Operation and Maintenance Manual

for:

Livingston Warehouse

Township of North Brunswick
Middlesex County, New Jersey

Prepared By:

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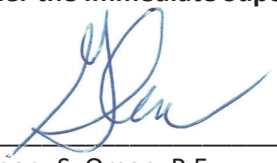

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GSO
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menlo engineering associates

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Purpose

The intent of this manual is to provide a strategic plan for the party(s) responsible for the operation and maintenance of the stormwater management facility(s) located on the site in question. The plan must be complied with to insure the proper function and prolonged life span of the facility(s).

For regular maintenance, the plan describes a list of procedures to be completed and carried out under a specific schedule and contingency procedures during unusual or infrequent conditions that may arise. In addition to maintenance, a detailed inspection log of tasks/conditions/findings of the stormwater management facilities will be recorded in this manual upon every inspection performed.

THIS MANUAL IS BASED ON THE REQUIREMENTS SET FORTH BY THE *NEW JERSEY STORMWATER BEST MANAGEMENT PRACTICES MANUAL, APRIL 2004.*

Description

The location of the four (4) stormwater management facilities this manual is intended for is now or formerly known as Livingston Warehouse, located on Lots 5.02 & 7.01 in Block 140.01, situated in the Township of North Brunswick, Middlesex County, New Jersey. The purpose of all five of these facilities is to provide some degree of the following conditions:

- Provide a temporary means of storage for stormwater.
- Facilitate water quality (to help eliminate contaminants and particulate matter from stormwater runoff).
- Recharge the groundwater supply.

A stormwater management facility is also commonly referred to as a Best Management Practice (or BMP). The five (5) BMP's for this project are as follows:

- Lawn and Landscaped Area– any area containing stable vegetation, lawn area or landscaping.
- Stormwater Collection System– a collection of pipes and drainage structures including manholes and inlets that collect stormwater runoff.
- Detention Basin – One (1) stormwater management basin constructed on-site with the purpose of attenuating stormwater runoff. The basin, located on the south side of the site, outlets to the wetlands along Route 1.
- Stormwater Treatment Device –CDS-7 is used to achieve the appropriate TSS Removal as specified in the Stormwater Management Report.

RESPONSIBILITY

All BMP operation tasks, maintenance and inspection log entries, as defined within this manual, will be performed by the maintenance staff employed or retained by owner of Lot(s) 5.02 & 7.01 of Block 140.01, situated in the Township of North Brunswick, Middlesex County, New Jersey *or a third party designated by said owner and/or operator*. The latest dated party listed below will be considered the party responsible.

DATE:	***04/02/2019***	DATE:	
COMPANY:	***1460 LIVINGSTON AVE INVESTORS LP***	COMPANY:	
CONTACT:	***ABBI HIRSCH***	CONTACT:	
PHONE:	***(732) 886-5700***	PHONE:	
ADDRESS:	***920 E COUNTY LINE RD, STE 103***	ADDRESS:	
	LAKEWOOD, NJ 08701		

Additional Information (if applicable):

DATE:		DATE:	
COMPANY:		COMPANY:	
CONTACT:		CONTACT:	
PHONE:		PHONE:	
ADDRESS:		ADDRESS:	

- Any amendment or alteration to this manual (i.e.: change in ownership, the inclusion of third party maintenance agreements, a modification or addition to maintenance procedures) must be entered in this manual or attached as a rider to this manual, and complete copies submitted to all parties involved and, must be in compliance with the most current guidelines set forth by the New Jersey Department of Environmental Protection Stormwater Management Rules.

- This manual as outlined, or any amendment or alteration to this manual is to be recorded in the deed of record for the property. The deed shall state that any future sale of the property carries with it the responsibility of the new owner to comply with the conditions of this Operation and Maintenance Manual.

- In addition, this manual as outlined, or any amendment or alteration to this manual, must be made available upon request to the local mosquito control or extermination committee and any public entity with administrative, health, environmental, or safety authority over the site.

- The person or party responsible (as named above) for maintenance must maintain a detail log of all preventive and corrective maintenance for the structural stormwater management measures as described in this manual, including inspections and copies of all maintenance related work orders.

- The person or party responsible (as named above) for maintenance shall evaluate the effectiveness of the Operation and Maintenance Plan at least once per year and adjust the plan and the deed as needed.

STORMWATER COLLECTION SYSTEM MAINTENANCE:

Schedule I - four times annually and after every storm exceeding 1 inch of rainfall
Schedule III - annually

DESCRIPTION

Stormwater collection system maintenance involves routine periodic inspection of the storm collection system, the removal of accumulated sediment and debris, and the correction of any structural problems.

1) Inspection : General

a) The Contractor shall inspect all areas to verify that all work is being performed properly and as scheduled, locate potential problems, and correct unacceptable conditions. A brief verbal report is to be submitted to the Owner. Problems requiring immediate attention shall be reported to the Owner.
(Cost: $300 per visit x 4=$1,200)

2) ***Inspection : Schedule I***

a) Inlets, conduit, outfalls and other conveyance elements: Inspect for and clear debris from the gratings, inlets and pipes. This is to prevent clogging of the inlets and subsequent backup of stormwater runoff. Any problems or defects shall be reported to the Owner.
(Cost: $1,500 per visit x 4= $6,000; excludes visits for 1" of rainfall events)

3) Inspection : Schedule III (annually***)***

a) Visual inspection of all components of the onsite stormwater collection system. Inspect for and remove silt and sediment, litter and other debris from all inlets, gratings and drainage pipes. All inlets and manhole are to be vacuumed. (Frequency of vacuuming may be adjusted if maintenance records indicate that sediment and debris accumulation is insignificant.) In the event that the accumulated material exceeds 10% of the pipe diameter, it must be flushed / vacuumed out of the system.
(Cost: $2,500)

4) Prevention of Water Pollution

a) The contractor's activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminates, debris or other pollutants and wastes into the downstream conveyance system. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, collected silt and sediment, etc. Disposal of debris and trash should be done only at suitable disposal / recycling sites and must comply with all applicable local, state, and federal waste regulations.

LAWN AND LANDSCAPED AREA MAINTENANCE:

DESCRIPTION

Maintenance involves routine periodic inspection of the vegetation, fertilization, and the correction of erosion problems.

Schedule III – annually or as noted

Shrubs & Trees:	Between March 1 and April 15
Mowing:	As specified per BMP
Fertilize:	Fall - Between September 1 and October 15
Liming:	Between September 1 and October 15
Soil Testing:	Between September 1 and October 15
Pest & Disease Control:	As required
Overseeding:	Between September 1 and October 15 (As required)
Aeration:	Between September 1 and October 15 (As required)

1) Maintenance: General

a) The Contractor shall inspect all areas to verify that all work is being performed properly and as scheduled, locate potential problems, and correct unacceptable conditions. A brief verbal report is to be submitted to the Owner. Problems requiring immediate attention shall be reported to the Owner.

2) Shrubs & Trees:

a) These plants shall be maintained in a natural setting. No shearing is allowed, shrubs and trees will be hand-pruned to remove dead or diseased branches. Dead plant material shall be replaced in kind unless cultural requirements necessitate change. When planting within compacted slopes, excavate larger holes and backfill with a suitable planting medium.
(Cost: $100 per 1,000 SF)

3) Mowing:

a) All clippings are to be raked, bagged and disposed off-site to prevent clogging of the outlet structure.
(Cost:$250 per acre)

4) ***Fertilize:***

a) Fall: Fertilizer analyses and rates are to be based on soil test results. Standard fertilizer blends rather than custom blends are assumed.
(Cost: $20 per 1,000 SF)

5) ***Liming:***

a) One application in the fall as required by a soil test. Minimum requirements - Lime with pulverized dolomite limestone at a rate of 100 lbs./1,000 s.f.
(Cost: $10 per 1,000 SF)

6) Soil Testing:

a) The Contractor shall take soil samples from grassed areas for the following analysis: ph, available Mg, P, K, C, recommended nitrogen application. Copies of the analyses for each area are to be furnished to the Owner. Samples shall be taken before liming and fertilization as noted on the schedule.

7) Turf disease and pest control:

a) As required. Submit to the Owner the following information before spraying:
   i) -Targeted pests or diseases.
   ii) -Materials and methods used.
   (Cost: $20 per 1,000 SF)

8) ***Overseeding:***

a) Overseeding is scheduled, as required per field inspection; or a minimum of once every four (4) years. A variseeder or equal equipment should be used to overseed designated lawn areas. Seed type and rate per the following schedule.
   (Cost: $200 per 1,000 SF)

b) Seed type and rates for grass basin bottoms:
   Lofts Reclaim Conservation Mix-Damp Formula
   (At a rate of 5 lbs./1,000 s.f.)
   -45% Tall Fescue
   -10% Perennial Ryegrass
   -25% Poa Trivalis
   -10% Salty Alkaligrass
   - 5% Redtop
   - 5% Reed Canary Grass

c) Seed type and rates for lawn areas, grass basin side slopes and berm:
   SCS Seed Mix 16
   -(3.5 lbs./1,000 s.f) Tall Fescue
   -(0.4 lbs./1,000 s.f) Kentucky Bluegrass (blend)
   -(0.4 lbs./1,000 s.f) Perennial Ryegrass (blend)

d) Seed type and rates for low maintenance areas:
   Lofts Reclaim Native Grass Mixture
   (At a rate of 60lbs/acre)
   -30% Little Bluestem
   -20% Indiangrass
   -20% Azure Blue Fescue
   -15% Side Oats Grama
   -10% Big Bluestem
   - 5% Switchgrass

9) ***Aeration:***

a) A coring with 3" minimum hollow tines should be used to aerate lawn areas, followed by a steel drag mat to disperse cores. Coring should be timed for adequate soil moisture to insure proper penetration and plug removal. Coring should be done in conjunction with fertilization and/or liming and overseeding in the fall, once a year. (Cost: $10 per 1.000 SF)

EXTENDED DETENTION BASIN MAINTENANCE:

DESCRIPTION

Effective detention basin performance requires regular and effective maintenance. Maintenance involves routine periodic inspection of the basin and vegetation, the removal of accumulated sediment and debris, and the correction of any structural or erosion problems.

Schedule I - four times annually and after every storm exceeding 1 inch of rainfall
Schedule IA - once a month during the growing season
Schedule II - bi-annually, during the growing season and the non-growing season
Schedule III - annually

1) Maintenance: General

a) The Contractor shall inspect all areas to verify that all work is being performed properly and as scheduled, locate potential problems, and correct unacceptable conditions. A brief verbal report is to be submitted to the Owner. Problems requiring immediate attention shall be reported to the Owner.

2) Maintenance: Schedule I

a) Basin Outlet Works: Inspect for and clear debris from the trashrack and exit ports of the basin outlet structures. This is to prevent clogging of the outlets and subsequent backup of detained water.
b) Inspect receiving waters for damage, obstructions and unsightly debris. All obstructions shall be removed immediately and any damage repaired.
c) Inspect for and clear excessive debris from the basin bottom, low flow channel, pipe inlets and aprons.
d) Inspect for any erosion of banks or other hazards. Any erosion shall be immediately repaired and stabilized accordingly. Maintain seeded areas until they are established.
e) Any problems or defects shall be reported to the Owner.

3) ***Maintenance: Schedule IA (monthly during growing season)***

a) Vegetated Areas: Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season.

4) *Maintenance: Schedule II (bi-annually)*

a) Once established, inspections of vegetation health, density, and diversity should be performed during both the growing and non-growing season at least twice annually.
b) The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications (see seeding specification) and the inspection requirements presented above. All use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health must not compromise the intended purpose of the vegetative filter. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

5) ***Maintenance: Schedule III (annually)***

a) Vegetated areas must be inspected annually for erosion and scour. Vegetated areas must be inspected for unwanted growth, which must be removed with minimum disruption to the planting soil bed and remaining vegetation.

b) When establishing or restoring vegetation, biweekly inspections of vegetation health must be performed during the first growing season or until the vegetation is established.

6) Basin Performance Criteria

a) The detention basin should completely drain as follows:

2ft deep at outlet structure – 16 hours

3.2ft deep (peak) at outlet structure – 24 hours

Adjust as necessary (bottom of weir, 100 yr storm, etc)

If significant increases or decreases in the normal drain time are observed, or if the 72 hour maximum drain time is exceeded, the basin's outlet structure, underdrain system, and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the basin.

7) Prevention of Water Pollution

a) The contractor's activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminates, debris or other pollutants and wastes into the downstream conveyance system. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, collected silt and sediment, etc. Disposal of debris and trash should be done only at suitable disposal / recycling sites and must comply with all applicable local, state, and federal waste regulations.

MANUFACTURED TREATMENT DEVICE MAINTENANCE:

CDS TECHNOLOGIES - CONTINUOUS DEFLECTION SEPARATION

Schedule A – first month
Schedule I - four times annually
Schedule III - annually

DESCRIPTION

Manufactured treatment device maintenance involves routine periodic inspection of the storage system, the removal of accumulated sediment and debris, and the correction of any structural problems.

1) Inspection : General

a) The Contractor shall inspect all areas to verify that all work is being performed properly and as scheduled, locate potential problems, and correct unacceptable conditions. A brief verbal report is to be submitted to the Owner. Problems requiring immediate attention shall be reported to the Owner.

2) Inspection : Schedule A (first month)

a) New Installation: Check the condition of the unit after every runoff event for the first 30 days. Checking includes a visual inspection to ascertain that the unit is functioning properly and measuring the amount of deposition that has occurred in the unit. This can be done with a "dip stick" that is calibrated so the depth of deposition can be tracked. Based on the behavior of the unit relative to storm events, inspections can be scheduled on projections using storm events vs. pollutant buildup.

3) Inspection : Schedule I (four times annually)

a) Ongoing Operation: Floatables should be removed and the sump cleaned when the sump is above 85% full. The contents of the sump and separation chamber can be removed using a vactor truck, clam bucket or other means.

4) ***Inspection : Schedule III (annually)***

a) At least once a year, the unit should be pumped down and the screen inspected for damage and to ensure that it is properly fastened. The screen should be power washed for the inspection.
b) The CDS unit is a confined space. Properly trained people equipped with required safety gear will be required to enter the unit to perform the detailed inspection.

5) Prevention of Water Pollution

a) The contractor's activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminates, debris or other pollutants and wastes into the downstream conveyance system. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, collected silt and sediment, etc. Disposal of debris and trash should be done only at suitable disposal / recycling sites and must comply with all applicable local, state, and federal waste regulations.

6) <u>Estimated Maintenance Costs:</u>

a) A Vactor truck is recommended for cleanout and can be easily accomplished in less than 30-40 minutes for most installations. Standard vactoring operations should be employed in the cleanout of the unit. Disposal of material from the unit should be in accordance with the local municipality's requirements.

b) The clean-out cost is based on a typical four (4) hour minimum retail clean-out charge at $125 per hour, resulting in a minimum cost of $500 regardless if one or four CDS units were cleaned.

Maintenance Log

Detail logs of all preventative and corrective maintenance performed at the stormwater management measures, including all maintenance-related work orders must be recorded in this log. Document maintenance performed and keep receipts.

Date of Inspection or Maintenance	Name of Inspector or Worker and Company	Description of Maintenance or Inspection Task

Inspection Log Entry

Date: _____ Performed By: _____

Extended Detention Basin

Checklist	Physical Condition* 1	2	3	4	Required Cleaning (y/n)	Description of Maintenance or Damage Report
Outlet Structure						
Scouring at Outfall						
Pests or Diseases						
General Landscape Condition						

Stormwater Treatment Device

Checklist	Physical Condition* 1	2	3	4	Required Cleaning (y/n)	Description of Maintenance or Damage Report
Structure Integrity						
Accumulated Sediment						
Floatables						

Stormwater Collection System

Checklist	Physical Condition* 1	2	3	4	Required Cleaning (y/n)	Description of Maintenance or Damage Report
Frame and Casting						
Access Steps						
Interior Masonry						
Accumulated Sediment						
Scouring at Outfall						

Lawn and Landscaped Area Maintenance

Checklist	Physical Condition* 1	2	3	4	Required Cleaning (y/n)	Description of Maintenance or Damage Report
General turf condition						
General Landscape Condition						
Pests or Diseases						

Additional Notes: _____

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_____

* Denotes a rating table to describe the condition of item (1 being in excellent condition and 4 being in need of immediate repair).