GATEWAY ENGINEERS

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Adams Ridge Stormwater Management Facilities Maintenance Plan: HOA Guidance

Mars, PA 16046
Adams Township, Butler County, Pennsylvania

PREPARED FOR

Adams Ridge HOA
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A FULL-SERVICE CIVIL ENGINEERING FIRM

HOA SWM PLAN

STORMWATER MANAGEMENT FACILITIES MAINTENANCE PLAN

INDEX

	Page No.
HOA Responsibility	1
Wet Pond (Retention Basin)	2
Detention Basin	3
Grass/Vegetated Swale	4
Constructed Wetland	5
Streams	6
Riprap Channel	6
Yard Drains	7
References	7

APPENDICES

HOA Stormwater Basins/Ponds Inspection Sheet	Appendix A
HOA Grass/Vegetated Swales Inspection Sheet	Appendix B
HOA Constructed Wetlands Inspection Sheet	Appendix C

HOA RESPONSIBILITY

The Adams Ridge development contains several stormwater best management practices (BMPs) to control and manage the impact of increased stormwater runoff due to the development's construction and to reduce the amount of pollutants entering local waterways from stormwater runoff.

The following plan has been developed to provide guidance to the HOA for the completion of inspections and implementation of maintenance measures for specific BMPs. Each section outlines how often the BMP should be inspected and the measures the HOA should take if maintenance or repairs are required. Example HOA inspection templates are enclosed in the Appendix to assist with the documentation of BMP conditions.

A separate report has been created to outline resident specific stormwater management responsibilities. The material included in this HOA report should not be carried out by residents. This report is shared with residents for use as an educational tool to familiarize them with the HOA's responsibilities. For information on how residents should assist with the inspection and maintenance of stormwater management facilities, please refer to the "Adams Ridge Stormwater Management Facilities Maintenance Plan: Resident Guidance."

To learn more about stormwater management, please refer to the Pennsylvania Department of Environmental Protection (https://www.dep.pa.gov/) and United States Environmental Protection Agency (https://www.epa.gov/) websites.

WET POND (RETENTION BASIN)

BMP Description: A surface facility that has a substantial permanent pool of water with additional capacity to temporarily handle stormwater runoff.

Maintenance Frequency: HOA to inspect quarterly, after major storm events (more than 2 inches of rain in 24 hours), and after rapid ice breakup. Noted issues or maintenance items should be addressed ASAP.

Inspection and Maintenance Measures:

- Pond structures (outlets structures, trash racks, and headwalls/endwalls), inflow/outfall pipes, and the emergency spillway should be inspected for clogging by trash, debris, and/or sediment.
    - Trash and debris should be removed and disposed of.
    - Significant sedimentation accumulation impeding water flow into or out of the pond should be removed and disposed of when the pond is dry. The pond's drain must be utilized to dewater the facility.
    - All disturbed areas should be immediately stabilized and revegetated once trash, debris, and/or sediment is removed.
- Pond structures should be inspected for structural damage and be repaired or replaced.
- Evidence of erosion (rills, channels, gullies) in or around the pond should be addressed.
- Evidence of embankment deterioration (ground sinking, ground movement, or cracking) should be repaired.
- Stone riprap should be removed and replaced if it is clogged or filled with sediment.
- Stone riprap should be reset or added to if it has been displaced.
    - The installation of larger riprap may be required if it is frequently displaced after storm events.
- The pond's drain and valves, as applicable, should be inspected and tested to ensure the pond's dewatering system is operating properly.
- The depth of the pond should be monitored. If the pond becomes too shallow due to excess sediment buildup, it should be dredged.

Vegetation Management:

- Undesirable, exotic/invasive species should be carefully removed, and desirable replacements planted, if necessary. Do not apply herbicide.
- Vegetation should maintain at least an 85% cover of the emergent vegetation zone (wet zone up to 18" deep) and buffer area.
    - If the basin's vegetative cover needs to be reestablished, meadow grasses or other deeply rooted herbaceous vegetation are recommended.
- Woody vegetation located on or within 25 feet of the pond's embankments or emergency spillway should be removed.
- Do not apply fertilizer to the vegetated buffer area around the pond.

DETENTION BASIN

BMP Description: A surface facility that provides temporary storage of stormwater. This basin has a low-flow outlet, or orifice, to slowly release stormwater.

Maintenance Frequency: HOA to inspect quarterly and after major storm events (more than 2 inches of rain in 24 hours). Noted issues or maintenance items should be addressed ASAP.

Inspection and Maintenance Measures:

- Basin structures (outlets structures, trash racks, and headwalls/endwalls), inflow/outfall pipes, and the emergency spillway should be inspected for clogging by trash, debris, and/or sediment.
    - Trash and debris should be removed and disposed of.
    - Significant sedimentation accumulation impeding water flow into or out of the pond should be removed and disposed of when the pond is dry.
    - All disturbed areas should be immediately stabilized and revegetated once trash, debris, and/or sediment is removed.
- Basin structures should be inspected for structural damage and be repaired or replaced.
- Evidence of erosion (rills, channels, gullies) in/around the basin should be addressed.
- Evidence of embankment deterioration (ground sinking, ground movement, or cracking) should be repaired.
- Stone riprap should be removed and replaced if it is clogged or filled with sediment.
- Stone riprap should be reset or added to if it has been displaced.
    - The installation of larger riprap may be required if it is frequently displaced after storm events.
- The depth of the basin should be monitored, and excess sediment buildup removed, if necessary.

Vegetation Management:

- Mowing and trimming should be performed as necessary to sustain the system.
- Care should be taken to prevent compaction of soil in the bottom of the basin to promote healthy plant growth and encourage infiltration.
- Undesirable, exotic/invasive species should be carefully removed, and desirable replacements planted, if necessary.
    - Do not apply herbicide.
- Vegetation should maintain at least an 85% cover.
    - If the basin's vegetative cover needs to be reestablished, meadow grasses or other deeply rooted herbaceous vegetation are recommended.
- Woody vegetation located on or within 25 feet of the basin's embankments or emergency spillway should be removed.
- Do not apply fertilizer or pesticides to the basin.

GRASS/VEGETATED SWALE

BMP Description: A grass or vegetated swale is a broad, shallow, trapezoidal or parabolic channel, planted with trees, shrubs, and/or grasses. Swales control the flow path of stormwater runoff and divert it away from residences and into a stream or stormwater management facility.

Maintenance Frequency: HOA to inspect every 2–5 years or as required by field identified conditions. HOA is to notify property owner(s) of identified routine swale maintenance measures or issues found following the completion of the inspection.

Inspection and Maintenance Measures:

- Inspect and address evidence of erosion and sediment/debris accumulation in the swale and along its side slopes.
- Inspect for pools of standing water in the swale. If identified, dewater the area and restore the grade of the swale.
- Inspect for uniformity in cross-section and longitudinal slope. Regrade the swale, if required.
- Inspect swale inlets (curb cuts, pipes, etc.) and outlets (headwalls) for signs of erosion or blockage and address as required.

Winter Related Maintenance:

- Inspect swales after the spring melt, remove residuals (e.g. sand), and replace damaged vegetation without disturbing remaining vegetation.
- If roadside or parking lot runoff is directed to the swale:
    - Mulching and/or soil aeration/manipulation may be required to restore soil structure and moisture capacity as well as reduce the impacts of deicing agents.
    - Apply nontoxic, organic deicing agents, applied either as blended, magnesium chloride-based liquid products or as pretreated salt.
    - Plant salt-tolerant vegetation in swales.

Vegetation Management:

- Reseed bare areas
- Install appropriate erosion control measures when native soil is exposed, or erosion channels are forming.
- Rototill and replant swale if draw down time exceeds 48 hours.
    - To be completed by a hired professional only.
- Mow and trim the vegetation only when the swale is dry to avoid rutting.
- Undesirable, exotic/invasive species should be carefully removed, and desirable replacements planted, if necessary. Do not apply herbicide.
- Water the swale during dry periods.

CONSTRUCTED WETLAND

BMP Description: Constructed wetlands are shallow marsh systems planted with emergent vegetation that are designed to treat stormwater runoff.

Maintenance Frequency: Inspect every 2-5 years or as required by field identified conditions.

Inspection and Maintenance Measures:

- Sediment and debris accumulation should be removed.
- Evidence of erosion (rills, channels, gullies) in/around the wetland should be addressed.
    - Mulch should be re-spread when erosion is evident and be replenished as needed.
    - The entire area may require mulch replacement once every 2 to 3 years.
- Structures (outlets structures, trash racks, and headwalls/endwalls), and inflow/outfall pipes should be inspected for clogging by trash, debris, and/or sediment.
    - Trash and debris should be removed and disposed of.
    - Significant sedimentation accumulation impeding water flow into or out of the wetland should be removed and disposed of.
    - All disturbed areas should be immediately stabilized and revegetated once trash, debris, and/or sediment is removed.
- Stone riprap should be removed and replaced if it is clogged or filled with sediment.
- Stone riprap should be reset or added to if it has been displaced.
- The installation of larger riprap may be required if the riprap apron is frequently displaced after storm events.

Vegetation Management:

- Vegetation should maintain at least an 85% cover of the emergent vegetation zone (wet zone up to 18” deep).
- Perennial plantings should be cut down at the end of the growing season.
- Undesirable, exotic/invasive species should be carefully removed, and desirable replacements planted, if necessary.
    - Do not apply herbicide.
    - If the basin’s vegetative cover needs to be reestablished, a wetland seed mix should be applied.

STREAMS

BMP Description: A body of running water flowing in a channel.

Maintenance Frequency: Inspect every 2-5 years or as required by field identified conditions.

Inspection and Maintenance Measures:

- Sediment and debris accumulation should be monitored and removed.
- Evidence of erosion (rills, channels, gullies) in/around the stream bed and banks should be addressed.
- Discoloration of the water should be investigated and addressed.

Vegetation Management:

- Stream bank vegetation should be maintained.
- Undesirable, exotic/invasive species should be carefully removed, and desirable replacements planted, if necessary.
    - Do not apply herbicide.
- Fallen trees should be removed.

RIPRAP CHANNEL

BMP Description: A riprap channel is a permanent layer of large, angular stones used to protect the soil surface against erosion.

Maintenance Frequency: Inspect every 2-5 years or as required by field identified conditions.

Inspection and Maintenance Measures:

- Sediment and debris accumulation should be monitored and removed.
- Stone riprap should be reset or added to if it has been displaced.
    - The installation of larger riprap may be required if it is frequently displaced after storm events.

Vegetation Management:

- Vegetation should be removed from the channel.

YARD DRAINS

BMP Description: A yard drain collects runoff from a pervious area, such as a grass yard or landscaped area.

Maintenance Frequency: Inspect every 2-5 years or as required by field identified conditions.

Inspection and Maintenance Measures:

- Address structural issues on HOA owned yard drains.
- Clean sediment from HOA owned yard drain basins and pipes.

REFERENCES

Pennsylvania Department of Environmental Protection. (2006). *Pennsylvania Stormwater Best Management Practices Manual*.

United States Environmental Protection Agency. (2009). *Stormwater Wet Pond and Wetland Management Guidebook*.

Appendix A

HOA INSPECTION SHEET FOR STORMWATER BASINS/PONDS

Location:	BMP Type: ☐Retention/Wet Pond
Owner Name:	☐Detention Basin
Owner Phone:	Year Constructed:
Maintenance Agreement? ☐Yes ☐No	Inspected By:
Present Conditions:	Inspection Date:

INSPECTION RATING SYSTEM

0 = Good condition. Well maintained, no action required.
1 = Moderate condition. Adequately maintained, routine maintenance needed.
2 = Degraded condition. Poorly maintained, routine maintenance and repair needed.
3 = Serious condition. Immediate need for repair or replacement.

INSPECTION ITEMS	RATING	COMMENTS/ACTIONS
INLETS		
Stable conveyance into facility?	0 1 2 3 N/A	
Excessive trash/debris/sediment accumulation?	0 1 2 3 N/A	
Pipe or structure clogged/cracked?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
PRETREATMENT		
Excessive trash/debris accumulation?	0 1 2 3 N/A	
Excessive sediment?	0 1 2 3 N/A	
Dead vegetation/exposed soil?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
BMP FACILITY		
Maintenance access to facility?	0 1 2 3 N/A	
Excessive trash/debris in facility?	0 1 2 3 N/A	
Excessive sediment?	0 1 2 3 N/A	
Invasive species/weeds?	0 1 2 3 N/A	
Dead vegetation?	0 1 2 3 N/A	
Vegetation overgrowth?	0 1 2 3 N/A	
Standing water after 5 days preceding storm (Dry detention ponds only)	0 1 2 3 N/A	
OUTLET STRUCTURE		
Blockage of orifice trash rack?	0 1 2 3 N/A	
Excessive trash/debris?	0 1 2 3 N/A	
Stable conveyance provided by outlets?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
EMBANKMENT AND EMERGENCY SPILLWAY		
Excessive trash/debris in facility?	0 1 2 3 N/A	
Excessive sediment?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
Invasive species/weeds?	0 1 2 3 N/A	
Vegetation overgrowth?	0 1 2 3 N/A	
PUBLIC SAFETY AND HAZARDS		
Insect/mosquito problems?	0 1 2 3 N/A	
Animal burrows?	0 1 2 3 N/A	
Safety measures present? (signage/fencing)	0 1 2 3 N/A	
Complaints from local residents?	0 1 2 3 N/A	

CORRECTIVE ACTIONS

Any ratings of 2 or 3 require corrective actions which are to be recommended to the BMP owner.

CORRECTIVE ACTIONS	RECOMMENDATIONS TO OWNER

PHOTOGRAPHS

Attach photographs, including descriptions, which demonstrate current condition of the BMP and any deficiencies identified in this inspection.

Appendix B

HOA INSPECTION SHEET FOR GRASS/VEGETATED SWALES

Location:	BMP Type: ☐Vegetated Swale/Bioswale
Owner Name:	☐Grass Swale
Owner Phone:	Year Constructed:
Maintenance Agreement? ☐Yes ☐No	Inspected By:
Present Conditions:	Inspection Date:

INSPECTION RATING SYSTEM

0 = Good condition. Well maintained, no action required.
1 = Moderate condition. Adequately maintained, routine maintenance needed.
2 = Degraded condition. Poorly maintained, routine maintenance and repair needed.
3 = Serious condition. Immediate need for repair or replacement.

INSPECTION ITEMS	RATING	COMMENTS/ACTIONS
INLETS		
Stable conveyance into facility?	0 1 2 3 N/A	
Excessive trash/debris/sediment accumulation?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
BMP FACILITY		
Clogging?	0 1 2 3 N/A	
Excessive trash/debris/sediment in facility?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
Uniformity in cross section and slope?	0 1 2 3 N/A	
Evidence of oil/chemical accumulation?	0 1 2 3 N/A	
Evidence of standing water? (more than 48 hours after rain event)	0 1 2 3 N/A	
Broken/clogged underdrain system (if equipped)	0 1 2 3 N/A	
Sediment buildup from check dams? (if equipped)	0 1 2 3 N/A	
Condition of check dams? (if equipped)	0 1 2 3 N/A	
Adequate vegetation cover?	0 1 2 3 N/A	
Invasive species/weeds/trees?	0 1 2 3 N/A	
Overgrown vegetation/grass?	0 1 2 3 N/A	
Dead vegetation/exposed soil?	0 1 2 3 N/A	
OUTLET		
Stable conveyance out of facility?	0 1 2 3 N/A	
Excessive trash/debris/sediment at outlet	0 1 2 3 N/A	
Evidence of erosion at/around outlet?	0 1 2 3 N/A	
PUBLIC SAFETY AND HAZARDS		
Insect/mosquito problems?	0 1 2 3 N/A	
Animal burrows?	0 1 2 3 N/A	
Safety measures present? (signage/fencing)	0 1 2 3 N/A	
Complaints from local residents?	0 1 2 3 N/A	

CORRECTIVE ACTIONS

Any ratings of 2 or 3 require corrective actions which are to be recommended to the BMP owner.

CORRECTIVE ACTIONS	RECOMMENDATIONS TO OWNER

PHOTOGRAPHS

Attach photographs, including descriptions, which demonstrate current condition of the BMP and any deficiencies identified in this inspection.

Appendix C

HOA INSPECTION SHEET FOR CONSTRUCTED WETLANDS

Location:	Year Constructed:
Owner Name:	Inspected By:
Owner Phone:	Inspection Date:
Maintenance Agreement? ☐Yes ☐No	
Present Conditions:	

INSPECTION RATING SYSTEM

0 = Good condition. Well maintained, no action required.
1 = Moderate condition. Adequately maintained, routine maintenance needed.
2 = Degraded condition. Poorly maintained, routine maintenance and repair needed.
3 = Serious condition. Immediate need for repair or replacement.

INSPECTION ITEMS	RATING	COMMENTS/ACTIONS
INLETS		
Stable conveyance into facility?	0 1 2 3 N/A	
Excessive trash/debris/sediment accumulation?	0 1 2 3 N/A	
Evidence of erosion?	0 1 2 3 N/A	
BMP FACILITY		
Maintenance access to facility?	0 1 2 3 N/A	
Excessive trash/debris/sediment in facility?	0 1 2 3 N/A	
Evidence of erosion or movement of mulch?	0 1 2 3 N/A	
Evidence of oil/chemical accumulation?	0 1 2 3 N/A	
Adequate vegetation cover?	0 1 2 3 N/A	
Invasive species/weeds?	0 1 2 3 N/A	
Overgrown vegetation?	0 1 2 3 N/A	
Dead vegetation/exposed soil?	0 1 2 3 N/A	
Signs of mulch layer thinning?	0 1 2 3 N/A	
OUTLET		
Stable conveyance out of facility?	0 1 2 3 N/A	
Excessive trash/debris/sediment at outlet	0 1 2 3 N/A	
Evidence of erosion at/around outlet?	0 1 2 3 N/A	
PUBLIC SAFETY AND HAZARDS		
Insect/mosquito problems?	0 1 2 3 N/A	
Animal burrows?	0 1 2 3 N/A	
Safety measures present? (signage/fencing)	0 1 2 3 N/A	
Complaints from local residents?	0 1 2 3 N/A	

CORRECTIVE ACTIONS

Any ratings of 2 or 3 require corrective actions which are to be recommended to the BMP owner.

CORRECTIVE ACTIONS	RECOMMENDATIONS TO OWNER

PHOTOGRAPHS

Attach photographs, including descriptions, which demonstrate current condition of the BMP and any deficiencies identified in this inspection.