RESIDENTIAL RAINGARDEN WITH UNDERDRAIN NOTES

THIS DETAIL IS INTENDED AS A REFERENCE FOR SMALL RAINGARDEN FACILITIES INSTALLED WITHIN A NEWLY OR RECENTLY DEVELOPED RESIDENTIAL LOT OR SIMILAR CONTEXT THAT TYPICALLY RECEIVE STORMWATER FROM 1 ACRE OR LESS.

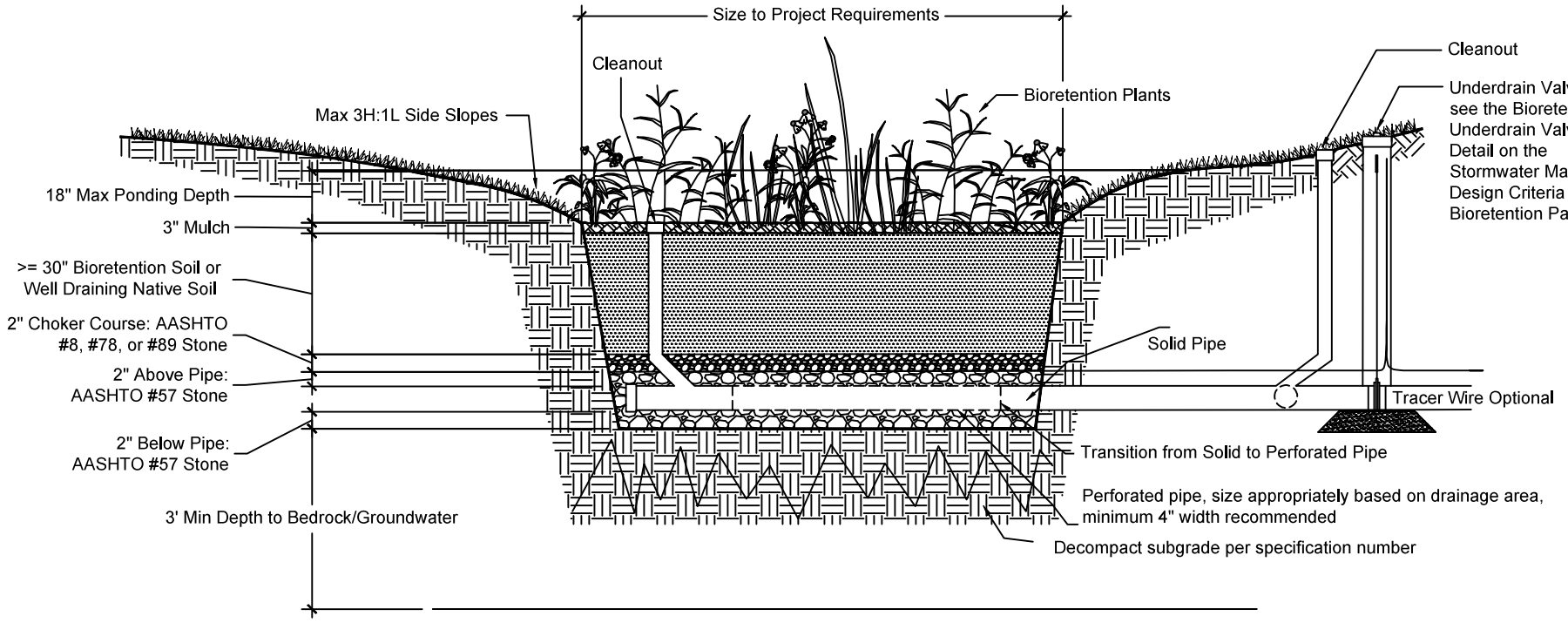
NOTES TO DESIGNER: *Edit all suggested notes as needed to meet project requirements.*

- PROVIDE ADEQUATE PRETREATMENT FOR ALL FILTRATION AND INFILTRATION PRACTICES. SEE GUIDANCE ON THE MN STORMWATER MANUAL PRETREATMENT PAGE FOR PRETREATMENT OPTIONS AND SIZING.
- FOR PROJECTS SUBJECT TO REGULATION UNDER PERMIT MNR100001, THE CONSTRUCTION STORMWATER GENERAL PERMIT, ENSURE THAT THE DESIGN MEETS ALL REQUIREMENTS STATED IN SECTION 16, INFILTRATION SYSTEMS, OR SECTION 17, FILTRATION SYSTEMS, OF THE PERMIT AS APPLICABLE.
- FOR PRACTICES THAT INCLUDE AN UNDERDRAIN SEE RECOMMENDATIONS IN UNDERDRAIN SECTION OF THE MN STORMWATER DESIGN CRITERIA FOR INFILTRATION PAGE.

IT IS RECOMMENDED THAT THE FOLLOWING ITEMS BE INCLUDED FOR CONSTRUCTION PLANS THAT INCLUDE RAINGARDEN FACILITIES:

- IDENTIFY EMERGENCY OVERFLOW PATHWAYS FOR RAINGARDENS ON STORMWATER MANAGEMENT PLANS AND GRADING PLANS. ENSURE THAT OVERFLOWS ARE DIRECTED TO AN APPROPRIATE DRAINAGE STRUCTURE.
- DELINEATE ALL BIORETENTION AREAS ON SITE, GRADING, UTILITY, STORMWATER MANAGEMENT, EROSION & SEDIMENT CONTROL, OR OTHER RELEVANT PLAN SHEETS TO MINIMIZE CHANCES OF MISMANAGEMENT DURING CONSTRUCTION ACTIVITY.
- DEVELOP A POST-CONSTRUCTION MAINTENANCE PLAN SUMMARIZING THE TYPE AND FREQUENCY OF MAINTENANCE ACTIVITIES RECOMMENDED FOR STORMWATER FACILITIES BASED ON THE TYPE OF PRACTICE AND APPLICABLE SITE CONDITIONS.
- PROVIDE A SUBGRADE DECOMPACTION OR SUBGRADE PREPARATION SPECIFICATION FOR ALL BIORETENTION RAINGARDEN AREAS CONSISTENT WITH FINDINGS FROM GEOTECHNICAL INVESTIGATION AND DESIGN GUIDELINES FOR BIORETENTION OUTLINED IN THE MN STORMWATER MANUAL IN THE CONSTRUCTION SPECIFICATIONS FOR INFILTRATION PAGE.
- PLANTING PLAN PREPARED BY A QUALIFIED LANDSCAPE PROFESSIONAL
  - PLANTING NOTES PREPARED BY A QUALIFIED LANDSCAPE PROFESSIONAL
  - PLANTING DETAILS AS APPROPRIATE PREPARED BY A QUALIFIED LANDSCAPE PROFESSIONAL.

Note: this detail shows an off line system. To show an on line system,this detail should be modified to include an overflow structure, set at the maximum ponding elevation.



Residential Raingarden with Underdrain

Not To Scale

NOT FOR CONSTRUCTION PURPOSES

NO.	REVISION DESCRIPTION	DATE	BY

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Print Name: _____

Sign Name: _____ License No. _____

Date _____

Date | Designed By | Drawn By

Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-4194

MPCA

MINNESOTA STORMWATER MANUAL

RESIDENTIAL RAINGARDEN WITH UNDERDRAIN

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SUGGESTED FOR INCLUSION IN CONSTRUCTION SEQUENCING NOTES *(site/project-scale)*

1. INSTALL DOWN-GRADIENT PERIMETER SEDIMENT CONTROL BMPS PRIOR TO ANY UP GRADIENT LAND DISTURBING ACTIVITY BEGINS.

2. INSTALL ALL UTILITIES (WATER, SANITARY SEWER, ELECTRIC, NATURAL GAS, PHONE, FIBER OPTIC, ETC.) PRIOR TO SETTING FINAL GRADE OF STORMWATER BMPS.

SUGGESTED FOR INCLUSION IN SITE GRADNG NOTES:

1. PROTECT RAINGARDEN AREAS DURING SITE GRADING ACTIVITY.

   a. DO NOT EXCAVATE BELOW THE PROPOSED MEDIA SURFACE OF RAINGARDEN FACILITIES PRIOR TO STARTING FACILITY CONSTRUCTION (SEE CONSTRUCTION NOTES). THIS WILL PREVENT CLOGGING OF PARENT SOILS AT THE PROPOSED SUBGRADE.

   b. MAINTAIN PERIMETER CONTROLS AROUND RAINGARDEN AREA FOLLOWING ROUGH GRADING TO KEEP HEAVY EQUIPMENT OUT OF RAINGARDEN AREAS.

2. IF RAINGARDEN AREAS ARE BEING USED AS TEMPORARY SEDIMENT BASINS DURING CONSTRUCTION, LEAVE A MINIMUM OF 1 FEET OF COVER OVER THE PRACTICE TO PROTECT THE UNDERLYING SOILS FROM CLOGGING.

SUGGESTED FOR INCLUSION IN CONSTRUCTION NOTES

1. FINAL GRADING OF RAINGARDEN PRACTICE SHALL NOT BEGIN UNTIL AFTER ALL UPSTREAM DRAINAGE AREAS HAVE BEEN ADEQUATELY STABILIZED.

2. REVIEW AS-BUILT ELEVATIONS OF INSTALLED UTILITIES TO CONFIRM THAT REQUIRED CONNECTIONS, CLEARANCES, AND OVERFLOWS FOR THE BIOFILTRATION PRACTICES WILL BE MET. ADJUST FINAL GRADE OF THE PRACTICE AS NECESSARY.

3. INSTALL APPROPRIATE TEMPORARY EROSION CONTROL DEVICES TO PREVENT SEDIMENT FROM LEAVING OR ENTERING THE PRACTICE DURING CONSTRUCTION.

4. FOLLOWING EXCAVATION OF THE RAINGARDEN FOOTPRINT, INSPECT SOILS AT THE SUBGRADE ELEVATION. CONSULT DESIGN ENGINEER IF SOIL TYPE/TEXTURE IS NOT CONSISTENT WITH DESIGN ASSUMPTIONS OR SOIL INVESTIGATION.

5. LOOSEN/PREPARE RAINGARDEN SUBGRADE PER DESIGN ENGINEER'S SPECIFICATIONS.

6. PERFORM CONTINUOUS INSPECTIONS OF EROSION CONTROL PRACTICES DURING AND FOLLOWING CONSTRUCTION, ESPECIALLY AFTER EACH RAINFALL EVENT TO PREVENT CLOGGING.

7. CONSTRUCT FOLLOWING STABILIZATION OF CONTRIBUTING DRAINAGE AREA. ENSURE THAT CRITICAL ELEVATIONS, SUCH AS UNDERDRAIN INVERT, TOP OF MEDIA, TOP OF MULCH, AND INVERT OF OVERFLOW STRUCTURE (IF PRESENT) ARE CORRECT.

8. INSTALL VEGETATION PER APPROVED/RECOMMENDED PLANTING PLAN INCLUDING MAINTENANCE DURING VEGETATION ESTABLISHMENT.

9. REMOVE TEMPORARY EROSION CONTROL DEVICES ONLY AFTER THE CONTRIBUTING DRAINAGE AREA IS ADEQUATELY VEGETATED.

SUGGESTED FOR INCLUSION IN RAINGARDEN UNDERDRAIN NOTES

1. UNDERDRAINS ARE HIGHLY RECOMMENDED WHERE PARENT SOILS ARE HSG C OR D.

2. INSTALL 2 OR MORE UNDERDRAINS FOR EACH RAINGARDEN FACILITY IN CASE ONE CLOGS. AT A MINIMUM, PROVIDE ONE UNDERDRAIN FOR EVERY 1,000 SQUARE FEET OF INFILTRATION AREA.

3. IT IS RECOMMENDED THAT DRAINTILE BE INSTALLED WITH A VALVE TO CONSTRAIN THE FLOW OF WATER OUT OF THE OF THE PRACTICE/REDUCE THE NEED TO SUPPLEMENTAL WATERING IF THE PLANTER IS NOT HOLDING SUFFICIENT WATER TO SUPPORT PLANTINGS.

4. DRAINTILE PIPES SHOULD BE INSTALLED WITH A MINIMUM SLOPE OF 0.5%.

SUGGESTED FOR INCLUSION IN PLANT NOTES

1. PLANT PLUGS ARE PREFERRED OVER SEEDS DUE TO FLOODING AND WIND THAT MIGHT MAKE SEEDING DIFFICULT. AIM TO USE 100% PLUGS TO MORE QUICKLY ESTABLISH THE RAINGARDEN.

2. RECOMMENDED PLANT SPECIES FOR RAINGARDENS INCLUDE BUT ARE NOT LIMITED TO:

- GIANT HYSSOP *AGASTACHE FOENICULUM*
- BLACK CHOKEBERRY *ARONIA MELANOCARPA*
- MARSH MILKWEED *ASCELPIAS INCARNATA*
- PLAINS OVAL SEDGE *CAREX BREVIOR*
- BOTTLEBRUSH *SEDGE COMOSA*
- PORCUPINE SEDGE *CAREX HYSTERICINA*
- FOX SEDGE *CAREX VULPINOIDEA*
- PALM SEDGE *CAREX MUSKINGUMENSIS*
- TURTLEHEAD *CHELONE GLABRA*
- RED -OSIER DOGWOOD *CORNUS SERICEA*
- JOE-PYE WEED *EUTROCHIUM PURPUREUM*
- SNEEZEWEED *HELENIUM AUTUMNALE*
- WINTERBERRY *ILLEX VERTICILLATE*
- SOFT RUSH *JUNCUS EFFUSUS*
- BLUE LOBELIA *LOBELIA SIPHILITICA*
- SENSITIVE FERN *ONOCLEA SENSIBILIS*
- SWITCH GRASS *PANICUM VIRGATUM*
- PRAIRIE CORD GRASS *SPARTINA PECTINATA*
- RED-STEMMED ASTER *SYMPHYOTRICHUM PUNICEUM*
- IRONWEED *VERNONIA FASCICULATA*
- GOLDEN ALEXANDERS *ZIZIA AUREA*
- NORTHERN PLAINS BLAZING STAR *LIATRIS LIGULISTYLIS*

SUGGESTED FOR INCLUSION IN MAINTENANCE NOTES

1. RECOMMENDED POST-CONSTRUCTION MAINTENANCE FOR THIS PRACTICE INCLUDES:

   a. MAINTAIN HEALTHY VEGETATION
   b. CLEAR DEBRIS FROM INLETS AND OUTLET.
   c. INSPECT DRAINTILE PERIODICALLY AND REMOVE ACCUMULATED SEDIMENT TO MAINTAIN FLOW.
   d. SEE THE OPERATION AND MAINTENANCE OF BIORETENTION AND OTHER INFILTRATION PRACTICES PAGE IN THE STORMWATER MANUAL FOR ADDITIONAL DETAILS.

NOT FOR CONSTRUCTION PURPOSES

NO.	REVISION DESCRIPTION	DATE	BY

I, hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Print Name:

Sign Name:

Date License No.

Date | Designed By | Drawn By

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