

APPENDIX D:
**Stormwater Facilities Operations
And Maintenance Manual**

**LOOMIS TRAIL PHASE I
BIRCH BAY, WASHINGTON**

**STORMWATER FACILITIES
OPERATION & MAINTENANCE PLAN**

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**LOOMIS TRAIL PHASE I
STORMWATER OPERATIONS AND MAINTENANCE MANUAL**

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1. Introduction

This plan has been prepared for use by the Loomis Trail Phase I owner for the operation and maintenance of the site's stormwater facilities. This manual describes each of the stormwater system components, how they are intended to operate, and what maintenance activities should be followed. The three main components are the stormwater conveyance system, stormwater treatment biofiltration swales and a stormwater treatment wet pond. Each component is designed to operate with a minimum of maintenance, however some maintenance will be required.

2. Stormwater Conveyance System

2.1 Description:

Stormwater runoff from streets, driveways and roof drains is captured in a series of catch basins located throughout the site.

2.2 Operation:

The stormwater conveyance system is designed to operate trouble free for many years. There are no operational needs for the system other than the maintenance functions listed below.

2.3 Maintenance:

Catch Basins:

Catch basins should be visually inspected every six months. The grates should be removed, and a light directed at the pipe inverts and catch basin sump. Any debris should be removed from the catch basin. Any large build up of sediment in the sump areas should also be removed.

Storm Piping:

Storm conveyance pipes should be inspected at the same time as catch basins. Careful attention should be given to the build up of sediment and debris within the invert (bottom) of the pipe. If more than one-inch of sediment is observed, then the sediments should be removed through cleaning. Any line flushing to remove sediment or debris should only be done during periods of dry weather. This is to avoid the potential of sediment laden cleaning water from being allowed to enter the downstream system and diminishing the function of the stormwater treatment swale, or wetland systems downstream of the swale.

3. Stormwater Treatment Wet Pond System

3.1 Description:

Treatment of stormwater is achieved in several areas of the system. Large sediment particles are trapped within the sumps of the catch basins located throughout the parking lot. Runoff is routed to stormwater treatment wet pond. This wet pond is a pond that contains a permanent pool of water that provides water quality treatment when vegetation captures and breaks down pollutants. Water already in the pond is displaced when incoming flows enter the pond.

3.2 Operation and Maintenance:

- Floating debris and accumulated petroleum products should be removed as needed, but at least annually.
- Site vegetation around the pond area should be trimmed as necessary to keep the pond free of leaves and to maintain the aesthetic appearance of the site. Slope areas that have become bare should be re-vegetated and eroded areas should be regraded prior to being re-vegetated.
- The wet pond should be inspected at least twice per year during the first three years during both growing and non-growing seasons to observe plant species presence, abundance, and condition. Pond configuration and water depth shall also be observed for sediment build up conformance to the design plans. Provide corrective measures as required.
- Plants may require watering, physical support, mulching, weed removal, or replanting during the first three years.
- Nuisance plant species should be removed and desirable species should be replanted.

4. Stormwater Treatment Biofiltration Swale

4.1 Description:

Treatment of stormwater from the Castlerock Drive is accomplished with an engineered biofiltration swale. The swale is designed to mimic the naturally occurring treatment benefits of wetland areas. Because of this, little to no maintenance will be required within the swale itself.

4.2 Operation:

The stormwater treatment facility has been designed to meet WDOE design criteria. Under low flow conditions, stormwater runoff from impervious areas throughout the site are routed to the biofiltration swale. Vegetation within the swale provides mechanical removal of additional sediments by slowing the water flow through the stems of the vegetation. The vegetation also allows for the biological uptake of excess nutrients within the stormwater, preventing pollutants from reaching downstream wetland areas.

4.3 Maintenance:

Maintenance of the biofiltration swale will be comprised of removing trash and debris, and occasional mowing. Inspection of the ditch should be made monthly. During this routine inspection, the following actions should be taken:

- Any obvious trash and/or debris should be removed.
- The vegetation should also be inspected for good, uniform growth. If patches are noted that do not exhibit a good dense stand of grasses, then additional seed should be placed, with watering as necessary to germinate the seed and allow for healthy growth. Build up of woody vegetation needs to be checked. Small trees or other woody vegetation should be mowed or otherwise removed. Mowing of the grass vegetation below this elevation once to twice a year should be

adequate to avoid build up of woody vegetation. Woody vegetation should also be removed in the overflow area along the north portion of the berm.

- The grass, located at the bottom of the swale, should be cut to a minimum height of 4" on an as needed basis.
- In the event there is any observance of oil, gasoline or other contaminants or pollutants, then coordination should be made with a local water quality response agency for cleanup. Whatcom County Public Works Department can direct the O&M manager to the appropriate agency.
- Side slopes should be inspected for signs of erosion. Any erosion areas should be stabilized and re-seeded. If erosion problems reoccur on a frequent basis, a civil engineer should be consulted for a more permanent remedy.

If the occurrence of trash/debris is routinely found during the monthly inspections, then inspection frequency should be increased.