



OPERATIONS & MAINTENANCE MANUAL

STORMWATER CONTROL STRUCTURE
Underground Detention

Owner(s): _____
 Address: _____
 Phone Number: _____
 Site/Subdivision Plan # _____
 Location: _____
 Prepared by: _____
 Receiving Water Course: _____
 Date: _____
 Date Constructed: _____

OPERATIONS AND MAINTENANCE MANUAL

PROJECT NAME: _____
 Underground Detention

This manual establishes procedures for maintenance and operation of the _____
 Level Spreader (s) in accordance with the Town of Fuquay-Varina’s Land Development
 Ordinance as set forth in Section 9-1405(e) MAINTENANCE.

Contractor: (List below)

Detention System	
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Material Supplies: (List below)

Pipe Material and Size	
Junction Box Materials	
Outlet Pipe	

I. Maintenance of Detention Device

A. Seepage

Detection – due to the nature of the detention device (pipe), noticeable seepage should not be expected from this facility. However, a cursory inspection of the detention area and downstream area should be made for completeness of the inspection. Seepage may vary in appearance from a soft wet area to a flowing spring. It may show up first as only an area where the vegetation is lush and darker green. Cattails, reeds, mosses and other marsh vegetation often become established in a

seepage area. The downstream areas where the embankment fill and natural ground interface are very common locations for seepage. Also the natural ground interfaces are very common locations for seepage. Seepage of this type is generally attributed to poor compaction around the pipe and is generally most evident on the underside of the pipe.

B. Cracks, Slides, Sloughing, and Settlement (If embankments or fill are part of the detention system)

- ◆ Cracks – the entire detention area inspected for cracks. Short, isolated cracks are usually not significant, but larger cracks (wider than ¼”), well defined cracks indicate a serious problem. There are two types of cracks: transverse and longitudinal.

Transverse cracks appear crossing the embankment and indicated difference of settlement within the embankment. These cracks provide avenues for seepage and piping could develop.

Longitudinal cracks run parallel to the embankment and may signal the early stages of a slide. In recently built structures, these cracks may be indicative of poor compaction or poor foundation preparation resulting in consolidation after construction.

- ◆ Settlement – To a certain degree this is normal and should be experienced. Any area of excessive settlement should be restored to original elevation and condition. A relatively large amount of settlement (more than 6”) within a small area could indicate serious problems in the foundation or perhaps the lower part of the embankment. Settlement accompanied by cracking often precedes failure.

II. MAINTENANCE OF SPILLWAYS & CONTROL STRUCTURES

A. Inspection of Conduits

Conduits should be inspected thoroughly once a year. Conduits should be visually inspected at the joints. Pipes should be inspected for proper alignment (sagging), elongation and displacement at joints, cracks, leaks, surface water, surface wear, loss of protective coating, corrosion and blocking. Problems with pipes most often occurs at joints and special attention should be given to them during inspection. Joints should be checked for gaps caused by elongation or settlement and loss of joint filler material. Open joints can permit erosion of the embankment material and possibly the piping of soil material through the joints. Catch basin should be checked for signs of water seeping along the exterior surface of the pipe where it enters the catch basin. A depression in the soil surface over the pipe may be signs that soil is being removed from around the pipe.

- ◆ What to do if problems are detected: Retain the assistance of a civil engineer or geotechnical engineer qualified in the design Underground detention systems.
- ◆

III. OPERATION

A. Trash Control

It is important to control the potential risk of system blockage due to the presence of trash such as cardboard, bottles, trash bags, ect. in the piping and outlet structure. Due to the nature of the flow-control structure, trash or other items could possibly become trapped in the structure and cause partial or complete blockage. Site maintenance should include routine and effective trash collection and control measures.

Sediment Removal

Sedimentation from areas tributary to the site will result in the reduction of the storage volume. Sediment deposited in the system will require removal. The frequency of the sediment removal can be reduced by ensuring that the site areas around the building are stabilized with a vegetative ground cover such that it restrains erosion. This requires periodic applications of fertilizer and other treatments necessary to promote a stable groundcover and minimize sedimentation. When the sediment level at any point within the storage pipe or outlet structure exceeds 4 inches in depth, the sediment must be removed and the original volume restored. General, the removal process should be carried out by methods that do not simply wash the sediment downstream. If scouring and flushing is used, filtering or trapping devices should be installed immediately below the piping to capture sediment for removal. It is very important to remove sedimentation from the pipes regularly and prior to any large accumulation, as the degree of removal difficulty, and the likelihood of downstream impacts increase significantly with increased sediment depth and volume.

Record Keeping

Operation of an underground detention system should include recording of the following:

- a. Annual Inspection Reports – a collection of written inspection report should be kept on record in Section IV of this manual. Inspection should be conducted annually. Copies should be provided to the Town of Fuquay-Varina Engineering Department.
- b. Observations – all observations should be recorded. Where periodic inspections are performed following significant rainfall events, these inspections should be logged into the Periodic Inspection, Operation & Maintenance Form in Section IV of this manual.
- c. Maintenance – written records of maintenance and/or repairs should be recorded on the Periodic Inspection, Operation & Maintenance Form in Section IV of this manual.
- d. Other Operation Procedures – the owner should maintain a complete and up-to-date set of plans (as-built drawings) and all changes made to the dam over time should be recorded on the as-builts.

IV. INSPECTION, OPERATION & MAINTENANCE CHECKLISTS

V. SPECIAL CONSIDERATIONS

INSPECTION CHECKLIST

Date: _____

Time: _____

Project Name: _____ Site/Subdivision Plan # _____

UDERGROUND PIPE- DRAINS – OUTLETS

Item Inspected and Date	Observations	Action Repair	Action Monitor	Action Investigative

General Comments, Sketches & Field Measurements

UNDERGROUND DETENTION INSPECTION CHECKLIST

Date: _____
Time: _____

Project Name: _____

Check/Circle Condition Noted	Observations	Action Repair	Action Monitor	Action Investigative
Inlet	Type:			
Condition of Inlet Structure (Baffles or Weirs)				
Water Seepage				
Sedimentation				
Access				
Obstruction \ Trash				
Outlet	Type:			
Ruts/erosion				
Cracks/settlement				
Weir/Baffles				
Pipe Condition				
Embankments	Type:			
Vegetation/erosion				
Sloughs/slides/cracks				
Seepage/wetness				
Abutment	Type:			
Vegetation/erosion				
Slough/slides/cracks				
Seepage/wetness				

General Comments, Sketches & Field Measurements

PERIODIC INSPECTION, OPERATION & MAINTENANCE RECORDS

(Project Name): _____

Date	Time	Rain “	Pool Level	Weather Conditions	General Observations or Comments	Recorded By
Date	Maintenance Performed			Comments		Recorded By
Date	Equipment Operated			Comments		Recorded By