Maintaining Detention Ponds

Contents…

Definitions…

Wet detention pond: a pond designed to have a remaining permanent pool of water after a storm event.
Dry detention pond: a pond designed to NOT have a significant pool of water remaining after a storm event.
Regional Pond: a pond designed to capture stormwater runoff from a larger, regional area.
Water Quality Pond: a detention pond with an orifice sized to allow time for settling and filtering of pollutants before the runoff is discharged from the pond.
Tributary drainage area: the total land area that drains to the pond.
Impervious area: a solid surface that does not allow rain to enter.
Stormwater runoff: runoff that occurs as a result of a rain or storm event hitting an impervious surface and running off.
UDFCD: Urban Drainage and Flood Control District; assists local governments in the metro Denver area in urban stormwater issues.
Inlet: The point where stormwater enters the pond.
Trickle channel: A channel that efficiently conveys stormwater from the inlet to the outlet structure (selected ponds).
Outlet: A structure that controls the rate of release from the pond and the water depth and storage volume in the pond.
Orifice: A controlled opening on the outlet structure through which stormwater is discharged from the pond (selected ponds).
Trash Rack: A structural feature of the outlet that filters stormwater by trapping debris before runoff is discharged (selected ponds).
Rip rap: Rock material typically used to stabilize conveyance channels.
Emergency spillway: Conveyance feature of a detention pond to discharge excess stormwater flows to maintain the integrity of the pond structure during substantial runoff events.
Easement: A set-aside area with various restrictions to provide open access for inspection or repair of drainage feature.

So you have a detention pond on your property…

Detention ponds are used to **improve the quality** of urban runoff from roads, parking lots, residential neighborhoods, commercial areas, and industrial sites, and to **reduce peak stormwater runoff rates** by providing temporary storage during larger storm events. If the detention pond on your property was constructed early in the development process, it was probably used to trap sediment from construction activities in the tributary drainage area, a very effective way to collect and remove pollutants. In addition, the detention pond on your property may provide other benefits such as passive recreation and open space opportunities in addition to reducing peak runoff rates and improving water quality. A functioning detention pond is a requirement for stormwater management.

You, as the owner of this stormwater feature, the manager of a commercial site, or as a member of a Homeowner Association (HOA), need to understand the importance of the detention pond facility and your obligation to assure its continued proper function. This detention pond maintenance fact sheet will provide the information and the contacts you need to operate a fully functional detention pond on your property.

Who's responsible for your pond…

Designation of a responsible party is important to assure proper operation of your detention pond feature. In some instances this may be a shared responsibility. In the majority of cases, the commercial property owner or the HOA is responsible for the correct operation and proper maintenance of the pond. Some ponds may be eligible for maintenance by the Southeast Metro Stormwater Authority (SEMSWA). In rare cases, UDFCD has accepted maintenance eligibility on Regional Ponds for the *structural components* of the pond, including the trickle channel and outlet works. You can find out about SEMSWA assistance and UDFCD eligibility by calling SEMSWA @ 303-858-8844. SEMSWA does have the authority to inspect and review maintenance activities to ensure the viability of your pond, and easements provide for this.

Why Maintain your pond…

Stormwater runoff is a significant source of water pollution in urbanizing areas. In addition, the increased volumes of flow resulting from added impervious areas during urbanization results in increased runoff volumes. Detention ponds mitigate both scenarios in providing a treatment basin for pollutant removal as well as a collection basin to retain the larger flows and thus reduce the peak runoff rates downstream. Studies have shown *that properly maintained detention ponds* can be very effective at removing certain pollutants and providing necessary storage volumes during larger storm events. Improperly maintained ponds can increase the discharge of pollutants downstream, increase the risk of flooding downstream, increase the instability of downstream channels, and lead to aesthetic and nuisance problems.

Why some ponds fail…

Studies show that *poor operation and maintenance* is the leading cause of pond failure. Poor maintenance can also create unpleasant odors, nuisance insects, algae blooms and a generally unsightly, unkempt area. Detention ponds may fail due to

- poor vegetation maintenance in terms of mowing and weed control,
- clogged inlets resulting from trash and debris, sediment accumulation,
- failed side slopes, and
- inadequate access for routine maintenance activities.

Knowing why this pond was built at your commercial site or in your subdivision community and the importance of all the components working together should reduce the chance of pond failure.

SEMSWA Offices: 76 Inverness Drive East, Suite A, Englewood, Colorado 303-858-8844

Maintaining Detention Ponds

Maintenance considerations…

Routine HOA maintenance, like mowing and debris removal, is vital to the proper operation of the detention pond, and needs to be done on a frequent basis. Non-routine HOA maintenance, like slope stabilization and sediment removal, will probably be more on an annual basis. Every pond is different in the size, type and characteristics of the tributary area that contributes runoff to the pond, as well as the location of the pond within the development.

- A pond serving a large commercial district will likely require more maintenance than one serving an established neighborhood, and a pond in a prominent location in the development will require more frequent collection of trash to make a favorable impression.
- Maintenance considerations for a wet pond will need to focus on floating litter, scum and algal blooms, shoreline erosion, possible unpleasant odors and mosquitoes, as well as more difficult sediment removal.
- Maintenance considerations for a dry pond will concentrate more on mowing to control the vegetation and frequent removal of the trash and debris that may clog the outlet/trash rack.

Maintenance will always be needed; if maintenance is not done, or not done frequently enough, or properly, a false sense of security exists for the pond's temporary storage abilities during a large storm event, and its pollutant removal abilities during a typical runoff event.

Costs and Funding…

The property owner or the HOA will need to establish an O&M fund and assess annual fees for maintenance. Typically, fees are established by the developer prior to turning the responsibility of the pond over to the owner. After several years of operation with these set fees, it may be necessary to re-evaluate maintenance costs for the actual operation of the pond after the development is established. An excellent source of information about pond maintenance costs is UDFCD. You can contact SEMSWA @ 303-858-8844 and ask about estimates for costs for your pond based on UDFCD data.

The Operation & Maintenance (O&M) Program…

An effective Operations and Maintenance Program requires several things:

- A good plan that specifies what maintenance actions are needed, when they will be performed and how often they will be performed, inspection checklists and follow-up repair timetables
- An understanding of the routine and non-routine activities to be employed
- An understanding of the equipment and materials needed for maintenance
- An identification of responsible parties for routine maintenance, non-routine maintenance, inspections and repairs
- Adequate funding for the maintenance activities

An O&M Manual may have been prepared for your pond; please contact SEMSWA to inquire if there is one or request a sample O&M Manual that may be applicable.

Minimum checklist components…

(A good time to fill out checklist is every time routine maintenance is done; while mowing, someone can check the other features, too)

Any obstructions of the inlet or outlet or orifice?
Has trash accumulated in the pond or on the rack?
Any erosion or instability on the slopes?
Any sedimentation in the basin?
Any settling or cracking of the bermed areas?
Are there any upstream or downstream conditions that could affect pond operation?
Is trickle channel conveyance in good working order?
Is outlet channel conveyance in good working order?

Routine HOA Maintenance…

Routine maintenance includes:

Inspections: Periodic scheduled inspections with a specified checklist, and inspections after major rainfall events, to check for obstructions/damage & to remove debris/ trash.

Vegetation Management: Mowing on a regular basis to prevent erosion or aesthetic problems. Limited use of fertilizers and pesticides in and around the ponds to minimize entry into pond and subsequent downstream waters.

Trash, debris and litter removal: Removal of any trash, etc causing any obstructions at the inlet, outlet, orifice or trash rackduring periodic inspections and especially after every runoff producing rainfall event. General pickup of trash, etc in and around the pond during all inspections.

Mechanical Equipment check: Inspection of any valves, pumps, fence gates, locks or mechanical components during periodic inspections and appropriate replacement/repair.

Structural Component check: Inspection of the outlet works, inlet, orifice, trash rack, trickle channel on a regular basis for additions to the annual Non-routine Maintenance list

Non-routine HOA maintenance…

Non-routine maintenance includes:

Bank erosion/stabilization: It is critical to keep effective ground cover on all vegetated areas in order to see the benefits of proper infiltration of runoff, and effective filtering of pollutants. All areas not vegetated should be re-vegetated and stabilized immediately

Sediment removal: Every six months or so, the accumulated sediment should be removed from the bottom of the outlet structure and the pond depths checked at several points. If the depth of the accumulated sediment is greater than 25% of the original design depth, sediment should be removed. Check w/ SEMSWA on typical sediment removal schedules for residential ponds and commercial ponds.

Structural Repair/Replacement: Eventually the outlet structure or other structural components like the trickle channel or trash rack will need repair or be replaced.

SEMSWA Offices: 76 Inverness Drive East, Suite A, Englewood, Colorado 303-858-8844

Maintaining Detention Ponds

DETENTION POND "Quick Study" Standard Operating Procedure (SOP) Fact Sheet

Standard Operating Procedures (SOPs) are prepared for activities that have the potential to impact 'waters of the state. One of the primary goals of these SOPs is to provide time-tested, generally accepted routine procedures that minimize the potential for release of pollutants. This Fact Sheet provides an overview of routine maintenance standard operating procedures at a detention pond facility.

Detention Pond Maintenance is an operational best management practice (BMP) developed to control pollutant discharges by keeping these stormwater facilities operating properly with routine maintenance procedures, including mowing and debris control.

These procedures are critical steps that must be included during pond maintenance on an annual basis, after an inspection, or on an as-needed basis after a storm event.

DO

- Inspect inlet and outlet works initially on a monthly basis until the appropriate timing of maintenance is established; prepare a maintenance schedule that assures proper function.
- Conduct maintenance per schedule, or on an as-needed basis as identified during an annual inspection, or on an as-needed basis after a storm event.
- Keep screen and/or trash rack free from debris using established maintenance schedule or on an as-needed basis after a storm event; notify supervisor if screen or rack is in need of maintenance at a higher level than scheduled.
- Report damage/compromise to side slopes, pond banks, inlet pipe, trickle channels, outlet structure; prepare a repair schedule and complete repairs.
- Remove vegetation adjacent to outlet works that may interfere with operation; note if noxious weeds present and notify supervisor to schedule treatment/removal.
- Remove debris/trash from the detention pond and surrounding area and dispose properly.
- When mowing, collect grass clippings and all other clippings/trimmings and take offsite for disposal or dispose in trash on site; do not leave in the pond.
- Notify supervisor any hazardous conditions or materials found during inspection.

DON'T

- DO NOT mow detention pond too close to the surface; height should be 4 to 6 inches to maintain healthy grasses.
- DO NOT clean equipment or conduct maintenance on equipment in the detention pond, or near a storm drain or other stormwater conveyance feature.
- DO NOT leave grass clippings or trimming residue in pond; collect and dispose of in trash.
- DO NOT apply landscaping chemicals in pond area, or in areas where the residue could make it into the pond during a storm event.
- DO NOT attempt to clean up any unidentified or possibly hazardous materials found in or around pond during inspections; notify supervisor immediately upon discovery of hazardous materials.

Contact Numbers…
Southeast Metro Stormwater Authority: 303-858-8844
Urban Drainage and Flood Control District: 303-455-6277

Websites of interest: www.semswa.org
www.SPLASHCO.org
www.epa.gov/nps

Reference Document: "Maintaining Your BMPs", available as a pdf at www.novaregion.org/pdf/Maintaining_BMPs.pdf

Maintaining Detention Ponds

Example Maintenance Inspection Checklist

Pond: _____ Date: _____ Inspected by: _____ Type of Inspection: ☐ Routine ☐ Storm Event _____ (# days since event)

General Observations:
Is water flowing? ☐Yes ☐ No Standing water? ☐ Yes ☐No Depth: _____ Comments: _____

Any evidence of obstructions or erosion in vicinity of the pond that could affect performance? ☐Yes ☐No _____

Pond Conditions:
Does the pond sides/slopes/bottom show signs of settling, cracking, sloughing or other problems? ☐ Yes ☐ No _____

Do the embankments, emergency spillway (if applicable), or side slopes show any erosion or instability? ☐Yes ☐No _____

Is there any evidence of animal burrowing or other activity that could contribute to instability or increased erosion? ☐Yes ☐No _____

Is there evidence of encroachment into the pond or improper use of the pond? ☐Yes ☐No _____

Do vegetated areas need mowing? ☐Yes ☐No ☐ Mowed today ☐Will schedule mowing

Are there areas that need to be re-vegetated? ☐Yes ☐No _____ ☐Will schedule re-vegetation activities

Do vegetated areas need thinning, i.e. cattails, willows, trees? ☐Yes ☐No ☐Thinned today ☐Will schedule thinning

Is there accumulation of trash, debris and/or litter to be removed? ☐Yes ☐No ☐ Removed today ☐ Will schedule removal

Any signs of vandalism or other activity that could affect performance of the pond? ☐Yes ☐No _____

If permanent pool, any visible pollution? ☐Yes ☐No _____ Erosion at high water mark? ☐Yes ☐No _____

Abnormally high water level? ☐Yes ☐No _____ (May indicate obstruction at orifice, or trash rack; verify outlet structure operating properly)

Unusual Algae blooms? ☐Yes ☐No _____ (May signal too many nutrients in runoff; identify dog activity and clippings management; will need monitoring)

Structural Components:
Are the pipes/inlets going into or out of the pond clogged or obstructed? ☐Yes ☐No _____

Is the outfall channel from the pond functioning appropriately? ☐Yes ☐No _____

Is the inflow trickle channel working properly? ☐Yes ☐No _____

Is the orifice and/or trash rack obstructed? ☐Yes ☐No _____

Is the outfall channel, trickle channel or other conveyance in need of repair? ☐Yes ☐No _____

Are the manholes, frames, and covers associated with the outfall channel in appropriate condition? ☐Yes ☐No _____

Do any safety features, such as fences, gates or locks need repair or replacement? ☐Yes ☐No _____

Plan of Action:
If answered YES to any of the above, the following is an anticipated *Maintenance Needs Action List*:

Total number of concerns: _____ (Yes answers)

_____ Need more monitoring (Anticipated schedule to re-visit; identify what will trigger action)

_____ Need routine repair (Approximate schedule for repairs; date of follow-up to re-inspect)

_____ Need immediate repair (Take action if correct equipment on site; or contact supervisor)

_____
Signature

SEMSWA Offices: 76 Inverness Drive East, Suite A, Englewood, Colorado 303-858-8844