Appendix A PCSMP Submittal Checklist

Post-Construction Stormwater Management Plan (PCSMP)
Submittal Checklist

Preliminary submittals required by the City will include preliminary information. Final submittals shall be representative of the intended construction bid package.

PROJECT NAME:

_____

PLANS

- ☐ Site topography including existing contours, property lines and easements, utilities, and site features such as existing water bodies, trees and shrubs, pavement and other structures
- ☐ Proposed contours
- ☐ Proposed inlets, storm sewer, culverts, and drainageways
- ☐ Proposed STF's and/or detention facilities
- ☐ Proposed roadways, parking, building footprints, and other structures
- ☐ A table shall be provided in construction drawings that includes, for each Stormwater Treatment Facility (STF)

The information shall be provided on drawings in a format that is consistent with the following:

STF Identification Number	STF TYPE	STF Location (Lat/Long)	Drainage Area (Acres)	Design WQCV (cf) OR Q_{wc} (cfs)	WQCV (cf) or Q_{wq} (cfs) Provided

CALCULATIONS

- ☐ Water Quality Volume (WQCV) or Water Quality Volume Discharge Rate (Q_{WQ}) for each STF.

(To be included with a site design or subdivision drainage study)

- ☐ Drainage Study

AGREEMENTS

A maintenance agreement is required for neighborhood level and lot level STF's. If an agreement is made for mitigation off site or other agreements are made, make note and describe below

- ☐ Inspection and Maintenance Agreement
- ☐ Other Agreement

CERTIFICATION OF PERMANENT STF's

Unless otherwise indicated by the City, a Hold on the Certificate of Occupancy will be placed on the project until the STF has been certified. If applicable, check "Hold" until certification is received. If not applicable, check N/A.

- ☐ Hold on C.O.
- ☐ N/A

Submitted upon completion of a project; a statement by a professional engineer licensed in the State of Nebraska or person(s) under the direct supervision of a professional engineer licensed in the State of Nebraska attesting that the completed project is in compliance with the approved Final Plan.

- ☐ Certification of Permanent STF's
- ☐ Record Drawings (if required by City)

- ☐ Hold on C.O. Released (if applicable) Released By:

_____

Appendix B Maintenance Agreement

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN MAINTENANCE AGREEMENT AND EASEMENT

WHEREAS, __Party Responsible for Maintenance____recognizes that stormwater treatment facilities (hereinafter referred to as "the facility" or "facilities" or "STF's") must be maintained for the development called __Development/Project Name___located in the jurisdiction of the City of Kearney, Buffalo County, Nebraska; and,

WHEREAS, the Property Owner (whether one of more) is the owner of ____Property Name_____ (hereinafter referred to as "the Property"), and,

WHEREAS, the City of Kearney (hereinafter referred to as "the City") requires and the Property Owner, and its administrators, executors, successors, heirs, or assigns, agree that the health, safety and welfare of the citizens of the City require that the facilities be constructed and maintained on the property, and,

WHEREAS, the Post Construction Stormwater Management Plan, ____Project Number and Name____,

(hereinafter referred to as "PCSMP"), should be constructed and maintained by the Property Owner, its administrators, executors, successors, heirs, or assigns.

NOW, THEREFORE, in consideration of the foregoing premises, the covenants contained herein, and the following terms and conditions, the property owner agrees as follows:

1.) The facility or facilities shall be constructed by the Property Owner in accordance with the PCSMP, which has been reviewed and accepted by the City of Kearney or its designee.

2.) The Property Owner must develop and provide the "STF Maintenance Requirements", attached here to as Exhibit "B", which have been reviewed and accepted by the City of Kearney or its designee. The STF Maintenance Requirements shall describe the specific maintenance practices to be performed for the facilities and include a schedule for implementation of these practices. The Plan shall indicate that the facility or facilities shall be inspected by a professional qualified in stormwater STF function and maintenance at least annually to ensure that it is operating properly. A written record of inspection results and any maintenance work shall be maintained and available for review by the City.

3.) The Property Owner, its administrators, executors, successors, heirs, or assigns, shall construct and perpetually operate and maintain, at its sole expense, the facilities in strict accordance with the attached BMP Maintenance Requirements accepted by the City of Kearney or its designee.

4.) The Property Owner, its administrators, executors, successors, heirs, or assigns hereby grants permission to the City, its authorized agents and employees, to enter upon the property and to inspect the facilities whenever the City deems necessary. The City shall provide the Owner copies of the inspection findings and a directive to commence with the repairs if necessary. The City will require the Property Owner to provide, within 7 calendar days, a written response addressing what actions will be taken to correct any deficiencies and provide a schedule of repairs within a reasonable time frame. Whenever possible, the City shall provide notice prior to entry. The City shall indemnify and hold the Property Owner harmless from any damage by reason of the City's negligent acts during such entry upon the property.

5.) The Property Owner its administrators, executors, successors, heirs, or assigns, agrees that should it fail to correct any defects in the facility or facilities within reasonable time frame agreed to in the response by the Property Owner for corrective actions, or shall fail to maintain the structure in accordance with the attached BMP Maintenance Requirements and with the law and applicable executive regulation or, in the event of an emergency as determined by the City of Kearney or its designee in its sole

discretion, the City of Kearney or its designee is authorized to enter the property to make all repairs, and to perform all maintenance, construction and reconstruction as the City of Kearney or its designee deems necessary. Notwithstanding the foregoing, the City shall indemnify and hold the Property Owner harmless from any damage by reason of the City's negligent acts during such entry upon the property.

The City of Kearney or its designee shall have the right to recover from the Property Owner any and all reasonable costs the City of Kearney expends to maintain or repair the facility or facilities or to correct any operational deficiencies subject to the provisions of the immediately preceding sentence relating to negligent acts of the City. Failure to pay the City of Kearney or its designee all of its expended costs, after forty-five days written notice, shall constitute a breach of the agreement. The City of Kearney or its designee shall thereafter be entitled to bring an action against the Property Owner to pay, or foreclose upon the lien hereby authorized by this agreement against the property, or both. Interest, collection costs, and reasonable attorney fees shall be added to the recovery to the successful party.

6.) The Property Owner shall not obligate the City of Kearney to maintain or repair the facility or facilities, and the City of Kearney shall not be liable to any person for the condition or operation of the facility or facilities.

7.) The Property Owner, its administrators, executors, successors, heirs, or assigns, hereby indemnifies and holds harmless the City and its authorized agents and employees for any and all damages, accidents, casualties, occurrences or claims that may arise or be asserted against the City from the construction, presence, existence or maintenance of the facility or facilities by the Property Owner. In the event a claim is asserted against the City, its authorized agents or employees, the City shall promptly notify the Property Owner and the Property Owner shall defend at its own expense any suit based on such claim unless due solely to the negligence of the City in which event the City shall be required to defend any such suit at its own expense. Notwithstanding the foregoing, if any claims are made against both the City of Kearney and the Property Owner, each will be required to defend any such suit or claim against it at its own expense. Each shall be responsible for payment of any recovery to the extent determined in such suit. If any judgment or claims against the City, its authorized agents or employees shall be allowed, the Property Owner shall pay for all costs and expenses in connection herewith except to the extent of the negligent act of the City.

8.) The Property Owner shall not in any way diminish, limit, or restrict the right of the City of Kearney to enforce any of its ordinances as authorized by law.

9.) This Agreement shall be recorded with the Register of Deeds of Buffalo County, Nebraska and shall constitute a covenant running with the land and shall be binding on the Property Owner, its administrators, executors, successors, heirs, or assigns, including any homeowners or business association and any other successors in interest.

IN WITNESS WHEREOF, the Property Owner (s) has/ have executed this agreement this DD day of ___MONTH_____, 20YY_.

INDIVIDUAL, PARTNERSHIP and/or CORPORATION

Name of Individual, Partnership and/or Corporation Name Title Signature	Name of Individual, Partnership and/or Corporation Name Title Signature
Name of Individual, Partnership and/or Corporation Name Title Signature	Name of Individual, Partnership and/or Corporation Name Title Signature

ACKNOWLEDGMENT

) State _____

) County _____

On this DD day of MM , 20 YY before me, a Notary Public, in and for said County, personally came the above named:

who is (are) personally known to me to be the identical person(s) whose name(s) is (are) affixed to the above instrument and acknowledged the instrument to be his, her (their) voluntary act and deed for the purpose therein stated.

WITNESS my hand and Notarial Seal the day and year last above written.

Notary Public

Notary Seal

Exhibit “A”

Insert Real Property Depiction

Exhibit “B”

Insert STF Maintenance Requirements

(See Guidance Document for Information Needed)

This Agreement is made and entered into as of this ____ day of _____, by and between the City of Kearney, a municipal corporation ("City"), and _____ (XX).

WHEREAS, XX is responsible under the dedication in the Plat for the inspections and maintenance of the Stormwater Treatment Facilities identified in the Plat; and

WHEREAS, XX is aware of inspection and maintenance needs for the Stormwater Treatment Facilities; and

WHEREAS, XX desires that the City inspect and maintain the Stormwater Treatment Facilities; and
WHEREAS, XX and the City desire to enter into this Agreement for a Maintenance Permit that outlines responsibilities for inspections and maintenance of the Stormwater Treatment Facilities for the specified period of time.

NOW THEREFORE, in consideration of the above, and the covenants and conditions contained herein, the parties agree as follows:

1. Stormwater Treatment Facilities. The parties agree the following Stormwater Treatment Facilities shall be inspected and maintained by the City:
a. {Description of Stormwater Treatment Facility(s), include location graphic in Attachment A}
2. Inspection of Stormwater Treatment Facilities. The City will annually inspect the Stormwater Treatment Facilities using the Inspection Form shown in {Attachment B}. The completed Inspection Form will be submitted to the designated representative for XX annually in _____ of each year.
3. Maintenance of Stormwater Treatment Facilities. The City will maintain the Stormwater Treatment Facilities using the below frequencies and standards of maintenance. A report will be completed at the end of each inspection and submitted to the designated representative for XX within one month of the inspection.
a. {List frequency and standards of maintenance for Stormwater Treatment Facilities, Report to be submitted using the form supplied in Attachment C}
4. XX will provide the City a designated representative as the point of contact between the City and XX prior to the start of any inspections or maintenance activities.
5. Funding. XX will submit $_____ in costs to the City for the City inspecting and maintaining the Stormwater Treatment Facilities prior to any inspections or maintenance activities.
6. Time Frame: This maintenance permit will commence upon the approval of this agreement and end on _____.
7. Ownership of the Stormwater Treatment Facilities. Before, during and upon completion of the Maintenance Permit, the Stormwater Treatment Facilities continue to be owned by XX. In addition, by the execution of this Agreement, the Associations hereby authorizes the City, its representatives, designees, contracts, and subcontractors, without any further notice or authorization, to access the Stormwater Treatment Facilities properties for the purposes of inspection and maintenance.
It is agreed that City shall not be liable for trespass or any other damages or taking of any kind arising out of entering onto the Best Management Practice properties for the purposes provided herein. XX shall not allow others to use the Stormwater Treatment Facilities in such manner that might interfere

with the inspections and maintenance of the City during the term of this Agreement. In the event interference, damage, or tampering occurs on the Stormwater Treatment Facilities during the term of the Agreement, the party with notice shall inform the other party within five (5) business days.

8. Indemnification: To the fullest extent permitted by law, XX shall release, waive, indemnify, defend and hold harmless City, its officers, agents, contractors, and employees from and against claims, damages, losses and expenses, including but not limited to, attorney=s fees, arising out of or resulting from the performance of this Agreement that results in any claim for damage, including without limitation, any bodily injury, sickness, disease, death, or damage to tangible or intangible property, including any loss of use resulting therefrom that is caused in whole or in part by the acts or omission of XX, its employees, agents, contractors or other duly authorized representatives or designees. City does not waive its governmental immunity by entering into this Agreement and fully retains all immunities and defenses provided by law with regard to any activities authorized by this Agreement. This section survives termination of this Agreement.

9. Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto, and their respective heirs, devisees, personal representatives, successors and assigns. Each party hereby certifies, represents and warrants to the other party that the execution of this Agreement is duly authorized and constitutes a legal, valid and binding obligation of said party.

10. Amendment: This Agreement may only be amended or modified in writing signed by the parties to this Agreement.

11. Further Assurances. Each party will use its best and reasonable efforts to successfully carry out and complete each task, covenant, and obligation as stated herein. Each of the parties shall cooperate in good faith with the other and shall do any and all acts and execute, acknowledge, and deliver any and all documents so requested in order to satisfy the conditions set forth herein and carry out the intent and purposes of this Agreement.

12. Execution in Counterparts. This Agreement may be executed on two or more counterparts, each of which shall be an original, but all of which shall constitute one and the same instrument.

13. Governing law. All aspects of this Agreement shall be governed by the laws of the State of Nebraska. The invalidity of any portion of this Agreement shall not invalidate the remaining provisions.

14. Interpretations. Any uncertainty or ambiguity existing herein shall not be interpreted against any party because such party prepared any portion of this Agreement, but shall be interpreted according the application of rules and interpretations of contracts generally. This Agreement represents the entire agreement between the parties and all prior negotiations and representations are hereby expressly excluded from this Agreement. The failure of either party to enforce any provision of this Agreement shall not be construed as a waiver or limitation of that party=s right to subsequently enforce and compel strict compliance with every provision of this Agreement.

15. Relationship of Parties. Neither the method of computation of funding nor any other provisions contained in this Agreement nor any acts of any party shall be deemed or construed by the City, or by and third person to create the relationship of partnership or of joint venture or any association between the parties, other than contractual relationships stated in this Agreement.

16. Assignment. In the case of the assignment of this Agreement to other parties, prompt written notice shall be given to the other party, who shall at the time of such notice be furnished with a duplicate of such assignment by such assignor. Any such assignment shall not terminate the liability of the assignor to perform its obligations hereunder, unless a specific release in writing is given and signed by the other party to this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date written above.

{Add City signature block, XX signature block and notaries}

Appendix C

Acceptable STF's

Bio-swales

Bio-swales are landscape elements designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloped sides (less than six percent) and filled with filter strip, vegetation, compost and/or riprap.

Depending upon the geometry of land available, a bio-swale may have a meandering or almost straight channel alignment. Biological factors also contribute to the breakdown of certain pollutants.

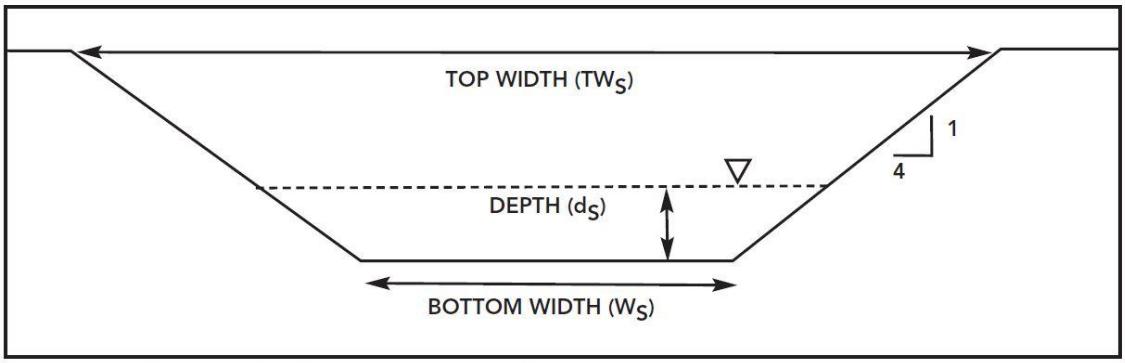


Figure 8-21 Trapezoidal Cross Section with 4:1 Side Slopes

*Drawing from Omaha Regional Stormwater Design Manual Chapter 8

**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Erosion or bare soil is visible in the bottom of the swale or on side slopes.
- Standing water is visible after 24 hours.
- Vegetation is in poor condition or dead.
- Trash, debris and sediment have accumulated within the swale or in front of culverts or over catch basins outlets.
- Foul odor present.

ROUTINE MAINTENANCE:

- Sediment and Debris: Remove accumulated sediment and debris from the mulch or grass surface area of the vegetated infiltration swale.
- Outlet Structure: Keep culverts or drains within the vegetated infiltration swale free from blockage by sediment, debris, trash, mulch or plant material.
- Erosion and Scour: Repair soil erosion or scouring within the swale area or side slopes leading into the vegetated infiltration swale.
- Curb Cuts: Keep curb cuts to the vegetated infiltration swale free from blockage by sediment, debris and trash
- Weeds: Remove weeds and invasive plants from the vegetated infiltration swale.
- Vegetation Management: Inspect plant health seasonally to ensure vigorous growth. Prune plants, particularly shrubs and trees, during the dormant season (fall to early spring).
- Snow Removal: Do not pile or store snow within the vegetated infiltration swale as this will compact the specialized soils and add sediments that may lead to clogging.

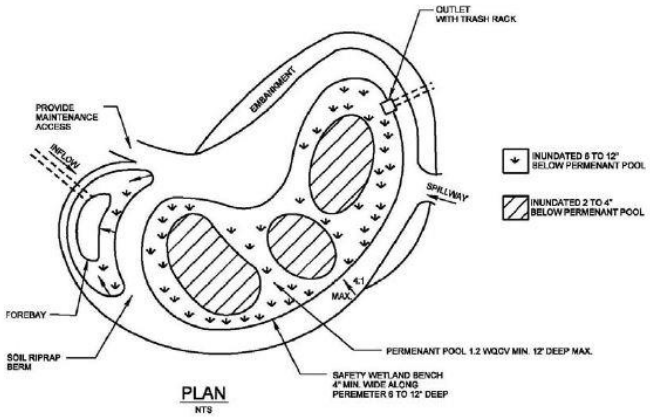
NON-ROUTINE MAINTENANCE:

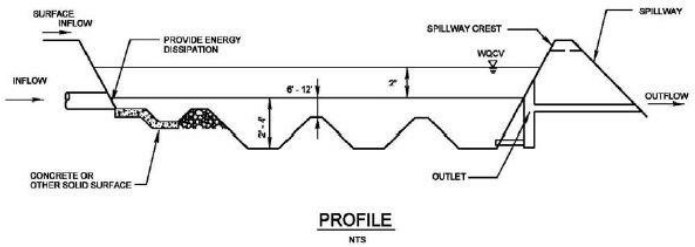
- Plant Replacement: Replace diseased or dying plants.
- Ponding Water: If ponding water occurs beyond the precipitation event, contact your local community stormwater manager for further consultation.
- Specialized Soil Replacement: Clogging of the specialized soil by fine sediments may require complete replacement of the specialized soil, mulch and plant materials.
- Underdrain Flushing: Some vegetated infiltration swales are constructed with perforated underdrain pipes that drain the infiltration swale's specialized soils. If the underdrains become clogged with fine sediments they may need to be flushed with special equipment or replaced.

Sediment Forebays

A sediment forebay is a settling basin or plunge pool constructed at the incoming discharge points of a stormwater BMP. The purpose of a sediment forebay is to allow sediment to settle from the incoming stormwater runoff before it is delivered to the balance of the BMP. A sediment forebay helps to isolate the sediment deposition in an accessible area, which facilitates BMP maintenance efforts.

FIGURE 8.2 CONSTRUCTED WETLAND





Constructed Wetland - Plan and Cross Section

*Drawing used from the Lincoln Stormwater Best Management Practices Chapter 8

**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Erosion is visible into the forebay.
- Sediment depth marker is no longer visible.
- Sediment is clogging the outfall inlet from properly receiving stormwater.
- Foul odors are present.
- Flooding is taking place after/during a rain event.

ROUTINE MAINTENANCE:

- Adequate access: Must be provided for inspection, maintenance, and landscaping upkeep, including appropriate equipment and vehicles. It is *Recommended* that a maintenance right of way or easement extend to ponds from a public or private road.
- Sediment Removal: It is *Highly Recommended* that sediment removal in the forebay and permanent pool occur every 2 to 7 years or after 50 percent of total forebay or permanent pool capacity has been lost. In areas where road sand is used, an inspection of the forebay and permanent pool should be scheduled after the spring melt to determine if clean-out is necessary.
- Periodic mowing: *Highly Recommended* to mow along maintenance rights-of-way and the embankment. The remaining buffer can be managed as a meadow (mowing every other year), prairie, or forest.

NON-ROUTINE MAINTENANCE:

- Draining: Care should be exercised while draining the pond to prevent rapid release and minimize the discharge of sediments or anoxic water. The approving jurisdiction should be notified before draining a pond.
- Maintenance Timing: It is *Highly Recommended* that the Operation and Maintenance plan include a provision to lower the level of the permanent pool in the late fall, to provide additional retention storage for snowmelt runoff and ensure that some permanent pool storage is available above the ice (the permanent pool should not be completely eliminated nor allowed to freeze through completely).

Rain Gardens

A **rain garden** is a planted depression or a hole that allows rainwater runoff from impervious urban areas, like roofs, driveways, walkways, parking lots, and compacted lawn areas, the opportunity to be absorbed. Rain gardens can cut down on the amount of pollution reaching creeks and streams by up to 30%.

Plant selection

Plants selected for use in a rain garden should tolerate both saturated and dry soil. Using native plants is generally encouraged. This way the rain garden may contribute to urban habitats for native butterflies, birds, and beneficial insects.

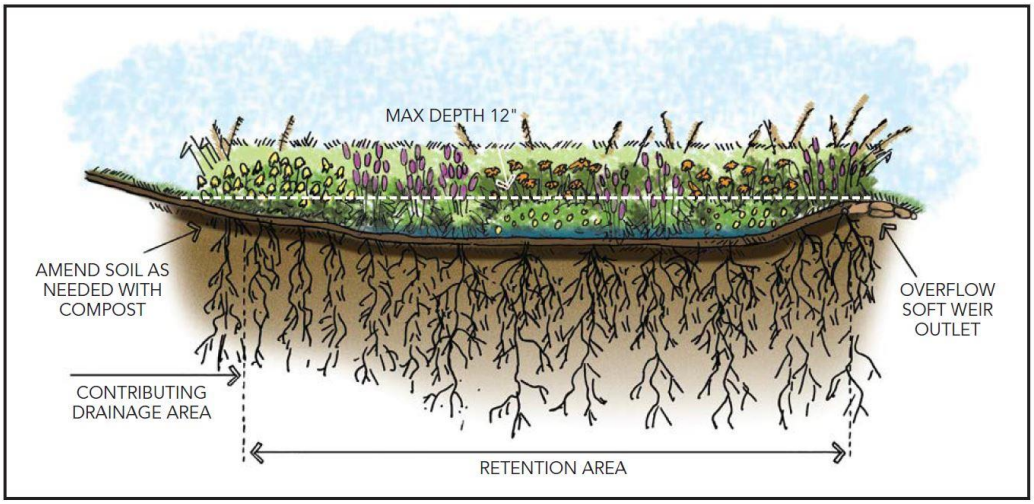


Figure 8-7 Rain Garden Cross Section

*Drawing from Omaha Regional Stormwater Design Manual Stormwater Best Management Practices Chapter 8
**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Standing water is visible 24 hours after a rain event.
- Erosion is visible within the rain garden, on the slopes and inlets leading into the rain garden, or on the berm if present.
- Vegetation, sediment or debris blocking inlets or is excessively present in rain garden.
- Vegetation is wilting, discolored, or dying.
- Foul odors present.
- Mulch cover is inadequate.

ROUTINE MAINTENANCE:

- Sediment and Debris: Remove accumulated sediment and debris from the mulch layer of the rain garden.
- Erosion and Scour: Repair soil erosion or scouring within the rain garden or side slopes leading into the rain garden.
- Mulch: Maintain a 2 to 3-inch depth of hardwood bark mulch layer within the rain garden. If an excessive depth of mulch exists, remove mulch until the mulch layer is 2 to 3 inches in depth.
- Curb Cuts: Keep curb cuts to rain garden free from blockage by sediment, debris and trash.
- Weeds: Remove weeds and invasive plants from rain garden.
- Vegetation Management: Inspect plant health seasonally to ensure vigorous growth. Prune plants, particularly shrubs and trees, during the dormant season (fall to early spring).
- Snow Removal: Do not pile or store snow within the rain garden as this will compact the specialized soils and add sediments from snow melt that may lead to clogging.

NON-ROUTINE MAINTENANCE:

- Plant Replacement: Replace diseased or dying plants.
- Ponding Water: When ponding continues beyond a 24-hour period, contact your local community stormwater manager for further consultation.
- Specialized Soil Replacement: Clogging of the specialized soil by fine sediments may require complete replacement of the specialized soil, mulch and plant materials.

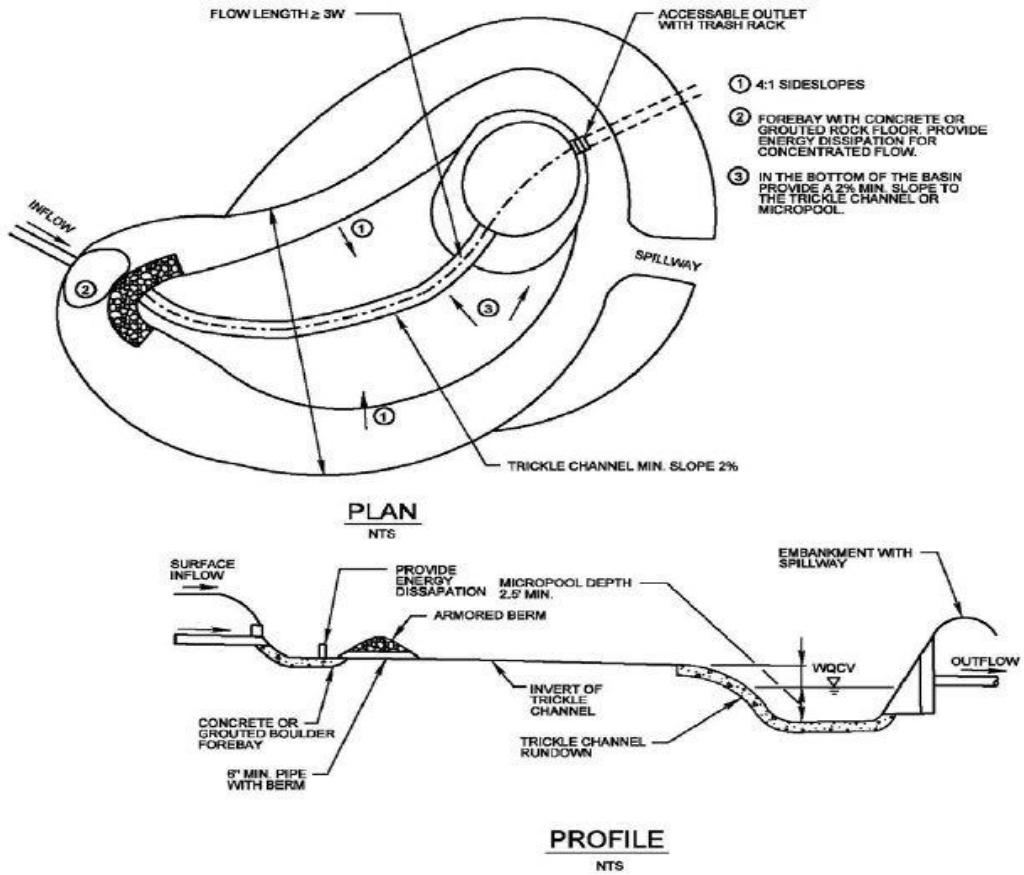
Regional Detention (Dry) Cells

A **Regional Infiltration Detention Cell,** also referred to as an **Extended Dry Detention Basin,** is a vegetated depression located on the site that is designed to collect, store, and infiltrate runoff. Typically includes a mix of amended soils and vegetation. The idea is to hold back the stormwater runoff from reaching the watershed, allowing infiltration and provide treatment. An extended dry detention basin can limit downstream erosion and control of some pollutants such as suspended solids.

Vegetation

Native vegetation should be used to reinforce all earthen structures and be planted along the basin perimeter to prevent erosion. Using vegetation at the inlet will also filter incoming runoff and may reduce inlet velocities. Vegetation surrounding the outlet may serve to reduce runoff impacts on downstream areas so long as it does not promote clogging of the outlet structure.

FIGURE 8.3 EXTENDED DETENTION BASIN



*This image is from the City of Lincoln's Stormwater Best Management Practices Manual Chapter 8

**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Standing water is visible 24 hours after a rain event.
- Outlet is blocked by trash, debris or vegetation.
- Erosion within the emergency spillway, or blocked by debris.
- Erosion of side slopes or dam portion of pond.
- Low flow orifice, forebay, and micro pool are blocked by trash, debris, or sediment.
- Excessive (wetland) vegetation growing within dry pond area.
- Animal burrows within dam portion or side slopes of pond.
- Trees growing on the dam.
- Foul odors present.

ROUTINE MAINTENANCE:

- Outlet Structures: Keep outlets such as principle spillway pipe, water quality orifice pipe and emergency spillway free from blockage by sediment, debris, or trash.

- Dam/Embankment: Mow grassed dam and embankment of dry pond to prevent establishment of woody vegetation.
- Erosion and Scour: Repair soil erosion or scouring on the side slopes leading into the dry pond or within the bottom or forebay of the dry pond.
- Vegetation Management: Remove woody vegetation from ponding area of dry pond.
- Sediment and Debris: Remove accumulated sediment, debris and trash from the dry pond forebay, low flow channel and ponding area. Remove sediments when accumulation reaches 6 inches in depth.

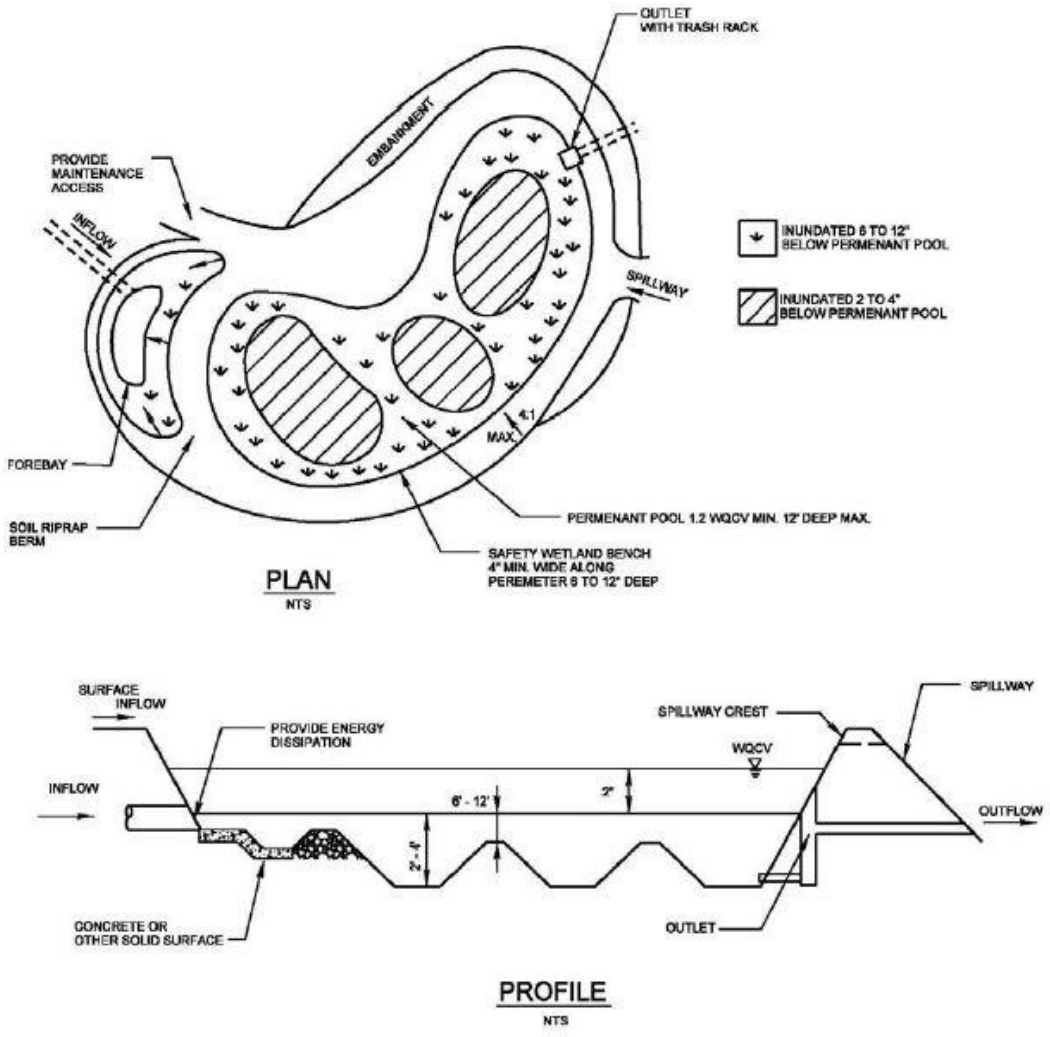
NON-ROUTINE MAINTENANCE*:*

- Excessive Sediment: Remove sediment accumulation from the ponding area prior to 25 percent of the ponding storage volume being lost within the dry pond.
- Invasive Vegetation: Treat and remove invasive vegetation from ponding area, side slopes and emergency spillway.
- Outlet Structure: Repair or replace damaged outlet structure.
- Erosion Protection: Repair or replace riprap or stone protection at pipe inlets, pipe outlets or emergency spillway.
- Dam/Embankment: Seek professional consultation if seepage or leaks appear during ponding or erosion is discovered on the dam or embankment of the dry pond.

Regional Retention (Wet) Cell

The main design difference between a dry detention cell and a wet retention cell is if it has a continuous pool of water- such as a "pond". The location of the low flow orifice determines the level of the water. Usually, the orifice is part of a riser that is concrete structure. Retention cells have an orifice that is at a higher position than a detention cell, therefore not allowing constant drainage.

FIGURE 8.2 CONSTRUCTED WETLAND



Constructed Wetland - Plan and Cross Section

*Drawings from the Omaha Regional Stormwater Design Manual Chapter Stormwater Best Management Practices 8
**This drawing is only a template that needs to be adjusted and revised for each project

MAINTENANCE REQUIRED WHEN:

- Outlet is blocked by trash, debris or vegetation.
- The emergency spillway is blocked by debris or has signs of erosion.
- Erosion of dam, embankment or side slopes of pond.
- Low flow orifice, forebay, and micro pool are blocked by trash, debris, or sediment.
- Dam or embankment shows signs of visible water seepage.
- There are animal burrows within dam, embankment or side slopes of pond.
- Woody vegetation is growing on the dam.
- Foul odors present.
- Pond depths have been significantly reduced due to sediment accumulation.
- Algae blooms covering over 1/3 of pond surface area occur in the summer.
- Beavers are present in the basin.

ROUTINE MAINTENANCE:

- Outlet Structures: Keep outlets such as principal spillway pipe, water quality orifice pipe and emergency spillway free from blockage by sediment, debris, or trash.
- Dam/Embankment: Mow grassed dam and embankment of wet pond to prevent establishment of woody vegetation.
- Erosion and Scour: Repair soil erosion or scouring on the side slopes leading into the wet pond.
- Vegetation Management: Remove vegetation from at least 10 feet away from the outlet structure.
- Sediment and Debris: Remove accumulated sediment, debris and trash from the wet pond forebay and ponding area. Remove sediments when the pool volume has become significantly reduced or the pond begins to become eutrophic.

NON-ROUTINE MAINTENANCE:

- Excessive Sediment: Remove sediment accumulation from the forebay and ponding area prior to 25 percent of the ponding storage volume being lost within the wet pond.
- Invasive Vegetation: Treat and remove invasive vegetation from ponding area, side slopes and emergency spillway.
- Outlet Structure: Repair or replace damaged outlet structure.

- Erosion Protection: Repair or replace riprap or stone protection at pipe inlets, pipe outlets or emergency spillway.
- Dam/Embankment: Seek professional consultation if seepage, leaks or erosion is discovered on the dam or embankment of the wet pond.

Underground Detention

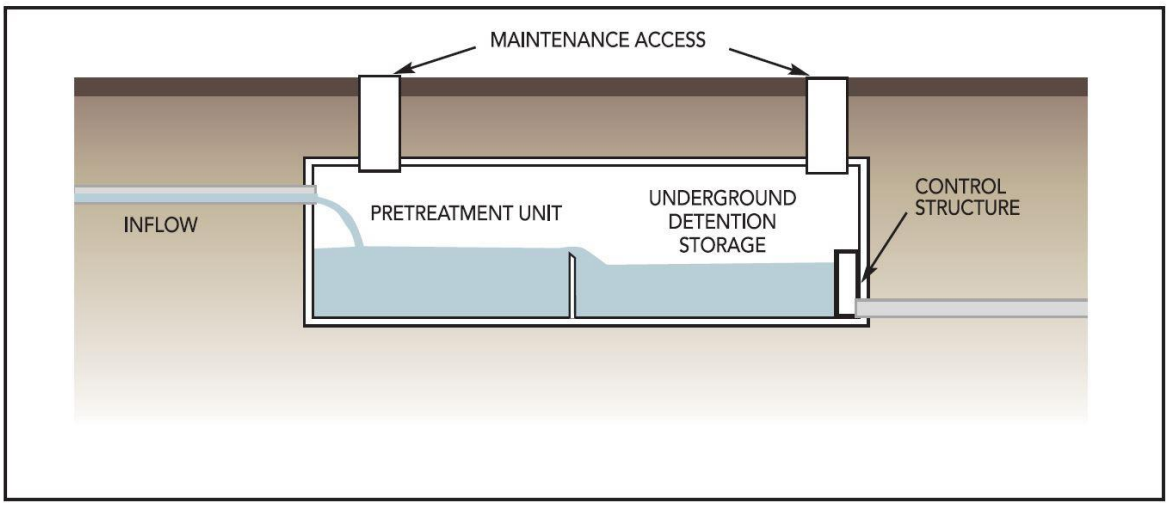


Figure 8-30 Example of Manufactured Storage System

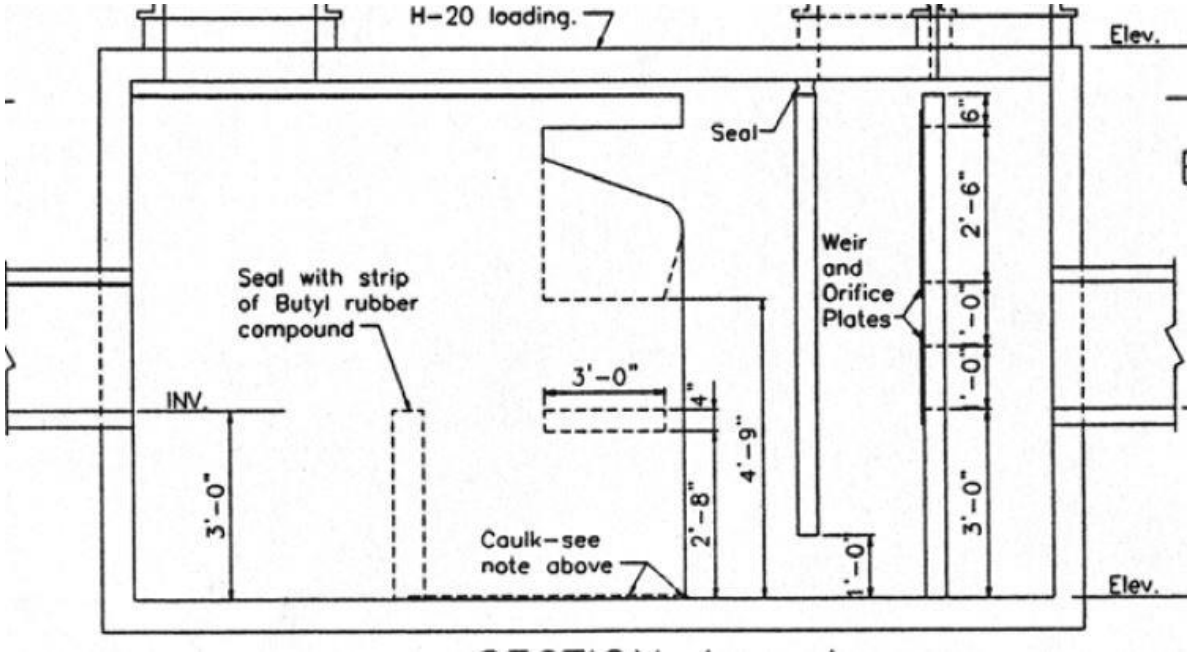


*Image created by the Omaha Regional Stormwater Design Manual Stormwater Best Management Practices Chapter 8
**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Ponding on surface area draining to system.
- Sediment and debris have accumulated at the inlets or outlets of system.
- There is visible damage to the inlets or outlets.
- Inspection of pipes or chambers through inspection port (if present) using a flashlight and stadia rod reveal sediment accumulation that exceeds design criteria.

❖ Do not enter underground detention manholes to inspect system unless Occupational Safety & Health Administration (OSHA) regulations for confined space entry are followed.

❖ Follow inspection and maintenance instructions and schedules provided by system manufacturer and installer.

ROUTINE MAINTENANCE:

- Sediment and Debris: Remove accumulated sediment, debris and trash from inlets, detention chambers and outlets per manufacturer's specifications.
- Erosion and Scour: Repair soil erosion or scouring at the outlet(s) of the underground detention if overflow is discharged onto ground surfaces.
- Inspection Port: Inspect the monitoring well or inspection port to ensure access by qualified personnel to determine if accumulation of sediment and debris within detention chambers requires removal per manufacturer's specifications.

NON-ROUTINE MAINTENANCE:

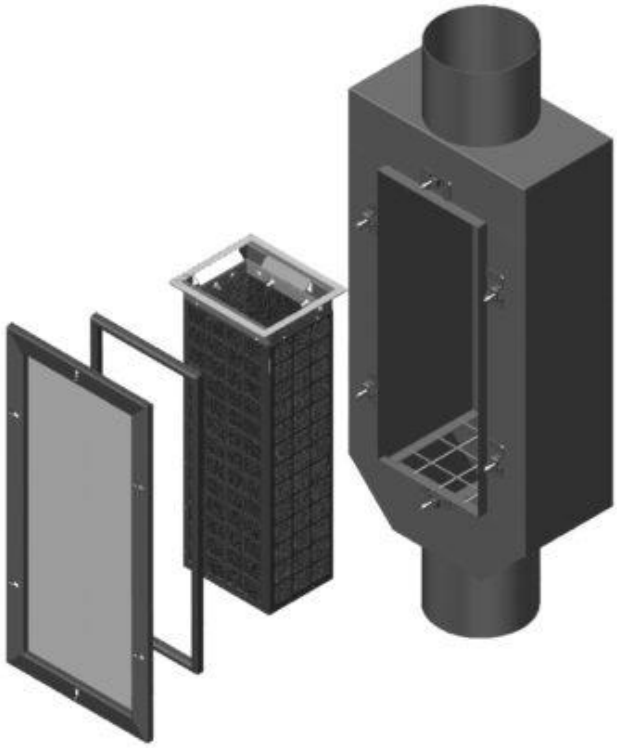
- System Component Repair: Repair or replace damaged system components based on manufacturer's specifications.

* Do not enter underground detention manholes to inspect system unless Occupational Safety & Health Administration (OSHA) regulations for confined space entry are followed.

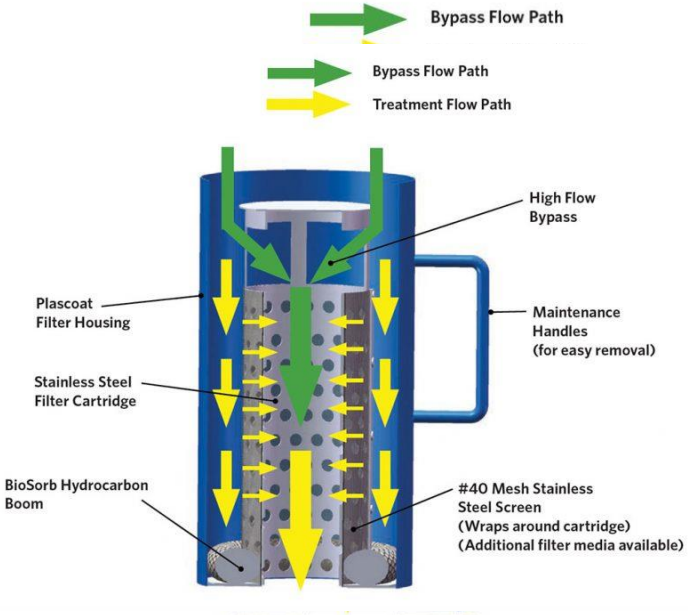
* Follow inspection and maintenance instructions and schedules provided by system manufacturer and installer.

* Properly dispose of all wastes.

Downspout Filters



*https://oldcastleinfrastructure.com/product/flogard-plus-downspout-filter/



* https://biocleanenvironmental.com/downspout-filter/

**These drawings only represent examples of the types of downspout filters available.

MAINTENANCE REQUIRED WHEN:

- Empty collection basket when filled with debris.
- Ensure adequate connection into and out of filter.
- Replace filter as described by manufacturer.

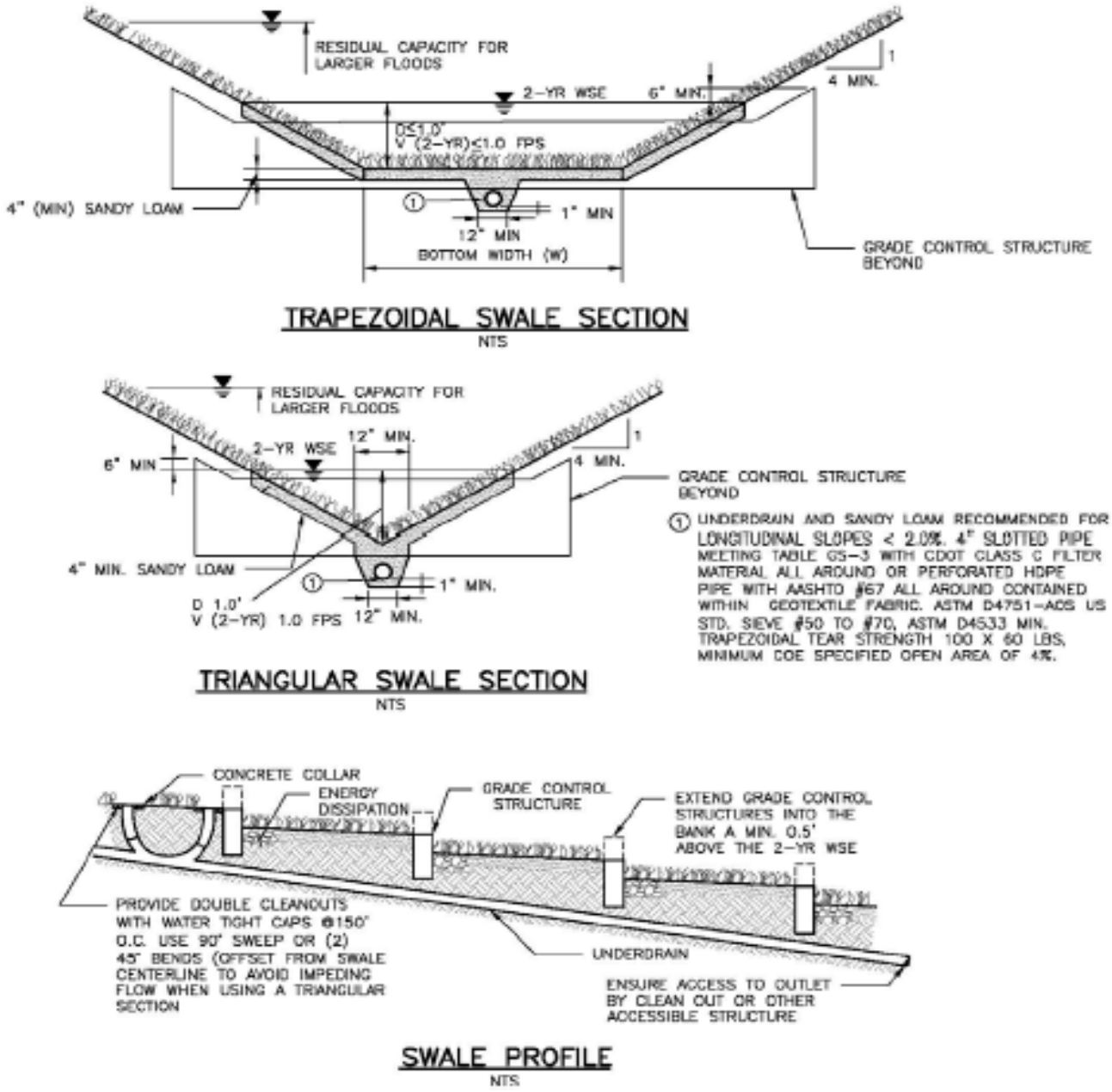
ROUTINE MAINTENANCE:

- Filter Net Inspection: Routinely inspect the filter/collection net to ensure it is not clogged. Empty as needed.
- Connection: Inspect connection to existing downspout for proper efficiency of STF.

NON-ROUTINE MAINTENANCE:

- Frequency of maintenance: Depends on the conditions of the site and performance of the system.

Grass Swale



*Drawings courtesy of UDFCD Urban Storm Drainage Manual Volume 3 Chapter 4

**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Erosion is visible within the grass swale.
- Standing water is visible 24 hours after rain event.
- Native grass species are not germinating, discolored, wilting, or dying.
- Four odors present.

ROUTINE MAINTENANCE:

- Sediment and Debris: Remove accumulated sediment, debris and trash from inlets, detention chambers and outlets per manufacturer's specifications.
- Erosion and Scour: Repair soil erosion or scouring at the outlet(s) of the underground detention if overflow is discharged onto ground surfaces.
- Prune and Weed: Cut back and remove previous year's plant material and remove accumulated leaves if needed.

NON-ROUTINE MAINTENANCE:

- Replace Vegetation: When coverage falls below 90%, consult with horticulturist if vegetation suffers for no apparent reason and/or test soil as needed.
- Repair Check Dams: If structural damage is apparent at inlet/outlet structure or check-dams.

Filter Strips

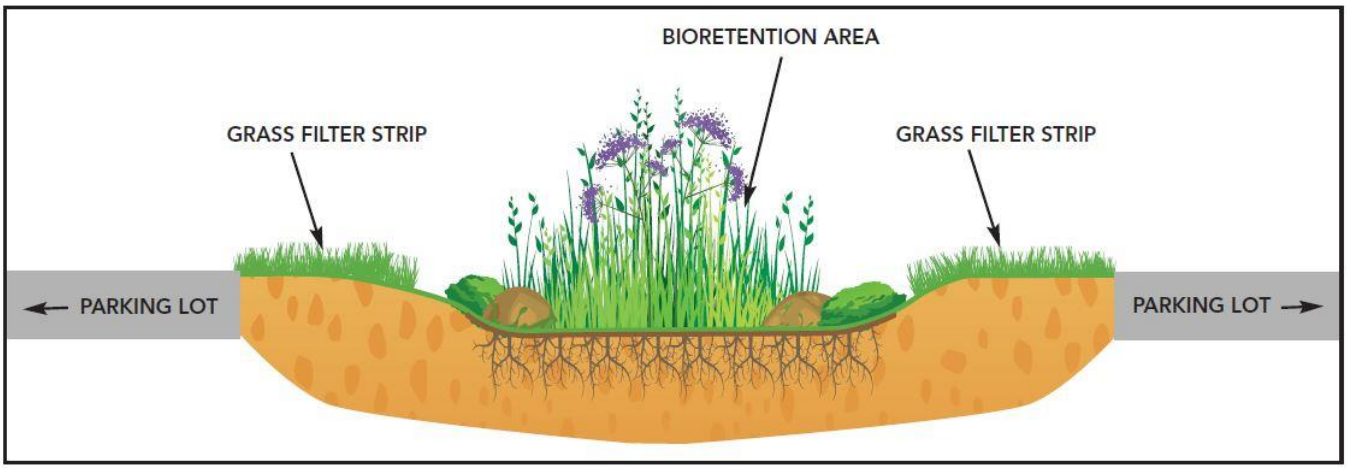


Figure 8-22 Grass Filter Strip Used for Pretreatment

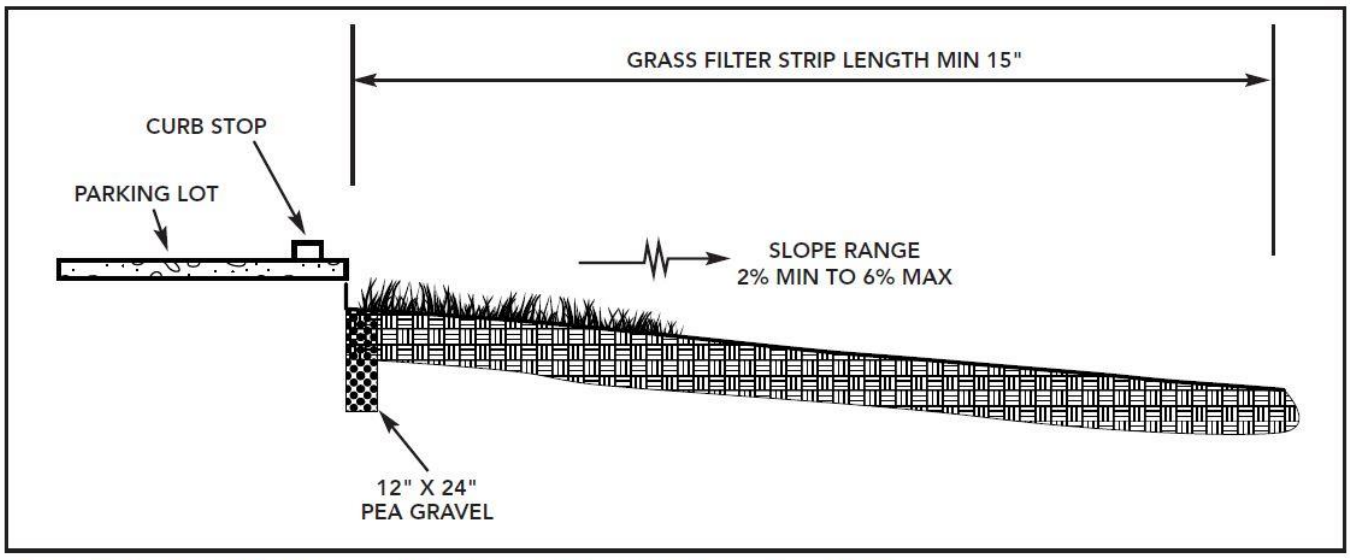


Figure 8-23 Grass Filter Strip Profile (Source Claytor and Schueler, 1996)

*Images from Omaha Stormwater Drainage Manual Stormwater Best Management Practices Chapter 8

**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Standing water is visible 24 hours after a rain event.
- Erosion is visible within the filter strip, on the slopes and inlets leading into the filter strip, or on the berm if present.
- Vegetation, sediment or debris blocking inlets or is excessively present in filter strip.
- Vegetation is overgrown, wilting, discolored, or dying.
- Foul odors present.
- Mulch cover is inadequate.

ROUTINE MAINTENANCE:

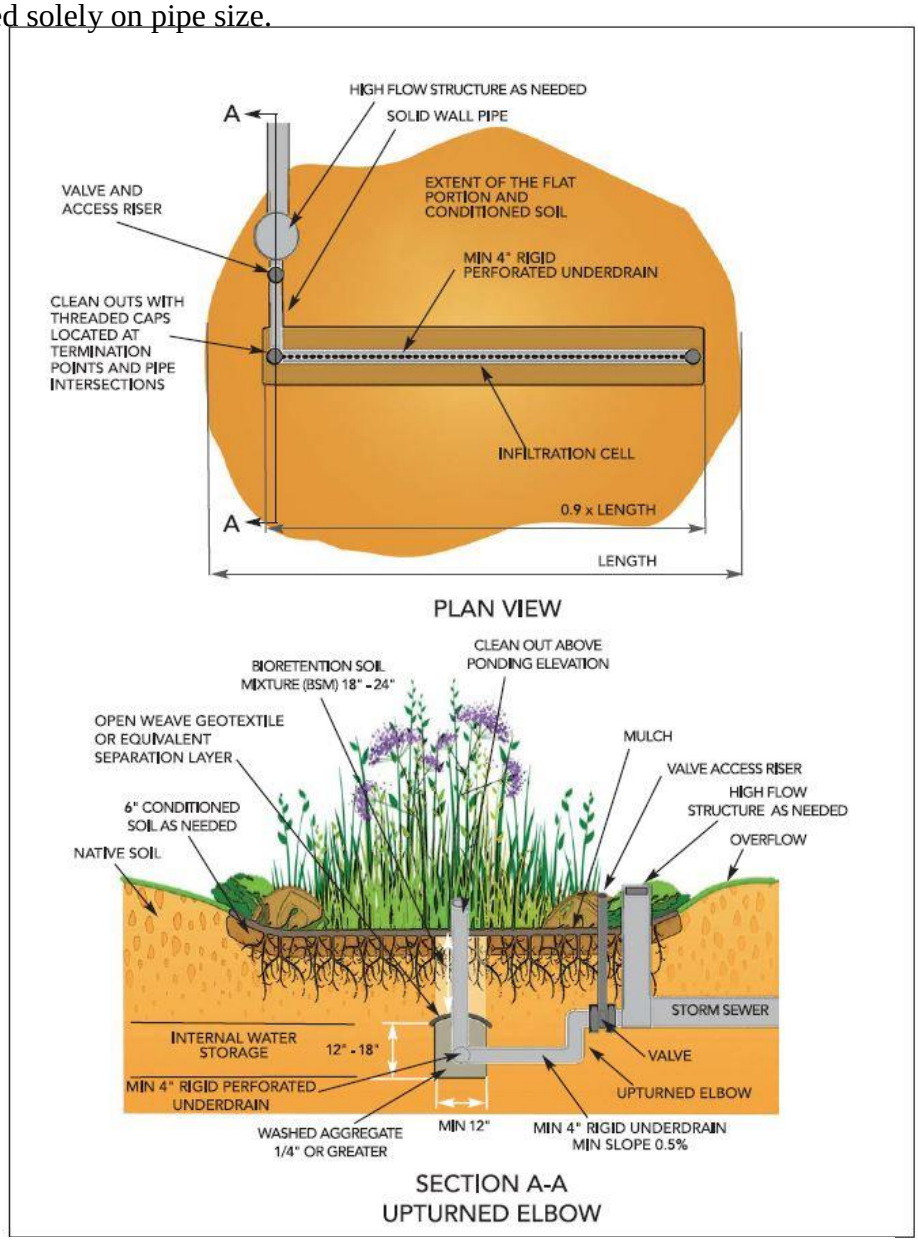
- Sediment and Debris: Remove accumulated sediment and debris from the mulch or grass surface area of the vegetated infiltration swale.
- Erosion and Scour: Repair soil erosion or scouring within the swale area or side slopes leading into the vegetated infiltration swale.
- Curb Cuts: Keep curb cuts to the infiltration trench free from blockage by sediment, debris and trash.
- Weeds: Remove weeds and invasive plants from the infiltration trench.
- Snow Removal: Do not pile or store snow within the infiltration trench as this will compact the specialized soils and add sediments that may lead to clogging.

NON-ROUTINE MAINTENANCE:

- Plant Replacement: Replace diseased or dying plants.
- Ponding Water: If ponding water occurs beyond the precipitation event, contact your local community stormwater manager for further consultation.
- Specialized Soil Replacement: Clogging of the specialized soil by fine sediments may require complete replacement of the specialized soil, mulch and plant materials.
- Underdrain Flushing: Some infiltration trenches are constructed with perforated underdrain pipes that drain the trench's specialized soils. If the underdrains become clogged with fine sediments they may need to be flushed with special equipment or replaced.

Bio-Retention Area

Bio-retention areas have a gradual swale that leads to a landscaped flowline. This could consist of rock, mulch, vegetation, etc.…The material in the flowline is a 'Bio-retention Soil Mixture' that allows for easy infiltration. Underneath this mixture is a trenched flowline that has a perforated underdrain in. To control the water quality discharge rate (Q_{wq}) through this perforated underdrain, a valve should be installed prior to the emergency overflow. If a valve is not desired, then design of the pipe diameter should be considered for creating a maximum outflow based solely on pipe size.



*The images were created by the Omaha Stormwater Drainage Manual Best Management Practices Chapter 8

**This drawing is only a template that needs to be adjusted and revised for each project.

MAINTENANCE REQUIRED WHEN:

- Standing water is visible 24 hours after a rain event.
- Erosion is visible within the bioretention area, or on the slopes and inlets leading into the bioretention area.
- Vegetation, sediment or debris is blocking inlets or outlets.
- Vegetation is wilting, discolored, or dying.
- Foul odors present.
- Sediment has accumulated over the mulch or soil media.

ROUTINE MAINTENANCE:

- Sediment and Debris: Remove gross accumulated sediment and debris from the mulch or grass surface area of the bioretention area.
- Outlet Structure: Keep outlets of bioretention area free from blockage by sediment, debris, trash, mulch or plant material.
- Erosion and Scour: Repair soil erosion or scouring within the bioretention area, side slopes or inlets leading into the bioretention area.
- Mulch: Maintain a 2 to 3-inch depth of hardwood bark mulch layer within the planted area of the bioretention area. If an excessive depth of mulch exists, remove mulch until the mulch layer is 2 to 3 inches in depth.
- Curb Cuts: Keep curb cuts to bioretention area free from blockage by sediment, debris and trash
- Weeds: Remove weeds and invasive plants from bioretention area.
- Vegetation Management: Inspect plant health seasonally to ensure vigorous growth. Prune plants, particularly shrubs and trees, during the dormant season (fall to early spring).
- Snow Removal: Do not pile or store snow within the bioretention area as this will compact the specialized soils and add sediments that may lead to clogging.

NON-ROUTINE MAINTENANCE:

- Plant Replacement: Replace diseased or dying plants.
- Water Ponding Period: When ponding continues beyond a 48 hour period or the designed ponding duration, there may be construction, or design issues that need to be corrected. Contact

your local community stormwater manager, state technical assistance staff and the designer for further consultation.

- Specialized Soil Replacement: Clogging of the specialized soil by fine sediments may require complete replacement of the specialized soil, mulch and plant materials.

References

- City of Lincoln, Nebraska; “Drainage Criteria Manual”; City of Lincoln Public Works and Utilities Department; Chapter 8, Stormwater Best Management Practices. 2014 Revision. https://lincoln.ne.gov/city/ltu/watershed/dcm/

- Nebraska Department of Transportation; “Drainage and Erosion Control Manual”; Chapter 3, Stormwater Treatment. 2013 Version. https://dot.nebraska.gov/projects/environment/roadside/

- Omaha Regional Stormwater Design Manual; Chapter 8, Stormwater Best Management Practices. 2014 Revision. https://omahastormwater.org/orsdm/

- Urban Drainage and Flood Control District, “Urban Storm Drainage Criteria Manual Volume 3”; Chapter 4, Treatment BMP’s. 2010 Version. https://udfcd.org/volume-three

- Flogard +Plus, Downspout Filter; https://oldcastleinfrastructure.com/product/flogard-plus-downspout-filter/

- BioClean Downspout Filter; https://biocleanenvironmental.com/downspout-filter/

Appendix D

Annual Inspection Forms

INSPECTION FORM

Project Name: _____ **Inspection Date:** _____

Inspector's Name: _____ **Inspector's Company:** _____

STF Identification Number	STF Type	Assessment Performed (Yes/No)	Corrective Actions	Assigned To	Expected Completion	Access Restricted (Fence, vegetation, etc.…)	Is site modified from original plan?

Photographs: Attach photographs of the site and STF features, provide captions describing each photograph.

Additional Comments:

INSPECTION FORM

Project Name: _____ **Inspection Date:** _____

Inspector's Name: _____ **Inspector's Company:** _____

STF Identification Number	STF Type	Assessment Performed (Yes/No)	Corrective Actions needed	Assigned To	Expected Completion	Access Restricted (Fence, vegetation, etc…)	Is site modified from original plan?

Condition:	**Describe Maintenance/Additional Comments:**
○ Outstanding (No Maintenance Required) ○ Satisfactory (Minor Maintenance Required) ○ Needs Improvement (Maintenance Needed) ○ Not Applicable	

Photographs: Attach photographs of the site and STF features, provide captions describing each photograph.

STF Annual Inspection Form

STF:_____

STF Identification:_____ Inspection Date:_____

Every response that is a 'yes' requires a corrective action, whom the action is assigned to, and the expected completion date of the assignment.

Condition:
- ○ Outstanding (No Maintenance Needed)
- ○ Satisfactory (Minor Maintenance Needed)
- ○ Needs Improvement (Maintenance Needed)
- ○ Not Applicable

Features Assessment	Yes/No	Corrective Actions	Assigned To	Expected Completion

Misc. Assessment	Yes/No	Corrective Actions	Assigned To	Expected Completion
Access restricted (fence, vegetation, etc.)				
Fumes/Odors present				
Evidence of routine maintenance not being performed				
Issues with additional features (walkways, fences, etc.)				
Is site modified from approved plan?				

Photographs:

Attach photographs of the site and STF features using the photo log template attached. Include captions describing each photograph.

Additional Comments:

Permanent Stormwater Treatment Facility (STF) Annual Inspection Form

Inspection Date: _____ Inspection Time: _____

Project Name: _____ Project Number: _____

Site Address: _____ City: _____ Postal Code: _____

Owner Name: _____ Owner Phone Number: _____

Owner Address: _____ City: _____ Postal Code: _____

Designer Name: _____ Designer Company _____

Are maintanence records being kept?: ☐ Yes ☐ No

Date of previous inspection: _____

Was previous inspection reviewed prior to conducting this inspection? ☐ Yes ☐ No ☐ N/A

Are there any outstanding corrective actions? ☐ Yes ☐ No ☐ N/A

If yes, explain: _____

Site Contact Name: _____ Site Contact Phone Number: _____

Site Contact E-mail: _____

Inspector: _____ Inspector Phone Number: _____

Inspector E-mail: _____ Inspector Company/Firm: _____

Inspector Qualifications/Certifications/Official Training:

_____

_____

STF Type	Number of STF's per Site (use separate checklist for EACH BMP)
Bio Retention System	
Dry Detention Basin	
Bioswale	
Level Spreader	
Sediment Forebay	
Permeable Pavers/Pervious Pavement	
Other:	

Days since last rain: _____ Amount of rain: _____

I certify that this information is true and accurate to the best of my knowledge.

Signature: _____ Date: _____

Only applicants emailing this application to stormwater@kearneygov.org may check the ☐ _____

box to the right and type their initials in the space provided in lieu of physically signing.