REMEDIAL REPAIRS
COLUMBIA GATEWAY
STORMWATER MANAGEMENT DAM

MD DAM # 79

HOWARD COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION

INDEX OF SHEETS

LEGEND

- EX. TREES
- EXIST. MAJOR CONTOUR
- EXIST. MINOR CONTOUR
- PROP. MAJOR CONTOUR
- PROP. MINOR CONTOUR
- EXIST. PROPERTY LINE
- WETLANDS
- ORANGE SAFETY FENCE
- LIMIT OF DISTURBANCE
- SILT FENCE
- RPS — REMOVABLE PUMPING STATION
- DD — SILT BAG DEWATERING DEVICE
- EXISTING FLOODPLAIN
- PROPOSED FLOODPLAIN
- 8"W — EX. WATER LINE
- 8"S — EX. SEWER LINE
- EX. MONITORING WELL
- PROPOSED MONITORING WELL

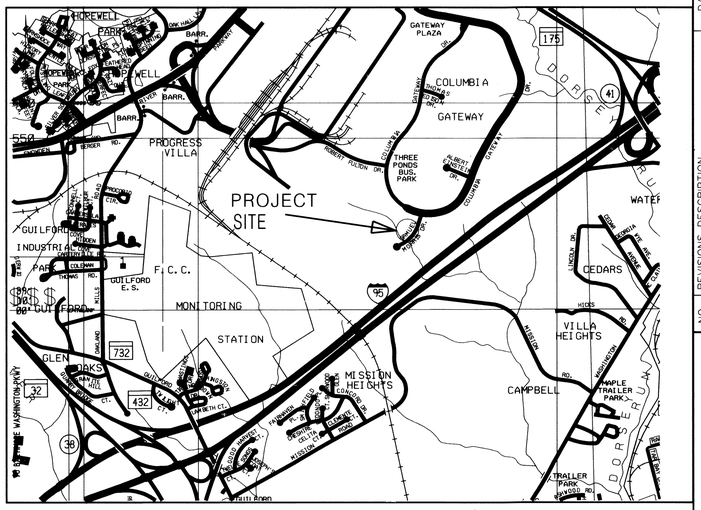
BENCHMARK DATA

TRAVERSE # 100
N 547416.521
E 1366115.778
El. 330.622

TRAVERSE # 101
N 547982.702
E 1366517.162
El. 319.189

TRAVERSE # 102
N 547829.585
E 1366523.319
El. 319.023

TRAVERSE # 103
N 547756.363
E 1366590.451
El. 290.851



SITE VICINITY MAP
SCALE: 1" = 1500'

GENERAL NOTES

1. THE PURPOSE OF THE REMEDIAL REPAIRS IS TO:
   A. INSTALL AN UNDERDRAIN SYSTEM AT EACH OF THE EXISTING WINGWALLS (BY GENERAL CONTRACTOR/CONTRACTOR).
   B. INSTALL TWO MONITORING WELLS, ONE EACH AT THE WINGWALLS (BY DRILLING SUB-CONTRACTOR).
   C. GROUT SEAL EACH OF THE 17 JOINTS IN THE EXISTING 10-FT. DIA. RCP SPILLWAY AND THE HEADWALL/RCP INTERFACE JOINT (BY GROUTING SUB-CONTRACTOR).
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH HOWARD COUNTY STANDARDS, SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
3. CALL MISS UTILITY AT 1-800-257-7777 5 DAYS PRIOR TO THE START OF WORK. THE CONTRACTOR AND GROUTING SUB-CONTRACTOR 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.
4. ALL UTILITY COMPANIES SHALL BE NOTIFIED 24 HOURS IN ADVANCE OF CONSTRUCTION.
5. APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
6. THE CONTRACTOR SHALL TEST PIT EXISTING UTILITIES WHERE DIRECTED BY THE ENGINEER A MINIMUM OF TWO WEEKS IN ADVANCE OF ANY CONSTRUCTION.
7. WATERWAY CONSTRUCTION PERMIT WILL BE PROVIDED BY HOWARD COUNTY DPW.
8. CONTRACTOR TO NOTIFY THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS AND PERMITS AT LEAST 5 DAYS BEFORE STARTING WORK SHOWN OF THESE DRAWINGS. TELEPHONE NO. : 410-313-1880.
9. ALL DISTURBED SLOPE AREAS TO BE STABILIZED AS SOON AS CONSTRUCTION WORK AND GRADING ARE COMPLETED.
10. MAINTAINANCE OF TRAFFIC DURING CONSTRUCTION SHOULD BE IN ACCORDANCE WITH HOWARD COUNTY STANDARD DETAILS. TRAFFIC CONTROL DEVICES AND THEIR INSALLATION SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 1988 REVISED EDITION.
11. SWM POND AS-BUILT SURVEY INFORMATION DATED OCTOBER 2006 WAS PROVIDED BY HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS (DPW).
12. THE MD DAM SAFETY DIVISION HAS CLASSIFIED THE DAM AS A HIGH HAZARD STRUCTURE DUE TO INCREASED FLOODING TO INTERSTATE 95.

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

KOFI B. ACHEAMPONG PE NO. 33722
KOFI B. ACHEAMPONG DATE 12/14/2007

CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ONSITE INPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ONSITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. DOES NOT MEAN OR IMPLY A GAURANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

STATE OF MARYLAND — KOFI B. ACHEAMPONG — No. 33722 — PROFESSIONAL ENGINEER

AS BUILT
KCI TECHNOLOGIES, INC.

ENGINEER'S CERTIFICATION

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL DATED 1994."

SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE) — DATE 8/9/07
KOFI B. ACHEAMPONG

OWNER'S/DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN OF DEVELOPMENT AND PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF NATURAL RESOURCES APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE THE BEGINNING OF THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT OR THEIR AUTHORIZED AGENTS AS ARE DEEMED NECESSARY."

SIGNATURE OF DEVELOPER (PRINT NAME BELOW SIGNATURE) — DATE 8/7/07
Mark S. Richmond

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
DIRECTOR OF PUBLIC WORKS — DATE 8/7/07
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 8/7/07
CHIEF, STORMWATER MANAGEMENT DIVISION — DATE 8/7/07

KCI TECHNOLOGIES
10 NORTH PARK DRIVE
HUNT VALLEY, MD 21030
PHONE: (410) 316-7800
FAX: (410) 316-7817
www.kci.com

NO.	REVISIONS	DESCRIPTION	DATE

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ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS
KCI TECHNOLOGIES www.kci.com

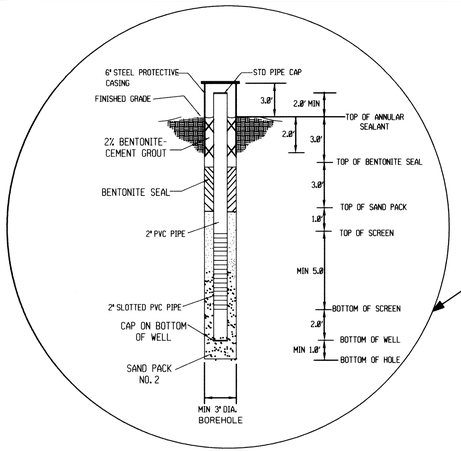
TITLE SHEET

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM
HOWORD COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

STATE OF MARYLAND — KOFI B. ACHEAMPONG — No. 33722 — PROFESSIONAL ENGINEER — 8/9/07

SCALE:	NTS
DATE:	08/7/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA

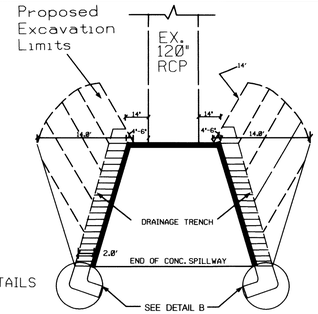
SHEET NO.
1 OF 8



SEE MONITORING WELL LOGS FOR AS-BUILT DETAILS

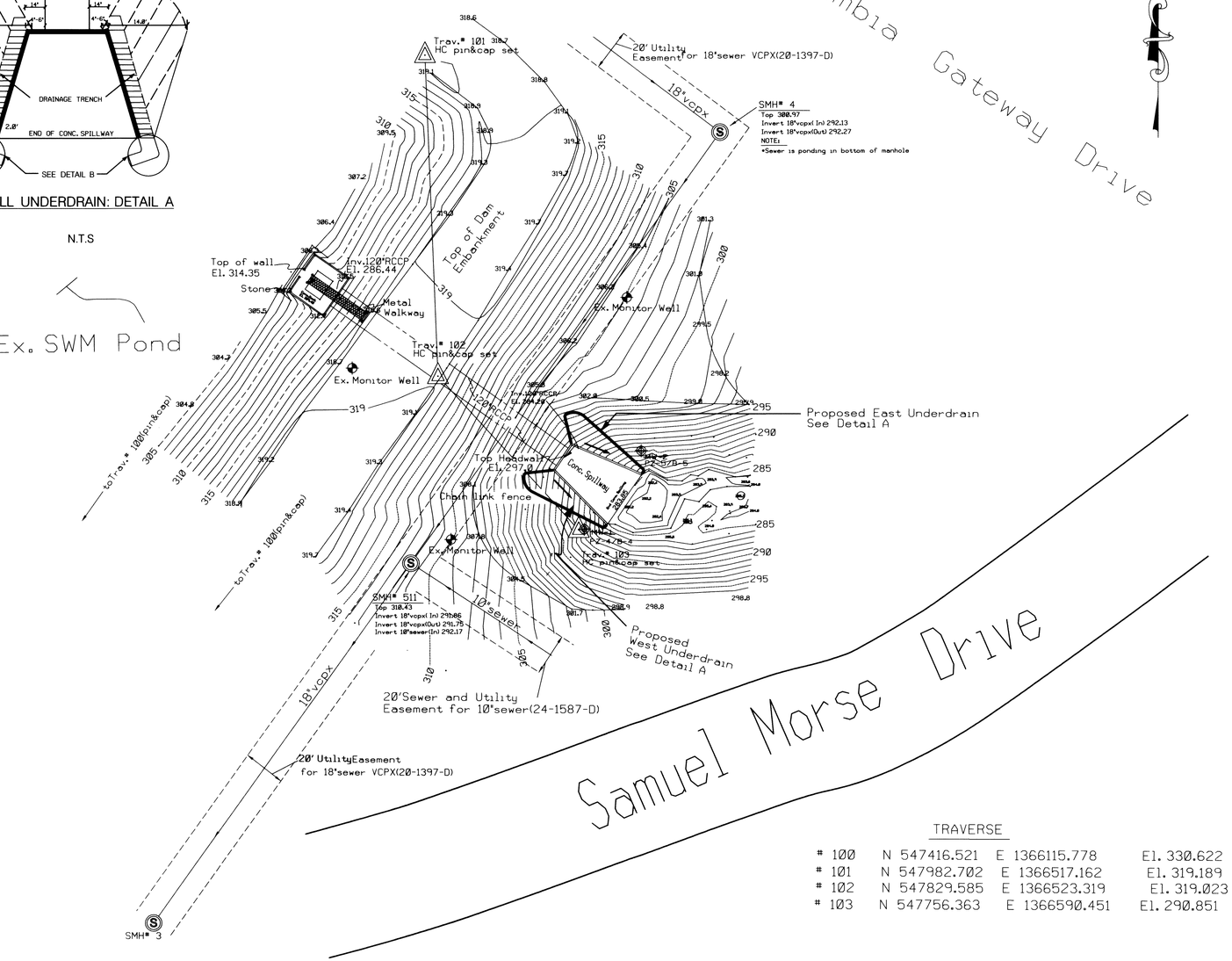
TYPICAL SKETCH FOR MONITORING WELL

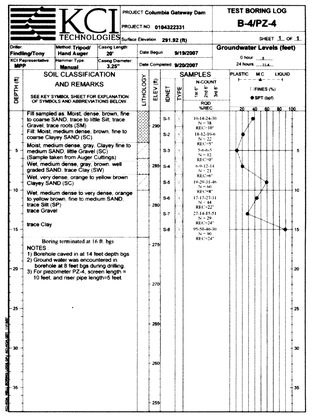
N.T.S

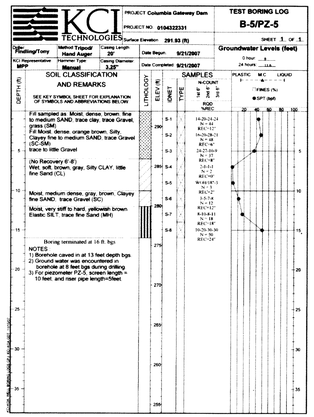


WALL UNDERDRAIN: DETAIL A

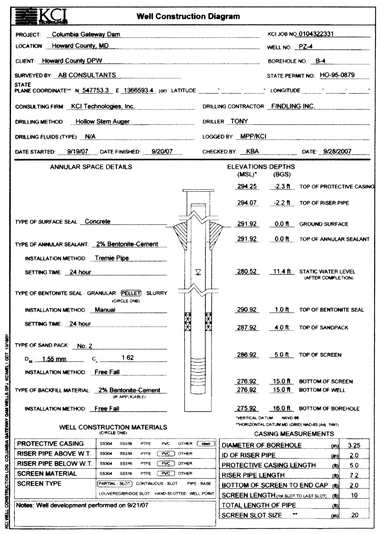
N.T.S

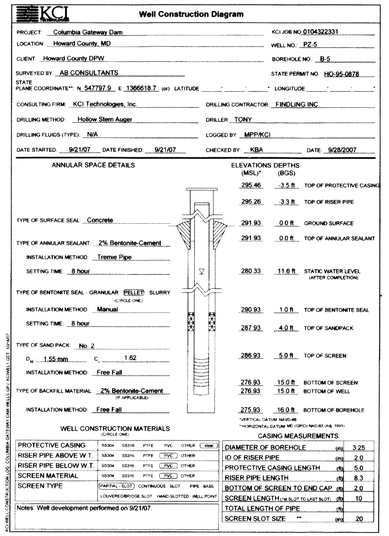




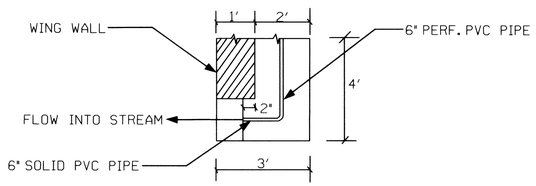


BORING LOGS





MONITORING WELL LOGS



END OF UNDERDRAIN: DETAIL B

N.T.S

TRAVERSE

# 100	N 547416.521	E 1366115.778	El. 330.622
# 101	N 547982.702	E 1366517.162	El. 319.189
# 102	N 547829.585	E 1366523.319	El. 319.023
# 103	N 547756.363	E 1366590.451	El. 290.851

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KCI TECHNOLOGIES, INC.

LEGEND

- WALL UNDERDRAIN
- DIRECTION OF FLOW IN UNDERDRAIN
- PZ-4/B-4 2007 MONITORING WELL LOCATION AND NO.
- EXISTING 2006 MONITORING WELL
- MW-1 PROPOSED MONITORING WELL

NOTES:

1. COORDINATES AND ELEVATIONS SHOWN HEREON ARE BASED ON THE FOLLOWING DATUMS AND PROJECTIONS:
   HORIZONTAL: MARYLAND (GRID) NAD 83 (ADJ. 1991)
   VERTICAL: NAVD 88 U.S. SURVEY FEET
2. ORIGINAL BASE MAP PROVIDED VIA EMAIL BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS (DPW) STORM WATER MANAGEMENT DIVISION, AND DATED OCTOBER 2006.
3. CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OR OVER THE EXISTING SANITARY SEWER LINES.
4. MONITORING WELLS SHALL BE INSTALLED TO A DEPTH OF 15 FEET, OR AS DIRECTED BY THE ENGINEER.

NO.	REVISIONS DESCRIPTION	DATE

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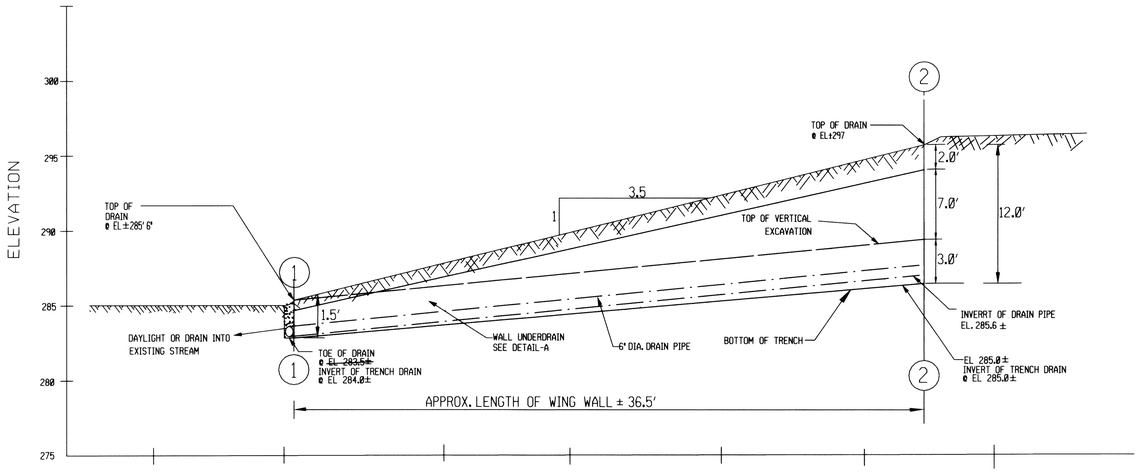
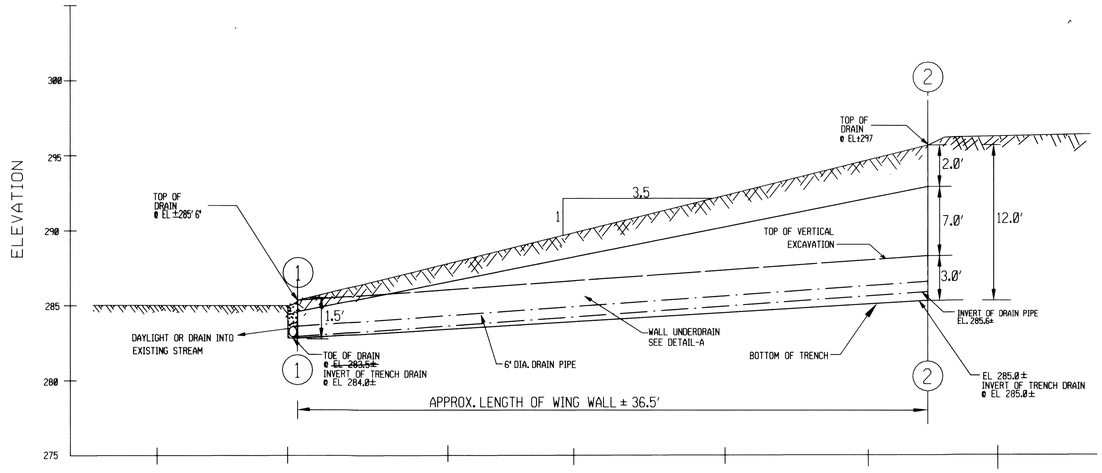
PLAN SHEET

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM
HOWORD COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

STATE OF MARYLAND
KOFI B. ACHEAMPONG
No. 32715
PROFESSIONAL ENGINEER

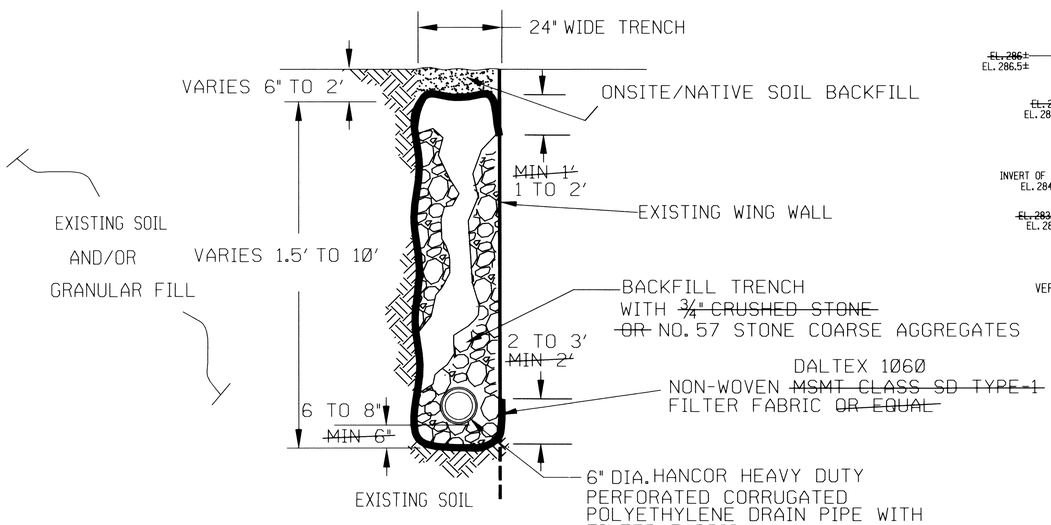
SCALE:	1"=30'
DATE:	12/14/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA
SHEET NO.:	2 OF 8





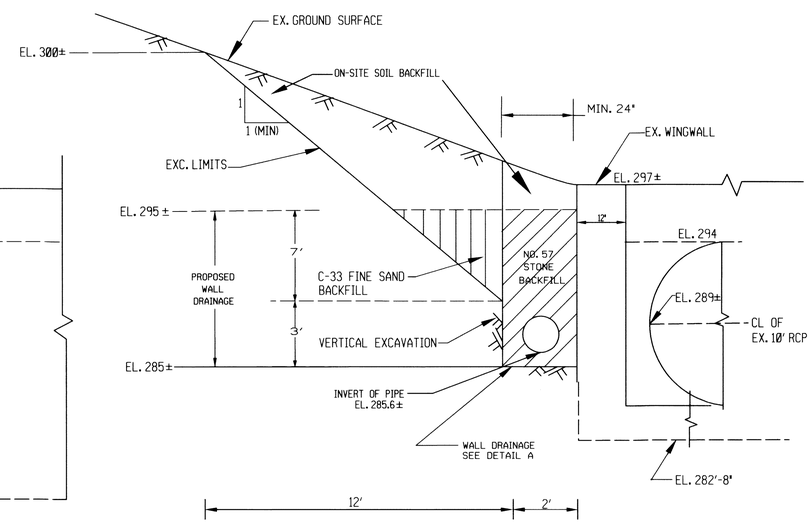
WEST WINGWALL DRAINAGE PROFILE

NOT TO SCALE



EAST WINGWALL DRAINAGE PROFILE

NOT TO SCALE



DETAIL A - STONE-FILLED UNDERDRAIN

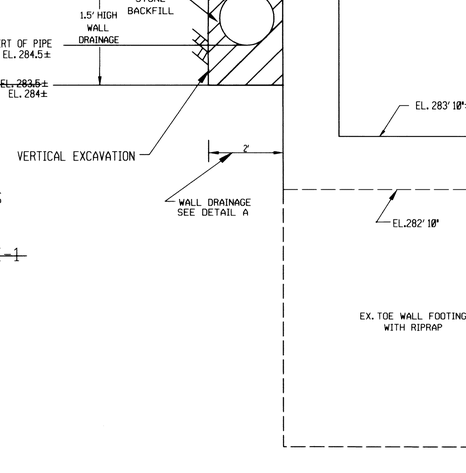
NOT TO SCALE

UNDERDRAIN STONE BACKFILL SPECIFICATIONS

SIEVE SIZE	NO. 57
	PERCENT FINER BY WEIGHT
1½ INCH	100
1 INCH	95 - 100
½ INCH	25 - 60
NO. 4	0 - 10
NO. 8	0 - 5

FINE SAND AGGREGATE BACKFILL SPECIFICATIONS

SIEVE SIZE	MSMT FINE AGGREGATE/ UNDERDRAIN (% FINER)	ASTM C-33 (% FINER)
~~3/8~~ INCH	100	100
NO. 4	95-100	95-100
NO. 8	-	80-100
NO. 16	45-85	50-85
NO. 30	-	25-85
NO. 50	10-30	5-30
NO. 100	0-10	0-10
NO. 200	-	⩽ 3



SECTION 1-1 (TYP.)

NOT TO SCALE

TOE OF WALL DRAIN (OUTLET)

SECTION 2-2 (TYP.)

NOT TO SCALE

TOP OF WALL DRAIN (INLET)

NOTES:

1. SEE SHEET 2 FOR PLAN LAYOUT OF PROPOSED WINGWALL DRAINAGE.
2. EXISTING WINGWALL FOUNDATION DEPTHS AND ELEVATIONS ARE BASED ON AS-BUILT DRAWING (DATED MAY 1, 1970).
3. NEAR VERTICAL EXCAVATION HEIGHT AT BASE OF TRENCH IS ABOUT 2.5 TO 3 FEET ALONG THE DRAIN.
4. HORIZONTAL EXTENTS OF PROPOSED 1:1 SLOPED EXCAVATION VARIES FROM ABOUT 0' (AT TOE) TO 12' (AT TOP OF DRAIN).

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WALL DRAINAGE SYSTEM PROFILE AND DETAIL SHEET

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM

HOWORD COUNTY, MARYLAND

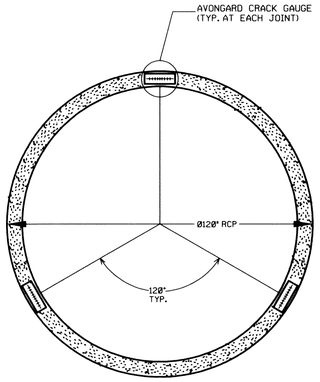
DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

STATE OF MARYLAND — KOFI B. ACHEAMPONG — NO. 33722 — PROFESSIONAL ENGINEER

SCALE:	NTS
DATE:	12/14/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA

SHEET NO:

3 OF 8



TYPICAL SECTION

NOT TO SCALE

MONITORING NOTES:

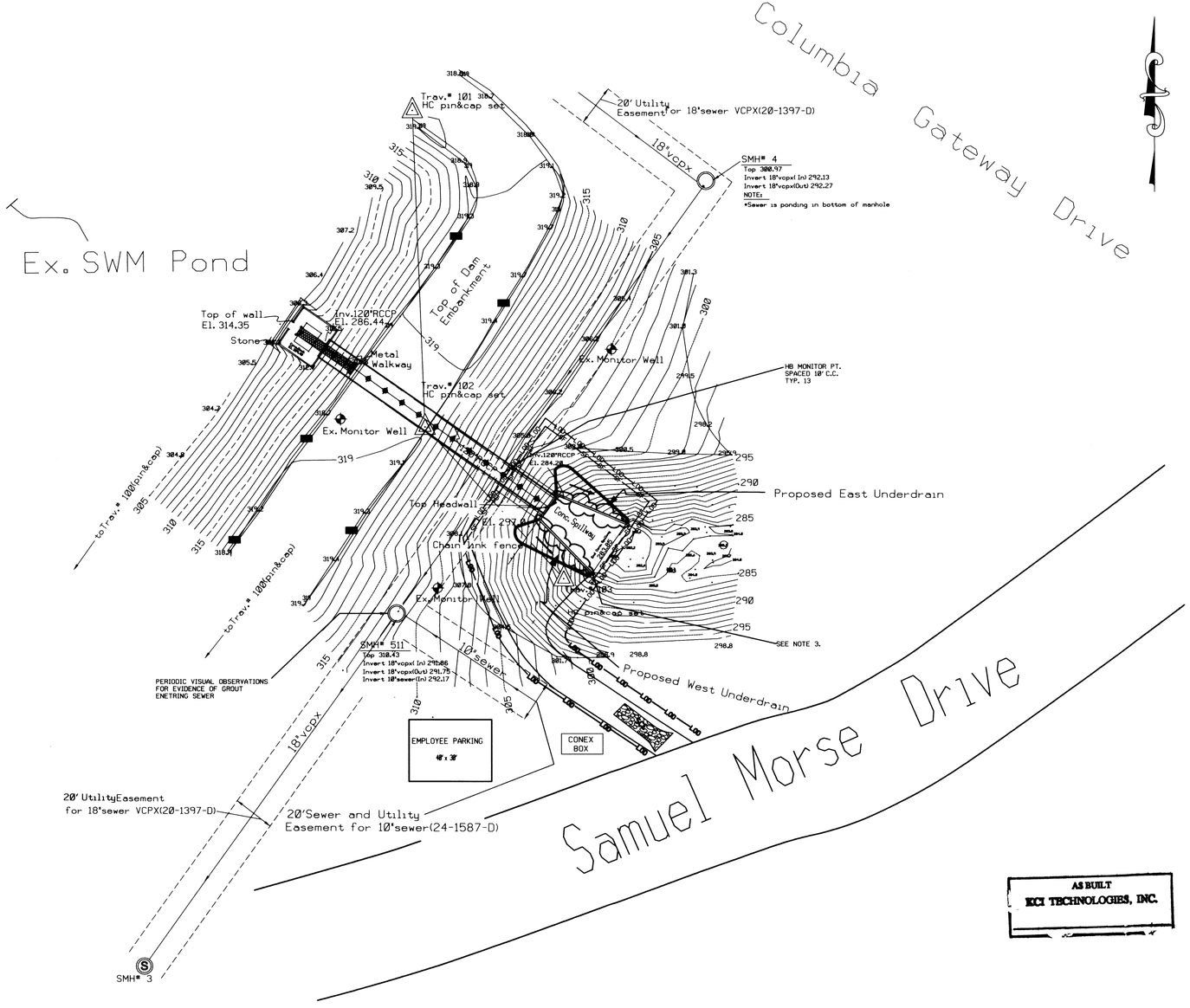
1 AVONGARD CRACK MONITORS TO BE INSTALLED AT EACH JOINT, INCLUDING HEADWALL, AS SHOWN, USING PLASTIC SCREW ANCHORS.

2. MEASUREMENTS TO BE READ AND RECORDED HOURLY WHILE INJECTING AT THAT JOINT. MONITORING MAY BE MOVED FROM ONE JOINT TO THE NEXT AS WORK PROCEEDS.

AS-BUILT REMEDIAL GROUTING OF EXISTING 10' DIAMETER REINFORCED CONCRETE PIPE (RCP) SPILLWAY JOINTS, RCP/HEADWALL & RCP/SEWER MAIN INTERFACES

HEADWALL / RCP JOINT #	ESTIMATED GROUT VOLUME INTAKE GALLONS	DATE STARTED	DATE COMPLETED	TYPICAL JOINT GROUTING DETAILS (SHEET 5 OF 8)	REMARKS
Headwall & 1	10	10/5/2007	10/12/2007	See Details for Joint < 3/16"	Patched Headwall/RCP Interface
2	3.5	10/9/2007	10/11/2007	See Details for Joint > 1/2"	
3	2	10/9/2007	10/9/2007	See Details for Joint > 1/2"	
4	0.5	10/11/2007	10/11/2007	See Details for Joint < 3/16"	Water test determined that there was no cold joint Chipped concrete & patched; coated rebar
5	1	10/10/2007	10/11/2007	See Details for Joint < 3/16"	Narrow Joint Near Sanitary Sewer
6	1.5	10/9/2007	10/9/2007	See Details for Joint > 1/2"	
7	2	10/9/2007	10/9/2007	See Details for Joint > 1/2"	
8	2	10/9/2007	10/10/2007	See Details for Joint < 3/16"	
9	1	10/10/2007	10/10/2007	See Details for Joint < 3/16"	Narrow Joint; Drilled 6 holes for grouting
10	1.5	10/9/2007	10/9/2007	See Details for Joint > 1/2"	
11	2	10/9/2007	10/9/2007	See Details for Joint > 1/2"	
12	1.5	10/9/2007	10/9/2007	See Details for Joint > 1/2"	
13	2	10/9/2007	10/9/2007	See Details for Joint < 3/16"	Narrow Joint
14	2	10/8/2007	10/10/2007	See Details for Joint > 1/2"	
15	3	10/8/2007	10/8/2007	See Details for Joint > 1/2"	
16	3	10/8/2007	10/9/2007	See Details for Joint > 1/2"	
17	3	10/8/2007	10/9/2007	See Details for Joint > 1/2"	
Sewer Joints (Horizontal Joints)	1	10/11/2007	10/11/2007	See Details for Joint < 3/16"	Joint Under Existing Sewer Pipe Area
Sewer Joint (Two additional 1/2 Joints)	1.5	10/5/2007	10/5/2007	See Details for Joint < 3/16"	Located between RCP Joint Nos. 4 and 5

NOTES:
1 SEE SHEET NO. 5 - RCP SPILLWAY JOINT GROUTING DETAILS II FOR ADDITIONAL REMEDIAL GROUTING INFORMATION.
2 GROUTING WAS INJECTED UNDER PRESSURE THROUGH PLASTIC INJECTO-TUBES AND/OR GROUT HOELS INSTALLED AROUND THE INSIDE PERIMETER OF EACH PIPE JOINT.
3 THE GROUTING MATERIAL USED WAS A HYDRO-ACTIVE COMBI RESIN.
4 AVONGARD CRACK MONITORING GAUGES WERE INSTALLED ACROSS THE JOINTS DURING GROUT INJECTION WORK WITH NO WITH NO MOVEMENTS RECORDED AT EACH JOINT.



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KCI TECHNOLOGIES, INC.

EXTERIOR MONITORING AND HAYWARD BAKER (HB) EQUIPMENT LAYOUT PLAN WITH JOINT MONITORING DETAIL

SCALE: 1"=30'

NOTES:

1. CENTERLINE ELEVATIONS WILL BE SURVEYED WEEKLY DURING JOINT GROUTING.
2. SURVEY TO BE TIED TO BENCHMARK(S) PROVIDED BY KCI.
2. EXISTING CHAINLINK FENCE AT WINGWALLS TO BE REMOVED TEMPORARILY BY GENERAL CONTRACTOR TO ALLOW ACCESS INTO CONDUIT. TEMPORARY CONSTRUCTION FENCE TO BE CONSTRUCTED BY GENERAL CONTRACTOR.

HAYWARD BAKER
A KELLER COMPANY
NORTHEASTERN REGION
1875 MAYFIELD RD.
ODENTON, MD 21113
Ph: (410) 551-1980
Fax: (410) 551-8206

NO.	REVISIONS DESCRIPTION	DATE

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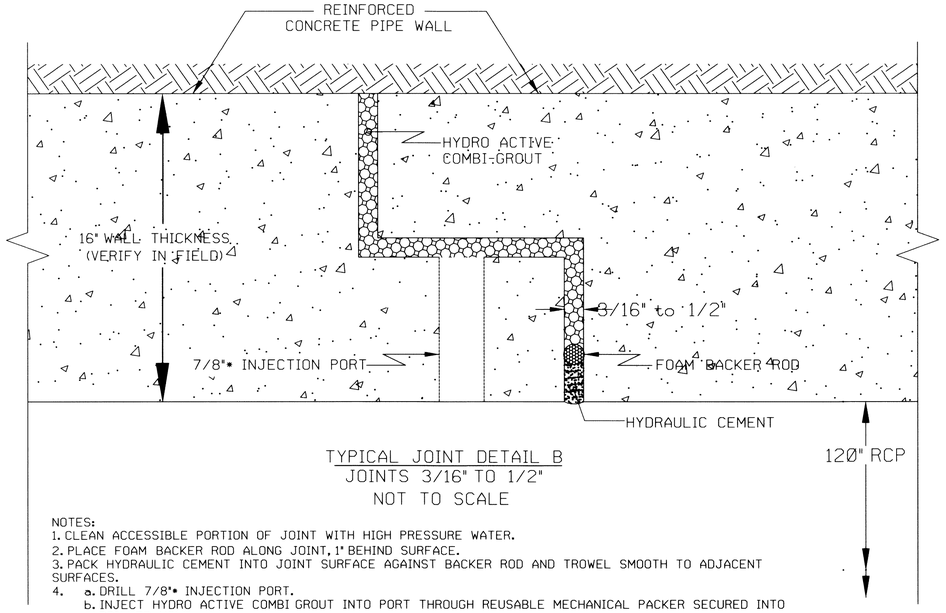
RCP SPILLWAY JOINT GROUTING DETAILS-I

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM
HOWORD COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

STATE OF MARYLAND — KOFI B. ACHEAMPONG — No. 33722 — PROFESSIONAL ENGINEER

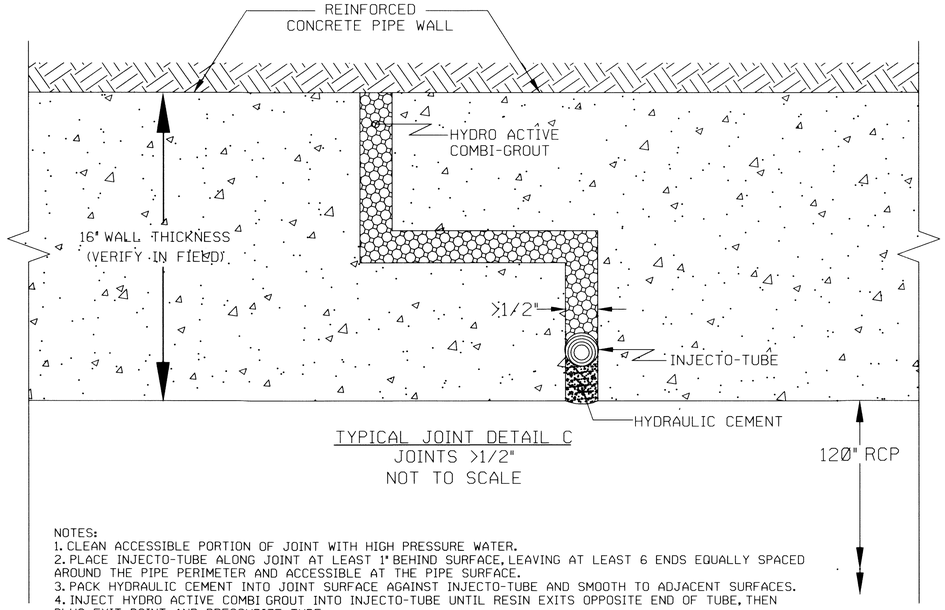
SCALE:	AS SHOWN
DATE:	12/14/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA

SHEET NO:
4 OF 8



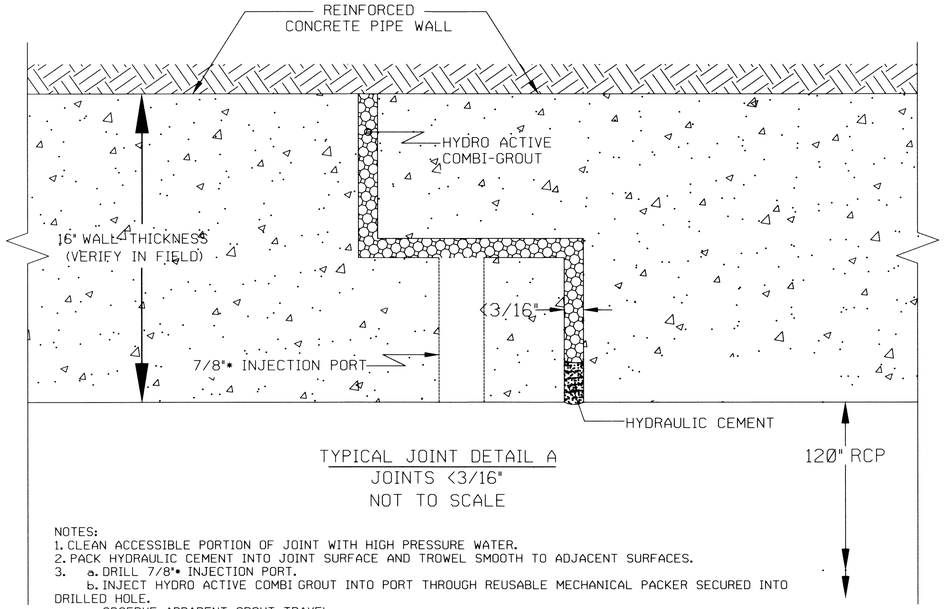
TYPICAL JOINT DETAIL B
JOINTS 3/16" TO 1/2"
NOT TO SCALE

NOTES:
1. CLEAN ACCESSIBLE PORTION OF JOINT WITH HIGH PRESSURE WATER.
2. PLACE FOAM BACKER ROD ALONG JOINT, 1" BEHIND SURFACE.
3. PACK HYDRAULIC CEMENT INTO JOINT SURFACE AGAINST BACKER ROD AND TROWEL SMOOTH TO ADJACENT SURFACES.
4. a. DRILL 7/8"ø INJECTION PORT.
   b. INJECT HYDRO ACTIVE COMBI GROUT INTO PORT THROUGH REUSABLE MECHANICAL PACKER SECURED INTO DRILLED HOLE.
   c. OBSERVE APPARENT GROUT TRAVEL.
   d. DRILL AND INJECT ADDITIONAL PORTS AS REQUIRED TO COMPLETE THE SEAL. PROGRESS FROM INVERT TO CROWN.
4. REMOVE GROUT PACKERS AND PATCH HOLES WITH HYDRAULIC CEMENT, FINISHED SMOOTH TO ADJACENT SURFACES.
5. SCRAPE OFF EXCESS HYDRO ACTIVE RESIN FROM PIPE SURFACES.
6. TOTAL NUMBER OF JOINTS TO BE TREATED IS 17, PLUS THE CIRCUMFRENTIAL HEADWALL JOINT AND SEWER JOINTS (TWO ADDITIONAL JOINTS + HORIZONTAL JOINT). JOINT SIZE AND APPROPIATE TREATMENT OPTION WILL BE DECIDED AFTER AWARD OF CONTRACT AND ESTABLISHMENT OF SAFE ACCESS INTO STRUCTURE.
7. LOCALIZED DEWATERING OF EACH JOINT INVERT WILL BE ACCOMPLISHED BY PLACING SAND BAGS ON BOTH SIDES OF THE JOINT, DEWATERING THE JOINT BY PUMP AND VACUUM AND BYPASSING PIPE FLOW ACROSS THE JOINT WITH A SUBMERSIBLE PUMP.



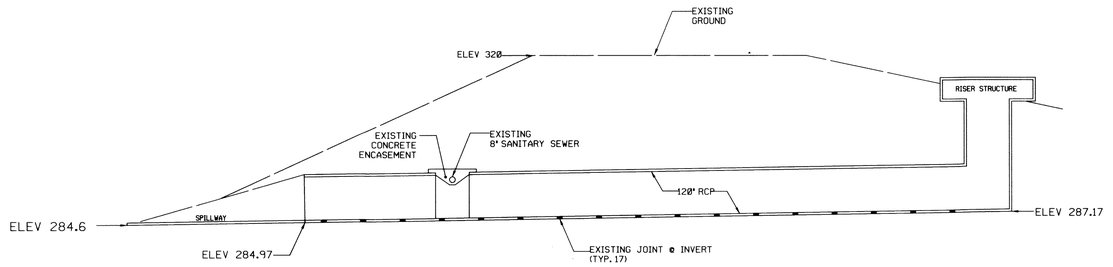
TYPICAL JOINT DETAIL C
JOINTS >1/2"
NOT TO SCALE

NOTES:
1. CLEAN ACCESSIBLE PORTION OF JOINT WITH HIGH PRESSURE WATER.
2. PLACE INJECTO-TUBE ALONG JOINT AT LEAST 1" BEHIND SURFACE, LEAVING AT LEAST 6 ENDS EQUALLY SPACED AROUND THE PIPE PERIMETER AND ACCESSIBLE AT THE PIPE SURFACE.
3. PACK HYDRAULIC CEMENT INTO JOINT SURFACE AGAINST INJECTO-TUBE AND SMOOTH TO ADJACENT SURFACES.
4. INJECT HYDRO ACTIVE COMBI GROUT INTO INJECTO-TUBE UNTIL RESIN EXITS OPPOSITE END OF TUBE, THEN PLUG EXIT POINT AND PRESSURIZE TUBE.
5. REMOVE GROUT PORTS, CUT INJECTO-TUBE BEHIND SURFACE. PATCH HOLES WITH HYDRAULIC CEMENT, FINISHED SMOOTH TO ADJACENT SURFACES.
6. SCRAPE OFF EXCESS HYDRO ACTIVE RESIN FROM PIPE SURFACES.
7. TOTAL NUMBER OF JOINTS TO BE TREATED IS 17, PLUS THE CIRCUMFRENTIAL HEADWALL JOINT AND SEWER JOINTS (TWO ADDITIONAL JOINTS + HORIZONTAL JOINT). JOINT SIZE AND APPROPIATE TREATMENT OPTION WILL BE DECIDED AFTER AWARD OF CONTRACT AND ESTABLISHMENT OF SAFE ACCESS INTO STRUCTURE.
8. LOCALIZED DEWATERING OF EACH JOINT INVERT WILL BE ACCOMPLISHED BY PLACING SAND BAGS ON BOTH SIDES OF THE JOINT, DEWATERING THE JOINT BY PUMP AND VACUUM AND BYPASSING PIPE FLOW ACROSS THE JOINT WITH A SUBMERSIBLE PUMP.



TYPICAL JOINT DETAIL A
JOINTS <3/16"
NOT TO SCALE

NOTES:
1. CLEAN ACCESSIBLE PORTION OF JOINT WITH HIGH PRESSURE WATER.
2. PACK HYDRAULIC CEMENT INTO JOINT SURFACE AND TROWEL SMOOTH TO ADJACENT SURFACES.
3. a. DRILL 7/8"ø INJECTION PORT.
   b. INJECT HYDRO ACTIVE COMBI GROUT INTO PORT THROUGH REUSABLE MECHANICAL PACKER SECURED INTO DRILLED HOLE.
   c. OBSERVE APPARENT GROUT TRAVEL.
   d. DRILL AND INJECT ADDITIONAL PORTS AS REQUIRED TO COMPLETE THE SEAL. PROGRESS FROM INVERT TO CROWN.
4. REMOVE GROUT PACKERS AND PATCH HOLES WITH HYDRAULIC CEMENT, FINISHED SMOOTH TO ADJACENT SURFACES.
5. SCRAPE OFF EXCESS HYDRO ACTIVE RESIN FROM PIPE SURFACES.
6. TOTAL NUMBER OF JOINTS TO BE TREATED IS 17, PLUS THE CIRCUMFRENTIAL HEADWALL JOINT AND SEWER JOINTS (TWO ADDITIONAL JOINTS + HORIZONTAL JOINT). JOINT SIZE AND APPROPIATE TREATMENT OPTION WILL BE DECIDED AFTER AWARD OF CONTRACT AND ESTABLISHMENT OF SAFE ACCESS INTO STRUCTURE.
7. LOCALIZED DEWATERING OF EACH JOINT INVERT WILL BE ACCOMPLISHED BY PLACING SAND BAGS ON BOTH SIDES OF THE JOINT, DEWATERING THE JOINT BY PUMP AND VACUUM AND BYPASSING PIPE FLOW ACROSS THE JOINT WITH A SUBMERSIBLE PUMP.



INVERT JOINT MONITORING PROFILE
NOT TO SCALE

NOTES:

1. EXISTING PIPE JOINTS WILL BE MONITORED FOR VERTICAL DEFLECTION ON BOTH SIDES OF EACH JOINT AT THE INVERT.
2. SURVEY CONTROL WILL BE ESTABLISHED BY KCI AT THE SPILLWAY AND RISER STRUCTURES FOR HB INVERT JOINT MONITORING.
3. STRIP THE DETERIORATED PORTIONS OF THE CAST-IN-PLACE CONCRETE COLLAR NEAR EXISTING SANITARY SEWER LINE. APPLY GALVANIZED COATING TO EXPOSED REBAR AND PACK HYDRAULIC CEMENT WITHIN THE STRIPPED/ EXPOSED PORTIONS.

AS BUILT
KCI TECHNOLOGIES, INC.

HAYWARD BAKER
A KELLER COMPANY

NORTHEASTERN REGION
1875 MAYFIELD RD.
ODENTON, MD 21113
Ph: (410) 551-1980
Fax: (410) 551-8206

NO.	REVISIONS DESCRIPTION	DATE

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ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS
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RCP SPILLWAY JOINT GROUTING DETAILS–II

COLUMBIA GATEWAY
STORM WATER
MANAGEMENT DAM
HOWORD COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

STATE OF MARYLAND
KOFI B. ACHEAMPONG
No. 33722
PROFESSIONAL ENGINEER

SCALE:	AS SHOWN
DATE:	12/14/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA
SHEET NO:	5 OF 8

TRAVERSE

# 100	N 547416.521	E 1366115.778	El. 330.622
# 101	N 547982.702	E 1366517.162	El. 319.189
# 102	N 547829.585	E 1366523.319	El. 319.023
# 103	N 547756.363	E 1366590.451	El. 290.851

NOTES:

1. Coordinates and elevations shown hereon are based on the following Datums and projections:
   Horizontal: Maryland(Grid)NAD83' (Adj.1991)
   Vertical: NAVD88' U.S. Survey Feet
2. Original Base Map Provided via email by the Howard County Department of Public Works (DPW) Strom Water Management Division, and dated October 2006

LEGEND

———LOD——— LIMIT OF DISTURBANCE

———SF——— SILT FENCE

SCE STABILIZED CONSTRUCTION ENTRANCE

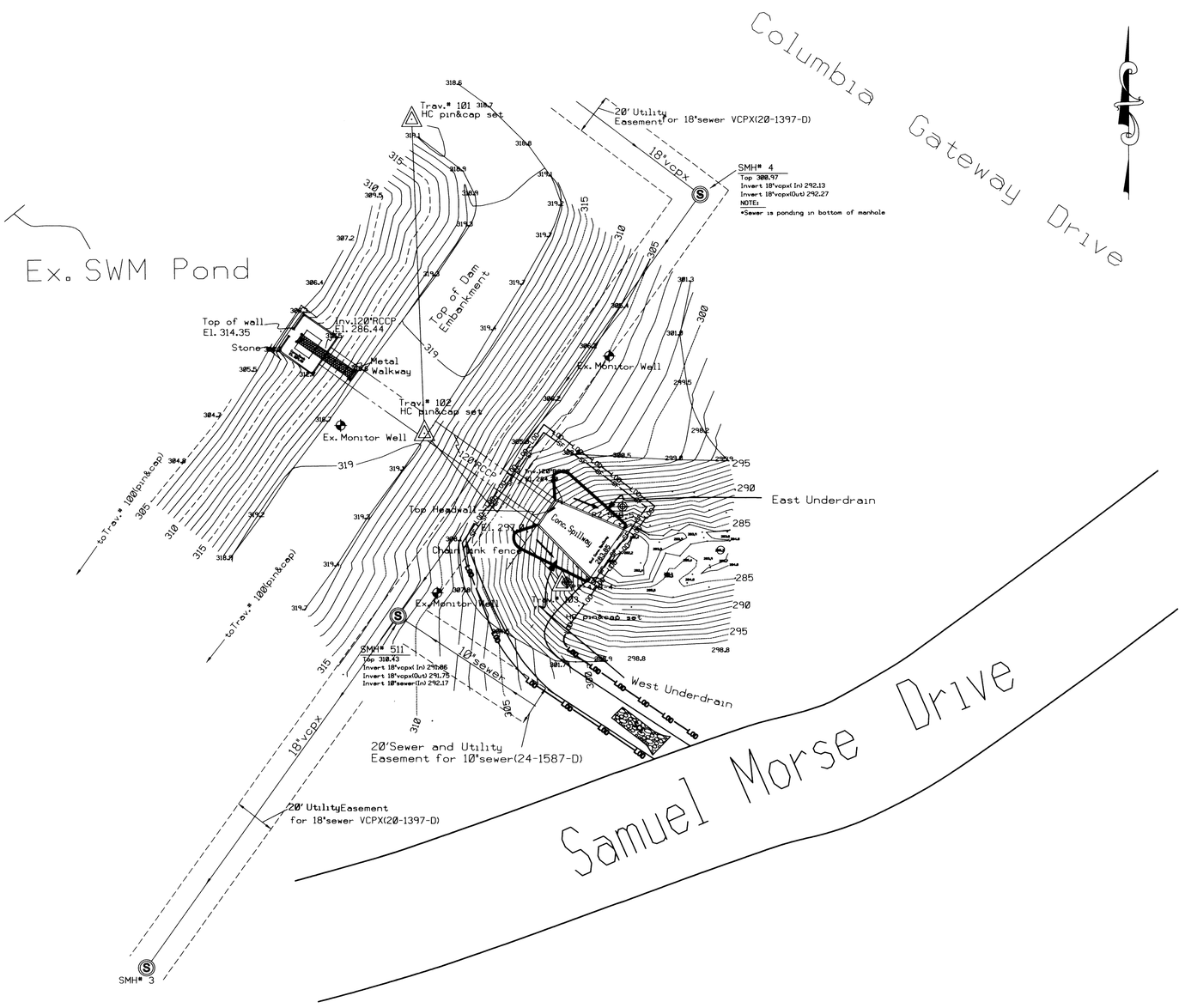
DIRECTION OF FLOW IN UNDERDRAIN

EXISTING 2006 MONITORING WELL

PZ-4/B-4 2007 MONITORING WELL LOCATION AND NO.

SEQUENCE OF CONSTRUCTION

1. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AND THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS/ BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION (410-313-1880) AT LEAST 5 DAYS PRIOR TO BEGINNING ANY WORK.
2. CONTRACTOR AND THE GROUTING SPECIALITY CONTRACTOR SHALL COORDINATE AN ON-SITE PRE-CONSTRUCTION MEETING WHICH SHALL INCLUDE, BUT NOT BE LIMITED TO, THE COUNTY PROJECT MANAGER, THE ENGINEER, MDE DAM SAFTEY AND A REPRESENTATIVE FROM HOWARD COUNTY CONSTRUCTION INSPECTION.
3. CLEAR AND GRUB THOSE AREAS WITHIN THE LIMIT OF DISTURBANCE REQUIRED TO INSTALL STABILIZED CONSTRUCTION ENTRANCE.
4. INSTALL SEDIMENT CONTROL MEASURES AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN.
5. PERFORM INSTALLATION OF WALL DRAINAGE SYSTEM AS SHOWN ON THE DRAWINGS, INCLUDING EXCAVATION DEWATERING.
6. INSTALL TWO MONITORING WELLS TO A DEPTH OF 15 FEET, ONE AT EACH WINGWALL LOCATIONS AS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER.
7. CONSTRUCTION WATER CONTROLS THROUGH THE RCP SPILLWAY
   a. GROUTING SUB-CONTRACTOR SHALL COORDINATE WITH THE COUNTY AND MDE DAM SAFTEY ON TEMPORARY CLOSING/OPENING OF THE SLUICE GATE AND DIVERT WATER FROM ENTERING THE SPILLWAY TO MAINTAIN RELATIVELY DRY WORK AREA WITHIN THE RCP FOR JOINT GROUTING WORK.
   b. GROUTING SUB-CONTRACTOR SHALL PROVIDE ALTERNATE MEANS/METHODS INCLUDING SAND BAGS AND SUBMERSIBLE PUMPS TO TEMPORARILY CONTROL WATER FLOW THROUGH THE SPILLWAY DURING GROUTING WORK.
   c. LOCALIZED PIPE JOINT DEWATERING CAN BE ACHIEVED BY USING SAND BAGS TO ISOLATE EACH JOINT AND USING SUBMERSIBLE PUMP TO DEWATER.
8. PERFORM REMEDIAL GROUTING AT PIPE JOINTS INCLUDING GROUND/STRUCTURE MONITORING AS SHOWN ON DRAWINGS.
9. PERMANENTLY STABILIZE ALL DISTURBED AREAS WITH TOPSOIL OR AS SPECIFIED ON THE PLAN.DEWATER ENTRAPPED AREA AS SHOWN ON THE PLANS. NO SEDIMENT-LADEN FLOW SHALL BE ALLOWED TO ENTER THE DOWNSTREAM CHANNEL.
10. WHEN THE SITE IS STABILIZED AND WITH THE PERMISSION OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL DEVICES AND STABILIZE ANY AREAS DISTURBED BY THIS ACTIVITY.



AS BUILT
KCI TECHNOLOGIES, INC.

NO.	REVISIONS DESCRIPTION	DATE

KCIFILE: m:\0199909.grv\Proposals\Geotech\2006\Columbia Gateway

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ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS
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EROSION AND SEDIMENT CONTROL PLAN

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM

HOWORD COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

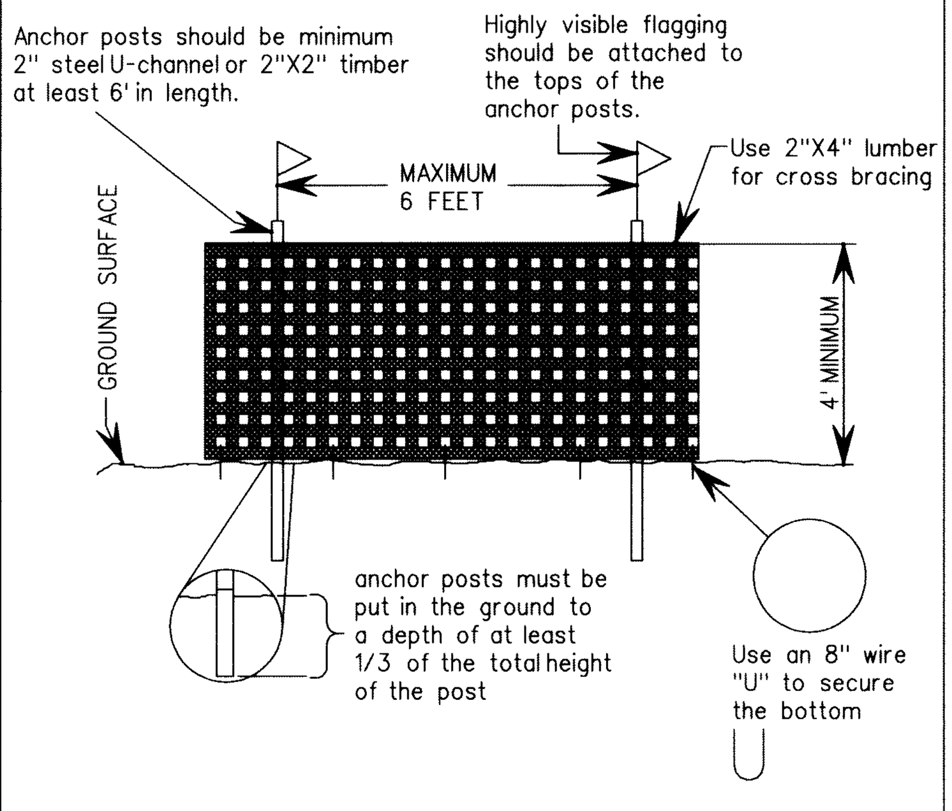
JOEL B. ACHEAMPONG No. 33122 STATE OF MARYLAND PROFESSIONAL ENGINEER

SCALE:	1"=30'
DATE:	12/15/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA

SHEET NO:

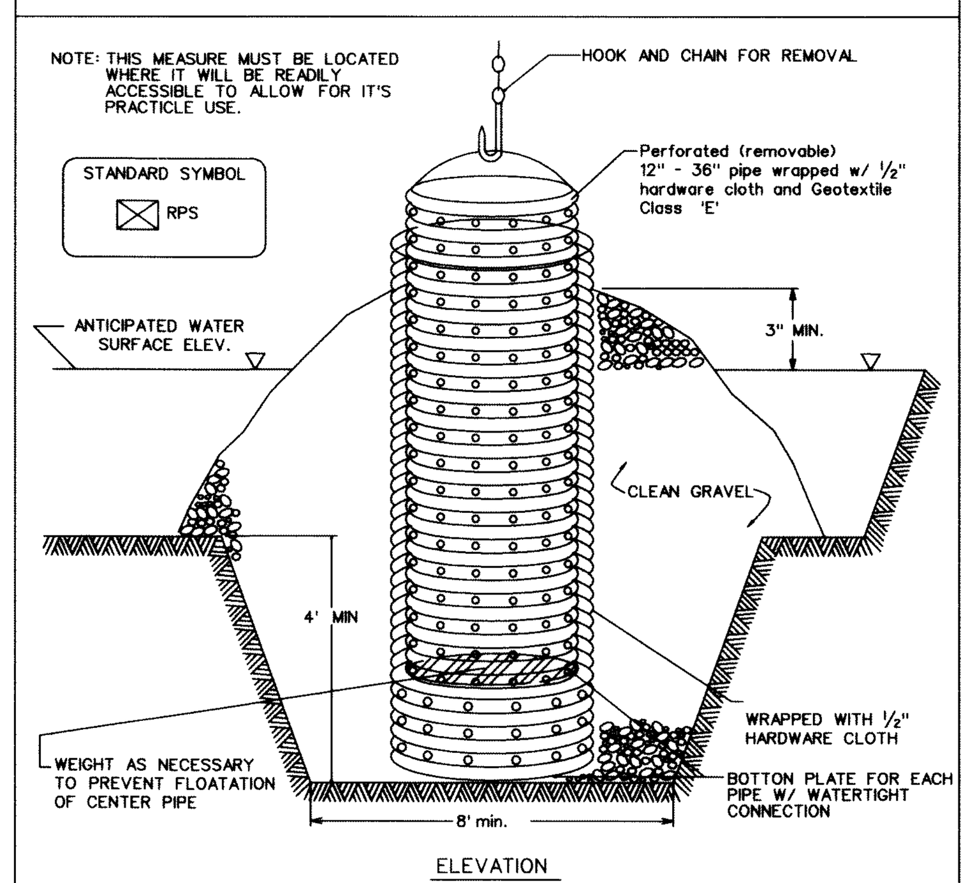
6 OF 8

NO.	REVISIONS DESCRIPTION	DATE



DETAIL FOR
BLAZE ORANGE PLASTIC
MESH SAFETY FENCE
NOT TO SCALE

DETAIL 20A - REMOVABLE PUMPING STATION



ELEVATION

Construction Specifications

1. The outer pipe should be 48" dia. or shall, in any case, be at least 4" greater in diameter than the center pipe. The outer pipe shall be wrapped with ½" hardware cloth to prevent backfill material from entering the perforations.

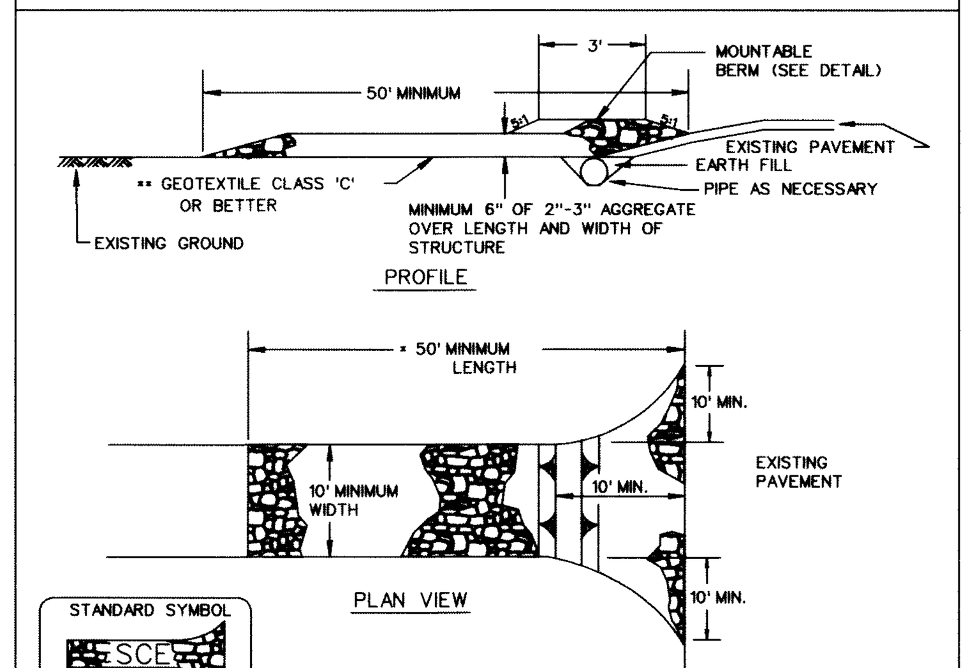
2. After installing the outer pipe, backfill around outer pipe with 2" aggregate or clean gravel.

3. The inside stand pipe (center pipe) should be constructed by perforating a corrugated or PVC pipe between 12" and 36" in diameter. The perforations shall be ½" X 6" slits or 1" diameter holes 6" on center. The center pipe shall be wrapped with ½" hardware cloth first, then wrapped again with Geotextile Class E.

4. The center pipe should extend 12" to 18" above the anticipated water surface elevation or riser crest elevation when dewatering a basin.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE D - 12 - 5	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



Construction Specification

1. Length - minimum of 50' (*30' for single residence lot).

2. Width - 10' minimum, should be flared at the existing road to provide a turning radius.

3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. **The plan approval authority may not require single family residences to use geotextile.

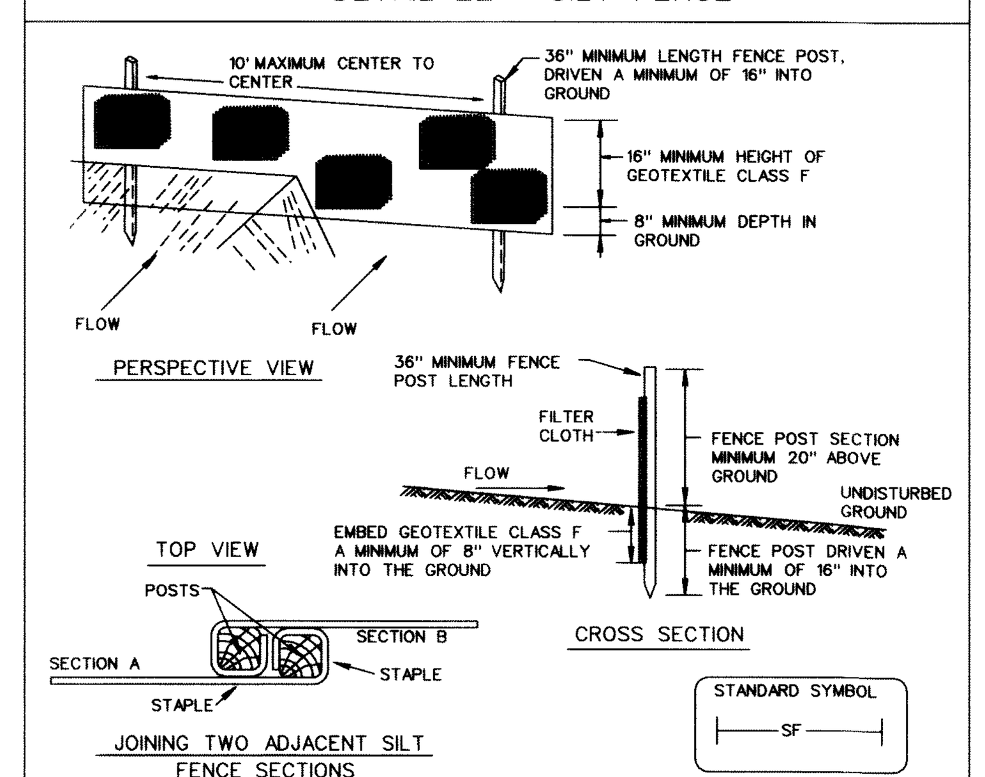
4. Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.

5. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.

6. Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F --17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 22. - SILT FENCE



Construction Specifications

1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1½" x 1½" square (minimum) cut, or 1¾" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pond per linear foot.

2. Geotextile 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:

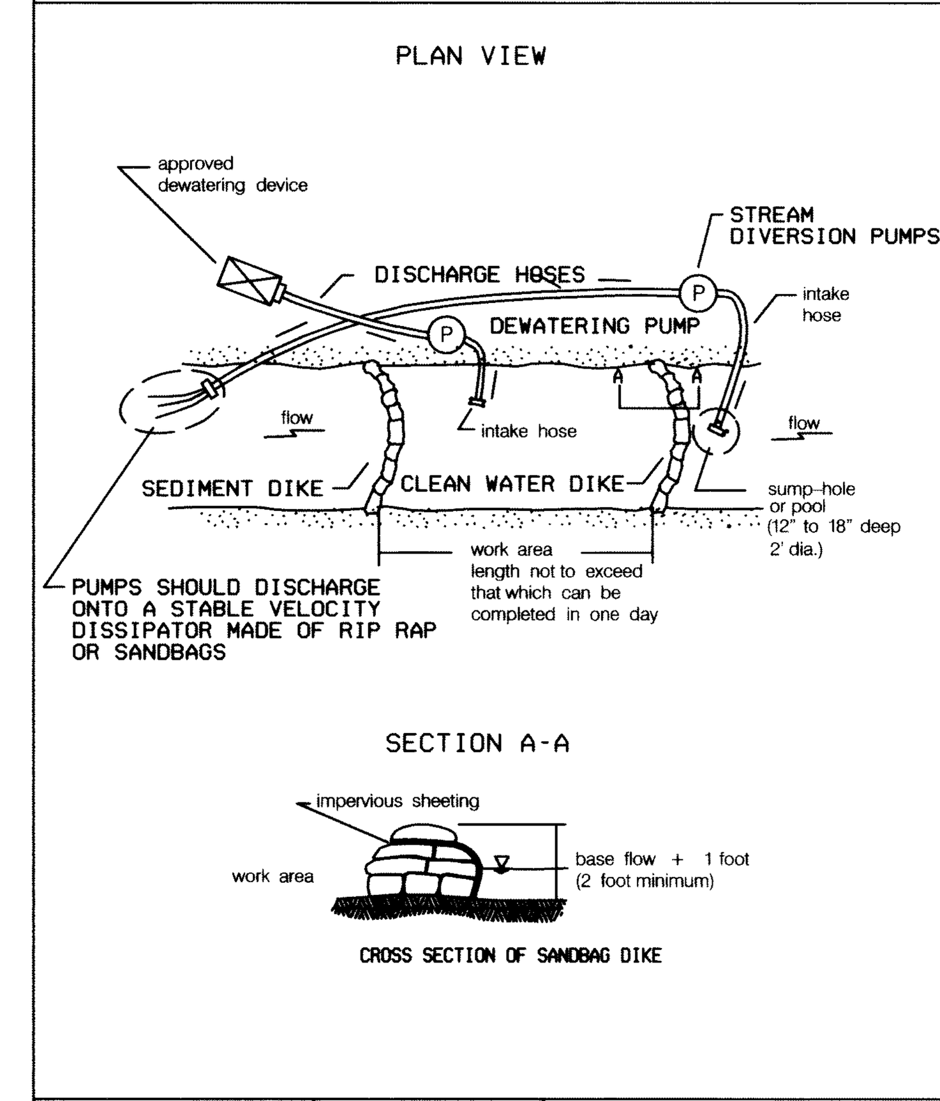
Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal ft / minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.

4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

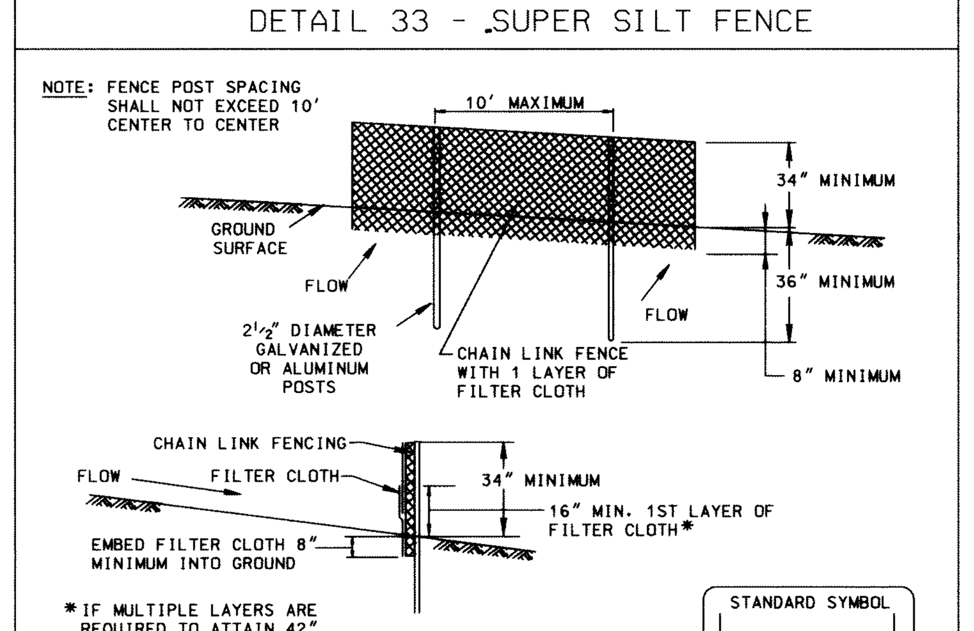
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E --15 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 1.2: PUMP-AROUND PRACTICE



TEMPORARY INSTREAM CONSTRUCTION MEASURES	REVISED NOVEMBER 2000 PAGE 1.2 - 3	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 33 - SUPER SILT FENCE



Construction Specifications

1. 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.

2. 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.

3. Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.

4. Filter cloth shall be embedded a minimum of 8" into the ground.

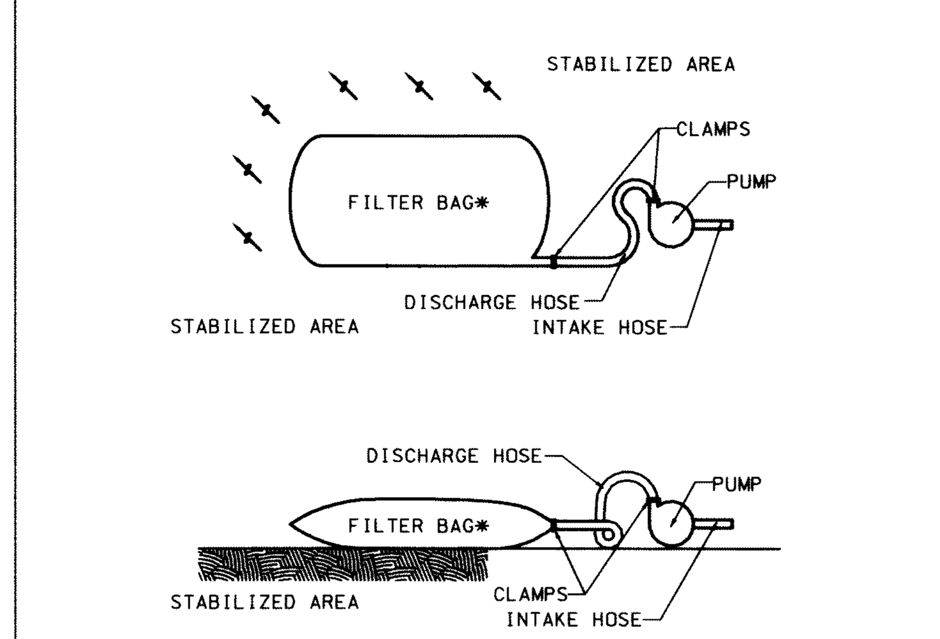
5. When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.

6. 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

7. 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/ft²/minute (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



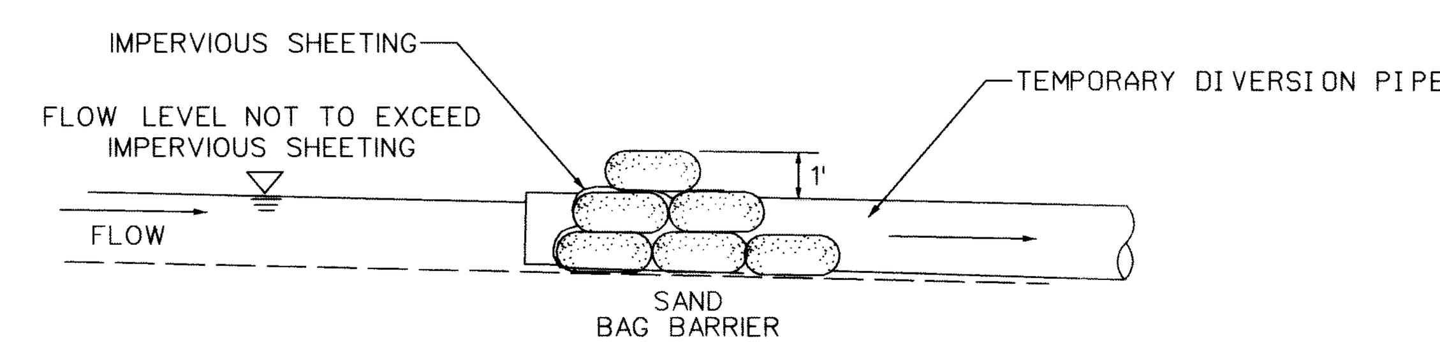
* NON-WOVEN GEOTEXTILE FILTER BAG WHICH RETAINS ALL SEDIMENT PARTICLES LARGER THAN 150 MICRONS.

SILT BAG DEWATERING DEVICE FOR PUMPED WATER

NOT TO SCALE

NOTES:
1. PLACE FILTER BAGS ON STABLE OR WELL VEGETATED AREAS WHICH ARE FLATTER THAN 5% AND WILL NOT ERODE WHEN SUBJECTED TO BAG DISCHARGES.
2. CLAMP PUMP DISCHARGE HOSES SECURELY INTO FILTER BAGS.
3. LIMIT PUMPING RATE TO ½ THE MANUFACTURER'S MAXIMUM PUMPING RATE.
4. WHEN SEDIMENTS FILL ⅓ THE VOLUME OF A FILTER BAG, IMMEDIATELY REMOVE THAT BAG FROM SERVICE. PROPERLY DISPOSE OF SPENT BAGS WITH THEIR SEDIMENTS.

NOTE: ALL WATER COLLECTED WITHIN THE LIMIT OF DISTURBANCE (WITH THE EXCEPTION OF WATER DIVERTED AROUND THE WORK AREA) SHALL BE PUMPED THROUGH THE FILTER BAG.



SAND BAG BARRIER AND TEMPORARY DIVERSION PIPE DETAIL

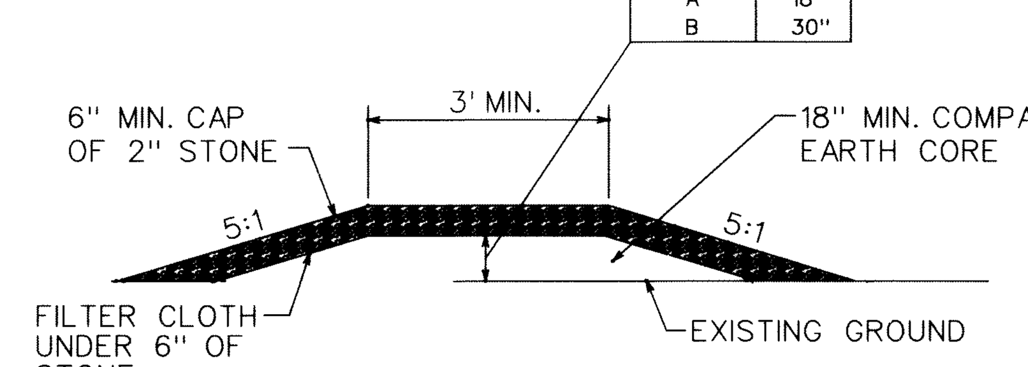
NOT TO SCALE

FILTER BAG SPECIFICATIONS

1. FILTER BAG SHALL BE MADE OF NON-WOVEN GEOTEXTILE WITH A MINIMUM SURFACE AREA OF 225 SQUARE FEET PER SIDE.
2. ALL STRUCTURAL SEAMS SHALL BE SEWN WITH A DOUBLE STITCH USING A DOUBLE NEEDLE MACHINE WITH HIGH STRENGTH THREAD. SEAM STRENGTH SHALL WITHSTAND 100 LB/IN USING ASTM D-4884 TEST METHOD.
3. FILTER BAG SHALL HAVE A NOZZLE LARGE ENOUGH TO ACCOMMODATE A FOUR(4) INCH DIAMETER PUMP DISCHARGE HOSE.
4. NOZZLE SHALL BE SEALED TIGHTLY AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE TO PREVENT UNFILTERED WATER FROM ESCAPING.
5. FILTER BAG SHALL BE PLACED ON A LEVEL OR GENTLY SLOPING (5% MAXIMUM) AREA.
6. FILTER BAG SHALL BE PLACED UPON A BASE OF STRAW BALES OR THREE (3) INCHES OF CLEAN STONE TO PROMOTE DEWATERING THROUGH BOTTOM SURFACE OF THE FILTER BAG.
7. PUMPING RATES SHALL BE CONTROLLED TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG. AS THE BAG BECOMES FILLED WITH SEDIMENT THE PUMPING RATE SHALL BE REDUCED.
8. THE FILTER BAG SHALL BE DEWATERED, REMOVED AND DISPOSED OF UPON COMPLETION OF PUMPING OPERATIONS OR AFTER IT HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. THE DEWATERED SEDIMENT FROM THE BAG SHALL BE SPREAD IN AN UPLAND AREA AND STABILIZED WITHIN 24 HOURS.
9. THE GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WITH PROPERTIES DETERMINED IN ACCORDANCE WITH THE FOLLOWING PROCEDURES:

WEIGHT	10 OZ/YD	ASTM D-3776
GRAB TENSILE	210 LBS.	ASTM D-4632
PUNCTURE	150 LBS.	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT2	ASTM D-4491
PERMITIVITY (SEC)	1.3	ASTM D-4991
UV RESISTANCE	70%	ASTM D-4355
APPARENT OPENING SIZE (AOS)	40-80	ASTM D-4751

BERM NO.	HEIGHT
A	18"
B	30"



FILTER CLOTH SHALL BE GEOTEXTILE CLASS "C", OR BETTER

MOUNTABLE BERM DETAIL

NOT TO SCALE

MGWC 1.2: PUMP-AROUND PRACTICE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing a temporary pump around and supporting measures to divert flow around in-stream construction sites.

IMPLEMENTATION SEQUENCE

Sediment control measures, pump-around practices, and associated channel and bank construction should be completed in the following sequence (refer to Detail 1.2):

1. Construction activities including the installation of erosion and sediment control measures should not begin until all necessary easements and/or right-of-ways have been acquired. All existing utilities should be marked in the field prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and should repair the damage at his/her own expense to the county's or utility company's satisfaction.

2. The contractor should notify the Maryland Department of the Environment or WMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor should inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.

3. The contractor should conduct a pre-construction meeting on site with the WMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. The contractor should stake out all limits of disturbance prior to the pre-construction meeting so they may be reviewed. The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance, which will be removed for construction access. Trees should not be removed within the limit of disturbance without approval from the WMA or local authority.

4. Construction should not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor should stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible.

5. Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor should begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. In some cases, work may begin downstream if appropriate. The sequence of construction must be followed unless the contractor gets written approval for deviations from the WMA or local authority. The contractor should only begin work in an area which can be completed by the end of the day including grading adjacent to the channel. At the end of each workday, the work area must be stabilized and the pump around removed from the channel. Work should not be conducted in the channel during rain events.

6. Sandbag dikes should be situated at the upstream and downstream ends of the work area as shown on the plans, and stream flow should be pumped around the work area. The pump should discharge onto a stable velocity dissipater made of riprap or sandbags.

7. Water from the work area should be pumped to a sediment filtering measure such as a dewatering basin, sediment bag, or other approved source. The measure should be located such that the water drains back into the channel below the downstream sandbag dike.

8. Traversing a channel reach with equipment within the work area where no work is proposed should be avoided. If equipment has to traverse such a reach for access to another area, then timber mats or similar measures should be used to minimize disturbance to the channel. Temporary stream crossings should be used only when necessary and only where noted on the plans or specified. (See Section 4, Stream Crossings, Maryland Guidelines to Waterway Construction).

9. All stream restoration measures should be installed as indicated by the plans and all banks graded in accordance with the grading plans and typical cross-sections. All grading must be stabilized at the end of each day with seed and mulch or seed and matting as specified on the plans.

10. After an area is completed and stabilized, the clean water dike should be removed. After the first sediment flush, a new clean water dike should be established upstream from the old sediment dike. Finally, upon establishment of a new sediment dike below the old one, the old sediment dike should be removed.

11. A pump around must be installed on any tributary or storm drain outfall, which contributes baseflow to the work area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. This water should discharge onto the same velocity dissipater used for the main stem pump around.

12. If a tributary is to be restored, construction should take place on the tributary before work on the main steam reaches the tributary confluence. Construction in the tributary, including pump around practices, should follow the same sequence as for the main stem of the river or stream. When construction on the tributary is completed, work on the main stem should resume. Water from the tributary should continue to be pumped around the work area in the main stem.

13. The contractor is responsible for providing access to and maintaining all erosion and sediment control devices until the sediment control inspector approves their removal.

14. After construction, all disturbed areas should be regraded and revegetated as per the planting plan.

AS BUILT
KCI TECHNOLOGIES, INC.

ENGINEERS
PLANNERS
SCIENTISTS
CONSTRUCTION MANAGERS
KCI TECHNOLOGIES www.kci.com

EROSION AND SEDIMENT CONTROL DETAILS

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM
HOWORD COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

SCALE:	NTS
DATE:	12/14/2007
KCI JOB NO.:	01-04322320
DESIGNED BY:	KBA
DRAWN BY:	MPP
CHECKED BY:	KBA
SHEET NO:	7 OF 8

TEMPORARY VEGATATIVE STABILIZATION

A) SEEDBED PREPARATION:
LOOSEN UPPER THREE INCHES BY DISCING, RAKING OR OTHER ACCEPTABLE MEANS.

B) SOIL AMENDMENTS:
APPLY 600 LBS PER ACRE OF 10-10-10 FERTILIZER AND TWO TONS PER ACRE OF LIME.

C) SEEDING: *
FOR PERIODS OF MARCH 1 TO APRIL 30 AND AUGUST 15 TO NOVEMBER 15, SEED WITH 2.5 BU PER ACRE OF CEREAL RYE PLUS 30 LBS PER ACRE OF TALL FESCUE OR 5 LBS PER ACRE OF REDTOP OR 20 LBS PER ACRE OF PERENNIAL RYEGRASS.
FOR PERIOD OF MAY 1 TO AUGUST 14, SEED WITH 3 LBS PER ACRE OF WEEPING LOVEGRASS OR 40 LBS PER ACRE OF JAPANESE OR FOXTAIL MILLET.

FOR THE PERIOD OF NOVEMBER 16 TO FEBRUARY 28, PROTECT THE SITE BY APPLYING TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING OR USE SOD.

D) MULCHING SPECIFICATIONS:
MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.

APPLY 2 TONS PER ACRE OF STRAW OVER ALL SEEDED AREAS. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHALL BE INCREASED TO 2.5 TONS PER ACRES.**

MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND AND WATER. THE TYPE OF MULCH ANCHORING USED MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATIONS.

* IF OTHER SEED MIXES ARE TO BE SUBSTITUTED, THEY MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICTAIONS, CHAPTER 20, TABLE 25.
** IF A DIFFERENT TYPE OF MULCH IS TO BE USED, IT MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICTION, CHAPTER 20.

PERMANENT VEGATATIVE STABILIZATION

ALL DISTURBED AREAS, WHICH ARE NOT TO BE PAVED, SHALL BE PERMANENTLY STABILIZED AS FOLLOWS:

A) SEEDBED PREPARATION:
LOOSEN UPPER THREE INCHES BY RAKING, DISCING, OR OTHER ACCEPTABLE MEANS AFTER SPREADING FOUR INCHES OF TOPSOIL.

B) SOIL AMENDMENTS:
APPLY 500 LBS PER ACRE OF 10-10-10 FERTILIZER AND TWO TONS PER ACRE OF LIME.

C) SEEDING:*
FOR PERIODS OF MARCH 1 TO MAY 15 AND AUGUST 15 TO OCTOBER 15, SEED WITH 125 LBS PER ACRE OF TALL FESCUE, 15 LBS PER ACRE OF PERENNIAL RYEGRASS, AND 10 LBS OF KENTUCKY BLUEGRASS.

FOR PERIOD OF MAY 16 TO AUGUST 14, SEED WITH 110 LBS PER ACRE OF TALL FESCUE AND 3 LBS PER ACRE OF WEEPING LOVEGRASS.

FOR PERIOD OF OCTOBER 16 TO FEBRUARY 28, PROTECT SITE BY: OPTIONS - 1) 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, 2) USE SOD, OR 3) SEED WITH 60 LBS PER ACRE OF TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.

NOTE: FOR QUICK COVER WITH TALL FESCUE, ADD 2 LBS OF SMALL GRAIN PER 1,000 SQ. FT.

D) MULCHING SPECIFICATIONS:
MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.

APPLY 2 TONS PER ACRE OF STRAW OVER ALL SEEDED AREAS. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHALL BE INCREASED TO 2.5 TONS PER ACRES.**
MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND AND WATER. THE TYPE OF MULCH ANCHORING USED MUST COMPLY WITH THE 1994 MARYLAND STANDARD AND SPECIFICATIONS.

HOWARD COUNTY CONSERVATION DISTRICT
STANDARD SEDIMENT CONTROL NOTES

1. A minimum of 48 hours notice must be given to the Howard County Department of Inspections, Licenses and Permits, Sediment Control Division prior to the start of any construction (313-1855).

2. 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 SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL and revisions thereto.

3. Following initial soil disturbance or re-disturbance, 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 all other disturbed or graded areas on the project site.

4. All sediment traps/basins shown must be fenced and warning signs posted around their perimeter in accordance with Vol 1, Chapter 12 of the HOWARD COUNTY DESIGN MANUAL, Storm Drainage.

5. All disturbed areas must be stabilized within the time period specified above in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seeding (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.

6. 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.

7. Site Analysis:

Total Area of Site	0.60 Acres
Area Disturbed	0.10 Acres
Area to be roofed or paved	0 Acres
Area to be vegetatively stabilized	-- Acres
Total Cut	200 Cu. Yds.
Total Fill	200 Cu. Yds.

8. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.

9. Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.

10. 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.

11. Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized by the end of each work day, whichever is shorter.

21.0 STANDARD AND SPECIFICATIONS FOR TOPSOIL

Definition

Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation.

Purpose

To provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

Conditions 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 Standards 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 Specifications

I. Topsoil salvaged from the existing site may be used provided that it meets the standards 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 Experimental Station.

II. Topsoil Specifications - Soil to be used as topsoil must meet the following:
   i. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, 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 mixutre 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 1/2" in diameter.
   ii. Topsoil must be free of plants or plant parts such as bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified.
   iii. Where the 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 disturbed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following proceures.

III. For sites having disturbed areas under 5 acres:
   i. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section * - Vegetative Stabilization Methods and Materials.

IV. For sites having disturbed areas over 5 acres:
   i. On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
      a. pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.
      b. Organic content of topsoil shall be not less than 1.5 percent by weight.
      c. Topsoil having soluble salt content greater than 500 parts per million shall not be used.
      d. 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 as elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

Note: Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

   ii. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section * -

V. Topsoil Application
   i. 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.
   ii. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.
   iii. 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 minmum 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.
   iv. 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 my otherwise be detrimental to proper grading and seedbed preparation.

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KCI TECHNOLOGIES, INC.

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EROSION AND SEDIMENT CONTROL NOTES

COLUMBIA GATEWAY STORM WATER MANAGEMENT DAM
HOWORD COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

KOFI B. ACHEAMPONG — No. 33732 — PROFESSIONAL ENGINEER — STATE OF MARYLAND

SCALE: NTS
DATE: 12/14/2007
KCI JOB NO.: 01-04322320
DESIGNED BY: KBA
DRAWN BY: MPP
CHECKED BY: KBA

SHEET NO:
8 OF 8