

Operations and Maintenance Plan
The Residences at Johnson Farm
189 Landham Road
Sudbury, Massachusetts

Submitted to:
Town of Sudbury

December 2011

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	Stormwater Management O&M Plan (in pocket)	

1.0 Introduction

This long-term Stormwater Management System Operations and Maintenance (O&M) Plan, filed with the Town of Sudbury, shall be implemented at The Residences at Johnson Farm development at 189 Landham Road to ensure that the stormwater management and porous pavement systems function as designed. The Owner possesses the primary responsibility for overseeing and implementing the O&M Plan and assigning a Property Manager who will be responsible for the proper operation and maintenance of the stormwater structures. In case of transfer of property ownership, future property owners shall be notified of the presence of the stormwater management system and the requirements for proper implementation of the O&M Plan. Included in the manual is a Stormwater Management O&M Plan identifying the key components of the stormwater system and a log for tracking inspections and maintenance.

The stormwater management system protects and enhances the stormwater runoff water quality through the removal of sediment and pollutants, and source control significantly reduces the amount of pollutants entering the system. Preventive maintenance of the system will include a comprehensive source reduction program of regular vacuuming and litter removal, prohibitions on the use of pesticides, and maintenance of designated waste and recycling areas.

1.1 Responsibility

The purpose of the Stormwater Operations and Maintenance (O&M) plan is to ensure inspection of the system, removal of accumulated sediments, oils, and debris, and implementation of corrective action and record keeping activities. The below O&M activities associated the site-wide porous pavement areas will be performed by a Contract Operator for the scope of maintenance. The Contract Operator will be a professional engineer or other technical professional with expertise and experience with porous pavement and stormwater management facilities operation and maintenance.

The ongoing responsibility is the Owner, its successors and assigns. Adequate maintenance is defined in this document as good working condition.

Contact information is provided below:

Responsibility for Operations and Maintenance

Name: Madison Place Sudbury LLC
Address: 15 Brickyard Lane
City, State: Westborough, MA 01581
Contact: Robert E. Moss
Telephone: (508) 366-1966

1.2 Documentation

An Inspection and Maintenance Record Log and Schedule will be kept by the Owner or Property Manager summarizing inspections, maintenance, repairs and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Inspection & Maintenance Logs will be kept on file at the on-site Property Management office.

2.0 Maintenance Program

The Owner, Property Manager and maintenance staff will conduct the Operation and Maintenance program set forth in this document. The Owner or Property Manager will ensure that inspections and record keeping are timely and accurate and that cleaning and maintenance are performed in accordance with the recommended frequency for each stormwater component. Inspection & Maintenance Log Forms (provided herein) shall include the date and the amount of the last significant storm event in excess of 1” of rain in a 24-hour period, physical conditions of the structures, depth of sediment in structures, evidence of overtopping or debris blockage and maintenance required of each structure. Estimated annual cost of the Maintenance Program is \$2,000 to \$5,000.

2.1 Inspection and Maintenance Frequency and Corrective Measures

The following areas, facilities and measures will be inspected by the Owner or Property Manager and maintained as specified below. Identified deficiencies will be corrected. Accumulated sediments and debris will be properly handled and disposed of off-site, in accordance with local, state, and federal guidelines and regulations. Refer to Figure 1, *Stormwater Management O&M Plan* for the components of the stormwater management system.

2.1.1 Yard Drains

Yard drains will be inspected quarterly to ensure that they are working in their intended fashion and free of debris. Sediments and hydrocarbons will be properly handled and disposed of off-site, in accordance with local, state and federal guidelines and regulations. The method of sediment removal will be manual and disposal must be documented. Any structural damage to yard drains or to castings must be repaired upon discovery.

2.1.2 Storm Drain Piping

The storm drain piping (from two leaching catch basins) to stormwater basins will be inspected quarterly and cleaned as necessary. Sediments and hydrocarbons will be properly handled and disposed of off-site, in accordance with local, state and federal guidelines and regulations. Pipe outlets should be cleaned away from the stormwater basins to prevent discharge of sediment into the basin.

2.1.3 Flared End Sections

Flared end sections shall be inspected quarterly or as necessary to ensure that they are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the outlet and within the conduit and to repair any erosion damage.

2.1.4 Stormwater Basins

Stormwater basins shall be inspected quarterly and after major storm events. Maintenance and repairs will be made as necessary. Basins will be mowed at least twice a year and sediment will be removed as necessary or every five (5) years.

2.1.5 Vegetated Areas

Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. If erosion is evident, armor the area with an appropriate lining or riprap stone.

2.1.6 Grass Swales

Inspect grass swales for the first few months after construction and thereafter quarterly to ensure they are functioning as designed and are free of sediment and debris. Remove any obstructions to flow, including accumulated sediments, trash, debris, and vegetated growth at the time of inspection.

Grass swales shall be mowed at least twice a year and minimally organic-fertilized. In addition, they should be visually inspected for ponding and to identify areas of soft and/or saturated conditions.

If the grass swales have a riprap lining, replace riprap on areas where underlying filter fabric or underdrain gravel shows through the stone or where stones have been dislodged. Woody vegetation growing through riprap linings must also be removed. Vegetation should not be removed by application of herbicides. Repair slumping side slopes as soon as practicable. Correct erosion occurring at the channel bottom or along the channel side slopes.

2.1.7 Porous Pavement

Long-term management practices include quarterly power-washing and vacuuming of the porous paved surfaces. Sanding and material stockpiles are prohibited on the porous pavement.

Power-washing of porous pavement must be used for unclogging plugged areas in conjunction with a high velocity vacuum head so that debris is removed and not just displaced. Power-washing should occur at mid-pressure typically less than 500 psi, and at a low angle less than 45 degrees, to drive sediment and material out of the void spaces, instead of deeper clogging. A powerful vacuum, such as Elgin Whirlwind or Tymco 500X, is required. All paved areas will be cleaned and maintained quarterly (4 times per year), and more often if conditions warrant.

Routine preventative cleaning of the porous pavement is more effective than corrective cleaning. Controlling run-on and debris tracking is the key to extending the life of porous pavement surfaces. Materials such as sand, salt, mulch, soil, yard waste and other stockpile materials should not be stored on porous pavement. Signage installation is required to identify areas of porous pavement and to prohibit winter sanding. All accumulated vacuum sweepings must be disposed of in a legal manner.

It is recommended that Madison Place Sudbury LLC hire a Contract Operator such as Stormwater Compliance, LLC to manage the maintenance of porous pavement areas, including operation of the regenerative air vacuum truck and power washing implement. The contact at Stormwater Compliance, LLC is Gregg Novick, phone (877) 271-9055.

2.2 Winter Maintenance Program

Ensure structures are not blocked by ice, snow, debris or trash during winter months. Sand is prohibited from use on the porous pavement areas because it will clog the voids and render the porous pavement ineffective. Signage must be installed at the site to identify the use of porous pavement and to prevent sand use by snowplow operators. Reduced use of road salt (sodium chloride use is prohibited; only calcium chloride use is permitted) to the extent feasible helps limit the amount of dissolved pollutants in runoff and minimizes the potential impact of deicing chemicals on wetland resources.

2.3 Fertilizer Use

Only slow-release organic low-phosphorous fertilizers will be used in any landscaped areas in order to limit the amount of nutrients that could enter the stormwater system and the adjacent wetlands.

3.0 Emergency Spill Containment

The Owner, along with the on-site Property Manager is responsible for educating staff and informing tenants on the environmental benefits associated with the use of porous pavement at the site. Staff must be trained and tenants informed via the community website as to the proper spill prevention control and response procedures should a spill occur on the porous pavement surface. Proper spill control products, such as a granular dry absorbent, must be kept on-site at the property management office in a clean, dry chemical and corrosion resistant container.

In the event of a hazardous waste spill on the porous pavement surface, the following protocol should be followed:

- If it is safe to do so, maintenance staff or any tenant detecting a gasoline, oil or other hazardous waste spill on the porous pavement surface should immediately stop the release and use available materials to prevent spreading.
- If there is a potentially flammable, toxic or explosive condition, evacuate the vicinity of the spill.
- The tenant should immediately contact the on-site Property Manager or staff personnel, who will apply a granular absorbent such as Speedy-Dry or Oil-Dri. The used product should be disposed of properly.
- If the quantity of the spill results in more than one quart of product penetrating below the porous pavement surface, the asphalt area covered by the spill should be saw-cut out and the dirty stone removed and replaced. Standard dense-mix asphalt patch can be used to replace the porous cut-out area. The removed, contaminated materials must be disposed of properly at a Massachusetts licensed hazardous waste facility by a licensed waste hauler.
- This clean-up procedure must occur prior to the next precipitation event to prevent the waste material from being washed deeper into the porous pavement media.
- Typically, because of the viscous properties of oil and gasoline, travel rates through the media are impeded and the product becomes trapped in the finer filter course layer where it can be removed and disposed of properly, thereby preventing deeper penetration and potential contamination of groundwater.

A spill of greater than 10 gallons of oil or a spill of any quantity that has reached a surface water, into a sewer, storm drain, ditch, or culvert leading to a surface water, is immediately reported to one or more municipal, state, or federal authority.

In the event of a hazardous waste spill on-site, the following protocol should be followed.

- If it is safe to do so, maintenance staff or tenants detecting an oil spill should immediately stop the release and use available materials to prevent the spread of oil,

particularly from discharging towards leaching catch basins located within the access driveway.

- If there is a potentially flammable, toxic or explosive condition, evacuate the vicinity of the spill.
- If it's believed that a reportable or dangerous condition exists, immediately call your local Fire Department to notify them of the release.
- If it is believed that a reportable condition exists, immediately call the Massachusetts Department of Environmental Protection (DEP) to notify them of the release. Call the DEP Emergency Response Section toll free statewide number, 1-888-304-1133. Be prepared to provide the following information to the DEP and the Fire Department:
 - Identity of the caller
 - Contact phone number
 - Location of the spill
 - Type of product spilled
 - Approximate quantity or product spilled
 - Extent of actual and/or potential water pollution
 - Date and time of spill
 - Cause of spill
- Contact a Licensed Site Professional (LSP) to assist in further handling of the material(s) and DEP.

4.0 Inspection Forms

Inspection and Maintenance Log

INSPECTOR: _____ YEAR: _____
 RAINFALL INSPECTION: DATE: _____ RAINFALL AMOUNT: _____

Component to be inspected	Frequency	Date Performed	Action to be Taken	Comments
Yard Drains	Quarterly Inspections		Remove sediment and debris	
Flared End Outlets	Quarterly Inspections		Removal of trash and sediment from outlets	
Storm Drain Pipes (Two Leaching Catch Basins)	Quarterly Inspections		Maintenance as necessary-removed sediment	
Porous Pavement	Monthly Inspections		As needed Power Washing & Vacuuming of porous paved areas	
	Quarterly Maintenance		Required Power Washing & Vacuuming	
Stormwater Basins	Quarterly Inspections; Twice per Year Mowing; Sediment Removal as necessary or every 5 Years		Removal of trash, debris, sediment	
Grass Swales	Quarterly Inspections and Twice per Year Mowing		Maintenance as necessary-remove trash, debris, sediment Areas of visible ponding water	
Vegetated Areas	Quarterly Inspections		Maintenance as necessary	

FLARED END SECTION INSPECTION FORM

The Residences at Johnson Farm
Sudbury, Massachusetts

Owner: _____

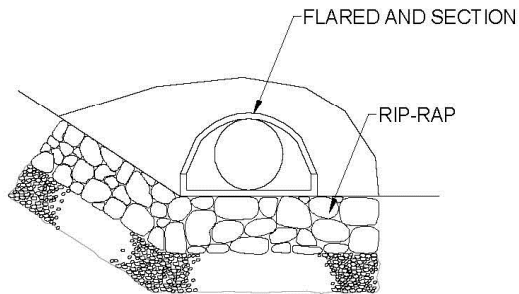
Property Manager: _____

Inspected By: _____

Date of Inspection: _____

Flared End Section Inspected: _____

Acceptable Needs Work Notes



Date of Cleaning: _____ By Whom: _____

Date of Repair: _____ By Whom: _____

Note any discrepancies and suggested corrective actions:

STORMWATER BASIN INSPECTION FORM

The Residences at Johnson Farm
Sudbury, Massachusetts

Owner: _____

Property Manager: _____

Inspected By: _____

Date of Inspection: _____

Stormwater Basin Inspected: _____

Acceptable Needs Work Notes

ARE THERE ANY SURFACE CRACKS IN THE BERM?	
IS THERE ANY UNUSUAL CRACKING OR MOVEMENT AT OR BEYOND THE TOE?	
IS THERE ANY EROSION ON THE UPSTREAM FACE OF THE BERM FROM WATER ACTION OR FROM CHANGES IN WATER ELEVATION?	
ARE GULLIES BEING ERODED OR ARE THERE BARE AREAS ON THE BERM?	
ARE THERE ANY ANIMAL BURROWS IN THE BERM?	
IS THERE EVIDENCE OF MUDDY FLOW THROUGH THE SOIL OF THE BERM?	
ARE THERE DEPRESSED AREAS IN THE BERM?	
IS THE BERM, SURROUNDING EMBANKMENTS, AN/OR THE BOTTOM OF THE POND OVERGROWN WITH BRUSH AND TREES?	
IS THE EMERGENCY SPILLWAY CLEAR OF UNDERBRUSH, TREES & DEBRIS?	
ARE THERE BARE AREAS OR EVIDENCE OF EROSION IN THE EMERGENCY SPILLWAY?	
HAS THE SEDIMENT IN THE BASIN BOTTOM BEEN MEASURED? WHAT ARE THE SEDIMENT DEPTHS?	

Date of Cleaning: _____ By Whom: _____

Date of Repair: _____ By Whom: _____

Note any discrepancies and suggested corrective actions:

YARD DRAIN INSPECTION FORM

The Residences at Johnson Farm
Sudbury, Massachusetts

Owner: _____

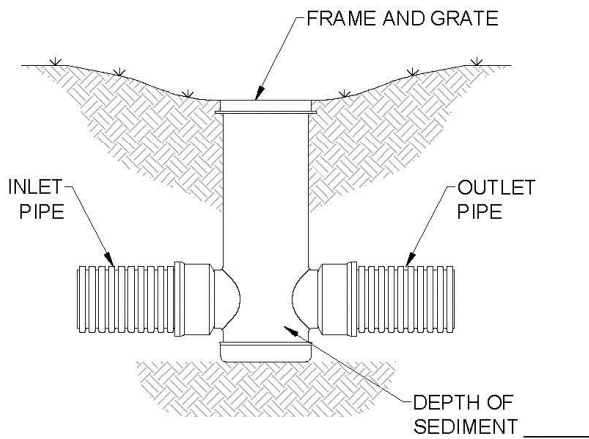
Property Manager: _____

Inspected By: _____

Date of Inspection: _____

Yard Drain Inspected: _____

Acceptable Needs Work Notes



Date of Cleaning: _____

By Whom: _____

Date of Repair: _____

By Whom: _____

Note any discrepancies and suggested corrective actions:
