INDIANA DEPARTMENT OF TRANSPORTATION

Stormwater Post-Construction Best Management Practice Operations and Maintenance Manual

For

Dry Detention

Dry Detention Overview

Dry detention shall be utilized as a Stormwater Post-construction Best Management Practice (PCBMP) to treat stormwater collected from INDOT project sites after construction is completed. A dry detention practice is an engineered pond or swale with planted grass which fully drains within 72 hours after a rainfall event. Dry detention ponds have an outlet structure to control flow and typically will have a constructed embankment. Turf grasses will typically be planted if a dry detention practice is located within 30 feet of the edge of pavement, but native grasses should be planted if one is more than 30 feet from the edge of pavement.

Inspections

All dry detention practices shall be inspected at a minimum one time per 5-year INDOT Stormwater permit cycle. Values below are typical indicators for the need of maintenance for the structure. Inspections will use the form attached in Appendix A as an inspection checklist to note the following:

- Vegetation – cover should be approximately 90% of dry detention practice
    - barren areas
    - dead plants which are preventing vegetative growth
    - presence of invasive plants or weeds
    - presence of woody vegetation
- Erosion and scour
    - erosion in bottom of dry detention practice or on embankments
    - scour at inflow or outflow points
    - channelization of flow through detention practice
- Trash and debris
    - presence of trash or debris in dry detention practice
    - inspector shall remove trash if possible
        - refer to material disposal section
- Excessive ponding
    - stagnant water in dry detention practice or water present in dry detention practice more than 72 hours after a rainfall event
- Inflow – if present, inlet structure and/or pipes should be able to convey flow
    - pipe is clogged
    - pipe is collapsed
- Outflow – should be able to convey flow
    - pipe, perforated underdrain (if present), and/or pipe orifice control (if present) are clogged
    - pipe and/or perforated underdrain (if present) have collapsed
- Sediment buildup
    - if sediment buildup is blocking, channelizing, or reducing designed retention time of the dry detention practice or is blocking outflow structure
        - refer to material disposal section

Initial inspections should place a particular focus on ensuring the vegetation has established as designed. Issues identified during inspection shall require maintenance as soon as possible, per noted rating condition.

- Sediment buildup
    - if sediment buildup is blocking, channelizing, or reducing designed retention time of the dry detention practice or is blocking outflow structure
        - refer to material disposal section
- Gates or Check Valves
    - trapped obstructions, debris, sediment, or biological growth
    - signs of wear such as corrosion, cracks, gouges, tears, gaps, leaks, or excessive stiffness
    - misalignment or improper seating
    - gate should open with normal water flow

Initial inspections should place a particular focus on ensuring the vegetation has established as designed. Issues identified during inspection shall require maintenance as soon as possible, per noted rating condition.

Maintenance

All dry detention practices shall be mowed once yearly during the typical INDOT mowing and vegetation management cycle for their associated road and shall be performed in a manner which directs clippings out of the dry detention practices. Any excessive clippings in a dry detention practice shall be removed and disposed of according to the Materials Disposal section below. Additionally, maintenance shall be performed on an as needed or directed basis from inspection observations. Typical corrective actions consist of:

- Vegetation
    - reseed barren areas to bring vegetative coverage to 90% (seed mixtures provided in Appendix B)
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
    - clear dead vegetation that is preventing plant growth and, if necessary, reseed cleared areas until cover has again reached 90%
        - remove all cut grasses and vegetation from PCBMP structure
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
    - remove invasive plants identified during inspection
    - remove woody vegetation identified during inspection
        - if spraying of woody vegetation is required; application of herbicide spray shall meet all local, state, and federal regulations
        - all herbicide sprayers shall be licensed by the Office of the Indiana State Chemist
- Erosion and scour
    - fill in erosion or rills found in detention practice bottom or on embankments and reseed to bring to 90% cover
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
    - fill in scour hole and replace/install protection around inlet or outlet
    - fill in channelized section of bottom of detention practice and reseed until cover has again reached 90%
        - use a snake and turtle safe erosion protection blanket as seed cover and protection

- Trash and debris
    - remove any trash or debris remaining in dry detention practice after inspection
        - dispose of all materials per material disposal section
- Excessive ponding
    - clear any dead vegetation, fill depressions level to the existing channel, reseed to maintain 90% vegetative coverage
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
- Inflow
    - unclog pipe by removing debris
    - repair or replace collapsed pipe
    - remove all debris from trash rack
- Outflow
    - unclog pipe and/or pipe orifice control by removing debris
    - repair or replace collapsed pipe
    - remove all debris and vegetation from overflow area
- Sediment buildup
    - remove excess sediment and the top two inches of soil
        - replace removed soil with fresh soil, reseed to bring cover to 90%
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
        - dispose of all materials per material disposal section
- Gates or Check Valves
    - Remove debris manually or with a clean water flush
    - Lubricate moving parts
    - Repair cracks in rubber material with a self-curing rubber compound (for duck bill flap gates)
    - If damage is significant, replace gate or valve

As well as issues related to the inspection criteria, maintenance will be required to address any problem which does not fall into these categories that threatens the functionality of the dry detention practice as a stormwater treatment device.

Material Disposal

All materials removed from maintenance and/or operation activities shall be disposed of according to all local, state, and federal requirements. If material observed in PCBMPs exhibits odor (petroleum, gas, oil, etc.), color, or other physical features that may indicate non-stormwater origins, do not remove this material, and contact the INDOT Stormwater Team for further investigation, identification, and proper disposal.

APPENDIX A – INSPECTION FORM

INDIANA DEPARTMENT OF TRANSPORTATION

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Dry Detention Pond	Asset ID	
Design Criteria		Location	Coordinates, Driving Directions
This dry detention pond was designed to remove Total Suspended Solids (TSS) from stormwater runoff but also serves as a peak flow mitigation measure. This pond should fully drain within 72 hours of a rainfall event and should remain dry between rainfall events.			

Information

Is this inspection being conducted within 72 hours of a rainfall event?	☐ Yes	☐ No
Is the dry detention pond holding water?	☐ Yes	☐ No
Is an overflow catch basin or embankment present?	☐ Yes	☐ No
Is there land use upstream with high probability of pollutants?	☐ Yes	☐ No
Can the unit be accessed directly from INDOT right-of-way?	☐ Yes	☐ No
Will traffic control be required for maintenance?	☐ Yes	☐ No
Is forebay present?	☐ Yes	☐ No

Inspection Criteria

Maintenance Issues: **Description:**

Is vegetative cover approximately 90%?	☐ Yes	☐ No	_____.
Is there evidence of erosion/scouring present?	☐ Yes	☐ No	_____.
Is the pond free of any invasive/unwanted species?	☐ Yes	☐ No	_____.
Are in/outflow points blocked by debris or vegetation?	☐ Yes	☐ No	_____.
Is woody vegetation present in pond or on embankments?	☐ Yes	☐ No	_____.
Are there areas of standing/stagnant water?	☐ Yes	☐ No	_____.
Is there a sheen or odor present?	☐ Yes	☐ No	_____.
Are any animal burrows or nests present?	☐ Yes	☐ No	_____.
Is evidence of litter, dumping, or illicit discharge present?	☐ Yes	☐ No	_____.
Is excessive sediment present within the pond or forebay?	☐ Yes	☐ No	Depth: _____ inches

Structural Issues:

Is there structural damage to the inflow/outflow structures?	☐ Yes	☐ No	
Is there adequate scour protection at the outlet?	☐ Yes	☐ No	
Is there structural damage to the emergency overflow/embankments?	☐ Yes	☐ No	
Is there any apparent damage to the underdrains?	☐ Yes	☐ No	☐ N/A
Do gates and/or valves appear to be in working order?	☐ Yes	☐ No	☐ N/A

Comments:

_____.
_____.
_____.
_____.
_____.
_____.
_____.
_____.

Last Inspected		Current Inspection	

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Dry Detention Pond	Asset ID	

Typical Corrective Actions

- **Vegetation – re-establish as needed so that cover is approximately 90%**
- **Erosion and scour – re-grade as needed, install erosion protection if required**
- **Trash and debris buildup – remove trash and debris as needed**
- **Excessive ponding – re-grade as needed to drain excessive ponded or stagnant water**
- **Inflow and outflow points and/or structures – repair structures and remove debris or blockage as needed**
- **Sediment buildup – should be ≤ 25% of original design volume – remove sediment as needed**

Maintenance Recommendations

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Dry Detention Pond	Asset ID	

Plans and Plan Cross Section(s)

INDIANA DEPARTMENT OF TRANSPORTATION

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Dry Detention Pond	Asset ID	

Photographs & Maps

INSPECTED BY	APPROVED BY
Printed Name/Title	Printed Name/Title

APPENDIX B – SEED MIXES

NATIVE GRASS SEED MIX

Common Name	Botanical Name	Pure Live Seeds (Oz/Acre)
Common Milkweed	*Asclepias syriaca*	2
Frank's Sedge	*Carex frankii*	6
Spreading Oval Sedge	*Carex normalis*	6
Bottlebrush Sedge	*Carex lurida*	6
Awl-fruited Sedge	*Carex stipata*	6
Fox Sedge	*Carex vulpinoidea*	8
Common Rush	*Juncus effusus*	2
Canada Wild Rye	*Elymus canadensis*	36
Virginia Wild Rye	*Elymus virginicus*	36
Stiff Goldenrod	*Oligoneuron rigidum*	1
Switch Grass	*Panicunm virgatum*	4
Little Bluestem	*Schizachyrium scoparium*	96
Woolgrass	*Scirpus cyperinus*	2
Reddish Bulrush	*Scirpus pendulus*	4
Prairie Cord Grass	*Spartina pectinata*	2
Common Spiderwort	*Tradescantia ohiensis*	6
	Total	223

TURF GRASS SEED MIXES

(a) Seed Mixture R

This seed mixture shall be applied at the rate of 202.5 lb/ac consisting of 100 lb/ac of low endophyte Tall Fescue, 50 lb/ac of turf type Perennial Ryegrass, 50 lb/ac of Creeping Red Fescue, and 2.5 lb/ac of White Dutch Clover. Seed used in this mixture shall be drought tolerant. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.

(b) Seed Mixture U

This seed mixture shall be applied at the rate of 196.5 lb/ac consisting of 100 lb/ac of a 4-way blend of turf type Tall Fescue, 50 lb/ac Creeping Red Fescue, 45 lb/ac Perennial Ryegrass, and 1.5 lb/ac White Dutch Clover. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.