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806 Metcalf Street
Sedro-Woolley, WA 98284
Phone: (360) 855-2121

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Skagit County Auditor
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COVER SHEET
OPERATION & MAINTNEANCE MAUNAL

GRANTOR: Brant Hunger, Fred C. Hunger, and Linda M. Hunger

GRANTEE: Current and Future Owners Lots 1 & 2 Short Plat PL06-0608

LEGAL DESCRIPTION: Portion of the NW ¼ of the NE ¼ of Section 3, township 35 N. Range 4 E. W.M.

ASSESSOR'S PROPERTY TAX PARCEL NUMBER: P123834

HUNGER SHORT PLAT

PL06-0608

GRIP ROAD

OPERATION

AND

MAINTENANCE MANUAL

FOR THE

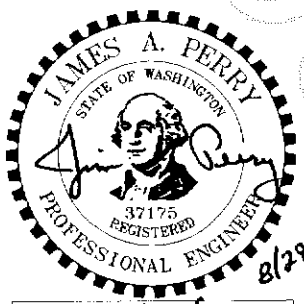
STORMWATER COLLECTION

AND

DETENTION SYSTEM

AUGUST 29, 2008

PREPARED BY



8/29/08

EXPIRES 7/18/09

Skagit Surveyors & Engineers

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

OPERATION AND MAINTENANCE MANUAL

For

HUNGER SHORT PLAT

PL06-0608

ON GRIP ROAD

STORMWATER COLLECTION AND DETENTION SYSTEM

TABLE OF CONTENTS

EXHIBITS:

I. PURPOSE OF MANUAL

The purpose of this manual is to outline the procedures for the proper operation and maintenance of the stormwater facilities as required to be maintained by the two lot owners of this short plat PL06-0608 on Grip Road.

Lot owners have the responsibility for all reasonable and necessary maintenance and repairs of the stormwater facilities within this short plat. The Skagit County Public Works Department will maintain the road ditch and culverts within the right-of-way for Grip Road.

This manual is the mechanism for the maintenance, repair and replacement of stormwater, water detention and drainage facilities.

For the benefit of the owners of the two lots, conditions should not be allowed to deteriorate, nor maintenance not performed on-site, which would force the Skagit County Public Works Department to assume responsibility of the facility. The stormwater collection system and detention system should add to the beauty and ease of living there.

II. PURPOSE OF FACILITY

In the development of these two residential lots, the natural drainage of the area was changed by the construction of the driveway and houses. Instead of the rain falling on trees and grass and most of the water percolating into the soil, some of the rain will fall on the gravel driveway and roofs and quickly run off and collect at low points.

Now with more water reaching the low point faster, this stormwater facility provides control of the quality, amount and rate at which stormwater is discharged off the property.

III. LAYOUT OF FACILITY

The stormwater system basically is comprised of two parts; first, the collection system and secondly, the detention system.

Exhibit "A" is the plat layout of the lots and easement for the driveway. Also shown are the drainage easements of which the lot owners have legal right of access for maintenance purposes.

IV. FUNCTION OF UNITS

A. DITCHES

For this plat, the driveway ditch collects and conveys stormwater in two directions. From the high point in the north/south portion of the driveway, sheet flow from the east and driveway runoff collects in the up-hill side of the roadside ditch and flows south to Grip Road. The water then flows west through the driveway culvert then west in the Grip Road north side ditch. From the driveway high point stormwater also collects and flows north in the driveway ditch. At the bend to the west in the driveway, the stormwater spreads out and sheet flows west to the detention pond.

On lot 1 the stormwater from the house and the west half of the driveway sheet flows west until intercepted by a ditch which directs and conveys the stormwater to the detention pond.

B. DETENTION POND

The detention pond is designed and sized to store the increase in runoff as a result of construction of the driveway and construction of two new houses. The only purpose of the detention pond is to store this volume of increased stormwater runoff while it is slowly discharged off the property. This increase in runoff from "pre-developed" to "developed" conditions was calculated to be 60,103 cubic feet or 449,570 gallons.

The detention pond was actually built with larger capacity that what was required. The constructed pond capacity is 75,600 cubic feet or 565,488 gallons. This additional capacity will allow for more impervious area to be constructed than that was used in the original drainage report for this project. An engineering analysis will be required to determine how much more impervious area can be added which is provided for by the larger detention pond. The layout of the detention pond as constructed is shown in Exhibit "B".

C. FLOW CONTROL STRUCTURE (FCS)

The purpose of flow control structure (FCS) is to release the stored water in the detention pond at a slow rate. This rate is regulated by the Skagit County Drainage Ordinance. The flow rate is basically similar to the "pre-developed" runoff rate from the site. Exhibit "C" is a detail of the FCS.

The flow is controlled by two orifices or holes in the discharge riser pipe inside the FCS manhole. These two holes provide for the first two flow-rate criteria.

Stormwater in excess of these two criteria flows over the top of the riser pipe and into the discharge pipe. Water can also flow over the spillway.

The first and lowest hole (orifice) in the riser pipe is designed to discharge 50% of the "pre-developed" 2-year flow rate. A 3 ½" hole below the level of the discharge pipe provides for the flow. The rate of flow through this hole is when the pond holds 37,520 cubic feet of water. For this volume the water depth is 1.81 feet (1 foot, 10 inches) in the pond and the discharge rate in .56 c.f.s. (250 gpm). This is the volume of the difference between the "pre-developed" and "developed" 2-year storm runoff. Note that a "2-year storm" is a rainfall that is likely to occur every 2 years and is a certain amount based on many years of rainfall records.

The second hole is designed to discharge the same as the "re-developed" 10-year stormwater runoff rate from the site. A 6" diameter hole in the side of the riser pipe allows 2.85 c.f.s. (1280 gpm) of stormwater to be discharged.

The overflow pipe (the top of the riser pipe) and the spillway are designed to handle the total 100-year flow. This flow is 8.34 c.f.s. (3,743 gpm).

It must be understood that the pond and discharge structure are designed to handle only the increase in the stormwater runoff as a result of this development (driveway and 2 houses). However, all the stormwater runoff is still being directed to the detention pond. Stormwater volume and flow rates in excess of the pond volume and FCS discharge rates will flow over the spillway. This is normal and how the detention system was designed.

V. NORMAL OPERATING PROCEDURES

The stormwater collection and detention system is designed to function on its own. When a rainstorm comes, the water is collected and flows through the ditches to the detention pond. The only and main operation procedure is to, once a month, make sure nothing has plugged the orifices in the flow control structure (FCS). It is important that this operating procedure be recorded.

Inspect the orifices by removing the manhole lid on the FCS. Visually inspect the orifices to make sure they are not clogged. By looking down the inside of the riser pipe you should be able to see the bottom orifice.

The County may wish to see a record of operating and maintenance procedures actually performed. Keep a log of the date and what was observed and/or done. A copy of a master form for keeping this log is included as Exhibit "D". The person responsible for operating and maintaining the stormwater system is to keep a copy of

this manual in a ring binder with extra copies of the maintenance log form. This way the manual and log will keep everything recorded and organized.

A "normal" operating procedure is to do the above mentioned inspection after a very heavy rain. This way you will make sure everything worked properly and the system is ready for the next rainstorm. Be sure to log all of your inspection items on the log form.

VI. MAINTENANCE OF FACILITY

There basically is no routine maintenance of your stormwater system. When tall weeds or trees start to grow on the bottom and sides of the detention pond they should be removed. When this is necessary, record it on the maintenance log form.

The ditches should be inspected to remove any accumulated debris. This should be a part of the monthly operating procedure.

VII. RECORD KEEPING

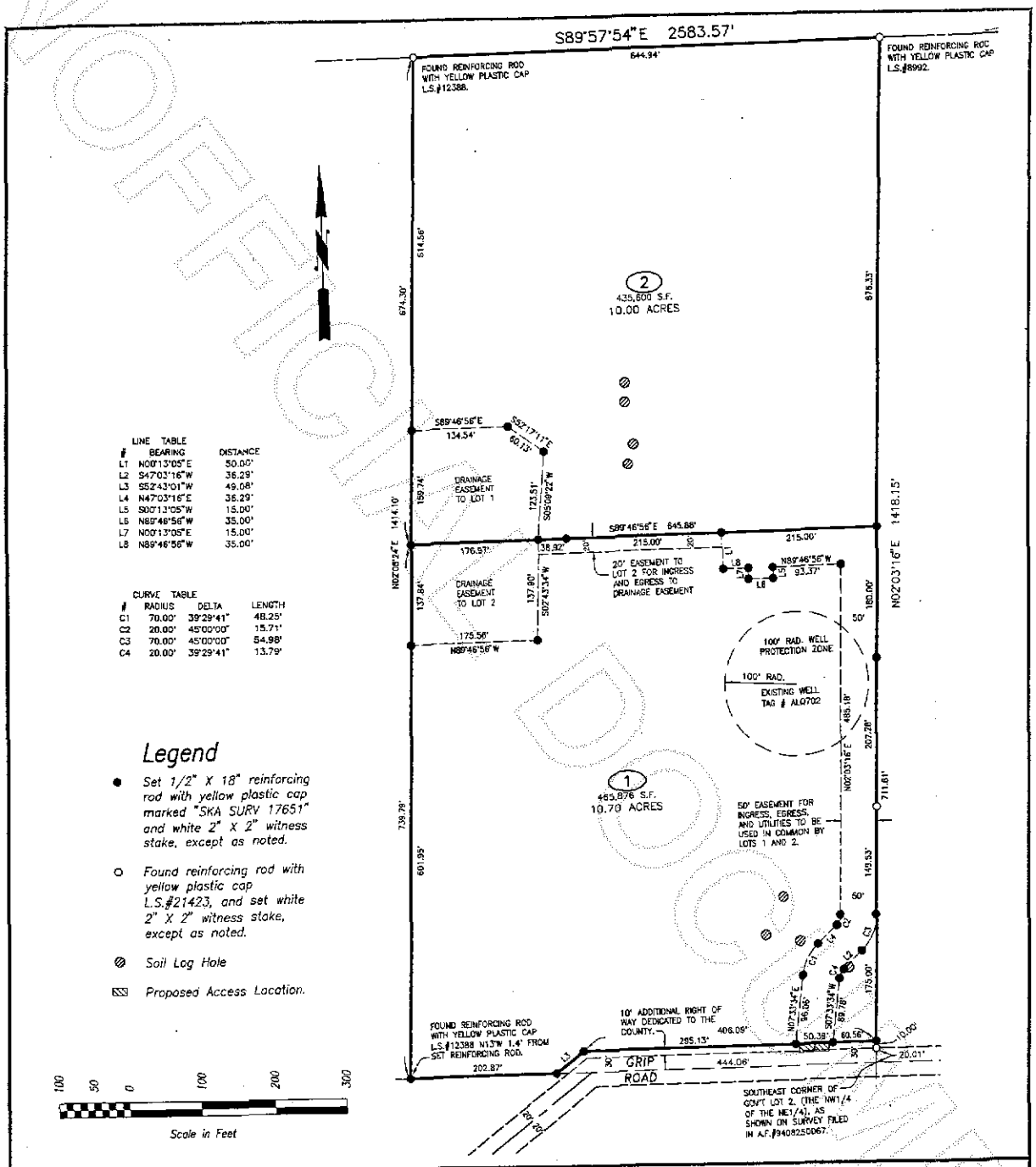
As explained in the previous sections, it is important to keep a log of all inspections and maintenance performed on your stormwater collection and detention system. This log is to be available for inspection by the Skagit County Public Works Department. By keeping this log up to date and kept in a binder, you will be ready for any unexpected inspection.

These maintenance procedures are required by Skagit County pursuant to the terms and conditions set forth on the face of the plat.

VIII. EMERGENCIES

If there is a situation, such as a major oil spill into your collection system, or if there is any other type of major damage to the stormwater collection or detention system, be sure to call the Skagit County Public Works Department at 360/336-9400 and report it to them. Inform the County what happened, what you are doing about it, and solicit any help you may need.

If any major repairs are necessary, make sure they are done consistent with the initial plans and construction of your facilities. A copy of the construction plans is to be readily available to the maintenance person at all times.



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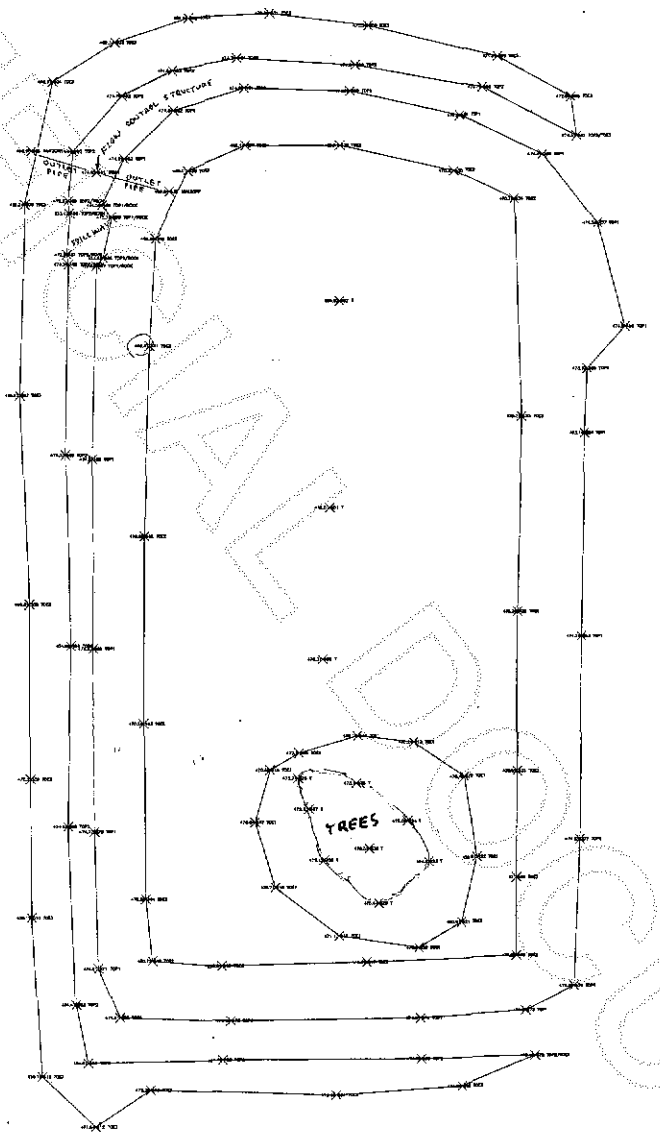
O & M MANUAL
HUNGER SHORT PLAT PL06-0608

PLAT LAYOUT

EXHIBIT "A"



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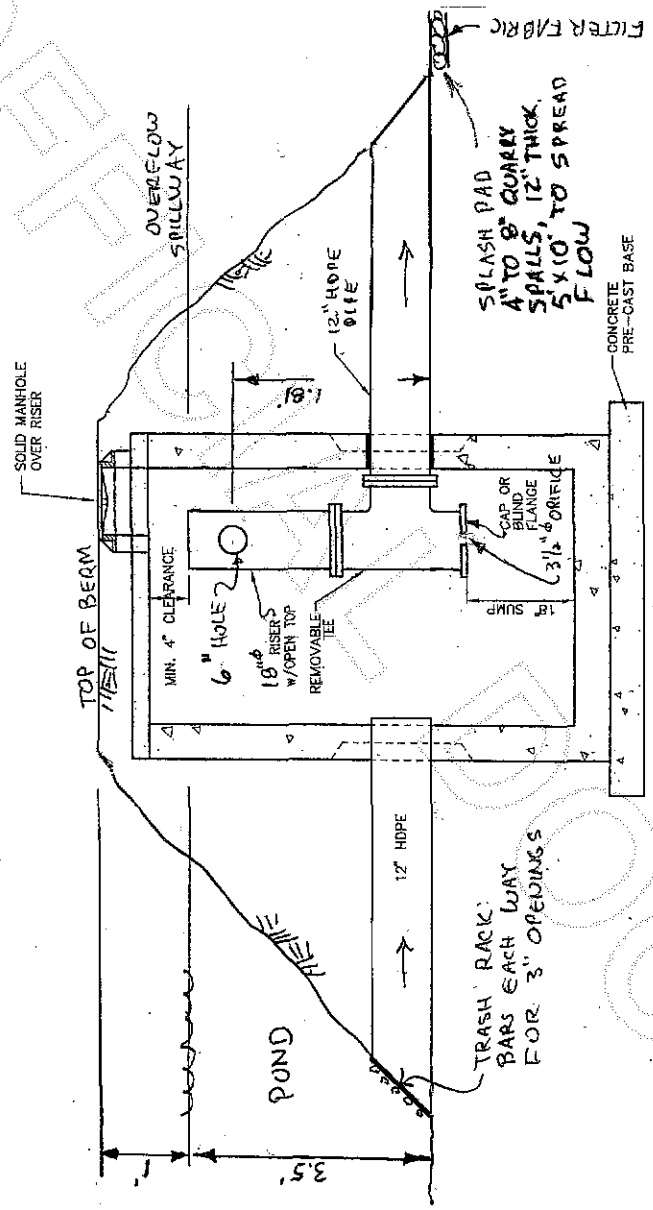
O & M MANUAL
HUNGER SHORT PLAT PL06-0608

DETENTION POND LAYOUT

EXHIBIT "B"



FLOW CONTROL STRUCTURE SCHEMATIC
(MODIFIED TYPE II CATCH BASIN)
NO SCALE

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O & M MANUAL
HUNGER SHORT PLAT PL06-0608

FLOW CONTROL STRUCTURE DETAIL

EXHIBIT "C"

HUNGER SHORT PLAT O & M MANUAL

MAINTENANCE LOG FORM

MASTER COPY

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HUNGER SHORT PLAT PL06-0608

MASTER MAINTENANCE LOG FORM

EXHIBIT "D"

HUNGER SHORT PLAT
GRIP ROAD

Maintenance Log

DATE	NAME	DESCRIPTION OF INSPECTION/WORK

Page _____

HUNGER SHORT PLAT 0 & M MANUAL

MAINTENANCE LOG FORM

ACTIVE MAINTENANCE LOG

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O & M MANUAL
HUNGER SHORT PLAT PL06-0608

ACTIVE MAINTENANCE LOG FORM

EXHIBIT "E"

HUNGER SHORT PLAT
GRIP ROAD

Maintenance Log

DATE	NAME	DESCRIPTION OF INSPECTION/WORK