

GENERAL NOTES:

1. DIMENSIONS AND STATIONS ARE APPROXIMATE.
2. MATCH EXISTING ELEVATIONS AT THE EDGE OF PROPOSED SIDEWALK, SIDEWALK RAMPS AND CURB AND GUTTER.
3. REPLACE CURB AS NEEDED FOR PROPOSED RAMPS.
4. ADJUST EXISTING UTILITIES AS REQUIRED FOR SIDEWALK AND RAMP REPLACEMENT.

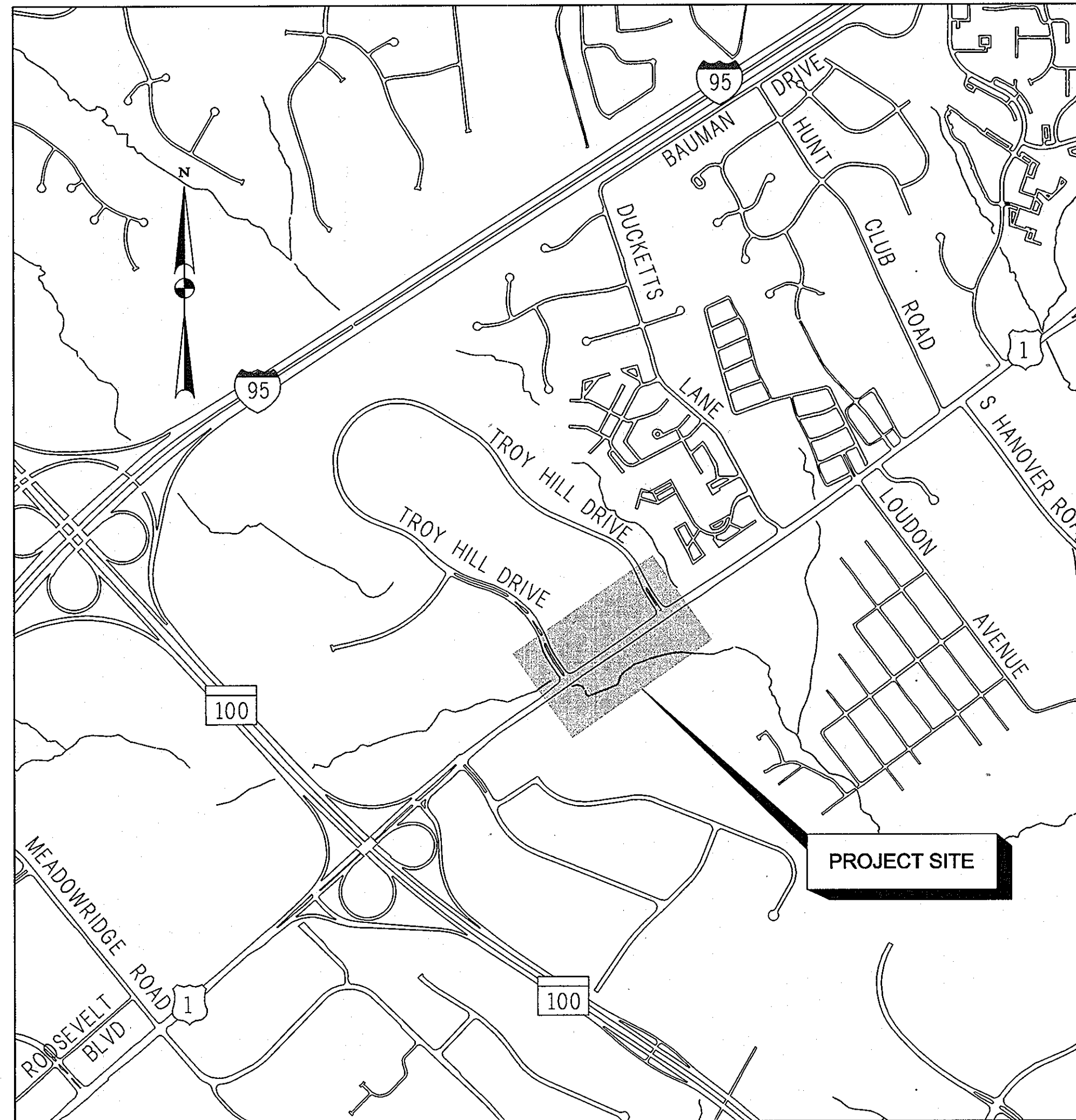
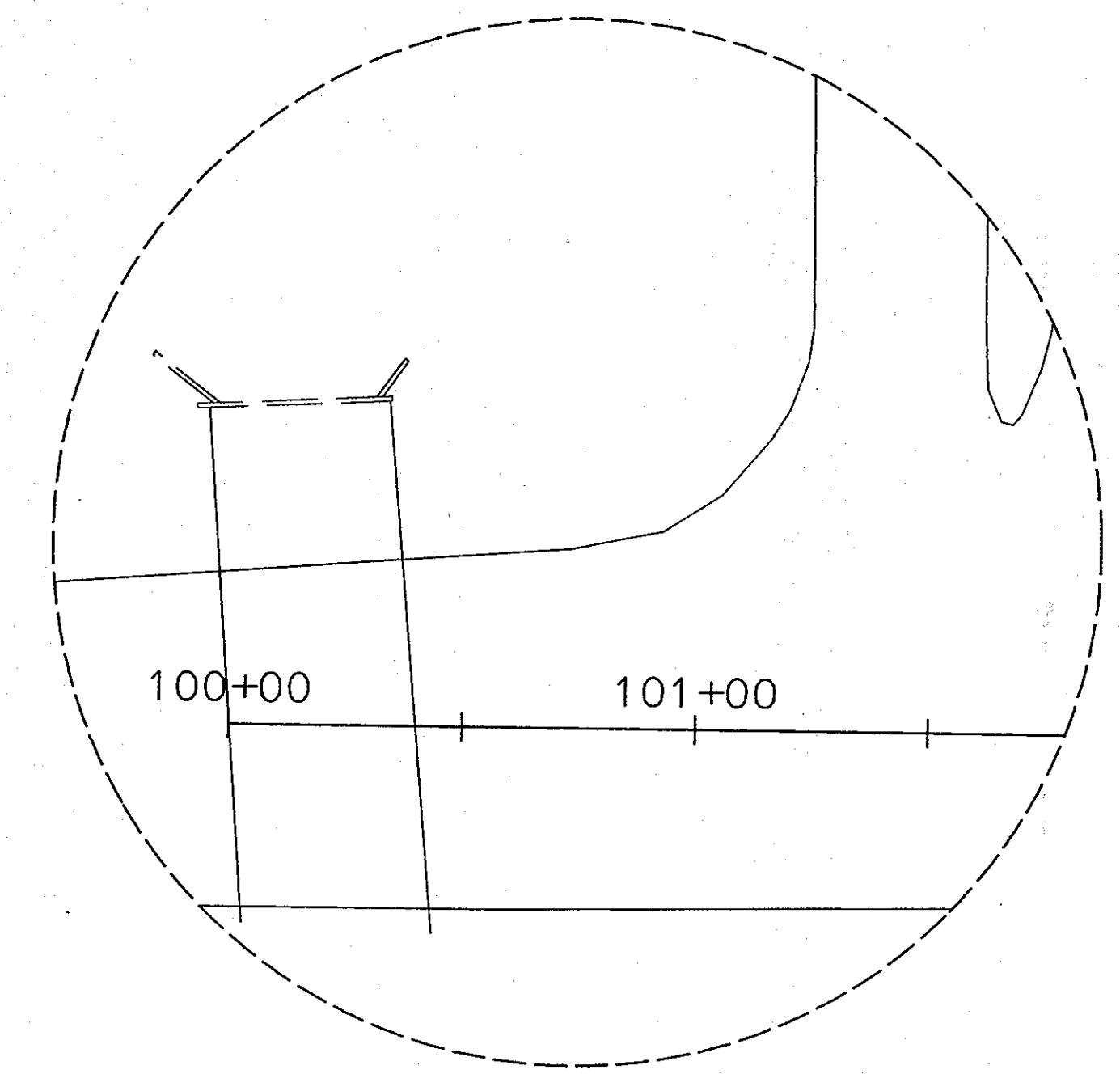
MAINTENANCE OF TRAFFIC NOTES:

1. FOLLOW STD. MD 104.03-05. ALL CLOSED LANES TO BE RE-OPENED AT THE END OF EACH WORKING DAY.
2. SET UP TEMPORARY TRAFFIC CONTROL PRIOR TO START OF CONSTRUCTION.
3. PROVIDE ACCESS TO ALL ENTRANCES AND COORDINATE DRIVEWAY ACCESS WITH HOME OWNERS.
4. ALL TEMPORARY TRAFFIC CONTROLS SHALL BE IN ACCORDANCE WITH THE SHA'S "GENERAL NOTES FOR TEMPORARY TRAFFIC CONTROL APPLICATIONS" AND THE APPLICABLE STANDARDS AND DETAILS.

E & S NOTES:

NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN APPROVED SEDIMENT CONTROL DEVICE.

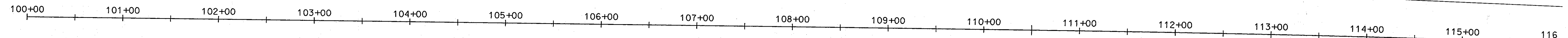
# SIDEWALK EXTENSIONS US 1 (WASHINGTON BOULEVARD) AT TROY HILL DRIVE



SCALE: 1" = 2000'

TROY HILL DRIVE

TROY HILL DRIVE



US 1 (WASHINGTON BLVD)



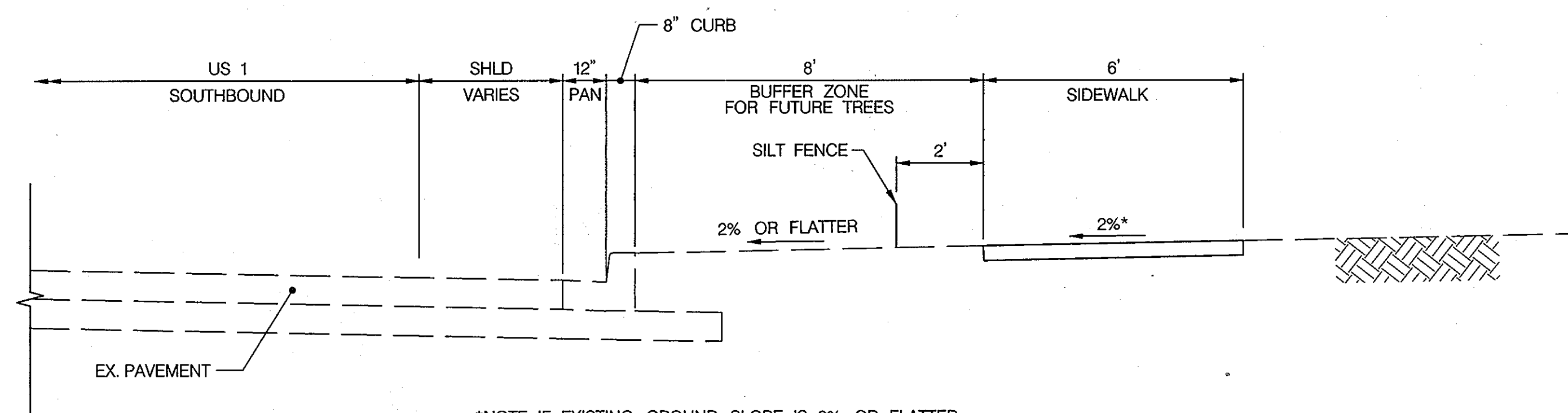
Engineers - Civil/Structural/Inspections  
4785 Dorsey Hall Drive  
Suite 124  
Ellicott City, Maryland 21042

Phone: (410) 995-2651 Fax: (410) 995-1383

DES:	CCW						
DRN:	CCW						
CHK:	TRE						
DATE:	APR 2008	BY	NO.	REVISION	DATE	600' SCALE MAP NO.	BLOCK NO.

**K-5038**  
SIDEWALK EXTENSIONS  
US 1 (WASHINGTON BLVD)  
AT TROY HILL DRIVE  
ELKRIDGE, MARYLAND

SCALE:  
AS SHOWN  
SHEET  
1 OF 4



\*NOTE: IF EXISTING GROUND SLOPE IS 2% OR FLATTER, SIDEWALK CROSS SLOPE SHOULD ATTEMPT TO MATCH.

TYPICAL SECTION  
NOT TO SCALE



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DATE:	APR. 2008	BY	NO.	REVISION	DATE

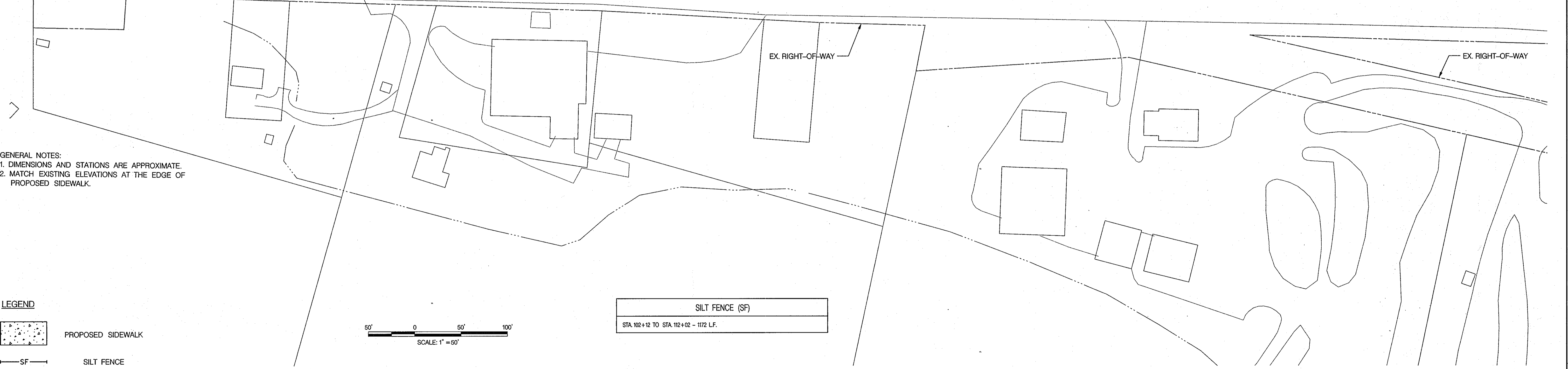
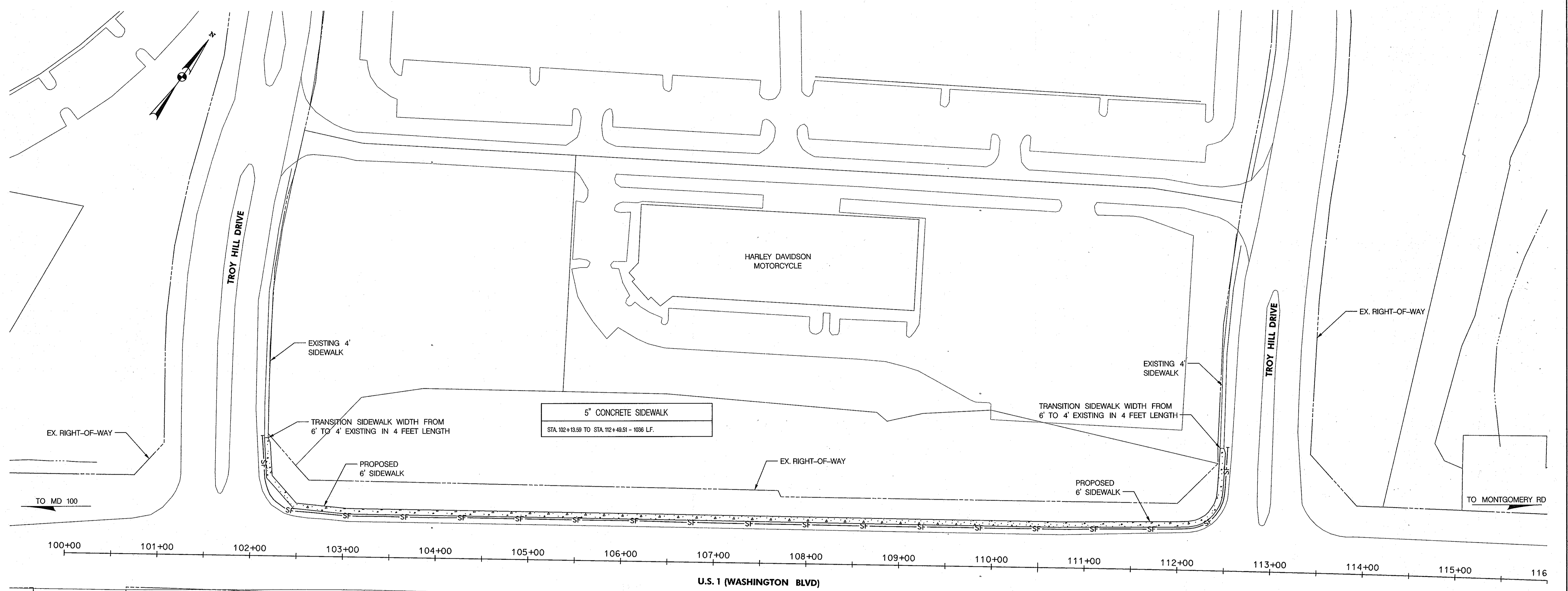
TYPICAL SECTIONS

600' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_


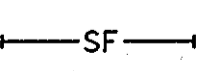
**K-5038**  
SIDEWALK EXTENSIONS  
US 1 (WASHINGTON BLVD)  
AT TROY HILL DRIVE  
ELKRIDGE, MARYLAND

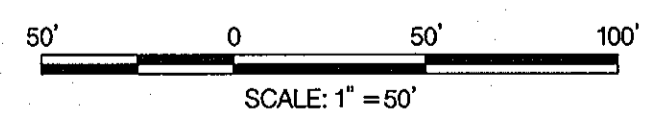
SCALE:  
AS SHOWN

SHEET  
2 OF 4



GENERAL NOTES:  
 1. DIMENSIONS AND STATIONS ARE APPROXIMATE.  
 2. MATCH EXISTING ELEVATIONS AT THE EDGE OF PROPOSED SIDEWALK.

**LEGEND**  
 PROPOSED SIDEWALK  
 SILT FENCE



**SILT FENCE (SF)**  
 STA. 102+12 TO STA. 112+02 - 1172 L.F.

**NOLAN**  
 Associates, Inc.  
 Engineers - Civil/Structural/Inspections  
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 Suite 124  
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DES:	CCW				
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CHK:	TRE				
DATE:	APR. 2008				
BY:		NO.		REVISION	
DATE:					

**PLAN**  
 800' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

**K-5038**  
 SIDEWALK EXTENSIONS  
 US 1 (WASHINGTON BLVD)  
 AT TROY HILL DRIVE  
 ELKCRIDGE, MARYLAND

SCALE:  
 AS SHOWN  
 SHEET  
 3 OF 4

**SPECIFICATIONS FOR VEGETATION ESTABLISHMENT**

**PERMANENT SEEDING NOTES**

Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.

Seedbed Preparation:—Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

Soil Amendments:—In lieu of soil test recommendations, use one of the following schedules:

1. Preferred—Apply 2 tons per acre dolomitic limestone (92 lbs/1000 sq. ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil. At time of seeding, apply 400 lbs per acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq. ft.)
2. Acceptable—Apply 2 tons per acre dolomitic limestone (92 lbs/1000 sq. ft.) and 1000 lbs per acre 10-10-10 fertilizer (23 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil.

Seeding—For the periods March 1 thru April 30, and August 1 thru October 15, seed with 60 lbs per acre (1.4 lbs/1000 sq. ft.) of Kentucky 31 Tall Fescue and 2 lbs per acre (.05 lbs/1000 sq. ft.) of weeping lovegrass. During the period of October 16 thru February 28, protect site by: Option (1) - 2 tons per acre of well anchored straw mulch and seed as soon as possible in the spring. Option (2) - Use sod. Option (3) - Seed with 60 lbs/acre Kentucky 31 Tall Fescue and mulch with 2 tons/acre well anchored straw.

Mulching—Apply 1-12 to 2 tons per acre (70 to 90 lbs/1000 sq. ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000 sq. ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq. ft.) for anchoring.

Maintenance—Inspect all seeding areas and make needed repairs, replacements and reseeding.

**TEMPORARY SEEDING NOTES**

Apply to graded or cleared areas likely to be redisturbed where a short-term vegetative cover is needed.

Seedbed preparation:—Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

Soil Amendments:—Apply 600 lbs per acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.).

Seeding—For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2-12 bushel per acre of annual ryegrass (3.2 lbs/1000 sq. ft.). For the period May 1 thru August 14, seed with 3 lbs per acre of weeping lovegrass (.07 lbs/1000 sq. ft.). For the period November 16 thru February 28, protect site by applying 2 tons per acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod.

Mulching—Apply 1-12 to 2 tons per acre (70 to 90 lbs/1000 sq. ft.) of unrotted weed free small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal per acre (5 gal/1000 sq. ft.) of emulsified asphalt on flat areas. On slopes 8 ft. or higher, use 348 gal per acre (8 gal/1000 sq. ft.) for anchoring.

Refer to the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for additional rates and methods not covered.

**STANDARD SEDIMENT CONTROL NOTES**

1. A minimum of 24 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, (313-1850).
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 SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", and revisions thereto.
3. Following initial soil disturbance or redisturbance, 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 SPECIFICATIONS 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	0.24	Acres
Area Disturbed	0.19	Acres
Area to be roofed or paved	0.14	Acres
Area to be vegetatively stabilized	0.05	Acres
Total Cut	106	Cu. Yds.
Total Fill	0	Cu. Yds.

Offsite Waste/Borrow Area Location To Be Determined By Contractor at a site with an active grading permit.
8. \*It is the responsibility of the contractor to identify the soil/borrow site and notify and gain the approval from the sediment control inspector of the site and its grading permit number at the time of construction.
9. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
10. Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.

**SEQUENCE OF CONSTRUCTION**

1. OBTAIN GRADING PERMIT.
2. NOTIFY HOWARD COUNTY BUREAU OF INSPECTIONS AND PERMITS (410-313-1880) AT LEAST 48 HOURS BEFORE STARTING ANY WORK.
3. DELINEATE LIMITS OF DISTURBANCE.
4. INSTALL SILT FENCE.
5. CONSTRUCT SIDEWALK.
6. STABILIZED DISTURBED AREAS WITH 4" TOPSOIL, SEED AND MULCH.
7. WITH THE APPROVAL OF THE SEDIMENT CONTROL INSPECTOR, REMOVE DIVERSION AND ALL SEDIMENT CONTROL DEVICES. STABILIZE AREAS DISTURBED BY THE REMOVAL.

NOTE:

NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN APPROVED SEDIMENT CONTROL DEVICE.

**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

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.

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

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.

Topsoil Specifications - Soil to be used as topsoil must meet the following:

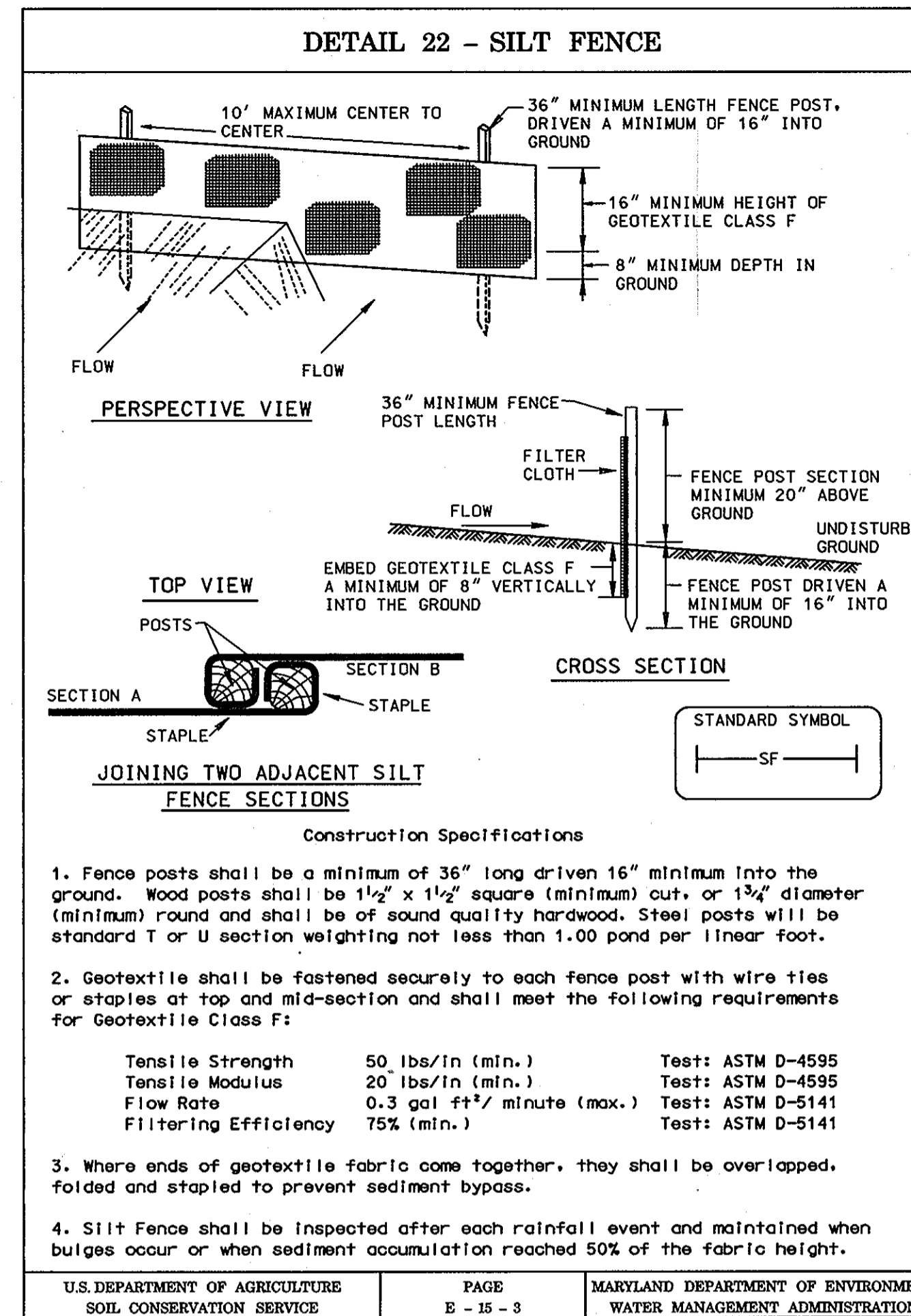
- i. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting textured subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1 1/2" in diameter.
- ii. Topsoil must be free of plants or plant parts such as bermuda grass, quackgrass, Johnsongrass, nutssedge, 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 distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.
- iv. For sites having disturbed areas under 5 acres:
  - a. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.
- v. For sites having disturbed areas over 5 acres:
  - a. On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
    - i. 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.
    - ii. Organic content of topsoil shall be not less than 1.5 percent by weight.
    - iii. Topsoil having soluble salt content greater than 500 parts per million shall not be used.
    - iv. 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 phytotoxic materials.

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

i. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

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 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.
- 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 may otherwise be detrimental to proper grading and seedbed preparation.
- v. 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:
  - i. Composted Sludge Material for use as soil conditioner for sites having disturbed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:
    - a. 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 Environment under COMAR 26.04.06.
    - b. 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 compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.
    - c. Composted sludge shall be applied at the rate of 1 ton/1,000 square feet.
  - ii. Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1000 square feet, and 1/3 the normal lime application rate.



SILT FENCE		
Silt Fence Design Criteria		
Slope Steepness	(Maximum) Slope Length	(Maximum) Silt Fence Length
Flatter than 50:1	unlimited	unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

Note: In areas of less than 2% slope and sandy soils (USDA general classification system, soil Class A) maximum slope length and silt fence length will be unlimited. In these areas a silt fence may be the only perimeter control required.

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

THIS PLAN IS FOR SEDIMENT AND EROSION CONTROL PURPOSE ONLY.

By the Owner/Developer:

"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."

Steve Sharan  
Signature of Owner/Developer  
Print name below signature

10/30/08  
Date

By the Engineer:

"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."

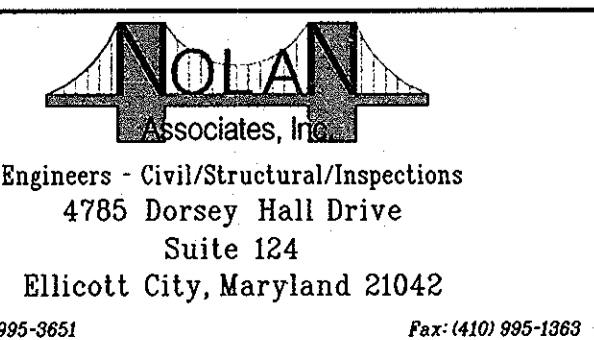
Charles S. Nolan  
Signature of Engineer  
Print name below signature  
CHARLES S. NOLAN

11/29/08  
Date

These plans are approved for soil erosion and sediment control by the Howard Soil Conservation District.

John R. Robertson  
Howard S.C.D.

11/5/08  
Date



DES:	CCW				
DRN:	CCW				
CHK:	TRE				
DATE:	APR 2008	BY	NO.	REVISION	DATE

600' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

**EROSION AND SEDIMENT CONTROL NOTES AND DETAILS**

**K-503B**  
SIDEWALK EXTENSIONS  
US 1 (WASHINGTON BLVD)  
AT TROY HILL DRIVE  
ELKBRIDGE, MARYLAND

SCALE: AS SHOWN  
SHEET 4 OF 4

# UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION

HOWARD COUNTY GOVERNMENT  
DEPARTMENT OF PUBLIC WORKS  
CAPITAL PROJECT NO. F-5972  
CONTRACT NO. 65-4647

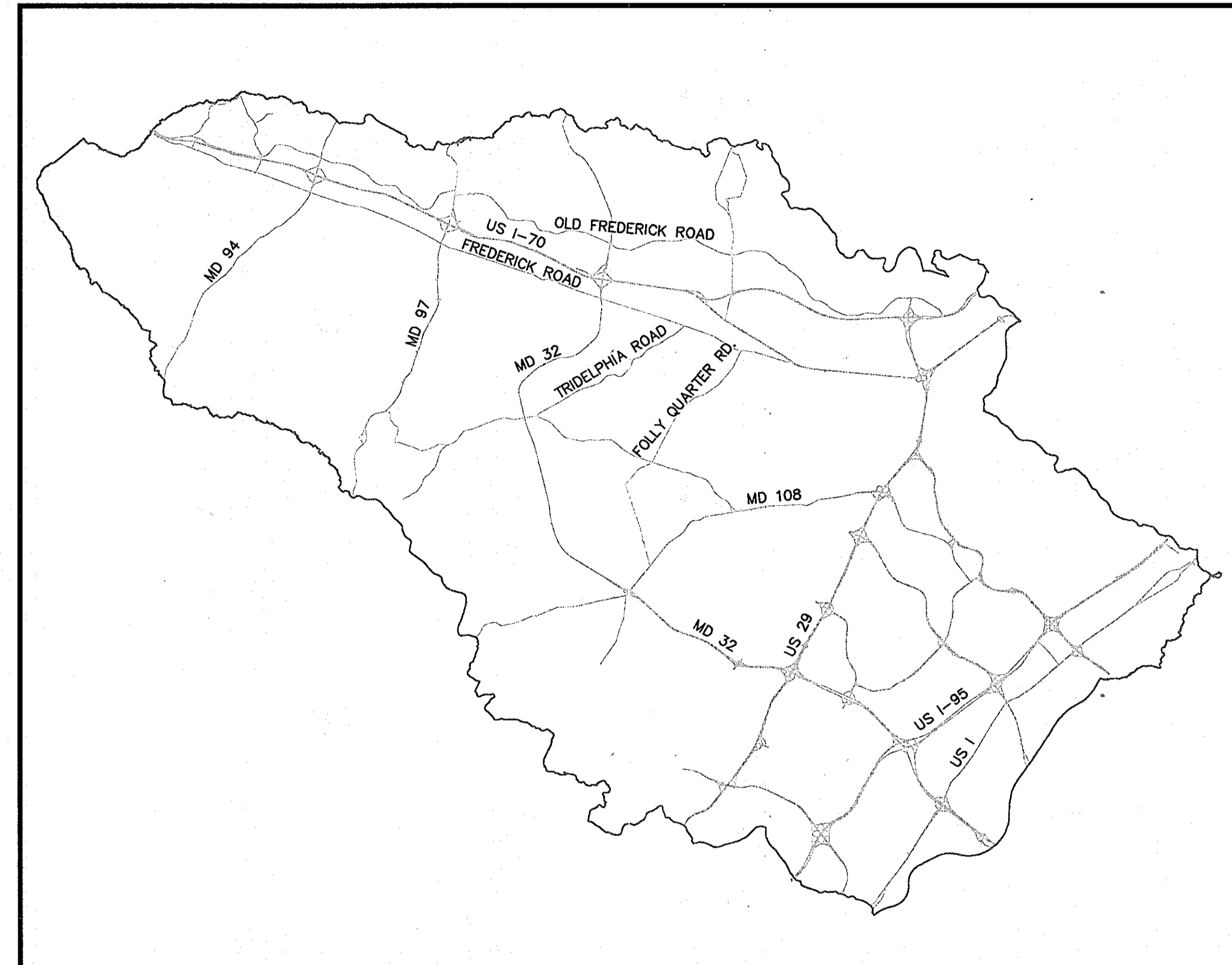
## GENERAL NOTES

- THE APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO PROTECT EXISTING STRUCTURES, UTILITIES AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
- TOPOGRAPHIC FIELD SURVEYS WERE PERFORMED IN APRIL, 2009 BY KCI TECHNOLOGIES.
- HORIZONTAL AND VERTICAL CONTROL:  
THE COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON MARYLAND STATE REFERENCE SYSTEM NAD'83/91 AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 22BB, NO. 28AA AND NO. 07FC  
ALL VERTICAL CONTROLS ARE BASED ON NAVD '88, STATIONS 22BB AND 28AA ARE HOWARD COUNTY STANDARD DISKS WITH A PIECE OF IRON TO FACILITATE MAGNETIC DETECTION. STATION 07FC IS A NAIL EMBEDDED ON TOP OF 10" CONCRETE CURB
- THE CONTRACTOR SHALL NOTIFY MISS UTILITY AT 1-800-257-7777 AT LEAST 48 HOURS IN ADVANCE OF ANY WORK IN THIS AREA, SO APPROPRIATE MARKING OF EXISTING UTILITIES CAN BE MADE.
- ALL EXCAVATION SHALL BE KEPT FREE OF WATER UNTIL BACKFILL IS PROPERLY TAMPED IN PLACE TO FINISHED GRADE.
- FOR DETAILS NOT SHOWN ON THE DRAWINGS, AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.
- CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS:  

AT&T	1-800-252-1133
BG&E (CONSTRUCTION SERVICES)	410-858-4628
BG&E (EMERGENCY)	410-685-1400
BUREAU OF UTILITIES (DPW)	410-313-4900
COLONIAL PIPELINE CO.	410-795-1390
MISS UTILITY	1-800-257-7777
STATE HIGHWAY ADMINISTRATION	410-531-5533
VERIZON	1-800-743-0033 / 410-224-9210
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT. TREES AND SHRUBS WITHIN THE CONSTRUCTION AREA ARE NOT TO BE REMOVED UNLESS THEY ARE LOCATED WITHIN THE AREA OF EXCAVATION.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12". CLEAR ALL POLES BY 5'-0" MINIMUM. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES AND MAKE ARRANGEMENTS FOR BRACING OF POLES AS REQUIRED.

## TANK GENERAL NOTES:

- CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THESE DRAWINGS, THE SPECIAL PROVISIONS AND THE HOWARD COUNTY STANDARD DETAILS AND SPECIFICATIONS FOR CONSTRUCTION.
- THE CONTRACTOR SHALL CONDUCT A VERIFICATION OF SITE STAKING AND LAYOUT PRIOR TO EXCAVATION.
- ALL EXCAVATION, BACKFILL, AND COVER SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS ON THESE DRAWINGS AS A MINIMUM, AND TANK MANUFACTURER'S SPECIFICATIONS. DETAILS AND DIMENSIONS SHALL NOT SUPERCEDE MANUFACTURER'S REQUIREMENTS. EXCAVATION DEPTH SHALL BE DETERMINED BY SITE CONDITIONS AND MANUFACTURER'S SPECIFICATIONS. SHORE AS NECESSARY. ELEVATIONS SHOWN IN TABLE 2 ON SHEET 5 OF 6 REPRESENT THE MAXIMUM ALLOWABLE CONDITION FOR PROPER TANK OPERATION AND SHALL NOT BE EXCEEDED.
- ALL TESTING IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL CONTRACTORS SHALL BE CERTIFIED BY THE TANK MANUFACTURER PRIOR TO ANY INSTALLATION
- ALL WORK SHALL BE COMPLETED IN A TIMELY AND WORKMANLIKE MANNER. ALL WORK SHALL CONFORM TO APPLICABLE CODES AND STANDARDS.
- EXCAVATION AND SITE WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE AND CURRENT MOSHA AND OSHA REGULATIONS.
- PRESSURE TEST PROCEDURES SHALL BE PERFORMED BY THE INSTALLER PRIOR TO AND AFTER INSTALLATION, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND THESE DRAWINGS.
- AN OPERATIONAL TEST SHALL BE CONDUCTED AFTER INSTALLATION PER THE TANK MANUFACTURERS SPECIFICATIONS AND THESE DRAWINGS.
- ALL STEEL AND PVC FITTINGS ABOVE GRADE SHALL BE PAINTED WITH EXTERIOR ENAMEL, UNLESS OTHERWISE SPECIFIED. COLORS SHALL BE APWA STANDARD YELLOW OR RED AS NOTED ON THE DRAWINGS.
- THE CONTRACTOR SHALL RESTORE THE SITE TO ORIGINAL CONDITION AFTER FINAL TESTING INCLUDING, BUT NOT LIMITED TO FINE GRADING, SEEDING, MULCHING, AND GENERAL CLEANUP.
- THE DISTANCE FROM THE CENTERLINE OF THE DRAFT FITTING SHALL BE 8'-0" OR LESS TO THE EDGE OF THE ROADWAY OR PULLOFF. THIS DIMENSION SHALL APPLY TO ALL INSTALLATION CONFIGURATIONS.
- THE WATER LEVEL INDICATOR SHALL BE ORIENTED TOWARD THE ACCESS AREA OR PULLOFF FOR VISIBILITY.
- INSTALL POST AND DOT R7 STYLE NO PARKING SIGNAGE, SEE SHEET 5 OF 6 FOR DETAILS. TOP OF POST SHALL BE 7'-0" ABOVE FINISHED GRADE.
- UNLESS OTHERWISE NOTED, THE CENTER DRAFT CONFIGURATION SHALL BE USED WHERE THE TANK IS PLACED PARALLEL TO THE PULLOFF OR ROADWAY. THE END DRAFT CONFIGURATION SHALL BE USED WHERE THE TANK IS PLACED PERPENDICULAR TO THE PULLOFF OR ROADWAY. ALTERNATE CONFIGURATIONS MAY BE REQUIRED DUE TO SPECIFIC SITE CONDITIONS.
- VARIATION IN FITTING PLACEMENT DUE TO DIFFERENT TANK MANUFACTURERS IS ACCEPTABLE, BUT CRITICAL DIMENSIONS SHALL BE MAINTAINED, SEE SPECIFICATIONS. VARIATIONS OR SPECIAL FEATURES REQUIRE APPROVAL BY THE OWNER AND THE HOWARD COUNTY FIRE MARSHALL.



HOWARD COUNTY, MARYLAND  
SCALE: 1" = 12,000'

INDEX OF SHEETS	
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4 of 7	GENERAL DETAILS - 1
5 of 7	GENERAL DETAILS - 2
6 of 7	GENERAL DETAILS - 3
7 of 7	SEDIMENT AND EROSION CONTROL NOTES AND DETAILS

PROFESSIONAL CERTIFICATION. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 20453, Expiration Date 05/18/2010.

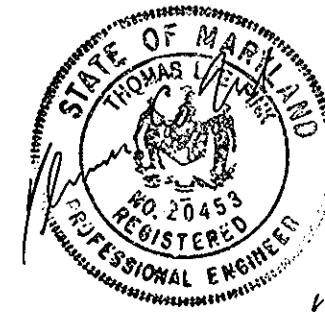
KCI TECHNOLOGIES PROJECT NO.: 01-07137804

Oct 14, 2009 4:47pm User: jacobson.maryland M:\000\00137804\Drawings\01\_TITLE\_SHEET.dwg

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

	12/1/10		1/21/10
DIRECTOR OF PUBLIC WORKS	DATE	ACT. CHIEF, BUREAU OF ENGINEERING	DATE
	1/21/10		1/21/10
CHIEF, BUREAU OF UTILITIES	DATE	ACT. CHIEF, UTILITY DESIGN DIVISION	DATE

ENGINEERS  
PLANNERS  
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Phone: (410) 316-7800  
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DES:	TLF				
DRN:	JBM				
CHK:	CLO				
DATE:	01/05/09	BY	NO.	REVISION	DATE

TITLE SHEET

UNDERGROUND WATER STORAGE  
TANKS FOR FIRE SUPPRESSION

CAPITAL PROJECT No. F-5972  
CONTRACT No. 65-4647  
HOWARD COUNTY, MARYLAND

SCALE  
AS SHOWN  
SHEET  
1 OF 7



13. ANCHORING TANKS

- 13.1 EVERY SITE SHALL BE THOROUGHLY EVALUATED FOR THE POTENTIAL OF A RISE IN THE LOCAL WATER TABLE OR OF TRAPPED WATER. FAILURE TO ANCHOR A TANK WHEN REQUIRED MAY CAUSE TANK FAILURE, OR DAMAGE THE TANK OR SURROUNDING PROPERTY.
- 13.2 UNLESS NOTED OTHERWISE ON THE DRAWINGS, DEADMEN USED TO PREVENT FLOATATION SHALL HAVE THE FOLLOWING CHARACTERISTICS:
  - 13.2.1. DEADMEN SHALL BE REINFORCED CONCRETE BEAMS.
  - 13.2.2. THE LENGTH OF DEADMEN SHALL BE EQUAL TO THE LENGTH OF THE TANK, AT A MINIMUM.
  - 13.2.3. PREFABRICATED DEADMEN ARE SUPPLIED WITH 3/4 -INCH-DIAMETER, GALVANIZED, ADJUSTABLE ANCHOR POINTS (SUBSEQUENTLY REFERRED TO AS ANCHOR POINTS). THESE ANCHOR POINTS PROTRUDE UP THROUGH THE SLOTS IN THE DEADMEN AND ARE HELD UP WITH COTTER PINS.
- 13.3 ONLY USE THE ANCHOR POINTS WHEN LIFTING AND POSITIONING THE DEADMEN. A SPREADER BAR MAY BE REQUIRED TO LIFT LONGER SECTIONS OF DEADMEN. USE GUY ROPES TO GUIDE THE DEADMEN WHEN LIFTING.
- 13.4 THE ANCHOR POINTS CAN BE MOVED AND POSITIONED TO MATCH THE HOLD-DOWN STRAP LOCATIONS ON THE TANK
- 13.5 CARE SHOULD BE TAKEN TO KEEP BACKFILL FROM ENTERING THE ANCHOR-POINT SLOT UNTIL FINAL ADJUSTMENT IS MADE.
- 13.6 THE DEADMEN ARE TO BE BUTTED TOGETHER WHEN MULTIPLE SECTIONS ARE USED.
- 13.7 USE ONE ANCHOR POINT PER STRAP END AND ONLY ONE STRAP PER ANCHOR POINT.

14. ANCHOR SLAB (GROUNDWATER INSTALLATION ONLY)

- 14.1 THE ANCHOR SLAB SHALL BE REINFORCED CONCRETE.
- 14.2 THE TOTAL LENGTH OF THE SLAB SHALL BE AT LEAST THE SAME AS THE LENGTH OF THE TANK.
- 14.3 THE MINIMUM SLAB THICKNESS IS 8 INCHES.
- 14.4 THE WIDTH OF THE SLAB DEPENDS ON THE TANK DIAMETER. THE SLAB SHALL EXTEND A MINIMUM OF 18 INCHES BEYOND EACH SIDE OF THE TANK.
- 14.5 PROVIDE A SEPARATE ANCHOR POINT FOR EACH HOLD-DOWN STRAP.
- 14.6 ALL ANCHOR POINTS MUST BE ENGINEERED TO WITHSTAND THE TANK'S BUOYANCY FORCES.
- 14.7 WHEN USING A CONCRETE BASE SLAB, ALLOW SUFFICIENT DEPTH IN THE EXCAVATION FOR 12 INCHES OF BEDDING MATERIAL BELOW THE TANK.

15. HOLD-DOWN STRAPS

- 15.1 EVENLY DISTRIBUTE LOADS BY TIGHTENING ALL HOLD-DOWN STRAPS UNIFORMLY UNTIL THEY ARE SNUG OVER THE RIBS BUT CAUSE NO DEFLECTION OF THE TANK.
- 15.2 TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK TO DETERMINE WHETHER VERTICAL DEFLECTION IS WITHIN THE LIMITS SPECIFIED AFTER THE STRAPS HAVE BEEN INSTALLED AND TIGHTENED.
- 15.3 ALL ANCHORING HARDWARE SHALL BE GALVANIZED AND SIZED ACCORDING TO THE FOLLOWING MINIMUM REQUIREMENTS (FOR A 10' DIAMETER TANK):
  - 15.3.1. HOOK - 1 1/4"
  - 15.3.2. JAW - 3/2"
  - 15.3.3. EYE - 3/4"
  - 15.3.4. WIRE ROPE - 1/2"
- 15.4 THE INSTALLING CONTRACTOR IS RESPONSIBLE FOR PROVIDING HARDWARE AND ANCHOR POINTS OF SUFFICIENT SIZE AND STRENGTH.
- 15.5 THE PARTICULAR CONFIGURATION OF HARDWARE WILL BE DETERMINED BY THE CONTRACTOR, THE OWNER OR THE OWNER'S REPRESENTATIVE.

16. INSTALLATION

- 16.1 USE ONLY APPROVED BACKFILL MATERIAL.
- 16.2 DO NOT MIX APPROVED BACKFILL MATERIAL WITH SAND OR IN SITU SOIL.
- 16.3 DO NOT USE IN SITU SOIL AS BACKFILL MATERIAL.
- 16.4 PREPARE A SMOOTH, LEVEL BED, 12 INCHES THICK, OF APPROVED BACKFILL MATERIAL.
- 16.5 PLACE THE TANK OR TANKS ONTO THE BED.
- 16.6 USE THE TOPS OF THE RIBS TO ESTABLISH LONGITUDINAL LEVEL. ESTABLISH LATERAL LEVEL BY PLACING THE LEVEL ACROSS THE TOP OF A FITTING OR A MANWAY.
- 16.7 WHEN THE TANK IS PLACED, TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK. RECORD THIS MEASUREMENT AS INITIAL INTERNAL DIAMETER ON THE TANK INSTALLATION.
- 16.8 IF THE TANK IS TO BE ANCHORED, INSTALL THE ANCHORING HARDWARE AT THIS TIME.
- 16.9 PLACE ONE 12-INCH LIFT OF APPROVED BACKFILL MATERIAL EVENLY AROUND THE TANK. FROM THE EDGE OF THE HOLE OR THE TOP OF AN ADJACENT TANK, PUSH THE BACKFILL IN PLACE BY USING A NON-METAL PROBE LONG ENOUGH TO REACH BENEATH THE TANK. WORK THE BACKFILL MATERIAL UNDER THE TANK BODY AND DOMES SO THE TANK IS FULLY SUPPORTED - THAT IS, SO THERE ARE NO VOIDS UNDER THE TANK.
- 16.10 REPEAT POINT 16.9 WITH A SECOND 12-INCH LIFT.
- 16.11 AFTER THE SECOND LIFT OF MATERIAL HAS BEEN PLACED AND WORKED UNDER THE TANK, BRING THE BACKFILL TO THE TOP OF THE TANK.

16.12 FOR GROUNDWATER INSTALLATION, FOLLOW THE INSTALLATION PROCEDURE ABOVE WITH THE FOLLOWING MODIFICATIONS:

- 16.12.1. BEFORE PERFORMING POINT 16.4 OF THE DRY-HOLE INSTALLATION, TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK BEFORE THE TANK IS PLACED IN THE EXCAVATION HOLE. RECORD THIS MEASUREMENT AS INITIAL INTERNAL DIAMETER ON THE TANK INSTALLATION CHECKLIST.
- 16.12.2. BEFORE PERFORMING POINT 16.4. OF THE DRY-HOLE INSTALLATION, PUMP THE WATER FROM THE HOLE AND CONTINUE PUMPING TO MAINTAIN MINIMUM WATER LEVEL DURING TANK INSTALLATION.
- 16.12.3. DURING POINT 16.5. OF THE DRY-HOLE INSTALLATION, WHEN SETTING AND LEVELING THE TANK, PARTIALLY BALLAST THE TANK UNTIL IT SETTLES FIRMLY ON THE PREPARED BED. THE BALLAST LEVEL IN THE TANK MUST NEVER EXCEED THE WATER LEVEL IN THE HOLE BY MORE THAN 1 FOOT UNTIL THE BACKFILL REACHES THE TOP OF THE TANK.
- 16.12.4. COVER DEPTH MUST MEET MINIMUM DEPTH SPECIFIED IN SECTION 9.
- 16.12.5. COMPLETELY BALLAST THE TANK ONCE BACKFILL IS EVEN WITH THE TOP OF THE TANK.
- 16.12.6. AFTER BACKFILL IS BROUGHT TO THE TOP OF THE TANK, TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK AS A DEFLECTION CHECK.

17. POST-INSTALLATION TESTING

- 17.1 AFTER THE INTERNAL DIAMETER OF THE TANK HAS BEEN MEASURED AND VERTICAL DEFLECTION IS DETERMINED TO BE WITHIN THE LIMITS THE TANK MUST BE PRESSURE-TESTED TO ENSURE THAT NO DAMAGE OCCURRED DURING INSTALLATION.
- 17.2 FOLLOW THE PROCEDURE IN SECTION 6, SOAPING ALL EXPOSED AREAS OF THE TANK AND ALL FITTINGS, AND MONITORING THE PRESSURE FOR ONE HOUR.
- 17.3 CAREFULLY RELIEVE THE PRESSURE IN THE TANK.

18. BACKFILLING TO GRADE

- 18.1 CONTINUE TO TAKE SAFETY MEASURES (SUCH AS PLACING BARRICADES) AROUND THE EXCAVATION SITE UNTIL INSTALLATION IS COMPLETED.
- 18.2 WHEN THE TANK HAS BEEN SET, TESTED AND BACKFILLED, AND ALL PIPING AND VENTING HAS BEEN COMPLETED, ADD THE BALANCE OF THE BACKFILL MATERIAL.
- 18.3 THE BACKFILL MUST BE FREE OF DEBRIS, ICE OR SNOW. ANY BLOCKS OR BRICKS USED AS SUPPORT MATERIAL DURING PIPING MUST BE REMOVED PRIOR TO COMPLETION OF BACKFILLING.
- 18.4 THE BACKFILL MATERIAL SPECIFIED IN SECTION 7 MUST BE USED TO COMPLETELY FILL EXCAVATION.
- 18.5 THE INSTALLATION SHALL MEET ALL THE REQUIREMENTS OF MINIMUM COVER AS SPECIFIED IN SECTION 9.
- 18.6 WHEN THE TANK HAS BEEN BACKFILLED TO SUBGRADE (BEFORE PLACEMENT OF ASPHALT OR CONCRETE), TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK. RECORD THIS MEASUREMENT AS FINAL INTERNAL DIAMETER ON THE TANK INSTALLATION CHECKLIST.
- 18.7 COMPLETE THE TANK INSTALLATION CHECKLIST.

19. DEFLECTION MEASUREMENT


- 19.1 OBTAIN THE DEFLECTION MEASUREMENT BY TAKING A MINIMUM OF TWO MEASUREMENTS OF THE INTERNAL DIAMETER OF THE TANK.
- 19.2 TWO METHODS OF MEASURING THE INTERNAL DIAMETER OF THE TANK ARE DESCRIBED HERE. BOTH METHODS USE A DIPSTICK. (SIMILAR METHODS CAN BE USED, SUCH AS USING A TAPE MEASURE, ETC.)
- 19.3 THE DEFLECTION MEASUREMENT CAN BE OBTAINED BY USING EITHER METHOD TWICE OR BY USING EACH METHOD ONCE. EACH WILL BE DESCRIBED HERE AS IF THAT METHOD WERE BEING USED TWICE.
- 19.4 TAKE THE INITIAL INTERNAL-DIAMETER MEASUREMENT BEFORE BACKFILLING THE TANK, AND RECORD THE MEASUREMENT ON THE TANK INSTALLATION CHECKLIST. IN A GROUNDWATER INSTALLATION, TAKE THIS MEASUREMENT BEFORE THE TANK IS PLACED IN THE EXCAVATION HOLE.
- 19.5 TAKE OTHER DIAMETER MEASUREMENTS DURING THE BACKFILLING PROCESS TO DETERMINE WHETHER VERTICAL DEFLECTION CONTINUES TO BE WITHIN THE LIMITS SPECIFIED BY THE TANK MANUFACTURER.
- 19.6 TAKE THE FINAL INTERNAL-DIAMETER MEASUREMENT WHEN THE TANK HAS BEEN BACKFILLED TO SUBGRADE.
- 19.7 TO GET THE DEFLECTION MEASUREMENT AT ANY TIME, SUBTRACT THE CURRENT INTERNAL-DIAMETER MEASUREMENT FROM THE INITIAL INTERNAL-DIAMETER MEASUREMENT.
- 19.8 COMPARE THIS MEASUREMENT TO THE ALLOWABLE DEFLECTIONS PROVIDED BY THE TANK MANUFACTURER AND RECORD THE INFORMATION ON THE TANK INSTALLATION CHECKLIST.
- 19.9 VERTICAL DEFLECTION IN EXCESS OF THIS MEASUREMENT INDICATES IMPROPER INSTALLATION AND VOIDS THE TANK WARRANTY.


20. OPERATING GUIDELINES


- 20.1 NO PERSON SHALL BE PERMITTED TO ENTER THE TANK UNLESS IT HAS BEEN PROPERLY EMPTIED AND VENTED, AND UNLESS THE PERSON ENTERING THE TANK HAS BEEN TRAINED IN CONFINED-SPACE ENTRY PROCEDURES, APPLICABLE OSHA REGULATIONS, AND IS IN POSSESSION OF A VALID HOWARD COUNTY CONFINED SPACE ENTRY PERMIT.
- 20.2 NEVER OVERFILL THE TANK.
- 20.3 EACH TIME THE TANK IF FILLED, THE OWNER/OPERATOR SHALL MAKE SURE THE TANK IS PROPERLY VENTED.
- 20.4 OWNER/OPERATOR SHALL DETERMINE WHETHER THE TANK HAS OVERFILL PROTECTION, SUCH AS AUTOMATIC SHUT-OFF DEVICES OR VENT-RESTRICTION DEVICES (BALL-FLOAT VALVES), WHICH WILL CLOSE OFF THE INTERNAL PIPING AND REDUCE THE TANK'S CAPACITY.
- 20.5 OWNER/OPERATOR SHALL NOTIFY WHOEVER FILLS THE TANK THAT IT HAS OVERFILL PROTECTION, WHICH REDUCES THE TANK'S CAPACITY.
- 20.6 BEFORE EACH TANK FILLING, OWNER/OPERATOR OR THE DELIVERY SERVICE MUST DETERMINE THE TANK'S REDUCED CAPACITY DUE TO THE OVERFILL PROTECTION, AND CONSULT THE INSTRUCTIONS OR GUIDELINES PROVIDED BY THE INSTALLER AND MANUFACTURER OF THE OVERFILL-PROTECTION DEVICE TO DETERMINE HOW MUCH ADDITIONAL PRODUCT THE TANK CAN HOLD.
- 20.7 THE MAXIMUM TEMPERATURE FOR STORING NONPOTABLE WATER IS 150° F. NOTE: POTABLE WATER IS TO BE STORED AT AMBIENT TEMPERATURE.

PROFESSIONAL CERTIFICATION. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State Of Maryland, License No. 20453, Expiration Date 05/18/2010.

**DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND**

 12/16/10  
 DIRECTOR OF PUBLIC WORKS DATE

 12/16/10  
 CHIEF, BUREAU OF ENGINEERING DATE

 1/21/10  
 CHIEF, UTILITY DESIGN DIVISION DATE

**KCI TECHNOLOGIES**

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DRN:	JBM				
CHK:	CLO				
DATE:	01/05/09	BY	NO.	REVISION	DATE

SPECIFICATIONS - 2

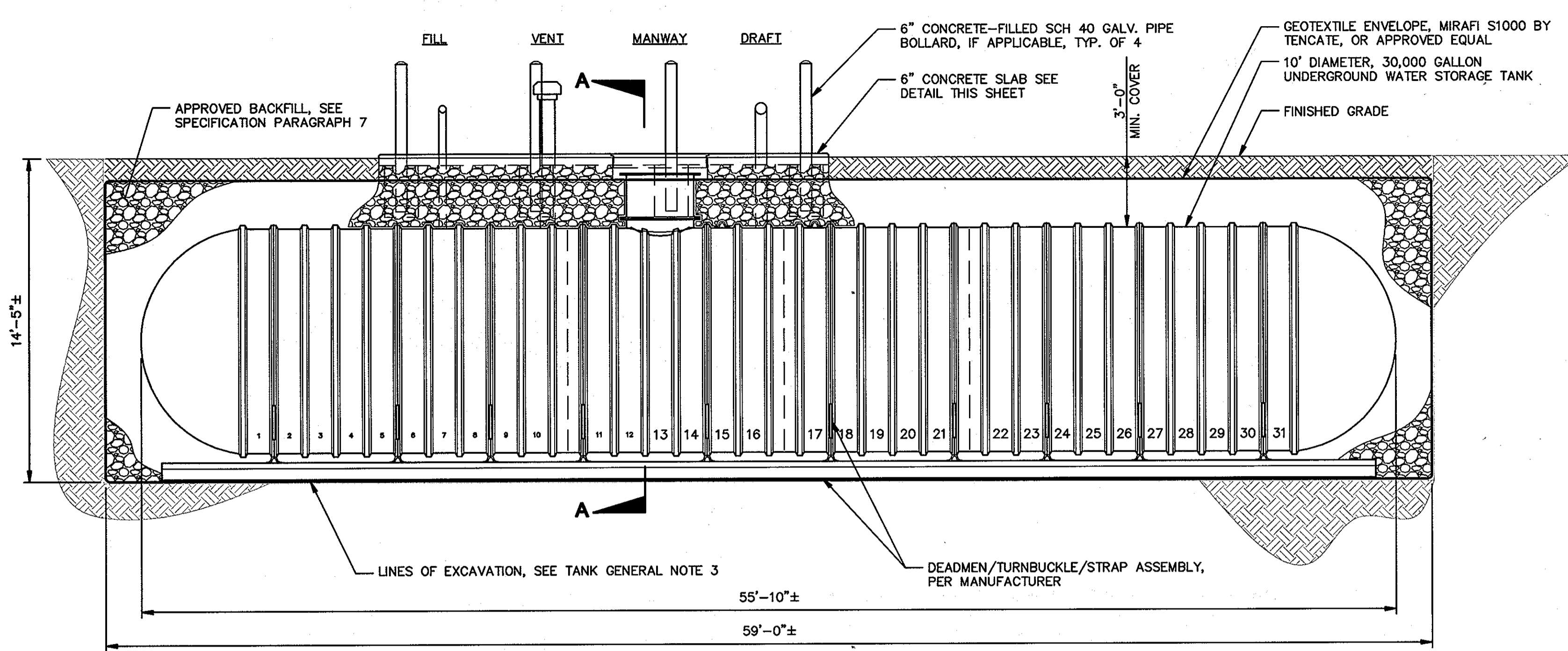
**UNDERGROUND WATER STORAGE  
TANKS FOR FIRE SUPPRESSION**

CAPITAL PROJECT No. F-5972  
CONTRACT No. 65-4647  
HOWARD COUNTY, MARYLAND

SCALE  
AS SHOWN  
SHEET  
3 OF 2

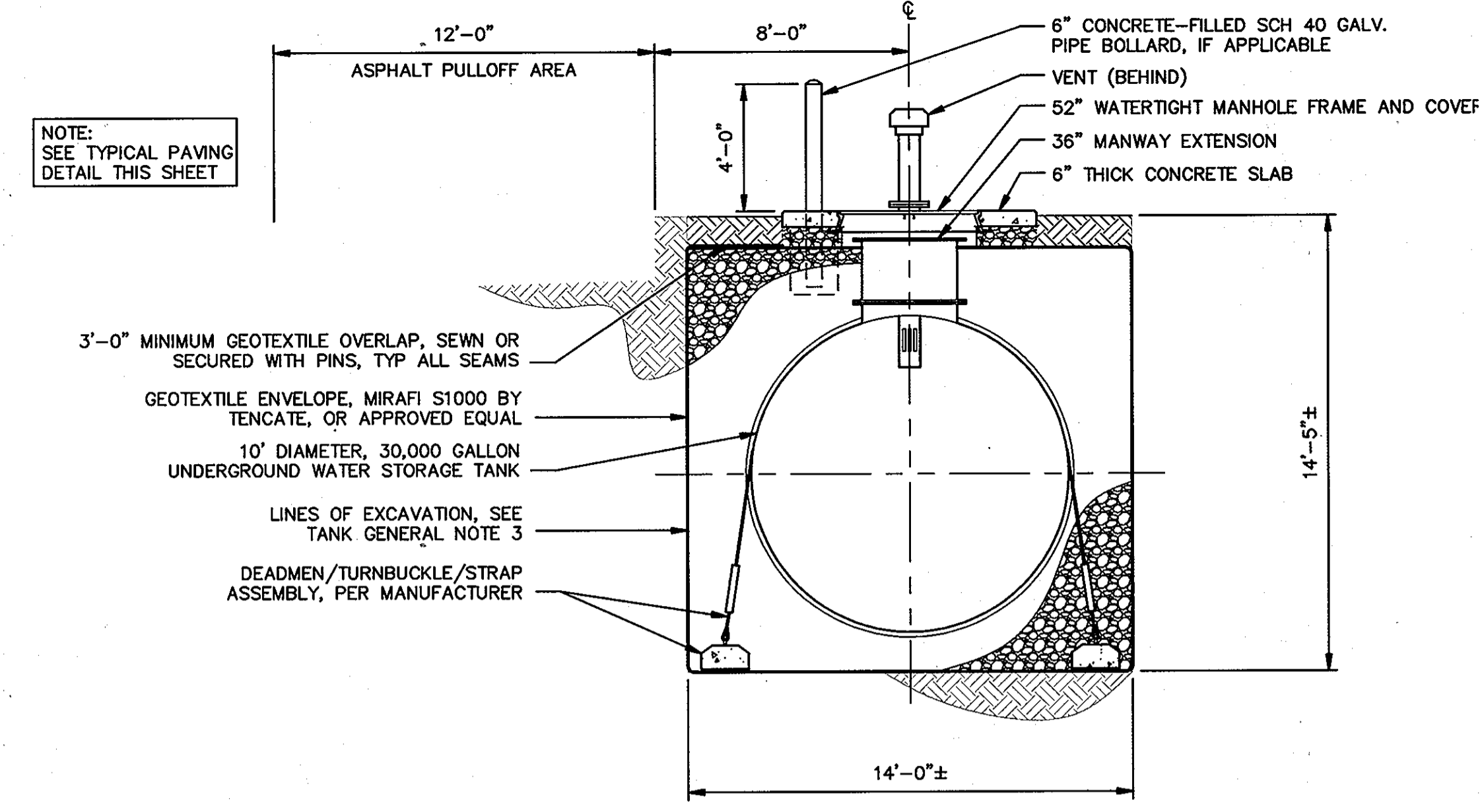
KCI TECHNOLOGIES PROJECT No.: 01-07197804

01.14.2008 - 4:48pm User: jacobson.meyers  
M:\2007\01071978\04\GENERAL DETAILS - 1.dwg

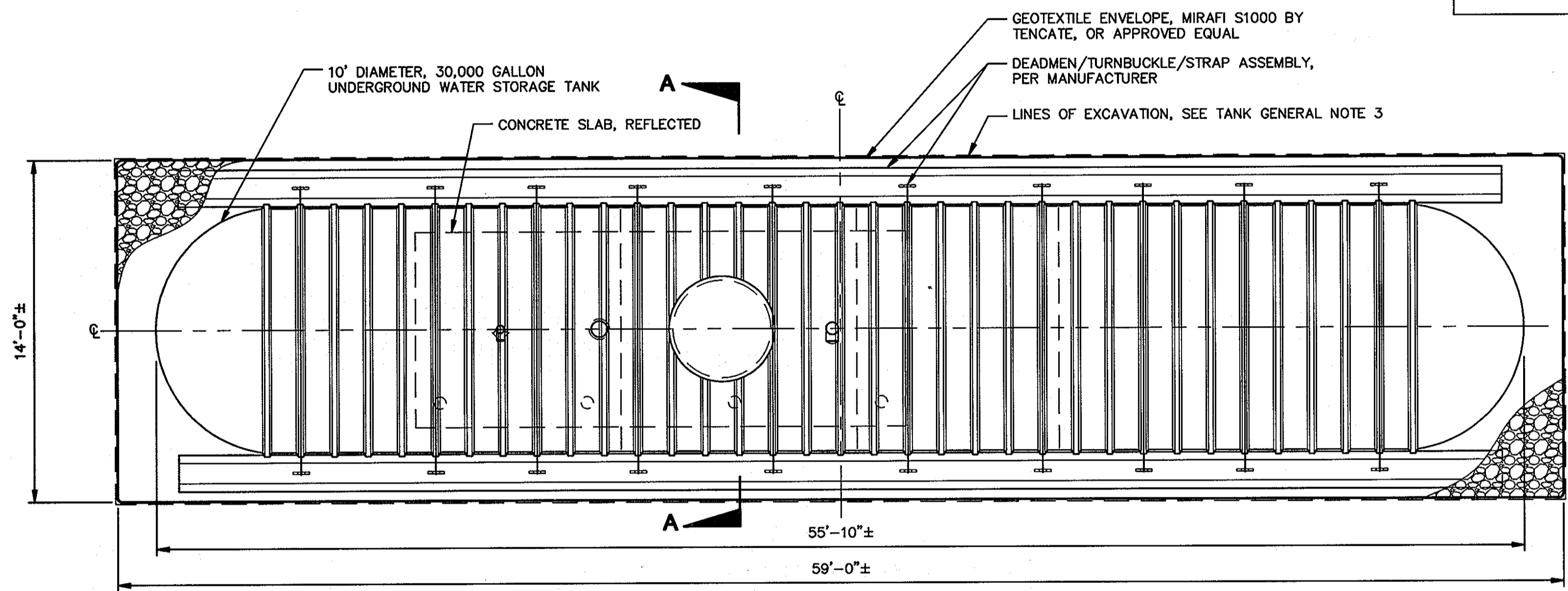


**ELEVATION: 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK**  
SCALE: 1/4" = 1'-0"

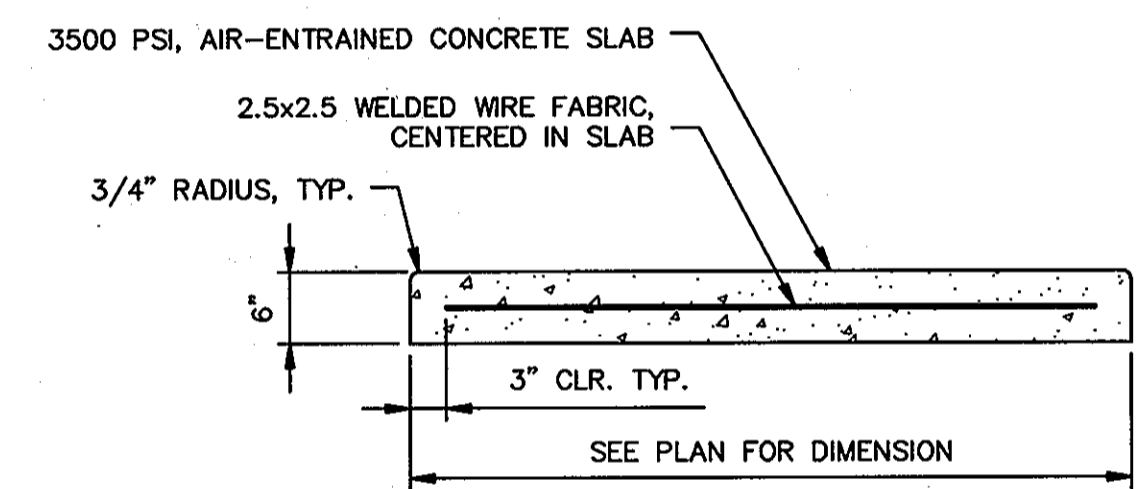
**NOTE:**  
TANK DIMENSIONS AND LAYOUT ARE FOR REFERENCE ONLY. ACTUAL TANK DIMENSIONS WILL VARY WITH MANUFACTURER. FITTINGS SHALL BE PER DETAILS ON SHEET 5 OF 10.



**SECTION A-A**  
SCALE: 1/4" = 1'-0"

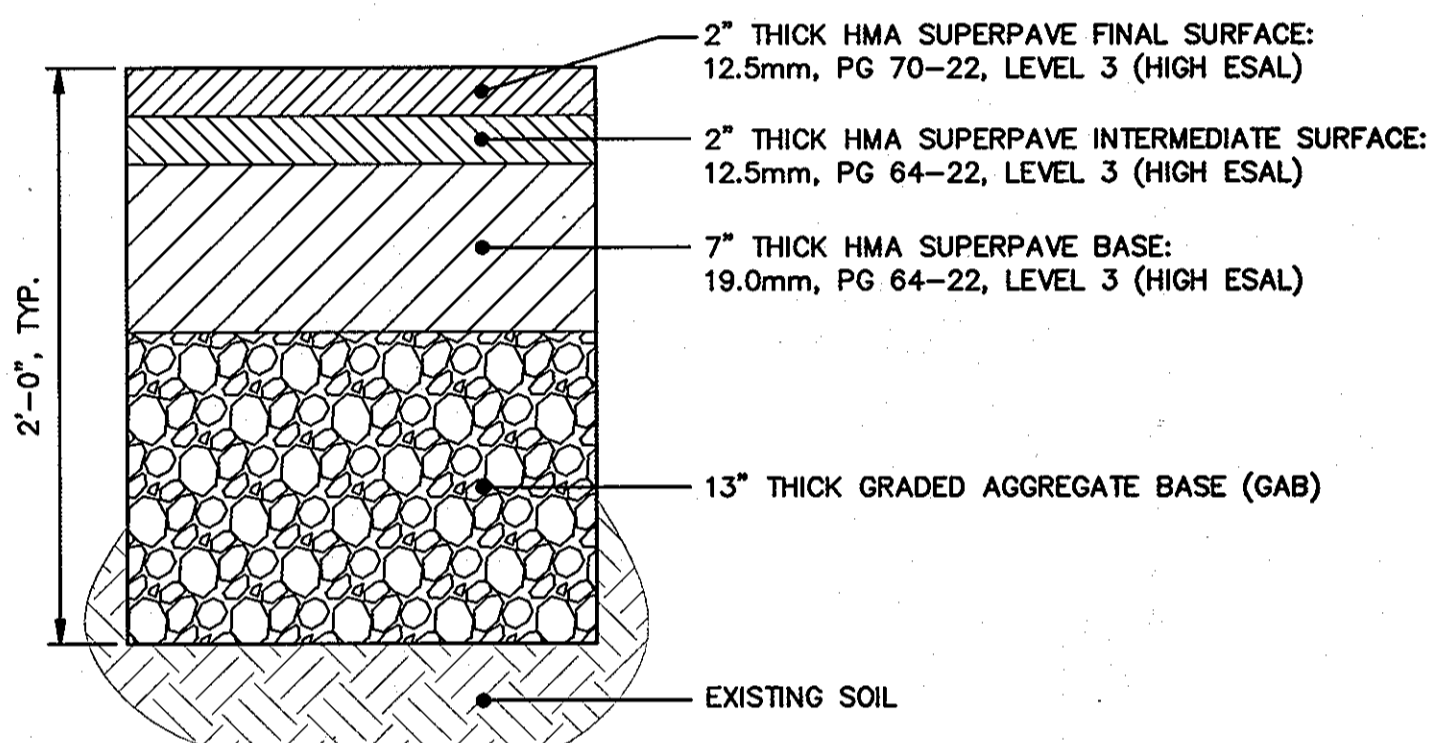


**PLAN: 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK**  
SCALE: 1/4" = 1'-0"

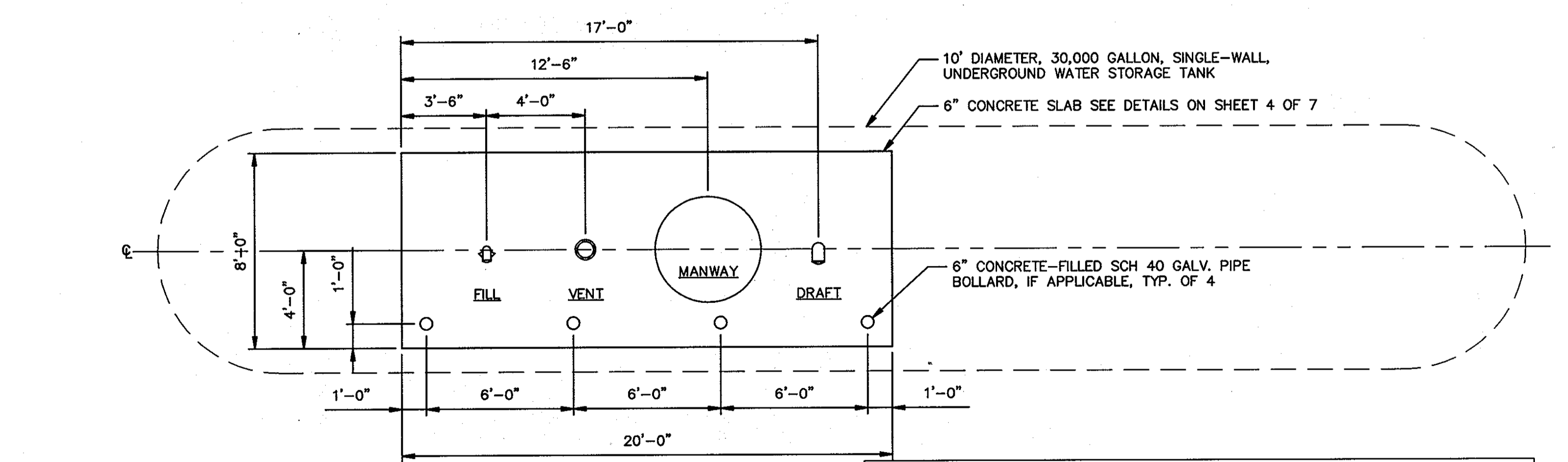


**DETAIL: CONCRETE SLAB TYPICAL SECTION**  
SCALE: 3/4" = 1'-0"

- PAVING NOTES:**
- PAVING SHALL COMPLY WITH THE LATEST EDITION OF THE HOWARD COUNTY VOLUME IV DESIGN MANUAL, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
  - PAVING FOR THE ASPHALT PULLOFF SHALL CONFORM TO DETAIL R-2.02, SECTION NUMBER P-6 OF THE MAY 18, 2007 EDITION OF THE HOWARD COUNTY DESIGN MANUAL.
  - HOWARD COUNTY DPW RESERVES THE RIGHT TO REQUIRE AN ALTERNATE PAVING SECTION, BASED ON SITE CONDITIONS OR VEHICULAR REQUIREMENTS.
  - ALL PAVING THICKNESSES SHOWN, DIMENSIONED OR OTHERWISE NOTED ARE MINIMUM THICKNESSES.

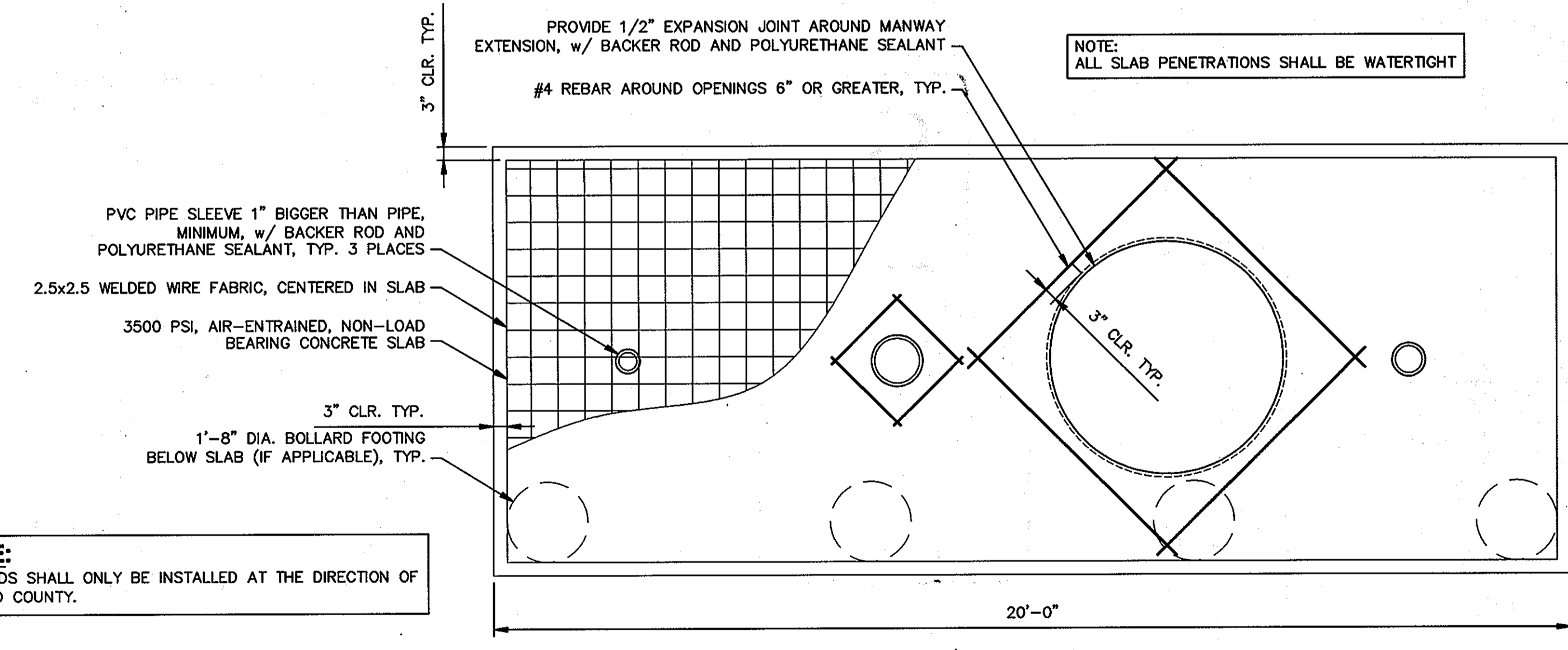


**DETAIL: PAVING TYPICAL SECTION**  
SCALE: 1 1/2" = 1'-0"



**DETAIL: CONCRETE SLAB**  
SCALE: 1/4" = 1'-0"

PROFESSIONAL CERTIFICATION. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 20453, Expiration Date 05/18/2010.



**DETAIL: CONCRETE SLAB REINFORCEMENT**  
SCALE: 1/4" = 1'-0"

**DEPARTMENT OF PUBLIC WORKS**  
**HOWARD COUNTY, MARYLAND**

*[Signature]* DATE 1/21/10  
DIRECTOR OF PUBLIC WORKS

*[Signature]* DATE 1/21/10  
CHIEF, BUREAU OF ENGINEERING

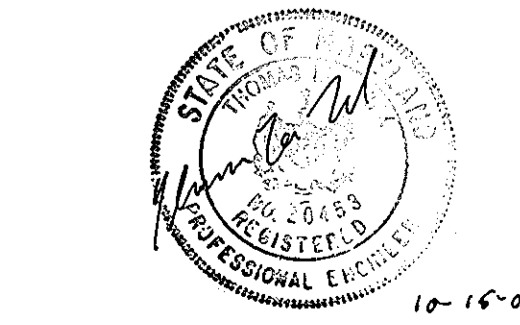
*[Signature]* DATE 1/21/10  
CHIEF, UTILITY DESIGN DIVISION

*[Signature]* DATE 1/21/10  
CHIEF, BUREAU OF UTILITIES

**ENGINEERS**  
**PLANNERS**  
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**KCI TECHNOLOGIES**

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CHK:	CLO				
DATE:	01/05/09	BY:	NO.	REVISION	DATE

GENERAL DETAILS - 1

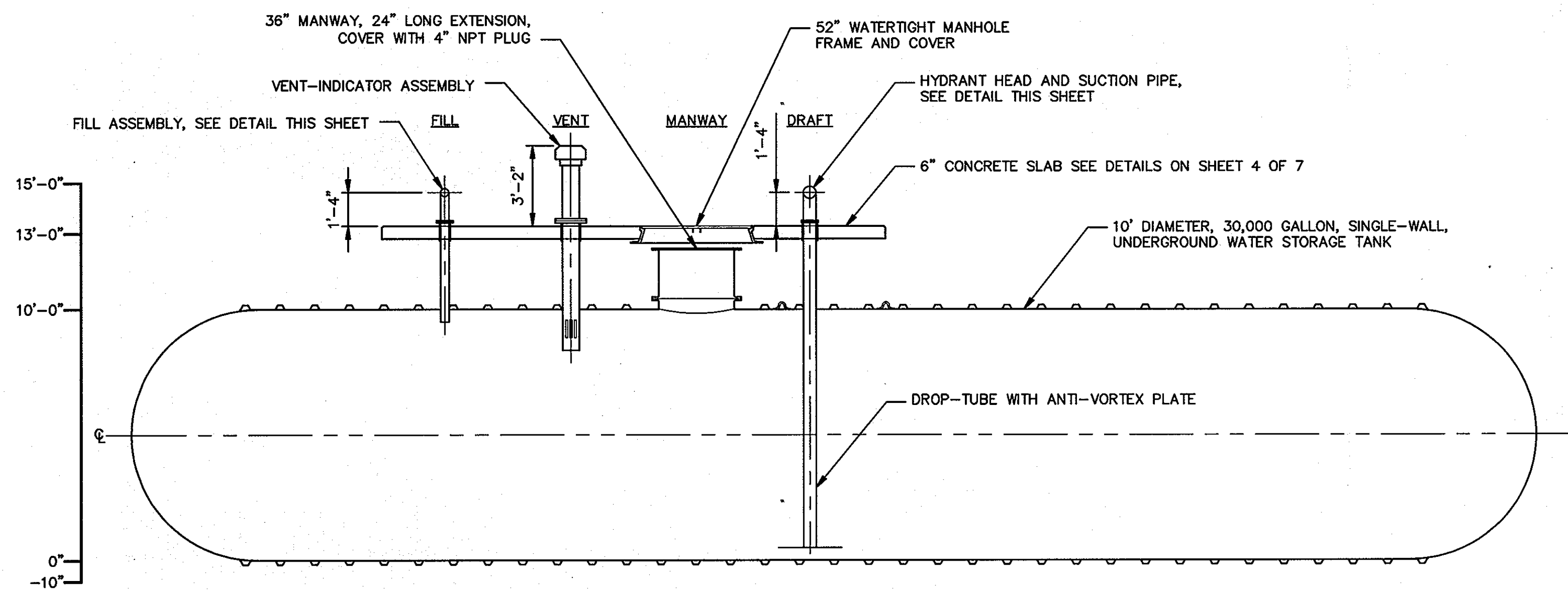
**UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION**

CAPITAL PROJECT No. F-5972  
CONTRACT No. 65-4647  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 4 OF 2



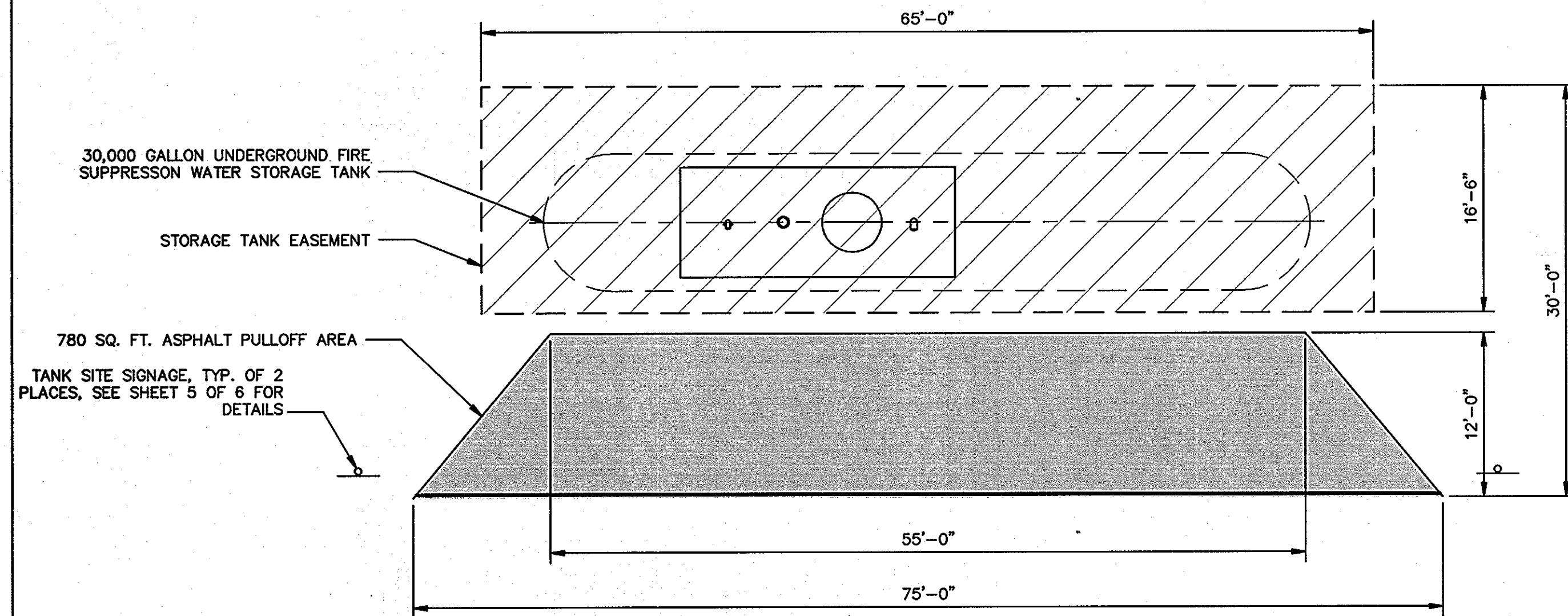
KCI TECHNOLOGIES PROJECT No.: 01-07137804



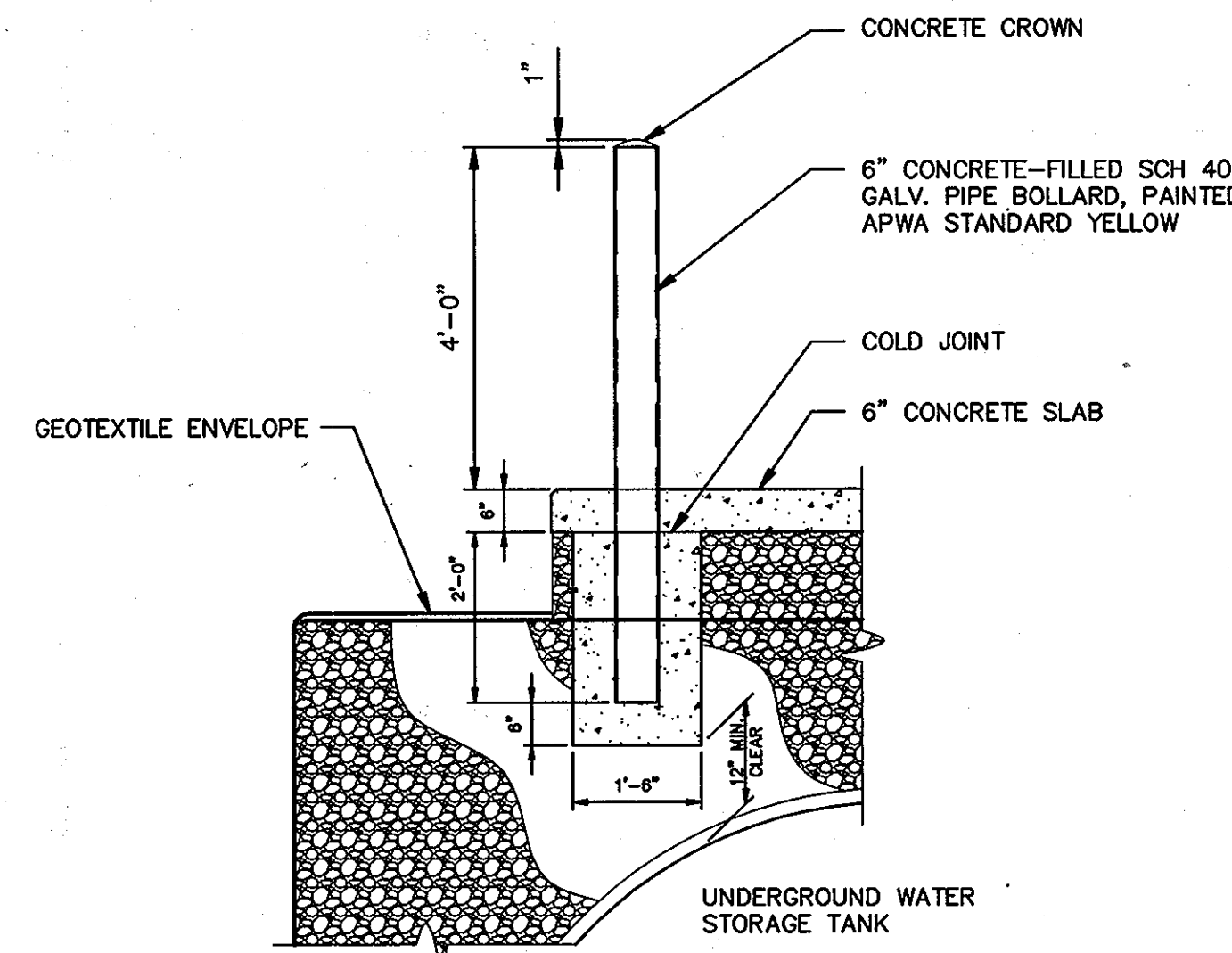
**SECTION THROUGH 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK**  
SCALE: 1/4" = 1'-0"

**NOTE:**  
TANK DIMENSIONS AND LAYOUT ARE FOR REFERENCE ONLY. ACTUAL TANK DIMENSIONS WILL VARY WITH MANUFACTURER.

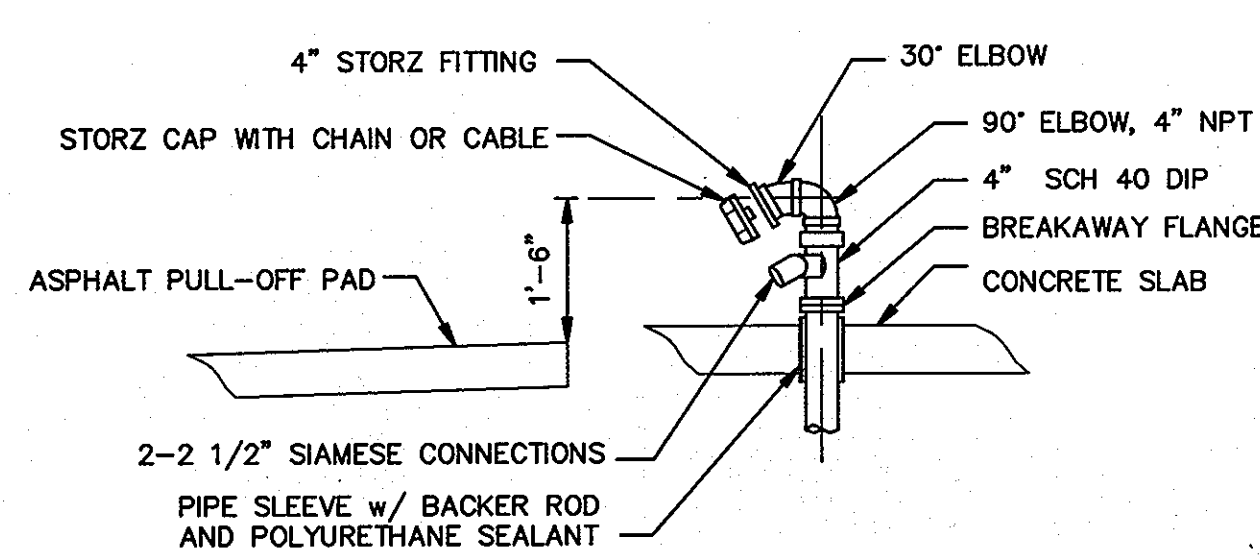
**NOTE:**  
BOLLARDS SHALL ONLY BE INSTALLED AT THE DIRECTION OF HOWARD COUNTY.



**DETAIL: TYPICAL TANK SITE LAYOUT**  
SCALE: 1/8" = 1'-0"

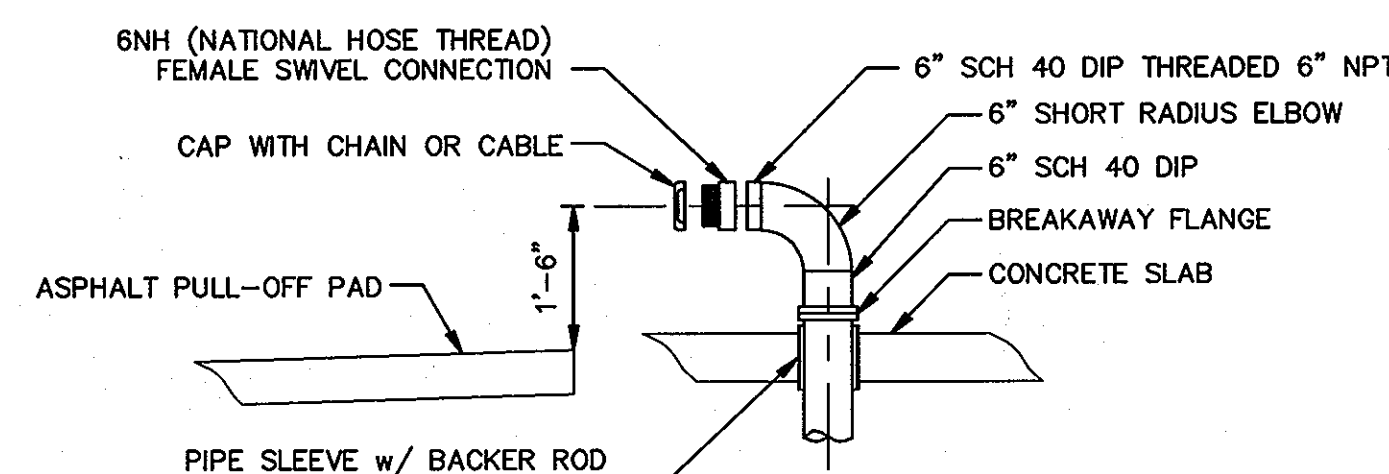


**DETAIL: TYPICAL BOLLARD**  
SCALE: 1/2" = 1'-0" (WHEN REQUIRED)



**NOTE:**  
REFER TO SPECIFICATION 2.2.4 - FITTINGS, ON SHEET 2 OF 6

**DETAIL: FILL ASSEMBLY**  
SCALE: 1/2" = 1'-0"



\* PVC FITTINGS WILL NOT BE PERMITTED FOR DRAFT ASSEMBLY

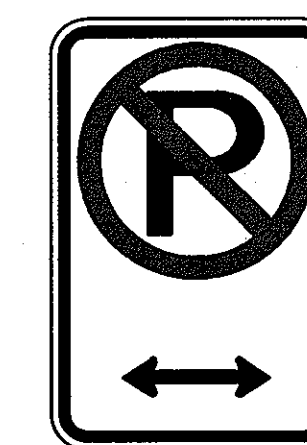
**NOTE:**  
REFER TO SPECIFICATION 2.2.4 - FITTINGS, ON SHEET 2 OF 6

**DETAIL: HYDRANT HEAD (DRAFT) ASSEMBLY**  
SCALE: 1/2" = 1'-0"

FITTING	DESCRIPTION	SPECIFICATION	CENTER DRAFT		END DRAFT	
			SECTION*	OFFSET	SECTION*	OFFSET
DRAFT	6" 6NH FEMALE SWIVEL (DIP)	2.2.4.1	16	20'-7 1/2"	1	0"
FILL	4" DIP, (2) 2 1/2" FEMALE SIAMESE, AND (1) 4" STORTZ	2.2.4.3	6	6'-10 1/2"	6	6'-10 1/2"
VENT	8" PVC	2.2.4.2	10	12'-4 1/2"	10	12'-4 1/2"
MANWAY	36" DIAMETER, 52" COVER	2.2.2	12-13	15'-9 3/4"	12-13	15'-9 3/4"

ELEVATION	DESCRIPTION
15'-0" (MAX.)	DRAFT PIPE CENTERLINE
13'-0"	TOP OF SLAB
10'-0"	TOP OF TANK
0	BOTTOM OF TANK
-10"	BOTTOM OF EXCAVATION

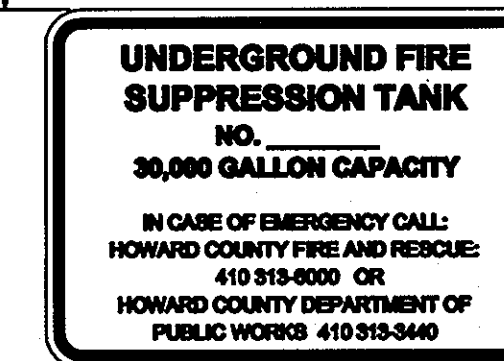
FITTING	DESCRIPTION	CENTER DRAFT		END DRAFT	
		SECTION*	OFFSET	SECTION*	OFFSET
DRAFT	6" NPT FULL COUPLING	16	20'-7 1/2"	1	0"
FILL	4" NPT FULL COUPLING	6	6'-10 1/2"	6	6'-10 1/2"
VENT	10" CLASS 150 FLANGE	10	12'-4 1/2"	10	12'-4 1/2"
MANWAY	36" MANWAY, 24" EXTENSION, 4" NPT COUPLING AND PLUG	12-13	15'-9 3/4"	12-13	15'-9 3/4"



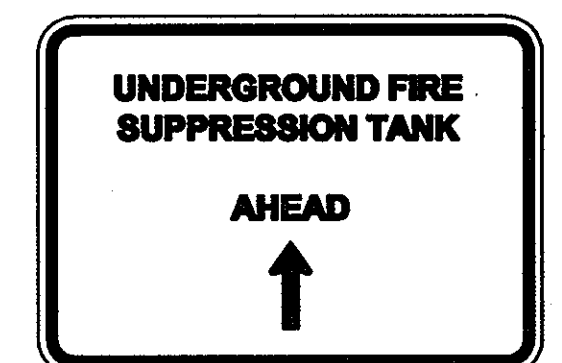
MDSA R7-1(1) STANDARD SIGN

**NOTE:**  
BOTH SIGNS SHALL BE MOUNTED ON A SINGLE POST, IN ACCORDANCE WITH HOWARD COUNTY STANDARD DETAILS

MDSA BS-6 STANDARD SIGN



**DETAIL: TYPICAL TANK SITE SIGNAGE**  
SCALE: 1/2" = 1'-0"



MDSA BS-6 STANDARD SIGN

**DETAIL: TYPICAL ADVANCE SIGNAGE**  
SCALE: 1/2" = 1'-0"

PROFESSIONAL CERTIFICATION. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 20453, Expiration Date 05/18/2010.

01.14.2009 - 4:48pm User: kradon.meyers M:\2007\01071378.dwg GENERAL DETAILS - 2.dwg

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] DATE: 11/21/10  
 Chief, Bureau of Engineering: [Signature] DATE: 11/21/10  
 Chief, Bureau of Utilities: [Signature] DATE: 11/21/10  
 Chief, Utility Design Division: [Signature] DATE: 11/21/10

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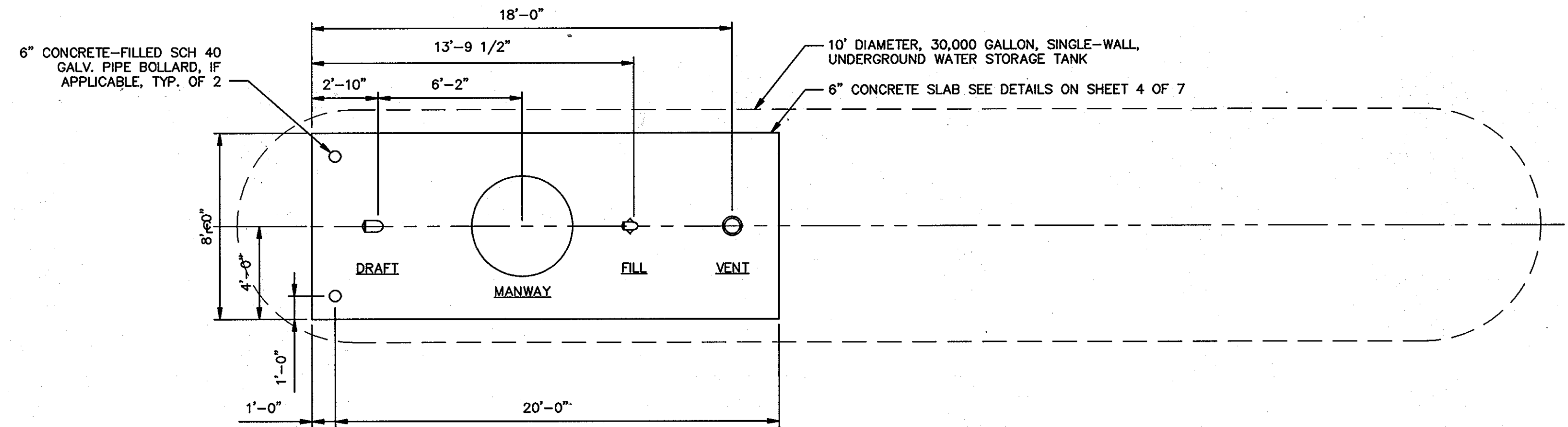
DES:	TLF				
DRN:	JBM				
CHK:	CLO				
DATE:	01/05/09	BY:	NO.	REVISION	DATE

GENERAL DETAILS - 2

**UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION**

CAPITAL PROJECT No. F-5972  
CONTRACT No. 65-4647  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 5 OF 7

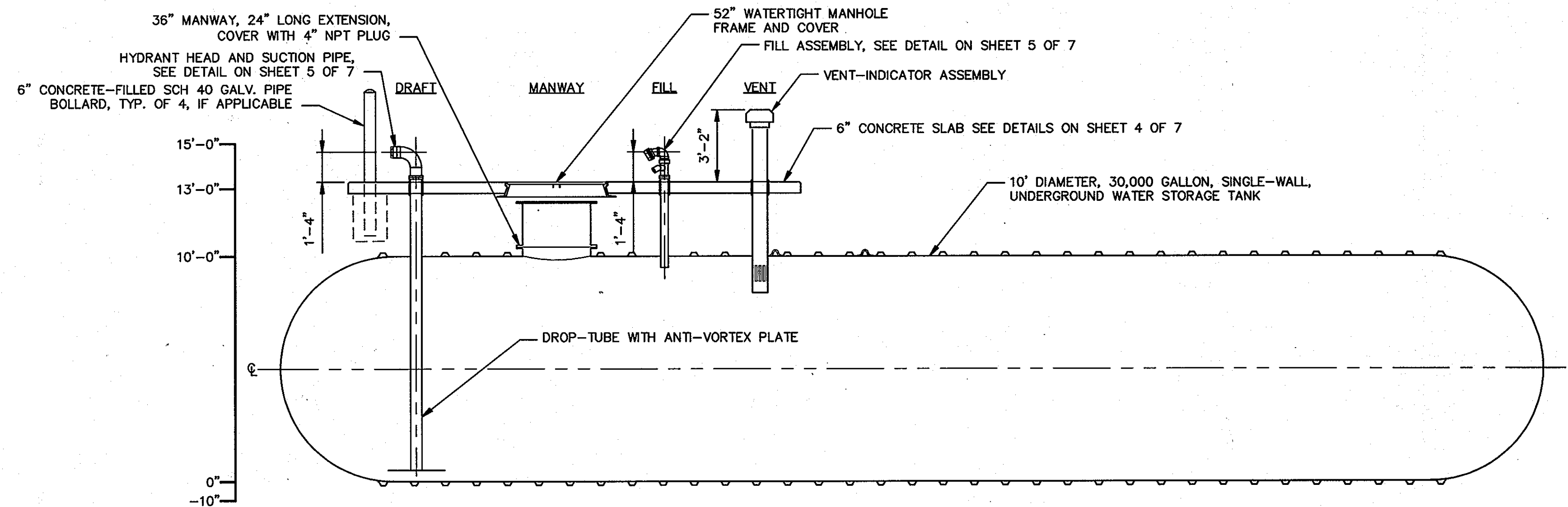


**PLAN: 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK, END-DRAFT CONFIGURATION**

SCALE: 1/4" = 1'-0"

**NOTE:**  
BOLLARDS SHALL ONLY BE INSTALLED AT THE DIRECTION OF HOWARD COUNTY.

**NOTE:**  
TANK DIMENSIONS AND LAYOUT ARE FOR REFERENCE ONLY. ACTUAL TANK DIMENSIONS WILL VARY WITH MANUFACTURER.



**SECTION THROUGH 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK, END-DRAFT CONFIGURATION**

SCALE: 1/4" = 1'-0"

PROFESSIONAL CERTIFICATION. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 20453, Expiration Date 05/18/2010.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

1/21/10  
1/21/10

DIRECTOR OF PUBLIC WORKS DATE  
CHIEF, BUREAU OF UTILITIES DATE

1/21/10  
1/21/10

CHIEF, BUREAU OF UTILITIES DATE  
CHIEF, UTILITY DESIGN DIVISION DATE

ENGINEERS  
PLANNERS  
SCIENTISTS  
CONSTRUCTION MANAGERS

KCI  
TECHNOLOGIES

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



DES:	TLF				
DRN:	JBM				
CHK:	CLO				
DATE:	01/05/09	BY	NO.	REVISION	DATE

GENERAL DETAILS - 3

**UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION**

CAPITAL PROJECT No. F-5972  
CONTRACT No. 65-4647  
HOWARD COUNTY, MARYLAND

SCALE  
AS SHOWN

SHEET  
6 OF 7