

Annual Stormwater Operation & Maintenance Report (2021)
Windsor Estates Condominiums, Lynnfield, MA

Structural Best Management Practices (BMPs) require periodic maintenance to insure proper function and efficiency in pollutant removal from stormwater discharges that would otherwise discharge from the proposed impervious areas untreated. Maintenance schedules found below are as recommended in the manufacturer's specifications. Inspection forms can be found at the end of this document.

The following BMPs shall be utilized for project for pollutant removal from stormwater discharge as well providing additional groundwater recharge on site by directing the proposed runoff to twenty-one (21) catch basins, five (5) Stormceptors, three (3) Cultec recharge chambers, eleven (11) roof recharge chambers, two (2) Brentwood Stormtank subsurface infiltration basins, and four (4) surface infiltration basins where shown on the accompanying plans:

- Precast Catch Basins (21 total)
- Subsurface Stormwater Management Areas (Brentwood Stormtank - 2 total)
- Stormceptors (5 total)
- Surface Infiltration Basins (4 total)
- Cultec Recharge Chambers (3 total)
- Roof Recharge Chambers (11 total)
- Street Sweeping

Deep Sump Catch Basins

- Inspect the units at least once per year with special consideration given to the end of foliage and snow removal seasons.
- Sediments must also be removed once per year or 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 unit. Clamshell buckets and/or vacuum trucks are typically used to remove sediment in Massachusetts.
- 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. However, some landfills require catch basin cleanings to be tested before they are accepted. For information on all of the MassDEP requirements pertaining to the disposal of catch basin cleanings go to www.Mass.gov/dep/recycle/laws/cafacts.doc

Inspection Date: 7/27/2021

Inspected By: Rapid Flow, Inc.

Catch Basin 1:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 2:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 3:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 4:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 5:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 6:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 7:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 8:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 9:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 10:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 11:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 12:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 13:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 14:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 15:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 16:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 17:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 18:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 19:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 20:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Catch Basin 21:

Outlet control (Hood) Installed / Condition?: Yes - Good

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: N/A

Action Required: Catch basin pumped out.

Stormceptor:

Maintenance of the Stormceptor system is performed using vacuum trucks. No entry into the unit is required for maintenance (in most cases). The vacuum service industry is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. The need for maintenance can be determined easily by inspecting the unit from the surface. The depth of oil in the unit can be determined by inserting a dipstick in the oil inspection/cleanout port. Similarly, the depth of sediment can be measured from the surface without entry into the Stormceptor via a dipstick tube equipped with a ball valve. This tube would be inserted through the riser pipe. Maintenance should be performed once the sediment depth exceeds the guideline values provided in the Table 4. Once sediment depth exceeds 8 inches, the device should be cleaned out.

- Inspect the units at least once per year with special consideration given to the end of foliage and snow removal seasons.
- Check for oil through the oil cleanout port.
- Remove any oil separately using a small portable pump.
- Decant the water from the unit to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank.
- Remove the sludge from the bottom of the unit using the vacuum truck.
- Re-fill Stormceptor with water where required by the local jurisdiction.
- Although annual servicing is recommended, the frequency of maintenance may need to be increased or reduced based on local conditions (i.e. if the unit is filling up with sediment more quickly than projected, maintenance may be required semi-annually; conversely once the site has stabilized maintenance may only be required every two or three years).
- Requirements for the disposal of material from the Stormceptor System are similar to that of any other stormwater Best Management Practice (BMP) where permitted. Disposal options for the sediment may range from disposal in a sanitary trunk sewer upstream of a sewage

- treatment plant, to disposal in a sanitary landfill site. Petroleum waste products collected in the Stormceptor (free oil/chemical/fuel spills) should be removed by a licensed waste management company

Inspection Date: 7/27/2021

Inspected By: Rapid Flow, Inc.

Stormceptor 1:

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: Good condition. No issues observed.

Action Required: Stormceptor pumped out.

Stormceptor 2:

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: Good condition. No issues observed.

Action Required: Stormceptor pumped out.

Stormceptor 3:

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: Good condition. No issues observed.

Action Required: Stormceptor pumped out.

Stormceptor 4:

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: Good condition. No issues observed.

Action Required: Stormceptor pumped out.

Stormceptor 5:

Depth of Sediment Buildup (Inches): Not measured.

Overall Condition and General Notes: Good condition. No issues observed.

Action Required: Stormceptor pumped out.

Roof Recharge Chambers

- Access to the chambers is through the inspection ports to be located at either end of the row of chambers where shown on the site plan.
- From the surface, through these inspection ports, the sediment may be measured.
- Once the depth of sediment is in excess of three (3") inches, the affected Cultec Chambers shall be excavated and the six (6) inch stone bed beneath them is removed and replaced with clean stone.
- Should standing water be present in bottom of system during a routine inspection or more than seventy-two (72) hours after the end of a rainfall event, it may be as a result of the stone bed layer being clogged with fine particles. The amount of elapsed time required for the water to infiltrate completely should be recorded. If after seventy-two (72) hours from the end of a rainfall event there is still standing water in the bottom of the chambers, excavate the system and replace the stone bed layer with clean stone as mentioned above.
- We recommend the following schedule for system maintenance

One year after commissioning and every year following:

- Check inlets for clogging and remove any debris as necessary
- Inspect the interior of the chambers via inspection ports and measure sediment or depth of standing water
- Check for settlement in areas over and surrounding the system
- Confirm that no unauthorized modifications have been performed to the site

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers to south of units 15-16:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers in rear of units 20-21:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers in between units 13-14 and 9-11:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers in between units 9-11 and 7-8:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers in rear of units 12 & 44:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers to southwest of units 5-6:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers to north of units 1-2:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers to south of units 28-30:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers to south of units 28-30:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers in rear of units 42-43:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers in rear of units 39-41:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Roof recharge chambers to south of units 36-38:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Subsurface Infiltration Chambers (Cultec and Brentwood Stormtank)

- Access to the chambers is through the inspection ports to be located at either end of the row of chambers where shown on the site plan.
- From the surface, through these inspection ports, the sediment may be measured.
- Once the depth of sediment is in excess of three (3") inches, the affected Cultec Chambers shall be excavated and the six (6) inch stone bed beneath them is removed and replaced with clean stone.
- Should standing water be present in bottom of system during a routine inspection or more than seventy-two (72) hours after the end of a rainfall event, it may be as a result of the stone bed layer being clogged with fine particles. The amount of elapsed time required for the water to infiltrate completely should be recorded. If after seventy-two (72) hours from the

end of a rainfall event there is still standing water in the bottom of the chambers, excavate the system and replace the stone bed layer with clean stone as mentioned above.

- We recommend the following schedule for system maintenance

One year after commissioning and every year following:

- Check inlets and outlets for clogging and remove any debris as necessary
 - Inspect the interior of the chambers via inspection ports and measure sediment or depth of standing water
 - Check for settlement in areas over and surrounding the system
 - Confirm that no unauthorized modifications have been performed to the site
- It should be noted that most failures occur in subsurface systems such as these due to inadequate pre-treatment which leads to clogging. However, with the installation of deep-sump catch basins with hoods and Stormceptors we do not expect there to be any adverse impacts to the system due to debris accumulation.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Brentwood Stormtank in rear of units 36-38:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Brentwood Stormtank in rear of units 34-35:

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Cultec (RES 01):

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Cultec (RES 07):

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Cultec (RES 08):

Depth of Standing Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Settlement over system?: None

Overall Condition and General Notes: Good condition. No sediment observed within inspection port.

Action Required: None at this time.

Infiltration Basins:

The detention basin is designed to capture, treat, and infiltrate stormwater runoff from portions of the paved surfaces at Michael's Landing and from the neighboring Christmas Tree Shop parking areas. The water level in the basin will be controlled by two outlet control structures. Under normal conditions, the pre-existing water levels within the basin will be maintained.

- Debris should be removed from the infiltration basin on an annual basis.
- Annual inspections should include observation of the condition of the bottom of the infiltration basin. Over time, sediment buildup within the basin can limit the infiltration of stormwater.
- Additionally, the sediment forebay should be observed with attention given to condition of the riprap / stone outlet and whether sediment is overflowing into the infiltration basin.
- Should sediment buildup be observed in either the detention basin, forebay or infiltration basin, the cleaning of these areas will be coordinated with the condominium association.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Infiltration Basin (RES 02)

Depth of Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Riprap Condition: Good condition. No issues observed.

Overall Condition and General Notes: Good condition. Minimal sediment observed within basin. No sediment observed around riprap.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Infiltration Basin (RES 03)

Depth of Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Riprap Condition: Good condition. No issues observed.

Overall Condition and General Notes: Good condition. Minimal sediment observed within basin. No sediment observed around riprap.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Infiltration Basin (RES 05)

Depth of Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Riprap Condition: Good condition. No issues observed.

Overall Condition and General Notes: Good condition. Minimal sediment observed within basin. No sediment observed around riprap.

Action Required: None at this time.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Infiltration Basin (RES 06)

Depth of Water (Inches): 0"

Depth of Sediment Buildup (Inches): 0"

Riprap Condition: Good condition. No issues observed.

Overall Condition and General Notes: Good condition. Minimal sediment observed within basin. No sediment observed around riprap.

Action Required: None at this time.

Street Sweeping

- It is recommended that street sweeping be conducted at least twice per year (in the Spring and Fall). At a minimum, one street cleaning MUST BE conducted every spring to minimize the Total Suspended Solids load on the catch basins. Street sweeping should be coordinated by the HOA.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Overall condition: No sediment observed along street or roadways at this time.

Action Required: None at this time.

Catch basin Grate inspections/cleaning

- Homeowners/HOA shall inspect and clean grates of leaves and debris prior to substantial rainfall events.

Inspection Date: 7/27/2021 **Inspected By:** Williams & Sparages LLC

Overall condition: No sediment or debris observed along catch basin grates.

Action Required: None at this time.