OPERATION & MAINTENANCE MANUAL

for

Montclair Hospital LLC

Prepared for:

311 Bay Avenue
Borough of Glen Ridge & Township of Montclair
Essex County, New Jersey

Prepared by

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ENGINEERING

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INTRODUCTION

This manual consists of three parts. The first part includes the introduction, project description and a list of project contacts. The second part provides the operation and maintenance instructions for the facilities and equipment. The third part (Appendix) provides information regarding the inspection and maintenance activities.

PART I: PROJECT DETAILS

A. Introduction and Description of Facilities:

The proposed site is a redevelopment of a parcel of land (northern lot and southern lot separated by George Street) that is located at the west side of Walnut Crescent, across the street from Hackensack UMC Mountainside Emergency Room. A portion of the parcel is located in Borough of Glen Ridge, and a portion of the parcel is located in the Township of Montclair. The northern lot includes Block 4213 Lots 1-2, 22 & 23 in the Township of Montclair, and the southern lot includes Block 4207 Lots 1, 2, 30 & 31 in the Township of Montclair and Block 91 Lot 1 in the Borough of Glen Ridge. The stormwater management for the proposed southern lot remains unchanged as impervious area was decreased and a minimal area is being disturbed. The stormwater management for the proposed northern lot (pavement area and landscaping) is collected through a series of inlets and piping to the underground conveyance system, and eventually is collected in the proposed underground detention basin system. This stormwater is treated via a water quality unit before being discharged into the right of way drainage system. The proposed stormwater design meets the requirements set forth by the reviewing jurisdictional agencies and the NJDEP Stormwater Regulations.

B. *Project Contacts:*

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Maintenance by:	Montclair Hospital, LLC 1 Bay Street Montclair, NJ 07042
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PART II: INSPECTION AND MAINTENANCE:

A. Routine Inspection and Maintenance of the Stormwater Management Facilities:

The stormwater management system has been designed properly to control stormwater, and prevent flooding and degradation of water quality. Without proper routine inspection and maintenance, the system may lose some or all of its capability to function to its full capacity. Lack of adequate maintenance at these facilities could lead to failure.

A consulting professional engineer should perform regularly scheduled maintenance inspections of the stormwater facilities at least twice each year, unless otherwise specified. The primary purpose of these inspections is to ascertain the operational condition and safety of the facilities, particularly the condition of detention basin, and other safety-related aspects. Inspections will also provide information on the effectiveness of regularly scheduled Preventative, Corrective, and Aesthetic Maintenance Procedures, and will help to identify where changes in the extent and scheduling of the procedures are warranted. Finally, the facility inspections should also be used to determine the need for and timing of Corrective Maintenance procedures.

Routine maintenance of these facilities should be separated into three (3) basic types: Preventative and Corrective, and Aesthetic. Listed below are the Preventative, Corrective, and Aesthetic Maintenance Procedures to be performed on a routine basis:

1. <u>Preventative Maintenance Procedures</u>:

The purpose of Preventative Maintenance is to insure that the stormwater management aspect of the system remains operational and safe at all times, and to minimize the need for emergency or corrective maintenance. These procedures are as follows:

a) Maintenance of Landscape Areas:

Grassy areas, trees, and shrubs require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth and to provide stabilization. The application of fertilizers should follow manufacturer's instructions to reduce runoff of these compounds. Additionally, provisions should be made to re-seed and re-establish grass cover in areas damaged by sediment accumulation, stormwater flow, or other causes. These tasks should be performed, or at least evaluated, on a quarterly basis.

grass cover in areas damaged by sediment accumulation, stormwater flow, or other causes. These tasks should be performed, or at least evaluated, on a quarterly basis.

b) Removal and Disposal of Trash and Debris:

A regularly scheduled program of debris and trash removal will reduce the chance of the inlets, outlet structure, and other components becoming clogged and inoperable during storm events.

Additionally, removal of trash and debris will eliminate potential mosquito breeding habitats. Debris and trash must be properly hauled off the site and transferred to an approved disposal site. These tasks should be performed on a quarterly basis and after any major storm event.

c) Vegetative Area:

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. Vegetative areas must be inspected at least annually (April 1st) for unwanted growth, which should be removed with minimum disruption to the bottom surface and remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of the vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually (April 1st and October 1st) during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50% damage, the area should be reestablished in accordance with the original specifications. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

d) Structural Components:

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

e) Sediment Removal and Disposal:

All components of the stormwater system should be evaluated for excessive deposition of sediment. Accumulated sediment should be removed. Before desedimentation activities are performed, consideration should be given to evacuating all standing water (if there is any) from the stormwater management facilities. This may be accomplished by pumping the water out of the detention basin and/or storm pipe system. Disposal of sediment must comply with all local, county, state and federal regulations. Only suitable disposal sites should be utilized. These tasks should be performed as needed. If stabilized soil conditions exist across the site, sediment deposition should not be a problem. Should a recurrent problem develop, the inspector should identify the upstream sources of sediment and recommend required stabilization measures.

f) Elimination of Potential Mosquito Breeding Habitats:

The most effective mosquito control program is one that eliminates potential breeding habitats. Almost any stagnant pool of water can be attractive to mosquitoes, and become the source of a large mosquito population. A maintenance program dedicated to eliminating potential breeding areas is certainly preferable to chemical means of controlling mosquitoes. The most important maintenance function is removal of all obstructions to natural flow patterns before stagnant water conditions can develop.

g) Parking Lot Maintenance:

This management measure involves employing pavement cleaning practices, such as parking lot sweeping on a regular basis, to minimize pollutant export to the stormwater conveyance system / detention basins and eventually the receiving waters. These cleaning practices are designed to remove sediment, debris, and other pollutants from access drive and parking lot surfaces that are a potential source of pollution impacting urban waterways. Mechanical machines that use vacuum-assisted dry sweeping to remove particulate matter shall be utilized as these have the ability to remove finer sediment particles. Parking lots and access drives shall be swept/vacuumed at least once a month. The disposal of the swept material must be properly hauled off the site and transferred to an approved disposal site. Other parking lot maintenance features include the use of on-site trash receptacles. These receptacles should be located in strategic areas where the majority of the pedestrian traffic occurs. These receptacles should be emptied

daily. The disposal of the solid waste must be properly hauled off the site and transferred to an approved disposal site.

h) Maintenance of Underground Basin:

High-powered vacuum truck is to be used when there is sediment accumulation within the underground basin. Any trash, sediment and debris shall be extracted by high-powered vacuum truck via the access manholes and /or cleanouts.

2. Corrective Maintenance Procedures:

a) Removal of Debris and Sediment:

Sediment, debris, and trash that threaten the discharge capacity of the system should be removed immediately and properly disposed. As noted previously, it is recommended that all water (if there is any) be evacuated from the detention basin and/or storm pipe system before any significant amount of sediment, settled debris, or trash is removed. The lack of an available disposal site should not delay the removal of trash, debris and sediment. Temporary disposal sites should be utilized if necessary.

b) Structural Repairs:

Structural damage to overflow and inlet structures, manhole structures, trash racks, access hatches, roadways, and headwalls as a result of vandalism, flood events, settlement, or other causes must be repaired promptly. The urgency of the repairs will depend upon the nature of the damage and its effects on the safety and operation of the facility. The analysis of structural damage and the design and performance of structural repairs should only be undertaken by the consulting Professional Engineer.

c) Extermination of Mosquitoes:

Mosquitos shall not be a concern for the proposed stormwater management system. The extermination of mosquitoes will usually require the services of the County Mosquito Commission. If mosquito control in the facility becomes necessary, the preventative maintenance program should be re-evaluated, and more emphasis should be placed on control of mosquito breeding habitats.

d) *Erosion Repair:*

Vegetative cover or other protective measures are necessary to prevent the loss of soil due to the forces of wind and water. Where a re-seeding program has not been effective in maintaining a non-erosive vegetative cover, or other factors have exposed soils to erosion, corrective steps should be initiated to prevent further loss of soil. Soil loss can be controlled by a variety of materials and methods, including rip-rap, gabion lining, geotextile fabrics, sod, seeding, concrete lining and re-grading.

e) *Snow and Ice Removal:*

Accumulations of snow and ice can threaten the functioning of the inlets and outlets. Provision of the equipment, material, and personnel to monitor and remove snow and ice from critical areas will assure the function of the facility during the winter months.

f) *Elimination of Trees, Brush, Roots and Animal Burrows from Embankments:*

The stability of embankments can be impaired by large roots and animal burrows. Additionally, burrows can present a safety hazard for maintenance personnel. Trees and brush with extensive, woody root systems should be completely removed to prevent destabilization and the creation of seepage routes. Roots should also be completely removed to prevent decomposition within the embankment. Root voids and burrows should be filled with material similar to the existing material, and capped just below grade with stone, concrete or other material. If the filling of the burrows does not discourage the animals from returning, further measures should be taken to either move the animal population or to make critical areas of the facility unattractive to them.

h) *Basin Drain Time:*

Per NJBMP, the maximum drain down time for a detention basin is 72 hours. If the basin fails to drain in the above-mentioned time, the basin should be dewatered down to the basin bottom elevation, and all sediment/debris within basin shall be removed. The outlet of the basin shall be inspected, and all debris clogging the discharge point shall be removed. Any jetting/vactoring needed to remove sediment/debris from basin or outlet shall be completed.

3. Aesthetic Maintenance Procedures:

a) Graffiti Removal:

The timely removal of graffiti will restore the aesthetic quality of the overall site. Removal can be accomplished by paint or other cover, or removal with scrapers, solvents or cleansers. Timely removal is important to discourage further graffiti and other acts of vandalism.

b) Grass Trimming/Landscape Maintenance:

The lawn areas shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2 to 3 inches. These areas shall also be fertilized twice a year, once in the spring and once in the fall. Fertilizer for lawn areas shall be 10-20-10 applied at a rate of 11 lbs. per 1,000 SF. or as determined by a soil test. Any bare, dead or damaged lawn areas shall be re-seeded in accordance with the original procedures as outlined in the Soil Erosion and Sediment Control Plans using the same mix and seeding rates. Stabilization of bare or damaged areas shall be done in a timely fashion so as to avoid exposing the soil to erosion.

If season prevents the re-establishment of turf cover, exposed areas should be stabilized with straw or salt hay mulch as described in the Soil Erosion and Sediment Control Plans until permanent seeding can be done. Seeding can be done between March 15th and June 15th and between September 15th and December 1st, only if adequate water is provided.

The shrubs should also be maintained in order to promote a neat appearance and healthy, vigorous growth. All shrubs should be allowed to grow together in masses as shown on the plans and not pruned into individual plants. The planting beds should be mulched with hardwood mulch every two (2) years in order to provide a suitable growing medium for the shrubbery and to retain moisture around the root zones.

Pruning of shrubs should also be done on a regular basis to maintain the shape and appearance of the shrub masses. The height of the shrubs may vary according to the plants natural growth habits, but should not exceed six (6) feet. Pruning should be done as necessary throughout the year to remove dead branches and to control new growth. Any pruning, other than the removal of dead branches, should be done in either late winter/early spring or after the shrub has flowered in the spring.

In the event that a shrub should experience more than 2/3 die back, it should be replaced in kind as soon as possible in either the spring or fall planting season. The replacement shrub should be the same species as the original and installed at the size and condition as specified on the original landscape plans. If, for any reason, a substitution of species or size must be made, it shall be subject to the approval of the project Landscape Architect.

The trees shall be maintained regularly to ensure good health and exhibit an attractive appearance. Their maintenance should include fertilization twice annually, with one application in the spring and another in early fall. The trees shall be pruned in the late winter or early spring. However, dead branches should be removed as soon as they are noticed. Care should be taken to avoid cutting off the central leader of a tree if one is present.

If a tree is severely damaged or experiences more than 2/3 die back, it should be replaced in either the spring or fall planting season, whichever comes first. The only exception to this is if the replacement tree has a fall transplanting hazard. Replacement trees should be planted at the same size and condition as specified on the landscape plans. Any tree or shrub maintenance, tree pruning or plant material substitution of species or size shall be subject to the approval of the project Landscape Architect.

c) Control of Weeds:

Although a regular grass maintenance program will minimize weed intrusion, some weeds will appear. Periodic weeding, either chemically or mechanically, will help to maintain a healthy turf, and keep grassed areas looking attractive. Application of chemicals should be monitored closely so as not to affect the ecosystems. Excessive growth of weeds can be controlled mechanically as discussed in the previous section.

4. Summary of Maintenance Procedures:

Preventative Maintenance

a) Maintenance of Landscape Areas
b) Removal and Disposal of Trash and Debris
c) Vegetative Area
d) Structural Components

e) Sediment Removal and Disposal

f) Elimination of Potential Mosquito Breeding Habitats

g) Parking Lot Maintenance

h) Maintenance of Underground Basin

Corrective Maintenance

a) Removal of Debris and Sediment

b) Structural Repairs

c) Extermination of Mosquitoes

d) Erosion Repair

e) Snow and Ice Removal

f) Elimination of Trees, Brush, Roots and Animal Burrows from Embankments

g) Basin Drain time

Aesthetic Maintenance

a) Graffiti Removal

b) Grass Trimming/Landscape Maintenance

c) Control of Weeds

B. Maintenance Equipment and Materials

1. Grass Maintenance Equipment

a) Riding Mowers

b) Hand Mowers

c) Gas Powered Trimmers

d) Gas Powered Edgers

e) Seed Spreaders

f) Fertilizer Spreaders

g) De-thatching Equipment

h) Pesticide and Herbicide Application Equipment

i) Grass Clipping and Leaf Collection Equipment

2. Transportation Equipment

a) Trucks for Transportation of Materials

b) Trucks for Transportation of Equipment

c) Vehicles for Transportation of Personnel

3. Debris, Trash and Sediment Removal Equipment
    a) Loader
    b) Backhoe
    c) Grader
    d) Portable Pump for Dewatering

4. Miscellaneous Equipment
    a) Shovels
    b) Rakers
    c) Picks
    d) Wheelbarrows
    e) Gloves

5. Standard Mechanics Tools

6. Tools for Maintenance of Equipment

7. Materials
    a) Topsoil
    b) Fill
    c) Seed
    d) Soil Amenities (Fertilizer, Lime, etc.)
    e) Chemicals (Pesticides, Herbicides, etc.)
    f) Mulch
    g) Spare Parts for Equipment

C. Checklists and Logs

The Appendix of this report contains sample checklists and logs regarding various aspects of the maintenance and inspection. A brief description of the use of each form is listed below:

1. "Maintenance Work Order and Checklist" – a comprehensive form outlining both required and completed maintenance work.
2. "Maintenance Log" – a summary table for recording of all maintenance work at the site.
3. "Inspection Checklist" – a comprehensive checklist of the items to be inspected.
4. "Inspection Log" – a summary table for recording the results of all inspections.

MAINTENANCE WORK ORDER AND CHECKLIST
FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY _____
LOCATION _____ DATE _____
CREW _____ WORK STARTED _____
EQUIPMENT _____ WORK COMPLETED _____
WEATHER _____ TOTAL MANPOWER OF WORK _____

A. PREVENTATIVE MAINTENANCE

WORK ITEMS	ITEMS REQUIRED (X)	ITEMS DONE (X)	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRASS CUTTING			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. OTHERS			
2. GRASS MAINTENANCE			
A. FERTILIZING			
B. RE-SEEDING			
C. DE-THATCHING			
D. PEST CONTROL			
E. OTHERS			
3. VEGETATIVE COVER			
A. FERTILIZING			
B. PRUNING			
C. PEST CONTROL			
D. OTHERS			
4. TRASH AND DEBRIS REMOVAL			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. INLETS			
F. OTHERS			
5. SEDIMENT REMOVAL			
A. INLETS			
B. BOTTOMS			
C. OTHERS			
6. ELIMINATION OF POTENTIAL MOSQUITO BREEDING HABITATS			
7. OTHER PREVENTIVE MAINTENANCE			

B. CORRECTIVE MAINTENANCE

WORK ITEMS	ITEMS REQUIRED (X)	ITEMS DONE (X)	LOCATION, COMMENTS AND SPECIAL INSTRUCTIONS
1. REMOVAL OF DEBRIS AND SEDIMENT			
2. STRUCTURAL REPAIRS			
3. EMBANKMENTS AND SIDE SLOPES			
4. DEWATERING			
5. BASIN MAINTENANCE			
6. CONTROL OF MOSQUITOES			
7. EROSION REPAIR			
8. FENCE REPAIR			
9. SNOW AND ICE REMOVAL			
10. OTHER			

C. AESTHETIC MAINTENANCE

WORK ITEMS	ITEMS REQUIRED (X)	ITEMS DONE (X)	LOCATION AND COMMENTS
1. GRAFFITI REMOVAL			
2. GRASS TRIMMING			
3. WEEDING			
4. OTHERS			

REMARKS (REFER TO ITEM NO. IF APPLICABLE)

WORK ORDER PREPARED BY: _____

WORK COMPLETED BY: _____

MAINTENANCE LOG
FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY _____
LOCATION _____

A. PREVENTATIVE MAINTENANCE

WORK ITEMS	DATE							
1. GRASS CUTTING	(X) COMPLETED							
A. BOTTOMS								
B. EMBANKMENTS AND SIDE SLOPES								
C. PERIMETER AREAS								
D. ACCESS AREAS AND ROADS								
E. OTHERS								
2. GRASS MAINTENANCE								
A. FERTILIZING								
B. RE-SEEDING								
C. DE-THATCHING								
D. PEST CONTROL								
E. OTHERS								
3. VEGETATIVE COVER								
A. FERTILIZING								
B. PRUNING								
C. PEST CONTROL								
D. OTHERS								
4. TRASH AND DEBRIS REMOVAL								
A. BOTTOMS								
B. EMBANKMENTS AND SIDE SLOPES								
C. PERIMETER AREAS								
D. ACCESS AREAS AND ROADS								
E. INLETS								
F. OTHERS								
5. SEDIMENT REMOVAL								
A. INLETS								
B. BOTTOMS								
C. OTHERS								
6. ELIMINATION OF POTENTIAL MOSQUITO BREEDING HABITATS								
7. OTHER PREVENTIVE MAINTENANCE								

B. CORRECTIVE MAINTENANCE

WORK ITEMS							
1. REMOVAL OF DEBRIS AND SEDIMENT							
2. STRUCTURAL REPAIRS							
3. EMBANKMENTS AND SIDE SLOPES							
4. DEWATERING							
5. BASIN MAINTENANCE							
6. CONTROL OF MOSQUITOES							
7. EROSION REPAIR							
8. FENCE REPAIR							
9. SNOW AND ICE REMOVAL							
10. OTHER							

C. AESTHETIC MAINTENANCE

WORK ITEMS							
1. GRAFFITI REMOVAL							
2. GRASS TRIMMING							
3. WEEDING							
4. OTHERS							

REMARKS (REFER TO ITEM NO. IF APPLICABLE)

INSPECTION CHECKLIST
FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY _____
LOCATION _____
DATE _____
WEATHER _____

FACILITY ITEM

1. EMBANKMENTS AND SIDE SLOPES	OK (1)	ROUTINE (2)	URGENT (3)	COMMENTS (4)
A. VEGETATION				
B. LININGS				
C. EROSION				
D. SETTLEMENT				
E. SLOUGHING				
F. TRASH AND DEBRIS				
G. SEEPAGE				
H. AESTHETICS				
I. OTHERS				

2. BOTTOMS (DETENTION AND INFILTRATION)				
A. VEGETATION				
B. EROSION				
C. STANDING WATER				
D. SETTLEMENT				
E. TRASH AND DEBRIS				
F. SEDIMENT				
G. AESTHETICS				
H. OTHERS				

3. INLET STRUCTURE				
A. CONDITION OF STRUCTURE				
B. EROSION				
C. TRASH AND DEBRIS				
D. SEDIMENT				
E. AESTHETICS				
F. OTHERS				

4. EMERGENCY SPILLWAY				
A. VEGETATION				
B. LINING				
C. EROSION				
D. TRASH AND DEBRIS				
E. OTHERS				

5. PERIMETER				
A. VEGETATION				
B. EROSION				
C. TRASH AND DEBRIS				
D. FENCE AND GATES				
E. AESTHETICS				
F. OTHERS				

6. ACCESS ROADS				
A. VEGETATION				
B. ROAD SURFACES				
C. FENCE AND GATES				
D. EROSION				
E. AESTHETICS				
F. OTHERS				

7. MISCELLANEOUS				
A. EFFECTIVENESS OF EXIST. MAINT. PROGRAM				

B. POTENTIAL MOSQUITO HABITATS				
C. MOSQUITOES				

(1) ITEMS CHECKED IS IN GOOD CONDITION, AND THE MAINTENANCE PROGRAM IS ADEQUATE.
(2) ITEMS CHECKED REQUIRES ATTENTION, BUT DOES NOT PRESENT AN IMMEDIATE THREAT TO THE FACILITY FUNCTION OR OTHER FACILITY COMPONENTS.
(3) THE ITEMS CHECKED REQUIRES IMMEDIATE ATTENTION TO KEEP THE FACILITY OPERATIONAL OR TO PREVENT DAMAGE TO OTHER FACILITY COMPONENTS.
(4) PROVIDE EXPLANATION AND DETAILS IF COLUMNS 2 OR 3 ARE CHECKED.

REMARKS (REFER TO ITEM NO. IF APPLICABLE)

INSPECTOR:

INSPECTION LOG
FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY: _____

LOCATION: _____

DATE							

FACILITY ITEM	INDICATE CONDITION (I.E. 1,2 OR 3)						
1. EMBANKMENTS AND SIDE SLOPES							
A. VEGETATION							
B. LININGS							
C. EROSION							
D. SETTLEMENT							
E. SLOUGHING							
F. TRASH AND DEBRIS							
G. SEEPAGE							
H. AESTHETICS							
I. OTHERS							
2. BOTTOMS (DETENTION AND INFILTRATION)							
A. VEGETATION							
B. EROSION							
C. STANDING WATER							
D. SETTLEMENT							
E. TRASH AND DEBRIS							
F. SEDIMENT							
G. AESTHETICS							
H. OTHERS							
3. INLET STRUCTURE							
A. CONDITION OF STRUCTURE							
B. EROSION							
C. TRASH AND DEBRIS							
D. SEDIMENT							
E. AESTHETICS							
F. OTHERS							
4. EMERGENCY SPILLWAY							
A. VEGETATION							
B. LINING							
C. EROSION							
D. TRASH AND DEBRIS							
E. OTHERS							
5. PERIMETER							
A. VEGETATION							
B. EROSION							
C. TRASH AND DEBRIS							
D. FENCE AND GATES							
E. AESTHETICS							
F. OTHERS							
6. ACCESS ROADS							
A. VEGETATION							
B. ROAD SURFACES							
C. FENCE AND GATES							
D. EROSION							
E. AESTHETICS							
F. OTHERS							
7. MISCELLANEOUS							
A. EFFECTIVENESS OF EXIST. MAINT. PROGRAM							

B. POTENTIAL MOSQUITO HABITATS							
C. MOSQUITOES							

(1) ITEMS CHECKED IS IN GOOD CONDITION, AND THE MAINTENANCE PROGRAM IS ADEQUATE.
(2) ITEMS CHECKED REQUIRES ATTENTION, BUT DOES NOT PRESENT AN IMMEDIATE THREAT TO THE FACILITY FUNCTION OR OTHER FACILITY COMPONENTS.
(3) THE ITEMS CHECKED REQUIRES IMMEDIATE ATTENTION TO KEEP THE FACILITY OPERATIONAL OR TO PREVENT DAMAGE TO OTHER FACILITY COMPONENTS.

REMARKS (REFER TO ITEM NO. IF APPLICABLE)

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.