

Maintenance Plan

for the Drainage Control System at The Willows at Upriver

Owners of homes and/or lots within The Willows at Upriver will become members of The Willows at Upriver Homeowners' Association. The surface water drainage facilities located within The Willows at Upriver are for the use of the members of The Willows at Upriver Homeowners' Association on an equal basis, subject to the provisions promulgated by the Association in the *Declaration of Covenants, Conditions and Restrictions of The Willows at Upriver*. It shall be the responsibility of the Association to inspect and maintain the stormwater drainage system serving the included properties as per the maintenance schedule outlined herein.

Facilities Inventory:

The plat listed above contains the following stormwater drainage facilities:

	Catch Basins and Inlets	Access Manholes	Drywells	Pipe, LF (approx.)	Ponding Areas
The Willows at Upriver	12	0	5	560	5

Maintenance of Drainage Facilities:

Maintenance procedures for the stormwater drainage facilities are described on the following pages. Refer to the *Stormwater Drainage Plan* map sheets for the locations of the drainage facilities.

- Drywells

Remove grate and inspect drywell for sediment or debris buildup twice per year (e.g. in the spring and autumn). Sediment and debris must be removed before buildup reaches the invert of the lowest slot out of the drywell.

Check annually for structural damage to the frame, risers, top slab, walls or bottom of the drywell. The frame should sit flush on the top slab or riser. Any separation of 3/4" or greater should be adjusted and repaired. The top slab, risers, and the walls and floor of the drywell should be free of cracks, to maintain structural integrity and to assure that flows stay contained and sediments are kept out. The drywell should be replaced or repaired to design standards if it has settled more than 1".

Repairs should be made to cracks as follows:

- any cracks wider than ¼" in the top slab or risers
- any cracks wider than ½" and longer than 3 feet in the drywell walls or floor
- if there is any evidence of sediment entering through a crack

If the maintenance person judges the structure is unsound due to cracks or any other problem, the drywell should be replaced or repaired to design standards. The life expectancy of drywells is generally at least 20 years.

- Pipes and other Conveyance Systems

1. Pipes shall be cleared of accumulated sediment or debris that exceeds 20% of the diameter of the pipe. Any vegetation that reduces the free movement of water through the pipe shall be removed. Inspect pipes annually (where possible) for any damage or deformation, and repair or replace pipe as necessary to maintain flow characteristics. Repair or replace pipes having any dent or deformation that reduces the cross-sectional area of the pipe by more than 20%. Maintain sufficient cover over pipes to provide protection from structural damage.

2. Open ditches, berms, culverts and other surface drainageways shall be kept clear of trash and debris. Inspect ditches, berms and culverts monthly, remove accumulated sediment that exceeds 20% of the design depth, and regrade as necessary so that the ditch, berm or culvert matches design specifications and retains full functionality. Any vegetation that reduces the free movement of water through a drainageway shall be removed. Inspect ditches for erosion damage, especially after storms, and repair or regrade drainageways as necessary to maintain flow characteristics and design specifications.

1. Rock rip rap or channel linings should be inspected monthly and after large storms for any missing or misplaced rocks, and replaced or repaired as necessary. Soil should not be visible beneath the rock lining.

- Ponds "A" – "E"

The Ponds for The Willows at Upriver are permanent facilities to treat runoff from adjacent public streets, private driveways and on-site runoff.

The sod will be placed in the pond and shall be kept at less than 24" in height, and any noxious weeds shall be removed. Any accumulation of sediment, debris or oils should be removed.

Visually inspect monthly to watch for signs of erosion or other degradation of the pond and its side slopes. Rock rip rap at the outlets should be inspected after all large storms for any missing or misplaced rocks, and repaired as necessary. Soil should not be visible beneath the rock rip rap.

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Sinking Fund for Annual Costs

for the Drainage Control System at The Willows at Upriver

Original Prepared April 9, 2008

Updated April 18, 2013

The following are assumptions, estimates and recommendations for providing annual set-aside funds for annual maintenance costs and future replacement costs in the form of a sinking fund for the portions of the drainage system that may need replacement or major renovation within the next 15 years. The sinking fund is an approximation of the replacement costs of the primary drainage facilities that are the responsibility of The Willows at Upriver Homeowners' Association.

The fund reserve amount is computed with consideration for probable inflation over the life of the materials, structures, and facilities, and includes a summary of the amount of money to be set aside annually for the fund and the annual charge per lot to equal the annual set-aside.

Note that the sinking fund calculations are only an estimate, using approximated values. The Homeowners' Association should use these computations as a guide, and modify them as needed to more accurately reflect actual costs.

Assumptions:

2. The drainage facilities are constructed properly, as per the approved plans and details.
3. Inspection and minor maintenance & repairs (e.g. removing debris) performed by Association members/volunteers; labor charge = zero or minimal
4. Roadway life = 20 years
5. Pipes: assume 50% replacement of pipes in 20 years
6. All ponds will need reseeding every 5 years.

Estimated Operation & Maintenance Costs:

Operation cost of the surface runoff drainage facilities is essentially zero, as there are no electric or fuel-driven pumps or other devices specified for the system. Maintenance items, as detailed in the *Maintenance Plan*, include the following:

Sinking Fund for Annual Costs – *continued*

- **Ponding Areas** (5 total):

Removal of sediment/debris, inspection/repair of rock rip rap at outlets. Approximate annual maintenance cost: \$ 20 per pond

Total approximate annual cost: 5 Pond at (\$ 20) = $5 \times \$ 20 = \underline{\$ 100}$.

- **Pipes** (approximately 560 lineal feet):

Manually clearing pipe ends of sediment/debris, removal of vegetation, repair/replacement of damaged pipe, repairing/grouting at pipe ends;

Total approximate annual cost: 560 LF at \$ 0.20 per LF = \$ 112.

- **Catch Basins** (9 total):

Clearing grates, removing vegetation, repairing (grouting) cracks at approximate annual cost of \$ 20 per catch basin, plus vactoring once every 3 years at approximately \$ 75 per catch basin;

Total approximate annual cost: 9 Catch Basins at $(\$ 20 + \$ 75/3) = 9 \times \$ 45 = \underline{\$ 405}$.

- **Storm System Drywells** (5 total):

Clearing grates, removing vegetation, repairing (grouting) cracks at approximate annual cost of \$20 per drywell, plus vactoring once per 5 year period at approximately \$ 75 per drywell;

Total approximate annual cost: 5 Drywells at $(\$ 20 + \$ 15) = \underline{\$ 175}$

Total Approximate Annual Operation & Maintenance Costs:

$(\$100 + \$112 + \$405 + \$175) =$ approximately \$ 792 per year

Sinking Fund Reserve Account

Calculations for Operation & Maintenance Costs plus Replacement Costs

<u>Symbol</u>	<u>Factor</u>	<u>Cost</u>
OM	Annual Operation and Maintenance costs	\$ 792
PV ₁	Present Value of Drainage Ponds and Structures	\$ 27,800
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PV	Total Assumed Present Value (rounded up)	\$ 28,000
PV/5	Assume 20% replacement of system in 15 years ¹	\$ 5,600
FV	Future Value of system to replace in 15 years ² assuming inflation = 3%, (@3% and n= 15, F/P = 1.5580; (PV/5)(F/P) FV = (\$5,600)(1.5580) = \$ 8,724.80	\$ 8,724.80
A	Annual Set-aside for future replacement costs assume conservative investment, interest = 1.5% [@ 1.5% and n = 15, A/F = 0.0599; A = FV (A/F)]	\$ 523
Total Annual Charge = Annual O&M Costs + Annual Set-aside = OM + A =		\$ 1,315
<u>Total Annual Charge per Lot</u> = (OM + A) / (49)=		<u>\$ 26.83</u>

I recommend at the lot charge remain at \$27 per lot

1. The inflation rate over the past fifteen years has been approximately 3%.
2. Interest rates are presently relatively low, with money market rates below 1.5%.