HOWARD COUNTY

DEPARTMENT OF PUBLIC WORKS
ELLICOTT CITY, MARYLAND 21043

GENERAL NOTES

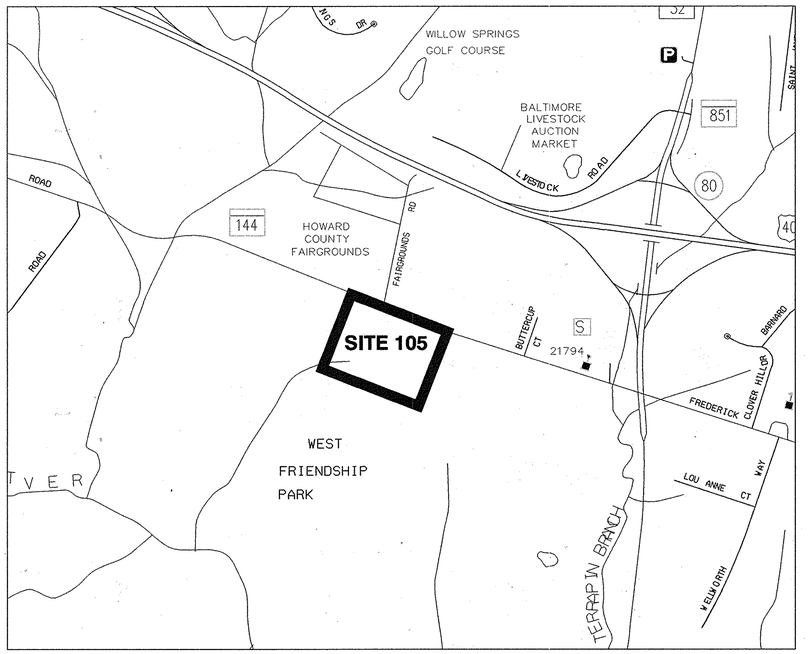
1. APPROXIMATE LOCATIONS OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
2. TOPOGRAPHIC FIELD SURVEY WAS PERFORMED IN 2012 BY FISHER, COLLINS, AND CARTER, INC.
3. HORIZONTAL AND VERTICAL SURVEY CONTROLS:
   COORDINATES & BEARINGS SHOWN HEREON ARE BASED ON HOWARD COUNTY CONTROL STATIONS AND REPRESENT THE MARYLAND STATE PLANE COORDINATE SYSTEM AS DERIVED FROM NORTH AMERICAN DATUM (NAD83/07) FOR HORIZONTAL AND NORTH AMERICAN VERTICAL DATUM (NAVD88) FOR VERTICAL DATUM. DEWBERRY UTILIZED THE REAL TIME NETWORK (RTN) "KEYNETGPS" OPERATED BY TRIMBLE TO ACQUIRE MEASUREMENTS FOR THE SURVEY CONTROL SET AT THE SUBJECT SITES FOR THE PROJECT AS WELL AS THE CONTROL NOTED BELOW. THE "KEYNETGPS" NETWORK PROVIDES FOR HIGH ACCURACY POSITIONING THROUGHOUT THE GEOGRAPHIC REGION. THE USE OF AN RTN FOR GEODETIC CONTROL INVOLVES THE COLLECTION AND USE OF ATMOSPHERIC, TROPOSPHERIC, AND OTHER CORRECTION FROM MULTIPLE CONTROL POINTS SURROUNDING THE PROJECT SITE, RESULTING IN HIGH PRECISION POSITIONAL DATA. THE CONTROL POINTS OF THIS NETWORK ARE NATIONAL GEODETIC SURVEY CONTINUOUSLY OPERATING REFERENCE STATIONS OR NGS CORS, AND THE RESULTING MEASUREMENT VECTORS BETWEEN THE GPS RECEIVER AND NETWORK ARE DIRECT MEASUREMENTS TO EXISTING, HIGH ORDER PHYSICAL MONUMENTATION WHICH HAVE BEEN VETTED, MAINTAINED, AND DISTRIBUTED BY THE NATIONAL GEODETIC SURVEY. THE FOLLOWING HOWARD COUNTY CONTROL STATIONS WERE USED FOR THIS PROJECT:

HOWARD COUNTY GEODETIC SURVEY CONTROL

NO.	NORTHING (FT)	EASTING (FT)	ELEV (FT)
45CA	540070.9730	1327702.7218	426.15
42IB	542366.9133	1363075.9515	282.35
08AB	610602.2863	1297911.2033	579.72
16E1	593251.0015	1340192.6876	463.815

4. 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.
5. 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.
6. WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL ◪ AT THE LOCATION OF THE TEST PIT. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PIT OR PITS IS INCLUDED ON THE DRAWINGS OR SPECIFICATIONS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY THE CONTRACTOR TWO (2) WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.
7. CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE (5) WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS: 1-800-252-1133
   AT&T 410-637-8713
   BGE - CONTRACTOR SERVICES 410-685-0123
   BGE - EMERGENCY 410-313-7450
   BUREAU OF HIGHWAYS 410-313-4900
   BUREAU OF UTILITIES (DPW) 410-795-1390
   COLONIAL PIPELINE CO. 1-800-257-7777
   MISS UTILITY 410-531-5533
   STATE HIGHWAY ADMINISTRATION ..... 1-800-743-0033 / 410-224-9210
   VERIZON.....
9. TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT.
10. 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.

INDEX OF SHEETS



VICINITY MAP
SCALE : 1" = 1000'

UNDERGROUND WATER STORAGE TANK FOR FIRE SUPPRESSION

TANK GENERAL NOTES

1. CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THESE DRAWINGS, THE SPECIAL PROVISIONS, AND THE HOWARD COUNTY STANDARD DETAILS AND SPECIFICATIONS FOR CONSTRUCTION.
2. THE CONTRACTOR SHALL CONDUCT A VERIFICATION OF SITE STAKING AND LAYOUT PRIOR TO EXCAVATION.
3. 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. VERTICAL DIMENSIONS SHOWN IN TABLE 2 ON SHEET 5 REPRESENT THE MAXIMUM ALLOWABLE CONDITION FOR PROPER TANK OPERATION AND SHALL NOT BE EXCEEDED.
4. ALL TESTING IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. CONTRACTOR SHALL BE CERTIFIED BY THE TANK MANUFACTURER PRIOR TO TANK INSTALLATION.
6. ALL WORK SHALL BE COMPLETED IN A TIMELY AND WORKMANLIKE MANNER. ALL WORK SHALL CONFORM TO APPLICABLE COEDS AND STANDARDS.
7. EXCAVATION AND SITE WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE AND CURRENT MOSHA AND OSHA REGULATIONS.
8. PRESSURE TEST PROCEDURES SHALL BE PERFORMED BY THE TANK INSTALLER PRIOR TO AND AFTER INSTALLATION, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND THESE DRAWINGS.
9. AN OPERATIONAL TEST SHALL BE CONDUCTED AFTER INSTALLATION PER THE TANK MANUFACTURER'S SPECIFICATIONS AND THESE DRAWINGS.
10. ALL STEEL AND PVC FITTINGS ABOVE GRADE SHALL BE PAINTED WITH EXTERIOR ENAMEL PER SPECIFICATION, UNLESS OTHERWISE SPECIFIED. COLORS SHALL BE APWA STANDARD YELLOW OR RED AS NOTED ON THE DRAWINGS.
11. THE CONTRACTOR SHALL RESTORE THE SITE TO ORIGINAL CONDITION AFTER FINAL TESTING INCLUDING, BUT NOT LIMITED TO FINE GRADING, SEEDING, MULCHING, AND GENERAL CLEANUP.
12. 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.
13. THE WATER LEVEL INDICATOR SHALL BE ORIENTED TOWARD THE ACCESS AREA OR PULLOFF FOR VISIBILITY.
14. INSTALL POST AND DOT R7 STYLE NO PARKING SIGNAGE, SEE SHEET 5 FOR DETAILS. TOP OF POST SHALL BE 7'-0" ABOVE FINISHED GRADE.
15. 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.
16. 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.

LEGEND

- TRAVERSE
- PROPERTY LINE
- DECIDUOUS TREE
- EVERGREEN TREE
- TREE TO BE REMOVED
- EX. CONTOUR
- TREELINE
- LOD — LIMITS OF DISTURBANCE
- SF — SF — SILT FENCE
- BOF — BLAZE ORANGE FENCE
- FO — EXISTING UNDERGROUND FIBER OPTIC
- G — EXISTING GAS LINE
- E — EXISTING ELECTRIC
- SOIL BORING/PAVING CORE
- ELECTRIC POLE
- SIGN

BY THE OWNER :

I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IIN 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.

OWNER _____ DATE 7.17.14

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
Approved _____ Date 7/22/14

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. 10966 EXPIRATION DATE: MAY 12, 2016

Thomas W. Dallett Jr. — Signature of Engineer — 7/11/2014 Date

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 AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

Thomas W. Dallett Jr. — ENGINEER — 7/11/2014 DATE

AS-BUILTS DEC 28 2015

EP-13-023

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS — 7/21/14 DATE
CHIEF, BUREAU OF ENGINEERING — 7/18/14 DATE
CHIEF, BUREAU OF UTILITIES — 7/21/14 DATE
CHIEF, UTILITY DESIGN DIVISION PSD — 7/17/14 DATE

Dewberry
Dewberry Consultants, LLC
3106 LORD BALTIMORE DRIVE
SUITE 110
BALTIMORE, MD 21244-2662
410.265.9500
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STATE OF MARYLAND — THOMAS W. DALLETT JR. — No. 10966 — REGISTERED PROFESSIONAL ENGINEER

DES:	LAL
DRN:	RLI
CHK:	TND
DATE:	07/2014

BY	NO.	REVISIONS	DATE

TITLE SHEET

600' SCALE MAP NO. 15 BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK
FOR FIRE SUPPRESSION
CAPITAL PRO: F-5972 CONTRACT GS-4908

ELECTION DISTRICT NO. 4 HOWARD COUNTY, MARYLAND

SCALE: SHOWN

SHEET 1 OF 8

TECHNICAL SPECIFICATIONS FOR UNDERGROUND WATER STORAGE TANKS FOR FIRE PROTECTION

1. GENERAL

1.1 SCOPE

THE CONSTRUCTION OF UNDERGROUND TANKS FOR FIRE PROTECTION IN ACCORDANCE WITH HOWARD COUNTY CODE, TITLE 17 AND THIS SPECIFICATION IS PART OF A PROGRAM DESIGNED TO IMPROVE THE LEVEL OF PROTECTION FROM FIRES IN RESIDENTIAL AND COMMERCIAL PROPERTIES. THESE SPECIFICATIONS, ALONG WITH ASSOCIATED DOCUMENTS, PROVIDE THE INFORMATION NECESSARY FOR THE CONSTRUCTION AND PLACEMENT OF FIRE PROTECTION TANKS USED FOR THIS PURPOSE.

1.2 PURPOSE

THE PURPOSE OF THIS SPECIFICATION IS TO PROVIDE THE GENERAL TECHNICAL INFORMATION REQUIRED FOR THE CONSTRUCTION OF UNDERGROUND WATER STORAGE TANKS IN ACCORDANCE WITH HOWARD COUNTY MARYLAND, TITLE 17 AND ALL DATA THEREIN REFERENCED.

2. MATERIALS

2.1 GENERAL

2.1.1 ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF HOWARD COUNTY VOLUME IV DESIGN MANUAL: STANDARD SPECIFICATIONS AND DETAILS OF CONSTRUCTION (HOWARD COUNTY STANDARDS). EXCEPTIONS SHALL BE GRANTED ON A CASE-BY-CASE BASIS, FOLLOWING THE CONTRACTOR'S WRITTEN REQUEST TO THE ENGINEER FOR EXCEPTION.

2.2 UNDERGROUND STATIC WATER STORAGE TANK

2.2.1 THE TANK MANUFACTURER SHALL HAVE, AT MINIMUM, FIVE (5) YEARS OF EXPERIENCE SUCCESSFULLY CONSTRUCTING FRP STORAGE TANKS, AND SHALL PROVIDE A MINIMUM OF THREE (3) REFERENCES FOR TANK INSTALLATIONS WITHIN THE LAST THREE (3) YEARS.

2.2.2 THE MANUFACTURE OF THE UNDERGROUND STORAGE TANK SHALL BE IN ACCORDANCE WITH ANSI-AWWA D-120-02, THERMOSETTING FIBERGLASS-REINFORCED PLASTIC TANKS.

2.2.3 TANKS SHALL BE CONSTRUCTED OF SINGLE-WALL FIBERGLASS REINFORCED PLASTIC (FRP), MANUFACTURED WITH 100% RESIN AND GLASS-FIBER REINFORCEMENT. SAND FILLERS ARE NOT PERMITTED.

2.2.4 THE MANUFACTURER SHALL PROVIDE A 30-YEAR WARRANTY, AGAINST DEFECTS IN MATERIAL FOR THE TANK SYSTEM, TO THE PURCHASER OF THE TANK AND THEIR HEIRS, SUCCESSORS, AND ASSIGNS.

2.2.5 UNLESS NOTED OTHERWISE ON THE SITE-SPECIFIC DRAWING(S), THE TANK SHALL HAVE A NOMINAL STORAGE CAPACITY OF 42,000 GALLONS OF LIQUID WITH A SPECIFIC GRAVITY OF 1.1. IT SHALL BE CLEARLY UNDERSTOOD THAT ALL REFERENCES TO TANK CAPACITY IN THE PLANS AND SPECIFICATIONS REFER TO THE NOMINAL CAPACITY, UNLESS EXPLICITLY STATED OTHERWISE.

2.2.6 THE TANK SYSTEM SHALL INCLUDE A DEVICE FOR HOLDING THE TANK IN POSITION AGAINST FLOTATION (DEADMEN). THIS CONFIGURATION SHALL BE SUPPLIED AND WARRANTED BY THE TANK MANUFACTURER AS PART OF THE TANK PACKAGE. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

2.2.7 THE TANK SHALL INCLUDE A REMOVABLE WATERTIGHT ACCESS COVER AT GRADE (MANHOLE), AT LEAST 52" IN DIAMETER, TO ALLOW ENTRY FOR MAINTENANCE AND INSPECTION OF THE INSIDE OF THE TANK. THE COVER SHALL BE PROPERLY SECURED AND LOCKED. AN INTERNAL LADDER SHALL BE SECURELY MOUNTED TO THE TANK. THE TANK MANWAY SHALL BE 36" IN DIAMETER.

2.2.8 THE 52-INCH DIAMETER MANHOLE FRAME AND COVER SHALL BE MADE WITH A 1-1/4" WIDE STEEL RING FRAME, 3/8" DIAMOND PLATE STEEL COVER WITH RUST RESISTANT COATING, A 14 GAUGE GALVANIZED STEEL SKIRT, AND CARRIES THE H-20 LOAD RATING. THE 52' MANHOLE COVER SHALL BE PROVIDED WITH TWO EASY GRIP RECESSED HANDLES. THE MANHOLE SHALL ALSO BE A WATERTIGHT MANHOLE, AND INCLUDE A BUNA-N GASKET. THE 52-INCH DIAMETER MANHOLE FRAME AND COVER SHALL BE MODEL 10752x10, MANUFACTURED BY PEMCO OR APPROVED EQUAL.

2.2.9 THE TANK SYSTEM SHALL INCLUDE AN ANCHORING SYSTEM TO ATTACH THE TANK TO THE DEADMEN. THE ANCHORING SYSTEM SHALL BE SUPPLIED BY THE TANK MANUFACTURER AS PART OF THE TANK PACKAGE. INSTALLATION SHALL BE IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE MANUFACTURER'S RECOMMENDATIONS.

2.2.10 A PAD CONSISTING OF 6-INCH THICK CONCRETE SHALL BE PLACED AT GRADE OVER THE TANK AND SHALL ENCOMPASS ALL FITTINGS. REFER TO TANK DRAWINGS FOR CONCRETE DIMENSIONS AND LAYOUT; REFER TO HOWARD COUNTY STANDARD SPECIFICATIONS FOR CONCRETE MIX DESIGN.

2.3 PIPE & FITTINGS

2.3.1 ALL BURIED PIPING SHALL BE FULLY-RESTRAINED MECHANICAL JOINT CLASS 52 DUCTILE IRON PIPE IN ACCORDANCE WITH HOWARD COUNTY STANDARD SPECIFICATIONS.

2.3.2 ONE DRAFT ASSEMBLY SHALL CONSIST OF A 6 INCH NOMINAL DIAMETER SCHEDULE 40 BLACK STEEL PIPE. THE DRAFT CONNECTION SHALL TERMINATE IN A 6NH (NATIONAL HYDRANT FEMALE) SWIVEL CONNECTOR WITH PLUG OR CAP. A PVC DRAFT PIPE WITH AN ANTI-VORTEX PLATE SHALL BE INSTALLED INSIDE THE TANK BY THE MANUFACTURER. THE DRAFT CONNECTION ALLOWS A FIRE DEPARTMENT PUMPER TO CONNECT AND REMOVE WATER FROM THE TANK AT THE SPECIFIED RATE OF FLOW (FIRE FLOW).

2.3.3 ONE COMBINATION VENT/FILL INDICATOR SHALL CONSIST OF A MIN. 8 INCH DIAMETER SCHEDULE 80 PVC PIPE WHICH ALLOWS VISUAL INSPECTION OF THE TANK WATER LEVEL, AS WELL AS PROVIDING THE REQUIRED AMOUNT OF VENTING TO THE TANK.

2.3.4 ONE FILL ASSEMBLY SHALL CONSIST OF A 4 INCH NOMINAL DIAMETER SCHEDULE 40 BLACK STEEL PIPE WITH A SIAMESE CONNECTION WITH TWO, TWO AND ONE HALF INCH (2-2 1/2") CONNECTIONS AND ONE 4" STORTZ CONNECTION. THE FITTING SHALL BE ANGLED DOWNWARD AT 30 DEGREES TO REDUCE HOSE AND FITTING STRAIN DURING FILLING OPERATIONS.

2.3.5 ALL PIPE THAT PROJECTS ABOVE THE SLAB SHALL BE INSTALLED WITH A BREAK AWAY FLANGE AT OR NEAR SLAB.

2.4 PAINTINGS & COATINGS

2.4.1 ALL STEEL PIPE PROTRUDING FROM SLAB OR GROUND SHALL BE COATED PER HOWARD COUNTY SPECIFICATION 967.03 EXTERNAL COATING FOR STEEL PIPE.

2.5 GEOTEXTILE ENVELOPE

2.5.1 THE GEOTEXTILE USED TO SEPARATE BACKFILL FROM SURROUNDING SOIL SHALL BE A MEDIUM DUTY, NEEDLE-PUNCHED, NON-WOVEN POLPROPYLENE MATERIAL SPECIFICALLY SUITED TO BE USED AS A SEPARATION LAYER.

2.5.2 THE GEOTEXTILE ENVELOPE SHALL MEET AASHTO M288-06 CLASS 1.

2.5.3 GEOTEXTILE SHALL NOT BE STORED IN DIRECT SUNLIGHT; THE CONTRACTOR SHALL COVER THE ROLLS TO MINIMIZE UV DEGRADATION.

2.5.4 THE GEOTEXTILE ENVELOPE SHALL BE MIRAFI S1000 BY TENCATE OR APPROVED EQUAL.

2.6 BACKFILL

2.6.1 APPROVED BACKFILL MATERIAL MUST MEET THE FOLLOWING SPECIFICATIONS:

2.6.1.1 THE MATERIAL IS WASHED, FREE-FLOWING, AND FREE OF ICE, SNOW, AND DEBRIS.

2.6.1.2 WHEN USING PEA GRAVEL, THE MATERIAL IS TO BE A MIX OF ROUNDED PARTICLES, SIZES BETWEEN 1/8 INCH AND 3/4 INCH. THE PEA GRAVEL SHALL CONFORM TO THE SPECIFICATIONS OF ASTM C-33, PARAGRAPH 9.1, SIZES 6, 67, OR 7.

2.6.1.3 WHEN USING CRUSHED STONE, THE MATERIAL IS TO BE A MIX OF ANGULAR PARTICLES, SIZES BETWEEN 1/8 INCH AND 1/2 INCH. THE CRUSHED STONE MUST CONFORM TO THE SPECIFICATIONS OF ASTM C-33, PARAGRAPH 9.1, SIZES 7 OR 8.

2.6.1.4 NO MORE THAN 5% (BY WEIGHT) OF THE MATERIAL MAY PASS THROUGH A #8 SIEVE.

2.6.1.5 THE MATERIALS SUPPLIER SHALL CERTIFY THAT THE MATERIAL CONFORMS TO ASTM C-33 AND ANY OTHER APPLICABLE SPECIFICATIONS.

2.6.2. TANKS MUST BE INSTALLED USING EITHER PEA GRAVEL OR CRUSHED STONE AS BACKFILL MATERIAL.

2.6.3 USING OTHER THAN APPROVED BEDDING AND BACKFILL MATERIALS WITHOUT PRIOR WRITTEN AUTHORIZATION FROM HOWARD COUNTY DPW IS PROHIBITED.

2.7 LANDSCAPING

2.7.1 REPLACEMENT PLANTINGS SHALL BE, AT MINIMUM, EQUAL IN SIZE AND TYPE TO THE TREES AND SHRUBS REMOVED FOR CONSTRUCTION, SUBJECT TO THE PROVISIONS OF THE HOWARD COUNTY LANDSCAPE MANUAL AND ALL SUBSEQUENT UPDATES, INTERIM, OR PERMANENT.

2.7.2 IN THE EVENT THAT PLANTINGS CANNOT BE REPLACED WITH IDENTICAL SPECIES, A SUBSTITUTION MAY BE PROVIDED BY THE CONTRACTOR. THE SUBSTITUTION SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE HOWARD COUNTY PROJECT MANAGER.

2.8 SUBMITTALS

2.8.1 SHOP DRAWINGS SHALL BE PROVIDED FOR ALL MATERIALS OR COMPONENTS OF CONSTRUCTION, AND PROPOSED PIPING LAYOUTS. THESE SHOP DRAWINGS SHALL BE PROVIDED MIN. 20 DAYS PRIOR TO CONSTRUCTION IN ORDER TO ALLOW FOR DISTRIBUTION AND REVIEW BY THE OWNER AND THE FIRE MARSHALL. THE CONTRACTOR SHALL PROVIDE A LIST OF ALL ANTICIPATED SHOP DRAWINGS TO THE OWNER FOR REVIEW PRIOR TO CONSTRUCTION. ADDITIONAL SUBMITTALS OR DOCUMENTATION MAY BE REQUIRED BY THE OWNER OR OTHER REVIEWING PARTIES, FOR WHICH THE CONTRACTOR SHALL NO SEEK ADDITIONAL COMPENSATION.

2.8.2 IN THE EVENT THAT SITE CONDITIONS DICTATE THE USE OF STRUCTURAL ELEMENTS NOT EXPLICITLY DETAILED IN THE DRAWINGS, THE CONTRACTOR SHALL SUBMIT DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND.

2.8.3 OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED BY THE TANK MANUFACTURER, INCLUDING OPERATIONAL TESTING PROCEDURES.

3. EXECUTION

3.1 GENERAL

3.1.1 ALL TANKS SHALL BE INSTALLED IN ACCORDANCE WITH THESE SPECIFICATION AND THE APPROVED MANUFACTURER'S INSTRUCTIONS. THE INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FOR WORK AND FOR SCHEDULING REQUIRED INSPECTIONS.

3.1.2 THE CONTRACTOR SHALL SEEK THE ADVICE OF A MARYLAND-LICENSED PROFESSIONAL ENGINEER TO DETERMINE THE PROPER PLACEMENT OF A TANK EXCAVATION NEAR ANY EXISTING STRUCTURE(S). IMPROPER PLACEMENT MAY RESULT IN TANK AND/OR OTHER PROPERTY DAMAGE.

3.1.3 ENSURE THAT DOWNWARD FORCES FROM LOADS CARRIED BY THE FOUNDATIONS AND SUPPORTS OF NEARBY STRUCTURES (CONSTRUCTED BEFORE OR AFTER TANK INSTALLATION) ARE NOT TRANSMITTED TO THE TANKS.

3.2 GRADING AND EXCAVATION

3.2.1 CONTRACTOR MUST TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EMPLOYEES WORKING IN OR NEAR A TANK EXCAVATION. THESE PRECAUTIONS SHOULD INCLUDE BUT ARE NOT LIMITED TO COMPLIANCE WITH HOWARD COUNTY STANDARD SPECIFICATIONS, INCLUDING ERECTION OF BARRICADES, SAFE USE OF LADDERS, PERSONAL PROTECTION EQUIPMENT, ETC.

3.2.2 LOCATE AND PROTECT ANY UTILITY INSTALLATIONS NEAR THE EXCAVATION BEFORE OPENING THE EXCAVATION.

3.2.3 SECURE THE WALLS OF THE EXCAVATION WITH APPROVED SHORING OR LAYBACK METHODS.

3.2.4 WATER ACCUMULATION IN THE EXCAVATION SHALL BE REMOVED IN ACCORDANCE WITH HOWARD COUNTY STANDARDS PRIOR TO INSTALLATION OF TANK BEDDING AND TANK.

3.2.5 THE EXCAVATED AREA WILL BE FREE OF ROCKS, ROOTS, OR OTHER PROTRUSIONS.

3.2.6 EXCAVATED MATERIAL SHALL BE HAULED OFF-SITE OR STABILIZED ON-SITE.

3.2.7 IF THE SOIL HAS LESS THAN 750 LBS/SQ. FT. COHESION AS CALCULATED FROM AN UNCONFINED COMPRESSION TEST; OR IN SOILS HAVING AN ULTIMATE BEARING CAPACITY OF LESS THAN 3,500 LBS/SQ. FT.; OR WHERE SOIL WILL NOT MAINTAIN A VERTICAL WALL, THE EXCAVATION MUST ALLOW A MINIMUM SPACE EQUAL TO HALF THE DIAMETER OF THE TANK BETWEEN THE EXCAVATION WALL AND BOTH THE SIDE AND THE ENDCAP OF THE TANK TO ENHANCE LATERAL RESISTANCE.

3.2.8 A REINFORCED CONCRETE SLAB MAY BE REQUIRED UNDER THE TANK AS A FOUNDATION IN THE EXCAVATION WHERE THE BOTTOM IS UNSTABLE OR IN GROUNDWATER.

3.3 PREPARATION FOR INSTALLATION

3.3.1 THE TANK INSTALLER SHALL TAKE CARE SO THAT THE TANK IS NOT DROPPED OR DAMAGED DURING DELIVERY, UNLOADING, AND HANDLING ON THE JOB SITE.

3.3.2 BEFORE UNLOADING THE TANK FROM THE TRUCK, THE TANK INSTALLER SHALL MAKE SURE THAT ALL TOOLS OR OTHER ITEMS THAT MAY DAMAGE THE TANK DURING UNLOADING ARE REMOVED FROM THE TRAILER BED.

3.3.3 BEFORE THE TANK IS UNLOADED OR RELOCATED ON THE JOB SITE (AND BEFORE PRE-INSTALLATION TESTING AT JOB SITE), THE TANK INSTALLER SHALL COMPLETE THE FOLLOWING STEPS:

3.3.3.1 VISUALLY INSPECT THE ENTIRE EXTERIOR SURFACE OF THE TANK TO MAKE SURE THAT NO SHIPPING OR HANDLING DAMAGE HAS OCCURRED. LOOK PARTICULARLY FOR HOLES, CRACKS, OR DEEP SCRAPES.

3.3.3.2 BE SURE THAT ALL EQUIPMENT USED TO LIFT THE TANK IS RATED TO HANDLE THE LOAD.

3.3.3.3 TO UNLOAD TANKS, USE THE LIFTING LUGS THAT ARE SITUATED ON TOP OF THE TANK IN ITS ROTATED POSITIONS.

3.3.3.4 DO NOT WRAP CHAIN OR CABLE AROUND THE TANK.

3.3.3.5 USE GUY ROPES TO GUIDE THE TANK WHEN NEEDED.

3.3.3.6 DO NOT ROLL THE TANK TO MOVE IT.

3.3.4 WHENEVER A TANK IS TEMPORARILY PLACED ABOVEGROUND AT THE SITE, CHOCK IT IN PLACE TO PREVENT ROLLING. TIE THE TANK DOWN IF HIGH WINDS ARE EXPECTED.

3.3.5 WHENEVER A TANK IS TEMPORARILY PLACED ABOVEGROUND AT THE SITE, ALWAYS TAKE EXTRA CARE SO WATER DOES NOT ENTER THE COLLAR. THE TANK IS TO BE ROTATED AND/OR THE COLLAR COVER.

3.4 PRE-INSTALLATION TESTING

3.4.1 PRIOR TO ANY INSTALLATION IT IS THE REQUIREMENT OF THE CONTRACTOR TO MEET OR OBTAIN ALL CERTIFICATION REQUIRED BY THE TANK MANUFACTURER.

3.4.2 TANK MUST BE RETESTED AT THE SITE PRIOR TO INSTALLATION IN ORDER TO VERIFY THE ABSENCE OF SHIPPING AND HANDLING DAMAGE.

3.4.3 THE INSTALLER SHALL VERIFY THAT ALL THE TEST EQUIPMENT IS IN GOOD WORKING CONDITION AND IS PROPERLY CONFIGURED AND CALIBRATED. TESTING SHALL BE WITNESSED BY THE HOWARD COUNTY ONSITE INSPECTOR OR OTHER REPRESENTATIVE AS APPROVED BY HOWARD COUNTY PROJECT MANAGER.

3.4.4 CONSTRUCT A TEST MANIFOLD WITH TWO AIR-SUPPLY GAUGES. EACH AIR SUPPLY GAUGE MUST HAVE A MAXIMUM FULL-SCALE READING OF 15 PSIG WITH 1/4-LB OR 1/10-LB INCREMENTS, AND A PRESSURE-RELIEF DEVICE SET AT 6 PSIG.

3.4.5 IT IS THE INSTALLER'S RESPONSIBILITY TO SELECT A THREAD SEALANT THAT IS COMPATIBLE WITH THE PRODUCT BEING STORED. SOME SEALANTS CANNOT BE USED WITH SOME PRODUCTS. REMOVE, CLEAN, AND RE-DOPE ALL FACTORY-FURNISHED TEMPORARY PLUGS WITH APPROPRIATE THREAD SEALANT. INSTALL PERMANENT PLUGS IN ALL OPENINGS WHERE PIPING WILL NOT BE INSTALLED. MAKE SURE ALL MANWAY BOLTS ARE TIGHTENED, AND FITTING PLUGS ARE PROPERLY DOPED AND SEALED.

3.4.6 WHEN CHECKING THE TANK FOR LEAKS DURING AN AIR/SOAP TEST, ROTATE THE TANK TO CHECK THE BOTTOM.

3.4.7 BEFORE ROTATING THE TANK DURING AN AIR/SOAP TEST, PLACE PROTECTIVE MATERIAL ON THE AREA ON WHICH THE TANK WILL BE ROTATED. MAKE SURE THE AREA IS FLAT AND IS FREE OF LARGE OR SHARP OBJECTS, SUCH AS ROCKS, WHICH MAY DAMAGE THE TANK.

3.4.8 ROTATE THE TANK SLOWLY AND CAREFULLY TO AVOID DEVELOPING TOO MUCH MOMENTUM. DO NOT ROTATE THE TANK MORE THAN 120 DEGREES FROM THE INITIAL STARTING POINT.

3.5 ANCHORING TANKS

3.5.1 EVERY SITE SHALL BE EQUIPPED WITH DEADMEN TO PROVIDE POSITIVE TANK ANCHORING . FAILURE TO ANCHOR A TANK WHEN REQUIRED MAY CAUSE TANK FAILURE OR DAMAGE THE TANK OR SURROUNDING PROPERTY.

3.5.2 UNLESS NOTED OTHERWISE ON THE DRAWINGS, DEADMEN USED TO PREVENT FLOTATION SHALL HAVE THE FOLLOWING CHARACTERISTICS:

3.5.2.1 DEADMEN SHALL BE REINFORCED CONCRETE BEAMS SUPPLIED BY TANK MANUFACTURER.

3.5.2.2 THE LENGTH OF DEADMEN SHALL BE EQUAL TO THE LENGTH OF THE TANK, AT A MINIMUM.

3.5.2.3 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.

3.5.3 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.

3.5.4 THE ANCHOR POINTS CAN BE MOVED AND POSITIONED TO MATCH THE ANCHOR STRAP LOCATIONS ON THE TANK.

3.5.5 CARE SHOULD BE TAKEN TO KEEP BACKFILL FROM ENTERING THE ANCHOR-POINT SLOT UNTIL FINAL ADJUSTMENT IS MADE.

3.5.6 THE DEADMEN ARE TO BE BUTTED TOGETHER WHEN MULTIPLE SECTIONS ARE USED.

3.5.7 USE ONE ANCHOR POINT PER STRAP END AND ONLY ONE STRAP PER ANCHOR POINT.

3.6 ANCHOR SLAB (GROUNDWATER INSTALLATION ONLY)

3.6.1 THE ANCHOR SLAB SHALL BE REINFORCED CONCRETE.

3.6.2 THE TOTAL LENGTH OF THE SLAB SHALL BE AT LEAST THE SAME AS THE LENGTH OF THE TANK.

3.6.3 THE MINIMUM SLAB THICKNESS IS 8 INCHES.

3.6.4 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.

3.6.5 PROVIDE A SEPARATE ANCHOR POINT FOR EACH ANCHOR STRAP.

3.6.6 ALL ANCHOR POINTS MUST BE ENGINEERED TO WITHSTAND THE TANK'S BUOYANCY FORCES.

3.6.7 WHEN USING A CONCRETE BASE SLAB, ALLOW SUFFICIENT DEPTH IN THE EXCAVATION FOR 12 INCHES OF BEDDING MATERIAL BELOW THE TANK.

3.7 ANCHOR STRAPS

3.7.1 EVENLY DISTRIBUTE LOADS BY TIGHTENING ALL ANCHOR STRAPS UNIFORMLY UNTIL THEY ARE SNUG OVER THE RIBS BUT CAUSE NO DEFLECTION OF THE TANKS.

3.8 INSTALLATION

3.8.1 USE ONLY APPROVED BACKFILL MATERIAL FREE OF INSITU SOIL.

3.8.2 PLACE GEOTEXTILE ENVELOPE IN PREPARED EXCAVATION SUCH THAT GEOTEXTILE IS FREE FROM RIPS, TEARS, OR HOLES. REPAIR DAMAGED GEOTEXTILE BY PATCHING OR STITCHING . OVERLAP SEAMS FOR GEOTECH MANUFACTURER INSTRUCTIONS.

3.8.3 PLACE DEADMEN CAREFULLY TO AVOID DAMAGING GEOTEXTILE.

3.8.4 PLACE THE TANK OR TANKS ONTO THE BED.

3.8.5 USE THE TOPS OF THE RIBS TO ESTABLISH LONGITUDINAL LEVEL. ESTABLISH LONGITUDINAL LEVEL BY PLACING THE LEVEL ACROSS THE TOP OF A FITTING OR A MANWAY.

3.8.6 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 CHECKLIST.

3.8.7 INSTALL THE ANCHORING HARDWARE AT THIS TIME.

3.8.8 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.

3.8.9 REPEAT PREVIOUS POINT WITH A SECOND 12-INCH LIFT.

3.8.10 AFTER THE SECOND LIFT OF MATERIAL HAS BEEN PLACED AND WORKED UNDER THE TANK, BRING THE BACKFILL TO THE TOP OF THE TANK IN 4 FT MAXIMUM LIFTS. FILL VOIDS AROUND TANK OR EXCAVATION.

3.9 FOR GROUNDWATER INSTALLATION, FOLLOW THE INSTALLATION PROCEDURE IN SECTION 3.8 WITH THE FOLLOWING MODIFICATIONS:

3.9.1 BEFORE PERFORMING POINT 3.8.4 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.

3.9.2 BEFORE PERFORMING POINT 3.8.4 OF THE DRY-HOLE INSTALLATION, PUMP THE WATER FROM THE HOLE AND CONTINUE PUMPING TO MAINTAIN MINIMUM WATER LEVEL DURING TANK INSTALLATION.

3.9.3 DURING POINT 3.8.5 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.

3.9.4 COVER DEPT MUST MEET MINIMUM DEPTH SPECIFIED IN SECTION 3.10

3.9.5 COMPLETELY BALLAST THE TANK ONCE BACKFILL IS EVEN WITH THE TOP OF THE TANK.

3.9.6 AFTER BACKFILL IS BROUGHT TO THE TOP OF THE TANK, TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK AS A DEFLECTION CHECK.

3.10 BURIAL DEPTH

3.10.1 TANKS SUBJECTED TO TRAFFIC LOADS (H-20 LOADS) MUST HAVE A COVER DEPTH OF AT LEAST 36 INCHES OF BACKFILL, OR 18 INCHES OF BACKFILL PLUS 6 INCHES OF REINFORCED CONCRETE OR 9 INCHES OF ASPHALT.

3.10.2 TANKS NOT SUBJECTED TO TRAFFIC LOADS MUST HAVE A COVER DEPTH OF AT LEAST 24 INCHES OF BACKFILL, OR 12 INCHES OF BACKFILL. PLUS 6 INCHES OF REINFORCED CONCRETE OR 6 INCHES OF ASPHALT.

3.10.3 IN A NON-TRAFFIC INSTALLATION, ENSURE THAT THE AREAS ABOVE THE TANKS ARE NOT SUBJECTED TO TRAFFIC OR OTHER TYPES OF LOADS, WHICH COULD CAUSE TANK DAMAGE AND RESULT IN DEATH OR SERIOUS INJURY.

3.10.4 THE MAXIMUM BURIAL DEPTH IS 40 INCHES OF COVER OVER THE TOP OF THE TANK. DEVIATION FROM THIS MAY BE PERMISSIBLE WITH PRIOR WRITTEN AUTHORIZATION FROM HOWARD COUNTY INSPECTOR.

3.10.5 IF THERE IS AN UNATTACHED MANWAY RISER, IT MUST NOT TRANSMIT LOAD FROM THE CONCRETE SLAB TO THE TANK. A MINIMUM SPACE OF 6 INCHES MUST EXIST BETWEEN THE BOTTOM OF THE RISER AND THE TOP OF THE TANK.

3.10.6 TRAFFIC LOADS FROM THE TOP SLAB MUST NOT BE TRANSMITTED TO AN ATTACHED SUMP OR RISER. A MINIMUM SPACE OF 3 INCHES MUST EXIST BETWEEN THE RISER OR SUMP AND THE SLAB.

3.11 FITTINGS INSTALLATION

3.11.1 THE DRAFT CONNECTION SHALL BE LOCATED 15 FEET OR LESS FROM THE EDGE OF THE PARKING SURFACE OR CURB LINE. THE DRAFT CONNECTION OPENING SHALL BE TURNED FACING DIRECTLY TOWARD THE ROAD SURFACE.

3.11.2 TOTAL ELEVATION FROM THE BOTTOM OF THE SUCTION PIPE TO THE CENTERLINE OF THE DRAFT CONNECTION SHALL NOT EXCEED 15 FEET ZERO INCHES. THIS DIMENSION SHALL BE MINIMIZED AS MUCH AS POSSIBLE TO REDUCE HEAD LOSS, WHILE MAINTAINING CORRECT DEPTH OF COVER OVER TANK, PER MANUFACTURER'S SPECIFICATIONS.

3.11.3 THE DRAFT CONNECTION SHALL BE FIXED AT A HEIGHT OF 18 INCHES ABOVE FINISHED GRADE OF THE PULLOFF PAD, TO THE CENTERLINE OF THE FITTING.

3.11.4 THE FILL CONNECTION SHALL BE FIXED AT A HEIGHT OF 18 INCHES ABOVE FINISHED GRADE OF THE PULLOFF PAD, TO THE CENTERLINE OF THE FITTING.

3.12 BACKFILLING TO GRADE

3.12.1 CONTINUE TO TAKE SAFETY MEASURES (SUCH AS PLACING BARRICADES) AROUND THE EXCAVATION SITE UNTIL INSTALLATION IS COMPLETED.

3.12.2 WHEN THE TANK HAS BEEN SET, TESTED AND BACKFILLED, AND ALL PIPING AND VENTING HAS BEEN COMPLETED, ADD THE BALANCE OF THE BACKFILL MATERIAL.

3.12.3 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.

3.12.4 THE BACKFILL MATERIAL SPECIFIED IN SECTION 2.6 MUST BE USED TO COMPLETELY FILL EXCAVATION.

3.12.5 THE INSTALLATION SHALL MEET ALL THE REQUIREMENTS OF MINIMUM COVER AS SPECIFIED IN SECTION 3.10.

AS-BUILTS DEC 28 2015

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS — DATE 7/21/14
CHIEF, BUREAU OF UTILITIES — DATE 7/21/14
CHIEF, BUREAU OF ENGINEERING — DATE 7/18/2014
CHIEF, UTILITY DESIGN DIVISION — DATE 7/17/14

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410.265.9500
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STATE OF MARYLAND — THOMAS W. DALRYMPLE — No. 21065 — REGISTERED PROFESSIONAL ENGINEER

DES: LAL
DRN: RLI
CHK: TND
DATE: 07/2014

BY	NO.	REVISIONS	DATE

SPECIFICATIONS 1

600' SCALE MAP NO. 15 BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK
FOR FIRE SUPPRESSION
F-5972 GS-4908

ELECTION DISTRICT NO. 4 — HOWARD COUNTY, MARYLAND

SCALE: SHOWN

SHEET 2 OF 8

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Last Saved: Jul 16, 2014 - 11:23am
Last Saved By: Q:\GDOCS\781\CAD\Civil\Frederick Border.dwg
XREFs---> Q:\GDOCS\781\CAD\Civil\Frederick Border.dwg

3.12.6 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.

3.12.7 COMPLETE THE TANK INSTALLATION CHECKLIST.

4. TESTING AND ACCEPTANCE

4.1 GENERAL

4.1.1 THE TANK SHALL BE OPERABLE WITH A RATE OF FLOW (FIRE FLOW) OF 1000 GALLONS PER MINUTE (GPM) MINIMUM USING A FIRE DEPARTMENT PUMPER OPERATING UNDER NORMAL CONDITIONS. CONTACT (4100 313-6300 TO SCHEDULE THE TEST.

4.1.2 AN OPERATIONAL FLOW TEST SHALL BE PERFORMED WHEN CONSTRUCTION IS COMPLETED, IN ACCORDANCE WITH THE APPROVED PROCEDURES. THE TEST SHALL BE CONDUCTED BY THE FIRE DEPARTMENT AND THE INSTALLER. WHEN TESTING HAS BEEN COMPLETED, THE INSTALLER SHALL REFILL THE TANK TO FULL CAPACITY AS REQUIRED. ONCE ACCEPTED, FURTHER USE OF THE TANK SHALL BE LIMITED TO FIREFIGHTING OPERATIONS AND ROUTINE TESTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING WATER FOR TESTING AND TO FILL TANK.

4.1.3 FINAL APPROVAL WILL BE MADE PER NOTIFICATION IN WRITING BY THE HOWARD COUNTY FIRE OFFICIAL.

4.1.4 ALL TESTING SHALL BE WITNESSED BY THE HOWARD COUNTY INSPECTOR OR OTHER REPRESENTATIVE AS APPROVED BY THE HOWARD COUNTY PROJECT MANAGER.

4.2 POST INSTALLATION TESTING

4.2.1 REMOVE ALL TEMPORARY SERVICE-FITTING PLUGS.

4.2.2 RE-DOPE FITTINGS AND INSTALL PLUGS IN ALL OPENINGS, EXCEPT ONE SERVICE FITTING (NEEDED FOR THE TEST MANIFOLD).

4.2.3 INSTALL THE TEST MANIFOLD IN THE OPEN SERVICE FITTING. CONNECT THE PRESSURE SOURCE TO THE TEST MANIFOLD.

4.2.4 PRESSURIZE THE TANK TO 5 PSIG/MAXIMUM. ALLOW THE PRESSURE TO STABILIZE BY ADDING OR REMOVING AIR AS NECESSARY, AS PER TANK MANUFACTURER SPECIFICATION.

4.2.5 CLOSE THE AIR-SUPPLY VALVE ON THE TEST MANIFOLD. DISCONNECT THE AIR-SUPLLY LINE.

4.2.6 SOAP THE ENTIRE EXTERIOR OF THE TANK, CHECKING FOR LEAKS. WATCH FOR ACTIVE AIR BUBBLES, WHICH INDICATE A LEAK. PAY SPECIAL ATTENTION TO FITTINGS AND MANWAYS.

4.2.7 MONITOR THE PRESSURE FOR ONE HOUR. 5 PSIG SHALL BE MAINTAINED.

4.2.8 WHEN THE TEST IS COMPLETE, CAREFULLY RELEASE THE AIR PRESSURE FROM THE TANK BY OPENING THE AIR-SUPPLY VALVE.

4.2.9 WHEN AIRFLOW STOPS, REMOVE THE TEST MANIFOLD.

4.2.10 REPLACE THE PROTECTIVE COVERS IN THE SERVICE FITTINGS.

4.3 DEFLECTION MEASUREMENTS

4.3.1 OBTAIN THE DEFLECTION MEASUREMENTS BY TAKING A MINIMUM OF TWO MEASUREMENTS OF THE INTERNAL DIAMETER OF THE TANK.

4.3.2 MEASURING THE INTERNAL DIAMETER OF THE TANK CAN BE PERFORMED BY USING A DIPSTICK OR USING A TAPE MEASURE, ETC.

4.3.3 TAKE THE INITIAL INTERNAL DIAMETER MEASUREMENT BEFORE BACKFILLING THE TANK, AND RECORD THIS MEASUREMENT ON THE TANK INSTALLATION CHECKLIST. IN A GROUNDWATER INSTALLATION, TAKE THIS MEASUREMENT BEFORE THE TANK IS PLACED IN THE EXCAVATION HOLE.

4.3.4 TAKE OTHER DIAMETER MEASUREMENTS DURING THE BACKFILLING PROCESS TO DETERMINE WHETHER VERTICAL DEFLECTION CONTINUES TO BE WITHIN THE LIMITS SPECIFIED BY THE TANK MANUFACTURER.

4.3.5 TAKE THE FINAL INTERNAL DIAMETER MEASUREMENT WHEN THE TANK HAS BEEN BACKFILLED TO SUBGRADE.

4.3.6 TO GET THE DEFLECTION MEASUREMENT AT ANY TIME, SUBTRACT THE CURRENT INTERNAL DIAMETER MEASUREMENT FROM THE INITIAL INTERNAL DIAMETER MEASUREMENT.

4.3.7 COMPARE THIS MEASUREMENT TO THE ALLOWABLE DEFLECTIONS PROVIDED BY THE TANK MANUFACTURER AND RECORD THE INFORMATION ON THE TANK INSTALLATION CHECKLIST.

4.3.8 VERTICAL DEFLECTION IN EXCESS OF ALLOWABLE DEFLECTION INDICATES IMPROPER INSTALLATION AND VOIDS THE TANK WARRANTY.

5. ACCESSIBILITY SIGNS AND SURROUNDING FEATURES

5.1 A PULLOFF SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS. THE REQUIREMENTS FOR EACH SITE WILL BE EVALUATED AND APPROVED BY THE FIRE OFFICIAL PRIOR TO START OF WORK. DETAILS SHALL BE INDICATED AS APPLICABLE. THE EDGE OF PAVEMENT SHALL BE MIN. 8 FT FROM EDGE OF SLAB.

5.2 NO OBSTRUCTIONS SHALL IMPEDE ACCESS TO TANK FITTINGS. THE FACILITY SHALL REMAIN ACCESSIBLE ON A YEAR-ROUND BASIS.

5.3 LANDSCAPING, BRUSH, AND TREES SHALL BE TRIMMED AWAY FROM FITTINGS. OVERHANGING BRANCHES SHALL BE TRIMMED AWAY AT A MINIMUM OF 12 FEET OVERHEAD. GRASS AND WEEDS SHALL BE CUT AS NEEDED.

5.4 PROTECTIVE DEVICES SHALL BE USED AS APPLICABLE TO PREVENT DAMAGE TO THE FITTINGS AND TO PROVIDE SAFETY TO OPERATORS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

A. BOLLARDS
B. GUARD RAILS
C. FENCING
D. WALKWAYS
E. CURBS
F. ANY OTHER BARRIERS/DEVICES AS DETERMINED BY THE FIRE OFFICIAL

5.5 A REFLECTIVE SIGN SHALL BE POSTED WHICH CLEARLY INDICATES TANK FULL CAPACITY AND IDENTIFICATION (ID) NUMBER. AN IDENTIFICATION NUMBER SHALL BE ASSIGNED BY THE COUNTY AND POSTED AT THE SITE. SIGNS SHALL BE PLACED ON ALL MAJOR ROADS, INDICATING THE DISTANCE AND DIRECTION TO TANK WITHIN A 2,500 FOOT RADIUS. FINAL PLACEMENT OF SIGNS SHALL BE APPROVED BY MARTIN LEPORE @ 410-313-0513.

5.6 AN APPROVED NO PARKING SIGN SHALL BE PAINTED WITH EXTERIOR-GRADE ENAMEL. COLOR SHALL BE YELLOW UNLESS OTHERWISE SPECIFIED, WITH THE EXCEPTION OF THE DRAFT CONNECTION, WHICH SHALL BE PAINTED RED.

5.7 ALL PLANTINGS SHALL BE INSTALLED AND MAINTAINED PER HOWARD COUNTY STANDARDS.

6. OPERATING GUIDELINES

6.1 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.

6.2 NEVER OVERFILL THE TANK.

6.3 EACH TIME THE TANK IS FILLED, THE OWNER/OPERATOR SHALL MAKE SURE THE TANK IS PROPERLY VENTED TO PREVENT PUTTING TANK UNDER PRESSURE.

6.4 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.

6.5 OWNER/OPERATOR SHALL NOTIFY WHOEVER FILLS THE TANK THAT IT HAS OVERFILL PROTECTION, WHICH REDUCES THE TANK'S CAPACITY.

6.6 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 INSTRUCTION OR GUIDELINES PROVIDED BY THE INSTALLER AND MANUFACTURER OF THE OVERFILL PROTECTION DEVICE TO DETERMINE HOW MUCH ADDITIONAL PRODUCT THE TANK CAN HOLD.

6.7 THE MAXIMUM TEMPERATURE FOR STORING NON-POTABLE WATER IS 150° F.

6.8 POTABLE WATER IS TO BE STORED AT AMBIENT TEMPERATURE.

7. REFERENCES

7.1 PUBLISHED STANDARDS

7.1.1 NFPA 1963 - STANDARD FOR FIRE HOSE SCREW THREADS

7.1.2 NFPA 1142 - STANDARD FOR WATER SUPPLIES FOR SUBURBAN AND RURAL FIRE PROTECTION

7.1.3 NFPA 1141 - STANDARD FOR FIRE PROTECTION IN PLANNED BUILDING GROUPS

7.1.4 ASTM C33 - STANDARD SPECIFICATION FOR CONCRETE AGGREGATES

7.2 OTHER REFERENCED DOCUMENTS

7.2.1 THE CODE OF PUBLIC LOCAL LAWS AND ORDINANCES OF HOWARD COUNTY MARYLAND, CHAPTER 112.

7.2.2 UNDERGROUND TANKS & DRY FIRE HYDRANTS MAINTENANCE AND INSPECTION, CHIEF GREG DODS / REGIONAL FIRE PROTECTION COMMITTEE, 2003.

AS-BUILTS DEC 28 2015

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS 7/21/14 DATE
CHIEF, BUREAU OF ENGINEERING acting for TEB 7/18/14 DATE
CHIEF, BUREAU OF UTILITIES 7/21/14 DATE
CHIEF, UTILITY DESIGN DIVISION PSD 7/17/14 DATE

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STATE OF MARYLAND — THOMAS N. DALLAPALU — No. 10966 — REGISTERED PROFESSIONAL ENGINEER

DES: LAL
DRN: RLI
CHK: TND
DATE: 07/2014

BY	NO.	REVISIONS	DATE

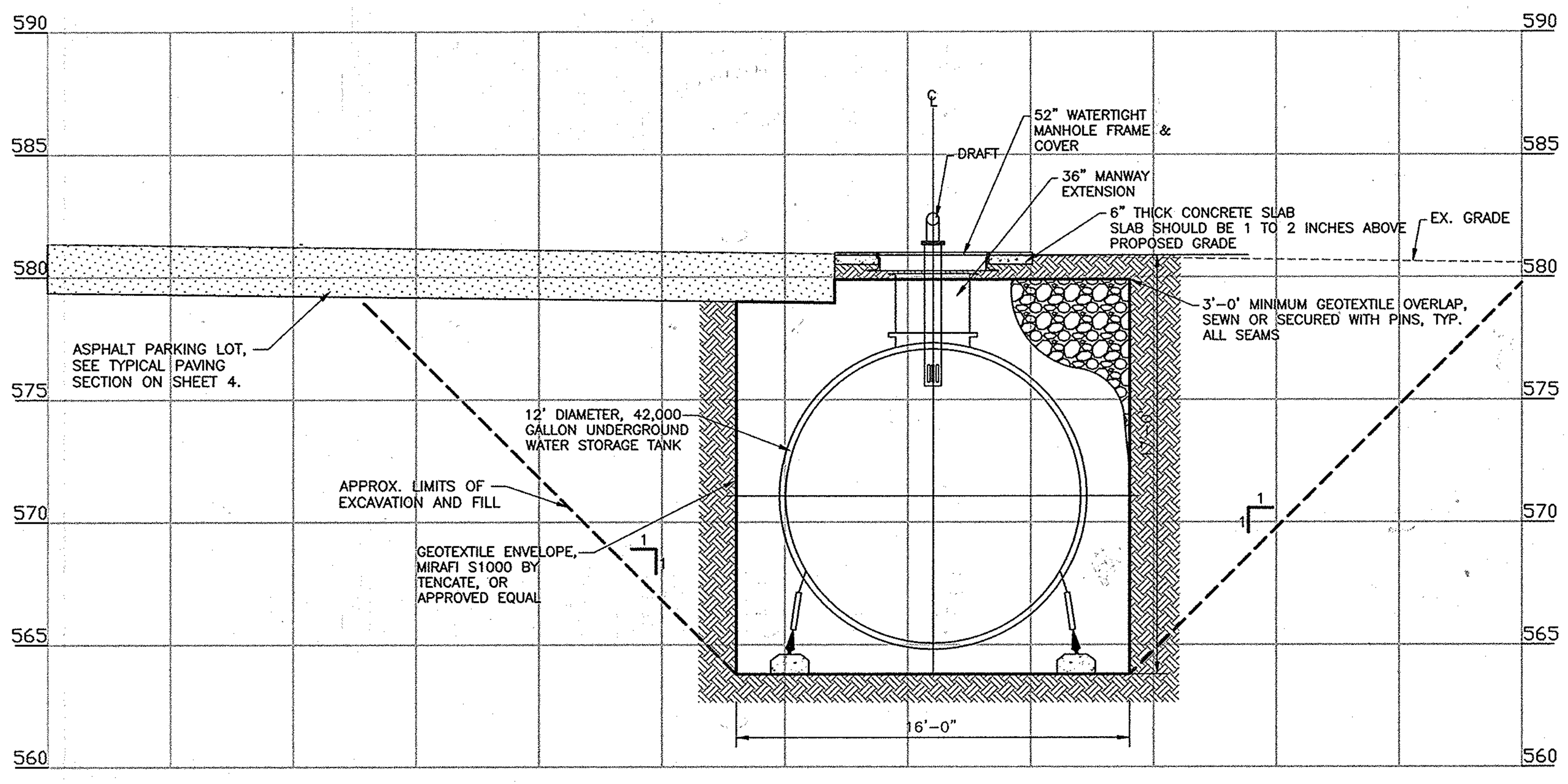
SPECIFICATIONS - 2

600' SCALE MAP NO. 15 BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK
FOR FIRE SUPPRESSION
F-5972 65-4908

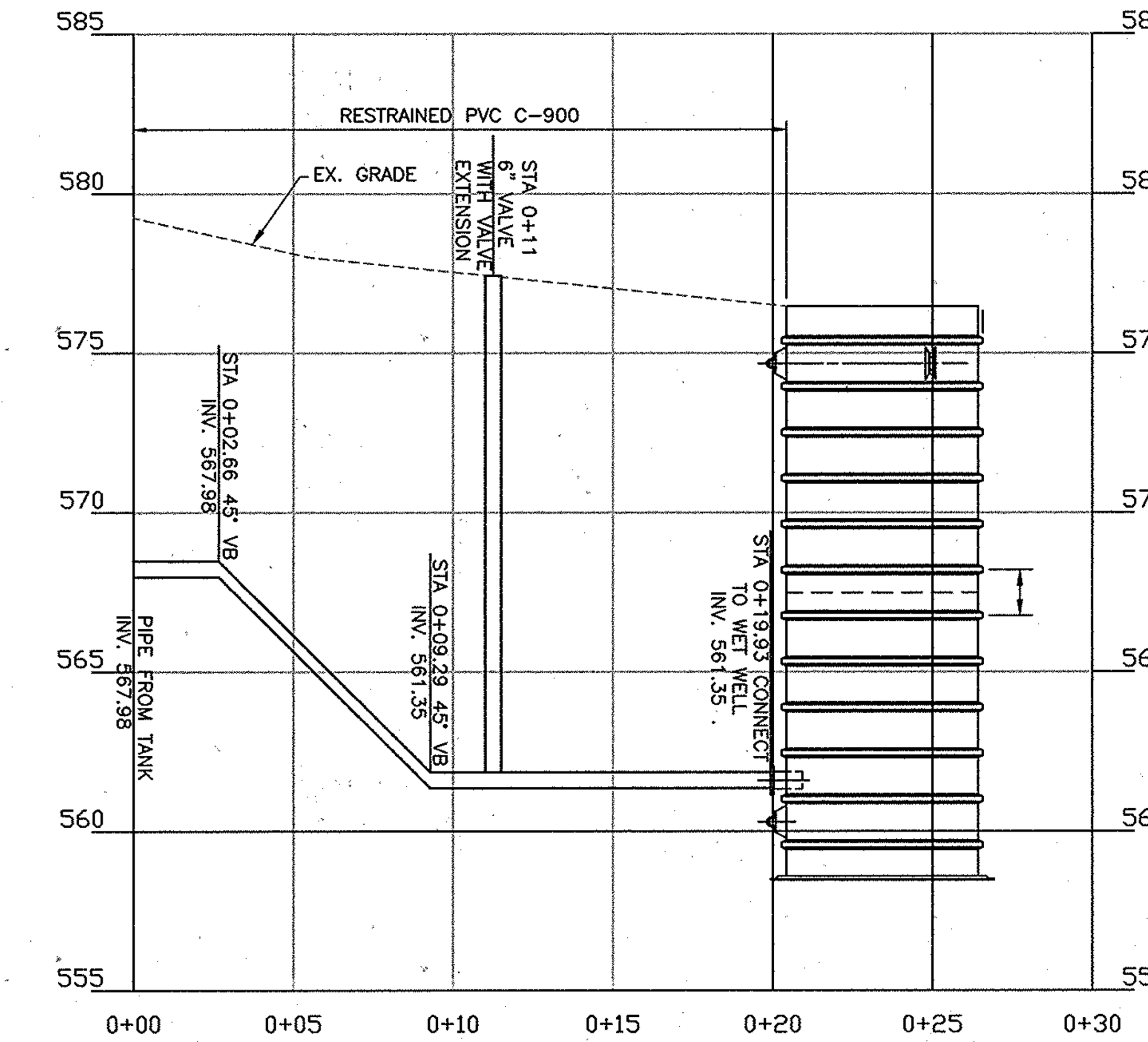
ELECTION DISTRICT NO. 4 **HOWARD COUNTY, MARYLAND**

SCALE: SHOWN



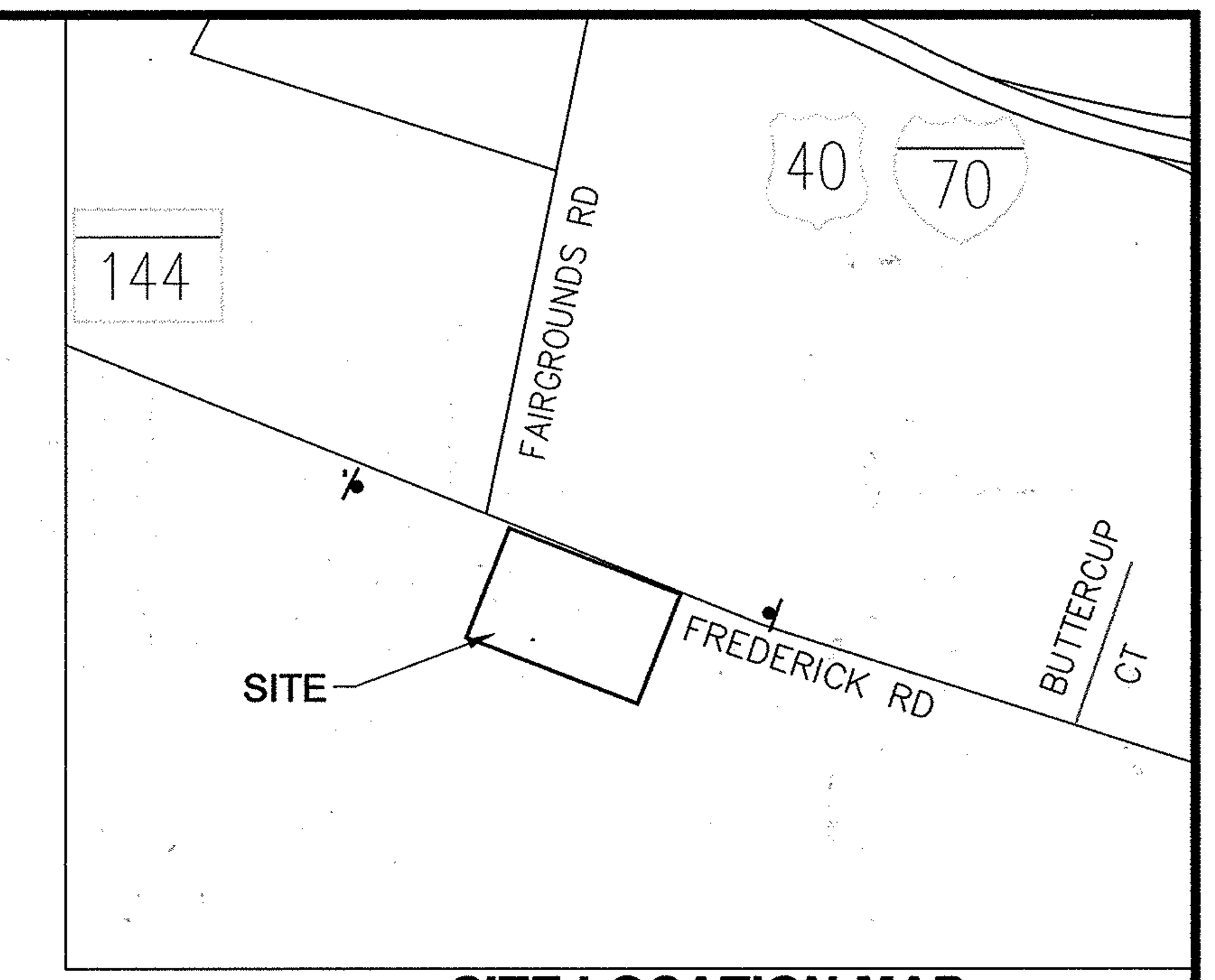
PROFILE

SCALE : HORIZ. 1" = 5'
VERT. 1" = 5'



PROFILE

SCALE : HORIZ. 1" = 5'
VERT. 1" = 5'



SITE LOCATION MAP

SCALE : 1" = 600'

ADC MAP REFERENCE: HOWARD COUNTY MAP 4813, GRID F2

HORIZONTAL & VERTICAL CONTROL

COORDINATES & BEARINGS SHOWN HEREON ARE BASED ON HOWARD COUNTY CONTROL STATIONS AND REPRESENT THE MARYLAND STATE PLANE COORDINATE SYSTEM AS DERIVED FROM NORTH AMERICAN DATUM (NAD83/07) FOR HORIZONTAL AND NORTH AMERICAN VERTICAL DATUM (NAVD88) FOR VERTICAL DATUM. DEWBERRY UTILIZED THE REAL TIME NETWORK (RTN) "KEYNETGPS" OPERATED BY TRIMBLE TO ACQUIRE MEASUREMENTS FOR THE SURVEY CONTROL SET AT THE SUBJECT SITES FOR THE PROJECT AS WELL AS THE CONTROL NOTED BELOW. THE "KEYNETGPS" NETWORK PROVIDES FOR HIGH ACCURACY POSITIONING THROUGHOUT THE GEOGRAPHIC REGION. THE USE OF AN RTN FOR GEODETIC CONTROL INVOLVES THE COLLECTION AND USE OF ATMOSPHERIC, TROPOSPHERIC, AND OTHER CORRECTION FROM MULTIPLE CONTROL POINTS SURROUNDING THE PROJECT SITE, RESULTING IN HIGH PRECISION POSITIONAL DATA. THE CONTROL POINTS OF THIS NETWORK ARE NATIONAL GEODETIC SURVEY CONTINUOUSLY OPERATING REFERENCE STATIONS OR NGS CORS, AND THE RESULTING MEASUREMENT VECTORS BETWEEN THE GPS RECEIVER AND NETWORK ARE DIRECT MEASUREMENTS TO EXISTING, HIGH ORDER PHYSICAL MONUMENTATION WHICH HAVE BEEN VETTED, MAINTAINED, AND DISTRIBUTED BY THE NATIONAL GEODETIC SURVEY. THE FOLLOWING HOWARD COUNTY CONTROL STATIONS WERE USED FOR THIS PROJECT:

HOWARD COUNTY GEODETIC SURVEY CONTROL

NO.	NORTHING (FT)	EASTING (FT)	ELEV (FT)
45CA	540070.9730	1327702.7218	426.15
42IB	542366.9133	1363075.9515	282.35
08AB	610602.2863	1297911.2033	579.72
16E1	593251.0015	1340192.6876	463.815

UTILITY NOTE:

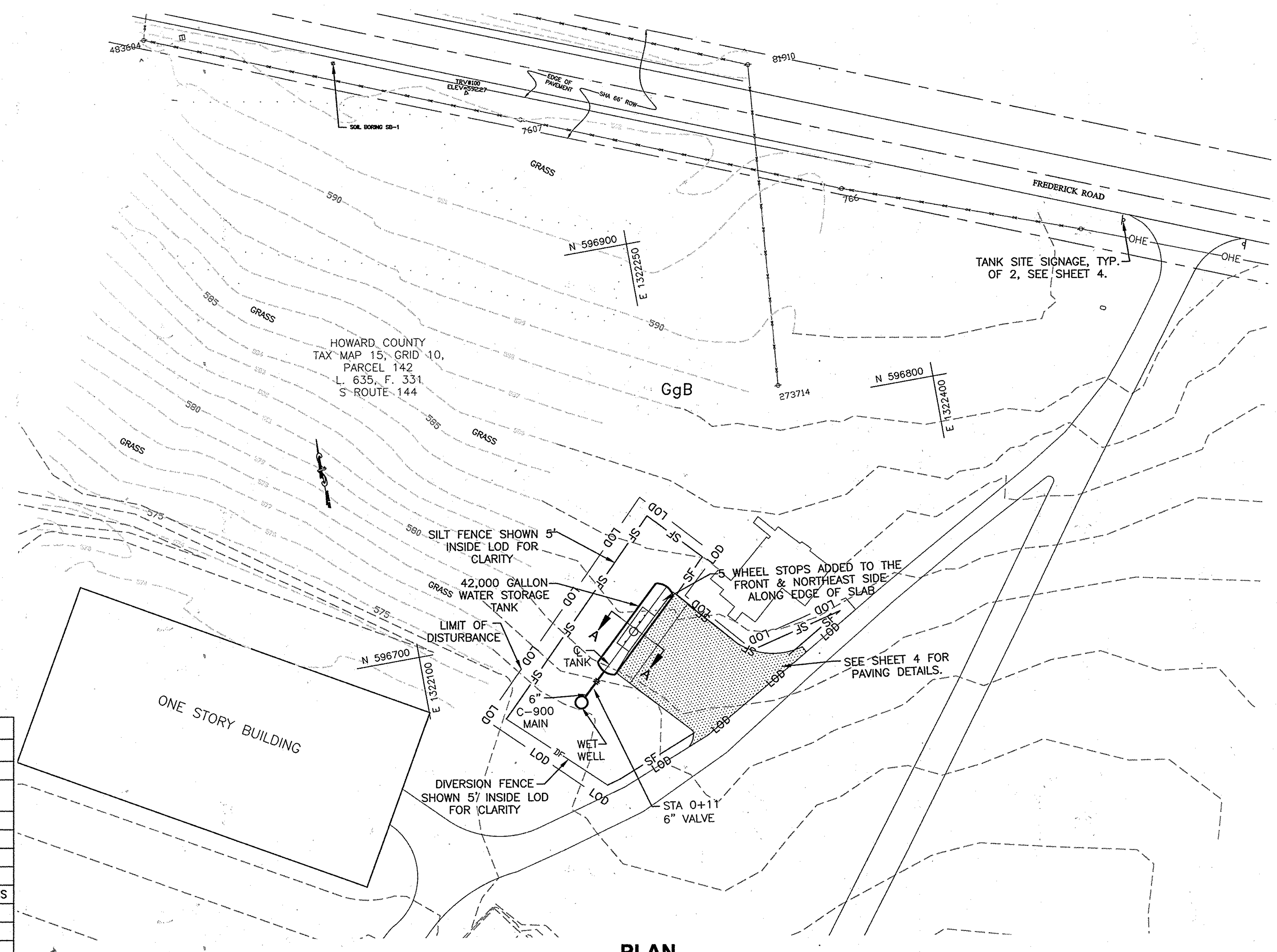
1. THE UNDERGROUND UTILITY LOCATIONS SHOWN HEREON HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, MISS UTILITY, AND/OR EXISTING DRAWINGS. THE ENGINEER MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE ENGINEER FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE INDICATED ON THE AFOREMENTIONED INFORMATION OBTAINED BY THE ENGINEER.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING "MISS UTILITY" 48 HOURS PRIOR TO CONSTRUCTION 1-800-257-7777.
3. HOWARD COUNTY SHALL TAKE ACTION TO RELOCATE THE TANK OR UTILITY.
4. ANY DELAY OR CLAIM RELATED TO UTILITY LOCATIONS WILL NOT BE ACCEPTED BY HOWARD COUNTY.
5. THE CONTRACTOR SHALL PROTECT AND RELOCATE UTILITIES, VERTICALLY AND/OR HORIZONTALLY, IN COORDINATION WITH THE UTILITY OWNER IN THE VICINITY OF THE TANKS AS NEEDED.

ASBUILT STAKEOUT TABLE

DESCRIPTION	NORTHING	EASTING	ELEVATION
TRAV 100	596996.19	1322179.51	592.27
TRAV 101	597200.03	1321801.19	590.97
BORING SB-1	597024.89	1322111.65	593.01
NW CORNER CONCRETE SLAB	596704.99	1322223.60	581.00
NE CORNER CONCRETE SLAB	596699.05	1322229.14	581.00
SW CORNER CONCRETE SLAB	596688.46	1322206.49	581.00
SE CORNER CONCRETE SLAB	596682.73	1322211.99	581.00
CENTER OF TANK MANHOLE	596692.91	1322216.47	581.00
6 INCH VALVE	596670.14	1322191.76	577.50
WET WELL	596658.22	1322179.72	576.00

ASBUILT QUANTITIES TABLE

ITEM	UNIT	ESTIMATE	AS-BUILT	MANUFACTURER
MOBILIZATION/DEMOBILIZATION	L.S.	1	1	NA
42,000 GALLON DRAFT WATER STORAGE TANK, COMPLETE IN PLACE, WITH WET WELL, 6" C-900 PIPING & 6" VALVE	L.S.	1	1	TANKS DIRECT
ASPHALT PAVING (FULL DEPTH)	S.F.	7,390	3,704	NA
CONCRETE SLAB	S.F.	160	190	NA
CLEARING AND GRUBBING	L.S.	1	1	NA
SIGN, SITE IDENTIFICATION	EA.	2	2	NA
SIGN, ADVANCE	EA.	1	1	SHANNON-BAUM SIGNS
SILT FENCE	L.F.	516	516	NA
DIVERSION FENCE	L.F.	66	66	NA
SITE RESTORATION	S.F.	13,810	13,810	NA
NAME OF UTILITY CONTRACTOR: KEYS MATERIALS & UTILITIES, 2705 MYSTIC WOODS CT, MT. AIRY, MD 21771				



PLAN

SCALE : HORIZ. 1" = 40'

GENERAL NOTES:

1. FOR GENERAL TANK INSTALLATION, PIPING, SPECIFICATIONS, AND DETAILS REFER TO SHEETS 1-3, 5-7, INCLUSIVE.
2. ALL TREES AND PLANTINGS INTERFERING WITH EXCAVATION SHALL BE REMOVED AND REPLACED WITH VIABLE TREES AND SIMILAR SPECIES AS INDICATED ON DRAWINGS. TREES AND PLANTINGS THAT ARE NOT CALLED OUT ON THE PLANS AND NEED TO BE REMOVED FOR CONSTRUCTION SHALL BE IDENTIFIED TO THE HOWARD COUNTY INSPECTOR PRIOR TO REMOVAL.
3. THE CONTRACTOR SHALL TAKE ALL REASONABLE MEANS POSSIBLE TO PROTECT EXISTING TREES AND PLANTINGS WITHIN THE CONSTRUCTION AREA AND SHALL REPLACE IN KIND THOSE DAMAGED AS DIRECTED ON THE DRAWING.
4. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL MANUAL.
5. CONTRACTOR IS RESPONSIBLE FOR ACQUIRING ALL STAGING AREAS TO BE USED DURING CONSTRUCTION.
6. THERE SHALL BE NO STOCKPILING OF EXCAVATED MATERIAL ON THE WORK SITE.
7. ALL SURVEY STAKEOUT IS THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL TANK EXCAVATIONS MUST MEET OSHA REQUIREMENTS.
9. CONTRACTOR TO CONFIRM FINAL SIGN LOCATIONS WITH MARTIN LAPORE@410-313-0513.
10. 6" WATER MAIN WILL BE PVC C-900 AND INSTALLED IN ACCORDANCE WITH HOWARD COUNTY, VOLUME IV, DESIGN MANUAL, STANDARD SPECIFICATIONS, AND STANDARD DETAILS.

SITE ANALYSIS

Total Area of Site	0.32 Acres
Area Disturbed	0.32 Acres
Area to be roofed or paved	0.03 Acres
Area to be Vegetatively Stabilized	0.29 Acres
Total Cut	1338 Cu. Yds.
Total Fill	1053 Cu. Yds.
Offsite waste/borrow area location	To be determined by contractor.

12-28-15
ASBUILT

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS — DATE 1/13/15
CHIEF, BUREAU OF ENGINEERING — DATE 1/13/15
CHIEF, BUREAU OF UTILITIES — DATE 1/1/15
CHIEF, UTILITY DESIGN DIVISION — DATE 1/1/15

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STATE OF MARYLAND — PROFESSIONAL ENGINEER

DES: LAL		
DRN: RLI		
CHK: TND		
DATE: 07/2014	BY / NO.	REVISIONS / DATE

RT# 105 12985 FREDERICK ROAD (MD ROUTE 144), WEST FRIENDSHIP, MD 21794

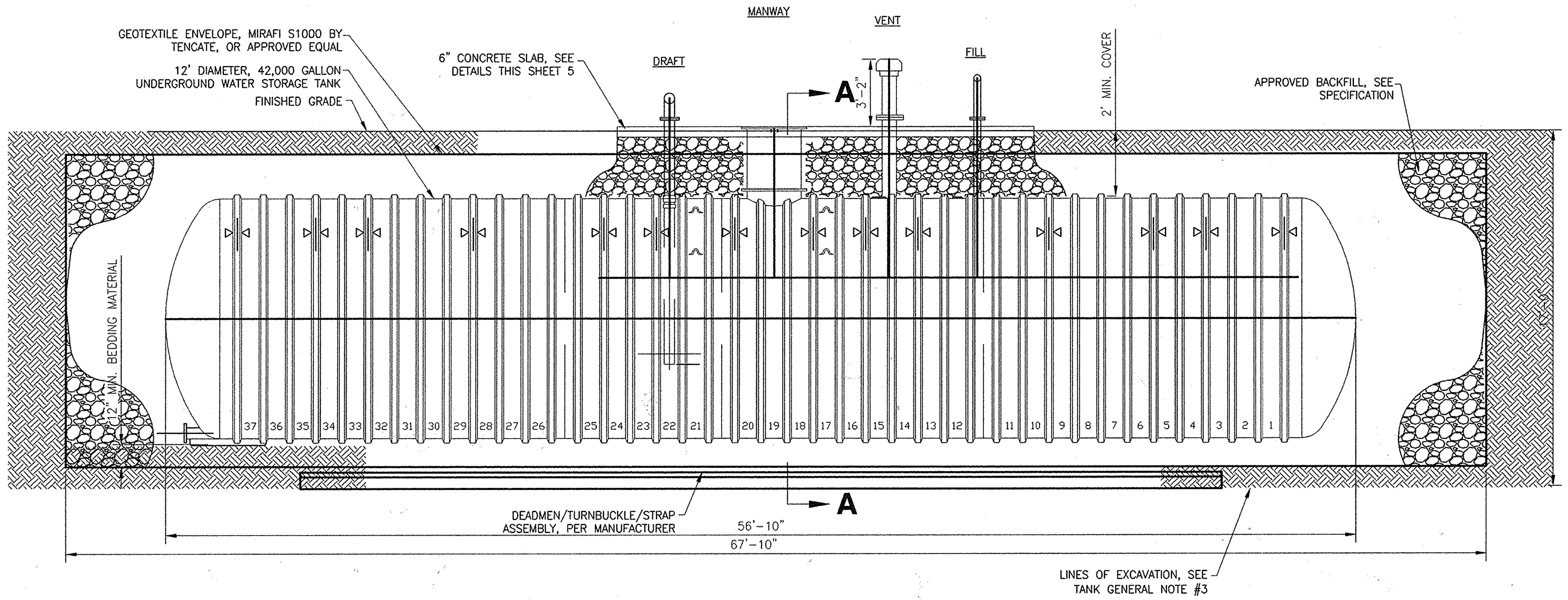
600' SCALE MAP NO. 15 — BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK FOR FIRE SUPPRESSION

F-5972 CS-4908

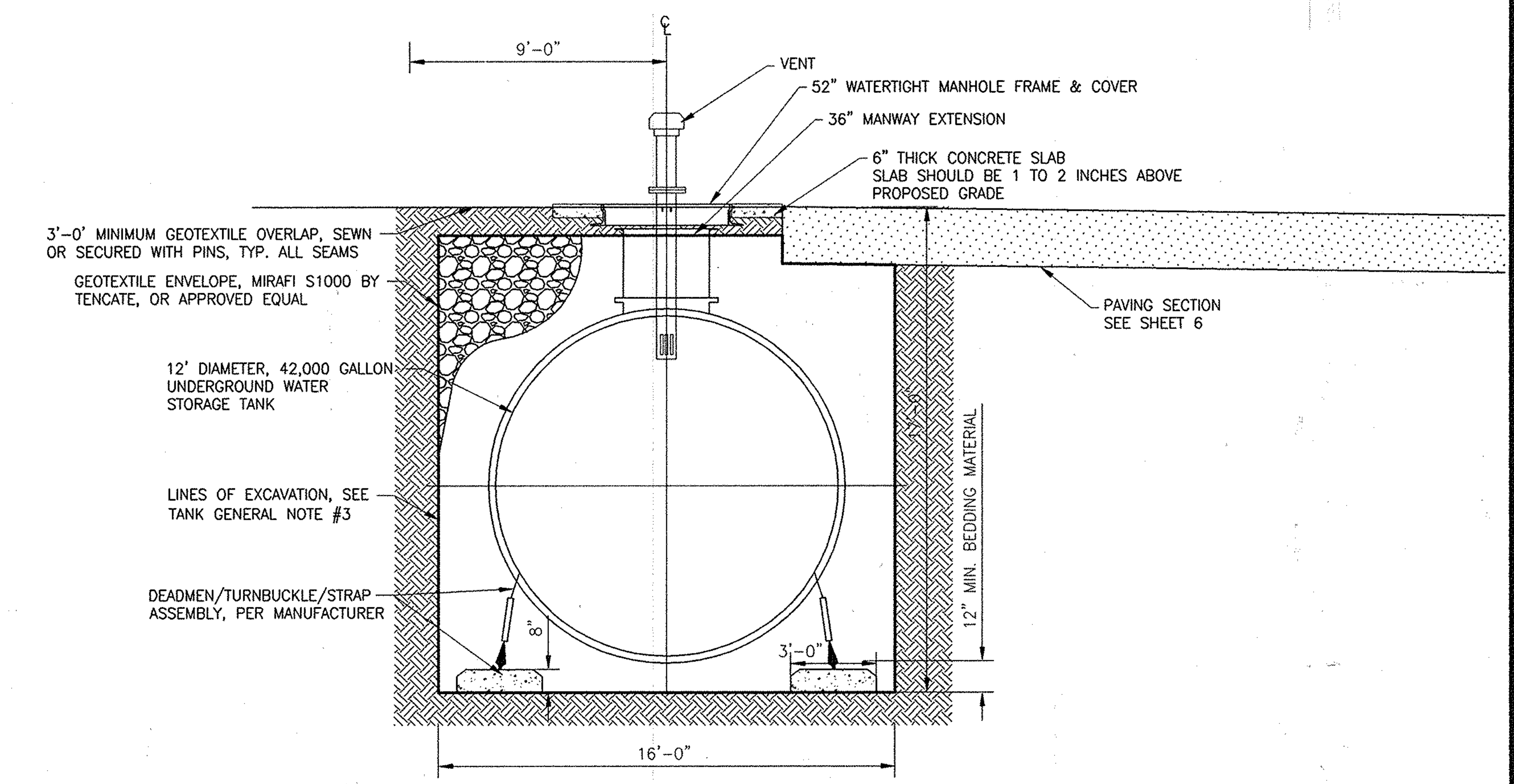
ELECTION DISTRICT NO. 4 — HOWARD COUNTY, MARYLAND

SCALE: SHOWN



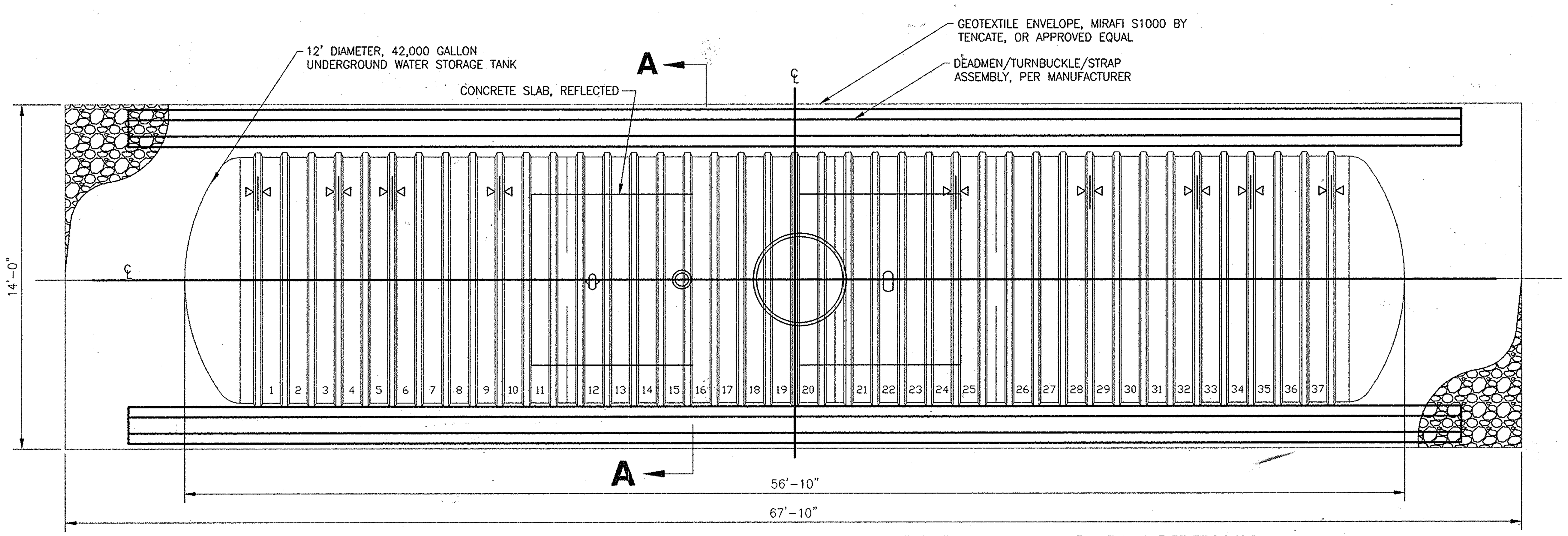
ELEVATION: 42,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK

SCALE 1/4" = 1'-0"



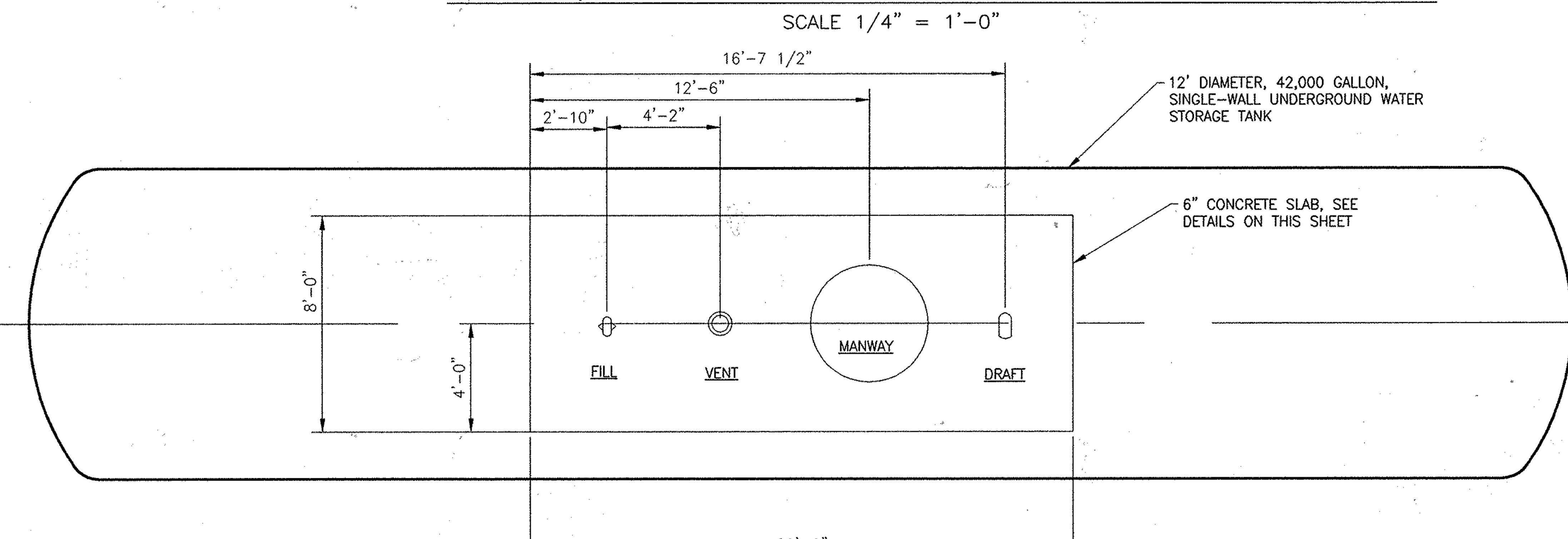
SECTION A-A

SCALE 1/4" = 1'-0"



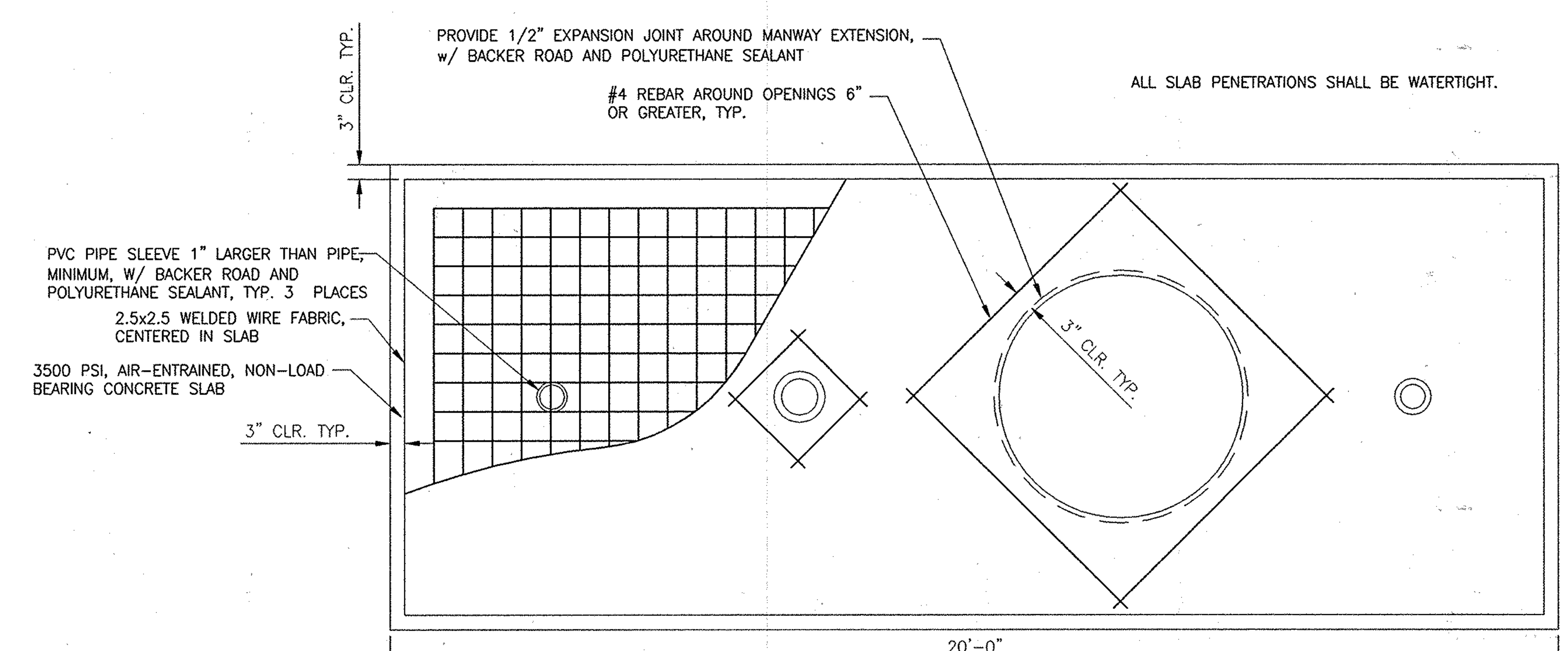
PLAN: 42,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK

SCALE 1/4" = 1'-0"



DETAIL: CONCRETE SLAB

SCALE 1/4" = 1'-0"



DETAIL: CONCRETE SLAB REINFORCEMENT

SCALE 1/2" = 1'-0"

AS-BUILTS DEC 28 2015

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

7/2/14 — DIRECTOR OF PUBLIC WORKS — DATE
acting for TEB 7/18/14 — CHIEF, BUREAU OF ENGINEERING — DATE
7/2/14 — CHIEF, BUREAU OF UTILITIES — DATE
PSD 7/17/14 — CHIEF, UTILITY DESIGN DIVISION — DATE

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BALTIMORE, MD 21244-2662
410.265.9500
FAX: 410.265.8875

STATE OF MARYLAND — THOMAS N. DALLAPALU — No 10966 — REGISTERED PROFESSIONAL ENGINEER

DES:	LAL
DRN:	RLI
CHK:	TND
DATE:	07/2014

BY	NO.	REVISIONS	DATE

GENERAL DETAILS 1

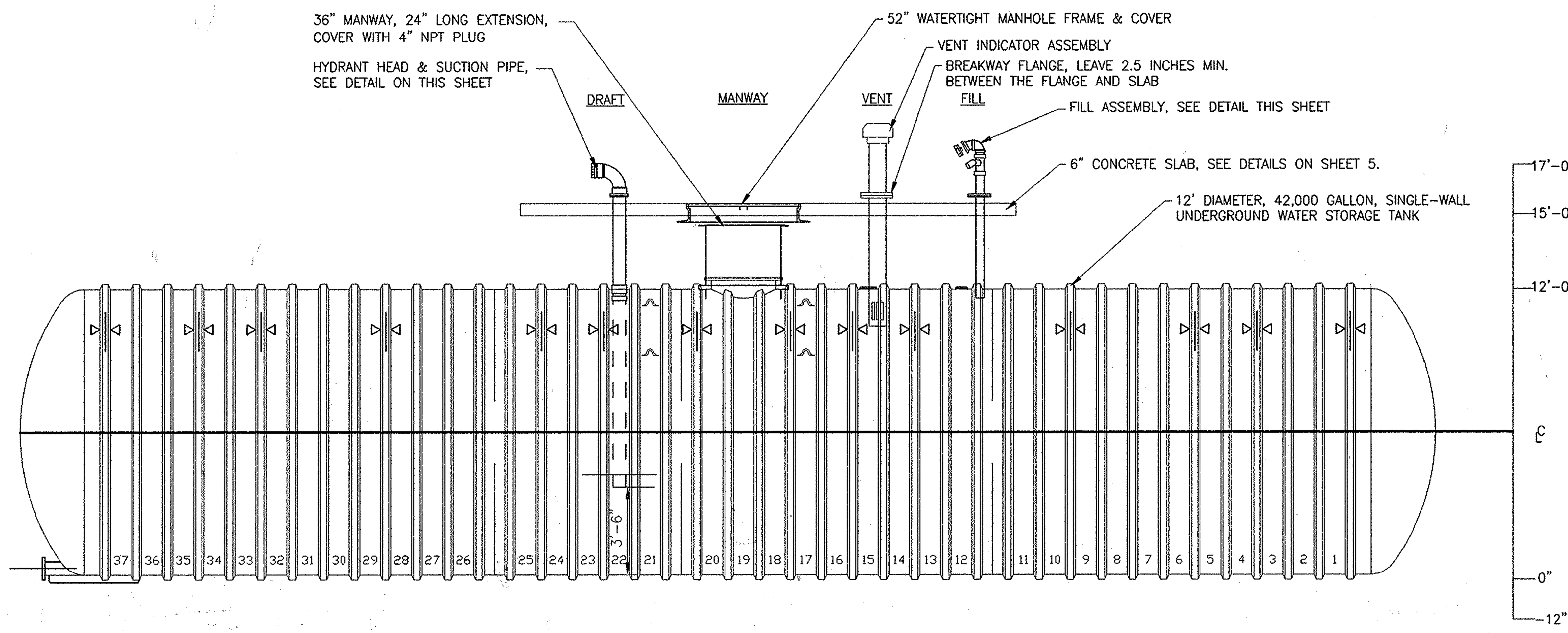
600' SCALE MAP NO. 15 — BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK
FOR FIRE SUPPRESSION
F-5972 65-4908

ELECTION DISTRICT NO. 4 — HOWARD COUNTY, MARYLAND

SCALE: SHOWN

SHEET 5 OF 8



SECTION THROUGH 42,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK

SCALE 1/4" = 1'-0"

TABLE 1 – CONNECTION & FITTING SCHEDULE

FITTING	CONNECTION DESCRIPTION	DESCRIPTION	SPECIFICATION	CENTER DRAFT	
				SECTION*	OFFSET**
DRAFT	6" 6NH FEMALE SWIVEL (SCH 40 BLACK)	6" NPT FULL COUPLING	2.3.2	22	29'-4 1/2"
FILL	4" SCH 40 BLACK (2) 2 1/2" FEMALE SIAMESE AND (1) 4" STORZ	4" NPT FULL COUPLING	2.3.4	12	14'-10 1/2"
VENT	8" PVC	10" CLASS 150 FLANGE	2.3.3	15	19'-0"
MANWAY	36" DIAMETER, 52" COVER	36" MANWAY, 24" EXTENSION, 4" NPT COUPLING AND PLUG	2.2.7	18-20	24'-4 1/2"

* SEE ELEVATION ON SHEET 5 FOR SECTION NUMBER

** OFFSET FROM CENTER OF SECTION 1

TABLE 2 – DIMENSIONS

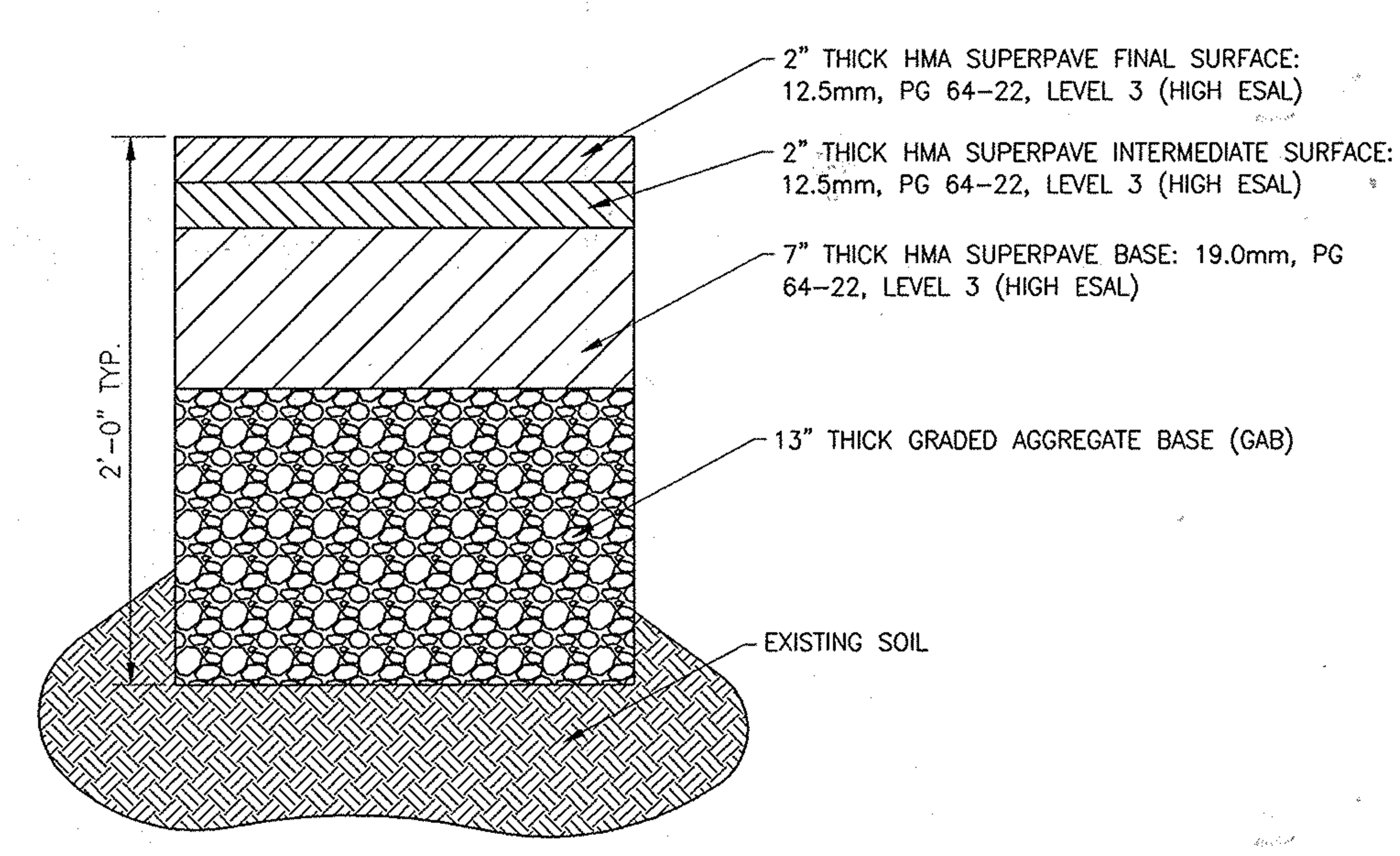
DIMENSION	DESCRIPTION
17'-0" (MAX)	DRAFT PIPE CENTERLINE
15'-0"	TOP OF SLAB
12'-0"	TOP OF TANK
0	BOTTOM OF TANK
-10"	BOTTOM OF EXCAVATION

NOTES

1. TANK DIMENSIONS AND LAYOUT ARE FOR REFERENCE ONLY. ACTUAL TANK DIMENSIONS WILL VARY WITH MANUFACTURER.
2. BOLLARDS SHALL ONLY BE INSTALLED AT THE DIRECTION OF HOWARD COUNTY.

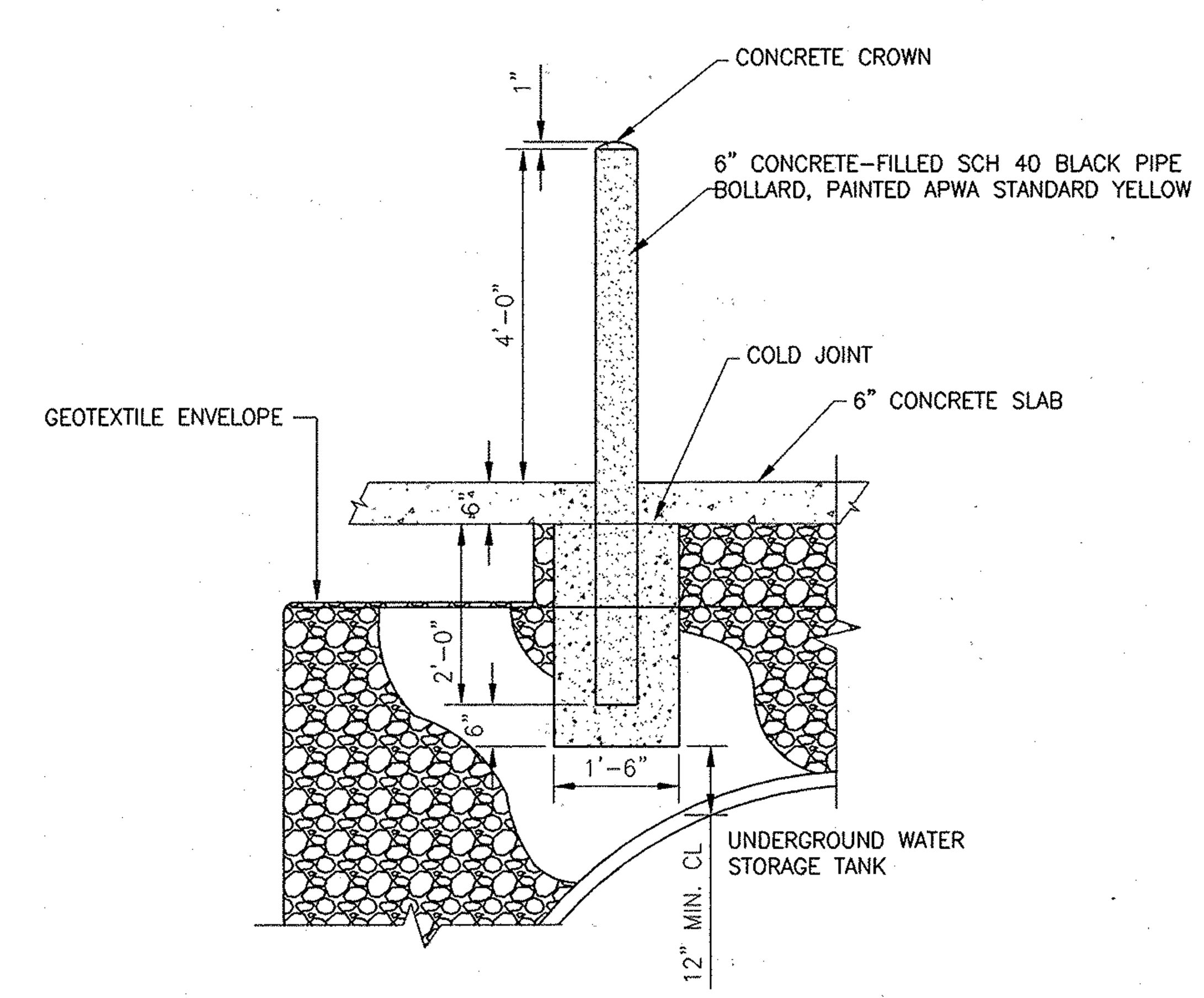
PAVING NOTES

1. LATEST EDITION OF THE HOWARD COUNTY VOLUME IV DESIGN MANUAL STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
2. 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.
3. HOWARD COUNTY DPW RESERVES THE RIGHT TO REQUIRE AN ALTERNATE PAVING SECTION, BASED ON SITE CONDITIONS OR VEHICULAR REQUIREMENTS.
4. ALL PAVING THICKNESSES SHOWN, DIMENSIONED OR OTHERWISE NOTED ARE MINIMUM THICKNESSES.



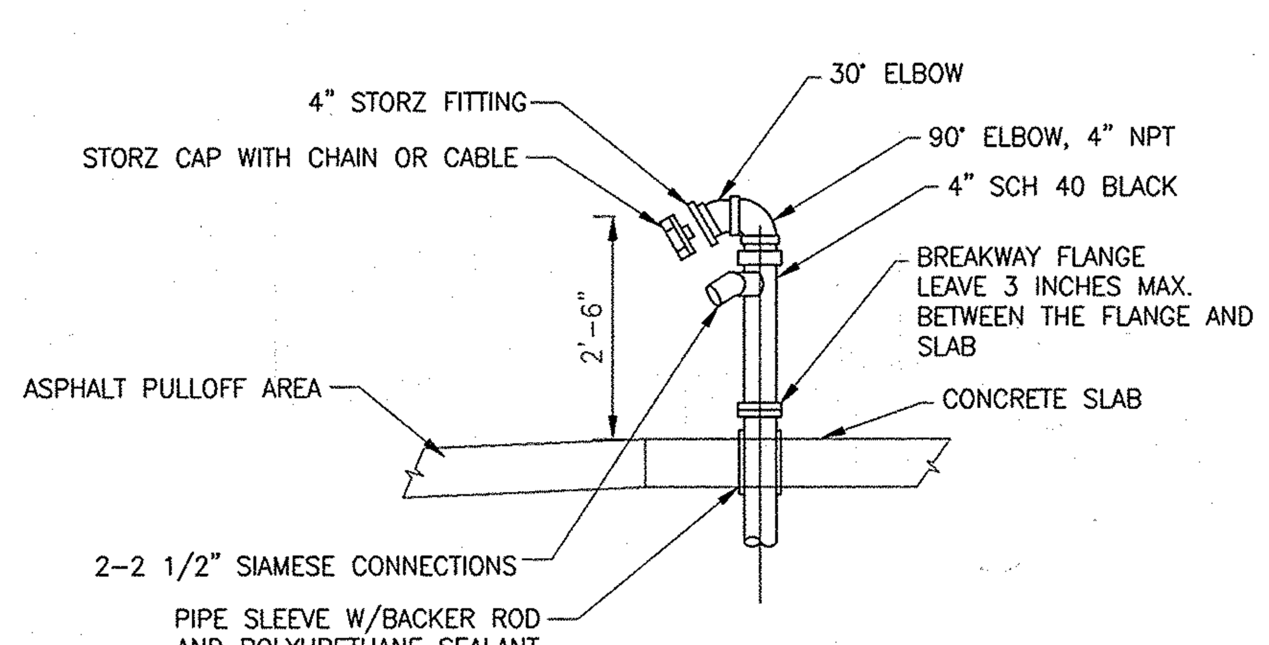
DETAIL: PAVING SECTION

SCALE 1-1/2" = 1'-0"



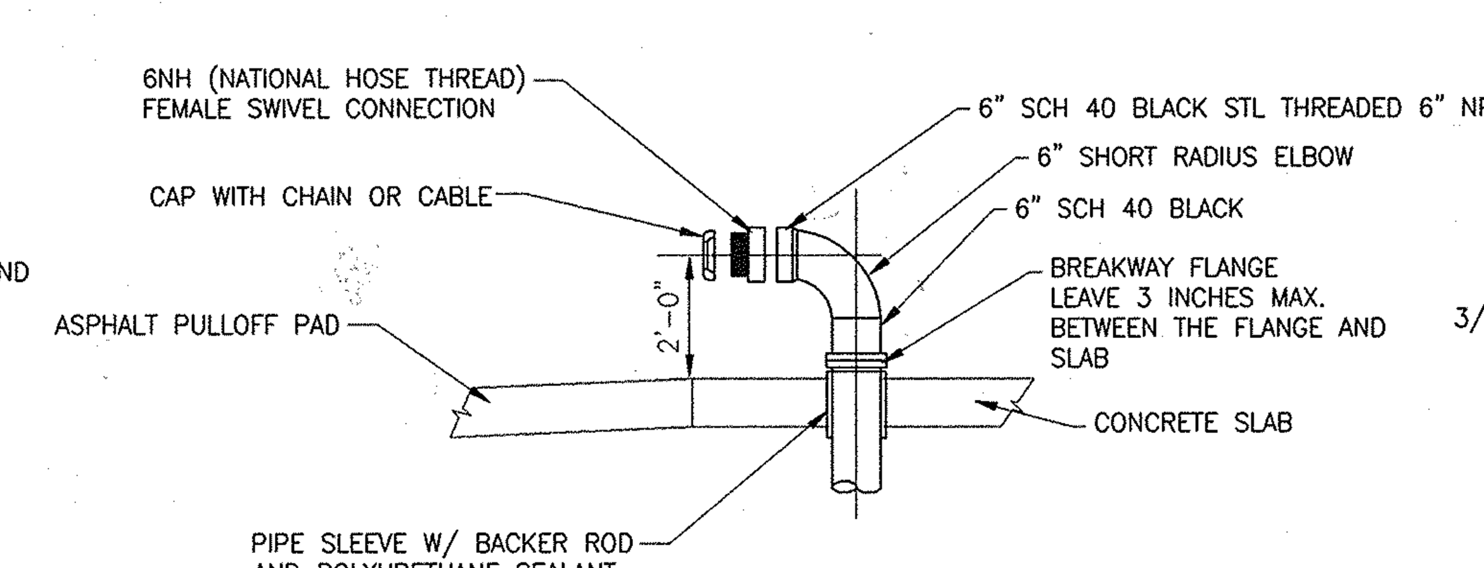
DETAIL: TYPICAL BOLLARD

SCALE 1/2" = 1'-0"



DETAIL: FILL ASSEMBLY

SCALE 1/2" = 1'-0"

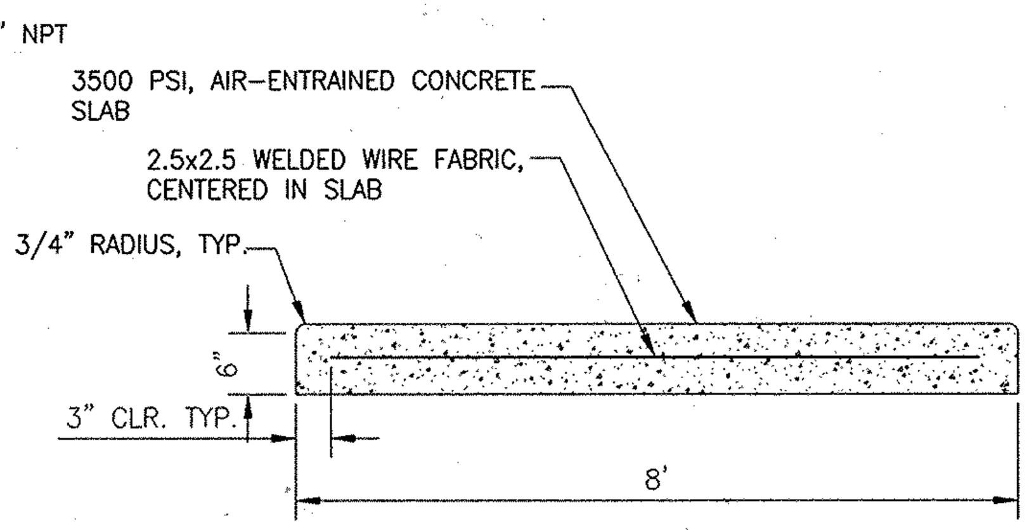


* PVC FITTINGS WILL NOT BE PERMITTED FOR DRAFT ASSEMBLY

SEE SPECIFICATION 2.3 FOR PIPE AND FITTINGS

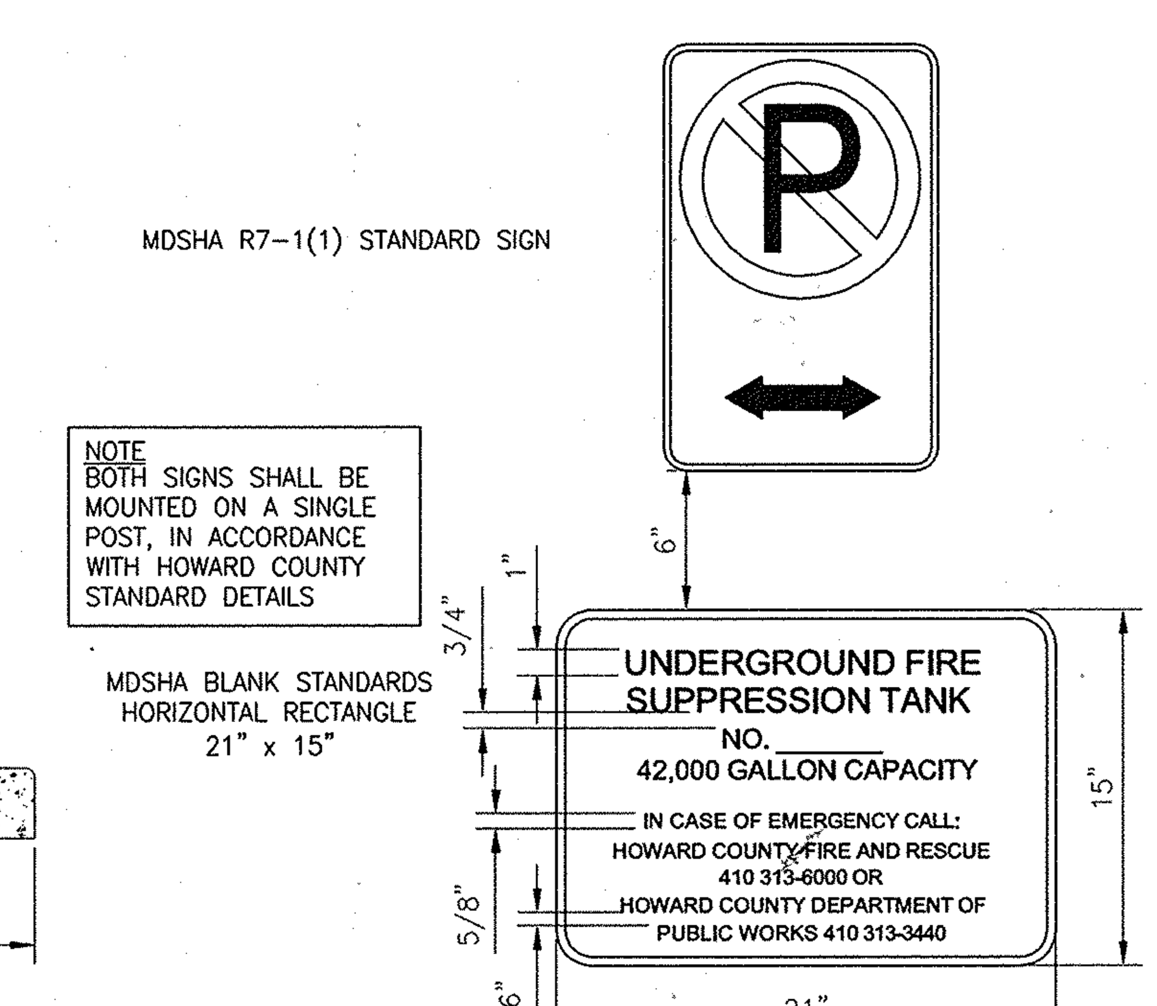
DETAIL:HYDRANT HEAD (DRAFT) ASSEMBLY

SCALE 1/2" = 1'-0"



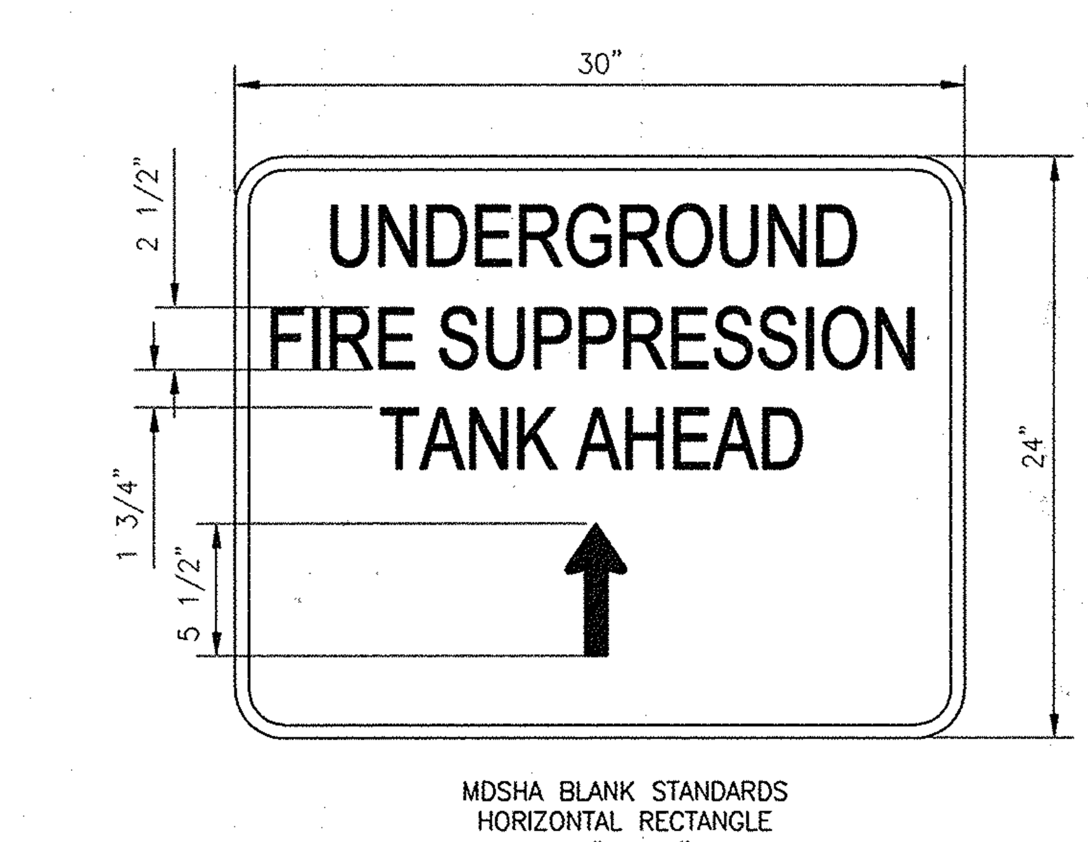
DETAIL: CONCRETE SLAB TYPICAL SECTION

SCALE 3/4" = 1'-0"



DETAIL: TYPICAL TANK SIGNAGE

SCALE 1/2" = 1'-0"



DETAIL: TYPICAL ADVANCE SIGNAGE

SCALE 1/2" = 1'-0"

AS-BUILTS DEC 28 2015

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS 7/2/14 DATE
CHIEF, BUREAU OF ENGINEERING acting for TEB 7/18/14 DATE
CHIEF, BUREAU OF UTILITIES 7/21/14 DATE
CHIEF, UTILITY DESIGN DIVISION PSD 7/17/14 DATE

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410.265.9500
FAX: 410.265.8875

DES: LAL
DRN: RLI
CHK: TND
DATE: 07/2014

BY	NO.	REVISIONS	DATE

GENERAL DETAILS - 2

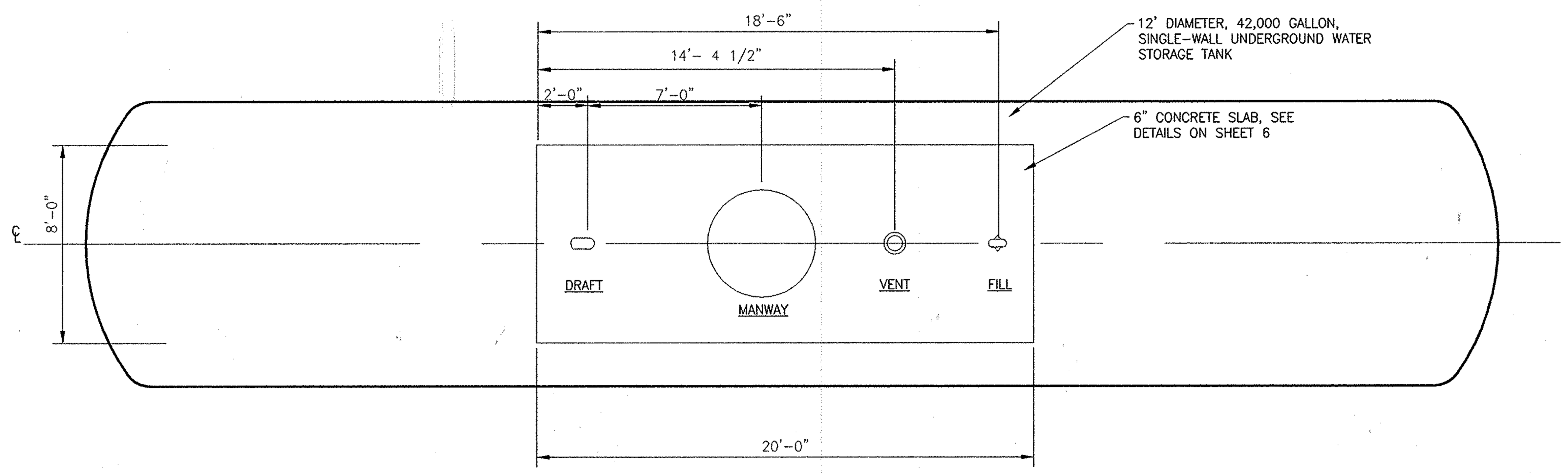
600' SCALE MAP NO. 15 BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK
FOR FIRE SUPPRESSION
F-5972 CS-4908

ELECTION DISTRICT NO. 4 HOWARD COUNTY, MARYLAND

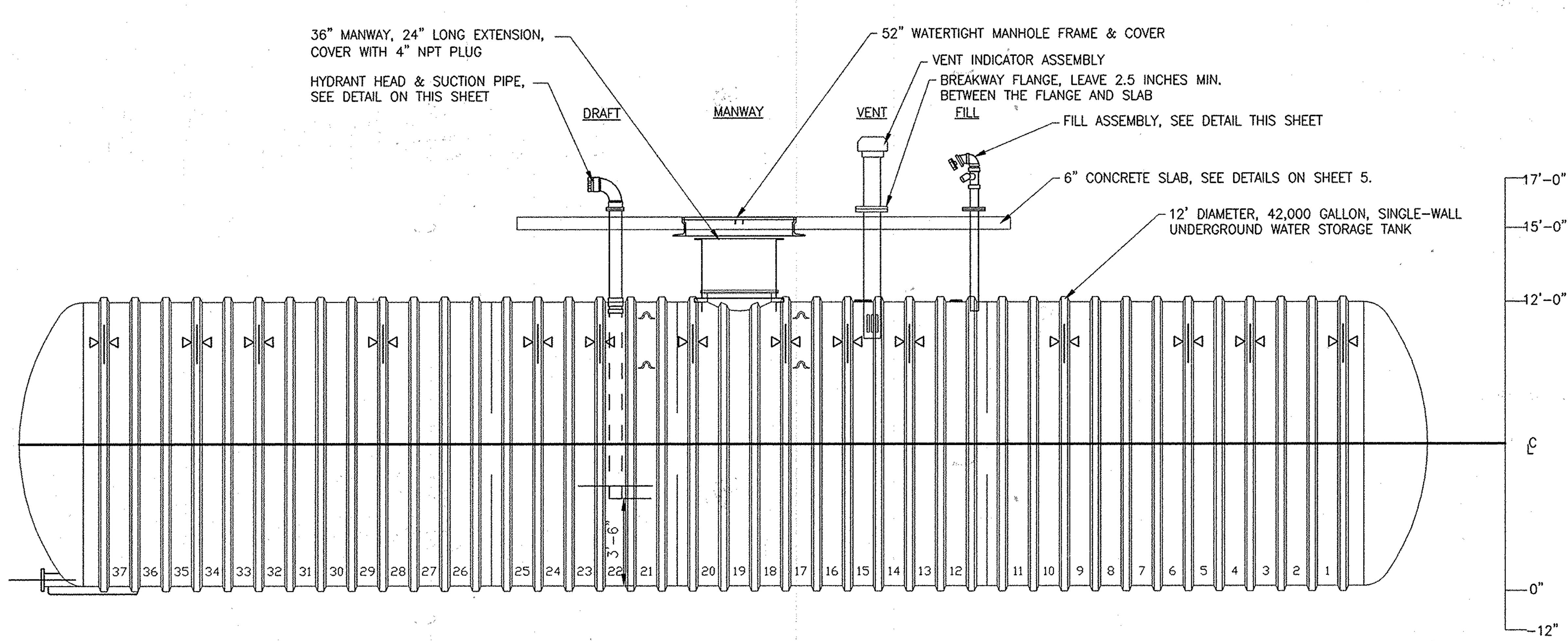
SCALE: SHOWN

SHEET 6 OF 8



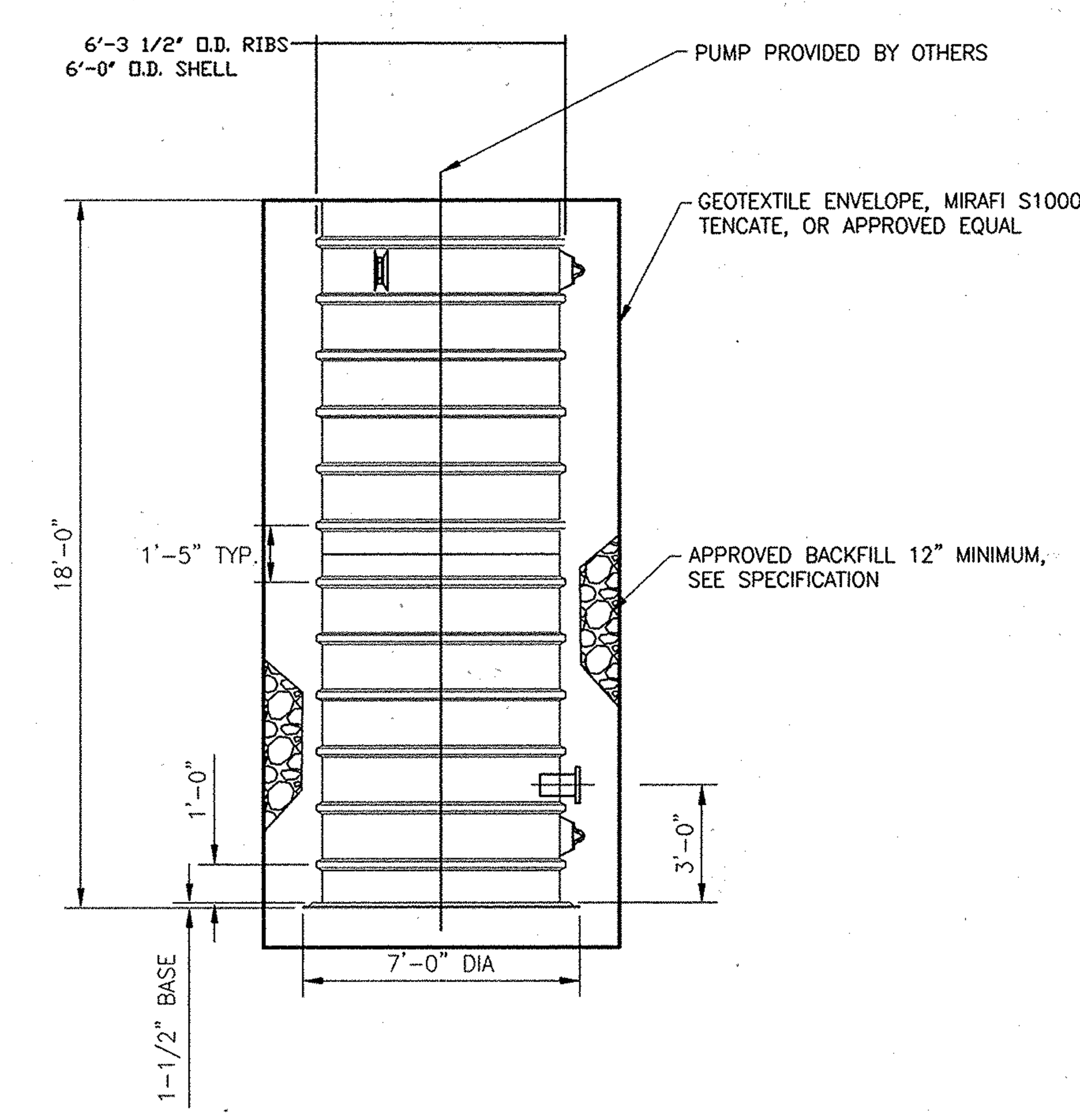
PLAN: 42,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK DRAFT CONFIGURATION

SCALE 1/4" = 1'-0"



SECTION THROUGH 42,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK DRAFT CONFIGURATION

SCALE 1/4" = 1'-0"



DETAIL: WET WELL

SCALE 1/4" = 1'-0"

AS-BUILTS DEC 28 2015

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS — DATE 7/21/14
CHIEF, BUREAU OF ENGINEERING — acting for TEB 7/18/14 — DATE
CHIEF, BUREAU OF UTILITIES — DATE 7/21/14
CHIEF, UTILITY DESIGN DIVISION — 7/17/14 — DATE

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DES: LAL
DRN: RLI
CHK: TND
DATE: 07/2014

BY	NO.	REVISIONS	DATE

GENERAL DETAILS - 3

600' SCALE MAP NO. 15 — BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK FOR FIRE SUPPRESSION
F-5972 GS-4908

ELECTION DISTRICT NO. 4 — HOWARD COUNTY, MARYLAND

SCALE: SHOWN

SEDIMENT CONTROL GENERAL NOTES

1. A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION. 410-313-1855.
2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THE 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 RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN; A) 3 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES AND ALL SLOPES GREATER THAN 3:1, B) 7 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING (SEC. B-4-5), TEMPORARY SEEDING (SEC. B-4-4) AND MULCHING (SEC. B-4-3). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.
5. 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.
6. ANY SEDIMENT CONTROL PRACTICES WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
7. ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
8. 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.
9. 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.
10. ANY CHANGES OR REVISIONS TO THE SEQUENCE OF CONSTRUCTION MUST BE REVIEWED AND APPROVED BY THE PLAN APPROVAL AUTHORITY PRIOR TO PROCEEDING WITH CONSTRUCTION.
11. A PROJECT IS TO BE SEQUENCED SO THAT GRADING ACTIVITIES BEGIN ON ONE GRADING UNIT (MAXIMUM ACREAGE OF 20 AC. PER GRADING UNIT) AT A TIME. WORK MAY PROCEED TO A SUBSEQUENT GRADING UNIT WHEN AT LEAST 50 PERCENT OF THE DISTURBED AREA IN THE PRECEDING GRADING UNIT HAS TO BE STABILIZED AND APPROVED BY THE ENFORCEMENT AUTHORITY. UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE APPROVAL AUTHORITY, NO MORE THAN 30 ACRES CUMULATIVELY MAY BE DISTURBED AT A GIVEN TIME.

This plan is approved for soil erosion and sediment control by the Howard Soil Conservation District.

(signature) 7/22/14
HOWARD SOIL CONSERVATION DISTRICT — DATE

SEQUENCE OF CONSTRUCTION

1. OBTAIN A GRADING PERMIT.
2. REQUEST FOR A PRE-CONSTRUCTION MEETING WITH THE APPROPRIATE ENFORCEMENT AUTHORITY.
3. CLEARING AND GRUBBING AS NECESSARY FOR THE INSTALLATION OF PERIMETER CONTROLS.
4. CONSTRUCTION AND STABILIZATION OF PERIMETER SEDIMENT CONTROLS.
5. SITE EXCAVATION AND GRADING, (3 DAYS), SITE STAGING AND STOCKPILE AREAS.
6. EXCAVATION FOR TANK. (2 DAYS)
7. INSTALL TANK ACCORDING TO PLAN AND DETAILS. (3 DAYS)
8. BACKFILL AROUND TANK. (1 DAY)
9. INSTALL CONCRETE SLAB ACCORDING TO PLAN AND DETAILS. (5 DAYS)
10. INSTALL ASPHALT PULLOFF ACCORDING TO PLAN AND DETAILS. (2 DAYS)
11. FINAL GRADING, LANDSCAPING, AND STABILIZATION.
12. APPROVAL OF THE APPROPRIATE ENFORCEMENT AUTHORITY PRIOR TO REMOVAL OF SEDIMENT CONTROLS.
13. REMOVAL OF CONTROLS AND STABILIZATION OF AREAS THAT ARE DISTURBED BY REMOVAL OF SEDIMENT CONTROLS.

Table B.1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate [1/] lb/ac	Seeding Rate [1/] lb/1000 ft²	Seeding Depth [2/] (inches)	Recommended Seeding Dates by Plant Hardiness Zone [3/] 5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass (*Lolium perenne ssp. multiflorum*)	40	1.0	0.5	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Barley (*Hordeum vulgare*)	96	2.2	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Oats (*Avena sativa*)	72	1.7	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Wheat (*Triticum aestivum*)	120	2.8	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Cereal Rye (*Secale cereale*)	112	2.8	1.0	Mar 15 to May 31; Aug 1 to Oct 31	Mar 1 to May 15; Aug 1 to Nov 15	Feb 15 to Apr 30; Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet (*Setaria italica*)	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet (*Pennisetum glaucum*)	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

NOTES:
1/ Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses.

Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.

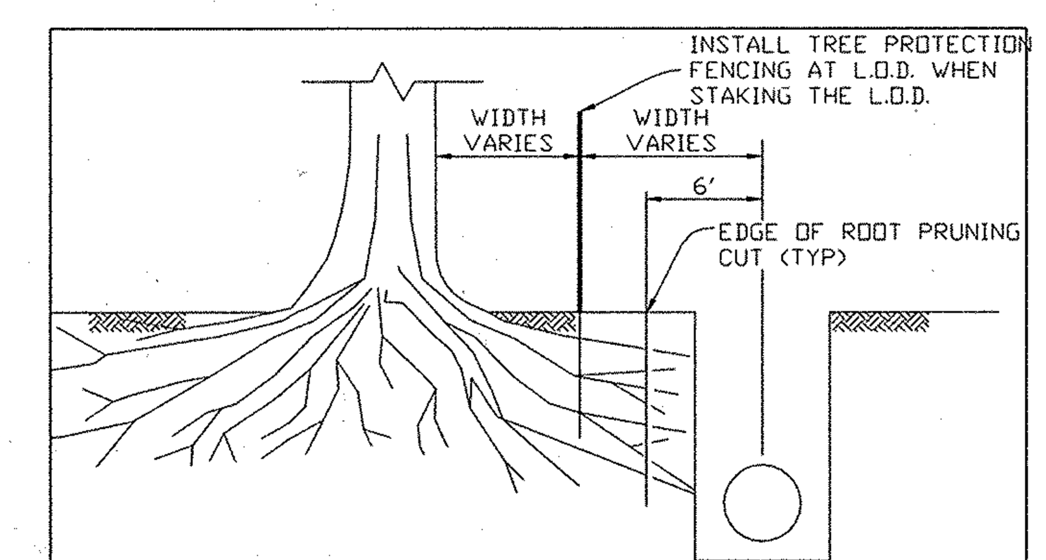
Oats are the recommended nurse crop for warm-season grasses.

2/ For sandy soils, plant seeds at twice the depth listed above.
3/ The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

B.20

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100 YEAR FLOODPLAIN

1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100 YEAR FLOODPLAIN.
2. PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100 YEAR FLOODPLAIN.
3. DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF ANY WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4. PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100 YEAR FLOODPLAIN.
5. REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100 YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6. RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100 YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
7. ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARLEY (HORDEUM SP.), OATS (UNIOLA SP.), AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
8. AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
9. TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM: USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THROUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
10. STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
11. CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.



TREE PROTECTION DETAIL ALONG TRENCH
NOT TO SCALE

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/ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ. FT.) AND 600 LBS/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/ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ. FT.)
2. ACCEPTABLE – APPLY 2 TONS/ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ. FT.) AND 1000 LBS/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 – APRIL 30, AND AUGUST 1 – OCTOBER 15, SEED WITH 60 LBS/ACRE (1.4 LBS/1000 SQ. FT.) OF KENTUCKY 31 TALL FESCUE. FOR THE PERIOD MAY 1 – JULY 31, SEED WITH 60 LBS KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS/ACRE (.05 LBS/1000 SQ. FT.) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 – FEBRUARY 28, PROTECT SITE BY: OPTION 1 – TWO 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 30 TALL FESCUE AND MULCH WITH 2 TONS/ACRE WELL ANCHORED STRAW.

MULCHING – APPLY 1-1/2 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 SLOPE 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 RESEEDINGS.

TEMPORARY SEEDING NOTES

APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE RE-DISTURBED 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/ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ. FT.).

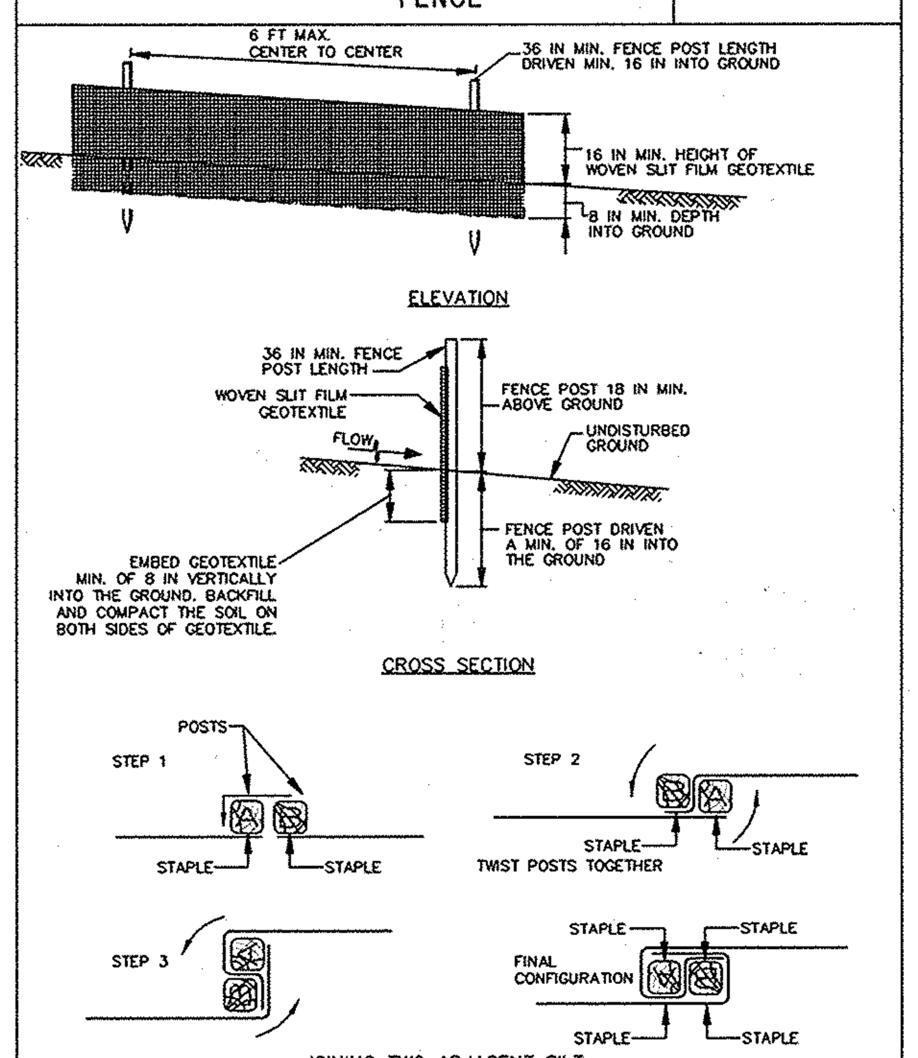
SEEDING: -- FOR PERIODS MARCH 1 – APRIL 30 AND FROM AUGUST 15 – OCTOBER 15, SEED WITH 2-1/2 BUSHEL PER ACRE OF ANNUAL [illegible] (3.2 LBS/1000 SQ. FT.). FOR THE PERIOD MAY 1 – AUGUST 14, SEED WITH 3 LBS/ACRE OF WEEPING LOVEGRASS (.07 LBS/1000 SQ. FT.). FOR THE PERIOD NOVEMBER 16 – FEBRUARY 28, PROTECT SITE BY APPLY 2 TONS/ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD.

MULCHING: -- APPLY 1-1/2 TO 2 TONS/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 SLOPE 8 FT. OR HIGHER, USE 348 GAL. PER ACRE (8GAL/1000 SQ. FT.) FOR ANCHORING.

REFER TO THE 2011 *MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL* FOR ADDITIONAL RATES AND METHODS NOT COVERED.

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: —SF—



1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: —SF—

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± ⅛ INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

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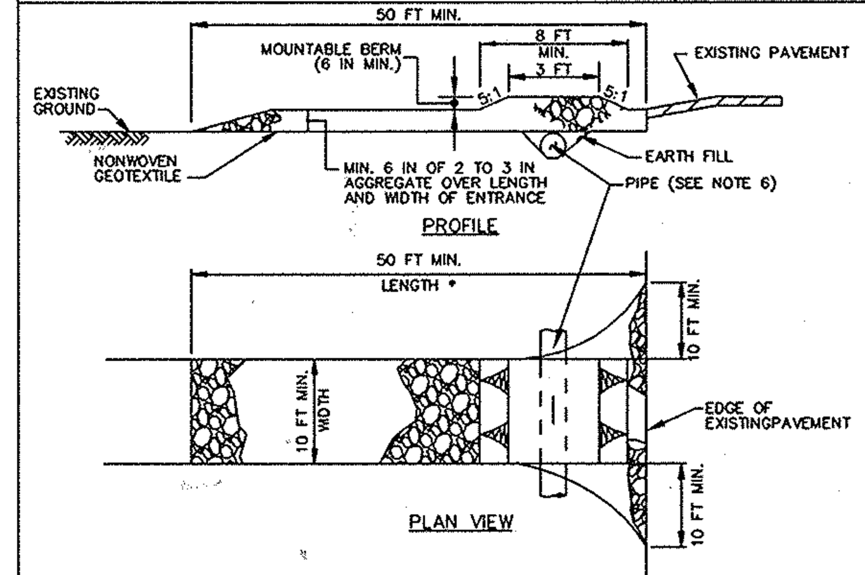
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL: SCE



CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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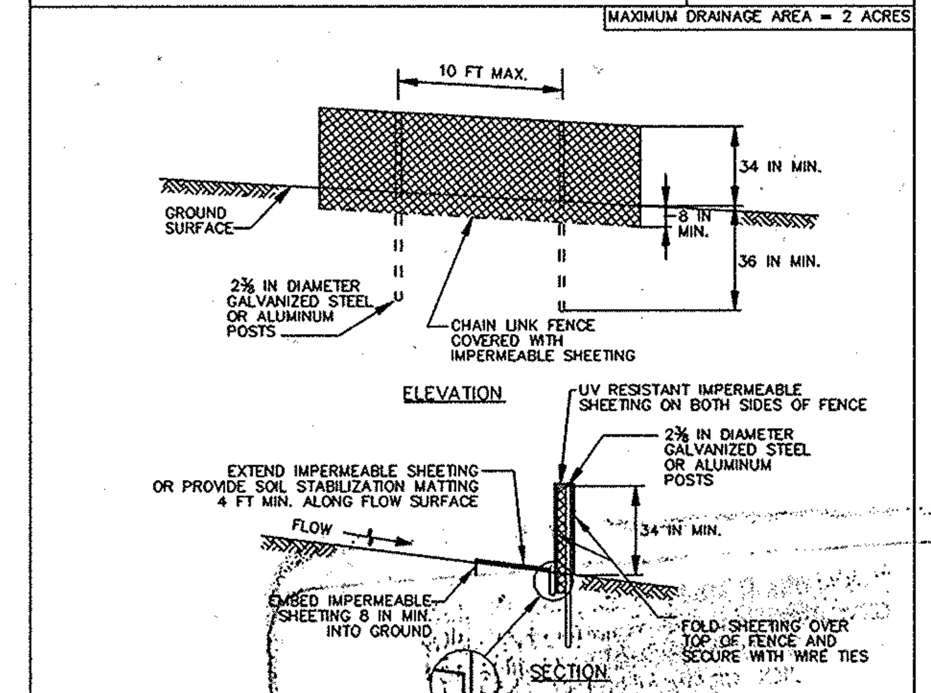
DETAIL C-9 DIVERSION FENCE

STANDARD SYMBOL: —DF—

MAXIMUM DRAINAGE AREA = 2 ACRES



CONSTRUCTION SPECIFICATIONS

1. USE 42 INCH HIGH, 9 GAUGE OR THICKER CHAIN LINK FENCING (2⅜ INCH MAXIMUM OPENING).
2. USE 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. THE POSTS DO NOT NEED TO BE SET IN CONCRETE.
3. FASTEN CHAIN LINK FENCE SECURELY TO THE FENCE POSTS WITH WIRE TIES.
4. SECURE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING TO CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT TOP, MID SECTION, AND BELOW GROUND SURFACE.
5. EXTEND SHEETING A MINIMUM OF 4 FEET ALONG FLOW SURFACE AND EMBED END A MINIMUM OF 8 INCHES INTO GROUND. SOIL STABILIZATION MATTING MAY BE USED IN LIEU OF IMPERMEABLE SHEETING ALONG FLOW SURFACE.
6. WHEN TWO SECTIONS OF SHEETING ADJOIN EACH OTHER, OVERLAP BY 6 INCHES AND FOLD WITH SEAM FACING DOWNGRADE.
7. KEEP FLOW SURFACE ALONG DIVERSION FENCE AND POINT OF DISCHARGE FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE. REPLACE IMPERMEABLE SHEETING IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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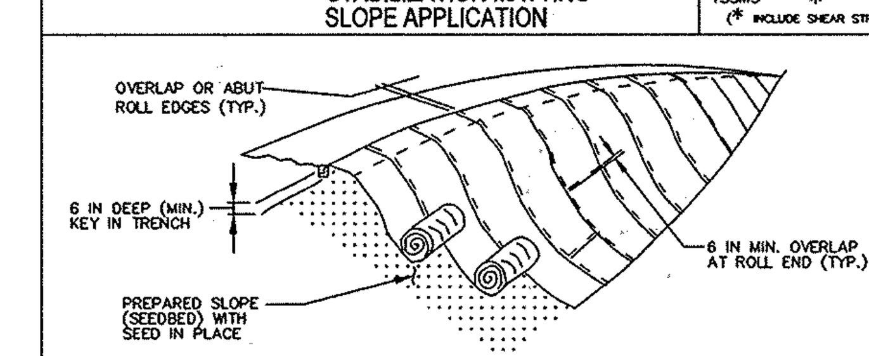
DETAIL B-4-6-B TEMPORARY SOIL STABILIZATION MATTING SLOPE APPLICATION

STANDARD SYMBOL: TSSMS – * lb/ft² (* INCLUDE SHEAR STRESS)



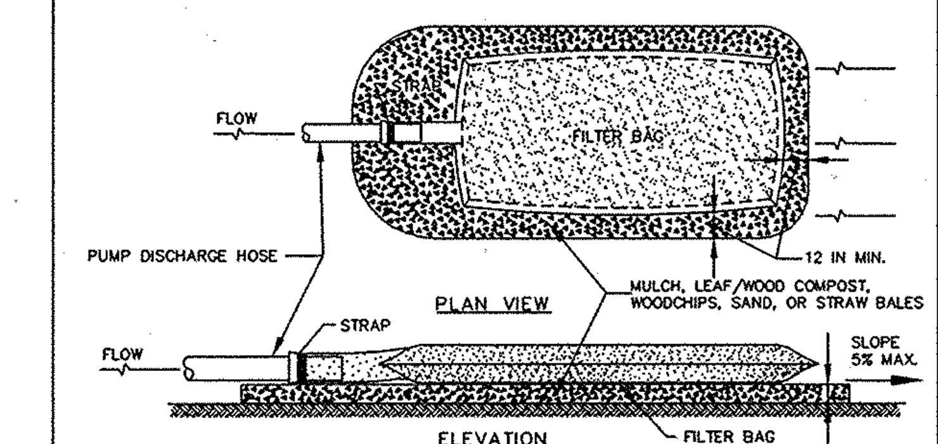
CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWNSLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE UPSLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL F-4 FILTER BAG

STANDARD SYMBOL: ☒FB



CONSTRUCTION SPECIFICATIONS

1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) FOR THE FOLLOWING:

GRAB TENSILE	250 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT²	ASTM D-4491
PERMITTIVITY (SEC⁻¹)	1.2 SEC⁻¹	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	90%	ASTM D-4632

6. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

AS-BUILTS DEC 28 2015

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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS	DATE 7/21/14	CHIEF, BUREAU OF ENGINEERING (acting for TEB)	DATE 7/18/2014
CHIEF, BUREAU OF UTILITIES	DATE 7/21/14	CHIEF, UTILITY DESIGN DIVISION (FSD)	DATE 7/17/14

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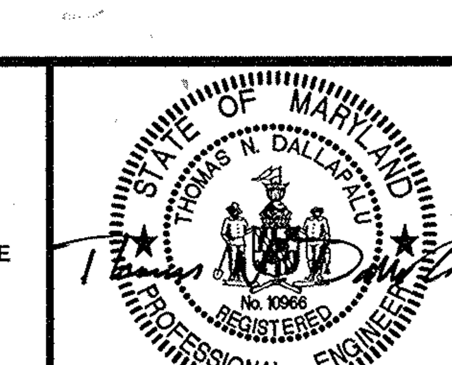

DES: LAL
DRN: RLI
CHK: TND
DATE: 07/2014

BY	NO.	REVISIONS	DATE

SEDIMENT & EROSION CONTROL NOTES

600' SCALE MAP NO. 15 — BLOCK NO. 10

UNDERGROUND WATER STORAGE TANK FOR FIRE SUPPRESSION
F-5972 65-4908

ELECTION DISTRICT NO. 4 — **HOWARD COUNTY, MARYLAND**

SCALE: SHOWN

SHEET 8 OF 8