

# STORMWATER FACILITIES OPERATION AND MAINTENANCE MANUAL

for

## **Prairie Breeze Subdivision** *Spokane, Washington*

*Prepared for:*

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March 11, 2008



EXPIRES 08-01-08





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## **I. Purpose**

This Operations and Maintenance Manual is intended to provide general guidelines for maintaining the stormwater facilities that were constructed to address stormwater runoff from the Prairie Breeze Subdivision. General operation and maintenance of these facilities will be the responsibility of the Prairie Breeze Homeowners Association. Implementation of these guidelines should help insure that the drainage facilities that have been installed will function as intended by the design engineer and as defined by the approved plans of record by Spokane County Division of Engineering and Roads.

## **II. Description**

The stormwater facilities for this project consist of a series of treatment ponds, catch basins, storm manholes, and conveyance pipes that outlet to stormwater detention facilities which either discharge to a infiltration gallery or a drywell.

### **A. Treatment Ponds**

In accordance with the Spokane County Aquifer Sensitive Area Ordinance, initial surface runoff discharges to a series of treatment ponds adjacent to the roadways throughout the development.

### **B. Catch Basins, Manholes and Conveyance Pipes**

Excess runoff that enters the treatment ponds discharge to a series of catch basins located at low points throughout the development. The catch basins are typically located in the treatment ponds at the intersection of the Prairie Breeze Avenue and the side streets. Once collected by the catch basins the stormwater enters a system of pipes and manholes that transport the runoff to a central detention pond.

### **C. Detention Ponds**

There are two detention ponds located within the development, one located at the intersection of Prairie Breeze Avenue and Prescott Road, and a second located at the north end of Dorset Road. Stormwater collected east of Prescott Road is piped to the detention pond at Prescott where the excess runoff either enters a pipe network that discharges to an infiltration trench or it enters a separate pipe network that discharges to the second detention pond at Dorset Road. Additionally, stormwater runoff from the development west of Prescott Road is collected and discharges to the second detention pond where it either discharge to a single drywell or overflows to the natural drainage course.

## **III. Function**

The stormwater facilities for Prairie Breeze Subdivision are relatively straightforward and should operate with little attention. Under most circumstances a non-functioning system will be visually obvious and regular maintenance of the system will eliminate the occurrence of drainage problems.

The following is a brief description of each component of the stormwater collection system and proper function of that component.

**A. Treatment Ponds**

The treatment ponds accept runoff through curb inlets from the roadway surface for treatment in accordance with the Aquifer Sensitive Area Ordinance. These ponds are typically shallow grass lined ponds with allowable ponding depths of 0.5'. Catch basins are located in select ponds with the rim elevation 0.5' above the bottom of the pond. The catch basins provide an outlet for runoff from larger storm events.

**B. Catch Basin, Manholes and Conveyance Pipes**

Catch basins are small concrete box with a slotted grate in select ponds. The catch basins provide an outlet for excess runoff from throughout the development and connect to a piped conveyance system. The conveyance system is a series of gradually larger pipes connected at angle points by manhole structures. The pipe conveyance system discharges to one of two large detention ponds.

**C. Detention Ponds**

The detention ponds are large grasses facilities that accept runoff from the conveyance system. Rip rap pads are provided at all outlet pipes form the conveyance system to protect the pond from erosion. The detention ponds serve as a storage facility for runoff from large storm events. Stormwater then slowly drains from the detention ponds to either a drywell or infiltration trench.

**IV. Responsibility to Maintain**

Prairie Breeze Home Owner Association will be responsible for the proper operation and maintenance of the treatment and disposal facilities described in this manual. These systems include the treatment and detention ponds, catch basins, culverts, and drywells located outside the public right-of-way. The Prairie Breeze Home Owners Association shall follow the methods described in this manual.

Spokane County will provide maintenance of all storm system facilities located with the public road right-of-way. These facilities include the manholes and associated piping.

**V. Maintenance**

In order for the drainage facilities to function as intended, proper maintenance procedures is a necessity. Improper maintenance or lack of maintenance may result in substantial on-site and downstream impacts. It is recommended that the homeowners association designate an individual who will responsible for implementing the maintenance measures.

The following information provides a brief maintenance description for each of the stormwater components included in this project. Prairie Breeze Homeowners Association is responsible to provide the maintenance described on the schedule noted for each element.

**A. General**

The following stormwater facilities shall be visually inspected immediately following a substantial rainfall or snowmelt event.

1. Inspect all gutters, catch basins, pipe inlets, drywells, rip rap pads and treatment ponds to make sure that they are clear of debris and obstructions.

**B. Catch Basins and Drywells**

The catch basins and drywells should have their grates removed at least twice a year, once in the spring and once in the fall to insure that they are free of dirt, silt, and debris for proper operation. Should excessive dirt, silt, or debris be present in any of the structures it must be cleaned by means of a vacuum truck.

**C. Treatment and Detention Ponds**

Period maintenance of the ponds should be done to insure it is functioning properly. The following items should be noted:

1. Inspect the pond banks, sides and berms to make sure there are no breaches or breaks in the sides of the ponds. Immediately repair any damaged areas and reseed.
2. Inspect the pond bottoms for trash, debris and sediment buildup. Remove all material that may prevent the proper infiltration of stormwater.
3. Inspect the rip rap pads located at the pipe outlets. The edges of the rip rap pads should be checked for scouring of the dirt around the pads. Repair and reseed any damaged areas.
4. The treatment ponds shall be seeded with a turf grass seed mixture. The detention ponds shall be seeded with the following dryland seed mixture:

10% Elka Perennial Rye  
20% Durar Hard Fescue  
45% Covar Sheep / Fescue  
15% Reubens Canadian Bluegrass

Provide mixture composed of 90 pounds per acres of seed mix with 300 pounds per acre of 16-16-16 timed release fertilizer.

5. Inspect the perimeter fencing around the detention pond for large gaps, corrosion, tears or any other means that could compromise the structural integrity of the fencing. If damage to the fencing is found, repair immediately.

**D. Conveyance System**

The pipe ends should be checked periodically for breakage, crushing or other damage which could impede stormwater flow. Additionally the pipes should be inspected for obstructions at each end and twice a year the pipe should be visually inspected for in line blockage. Should a in line blockage be observed within the pipe system outside the road right-of-way, it should be removed immediately. Should a blockage be observed in the system within the right-of-way, the homeowners association should notify Spokane County immediately.

**VI. Recommended Set-Aside Funds for Maintenance and Repair**

There will be annual costs associated with the maintenance and upkeep of the described facilities within this development. Similarly there will be replacement and major renovation cost of all the describe facilities which will occur in the future. These replacement costs are the responsibility of the Homeowners Association or successors. Maintenance and future replacement and renovation costs have been converted to annual costs in the form recommended set-aside funds. A breakdown of these costs are attached to this manual.

**VII. Summary**

Understanding the stormwater system as described in this manual and properly maintaining the components of the system will result in a longer lasting and effective stormwater facility.



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 Date: 3/10/08

**Sinking Fund Reserve Estimate**  
 for  
**Prairie Breeze Subdivision**

Description	Qty	Units	Unit Cost	Present Value	Replacement Cost	Future Value	Annual Set-aside	Fixed Cost
<b>Annual Operation and Maintenance</b>								
Estimated Annual O & M								\$2,500.00
<b>Stormwater Conveyance and Disposal System (outside of the public right-of-way)</b>								
Concrete Inlet Type 1 w/ F&G	8	EA	\$1,500.00	\$12,000.00	\$6,000.00	\$13,146.60	\$357.59	
8" Storm Pipe	42	LF	\$20.00	\$840.00	\$420.00	\$920.26	\$25.03	
12" Storm Pipe	99	LF	\$22.00	\$2,178.00	\$1,089.00	\$2,386.11	\$64.90	
15" Storm Pipe	59	LF	\$25.00	\$1,475.00	\$737.50	\$1,615.94	\$43.95	
18" Storm Pipe	50	LF	\$30.00	\$1,500.00	\$750.00	\$1,643.33	\$44.70	
21" Storm Pipe	60	LF	\$32.00	\$1,920.00	\$960.00	\$2,103.46	\$57.21	
24" Storm Pipe	142	LF	\$35.00	\$4,970.00	\$2,485.00	\$5,444.88	\$148.10	
Type "A" Drywell	1	EA	\$2,000.00	\$2,000.00	\$1,000.00	\$2,191.10	\$59.60	
<b>Sub-Total (system)</b>							<b>\$801.09</b>	<b>\$2,500.00</b>
<b>Total Annual Charge</b>							<b>\$3,301.09</b>	
<b>Number of Lots (ph 1)</b>								<b>59</b>
<b>Annual Per Lot Cost</b>								<b>\$55.95</b>

Replacement cost represents a 50% replacement value over 20 years.  
 Future Value assumes 4% inflation on the replacement cost over 20 years.  
 Annual Set-aside assumes a 6% investment for future replacement.