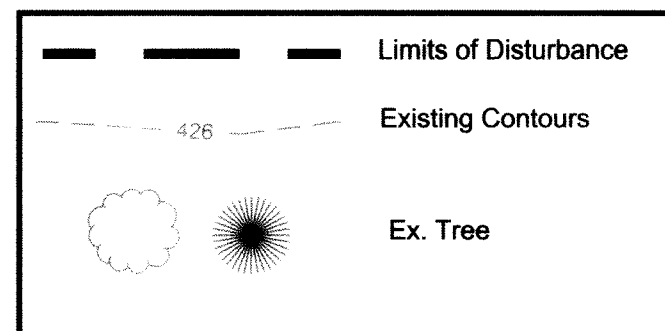


CENTENNIAL PARK SAND FILTER DESIGN

LEGEND



Sequence of Construction

1. Obtain Howard County grading permits if required. Conduct pre-construction meeting. (1 day)
2. Clear and grub in preparation to install super silt fence, silt diversion fence, pedestrian fence and inlet protection. (1day)
3. Install sediment control items (1 day)
4. Once all the necessary materials to construct the underdrain system are on site, Contractor to excavate for sandfilter bed (1 day)
5. Install sand underdrain system and pea gravel as shown on plans (2 days)
6. Install plantings and permanent seeding (1 day)
7. With Howard County sediment control inspector's permission remove remaining sediment control devices and stabilize areas disturbed by this process. (1 day)

Total = 8 days

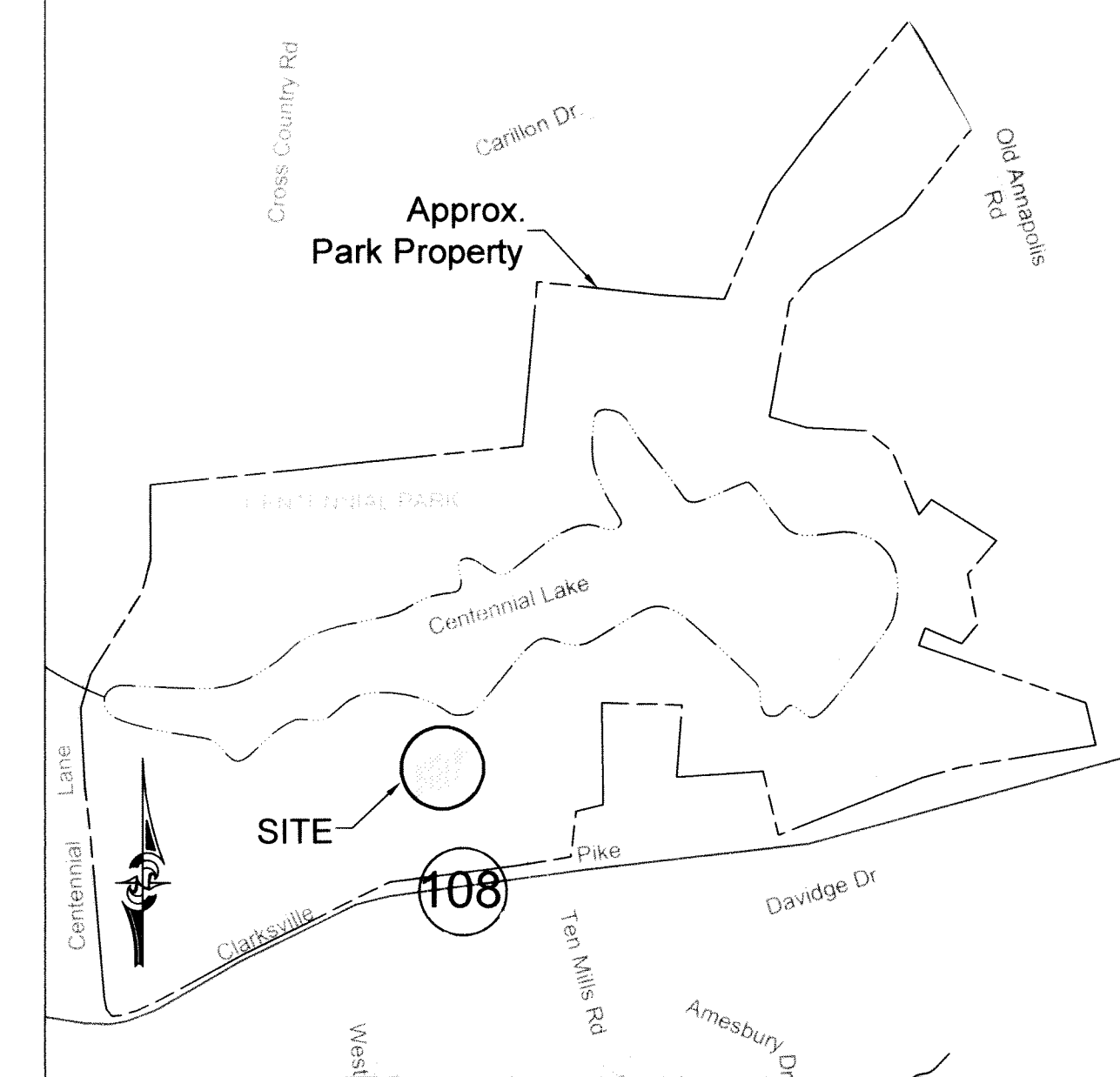
General Notes

1. These plans were prepared with the field information at the time of project survey. It is possible that field conditions as of the date of construction vary from these plans and it is the contractor's responsibility to verify field conditions such as elevations, depths, etc. prior to proceeding with work. It is the contractor's responsibility to verify with the supplier / manufacturer of any proprietary product that their product will function per the design for the field conditions at time of construction. The design engineer should be notified immediately if any deviations from the design plan are found.
2. All specified and/or proprietary products shown hereon may be subject to substitution with other products recommended by the contractor, subject to written review and approval by the design engineer.
3. All construction shall be in accordance with the latest standards and specifications of Howard County.
4. The contractor shall notify the Department of Public Works / Bureau of Engineering / Construction Inspection Division at (410) 313-4900 at least five (5) working days prior to the start of work.
5. The contractor shall notify "Miss Utility" at 1-800-257-7777 at least 48 hours prior to any excavation work.
6. The coordinates shown hereon are based upon the Howard County Geodetic control which is based upon the Maryland State Plane Coordinate System.
7. Source of existing topography is J.A. Rice Inc. field survey dated 01/20/2007. Horizontal and Vertical Datum is based on Maryland Grid NAD83/91 & NGVD29.

Survey Bench Mark

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	573054.31	1351795.34	366.80	JAR-1/GPS
2	572822.96	1351551.78	368.94	JAR-2/GPS

8. The contractor shall field visit and familiarize themselves with the site prior to bidding and construction.
9. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the most current *Maryland Standards and Specifications for Soil and Erosion and Sediment Control* and any revisions thereto.
10. The appropriate federal/state and local permits must be obtained before work commences.
11. Contractor shall not store any material and/ or equipment within 2 feet of private property.
12. Contractor shall take caution not to damage any existing trees, except those designated on the plan to be removed. Any damaged tree shall be replaced at contractor's expense.
13. All quantities are estimates only. The contractor is responsible for verifying quantities through a field visit and his own quantity takeoffs.
14. According to the Howard County G.I.S. website, this design site is not located in the 100-year floodplain. In addition, there are no wetlands or perennial stream channels located on this site.
15. On August 24, 2007, the Howard County Director of the Dept. of Planning and Zoning (DPZ) approved Waiver Petition #WP-08-002 to request to waive Section 16.155 of the Subdivision and Land Development Regulations. This approval of the waiver request is subject to the conditions that (a) the petitioner (CPJ) shall submit to HCSCD a set of plans for review and approval, and (b) the petitioner shall obtain a grading permit from the Howard County Department of Inspections, Licenses, and Permits for this project.



Vicinity Map
Howard County, MD
21st edition ADC Map: 15 G2
Approximate Scale: 1" = 2000'

SHEET INDEX

1. Title Sheet
2. Design View
3. Sediment Control Plan
4. Profiles
5. Sediment Control Notes and Details
6. Planting Plan
7. Planting Notes and Details

LIMITS OF DISTURBANCE

DA To Filter = 2.64 Ac.

DA Which Bypasses Filter = 12.9 Ac.

GP-08-28

<p>THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.</p> <p>USDA - NATURAL RESOURCES CONSERVATION SERVICE DATE</p> <p>THESE PLANS FOR SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.</p> <p>HOWARD SOIL CONSERVATION DISTRICT DATE</p> <p>BY THE OWNER/DEVELOPER:</p> <p>I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.</p> <p>OWNER/DEVELOPER DATE</p> <p>OWNER/DEVELOPER - PRINTED NAME</p>	<p>MISS UTILITY</p> <p>Call "Miss Utility" at 1-800-257-7777, 48 hours prior to the start of work. The excavator must notify all public utility companies with underground facilities in the area of proposed excavation and have those facilities located by the utility companies prior to commencing excavation.</p> <p>APPROVED DEPARTMENT OF PUBLIC WORKS</p> <p>DIRECTOR OF PUBLIC WORKS acting DATE</p> <p>CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE</p> <p>CHIEF, STORMWATER MANAGEMENT DIVISION DATE</p> <p>BY THE ENGINEER:</p> <p>I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.</p> <p>DATE</p> <p>License No. 14752, Expiration Date: 1-14-08</p>
---	---

Summary of Environmental Impacts

	Tree Removal (each)	Stream Disturbance (lf)	Wetland Disturbance (sq.ft)	Limits of Disturbance (sq.ft)	Limits of Disturbance (ac)	Cut (cy)	Fill (cy)	Net (cy)
Total	4	0	0	12,260	0.28	1,115	70	1045

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
6751 COLUMBIA GATEWAY DRIVE, SUITE 514
COLUMBIA, MD 21046
PHONE: (410) 313-6413
ATTN: MARK RICHMOND

HOWARD COUNTY, MD
PUBLIC RECREATION
PARCEL 9
ELECTION DISTRICT 5
MAP 30 GRID 7

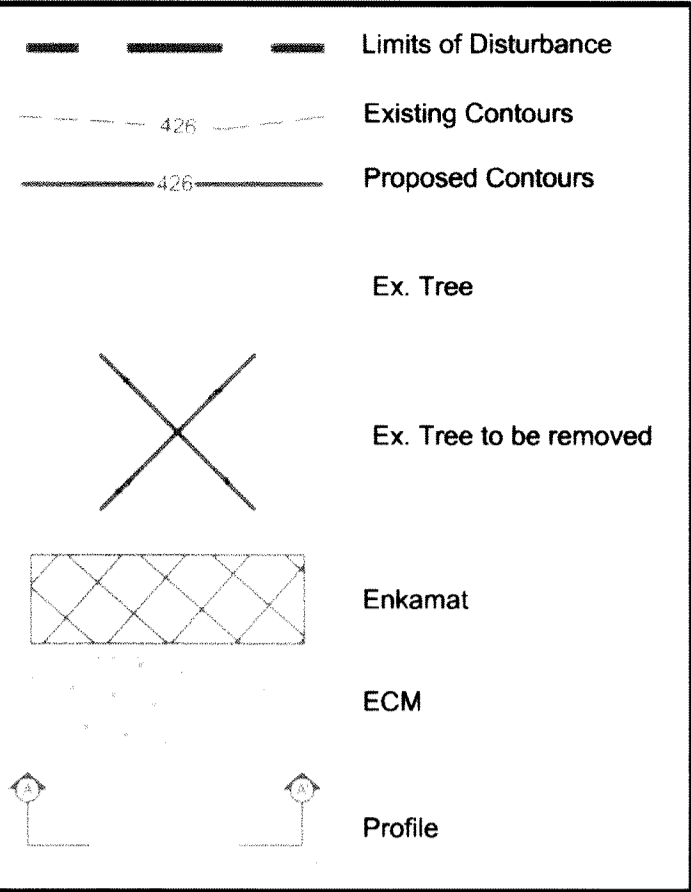
CENTENNIAL PARK
SAND FILTER DESIGN
Title and Existing

DATE:	10/07				
DESIGNED:	TCS				
DRAFTED:	HT				
CHECKED:	TCS				
BASE DATA:	J.A. RICE	NO.	REVISIONS	BY	DATE

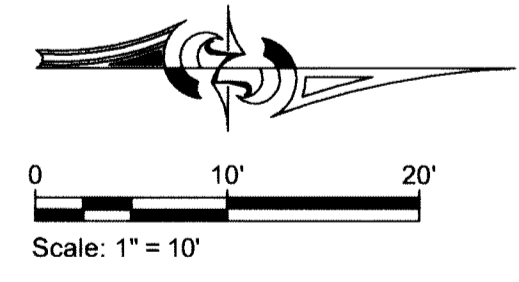
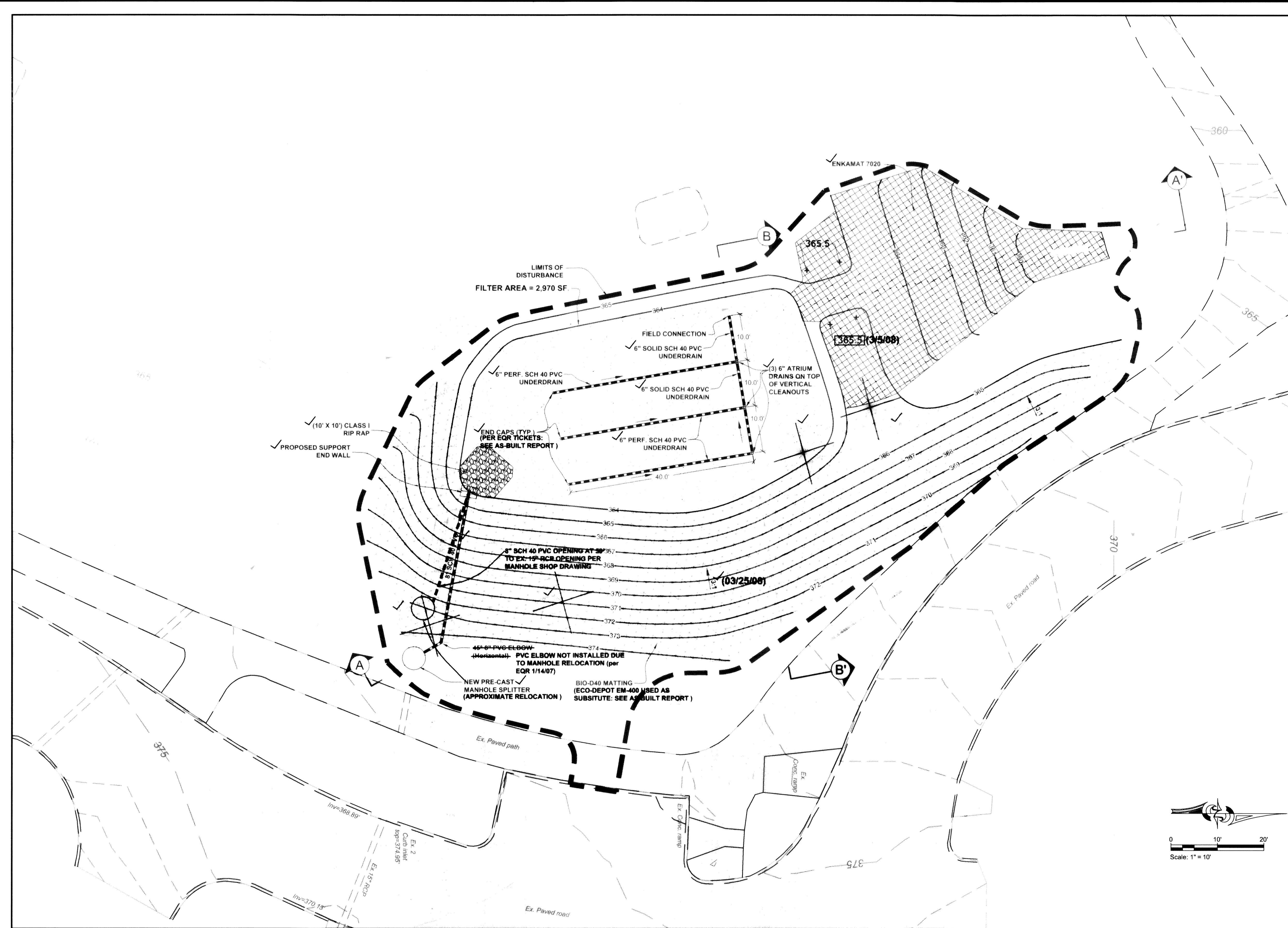
CPJ Associates
CPJ Environmental Services Division
STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
910 CLOPPER ROAD, STE 215N GAITHERSBURG MARYLAND 20878
Phone: (301) 208-9573 E-mail: env@cpja.com Fax: (301) 926-4551
SILVER SPRING, MD FREDERICK, MD FAIRFAX, VA

SCALE AS SHOWN
SHEET 1
OF 7 SHEETS
JOB NO. 36-524

LEGEND



- General As-built Notes:**
1. As-built elevations were not professionally surveyed. Elevations were taken by CPJ staff (CW) on the dates indicated, unless noted as taken by EQR (taken during construction phase). CPJ used the top of "Ex. 2 curb inlet top" as the benchmark for elevations.
 2. Checked items were visually confirmed by CPJ staff (CW), unless otherwise noted.
 3. Approximate east embankment slope confirmed by CPJ staff (CW) on date indicated.



I hereby certify that I am a duly licensed Professional Engineer under the laws of the State of Maryland.
 No. 14751
 Michael G. Campbell
 PROFESSIONAL ENGINEER
 1/14/07
 14751
 4/14/08

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
 6751 COLUMBIA GATEWAY DRIVE, SUITE 514
 COLUMBIA, MD 21046
 PHONE: (410) 313-6413
 ATTN: MARK RICHMOND

HOWARD COUNTY, MD PUBLIC RECREATION
 PARCEL 9
 ELECTION DISTRICT 5
 MAP 30 GRID 7

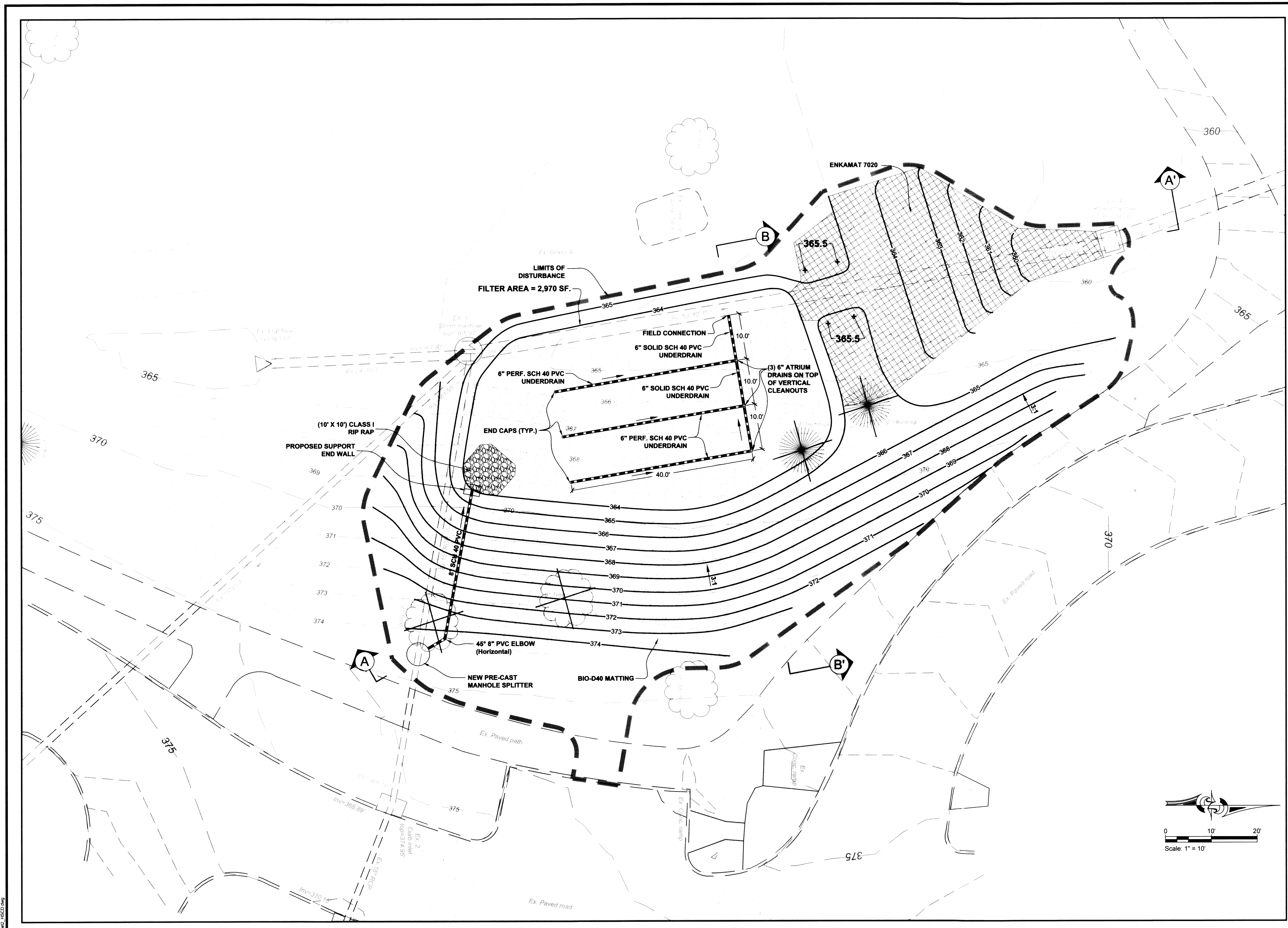
CENTENNIAL PARK SAND FILTER DESIGN
 Design View As-built

DATE:	12/08				
DESIGNED:	TCS				
DRAFTED:	HT/CW				
CHECKED:	TCS/DO				
BASE DATA:	J.A. RICE				
	NO.	REVISIONS	BY	DATE	

CPJ Associates CPJ Environmental Services Division
 STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
 910 CLOPPER ROAD, STE 215N GAITHERSBURG MARYLAND 20878
 Phone: (301) 208-9573 E-mail: env@cpj.com Fax: (301) 926-4551
 SILVER SPRING, MD FREDERICK, MD FAIRFAX, VA

SCALE AS SHOWN
 SHEET **2-1** OF 73 SHEETS
 JOB NO. 36-524

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 Design base: As-built.dwg



LEGEND

	Limits of Disturbance
	Existing Contours
	Proposed Contours
	Ex. Tree
	Ex. Tree to be removed
	Enkamat
	ECM
	Profile

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
 6751 COLUMBIA GATEWAY DRIVE, SUITE 514
 COLUMBIA, MD 21046
 PHONE: (410) 313-6413
 ATTN: MARK RICHMOND

HOWARD COUNTY, MD
 PUBLIC RECREATION
 PARCEL 9
 ELECTION DISTRICT 5
 MAP 30 GRID 7

**CENTENNIAL PARK
 SAND FILTER DESIGN**
 Design View

DATE:	10/07				
DESIGNED:	TCS				
DRAFTED:	HT				
CHECKED:	TCS				
BASE DATA:	J.A. RICE	NO.	REVISIONS	BY	DATE

CPJ Associates CPJ Environmental Services Division
 STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
 910 CLOPPER ROAD, STE. 215N GAITHERSBURG, MARYLAND 20878
 Phone: (301) 208-9573 E-mail: emar@cpja.com Fax: (301) 926-4551
 SILVER SPRING, MD FREDERICK, MD FAIRFAX, VA

SCALE AS SHOWN
 SHEET
2
 OF 7 SHEETS
 JOB NO.
 36-524

No. 24-207 10/07/07 User: JAR
 Project: P:\Centennial Park Sand Filter.dwg
 Plot: P:\Centennial Park Sand Filter.dwg
 Date: 10/07/07

GENERAL INSTALLATION NOTES

- Contractor to strictly follow the approved design and construction specifications. Any substitutions are to be pre-approved by the inspector and design engineer in writing prior to placement of materials.
- The bioretention facility may not be constructed until all contributing drainage areas to each facility are stabilized. Construction of the facility shall not proceed without prior authorization of the inspector.
- No "rock dust" can be used for sand.
- Unless otherwise noted, all poured in place concrete shall be 3500 psi at 28 days.
- Contact "Miss Utility" at 1-800-257-7777 at least 48 hours prior to the start of construction.

UNDERDRAIN INSTALLATION SPECIFICATIONS

- Pipe shall be 6" diameter perforated SCH 40 PVC with 3/8" diameter holes, or approved equivalent.
- Perforations are to be 3/8-inch diameter, located 90 degrees on center, every four inches on center along the underdrain pipe. More rows may be used, if desired.
- Pipe shall be surrounded by a bed of 3/4" diameter clean gravel.
- Under drains to be placed on a 3'-0" wide section of filter cloth (Mirafi 140 N, or approved equivalent). Pipe is placed next, followed by the gravel bedding.
- The ends of under drain pipes not terminating in an observation well shall be capped. Cleanout/Observation well cap shall be an Atrium drain to be placed on pipe.

SOIL SPECIFICATIONS

1. Sand Specifications:

Provide clean sand, free of deleterious materials. Sand shall meet AASHTP M-6 or ASTM C-33 with grain size of 0.02"-0.04".

2. Compaction:

It is very important to minimize compaction of both the base of the bioretention area and the required backfill. When possible, use excavation hoes to remove original soil. If areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires.

Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and storage volumes and is not acceptable. Compaction will significantly contribute to design failure. Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to restructure the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

When back filling the bioretention facility, place soil in lifts 12" or greater. Do not use heavy equipment within the basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

3. Geotextile Specifications:

- Geotextile fabric shall meet ASTM D-751 (puncture strength - 125 lb)
- ASTM D-1117 (Mullen burst strength - 400 PSI)
- ASTM D-1682 (Tensile strength - 300 lb)
- Fabric shall have 0.08" thick E.O.S. of #80 sieve, and maintain 125 GPM per sq. ft. flow rate.

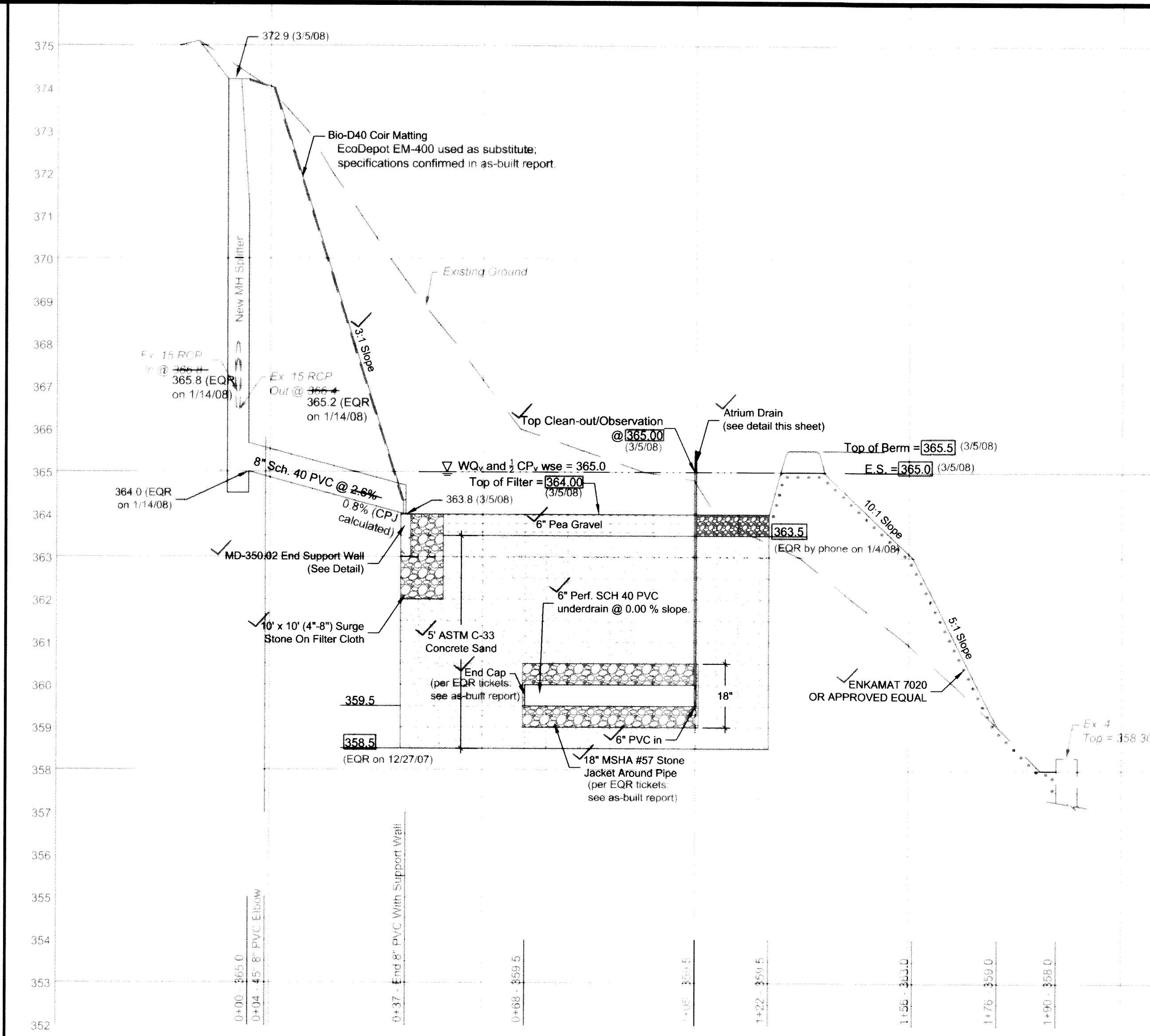
4. Gravel Filter Specifications:

Underdrain gravel blanket shall be double washed, #57 stone, 1- 1/2" in size. Pea Gravel shall be washed, river-run, round diameter, 1/2"-3/4" in size.

5. Enkamat: See specification, sheet 5.

6. Inspection Requirements:

- The contractor shall arrange a "preconstruction meeting" with the owner and architect/engineer prior to beginning work on the bioretention facility.
- At the completion of excavation to inspect subgrade preparation.
- During underdrain and filter installation.
- Back fill of sand and pea gravel. Soil certifications for back fill are required.
- The final topsoil layers should be thoroughly wetted achieve settlement of the soil/sand backfill mix.
- The work shall be inspected by the owner/architect prior to final stabilization.
- Sediment & erosion control practices may be removed upon approval by the County inspector.



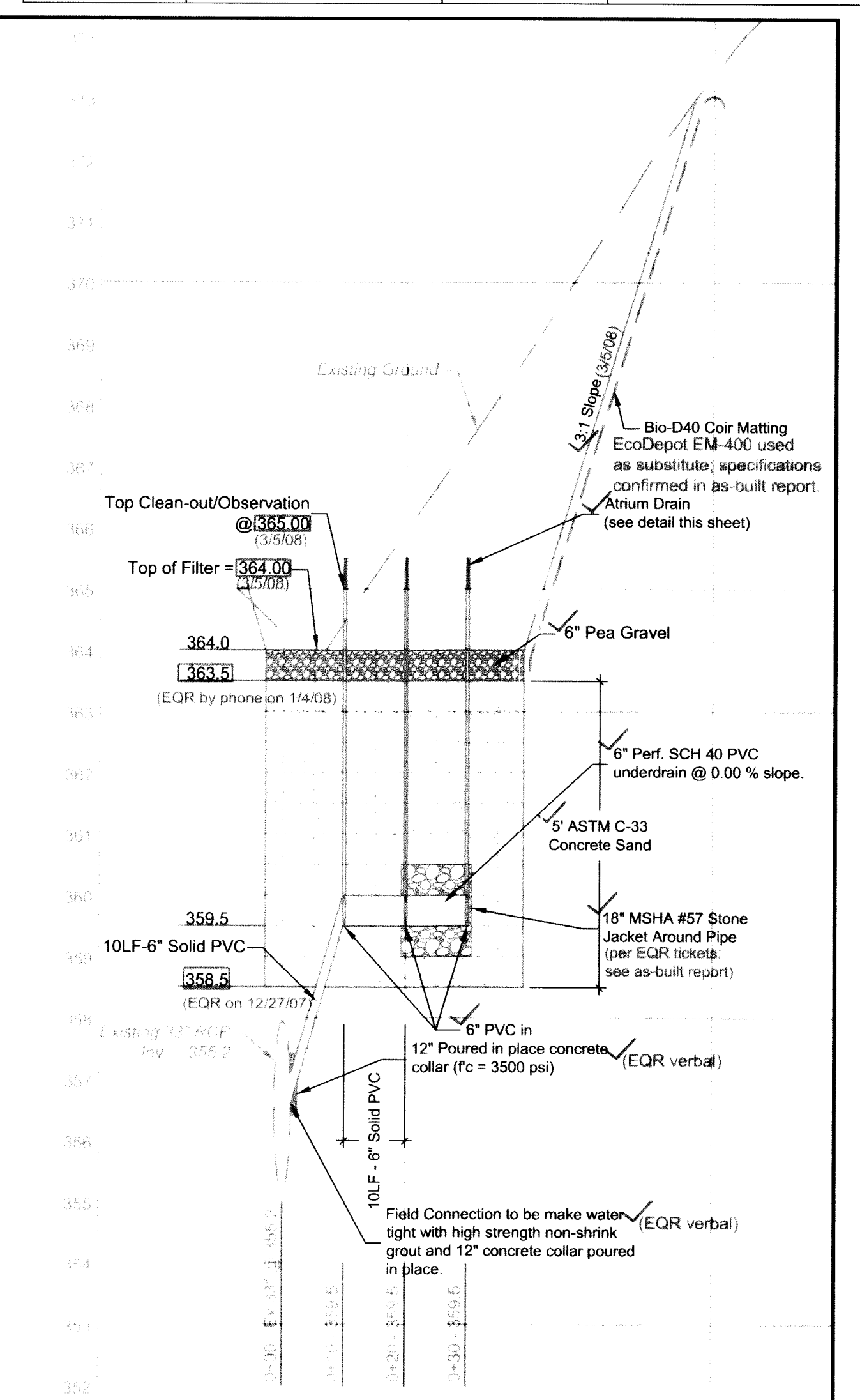
Profile A-A'

Vertical: 1" = 2'-0"

Horizontal: 1" = 20'-0"

PIPE SCHEDULE

Location	Material	Length	Specification
Cleanout	Solid 6" PVC	35'	Schedule 40
Underdrain	Solid 8" PVC	37'	Schedule 40
Underdrain	Perforated 6" PVC	130'	Schedule 40

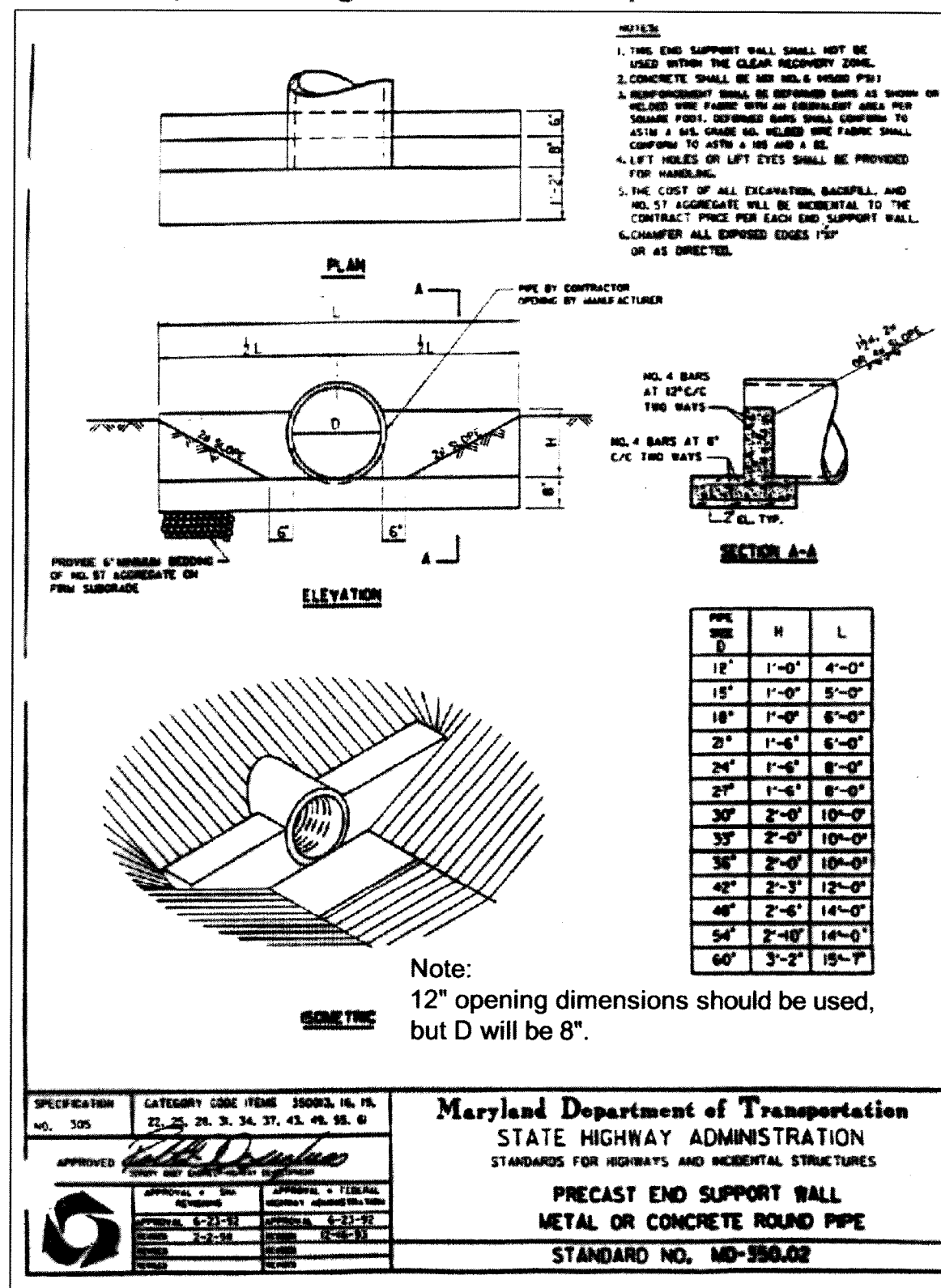


Profile B-B'

Vertical: 1" = 2'-0"

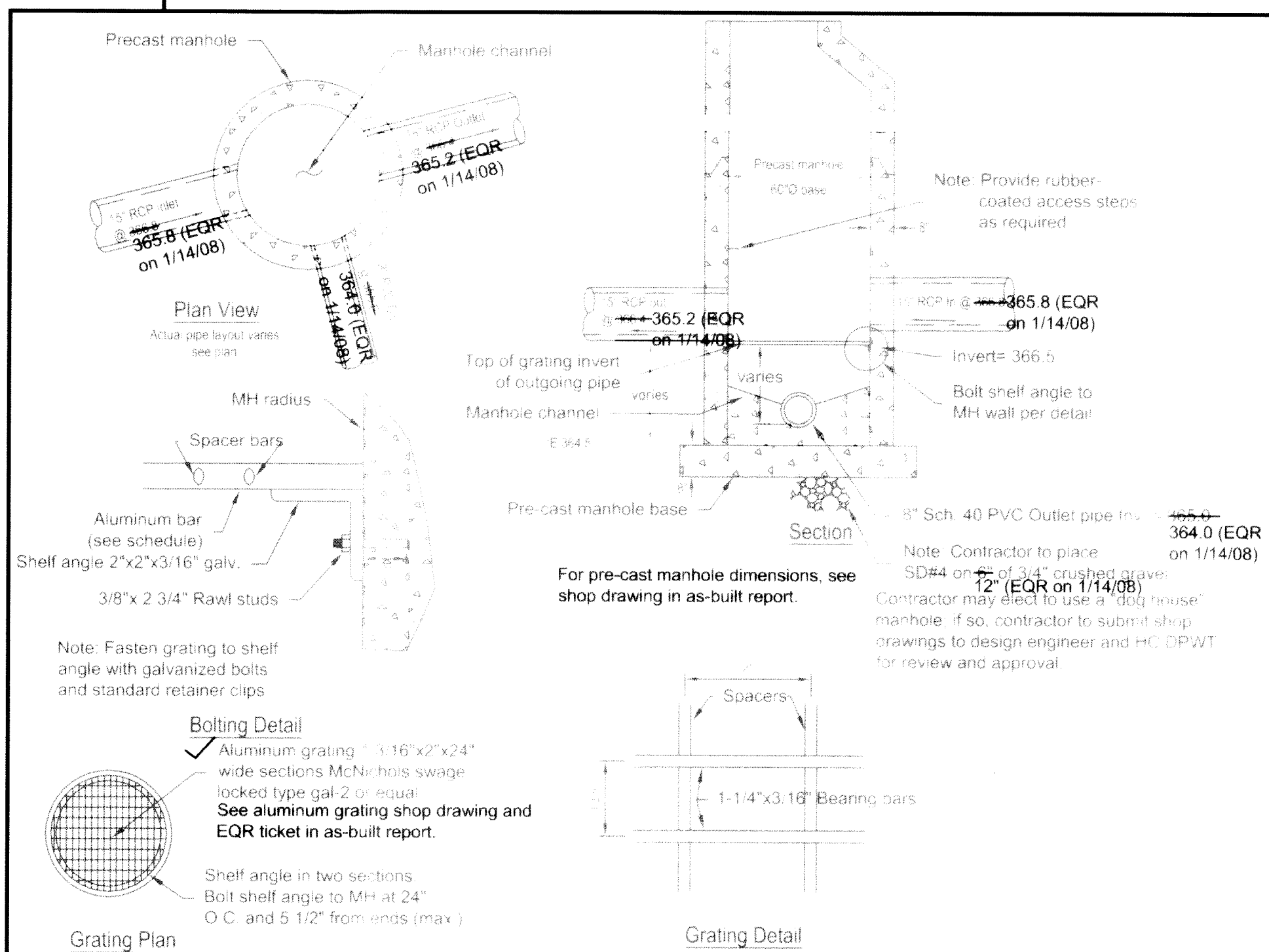
Horizontal: 1" = 20'-0"

See shop drawings in as-built report for end wall dimensions.



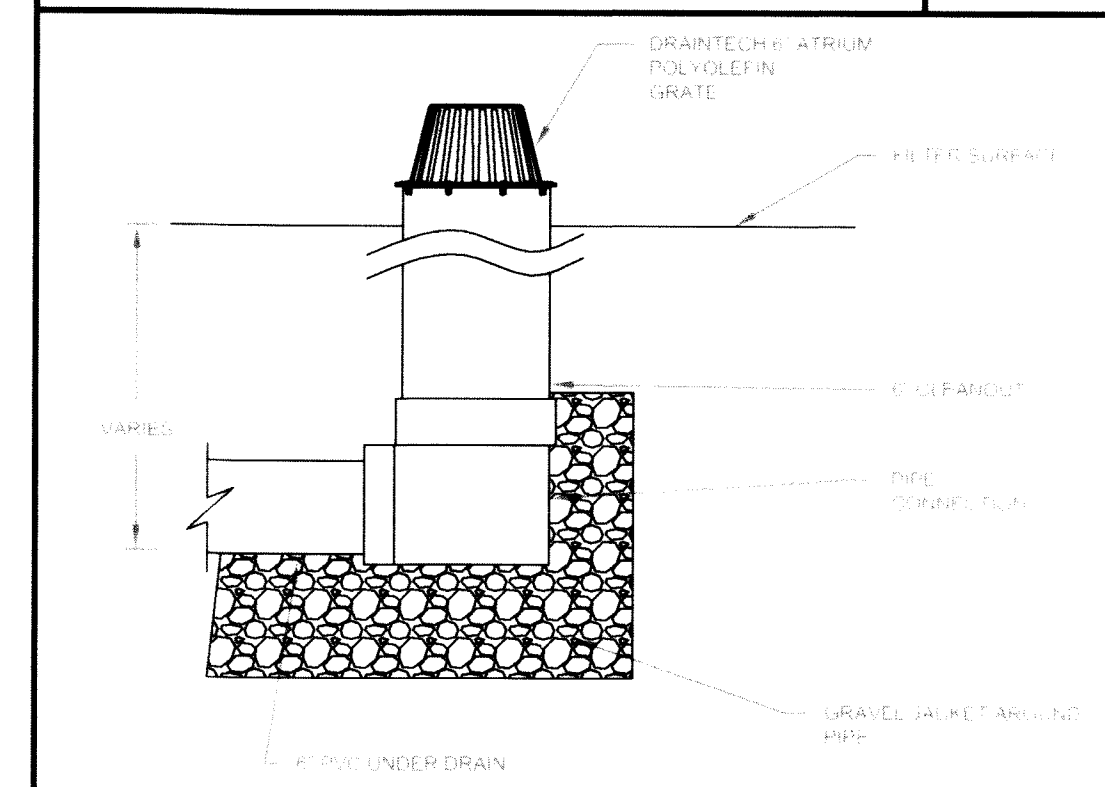
End Support Wall

N.T.S.



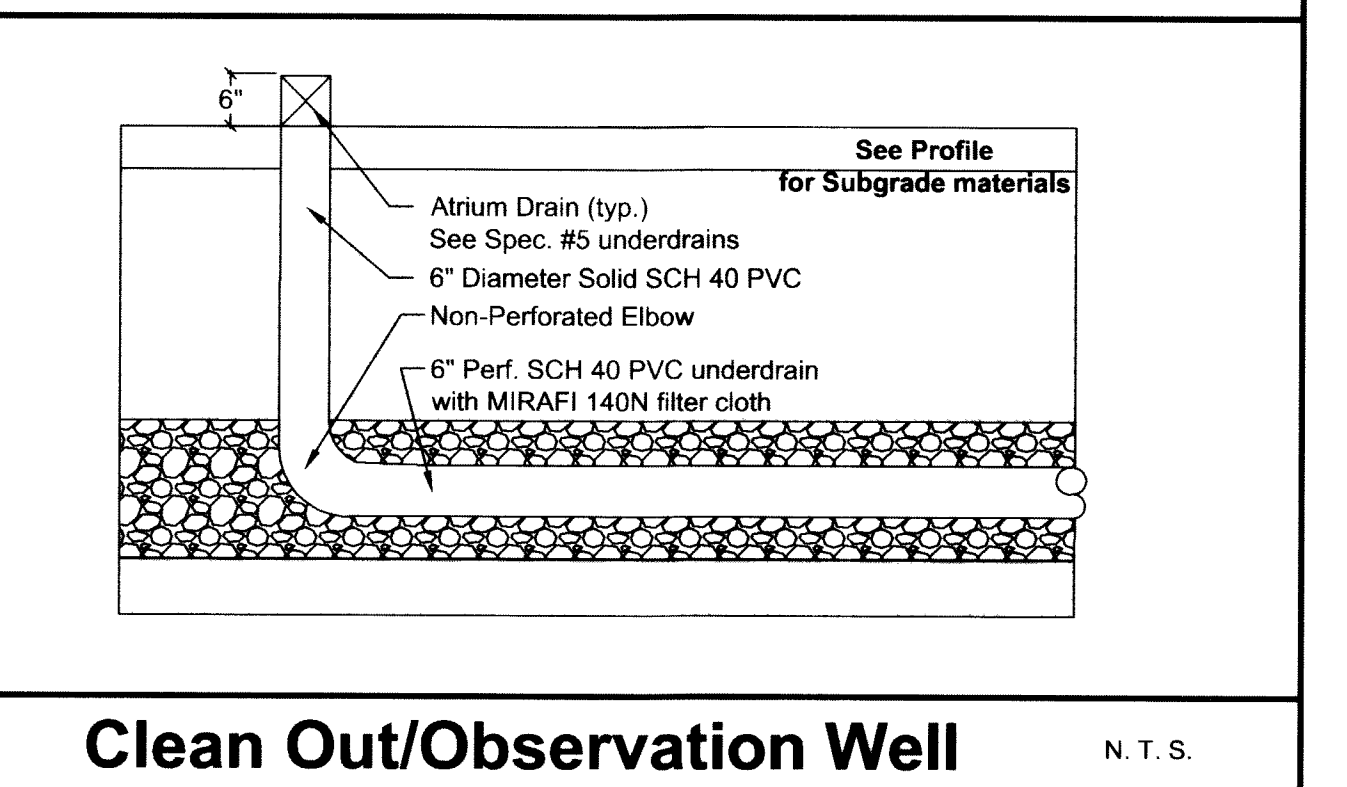
Manhole Flow Splitter

N.T.S.



ADS Drantech - Atrium Grate

N.T.S.



Clean Out/Observation Well

N.T.S.

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
6751 COLUMBIA GATEWAY DRIVE, SUITE 514
COLUMBIA, MD 21046
PHONE: (410) 313-6413
ATTN: MARK RICHMOND

HOWARD COUNTY, MD
PUBLIC RECREATION
PARCEL 9
ELECTION DISTRICT 5
MAP 30 GRID 7

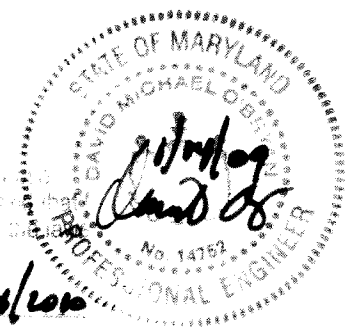
**CENTENNIAL PARK
SAND FILTER DESIGN**
Profile and Bioretention Specifications
As-built

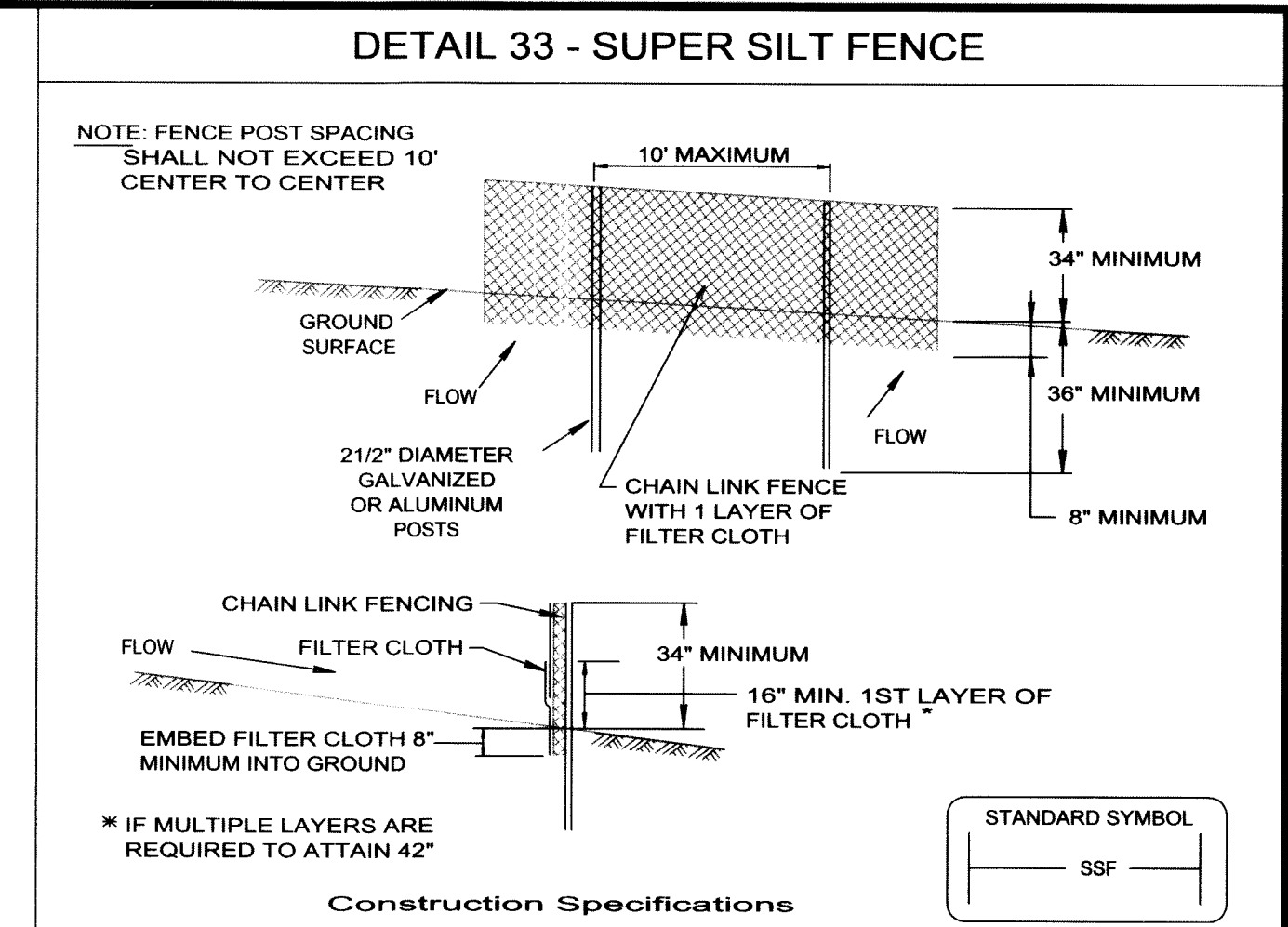
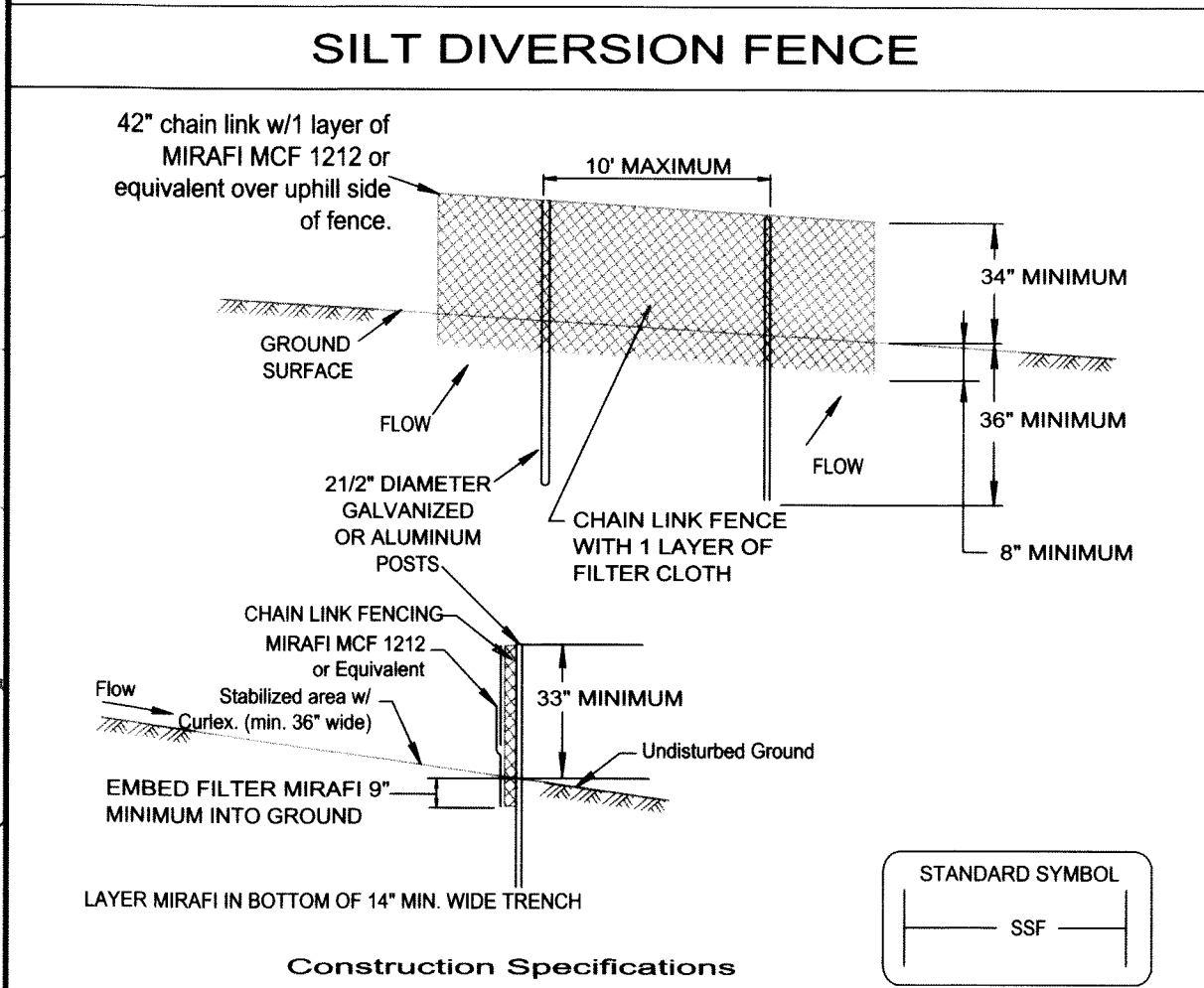
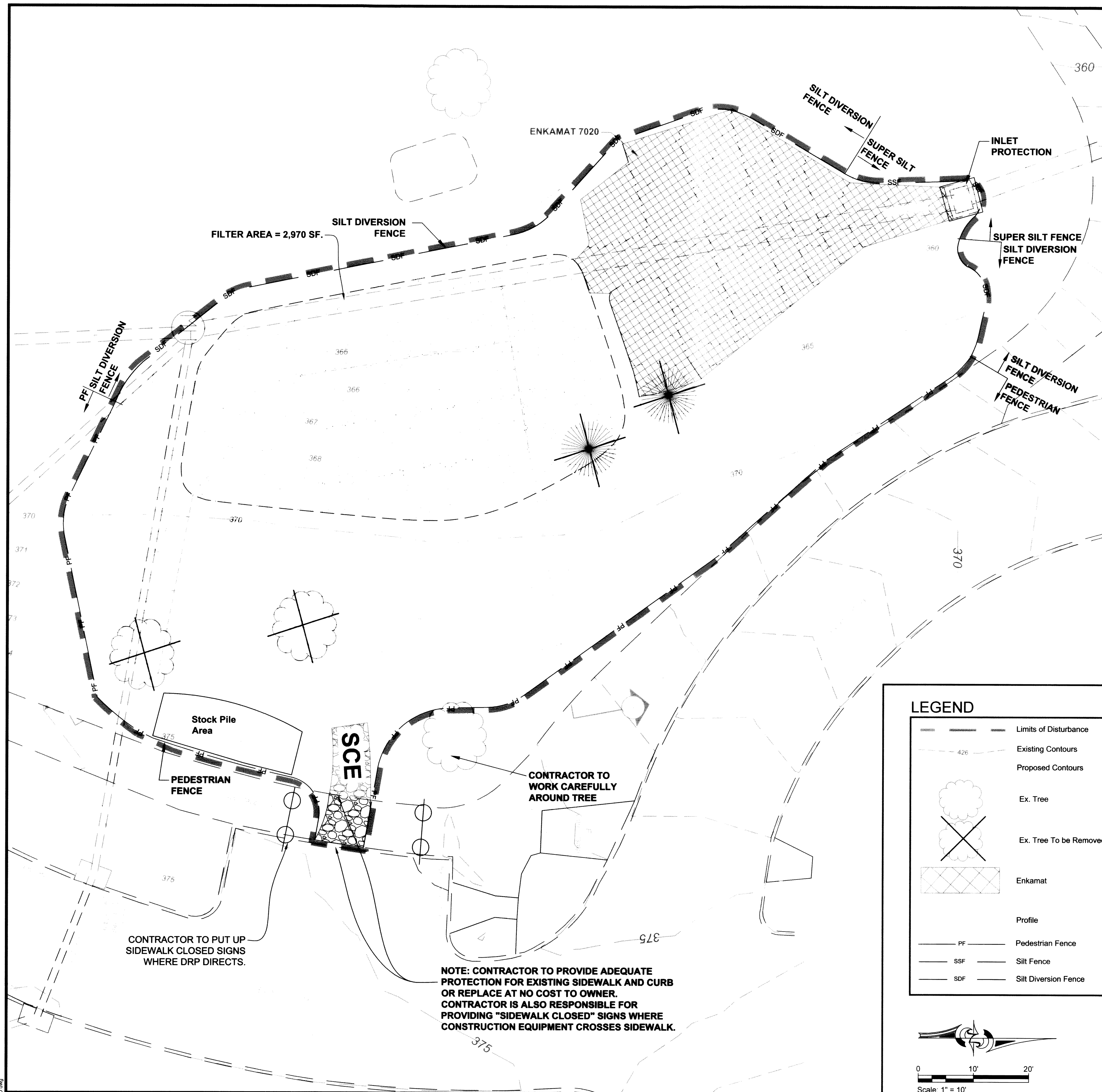
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DESIGNED:	TCS				
DRAFTED:	HT/CW				
CHECKED:	TCS/DO				
BASE DATA:	J.A. RICE	NO.		REVISIONS	BY DATE

CPJ Associates
CPJ Environmental Services Division
STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
910 CLOPPER ROAD, STE 215N GAITHERSBURG MARYLAND 20878
Phone: (301) 208-9573 E-mail: env@cpja.com Fax: (301) 926-4551
SILVER SPRING, MD. FREDERICK, MD. FAIRFAX, VA

SCALE
AS SHOWN
SHEET
42
OF 73 SHEETS
JOB NO.
36-524

12/07/2008 1:27:24 PM User: mchase
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 Atrium Drain STD-110: As-Built.dwg
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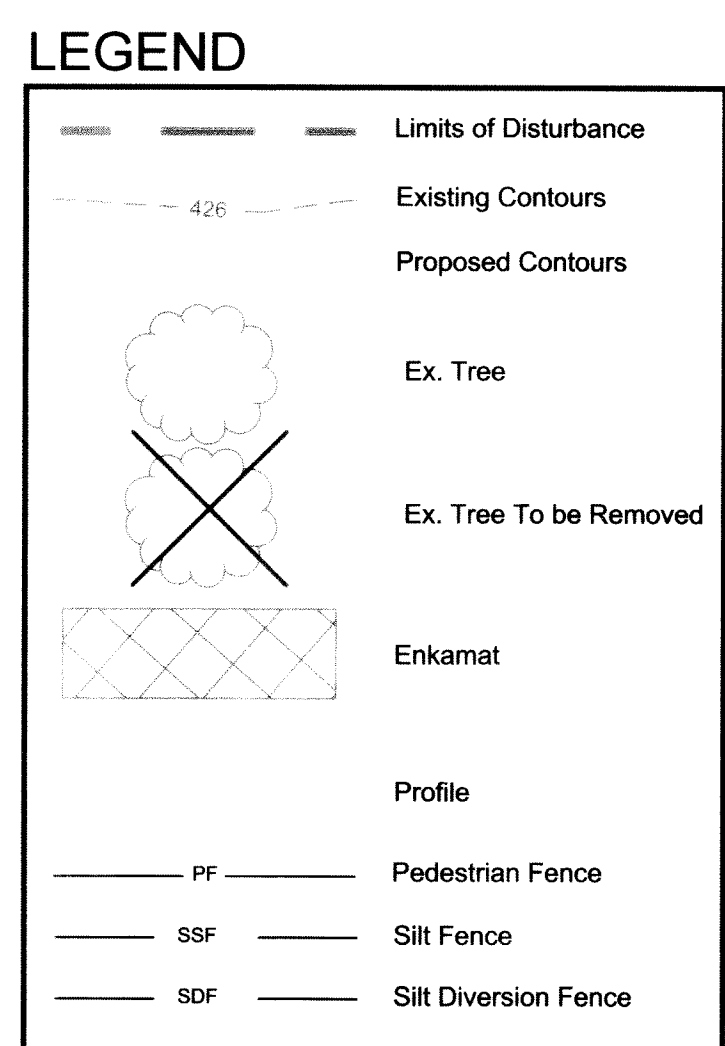


- SILT DIVERSION FENCE**
Not to scale
- Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
 - Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence.
 - Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
 - Filter cloth shall be embedded a minimum of 8" into the ground.
 - When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
 - Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height

- Construction Specifications**
- Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
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 - Filter cloth shall be embedded a minimum of 8" into the ground.
 - When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
 - Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height
 - Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:
- | | | |
|----------------------|----------------------------|----------------|
| Tensile Strength | 50 lbs/in. (min.) | Test: MSMT 509 |
| Tensile Modulus | 20 lbs/in. (min.) | Test: MSMT 509 |
| Flow Rate | 0.3 gal/ft. min/ute (max.) | Test: MSMT 322 |
| Filtering Efficiency | 75% (min.) | Test: MSMT 322 |
- U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE H - 26 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

1 SILT DIVERSION FENCE
Not to scale

2 SUPER SILT FENCE
Not to scale



30.0 DUST CONTROL
Definition: Controlling dust blowing and movement on construction sites and roads.
Purpose: To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards, and improve traffic safety.
Conditions Where Practice Applies: This practice is applicable to areas subject to dust blowing and movement where on and off-site damage is likely without treatment.
Specifications: Temporary Methods: 1. Mulches - See standards for vegetative stabilization with mulches only. Mulch should be crimped or tacked to prevent blowing. 2. Vegetative Cover - See standards for temporary vegetative cover. 3. Tillage - To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12' apart, spring-toothed harrows, and similar plows are examples of equipment which may produce the desired effect. 4. Irrigation - This is generally done as an emergency treatment. Site is sprinkled with water until the surface is moist. Repeat as needed. At no time should the site be irrigated to the point that runoff begins to flow. 5. Barriers - Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing. Barriers placed at right angles to prevailing currents at intervals of about 10 times their height are effective in controlling soil blowing. 6. Calcium Chloride - Apply at rates that will keep surface moist. May need retreatment.
Permanent Methods: 1. Permanent Vegetation - See standards for permanent vegetative cover, and permanent stabilization with sod. Existing trees or large shrubs may afford valuable protection if left in place. 2. Topsoiling - Covering with less erosive soil materials. See standards for topsoiling. 3. Stone - Cover surface with crushed stone or coarse gravel.
References: 1. Agriculture Handbook 346. Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss. 2. Agriculture Information Bulletin 354. How to Control Wind Erosion. USDA-ARS. H-30-1

DUST CONTROL SPECIFICATION

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

USDA - NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

John R. Plutko 11/19/07
HOWARD SOIL CONSERVATION DISTRICT DATE

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
6751 COLUMBIA GATEWAY DRIVE, SUITE 114
COLUMBIA, MD 21046
PHONE: (410) 313-6413
ATTN: MARK RICHMOND

HOWARD COUNTY, MD PUBLIC RECREATION
PARCEL 9
ELECTION DISTRICT 5
MAP 30 GRID 7

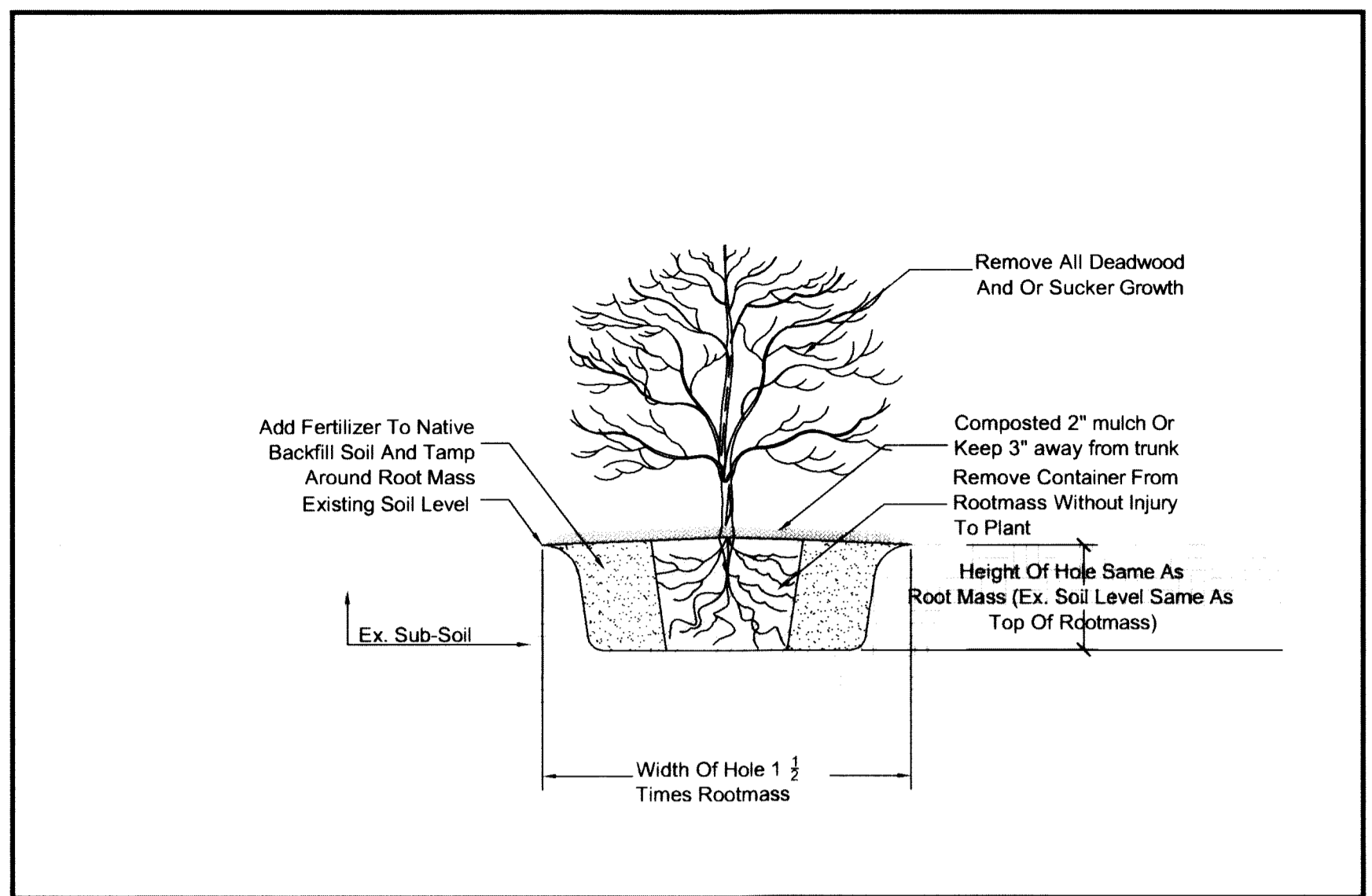
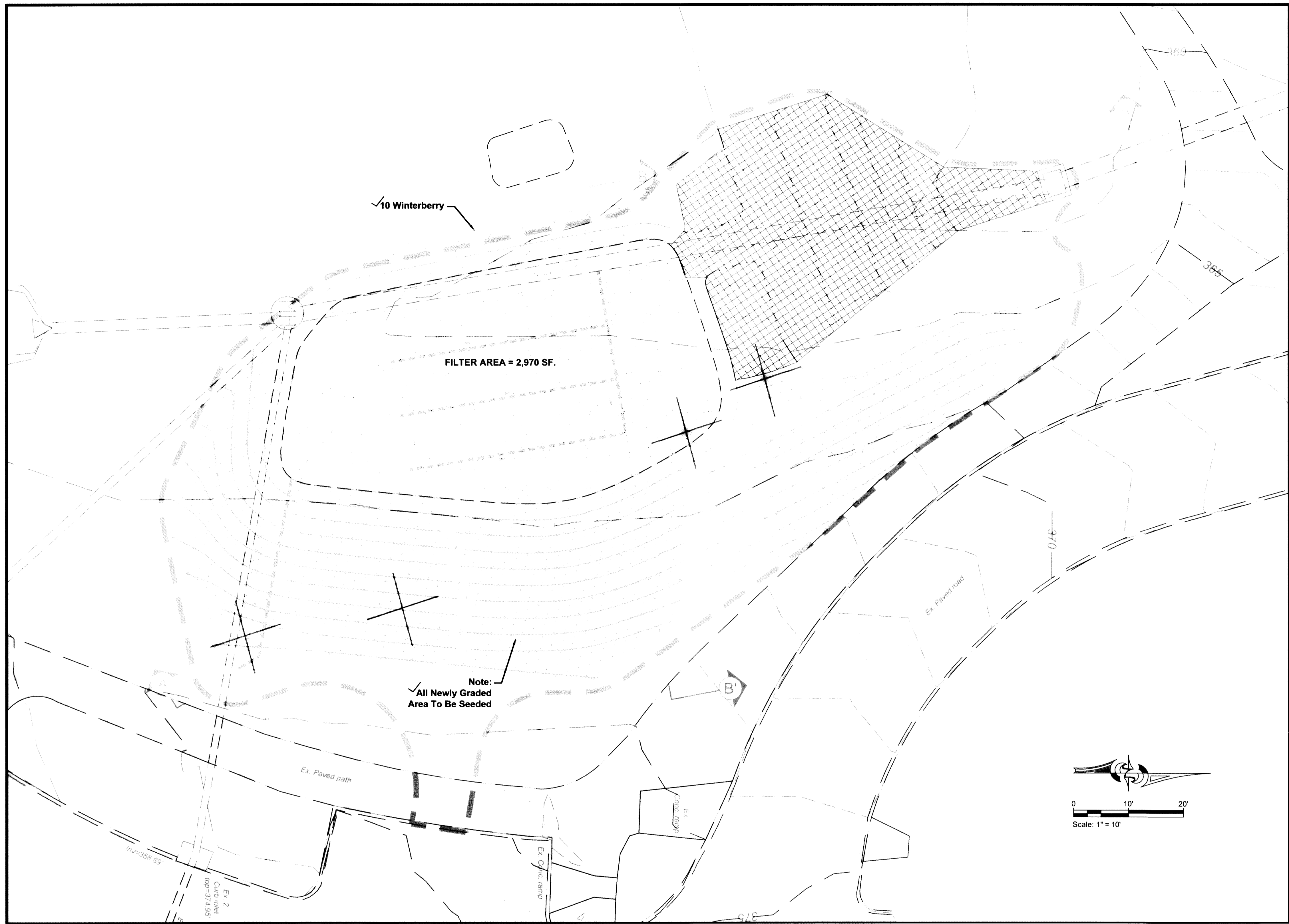
CENTENNIAL PARK SAND FILTER DESIGN
Sediment Control Plan

DATE:	10/07				
DESIGNED:	TCS				
DRAFTED:	HT				
CHECKED:	TCS				
BASE DATA:	J.A. RICE	NO.			
		REVISIONS		BY	DATE

CPJ Associates
CPJ Environmental Services Division
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SILVER SPRING, MD FREDERICK, MD FAIRFAX, VA

SCALE AS SHOWN
SHEET 3 OF 7 SHEETS
JOB NO. 36-524

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Project: E:\Communit Park Sand Filter 800109\CAD\DWG\100%Sheet3_HSCD.dwg
Scale: 1" = 10'



2 SHRUB PLANTING DETAIL
Not to Scale

BIORETENTION PLANTING SCHEDULE

ID	Common Name	Scientific Name	Size	QTY	Spacing	Notes
○	Winterberry	<i>Ilex verticillata</i>	2 Gal.	10	As Shown	

Note: Newly graded areas to be seeded with application rate at 8.0 lb/1,000 sf. All grass seed varieties must be selected from list of recommended cultivars of Turf-type tall fescues as indicated by the University of Maryland Agronomy Mimeo 77 (Revised May 2006) or most current edition. Seed mix shall consist of a three way blend (34%, 33%, 33%) of Turf-type tall fescues from the University of Maryland list of recommended cultivars.

See EQR receipt in as-built report for tall fescue cultivars used.

Turf-Type Tall Fescue

The following recommended turf-type tall fescue cultivars may be seeded individually or in blends:

And 3 rd	Empress ¹	Lion ²	Shenandoah II ¹
Averger	Endeavor	Magellan	Shenandoah ¹
Barerra ³		Masterpiece	
Batexas			
Biltmore ³	Falcon IV	Millennium	
Bingo	Falcon II ¹	Mustang 3 ¹	Southern Choice ^{1,4}
	Fidelity		SR 8250
			SR 8300 ²
Bonsai 2000 ¹	Finelawn Petite ⁴	Onyx ¹	
Bravo ¹		Padre ¹	
		Penn 1901	Stetson ^{1,2}
Chapel Hill ¹	Genesis ⁴	Picasso	Tartan ¹
	Good-En	Quest	Tartan II
Cochise III	Grande	Raptor	
Constitution		Rebel 2000 ¹	T-F68 ¹
	Greenkeeper WAF	Rebel Exeoda	Titan 2 ¹
		Rebel Sentry ¹	Titanium
Coyote II ¹		Red Coat ¹	Tulsa ¹
Coyote ¹	Hounding 5	Regiment II	Turbo
Crewcut II ¹		Rembrandt	
Davinci	Inferno	Rencillon	Ultimate
		Renegade ^{1,2}	
		Reserve ¹	Virvue
Dominion ¹	Jaguar 3 ¹		
Durana ¹	Justice	2 nd Millennium	Watchdog
Duster ¹	Kalahari		Wolfpack
	Laramie ³		WFEZE ¹
Dynasty ¹			Wyatt

KEY POINTS:
1. Recommended cultivars have been evaluated for performance in Maryland and Virginia.
2. Maryland Certified Seed must contain only recommended cultivars.
3. Recommended cultivars may provide better quality of turf, improve ground cover.
4. The use of recommended cultivars reduces mowing time and maintenance problems.
5. Recommended cultivars have proven better tolerance to drought, water, and insect damage.
Cultivar listed in boldface are considered to be available in Maryland or Virginia for 2 years, or may be difficult to find due to limited or no seed availability.
Cultivar followed by a superscripted notation may be removed from this list for the following reasons:
Cultivar 1 - May be removed from the list due to declining field performance relative to other cultivars.
Cultivar 2 - May be removed from the list due to declining seed quality.
Cultivar 3 - May be removed from the list due to declining ability of recommended cultivars.
Cultivar 4 - May be removed from the list due to the lack of turf seed testing data relative to other cultivars.
The cultivar will be removed from the list if it is not included in the most available cultivar list.

LANDSCAPE ARCHITECT CERTIFICATE:
I hereby certify that this plan is prepared in accordance with Howard County Forest Conservation Regulations.

Date: James M. Fetchu, RLA
Registered Landscape Architect
MD #3241

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
6751 COLUMBIA GATEWAY DRIVE, SUITE 514
COLUMBIA, MD 21046
PHONE: (410) 313-6413
ATTN: MARK RICHMOND

HOWARD COUNTY, MD PUBLIC RECREATION
PARCEL 9
ELECTION DISTRICT 5
MAP 30 GRID 7

CENTENNIAL PARK SAND FILTER DESIGN

Planting Plan As-built

DATE:	12/08				
DESIGNED:	TCS				
DRAFTED:	HT/CW				
CHECKED:	TCS/DO				
BASE DATA:	J.A. RICE	NO.	REVISIONS	BY	DATE

CPI Associates CPJ Environmental Services Division
STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
910 CLOPPER ROAD, STE 216N GAITHERSBURG MARYLAND 20878
Phone: (301) 208-9573 E-mail: env@cpj.com Fax: (301) 926-4551
SILVER SPRING, MD FREDERICK, MD FAIRFAX, VA

SCALE AS SHOWN
SHEET 6-3
OF 73 SHEETS
JOB NO. 36-524

Scale: Planting base: as-built.dwg
24-361 Title: As-built.dwg

GENERAL INSTALLATION NOTES

- Contractor to strictly follow the approved design and construction specifications. Any substitutions are to be pre-approved by the inspector and design engineer in writing prior to placement of materials.
- The bioretention facility may not be constructed until all contributing drainage areas to each facility are stabilized. Construction of the facility shall not proceed without prior authorization of the inspector.
- No "rock dust" can be used for sand.
- Unless otherwise noted, all poured in place concrete shall be 3500 psi at 28 days.
- Contact "Miss Utility" at 1-800-257-7777 at least 48 hours prior to the start of construction.

UNDERDRAIN INSTALLATION SPECIFICATIONS

- Pipe shall be 6" diameter perforated SCH 40 PVC with 3/8" diameter holes, or approved equivalent.
- Perforations are to be 3/8-inch diameter, located 90 degrees on center, every four inches on center along the underdrain pipe. More rows may be used, if desired.
- Pipe shall be surrounded by a bed of 3/4" diameter clean gravel.
- Under drains to be placed on a 3'-0" wide section of filter cloth (Miraflo 140 N, or approved equivalent). Pipe is placed next, followed by the gravel bedding.
- The ends of under drain pipes not terminating in an observation well shall be capped. Cleanout/Observation well cap shall be an Atrium drain to be placed on pipe.

SOIL SPECIFICATIONS

1. Sand Specifications:

Provide clean sand, free of deleterious materials. Sand shall meet AASHTP M-6 or ASTM C-33 with grain size of 0.02"-0.04".

2. Compaction:

It is very important to minimize compaction of both the base of the bioretention area and the required backfill. When possible, use excavation hoes to remove original soil. If areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires.

Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and storage volumes and is not acceptable. Compaction will significantly contribute to design failure. Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rotillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

When back filling the bioretention facility, place soil in lifts 12" or greater. Do not use heavy equipment within the basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

3. Geotextile Specifications:

Geotextile fabric shall meet ASTM D-751 (puncture strength - 125 lb)
 ASTM D-1117 (Mullen burst strength - 400 PSI)
 ASTM D-1682 (Tensile strength - 300 lb)
 Fabric shall have 0.08" thick E.O.S. of #80 sieve, and maintain 125 GPM per sq. ft. flow rate.

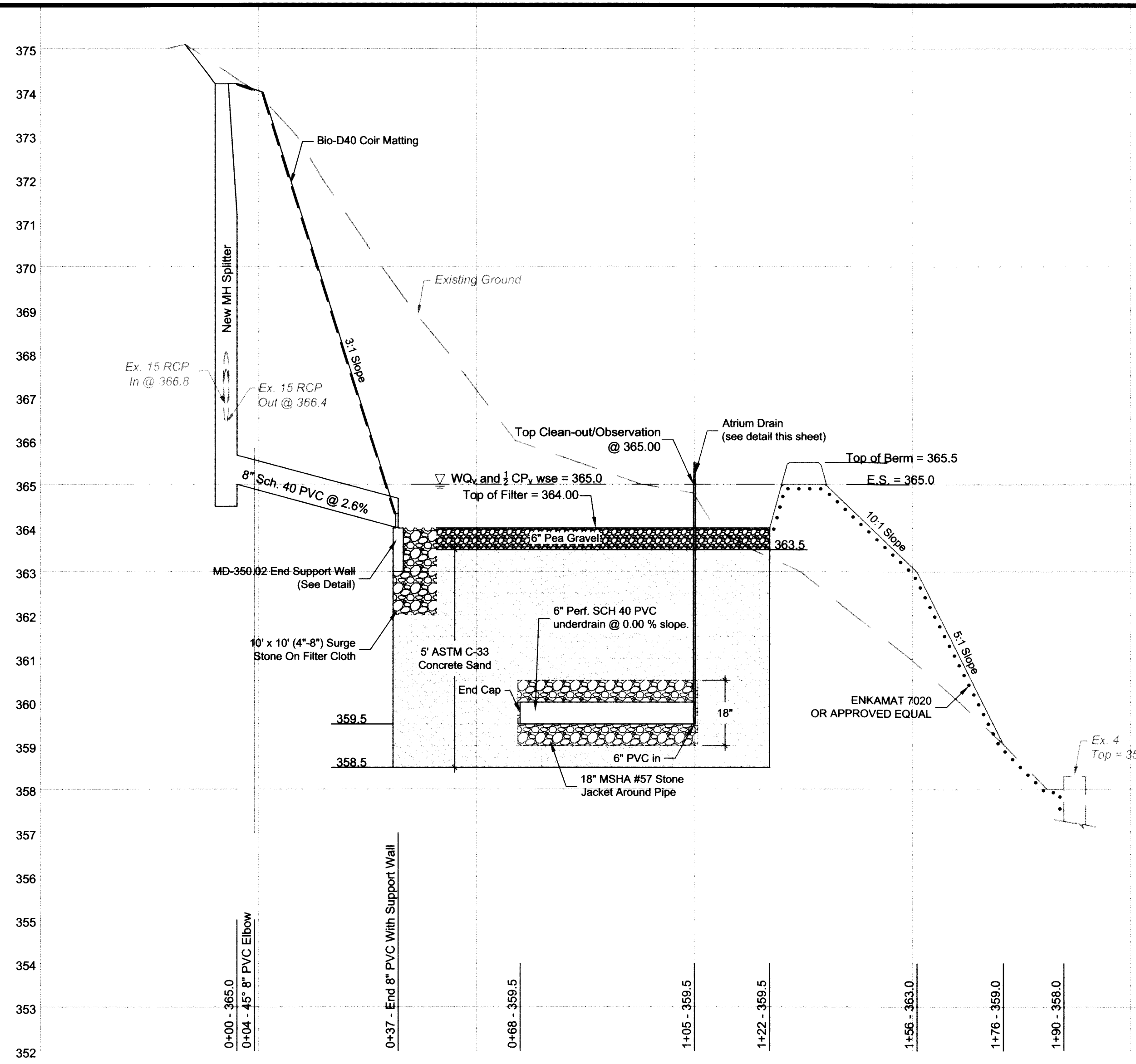
4. Gravel Filter Specifications:

Underdrain gravel blanket shall be double washed, #57 stone, 1-1/2" in size. Pea Gravel shall be washed, river-run, round diameter, 1/2" in size.

5. Enkamat: See specification, sheet 5.

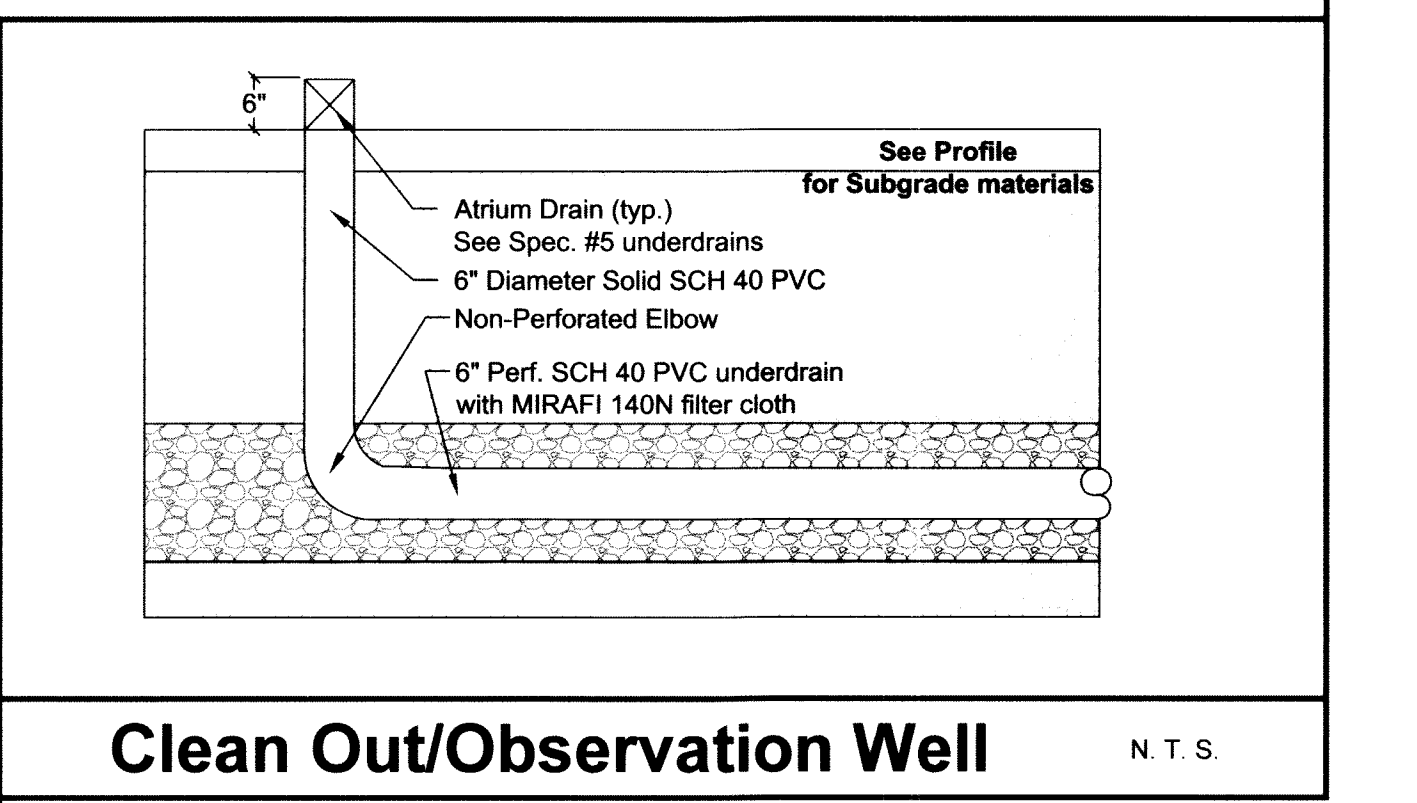
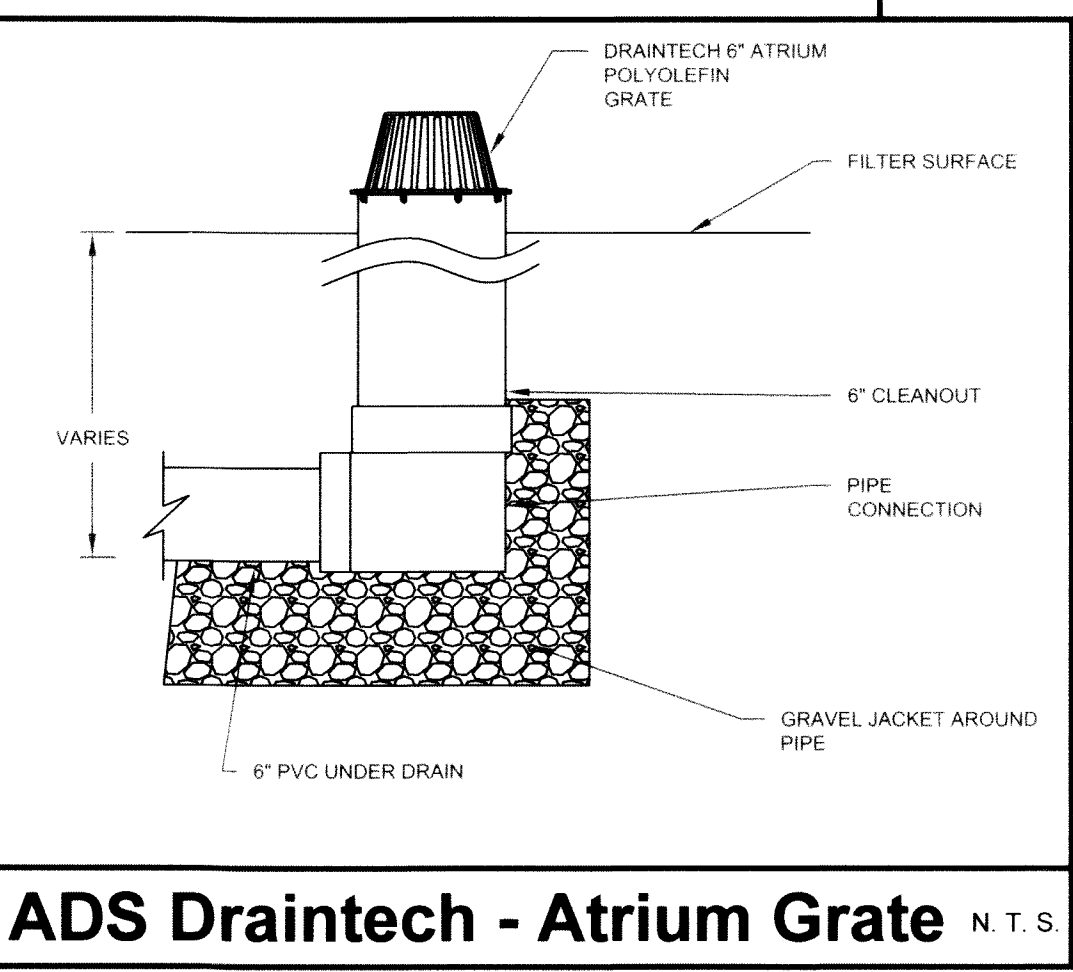
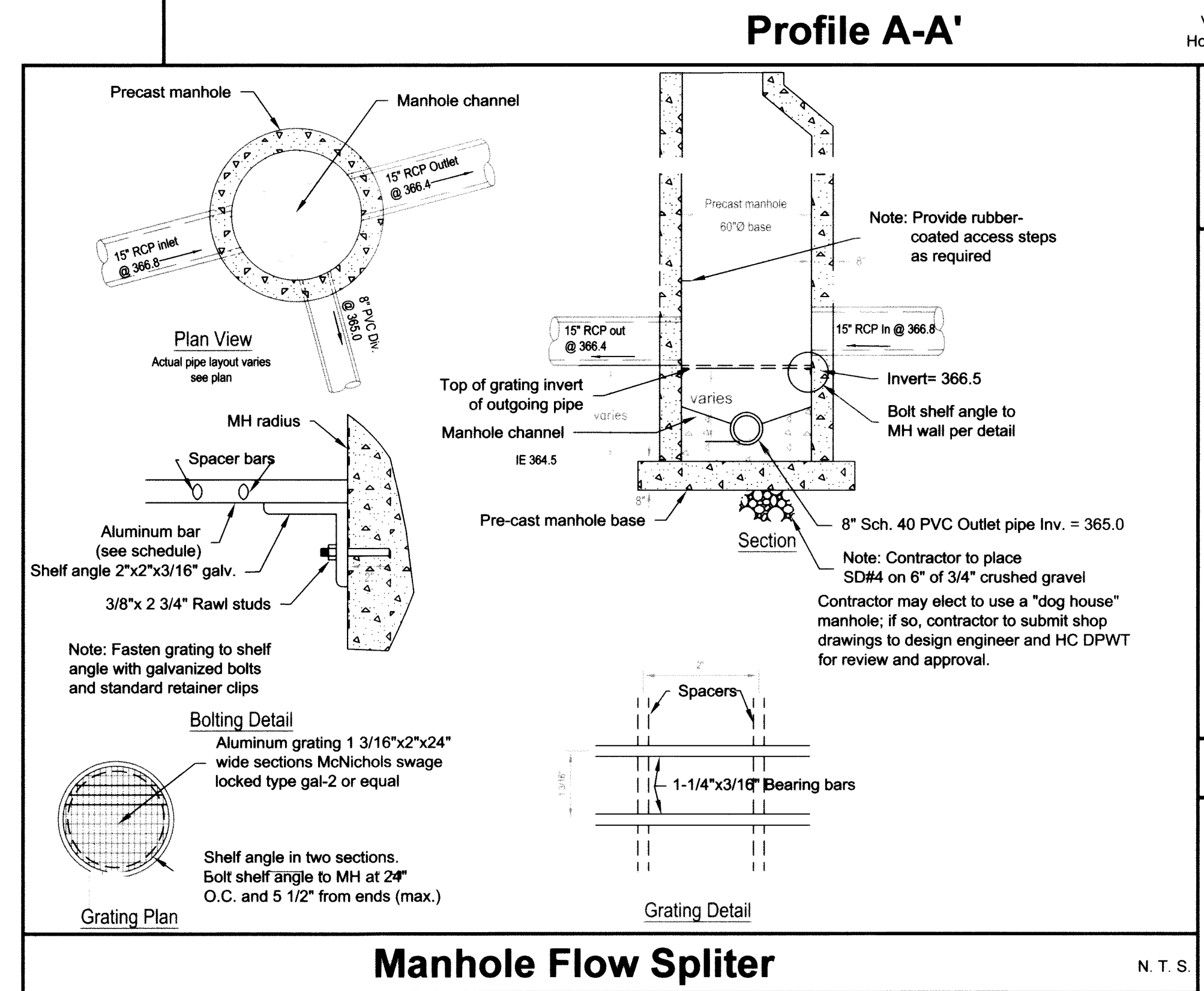
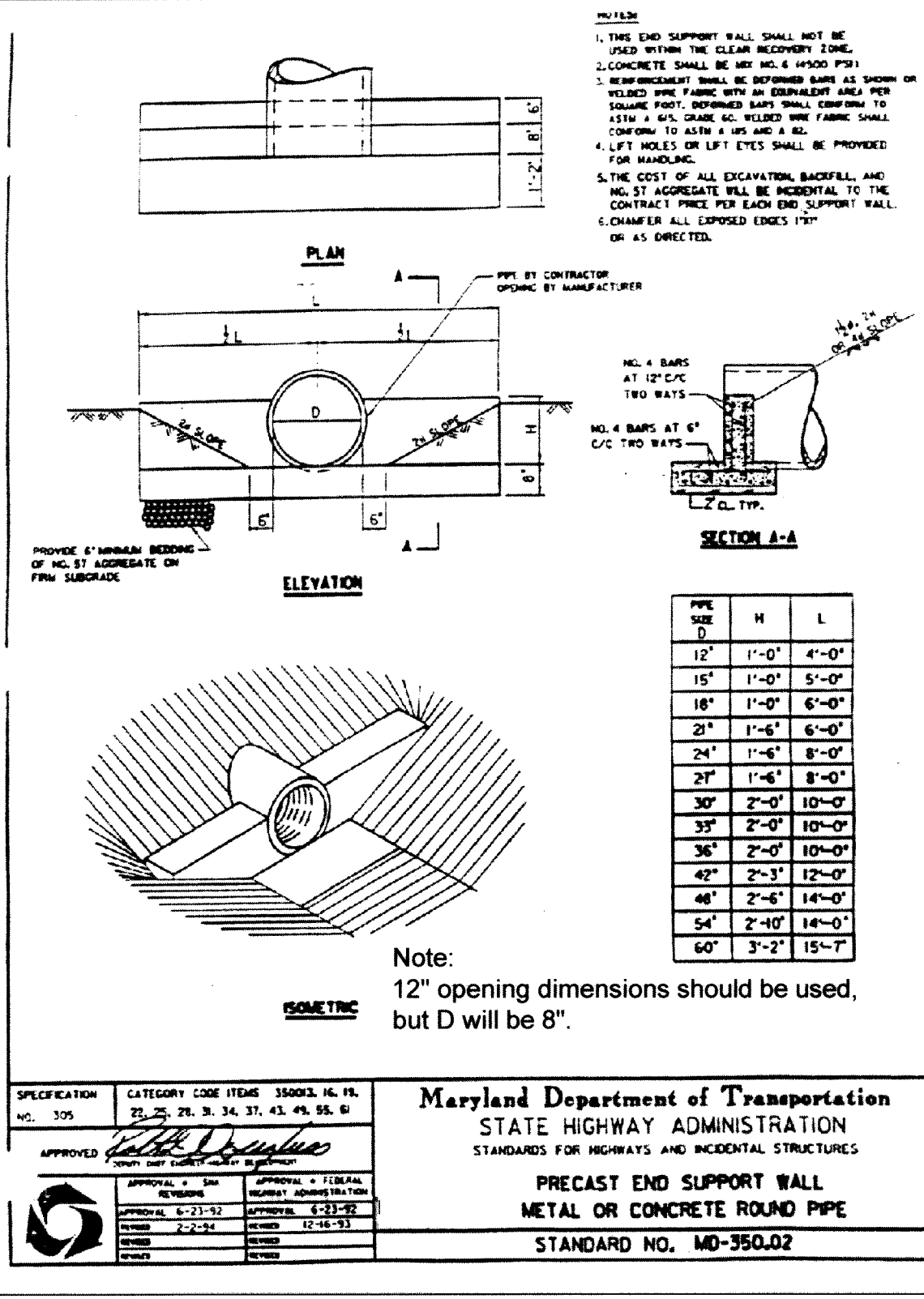
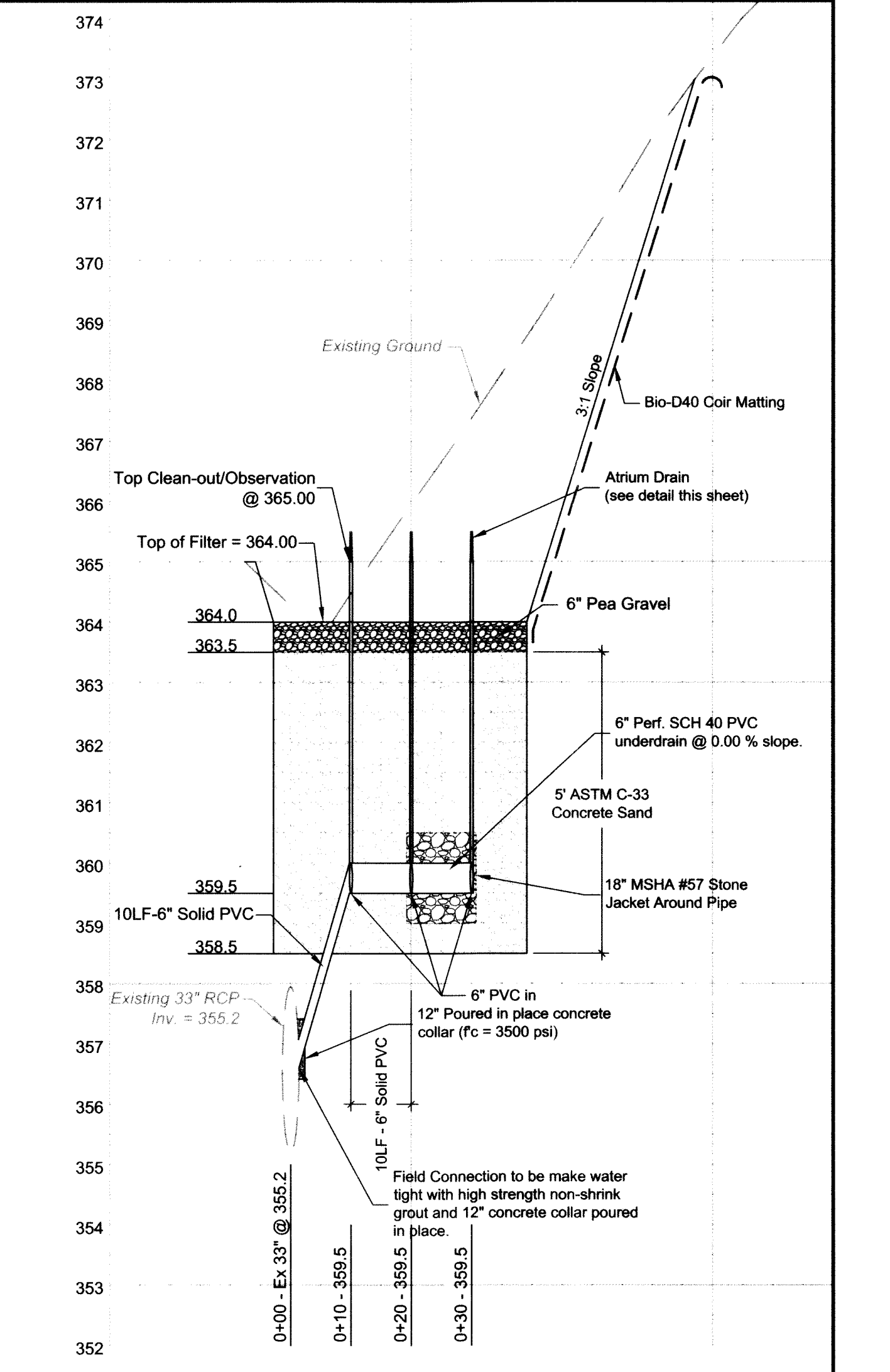
6. Inspection Requirements:

- The contractor shall arrange a "preconstruction meeting" with the owner and architect/engineer prior to beginning work on the bioretention facility.
- At the completion of excavation to inspect subgrade preparation.
- During underdrain and filter installation.
- Back fill of sand and pea gravel. Soil certifications for back fill are required.
- The final topsoil layers should be thoroughly wetted and achieve settlement of the soil/sand backfill mix.
- The work shall be inspected by the owner/architect prior to final stabilization.
- Sediment & erosion control practices may be removed upon approval by the County inspector.



PIPE SCHEDULE

Location	Material	Length	Specification
Cleanout	Solid 6" PVC	35'	Schedule 40
Underdrain	Solid 8" PVC	37'	Schedule 40
Underdrain	Perforated 6" PVC	130'	Schedule 40



HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
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HOWARD COUNTY, MD
 PUBLIC RECREATION
 PARCEL 9
 ELECTION DISTRICT 5
 MAP 30 GRID 7

CENTENNIAL PARK SAND FILTER DESIGN
Profile and Bioretention Specifications

DATE: 10/07
 DESIGNED: TCS
 DRAFTED: HT
 CHECKED: TCS
 BASE DATA: J.A. RICE

NO. _____

REVISIONS

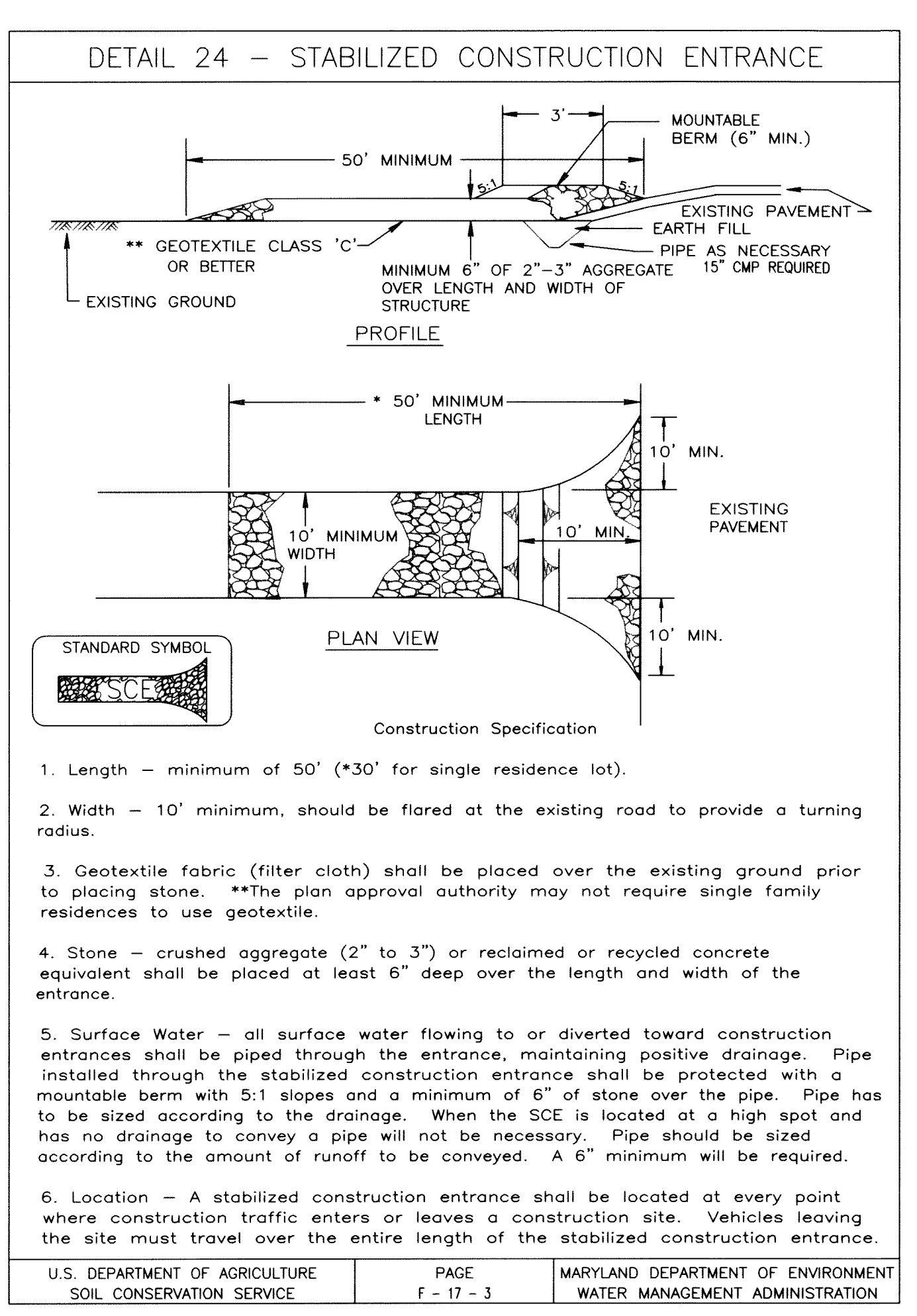
BY _____

DATE _____

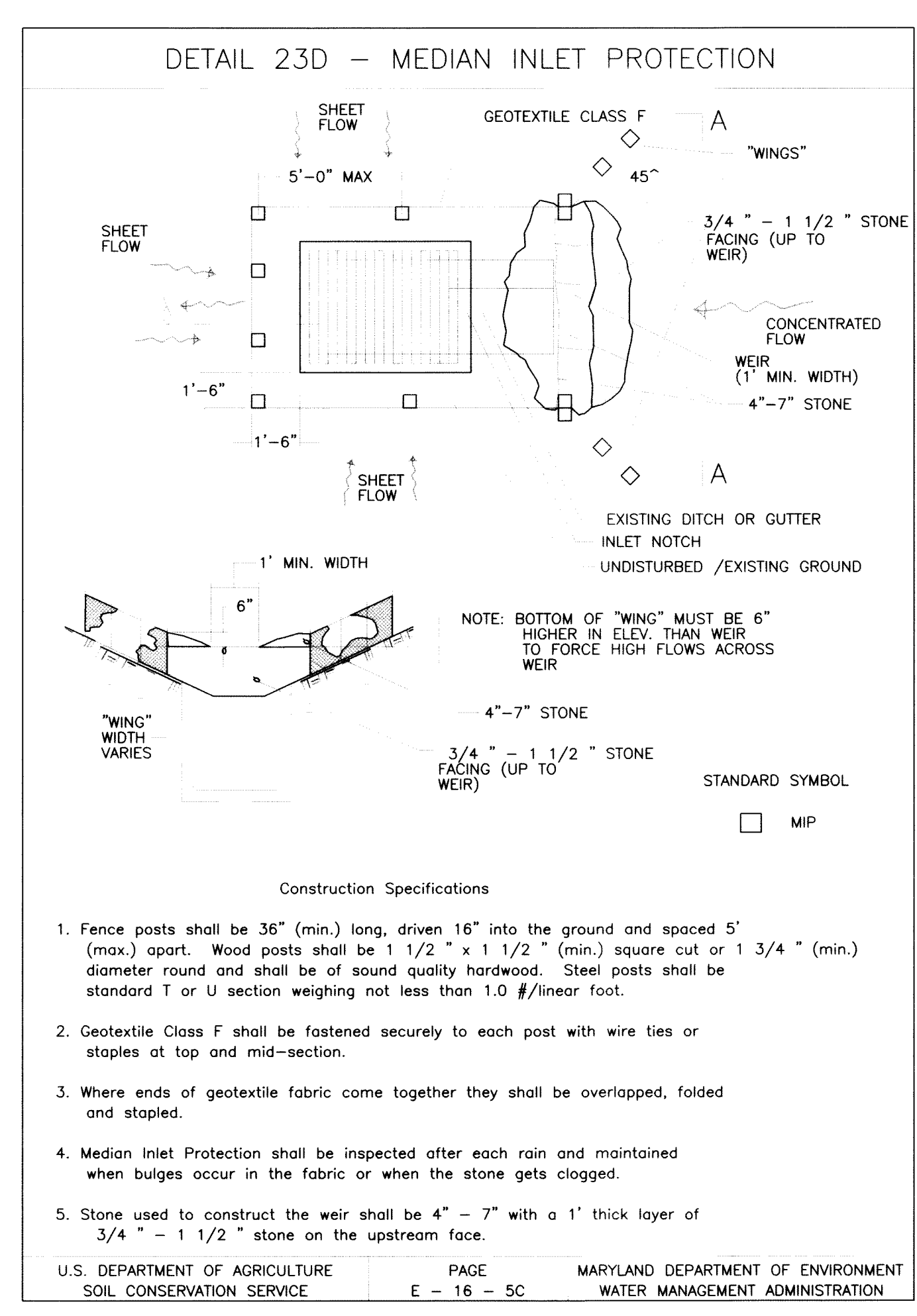
SCALE AS SHOWN
 SHEET
4
 OF 7 SHEETS
 JOB NO.
 36-524

CPJ Associates
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 STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
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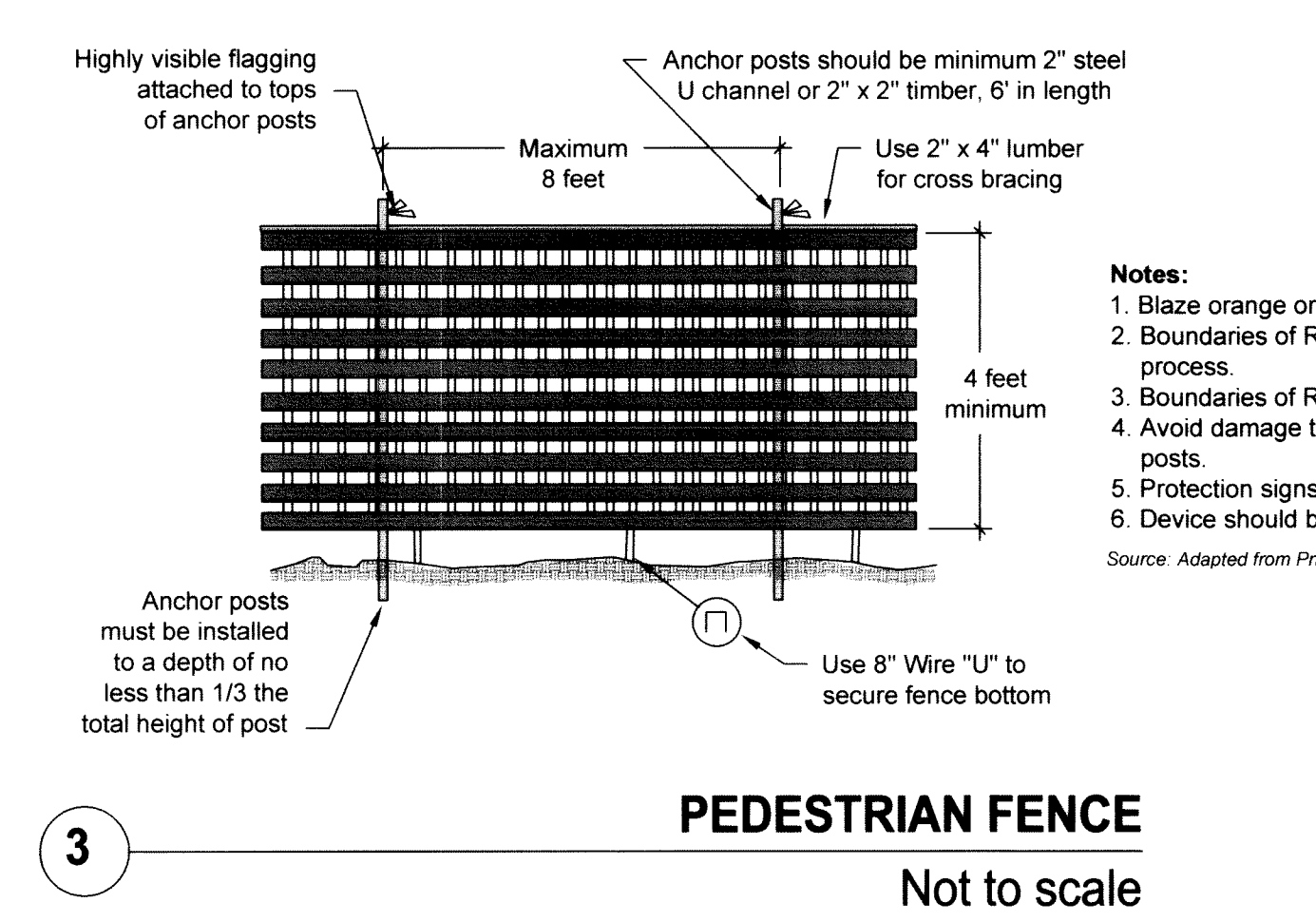
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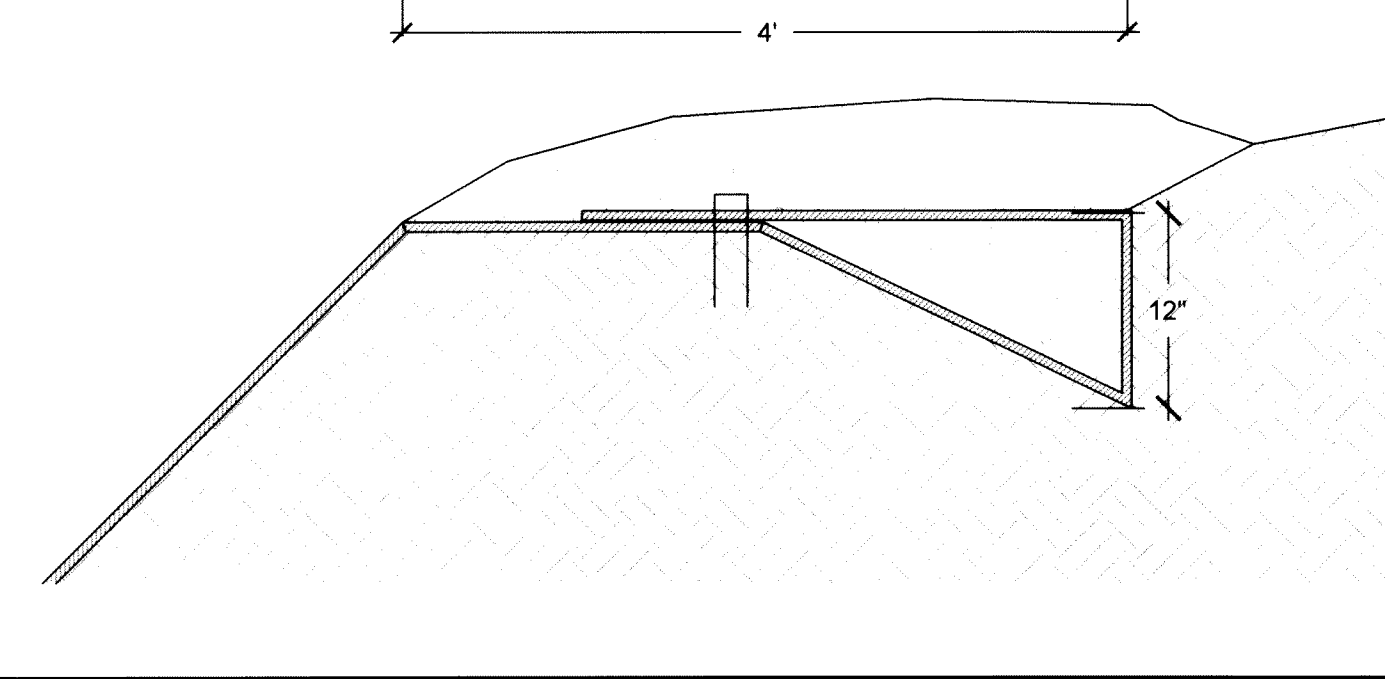
1 Stabilized Construction Entrance
Not to scale



2 MEDIAN INLET PROTECTION
Not to scale



3 PEDESTRIAN FENCE
Not to scale



4 FIBER MATTING KEY-IN
Not to scale

Sediment Control Notes

- A minimum of 48 hours notice must be given to the Howard County Department of Inspections and Permits prior to the start of any construction (410-313-1855).
- All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the Maryland Standards and Specifications for Soil and Erosion Control, revisions thereto.
- Following initial soil disturbance or redistribution, permanent or temporary stabilization shall be completed within: (a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes and all slopes greater than 3:1, (b) 14 days as to other disturbed or graded areas on the project site.
- All sediment traps/basins shown must be fenced and warning signs posted around the perimeter in accordance with Vol. 1, Chapter 12, of the Howard County Design Manual, storm drainage.
- All disturbed areas must be stabilized within the time period specified above in accordance with the 1991 Maryland Standards and Specifications for Soil and Erosion Control for permanent seedings (Sec. 51), sod (Sec. 54), temporary seeding (Sec. 50) and mulching (Sec. 52). Temporary stabilization with mulch alone can only be done when recommended seeding dates do not allow for proper germination and establishment of grasses.
- All Sediment control structures are to remain in place and are to be maintained in operative condition until permission for their removal has been obtained from the Howard County Sediment Control Inspector.
- Site Analysis :**
 - Total area of site: 137.53 acres
 - Area disturbed: 0.28 acres
 - Area that is roofed or paved: 0.0 acres
 - Area to be vegetatively stabilized: 0.28 acres
 - Drainage area: 12.9 acres
 - Total cut: 1,115.0 cu. Yds.
 - Total fill: 70.0 cu. Yds.
- Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
- Additional sediment controls must be provided if deemed necessary by the Howard County Sediment Control Inspector.
- On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.
- Trenches for the construction of utilities is limited to three pipe lengths or that which can be backfilled and stabilized within one working day, whichever is shorter.
- Site grading will begin only after all perimeter sediment control measures have been installed and are in a functioning condition.
- Sediment will be removed from traps when its depth reaches clean out elevation shown on plans.
- Cut and fill quantities provided under site analysis do not represent bid quantities. These quantities do not distinguish between topsoil, structural fill or embankment material, nor do they reflect consideration of undercutting or removal of unsuitable material. The contractor shall familiarize himself/herself with site conditions which may affect the work.

Standard and Specifications For Topsoil

Definition: Placement of topsoil over prepared subsoil prior to establishment of permanent vegetation.
Purpose: To provide a suitable soil medium for vegetation growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
 Condition where practice applies:
 I. This practice is limited to areas having 2:1 or flatter slopes where:
 a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth
 b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
 c. The original soil to be vegetated contains material toxic to plant growth.
 d. The soil is so acidic that treatment with limestone is not feasible.
 II. For the purpose of these Standard and Specifications, areas having slopes steeper than 2:1 require special consideration and design for adequate stabilization. Areas having slopes steeper than 2:1 shall have the appropriate stabilization shown on the plans.

Construction and Material Specification

- Topsoil salvaged from the existing site may be used provided that it meets the standard as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the soil survey published by USDA-SCS in cooperation with Maryland Agricultural Experimentation Station.
 - Topsoil Specifications - Soil to be used as topsoil must meet the following:
 - Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, and loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting textured subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1" in diameter.
 - Topsoil must be free of plants or plant parts such as Bermuda grass, quackgrass, Johnson grass, nutsedge, poison ivy, thistle, or other as specified.
 - Where subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operation as described in the following procedures.
 - For site having disturbed areas under 5 acres:
 - Place topsoil (if required) and apply soil amendments as specified in 20.0 vegetation Stabilization - b Section I - Vegetation Stabilization Method and Materials.
 - For site having disturbed areas over 5 acres:
 - On soil meeting Topsoil Specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
 - pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.
 - Organic content of topsoil shall be not less than 1.5 percent by weight.
 - Topsoil having soluble salt content greater than 500 parts per million shall not be used.
 - No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.
- * Note: Topsoil substitutes to amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriated approval authority may be used in lieu of natural topsoil.

V. Topsoil application

- When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade Stabilization Structures, Earth Dikes, Slope Silt Fence and sediment Traps and Basins.
 - Grade on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4"-8" higher in elevation.
 - Topsoil shall be uniformly distributed in a 4" - 8" layer and lightly compacted to a minimum thickness of 4". Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets.
 - Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.
- VI. Alternative for Permanent Seeding - instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:
- Composted Sludge Material for used as a soil conditioner for sites having areas over 5 acres shall be tested to prescribe amendments and for site having disturbed areas under 5 acres shall conform to the following requirements:
 - Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.04.06.
 - Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a pH of 7.0 to 8.0.
 - If composted does not meet these requirements, the appropriated constituents must be added to meet the requirement prior to use.
 - Composted sludge shall be applied at a rate of 1 ton/1,000 square feet.
 - Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 square feet and 1/3 the normal lime application rate.
- * Reference: Guideline Specifications, Soil Preparation and Sodding, MD - VA, Pub. #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institutes. Revised 1973.

Erosion Control Matting (ECM)

- Unless specified otherwise, all erosion control matting (ECM) shall be BIO D-40, or approved equal. Matting shall be "keyed" into ground 12 inches on the top and bottom of slopes.
- Base soil shall be tilled to a three-inch depth, rake in three inches of organic matter or top soil prior to ECM placement.
- Seeding for ECM areas shall be seeded with mix as described in these specifications.

Enkamat 7020

I. Materials

- Turf Reinforcement Mat
 - The TRM shall be Enkamat 7020 manufactured for the purpose of permanent channel lining and turf reinforcement. The TRM shall be made from 100% synthetic material and contain no biodegradable or photodegradable components or materials.
 - The TRM shall be a three-dimensional matrix and maintain the three dimensional stability without laminated or stitched layers. The TRM shall have a sufficient Area Holding Capacity and a minimum 90% open space available for soil and root. The TRM shall not lose its structural integrity and shall not unravel or separate when TRM is cut in the field.
 - The TRM shall exhibit no buoyancy factor (i.e., the specific gravity of the fibers used should be greater than 1.0) so as to allow the TRM to maintain intimate contact with the soil (particularly between fasteners) under low flow conditions.
 - The TRM shall meet the requirements of Table 1.

Table 1 - Permanent turf reinforcement mat

Property	Test Method	Units	Value
Mass/Unit Area	ASTM D 5261	oz/sq yd	12.0
Thickness	ASTM D 5199	inches	0.7
Tensile Strength (MD)	ASTM D 5035 mod	lb/ft	240.0
Area Holding Capacity	Calculated	cu in/sq yd	850
Porosity	Calculated	%	>95
UV Stability	ASTM D 1682 mod	%	80
Velocity	Flume Testing	ft/sec	
30 min. Vegetated			19.0
50 hr. Vegetated			14.0
Shear	Flume Testing	ft/sec	
30 min. Vegetated			10.0
50 hr. Vegetated			8.0

II. Accessories

- Anchoring Devices
 - The TRM shall be secured in place using heavy-duty metal staples. The metal staples shall be U-shaped, a minimum of 6 inch long (each leg), one and one half (1-1/2) inches wide, and shall be fabricated from 9 gauge diameter metal wire. If difficulties arise installing the staples, then 10 inch pins fabricated from 9 gauge with one and one half (1-1/2) inch diameter washer or 7 inch gutter spike with one and one half (1-1/2) inch diameter washer shall be used. In some cases where loose soil conditions exists and anchors of stated length do not properly secure the TRM to the ground, then longer staple should be used such as a 8-12 inch long staples or pins.

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

USDA - NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

John K. Richmond 11/9/87
HOWARD SOIL CONSERVATION DISTRICT DATE

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
6751 COLUMBIA GATEWAY DRIVE, SUITE 514
COLUMBIA, MD 21046
PHONE: (410) 313-6413
ATTN: MARK RICHMOND

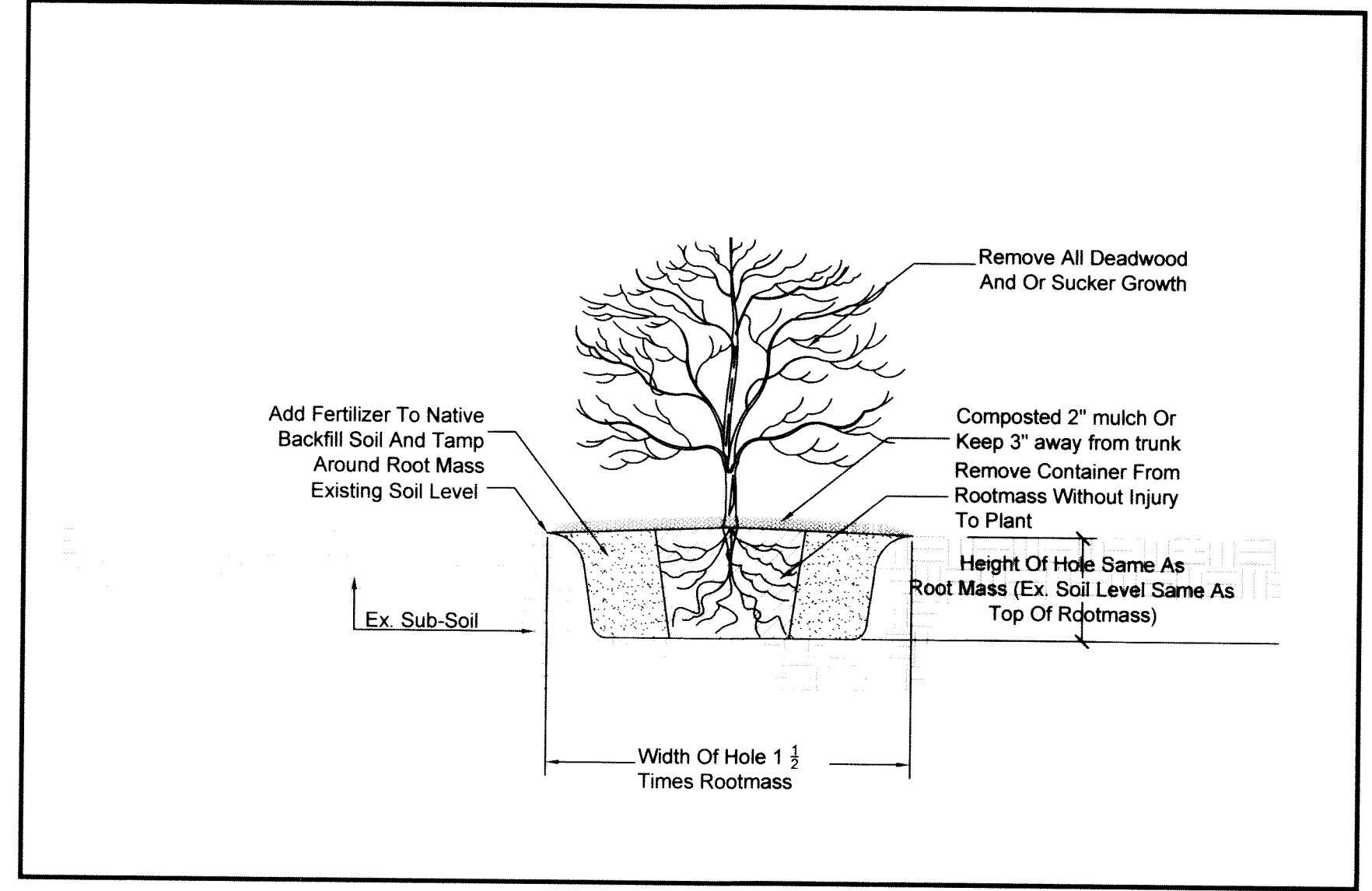
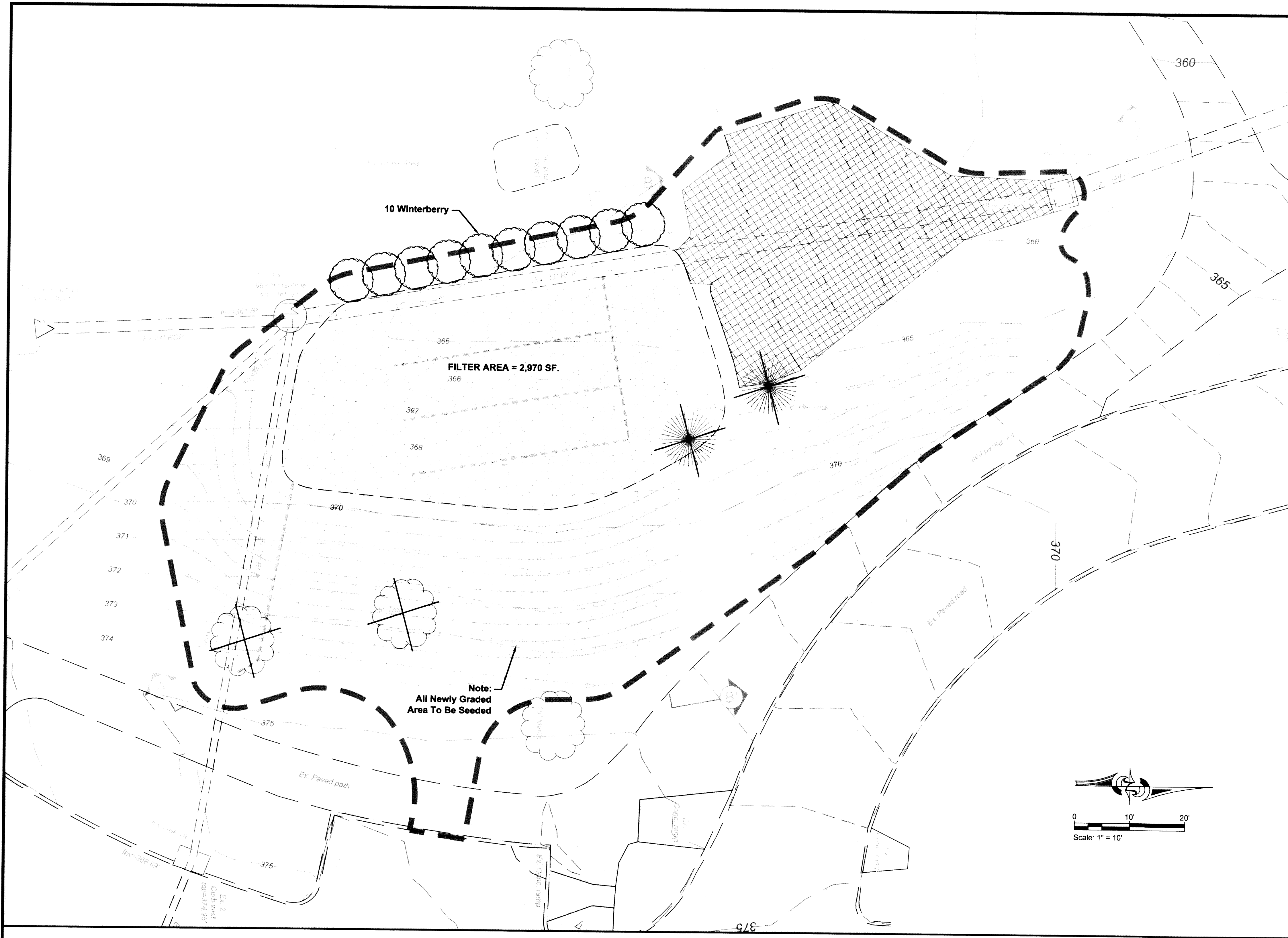
HOWARD COUNTY, MD PUBLIC RECREATION
PARCEL 9
ELECTION DISTRICT 5
MAP 30 GRID 7

CENTENNIAL PARK SAND FILTER DESIGN
Sediment Control Notes and Details

DATE:	10/07				
DESIGNED:	TCS				
DRAFTED:	HT				
CHECKED:	TCS				
BASE DATA:	J.A. RICE	NO.	REVISIONS	BY	DATE

CPJ Associates
CPJ Environmental Services Division
STREAM RESTORATION - STORMWATER MANAGEMENT - INSPECTION
910 CLOPPER ROAD, STE 219N GAITHERSBURG MARYLAND 20878
Phone: (301) 208-9575 E-mail: emc@cpja.com Fax: (301) 926-4551
SILVER SPRING, MD FREDERICK, MD FAIRFAX, VA

SCALE AS SHOWN
SHEET 5 OF 7 SHEETS
JOB NO. 36-524



2 SHRUB PLANTING DETAIL
Not to Scale

BIORETENTION PLANTING SCHEDULE

ID	Common Name	Scientific Name	Size	QTY	Spacing	Notes
○	Winterberry	<i>Ilex verticillata</i>	2 Gal.	10	As Shown	

Note: Newly graded areas to be seeded with application rate at 8.0 lb/1,000 sf. All grass seed varieties must be selected from list of recommended cultivars of Turf-type tall fescues as indicated by the University of Maryland Agronomy Mimeo 77 (Revised May 2006) or most current edition. Seed mix shall consist of a three way blend (34%, 33%, 33%) of Turf-type tall fescues from the University of Maryland list of recommended cultivars.

Turf-Type Tall Fescue

The following recommended turf-type tall fescue cultivars may be seeded individually or in blends:

And 3 rd	Empress ²	Lion ^{2,4}	Shenandoah II ¹
Avenger	Endeavor ²	Magellan	Shenandoah ¹
Barerra ^{2,3}		Masterpiece	
Barflex ²			
Billmore ²	Falcon IV	Millennium ¹	
Bingo	Falcon II ²	Mustang 3 rd	Southern Choice ^{2,3}
	Fidelity ²		SR 8250
			SR 6300 ²
Bonsai 2000 ²	Finelawn Petite ²	Onyx ²	
Bravo ²		Padre	
		Penn 1901	Sietson ^{2,3}
Chapel Hill ¹	Genesis ¹	Picasso	Tarheel
	Good-En	Quest	Tarheel II
Cochise III	Grande	Raptor	
Constitution		Rebel 2000 ²	TF68 ¹
	Greenkeeper WAF	Rebel Exeoda	Titan 2 ¹
		Rebel Sentry	Titanium
Coyote II ¹		Red Coat ²	Tulsa ²
Coyote	Hounddog 5	Regiment II	Turbo
Crewcut II ¹		Rembrandt	
Davinci	Inferno	Rensselaer ²	Ultimate
		Reserve ²	Virtue ¹
Dominion ¹	Jaguar 3 rd		
Durana ²	Justice	2 nd Millennium	Watchdog
Duster ²	Kalahari		WOLFPAK
	Laramie ²		WPEZE ²
Dynasty ¹			Wyatt

KEY NOTES:
 Fescue cultivars have been evaluated for performance in Maryland and Virginia.
 Maryland Certified Turf Seed Contact: 1-800-999-9999
 Fescue cultivars may be seeded individually or in blends.
 The use of recommended cultivars reduces the risk of turf and management problems.
 Recommended cultivars often have lower, better, more, and better seed.
 Cultivars listed in italics are considered promising but have only been tested in Maryland or Virginia for 2 years, or may be difficult to find due to limited certified seed availability.
 Cultivars followed by a superscript number may be susceptible to the following reasons:
 Cultivar 1 - may be reserved from the list due to declining field performance relative to other cultivars.
 Cultivar 2 - may be reserved from the list due to declining seed quality.
 Cultivar 3 - may be reserved from the list due to inconsistent field performance.
 Cultivar 4 - may be reserved from the list due to lack of available seed or other reasons.
 The cultivar will be reserved from the list if it is not available for use.

LANDSCAPE ARCHITECT CERTIFICATE:
 I hereby certify that this plan is prepared in accordance with the
 Howard County Forest Conservation Regulations.
 Date: 1/15/07
 James M. Fetchu, RLA
 Registered Landscape Architect
 MD #9241

HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
 6751 COLUMBIA GATEWAY DRIVE, SUITE 514
 COLUMBIA, MD 21046
 PHONE: (410) 313-6413
 ATTN: MARK RICHMOND

HOWARD COUNTY, MD
 PUBLIC RECREATION
 PARCEL 9
 ELECTION DISTRICT 5
 MAP 30 GRID 7

CENTENNIAL PARK
 SAND FILTER DESIGN
 Planting Plan

DATE:	10/07				
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DRAFTED:	HT				
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BASE DATA:	J.A. RICE	NO.	REVISIONS	BY	DATE

CPJ Environmental Services Division
 STREAM RESTORATION • STORMWATER MANAGEMENT • INSPECTION
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SCALE AS SHOWN
 SHEET 6
 OF 7 SHEETS
 JOB NO. 36-524

SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. Site Preparation

- i) Install erosion and sediment control structures (either temporary or permanent) such as diversions, grade stabilization structures, berms, waterways, or sediment control basins.
- ii) Perform all grading operations at right angles to the slope. Final grading and shaping is not usually necessary for temporary seeding.
- iii) Schedule required soil tests to determine soil amendment composition and application rates for sites having disturbed area over 5 acres.

B. Soil Amendments)

- i) Lime shall be agricultural grade lime material (ground limestone, hydrated or burnt lime) which contains total carbonates of 85% with a minimum of 30% magnesium carbonate and which contains at least 50% total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground so that not less than 50% passes a 100-mesh sieve and 90-100% passes a 20-mesh sieve.
- ii) Lawn fertilizer. Complete fertilizer of neutral character and uniform composition that is suitable for applications with approved equipment. Lawn fertilizer shall be the only used after seeding operations.
 - a. Fertilizer shall contain some elements derived from organic sources and provide nitrogen in a form that will be available to the lawn during its initial period of growth.
 - b. Fertilizer shall be delivered to the site fully labeled according to applicable state fertilizer laws and shall bear the name, trade name or trademark and warranty of the producer.
 - c. Fertilizer shall, at a minimum contain the following percentages of available plant nutrients: 18% N, 24% P, 12% K, 50% SCU applied at a rate of 1 lb. Per 1,000 square feet lawn area.

C. Seedbed Preparation

- i) Temporary Seeding
 - a. Seedbed preparation shall consist of loosening soil to a depth of 3" to 5" by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened it should not be rolled or dragged smooth but left in the roughened condition. Sloped areas (greater than 3:1) should be tracked leaving the surface in an irregular condition with ridges running parallel to the contour of the slope.
 - b. Apply fertilizer and lime as prescribed on the plans.
 - c. Incorporate lime and fertilizer into the top 3 -5" of soil by disking or other suitable means.
- ii) Permanent Seeding
 - a. Minimum soil conditions required for permanent vegetative establishment:
 - 1. Soil pH shall be between 6.0 and 7.0.
 - 2. Soluble salts shall be less than 500 parts per million (ppm).
 - 3. The soil shall contain less than 40% clay but enough fine grained material (> 30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if lovegrass or sercia lespedeza is to be planted, then a sandy soil (< 30% silt plus clay) would be acceptable.
 - 4. Soil shall contain 1.5% minimum organic matter by weight.
 - 5. Soil must contain sufficient pore space to permit adequate root penetration.
 - 6. If these conditions cannot be met by soils on site, adding topsoil is required in accordance with Section 21 Standard and Specification for Topsoil.
 - b. Areas previously graded in conformance with the drawings shall be maintained in a true and even grade, then scarified or otherwise loosened to a depth of 3 -5" to permit bonding of the topsoil to the surface area and to create horizontalactive. 7 erosion check slots to prevent topsoil from sliding down a slope.
 - c. Apply soil amendments as per soil test or as included on the plans.
 - d. Mix soil amendments into the top 3- 5" of topsoil by disking or other suitable means. Lawn areas should be raked to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Where site conditions will not permit normal seedbed preparation, loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface. Steep slopes (steeper than 3:1 should be tracked by a dozer leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. The top 1 -3" of soil should be loose and friable. Seedbed loosening may not be necessary on newly disturbed areas.

D. Seed Specifications

- i) All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to re-testing by a recognized seed laboratory. All seed used shall have been tested within the 6 months immediately preceding the date of sowing such material on this job.

Note: Seed tags shall be made available to the inspector to verify type and rate of seed used.
- ii) Inoculant -The inoculant for treating legume seed in the seed mixtures shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species. Inoculants shall not be used later than the date indicated on the container. Add fresh inoculant as directed on package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75-80 F. can weaken bacteria and make the inoculant less effective.

E. Methods of Seeding

- i. **Hydroseeding.** Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer), broadcast or drop seeder, or a cultipacker seeder.
 - a. If fertilizer is being applied at the time of seeding, the application rates amounts will not exceed the following: nitrogen, maximum of 100 lbs. per acre total of soluble nitrogen, P2O5 (phosphorus), 200 lbs/ac, K2O (potassium), 200 lbs/ac.
 - b. Lime -use only ground agricultural limestone. (Up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at anyone time. Do not use burnt or hydrated lime when hydroseeding.
 - c. Seed and fertilizer shall be mixed on site and seeding shall be done immediately and without interruption.
- ii) **Dry Seeding:** This includes use of conventional drop or broadcast spreaders.
 - a. Seed spread dry shall be incorporated into the subsoil at the rates prescribed on the Temporary or Permanent Seeding Summaries or Tables 25 or 26. The seeded area shall then be rolled with a weighted roller to provide good seed to soil contact.
 - b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.
- iii) **Drill or Cultipacker Seeding:** Mechanized seeders that apply and cover seed with soil.
 - a. Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
 - b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.

F. Mulch Specifications (In order of preference)

- i) Straw shall consist of thoroughly threshed wheat, rye or oat straw, reasonably bright in color, and shall not be musty, moldy, caked, decayed, or excessively dusty and shall be free of noxious weed seeds as specified in the Maryland Seed Law.
 - ii) Wood Cellulose Fiber Mulch (WCFM)
 - a. WCFM shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state. down a sil
 - b. WCFM shall be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
 - c. WCFM, including dye, shall contain no germination or growth inhibiting factors.
 - d. WCFM materials shall be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material shall form a blotter-like ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
 - e. WCFM material shall contain no elements or compounds at concentration levels that will be phyto-toxic.
 - f. WCFM must conform to the following physical requirements: fiber length to approximately 10 mm, diameter approximately 1 mm, pH range of 4.0 to 8.5, ash content of 1.6% maximum and water holding capacity of 90% minimum.
- Note:** Only sterile straw mulch should be used in areas where one species of grass is desired.

G. Mulching Seeded Areas - Mulch shall be applied to all seeded areas immediately after seeding.

- i) (per Howard County Public School Spec. Sect.#02490) Mulch shall be threshed barley, wheat or oat straw. It shall be clean and free of noxious weeds, weed seeds, and other foreign materials. Mulch all seeded areas as follows.
 - a. Mulch shall be applied at a rate of 2,000 pounds per acre in a uniform manner. The material shall be anchored immediately after application.
 - i) If grading is completed outside of the seeding season, mulch alone shall be applied as prescribed in this section and maintained until the seeding season returns and seeding can be performed in accordance with these specifications.
 - ii) When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre. Mulch shall be applied to a uniform loose depth of between 1" and 2". Mulch applied shall achieve a uniform distribution and depth so that the soil surface is not exposed. If a mulch anchoring tool is to be used, the rate should be increased to 2.5 tons/acre.

H. Securing Straw Mulch (Mulch Anchoring): Mulch anchoring shall be performed immediately following mulch application to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon size of area and erosion hazard:

- i) A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of two (2) inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should be used on the contour if possible.
- ii) Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 pounds/acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
- iii) Application of liquid binders should be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. The remainder of area should be appear uniform after binder application. Synthetic binders -such as Acrylic DLR (Agro-Tack), DCA-70, Petrosel, Terra Tax II, Terra Tack AR or other approved equal may be used at rates recommended by the manufacturer to anchor mulch.
- iv) Lightweight plastic netting may be stapled over the mulch according to manufacturer's recommendations. Netting is usually available in roll 4' to 15' wide and 300 to 3,000 feet long.

SECTION II -TEMPORARY SEEDING

Temporary Seed Mixture (For Hardiness Zone 7a) (from Table 26, MDE 1994)				Fertilizer Rate (10-10-10)	Lime Rate	
No.	Species	Application Rate (lb/ac)	Seeding Dates	Seeding Depth		
2	Rye plus Foxtail Millet	150	2/1-11/30	1/4-1/2 in.	600 lb/ac (15 lb/1000sf)	2 tons/acre (100 lb/1000 sf)

Vegetation -annual grass or grain used to provide cover on disturbed areas for up to 12 months. For longer duration of vegetative cover, Permanent Seeding is required.

A. Seed Mixtures - Temporary Seeding

- i) Select one or more of the species or mixtures listed in Table 26 for the appropriate Plant Hardiness Zone (from Figure 5) and enter them in the Temporary Seeding Summary below, along with application rates, seeding dates and seeding depths. If this Summary is not put on the plans and completed, then Table 26 must be put on the plans.
- ii) For sites having soil tests performed, the rates shown on this table shall be deleted and the rates recommended by the testing agency shall be written in. Soil tests are not required for Temporary Seeding.

SECTION III: PERMANENT SEEDING

A. GENERAL

i)Description

- a. The extent of seeding work is as shown on drawings and as specified. Contractor shall produce a dense, well-established turf.
- b. Furnish, install, and remove temporary seeding as shown and specified.
- c. Seed all disturbed site areas.
- d. Seeding notes appearing on Sediment Control drawings shall pertain only to temporary stabilization seeding and shall apply only to work covered on those drawings. Permanent seeding of all areas of the project to be seeded shall be performed in accordance with this specification.

ii) Job Conditions

- a. Seed shall be sown from August 15 to October 15 inclusive as soon as the soil is dry enough to allow proper penetration of a seedbed. Extensions beyond these time periods may be granted by the Contract Manager, depending upon weather conditions for the period in question. Any planting outside of these seasons shall be solely at the Contractor's risk and shall not be subject to compensation until stabilization has been accomplished in accordance with these Specifications.
 - 1. No seeding shall be done in frozen ground or when the temperature is 32 degrees F or lower.
 - 2. No seeding shall be done during windy weather or when ground is wet or otherwise untellable.
 - 3. Seed all areas within the project limits that are not paved or designated on the drawings to receive special treatment. Seed disturbed areas in the public right-of-way.
 - 4. Complete seeding of all playfields. Playfields shall be over seeded and re-fertilized in the spring of 2003, as directed by the Contract Manager. Contractor shall maintain, water, and mow all seeded areas until date of substantial completion.

iii) Workmanship

- a. During seeding, all areas shall be kept neat and clean, and precautions shall be taken to avoid damage to existing plants, turf, and structures.
- b. Upon completion, all debris and waste material resulting from seeding operations shall be removed from the project and the area cleaned up.
- c. Any areas damaged by the seeding contractor shall be restored to the original condition.

B. PRODUCTS

i)Materials

a. Grass Seeds

- 1. Seed lots must be state certified and blended under the supervision of the Maryland Department of Agriculture (MDA) Turf and Seed Section.
 - 2. All seed and labeling must fully comply with the Maryland Seed Law and these Specifications.
 - 3. Seed shall be packed 50 lbs. net weight and packed in new, clean, poly-woven bags, tightly woven to prevent leaking and contamination.
 - 4. Each container shall have permanently affixed to it an accurate analysis tag and a certification tag.
 - 5. All seed lots to be used in this mixture shall have been previously tested by the Maryland Seed Laboratory to insure compliance with Specification.
 - 6. A quality control sample of the delivered mixture shall be submitted to the Maryland Seed Laboratory for testing prior to payment and any lots found not to comply with the Specification shall be returned at the Contractor's expense.
 - 7. The Contractor shall submit seed certification tags to Contractor Manager's representative prior to the beginning of any seed work.
 - 8. Application rate: Grass seed mixture shall be applied at the rate of eight (8) pounds per 1,000 square feet immediately after fertilizing rake and/or drag mat fertilizer is applied.
- b. Seed Mixture: Irrigated Athletic Fields**
- 1. The turfgrass seed mixture shall conform to the following requirements.
 - 2. Improved varieties of each species are required. Acceptable varieties of Tall Fescue mix is to contain any two (2) certified varieties from the latest issue of the University of Maryland Memo No. 77.
 - 3. Acceptable varieties of certified Kentucky Bluegrass include Baron, Cheeri, Columbia, Monopoly, Nassau, Ram I, Vantage, and Vicia.
 - 4. Acceptable varieties of certified Perennial Rye Grass include Birdie II, Citation II, Cowboy, Derby, Manhattan II, Palmer, Pennant, Pennfine, Prelude, Regal, and Repell.
 - 5. Seed mixtures must be free of all prohibited and restricted noxious weeds in accordance with the Maryland Seed Law.
 - 6. Seed lots must be blended and certified as per the general certification specifications of the Maryland Department of Agriculture.
 - 7. Seed filling must comply with the MARYLAND SEED AND REGULATIONS LAW.
 - 8. All seed shall be certified with complete and accurate analysis tags attached to each container. The Contractor shall have all seed tags and submit them to the Contract Manager.

SECTION V - FILTER CLOTH

CLASS	APPARENT OPENING SIZE MM. MAX	GRAB TENSILE STRENGTH LB. MIN	BURST STRENGTH P.S.I. MIN
A	0.30**	250	500
B	0.60	200	320
C	0.30	200	320
D	0.60	90	145
E	0.30	90	145
F	0.40-0.80*	90	190

USE CLASS "C"

*US Std Sieve CW - 02215 ** 0.50 mm. max. for Super Silt Fence

The properties shall be determined in accordance with the following procedures:

- Apparent opening size MSMT 323
- Grab tensile strength ASTM D 1682: 4x8" specimen, 1x2" clamps, 12"/min. strain rate in both principal directions of geotextile fabric.
- Burst strength ASTM D 3786

The fabric shall be inert to commonly encountered chemicals and hydrocarbons, and will be rot and mildew resistant. It shall be manufactured from fibers consisting of long chain synthetic polymers, and composed of a minimum of 85% by weight of polyolephins, polyesters, or polyamides. The geotextile fabric shall resist deterioration from ultraviolet exposure.

In addition, Classes A through E shall have a 0.01 cm./sec. minimum permeability when tested in accordance with MSMT 507, and an apparent minimum elongation of 20 percent (20%) when tested in accordance with the grab tensile strength requirements listed above.

SECTION V - SILT FENCE MATERIALS:

Class F geotextile fabrics for silt fence shall have a 50 lb./in. minimum tensile strength and a 20 lb./in. minimum tensile modules when tested in accordance with MSMT 509. The material shall also have a 0.3 gal./ft.2/min. flow rate and seventy-five percent (75%) minimum filtering efficiency when tested in accordance with MSMT 322.

Geotextile fabrics used in the construction of silt fence shall resist deterioration from ultraviolet exposure. The fabric shall contain sufficient amounts of ultraviolet ray inhibitors and stabilizers to provide a minimum of 12 months of expected usable construction life at a temperature of 0 to 120 degrees F.

SECTION VI - PERMANENT GEOTEXTILE MATTING:

- A. Use Enkamat 7020 matting or approved equal.
- B. Install per manufacturer's instructions; see detail Sheet 5.

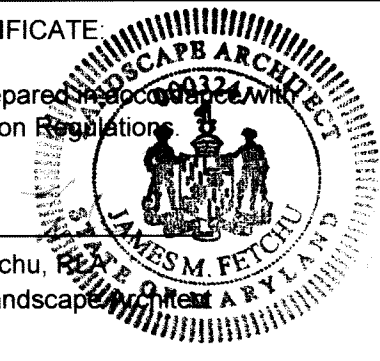
LANDSCAPE ARCHITECT CERTIFICATE

I hereby certify that this plan is prepared in accordance with the regulations of the State Board of Landscape Architecture.

Howard County Forest Conservation Regulations

Date: 1/15/07

James M. Fetchu
Registered Landscape Architect
MD #3241



HOWARD COUNTY DPW - ENVIRONMENTAL SERVICES
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HOWARD COUNTY, MD
PUBLIC RECREATION
PARCEL 9
ELECTION DISTRICT 5
MAP 30 GRID 7

**CENTENNIAL PARK
SAND FILTER DESIGN**

Planting Notes

DATE:	10/07				
DESIGNED:	TCS				
DRAFTED:	HT				
CHECKED:	TCS				
BASE DATA:	J.A. RICE	NO.		REVISIONS	BY DATE

CPJ Associates

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