furrows left by disking, harrowing, raking, or seed-planting machinery operated on the contour.
- Graded areas with slopes greater than 3:1 but less than 2:1 should be roughened before seeding. This can be accomplished in a variety of ways, including "track walking," or driving a crawler tractor up and down the slope, leaving a pattern of cleat imprints parallel to slope contours.
- Tracking is done by operating equipment up and down the slope to leave horizontal depressions in the soil.
- Areas that are graded in this manner should be seeded as quickly as possible.
- Regular inspections should be made of the area. If rills appear, they should be re-graded and re-seeded immediately.

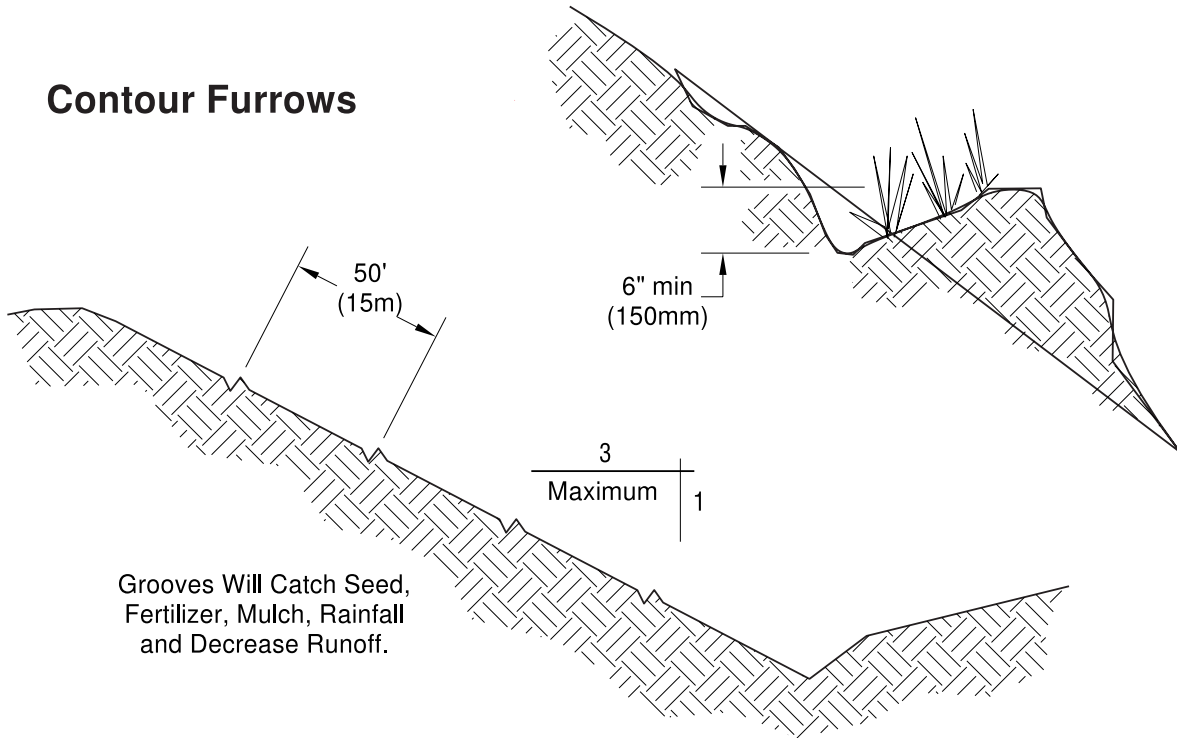
Maintenance Standards

Tracking



'TRACKING' with machinery up and down the slope provides grooves that will catch seed, rainfall and reduce runoff.

Contour Furrows



Grooves Will Catch Seed, Fertilizer, Mulch, Rainfall and Decrease Runoff.

Figure 4.6 – Surface Roughening by Tracking and Contour Furrows

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, if stable. 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 Stabilized Construction Entrance (BMP C105).
 - 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) 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 the 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, especially in eastern Washington. Since the wholesale cost of PAM is about \$ 4.00 per pound, this is an extremely 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 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 C151: Concrete Handling

<i>Purpose</i>	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. This BMP is intended to minimize and eliminate concrete process water and slurry from entering waters of the state.
<i>Conditions of Use</i>	Any time concrete is used, these management practices shall be utilized. Concrete construction projects include, but are not limited to, the following: <ul style="list-style-type: none">• Curbs• Sidewalks• Roads• Bridges• Foundations• Floors• Runways
<i>Design and Installation Specifications</i>	<ul style="list-style-type: none">• Concrete truck chutes, pumps, and internals shall be washed out only into formed areas awaiting installation of concrete or asphalt.• Unused concrete remaining in the truck and pump shall be returned to the originating batch plant for recycling.• Hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels shall be washed off only into formed areas awaiting installation of concrete or asphalt.• Equipment that cannot be easily moved, such as concrete pavers, shall only be washed in areas that do not directly drain to natural or constructed stormwater conveyances.• Washdown from areas such as concrete aggregate driveways shall not drain directly to natural or constructed stormwater conveyances.• When no formed areas are available, washwater and leftover product shall be contained in a lined container. Contained concrete shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
<i>Maintenance Standards</i>	Containers shall be checked for holes in the liner daily during concrete pours and repaired the same day.

BMP C152: Sawcutting and Surfacing Pollution Prevention

<i>Purpose</i>	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. This BMP is intended to minimize and eliminate process water and slurry from entering waters of the State.
<i>Conditions of Use</i>	Anytime sawcutting or surfacing operations take place, these management practices shall be utilized. Sawcutting and surfacing operations include, but are not limited to, the following: <ul style="list-style-type: none">• Sawing• Coring• Grinding• Roughening• Hydro-demolition• Bridge and road surfacing
<i>Design and Installation Specifications</i>	<ul style="list-style-type: none">• Slurry and cuttings shall be vacuumed 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.• Collected slurry and cuttings shall be disposed of in a manner that does not violate groundwater or surface water quality standards.• Process water that is generated during hydro-demolition, surface roughening or similar operations shall not drain to any natural or constructed drainage conveyance and shall be disposed of in a manner that does not violate groundwater or surface water quality standards.• Cleaning waste material and demolition debris shall be handled and disposed of in a manner that does not cause contamination of water. If the area is swept with a pick-up sweeper, the material must be hauled out of the area to an appropriate disposal site.
<i>Maintenance Standards</i>	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 from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in a designated area, and installing secondary containment.

Conditions of Use

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

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g. Polyacrylamide)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds
- Hazardous chemicals such as acids, lime, adhesives, paints, solvents and curing compounds
- Any other material that may be detrimental if released to the environment

Design and Installation Specifications

The following steps should be taken to minimize risk:

- Temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.

- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.

Material Storage Areas and Secondary Containment Practices:

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.
- Temporary secondary containment facilities shall provide for a spill containment volume able to contain precipitation from a 25 year, 24 hour storm event, plus 10% of the total enclosed container volume of all containers, or 110% of the capacity of the largest container within its boundary, whichever is greater.
- Secondary containment facilities shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- Secondary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each secondary containment facility shall be covered during non-working days, prior to and during rain events.
- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit).
- The spill kit should include, at a minimum:
 - 1-Water Resistant Nylon Bag
 - 3-Oil Absorbent Socks 3”x 4’
 - 2-Oil Absorbent Socks 3”x 10’
 - 12-Oil Absorbent Pads 17”x19”
 - 1-Pair Splash Resistant Goggles
 - 3-Pair Nitrile Gloves
 - 10-Disposable Bags with Ties
 - Instructions

BMP C161: Payment of Erosion Control Work

Purpose

As with any construction operation, the contractor should be paid for erosion control work. Payment for erosion control must be addressed during project development and design. Method of payment should be identified in the SWPPP.

Conditions of Use

Erosion control work should never be “incidental” to the contract as it is extremely difficult for the contractor to bid the work. Work that is incidental to the contract is work where no separate measurement or payment is made. The cost for incidental work is included in payments made for applicable bid items in the Schedule of Unit Prices. For example, any erosion control work associated with an item called “Clearing and Grubbing” is bid and paid for as part of that item, not separately.

Several effective means for payment of erosion control work are described below. These include:

- Temporary Erosion and Sediment Control (TESC) Lump Sum.
- TESC-Force Account.
- Unit Prices.
- Lump Sum.

TESC Lump Sum

One good method for achieving effective erosion and sediment control is to set up a Progress Payment system whereby the contract spells out exactly what is expected and allows for monthly payments over the life of the contract.

For example, an Item called “TESC Lump Sum” is listed in the Bid Schedule of Unit Prices. An amount, such as \$10,000, is written in both the Unit Price and Amount columns. This requires all bidders to bid \$10,000 for the item. If \$10,000 is not shown in the Amount column, each contractor bids the amount. Often this is under-bid, which can cause compliance difficulties later. In this example, the contractor is required to revise the project Construction SWPPP by developing a Contractor’s Erosion and Sediment Control Plan (CESCP) that is specific to their operations.

Next, the following language is included in the TESC specification Payment section:

Based upon lump sum Bid Item “TESC Lump Sum”, payments will be made as follows:

- A. Upon receipt of the Contractor’s CESCP, 25 percent.
- B. After Notice To Proceed and before Substantial Completion, 50 percent will be pro rated and paid monthly for compliance with the

CESCP. Non-compliance will result in withholding of payment for the month of non-compliance.

C. At Final Payment, 25 percent for a clean site.

Payment for “TESC Lump Sum” will be full compensation for furnishing all labor, equipment, materials and tools to implement the CESCP, install, inspect, maintain, and remove temporary erosion and sediment controls as detailed in the drawings and specified herein, with the exception of those items measured and paid for separately.

TESC Force Account

One good method for ensuring that contingency money is available to address unforeseen erosion and sediment control problems is to set up an item called “TESC-Force Account”. For example, an amount such as \$15,000 is written in both the Unit Price and Amount columns for the item. This requires all bidders to bid \$15,000 for the item.

The Force Account is used only at the discretion of the contracting agency or developer. If there are no unforeseen erosion problems, the money is not used. If there are unforeseen erosion problems, the contracting agency would direct the work to be done and pay an agreed upon amount for the work (such as predetermined rates under a Time and Materials setting).

Contract language for this item could look like this:

Measurement and Payment for “TESC-Force Account” will be on a Force Account basis in accordance with _____ (include appropriate section of the Contract Specifications). The amount entered in the Schedule of Unit Prices is an estimate.

Unit Prices

When the material or work can be quantified, it can be paid by Unit Prices. For example, the project designer knows that 2 acres will need to be hydroseeded and sets up an Item of Work for Hydroseed, with a Bid Quantity of 2, and a Unit for Acre. The bidder writes in the unit Prices and Amount.

Unit Price items can be used in conjunction with TESC-Force Account and TESC-Lump Sum.

Lump Sum

In contracts where all the work in a project is paid as a Lump Sum, erosion control is usually not paid as a separate item. In order to ensure that appropriate amounts are bid into the contract, the contracting agency can request a Schedule of Values and require that all erosion control costs be identified.

4.2 Runoff Conveyance and Treatment BMPs

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.

**Design and
Installation
Specifications**

- 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 it to a sediment basin.
- 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 flow 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	2:1 or flatter.
Grade	Depends on topography, however, dike system minimum is 0.5%, 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*).

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 bottom shall be level.
Depth	1-foot minimum.
Side Slope	2:1 or flatter.
Grade	Maximum 5 percent, with positive drainage to a suitable outlet (such as a sediment pond).
Stabilization	Seed as per <i>BMP C120, Temporary and Permanent Seeding</i> , or <i>BMP C202, Channel Lining</i> , 12 inches thick of 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 C207: Check Dams

<i>Purpose</i>	Construction of small dams across a swale or ditch reduces the velocity of concentrated flow and dissipates energy at the check dam.
<i>Conditions of Use</i>	<p>Where temporary channels or permanent channels are not yet vegetated, channel lining is infeasible, and velocity checks are required.</p> <ul style="list-style-type: none">• 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.• Check dams shall not be placed 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.
<i>Design and Installation Specifications</i>	<p>Whatever material is used, 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.</p> <p>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.</p> <ul style="list-style-type: none">• 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.• Check dams can be constructed of either rock or pea-gravel filled bags. Numerous new products are also available for this purpose. They tend to be re-usable, quick and easy to install, effective, and cost efficient.• Check dams should be placed perpendicular to the flow of water.• 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 2:1 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.

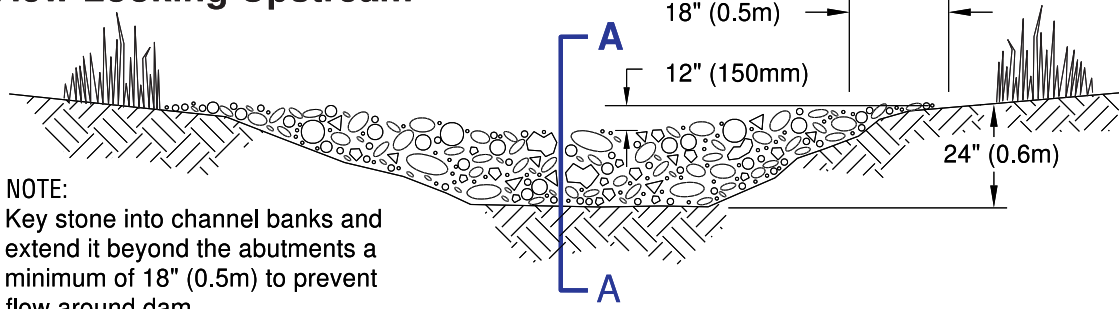
- Use filter fabric foundation under a rock or sand bag check dam. If a blanket ditch liner is used, this is not necessary. A piece of organic or synthetic blanket cut to fit will also work for this purpose.
- Rock check dams shall be constructed of appropriately sized rock. The rock must be placed by 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. The rock used must be large enough to stay in place given the expected design flow through the channel.
- 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 4.13 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.

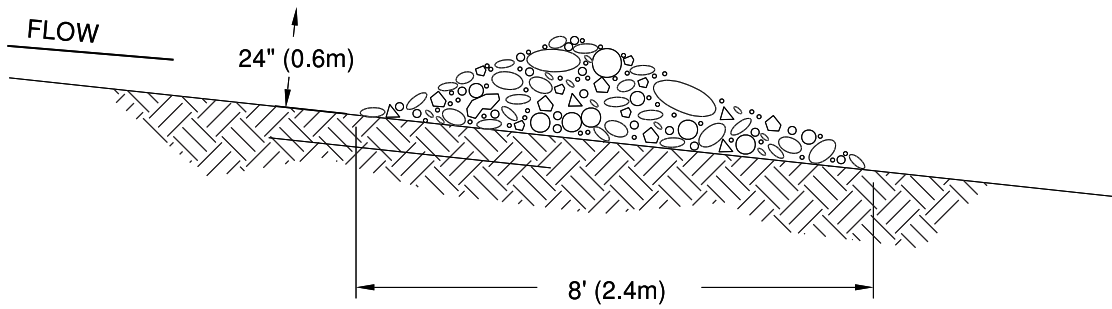
- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

View Looking Upstream



NOTE:
Key stone into channel banks and extend it beyond the abutments a minimum of 18" (0.5m) to prevent flow around dam.

Section A - A



Spacing Between Check Dams

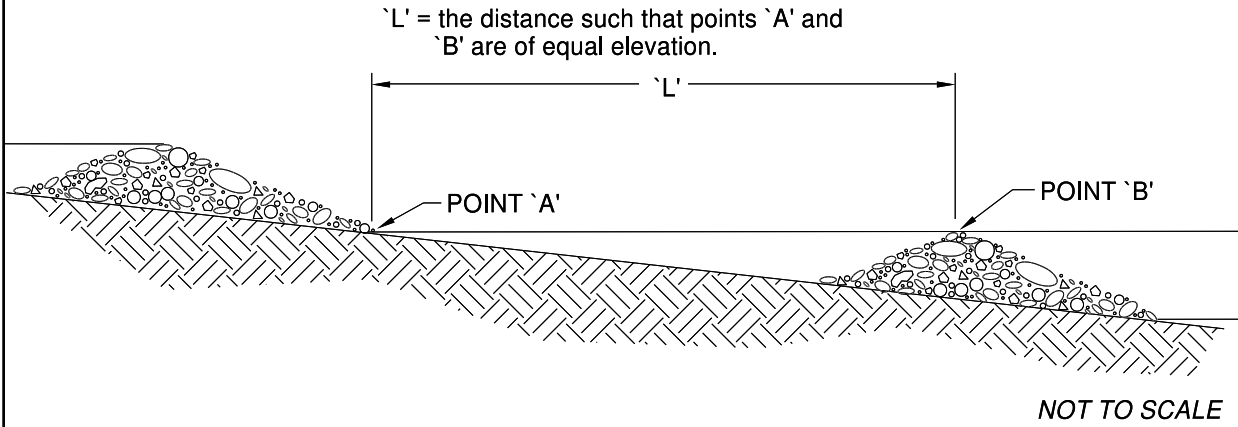


Figure 4.13 – Check Dams

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 4-foot 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, overwidened 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. See Volume V 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 To prevent coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use Where storm drain inlets are to be made operational before permanent stabilization of the disturbed drainage area. Protection should be provided for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless the runoff that enters the catch basin will be conveyed to a sediment pond or trap. Inlet protection may be used anywhere to protect the drainage system. It is likely that the drainage system will still require cleaning.

Table 4.9 lists several options for inlet protection. All of the methods for storm drain inlet protection are prone to plugging and require a high frequency of maintenance. Drainage areas should be limited to 1 acre or less. Emergency overflows may be required where stormwater ponding would cause a hazard. If an emergency overflow is provided, additional end-of-pipe treatment may be required.

Table 4.9 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' X 30'/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 a 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.

- Depth 1-2 ft as measured from the crest of the inlet structure.
- Side Slopes of excavation no steeper than 2:1.
- 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.
- It may be necessary to build a temporary dike 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 4.14.

- Height 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 2:1 or flatter.
- An alternative design is a gravel donut.
- Inlet slope of 3:1.
- Outlet slope of 2:1.
- 1-foot wide level stone area between the structure and the inlet.
- Inlet slope stones 3 inches in diameter or larger.
- Outlet slope use gravel ½- to ¾-inch at a minimum thickness of 1-foot.

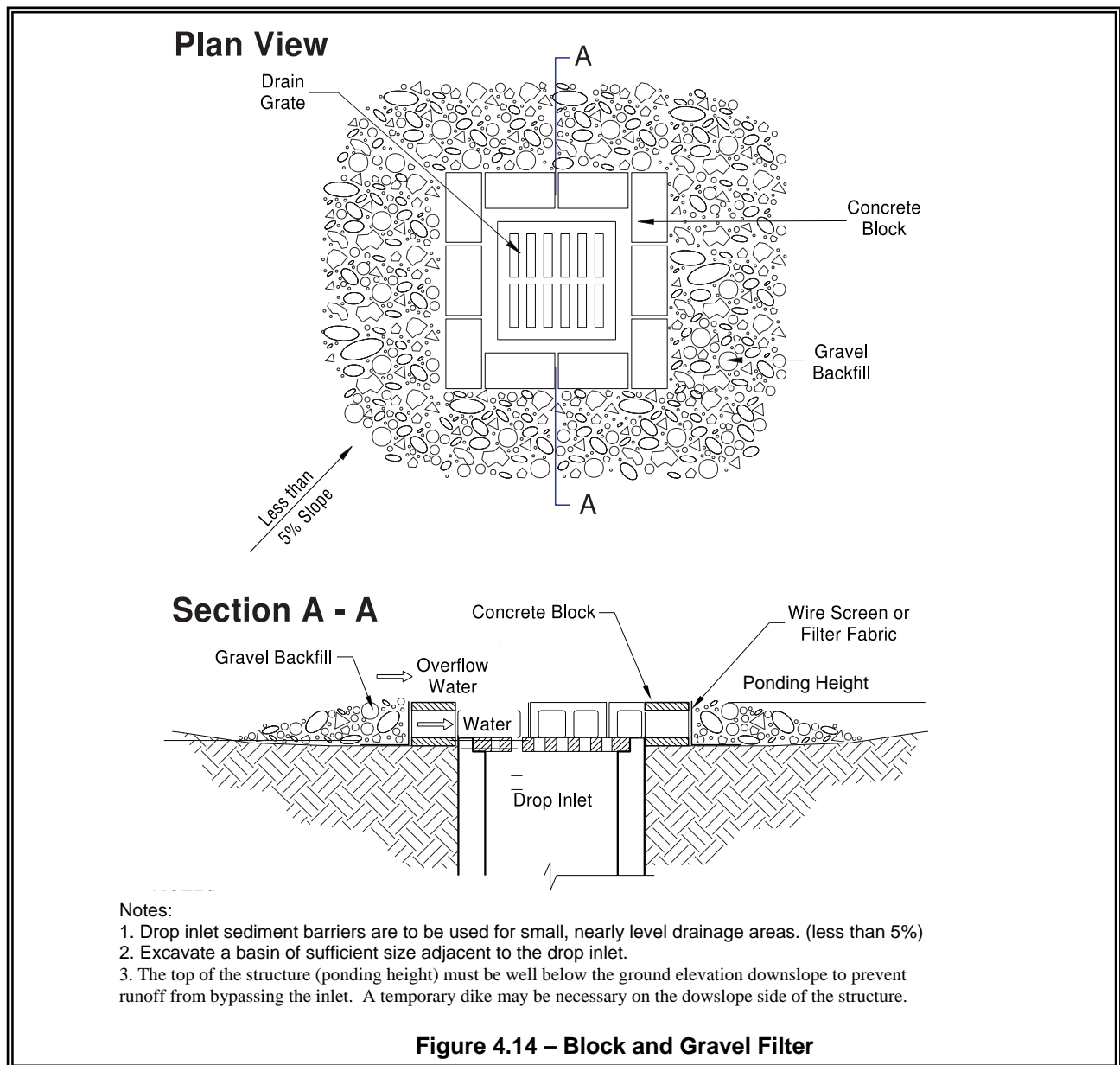


Figure 4.14 – Block and Gravel Filter

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

- Hardware cloth or comparable wire mesh with ½-inch openings.
- Coarse aggregate.
- 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.
- If more than one strip of mesh is necessary, overlap the strips.
- Place coarse aggregate over the wire mesh.
- The depth of the gravel should be at least 12 inches over the entire inlet opening and extend at least 18 inches on all sides.

Catchbasin Filters - Inserts should be designed by the manufacturer for use at construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. The maintenance requirements can be reduced by combining 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.

- 5 cubic feet of storage.
- Dewatering provisions.
- High-flow bypass that will not clog under normal use at a construction site.
- The catchbasin filter is inserted 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.

- Wire mesh with ½-inch openings.
- 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 an inlet with concrete blocks and gravel. See Figure 4.14.

- 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.

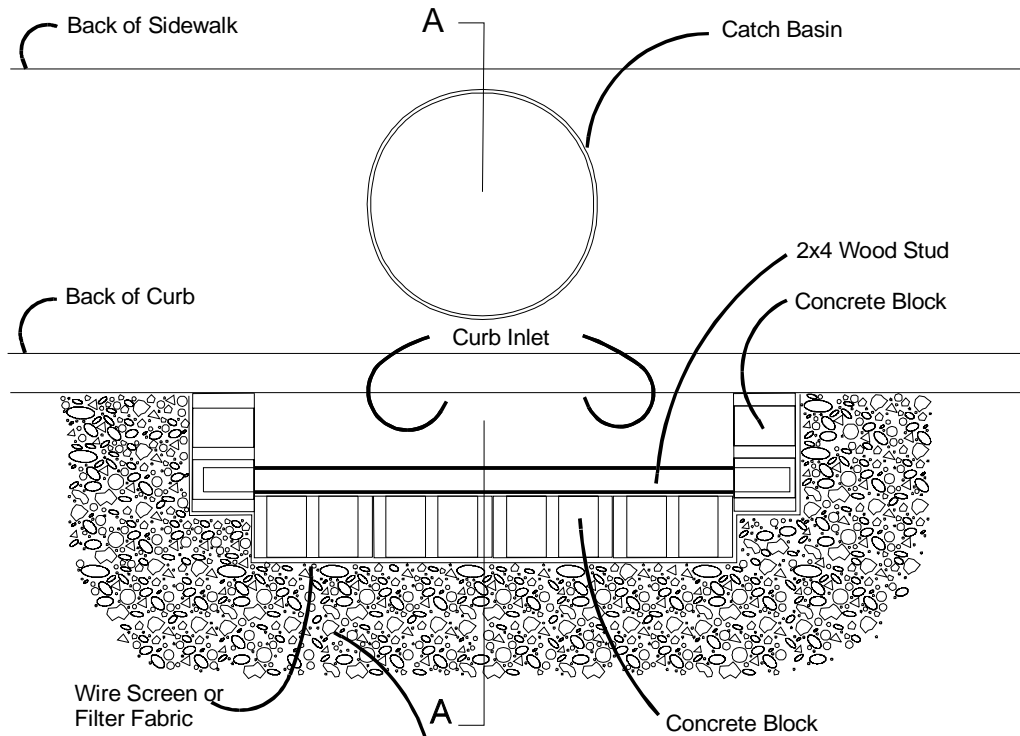
Curb and Gutter Sediment Barrier – Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure 4.16.

- 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.

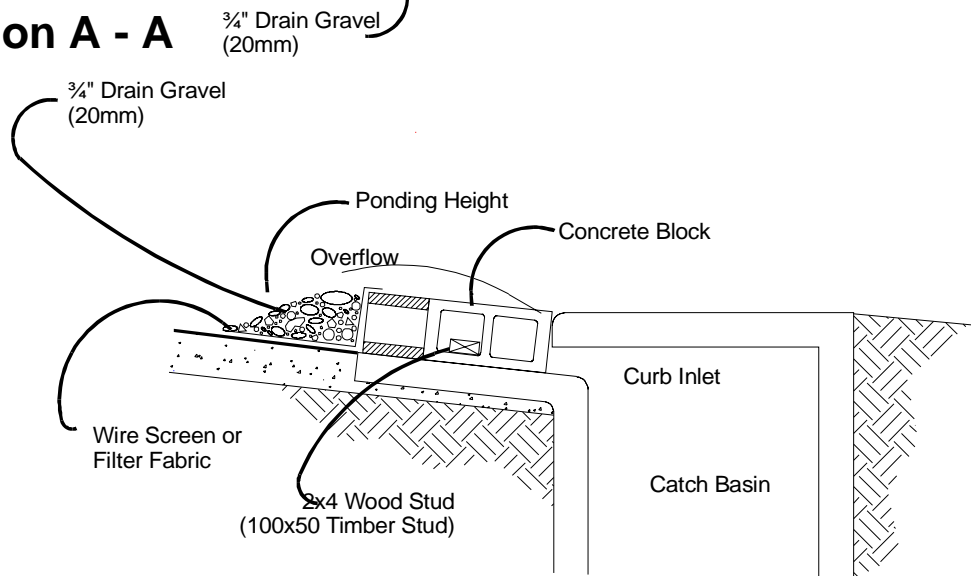
***Maintenance
Standards***

- Catch basin filters should be inspected frequently, especially after storm events. If the insert becomes clogged, it should be cleaned or replaced.
- For systems using stone filters: If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, 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.

Plan View



Section A - A

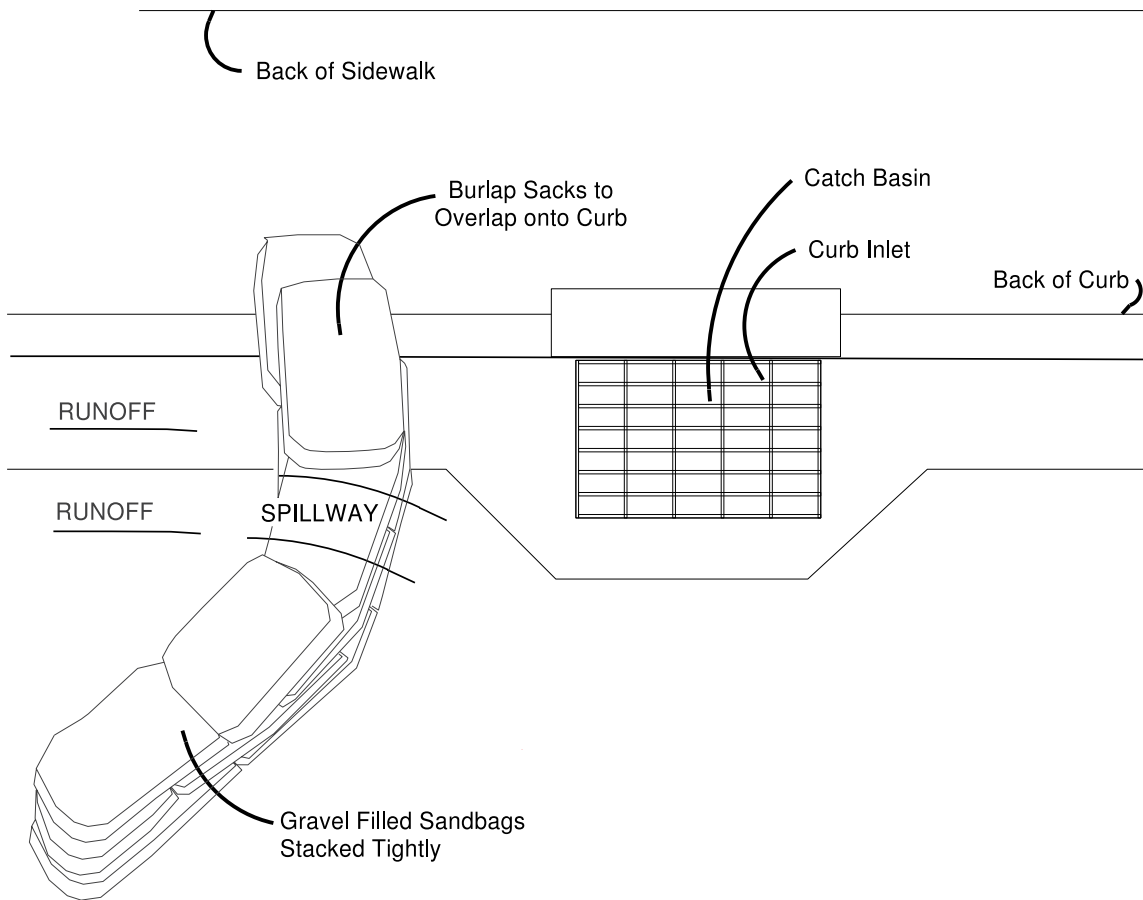


NOTES:

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.

Figure 4.15 – Block and Gravel Curb Inlet Protection

Plan View



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.

Figure 4.16 – Curb and Gutter Barrier

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 4.19 for details on silt fence construction.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence is not intended to treat concentrated flows, nor is it 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 silt fence, rather than by a sediment pond, is when the area draining to the fence is one acre or less and flow rates are less than 0.5 cfs.
- Silt fences should not be constructed in streams or used in V-shaped ditches. They are not an adequate method of silt control for anything deeper than sheet or overland flow.

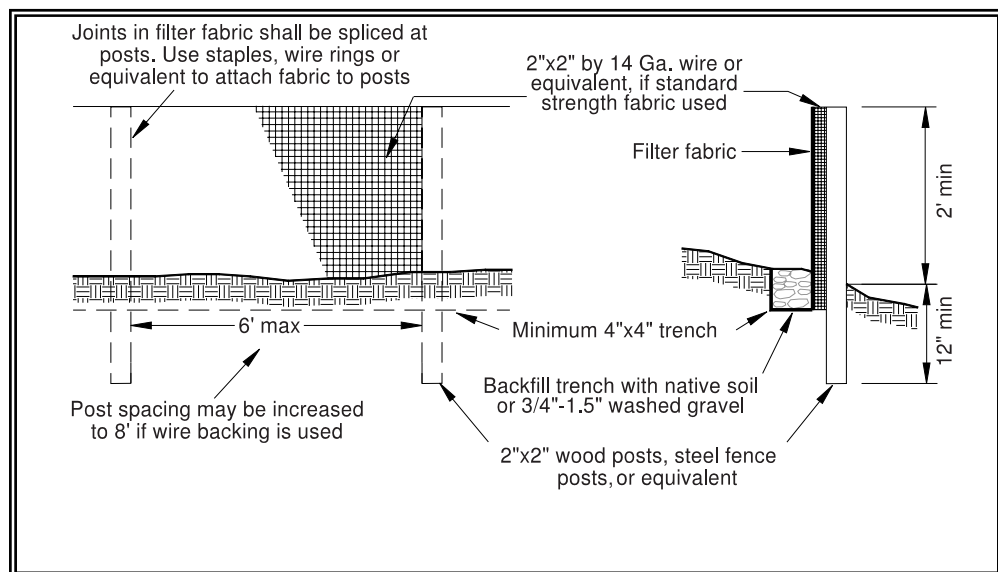


Figure 4.19 – Silt Fence

Design and Installation Specifications

- Drainage area of 1 acre or less or in combination with sediment basin in a larger site.
- Maximum slope steepness (normal (perpendicular) to fence line) 1:1.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- No 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 4.10):

Table 4.10 Geotextile Standards	
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film wovens (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 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. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Standard strength fabrics shall be supported 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.
- 100 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.
- Standard Notes for construction plans and specifications follow. Refer to Figure 4.19 for standard silt fence details.

The contractor shall install and maintain temporary silt fences at the locations shown in the Plans. The silt fences shall be constructed in the areas of clearing, grading, or drainage prior to starting those activities. A silt fence shall not be considered temporary if the silt fence must function beyond the life of the contract. The 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.

The minimum height of the top of silt fence shall be 2 feet and the maximum height shall be 2½ feet above the original ground surface.

The geotextile shall be sewn together at the point of manufacture, or at an approved location as determined by the Engineer, to form geotextile lengths as required. All sewn seams shall be located at a support post. 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.

The geotextile shall be attached on the up-slope side of the posts and support system with staples, wire, or in accordance with the manufacturer's recommendations. The geotextile shall be attached to the posts in a manner that reduces the potential for geotextile tearing at the staples, wire, or other connection device. Silt fence back-up support for the geotextile in the form of a wire or plastic mesh is dependent on the properties of the geotextile selected for use. If wire or plastic back-up mesh is used, the mesh shall be fastened securely to the up-slope of the posts with the geotextile being up-slope of the mesh back-up support.

The geotextile at the bottom of the fence shall be buried in a trench to a minimum depth of 4 inches below the ground surface. The trench shall be backfilled and the soil tamped in place over the buried portion of the geotextile, such that no flow can pass beneath the fence and scouring can not occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the trench a minimum of 3 inches.

The fence posts shall be placed or driven a minimum of 18 inches. A minimum depth of 12 inches is allowed if topsoil or other soft subgrade soil is not present and a minimum depth of 18 inches cannot be reached. Fence post depths shall be increased by 6 inches if the fence is located on slopes of 3:1 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.

Silt fences shall be located 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.

If the fence must cross contours, with the exception of the ends of the fence, gravel check dams placed perpendicular to the back of the fence shall be used to minimize concentrated flow and erosion along the back of the fence. The gravel check dams shall be approximately 1-foot deep at the back of the fence. It 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. The gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. The gravel check dams shall be located every 10 feet along the fence where the fence must cross contours. The slope of the fence line where contours must be crossed shall not be steeper than 3:1.

Wood, steel or equivalent posts shall be used. Wood posts shall have minimum dimensions of 2 inches by 2 inches by 3 feet minimum length, and shall be free of defects such as knots, splits, or gouges.

Steel posts shall consist of either size No. 6 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. or other steel posts having equivalent strength and bending resistance to the post sizes listed. The spacing of the support posts shall be a maximum of 6 feet.

Fence back-up 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 ultraviolet radiation as the geotextile it supports.

- Silt fence installation using the slicing method specification details follow. Refer to Figure 4.20 for slicing method details.

The base of both end posts must be at least 2 to 4 inches above the top of the silt fence 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.

Install posts 3 to 4 feet apart in critical retention areas and 6 to 7 feet apart in standard applications.

Install posts 24 inches deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.

Install posts with the nipples facing away from the silt fence fabric.

Attach the fabric to each post with three ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. In addition, each tie should be positioned to hang on a post nipple when tightening to prevent sagging.

Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties.

No more than 24 inches of a 36-inch fabric is allowed above ground level.

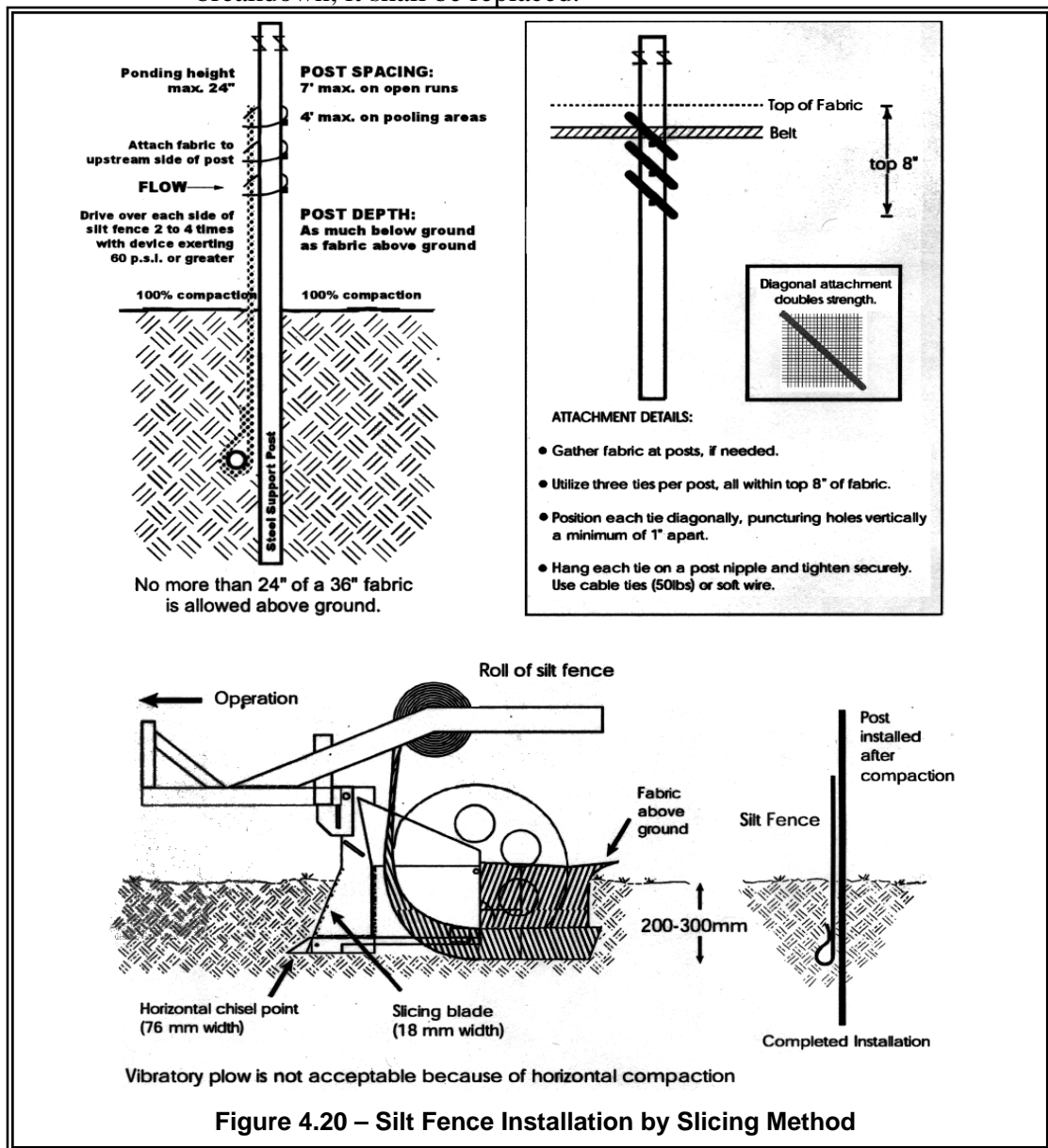
The rope lock system must be used in all ditch check applications.

The installation should be checked and corrected for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.

Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence 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.

Maintenance Standards

- Any damage shall be repaired immediately.
- If concentrated flows are evident uphill of the fence, they must be intercepted and conveyed to a sediment pond.
- 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.
- Sediment deposits shall either be removed when the deposit reaches approximately one-third the height of the silt fence, or a second silt fence shall be installed.
- If the filter fabric (geotextile) has deteriorated due to ultraviolet breakdown, it shall be replaced.



BMP C235: Straw Wattles

Purpose

Straw wattles are temporary erosion and sediment control barriers consisting of straw that is wrapped in biodegradable tubular plastic or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment. Straw wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length. The wattles are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes. See Figure 4.21 for typical construction details.

Conditions of Use

- Disturbed areas that require immediate erosion protection.
- Exposed soils during the period of short construction delays, or over winter months.
- On slopes requiring stabilization until permanent vegetation can be established.
- Straw wattles are effective for one to two seasons.
- If conditions are appropriate, wattles can be staked to the ground using willow cuttings for added revegetation.
- Rilling can occur beneath wattles if not properly entrenched and water can pass between wattles if not tightly abutted together.

Design Criteria

- It is critical that wattles are installed perpendicular to the flow direction and parallel to the slope contour.
- Narrow trenches should be dug across the slope on contour to a depth of 3 to 5 inches on clay soils and soils with gradual slopes. On loose soils, steep slopes, and areas with high rainfall, the trenches should be dug to a depth of 5 to 7 inches, or 1/2 to 2/3 of the thickness of the wattle.
- Start building trenches and installing wattles from the base of the slope and work up. Excavated material should be spread evenly along the uphill slope and compacted using hand tamping or other methods.
- Construct trenches at contour intervals of 3 to 30 feet apart depending on the steepness of the slope, soil type, and rainfall. The steeper the slope the closer together the trenches.
- Install the wattles snugly into the trenches and abut tightly end to end. Do not overlap the ends.
- Install stakes at each end of the wattle, and at 4-foot centers along entire length of wattle.
- If required, install pilot holes for the stakes using a straight bar to drive holes through the wattle and into the soil.
- At a minimum, wooden stakes should be approximately 3/4 x 3/4 x 24 inches. Willow cuttings or 3/8-inch rebar can also be used for stakes.

Maintenance Standards

- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.
- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.
- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.

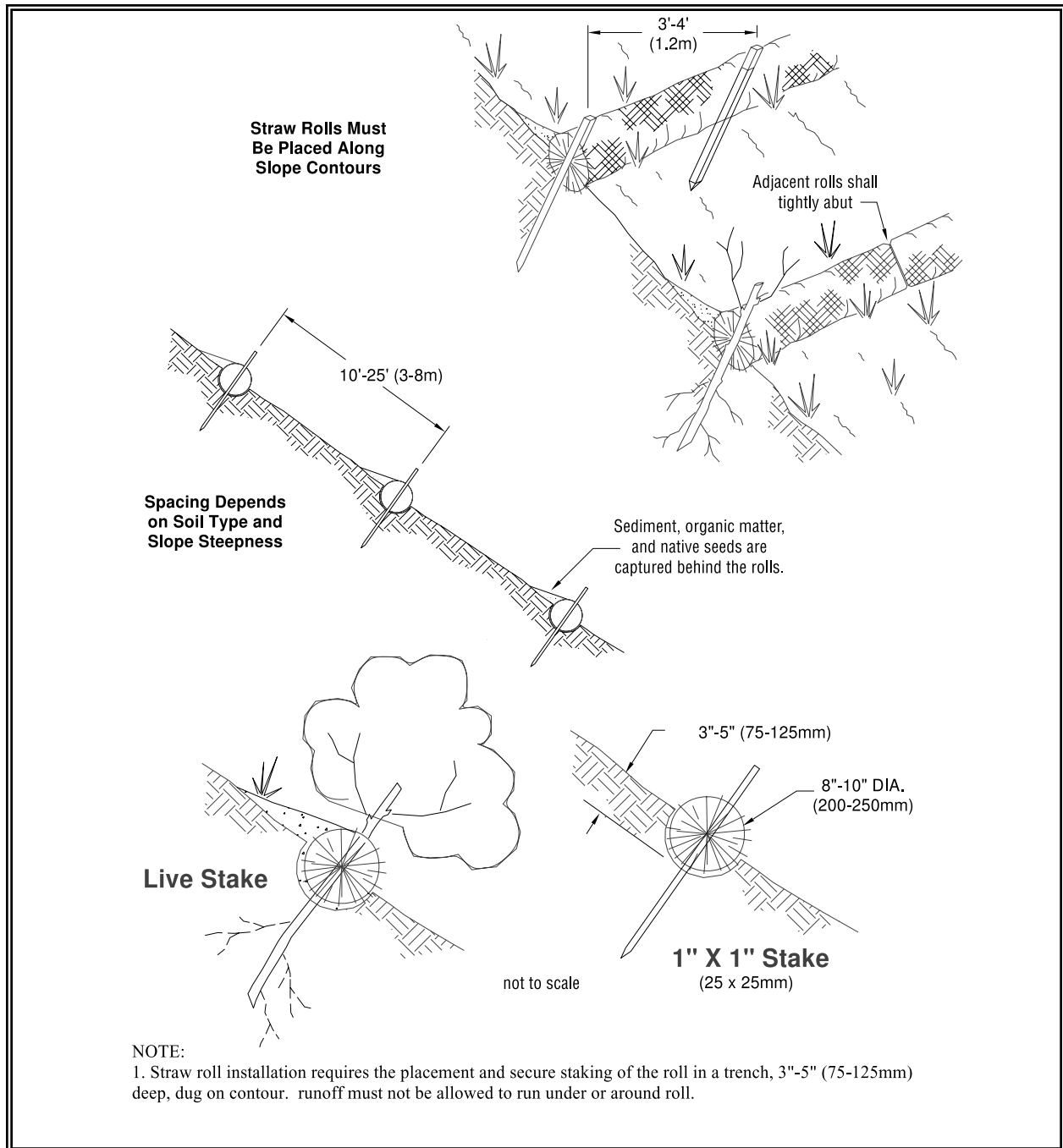


Figure 4.21 – Straw Wattles

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 onsite, relatively level, vegetated areas (see BMP C234 – Vegetated Strip). 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) 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 Figures 4.22 and 4.23 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 (V_s) 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:

$$SA = 2 \times Q_2 / 0.00096 \text{ or}$$

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.

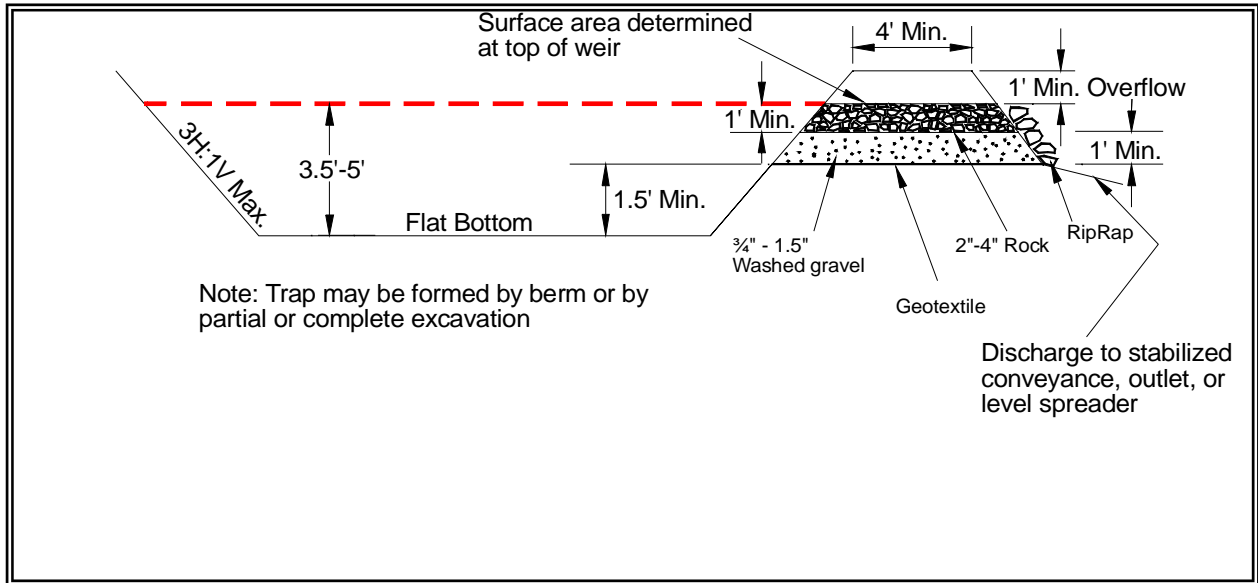


Figure 4.22 Cross Section of Sediment Trap

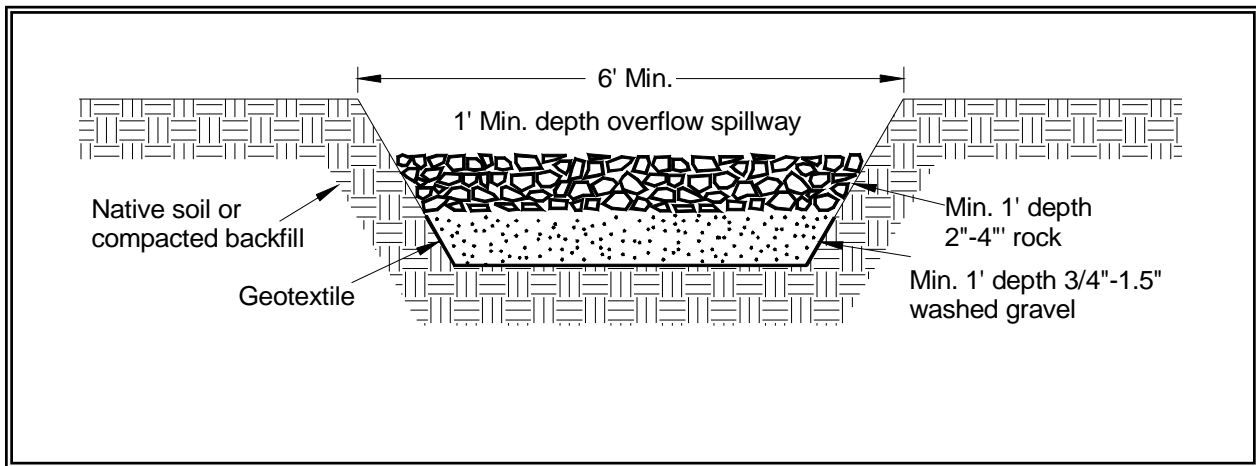


Figure 4.23 Sediment Trap Outlet

C. Correspondence

D. Site Inspection Form

Site Inspection Report

Site Name: _____ Inspection Area: _____

Division: _____ Inspection Date: _____ Inspector: _____

Permits: _____

Land Parcels: _____

Weather Conditions (check one): Dry Rain Snow Icy

Inspection Type (check one): Regular Final

Rainfall Amount at Time of Inspection: _____ (in inches)

Rainfall Duration: _____ (in hours) Pre-Storm

General		Yes	No	N/A
A.	Is the Storm Water Plan ("SWP") on site or its location posted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.	If required, are the Applicable Permit and/or NOI on site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.	Is contact information for the Site Storm Water Compliance Representatives provided on site and is it correct?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.	Since the last inspection, has Toll Brothers received written notice of a federal, state, or local inspection evaluating compliance with the Applicable Permit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E.	Was the Site Inspection Report for the last inspection signed by the Site Storm Water Compliance Representative and certified if and as required by the Applicable Permit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Maintenance		Yes	No	N/A
F.	Is there an excess of sediment or other pollutants exiting the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G.	Are off-site roads/gutters free of excessive sediment from the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H.	Are exit/entrance controls properly located and in working condition, with no maintenance necessary?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I.	Are exposed areas stabilized as required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J.	Are stockpiles located and stabilized as required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K.	Are other BMPs properly located, in working condition, and no repairs necessary?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L.	Are concrete, paint, and stucco washout areas properly located, in working condition, and no maintenance necessary?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M.	Are hazardous materials managed as required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N.	Are trash, construction debris, and other solid wastes managed as required; and on-site roads/gutters free of excessive sediment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
O.	Are portable toilets properly located and maintained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P.	Are the Site Storm Water BMPs and the SWP consistent with each other?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q.	Are there ruts, gullies, or other signs of accelerated erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R.	Are there any other compliance issues, inadequate BMPs, additional BMPs, or improvements this Site should address?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please note that this form must be kept with the Storm Water Plan ("SWP")

Site Inspection Report

Site Name: _____ Inspection Area: _____

Division: _____ Inspection Date: _____ Inspector: _____

Land Parcels: _____

Notes

Responsive Action Log

Unaddressed Action Items from Previous Inspections

Reference Number	Action Item and Location	Date Item Noted	Date Corrected	Due Date	Addressed By	Responsive Action Taken

New Action Items

Please note that this form must be kept with the Storm Water Plan ("SWP")

Site Inspection Report

Site Name:	Inspection Area:	
Division:	Inspection Date:	Inspector:
Land Parcels:		

INSERT CERTIFICATION IF AND AS REQUIRED BY THE APPLICABLE PERMIT

Name of Inspector	Signature of Inspector	Date
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INSERT CERTIFICATION IF AND AS REQUIRED BY THE APPLICABLE PERMIT

This form must be signed by a Site Storm Water Compliance Representative.

Site Storm Water Compliance Representative	Signature	Date
--	-----------	------

Please note that this form must be kept with the Storm Water Plan ("SWP")

Rain Event Site Inspection Report

Site Name: _____ Inspection Area: _____

Division: _____ Inspection Date: _____ Inspector: _____

Land Parcels: _____

Rainfall Amount at Time of Inspection: _____ (in inches)

Rainfall Duration: _____ (in hours) Pre-Storm

Walk through the entire construction area and look for

- 1. pollutant discharges;**
- 2. excessive sediment on off-site roads and gutters;**
- 3. erosion control measures that may have failed or been damaged;**
- 4. ruts, gullies, or other signs of accelerated erosion;**
- 5. existing erosion control measures that are inadequate; and**
- 6. areas which require additional erosion control measures.**

Maintenance		Yes	No	N/A
F.	Is there an excess of sediment or other pollutants exiting the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
G.	Are off-site roads/gutters free of excessive sediment from the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K.	Are other BMPs properly located, in working condition, and no repairs necessary?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q.	Are there ruts, gullies, or other signs of accelerated erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R.	Are there any other compliance issues, inadequate BMPs, additional BMPs, or improvements this Site should address?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes

Responsive Action Log

Unaddressed Action Items from Previous Inspections

Reference Number	Action Item and Location	Date Item Noted	Date Corrected	Due Date	Addressed By	Responsive Action Taken

Please note that this form must be kept with the Storm Water Plan ("SWP")

Rain Event Site Inspection Report

Site Name: _____ Inspection Area: _____

Division: _____ Inspection Date: _____ Inspector: _____

Land Parcels: _____

New Action Items

Please note that this form must be kept with the Storm Water Plan ("SWP")

Rain Event Site Inspection Report

Site Name:	Inspection Area:	
Division:	Inspection Date:	Inspector:
Land Parcels:		

INSERT CERTIFICATION IF AND AS REQUIRED BY THE APPLICABLE PERMIT

Name of Inspector	Signature of Inspector	Date
-------------------	------------------------	------

INSERT CERTIFICATION IF AND AS REQUIRED BY THE APPLICABLE PERMIT

This form must be signed by a Site Storm Water Compliance Representative.

Site Storm Water Compliance Representative	Signature	Date
--	-----------	------

Please note that this form must be kept with the Storm Water Plan ("SWP")

User Instructions for Site Inspection Report

GENERAL INSTRUCTIONS

These General Instructions describe the requirements for completion of the information and questions contained in the Site Inspection Report. There are separate instructions for access to and use of Toll Brothers' Storm Water Compliance reporting application.

- This form consists of the Site Inspection Report and Responsive Action Log.
- Only the Site Storm Water Compliance Representative and his/her Designee, including a Storm Water Consultant, are permitted to undertake the inspection required by this form. If you are not this person, you must contact the Division Storm Water Compliance Representative immediately.
- Each Action Item must have a corresponding Responsive Action. An Action Item is a condition that requires action to be taken to achieve or maintain compliance with Storm Water Requirements. A Responsive Action is an action taken to address an Action Item or to achieve or maintain compliance with Storm Water Requirements.
- Before proceeding with any inspection, you must first verify that the immediately previous inspection was conducted and the Site Inspection Report was completed. You must also determine whether all Responsive Actions identified from the prior inspection (including any rain events), if any, were undertaken within the time period allowed by the Applicable Permit.
- You must restate or carry over to the current Responsive Action Log any Responsive Action not completed since the last Regular Inspection or Rain Event Inspection regardless of the time period allowed by the Applicable Permit. For each Responsive Action carried forward, you should make a note in the prior Responsive Action Log that the Responsive Action has been carried forward. **Do not leave any blanks in a prior Responsive Action Log.**
- You must answer every question. Check "Yes", "No", or "N/A" for each question as appropriate. A response of "N/A" is only permitted where the designated area under "N/A" is not blocked out.
- If you check "No" for Questions A, B, C, E, G, H, I, J, K, L, M, N, O, and/or P, or "Yes" for Questions D, F, Q, and/or R on the Site Inspection Report, you must provide a reference number under the "Reference Number" column on the Responsive Action Log for each Action Item identified. Reference Numbers have a letter and a number. The first character matches the letter designation of the applicable question. The second character is numerical starting with number 1. Responsive Action reference numbers shall be successive thereafter as to the numerical portion, for example, F-1, F-2, F-3... G-1, G-2... H-1, I-1, etc.
- You must sign and date the completed Site Inspection Report. If you are a Storm Water Consultant or a Designee for the Site Storm Water Compliance Representative and you complete this form, the Site Storm Water Compliance Representative must review and sign the completed form as well.

- A copy of each completed Site Inspection Report must be kept with the SWP.
- At the conclusion of the Site Inspection, submit the Inspection Report to the Toll Brothers' Storm Water Compliance intranet-based reporting application.
- You must record the following information on each Site Inspection Report:
 - ✓ Site Name. Insert the name of the Toll Brothers' Community.
 - ✓ Inspection Area. Enter the name of the portion(s) of the Site that is (are) being inspected.
 - ✓ Division. Insert the name of the Toll's operating division responsible for the Site identified on the form.
 - ✓ Inspection Date. Insert the date on which the inspection is being performed.
 - ✓ Inspector. Enter the name of the person performing the inspection.
 - ✓ Weather conditions. Check the appropriate description that best describes weather conditions during the inspection.
 - ✓ Type of Inspection. Check the inspection type that represents the purpose of the inspection. Only one inspection type may be checked. A Regular Inspection is one conducted according to the regular schedule of inspections for a Site, and includes rain event inspection information, when applicable. A Final Inspection is the last inspection planned prior to obtaining the Notice of Termination.
 - ✓ Rainfall Amount at Time of Inspection: Enter the total amount of rain (in inches) that has fallen for the rainfall event covered by the inspection.
 - ✓ Rainfall Duration: Enter the length of the rainfall event in hours.
 - ✓ Pre-Storm Box: Check this box if you are performing an inspection in advance of a predicted rainfall event. (California is the only state with the current requirement to perform a Pre-Storm Inspection.)

INSTRUCTIONS FOR COMPLETING INDIVIDUAL QUESTIONS

- You must respond to all of the following questions on each and every Site Inspection Report:
 - A. **Is the Storm Water Plan (“SWP”) on site or its location posted?** – You must verify that the SWP is either at the construction office if the Site has one, or that the location of the SWP is posted.

- B. **If required, are the Applicable Permit and/or NOI on site?** – You must verify that the Applicable Permit and notification letter (if applicable) are on site if required under the Applicable Permit. Maintain a complete copy of the Applicable Permit in the SWP Binder.
- C. **Is contact information for the Site Storm Water Compliance Representatives provided on site and is it correct?** – You must verify that the name(s) and the phone number(s) of the Site Storm Water Compliance Representative(s) are located in a conspicuous place on site and are correct and legible.
- D. **Since that last inspection, has Toll Brothers received written notice of a federal, state, or local inspection evaluating compliance with the Applicable Permit?** - The notice contemplated by this question is written notice from a federal, state, or local entity regarding a storm water inspection evaluating compliance with the Applicable Permit (i.e., the NPDES or State equivalent storm water permit). Local inspections evaluating compliance with local programs (e.g. post-construction stormwater management of locally approved erosion and sediment control) do not require an answer of yes to this question. If, however, Toll has received written notice of a federal, state, or local inspection evaluating compliance with the Applicable Permit, you must record the name of the agency that performed the inspection, the name and the position of the person that performed the inspection for the agency, and the date of the inspection. Further, you must include on the Responsive Action Log a description of the Action Items that were identified on the federal, state, or local inspection.
- E. **Was the Site Inspection Report for the last inspection signed by the Site Storm Water Compliance Representative and certified if and as required by the Applicable Permit?** – You must verify that the Site Inspection Report for the prior inspection was signed and, if required under the Applicable Permit, verified by the person undertaking that inspection, whether that person was the Site Storm Water Compliance Designee or the Site Storm Water Compliance Representative. You must also verify the Site Storm Water Compliance Representative reviewed and signed the form if the Site Storm Water Compliance Designee conducted the Site Inspection.
- **Maintenance** - Assign a separate reference number to each Action Item identified within the following categories and briefly describe the Responsive Action required to address the Action Item.
- F. **Is there an excess of sediment or other pollutants exiting the site?** – You must verify that neither an excess of sediment nor an excess of other pollutants are exiting the site. You should check applicable BMPs such as outfalls, exit/entrance controls, site perimeter controls, receiving water courses and adjacent off-site areas for excessive sediment or other excessive pollutant discharges. You should determine and record the source of the excessive sediment or other pollutants. If an off-site property is discharging sediment or

pollutants onto the site, record that information and whether the off-site source is contributing to the excessive discharge from the site.

- G. **Are off-site roads/gutters free of excessive sediment from the site?** – You must verify that the roads adjacent to the site are free of excessive sediment. You should determine and record the source of the excessive sediment. If an off-site property is contributing to or causing the excessive sediment in the off-site roads or gutters, record that information.
- H. **Are exit/entrance controls properly located and in working condition, with no maintenance necessary?** – You must verify that exit/entrance controls are properly located, in working condition, and no repairs are necessary. You should check that exit/entrance controls, such as stone tracking pads, rumble grates, and related controls for the construction entrance and other access points are in place and are maintained pursuant to the SWP.
- I. **Are exposed areas stabilized as required?** – You must verify that exposed areas are stabilized, if and as required by the Applicable Permit. Exposed areas are any areas that have been disturbed or have otherwise lost natural cover. You should check that areas where construction activity has ceased or has been temporarily suspended are stabilized in accordance with the SWP.
- J. **Are stockpiles located and stabilized as required?** – You must verify that stockpiles are located and stabilized as required. You should check that stockpiles are located in areas where they may minimize the potential for discharging excessive sediment from the site or onto any road or gutter and that they have been stabilized in accordance with the SWP.
- K. **Are other BMPs properly located, in working condition, and no repairs necessary?** – You must verify that BMPs are properly located and in working condition and that no repairs are necessary. You should check that BMPs (including perimeter controls, soil stabilization techniques, sediment ponds/traps and inlet protection) are properly placed, appear to be working, and are maintained in accordance with the SWP.
- L. **Are concrete, paint, and stucco washout areas properly located, in working condition, and no maintenance necessary?** – You must verify that concrete, paint, and other washouts are properly placed, appear to be working, and are maintained in accordance with the SWP.
- M. **Are hazardous materials managed as required?** – You must verify that hazardous materials are managed as required. You should check that storage and containment areas and controls are implemented in accordance with the SWP, and confirm that hazardous materials are properly managed (no leaks or spills).
- N. **Are trash, construction debris, and other solid wastes managed as required; and on-site roads/gutters free of excessive sediment?** – You must verify that trash, construction debris, and other solid wastes are managed as required. You should check that controls for the collection and storage of

trash, construction debris, and other solid wastes are properly placed, appear to be effective, and are maintained in accordance with the SWP. You must verify that the on-site roads and gutters are free of excessive sediment.

- O. **Are portable toilets properly located and maintained?** – You must verify that portable toilets are provided and properly located. You should check that portable toilets are located off roads and away from gutters and inlets and are properly anchored and maintained.

- P. **Are the Site Storm Water BMPs and the SWP consistent with each other?** – You must verify that site BMPs and the SWP are consistent with each other. You should check that the BMPs shown on the SWP for the current stage of construction exist on site, and that the BMPs that exist on site are shown on the SWP. In particular, you must make sure that any map or figure within the SWP is consistent with what has been installed on the ground. Even if we have installed additional BMPs not originally called for in the SWP, the additional BMPs must be shown on the map.

- Q. **Are there ruts, gullies, or other signs of accelerated erosion?** – You must verify that there are no signs of accelerated erosion, including ruts or gullies. Be certain to check all unstabilized areas, slopes, and conveyance swales and ditches.

- R. **Are there any other compliance issues, inadequate BMPs, additional BMPs, or improvements this Site should address?** – You must verify that the Site is in compliance with other conditions of the Applicable Permit, and all BMPs are adequate and performing to the requirements of the SWP.

USER INSTRUCTIONS FOR RAIN EVENT SITE INSPECTION REPORT

GENERAL INSTRUCTIONS

This form is to be used when a NPDES Rain Event Inspection is required by the Applicable Permit. Do not use this form for Regularly Scheduled Inspections.

When a rain event occurs in conjunction with a regularly scheduled inspection (e.g. the community receives ½" of rain that ends less than 24 hours before the regularly scheduled inspection day), use the Regular Site Inspection Report.

This form will be used when a rain event occurs at all other times, including weekends.

- Within 24 hours of a rain event occurring, complete the Rain Event Site Inspection Report.
- Complete the Site Name, Inspection Area, Division, Inspection Date, Inspection Time, and Inspector's Name information at the top.
- List the Rainfall Amount received and the length of the storm (in hours) at the Site. Obtain the information from the on-site rain gauge, or from a weather information website for your location. Check the Pre-Storm box if you are performing an inspection in advance of a predicted rainfall event (currently only required by California).

INSTRUCTIONS FOR COMPLETING INDIVIDUAL QUESTIONS

Walk through the entire construction area and look for signs of

1. pollutant discharges;
 2. excessive sediment on off-site roads and gutters;
 3. erosion control measures that may have failed or been damaged;
 4. ruts, gullies, or other signs of accelerated erosion;
 5. existing erosion control measures that are inadequate; and
 6. areas which require additional erosion control measures.
- You must respond to all of the following questions on each and every Rain Event Site Inspection Report.
 - F. **Is there an excess of sediment or other pollutants exiting the site?** – You must verify that neither an excess of sediment nor an excess of other pollutants are exiting the site. You should check applicable BMPs such as outfalls, exit/entrance controls, site perimeter controls, receiving water courses and adjacent off-site areas for excessive sediment or other excessive pollutant discharges. You should determine and record the source of the excessive sediment or other pollutants. If an off-site property is discharging sediment or pollutants onto the site, record that information and whether the off-site source is contributing to the excessive discharge from the site.

- G. **Are off-site roads/gutters free of excessive sediment from the site?** – You must verify that the roads adjacent to the site are free of excessive sediment. You should determine and record the source of the excessive sediment. If an off-site property is contributing to or causing the excessive sediment in the off-site roads or gutters, record that information.
- K. **Are other BMPs properly located, in working condition, and no repairs necessary?** – You must verify that BMPs are properly located and in working condition and that no repairs are necessary. You should check that BMPs (including perimeter controls, soil stabilization techniques, sediment ponds/traps and inlet protection) are properly placed, appear to be working, and are maintained in accordance with the SWP.
- Q. **Are there ruts, gullies, or other signs of accelerated erosion?** – You must verify that there are no signs of accelerated erosion, including ruts or gullies. Be certain to check all unstabilized areas, slopes, and conveyance swales and ditches.
- R. **Are there any other compliance issues, inadequate BMPs, additional BMPs, or improvements this Site should address?** – You must verify that the Site is in compliance with other conditions of the Applicable Permit, and all BMPs are adequate and performing to the requirements of the SWP.

INSTRUCTIONS FOR COMPLETING THE RESPONSIVE ACTION LOG

- You must record each reference number on the Responsive Action Log in the first column under “Reference Number”. Each reference number must be listed on a separate line.
- For each reference number, you must identify in the “Action Item and Location” column the condition that requires action to be taken to achieve or maintain compliance with Storm Water Requirements, and give location information.
 - If a condition relates to a BMP, you must identify the applicable BMP by type and location and state the action necessary to achieve or maintain compliance with the SWP. If a condition relates to anything other than a BMP, you must briefly describe the condition that requires action and the action necessary to achieve or maintain compliance with the SWP.
- You must record the date the Action Item was first identified in the “Date Item Noted” column.
- The date recorded for a Responsive Action under the “Date Item Noted” column will not change, even if the Responsive Action is carried over to subsequent Responsive Action Logs. When a Responsive Action is restated or carried over to a new Responsive Action Log, you must restate or carry over the date for the Responsive Action as identified on the first Responsive Action Log on which the Responsive Action appeared.
- **The Site Storm Water Compliance Representative or the Storm Water Consultant Designee is responsible for recording the date each Responsive Action is corrected.** If the Site Storm Water Compliance Representative or the Storm Water Consultant Designee actually performed the Responsive Action, he or she should date the Responsive Action Log the same day as the Responsive Action is completed. If a Contractor performs the Responsive Action, the Site Storm Water Compliance Representative or the Storm Water Consultant Designee must confirm that the Responsive Action has been completed and record the date the Responsive Action was completed by the Contractor. The Site Storm Water Compliance Representative or the Storm Water Consultant Designee should record the individual or company that performed the Responsive Action in the “Addressed By” box.
- You must provide a description of the measures used to correct the Action Item in the column “Responsive Action Taken”.

Construction Stormwater Site Inspection Form

Project Name _____ **Permit #** _____ **Inspection Date** _____ **Time** _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*
 Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear Cloudy Mist Rain Wind Fog

A. Type of inspection: Weekly Post Storm Event Other

B. Phase of Active Construction (check all that apply):

Pre Construction/installation of erosion/sediment controls	<input type="checkbox"/>	Clearing/Demo/Grading	<input type="checkbox"/>	Infrastructure/storm/roads	<input type="checkbox"/>
Concrete pours	<input type="checkbox"/>	Vertical Construction/buildings	<input type="checkbox"/>	Utilities	<input type="checkbox"/>
Offsite improvements	<input type="checkbox"/>	Site temporary stabilized	<input type="checkbox"/>	Final stabilization	<input type="checkbox"/>

C. Questions:

- | | | | |
|--|-----|----|--|
| 1. Were all areas of construction and discharge points inspected? | Yes | No | |
| 2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen | Yes | No | |
| 3. Was a water quality sample taken during inspection? (<i>refer to permit conditions S4 & S5</i>) | Yes | No | |
| 4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* | Yes | No | |
| 5. If yes to #4 was it reported to Ecology? | Yes | No | |
| 6. Is pH sampling required? pH range required is 6.5 to 8.5. | Yes | No | |

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: _____ Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required" details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

E. Check all areas that have been inspected. ✓

All in place BMPs All disturbed soils All concrete wash out area All material storage areas
 All discharge locations All equipment storage areas All construction entrances/exits

Construction Stormwater Site Inspection Form

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

Title/Qualification of Inspector: _____

E. Construction Stormwater General Permit (CSWGP)

F. 303(d) List Waterbodies / TMDL Waterbodies Information



Washington State Water Quality Assessment 303(d)/305(b) List

Assessment WQ Search Tool Contact Us WQ Atlas

17 Matched Listings

The 303(d) List contains only Category 5 Listings.

View	ListingID	Assessment Unit ID	Medium	Parameter	Current Category	Waterbody Name	WRIA	WQ Improvement Project	WQ Atlas Map Link
View	13140	17110012001408	Water	Bacteria	1	EBRIGHT CREEK	8 - Cedar-Sammamish		13140
View	13562	17110012001408	Water	Ammonia-N	1	EBRIGHT CREEK	8 - Cedar-Sammamish		13562
View	13563	17110012001408	Water	Arsenic	1	EBRIGHT CREEK	8 - Cedar-Sammamish		13563
View	13568	17110012001408	Water	Copper	1	EBRIGHT CREEK	8 - Cedar-Sammamish		13568
View	13574	17110012001408	Water	Selenium	1	EBRIGHT CREEK	8 - Cedar-Sammamish		13574
View	12663	17110012001408	Water	Dissolved Oxygen	2	EBRIGHT CREEK	8 - Cedar-Sammamish		12663
View	13571	17110012001408	Water	Mercury	2	EBRIGHT CREEK	8 - Cedar-Sammamish		13571
View	4821	17110012001408	Water	Temperature	3	EBRIGHT CREEK	8 - Cedar-Sammamish		4821
View	12638	17110012001408	Water	pH	3	EBRIGHT CREEK	8 - Cedar-Sammamish		12638
View	13565	17110012001408	Water	Cadmium	3	EBRIGHT CREEK	8 - Cedar-Sammamish		13565
View	13567	17110012001408	Water	Chromium	3	EBRIGHT CREEK	8 - Cedar-Sammamish		13567
View	13570	17110012001408	Water	Lead	3	EBRIGHT CREEK	8 - Cedar-Sammamish		13570
View	13572	17110012001408	Water	Nickel	3	EBRIGHT CREEK	8 - Cedar-Sammamish		13572
View	13575	17110012001408	Water	Silver	3	EBRIGHT CREEK	8 - Cedar-Sammamish		13575
View	13576	17110012001408	Water	Zinc	3	EBRIGHT CREEK	8 - Cedar-Sammamish		13576
View	76855	17110012001408	Water	Chloride	3	EBRIGHT CREEK	8 - Cedar-Sammamish		76855
View	70113	17110012001408	Other	Bioassessment	5	EBRIGHT CREEK	8 - Cedar-Sammamish		70113

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Approved WQA Version: 1.0.7

Listing ID: 70113			
Main Listing Information			
Listing ID: 70113	2014 Category: 5		
Waterbody Name: EBRIGHT CREEK	2012 Category: 3		
Medium: Other	2008 Category: 3		
Parameter: Bioassessment	2004 Category: 3		
WQI Project: None Assigned	On 1998 303(d) List?: N		
Designated Use: None Assigned	On 1996 303(d) List?: N		
Assessment Unit			
Assessment Unit ID: 17110012001408			
Location Identification			
Counties: King		WRIA: 8 - Cedar-Sammamish	
Waterbody ID (WBID): None Assigned		Waterbody Class: None Assigned	
Town/Range/Section (Legacy): 25N-6E-32			
Basis			
Location ID [08LAK3627] was sampled by King County - the Benthic Index of Biotic Integrity (B-IBI) score was 26 in 2006, 34 in 2007, 34 in 2008, 26 in 2009, 26 in 2010			
Remarks			
Remark	Modified By	Modified On	Visibility
The source of the benthic macroinvertebrate community data and associated B-IBI scores is the Puget Sound Stream Benthos database, which is maintained by King County.	Patrick Lizon	12/22/2015	Private
The listing has been reassessed under the current Policy 1-11 and has been moved from Category 3 to Category 5 based on new data.	Patrick Lizon	8/14/2015	Private
The listing has been placed in Category 5 because the two most recent data points indicate that biological integrity is degraded or because two or more B-IBI/RIVPACS data points in the most recent five data points indicate biological degradation and the scores do not qualify for Category 1 or Category 2. A B-IBI score \leq 27 and a RIVPACS score less than 0.73 indicates degraded biological integrity. A data point is the lowest bioassessment score observed for a given year.	Curtis Cooper	8/13/2015	Public
EIM			
No EIM Records Entered			

Print

G. Contaminated Site Information

H. Engineering Calculations

Developed Site: 1.89 impervious surfaces

15-minute timestep:

Flow Frequency Analysis
Time Series File:west.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates---			-----Flow Frequency Analysis-----			
Flow Rate (CFS)	Rank	Time of Peak	- - Peaks (CFS)	- - Rank	Return Period	Prob
0.900	6	8/27/01 18:00	2.23	1	100.00	0.990
0.628	8	9/17/02 17:45	1.70	2	25.00	0.960
1.70	2	12/08/02 17:15	1.22	3	10.00	0.900
0.725	7	8/23/04 14:30	1.01	4	5.00	0.800
0.954	5	10/28/04 16:00	0.954	5	3.00	0.667
1.01	4	10/27/05 10:45	0.900	6	2.00	0.500
1.22	3	10/25/06 22:45	0.725	7	1.30	0.231
2.23	1	1/09/08 6:30	0.628	8	1.10	0.091
Computed Peaks			2.05		50.00	0.980

Developed Site: 2.37 impervious surfaces

15-minute timestep:

Flow Frequency Analysis
Time Series File:east.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates---			-----Flow Frequency Analysis-----			
Flow Rate (CFS)	Rank	Time of Peak	- - Peaks (CFS)	- - Rank	Return Period	Prob
1.13	6	8/27/01 18:00	2.80	1	100.00	0.990
0.788	8	9/17/02 17:45	2.14	2	25.00	0.960
2.14	2	12/08/02 17:15	1.53	3	10.00	0.900
0.909	7	8/23/04 14:30	1.26	4	5.00	0.800
1.20	5	10/28/04 16:00	1.20	5	3.00	0.667
1.26	4	10/27/05 10:45	1.13	6	2.00	0.500
1.53	3	10/25/06 22:45	0.909	7	1.30	0.231
2.80	1	1/09/08 6:30	0.788	8	1.10	0.091
Computed Peaks			2.58		50.00	0.980