

STORMWATER MAINTENANCE PLAN

FOR

DADA BHAGWAN VIGNAN INSTITUTE (DBVI)

BLOCK 516.01, LOT 4.17
TOWNSHIP OF FRANKLIN
SOMERSET COUNTY

Prepared for:

Dada Bhagwan Vignan Institute
630 South Middlebush Road
Somerset, NJ 08873

OCTOBER 2019
REVISED APRIL 2020

Prepared By:

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I. INTRODUCTION

Dada Bhagwan Vignan Institute (DBVI) is proposing to construct a new house of worship on Block 516.01, Lot 4.17 in Franklin Township, Somerset County. In conjunction with this proposal, stormwater management measures will be constructed to address the impact of stormwater runoff. These measures include the following:

- The stormwater runoff conveyance system, located throughout the site, which consists of pipes, inlets, storm manholes and trench drains
- An above-ground infiltration basin that also provides extended detention located in the northeasterly portion of the site, behind the existing dwelling
- Vegetated filter strip (wooded area) adjacent to the entrance driveway

In order for these stormwater management measures to function adequately, regular maintenance must be performed. This Stormwater Maintenance Plan outlines the proper inspection and maintenance procedures for each component of the stormwater management system. A Stormwater Management Facility Plan showing the location of the stormwater management components on the site is located in the map pocket at the end of this report.

This document and any future revisions to this document shall be recorded upon the deed of record for this property. The entity responsible for maintenance of the stormwater management elements designed for the project and outlined in detail below is as follows:

Dada Bhagwan Vignan Institute

630 South Middlebush Road - Somerset, NJ 08873

Phone: (732) 470-6517; Fax: (856) 667-7340

Attn.: Bhupendra Patel (email: bhupenipatel@gmail.com)

The responsible party shall maintain a detailed log of the preventative and corrective maintenance for the stormwater management elements, including a record of all inspection and maintenance procedures (See Appendix A for Maintenance Logs). The effectiveness of the maintenance plan shall be evaluated by the responsible party at least once a year and the plan shall be adjusted as needed. Written maintenance records for all stormwater management elements shall be maintained by the responsible party for at least five years and shall be provided to the municipality upon request.

II. STORMWATER CONVEYANCE SYSTEM

This element is comprised of the series of pipes, structures, underdrains and vegetated swales designed to convey runoff to and from the proposed infiltration/detention basin.

Normal maintenance of the storm sewer system requires inlets to be inspected semi-annually on or about April 1st and October 1st of each year. Any sediment or debris on the grate or within the inlets and vegetated swales shall be removed at that time.

Stormwater Conveyance System Maintenance Schedule			
Maintenance Item	Schedule	Inspection Requirement	Maintenance Requirement
Visual Inspection	Semi-Annually - April 1 +/- October 1 +/-	Inspect all grates and inlets for buildup of sediment/trash/debris.	Removed excess sediment/trash/debris from grates and/or within inlets.

III. INFILTRATION/EXTENDED DETENTION BASIN

This element is comprised of a normally dry extended detention basin with a 6" thick sand bottom layer. Runoff from the parking areas, building roof and paver area is piped to the basin. The storage volume below the lowest opening in the outlet structure provides 80% TSS removal prior to groundwater recharge. The upper stage orifice and weir provide storage for larger storm events and then the peak runoff volume will be routed through the outlet structures to attenuate peak discharge from the developed site. The purpose of the infiltration/extended detention basin is to control the quantity and enhance the quality of the stormwater runoff leaving the site.

A. General Maintenance

The bottom sand layer should be inspected at least monthly and all other components designed to catch debris and sediment must be inspected for clogging and excessive accumulation of material at least four (4) times annually, as well as after every storm exceeding one (1) inch of rainfall. These components include the sand basin bottom, inflow points, outlet structures, trash racks and rip-rap aprons. Sediment removal shall be performed when basin is thoroughly dry. Debris, trash, sediment, and other waste material removed from the detention basin, shall be disposed of at a suitable disposal site in accordance with all applicable regulations. The sand layer shall be tilled annually by light equipment to maintain the infiltration capacity and to maintain an even sand bed.

B. Vegetated Areas

Mowing/trimming of vegetation shall be conducted on a regular schedule based on specific site condition. Grass shall be mowed at least once monthly during the growing season. Vegetated areas shall be inspected at least once annually for erosion and scour. In addition, during the inspection, unwanted growth will be identified and removed with minimum disruption to remaining vegetation.

During establishment or restoration of vegetation, biweekly inspections shall be performed during the first growing season or until vegetation becomes established to determine health of planted material. Once established, inspection for health, vigor, density, and diversity shall be performed during the growing and non-growing season at least twice annually. Vegetative cover shall be maintained at 85 percent. Areas of the basin with greater than 50 percent non-growth or damage shall be re-established in accordance with the original specifications. Use of fertilizers, mechanical treatments, pesticides, and other measures to assure optimum vegetative cover shall not compromise the intended purpose of the basin. To the extent possible, all vegetative deficiencies should be corrected without the use of fertilizers or other chemicals.

C. Structural Components

All structural components, such as outlet structure and inflow structures shall be inspected for cracking, subsidence, spalling, erosion, and general deterioration at least once annually. Structural damage to outlet and inlet structures, trash racks, headwalls and flared end sections (FES) from vandalism, flood events, or other causes must be repaired promptly. Analysis of structural damage and the design of structural repairs shall only be undertaken by qualified personnel.

D. Dam Embankment

The embankment around the detention basin shall be visually inspected periodically (April 1st and October 1st) for signs of damage. Problems such as settlement, scouring or seepage shall be analyzed by qualified personnel. The stability of the embankment can be impaired by large roots and animal burrows. Trees and brush with extensive root systems should be completely removed from dams to prevent their destabilization and creation of seepage routes.

Root voids and animal burrows should be plugged by filling with material similar to the existing material and capped just below grade with stone, concrete or other material. If plugging of burrows does not discourage animals from returning, further measures should be taken to remove the animal population.

E. Other Maintenance Criteria

The volume of stormwater storage below the circular orifice in the outlet control structure will be infiltrated. The time necessary to drain the infiltration design storm runoff volume is less than 2 hours. For a short duration rainfall event, if the water does not drain within five (5) hours, the basin shall be reevaluated by a qualified civil or geotechnical engineer. For long duration storms with a significant amount of rainfall, if the basin does not drain within 72 hours, the basin should be reassessed by a qualified civil or geotechnical engineer. Testing of the permeability of the sand bed and underlying soil may be required.

Refer to the following table for schedule of maintenance and inspection:

Infiltration/Detention Basin Maintenance Schedule			
Maintenance Item	Schedule	Inspection Requirement	Maintenance Requirement
Establish Vegetation	Bi-weekly	During first growing season or until vegetation becomes established	Re-plant areas as required.
85 Percent Coverage	Twice Yearly	During both growing and non-growing season : April-May October/November	Re-plant areas exhibiting areas damaged in excess of 50 percent Re-plant areas exhibiting less than the required 85 percent coverage.
General Maintenance – Visual Inspection	Monthly (Bottom Sand Layer); Four (4) Times Annually for other components, or After Every Rainfall Exceeding One Inch	Inspect all visual components of the system for scour (sand bottom and rip-rap aprons), clogging, excessive debris, and sediment accumulation.	Remediate scour and clogging; Removal all trash, debris, sediment and dispose of in accordance with all applicable regulation.
Structural Components – Visual Inspection	Once Annually	Inspect all structural components i.e., outlet structures, flared-end-sections, headwalls, etc. for cracking, subsidence, spalling, erosion, and general deterioration.	Repair structural components as required.
Sand Bed	Once Annually	Inspect Sand Layer visually and till.	Till basin bottom with light equipment.
System Function		Evaluate drawdown time of basins compared to design criteria. 1.25” Storm: 2-3 hours Large Storms: less than 72 hrs	Analysis to be reviewed by qualified Civil or Geotechnical Engineer – Recommendations will be made at this time.

F. Design Information

The design parameters and functional expectations pertaining to the infiltration/detention basin are summarized below:

Design subsoil permeability rate = 10 inches/hour
Drain time = 1.8 hours WQ storm; 72 hours maximum for all storm events.
Elevation of Seasonal High Water Table is 101.87, max.
Elevation of the bottom of the basin = 104.5.0
Thickness of sand bottom = 6 inches
Design TSS Removal Rate = 80%

<i>Design Parameter:</i>	<i>Design Storm Event</i>			
	WQ	2-year	10-year	100-year
Rainfall Depth	1.25"	3.34"	5.01"	8.21"
Runoff Volume	0.196 ac-ft	0.661 ac-ft	1.068 ac-ft	1.881 ac-ft
Peak Inflow Rate	4.77 cfs	6.59 cfs	10.63 cfs	18.63 cfs
Peak Outflow Rate	0.0 cfs	0.23 cfs	0.46 cfs	4.33 cfs
Water Surface Elevation	105.32	106.47	107.37	108.44

Outlet Structure configuration: Top of structure = 108.50
4' weir at Elev. 108.0
4" orifice at Elev. 106.0

The basin includes a 20' spillway (opening in berm) to convey flow under emergency conditions. The invert of the spillway is elevation 108.5, 18 inches below the top of berm elevation of 110.0. The emergency spillway design storm is the 100-year storm + 50%, consistent with NJDEP criteria for a Class IV dam. The maximum water surface elevation in the basin under these emergency conditions is 108.88.

IV. VEGETATED FILTER STRIP

This element is comprised of the wooded area adjacent to the entrance drive, west of the house of worship and dwelling. The purpose of this area is to enhance the quality of runoff from the asphalt driveway before it leaves the site.

A. General Maintenance

The vegetated filter strip (wooded area adjacent to the entrance drive) must be inspected for clogging, excessive debris, and sediment accumulation four (4) times annually, at a minimum, as well as after every storm that exceeds one (1) inch of rainfall. Debris, trash, sediment, and other waste materials removed from the filter strip shall be disposed of at a suitable disposal site and in accordance with all applicable local, state and federal waste regulations.

B. Vegetated Areas

Trimming of vegetation shall be conducted on a regular schedule based on specific site condition. Vegetated areas shall be inspected at least once annually for erosion and scour. In addition, during the inspection, unwanted growth will be identified and removed with minimum disruption to the remaining vegetation. Vegetative cover shall be maintained at 85 percent. Areas with greater than 50 percent non-growth or damage shall be re-established.

Use of fertilizers, mechanical treatments, pesticides, and other measures to assure optimum vegetative cover shall not compromise the intended purpose of the filter strip. To the extent possible, all vegetative deficiencies should be corrected without the use of fertilizers or other chemicals.

Refer to the following table for schedule of maintenance and inspection:

Vegetated Filter Strip Maintenance Schedule			
Maintenance Item	Schedule	Inspection Requirement	Maintenance Requirement
General Maintenance – Visual Inspection	Four (4) Times Annually	Inspect all visual components of the system for scour, excessive debris, and sediment accumulation.	Remediate scour and clogging; Removal all trash, debris, sediment and dispose of in accordance with all applicable regulation.
Vegetation	Twice Yearly	During both growing and non-growing season : April-May October/November	Re-plant areas exhibiting areas damaged in excess of 50 percent

C. Design Information

The design parameters and functional expectations pertaining to the vegetated filter strip are summarized below:

- Maximum Design Storm = 1.25" in 2 hours (NJDEP Water Quality Storm)
- Slope = 4.0.% (Filter Strip 1); 3.5% (Filter Strip 2)
- Min. Required Length = 43 ft (Filter Strip 1); 40 ft (Filter Strip 2)
- Type of Vegetation = Forested
- Design TSS Removal Rate = 80%

V. MAINTENANCE RECORDS AND REPORTING

All inspections (as required above), regular maintenance, and required repairs shall be documented. Written maintenance and repair records for all stormwater management elements shall be maintained for at least five years by the responsible party and shall be provided to the municipality upon request. See Appendix for Maintenance Logs.

VI. EQUIPMENT AND MATERIALS

The following is a list of maintenance equipment and materials that would be required for the general maintenance of the Stormwater Management Facilities. It will be at the discretion of the owner to decide whether to perform the work (by the Department of Public Works) or to hire a maintenance service to maintain the above facilities. Should the Owner decide to hire a service to maintain the Stormwater Facilities, the responsibility of inspecting the facilities per the above report will still be the job of the Owner. The following equipment list has been separated into the various Stormwater Components. The equipment may be rented for a particular task or stored on-site as part of the maintenance program. Confined space entry shall be enforced at all times.

- a. Riding Mower
- b. Power Trimmer
- c. Power Edger
- d. Seed Spreader
- e. De-thatching Equipment
- f. Grass Clipping Equipment
- g. Shovels & Rakes
- h. Wheel Barrow
- i. Loader/Backhoe
- j. Dewatering pump
- k. Combination vacuum truck and sewer jet
- l. Concrete Repair Material
- m. Tilling machine
- n. Sand
- o. Grass Seed
- p. Mulch

APPENDIX A

INSPECTION AND MAINTENANCE LOGS

Stormwater Conveyance System

20__ Inspection Checklist for Stormwater Management Facilities

Name of Facility: Stormwater Conveyance Systems

Location/Address: 630 So. Middlebush Rd, Franklin Twp.
Block 37.02, Lot 46.03

Franklin ID #: _____

Submission for: (Select One)

1st Quarter

2nd Quarter

3rd Quarter

4th Quarter

STORMWATER CONVEYANCE SYSTEM					
Date:					
Facility Item:		O.K. ¹	Routine ²	Urgent ³	Comments ⁴
Inspection Checklist (X):Completed					
Inlet Grates & Manhole Covers					
	Condition of Castings				
	Trash & Debris				
Structures - Inlets & Manholes					
	Condition of Structure				
	Sediment				
	Trash & Debris				
	Standing Water				
	Settlement				
Pipe System					
	Surcharge/Clogging				
	Seepage				
	Settlement				
Miscellaneous:					
¹ The item checked is in good condition, and the maintenance program is adequate. ² The item checked requires attention, but does not present an immediate threat to the facility function or other facility components. ³ The item 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.					
Comments: (Additional comments not listed above)					

Inspection reports can be mailed, faxed to (732) 873-5391, or emailed to stormwater@twp.franklin.nj.us

STORMWATER CONVEYANCE SYSTEM

20__ Maintenance Log for Stormwater Management Facilities

Name of Facility: **Pipes, Inlets, & Manholes**

630 South Middlebush Road

Location/Address: **Block 37.02, Lot 46.03**

Franklin ID #: _____

Submission for: (select 1)

- 1st Quarter
- 2nd Quarter
- 3rd Quarter
- 4th Quarter

STORMWATER CONVEYANCE SYSTEM												
	Date:											
Preventative Maintenance		(X):Completed										
Trash and Debris removal:												
	Inlets & Manholes											
	Pipes											
	Riprap Aprons											
Sediment Removal:												
	Inlets & Manholes											
	Pipes											
	Riprap Aprons											
Corrective Maintenance												
Structural Repair												
Erosion Repair												
Other												
Comments: (indicate any repairs which were completed)												

Maintenance reports can be mailed, faxed to (732) 873-5391, or emailed to stormwater@twp.franklin.nj.us

Detention Basin

20__ Inspection Checklist for Stormwater Management Facilities

Name of Facility: Infiltration/Extended Detention Basin

Location/Address: 630 So. Middlebush Rd, Franklin Twp.

Block 37.02, Lot 46.03

Franklin ID #: _____

Submission for: (Select 1)

- 1st Quarter
- 2nd Quarter
- 3rd Quarter
- 4th Quarter

INFILTRATION/EXTENDED DETENTION BASIN				
	Date:			
Facility Item:	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
Inspection Checklist (X):Completed				
Sand Bottom				
	Debris/Sediment			
	Scour			
	Settlement			
	Standing Water			
Outlet Structure				
	Condition of Structure			
	Trash/Debris			
	Trash Racks			
Inlet/Outlet Pipes & FES				
	Condition of Structure			
	Trash/Debris			
	Sediment			
	Settlement			
	Rip Rap Stability			
Embankment/Side Slopes				
	Vegetation			
	Erosion/Sloughing			
	Settlement			
	Unwanted trees			
	Animal Burrows			
	Trash and Debris			
	Seepage			
	Emergency Spillway			
Other				
¹ The item checked is in good condition, and the maintenance program is adequate. ² The item checked requires attention, but does not present an immediate threat to the facility function or other facility components. ³ The item 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.				
Comments: (Additional comments not listed above)				

INFILTRATION/EXTENDED DETENTION BASIN

20__ Maintenance Log for Stormwater Management Facilities

Name of Facility: Infiltration/Extended Detention	<u>Submission for: (Select One)</u> <input type="checkbox"/> 1st Quarter <input type="checkbox"/> 2nd Quarter <input type="checkbox"/> 3rd Quarter <input type="checkbox"/> 4th Quarter
Location/Address: 630 South Middlebush Road Block 37.02, Lot 46.03	
Franklin ID #:	

INFILTRATION/EXTENDED DETENTION BASIN										
Date:										
Preventative Maintenance (X):Completed										
Lawn/Vegetative Area:										
	Cutting									
	Maintenance									
	Pest (weed) Control									
Trash and Debris removal:										
	Trash rack/outlets									
	Slopes/Ramps									
	Sand Bottom									
Sediment Removal:										
	Trash rack/outlets									
	Inlets									
	Slopes/Ramps									
	Sand Bottom									
Mechanical Components:										
	Trash racks									
Other:										
Corrective Maintenance										
Structural Repair										
Embankment Repair										
Erosion Repair										
Tilling (Sand Layer)										
Dewatering/Improve Infiltration										
Other										
Comments: <small>(indicate any repairs which were completed)</small>										

Maintenance reports can be mailed, faxed to (732) 873-5391, or emailed to stormwater@twp.franklin.nj.us

Detention Basin

20__ Inspection Checklist for Stormwater Management Facilities

Name of Facility: Vegetated Filter Strip

Location/Address: 630 South Middlebush Road
Block 37.02, Lot 46.03

Franklin ID #: _____

Submission for: (Select 1)

1st Quarter

2nd Quarter

3rd Quarter

4th Quarter

VEGETATED FILTER STRIP				
Date: _____				
Facility Item:	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
INSPECTION CHECKLIST (X):Completed				
Trash/Debris				
Sediment				
Scour				
Health of Trees				
Excessive Brush/Overgrowth				
Ground Cover				
Pavement edge				
Other:				
¹ The item checked is in good condition, and the maintenance program is adequate. ² The item checked requires attention, but does not present an immediate threat to the facility function or other facility components. ³ The item 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.				
Comments: <small>(Additional comments not listed above)</small>				

VEGETATED FILTER STRIP

20__ Maintenance Log for Stormwater Management Facilities

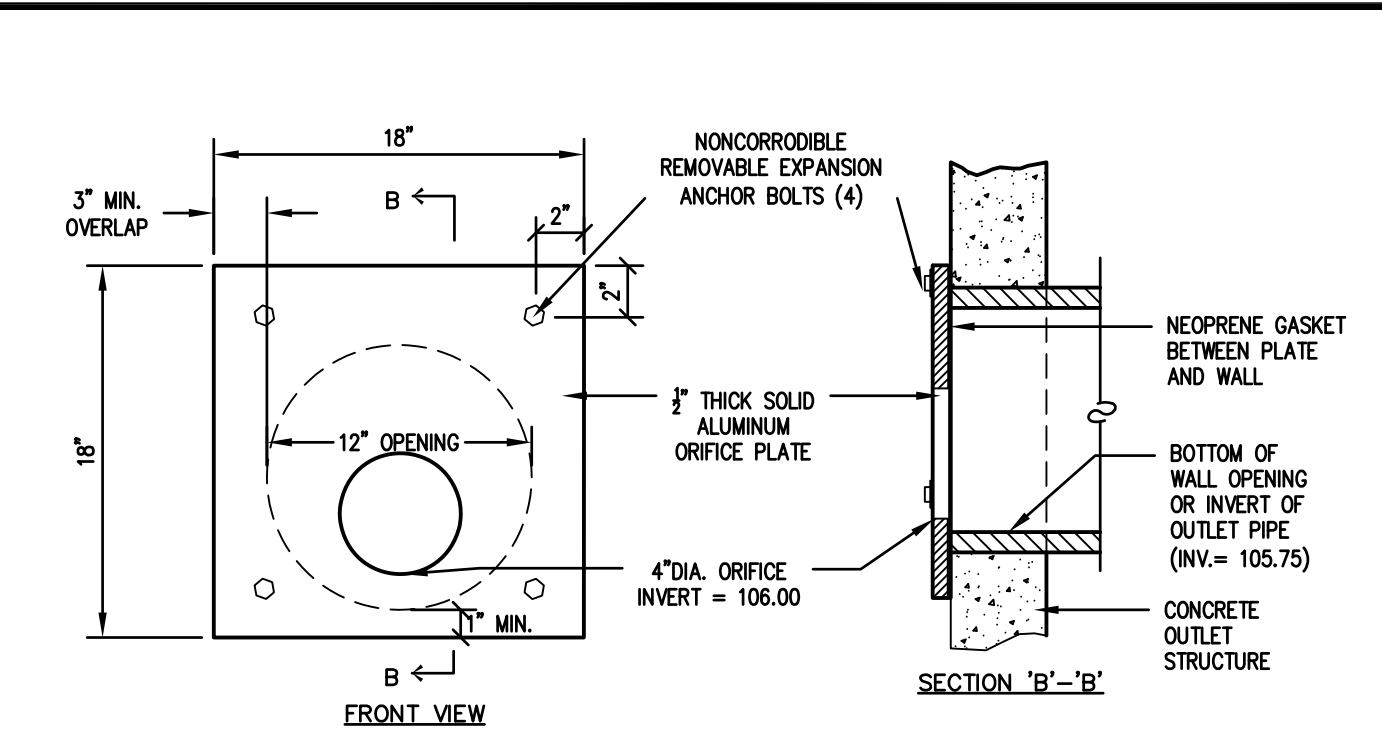
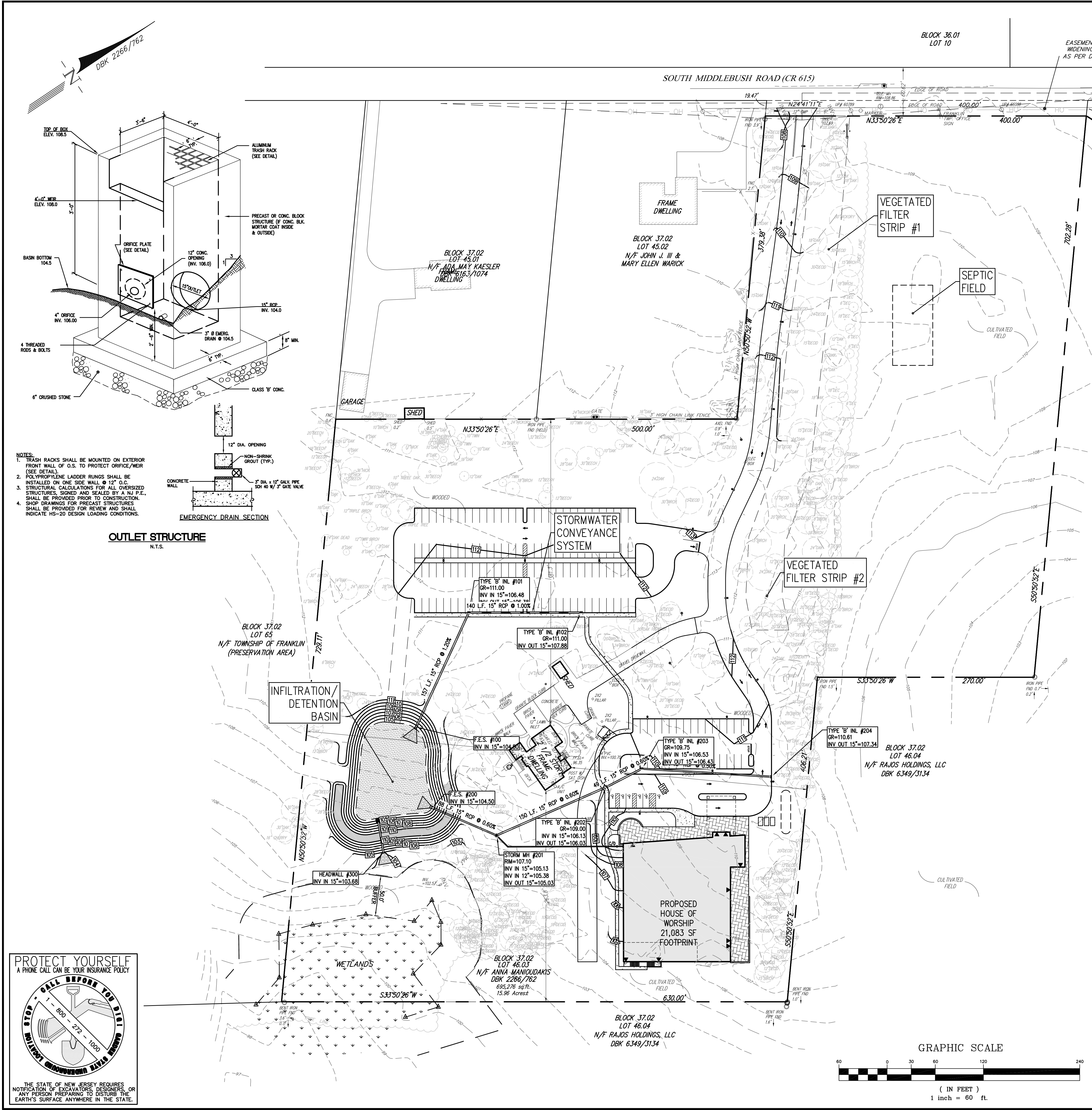
Name of Facility: **Vegetated Filter Strip**
 Location/Address: **630 South Middlebush Road**
 Franklin ID #: _____

Submission for: (Select 1)

- 1st Quarter
- 2nd Quarter
- 3rd Quarter
- 4th Quarter

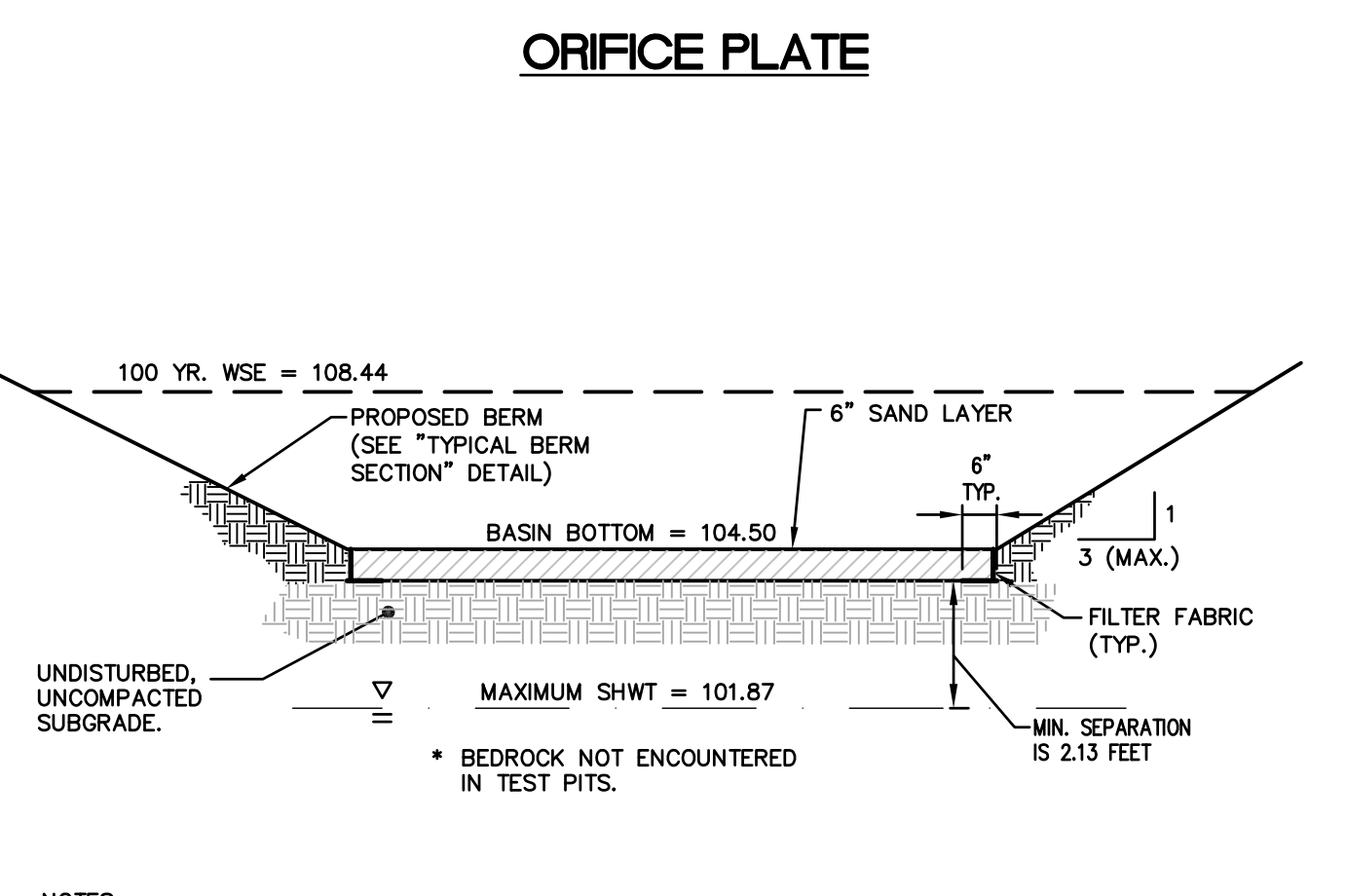
VEGETATED FILTER STRIP (Wooded Area)										
Date:										
Preventative Maintenance		(X):Completed								
Vegetative Area:										
	Pruning									
	Ground Cover									
	Maintenance									
	Pest (weed) Control									
Trash and Debris removal:										
	Pavement edge									
	Ground Cover									
Sediment Removal:										
	Pavement edge									
	Ground Cover									
Corrective Maintenance										
Restore Ground Cover (bare spots)										
Repair Erosion/Channelization										
Pest (animal) Control										
Other:										
Comments: (indicate any repairs which were completed)										

Maintenance reports can be mailed, faxed to (732) 873-5391, or emailed to stormwater@twp.franklin.nj.us



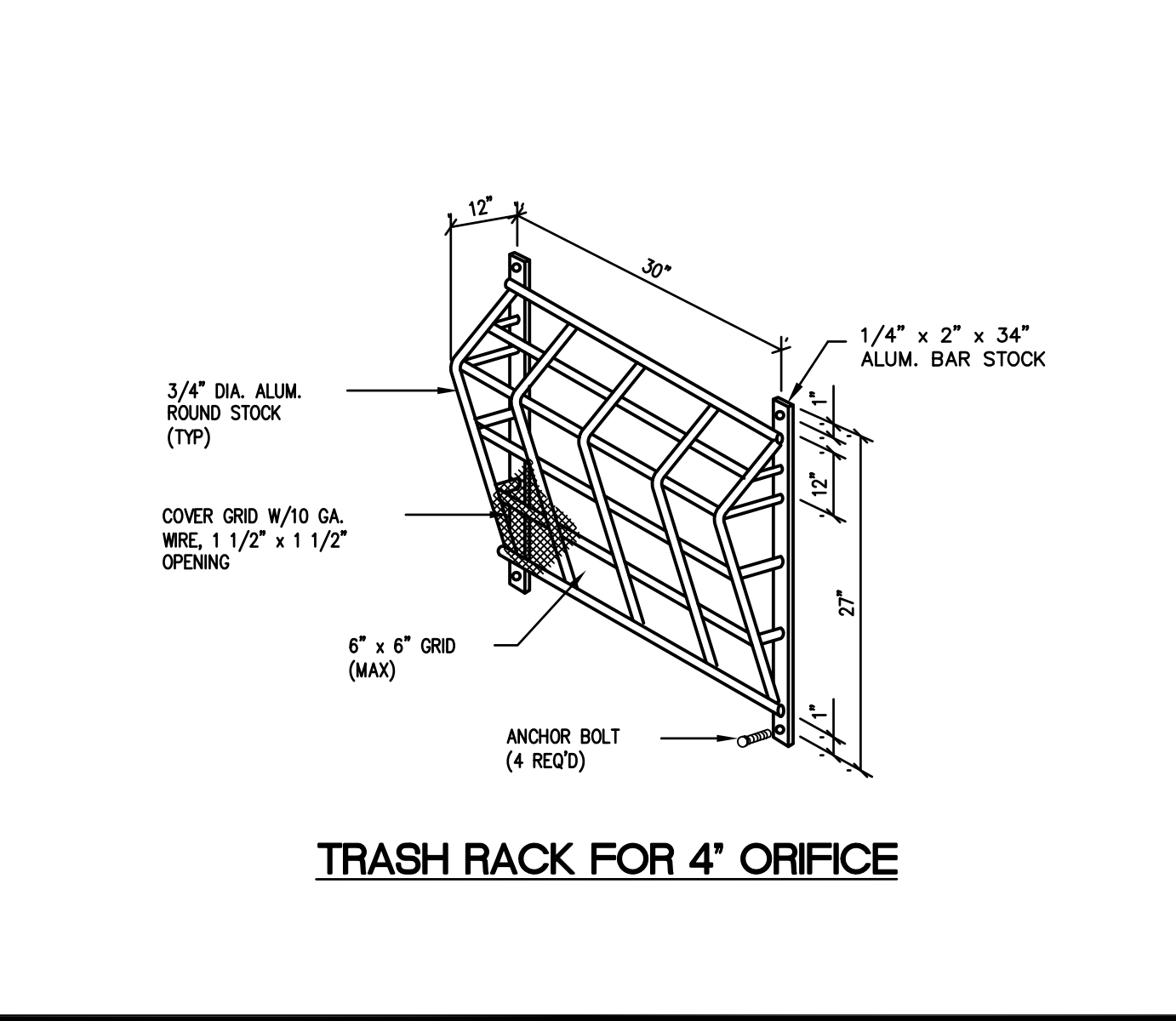
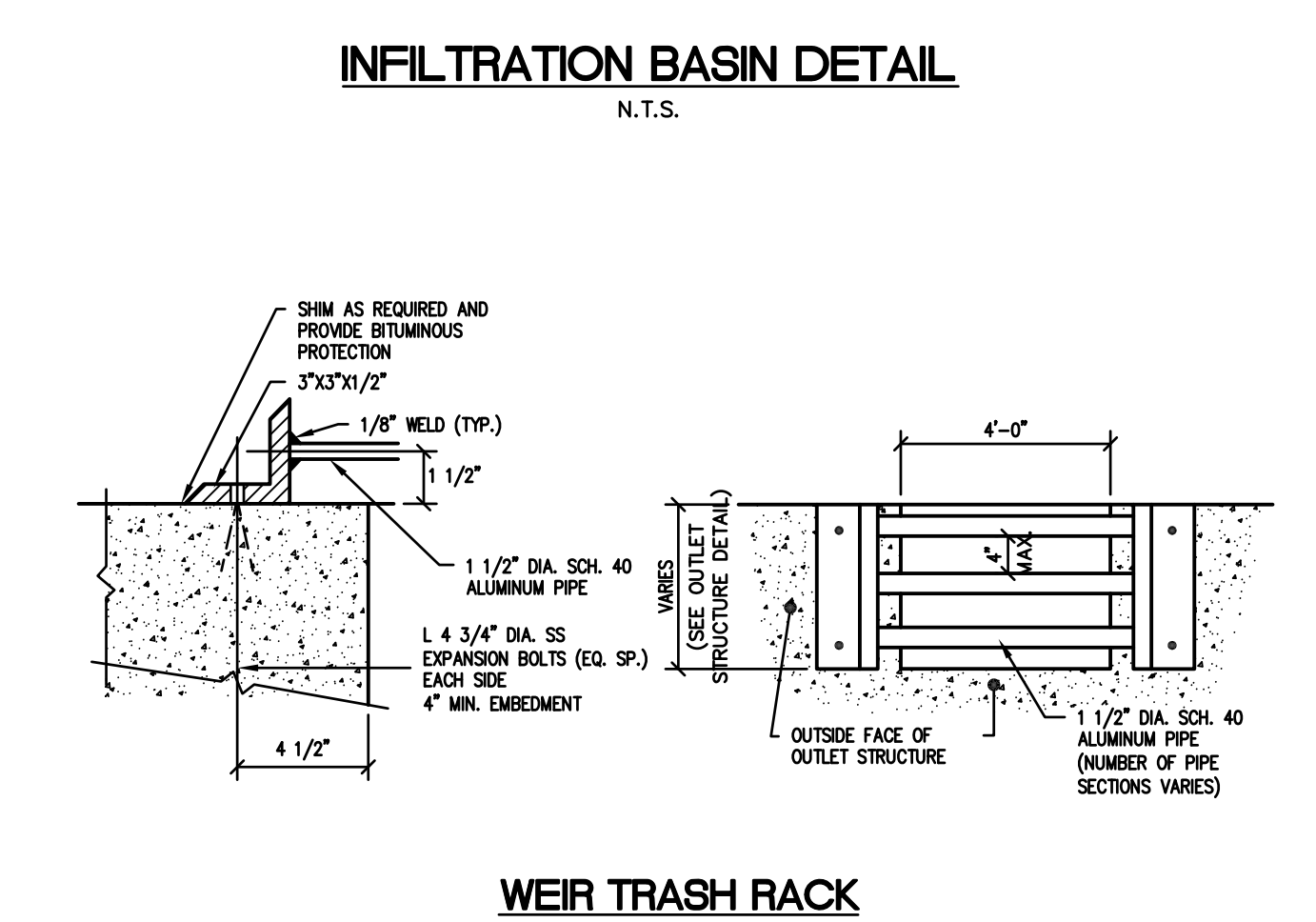
NOTES:

- SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEERING DEPARTMENT FOR REVIEW AND APPROVAL.
- THE AVERAGE VELOCITY FLOW THROUGH A CLEAN TRASH RACK IS NOT TO EXCEED 2.5 FEET PER SECOND UNDER THE FULL RANGE OF STAGE AND DISCHARGE. VELOCITY IS TO BE COMPUTED ON THE BASIS OF THE NET AREA OF THE OPENING THROUGH THE RACK.
- TRASH RACKS AND OVERFLOW GRATES SHALL BE CONSTRUCTED AND INSTALLED TO BE RIGID, DURABLE AND CORROSION RESISTANT, AND SHALL BE DESIGNED TO WITHSTAND A PERPENDICULAR LIVE LOADING OF 300 POUNDS PER SQUARE FOOT.



NOTES:

- BOTTOM SAND LAYER MUST CONSIST OF K5 SAND WITH A MAXIMUM OF 15% FINES AND A MINIMUM PERMEABILITY RATE OF 20" PER HOUR.
- CONTRACTOR SHALL USE RUBBER TIRE OR LIGHT DUTY EQUIPMENT WITHIN THE LIMITS OF THE INFILTRATION BASIN TO MINIMIZE COMPACTION OF UNDERLYING SOIL.
- POST CONSTRUCTION TESTING IN ACCORDANCE WITH APPENDIX E OF THE NJ STORMWATER BMP MANUAL MUST BE PERFORMED TO ENSURE THAT SOIL PERMEABILITY IS ADEQUATE. TEST RESULTS SHALL BE PROVIDED TO THE TOWNSHIP ENGINEER PRIOR TO BOND RELEASE. IF AS-BUILT TESTING SHOWS LONGER DRAIN TIME THAN 72 HOURS (FOR MAX 100 YR DESIGN STORM, OR 2 HOURS FOR WQ DESIGN STORM), CORRECTIVE ACTION MUST BE TAKEN PRIOR TO BOND RELEASE.



revisions		
no.	date	description
1	11/05/19	COMPLETENESS REVIEW
2	04/07/20	PER SCD COMMENTS AND TOWNSHIP STAFF REVIEW

LEGEND	
⊕	GAS VALVE
⊙	GAS METER
⊕	WATER VALVE
⊕	HYDRANT
⊕	WATER METER
⊕	CURB STOP
⊕	DRAINAGE MH
⊕	CURB INLET
⊕	LAWN INLET
⊕	SANITARY MH
⊕	CLEANOUT
⊕	BOLLARD
⊕	SIGN
⊕	LIGHT
⊕	MAIL BOX
⊕	GUY WIRE
⊕	UTILITY POLE
⊕	ELECTRIC MH
⊕	CONIFEROUS TREE
⊕	DECIDUOUS TREE
— x —	FENCE
⊕	GATE POST
— W —	WATER LINE
— G —	GAS LINE
— E —	ELECTRIC LINE
— S —	SANITARY LINE
— OH —	OVERHEAD WIRES

The Reynolds Group Inc.
State of New Jersey
Certificate of Authorization
Number 24GA27989200
21MH00004300
F. Mitchel Ardman, P.E., P.P.
Jeffrey D. Reynolds, P.L.A.

F. MITCHEL ARDMAN
N.J. PROFESSIONAL ENGINEER LIC. NO. 34317

project
DADA BHAGWAN VIGNAN INSTITUTE (DBVI)

BLOCK 37.02, LOT 46.03
TOWNSHIP OF FRANKLIN
SOMERSET COUNTY, NEW JERSEY

drawing title
STORMWATER FACILITY MAINTENANCE PLAN

job number 14-001	drawing number SWM-1
scale 1"=60'	
checked by FMA	
drawn by GH	
date 10/17/2019	sheet 1 of 1

