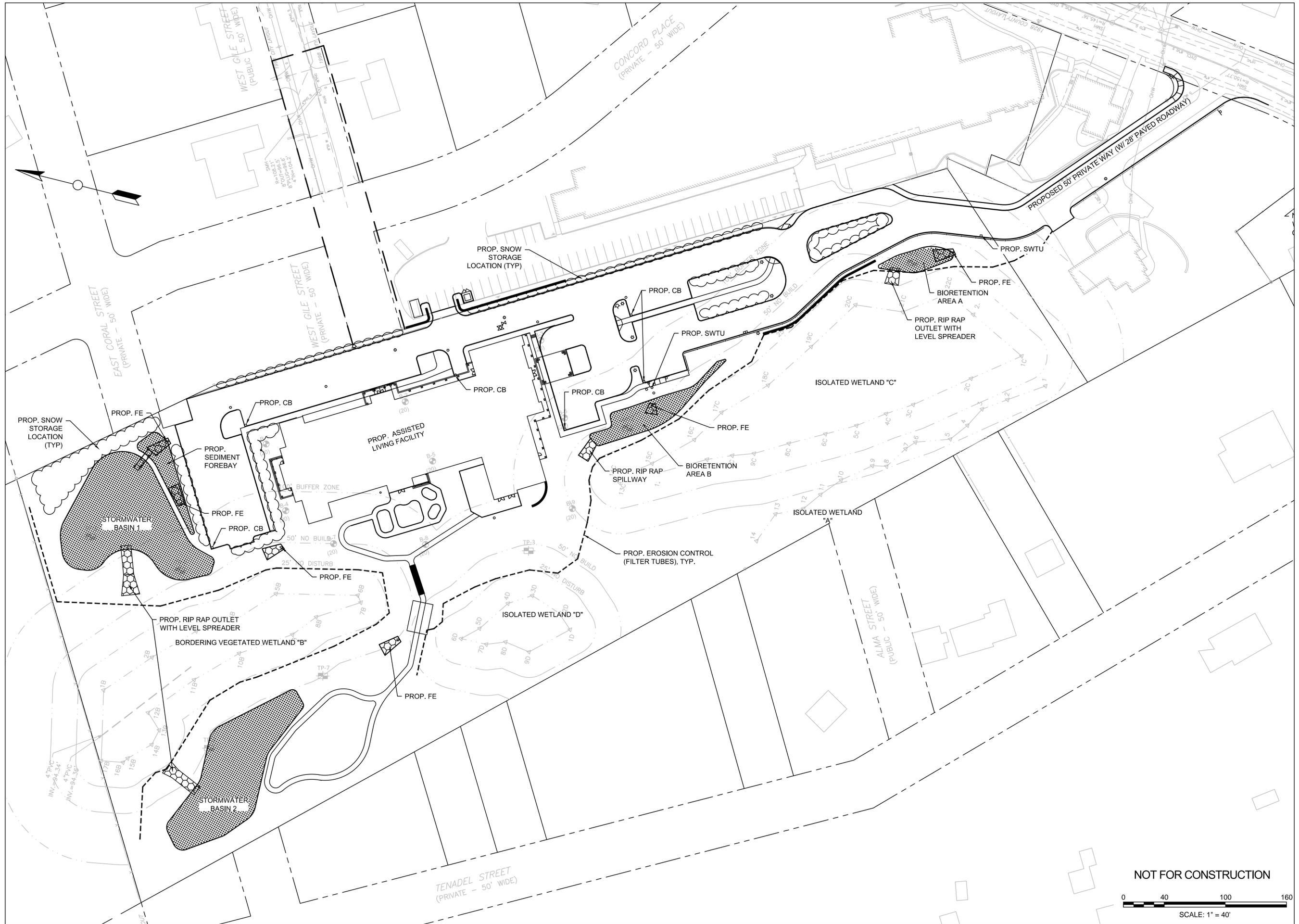


Operations and Maintenance Plan
Revised June 2016

Wingate Residences Haverhill



Project:

WINGATE RESIDENCES
North Avenue Haverhill, MA

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Consultants:

North:

Revisions:

Rev	Date	Description

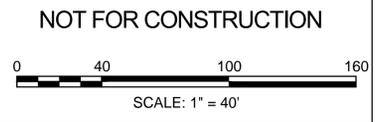
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Date: 6/20/16
Scale: 1:40
Drawn By: NAP
Reviewed By: LFK
Checked By: SRA
Approved By: SRA

Drawing Title:
BMP & SNOW STORAGE LOCATIONS

Sheet Number:
O&M



1.0 Introduction

WHC Haverhill AL, LLC is planning to construct a new assisted living facility on vacant land on North Avenue in Haverhill, adjacent to the Wingate at Haverhill Nursing Home. The stormwater guidelines were implemented in the Commonwealth of Massachusetts by the Department of Environmental Protection. The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. WHC Haverhill AL, LLC is the owner and operator of the system and is responsible for its upkeep, maintenance, and repair. This work will be funded on an annual basis through WHC Haverhill AL, LLC's operating budget. The estimated budget to maintain these BMPs utilizing independent contractors is approximately \$10,000 per year.

In the event the Owner sells the property, it is the Owner's responsibility to transfer this plan as well as the past three years of operation and maintenance records to the new property owner.

3.0 BMP Description and Locations

The attached BMP & Snow Storage Location Plan identifies all of the BMPs and their locations on site.

3.1 Deep Sump Catch Basins

There are a number of deep sump catch basins that collect stormwater runoff over the entire site. Deep sump catch basins are collection systems that are designed to remove trash, debris, and coarse sediment from the stormwater runoff.

3.2 Stormwater Treatment Structures

There are two stormwater treatment structures on site. These structures are hydrodynamic separators, designed to slow stormwater down and allow oil and debris to rise and sediment to settle out.

3.3 Drainage Swales

Drainage swales are vegetated channels that are designed to provide non-erosive conveyance of stormwater runoff. There is one drainage swale on site, located behind the building, downstream of Bioretention Area B.

3.4 Sediment Forebays

There is one sediment forebay on site used for the pretreatment of stormwater runoff into Stormwater Basin 1. Sediment forebays are designed to slow runoff and facilitate the gravity separation of suspended solids.

3.5 Bioretention Areas

There are two bioretention areas on site. Bioretention areas provide pollutant removal of the water quality volume by utilizing soils, plantings, and microbes to treat stormwater runoff prior to infiltration or discharge.

3.6 Stormwater Basins

There are two stormwater basins on site. The stormwater basins store stormwater runoff from the storm event until it exfiltrates through the basin floor or discharges over the spillway.

3.7 Flared Ends / Rip Rap Spillways

While the flared ends and spillways are not BMP's, all outfalls, including any riprap, should be inspected on a semiannual basis.

3.8 Street Sweeping

Street sweeping involves the use of mechanical street sweeping equipment which utilizes brooms or rotary brushes to scour the pavement to improve TSS removal from stormwater. Good housekeeping measures for the site should call for keeping the pavement clear of sediment buildup.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Deep Sump Catch Basins

Inspect and/or clean catch basins at least four times per year and at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Each catch basin should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. Catch basins shall be cleaned using clamshell buckets or vacuum trucks.

In the event of contamination by a spill or other means, all catch basins cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.2 Stormwater Treatment Structures

Stormwater treatment structures shall be inspected and cleaned in strict accordance with manufacturer's recommendations. At a minimum, the structures shall be inspected twice per year in the spring and fall. After a hazardous spill, structures shall be inspected immediately. The structures shall be cleaned with a vacuum truck a minimum of once per year or when the sediment has accumulated to a depth of two feet in the treatment chamber. Polluted water, sediments and debris should be disposed of in accordance with local, state and federal regulations.

4.3 Drainage Swales

The swale shall be inspected several times during the first few months following construction to ensure that no erosion has occurred and that the vegetation is adequate. Following the first few months, the swale shall be inspected twice per year for erosion and soil condition, vegetative health, ponding, and sediment accumulation. The swale shall be mowed as necessary to maintain a vegetation height between three and six inches. Sediment and debris shall be removed manually at least once per year. All sediment and debris should be disposed of in accordance with local, state, and federal regulations.

4.4 Sediment Forebays

The sediment forebay shall be inspected monthly for erosion and sediment accumulation and cleaned at least four times per year. All sediment and debris should be disposed of in accordance with local, state, and federal regulations. The forebay shall be mowed as necessary to maintain a vegetation height between three and six inches. Erosion repair and vegetation replacement shall be performed as needed by reseeding using hydroseeding or a similar method.

4.5 Bioretention Areas

Soil shall be inspected monthly for erosion and repaired, if required. Litter and debris shall be removed monthly and disposed of in accordance with local, state, and federal regulations. Dead vegetation shall be replaced twice per year in the spring and fall. If the bioretention area no longer functions as designed, the bioretention media and all vegetation shall be replaced.

4.6 Stormwater Basins

Stormwater basins should be inspected at least twice per year and after any storm event in which the drainage discharges through the highest outlet. Once a basin is in use, it should be inspected after every major storm for the first few months to ensure it is stabilized and is functioning properly. Take corrective actions if the system is not functioning properly.

Upon establishing that the system is functioning properly, the basin shall be inspected at least twice per year. The following items should be checked:

- Signs of differential settlement
- Cracking
- Erosion
- Leakage in embankments
- Tree growth on the embankments
- Condition of riprap
- Sedimentation accumulation
- Health of the turf
- Draining completely within 72 hours of rain events

At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove all grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. In addition, remove all trash, debris, and sediment from the basin bottom. Sediment shall only be removed when the bottom of the basin is thoroughly dry and shall be accomplished with the use of light equipment. Removal activities shall remove the top layer without compacting the underlying soil. Repair damage to vegetated areas by deep tilling and re-vegetating accordingly. All sediment and debris should be disposed of in accordance with local, state, and federal regulations.

4.7 Flared Ends / Rip Rap Spillways

While not BMP's, the rip rap spillways should be inspected and cleaned twice a year and after heavy rainstorms. Sediment and debris should be removed by hand and disposed of in accordance with local, state and federal regulations.

4.8 Street Sweeping

Street sweeping shall take place on a quarterly average, with sweeping scheduled primarily in spring and fall. All sediment and debris should be disposed of in accordance with local, state, and federal regulations.

4.9 Inspections and Record Keeping

- An inspection form should be filled out each and every time maintenance work is performed.
- A binder should be kept at the Facility that contains all of the completed inspection forms and any other related materials.
- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.
- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site at the Facility.
- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

Wingate Residences Haverhill
North Avenue, Haverhill, MA
Permanent BMP Inspection Checklist
Revised June 2016

Deep Sump Catch Basins

Frequency: Inspect and clean deep sump catch basins and leaching galleys in March, June, September and December.

Structure Number: _____

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

Instructions: Clean unit four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to lowest pipe in the basin/galley.



Stormwater Treatment Structure

Frequency: Inspect twice per year or as required by manufacturer's recommendations. After a hazardous spill, structures shall be inspected immediately.

Structure Number: _____

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

Instructions: Clean unit when the sediment has accumulated to a depth of two feet in the treatment chamber. Dispose of sediment and debris in accordance with local, state, and federal laws.



Drainage Swales

Frequency: Drainage swales shall be inspected at least twice per year and after major storm events.

Structure Number: _____

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

Instructions: Keep grass cut to six inches in height. Remove accumulated trash and debris. All trash and debris should be disposed of in accordance with local, state, and federal regulations.



Sediment Forebays

Frequency: Inspect on a monthly basis

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Structure Number: _____

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

Instructions: Remove sediment and debris at least four times per year, or as necessary, during months with snow removal. Also check that areas are draining completely within 72 hours of rain events.

**Bioretention Areas**

Frequency: Inspect on a monthly basis

Structure Number: _____

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

Instructions: Remove sediment and debris monthly. Repair eroded areas, as necessary. Dead vegetation shall be replaced twice per year in the spring and fall. If required, replace the bioretention media and all vegetation.

Stormwater Basins

Frequency: The basins shall be inspected at least twice per year (preferably in May and November) and after major storm events. At least twice a year, mow the buffer area, side slopes, and basin bottom.

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

- Instructions: The following items should be checked:
1. Signs of differential settlement
 2. Cracking
 3. Erosion
 4. Leakage in embankments
 5. Tree growth on the embankments
 6. Condition of riprap
 7. Sedimentation accumulation
 8. Health of the turf
 9. Draining completely w/in 72 hrs. of rain events

When mowing is conducted, remove all grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. In addition, remove all trash, debris, and sediment from the basin bottom. Sediment shall only be removed when the bottom of the basin is thoroughly dry and shall be accomplished with the use of light equipment. Removal activities shall remove the top layer without compacting the underlying soil. Repair damage to vegetated areas by deep tilling and re-vegetating accordingly. All sediment and debris should be disposed of in accordance with local, state, and federal regulations.

**Street Sweeping**

Frequency: Street sweeping shall be done quarterly.

Inspected By: _____ Date: _____

Observations: _____

Actions Taken: _____

Instructions: Sweep all paved areas of sediment and debris.
Dispose of sediment and debris in accordance with
local, state, and federal laws.