



# **Stormwater System Operation & Maintenance Plan**



## **Fieldstone Farms**

Located in South Kingstown, RI

Applicant: Old North Land Investments LLC

4-21-2022

Revised: 9-02-2022

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## Operation & Maintenance Plan Overview

An essential component of a successful Stormwater System (SS) is the ongoing Operation and Maintenance (O&M) of the various components of the stormwater drainage, control, and conveyance systems. These components include swales, pipes, catch basins, and treatment/ control devices are commonly referred to as Best Management Practices (BMPs). Failure to provide effective maintenance can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater practices.

Many people expect that stormwater facilities will continue to function correctly forever. However, it is inevitable that deterioration of the stormwater system will occur once it becomes operational. The question is not whether stormwater system maintenance is necessary but how often.

This plan has been developed to proactively address operations and maintenance to minimize potential problems and maximize potential stormwater runoff treatment and management. Ongoing inspections and maintenance will extend the service life of the Best Management Practices.

This plan addresses:

1. Stormwater management system(s) owners;
2. The party or parties responsible for operation and maintenance, including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
3. A description and delineation of public safety features;
4. The routine (scheduled) and non-routine (corrective) maintenance tasks for each BMP to be undertaken after construction is complete and a schedule for implementing those tasks;
5. A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
6. An estimated operation and maintenance budget; and
7. Funding source for operation and maintenance activities and equipment.

A major contributor to unmaintained stormwater facilities is a lack of clear ownership and responsibility definition. In order for an inspection and maintenance program to be effective, the roles for each responsibility must be clearly defined prior to construction of a system. This can be accomplished with a maintenance agreement between the site owners and the responsible authority.

This report is suitable for recording as an attachment to a maintenance agreement between the site owner and the responsible authority. A copy of a sample agreement prepared by RIDEM is attached to this report as Appendix B.

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## Stormwater System Owner / Party Responsible for O&M

Stormwater BMPs are maintained during construction by the site contractor as identified in the Soil Erosion and Sediment Control Plan (SESC) for the site. A copy of the SESC is required to be kept on site during construction. The SESC requires maintenance and inspection of the BMPs during the construction phase of project and requires a log be kept of these activities. Once construction is complete and the contractor's warranty period is elapsed, the contractor must obtain the signature of the stormwater system's owner releasing the contractor from his maintenance and inspection responsibilities. A copy of this release of contractor's responsibility must be attached to this document.

(COMMERCIAL/SINGLE OWNER) **(Lot 3, Lot 14)**. The property owner will also be the owner of the stormwater system. Upon completion of construction, the owner of the property along with mailing and emergency contact information must be added below.

Owner: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Emergency Contact Name: \_\_\_\_\_

Phone: \_\_\_\_\_

### Transfer of Ownership

In the event that the owner of the property changes, the current owner (grantor) must provide a copy of this document to the new owner (grantee). The new owner must notify the Rhode Island Department of Environmental Management of the change of ownership and provide a signed updated Operations and Maintenance Plan to the Rhode Island Department of Environmental Management.

(TWO OWNERS) **(Lots 1 & 2, Lots 4 & 5, Lots 6 & 7, Lots 8 & 9, Lots 10 & 11, Lots 12 & 13)**. The property owners will also be the owners of the shared stormwater system. Upon completion of construction, the owners of the properties along with mailing and emergency contact information must be added below.

Owner A: \_\_\_\_\_

Mailing Address A: \_\_\_\_\_

Emergency Contact Name A: \_\_\_\_\_

Phone A: \_\_\_\_\_

Owner B: \_\_\_\_\_

Mailing Address A: \_\_\_\_\_

Emergency Contact Name B: \_\_\_\_\_

Phone B: \_\_\_\_\_

### Transfer of Ownership

In the event that the owners of one of the properties changes, the current owner (grantor) must provide a copy of this document to the new owner (grantee). The new owner must notify the Rhode Island Department of Environmental Management of the change of ownership and provide a signed updated Operations and Maintenance Plan to the Rhode Island Department of Environmental Management.

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HOMEOWNER ASSOCIATION (**Lots 14 – 39**). The Owners Association will be the owner of the stormwater system located outside of public right of ways and all stormwater BMP. Upon completion of construction, and creation of the Owners Association, their legal name along with mailing and emergency contact information must be added below.

Owner; \_\_\_\_\_

Mailing Address; \_\_\_\_\_

\_\_\_\_\_

Emergency Contact Name; \_\_\_\_\_

Phone; \_\_\_\_\_

Transfer of Ownership

In the event that the owner of any property included in the Owner’s Association changes, the current owner (grantor) must provide a copy of this document to the new owner (grantee). In addition, the Owners Association must provide all new members with a copy of this document.

**The Stormwater System Owner is the Party Responsible for the ongoing O&M of the system.**

The two key components to adequately maintain the stormwater infrastructure are:

1. Performance of periodic and scheduled inspections
2. Performance of scheduled maintenance

The actual operation and maintenance of the system may be performed by a third party designated by the owner. If the owner contracts with a third party for O&M the name, address, and emergency contact information must be added below, and updated if the third party designee changes.

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

\_\_\_\_\_

Emergency Contact Name: \_\_\_\_\_

Phone: \_\_\_\_\_

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## Public Safety

Public safety was a critical factor in designing the stormwater system. Public safety features included in this design are:

- Accessibility to Stormwater BMPs
- Winter & Non-Winter Maintenance

### Accessibility to Stormwater BMPs

As shown on the site plans, a dedicated path is proposed to provide access to all stormwater BMPs from the roadway. This access has been sized to accommodate vehicle access to the BMPs.

### Winter Maintenance

The following tasks must be performed to protect public safety during the winter season:

- Roadways and parking lots will be salted/ sanded/ plowed in accordance with applicable Town of South Kingstown and RIDOT guidelines;
- Inspect the open and closed drainage networks adjacent to the snow stockpiles to ensure they are free of clogging and debris;
- Inspect roadways and drainage structures post-storm event to alleviate any signs of icing or damming.

### Non-Winter Maintenance

The following tasks must be performed to protect public safety during the non-winter seasons:

- Roadways and parking lots will be swept in accordance with applicable Town of South Kingstown and RIDOT guidelines;
- The stormwater management systems must be inspected and maintained in accordance with the enclosed Operations & Maintenance Plan.

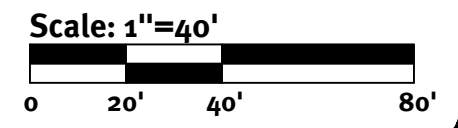
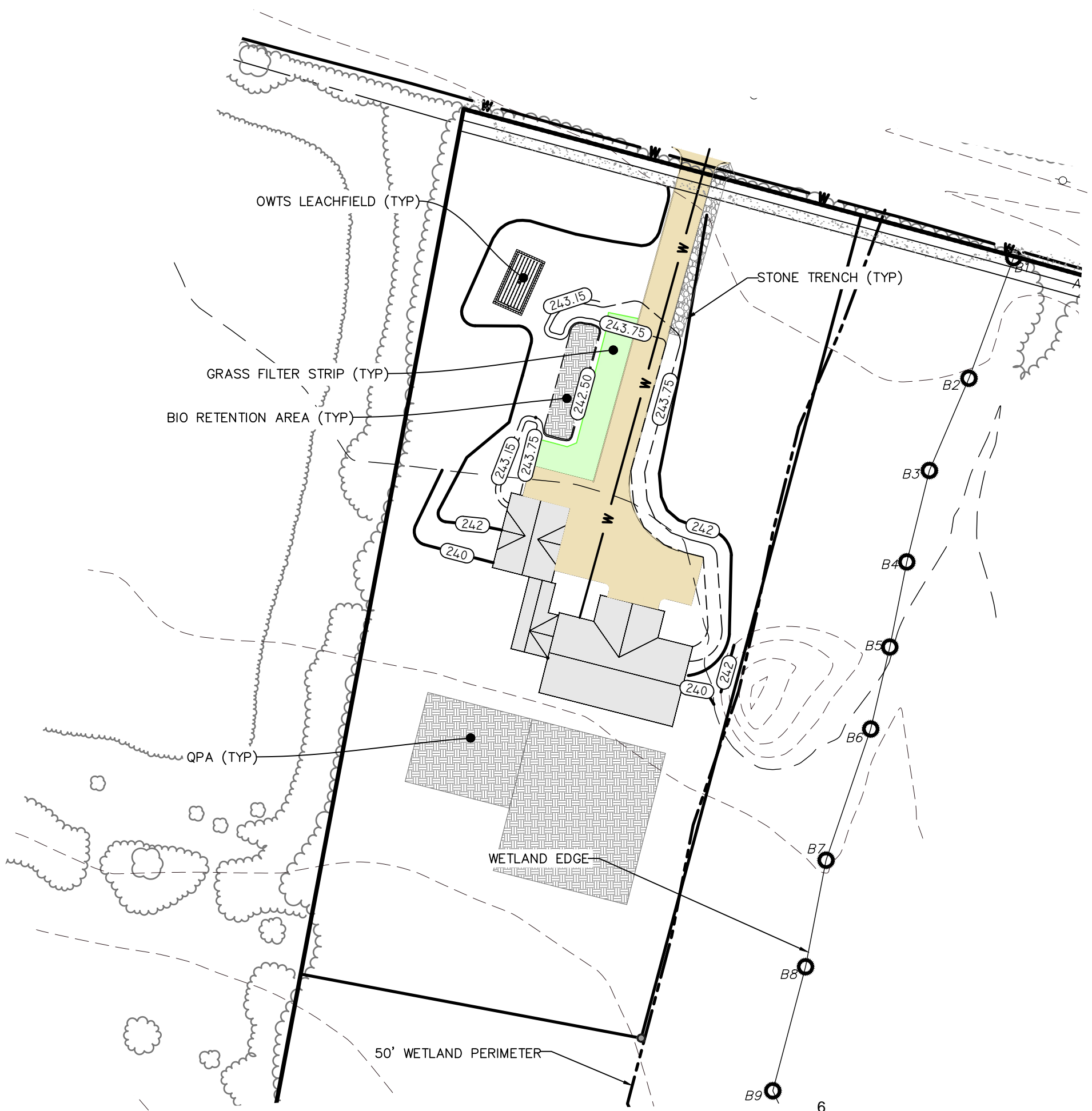
Particular care must be taken in the operation and maintenance of these features.

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## **Stormwater System Plan**

A plan identifying each component of the stormwater system is included on the following page.

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**DiPrete Engineering**

Two Stafford Court Cranston, RI 02920  
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**O&M PLAN - SINGLE OWNER**

**FIELD STONE FARMS**

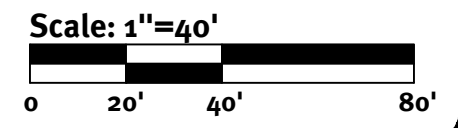
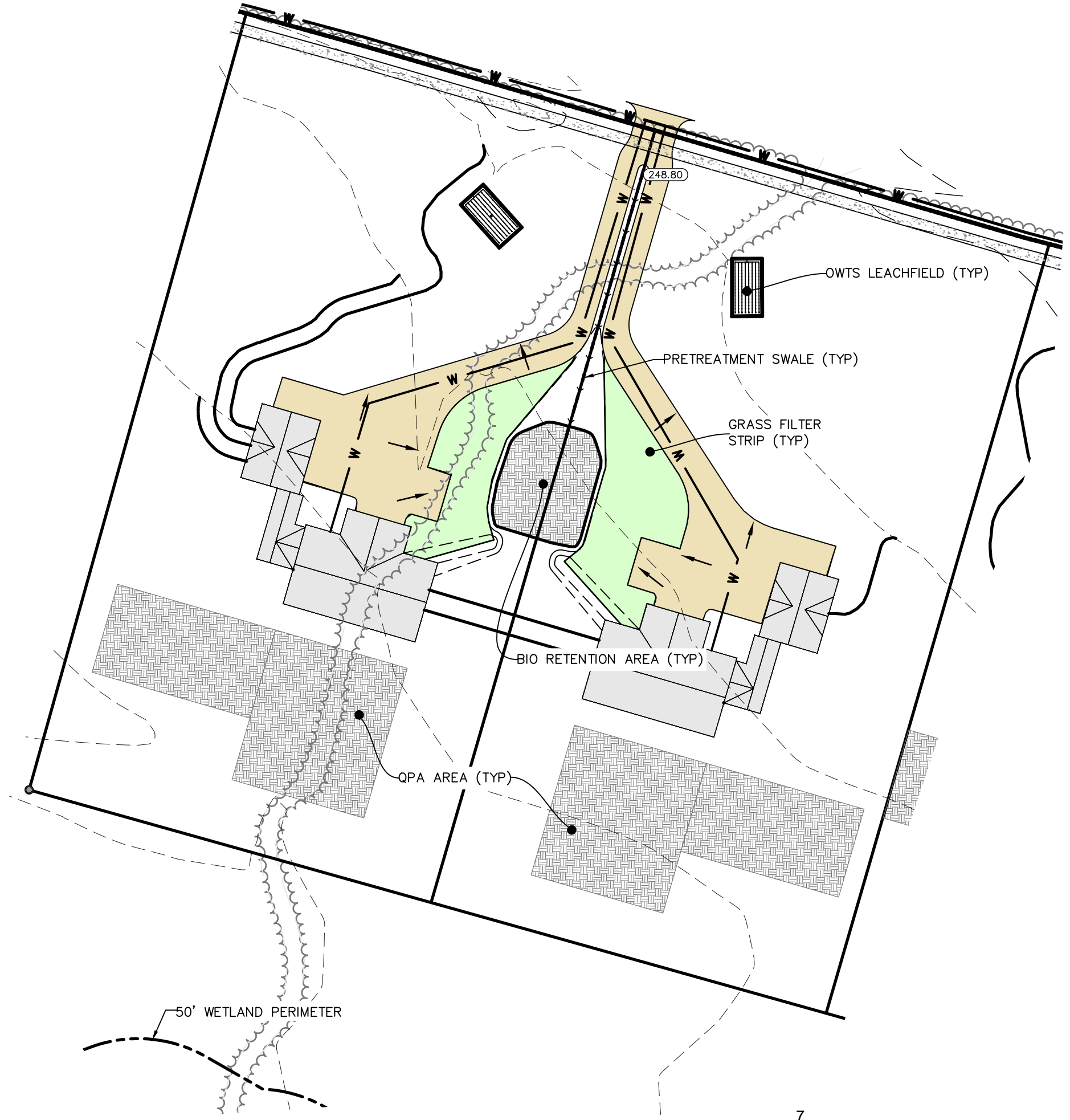
SOUTH KINGSTOWN, RHODE ISLAND

PREPARED FOR:  
**OLD NORTH LAND INVESTMENTS LLC**  
75 LAMBERT LIND HIGHWAY, WARWICK, RHODE ISLAND 02886

DATE:  
9-1-2022

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**O&M PLAN - SHARED SYSTEMS**

**FIELD STONE FARMS**

SOUTH KINGSTOWN, RHODE ISLAND  
 PREPARED FOR:  
**OLD NORTH LAND INVESTMENTS LLC** DATE: 9-1-2022  
 75 LAMBERT LIND HIGHWAY, WARWICK, RHODE ISLAND 02886

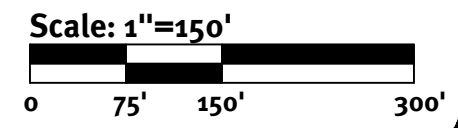
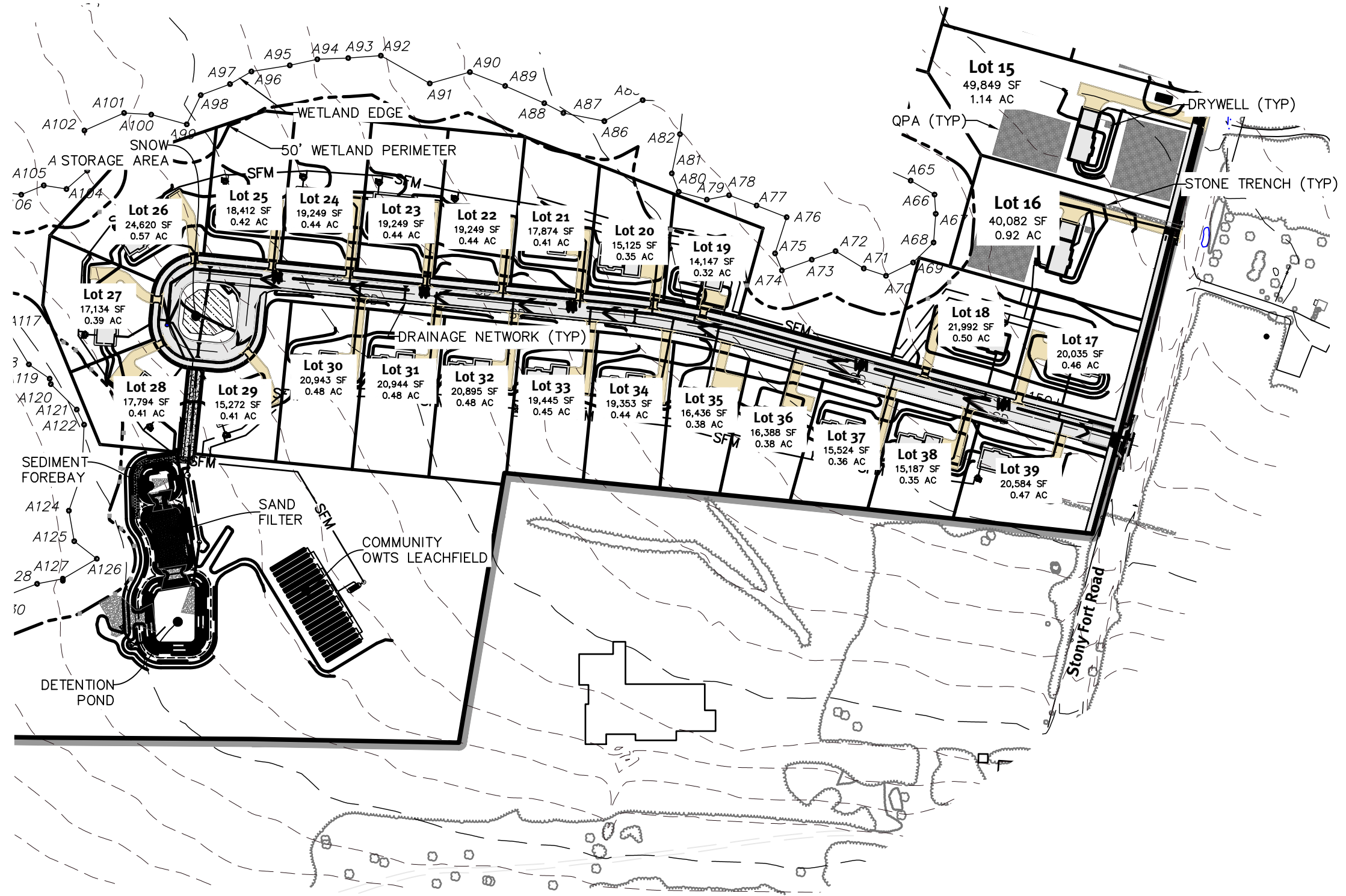
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**O&M PLAN - HOMEOWNERS ASSOCIATION**  
**FIELD STONE FARMS**  
 SOUTH KINGSTOWN, RHODE ISLAND  
 PREPARED FOR:  
**OLD NORTH LAND INVESTMENTS LLC**  
 75 LAMBERT LIND HIGHWAY, WARWICK, RHODE ISLAND 02886  
 DATE: 9-1-2022

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 Two Stafford Court Cranston, RI 02920  
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## Inspections & Maintenance

Inspections must be performed on a regular basis and scheduled based on the BMP type and configuration. It is not mandatory that all inspectors be trained engineers, but they must have some knowledge or experience with stormwater systems and in general, trained stormwater engineers should direct the inspectors. Follow-up inspections by registered professional engineers must be performed where a routine inspection has revealed a question of structural or hydraulic integrity affecting public safety.

Not all inspections can be conducted by direct human observation. For subsurface systems, video equipment may be required. There may be cases where other specialized equipment is necessary. The inspection program must be tailored to address the operational characteristics of the system.

The inspection process must document observations made in the field and must cover structural conditions, hydraulic operational conditions, evidence of vandalism, condition of vegetation, occurrence of obstructions, unsafe conditions, and build-up of trash, sediments and pollutants.

Maintenance of the stormwater management system is essential and can be divided into two types, scheduled and corrective.

**Scheduled** maintenance tasks are those that are typically accomplished on a regular basis and can generally be scheduled without referencing inspection reports. These items consist of such things as vegetation maintenance (such as mowing) and trash and debris removal. These tasks are required at well-defined time intervals and are a requirement for all stormwater structural facilities.

**Corrective** maintenance tasks consist of items such as sediment removal, stream bank stabilization, and outlet structure repairs that are done on an as-needed basis. These tasks are typically scheduled based on inspection results or in response to complaints.

Since specialized equipment may be required, some maintenance tasks can be effectively handled on a contract basis with an outside entity specializing in that field. In addition, some maintenance may also require a formal design and bid process to accomplish the work.

Appendix A provides an "Inspection Schedule & Maintenance Checklist" for the stormwater system components on this site. Completed checklists must be maintained as an ongoing record of inspections for each component of the stormwater system.

In addition to the maintenance of the stormwater system, maintenance of other site improvements can significantly enhance the ability for the BMPs to function as designed. Several of these have been listed below, along with the recommended maintenance.

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## **Lawn, Garden and Landscape Management**

- Lawns should be cut no shorter than 1-1/2" in the spring and fall to stimulate root growth, and no shorter than 2 to 3 inches throughout the summer.
- Infiltration ponds should be mowed at least twice per year.
- Fertilize no more than twice per year, once in May-June and once in September-October.
- Avoid spreading fertilizer on impervious surfaces.
- Weeds should be dug or pulled out. Large areas of weeds can be removed by covering with large plastic sheet(s) for a few days.
- Chemical pesticides should be used as a last resort. A healthy lawn is naturally disease resistant.
  - Visible insects can be removed by hand, by spraying with water, or even vacuum cleaning.
  - Store bought traps, specific for a species, can be used.
  - Slugs and other soft bodied insects can be eliminated using diatomaceous earth.
  - Plants infected with bacteria and fungi should be removed and disposed of.
  - Beneficial organisms should be maintained on the property and should be encouraged/ attracted to the property. Homeowners and property facility maintenance personal should become familiar with beneficial organisms.
- Irrigation should be minimal if required at all. Most lawns do not require watering and will become dormant during dry periods.
  - Established lawns require no more than one inch of water per week.
  - Areas should be watered before 9am to avoid evaporation.

## **Road and Parking Area Management**

### **Street and Parking Lot Sweeping**

- All street and parking areas on site must be swept a minimum of 2 times per year.

### **Deicing:**

- Salt storage areas must be completely covered and located on an impervious surface.
- Runoff must be contained in appropriate areas.
- See The Rhode Island Stormwater Design and Installation Standards Manual Appendix G for approved deicing agents and ways to reduce deicer impacts. The manual Appendices can be found online at:  
<http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/pdfs/swdsnapd.pdf>

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**Sealants:**

- Only asphalt based sealants are permitted, no coal-tar based asphalt sealants can be used on site.

**Snow Removal:**

- Snow must not be dumped in any water body including rivers, reservoirs, ponds, lakes, wetlands, bays, or the ocean.
- Avoid disposing of snow on top of storm drain catch basins or stormwater drainage swales or ditches.
- Snow must be stored in upland areas, not in or adjacent to water bodies or wetlands. Snow must be stored in a location that will allow snow melt and enter the onsite drainage system so it can be treated by onsite BMPs.

**Solid Waste Containment**

- Trash and recycling receptacles must be located onsite for all commercial areas.

*Reference; Additional information relating to operation and maintenance of specific BMPs can be found in the Rhode Island Stormwater Design and Installation Standards Manual.*

[www.dem.ri.gov/pubs/regs/regs/water/swmanual.pdf](http://www.dem.ri.gov/pubs/regs/regs/water/swmanual.pdf)

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## **Estimated Inspections & Maintenance Budget**

### **SINGLE OWNER (Lot 3, Lot 14, Lot 15, Lot 16)**

It is important to be able to budget for the O&M costs associated with the stormwater system. To assist the owner in budgeting, below is an estimate of the costs that may be incurred in maintaining the system. The costs have been estimated on a Yearly basis.

Periodic inspections, if performed by an outside entity will cost approximately \$250/yr.

#### **Bio Retention:**

For a 25 year finance period, Bio Retention cells cost approximately \$1,847.53 per acre of tributary area per year. The site contains approximately 0.135 acres of area flowing to Bioretention. This equates to an approximate cost of \$250 per year to maintain the Bioretention areas.

Based on the costs outlined above, the stormwater system will cost approximately \$250 per year (per lot) to maintain. This is only an estimate and costs may vary.

These costs are the responsibility of the stormwater system owner. Funding for the costs will be provided by the owner.

### **TWO OWNERS (Lots 1 & 2, Lots 4 & 5, Lots 6 & 7, Lots 8 & 9, Lots 10 & 11, Lots 12 & 13)**

It is important to be able to budget for the O&M costs associated with the stormwater system. To assist the owner in budgeting, below is an estimate of the costs that may be incurred in maintaining the system. The costs have been estimated on a Yearly basis.

Periodic inspections, if performed by an outside entity will cost approximately \$545/yr.

#### **Bio Retention:**

For a 25 year finance period, Bio Retention cells cost approximately \$1,847.53 per acre of tributary area per year. The site contains approximately 0.295 acres of area flowing to Bioretention. This equates to an approximate cost of \$545 per year to maintain the Bioretention areas.

Based on the costs outlined above, the stormwater system will cost approximately \$545 per year (per pair of owners) to maintain. This is only an estimate and costs may vary.

These costs are the responsibility of the stormwater system owner. Funding for the costs will be provided by the pair of owners.

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### **HOMEOWNERS ASSOCIATION (Lots 18 – 39)**

It is important to be able to budget for the O&M costs associated with the stormwater system. To assist the owner in budgeting, below is an estimate of the costs that may be incurred in maintaining the system. The costs have been estimated on a Yearly basis.

Periodic inspections, if performed by an outside entity will cost approximately \$4,528/yr.

#### **Sand Filter:**

For a 20 year maintenance period, sand filter structure cost can be calculated using this equation:  $C = 10,556 A^{0.534}$  Where A is tributary area in acres. The site has 10.100 acres flowing to the sand filter area and the total 20 year cost would be \$36,292. This cost equals \$1,815 per year.

#### **Extended Detention Structure:**

For a 25 year finance period, detention structures cost approximately \$268.59 per acre of tributary area per year. The site contains approximately 10.100 acres of area flowing to detention structures. This equates to an approximate cost of \$2,713 per year to maintain the detention structure.

Based on the costs outlined above, the stormwater system will cost approximately \$4,528 per year to maintain. This is only an estimate and costs may vary.

These costs are the responsibility of the stormwater system owner. Funding for the costs will be provided by Homeowners Association.

**Reference;** *Maintenance costs are based on information provided by Horsley Witten during the January 19, 2011 Stormwater Manual Training.*

<http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/slides/sess210.ppt>

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## Appendix A – Inspection Schedule & Maintenance Checklists

**Bioretention Filter  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- During the first six months following construction bioretention facilities should be inspected at least twice following precipitation events of at least 1.0 inch to ensure that the system is functioning properly. Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor
- When filtering capacity of the filter diminishes substantially (i.e., when water ponds on the surface of the filter bed for more than 48 hours), the top few inches of discolored material shall be removed and shall be replaced with fresh material. Sediment shall be disposed of in an acceptable manner at an approved and permitted location.

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
<b>1. Debris Cleanout (Quarterly)</b>		
Bioretention and contributing areas clean of debris including yard waste, litter and limbs		
Overflow Weir / outlet area clear of debris		
<b>2. Sedimentation (Quarterly)</b>		
Obvious trapping of sediment		
Removal of sediment when depth is greater than 1.0 inches over filter media bed.		

**Bioretention Filter  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

3. Vegetation (Quarterly)		
If there are plantings within the bioretention areas: <ul style="list-style-type: none"> <li>• Plant height is not less than design water depth.</li> <li>• Plant composition according to approved plans.</li> </ul> No placement of inappropriate plants		
If there is grass, grass height not greater than 10 inches.		
If there is a mulch layer, it should be replenished (to the original depth) every other year, as directed by inspection records. The previous mulch layer should be removed, and properly disposed of, or roto-tilled into the soil surface.		
Seasonally plants may need to be watered, mulch added to void areas, treating of diseased trees and shrubs, inspection of soil and repair eroded areas, and removal of litter and debris.		
Every 3 years pruning or replacement of wood vegetation.		
If 50% of vegetation coverage is not established after 2 years reinforcement planting is required.		
4. Embankments (Quarterly)		
Evidence of erosion		
Slopes stabilized with vegetation, slope protection, riprap, etc		



**Drainage Structures  
(Catch Basins, Manholes, etc.)  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Beyond inspection frequency noted, inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Semi-annually inspect drainage structures for damage		
Use a vacuum truck or other means to clean out any sediment or debris present in any drainage structure or whenever sediments reach ½ of the sump depth, which ever comes first.		
Semi-annually inspect drainage structures for debris and remove as necessary		



**Sediment Forebay  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
<b>1. Debris Cleanout (Quarterly)</b>		
The sediment forebay and sediment trap isolation chamber clear of debris or		
Inflow pipes / inlet area clear of debris		
Outflow pipes / outlet area clear of debris		
Overflow Weir / outlet area clear of debris		
<b>2. Sedimentation (Quarterly)</b>		
Obvious trapping of sediment		
Greater than 50% of storage volume remaining. If less than 50% of storage volume remaining, sediments to be removed and disposed of. (see notes at end of Forebay		

**Sediment Forebay  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

<b>3. Vegetation (Quarterly)</b>		
Vegetation within sediment forebay to be limited to 18" in height.		
<b>4. Embankments (Quarterly)</b>		
Evidence of erosion		
Seeps/leaks on downstream face		
Slope protection or riprap failure		
Slopes stabilized with vegetation, slope protection, riprap, etc		

COMMENTS:

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**Sand Filter  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
<b>1. Debris Cleanout (Annual)</b>		
Contributing Areas Clean of Debris		
Filtration facility clean of debris		
Inlet and outlets clear of debris		
Materials deposited on the surface of the sand filter (e.g. trash and litter) shall be removed manually.		
<b>2. Oil and Grease (Annual, After Major Storms)</b>		
No evidence of filter surface clogging		
Activities in drainage area minimize oil and grease entry		
<b>3. Vegetation (Semi-Annually)</b>		
Contributing drainage area stabilized		

**Sand Filter  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

No evidence of erosion. Minor soil erosion gullies should be repaired when they occur		
Area mowed a minimum of three times per growing season to maintain maximum grass heights less than 12", and clippings removed		
<b>4. Water Retention Where Required (Annual)</b>		
Water holding chambers at normal pool		
No evidence of leakage		
<b>5. Sediment Deposition (Annual)</b>		
Filter chamber free of sediments		
Sedimentation chamber not more than half full of sediments. Sediment shall be cleaned out of the sediment forebay when it accumulates to a depth of more than ½ the design depth.		
Silt/sediment shall be removed from the filter bed when the accumulation exceeds one inch. All oil, sludge, sediment, solids, trash, debris and floatable material shall be removed from all chambers of the sand filter. Materials deposited on the surface of the sand filter (e.g. trash and litter) shall be removed manually. All resulting waste including oil, sludge, sediment, and water should be disposed of in accordance with all applicable federal and local regulations.		
When the filtering capacity of the filter diminishes substantially (i.e. when water ponds on the surface of the filter bed for more than 48 hours), the top few inches of discolored material and the top six inches of sand shall be removed and shall be replaced with fresh material. If discolored or contaminated		

**Sand Filter  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

material is found below this removed surface then that material shall also be removed and replaced until all contaminated sand has been removed from the filter chamber. The removed sediments shall be disposed in an acceptable manner at an approved and permitted location		
<b>6. Structural Components (Annual)</b>		
No evidence of structural deterioration		
Any grates are in good condition		
No evidence of spalling or cracking of structural parts		
<b>7. Outlet/Overflow Spillway (Annual)</b>		
Good condition, no need for repairs		
No evidence of erosion (if draining into natural channel). Minor soil erosion gullies should be repaired when they occur		
<b>8. Overall Function of Facility (Annual)</b>		
Evidence of flow bypassing facility		
No noticeable odors		
During the six months immediately after construction, filter practices shall be inspected following at least the first two precipitation events of at least 1.0 inch to ensure the system is functioning properly. Thereafter, inspections shall be conducted on an annual basis and after storm events of greater than or equal to the 1-year, 24-hour Type III precipitation event.		



**Detention / Infiltration Pond  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor
- Sediment shall be removed from stormwater basins when the sediment volume exceeds 10% of the total basin volume. Sediment shall be disposed of in an acceptable manner at an approved and permitted location.
- Infiltration Ponds Only: When infiltration rates decrease below design infiltration rates, remove accumulated surface sediments and rototill pond bottom. Revegetate bottom of infiltration pond as needed

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Embankment and Emergency Spillway (Annual)		
Vegetation and Ground Cover Adequate		
Embankment Erosion		
Animal Burrows		
Unauthorized Planting		
Cracking, bulging or sliding of dam		
<ul style="list-style-type: none"> <li>• Upstream face</li> </ul>		
<ul style="list-style-type: none"> <li>• Downstream face</li> </ul>		

## Detention / Infiltration Pond Operation, Maintenance, and Management Inspection Checklist

Project:

Date:

Location:

Time:

Site Status:

Inspector:

<ul style="list-style-type: none"> <li>At or beyond toe</li> </ul>		
<ul style="list-style-type: none"> <li>Downstream</li> </ul>		
<ul style="list-style-type: none"> <li>Upstream</li> </ul>		
<ul style="list-style-type: none"> <li>Emergency Spillway</li> </ul>		
Basin, toe & chimney drains clear and functioning		
Seeps/leaks on downstream face		
Slope protection or riprap failure		
Vertical/horizontal alignment of top of dam "As-Built"		
Emergency Spillway clear of obstructions and debris		
<b>2. Riser and Principal Spillway (Annual)</b>		
Type: Reinforced Concrete____ Corrugated Pipe_____ Masonry_____		
Low-flow orifice obstructed		
Internal Low-flow orifice obstructed. Remove filter sock and riser to check.		
Low-flow trash rack <ul style="list-style-type: none"> <li>Debris removal necessary</li> </ul>		
<ul style="list-style-type: none"> <li>Corrosion control</li> </ul>		
Low Flow Filter Sock (Filter Fabric) <ul style="list-style-type: none"> <li>Signs of deterioration, replace if necessary</li> </ul>		
Weir trash rack maintenance <ul style="list-style-type: none"> <li>Debris removal necessary</li> </ul>		
<ul style="list-style-type: none"> <li>Corrosion control</li> </ul>		

**Detention / Infiltration Pond  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Excessive Sediment accumulation inside riser		
Concrete/Masonry condition riser and barrels		
<ul style="list-style-type: none"> <li>• cracks or displacement</li> </ul>		
<ul style="list-style-type: none"> <li>• Minor spalling (&lt;1")</li> </ul>		
<ul style="list-style-type: none"> <li>• Major spalling (rebars exposed)</li> </ul>		
<ul style="list-style-type: none"> <li>• Joint failures</li> </ul>		
<ul style="list-style-type: none"> <li>• Water tightness</li> </ul>		
Metal pipe Condition		
Control Valve		
<ul style="list-style-type: none"> <li>• Operational/ Exercised</li> </ul>		
<ul style="list-style-type: none"> <li>• Chained and Locked</li> </ul>		
Basin Drain Valve		
<ul style="list-style-type: none"> <li>• Operational/ Exercised</li> </ul>		
Outfall channels functioning		
<b>3. Dry Basin Areas (Annual)</b>		
Vegetation adequate		
Undesirable vegetative growth		
Undesirable woody vegetation		
Low-flow channels clear of obstructions		
Standing water or wet spots		
Annual mowing of vegetation along the maintenance access roads.		

**Detention / Infiltration Pond  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Annual inspection of vegetation within basin.		
Prune all dead or dying vegetation within the extents of the basin or WVTS.		
Sediment and/or trash accumulation *		
Remove all herbaceous vegetation root stock when overcrowding of the maintenance access to the facility, remove any vegetation that has a negative impact on stormwater flowage through facility, and trim any overgrown vegetation within the basin.		
Replace any/all original vegetation that has died off or has not fully established, as determined at the time of the inspection.		
Vegetation should be reinforced to its original design standards if less than 50% of the original vegetation is established after two years.		
Any invasive vegetation encroaching upon the perimeter of the facility should be pruned or removed if it is prohibiting access to the facility, compromising sight visibility and/or compromising original design vegetation.		
<b>4. Condition of Outfalls (Annual)</b>		
Riprap Failures		
Slope erosion		
Storm drain pipes		
Endwalls/ Headwalls		
Other (specify)		
<b>1. Emergent Vegetation (Annual)</b>		

**Detention / Infiltration Pond  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Annual mowing of vegetation: Annual mowing of the basin setback is only required along maintenance rights-of-way and the embankment. The remaining setback can be managed as rangeland (mowing every other year) or forest		
Vegetation healthy and growing maintaining 50% surface area coverage of emergent plants after the second growing season (If unsatisfactory, reinforcement plantings needed)		
Dominant emergent plants: Survival of desired emergent plant species. Distribution according to planting plan?		
Evidence of invasive species		
Maintenance of adequate water depths for desired emergent plant species		
Harvesting of emergent plantings needed		
Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		



**Street Sweeping  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Sweep all roadways two times per year. One of these sweepings must occur after winter sanding operations have concluded.		

COMMENTS:

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**Grassed Channel or Grassed Swale  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor
- If the surface of the grass channel becomes clogged to the point that standing water is observed on the surface 48 hours after precipitation events, the bottom should be rototilled or cultivated to break up any hard-packed sediment, and then reseeded

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
<b>1. Debris Cleanout (Quarterly)*</b>		
The channel/swale bottom is clear of debris or litter.		
Inflow pipes / inlet areas clear of debris		
Outlet area clear of debris		
Outlet area clear of debris		
<b>2. Sedimentation (Quarterly)*</b>		
Obvious trapping of sediment		

**Grassed Channel or Grassed Swale  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

When sediment accumulates to a depth of approximately ¼ of the original design depth, it should be removed, and the channel should be reconfigured to its original dimensions		
<b>3. Vegetation (Quarterly)*</b>		
The grass in the channel should be mowed at least 2 times during the growing season		
Dethatching swale bottom and removal of thatching		
<b>4. Embankments (Quarterly)*</b>		
Evidence of erosion		
Slopes stabilized with vegetation, slope protection, riprap, etc		

COMMENTS:

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**Grassed Filter Strip  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- Filter strips shall be inspected at least quarterly during the first year of operation and semiannually thereafter,
- Beyond the above noted inspection frequency, inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)
- All Checklist Maintenance items are MANDATORY.
- During inspections, if maintenance items are found not to be applicable, note as N/A in comments
- All removed sediments shall be disposed at an approved and permitted location.
- All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Ensure that grass has established; if not, replace with an alternative species		
Eroded spots must be reseeded and mulched to enhance a vigorous growth and prevent future erosion problems		
Deposited sediments shall be removed manually at least once per year or when accumulating sediments cause a change in the grade elevation. Reseeding may be necessary to repair areas damaged during the sediment removal process		
Grass filter strips should be mowed approximately 2 to 4 times a year, leaving vegetation a minimum of 4 inches in height. Mowing operations are to be conducted during the growing season, but preferably after mid-August. This management technique maintains a tall vigorous growth.		

**Grassed Filter Strip  
Operation, Maintenance, and Management  
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

<p>Filter strips provide a convenient area for snow storage and treatment. If used for this purpose, vegetation in the filter strip should be salt tolerant, (e.g., creeping bentgrass), and a maintenance schedule should include the removal of sand built-up at the bottom of the slope.</p>		
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COMMENTS:

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## Appendix B – RIDEM Sample Stormwater Facility Maintenance Agreement

**\*\*A site-specific Stormwater Facility Maintenance Agreement between the Owner and the responsible authority must be developed prior to construction\*\***

### **Sample Stormwater Facility Maintenance Agreement**

THIS AGREEMENT, made and entered into this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between (Insert Full Name of Owner)

\_\_\_\_\_ hereinafter called the "Landowner", and the [Local Jurisdiction], hereinafter called the "[Town/City]".

WITNESSETH, that WHEREAS, the Landowner is the owner of certain real property described as (Tax Map/Parcel Identification Number) \_\_\_\_\_ as recorded by deed in the land records of [Local Jurisdiction] Deed Book \_\_\_\_\_ Page \_\_\_\_\_, hereinafter called the "Property".

WHEREAS, the Landowner is proceeding to build on and develop the property; and WHEREAS, the Site Plan/Subdivision Plan known as \_\_\_\_\_, (Name of Plan/Development) hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the [Town/City], provides for detention of stormwater within the confines of the property; and

WHEREAS, the [Town/City] and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of [Local Jurisdiction] require that on-site stormwater management facilities be constructed and maintained on the Property; and

WHEREAS, the [Town/City] requires that on-site stormwater management facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site stormwater management facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan.
2. The Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater management facilities in accordance with the required Operation and Maintenance Plan. This includes all pipes, channels or other conveyances built to convey stormwater to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions. The Stormwater Best Management Practices Operation, Maintenance and Management Checklists are to be used to establish what good working condition is acceptable to the [Town/City].

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3. The Landowner, its successors and assigns, shall inspect the stormwater management facility and submit an inspection report annually. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structure, basin areas, access roads, etc. Deficiencies shall be noted in the inspection report.

4. The Landowner, its successors and assigns, hereby grant permission to the [Town/City], its authorized agents and employees, to enter upon the Property and to inspect the stormwater management facilities whenever the [Town/City] deems necessary. The purpose of inspection is to follow-up on reported deficiencies and/or to respond to citizen complaints. The [Town/City] shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the repairs if necessary.

5. In the event the Landowner, its successors and assigns, fails to maintain the stormwater management facilities in good working condition acceptable to the [Town/City], the [Town/City] may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the [Town/City] to erect any structure of permanent nature on the land of the Landowner outside of the easement for the stormwater management facilities. It is expressly understood and agreed that the [Town/City] is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the [Town/City].

6. The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. In the event a maintenance schedule for the stormwater management facilities (including sediment removal) is outlined on the approved plans, the schedule will be followed.

7. In the event the [Town/City] pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the [Town/City] upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the [Town/City] hereunder.

8. This Agreement imposes no liability of any kind whatsoever on the [Town/City] and the Landowner agrees to hold the [Town/City] harmless from any liability in the event the stormwater management facilities fail to operate properly.

9. This Agreement shall be recorded among the land records of [Local Jurisdiction] and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowners association.

WITNESS the following signatures and seals:

\_\_\_\_\_  
Company/Corporation/Partnership Name (Seal)

By: \_\_\_\_\_

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\_\_\_\_\_

(Type Name and Title)

The foregoing Agreement was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by

\_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires: \_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_

(Type Name and Title)

The foregoing Agreement was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by

\_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires: \_\_\_\_\_

Approved as to Form:

\_\_\_\_\_  
[Town/City] Attorney Date