# DESIGN

## TREE FILTER WELL BMP SIZING

DETERMINE WATER QUALITY VOLUME (WQV)

| | | |
|---|---|---|
| TRIBUTARY IMPERVIOUS AREA (SF) | _____ SF | |
| CRITICAL AREA USE 1.0" | | |
| OTHER AREA USE 0.5" | | |
| ENTER DECIMAL IN INCHES | _____ DIRECT RUNOFF | |
| REQUIRED WQV | _____ CF | |
| TREE WELL WQV | | |
| TREE WELL DIAMETER (4' OR 5') | _____ FT. IN DIAMETER | (*SEE DESIGN NOTE #8 BELOW) |
| GROWTH MEDIUM (2' MIN.) DEPTH* | _____ | *15% VOIDS AVAILABLE ONLY STONE NOT GROWTH MEDIUM |
| TREE WELL DEPTH (FT.) | _____ FT. IN DEPTH | |
| WQV PROVIDED | _____ CF | |
| NUMBER OF TREE FILTER WELLS NEEDED | _____ | |

DETERMINE INFILTRATION CAPACITY

SELECT SOIL TYPE

| SOIL | INFILTRATION RATE (IN/HR) |
|---|---|
| SAND | 8.27 |
| LOAMY SAND | 2.41 |
| SANDY LOAM | 1.02 |
| LOAM | 0.52 |
| SILT LOAM | 0.27 |
| SANDY CLAY LOAM | 0.17 |
| CLAY LOAM | UNSUITABLE |
| SILTY CLAY LOAM | UNSUITABLE |
| SANDY CLAY | UNSUITABLE |
| SILTY CLAY | UNSUITABLE |
| CLAY | UNSUITABLE |

| | | |
|---|---|---|
| SPECIFY INFILTRATION RATE | _____ IN/HR | |
| SPECIFY SURROUNDING STONE THICKNESS | _____ FT | |
| INFILTRATION FOR EACH TREE FILTER WELL | | |
| BOTTOM INFILTRATION RATE | _____ CFS | |
| SIDEWALL INFILTRATION RATE PER FOOT OF DEPTH | _____ CFS | |
| TOTAL SIDEWALL INFILTRATION RATE** | _____ CFS | **ASSUMES 2 ADDITIONAL FEET OF SIDEWALL DUE TO GROWTH MEDIUM. |
| TOTAL INFILTRATION RATE | _____ CFS | |

## INVERT SCHEDULE

| DESCRIPTION | | ELEVATION |
|---|---|---|
| TOP OF RISER | = | _____ |
| BOTTOM OF MULCH | = | _____ |
| BOTTOM OF MEDIA/RISER | = | _____ |
| 12" PERF PVC SUBDRAIN | = | _____ |
| BOTTOM OF 1/2" WASHED STONE | = | _____ |
| ESHGWE (2' MIN. SEPARATION) | = | _____ |


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## TREE FILTER DESIGN GUIDE NOTES:

1. **GREEN STREET SYSTEMS** ARE INTENDED TO BE ECONOMICAL, LOW IMPACT DEVELOPMENT (LID), STORMWATER MANAGEMENT TREATMENT SYSTEM(S) TO ENHANCE A SITE'S OVERALL STORMWATER SYSTEM.
2. THE DESIGN ENGINEER IS RESPONSIBLE TO COMPLETE SUBSURFACE SOIL EXAMINATIONS CLASSIFICATIONS, PERMEABILITY RATES AND ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION DETERMINATIONS TO FACILITATE THE PROPER SIZING AND INSTALLATION OF THE SYSTEM(S).
3. DO NOT INSTALL THE SYSTEM AT LOW POINTS OR IN AREAS WHICH RECEIVE DIRECT SHALLOW CONCENTRATED OR CHANNEL FLOWS INTO THE SYSTEM. GRADING WILL ACCOMODATE LINEAR FLOWS INTO THE SYSTEM. GRADE FLOW IN ONE DIRECTION LINEARLY PAST THE THROAT INLET. OPPOSING FLOWS INTO THE THROAT INLET WILL CAUSE MAINTENANCE PROBLEMS AND DISTRUBANCE OF THE MEDIA.
4. DESIGN SYSTEM TO RECEIVE INITIAL CRITICAL AREA RUNOFF, WITH BYPASS FLOWS INCORPORATED INTO THE DESIGN TO ACCOMODATE HIGHER FREQUENCY STORMS. ENSURE THE BYPASS ELEVATIONS ALLOW FOR POSITIVE FLOW PAST THE SYSTEM.
5. POSITIVE DRAINAGE IS REQUIRED FOR PROPER TREATMENT OF SURFACE RUNOFF ENTERING INTO THE SYSTEM. DESIGN FOR A 2 FOOT MINIMUM VERTICAL SEPARATION FROM ESTIMATED SEASONAL HIGH GROUNDWATER.
6. PROVIDE A 3" (MIN.) TRAP THROAT HEIGHT TO ENSURE SMALL DIMENSION FLOATABLES ARE CAPTURED IN THE ENTRANCE SUMP.
7. ENSURE OUTLET DRAINS ARE SIZED TO ACCOMODATE SEPARATION FROM GROUNDWATER, DESIGN STORM FLOWS AND POSITIVE DRAINAGE.

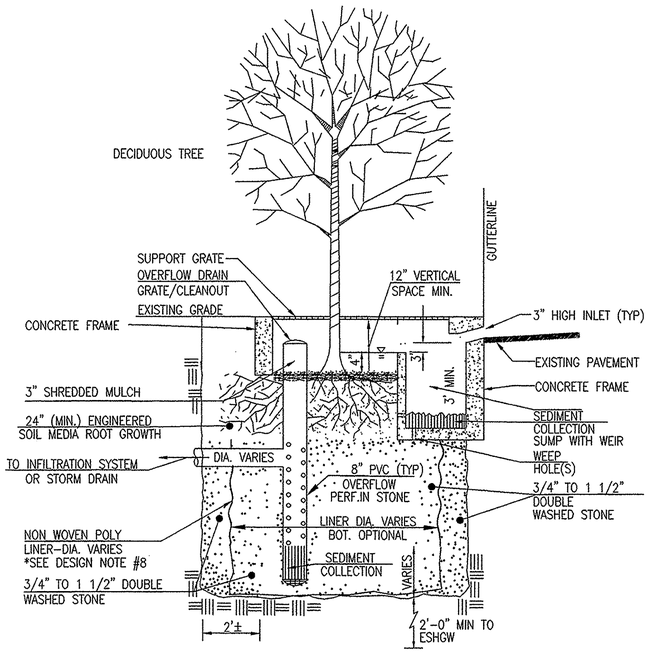
*8. THE SHAPE AND SIZE OF THE LINER CAN VARY TO ACCOMODATE SITE CONSTRAINTS AND DRAINAGE AREAS.

## MAINTENANCE SCHEDULE

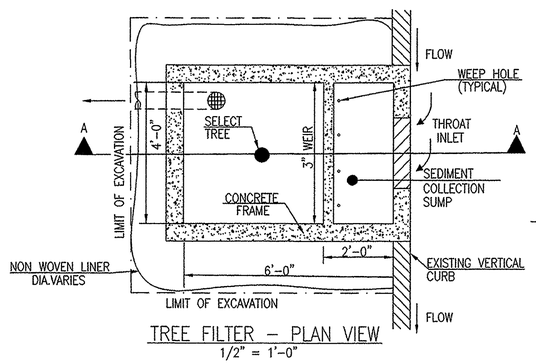
| ACTIVITY | FREQUENCY |
|---|---|
| INSPECT/CLEANING | SURFACE CLEANING (TRASH (MONTHLY)) |
| INSPECT/REPLENISH MULCH | ANNUALLY |
| REMOVE DEAD VEGETATION | ANNUALLY |
| REPLACE DEAD VEGETATION | AS NECESSARY |
| PRUNE | AS NECESSARY |
| SEDIMENT TRAP CLEANING | QUARTERLY |
| IRRIGATE | DURING TIMES OF EXTREME DROUGHT |

ALL INSPECTIONS ARE TO BE PERFORMED AND DOCUMENTED IN ACCORDANCE WITH FEDERAL, STATE, AND MUNICIPAL REQUIREMENTS. OWNER WILL KEEP PERMANENT RECORDS OF THE INSPECTIONS.

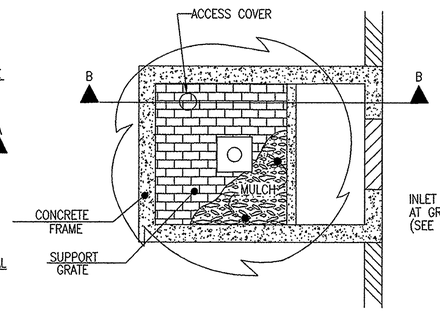
# DETAILS AND SECTIONS




TREE FILTER – CROSS SECTION A–A
1/2" = 1'-0"




TREE FILTER – PLAN VIEW
1/2" = 1'-0"



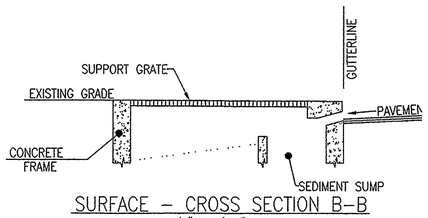

TREE FILTER – SURFACE VIEW
1/2" = 1'-0"

# CONSTRUCTION NOTES AND SPECIFICATIONS

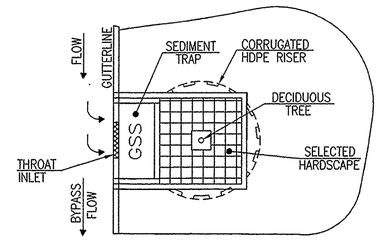
## TREE FILTER CONSTRUCTION NOTES:

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS ARE BASED ON RECORD INFORMATION AND MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY AND "DIG SAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES CONFLICTING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SECURE ALL NECESSARY STATE, MUNICIPAL AND UTILITY PERMITS AND VERIFY THE PROPOSED LOCATION OF UTILITIES WITH UTILITY COMPANIES.
3. **GREEN STREET SYSTEMS, LLC. TREE FILTER** TO BE DESIGNED AND INSTALLED AS PER FEDERAL, STATE, LOCAL AND **GREEN STREET SYSTEMS, LLC.**, REQUIREMENTS.
4. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO THE COMMENCEMENT OF ANY SITE WORK OR EARTHWORK OPERATIONS, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL REMAIN IN PLACE UNTIL ALL SITE WORK IS COMPLETE AND GROUND COVER IS ESTABLISHED. ALL EROSION CONTROL MEASURES SHALL BE ROUTINELY INSPECTED, CLEANED AND REPAIRED/REPLACED AS NECESSARY THROUGHOUT ALL PHASES OF CONSTRUCTION.
5. ALL DISTURBED OR EXPOSED AREAS SUBJECT TO EROSION SHALL BE STABILIZED WITH MULCH OR BE SEEDED FOR TEMPORARY VEGETATIVE COVER.
6. DURING CONSTRUCTION OF THE TREE FILTER SYSTEM, THE FOLLOWING MEASURES SHALL BE TAKEN:
   A. ALL STOCKPILES SHALL BE STORED DOWN GRADIENT OF THE EXCAVATION TO ENSURE THAT ANY POTENTIAL SEDIMENT DOES NOT REACH THE LOW IMPACT DEVELOPMENT (LID) AREA.
   B. ALL WATER RESULTING FROM DEWATERING ACTIVITIES SHALL BE DIRECTED AWAY FROM THE LID AREAS TO AN AREA DETERMINED BY THE ENGINEER.
   C. NO STORMWATER SHALL BE DISCHARGED INTO THESE FACILITIES UNTIL THE CONTRIBUTING AREAS ARE FULLY STABILIZED WITH PAVEMENT, VEGETATION OR OTHER PERMANENT SURFACE.
7. SILT BAGS OR HAYBALES SHALL BE UTILIZED AT ALL EXISTING AND PROPOSED TREE FILTERS SUBJECT TO STORMWATER RUNOFF FROM PROPOSED FILL AREAS DURING CONSTRUCTION, OR AS DIRECTED BY THE OWNER/ENGINEER. NO SEDIMENT SHALL ENTER THE TREE FILTER OR EXCAVATION AREA.
8. THE CONTRACTOR SHALL MINIMIZE THE AREA OF DISTURBED SOIL. EFFORTS SHALL BE MADE TO LIMIT THE TIME OF EXPOSURE OF DISTURBED AREAS.
9. RUNOFF WILL NOT BE ALLOWED TO ENTER THE TREE FILTER SYSTEM UNTIL ALL AREAS ARE PAVED, LANDSCAPED AND PERMANENTLY STABILIZED OR VEGETATED.

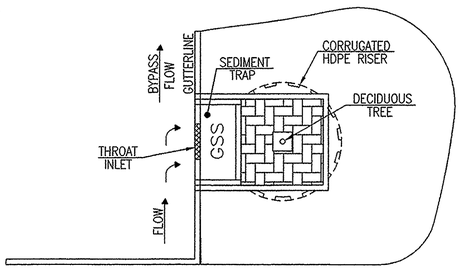
# VARIOUS CONFIGURATIONS




SURFACE – CROSS SECTION B–B
1/2" = 1'-0"

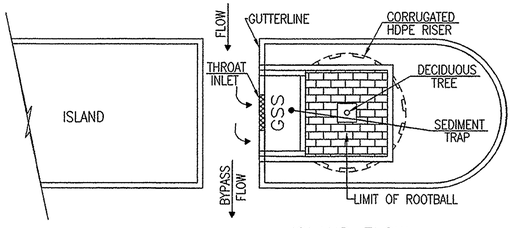



GUTTER LINE FLOW
(NOT TO SCALE)




CORNER FLOWS
(NOT TO SCALE)

INLET END OF FRAME SET AT GRADE TO MATCH EXISTING (SEE SECTION A–A)




ISLAND FLOW
(NOT TO SCALE)

SIMILAR SYSTEM TO BE USED FOR 133 YORK STREET

## IMPORTANT NOTES

1. THE PURPOSE AND INTENT OF THIS SHEET IS TO PROVIDE GENERAL DESIGN GUIDANCE, CONSTRUCTION DETAILS AND SPECIFICATIONS TO ASSIST IN THE PLANNING AND IMPLEMENTATION OF THE TREE FILTER.
2. USE OF THIS INFORMATION IS WITH THE SPECIFIC PERMISSION OF **GREEN STREET SYSTEMS, LLC.** (PATENT PENDING).
3. DESIGNER AND GENERAL CONTRACTOR SHOULD CONTACT GREEN STREET SYSTEMS, LLC FOR SITE

# GREEN STREET SYSTEMS TREE FILTER

DRAWN BY: JR/SK/PI

DESIGNED BY: PI/RCM

CHECKED BY: RCM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TREE FILTER
GENERAL DESIGN
CONSTRUCTION DETAILS
AND SPECIFICATIONS

VERSION 1.00

JUNE 26, 2009

SCALE: AS NOTED

GENERAL DESIGN DETAILS & SPECIFICATIONS

C2.4