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COVER SHEET
STORMWATER OPERATION AND MAINTENANCE MANUAL

GRANTOR: Port Gardner Timber

GRANTEE: Skagit County

LEGAL DESCRIPTION

Ptn SE $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 11; Gov. Lot 12 ptn Gov. Lot 13 of Sec. 12; ptn NW $\frac{1}{4}$ Of the NW $\frac{1}{4}$ & ptn Gov. Lot 4 of Sec. 13, all in Twp 35 N Rng 7 E W.M.

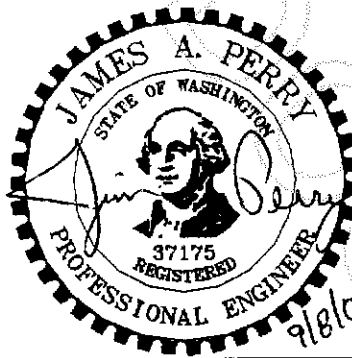
ASSESSOR'S PROPERTY TAX PARCEL NUMBER: P42509, P42579, P42580, P42535,
P42557

OPERATION AND MAINTENANCE MANUAL

FOR THE
ELYSIAN MEADOWS
STORMWATER DRAINAGE SYSTEM

December 2002

Prepared By



EXPIRES 7/18/05



SURVEYING * CIVIL ENGINEERING * SUBDIVISIONS * LAND USE PLANNING * ELEVATIONS

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OPERATION AND MAINTENANCE MANUAL

FOR THE

ELYSIAN MEADOWS

STORMWATER DRAINAGE SYSTEM

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EXHIBITS:

- A. LOT AND EASEMENT LAYOUT
- B. STORMWATER SYSTEM LAYOUT
- C. ROUTINE MAINTENANCE LOG
- D. LOG OF UNSCHEDULED MAINTENANCE



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I. PURPOSE OF MANUAL

The purpose of this manual is to outline the procedures for the proper operation and maintenance of the stormwater drainage facilities for Elysian Meadows as required to be maintained by the Elysian Meadows Homeowners Association.

The Elysian Meadows Homeowners Association has the responsibility for all reasonable and necessary maintenance and repairs of the stormwater drainage facilities as required by and is a part of the plat for Elysian Meadows.

The plat for Elysian Meadows states:

"The drainage facilities are designed and constructed to accommodate roadway stormwater runoff from the plat of Elysian Meadows. The Homeowners Association for the plat of Elysian Meadows shall maintain, repair, replace and otherwise manage the stormwater drainage facilities in Elysian Lane, (Corporate Road, Tract J), and in specified drainage easements, in accordance with a maintenance plan submitted to and approved by Skagit County. If at any time Skagit County reasonably determines that maintenance or repair work is required to be done to the stormwater drainage facilities, the director of the Department of Public Works shall give fourteen days notice to the Homeowners Association that the County intends to perform such maintenance or repairs, or to have them performed by others.

If at any time Skagit County reasonably determines that any existing stormwater drainage facilities pose a hazard to life and limb, or endangers property, or adversely affects the safety and operations of a public way, and that the situation is so adverse as to preclude written notice, the director of the Department of Public Works may take measures reasonably necessary to eliminate the hazardous situation, provided the director has made a reasonable effort to contact the Homeowners Association before acting. The Homeowners Association will assume responsibility for the cost of any maintenance or repair under this section, and will reimburse the County within thirty days of receipt of an invoice."

For the benefit of the Elysian Meadows Homeowners /association, conditions should not be allowed to deteriorate nor maintenance not performed on-site which would force the county to perform maintenance on the drainage facilities.

II. LAYOUT OF FACILITY

In the development of Elysian Meadows, the drainage of the north side of the first part of the road is designed to be directed to an infiltration trench. The north side of the last part of the road is collected and directed via a ditch to be spread onto



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the field. The entire width of the road is sloped to the north thus all road drainage is to the north.

Runoff from the roofs and driveways is to be discharged to the surrounding area around each house.

Exhibit "A" shows the overall layout of the lots for Elysian Meadows.

Exhibit "B" shows the layout of the road and drainage system for Elysian Meadows. Also shown are the drainage easements of which the Association has legal right of access for maintenance purposes.

III. FUNCTION OF THE DRAINAGE UNITS

A. GRASS-LINED SWALES

Water quality treatment for the access road is provided by a biofiltration swale located along the north side of the road. The swale is designed to be a minimum of 1-foot in depth with side slopes of 3:1. As water flows off the road surface across the grassed swale slope, and then along the grass-lined swale, suspended solids settle out. In addition, as the water flows through the vegetation, some pollutants (such as oil) are partially removed by the vegetation.

The soil in the swale also provide treatment for removal of pollutants as some water infiltrates into the ground. Organic matter and clay in the soil sorb, decompose and/or filter pollutants from the stormwater. Sorb is the process where the pollutants are taken up and held by either absorption or adsorption.

B. CATCH-BASIN

The catch basin is designed with a sump for further collection of sediment. A tee assembly functions as an oil separator by not allowing oil scum to be discharged to the infiltration trench. The removable grate lid allows for accumulated sediment to be removed. No mechanism is provided for automatic removal of any accumulated floating oil.

If considerable amount of oil does accumulated, the oil will need to be removed by skimming or use of absorbent material.

C. INFILTRATION TRENCH

The infiltration trench is backfilled with stone aggregate (usually referred to as drain rock) which allows for temporary storage of stormwater runoff in the voids of the rock. The water is distributed in the trench by a 6-inch perforated pipe in the upper part of the trench. Stored water then gradually infiltrates into the surrounding soil



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The trench is lined with 6 inches of loamy sand to slow down the percolation rate and to provide further treatment of the pollutants in the stormwater. The trench is designed so that during a rainstorm, the trench could fill up with water and spill over onto adjacent permeable soil. Additional ponding storage is provided around the infiltration trench area because the culvert invert is 12 inches higher than the top of the catch basin. A berm at the north end of the infiltration trench is to keep water from flowing north to the bank of the Skagit River. Any stormwater overflow is intended to flow south and spread in the fields to the south.

There is an observation pipe at the end of the trench in order to check the water level in the trench. Observation of the water level can be used to determine draw-down time that is affected by sediment build-up.

D. SWALE/FIELD DISPERSION

The infiltration trench collects water from the north side of first 570 feet of road. Stormwater runoff from the north side of the remaining 1300 feet of road is collected in the roadside ditch. A culvert conveys water under the road. From there the stormwater is conveyed in a grass-lined swale south along the west then south side of Lot 8, where the water then is dispersed to the southern flat portion of the large open field on Lot 7.

The reason for this route is to keep the buildable areas for Lots 7 and 8 free from sheet flowing stormwater. A culvert at the end of the swale provides for a driveway for Lot 9.

IV. NORMAL OPERATING AND MAINTENANCE PROCEDURES

Your drainage system is designed for minimal operating and maintenance procedures. The main objective is to make sure there is no standing water in the ditches when there should not be any.

Following are the normal procedures for the proper functioning of the drainage system:

1. During your normal driving of Elysian Lane, inspect and keep the bottom of the road swale clear of debris. Watch for any section of the swale where an unusual amount of silt may be accumulating. Remove the silt to the original flowline of the swale. Twice a year, at the beginning and end of the rainy season (suggest September and April), the entire length of the road swale needs to be carefully inspected and cleaned. Inspect and clean the swale after every major storm.

The grass swale is to be mowed regularly during the growing season. Grass clippings are to be removed from the swale and disposed of appropriately. The swale shall be free of garbage and any material



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that could flow into the infiltration trench. Any exposed soil patches should be grass seeded immediately.

2. Twice a year, clean out the silt accumulated in the sump of the catch basin. The best time of the year to do this is at the beginning and end of the rainy season (as with item No. 1, suggest September and April).

After every major storm, inspect the level of the silt in the catch basin. The level of the silt should not be more than 12 inches. Use a measuring stick to check the silt level.

With the catch basin designed with a sump, the water level in the catch basin will be at the level of the outflow pipe. You will need to feel around the sump with a shovel to know how much silt has built up and to know when you have most of the silt removed. Since this drainage system is a rather small system, disposal of the silt needs to be kept as easy as possible. One of the easiest ways to dispose of the silt is to spread it over the area on top and around the infiltrator trench. It may be necessary to rake it to leave it in a thin layer.

It is important to carefully inspect and clean out the silt from the catch basin to keep silt out of the infiltration trench. (Silt in the infiltration trench can cause water back-up and other serious problems.)

3. Twice a year, again suggest September and April, remove the cap on the observation well at the end of the infiltration trench. Measure down from the top edge of the pipe to the water level and make note of this measurement in the "Routine Maintenance Record". Over time, the water level in the infiltration trench may rise due to silt build-up in the drain rock. The depth of the rock in the trench is 3 feet. If the water level in the trench stays at around 2 feet for a few weeks after a good rainstorm, the silt in the trench will need to be washed out. This can be done with a water truck dumping clean water into the catch basin while a vacuum truck pumps out the silty water out of the observation pipe. If this does not work, the clogged drain rock will have to be replaced with clean drain rock.
4. Twice a year inspect the swale along the west and south sides of Lot 8. This should be done by walking along the length of the swale. Inspect for any areas where the swale may have silted in. If it is silted in, remove the silt to the original flow line of the swale.

Make record of the above four routine maintenance items in the attached log. It is recommended that the log be kept in the O & M Manual used by the person responsible for this maintenance.



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There may be instances where unscheduled or unusual maintenance of your drainage system is required. Keep record of any such non-routine maintenance work in the attached log. Again, it is recommended that this log is kept in the Operation & Maintenance Manual used by the maintenance person.

V. RECORD KEEPING

To assure the requirements of this Manual and the plat for Elysian Meadows are being performed, make entries in the Routine Maintenance Log and the Log of Unscheduled Maintenance for the stormwater facility. Make an entry in the Routine Maintenance Log even if everything was okay. Make note of any maintenance procedures performed.

VI. EMERGENCIES

With proper maintenance, your drainage system is designed to function smoothly and efficiently. If an emergency does happen to arise, problem solve from the maintenance instructions contained in this manual.



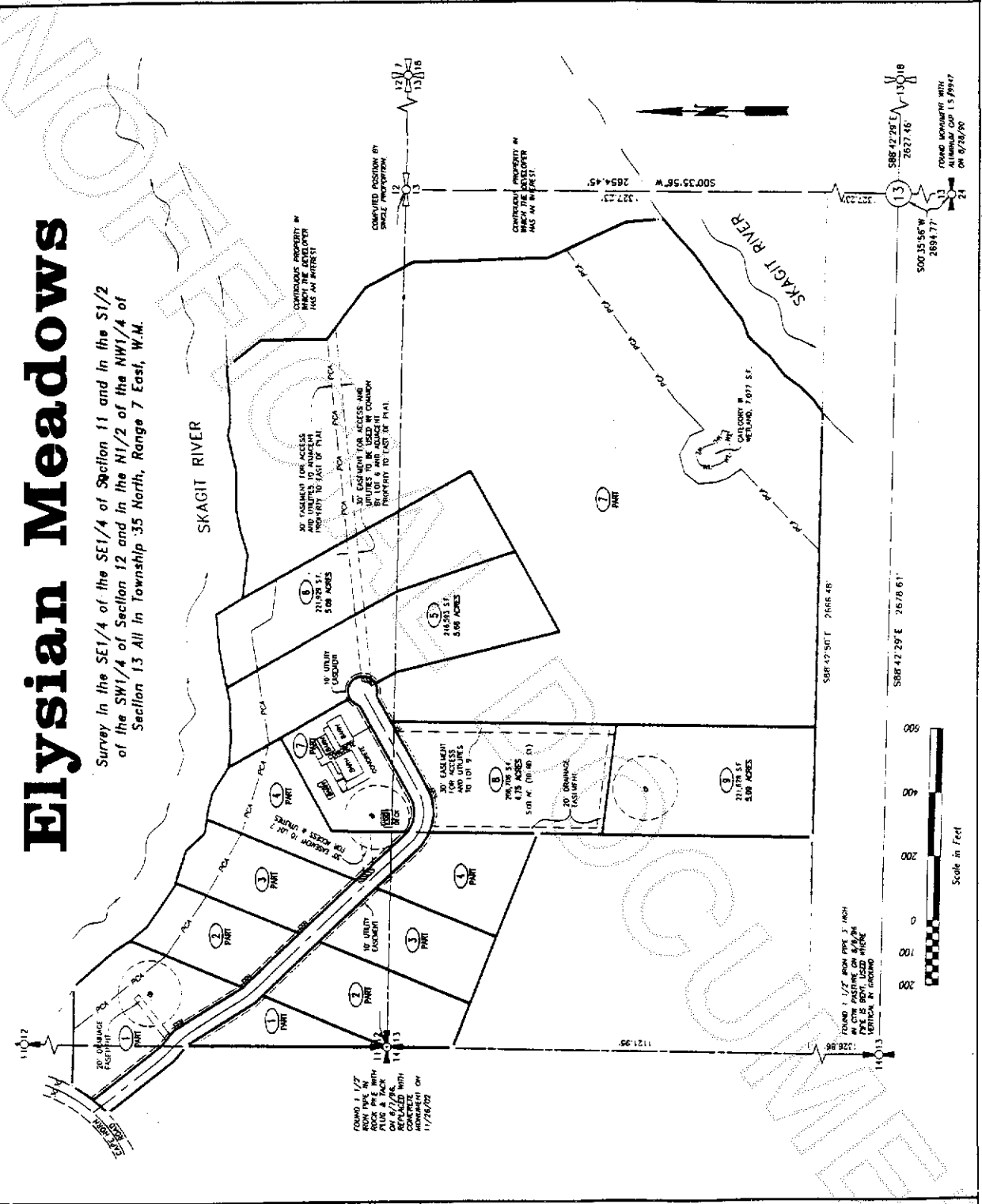
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Elysian Meadows

Survey in the SE1/4 of Section 11 and in the S1/2 of the SW1/4 of Section 12 and in the N1/2 of the NW1/4 of Section 13 All in Township 35 North, Range 7 East, W.M.



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ELYSIAN MEADOWS
 LOT & EASEMENT LAYOUT
 EXHIBIT "A"



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**ELYSIAN MEADOWS
STORMWATER DRAINAGE SYSTEM
ROUTINE MAINTENANCE RECORD**

Inspect and clean road ditches.	Remove silt from catch basin.	Inspect water level in infiltrator trench.	Inspect swale on Lot 8.
Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____
Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____
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Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____	Date: _____ By: _____ Comment: _____ _____ _____
			Sheet No. _____



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