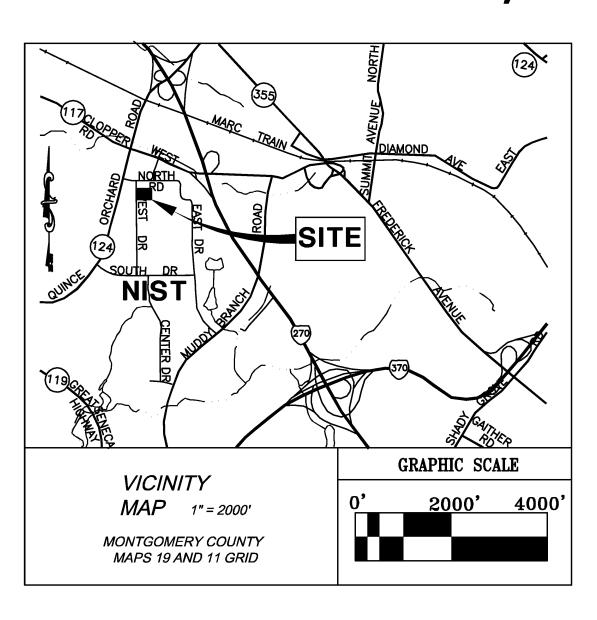


# UTILITY AND SITE DESIGN MARCH 2010

## NET ZERO ENERGY RESIDENTIAL TEST FACILITY

UNITED STATES DEPARTMENT OF COMMERCE THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY GAITHERSBURG, MARYLAND

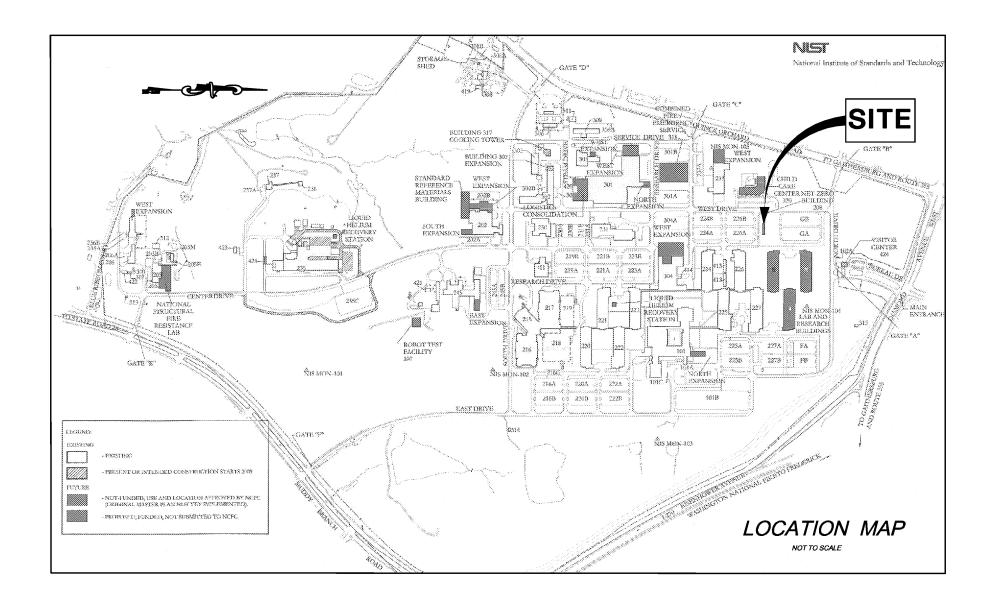


PROPERTY ADDRESS

NIST CAMPUS

WEST STREET

GAITHERSBURG, MARYLAND



PROPERTY OWNER/APPLICANT
UNITED STATES DEPARTMENTS OF COMMERCE
THE NATIONAL INSTITUTE OF STANDARDS
AND TECHNOLOGY
GAITHERSBURG, MARYLAND
(301) 975-8339
CONTACT PERSON: SILVIO BARUZZI

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C-404 EROSION AND SEDIMENT CONTROL NOTES

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E-1 ELECTRICAL LEGEND, ABBREVIATIONS, DIAGRAMS, AND NOTES

E-2 ATTIC AND BASEMENT FLOOR PLANS ELECTRICAL - NEW WORK

 REVISION
 DESCRIPTION
 BY
 DATE

 95% CD SET
 01/29/10

 100% CD SET
 02/24/10

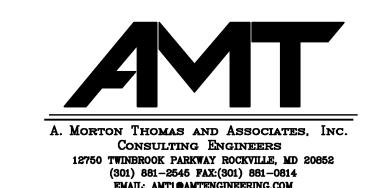
 ISSUED FOR CONSTRUCTION
 03/31/10

#### PROFESSIONAL CERTIFICATION

"I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM DULY LICENSED PROFESSIONAL ENGINEER UNDER THAT I AM DULY LICENSED PROFESSIONAL ENGINEER UNDER THAT I AM DESCRIPTION OF THE STATE OF MARYLAND.

LICENSE NO. 12564, EXPIRATION DATE 08/10/2011."

KEAST & HOOD CO.
Structural Engineers
1850 M Street NW Washington, DC 20036
(202) 223-1941 Fax (202) 223-1942







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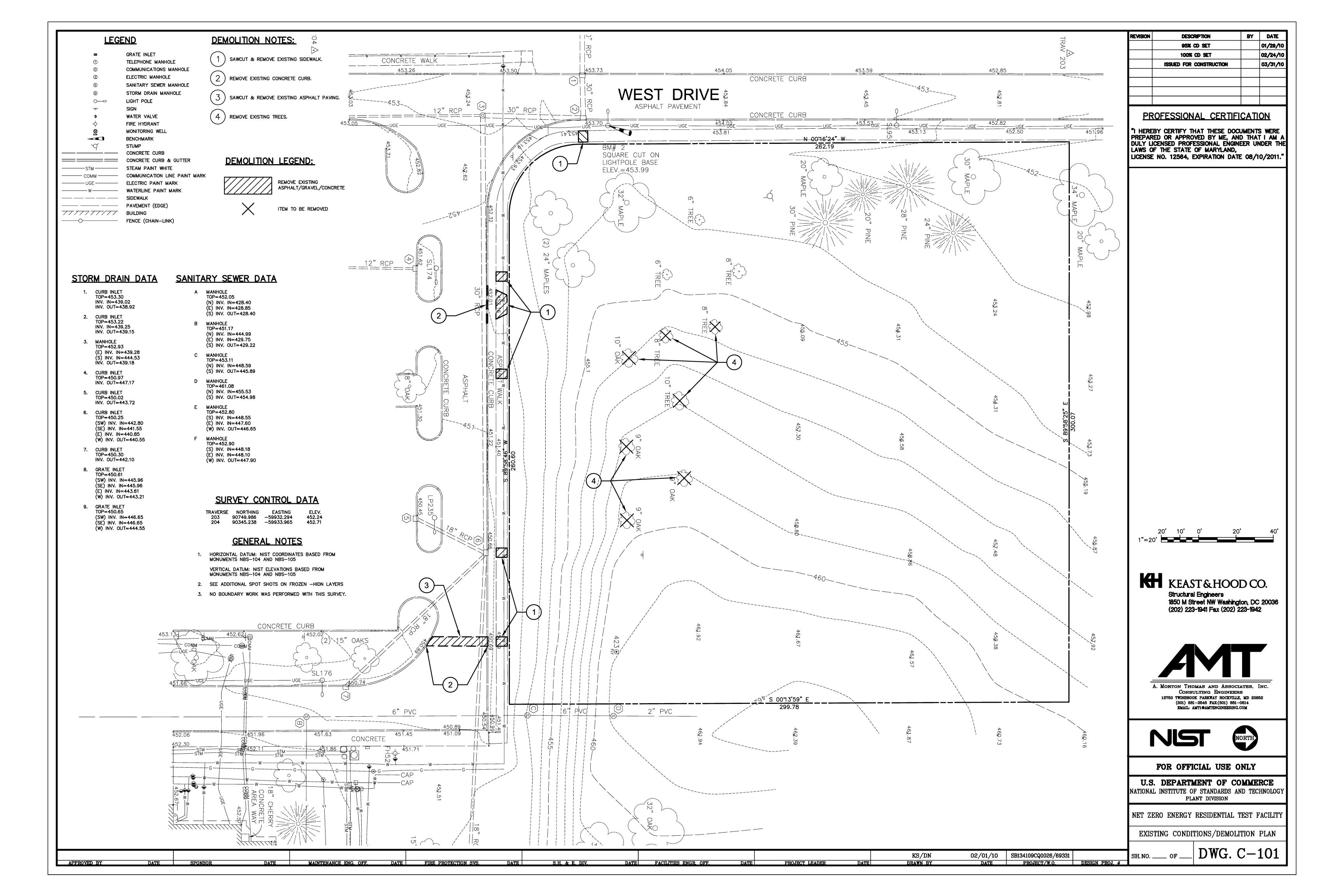
U.S. DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

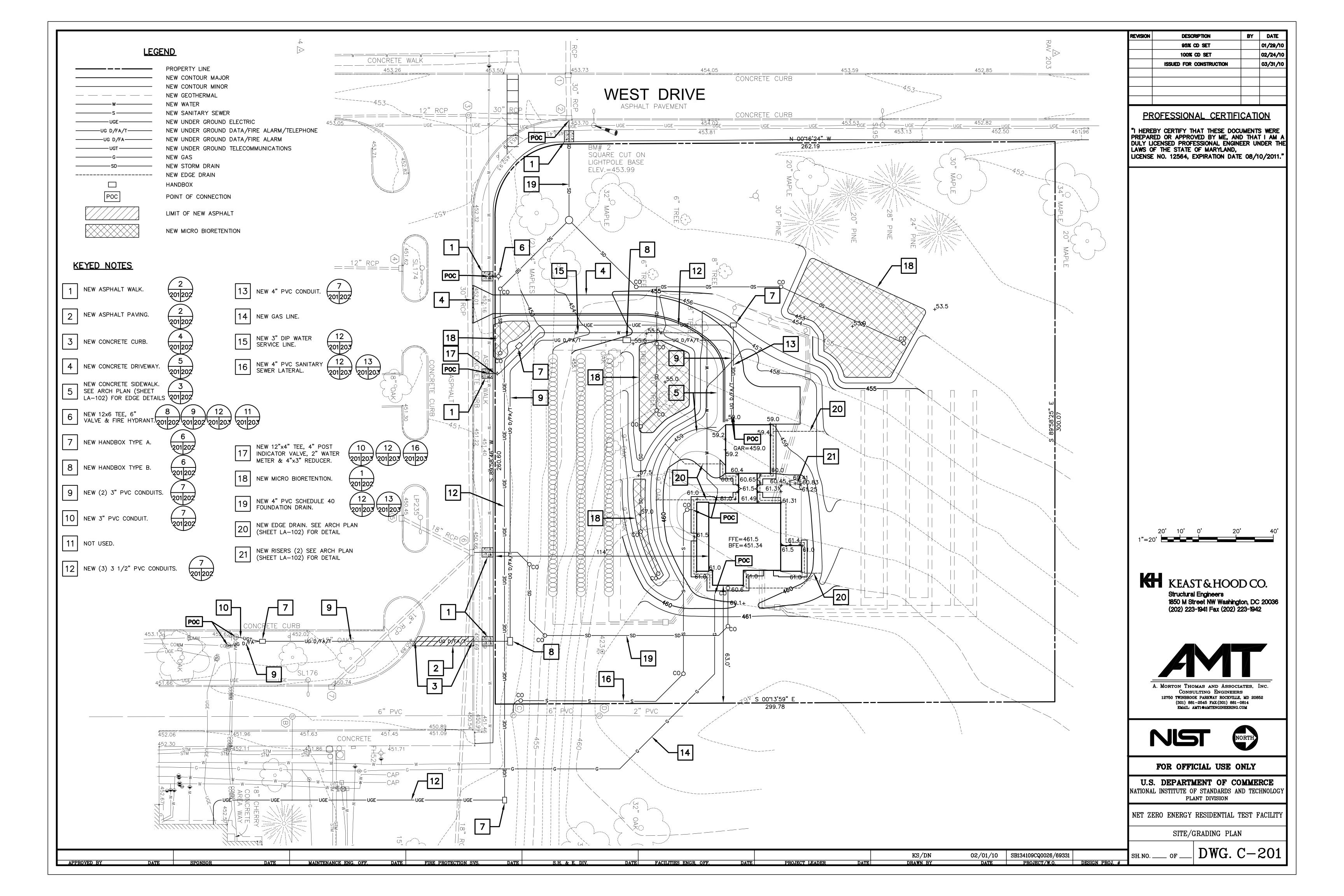
NET ZERO ENERGY RESIDENTIAL TEST FACILITY

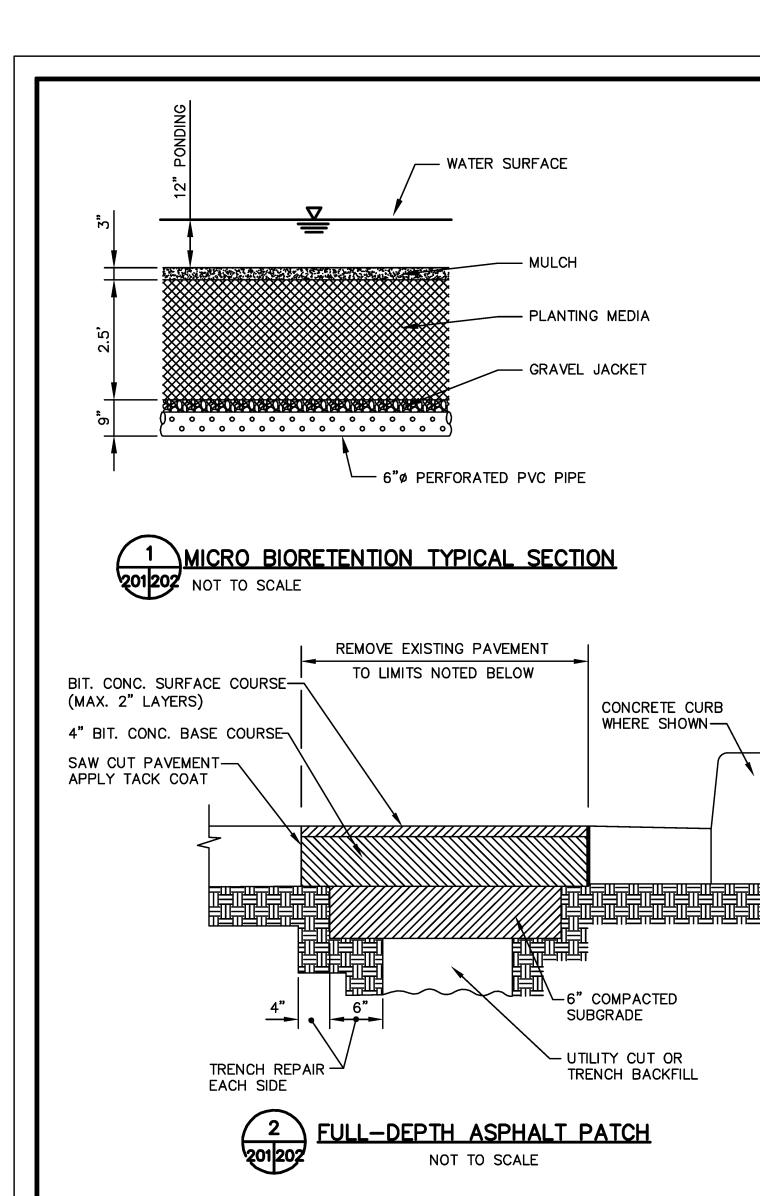
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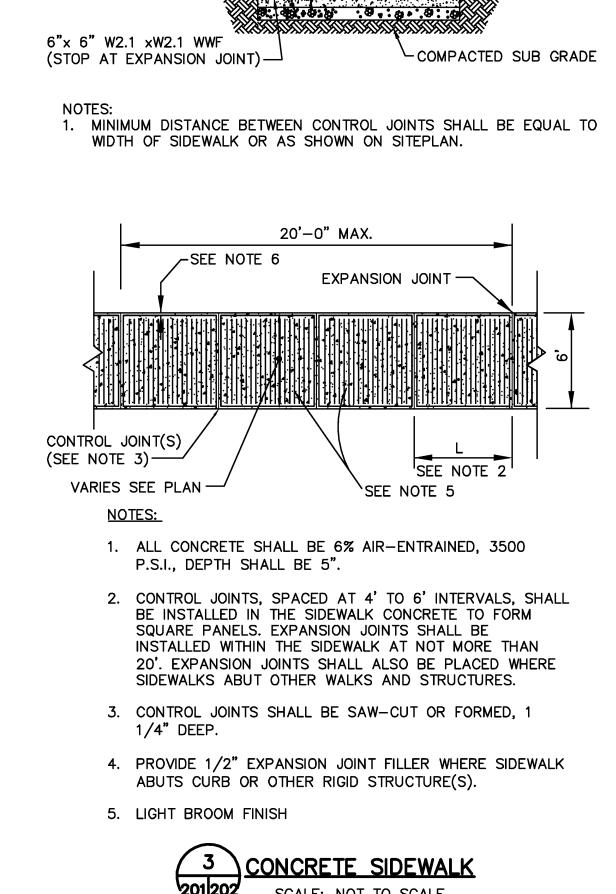
SH. NO. \_\_\_\_ OF \_\_\_ DWG. C-001

														KS/DN	02/01/10	SB134109CQ0026/69331	
APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENG. OFF.	DATE	FIRE PROTECTION SVS.	DATE	S.H. & E. DIV.	DATE	FACILITIES ENGR. OFF.	DATE	PROJECT LEADER	DATE	DRAWN BY	DATE	PROJECT/W.O.	DESIGN PROJ. #







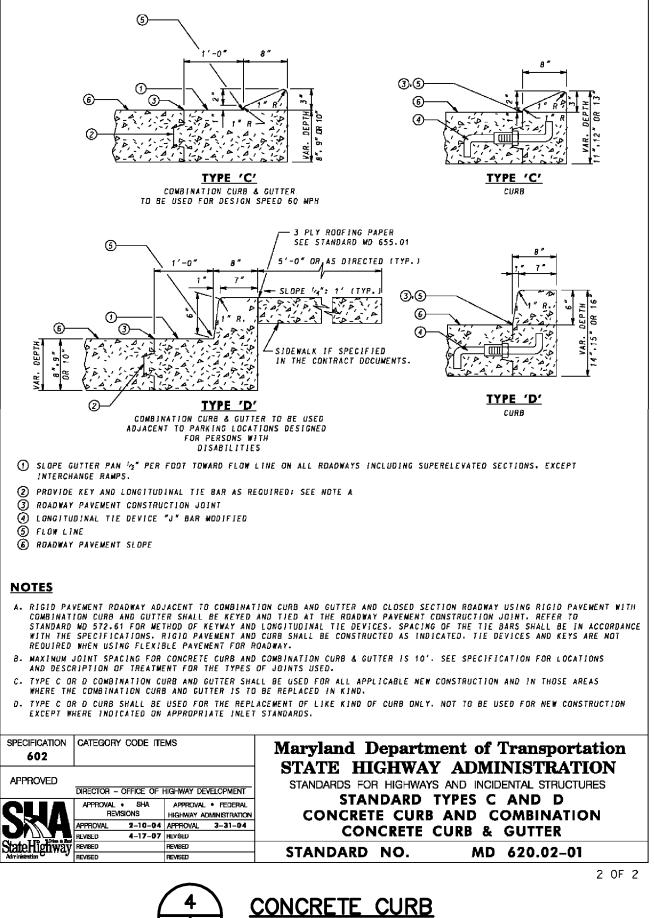


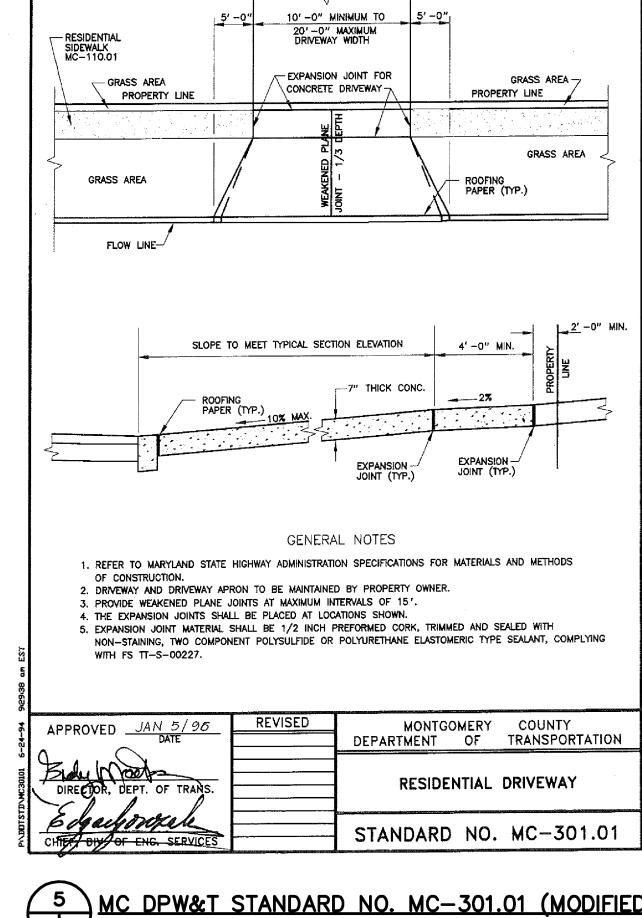
5" 3500 PSI CONCRETE W/ STD. BROOM

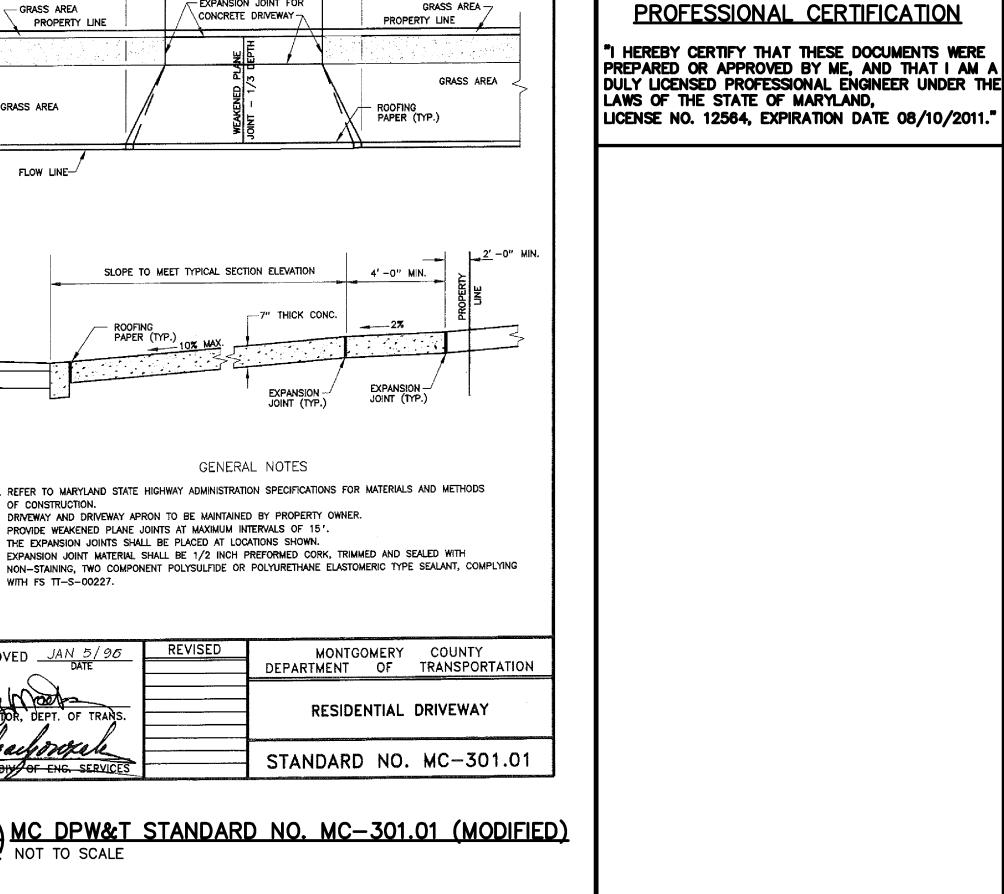
4" GRADED AGGREGATE —

BASE COURSE

FINISH (PERPENDICULAR TO PED. TRAFFIC)-







12' OR AS NOTED

ON THE DRAWINGS

YDRANT TO BE PLUMB-

REVISION

DESCRIPTION

95% CD SET

100% CD SET

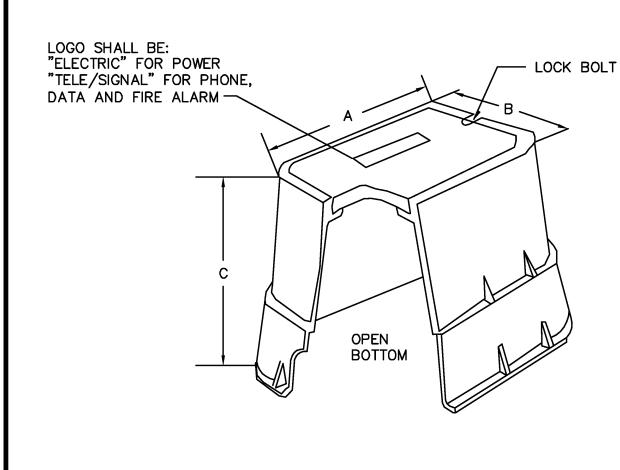
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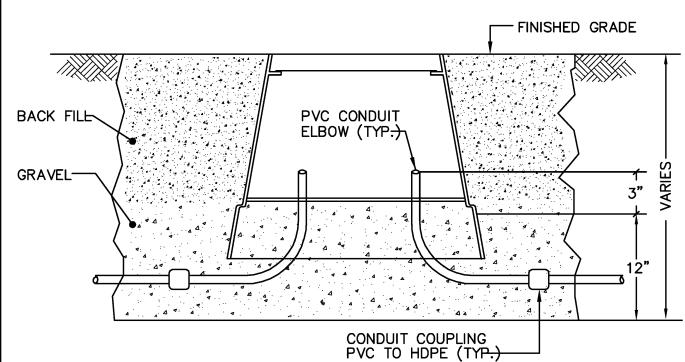
BY DATE

01/29/10

02/24/10

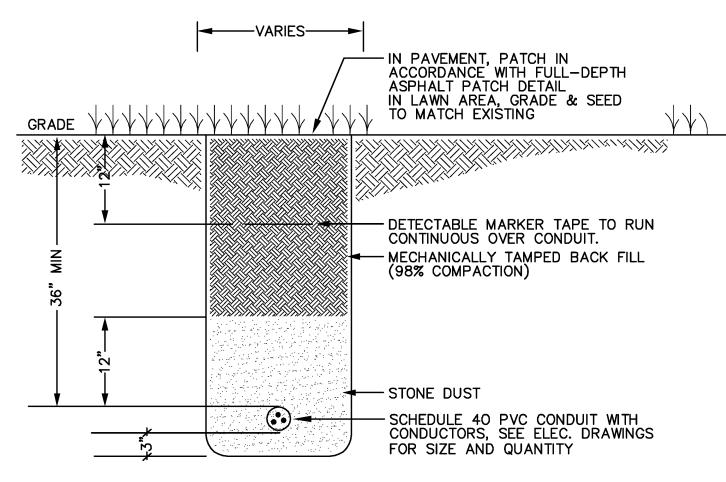
03/31/10

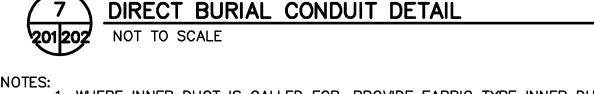






APPROVED BY

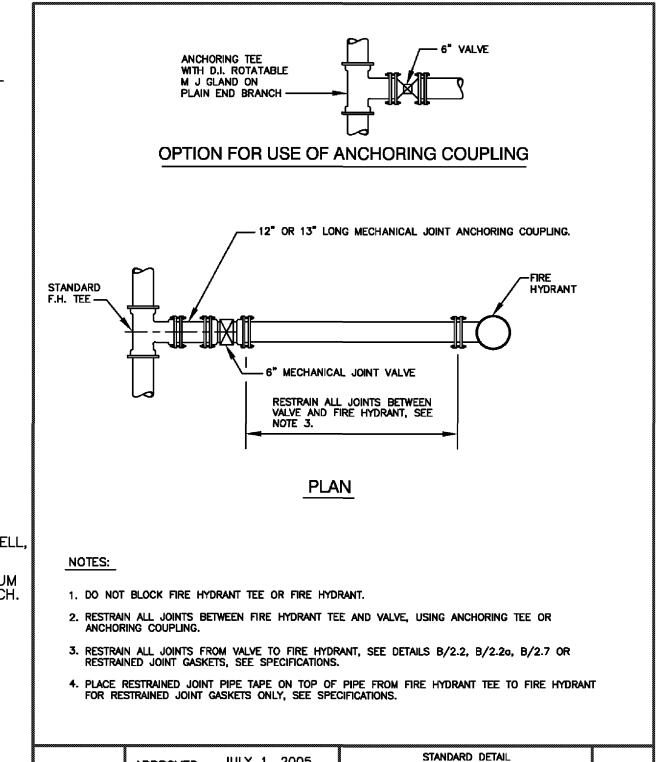




.

1. WHERE INNER DUCT IS CALLED FOR, PROVIDE FABRIC TYPE INNER DUCT BY MAXCELL, SIZE AND QUANTITY AS INDICATED ON ELECTRICAL DRAWINGS. 2. NUMBER OF CONDUITS IN TRENCH VARIES FROM 1 TO 3. MAINTAIN 3-INCH MINIMUM CLEARANCE BETWEEN CONDUITS AND BETWEEN CONDUITS AND OUTSIDE OF TRENCH.

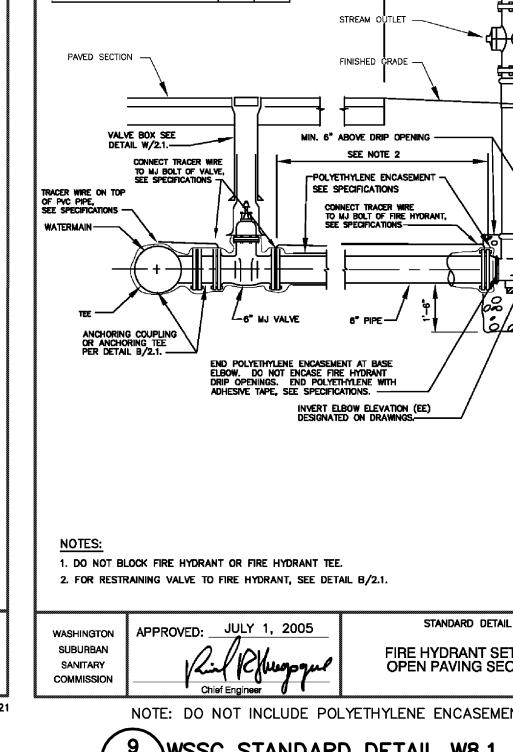
	HANDBOX SCHEDULE								
TYPE	DIME	ENSIONS		BASIS OF DESIGN					
ITTPE	A B C			BASIS OF DESIGN					
A	49 5/8"	32 1/8"	36"	QUAZITE STYLE PG, 30"x48", CAT. NO. PG3048BA36 WITH ANSI 22 LOAD RATING AND EXTRA HEAVY DUTY COVER WITH BOLTS. COLOR IS GREY.					
В	37 5/8"	26"	30"	QUAZITE STYLE PG, 24"x36", CAT. NO. PG2436BA30 WITH ANSI 22 LOAD RATING AND HEAVY DUTY COVER WITH BOLTS. COLOR IS GREY.					



METHOD OF RESTRAINING

FIRE HYDRANT TO MAIN

SCALE: NOT TO SCALE



H (IN.) MIN. MAX.

7 1/4 23 1/

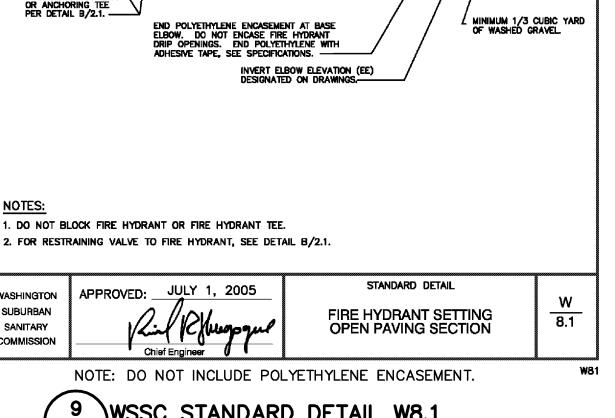
14 20

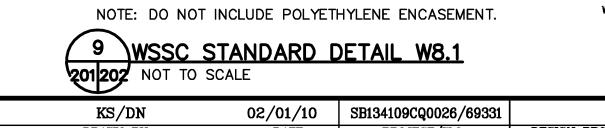
TYPE OF HYDRANT

U.S. PIPE AND FOUNDRY CO.

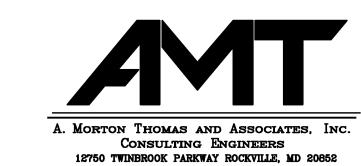
AMERICAN FLOW CONTROL

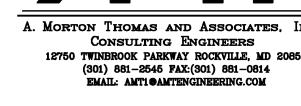
MUELLER COMPANY KENNEDY VALVE













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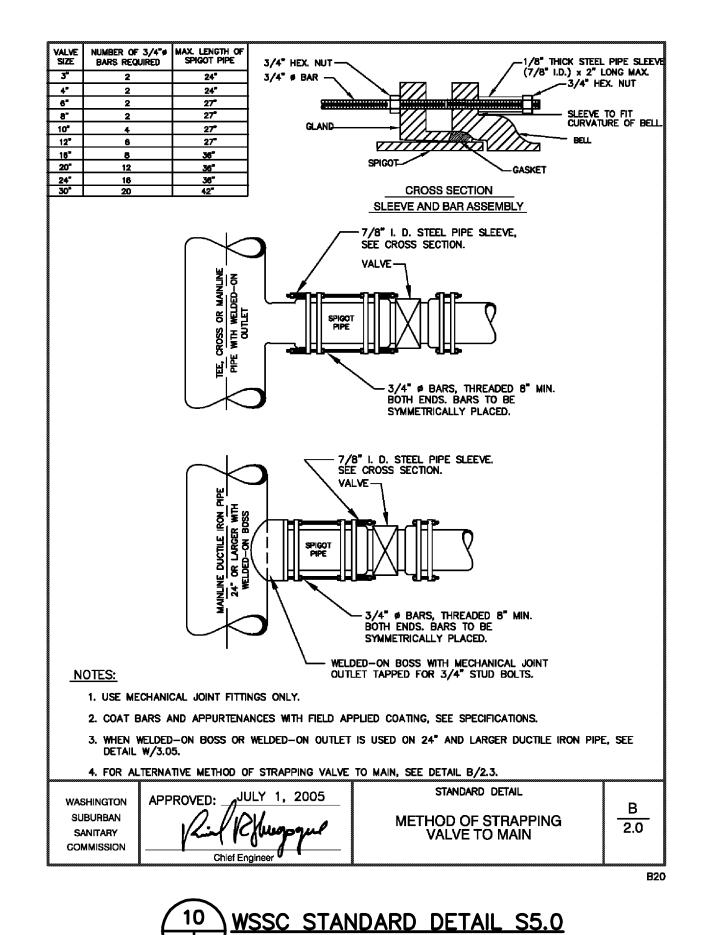
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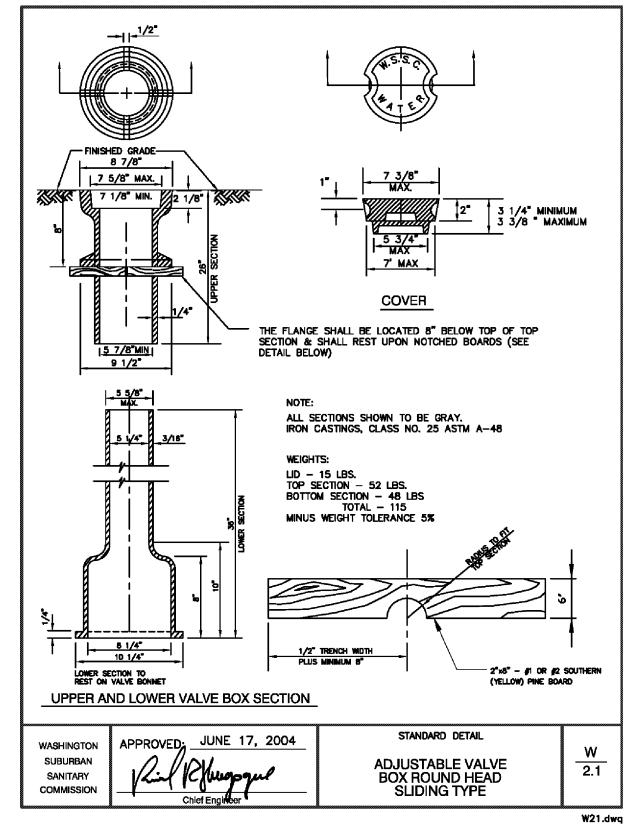
SITE DETAILS

DWG. C-202 SH. NO. \_\_\_\_\_ OF

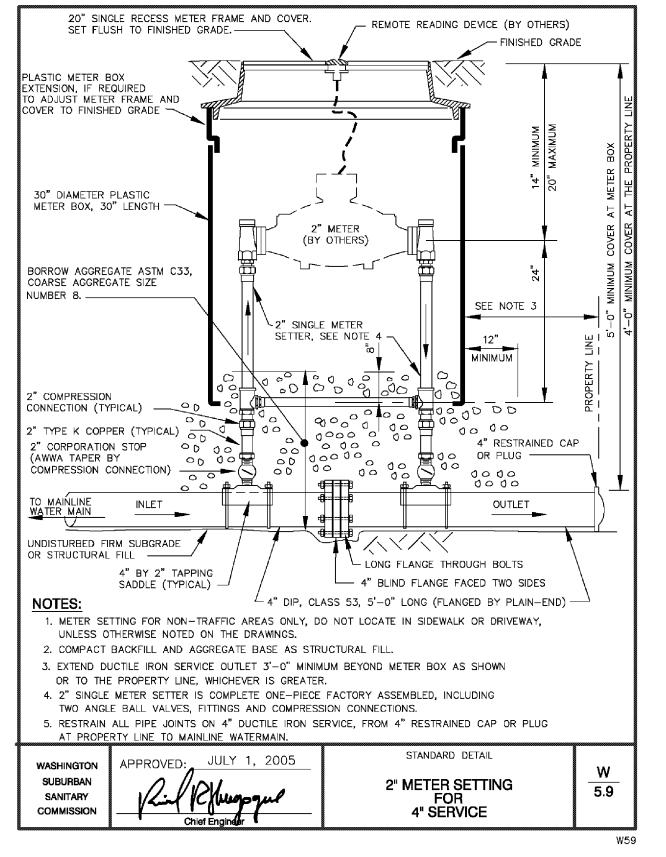
WSSC STANDARD DETAIL B2.1 MAINTENANCE ENG. OFF. DATE PROJECT/W.O. DATE FIRE PROTECTION SVS. S.H. & E. DIV. FACILITIES ENGR. OFF. DESIGN PROJ. #

SUBURBAN

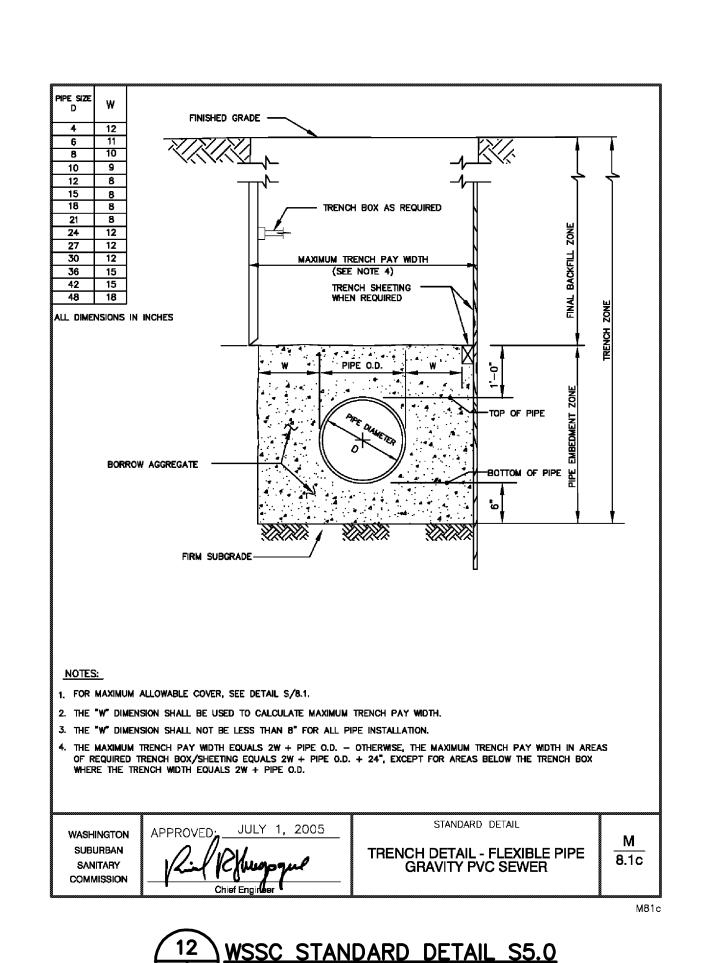




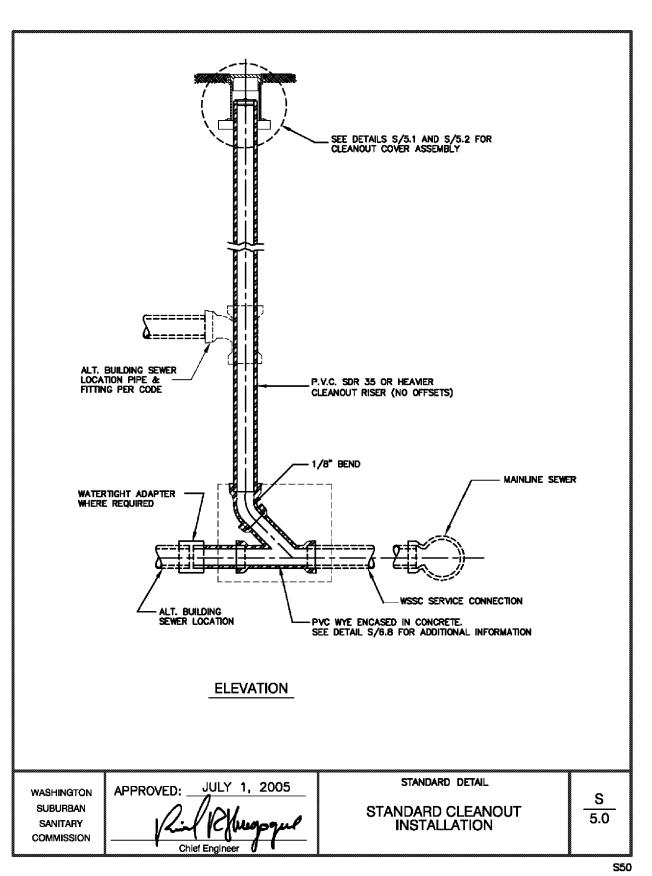
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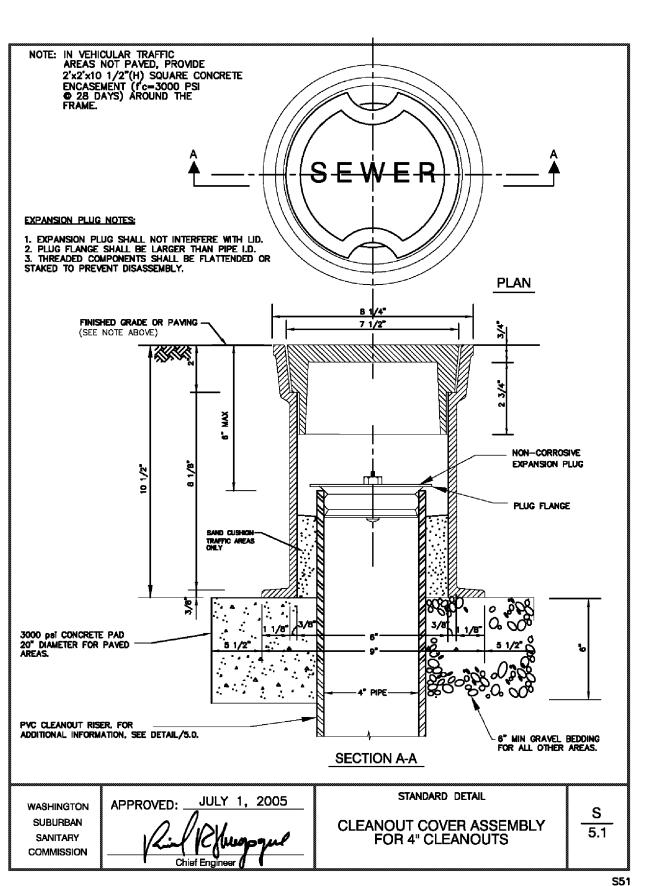


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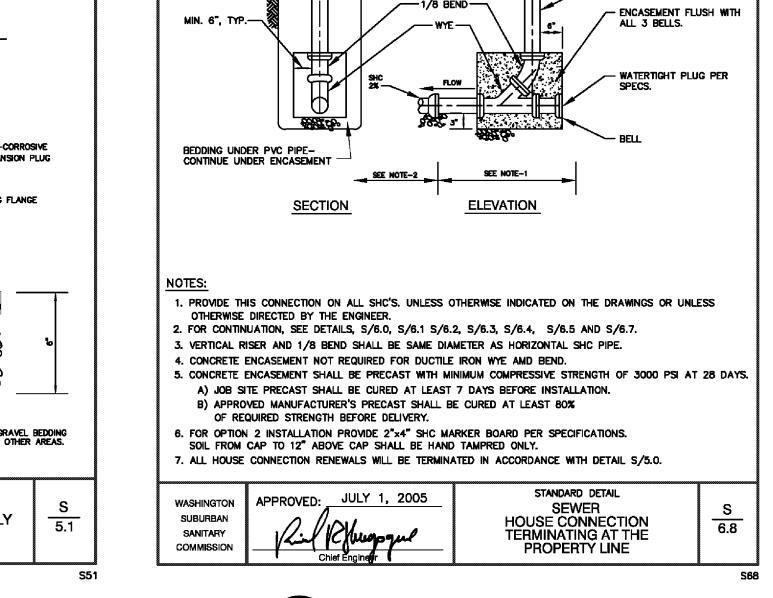
WSSC STANDARD DETAIL S5.0

201 203 NOT TO SCALE



WSSC STANDARD DETAIL S5.0

201 203 NOT TO SCALE



WATERTIGHT CAP OPTION 1

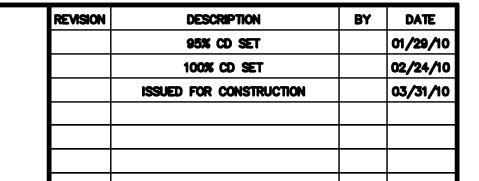
TRENCH WIDTH

CAP OPTION 2

VERTICAL PIPE -



VERTICAL PIPE SPIGOT x SPIGOT.

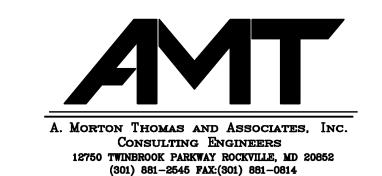


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KEAST & HOOD CO.

Structural Engineers
1850 M Street NW Washington, DC 20036
(202) 223-1941 Fax (202) 223-1942



EMAIL: AMT1@AMTENGINEERING.COM





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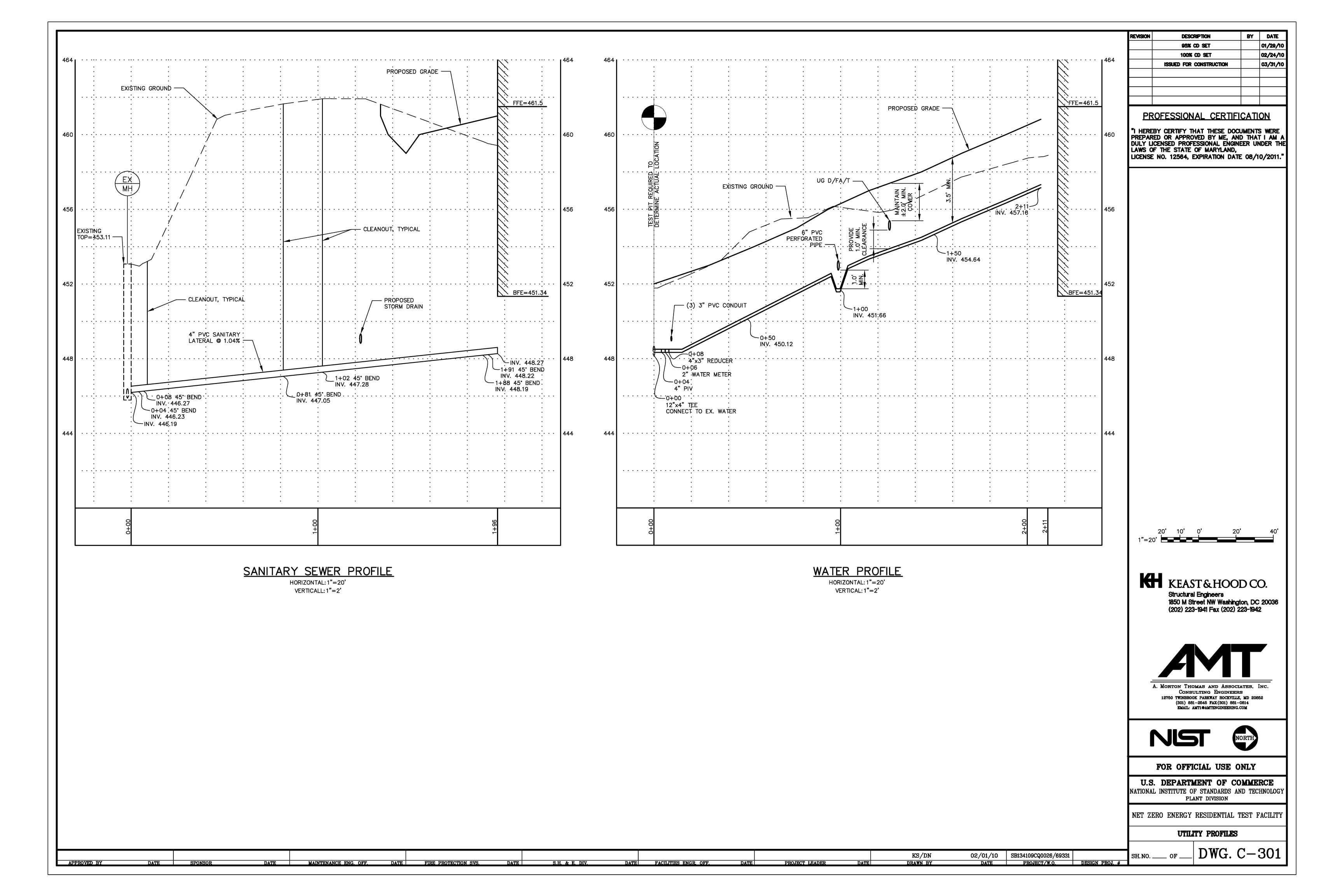
U.S. DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
PLANT DIVISION

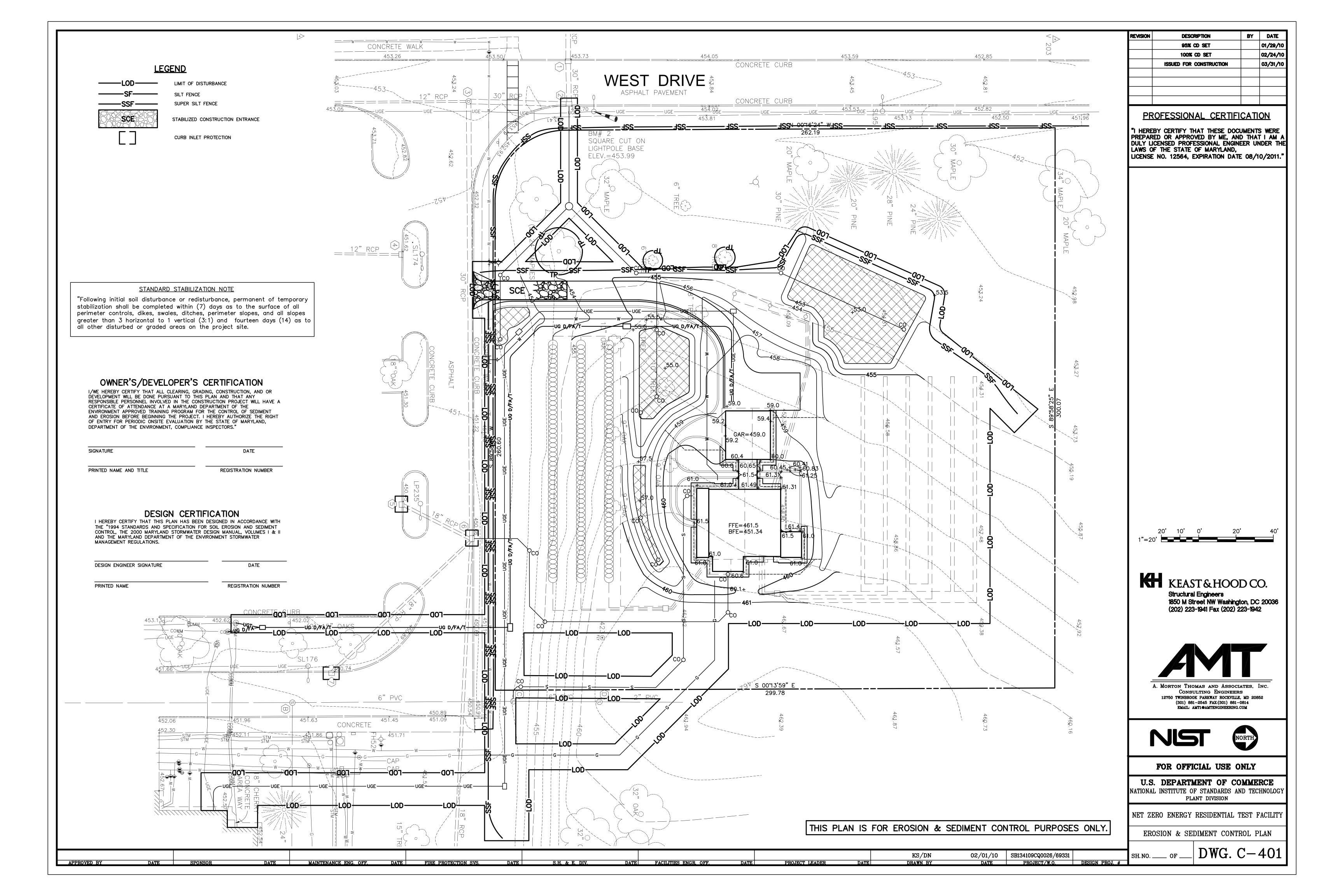
NET ZERO ENERGY RESIDENTIAL TEST FACILITY

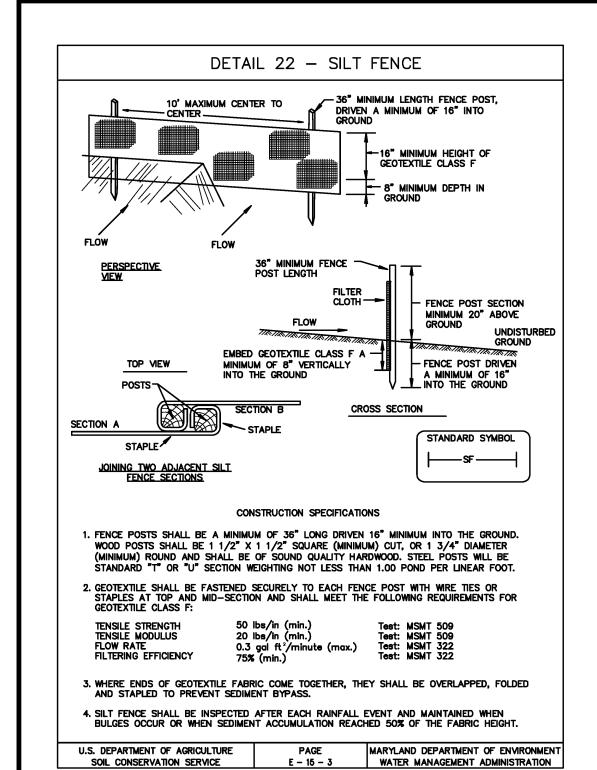
SITE DETAILS

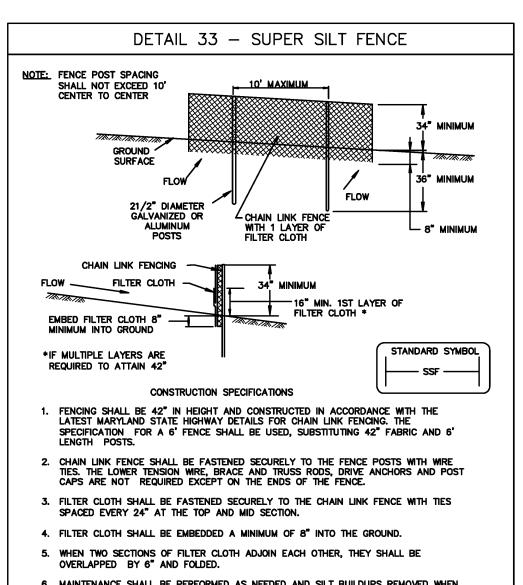
SH. NO. \_\_\_ OF \_\_ DWG. C-203

KS/DN 02/01/10 SB134109CQ0026/69331 APPROVED BY DATE SPONSOR DATE MAINTENANCE ENG. OFF. DATE FIRE PROTECTION SVS. DATE S.H. & E. DIV. DATE FACILITIES ENGR. OFF. DATE PROJECT LEADER DATE DRAWN BY DATE PROJECT/W.O. DESIGN PROJ. #









"BULGES" DEVELOP IN THE SILT FENCE, OR WHEN SILT REACHES 50% OF FENCE HEIGHT

7. FILTER CLOTH SHALL BE FASTENED SECURELY TO EACH FENCE POST WITH WIRE TIES OR STAPLES AT TOP AND MID SECTION AND SHALL MEET THE FOLLOWING REQUIREMENTS

50 lbs/in (min.)

DETAIL 23C - CURB INLET PROTECTION (COG OR COS INLETS)

Filtering Efficiency

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Test: MSMT 509

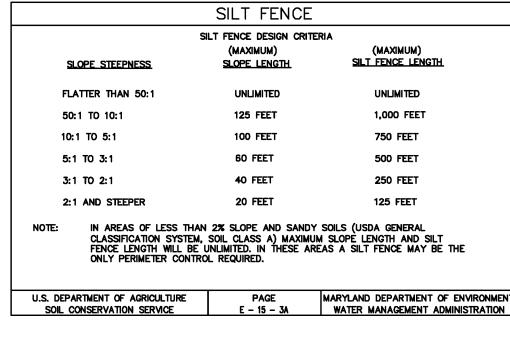
Test: MSMT 509

Test: MSMT 322

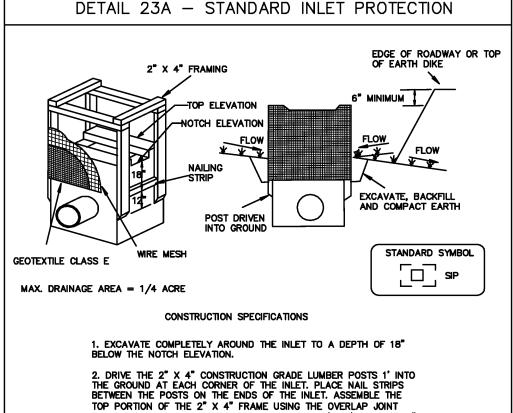
Test: MSMT 322

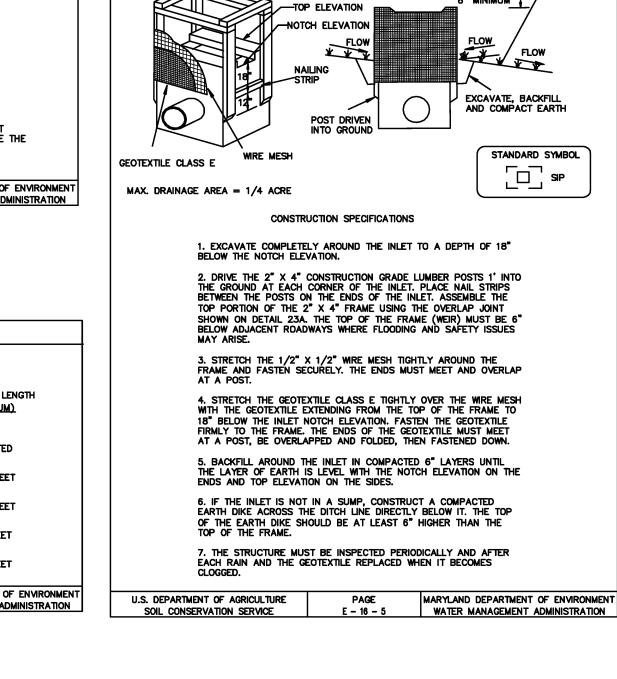
MARYLAND DEPARTMENT OF ENVIRONMENT

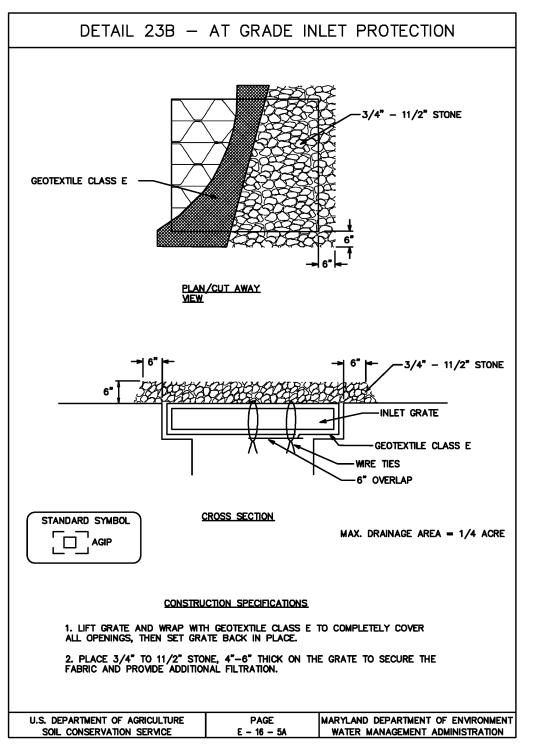
H - 25 - 3 WATER MANAGEMENT ADMINISTRATION

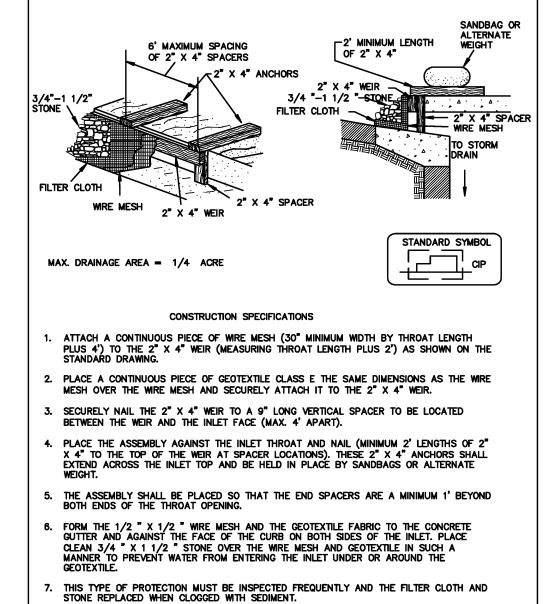


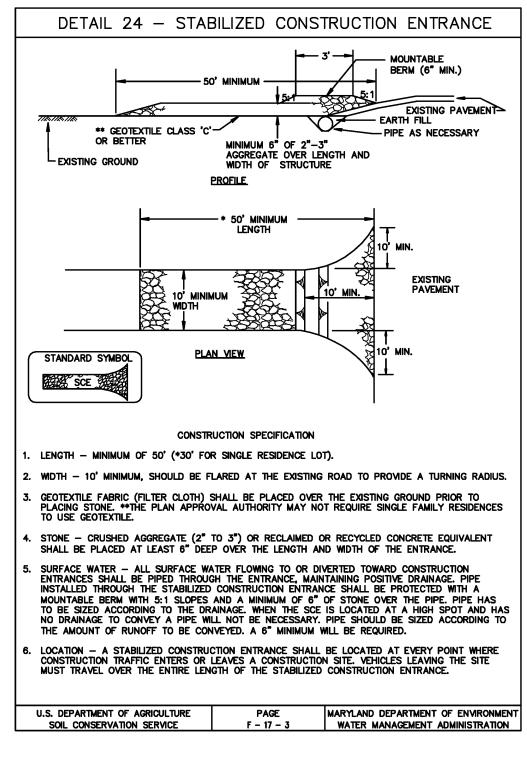
	CLIDE	R SILT FEN	CE		
	3011	\ JILI I LIV	CL		
	(	DESIGN CRITERIA			
SLOPE.	SLOPE STEEPNESS	SLOPE LEI (MAXIMU		SILT FENCE LENGTH (MAXIMUM)	
0 - 10%	0 - 10:1	UNLIMIT	ED	UNLIMITED	
10 - 20%	10:1 - 5:1	200 FE	ΞT	1,500 FEET	
20 - 33%	5:1 - 3:1	100 FEE	ΞT	1,000 FEET	
33 - 50%	3:1 - 2:1	100 FE	:T	500 FEET	
50% +	2:1 +	50 FEE	т	250 FEET	
U.S. DEPARTMENT OF AC		PAGE H - 26 - 3A		DEPARTMENT OF ENVIRONM MANAGEMENT ADMINISTRATIO	

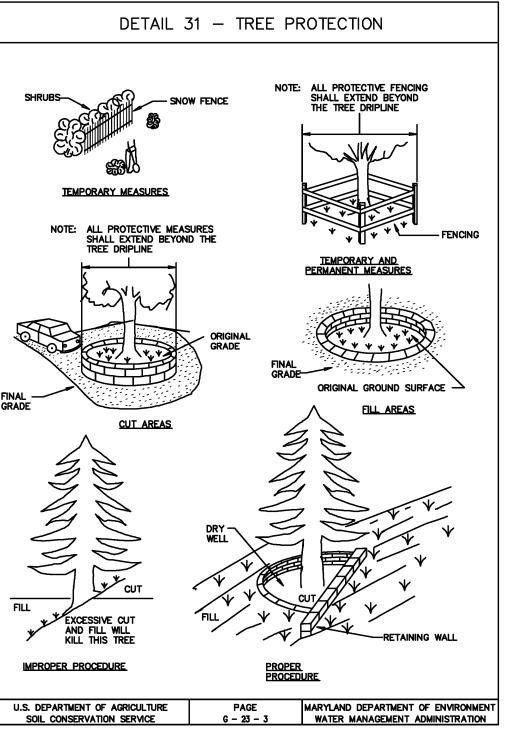










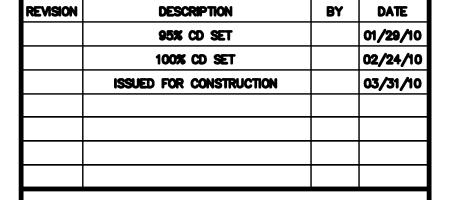


#### 23.0 STADARDS AND SPECIFICATIONS <u>TREE PROTECTION</u> CRITERIA FOR PROTECTING TREES: TREES WITHIN 25' OF A BUILDING SITE AND ASSOCIATED GRADING, PARKING AND UTILITY EXTENSIONS SHALL BE BOXED IN TO PREVENT MECHANICAL INJURY. THE BOX SHOULD BE AS CLOSE TO THE DRIP LINE OF THE TREE AS POSSIBLE. 2. BOARDS WILL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS. 3. HEAVY EQUIPMENT OPERATORS WILL BE CAUTIONED TO AVOID DAMAGE TO EXISTING TREE TRUNKS AND ROOTS DURING LAND LEVELING OPERATIONS. TUNNEL UNDER ROOT SYSTEM WEN INSTALLING LINES, IF TREE TRUNKS AND EXPOSED ROOTS AND LIMBS DAMAGED DURING EQUIPMENT OPERATIONS WILL BE CARED FOR AS PRESCRIBED BY A FORESTER OR LICENSED TREE EXPERT. . WOOD CHIPS WHEN SPREAD TO A 4" DEPTH CAN BE USED IN WOODED SITES TO HELP PREVENT SOIL COMPACTION AND DAMAGE TO TREES. THE USE OF HEAVY EQUIPMENT ON ROOT SYSTEMS OF DESIRABLE TREES MUST BE AVOIDED TO PREVENT SOIL COMPACTION. ALL CONSTRUCTION SHOULD BE KEPT OUT OF THE DRIP LINE OF PROTECTED TREES. PROTECTIVE FENCING SHALL BE UTILIZED FOR TREES BEING RETAINED AND SHALL BE LOCATED AT THE DRIP LINE. BROAD LEAF TREES SHOULD RECIEVE A HEAVY APPLICATION OF COMPLETE FERTILIZER TO AID THEIR RECOVERY FROM POSSIBLE DAMAGE CAUSED BY CONSTRUCTION OPERATIONS. FERTILIZATION SHOULD BE DONE DURING WINTER AND/OR EARLY SPRING FOLLOWING COMPLETION OF CONSTRUCTION. IT SHOULD BE APPLIED AT THE FOLLOWING RATE: 2 TO 4 LBS. OF 10-6-4 FOR EACH INCH OF TRUNK DIAMETER MEASURED AT 4 1/2" ABOVE GROUND LINE. FERTILIZER SHOULD BE APPLIED IN HOLES 1" IN DIAMETER 18" DEEP. SPACED ABOUT 2' APART AT THE DRIP LINE OF THE TREE. 8. DURING THE FIRST TWO SUMMERS FOLLOWING CONSTRUCTION, IT IS DESIRABLE THAT THE TREES RECIEVE ADEQUATE AMOUNTS OF WATER.

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



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KEAST&HOOD CO. Structural Engineers 1850 M Street NW Washington, DC 20036 (202) 223-1941 Fax (202) 223-1942





NORTH

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U.S. DEPARTMENT OF COMMERCE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY PLANT DIVISION

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

EROSION & SEDIMENT CONTROL DETAILS

SH. NO. \_\_\_\_ OF \_\_\_ DWG. C-402

İ	WEIGH I.			7.	SHALL BE PLACED AT LEAST 6" DE		
5	6. THE ASSEMBLY SHALL BE PLACED BOTH ENDS OF THE THROAT OPENI		ACERS ARE A MINIMUM 1' BEYOND	5.	SURFACE WATER - ALL SURFACE NENTRANCES SHALL BE PIPED THROU	WATER FLOWING TO OR	DIVERTED TOWARD CONS
6	3. FORM THE 1/2 " X 1/2 " WIRE ME GUTTER AND AGAINST THE FACE O CLEAN 3/4 " X 1 1/2 " STONE ON MANNER TO PREVENT WATER FROM GEOTEXTILE.	OF THE CURB ON BOTH WER THE WIRE MESH AT	SIDES OF THE INLET. PLACE ND GEOTEXTILE IN SUCH A		INSTALLED THROUGH THE STABILIZE MOUNTABLE BERM WITH 5:1 SLOPES TO BE SIZED ACCORDING TO THE D NO DRAINAGE TO CONVEY A PIPE I THE AMOUNT OF RUNOFF TO BE CO	ID CONSTRUCTION ENTR S AND A MINIMUM OF 6 PRAINAGE. WHEN THE SO MILL NOT BE NECESSAR	ANCE SHALL BE PROTE( " OF STONE OVER THE CE IS LOCATED AT A HII Y. PIPE SHOULD BE SIZ
7	7. THIS TYPE OF PROTECTION MUST E STONE REPLACED WHEN CLOGGED		ITLY AND THE FILTER CLOTH AND	6.	LOCATION — A STABILIZED CONSTR CONSTRUCTION TRAFFIC ENTERS OR MUST TRAVEL OVER THE ENTIRE LE	LEAVES A CONSTRUCT	ION SITE. VEHICLES LEA
Ε	B. ASSURE THAT STORM FLOW DOES I EARTH OR ASPHALT DIKE TO DIRECT						
			I			5.405	
$\vdash$	U.S. DEPARTMENT OF AGRICULTURE	PAGE	MARYLAND DEPARTMENT OF ENVIRONMENT		U.S. DEPARTMENT OF AGRICULTURE	PAGE	MARYLAND DEPARTME
	U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E - 16 - 5B	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION		SOIL CONSERVATION SERVICE	F - 17 - 3	WATER MANAGEME
				L			

EMAIL: AMT1@AMTENGINEERING.COM

EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.

THIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY.

KS/DN 02/01/10 | SB134109CQ0026/69331 | PROJECT LEADER DATE PROJECT/W.O. DESIGN PROJ. # APPROVED BY DATE SPONSOR DRAWN BY MAINTENANCE ENG. OFF. DATE FIRE PROTECTION SVS. S.H. & E. DIV. DATE FACILITIES ENGR. OFF.

#### STANDARD EROSION AND SEDIMENT CONTROL NOTES

THE WATER MANAGEMENT ADMINISTRATION REQUIRES THAT THESE NOTES, IN THEIR ENTIRETY, BE INCLUDED ON THE EROSION AND SEDIMENT CONTROL PLAN. IT IS RECOGNIZED THAT EVERY NOTE MAY NOT APPLY TO ALL PROJECTS. THE REQUIREMENT OF ANY INDIVIDUAL NOTE NOT APPLICABLE TO THE SUBJECT PROJECT IS NOT BINDING UPON THE APPLICANT OR THE APPLICANT'S CONTRACTOR.

- THE CONTRACTOR SHALL NOTIFY THE ADMINISTRATION (WMA) AT (410) 537-3510 SEVEN (7) DAYS BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY AND, UNLESS WAIVED BY THE
- 2. THE CONTRACTOR MUST NOTIFY WMA IN WRITING AND BY TELEPHONE AT THE FOLLOWING POINTS:
- THE REQUIRED PRE-CONSTRUCTION MEETING. FOLLOWING INSTALLATION OF SEDIMENT CONTROL MEASURES.
- DURING THE INSTALLATION OF SEDIMENT BASINS (TO BE CONVERTED INTO PERMANENT STORMWATER MANAGEMENT STRUCTURES) AT THE REQUIRED INSPECTION POINTS (SEE

ADMINISTRATION, SHALL BE REQUIRED TO HOLD A PRE-CONSTRUCTION MEETING BETWEEN PROJECT REPRESENTATIVES AND A REPRESENTATIVE OF WMA.

- INSPECTION CHECKLIST ON PLAN). NOTIFICATION PRIOR TO COMMENCING CONSTRUCTION OF EACH STEP IS MANDATORY. PRIOR TO REMOVAL OR MODIFICATION OF ANY SEDIMENT CONTROL STRUCTURE(S).
- PRIOR TO REMOVAL OF ALL SEDIMENT CONTROL DEVICES.
- PRIOR TO FINAL ACCEPTANCE.
- THE CONTRACTOR SHALL CONSTRUCT ALL EROSION AND SEDIMENT CONTROL MEASURES PER THE APPROVED PLAN AND CONSTRUCTION SEQUENCE AND SHALL HAVE THEM INSPECTED AND APPROVED BY THE AGENCY INSPECTOR OR WMA INSPECTOR PRIOR TO BEGINNING ANY OTHER LAND DISTURBANCES. MINOR SEDIMENT CONTROL DEVICE LOCATION ADJUSTMENTS MAY BE MADE IN THE FIELD WITH THE APPROVAL OF THE WMA INSPECTOR. THE CONTRACTOR SHALL ENSURE THAT ALL RUNOFF FROM DISTURBED AREAS IS DIRECTED TO THE SEDIMENT CONTROL DEVICES AND SHALL NOT REMOVE ANY EROSION OR SEDIMENT CONTROL MEASURE WITHOUT PRIOR PERMISSION FROM WMA INSPECTOR AND AGENCY INSPECTOR. THE CONTRACTOR MUST OBTAIN PRIOR AGENCY AND WMA APPROVAL FOR CHANGES TO THE SEDIMENT CONTROL PLAN AND / OR SEQUENCE OF CONSTRUCTION.
- THE CONTRACTOR SHALL PROTECT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS TO PREVENT THE DEPOSITION OF MATERIALS ONTO PUBLIC ROADS. ALL MATERIALS DEPOSITED ONTO PUBLIC ROADS SHALL BE REMOVED IMMEDIATELY.
- 5. THE CONTRACTOR SHALL INSPECT DAILY AND MAINTAIN CONTINUOUSLY IN AN EFFECTIVE OPERATING CONDITION ALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL SUCH TIMES AS THEY ARE REMOVED WITH PRIOR PERMISSION FROM WMA INSPECTOR AND AGENCY INSPECTOR.
- 6. ALL SEDIMENT BASINS, TRAP EMBANKMENTS, PERIMETER DIKES, SWALES AND ALL DISTURBED SLOPES STEEPER OR EQUAL TO 3:1 SHALL BE STABILIZED WITH SOD OR SEED AND ANCHORED STRAW MULCH, OR OTHER APPROVED STABILIZATION MEASURES, AS SOON AS POSSIBLE BUT NO LATER THAN SEVEN (7) CALENDAR DAYS AFTER ESTABLISHMENT. ALL AREAS DISTURBED OUTSIDE OF THE PERIMETER SEDIMENT CONTROL SYSTEM MUST BE MINIMIZED. MAINTENANCE MUST BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION. (REQUIREMENT FOR STABILIZATION MAY BE REDUCED TO THREE (3) DAYS FOR SENSITIVE AREAS.)
- THE CONTRACTOR SHALL APPLY SOD OR SEED AND ANCHORED STRAW MULCH, OR OTHER APPROVED STABILIZATION MEASURES TO ALL DISTURBED AREAS AND STOCKPILES WITHIN FOURTEEN (14) CALENDAR DAYS AFTER STRIPPING AND GRADING ACTIVITIES HAVE CEASED IN THE AREA. MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION. (REQUIREMENT MAY BE REDUCED TO SEVEN (7) DAYS FOR SENSITIVE AREAS.)
- PRIOR TO REMOVAL OF SEDIMENT CONTROL MEASURES, THE CONTRACTOR SHALL STABILIZE AND HAVE ESTABLISHED PERMANENT STABILIZATION FOR ALL CONTRIBUTORY DISTURBED AREAS USING SOD OR AN APPROVED PERMANENT SEED MIXTURE WITH REQUIRED SOIL AMENDMENTS AND AN APPROVED ANCHORED MULCH, WOOD FIBER MULCH MAY ONLY BE USED IN SEEDING SEASON WHERE THE SLOPE DOES NOT EXCEED 10% AND GRADING HAS BEEN DONE TO PROMOTE SHEET FLOW DRAINAGE. AREAS BROUGHT TO FINISHED GRADE DURING THE SEEDING SEASON SHALL BE PERMANENTLY STABILIZED AS SOON AS POSSIBLE, BUT NOT LATER THAN FOURTEEN (14) CALENDAR DAYS AFTER ESTABLISHMENT. WHEN PROPERTY IS BROUGHT TO FINISHED GRADE DURING THE MONTHS OF NOVEMBER THROUGH FEBRUARY, AND PERMANENT STABILIZATION IS FOUND TO BE IMPRACTICAL, TEMPORARY SEED AND ANCHORED STRAW MULCH SHALL BE APPLIED TO DISTURBED AREAS. THE FINAL PERMANENT STABILIZATION OF SUCH PROPERTY SHALL BE APPLIED BY MARCH 15 OR EARLIER IF GROUND AND WEATHER CONDITIONS
- THE SITE'S APPROVAL LETTER, APPROVED EROSION AND SEDIMENT CONTROL PLANS, DAILY LOG BOOKS, AND TEST REPORTS SHALL BE AVAILABLE AT THE SITE FOR INSPECTION BY DULY AUTHORIZED OFFICIALS OF WMA AND THE AGENCY RESPONSIBLE FOR PROJECT.
- 10. SURFACE DRAINAGE FLOWS OVER UNSTABILIZED CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER PREVENTING DRAINAGE FLOWS FROM TRAVERSING THE SLOPES OR BY INSTALLING PROTECTIVE DEVICES TO LOWER THE WATER DOWNSLOPE WITHOUT CAUSING EROSION. DIKES SHALL BE INSTALLED AND MAINTAINED AT THE TOP OF A CUT OR FILL SLOPE UNTIL THE SLOPE AND DRAINAGE AREA TO IT ARE FULLY STABILIZED, AT WHICH TIME THEY MUST BE REMOVED AND FINAL GRADING DONE TO PROMOTE SHEET FLOW DRAINAGE. PROTECTIVE METHODS MUST BE PROVIDED AT POINTS OF CONCENTRATED FLOW WHERE EROSION IS LIKELY TO OCCUR.
- 11. PERMANENT SWALES OR OTHER POINTS OF CONCENTRATED WATER FLOW SHALL BE STABILIZED WITH SOD OR SEED WITH AN APPROVED EROSION CONTROL MATTING, RIP-RAP, OR BY OTHER APPROVED STABILIZATION MEASURES.
- 12. TEMPORARY SEDIMENT CONTROL DEVICES MAY BE REMOVED, WITH PERMISSION OF WMA INSPECTOR AND AGENCY INSPECTORS, WITHIN THIRTY (30) CALENDAR DAYS FOLLOWING ESTABLISHMENT OF PERMANENT STABILIZATION IN ALL CONTRIBUTORY DRAINAGE AREAS. STORMWATER MANAGEMENT STRUCTURES USED TEMPORARILY FOR SEDIMENT CONTROL SHALL BE CONVERTED TO THE PERMANENT CONFIGURATION WITHIN THIS TIME PERIOD AS WELL.
- 13. NO PERMANENT CUT OR FILL SLOPE WITH A GRADIENT STEEPER THAN 3:1 WILL BE PERMITTED IN LAWN MAINTENANCE AREAS. A SLOPE GRADIENT OF UP TO 2:1 WILL BE PERMITTED IN NONMAINTENANCE AREAS PROVIDED THAT THOSE AREAS ARE INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN WITH A LOW-MAINTENANCE GROUND COVER SPECIFIED FOR PERMANENT STABILIZATION. SLOPE GRADIENT STEEPER THAN 2:1 WILL NOT BE PERMITTED WITH VEGETATIVE STABILIZATION.
- 14. FOR FINISHED GRADING, THE CONTRACTOR SHALL PROVIDE ADEQUATE GRADIENTS TO PREVENT WATER FROM PONDING FOR MORE THAN TWENTY FOUR (24) HOURS AFTER THE END OF A RAINFALL EVENT. DRAINAGE COURSES AND SWALE FLOW AREAS MAY TAKE AS LONG AS FORTY-EIGHT (48) HOURS AFTER THE END OF A RAINFALL EVENT TO DRAIN. AREAS DESIGNED TO HAVE STANDING WATER SHALL NOT BE REQUIRED TO MEET THIS REQUIREMENT.
- 15. SEDIMENT TRAPS OR BASINS ARE NOT PERMITTED WITHIN 20 FEET OF A FOUNDATION THAT EXISTS OR IS UNDER CONSTRUCTION. NO STRUCTURE MAY BE CONSTRUCTED WITHIN 20 FEET OF AN ACTIVE SEDIMENT TRAP OR BASIN.
- 16. THE WMA INSPECTOR HAS THE OPTION OF REQUIRING ADDITIONAL SAFETY OR SEDIMENT CONTROL MEASURES, IF DEEMED NECESSARY.
- 17. ALL TRAP DEPTH DIMENSIONS ARE RELATIVE TO THE OUTLET ELEVATION. ALL TRAPS MUST HAVE A STABLE OUTFALL. ALL TRAPS AND BASINS SHALL HAVE STABLE INFLOW POINTS.
- 18. VEGETATIVE STABILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. REFER TO APPROPRIATE SPECIFICATIONS FOR TEMPORARY SEEDING, PERMANENT SEEDING, MULCHING, SODDING, AND GROUND COVERS.
- 19. SEDIMENT SHALL BE REMOVED AND THE TRAP OR BASIN RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE QUARTER OF THE TOTAL DEPTH OF THE TRAP OR BASIN. TOTAL DEPTH SHALL BE MEASURED FROM THE TRAP OR BASIN BOTTOM TO THE CREST OF THE OUTLET.
- 20. SEDIMENT REMOVED FROM TRAPS (AND BASINS) SHALL BE PLACED AND STABILIZED IN APPROVED AREAS, BUT NOT WITHIN A FLOODPLAIN, WETLAND OR TREE-SAVE AREA. WHEN PUMPING SEDIMENT LADEN WATER, THE DISCHARGE MUST BE DIRECTED TO A SEDIMENT TRAPPING DEVICE PRIOR TO RELEASE FROM THE SITE. A SUMP PIT MAY BE USED IF SEDIMENT TRAPS THEMSELVES ARE BEING PUMPED OUT.
- 21. ALL WATER REMOVED FROM EXCAVATED AREAS SHALL BE PASSED THROUGH A WMA APPROVED DEWATERING PRACTICE OR PUMPED TO A SEDIMENT TRAP OR BASIN PRIOR TO DISCHARGE TO A FUNCTIONAL STORM DRAIN SYSTEM OR TO STABLE GROUND SURFACE.
- 22. SEDIMENT CONTROL FOR UTILITY CONSTRUCTION FOR AREAS OUTSIDE OF DESIGNED CONTROLS OR AS DIRECTED BY ENGINEER OR WMA INSPECTOR:

AND 4 INCHES IN HEIGHT WITH A MINIMUM OF 14 GAUGE WIRE. SAFETY FENCE MUST BE MAINTAINED AND IN GOOD CONDITION AT ALL TIMES.

- A. CALL "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF WORK. EXCAVATED TRENCH MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF THE TRENCH
- TRENCHES FOR UTILITY INSTALLATION SHALL BE BACKFILLED, COMPACTED, AND STABILIZED AT THE END OF EACH WORKING DAY. NO MORE TRENCH SHALL BE OPENED THAN CAN BE COMPLETED THAT SAME DAY, UNLESS;
- 23. WHERE DEEMED APPROPRIATE BY THE ENGINEER OR INSPECTOR, SEDIMENT BASINS AND TRAPS MAY NEED TO BE SURROUNDED WITH AN APPROVED SAFETY FENCE. THE FENCE MUST CONFORM TO LOCAL ORDINANCES AND REGULATIONS. THE DEVELOPER OR OWNER SHALL CHECK WITH LOCAL BUILDING OFFICIALS ON APPLICABLE SAFETY REQUIREMENTS. WHERE SAFETY FENCE IS DEEMED APPROPRIATE AND LOCAL ORDINANCES DO NOT SPECIFY FENCING SIZES AND TYPES, THE FOLLOWING SHALL BE USED AS A MINIMUM STANDARD: THE SAFETY FENCE MUST BE MADE OF WELDED WIRE AND AT LEAST 42 INCHES HIGH, HAVE POSTS SPACED NO FARTHER APART THAN 8 FEET, HAVE MESH OPENINGS NO GREATER THAN 2 INCHES IN WIDTH

APPROVAL MUST BE GRANTED BY THE LOCAL AUTHORITIES. ALL WASTE AND BORROW AREAS OFF-SITE MUST BE PROTECTED BY SEDIMENT CONTROL MEASURES AND STABILIZED.

TEMPORARY SILT FENCE SHALL BE PLACED IMMEDIATELY DOWNSTREAM OF ANY DISTURBED AREA INTENDED TO REMAIN DISTURBED FOR MORE THAN ONE DAY.

- 24. OFF-SITE SPOIL OR BORROW AREAS ON STATE OR FEDERAL PROPERTY MUST HAVE PRIOR APPROVAL BY WMA AND OTHER APPLICABLE STATE, FEDERAL, AND LOCAL AGENCIES; OTHERWISE
- 25. SITES WHERE INFILTRATION DEVICES ARE USED FOR THE CONTROL OF STORMWATER, EXTREME CARE MUST BE TAKEN TO PREVENT RUNOFF FROM UNSTABILIZED AREAS FROM ENTERING THE STRUCTURE DURING CONSTRUCTION. SEDIMENT CONTROL DEVICES PLACED IN INFILTRATION AREAS MUST HAVE BOTTOM ELEVATIONS AT LEAST TWO (2) FEET HIGHER THAN THE FINISH GRADE BOTTOM ELEVATION OF THE INFILTRATION PRACTICE. WHEN CONVERTING A SEDIMENT TRAP TO AN INFILTRATION DEVICE, ALL ACCUMULATED SEDIMENT MUST BE REMOVED AND DISPOSED OF PRIOR TO FINAL GRADING OF INFILTRATION DEVICE.
- 26. WHEN A STORM DRAIN SYSTEM OUTFALL IS DIRECTED TO A SEDIMENT TRAP OR SEDIMENT BASIN AND THE SYSTEM IS TO BE USED FOR TEMPORARILY CONVEYING SEDIMENT LADEN WATER, ALL STORM DRAIN INLETS IN NON-SUMP AREAS SHALL HAVE TEMPORARY ASPHALT BERMS CONSTRUCTED AT THE TIME OF BASE PAVING TO DIRECT GUTTER FLOW INTO THE INLETS TO AVOID SURCHARGING AND OVERFLOW OF INLETS IN SUMP AREAS.
- 27. SITE INFORMATION:
- TOTAL AREA OF FACILITY (BASE, CAMPUS, PARK, ETC.) <u>578+</u> ACRES
- TOTAL AREA OF PROJECT SITE 578 ACRES AREA DISTURBED 1.5 ACRES
- AREA TO BE ROOFED OR PAVED .16 ACRES (SOLAR PANELS)
- TOTAL CUT 2,000 CUBIC YARDS TOTAL FILL 2,000 CUBIC YARDS
- OFF-SITE WASTE / BORROW AREA LOCATION TO BE DETERMINED BY CONTRACTOR
- EARTHWORK QUANTITIES SHOWN HERE ON ARE APPROXIMATE AND ARE FOR THE REVIEWING AGENCY USE ONLY. THE CONTRACTOR MUST MAKE HIS OWN DETERMINATION OF EARTHWORK QUANTITIES.

THE ABOVE SITE INFORMATION HAS BEEN PROVIDED SOLELY FOR USE BY MDE IN REVIEWING SEDIMENT CONTROL AND IS NOT TO BE RELIED UPON BY ANY CONTRACTOR IN PREPARING BIDS. THE CONTRACTOR SHALL MAKE ITS OWN DETERMINATION OF QUANTITIES, VOLUMES AND/OR AREAS USED IN ESTABLISHING ITS BIDS.

#### STANDARD STABILIZATION NOTE

"Following initial soil disturbance or redisturbance, permanent of temporary stabilization shall be completed within (7) days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1) and fourteen days (14) as to all other disturbed or graded areas on the project site.

### EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.

ITHIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY.

#### STANDARDS AND SPECIFICATIONS FOR DUST CONTROL

- 1. THE CONTRACTOR SHALL CONDUCT OPERATIONS AND MAINTAIN THE PROJECT SITE AS TO MINIMIZE THE CREATION AND DISPERSION OF DUST. DUST
- 2. THE CONTRACTOR MUST PROVIDE CLEAN WATER, FREE FROM SALT, OIL AND OTHER DELETERIOUS MATERIAL TO BE USED FOR ON-SITE DUST CONTROL.
- 3. THE CONTRACTOR SHALL SUPPLY WATER SPRAYING EQUIPMENT CAPABLE OF ACCESSING ALL WORK AREAS.
- 4. THE CONTRACTOR SHALL IMPLEMENT STRICT DUST CONTROL MEASURES DURING ACTIVE CONSTRUCTION PERIODS ON-SITE. THESE CONTROL MEASURES WILL GENERALLY CONSIST OF WATER APPLICATIONS THAT SHALL BE APPLIED A MINIMUM OF ONCE PER DAY DURING DRY WEATHER OR MORE OFTEN AS REQUIRED TO PREVENT DUST EMISSIONS.
- 5. FOR WATER APPLICATION TO UNDISTURBED SOIL SURFACES. THE CONTRACTOR SHALL:

CONTROL SHALL BE USED THROUGHOUT THE WORK AT THE SITE.

- A. APPLY WATER WITH EQUIPMENT CONSISTING OF TANK, SPRAY BAR, PUMP WITH DISCHARGE PRESSURE GAUGE; ARRANGE SPRAY BAR HEIGHT, NOZZLE SPACING AND SPRAY PATTERN TO PROVIDE COMPLETE COVERAGE OF GROUND WITH WATER:
- C. DISPERSE WATER THROUGH NOZZLES ON SPRAY BAR AT 20 PSI MINIMUM. KEEP AREAS DAMP WITHOUT CREATING NUISANCE CONDITIONS SUCH AS
- 6. FOR WATER APPLICATION TO SOIL SURFACES DURING DEMOLITION AND/OR EXCAVATION, THE CONTRACTOR SHALL:
- A. APPLY WATER WITH EQUIPMENT CONSISTING OF A TANK, PUMP WITH DISCHARGE GAUGE, HOSES AND MIST NOZZLES. B. LOCATE TANK AND SPRAYING EQUIPMENT SO THAT THE ENTIRE EXCAVATION AREA CAN BE MISTED WITHOUT INTERFERING WITH DEMOLITION AND/OR
- EXCAVATION EQUIPMENT OR OPERATIONS. KEEP AREAS DAMP WITHOUT CREATING NUISANCE CONDITIONS SUCH AS PONDING. C. APPLY WATER SPRAY IN A MANNER TO PREVENT MOVEMENT OF SPRAY BEYOND THE SITE BOUNDARIES.

#### SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS

- A. SITE PREPARATION
- INSTALL EROSION AND SEDIMENT CONTROL STRUCTURES (EITHER TEMPORARY OR PERMANENT) SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, BERMS, WATERWAYS, OR SEDIMENT CONTROL
- IL PERFORM ALL GRADING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. FINAL GRADING AND SHAPING IS NOT USUALLY NECESSARY FOR TEMPORARY SEEDING.
- iii. SCHEDULE REQUIRED SOIL TESTS TO DETERMINE SOIL AMENDMENT COMPOSITION AND APPLICATION RATES FOR SITES HAVING DISTURBED AREA OVER 5 ACRES.
- B. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)
- SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OVER 5 ACRES. SOIL ANALYSIS MAY BE PERFORMED BY THE UNIVERSITY OF MARYLAND OR A RECOGNIZED COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSIS.
- FERTILIZERS SHALL BE UNIFORM IN COMPOSITION, FREE FLOWING, AND SUITABLE FOR ACCURATE APPLICATION BY APPROVED EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS SHALL BE DELIVERED TO THE SITE, FULLY LABELED ACCORDING TO APPLICABLE STATE FERTILIZER LAWS AND SHALL BEAR THE NAME, TRADE NAME OR TRADEMARK, AND WARRANTY OF THE PRODUCER.
- iii. LIME MATERIALS SHALL BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED) WHICH CONTAINS AT LEAST 50% TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT AT LEAST 50% WILL PASS THROUGH A #100 MESH SIEVE, AND 98 TO 100% WILL PASS THROUGH A #20 MESH SIEVE.
- iv. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
- C. SEEDBED PREPARATION
- TEMPORARY SEEDING
  - SEEDBED PREPARATION SHALL CONSIST OF LOOSENING SOIL TO A DEPTH OF 3" TO 5" BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS, CHISEL PLOWS, OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT SHOULD NOT BE ROLLED OR DRAGGED SMOOTH, BUT LEFT IN THE ROUGHENED CONDITION. SLOPED AREAS (GREATER THAN 3:1) SHOULD BE TRACKED LEAVING THE SURFACE IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
- b. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS.
- INCORPORATE LIME AND FERTILIZER INTO THE TOP 3" TO 5" OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
- ii. PERMANENT SEEDING
- a. MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT:
  - 1. SOIL pH SHALL BE BETWEEN 6.0 AND 7.0.
  - 2. SOLUBLE SALTS SHALL BE LESS THAN 500 PARTS PER MILLION (PPM).
  - 3. THE SOIL SHALL CONTAIN LESS THAN 40% CLAY, BUT ENOUGH FINE GRAINED MATERIAL (>30% SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION IS IF LOVEGRASS OR SERECIA LESPEDEZA IS TO BE PLANTED, THEN A SANDY SOIL (<30% SILT PLUS CLAY) WOULD BE ACCEPTABLE.
  - 4. SOIL SHALL CONTAIN 1.5% MINIMUM ORGANIC MATTER BY WEIGHT.
  - 5. SOIL MUST CONTAIN SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
  - 6. IF THESE CONDITIONS CANNOT BE MET BY SOILS ON SITE, ADDING TOPSOIL IS REQUIRED IN ACCORDANCE WITH SECTION 21 "STANDARD AND SPECIFICATION FOR TOPSOIL" OF THE 1994 MD STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT.
- AREAS PREVIOUSLY GRADED IN CONFORMANCE WITH THE DRAWINGS SHALL BE MAINTAINED IN A TRUE AND EVEN GRADE, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES TO PERMIT BONDING OF THE TOPSOIL TO THE SURFACE AREA AND TO CREATE HORIZONTAL EROSION CHECK SLOTS TO PREVENT TOPSOIL FROM SLIDING DOWN A SLOPE.
- c. APPLY SOIL AMENDMENTS AS PER SOIL TEST OR AS INCLUDED IN THE CONTRACT DOCUMENTS.
- MIX SOIL AMENDMENTS INTO THE TOP 3 5 INCHES OF TOPSOIL BY DISKING OR OTHER SUITABLE MEANS. LAWN AREAS SHOULD BE RAKED TO SMOOTH THE SURFACE; REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION, LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE. STEEP SLOPES (STEEPER THAN 3:1) SHOULD BE TRACKED BY A DOZER LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. THE TOP 1 -3 INCHES OF SOIL SHOULD BE LOOSE AND FRIABLE. SEEDBED LOOSENING MAY NOT BE NECESSARY ON NEWLY DISTURBED AREAS.
- D. SEED SPECIFICATIONS
- ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED SHALL BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED SHALL HAVE BEEN TESTED WITHIN 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON THIS
- NOTE: SEED TAGS SHALL BE MADE AVAILABLE TO THE INSPECTOR TO VERIFY TYPE AND RATE OF SEED USED.
- INOCULANTS THE INOCULANTS FOR TREATING LEGUME SEED IN THE SEED MIXTURES SHALL BE A PURE CULTURE OF NITROGEN-FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS SHALL NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN

 ${\color{red} {\rm NOTE:}}$  IT IS VERY IMPORTANT TO KEEP INOCULANTS AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOVE 75 - 80 DEGREES FAHRENHEIT CAN WEAKEN BACTERIA AND MAKE INOCULANTS LESS EFFECTIVE.

#### SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS

- E. METHODS OF SEEDING
- HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER). BROADCAST OR DROP SEEDER. OR ACULTIPACKER SEEDER.
- a. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES AMOUNTS WILL NOT EXCEED THE FOLLOWING: NITROGEN - MAXIMUM OF 100 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN; P205 (PHOSPHOROUS): 200 POUNDS/ACRE; K20 (POTASSIUM): 200 POUNDS/ACRE.
- b. LIME USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY HYDROSEEDING). NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN
- c. SEED AND FERTILIZER SHALL BE MIXED ON SITE, AND SEEDING SHALL BE DONE IMMEDIATELY WITHOUT INTERRUPTION.
- ii. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.
- a. SEED SPREAD SHALL BE INCORPORATED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON THE TEMPORARY OR PERMANENT SEEDING SUMMARIES OR TABLES 25 OR 26. THE SEEDED AREA SHALL THEN BE ROLLED WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.
- b. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
- iii. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
- a. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.
- b. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
- F. MULCH SPECIFICATIONS (IN ORDER OF PREFERENCE)
- STRAW SHALL CONSIST OF THOROUGHLY THRESHED WHEAT, RYE OR OAT STRAW, REASONABLY BRIGHT IN COLOR, AND SHALL NOT BE MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY, AND SHALL BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW.
- ii. WOOD CELLULOSE FIBER MULCH (WCFM)
- a. WCFM SHALL CONSIST OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
- b. WCFM SHALL BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
- c. WCFM, INCLUDING DYE, SHALL CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
- d. WCFM SHALL BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER, AND OTHER ADDITIVES TO FORM A HOMOGENOUS SLURRY. THE MULCH MATERIAL SHALL FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND SHALL COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDINGS.
- e. WCFM SHALL CONTAIN NO ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE
- WOOD CELLULOSE FIBER MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH TO APPROXIMATELY 10 mm., DIAMETER APPROXIMATELY 1 mm., pH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6% MAXIMUM, AND WATER HOLDING CAPACITY OF 90% MINIMUM.
- NOTE: ONLY STERILE STRAW MULCH SHOULD BE USED IN AREAS WHERE A STAND OF ONE SPECIES OF GRASS IS DESIRED.
- G. MULCHING SEEDED AREAS MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING
- i. IF GRADING IS COMPLETED OUTSIDE OF THE SEEDING SEASON, MULCH ALONE SHALL BE APPLIED AS PRESCRIBED IN THIS SECTION AND MAINTAINED UNTIL THE SEEDING SEASON RETURNS AND SEEDING CAN BE PERFORMED IN ACCORDANCE WITH THESE SPECIFICATIONS.
- WHEN STRAW MULCH IS USED, IT SHALL BE SPREAD OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS/ACRE. MULCH SHALL BE APPLIED TO A UNIFORM LOOSE DEPTH OF BETWEEN 1 AND 2 INCHES. MULCH APPLIED SHALL ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHOULD BE INCREASED TO
- WOOD CELLULOSE FIBER USED AS A MULCH SHALL BE APPLIED AT A NET DRY WEIGHT OF 1,500 LBS. PER ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER, AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LBS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
- H. SECURING STRAW MULCH (MULCH ANCHORING)

3,000 FEET LONG.

- MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON SIZE OF AREA AND EROSION HAZARD:
- A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 2 INCHES. THIS IS THE MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD BE USED ON THE CONTOUR, IF POSSIBLE.
- APPLIED AT A NET DRY WEIGHT OF 750 LBS./ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER, AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LBS. OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.

WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. THE FIBER BINDER SHALL BE

iii. APPLICATIONS OF LIQUID BINDERS SHOULD BE APPLIED HEAVIER AT EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. THE REMAINDER OF AREA SHOULD BE UNIFORM AFTER BINDER APPLICATION. SYNTHETIC BINDERS - SUCH AS ACRYLIC DRL (AGRO-TACX), DCA-70. PETROSET. TERRA TAX II. TERRA TACK AR, OR OTHER APPROVED EQUAL MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH.

LIGHTWEIGHT: PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER'S

RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 300 TO

REVISION BY DATE DESCRIPTION 95% CD SET 01/29/10 02/24/10 100% CD SET ISSUED FOR CONSTRUCTION 03/31/10

#### PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME. AND THAT I AM DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND,

LICENSE NO. 12564. EXPIRATION DATE 08/10/2011.'

KEAST&HOOD CO. Structural Engineers 1850 M Street NW Washington, DC 20036 (202) 223-1941 Fax (202) 223-1942







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U.S. DEPARTMENT OF COMMERCE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

PLANT DIVISION

EROSION & SEDIMENT CONTROL NOTES

DWG. C-403

KS/DN 02/01/10 | SB134109CQ0026/69331 APPROVED BY MAINTENANCE ENG. OFF. DATE FIRE PROTECTION SVS. DATE FACILITIES ENGR. OFF. PROJECT LEADER DRAWN BY DATE PROJECT/W.O. DESIGN PROJ. # SPONSOR S.H. & E. DIV.

	BIORETEN	NTION CONSTRUC	TION SPECIFICATIONS
MATERIAL	SPECIFICATION/ TEST METHOD	SIZE	NOTES
PLANTING SOIL (2.5' TO 4' DEEP)	SAND 30-60% SILT 30-55% CLAY 10-25%	N/A	USDA SOIL TYPES LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD		AGED 6 MONTHS, MINIMUM
PEA GRAVEL DIAPHRAGM AND CURTAIN DRAIN	PEA GRAVEL: ASTM D-448 ORNAMENTAL STONE: WASHED COBBLES	PEA GRAVEL: NO. 6 STONE: 2" TO 5"	
SAND	CLEAN AASHTO-M-6 OR ASTM-C-33 CONCRETE SAND	0.02" to 0.04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRAYSTONE #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATED OR DOLOMITIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND.
UNDERDRAIN GRAVEL	AASHTO-M-43	0.25" TO 0.75"	UNDERDRAIN GRAVEL SHALL BE CLEAN WASHED.
UNDERDRAIN PIPING	F758, TYPE PS 28 OR AASHTO-M-278	6" RIGID SCHEDULE 40 PVC OR SDR35	3/8" PERF. @ 6" ON CENTER, 4 HOLES PER ROW; MINIMUM OF 3" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES.
GEOTEXTILE FABRIC	CLASS "C", APPARENT OPENING SIZE (ASTM D-4751), GRAB TENSILE STRENGTH (ASTM D-4632), PUNCTURE RESISTANCE (ASTM D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY.
POURED IN PLACE CONCRETE (IF REQUIRED)	MSHA MIX NO. 3, F'c=3500 PSI AT 28 DAYS, NORMAL WEIGHT, AIR ENTRAINED, REINFORCING TO MEET ASTM 615-60	N/A	ON-SITE TESTING OF POURED IN PLACE CONCRETE REQUIRED. 28-DAY AND STRENGTH AND SLUMP TEST; ALL CONCRETE DESIGN (CAST-IN-PLACE OR PRECAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND — DESIGN TO INCLUDE MEETING ACI CODE 350.R/89; VERTICAL LOADING [H-10 OR H-20]; ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING.

MAINTENANCE SCHEDULE FOR BIORETENTION

FREQUENCY

WHENEVER NEEDED

THREE YEARS

ONCE A YEAR

N/A

ONCE EVERY TWO TO

IMMEDIATELY AFTER

IMMEDIATELY AFTER

ONCE A YEAR

N/A

PROJECT COMPLETION

PROJECT COMPLETION

MONTHLY

TIME OF YEAR

MONTHLY

SPRING

SPRING

N/A

N/A

THE SPRING

WHENEVER NEEDED

WHENEVER NEEDED

3/15 TO 4/30 AND 10/1 TO 11/30

VARIES, DEPENDS ON INSECT

OR DISEASE INFESTATION

ONLY REMOVE STAKES IN

METHOD

VISUAL

BY HAND

REMOVAL AND REPLACEMENT | SEE PLANTING SPECIFICATIONS | TWICE A YEAR

MECHANICAL OR BY HAND

DESCRIPTION

INSPECT AND REPAIR

REMULCH ANY VOID AREAS

REMOVE PREVIOUS MULCH

LAYER BEFORE APPLYING

NEW LAYER (OPTIONAL)

ANY ADDITIONAL MULCH

OF ALL DEAD AND DISEASED

TREAT ALL DISEASED TREES

MATERIAL SHALL TAKE PLACE

AT THE END OF EACH DAY

FOR FOURTEEN CONSECUTIVE

DAYS AFTER PLANTING HAS

MATERIAL SHALL TAKE PLACE

AT THE END OF EACH DAY

FOR FOURTEEN CONSECUTIVE

DAYS AFTER PLANTING HAS

REPLACE ANY DEFICIENT

REPLACE STAKES AFTER ONE

VEGETATION CONSIDERED

BEYOND TREATMENT

WATERING OF PLANT

BEEN COMPLETED

BEEN COMPLETED

STAKES OR WIRES

WATERING OF PLANT

AND SHRUBS

ADDED (OPTIONAL)

EROSION

ORGANIC LAYER

SOIL

AB-BUILT DATA FOR FILTERS							
* TO BE COMPLETED BY THE (	CERTIFYING ENG	INEER					
TYPE OF FACILITY: BIORETENTION	DESIGN	*AS-BUILT					
FILTER BED AREA (LxW)/ SURFACE AREA (SF)	327 SF						
FILTER BED WATER SURFACE ELEVATION	274.43						
FILTER INLET PIPE SIZE / ELEVATION	8"/ 275.00						
OUTLET PIPE (UNDERDRAIN) SIZE / ELEVATION	6"/ 270.50						
BIORETENTION VOLUME	325 CF						
MULCH THICKNESS	3"						
PLANTING MEDIA THICKNESS	30"						
PEA GRAVEL THICKNESS	3"						
UNDERDRAIN GRAVEL THICKNESS	8"						
GRAVEL THICKNESS BELOW UNDERDRAIN	6 <b>"</b>						
PROVIDE COMPOSITION CERTIFICATION OF FILTER MEDIA	_						
VERIFY GEOTEXTILE FABRIC INSTALLATION (SIDES ONLY)	_						
VERIFY PLANTING (SPECIES, NUMBER AND HEALTH)	_						
VERIFY PLANTING (SPECIES, NUMBER AND HEALTH)							
DATE AS-BUILT ACCEPTED BY MDE:							

#### AS-BUILT CERTIFICATION REQUIREMENTS:

ONCE CONSTRUCTION IS COMPLETE, AS-BUILT PLAN CERTIFICATION SHALL BE SUBMITTED TO THE ADMINISTRATION BY EITHER A PROFESSIONAL ENGINEER OR PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF MARYLAND TO ENSURE THAT CONSTRUCTED STORMWATER MANAGEMENT PRACTICES AND CONVEYANCE SYSTEMS COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE APPROVED PLANS. AT A MINIMUM, AS-BUILT CERTIFICATION SHALL INCLUDE A SET OF DRAWINGS COMPARING THE APPROVED STORMWATER MANAGEMENT PLAN WITH WHAT WAS CONSTRUCTED. THE ADMINISTRATION MAY REQUIRE ADDITIONAL INFORMATION.

AT A MINIMUM, REGULAR INSPECTIONS SHALL BE MADE AND DOCUMENTED AT THE FOLLOWING SPECIFIED STAGES OF CONSTRUCTION:

#### FILTERING SYSTEMS:

(A) DURING EXCAVATION TO SUBGRADE;

- (B) DURING PLACEMENT AND BACKFILL OF UNDERDRAIN SYSTEMS; (C) DURING PLACEMENT OF GEOTEXTILES AND ALL FILTER MEDIA; (D) DURING CONSTRUCTION OF APPURTENANT CONVEYANCE
- STRUCTURES: AND (E) UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.

SYSTEMS SUCH AS FLOW DIVERSION STRUCTURES, PRE-FILTERS AND FILTERS, INLETS, OUTLETS, ORIFICES, AND FLOW DISTRIBUTION

REVISION	DESCRIPTION	BY	DATE
	95% CD SET		01/29/10
	100% CD SET		02/24/10
	ISSUED FOR CONSTRUCTION		03/31/10

#### PROFESSIONAL CERTIFICATION

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## SPECIFICATIONS FOR BIORETENTION

1. MATERIAL SPECIFICATIONS

THE ALLOWABLE MATERIALS TO BE USED IN BIORETENTION AREA ARE DETAILED IN TABLE B.3.2 OF THE 2000 THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM MARYLAND STORMWATER DESIGN MANUAL.

#### 2. PLANTING SOIL

THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER SQUARE FEET. THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE BIORETENTION AREA THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING 6. UNDERDRAINS OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA: PH RANGE 5.2 - 7.0

ORGANIC MATTER 1.5 - 4% (BY WEIGHT)

MAGNESIUM 35 LB./AC PHOSPHORUS (PHOSPHATE - P205) 75 LB./AC

POTASSIUM (POTASH - K20) 85 LB./AC SOLUBLE SALTS NOT TO EXCEED 500 PPM

ALL BIORETENTION AREAS SHALL HAVE A MINIMUM OF ONE TEST. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH. PHOSPHORUS. AND POTASSIUM AND ADDITIONAL TESTS OF ORGANIC MATTER. AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOP SOIL WAS EXCAVATED. SINCE DIFFERENT LABS CALIBRATE THEIR TESTING EQUIPMENT DIFFERENTLY, ALL TESTING RESULTS SHALL

COME FROM THE SAME TESTING FACILITY.

SHOULD THE PH FALL OUT OF THE ACCEPTABLE RANGE. IT MAY BE MODIFIED (HIGHER) WITH LIME OR (LOWER) WITH IRON SULFATE PLUS SULFUR.

#### 3. COMPACTION

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF THE BIORETENTION AREA AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF BIORETENTION APPENDIX B.3. CONSTRUCTION SPECIFICATIONS FOR SAND FILTERS, BIORETENTION AND OPEN CHANNELS AREAS ARE EXCAVATED USING A LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE REQUIRED SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE. WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHÉS OF TOPSOIL OVER THE SAND. THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

RECOMMENDED PLANT MATERIAL FOR BIORETENTION AREAS CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

#### 5. PLANT INSTALLATION

MULCH SHOULD BE PLACED TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.

ROOT STOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION.

TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL. APPENDIX B.3. CONSTRUCTION SPECIFICATIONS FOR SAND FILTERS, BIORETENTION AND OPEN CHANNELS GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000

UNDERDRAINS ARE TO BE PLACED ON A 3'-0" WIDE SECTION OF FILTER CLOTH. PIPE IS PLACED NEXT, FOLLOWED BY THE GRAVEL BEDDING. THE ENDS OF UNDERDRAIN PIPES NOT TERMINATING IN AN OBSERVATION WELL SHALL BE CAPPED. THE MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

THE BIORETENTION FACILITY MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN

## AS BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE STORMWATER MANAGEMENT FACILITY SHOWN ON THE PLANS HAS (HAVE) BEEN CONSTRUCTED IN ACCORDANCE WITH THE PLANS APPROVED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, EXCEPT AS NOTED IN RED ON THE "AS BUILT" DRAWINGS.

	SIGNATURE	
NAME		
MARYLAND REGISTRATION	DATE	

MDE # ---SF----MDE No.

"CERTIFY" MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED ON SUFFICIENT AND APPROPRIATE ONSITE INSPECTIONS AND MATERIAL TESTS CONDUCTED DURING CONSTRUCTION.

BIORETENTION

FACILITY IDENTIFICATION

(NUMBER AND/OR TYPE)

## DESIGN CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN BEEN DESIGNED IN ACCORDANCE WITH THE 1994 STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I & II AND THE MARYLAND DEPARTMENT OF THE ENVIRONMENT STORMWATER MANAGEMENT REGULATIONS.

NAME

NUMBER

MARYLAND REGISTRATION NUMBER P.E., R.L.S. OR R.L.A. (CIRCLE)

DATE

SIGNATURE

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U.S. DEPARTMENT OF COMMERCE

NIST

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY PLANT DIVISION

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NORTH

Structural Engineers

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

EROSION & SEDIMENT CONTROL NOTES

SH. NO. \_\_\_\_\_ OF \_\_\_\_

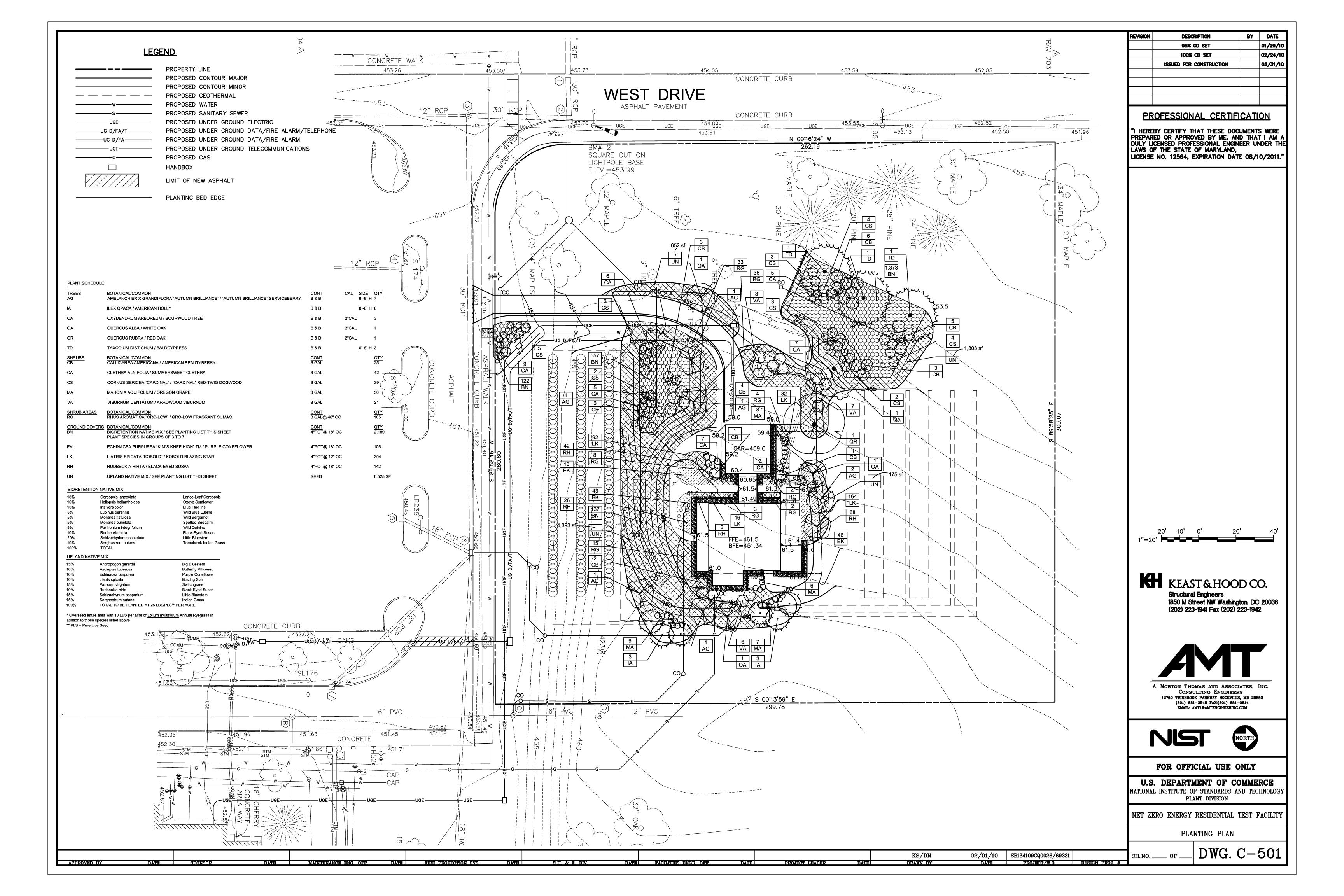
EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.

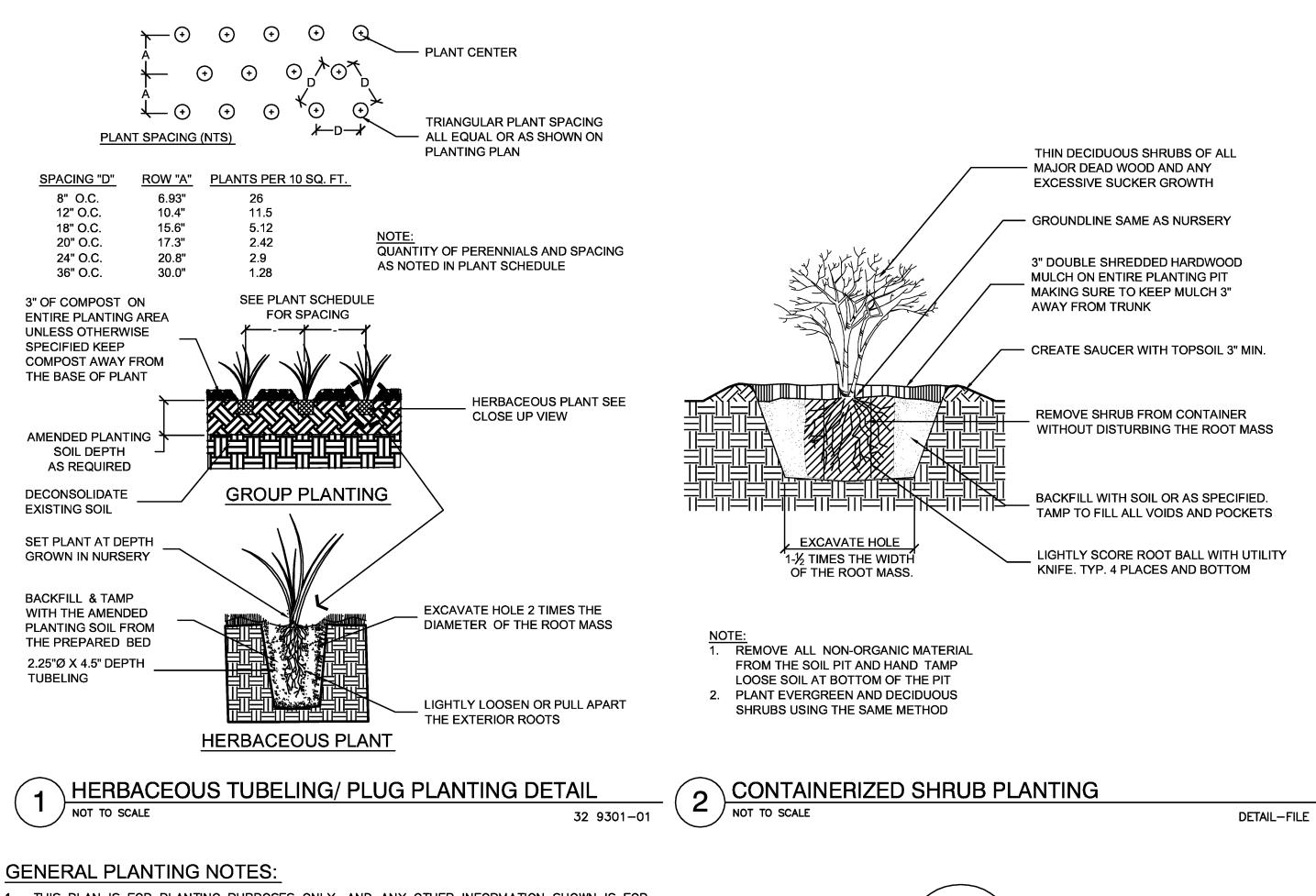
THIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY.

MDE # 10-SF-0096

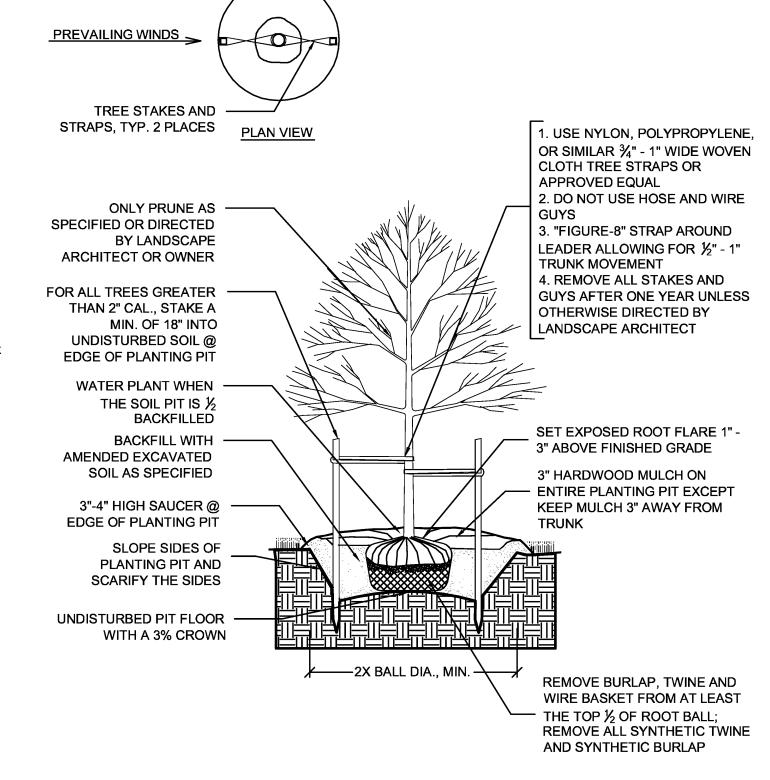
02/01/10 | SB134109CQ0026/69331 | KS/DN MAINTENANCE ENG. OFF. APPROVED BY DATE FIRE PROTECTION SVS. S.H. & E. DIV. DATE FACILITIES ENGR. OFF. DRAWN BY DATE PROJECT/W.O. DESIGN PROJ. # DATE SPONSOR

\_| DWG. C−404





- 1. THIS PLAN IS FOR PLANTING PURPOSES ONLY, AND ANY OTHER INFORMATION SHOWN IS FOR REFERENCE ONLY. SEE SITE PLAN FOR INFORMATION ABOUT ALL LAYOUT, GRADING AND OTHER SITE IMPROVEMENTS.
- 2. CALL MISS UTILITY AT 811 OR 1-800-257-7777 TO MARK UTILITIES AT LEAST 48 HOURS BEFORE
- 3. All materials and planting procedures except as otherwise noted shall conform to the latest edition of "LANDSCAPE SPECIFICATION GUIDELINES" by the Landscape Contractors Association MD-DC-VA.
- 4. Plants shall conform to the current edition of the American Standard for Nursery Stock. (ANSI
- 5. Plant names shall be those given in the latest edition of <u>Standard Plant Names</u>, American Committee on Horticultural Nomenclature.
- 6. Topsoil shall meet specifications as per the 1994 MD Standards and Specifications for Soil Erosion and Sediment Control.
- 7. The Contractor shall submit representative soil samples from both in-situ soils and soils brought in from off-site to a state licensed testing laboratory. The Contractor shall incorporate or apply soil amendments and fertilization based upon results of the soil tests and recommendations by the test
- 8. The Contractor shall apply grass according to the 1994 MD Standard and Specifications for Soil Erosion and Sediment Control. Do not use Kentucky 31 tall fescue.
- 9. The Contractor shall stake out all planting beds and tree locations for approval by the Landscape Architect or Owner's representative before digging. It is the Contractor's responsibility to locate and coordinate plantings with all existing utilities. If discrepancies occur because of utility locations or other existing conditions the Contractor shall notify the Landscape Architect and Owner's representative immediately to coordinate any necessary adjustments.
- 10. All plant material shall be labeled by the nursery and delivered with labels in place for inspection. Substitutions in plant species or size will not be permitted except with the approval of the Landscape Architect and Owner. Do not prune until plant material has been planted but as soon thereafter as is advisable under standard horticultural practices. For tree pruning and care methods please refer to ANSI A-300, latest edition.
- 11. It is of utmost importance that all plant material be set slightly higher in relation to grade than it was grown in the nursery and with good earth to root contact. Any materials or work may be rejected by the Landscape Architect if it does not meet this or any other requirement of the specifications. Rejected materials shall be removed from the site by the Contractor at Contractor's expense.
- 12. The Contractor shall mulch and water all plants well on the day they are planted. Individual planting shall be mulched. Acceptable mulch shall be hardwood only. Mulch must be wellaged, uniform in color, and free of foreign material including plant material. Well aged mulch is defined as mulch that has been stockpiled or stored for at least twelve (12) months. The Contractor shall apply the mulch uniformly to a 2 to 3 inch depth. Bark shall be kept 3 to 4 inches away from all trunks and woody stems.
- 13. In case of discrepancies between quantities on the plant list and the plan, the plan shall govern. 14. Seed or sod bare areas as directed by Owner for all disturbed areas to be stabilized that are not landscaped or covered.



STANDARD DECIDUOUS TREE PLANTING

32 9343-15

#### Channel Installation Instructions

Step 1 - Site Preparation Prepare site to design profile and grade. Remove debris, rocks, clods, etc.. Ground surface should be smooth prior to installation to ensure blanket remains in contact with slope.

Seeding of site should be conducted to design requirements or to follow local or state seeding requirements as necessary.

Step 3 - Staple Selection At a minimum, 6" long by 1" crown, biodegradable staples are to be used to secure the blanket to the ground surface. Installation in rocky, sandy or other loose soil may require longer staples.

#### Step 4 - Excavate Anchor Trench and Secure Blanket

Excavate a trench along the top of the channel side slopes and the upstream terminal end of the channel to secure the edges of the blanket. The trench should run along the length and width of the installation, be 6" wide and 6" deep. Staple blanket along bottom of trench, fill with compacted soil, overlap blanket towards toe of slope and secure with row of staples (shown in Figures A, E and F).

Step 5 - Secure Body of Blanket

Roll blanket down slope from anchor trench. Staple body of blanket following the pattern shown in Figure D. Leave end of blanket unstapled to allow for overlap shown in Figure B. Place downstream blanket underneath upstream blanket to from shingle pattern. Staple seam as shown in Figure E. Secure downstream blanket with stapling pattern shown in Figure D. Stapling pattern shown in Figure D reflects minimum staples to be used. More staples may be required to ensure blanket is sufficiently secured to resist mowers and foot traffic and to ensure blanket is in contact with soil surface over the entire area of blanket. Further, critical points require additional staples. Critical points are identified in Figure G.

#### Step 6 - Continue Along Slope - Complete Installation

Overlap ad jacent blankets as shown in Figure C and repeat Step 5. Secure toe of slope using stapling pattern shown in Figure E. Secure edges of installation by stapling at 1.0' intervals along the terminal edge. ∵Figure *1*0∾

Figure A Figure B - Profile View

Figure C - Cross Section View Product Application/Equivalency Specifications

Excelsior mat consists of a rapid degradable Rolled Erosion Control Product (RECP) comprised of an excelsior matrix mechanically (stitch) bound to a single, rapid photodegradable synthetic net (top). The expected longevity of the mat shall be approximately 45 - 90 days (actual longevity dependent on field and climatic conditions). The mat shall be manufactured to include physical properties sufficient to provide the intended longevity and performance to include:

### Verified Values:

1. Tensile strength: 5.0 md, 4.0 td lbs/in 2. Elongation: 20 md, 25 td percent 3. Mass per unit area: 11.5 oz/sq. yd 4. Light penetration: 50 percent open 5. Water absorption: 375 percent

## 1. Top net:

**\ EXCELSIOR MAT FOR NATIVE SEEDING AREAS** 

Synthetic rapid photo-degradable 2. Top net opening: 1.00 in x 0.75 in nominal

#### . Consist of machine produced, weed and debris free excelsior bound to a single, synthetic, rapidly degrading photo-degradable net. 2. Sufficient tensile strength, thickness and coverage to maintain integrity

during installation and ensure material performance. 3. Meet ECTC specification for category 1C products.

2.0' + 2.0' + 2.0' + 2.0' + 1.5'-1.0'-2.0-1.0'-X - Denotes Staple Location Figure D - Plan View \* \* \* \* \* \* 1.0' | 1.0' | 1.0' | 1.0' | 1.0' | 1.0' | 1.0' | 1.0'

× - Denotes Staple Location **\* \* \*** Figure E - Plan

\*Approximately 300 Staples per Roll (8' or 4' width) Required - Drawings Not to Scale 8' Wide Blanket Shown 6.0" [\_\_6.0" Figure F - Profile

- 2.0' - 2.0' -

Figure G - Critical Points

DETAIL-FILE

BY DATE

01/29/10

02/24/10

03/31/10

DESCRIPTION

95% CD SET

100% CD SET

ISSUED FOR CONSTRUCTION

PROFESSIONAL CERTIFICATION

HEREBY CERTIFY THAT THESE DOCUMENTS WERE

PREPARED OR APPROVED BY ME, AND THAT I AM A

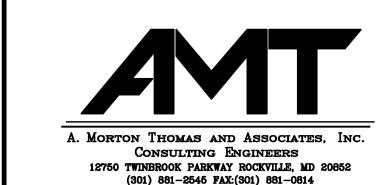
DULY LICENSED PROFESSIONAL ENGINEER UNDER THE

LICENSE NO. 12564, EXPIRATION DATE 08/10/2011.

LAWS OF THE STATE OF MARYLAND,

KH KEAST&HOOD CO. Structural Engineers 1850 M Street NW Washington, DC 20036

(202) 223-1941 Fax (202) 223-1942



NST

NORTH

EMAIL: AMT1@AMTENGINEERING.COM

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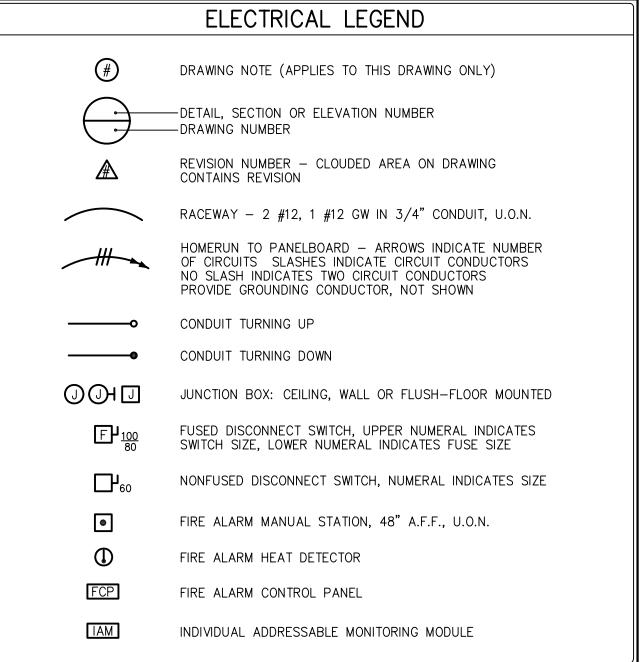
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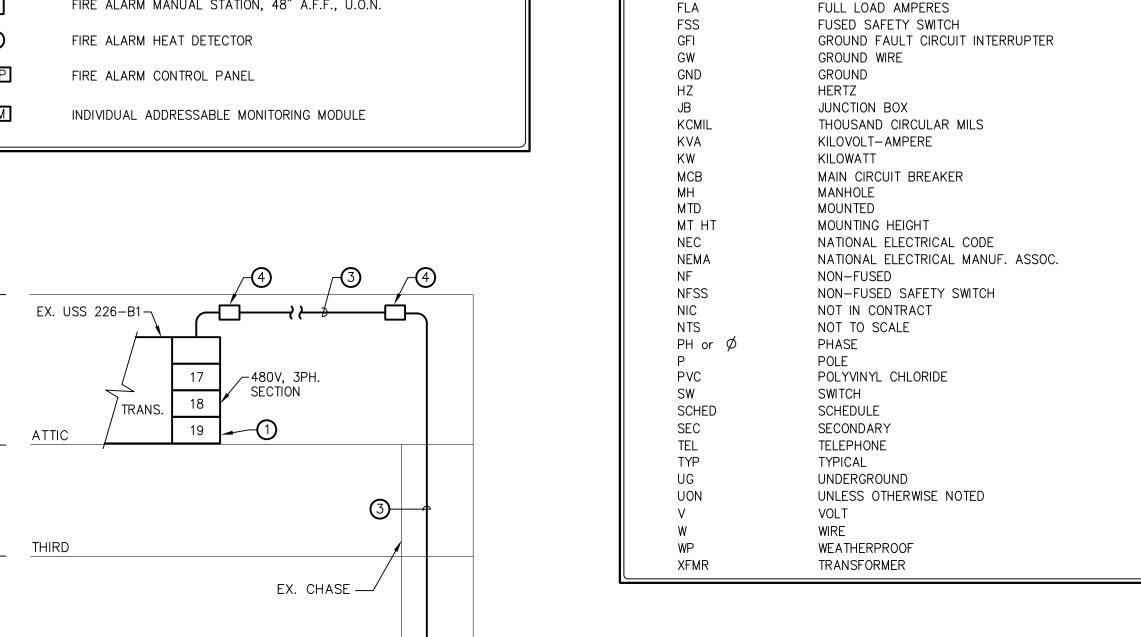
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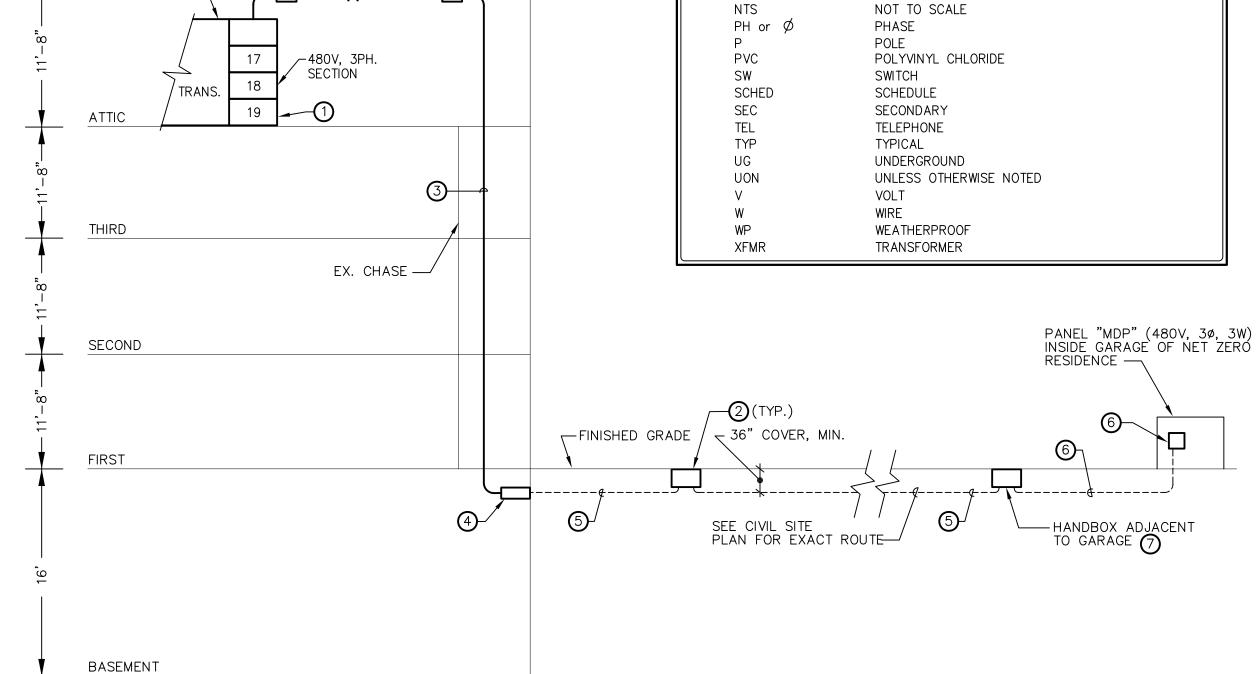
PLANTING PLAN NOTES & DETAILS

SH. NO. \_\_\_ OF \_\_ DWG. C-502

02/01/10 | SB134109CQ0026/69331 | KS/DN DATE PROJECT/W.O. DESIGN PROJ. # APPROVED BY MAINTENANCE ENG. OFF. FIRE PROTECTION SVS. S.H. & E. DIV. FACILITIES ENGR. OFF.







## POWER RISER DIAGRAM

NOT TO SCALE

## **POWER RISER NOTES:**

1 EXISTING USS IS BY EATON/CUTLER-HAMMER. PROVIDE NEW DRAW-OUT CIRCUIT BREAKER IN EXISTING SPARE CUBICLÉ NO. 19. BREAKER SHALL BE 800AF/300AT, LSIG, MAGNUM DS WITH 400A CURRENT SENSORS AND 300A TRIP PLUG.

BLDG. 226

- (2) SEE CIVIL PLAN FOR QUANTITY, LOCATION AND DETAIL OF OPEN BOTTOM HANDBOXES.
- 3 PROVIDE 2 SETS OF (3-300 KCMIL + 1 #1 GRD. IN 3" CONDUIT). WIRE IS OVERSIZED, DUE TO VOLTAGE DROP.
- (4) PULLBOX. SEE DRAWING E-2 FOR SIZE AND LOCATION.
- PROVIDE 2 SETS OF (3-300 KCMIL + 1 #1 GRD. IN 3 1/2" CONDUIT) AND PROVIDE ONE SPARE 3 1/2" CONDUIT WITH PULL STRING.
- (6) PROVIDE 3-500 KCMIL + 1 #3 GRD. IN 4" CONDUIT. LAND CONDUCTORS ON LINE SIDE OF
- PANEL "MDP" MAIN BREAKER". COORDINATE WITH GARAGE/HOUSE CONSTRUCTION AS
- 7) SPLICE 2 SETS OF 300 KCMIL CONDUCTORS (INCOMING) TO ONE SET OF 500 KCMIL CONDUCTORS (OUTGOING) IN HANDBOX. PROVIDE WATERTIGHT SPLICE.

## FIRE ALARM GENERAL NOTES:

1. ALL FIRE ALARM DEVICES SHALL BE BY SIMPLEX (NO SUBSTITUTION). ALL WORK MUST BE COMPATIBLE WITH THE EXISTING SIMPLEX 4100 FIRE ALARM SYSTEM.

**ELECTRICAL ABBREVIATIONS** 

ALTERNATING CURRENT

ABOVE FINISHED FLOOR

ABOVE FINISHED GRADE

AMERICAN WIRE GAUGE

CURRENT TRANSFORMER

ELECTRIC / ELECTRICAL ELECTRICAL METALLIC TUBING

FIRE ALARM CONTROL PANEL

EXISTING TO REMAIN

FUSED OR FUSIBLE

CIRCUIT BREAKER

BUILDING

CONDUIT

CIRCUIT CEILING

CENTER

COPPER

DIAMETER

DRAWING

**EQUIPMENT** 

EXISTING

FEEDER

FIRE ALARM

DOWN

DIRECT BURIAL

ANSI

AWG

BLDG

DWG

ELEC

**EQUIP** 

ETR

FACP

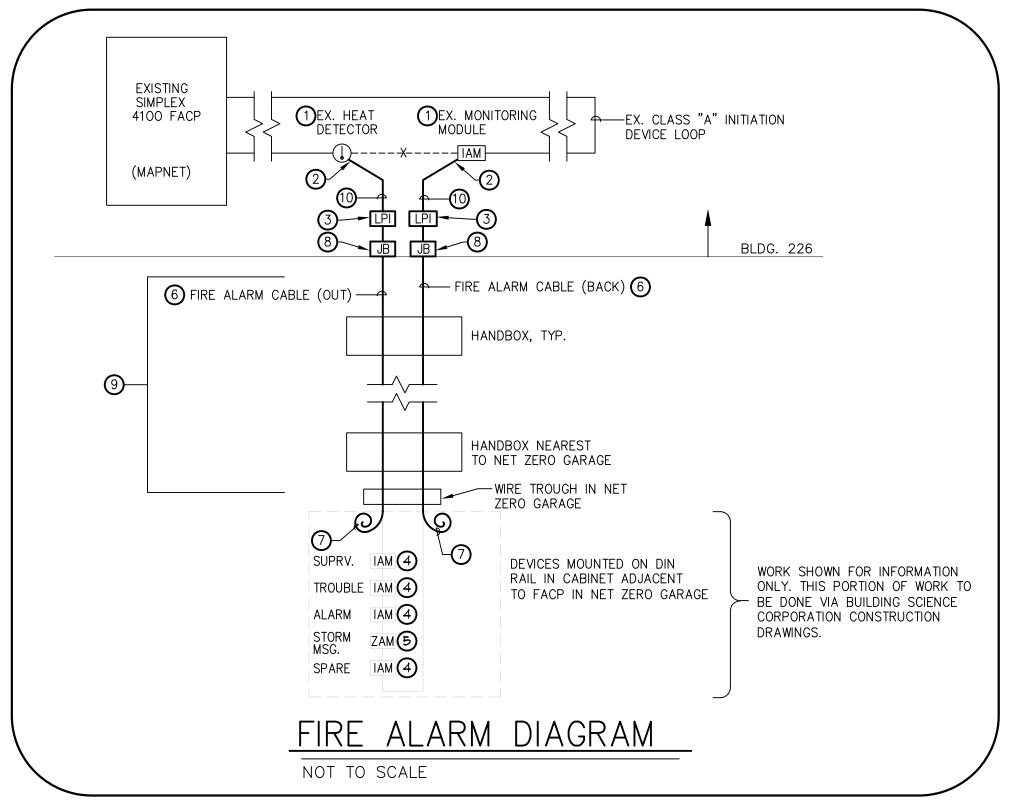
FDR

EMT

AMPERE INTERRUPTING CAPACITY

AMERICAN NAT'L STANDARDS INSTIT.

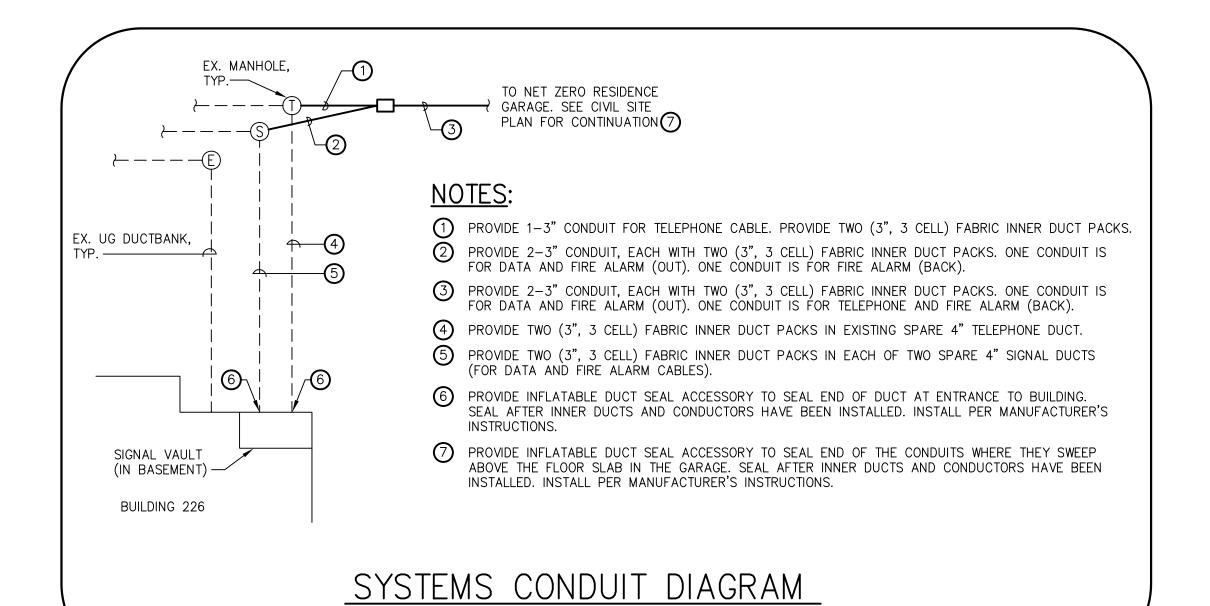
- 2. PAINT CONDUITS WITH A RED STRIPE EVERY 10 FEET. PAINT ALL CONDUIT BODY COVERS AND JUNCTION BOX COVERS WITH RED PAINT.
- 3. SPLICES AND T-TAPS ARE PROHIBITED.
- 4. MINIMUM CONDUIT SIZE SHALL BE 3/4" EMT.
- 5. ALL EXISTING DEVICES MUST REMAIN IN SERVICE WHEN THE NEW WORK IS BEING INSTALLED.
- 6. ALL NEW CIRCUITS SHALL BE NFPA 72 "CLASS A" (STYLE 6).
- 7. ALL TESTING SHALL BE PER MANUFACTURER'S INSTRUCTIONS AND NFPA 72. COMPLETE INTERNAL TESTING PRIOR TO REQUESTING AN OFFICIAL GOVERNMENT TEST.
- 8. RE-PROGRAMMING OF EX. SIMPLEX FACP SHALL BE DONE ON A MONDAY OR TUESDAY. COORDINATE WITH NIST, PROGRAMMING SHALL BE DONE BY A NIST APPROVED, SIMPLEX AUTHORIZED PROGRAMMER. TIE-IN OF NEWLY PROGRAMMED DEVICES SHALL BE DONE NO LATER THAN THE NEXT DAY AFTER PROGRAMMING.
- 9. SEE FIRE ALARM SPECIFICATION FOR ADDITIONAL REQUIREMENTS.



## FIRE ALARM NOTES:

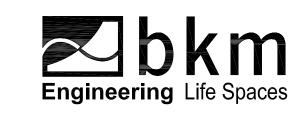
NOT TO SCALE

- (1) SEE DRAWING E-2 FOR LOCATION OF EXISTING DEVICES IN SIGNAL VAULT.
- (2) EXTEND INITIATION DEVICE LOOP AS INDICATED. ADD BOX EXTENSIONS TO EXISTING DEVICE BOXES AS REQUIRED TO ALLOW FOR NEW CONNECTIONS.
- (3) PROVIDE SIMPLEX 2190-9169, LINE POWERED ISOLATOR.
- (4) SIMPLEX 4090-9001, INDIVIDUAL ADDRESSABLE MODULE.
- (5) SIMPLEX 2190-9163, CONTROL RELAY ZONE ADAPTER MODULE.
- (6) PROVIDE 3 CABLES (16 AWG TSP EACH). USE 1 PAIR FOR INITIATION LOOP, REMAINING 2 PAIR ARE SPARE. SEE FIRE ALARM SPEC FOR WIRE TYPE. SEE SYSTEMS CONDUIT DIAGRAM FOR ROUTING AND CONDUIT SIZE.
- 7) PULL CABLES INTO FIRE ALARM DEVICE CABINET. COIL AND CAP/TAPE SPARE CABLES IN CABINET. TAG AS 'SPARE'. PROVIDE 5FT. LENGTH OF SPARE CABLE INSIDE CABINET.
- (8) COIL SPARE CONDUCTORS IN BOX AND CAP/TAPE FOR PROTECTION. SIZE BOX AS REQUIRED.
- (9) SEE CIVIL SITE PLAN FOR EXACT ROUTING OF UNDERGROUND CONDUIT AND LOCATION OF HANDBOXES. SEE HANDBOX DETAIL, THIS DRAWING.
- PROVIDE ONE 16 AWG TSP CABLE (SAME TYPE AS IS USED IN UNDERGROUND DUCT) IN 3/4" EMT



#### PROFESSIONAL CERTIFICATION

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. 20513, EXPIRATION DATE 07/17/2010."



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REVISION	DESCRIPTION	BY	DATE
	95% CD SET		1/29/10
	100% CD SET		2/24/10
	FINAL COORDINATION		3/26/10
	ISSUED FOR CONSTRUCTION		3/31/10





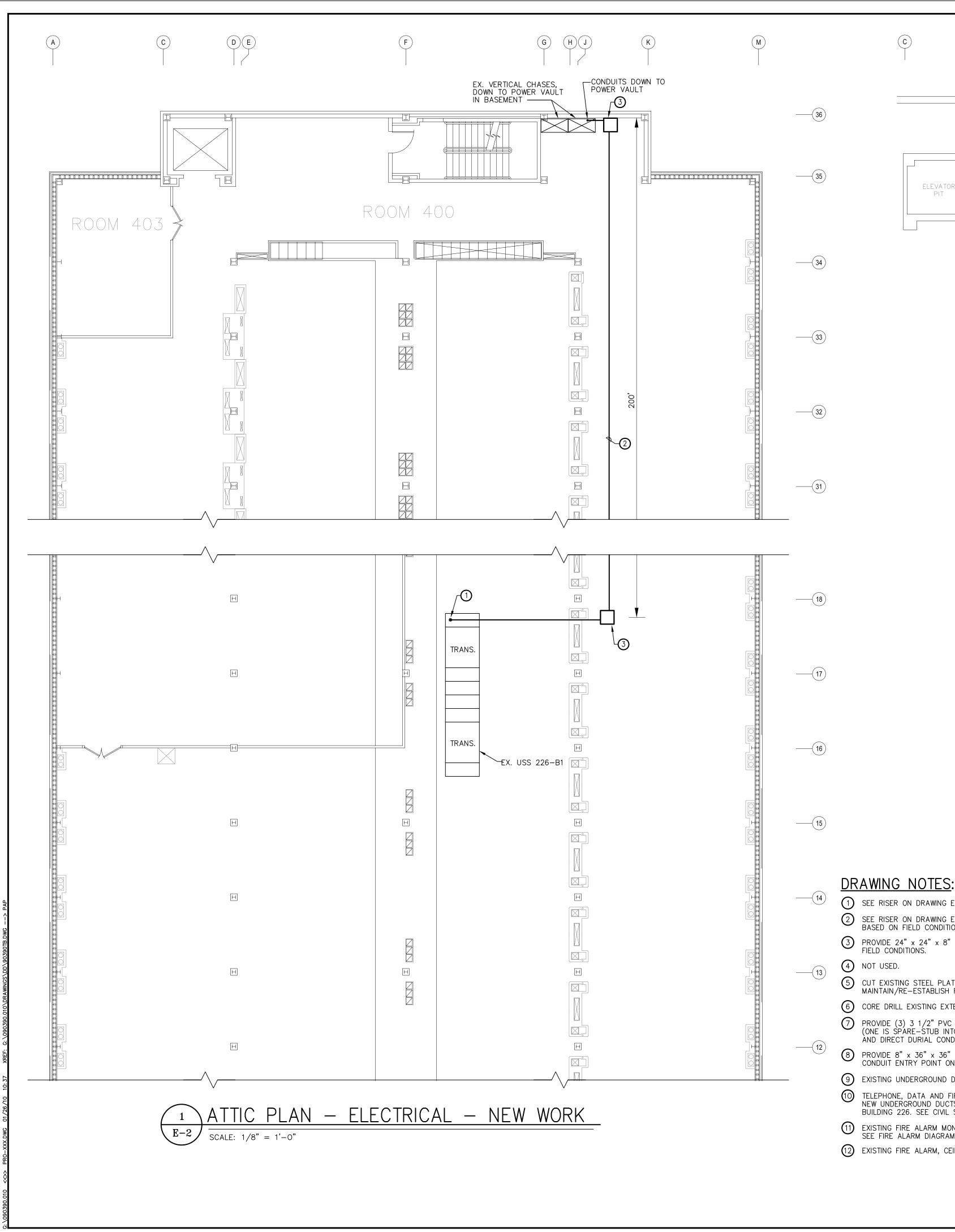
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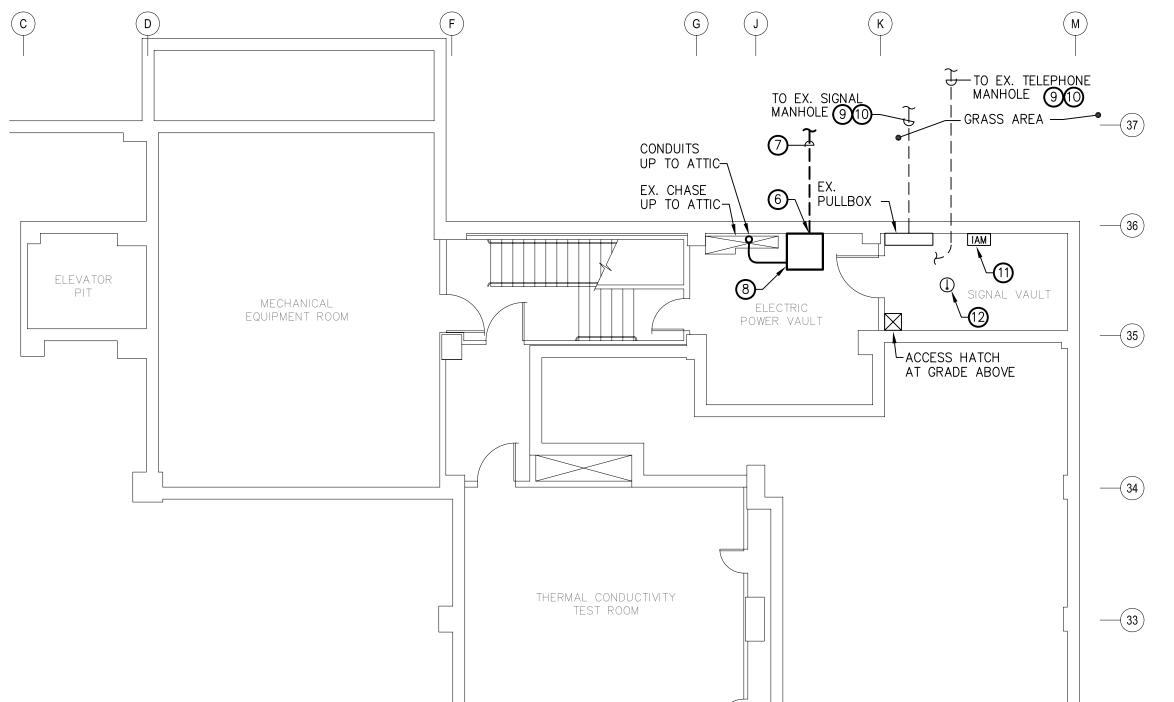
U.S. DEPARTMENT OF COMMERCE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY PLANT DIVISION

ELECTRICAL LEGEND, ABBREVIATIONS, DIAGRAMS AND NOTES

SH. NO. \_\_\_\_ OF \_\_\_ DWG. E-1

BKM# 090390.010





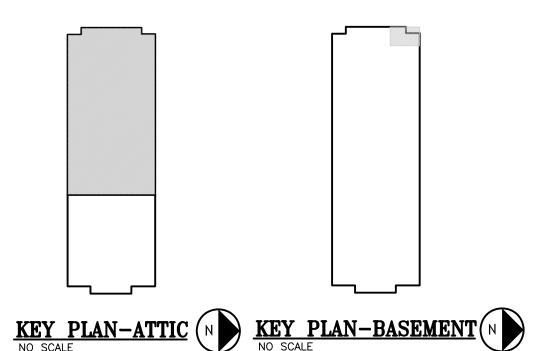
2 BASEMENT PLAN - ELECTRICAL - NEW WORK SCALE: 1/8" = 1'-0"

> ELASTOMERIC MODULAR SEAL ELEMENT EXTERIAL WALL -BY "LINK-SEAL" OR APPROVED EQUAL. - BOLT (NUT AND BOLT TO BE STAINLESS STEEL) - PRESSURE PLATE CORE DRILLED HOLE, CONDUIT, SIZE AS INDICATED ON PLAN SIZED PER MODULAR SEAL MANUFACTURER'S RECOMMENDATION — WALL PENETRATION DETAIL

- 1) SEE RISER ON DRAWING E-1 FOR CONNECTION WORK.
- SEE RISER ON DRAWING E-1 FOR CONDUIT AND WIRE SIZE. ADJUST CONDUIT PATH BASED ON FIELD CONDITIONS. PROVIDE PULLBOX(ES) AS REQUIRED.
- 3 PROVIDE 24" x 24" x 8" DEEP (MIN.) PULL BOX. ADJUST LOCATION BASED ON
- 5 CUT EXISTING STEEL PLATE (COVERING CHASE), AS REQUIRED FOR NEW CONDUIT. MAINTAIN/RE-ESTABLISH FIRE RATING OF COVER AFTER CONDUITS ARE IN PLACE.
- 6 CORE DRILL EXISTING EXTERIOR WALL. PROVIDE WATERTIGHT SEAL PER DETAIL, THIS DRAWING.
- PROVIDE (3) 3 1/2" PVC SCHEDULE 40, DIRECT BURIED CONDUITS WITH MIN. 36" COVER. (ONE IS SPARE-STUB INTO VAULT PULLBOX ONLY). SEE CIVIL SITE PLAN FOR CONTINUATION AND DIRECT DURIAL CONDUIT DETAIL. SEE RISER ON DRAWING E-1 FOR CONDUIT AND WIRE SIZE.
- 8 PROVIDE 8" x 36" x 36" DEEP PULLBOX. COORDINATE MOUNTING HEIGHT WITH UNDERGROUND CONDUIT ENTRY POINT ON EXTERIOR WALL.
- 9 EXISTING UNDERGROUND DUCTS SHOWN FOR INFORMATION ONLY.
- TELEPHONE, DATA AND FIRE ALARM SERVICE TO NET ZERO RESIDENCE WILL BE ROUTED VIA NEW UNDERGROUND DUCTS FROM EXISTING SIGNAL AND TELEPHONE MANHOLES IN FRONT OF BUILDING 226. SEE CIVIL SITE PLAN AND DRAWING E-1.
- EXISTING FIRE ALARM MONITORING MODULE IN 4" SQUARE RED JBOX (ADDRESS NO. 26: M1-34). SEE FIRE ALARM DIAGRAM, DRAWING E-1.
- 12 EXISTING FIRE ALARM, CEILING MOUNTED HEAT DETECTOR. SEE FIRE ALARM DIAGRAM, DRAWING E-1.

## **GENERAL NOTES:**

- 1. REFER TO DRAWING E-1 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES. 2. INSTALLATION OF NEW DRAW-OUT BREAKER IN USS 226-B1 SHALL BE DONE ON A SATURDAY DURING A 2 HOUR (MAX.) OUTAGE. COORDINATE WITH NIST 2 WEEKS IN
- ADVANCE. PROVIDE TEMP. LIGHTING AS REQUIRED. 3. ALL POWER CONDUCTORS RUN IN UNDERGROUND DUCT SHALL BE TYPE RHW-2.
- 4. SEE CIVIL DRAWINGS FOR DIRECT BURIAL CONDUIT DETAIL AND HANDBOX DETAIL.
- 5. PROVIDE PULL STRING IN ALL EMPTY DUCTS/CONDUITS.



SCALE: 1/8"=1'-0"

# ISSUED FOR CONSTRUCTION



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PROFESSIONAL CERTIFICATION

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Baltimore, Maryland 21209

Suite 500

REVISION

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ATTIC AND BASEMENT FLOOR PLANS ELECTRICAL - NEW WORK

SH.NO. OF  $\square$  DWG. E-2

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