Stormwater Management Operation and Maintenance Manual

For

Elion Acq., LLC

Proposed Warehouse Facilities

47 Veronica Avenue
Block 88.02, Lots 13, 25, 26, 71 & 72
Franklin Township, Somerset County, NJ

Prepared By

DYNAMIC ENGINEERING

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I. INTRODUCTION

The purpose of this report is to provide guidelines and information regarding the required maintenance for the proposed stormwater management facilities to be constructed in association with the development of Lots 13, 25, 26, 71, & 72, Block 88.02 in Franklin Township in Somerset County, New Jersey. The proposed site development consists of the construction of two (2) warehouse facilities with associated driveway and roadway areas. Additional site improvements include associated landscaping, lighting and stormwater management facilities. The stormwater management system includes the construction of one (1) above ground infiltration basin and one (1) wet pond basin.

The stormwater management facility will contribute toward the conveyance, storage, treatment and discharge of runoff generated by the proposed development. Every stormwater management system whether at grade or below grade, requires that basic periodic maintenance to be performed in order to maintain the proper functioning and operation of the system. This report will outline these procedures, further discuss responsibilities and highlight those responsible for performing said maintenance.

II. DESCRIPTION OF FACILITY

The proposed overall stormwater management system has been designed with one (1) aboveground infiltration basin and one (1) wet pond basin. The basins accept stormwater runoff from the proposed building roofs, paved parking areas, driveways, and surrounding landscaped areas. The aboveground infiltration basin and wet pond have been designed to meet the water quantity, quality, and groundwater recharge requirements set forth by NJAC 7:8.

These facilities will require periodic inspections and maintenance. The information in this manual can be considered a guideline for the continued maintenance including suggested inspection scheduling as well as performance objectives.

Requirement	Wet Pond (Basin 1)	Infiltration Basin (Basin 2)
Subsoil Permeability Rate	N/A	1 in/hr
Design Detention Time	54.60 hours	46.15 hours
Design Drain Time	<40 hours	45.25 hours
Elevation of SHWT	103.5	96
TSS Removal Rate	3:1 Permanent Pool	80% (Sand Bottom)
Rainfall Depth (2 year)	3.34 in.	3.34 in.
Rainfall Depth (10 year)	5.01 in.	5.01 in.
Rainfall Depth (100 year)	8.21 in	8.21 in.

Runoff Volume (2 year)	2.683 Ac-ft	1.085 Ac-ft
Runoff Volume (10 year)	4.051 Ac-ft	1.400 Ac-ft
Runoff Volume (100 year)	6.508 Ac-ft	1.821 Ac-ft
Peak Outflow Rate (2 year)	17.60 cfs	5.93 cfs
Peak Outflow Rate (10 year)	30.53 cfs	9.03 cfs
Peak Outflow Rate (100 year)	60.58 cfs	24.74 cfs
Peak Outflow Rate (Emergency Spillway)	288 cfs	77 cfs
Water Surface Elevation (2 year)	102.41 ft	102.43 ft
Water Surface Elevation (10 year)	103.01 ft	103.20 ft
Water Surface Elevation (100 year)	104.02 ft	104.14 ft
Water Surface Elevation (Emergency Spillway)	105.35 ft	104.89 ft

III. RESPONSIBLE PARTIES

Applicant:

Elion Acq., LLC
2875 NE 191st Street, Suite 800
Miami, FL 33180
(305)-933-3538

Owner:

Block 88.02, Lots 13, 71, 72
BGS Realty General Partnership
28 Kennedy Boulevard, Suite 800
East Brunswick, NJ 08816

Block 88.02, Lot 25
Barclay FNCL, LLC
1315 Stelton Road
Piscataway, NJ 08854

Block 88.02, Lot 26
R.D.L. Associates c/o Hamy Rieder
100 Cedar Lane
Highland Park, NJ 08904

Design Engineer:

Robert P. Freud, PE, PP
Dynamic Engineering Consultants, PC
1904 Main Street
Lake Como, NJ 07719
(732) 974-0198

IV. WET POND AND ABOVEGROUND INFILTRATION BASIN

A. Routine Inspection and Maintenance of Wet Pond

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

A consulting professional engineer should perform regularly scheduled maintenance inspections of the stormwater facilities at least twice each year. In addition to the regular scheduled inspections, inspections shall also occur after any major storm events. Major storm events are defined as storm events exceeding 1" of rainfall. The primary purpose of these inspections is to ascertain the operational condition and safeties of the facilities, particularly the condition of embankments, outlet structure, rip rap and other safety-related aspects. Inspections will also provide information on the effectiveness of regularly scheduled Preventative 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 this facility should be separated into two (2) basic types: Functional Maintenance and Aesthetic Maintenance. Functional Maintenance is further broken down into two (2) categories: Preventative and Corrective. Aesthetic Maintenance, which is necessary to maintain the visual appeal and aesthetic quality of these facilities should be incorporated on the same schedule as the preventative maintenance efforts. Listed below are the Preventative, Corrective and Aesthetic Maintenance Procedures to be performed on a routine basis:

1. Preventative Maintenance Procedures:

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

a) Algae and Weed Growth:

Excessive algae growth can cause severe oxygen depletion, causing the development of anaerobic conditions. These low oxygen conditions will eventually result in the emission of foul odors and other unpleasant side effects. Weeds associated with basins typically fall into three (3) categories: submergent, floating and emergent. All three (3) are typically found, to some extent, in a stormwater management system. However, excessive growth of any of these weeds can lead to problems. Submergent vegetation is the most difficult to detect, and can cause the most significant problems with any water level control features.

The basins should be evaluated regularly to determine whether excessive algae or plant growth is evident. Algae growth can often be attributed to the misuse of fertilizers on adjacent lands. A correction in the application of fertilizers can often solve these problems. Weeds, which have become a problem, can be cleared through harvesting by professional pond maintenance technicians.

b) Pond Aerator Maintenance:

Routine maintenance of the pond aerators is imperative for ensuring that the wet pond operates properly, and helps to minimize the need for more expensive repairs and replacement in the future. Aerator maintenance steps can be found below.

A. Keep the pumping chamber components and screen free of debris. Damage can occur to a clogged aerator.
B. Once a year, disconnect the unit from the power source and physically inspect the aerator, float and electrical cable. Visible damage to the motor unit or cable should be repaired to avoid safety hazards and/or potential failure.
C. Every three years, an oil change using "Otterbine Oil" is recommended to keep the aerator operating smoothly.

c) Maintenance of Adjacent Areas:

Grass areas, trees, and shrubs adjacent to the basin require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth and to provide bank stabilization. The application of fertilizers should follow manufacturer's instructions to reduce run-off of these compounds into the basin. 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.

d) Removal and Disposal of Trash and Debris:

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

Additionally, removal of trash and debris will prevent possible damage to vegetated areas and 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.

e) Sediment Removal and Disposal:

The basins should be evaluated for excessive deposition of sediment. Accumulated sediment should be removed before it threatens the storage volume of the basins. Before de-sedimentation activities are performed. Sediment removal should take place when the basin is thoroughly dry. 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 stable soil conditions exist around the basin, 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.

2. Corrective Maintenance Procedures:

a) Removal of Debris and Sediment:

Sediment, debris and trash that threaten the discharge capacity of the basin should be removed immediately and properly disposed. 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 outlet and inlet structures, 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) Embankment and Slope Repairs:

Damage to embankments, and side slopes must be repaired promptly. This damage can be the result of rain or flood events, vandalism, animals, vehicles or neglect. Typical problems include settlement, scouring, cracking, sloughing, seepage and rutting. The urgency of the repairs will depend upon the nature of the damage and its effect on the safety and operation of the facility. The analysis of damage and the design and performance of geotechnical repairs should only be undertaken by qualified personnel a direction of the consulting Professional Engineer. All basin embankments shall be inspected quarterly and after each significant storm. Any damage or indication of erosion shall be immediately inspected by a professional engineer.

d) Weed Harvesting:

It may be necessary to remove congested weeds from the basins. Companies with specialized harvesters should be contacted to perform these operations. Note that such work may require the approval of various regulatory agencies.

e) Extermination of Mosquitoes:

If neglected, the basin can become an ideal mosquito breeding area. 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.

f) Erosion Repair:

Vegetative cover or other protective measures are necessary to prevent the loss of soil due to the forces of wind and water. Vegetative cover must be maintained at 85%. If vegetation has greater than 50% damage, the area must be re-established in accordance with the original specifications and inspection requirements. 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 that may result in danger to the stability of the facility. Soil loss can be controlled by a variety of materials and methods, including riprap, gabion lining, sod, seeding, concrete lining and re-grading. When establishing or restoring vegetation for wet ponds, inspections should be performed on a bi-weekly basis.

g) Elimination of Trees, Brush, Roots and Animal Burrows:

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 remove the animal population or to make critical areas of the facility unattractive to them.

h) Snow and Ice Removal:

Accumulations of snow and ice can threaten the functioning of the inlets, outlets and emergency spillways. 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.

i) Drain Time:

If the actual drain time is significantly different than the anticipated design drain time, the components that could provide hydraulic control must be evaluated and appropriate measures must be taken to return the wet pond to minimum and maximum drain time requirements. Similarly, the outlet structure and groundwater/tailwater levels must be evaluated, and if needed, appropriate measures must be taken to comply with maximum drain time requirements.

3. Aesthetic Maintenance Procedures:

a) Graffiti Removal:

The timely removal of graffiti will restore the aesthetic quality of the basin. 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 around the basin shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2 to 3-inches (at least once a month during the growing season). 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 around the basin 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 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 surrounding the basin areas 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. In this case, it should be replanted in the spring. Replacement trees should be planted at the same size and condition as specified on the landscape plans. If it is necessary to make a substitution of species or size, it 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 within the basin. Excessive

growth of weeds within the basin can be controlled mechanically as discussed in the previous section.

The recording of all maintenance work and inspections will provide valuable data on the facility's condition. Review of this information will also help to establish more efficient and beneficial maintenance procedures and practices. All recorded information should be directed to the owners of the basin for review and subsequent follow-up on recommendations. Data obtained from informal inspections should be retained; however, this data does not have to be submitted to NJDEP.

4. Summary of Maintenance Procedures:

Preventative Maintenance

a) Algae and Weed Growth
b) Pond Aerator Maintenance
c) Maintenance of Adjacent Areas
d) Removal and Disposal of Trash and Debris
e) Sediment Removal and Disposal
f) Elimination of Mosquito Breeding Habitats

Corrective Maintenance

a) Removal of Debris and Sediment
b) Structural Repairs
c) Embankment and Slope Repairs
d) Weed Harvesting
e) Extermination of Mosquitoes
f) Erosion Repair
g) Elimination of Trees, Brush, Roots and Animal Burrows from Embankments
h) Snow and Ice Removal
i) Drain Time

Aesthetic Maintenance

a) Graffiti Removal
b) Grass Trimming/Landscape Maintenance
c) Control of Weeds

B. Routine Inspection and Maintenance of the Infiltration Basin

The aboveground infiltration basin has been designed to properly control stormwater and prevent flooding and degradation of water quality. Without proper routine inspection and maintenance, the basin may lose some or all of their capability to function at full capacity. Lack of adequate maintenance at this facility could lead to failure.

A consulting professional engineer should perform regularly scheduled maintenance inspections of the stormwater facilities at least twice each year. The primary purpose of these inspections is to ascertain the operational condition and safeties of the facilities, particularly the condition of embankments, outlet structure, rip rap and other safety-related aspects. Inspections will also provide information on the effectiveness of regularly scheduled Preventative 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 this facility should be separated into two (2) basic types: Functional Maintenance and Aesthetic Maintenance. Functional Maintenance is further broken down into two (2) categories: Preventative and Corrective. Aesthetic Maintenance, which is necessary to maintain the visual appeal and aesthetic quality of these facilities should be incorporated on the same schedule as the preventative maintenance efforts. Listed below are the Preventative, Corrective and Aesthetic Maintenance Procedures to be performed on a routine basis:

1. Preventative Maintenance Procedures:

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

a) Maintenance of Adjacent Areas:

Grass areas, trees, and shrubs adjacent to the basin require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth and to provide bank stabilization. The application of fertilizers should follow manufacturer's instructions to reduce run-off of these compounds into the basin. 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.

b) Removal and Disposal of Trash and Debris:

All storm water management components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding one inch of rainfall. Such components may include the basin, stormwater conveyance network (piping & inlet) flared end sections, rip rap, trash racks and outlet control structure.

These stormwater management components shall be visually inspected for the accumulation of excessive sediment as well as damage in the form of cracking, erosion and rutting. Sediment build up within the stormwater conveyance network shall be removed with the use of flushing. Sediment laden water is to be captured with the use of a pipe plug, or approved equal, prior to the basin and simultaneously pumped out with the use of pump with sediment bag. Sediment should be disposed of in accordance with all applicable local, state and federal regulations.

Removal of trash and debris will prevent possible damage to trash racks and outlet structure openings and eliminate potential mosquito breeding habitats. Debris and trash must be properly hauled off the site and transferred to an approved disposal site.

c) Sediment Removal and Disposal:

The basin should be evaluated for excessive deposition of sediment. Accumulated sediment should be removed before it threatens the storage volume of the basin. Before de-sedimentation activities are performed. Sediment removal should take place when the basin is thoroughly dry. 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 stable soil conditions exist around the basin, 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.

d) 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.

e) ***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/ infiltration basin/detention basin and downstream of the basin discharge. 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.

f) ***Observation After Rainfall:***

This management measure involves monitoring the amount of time the infiltration/detention basin takes to drain to ensure the basin is working properly. The basin should drain within 72 hours. If significant increases or decreases are observed in the drawdown time, a qualified licensed Professional Engineer shall be contacted to evaluate the basin's bottom surface, subsoil and both groundwater and tailwater elevations to determine what corrective measures may need to be implemented.

g) ***Vegetation Maintenance:***

All landscaped areas within the infiltration basin shall be periodically inspected a minimum of once per month and every two weeks during growing season or after each mowing session. Mowing shall occur twice a year in the spring and fall seasons to promote native growth. Clippings from the bi-annual mowing operations shall be removed and disposed of in accordance with all local, state and federal regulations. Basins should be reviewed to see if there are large areas showing bare soil. Reseeding, if required, shall occur within spring or early fall. Summer and fall seeding can be successful with a light mulching of weed-free straw to conserve moisture. Reseeding within the basin shall be performed with the basin planting seed mixture which can be found within the Appendix of this report.

The basin and emergency spillway should be free of trees or excessive vegetation which may damage the berms or spillways. All landscaped areas shall be inspected for invasive plant species. Invasive species should be removed immediately and properly disposed of at an approved disposal site.

2. Corrective Maintenance Procedures:

a) Removal of Debris and Sediment:

Sediment, debris and trash that threaten the discharge capacity of the basin should be removed immediately and properly disposed. 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) Replacement of Infiltration Basin Sand Bottom Layer:

Should the aboveground infiltration basin fail to infiltrate 72 hours after the end of a storm event, it shall be inspected by a consulting professional engineer to determine the extent of corrective measures that will need to be performed to restore functionality of the basin. The basin shall be drained to inspect the sand bottom layer and to test the permeability of the sand. Should test results indicate that the permeability of the sand bottom layer no longer meets required design specifications, the impacted areas or entire sand bottom layer, if deemed necessary, shall be removed and replaced with a new sand layer meeting required design parameters.

c) Structural Repairs:

Structural damage to outlet and inlet structures, 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.

d) Embankment and Slope Repairs:

Damage to embankments, and side slopes must be repaired promptly. This damage can be the result of rain or flood events, vandalism, animals, vehicles or neglect. Typical problems include settlement, scouring, cracking, sloughing, seepage and rutting. The urgency of the repairs will depend upon the nature of the damage and its effect on the safety and operation of the facility. The analysis of damage and the design and performance of geotechnical repairs should only be undertaken by qualified personnel a direction of the consulting Professional Engineer. All basin embankments shall be inspected quarterly and

after each significant storm. Any damage or indication of erosion shall be immediately inspected by a professional engineer.

e) Weed Harvesting:

It may be necessary to remove congested weeds from the basin. Companies with specialized harvesters should be contacted to perform these operations. Note that such work may require the approval of various regulatory agencies.

f) Extermination of Mosquitoes:

If neglected, the basin can become an ideal mosquito breeding area. 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.

g) 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 that may result in danger to the stability of the facility. Soil loss can be controlled by a variety of materials and methods, including riprap, gabion lining, sod, seeding, concrete lining and re-grading.

h) Elimination of Trees, Brush, Roots and Animal Burrows:

The stability of embankments and emergency spillways can be impaired by large roots from trees 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 remove the animal population or to make critical areas of the facility unattractive to them.

i) Snow and Ice Removal:

Accumulations of snow and ice can threaten the functioning of the inlets, outlets and emergency spillways. 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.

3. Aesthetic Maintenance Procedures:

a) Grass Trimming/Landscape Maintenance:

The lawn areas around the basin shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2 to 3-inches (at least once a month during the growing season). 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 around the basins 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 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 surrounding the basin areas 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. In this case, it should be replanted in the spring. Replacement trees should be planted at the same size and condition as specified on the landscape plans. If it is necessary to make a substitution of species or size, it shall be subject to the approval of the project Landscape Architect.

b) 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 within the basins. Excessive growth of weeds within the basin can be controlled mechanically as discussed in the previous section.

The recording of all maintenance work and inspections will provide valuable data on the facility's condition. Review of this information will also help to establish more efficient and beneficial maintenance procedures and practices. All recorded information should be directed to the owners of the basins for review and subsequent follow-up on recommendations. Data obtained from informal inspections should be retained; however, this data does not have to be submitted to NJDEP.

4. **Summary of Maintenance Procedures:**

Preventative Maintenance

a) Maintenance of Adjacent Areas
b) Removal and Disposal of Trash and Debris
c) Sediment Removal and Disposal
d) Elimination of Mosquito Breeding Habitats
e) Parking Lot Maintenance
f) Observation After Rainfall
g) Vegetation Maintenance

Corrective Maintenance

a) Removal of Debris and Sediment
b) Replacement of Infiltration Basin Sand Bottom Layer
c) Structural Repairs
d) Embankment and Slope Repairs
e) Weed Harvesting
f) Extermination of Mosquitoes
g) Erosion Repair
h) Elimination of Trees, Brush, Roots and Animal Burrows from Embankments
i) Snow and Ice Removal

Aesthetic Maintenance

a) Grass Trimming/Landscape Maintenance
b) Control of Weeds

C. 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. Vegetative Maintenance Equipment

a) Saws

b) Pruning Shears

c) Hedge Trimmers

d) Wood Chippers

e) Aquatic Weed Harvester (owned/operated by subcontractor)

3. Transportation Equipment

a) Trucks for Transportation of Materials

b) Trucks for Transportation of Equipment

c) Vehicles for Transportation of Personnel

4. Debris, Trash and Sediment Removal Equipment

a) Loader

b) Backhoe

c) Grader

d) Dredging Equipment

e) Portable Pump for Dewatering

5. Miscellaneous Equipment

a) Shovels

b) Rakers

c) Picks

d) Wheel Barrows

e) Painting Equipment

f) Gloves

6. Materials

a) Topsoil

b) Fill

c) Seed & Soil Amenities (Fertilizer, Lime, etc.)

d) Chemicals (Pesticides, Herbicides, etc.)

e) Mulch

f) Paint Removers

g) Spare Parts for Equipment

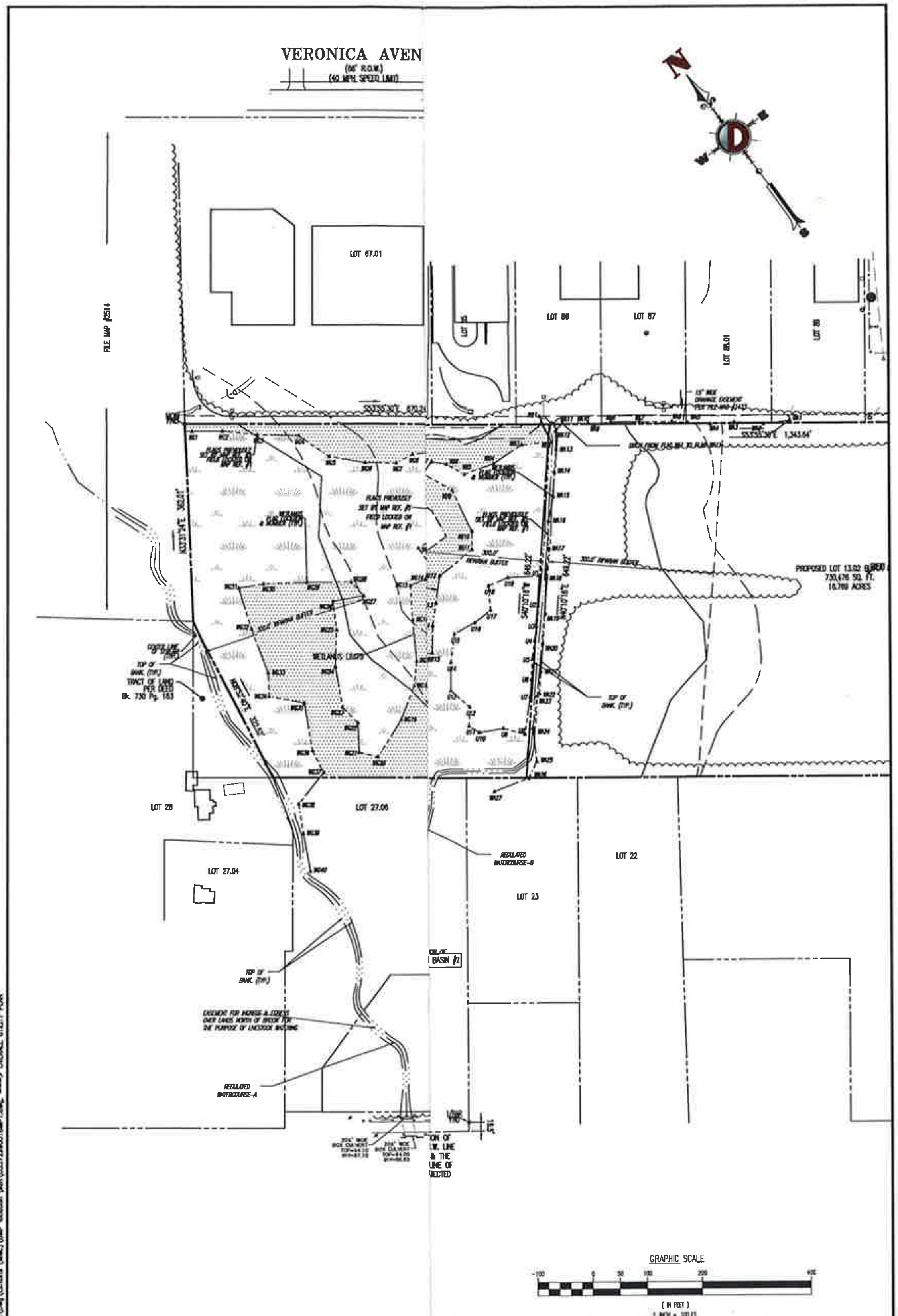
D. Checklists and Logs

The Appendix of this report contains sample checklists and logs regarding various aspects of the basin 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 the results of all maintenance of the basin.
3. "Inspection Log" – a summary table for recording the results of all inspections of the basin.

APPENDIX

BMP LOCATION MAP



GRAPHIC SCALE

-100 0 50 100 200 400

(IN FEET)
1 INCH = 100 FT.

THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

Legend		
EXIST. GUY WIRE	EXIST. MONITORING WELL	PROP. WATER VALVE
EXIST. LIGHT POLE	APPROX. TEST PIT LOCATION	PROP. GAS VALVE
EXIST. BUILDING LIGHT	EXIST. FIRE HYDRANT	PROP. STORM CLEANOUT
EXIST. SHOE BOX LIGHT	EXIST. WATER VALVE	PROP. SANITARY CLEANOUT
EXIST. COBRA LIGHT POLE	EXIST. GAS VALVE	PROP. AREA LIGHT
EXIST. TRAFFIC SIGNAL POLE	EXIST. GAS METER	PROP. OUTLET CONTROL STRUCTU
EXIST. MANHOLE	EXIST. ELECTRIC METER	PROP. DRAINAGE MANHOLE
EXIST. "A" INLET	EXIST. ELECTRIC BOX	PROP. SANITARY SEWER MANHOLE
EXIST. "B" INLET	EXIST. CLEAN OUT	PROP. "A" INLET
EXIST. "E" INLET	EXIST. WELL	PROP. "B" INLET
EXIST. YARD INLET	EXIST. WATER SHUT OFF VALVE	PROP. "E" INLET
EXIST. FLARED END SECTION	EXIST. TELEPHONE BOX	PROP. YARD INLET
EXIST. HEADWALL	EXIST. CABLE TV BOX	PROP. FLARED END SECTION
EXIST. UTILITY POLE	PROP. HEADWALL	

DYNAMIC ENGINEERING

LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING

TITLE:

BMP LOCATION PLAN

PROJECT: ELION PARTNERS
PROPOSED WAREHOUSE FACILITIES
BLOCK 88.02, LOT 13, 25, 26, 71 & 72
47 VERONICA AVENUE
TOWNSHIP OF FRANKIN, SOMERSET COUNTY, NEW JERSEY

JOB No: 3372-99-001
DATE: 03/10/2020
DRAWN BY: KTK
SCALE: (H) 1"=100 (V)
DESIGNED BY: JAR
CHECKED BY: RPF
CHECKED BY: –
SHEET No: 1 OF 1
Rev. # 1

Rev.	Date	Comments
1	06/18/20	REV. PER BASIN TYPE

ROBERT P. FREUD
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41838

JORDAN A. RIZZO
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 55348

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MAINTENANCE WORK ORDER & CHECKLIST

MAINTENANCE WORK ORDER AND CHECKLIST
FOR STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY: _____
LOCATION: _____ DATE: _____
WEATHER: _____ WORK STARTED: _____
MAINTENANCE PERFORMED BY: _____ WORK COMPLETED: _____

A. PREVENTATIVE MAINTENANCE			
WORK ITEMS	**ITEMS REQUIRED**	**ITEMS DONE**	**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. POISONOUS PLANTS			
E. OTHERS			
4. TRASH AND DEBRIS REMOVAL			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. INLETS			
F. OUTLETS AND TRASH RACKS			
G. OTHERS			
5. SEDIMENT REMOVAL			
A. INLETS			
B. OUTLETS AND TRASH RACKS			
C. LOW FLOW CHANNELS			
D. BOTTOMS			
E. OTHERS			
6. PEST CONTROL			
A. GEESE			
B. MOSQUITO BREEDING			
C. RODENTS / RODENT HOLES			
D. OTHERS			
7. STRUCTURAL REPAIRS			
A. VALVES			
B. SLUICE GATES			
C. PUMPS			
D. FENCE GATES			
E. LOCKS			
F. ACCESS HATCHES			
G. OTHER:			
8. POND MAINTENANCE			
A. AERATION EQUIPMENT			
B. DEBRIS AND TRASH REMOVAL			
C. WEED REMOVAL			
D. OTHER:			
9. OTHER PREVENTIVE MAINTENANCE			
A. PARKING LOT SWEEPING			
B. EMPTYING TRASH RECEPTACLES			
C. PUMPS AND VALVES			
D. ELECTRICAL PANEL AND WIRING			
E. DEWATERING			
F. GRAFFITI REMOVAL			
E. OTHER:			

B. CORRECTIVE MAINTENANCE			
WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	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. SAND LAYER REPLACEMENT			
11. OTHER			

C. AESTHETIC MAINTENANCE			
WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRAFFITI REMOVAL			
2. GRASS TRIMMING			
3. WEEDING			
4. OTHERS			

GENERAL NOTES AND REMARKS:

WORK ORDER PREPARED BY: _____

WORK COMPLETED BY: _____

MAINTENANCE LOG

MAINTENANCE LOG
FOR
STORMWATER MANAGEMENT FACILITIES

NAME OF FACILITY: _____
LOCATION: _____

DATE: | | | | | | | | | | |

A. PREVENTATIVE MAINTENANCE										
WORK ITEM	**(√) COMPLETED**									
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. POISONOUS PLANTS										
E. OTHERS										
4. TRASH AND DEBRIS REMOVAL										
A. BOTTOMS										
B. EMBANKMENTS AND SIDE SLOPES										
C. PERIMETER AREAS										
D. ACCESS AREAS AND ROADS										
E. INLETS										
F. OUTLETS AND TRASH RACKS										
G. OTHERS										
5. SEDIMENT REMOVAL										
A. INLETS										
B. OUTLETS AND TRASH RACKS										
C. LOW FLOW CHANNELS										
D. BOTTOMS										
E. OTHERS										
6. PEST CONTROL										
A. GEESE										
B. MOSQUITO BREEDING										
C. RODENTS / RODENT HOLES										
D. OTHER:										
7. MECHANICAL COMPONENTS										
A. VALVES										
B. SLUICE GATES										
C. PUMPS										
D. FENCE GATES										
E. LOCKS										
F. ACCESS HATCHES										
G. OTHER:										
8. POND MAINTENANCE										
A. AERATION EQUIPMENT										
B. DEBRIS AND TRASH REMOVAL										
C. WEED REMOVAL										
D. OTHER:										
9. OTHER PREVENTIVE MAINTENANCE										
A. PARKING LOT SWEEPING										
B. EMPTYING TRASH RECEPTACLES										
C. PUMPS AND VALVES										
D. ELECTRICAL PANEL AND WIRING										
E. DEWATERING										
F. GRAFFITI REMOVAL										
E. OTHER:										

B. CORRECTIVE MAINTENANCE										
WORK ITEM	(√) COMPLETED									
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. SAND LAYER REPLACEMENT										
11. OTHER										

C. AESTHETIC MAINTENANCE										
FACILITY ITEM	(√) COMPLETED									
1. GRAFFITI REMOVAL										
2. GRASS TRIMMING										
3. WEEDING										
4. OTHERS										

GENERAL NOTES AND REMARKS (REFER TO ITEM NUMBER IF APPLICABLE)

INSPECTION LOG

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. OTHER:										
2. BOTTOMS (DETENTION AND INFILTRATION)										
A. VEGETATION										
B. EROSION										
C. STANDING WATER										
D. SETTLEMENT										
E. TRASH AND DEBRIS										
F. SEDIMENT										
G. AESTHETICS										
H. OTHER:										
3. LOW FLOW CHANNELS (DETENTION)										
A. VEGETATION										
B. LININGS										
C. EROSION										
D. SETTLEMENT										
E. STANDING WATER										
F. TRASH AND DEBRIS										
G. SEDIMENT										
H. OTHER:										
4. PONDS (RETENTION)										
A. VEGETATION										
B. SHORELINE EROSION										
C. AERATION EQUIPMENT										
D. TRASH AND DEBRIS										
E. SEDIMENT										
F. WATER QUALITY										
G. OTHER:										
5. INLET STRUCTURE										
A. CONDITION OF STRUCTURE										
B. EROSION										
C. TRASH AND DEBRIS										
D. SEDIMENT										
E. AESTHETICS										
F. OTHER:										
6. OUTLET STRUCTURE										
A. CONDITION OF STRUCTURE										
B. EROSION										
C. TRASH AND DEBRIS										
D. SEDIMENT										
E. MECHANICAL COMPONENTS										
F. AESTHETICS										
G. OTHER:										

7. EMERGENCY SPILLWAY										
A. VEGETATION										
B. LINING										
C. EROSION										
D. TRASH AND DEBRIS										
E. OTHER:										
8. PERIMETER										
A. VEGETATION										
B. EROSION										
C. TRASH AND DEBRIS										
D. FENCES AND GATES										
E. AESTHETICS										
G. OTHER:										
9. ACCESS ROADS										
A. VEGETATION										
B. ROAD SURFACE										
C. FENCES AND GATES										
D. EROSION										
E. AESTHETICS										
F. OTHER:										
10. MISCELLANEOUS										
A. EFFECTIVENESS OF EXIST. MAINT. PROGRAM										
B. DAM INSPECTIONS										
C. POTENTIAL MOSQUITO HABITATS										
D. MOSQUITOES										

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

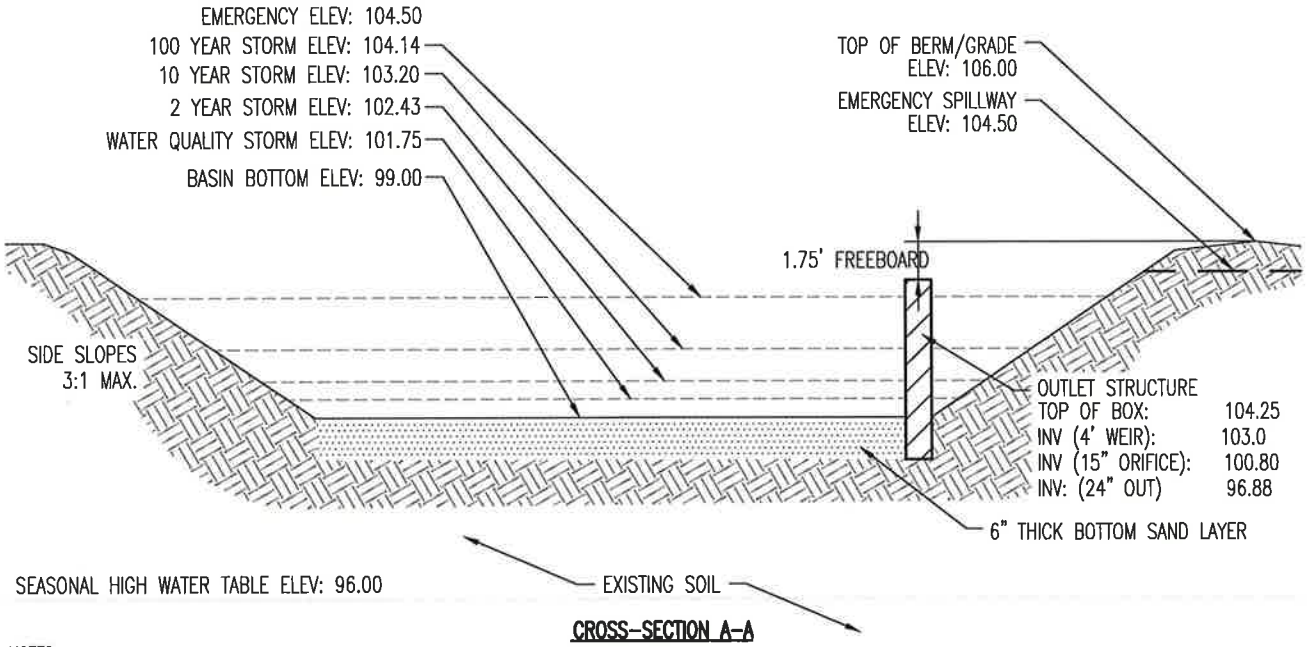
GENERAL NOTES AND REMARKS (REFER TO ITEM NUMBER IF APPLICABLE)

STORMWATER BASIN TEST PIT LOGS

Test Pit No.	Ex. Ground El.	Bottom of TP El.	SHWT El.	Permeability Rate (In/Hr)	Permeability Test Elev.
TP-101	104	92	101	N/A	N/A
TP-102	106	94	99	0 (Massive Rock)	101
TP-103	108	96	98	0 (Massive Rock)	100
TP-104	109.5	95	102	0 (Massive Rock)	104
TP-105	111	99.5	102	0 (Massive Rock)	103.5
TP-106	113	101.5	103.5	0.5 (Fractured Rock)	104.5
TP-107	111	100	N/E	0.5 (Fractured Rock)	102
TP-108	109	96.5	99	0 (Massive Rock)	102
TP-109	106	95.5	97.5	0 (Massive Rock)	100
TP-110	105.5	92.5	99	0 (Massive Rock)	101
TP-111	105	92	98	0 (Massive Rock)	100
TP-112	100	91	92	0 (Massive Rock)	97
TP-113	101	92	96	0.5 (Fractured Rock)	97.5
TP-114	98	91	92	0.5 (Fractured Rock)	95.5
LTP-1	103.6	97.3	97.3	N/A	N/A
LTP-2	104.9	98.9	98.9	N/A	N/A
LTP-3	107.3	101.3	101.3	N/A	N/A
LTP-4	109.8	100.8	107.8	N/A	N/A
LTP-5	111.8	103.8	108.9	N/A	N/A
LTP-6	112	103.8	103.8	N/A	N/A
LTP-7	112	104	110.5	N/A	N/A
LTP-8	109.4	103.4	103.4	N/A	N/A
LTP-9	107.7	102.2	102.2	N/A	N/A
LTP-10	105.9	100.9	100.9	N/A	N/A
LTP-11	103.3	96.1	96.1	N/A	N/A
LTP-12	99.3	89.3	89.3	N/A	N/A
LTP-13	100	89.6	90	N/A	N/A
LTP-14	100.9	92.5	92.5	N/A	N/A
LTP-15	99.1	91.6	92.3	N/A	N/A
BFT-1	103.6	99.3	99.3	0.1	99.3
BFT-2	111.8	107.8	107.8	9.2	107.8
BFT-3	112	107	107	0.8	107
BFT-4	107.7	104.2	104.2	1	104.2
BFT-5	103.3	99.3	99.3	1.1	99.3
BFT-6	100.9	94.9	94.9	0.1	94.9
BFT-7	99.1	91.9	91.9	N/A	N/A
LBFT-1	107.3	99.3	99.3	0	99.3
LBFT-2	111.8	101.8	101.8	N/A	101.8
LBFT-3	112	101	101	N/A	101
LBFT-4	109.4	98.9	98.9	N/A	98.9
LBFT-5	107.7	99.7	99.7	N/A	99.7
LBFT-6	100	97	97	N/A	97
LBFT-7	100	97	97	N/A	97
LBFT-8	100.9	96.9	96.9	N/A	96.9

For Additional Information, refer to the Geotechnical Report prepared by Langan

INFILTRATION BASIN DETAIL



CROSS-SECTION A-A

NOTES:

1. CONTRACTOR OR OWNER TO ENGAGE QUALIFIED GEOTECHNICAL ENGINEER TO TEST SOIL PERMEABILITY AND PROVIDE CONSTRUCTION PHASE INSPECTIONS OF THE BASIN BOTTOM SOILS AND FILL MATERIALS WITHIN ANY PROPOSED INFILTRATION OR RETENTION BASIN TO COMPARE RESULTS TO DESIGN CRITERIA.
2. TOPSOIL AND UNSUITABLE MATERIALS ARE TO BE STRIPPED FROM BASIN BOTTOM AREA AND REPLACED WITH SUITABLE MATERIAL PROVIDING PERMEABILITY RATES CONSISTENT WITH THAT OF THE SUBSURFACE SOILS ZONE OF INFILTRATION. CONTRACTOR SHALL PROVIDE A RECORD OF THE REPLACEMENT MATERIAL USED AND ITS CORRESPONDING PERMEABILITY RATE. REFER TO THE TEST PIT AND/OR SOIL BORING RECORDS AND STORMWATER MANAGEMENT REPORT TO CONFIRM THE DEPTH OF THE ZONE OF INFILTRATION.
3. BOTTOM SAND LAYER MUST CONSIST OF K5 SAND WITH A MAXIMUM OF 15% FINES AND A MINIMUM PERMEABILITY RATE OF 20 INCHES PER HOUR. SOIL TO BE CERTIFIED BY A NEW JERSEY LICENSED PROFESSIONAL ENGINEER.
4. BASIN CONSTRUCTION MUST NOT COMPACT SOILS BELOW BASIN BOTTOM.
5. POST-CONSTRUCTION SOIL PERMEABILITY TESTING SHALL BE CONDUCTED WITHIN THE MOST HYDRAULICALLY RESTRICTIVE SOIL HORIZON BETWEEN THE BOTTOM OF THE INFILTRATION BASIN AND THE SEASONAL HIGH GROUNDWATER TABLE. IF PERMEABILITY TESTING SHOWS DRAIN TIMES LONGER THAN 72 HOURS, APPROPRIATE SOIL REPLACEMENT MUST BE CONDUCTED AND RETESTED IN ACCORDANCE WITH APPENDIX E OF THE BMP MANUAL PRIOR TO BOND RELEASE.

ABOVEGROUND INFILTRATION BASIN 2 (SAND) DETAIL

NOT TO SCALE

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1904 Main Street - Lake Como, NJ 07719
T: 732.974.0198 - F: 732.974.3521
www.dynamicec.com

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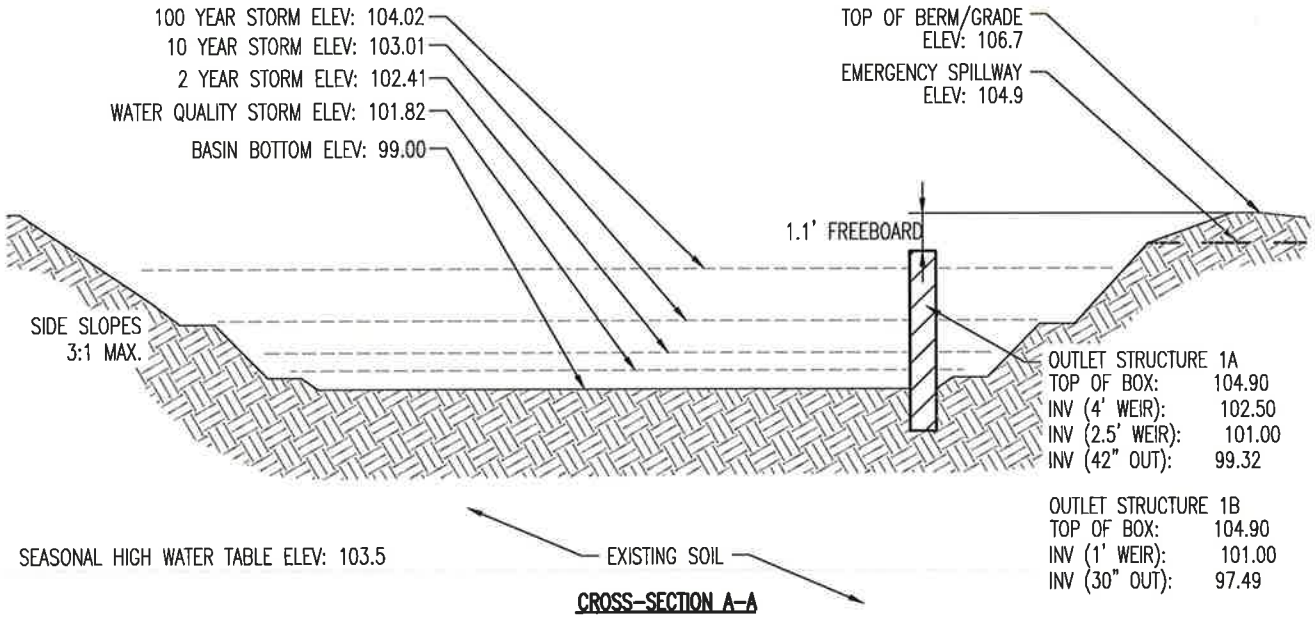
WET POND BASIN DETAIL



CROSS-SECTION A-A

NOTES:

1. WET POND BASIN BERM TO HAVE CLAYCORE AS SHOWN ON THE WET POND BASIN BERM W/ CLAYCORE DETAIL.
2. CONTRACTOR OR OWNER TO ENGAGE QUALIFIED GEOTECHNICAL ENGINEER TO TEST SOIL PERMEABILITY AND PROVIDE CONSTRUCTION PHASE INSPECTIONS OF THE BASIN BOTTOM SOILS AND FILL MATERIALS WITHIN ANY PROPOSED INFILTRATION OR RETENTION BASIN TO COMPARE RESULTS TO DESIGN CRITERIA.

RETENTION BASIN (WET POND) DETAIL

NOT TO SCALE

DYNAMIC ENGINEERING
1904 Main Street - Lake Como, NJ 07719
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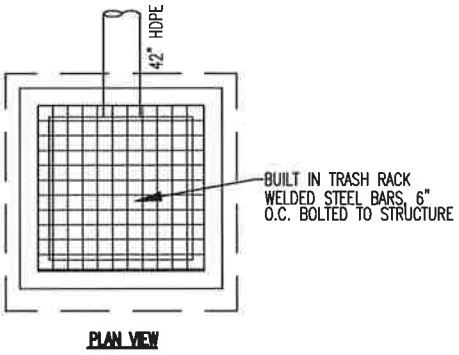
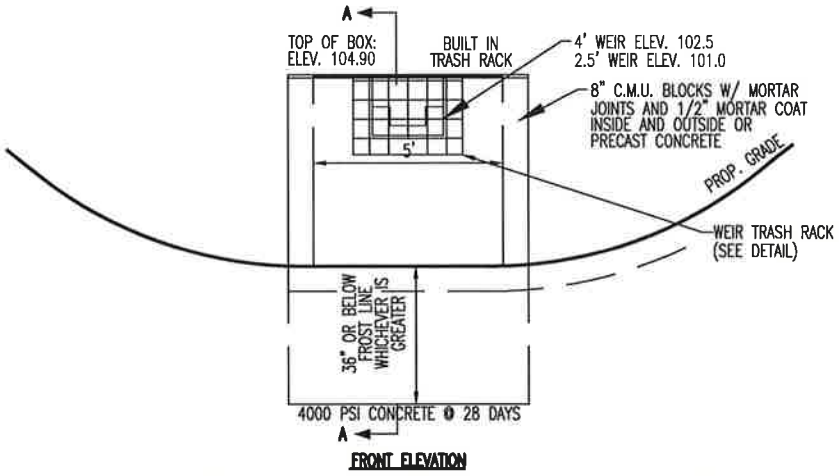
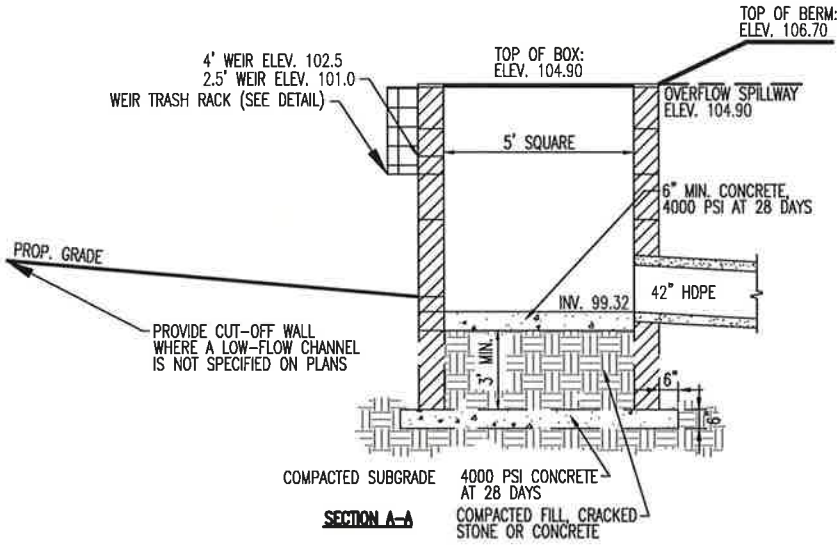
OUTLET CONTROL STRUCTURE DETAILS







OUTLET CONTROL STRUCTURE BASIN 1A DETAIL

NOT TO SCALE

DYNAMIC ENGINEERING
1904 Main Street - Lake Como, NJ 07719
T: 732.974.0198 - F: 732.974.3521
www.dynamicec.com

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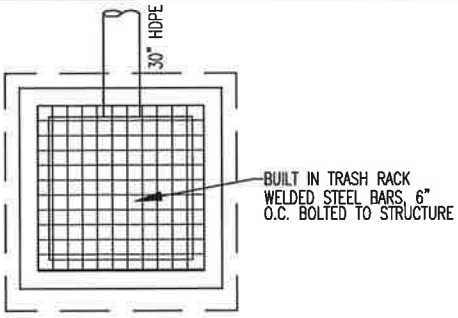
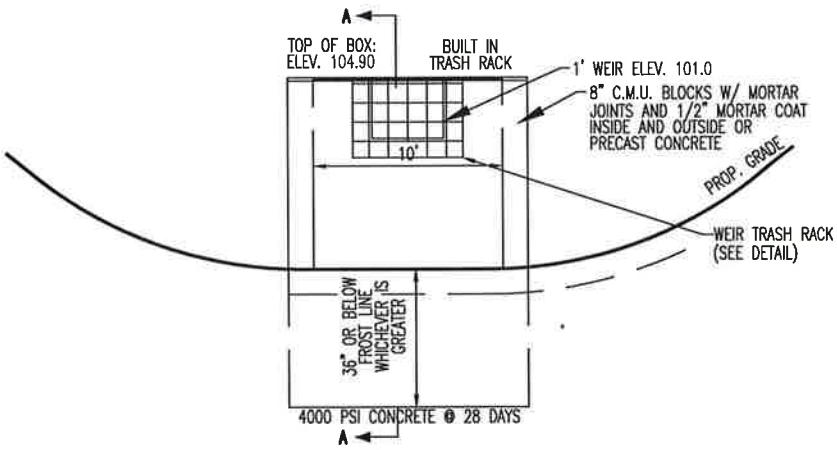
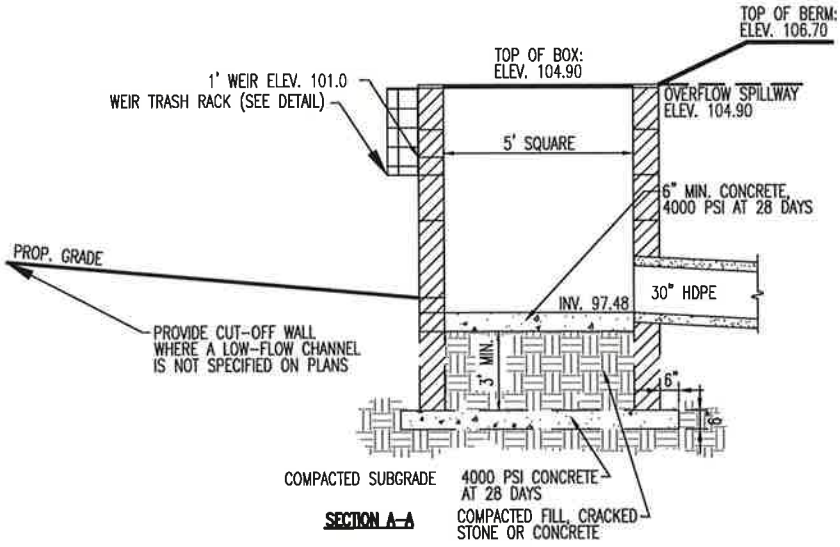


PLAN VIEW



FRONT ELEVATION



SECTION A-A

OUTLET CONTROL STRUCTURE BASIN 1B DETAIL

NOT TO SCALE

DYNAMIC ENGINEERING
1904 Main Street - Lake Como, NJ 07719
T: 732.974.0198 - F: 732.974.3521
www.dynamicec.com

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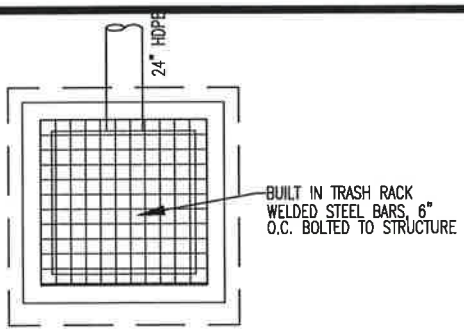
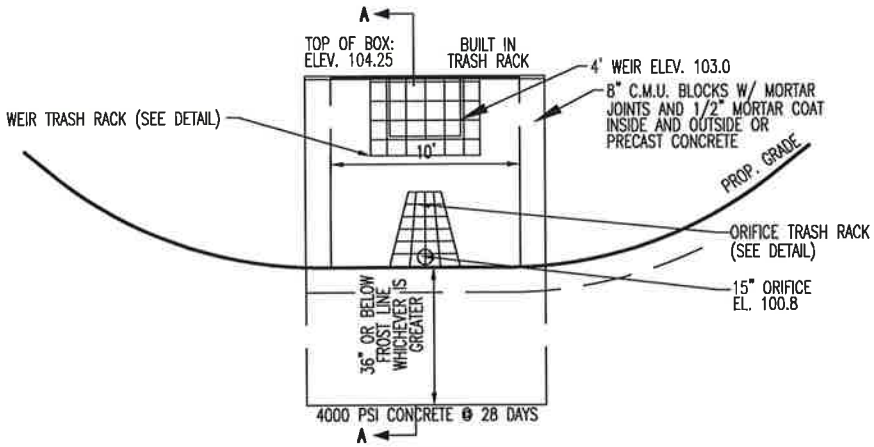
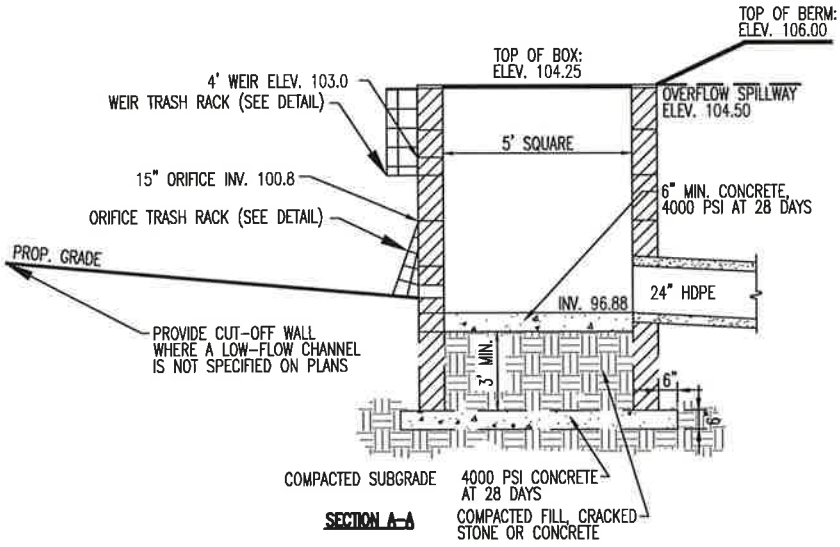


PLAN VIEW



FRONT ELEVATION



SECTION A–A

OUTLET CONTROL STRUCTURE BASIN 2 DETAIL

NOT TO SCALE

DYNAMIC ENGINEERING

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Plotted: 06/19/20 – 2:33 PM, By: kkirk, – Product Ver: 23.1s (LMS Tech)
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