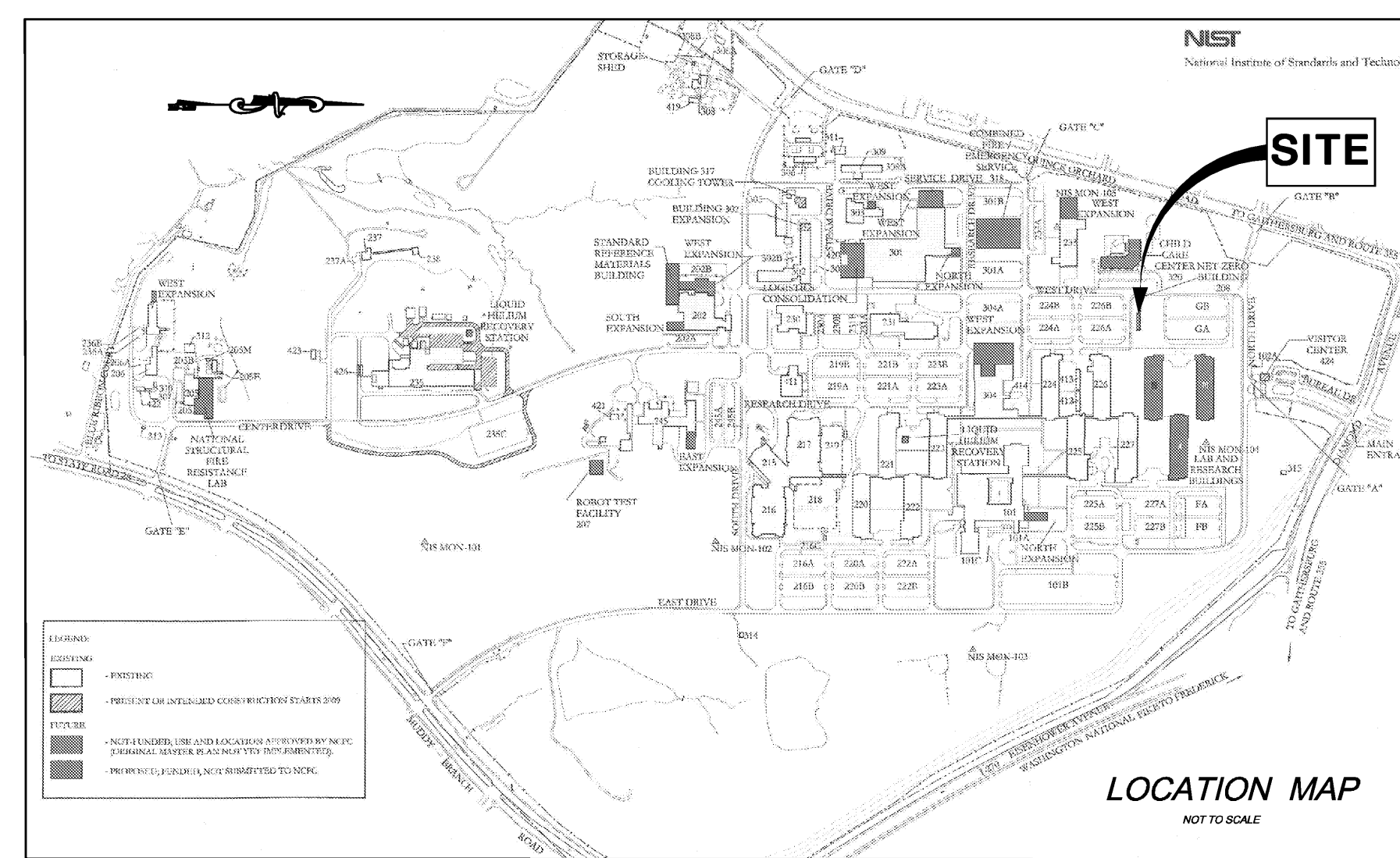
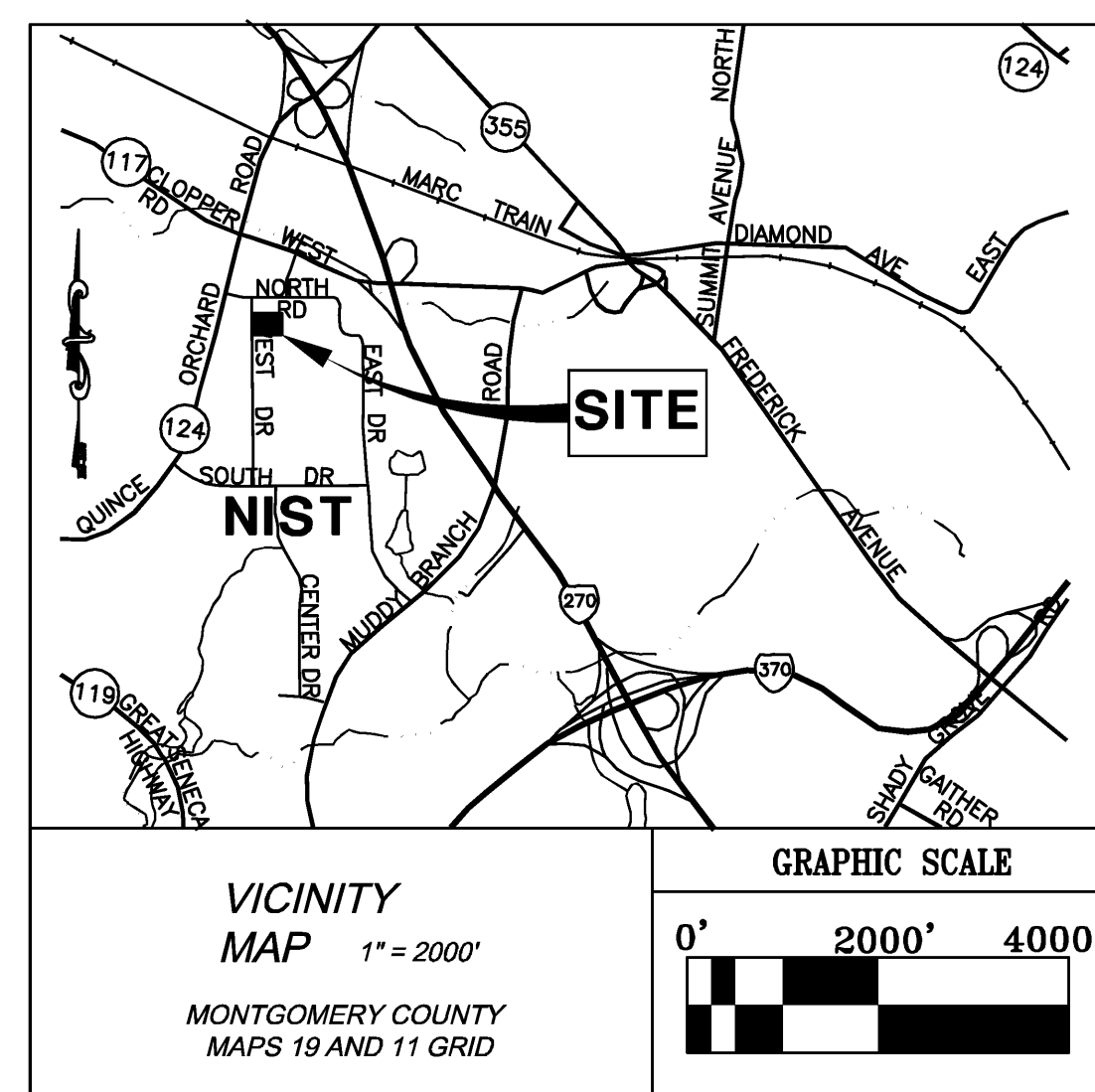


# NIST

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



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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

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 A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 12564, EXPIRATION DATE 08/10/2011."

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

**AMT**

A. MORTON THOMAS AND ASSOCIATES, INC.  
CONSULTING ENGINEERS  
12750 TWENBROOK PARKWAY ROCKVILLE, MD 20852  
(301) 881-8545 FAX: (301) 881-0814  
EMAIL: AMT1@AMTENGINEERING.COM

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NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY  
PLANT DIVISION

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

COVER SHEET

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

APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENGR. OFF.	DATE	FIRE PROTECTION SYS.	DATE	S.H. & E. DIV.	DATE	FACILITIES ENGR. OFF.	DATE	PROJECT LEADER	DATE	DRAWN BY	DATE	PROJECT W.O.	DESIGN PROJ. #
												KS/DN	02/01/10			SB134109C0026/69331	

**LEGEND**

- ⊠ GRATE INLET
- ⊙ TELEPHONE MANHOLE
- ⊙ COMMUNICATIONS MANHOLE
- ⊙ ELECTRIC MANHOLE
- ⊙ SANITARY SEWER MANHOLE
- ⊙ STORM DRAIN MANHOLE
- ⊙ LIGHT POLE
- ⊙ SIGN
- ⊙ WATER VALVE
- ⊙ FIRE HYDRANT
- ⊙ MONITORING WELL
- ⊙ BENCHMARK
- ⊙ STUMP
- ▬ CONCRETE CURB
- ▬ CONCRETE CURB & GUTTER
- ▬ STEAM PAINT WHITE
- ▬ COMMUNICATION LINE PAINT MARK
- ▬ UGE ELECTRIC PAINT MARK
- ▬ W WATERLINE PAINT MARK
- ▬ SIDEWALK
- ▬ PAVEMENT (EDGE)
- ▬ BUILDING
- ▬ FENCE (CHAIN-LINK)

**DEMOLITION NOTES:**

- 1 SAWCUT & REMOVE EXISTING SIDEWALK.
- 2 REMOVE EXISTING CONCRETE CURB.
- 3 SAWCUT & REMOVE EXISTING ASPHALT PAVING.
- 4 REMOVE EXISTING TREES.

**DEMOLITION LEGEND:**

- ▨ REMOVE EXISTING ASPHALT/GRAVEL/CONCRETE
- ⊗ ITEM TO BE REMOVED

**STORM DRAIN DATA**

1. CURB INLET  
TOP=453.30  
INV. IN=439.02  
INV. OUT=438.92
2. CURB INLET  
TOP=453.22  
INV. IN=439.25  
INV. OUT=439.15
3. MANHOLE  
TOP=452.93  
(E) INV. IN=439.28  
(S) INV. IN=444.53  
INV. OUT=439.18
4. CURB INLET  
TOP=450.97  
INV. OUT=447.17
5. CURB INLET  
TOP=450.02  
INV. OUT=443.72
6. CURB INLET  
TOP=450.25  
(SW) INV. IN=442.80  
(SE) INV. IN=441.55  
(E) INV. IN=440.95  
(W) INV. OUT=440.55
7. CURB INLET  
TOP=450.30  
INV. OUT=442.10
8. GRATE INLET  
TOP=450.61  
(SW) INV. IN=445.96  
(SE) INV. IN=445.96  
(E) INV. IN=443.61  
(W) INV. OUT=443.21
9. GRATE INLET  
TOP=450.65  
(SW) INV. IN=446.65  
(SE) INV. IN=446.65  
(E) INV. IN=443.61  
(W) INV. OUT=444.55

**SANITARY SEWER DATA**

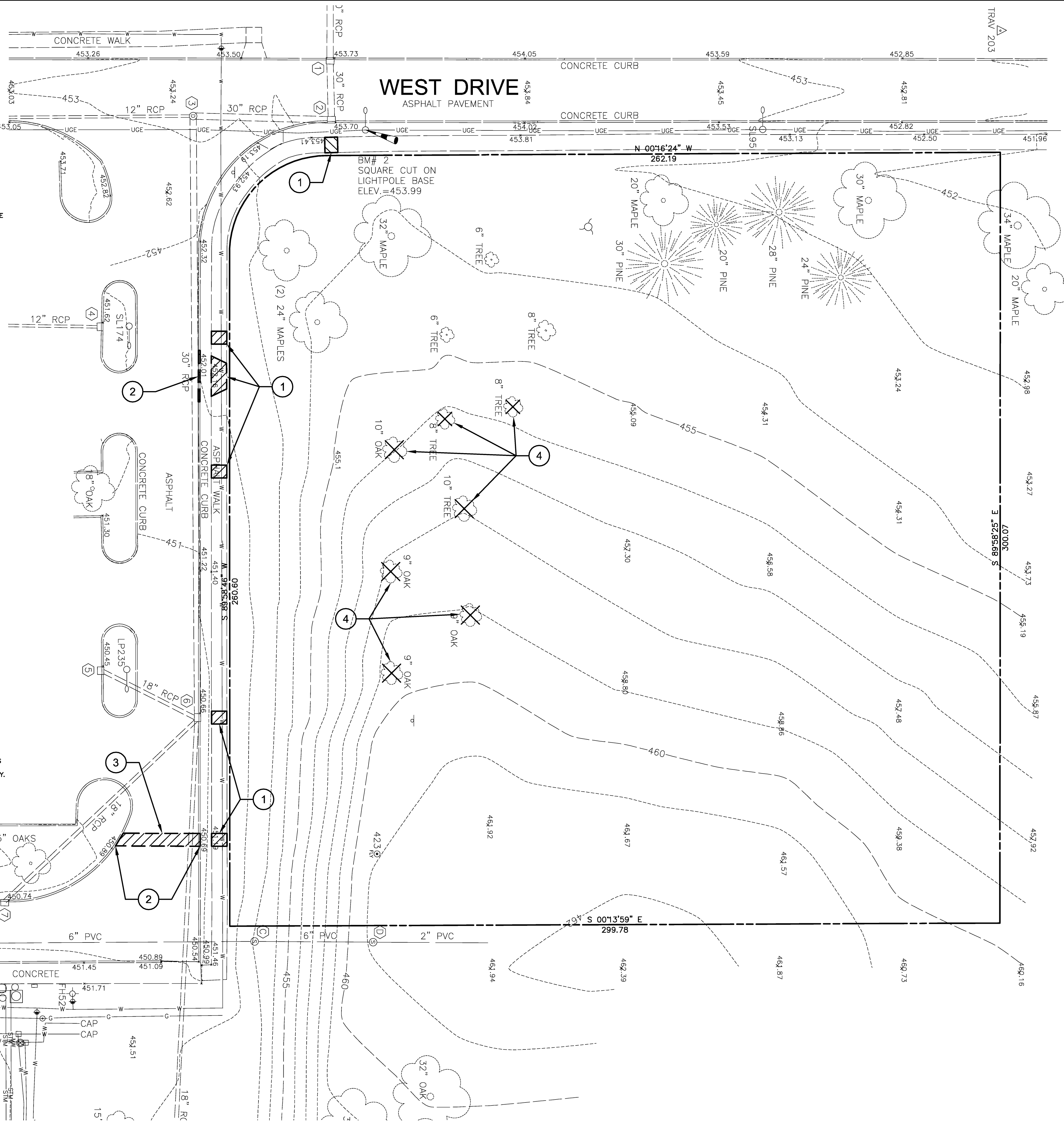
- A MANHOLE  
TOP=452.05  
(N) INV. IN=428.40  
(E) INV. IN=428.85  
(S) INV. OUT=428.40
- B MANHOLE  
TOP=451.17  
(N) INV. IN=444.99  
(E) INV. IN=429.75  
(S) INV. OUT=429.22
- C MANHOLE  
TOP=453.11  
(N) INV. IN=448.59  
(S) INV. OUT=445.89
- D MANHOLE  
TOP=461.08  
(N) INV. IN=455.53  
(S) INV. OUT=454.98
- E MANHOLE  
TOP=452.80  
(S) INV. IN=448.55  
(E) INV. IN=447.60  
(W) INV. OUT=446.65
- F MANHOLE  
TOP=452.90  
(S) INV. IN=448.18  
(E) INV. IN=448.10  
(W) INV. OUT=447.90

**SURVEY CONTROL DATA**

TRAVERSE	NORTHING	EASTING	ELEV.
203	90748.986	-59932.294	452.24
204	90345.238	-59933.965	452.71

**GENERAL NOTES**

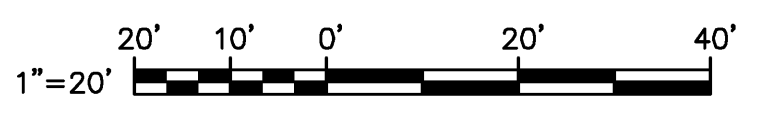
1. HORIZONTAL DATUM: NIST COORDINATES BASED FROM MONUMENTS NBS-104 AND NBS-105
2. VERTICAL DATUM: NIST ELEVATIONS BASED FROM MONUMENTS NBS-104 AND NBS-105
3. SEE ADDITIONAL SPOT SHOTS ON FROZEN -HIDN LAYERS
4. NO BOUNDARY WORK WAS PERFORMED WITH THIS SURVEY.



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EXISTING CONDITIONS/DEMOLITION PLAN

SH. NO. \_\_\_ OF \_\_\_ **DWG. C-101**

APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENG. OFF	DATE	FIRE PROTECTION SYS	DATE	S.H. & E. DIV	DATE	FACILITIES ENGR. OFF	DATE	PROJECT LEADER	DATE	DRAWN BY	DATE	PROJECT W.O.	DESIGN PROJ. #

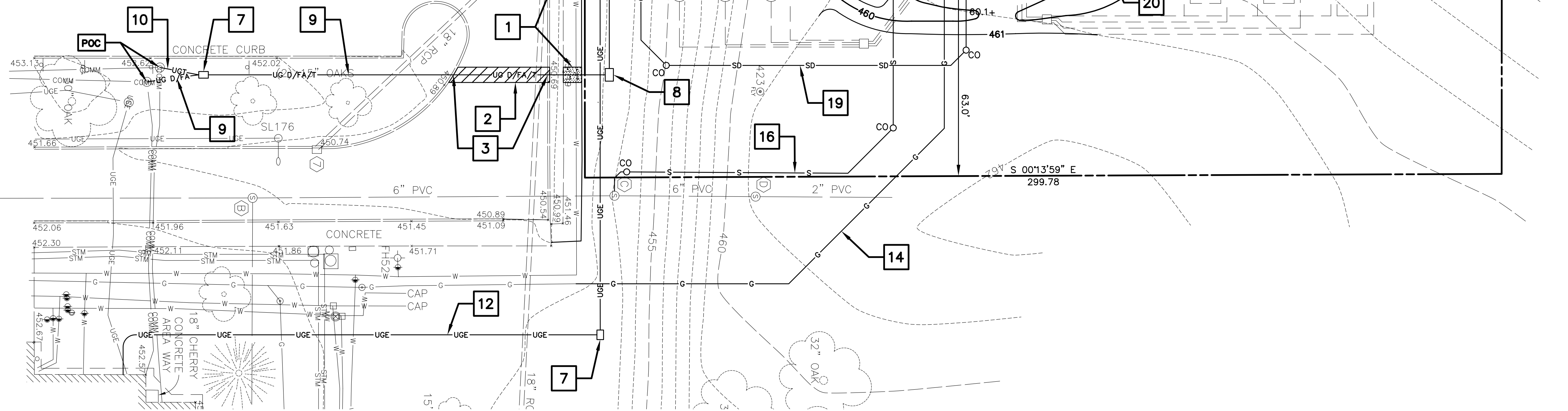
KS/DN 02/01/10 SB134109C0026/69831  
DRAWN BY DATE PROJECT W.O. DESIGN PROJ. #

**LEGEND**

- PROPERTY LINE
- NEW CONTOUR MAJOR
- NEW CONTOUR MINOR
- NEW GEOTHERMAL
- W --- NEW WATER
- S --- NEW SANITARY SEWER
- UGE --- NEW UNDER GROUND ELECTRIC
- UG D/FA/T --- NEW UNDER GROUND DATA/FIRE ALARM/TELEPHONE
- UG D/FA --- NEW UNDER GROUND DATA/FIRE ALARM
- UGT --- NEW UNDER GROUND TELECOMMUNICATIONS
- G --- NEW GAS
- SD --- NEW STORM DRAIN
- NEW EDGE DRAIN
- HANDBOX
- POC POINT OF CONNECTION
- ▨ LIMIT OF NEW ASPHALT
- ▩ NEW MICRO BIORETENTION

**KEYED NOTES**

- |  |   |   |                                  |
|--|---|---|----------------------------------|
| 1 NEW ASPHALT WALK.  | 2 201/202                                 | 13 NEW 4" PVC CONDUIT.  | 7 201/202                        |
| 2 NEW ASPHALT PAVING.  | 2 201/202                                 | 14 NEW GAS LINE.  |                                  |
| 3 NEW CONCRETE CURB.   | 4 201/202                                 | 15 NEW 3" DIP WATER SERVICE LINE.   | 12 201/203                       |
| 4 NEW CONCRETE DRIVEWAY.   | 5 201/202                                 | 16 NEW 4" PVC SANITARY SEWER LATERAL.                                       | 12 201/203 13 201/203            |
| 5 NEW CONCRETE SIDEWALK. SEE ARCH PLAN (SHEET LA-102) FOR EDGE DETAILS | 3 201/202                                 |   |                                  |
| 6 NEW 12x6 TEE, 6" VALVE & FIRE HYDRANT.                               | 8 201/202 9 201/202 12 201/203 11 201/203 | 17 NEW 12"x4" TEE, 4" POST INDICATOR VALVE, 2" WATER METER & 4"x3" REDUCER. | 10 201/202 12 201/203 16 201/203 |
| 7 NEW HANDBOX TYPE A.  | 6 201/202                                 | 18 NEW MICRO BIORETENTION.  | 1 201/202                        |
| 8 NEW HANDBOX TYPE B.  | 6 201/202                                 | 19 NEW 4" PVC SCHEDULE 40 FOUNDATION DRAIN.                                 | 12 201/203 13 201/203            |
| 9 NEW (2) 3" PVC CONDUITS.   | 7 201/202                                 | 20 NEW EDGE DRAIN. SEE ARCH PLAN (SHEET LA-102) FOR DETAIL                  |                                  |
| 10 NEW 3" PVC CONDUIT.   | 7 201/202                                 | 21 NEW RISERS (2) SEE ARCH PLAN (SHEET LA-102) FOR DETAIL                   |                                  |
| 11 NOT USED.   |   |   |                                  |
| 12 NEW (3) 3 1/2" PVC CONDUITS.  | 7 201/202                                 |   |                                  |



**WEST DRIVE**  
ASPHALT PAVEMENT

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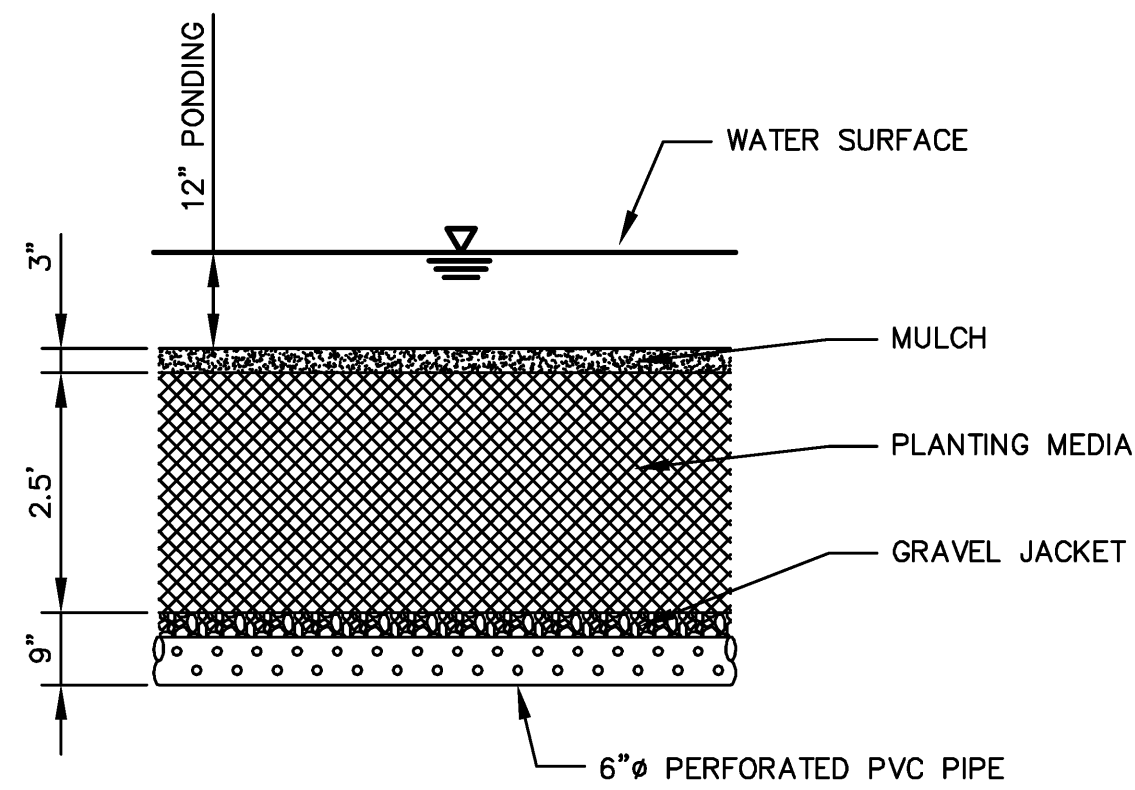
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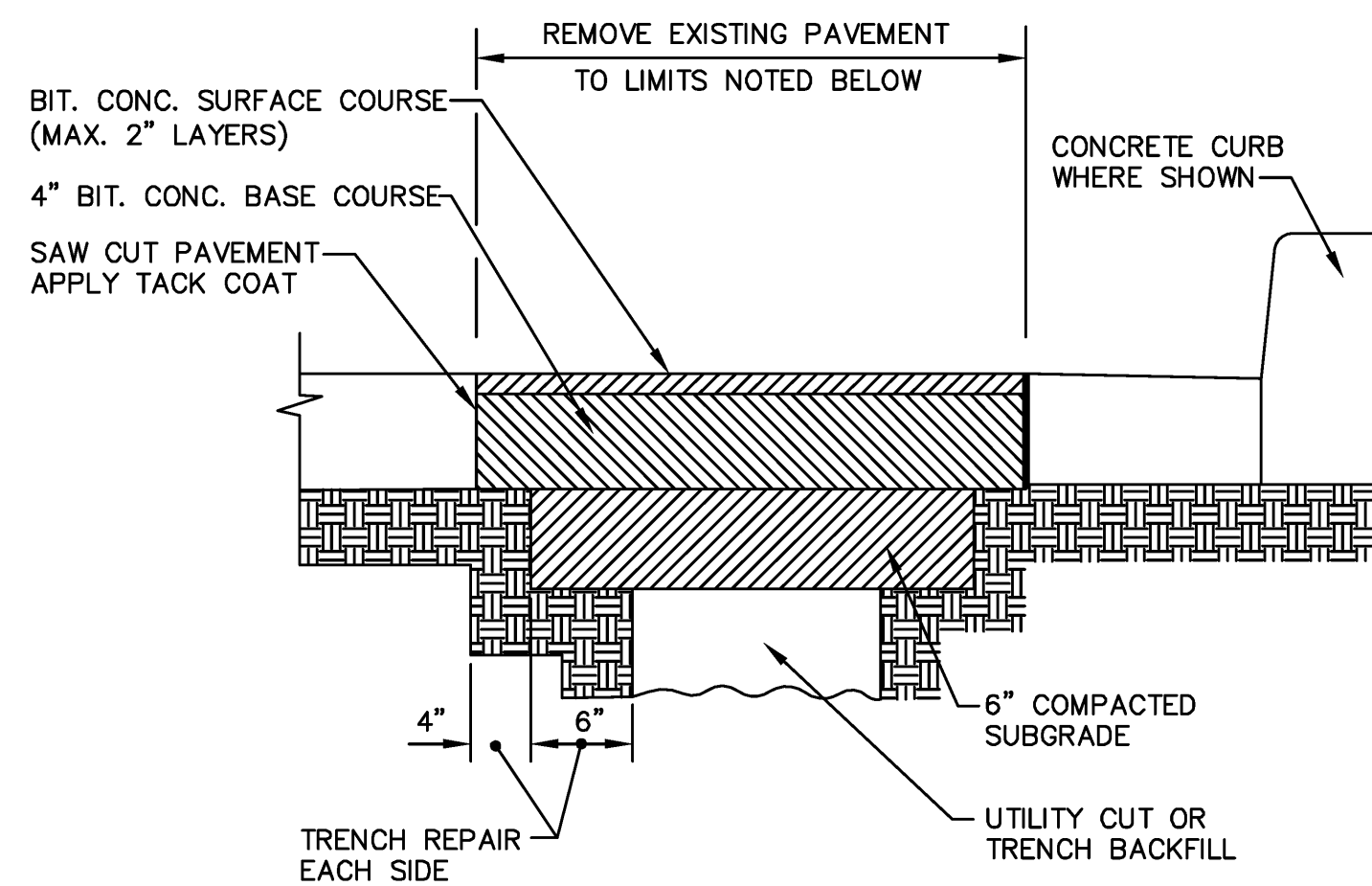
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SITE/GRADING PLAN

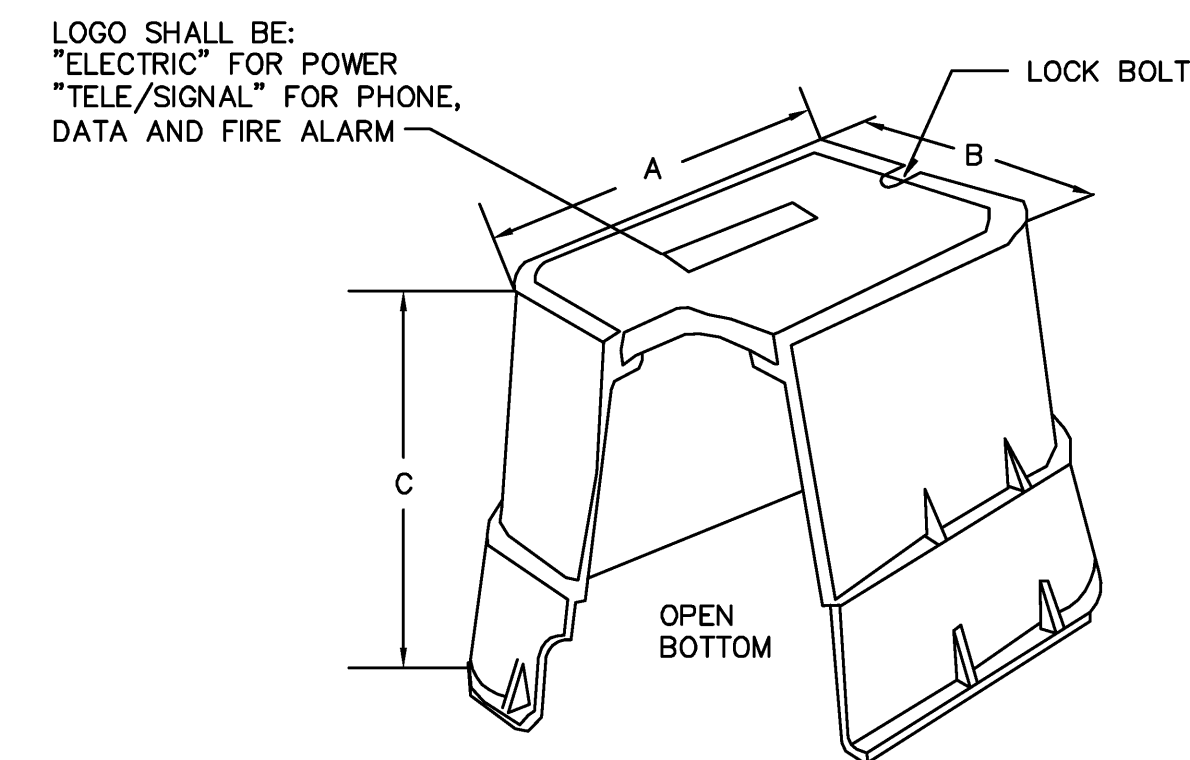
SH. NO. \_\_\_ OF \_\_\_ **DWG. C-201**



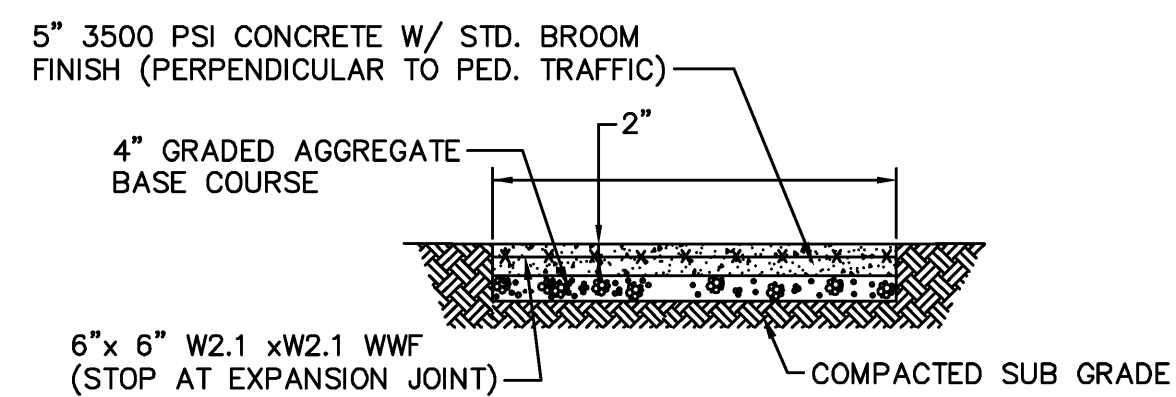
**1 MICRO BIORETENTION TYPICAL SECTION**  
201202 NOT TO SCALE



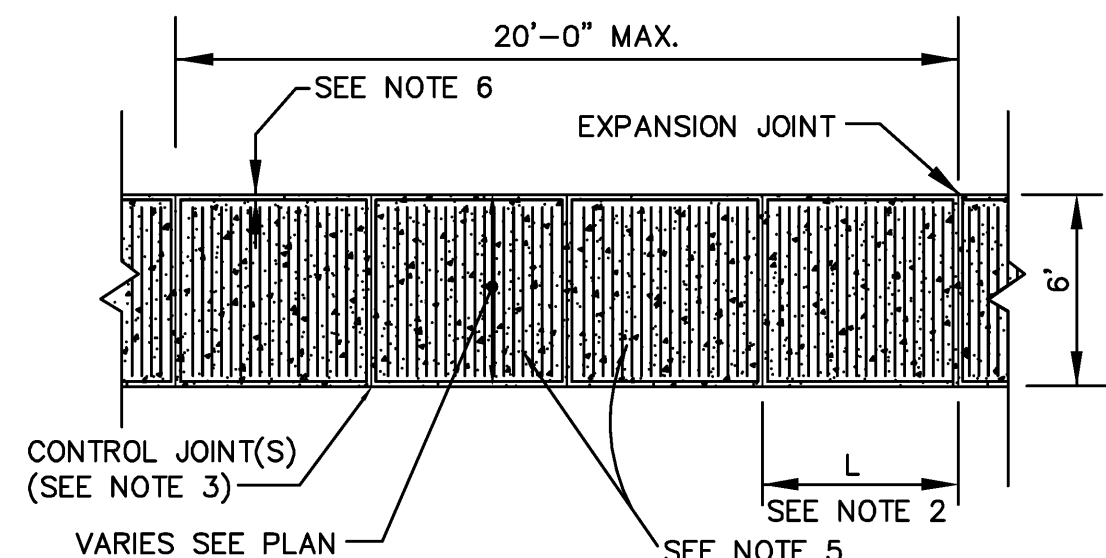
**2 FULL-DEPTH ASPHALT PATCH**  
201202 NOT TO SCALE



**6 HANDBOX DETAIL**  
201202 NOT TO SCALE

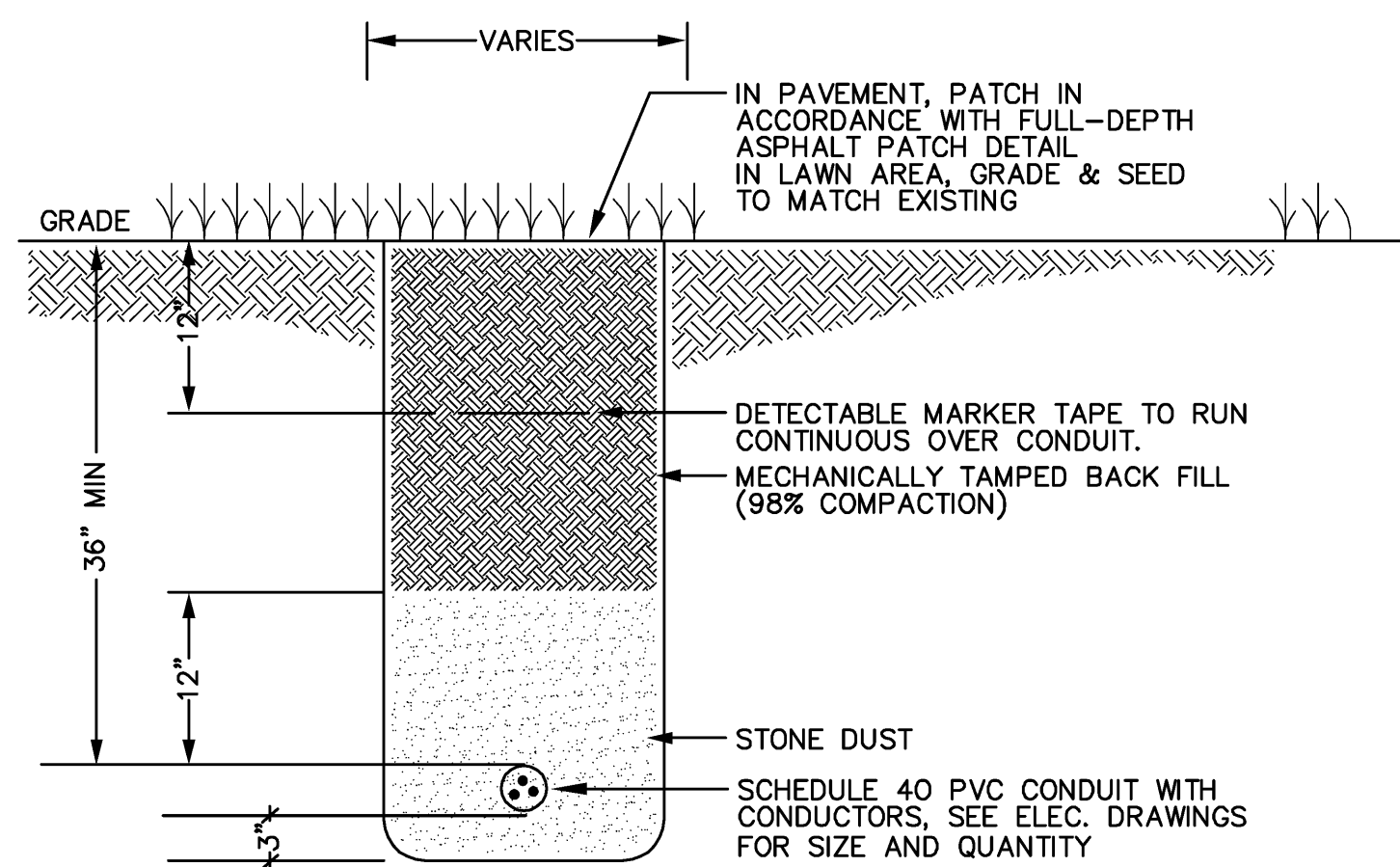


NOTES:  
1. MINIMUM DISTANCE BETWEEN CONTROL JOINTS SHALL BE EQUAL TO WIDTH OF SIDEWALK OR AS SHOWN ON SITEPLAN.



- NOTES:
- ALL CONCRETE SHALL BE 6% AIR-ENTRAINED, 3500 P.S.I., DEPTH SHALL BE 5".
  - CONTROL JOINTS, SPACED AT 4' TO 6' INTERVALS, SHALL BE INSTALLED IN THE SIDEWALK CONCRETE TO FORM SQUARE PANELS. EXPANSION JOINTS SHALL BE INSTALLED WITHIN THE SIDEWALK AT NOT MORE THAN 20'. EXPANSION JOINTS SHALL ALSO BE PLACED WHERE SIDEWALKS ABUT OTHER WALKS AND STRUCTURES.
  - CONTROL JOINTS SHALL BE SAW-CUT OR FORMED, 1 1/4" DEEP.
  - PROVIDE 1/2" EXPANSION JOINT FILLER WHERE SIDEWALK ABUTS CURB OR OTHER RIGID STRUCTURE(S).
  - LIGHT BROOM FINISH

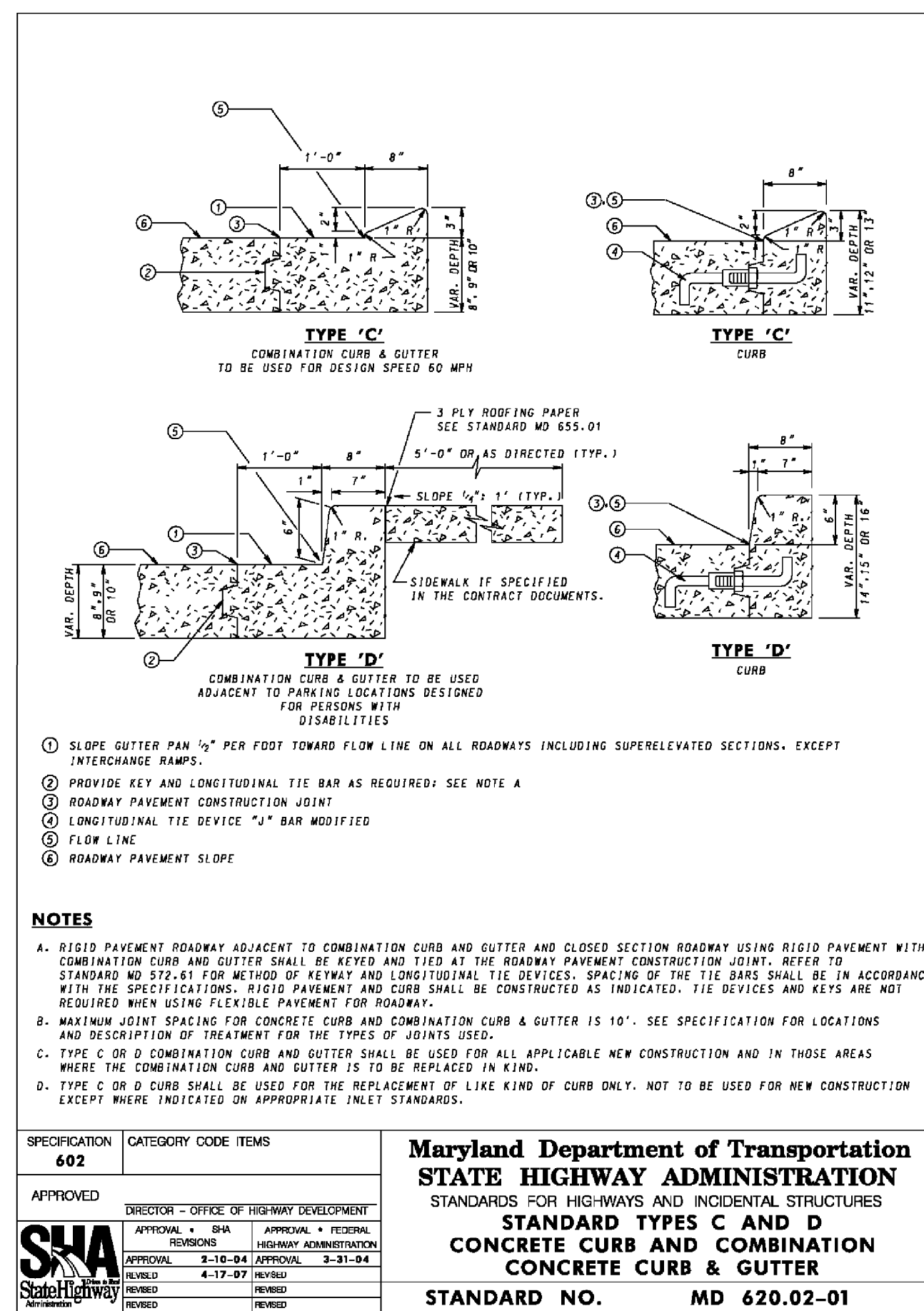
**3 CONCRETE SIDEWALK**  
201202 SCALE: NOT TO SCALE



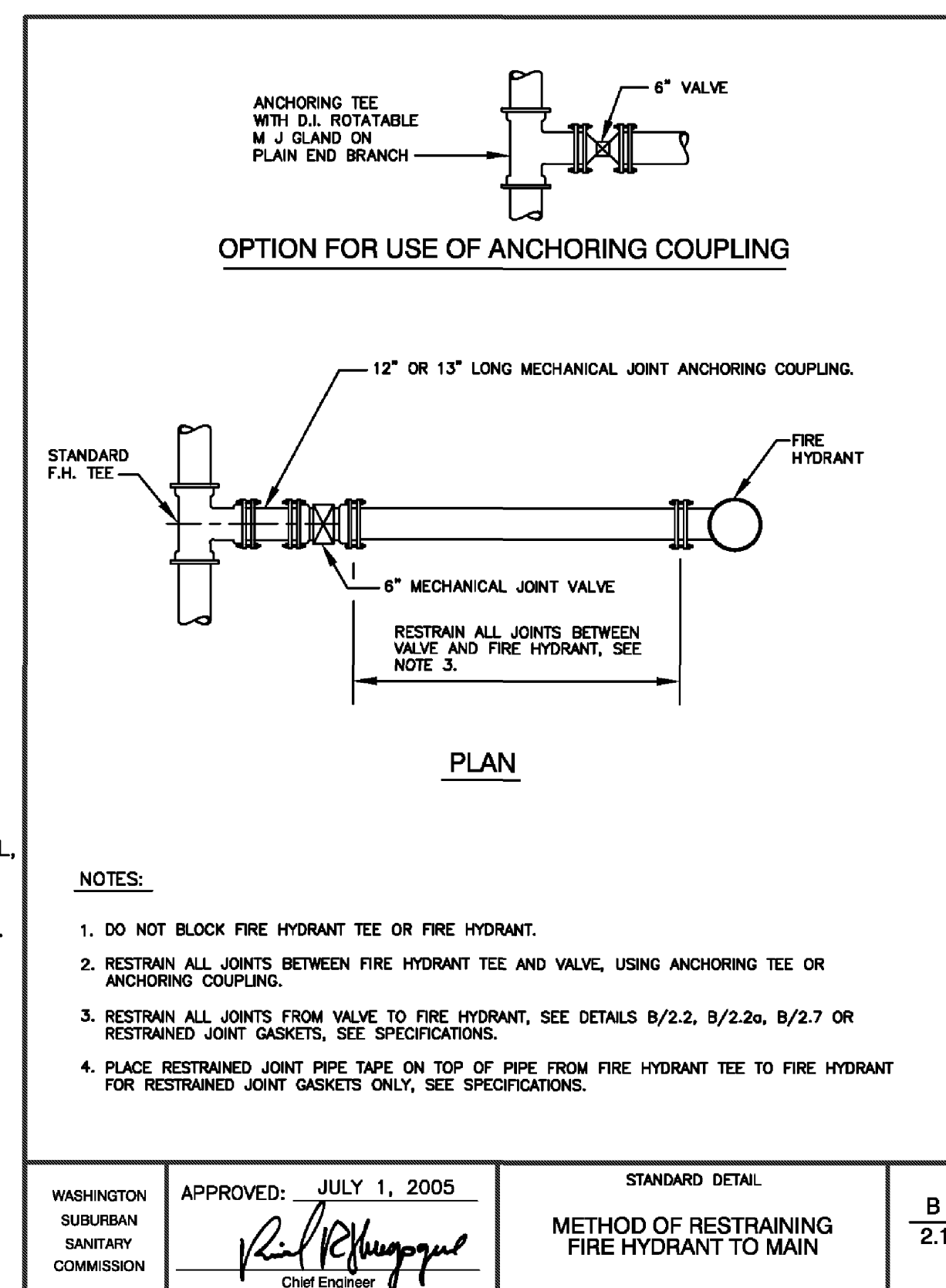
**7 DIRECT BURIAL CONDUIT DETAIL**  
201202 NOT TO SCALE

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

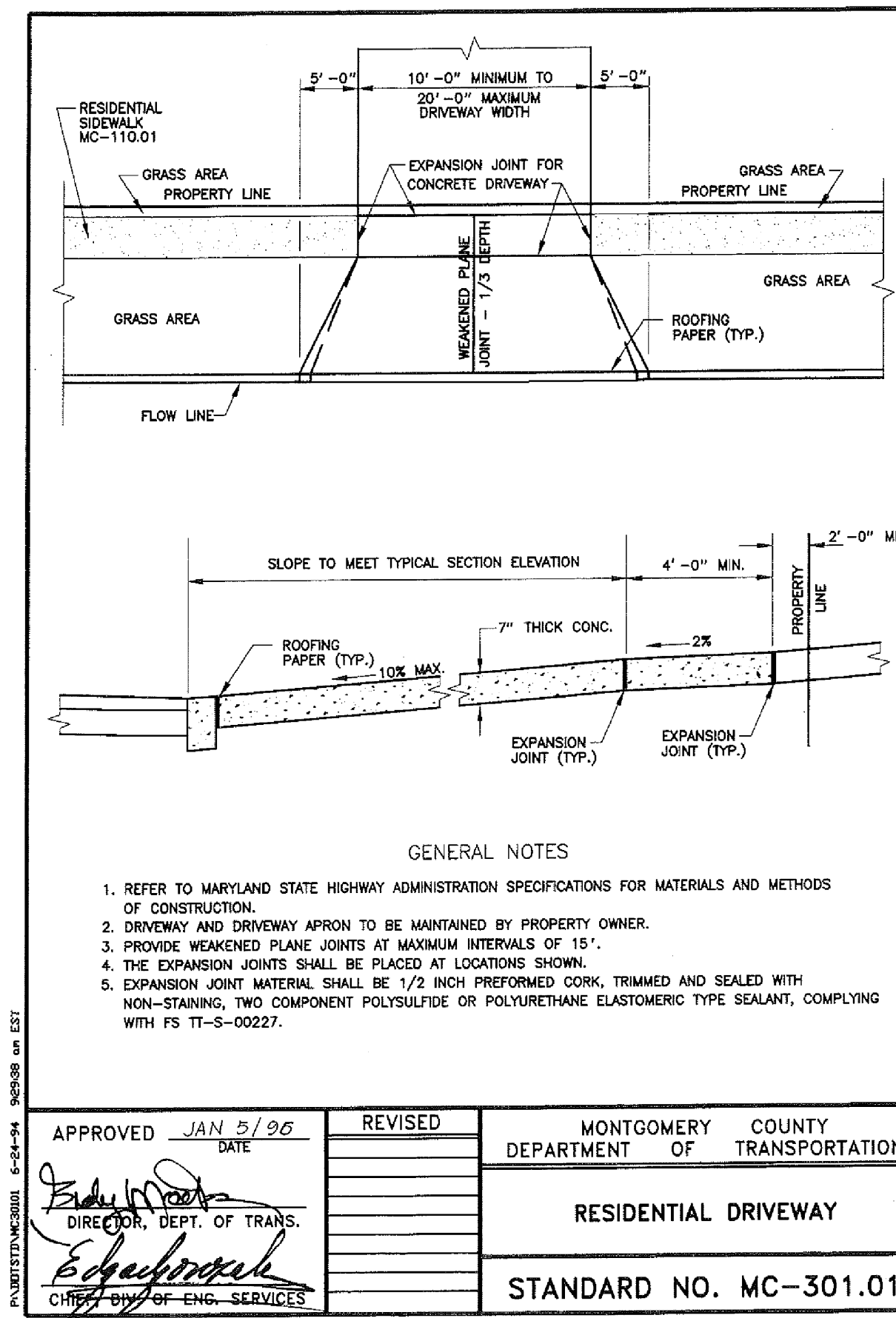
HANDBOX SCHEDULE				
TYPE	DIMENSIONS			BASIS OF DESIGN
	A	B	C	
A	49 5/8"	32 1/8"	36"	QUAZITE STYLE PG, 30"x48", CAT. NO. PG3048BA36 WITH ANSI 22 LOAD RATING AND EXTRA HEAVY DUTY COVER WITH BOLTS. COLOR IS GREY.
B	37 5/8"	26"	30"	QUAZITE STYLE PG, 24"x36", CAT. NO. PG2436BA30 WITH ANSI 22 LOAD RATING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



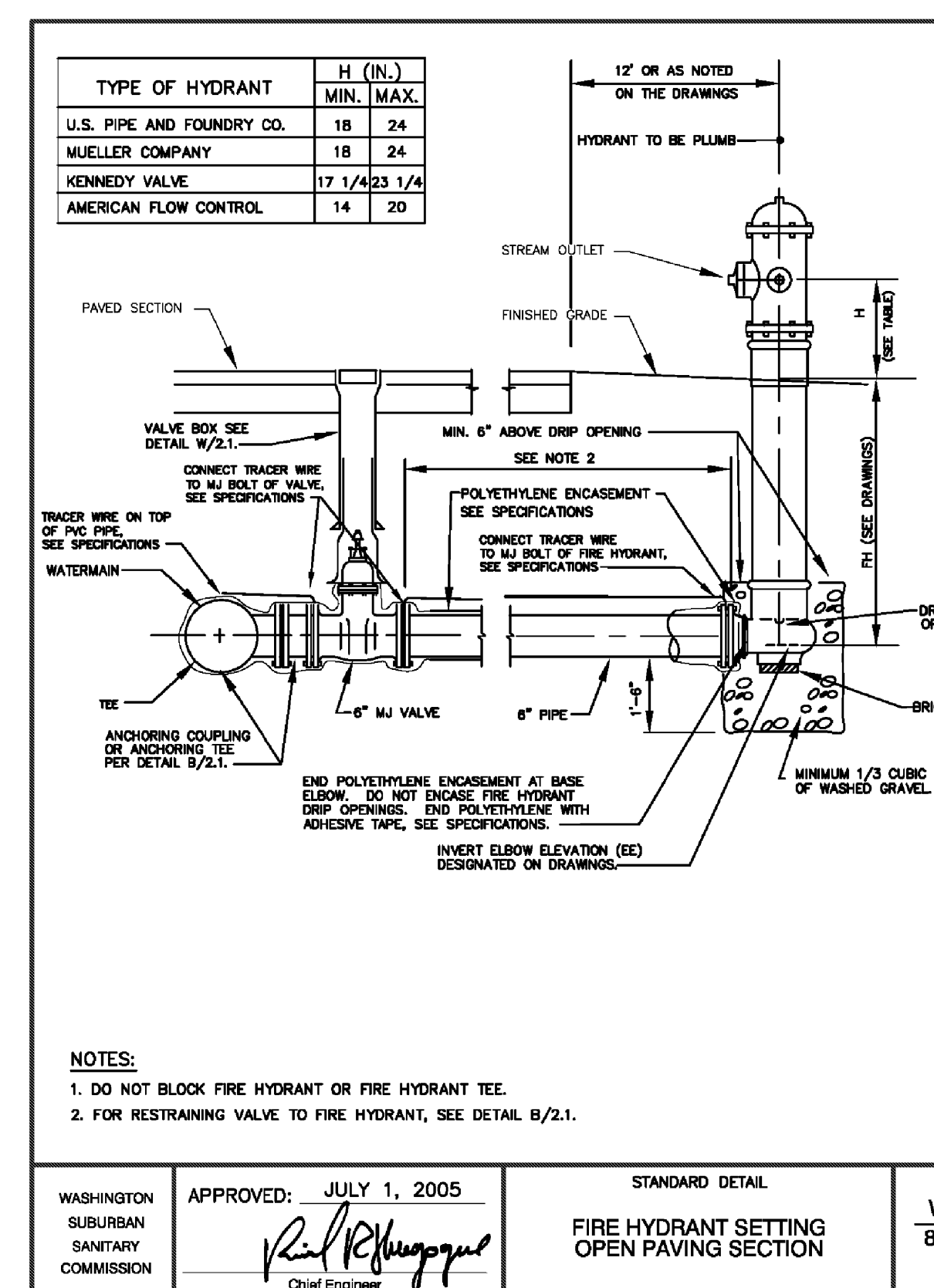
**4 CONCRETE CURB**  
201202 SCALE: NOT TO SCALE



**8 WSSC STANDARD DETAIL B2.1**  
201202 NOT TO SCALE



**5 MC DPW&T STANDARD NO. MC-301.01 (MODIFIED)**  
201202 NOT TO SCALE



**9 WSSC STANDARD DETAIL W8.1**  
201202 NOT TO SCALE

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APPROVED: *[Signature]* DATE: JAN 5/10  
 REVISIONS: \_\_\_\_\_  
 MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION  
 RESIDENTIAL DRIVEWAY  
 STANDARD NO. MC-301.01

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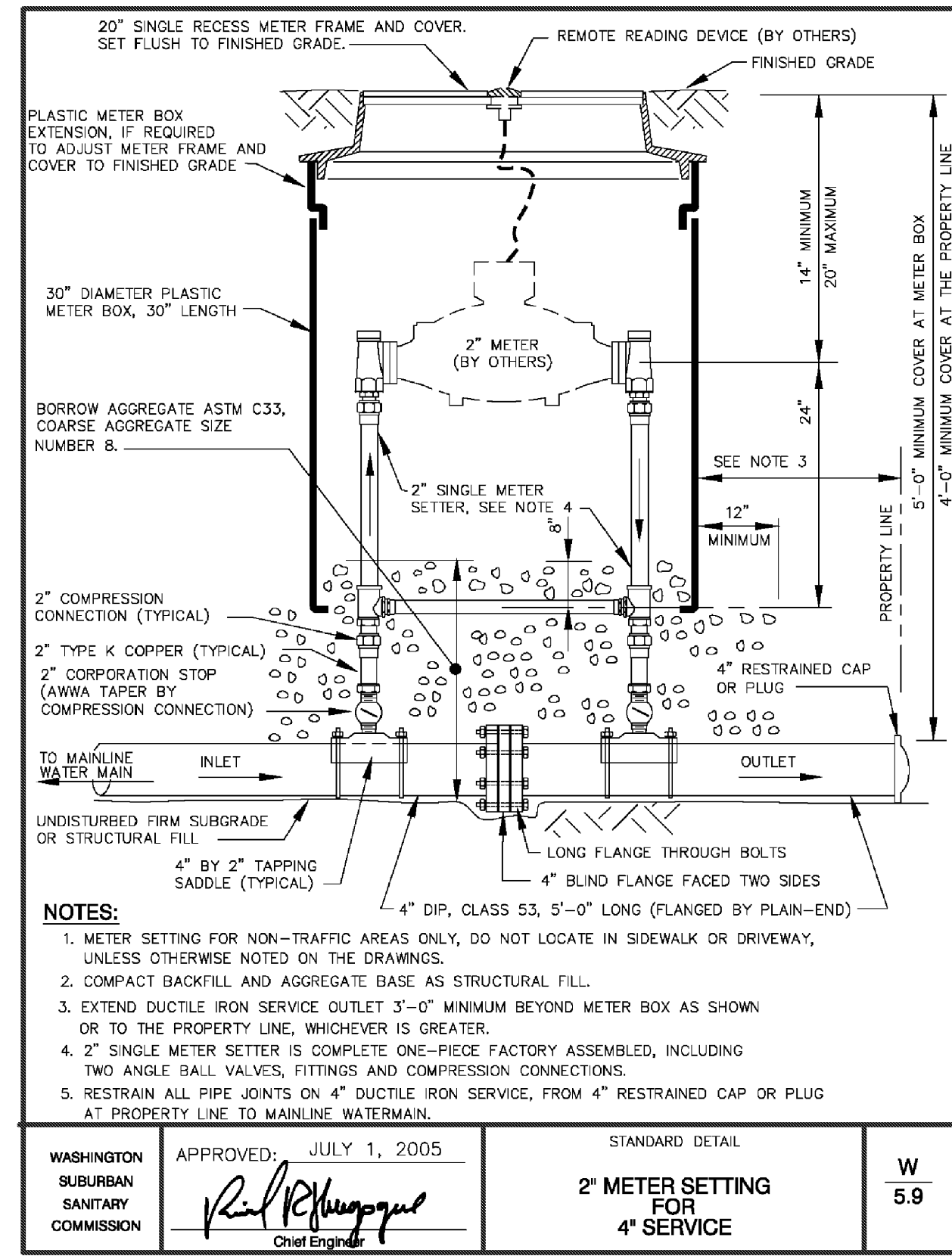
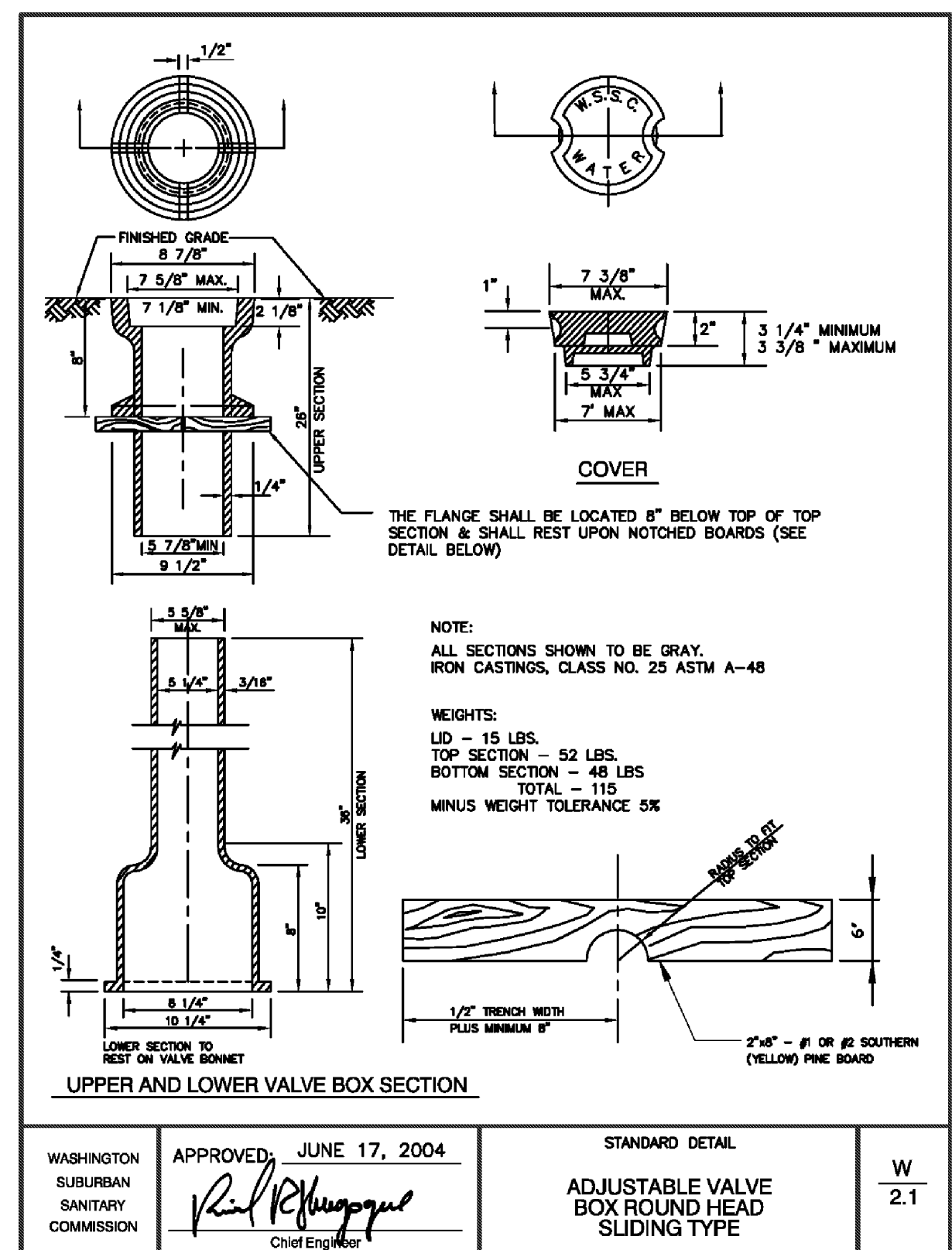
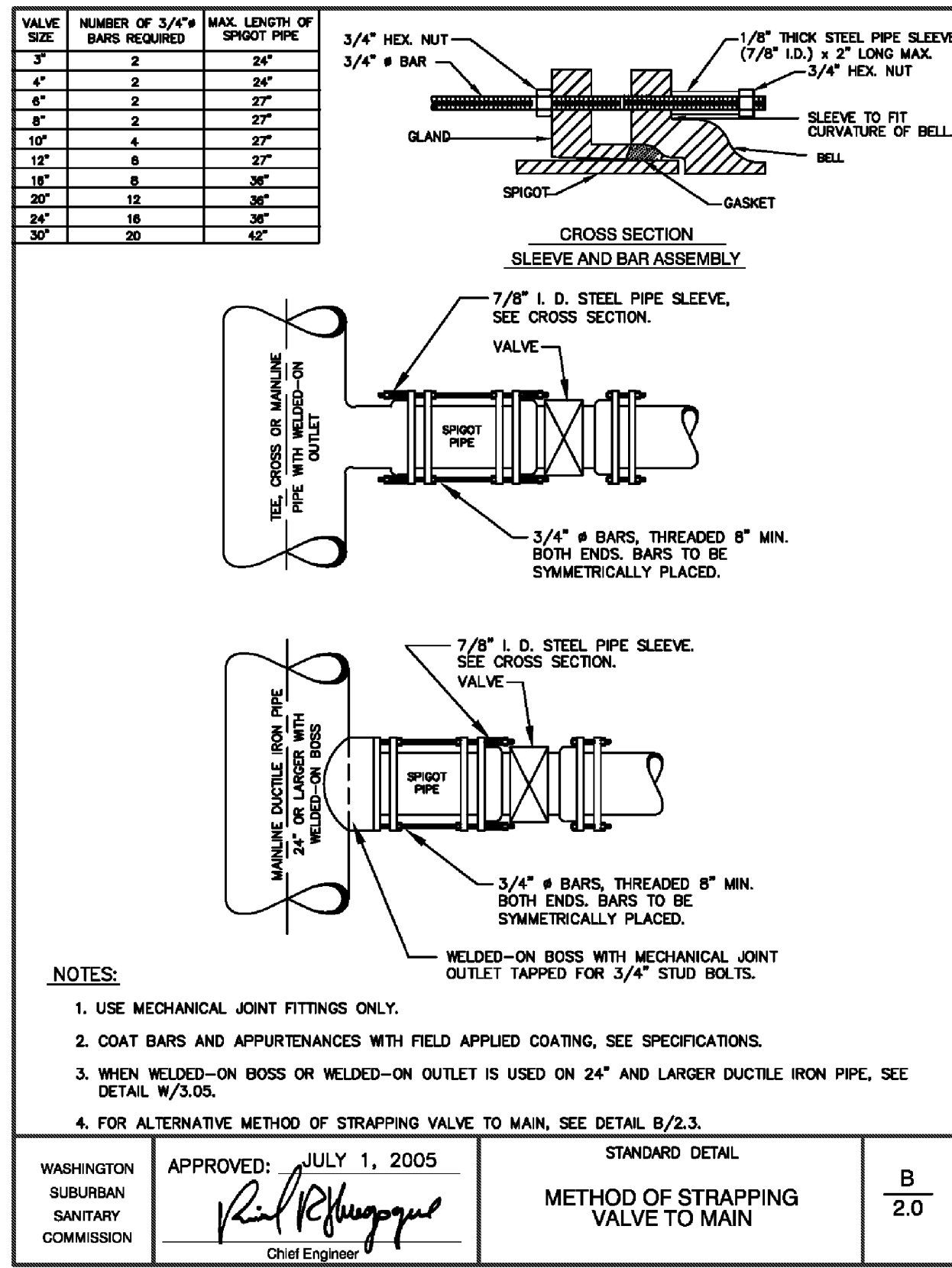
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SITE DETAILS

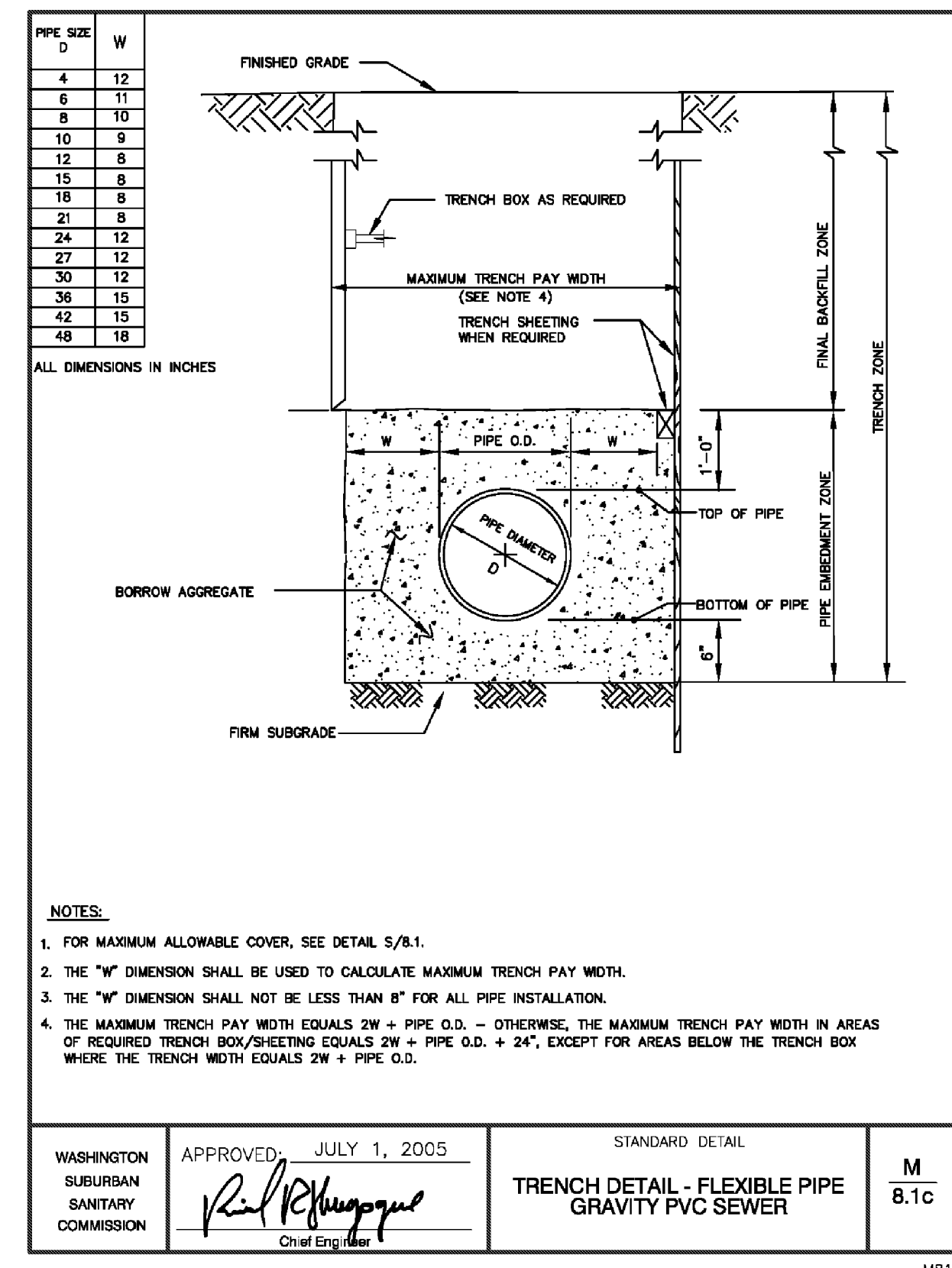
SH. NO. \_\_\_\_\_ OF \_\_\_\_\_ **DWG. C-202**



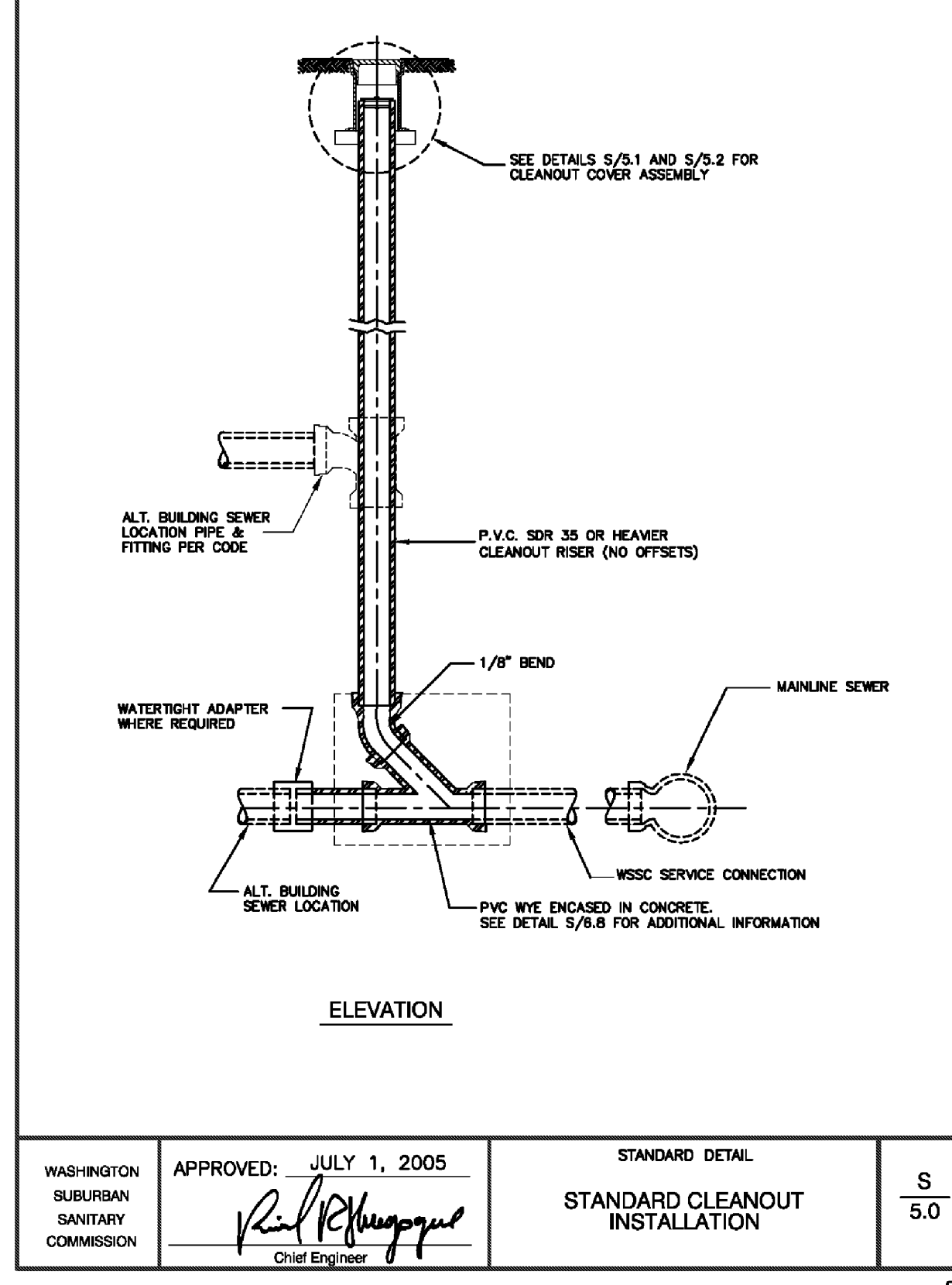
10 WSSC STANDARD DETAIL S5.0  
201203 NOT TO SCALE

11 WSSC STANDARD DETAIL S5.0  
201203 NOT TO SCALE

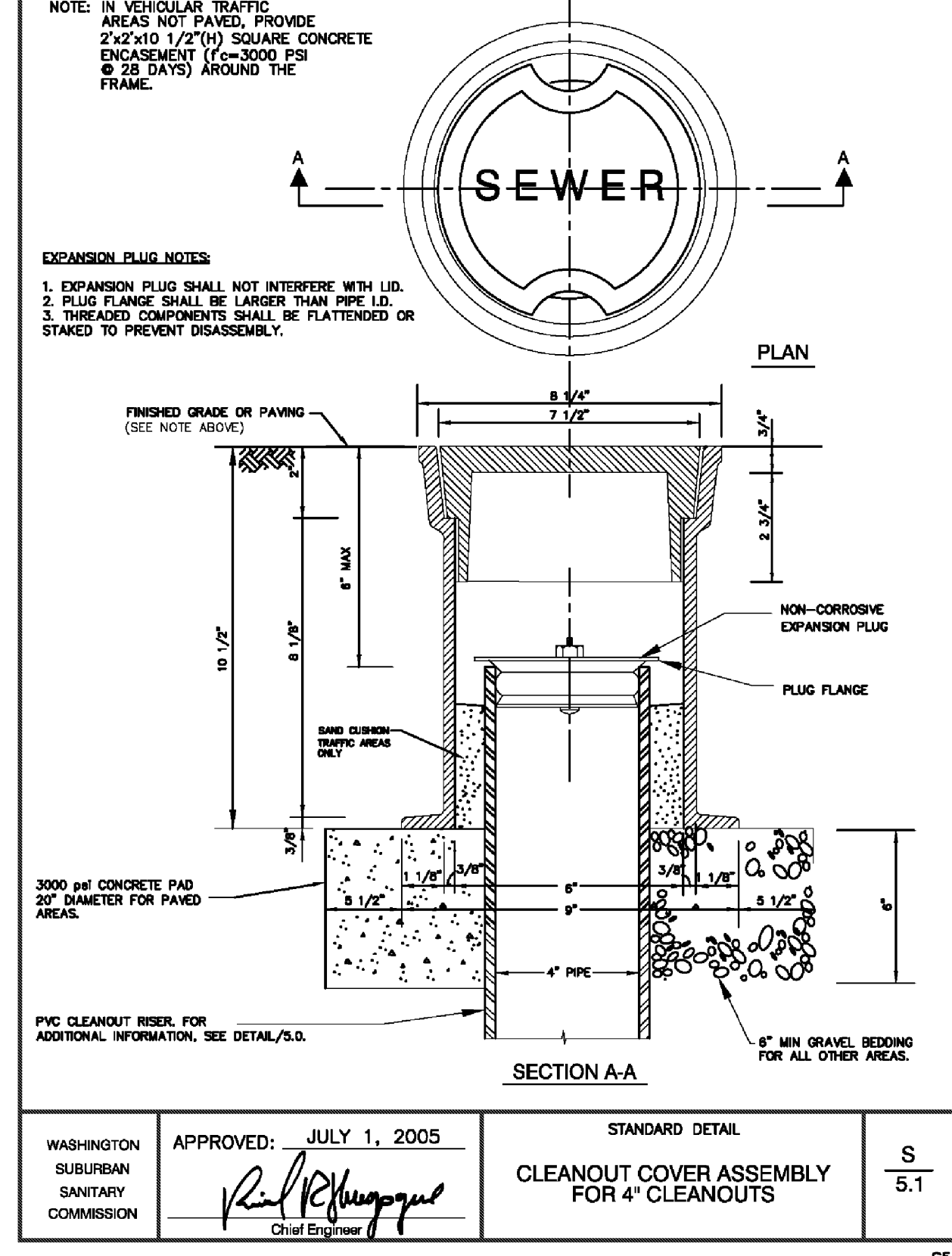
16 WSSC STANDARD DETAIL W5.9  
201203 NOT TO SCALE



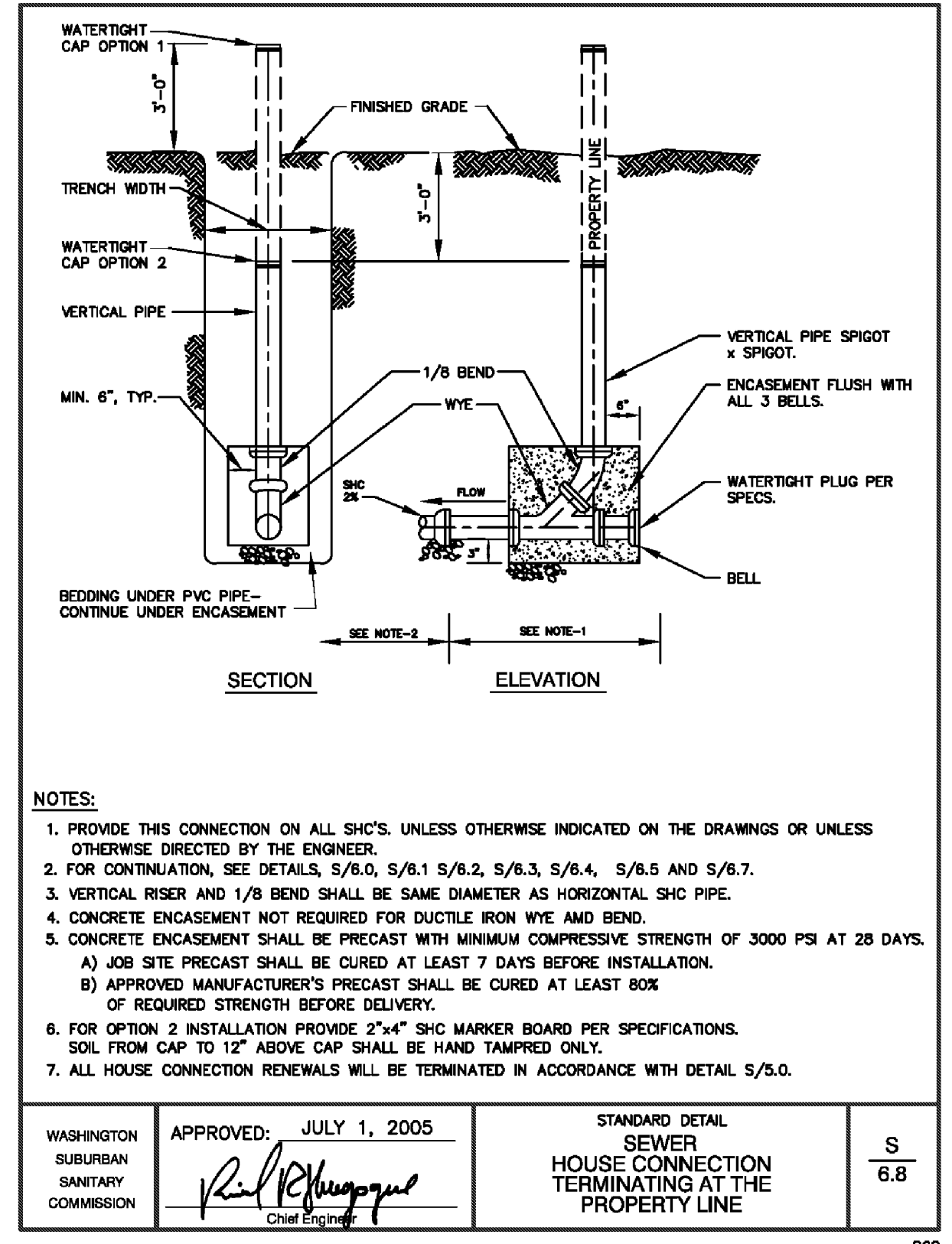
12 WSSC STANDARD DETAIL S5.0  
201203 NOT TO SCALE



13 WSSC STANDARD DETAIL S5.0  
201203 NOT TO SCALE



14 WSSC STANDARD DETAIL S5.0  
201203 NOT TO SCALE



15 WSSC STANDARD DETAIL S5.0  
201203 NOT TO SCALE

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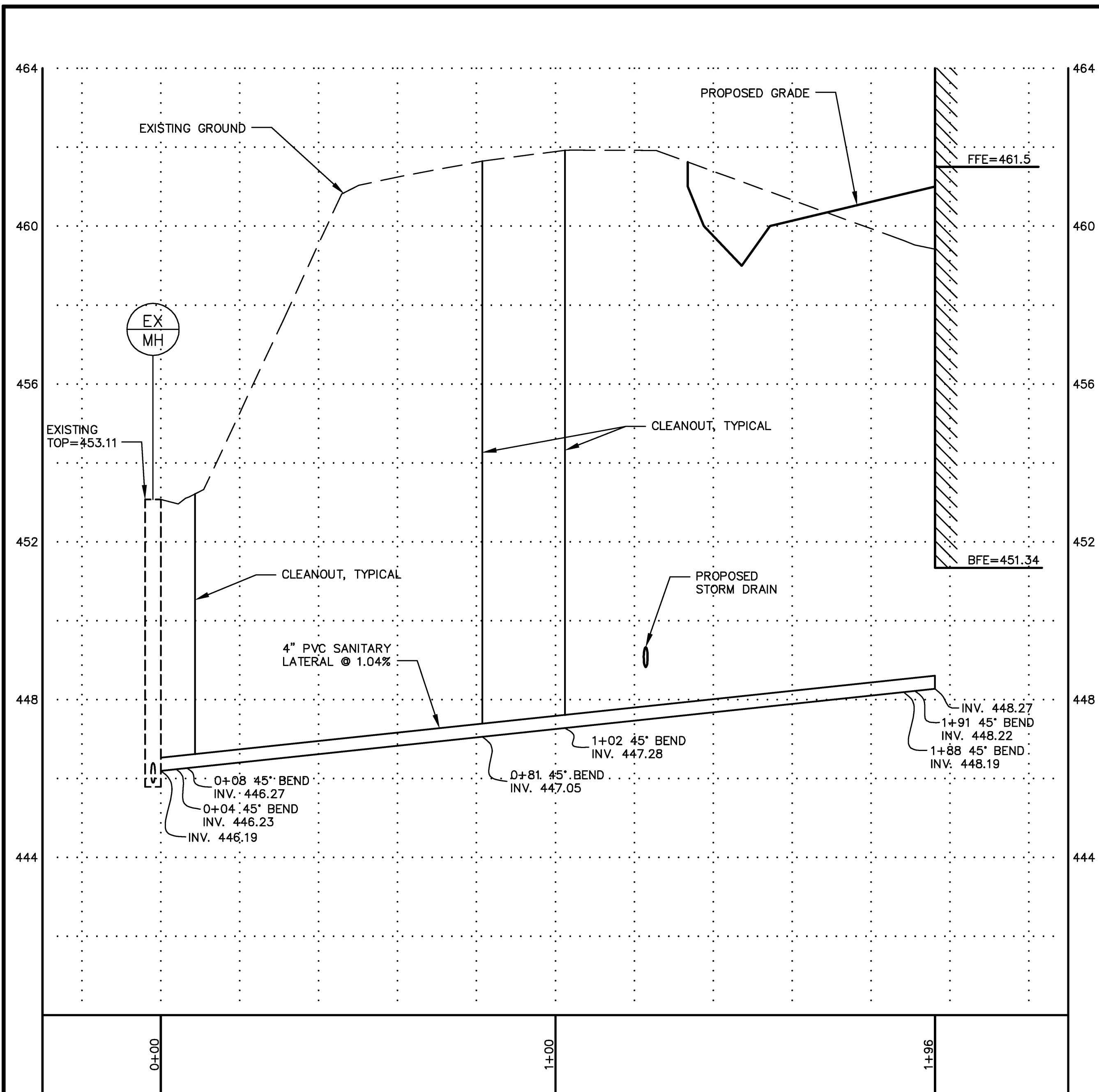
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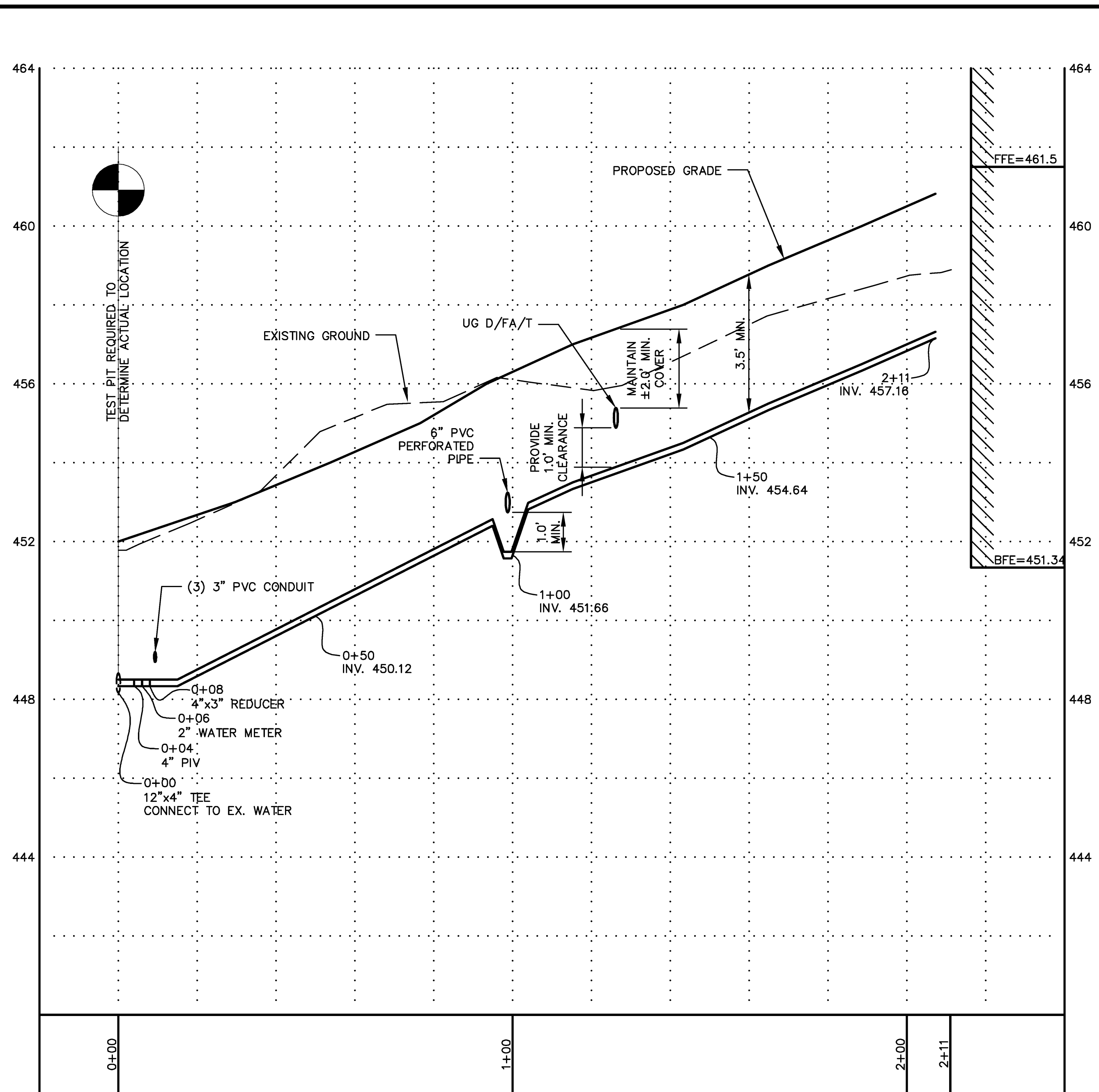
SITE DETAILS

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



**SANITARY SEWER PROFILE**

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'



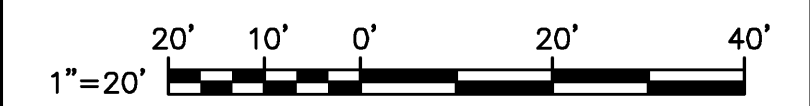
**WATER PROFILE**

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

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

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

UTILITY PROFILES

SH. NO. \_\_\_ OF \_\_\_ **DWG. C-301**

APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENGR. OFF.	DATE	FIRE PROTECTION SYS.	DATE	S.H. & E. DIV.	DATE	FACILITIES ENGR. OFF.	DATE	PROJECT LEADER	DATE	DRAWN BY	DATE	PROJECT NO.	DESIGN PROJ. #
												KS/DN	02/01/10			SB134109CQ0026/69331	

**LEGEND**

- LOD — LIMIT OF DISTURBANCE
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- ▨ SCE — STABILIZED CONSTRUCTION ENTRANCE
- — CURB INLET PROTECTION

**STANDARD STABILIZATION NOTE**

"Following initial soil disturbance or redistribution, permanent or 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.

**OWNER'S/DEVELOPER'S CERTIFICATION**

I/WE HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION, AND OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF THE SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I HEREBY AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ONSITE EVALUATION BY THE STATE OF MARYLAND, DEPARTMENT OF THE ENVIRONMENT, COMPLIANCE INSPECTORS."

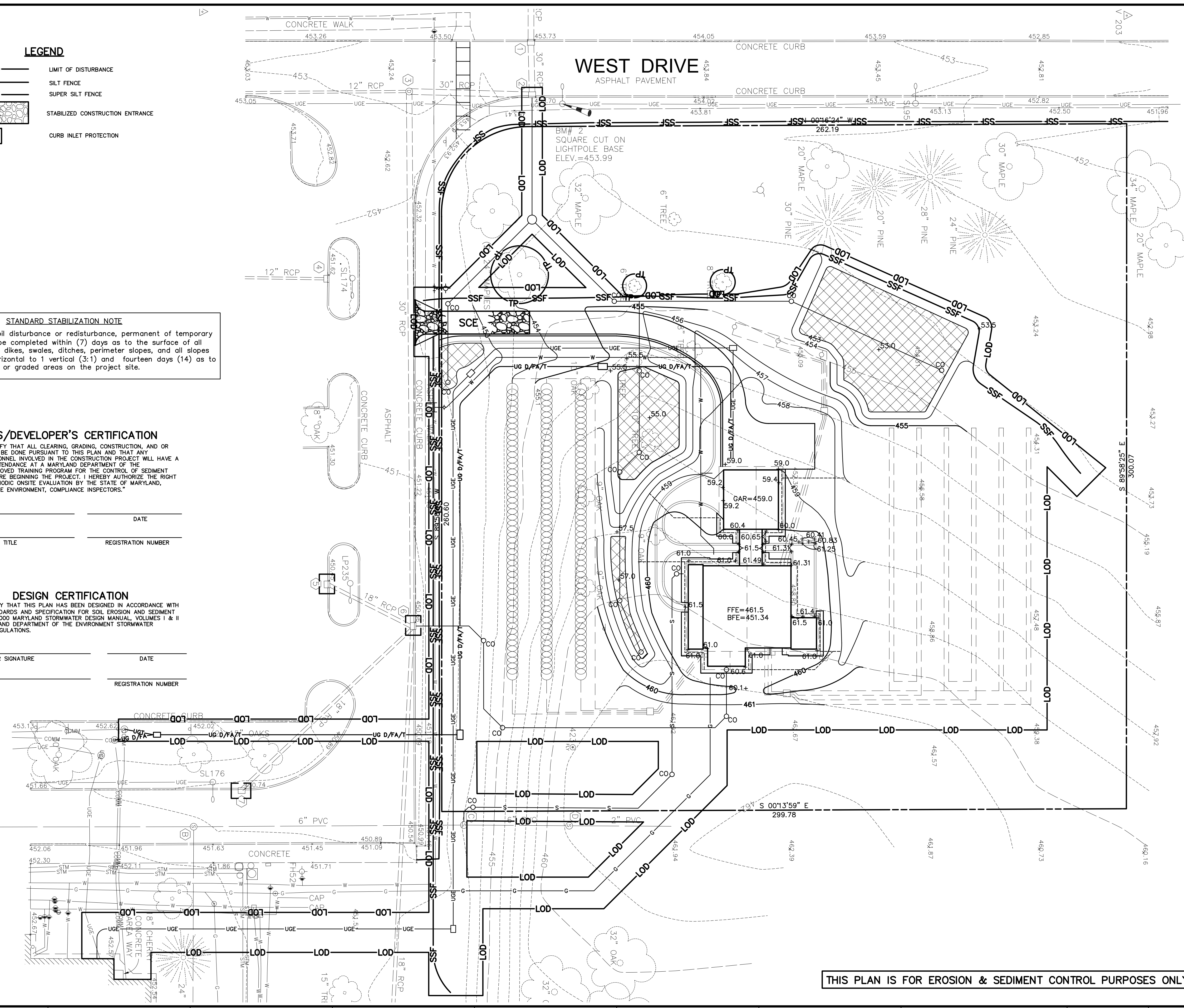
SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_  
 PRINTED NAME AND TITLE \_\_\_\_\_ REGISTRATION NUMBER \_\_\_\_\_

**DESIGN CERTIFICATION**

I HEREBY CERTIFY THAT THIS PLAN HAS 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.

DESIGN ENGINEER SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_  
 PRINTED NAME \_\_\_\_\_ REGISTRATION NUMBER \_\_\_\_\_

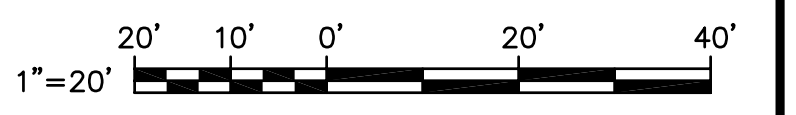
**WEST DRIVE**  
 ASPHALT PAVEMENT



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	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 A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 12564, EXPIRATION DATE 08/10/2011."



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NET ZERO ENERGY RESIDENTIAL TEST FACILITY

EROSION & SEDIMENT CONTROL PLAN

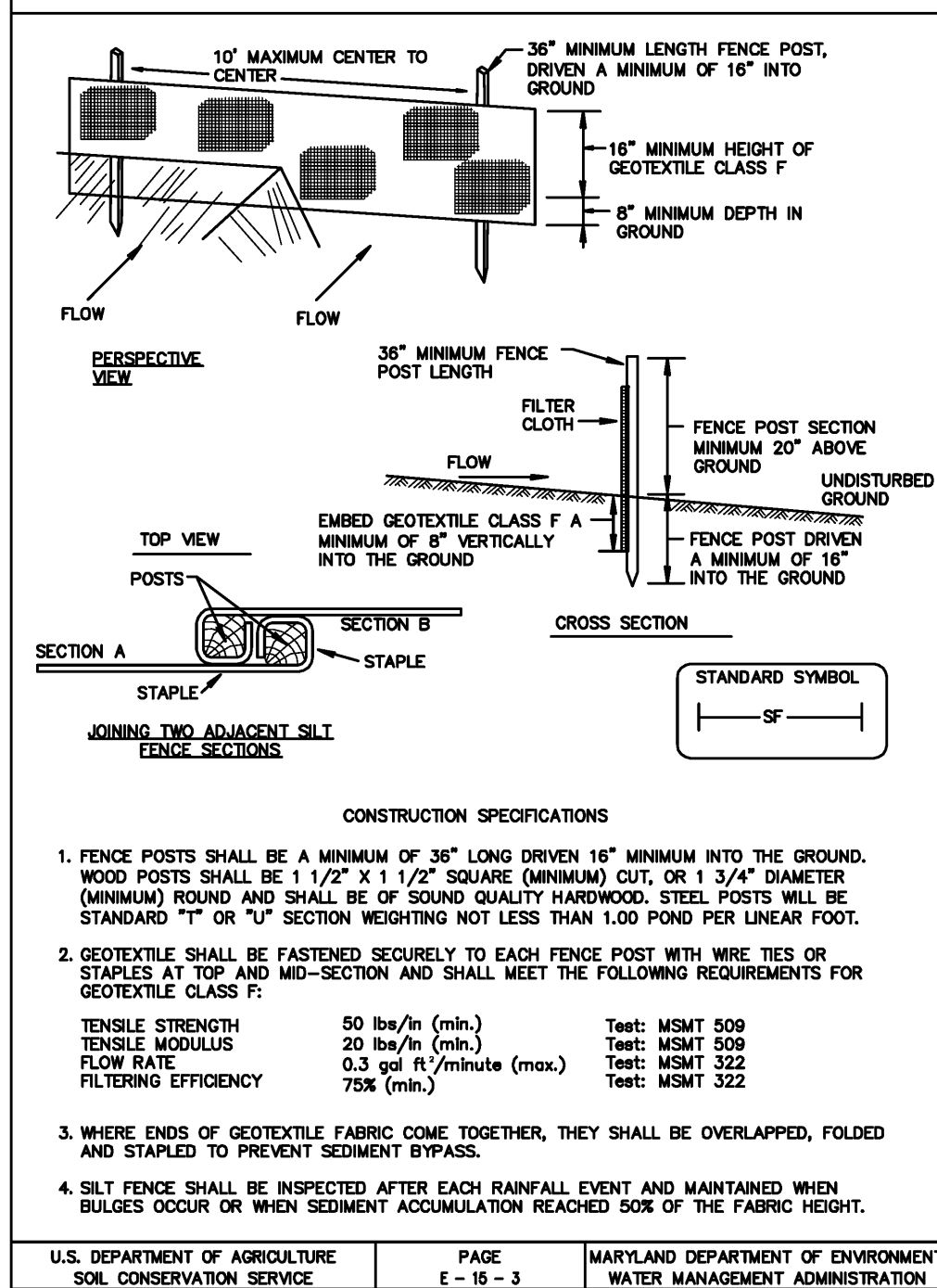
SH. NO. \_\_\_\_\_ OF \_\_\_\_\_ **DWG. C-401**

**THIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY.**

APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENGR. 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. #

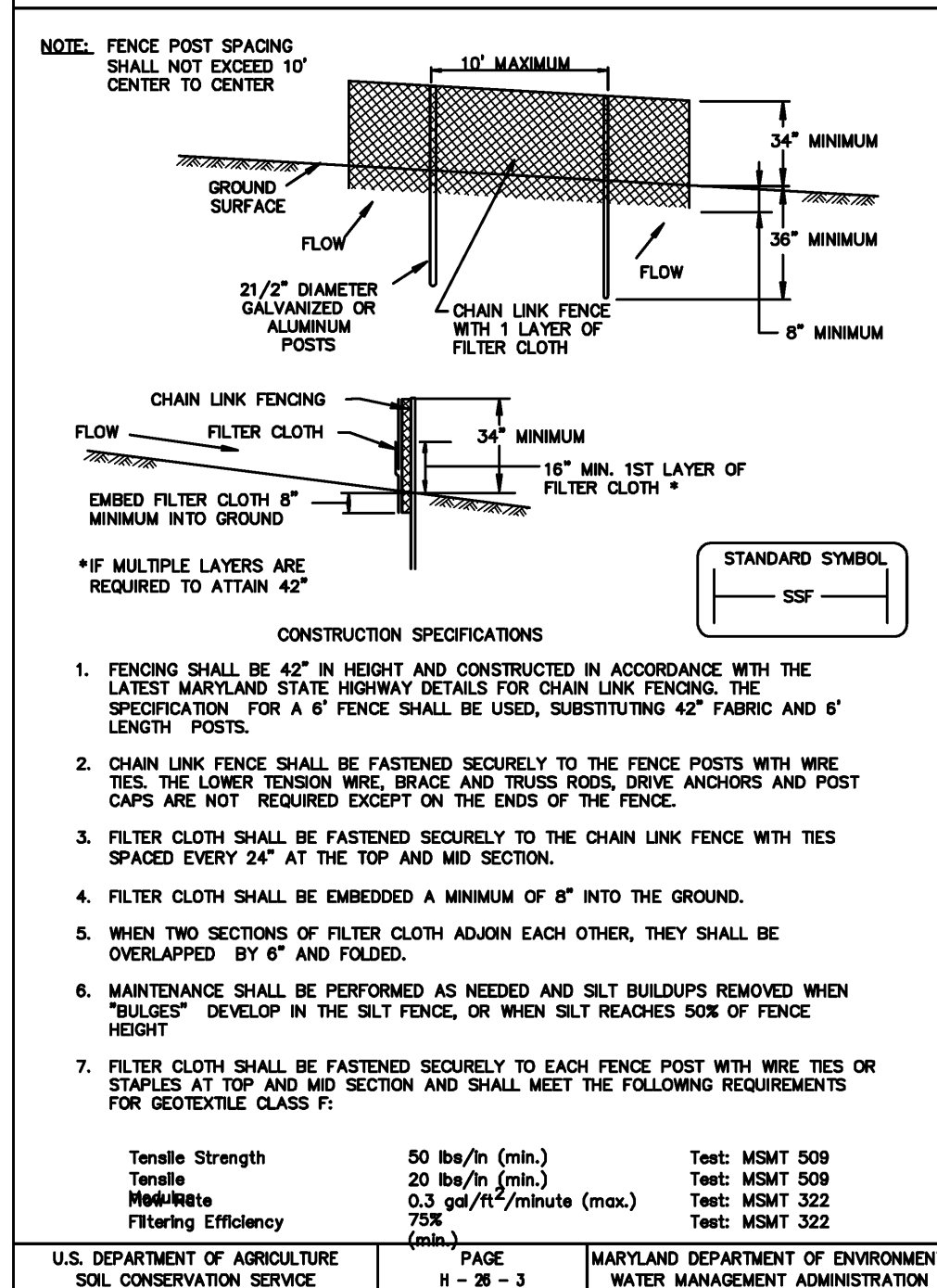
KS/DN 02/01/10 SB134109CQ0026/69331  
 DRAWN BY \_\_\_\_\_ PROJECT W.O. \_\_\_\_\_ DESIGN PROJ. # \_\_\_\_\_

**DETAIL 22 – SILT FENCE**



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**DETAIL 33 – SUPER SILT FENCE**



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**SILT FENCE**

SILT FENCE DESIGN CRITERIA		
SLOPE STEEPNESS	SLOPE LENGTH (MAXIMUM)	SILT FENCE LENGTH (MAXIMUM)
FLATTER THAN 50:1	UNLIMITED	UNLIMITED
50:1 TO 10:1	125 FEET	1,000 FEET
10:1 TO 5:1	100 FEET	750 FEET
5:1 TO 3:1	60 FEET	500 FEET
3:1 TO 2:1	40 FEET	250 FEET
2:1 AND STEEPER	20 FEET	125 FEET

NOTE: IN AREAS OF LESS THAN 2% SLOPE AND SANDY SOILS (USDA GENERAL CLASSIFICATION SYSTEM: SOIL CLASS A) MAXIMUM SLOPE LENGTH AND SILT FENCE LENGTH WILL BE UNLIMITED. IN THESE AREAS A SILT FENCE MAY BE THE ONLY PERMITTER CONTROL REQUIRED.

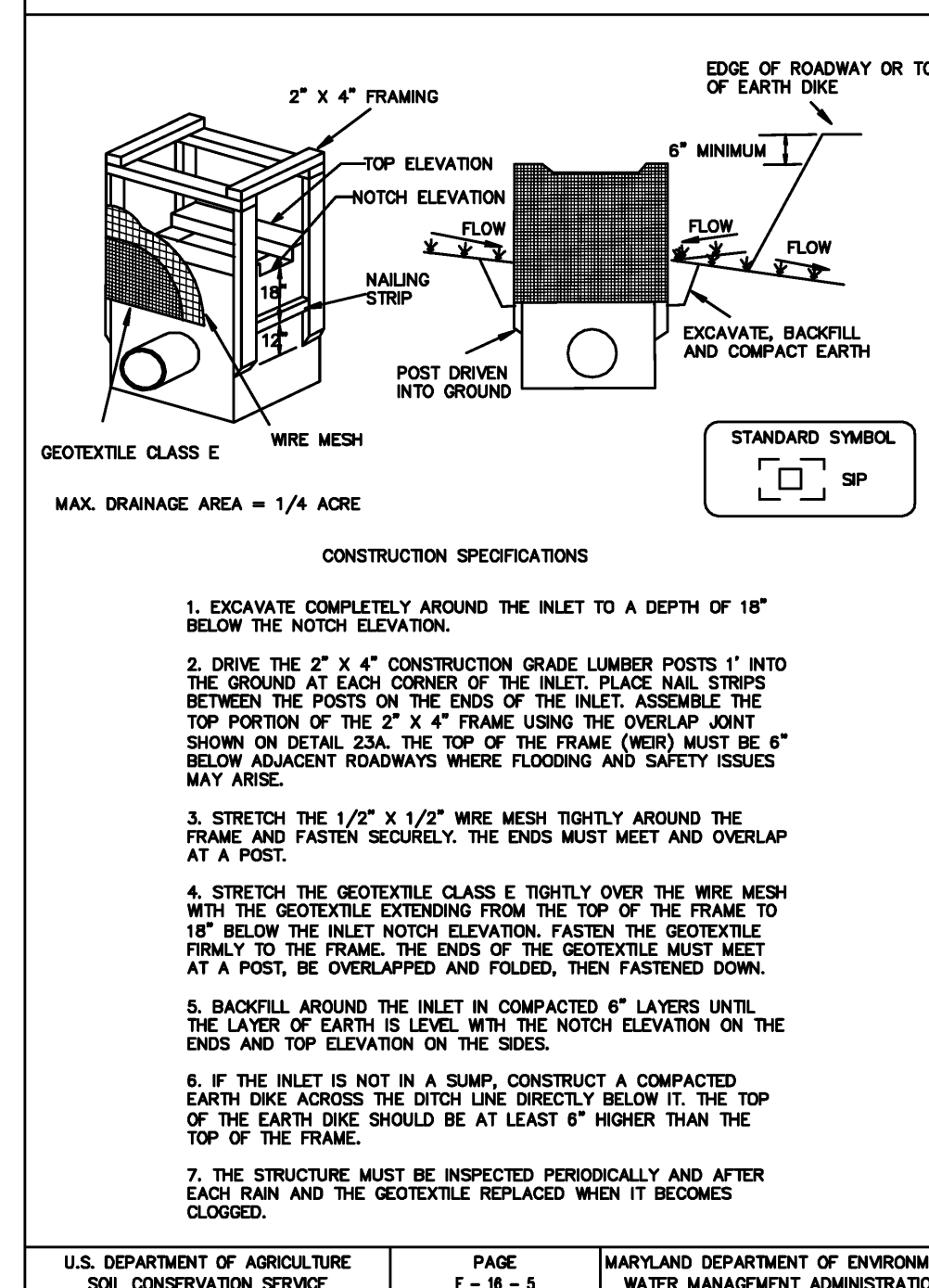
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E-15-3A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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**SUPER SILT FENCE**

DESIGN CRITERIA			
SLOPE	SLOPE STEEPNESS	SLOPE LENGTH (MAXIMUM)	SILT FENCE LENGTH (MAXIMUM)
0 - 10%	0 - 10:1	UNLIMITED	UNLIMITED
10 - 20%	10:1 - 5:1	200 FEET	1,500 FEET
20 - 33%	5:1 - 3:1	100 FEET	1,000 FEET
33 - 50%	3:1 - 2:1	100 FEET	500 FEET
50% +	2:1 +	50 FEET	250 FEET

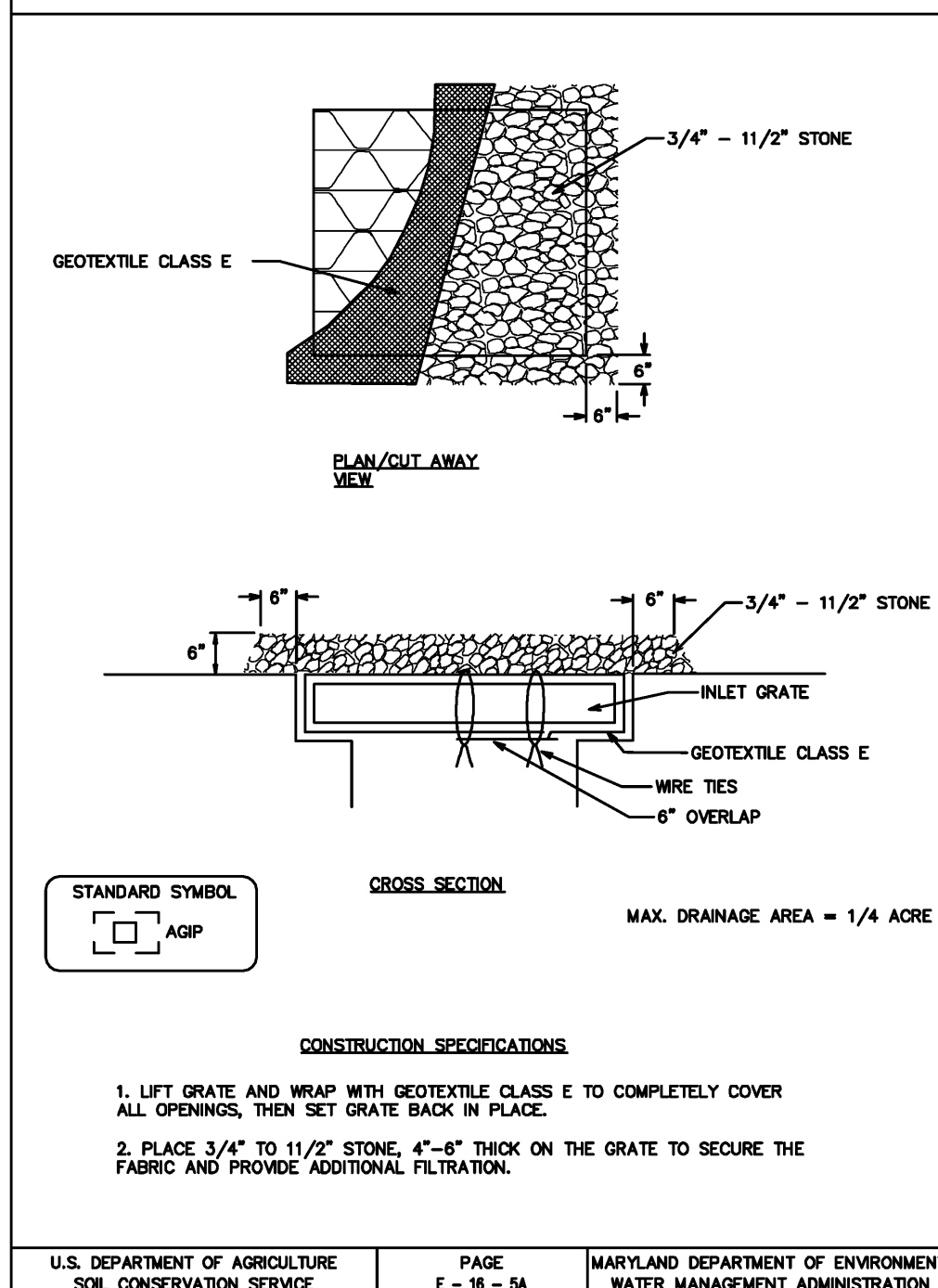
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E-15-3A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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**DETAIL 23A – STANDARD INLET PROTECTION**



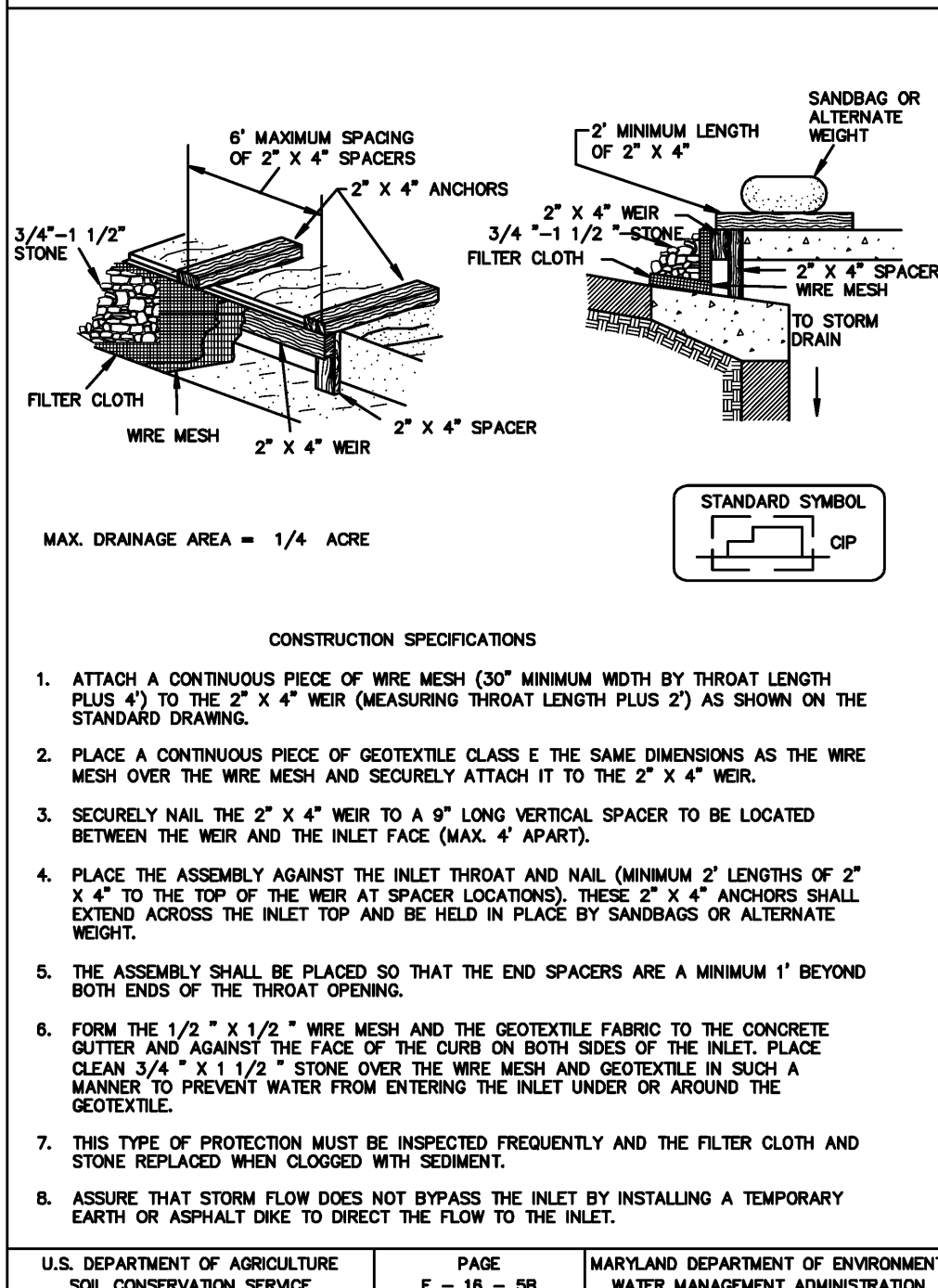
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E-16-5	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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**DETAIL 23B – AT GRADE INLET PROTECTION**



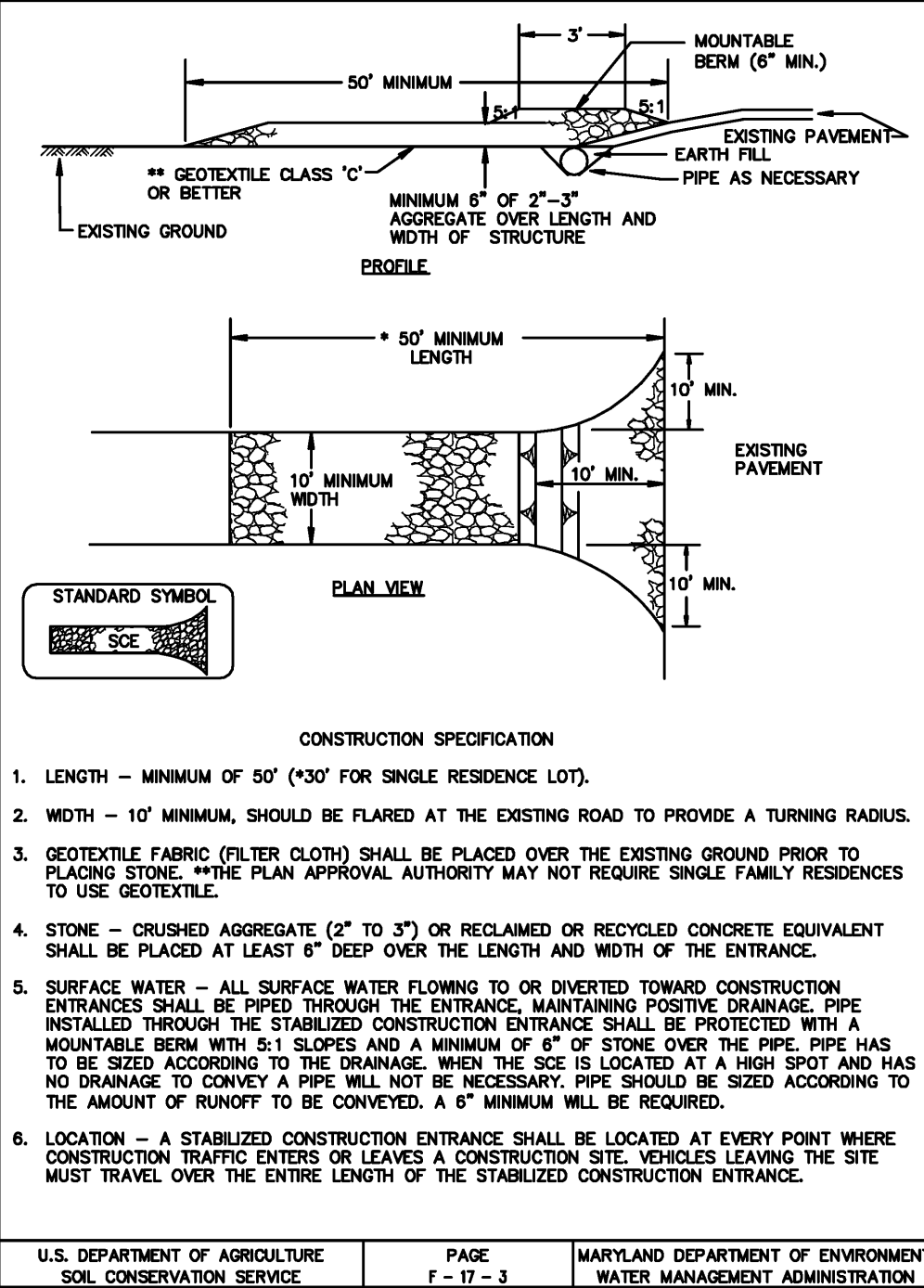
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E-16-5A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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**DETAIL 23C – CURB INLET PROTECTION (COG OR COS INLETS)**



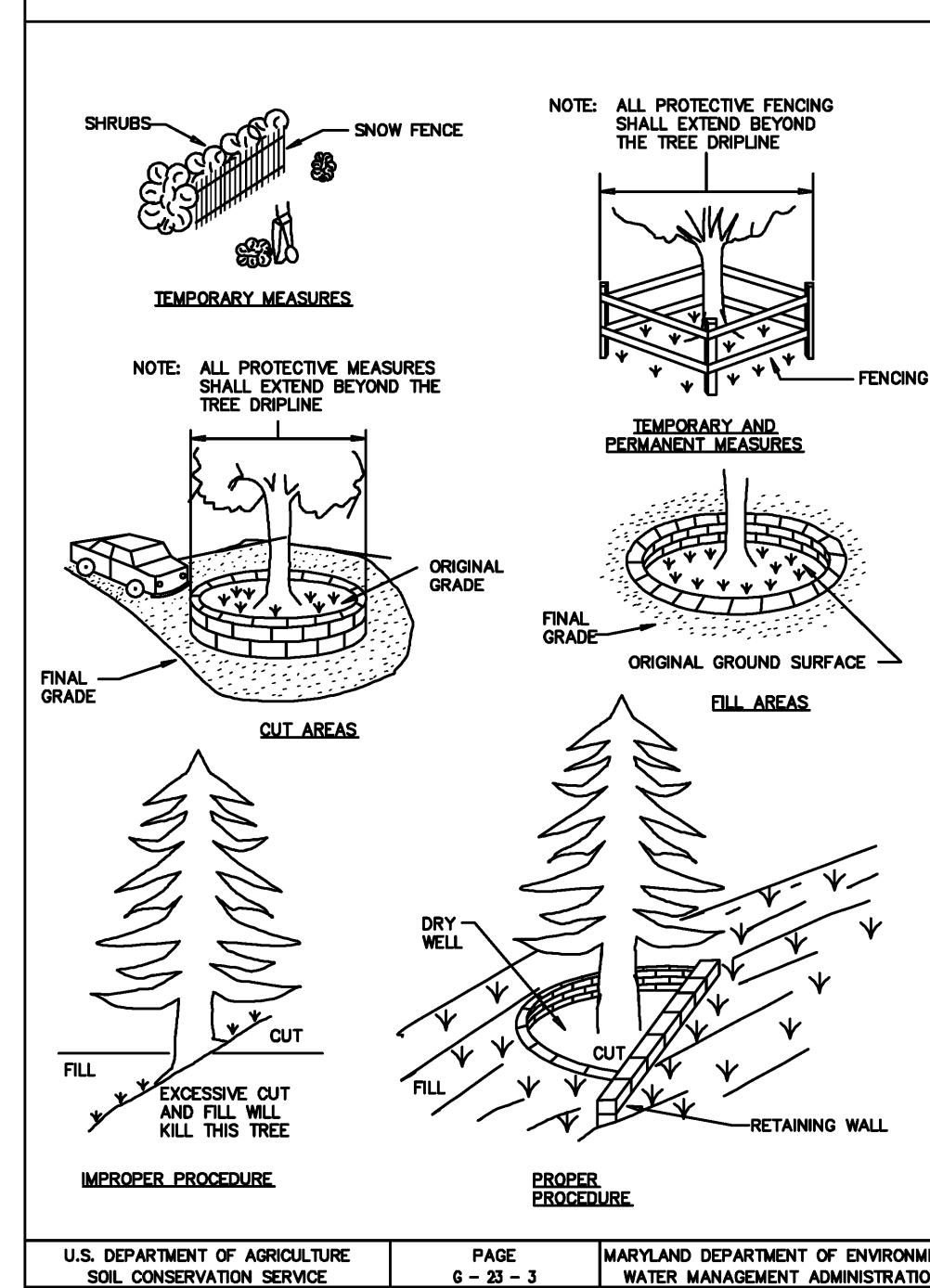
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E-16-5B	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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**DETAIL 24 – STABILIZED CONSTRUCTION ENTRANCE**



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**DETAIL 31 – TREE PROTECTION**



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E-23-3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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**23.0 STANDARDS AND SPECIFICATIONS FOR TREE PROTECTION**

- 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.
  - BOARDS WILL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
  - HEAVY EQUIPMENT OPERATORS WILL BE CAUTIONED TO AVOID DAMAGE TO EXISTING TREE TRUNKS AND ROOTS DURING LAND LEVELING OPERATIONS. TUNNEL UNDER ROOT SYSTEM WHEN INSTALLING LINES, IF POSSIBLE.
  - 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 RECEIVE 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.
  - DURING THE FIRST TWO SUMMERS FOLLOWING CONSTRUCTION, IT IS DESIRABLE THAT THE TREES RECEIVE ADEQUATE AMOUNTS OF WATER.

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**NIST**

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PLANT DIVISION

NET ZERO ENERGY RESIDENTIAL TEST FACILITY  
EROSION & SEDIMENT CONTROL DETAILS

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

THIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY. EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.

APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENG. OFF.	DATE	TREE PROTECTION SYS.	DATE	S.H. & E. DIV.	DATE	FACILITIES ENGR. OFF.	DATE	PROJECT LEADER	DATE	KS/DN	02/01/10	SB134108CQ0026/69331	DESIGN PROJ. #
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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.

- 1. 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 ADMINISTRATION, SHALL BE REQUIRED TO HOLD A PRE-CONSTRUCTION MEETING BETWEEN PROJECT REPRESENTATIVES AND A REPRESENTATIVE OF WMA.
2. THE CONTRACTOR MUST NOTIFY WMA IN WRITING AND BY TELEPHONE AT THE FOLLOWING POINTS:
A. THE REQUIRED PRE-CONSTRUCTION MEETING.
B. FOLLOWING INSTALLATION OF SEDIMENT CONTROL MEASURES.
C. DURING THE INSTALLATION OF SEDIMENT BASINS (TO BE CONVERTED INTO PERMANENT STORMWATER MANAGEMENT STRUCTURES) AT THE REQUIRED INSPECTION POINTS (SEE INSPECTION CHECKLIST ON PLAN), NOTIFICATION PRIOR TO COMMENCING CONSTRUCTION OF EACH STEP IS MANDATORY.
...
27. SITE INFORMATION:
A. TOTAL AREA OF FACILITY (BASE, CAMPUS, PARK, ETC.) 578± ACRES
B. TOTAL AREA OF PROJECT SITE 578 ACRES
C. AREA DISTURBED 1.5 ACRES
D. AREA TO BE ROOFED OR PAVED 16 ACRES (SOLAR PANELS)
E. TOTAL CUT 2,000 CUBIC YARDS
F. TOTAL FILL 2,000 CUBIC YARDS
G. OFF-SITE WASTE / BORROW AREA LOCATION TO BE DETERMINED BY CONTRACTOR

NOTE: 1. 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.

NOTE: 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 redistribution, 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.

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 CONTROL SHALL BE USED THROUGHOUT THE WORK AT THE SITE.
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.
...
6. FOR WATER APPLICATION TO SOIL SURFACES DURING DEMOLITION AND/OR EXCAVATION, THE CONTRACTOR SHALL:
A. APPLY WATER WITH EQUIPMENT CONSISTING OF TANK, SPRAY BAR, PUMP WITH DISCHARGE PRESSURE GAUGE;
B. ARRANGE SPRAY BAR HEIGHT, NOZZLE SPACING AND SPRAY PATTERN TO PROVIDE COMPLETE COVERAGE OF GROUND WITH WATER;
C. DISPENSE WATER THROUGH NOZZLES ON SPRAY BAR AT 20 PSI MINIMUM. KEEP AREAS DAMP WITHOUT CREATING NUISANCE CONDITIONS SUCH AS PONDING.

SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS

- A. SITE PREPARATION
I. INSTALL EROSION AND SEDIMENT CONTROL STRUCTURES (EITHER TEMPORARY OR PERMANENT) SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, BERMS, WATERWAYS, OR SEDIMENT CONTROL BASINS.
II. PERFORM ALL GRADING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. FINAL GRADING AND SHAPING IS NOT USUALLY NECESSARY FOR TEMPORARY SEEDING.
...
C. SEEDBED PREPARATION
I. TEMPORARY SEEDING
a. SEEDBED PREPARATION SHALL CONSIST OF LOOSENING SOIL TO A DEPTH OF 3" TO 5" BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS, CHESEL PLOWS, OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENEED, IT SHOULD NOT BE ROLLED OR DRAGGED SMOOTH, BUT LEFT IN THE ROUGHENED CONDITION.
...
D. SEED SPECIFICATIONS
I. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED SHALL BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED SHALL HAVE BEEN TESTED WITHIN 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON THIS JOB.
...
II. 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 HYDROSEEDING.

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
I. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER), BROADCAST OR DROP SEEDER, OR CULTEPACKER 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 HYDROSEEDING.
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.
...
F. MULCH SPECIFICATIONS (IN ORDER OF PREFERENCE)
I. STRAW SHALL CONSIST OF THOROUGHLY THRESHED WHEAT, RYE OR OAT STRAW, REASONABLY BRIGHT IN COLOR, AND SHALL NOT BE MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY, AND SHALL BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW.
II. WOOD CELLULOSE FIBER MULCH (WCFM)
a. WCFM SHALL CONSIST OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
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 ADJUTIVES TO FORM A HOMOGENEOUS SLURRY. THE MULCH MATERIAL SHALL FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND SHALL COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDINGS.
e. WCFM SHALL CONTAIN NO ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.
f. 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.

- 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.
II. WHEN STRAW MULCH IS USED, IT SHALL BE SPREAD OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS/ACRE. MULCH SHALL BE APPLIED TO A UNIFORM LOSSE 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 2.5 TONS/ACRE.
...
H. SECURING STRAW MULCH (MULCH ANCHORING)
MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON SIZE OF AREA AND EROSION HAZARD:
I. A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 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.
II. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. THE FIBER BINDER SHALL BE 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.
...
IV. 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 3,000 FEET LONG.

Table with 4 columns: REVISION, DESCRIPTION, BY, DATE. Row 1: 95% CD SET, 01/29/10. Row 2: 100% CD SET, 02/24/10. Row 3: ISSUED FOR CONSTRUCTION, 03/31/10.

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. 12564, EXPIRATION DATE 08/10/2011."

KH 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 PLANT DIVISION

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

EROSION & SEDIMENT CONTROL NOTES

SH. NO. \_\_\_ OF \_\_\_ DWG. C-403

Table with 12 columns: APPROVED BY, DATE, SPONSOR, DATE, MAINTENANCE ENG. OFF, DATE, FIRE PROTECTION SYS, DATE, S.H. & E. DIV, DATE, FACILITIES ENGR. OFF, DATE, PROJECT LEADER, DATE, KS/DN, DATE, 02/01/10, SB134109C40026/69331, PROJECT NO., DESIGN PROJ. #

EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.

THIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY.

BIORETENTION CONSTRUCTION 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 <sub>c</sub> =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.

AB-BUILT DATA FOR FILTERS		
* TO BE COMPLETED BY THE CERTIFYING ENGINEER		
TYPE OF FACILITY:	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"	
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 SYSTEMS SUCH AS FLOW DIVERSION STRUCTURES, PRE-FILTERS AND FILTERS, INLETS, OUTLETS, ORIFICES, AND FLOW DISTRIBUTION STRUCTURES; AND
- (E) UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.

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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MAINTENANCE SCHEDULE FOR BIORETENTION			
DESCRIPTION	METHOD	FREQUENCY	TIME OF YEAR
<b>SOIL</b>			
INSPECT AND REPAIR EROSION	VISUAL	MONTHLY	MONTHLY
<b>ORGANIC LAYER</b>			
REMULCH ANY VOID AREAS	BY HAND	WHENEVER NEEDED	WHENEVER NEEDED
REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER (OPTIONAL)	BY HAND	ONCE EVERY TWO TO THREE YEARS	SPRING
ANY ADDITIONAL MULCH ADDED (OPTIONAL)	BY HAND	ONCE A YEAR	SPRING
<b>PLANTS</b>			
REMOVAL AND REPLACEMENT OF ALL DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT	SEE PLANTING SPECIFICATIONS	TWICE A YEAR	3/15 TO 4/30 AND 10/1 TO 11/30
TREAT ALL DISEASED TREES AND SHRUBS	MECHANICAL OR BY HAND	N/A	VARIES, DEPENDS ON INSECT OR DISEASE INFESTATION
WATERING OF PLANT MATERIAL SHALL TAKE PLACE AT THE END OF EACH DAY FOR FOURTEEN CONSECUTIVE DAYS AFTER PLANTING HAS BEEN COMPLETED	BY HAND	IMMEDIATELY AFTER PROJECT COMPLETION	N/A
WATERING OF PLANT MATERIAL SHALL TAKE PLACE AT THE END OF EACH DAY FOR FOURTEEN CONSECUTIVE DAYS AFTER PLANTING HAS BEEN COMPLETED	BY HAND	IMMEDIATELY AFTER PROJECT COMPLETION	N/A
REPLACE STAKES AFTER ONE YEAR	BY HAND	ONCE A YEAR	ONLY REMOVE STAKES IN THE SPRING
REPLACE ANY DEFICIENT STAKES OR WIRES	BY HAND	N/A	WHENEVER NEEDED

### 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 MARYLAND STORMWATER DESIGN MANUAL.

2. PLANTING SOIL  
THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER 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 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 - K2O) 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 REFRACURE 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 INCHES 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.

4. PLANT MATERIAL  
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.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY, ADDING FERTILIZERS DEFATS, 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 SQUARE FEET.

6. UNDERDRAINS  
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).

7. MISCELLANEOUS  
THE BIORETENTION FACILITY MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

### 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 NUMBER \_\_\_\_\_ DATE \_\_\_\_\_

MDE # ----SF-----  
MDE No. \_\_\_\_\_  
BIORETENTION FACILITY IDENTIFICATION (NUMBER AND/OR TYPE) \_\_\_\_\_

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

### 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.

\_\_\_\_\_  
SIGNATURE

NAME \_\_\_\_\_  
MARYLAND REGISTRATION NUMBER \_\_\_\_\_  
P.E., R.L.S. OR R.L.A. (CIRCLE) \_\_\_\_\_ DATE \_\_\_\_\_

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THIS PLAN IS FOR EROSION & SEDIMENT CONTROL PURPOSES ONLY.

MDE # 10-SF-0096

APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENG. OFF.	DATE	FIRE PROTECTION SYS.	DATE	S.H. & E. DIV.	DATE	FACILITIES ENGR. OFF.	DATE	PROJECT LEADER	DATE	KS/DN	02/01/10	SB134109C0026/69331	DRAWN BY	DATE	PROJECT W.O.	DESIGN PROJ. #
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SH. NO. \_\_\_\_ OF \_\_\_\_ DWG. C-404

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NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY  
PLANT DIVISION

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

EROSION & SEDIMENT CONTROL NOTES



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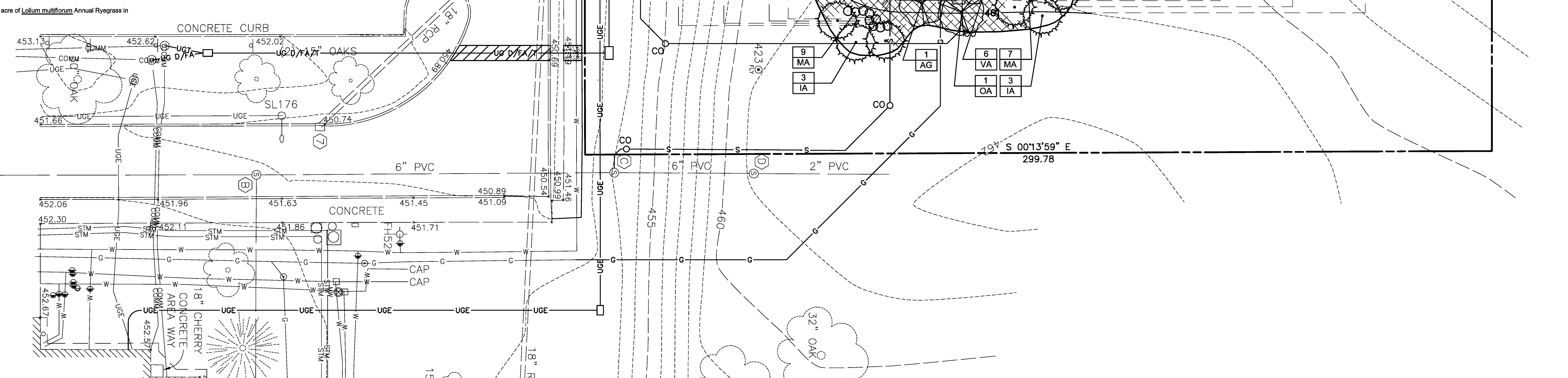
**LEGEND**

- PROPERTY LINE
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- PROPOSED GEOTHERMAL
- W --- PROPOSED WATER
- S --- PROPOSED SANITARY SEWER
- UGE --- PROPOSED UNDER GROUND ELECTRIC
- UG D/FA/T --- PROPOSED UNDER GROUND DATA/FIRE ALARM/TELEPHONE
- UG D/FA --- PROPOSED UNDER GROUND DATA/FIRE ALARM
- UGT --- PROPOSED UNDER GROUND TELECOMMUNICATIONS
- G --- PROPOSED GAS
- HANDBOX
- ▨ LIMIT OF NEW ASPHALT
- ▨ PLANTING BED EDGE

**PLANT SCHEDULE**

TREES	BOTANICAL/COMMON	CONT	CAL	SIZE	QTY
AG	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE' / 'AUTUMN BRILLIANCE' SERVICEBERRY	B & B		6'-8" H	7
IA	ILEX OPACA / AMERICAN HOLLY	B & B		6'-8" H	6
OA	OXYDENDRUM ARBOREUM / SOURWOOD TREE	B & B	2" CAL		3
QA	QUERCUS ALBA / WHITE OAK	B & B	2" CAL		1
QR	QUERCUS RUBRA / RED OAK	B & B	2" CAL		1
TD	TAXODIUM DISTICHUM / BALDCYPRESS	B & B		6'-8" H	3
SHRUBS	BOTANICAL/COMMON	CONT			
CB	CALLICARPA AMERICANA / AMERICAN BEAUTYBERRY	9 GAL			96
CA	CLETHRA ALNIFOLIA / SUMMERSWEET CLETHRA	3 GAL			42
CS	CORNUS SERICEA 'CARDINAL' / 'CARDINAL' RED-TWIG DOGWOOD	3 GAL			29
MA	MAHONIA AQUIFOLIUM / OREGON GRAPE	3 GAL			30
VA	VIBURNUM DENTATUM / ARROWWOOD VIBURNUM	3 GAL			21
SHRUB AREAS	BOTANICAL/COMMON	CONT			
RG	RHUS AROMATICA 'GRO-LOW' / GRO-LOW FRAGRANT SUMAC	3 GAL @ 48" OC			105
GROUND COVERS	BOTANICAL/COMMON	CONT			
BN	BIORETENTION NATIVE MIX / SEE PLANTING LIST THIS SHEET	4" POT @ 18" OC			2,189
EK	ECHINACEA PURPUREA 'KIM'S KNEE HIGH' TM / PURPLE CONEFLOWER	4" POT @ 18" OC			105
LK	LIATRIS SPICATA 'KOBOLD' / KOBOLD BLAZING STAR	4" POT @ 12" OC			304
RH	RUDBECKIA HIRTA / BLACK-EYED SUSAN	4" POT @ 18" OC			142
UN	UPLAND NATIVE MIX / SEE PLANTING LIST THIS SHEET	SEED			6,525 SF
BIORETENTION NATIVE MIX					
15%	Cotoneaster lanceolata	Lance-Leaf Cotoneaster			
10%	Helopsis helianthoides	Oxeye Sunflower			
15%	Iris versicolor	Blue Flag Iris			
5%	Lupinus perennis	Wild Blue Lupine			
5%	Monarda fistulosa	Wild Bergamot			
5%	Monarda punctata	Spotted Beebalm			
5%	Parmenium integrifolium	Wild Quinine			
10%	Rudbeckia hirta	Black-Eyed Susan			
20%	Schizachyrium scoparium	Little Bluestem			
10%	Sorghastrum nutans	Tomahawk Indian Grass			
100%	TOTAL				
UPLAND NATIVE MIX					
15%	Andropogon gerardii	Big Bluestem			
10%	Asclepias tuberosa	Butterfly Milkweed			
10%	Echinacea purpurea	Purple Coneflower			
10%	Liatis spicata	Blazing Star			
15%	Panicum virgatum	Switchgrass			
10%	Rudbeckia hirta	Black-Eyed Susan			
15%	Schizachyrium scoparium	Little Bluestem			
15%	Sorghastrum nutans	Indian Grass			
100%	TOTAL	TOTAL TO BE PLANTED AT 25 LBS/PLS** PER ACRE			

\* Overseed entire area with 10 LBS per acre of *Lolium multiflorum* Annual Ryegrass in addition to those species listed above  
 \*\* PLS = Pure Live Seed



APPROVED BY	DATE	SPONSOR	DATE	MAINTENANCE ENG. OFF	DATE	FIRE PROTECTION SYS	DATE	S.H. & E. DIV	DATE	FACILITIES ENGR. OFF	DATE	PROJECT LEADER	DATE	DRAWN BY	DATE	PROJECT W.O.	DESIGN PROJ. #

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**NIST**

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 PLANT DIVISION

NET ZERO ENERGY RESIDENTIAL TEST FACILITY

PLANTING PLAN

SH. NO. \_\_\_ OF \_\_\_ **DWG. C-501**

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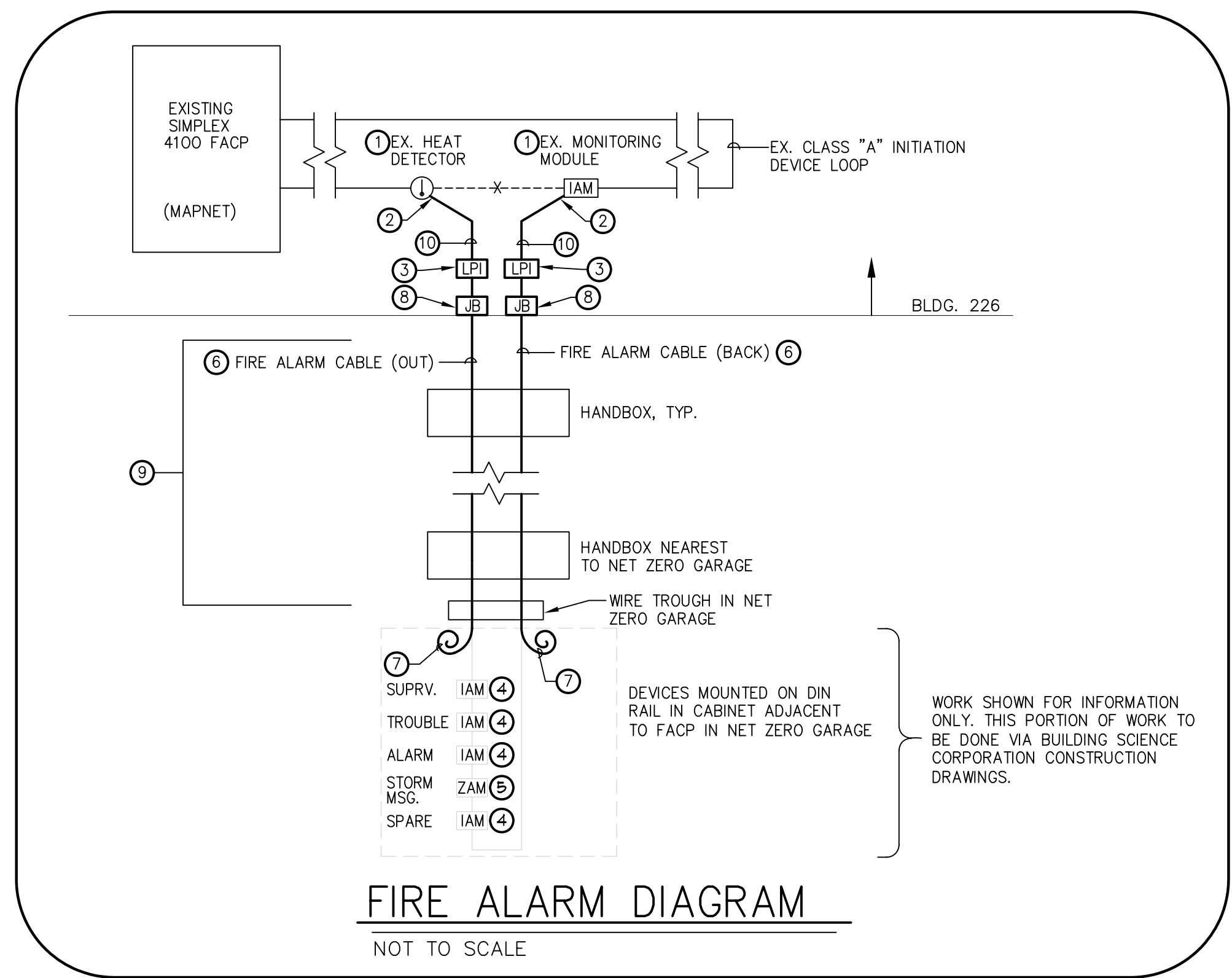
PLANTING PLAN

SH. NO. \_\_\_ OF \_\_\_ **DWG. C-501**



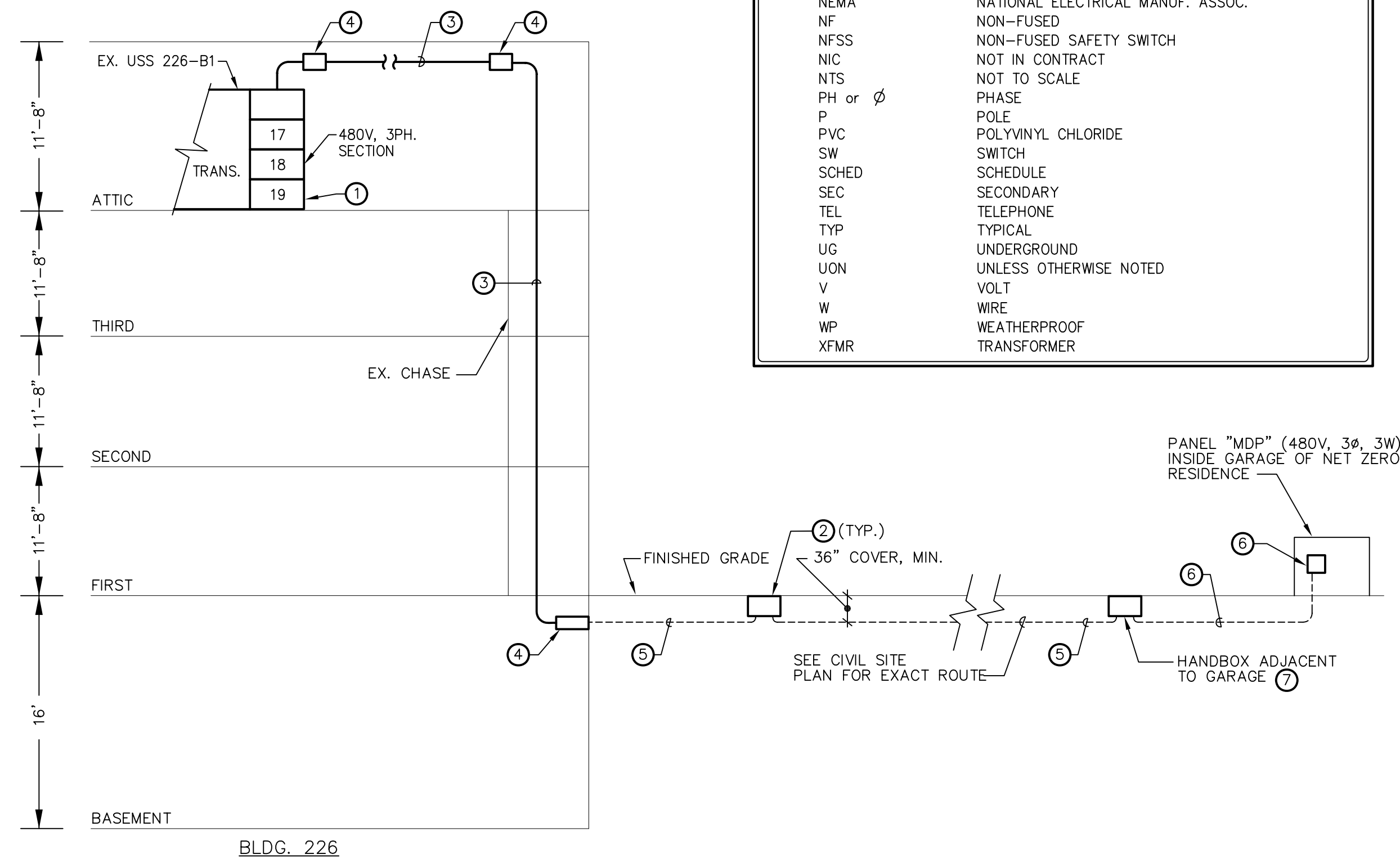
ELECTRICAL LEGEND	
	DRAWING NOTE (APPLIES TO THIS DRAWING ONLY)
	DETAIL, SECTION OR ELEVATION NUMBER DRAWING NUMBER
	REVISION NUMBER - CLOUDED AREA ON DRAWING CONTAINS REVISION
	RACEWAY - 2 #12, 1 #12 GW IN 3/4" CONDUIT, U.O.N.
	HOMERUN TO PANELBOARD - ARROWS INDICATE NUMBER OF CIRCUITS SLASHES INDICATE CIRCUIT CONDUCTORS NO SLASH INDICATES TWO CIRCUIT CONDUCTORS PROVIDE GROUNDING CONDUCTOR, NOT SHOWN
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	JUNCTION BOX: CEILING, WALL OR FLUSH-FLOOR MOUNTED
	FUSED DISCONNECT SWITCH, UPPER NUMERAL INDICATES SWITCH SIZE, LOWER NUMERAL INDICATES FUSE SIZE
	NONFUSED DISCONNECT SWITCH, NUMERAL INDICATES SIZE
	FIRE ALARM MANUAL STATION, 48" A.F.F., U.O.N.
	FIRE ALARM HEAT DETECTOR
	FIRE ALARM CONTROL PANEL
	INDIVIDUAL ADDRESSABLE MONITORING MODULE

ELECTRICAL ABBREVIATIONS	
A	AMPERE
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
ANSI	AMERICAN NAT'L STANDARDS INSTIT.
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CT	CURRENT TRANSFORMER
CTR	CENTER
CU	COPPER
DB	DIRECT BURIAL
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
ELEC	ELECTRIC / ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
ETR	EXISTING TO REMAIN
EX	EXISTING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FDR	FEEDER
F	FUSED OR FUSIBLE
FLA	FULL LOAD AMPERES
FSS	FUSED SAFETY SWITCH
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GW	GROUND WIRE
GND	GROUND
HZ	HERTZ
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT-AMPERE
KW	KILOWATT
MCB	MAIN CIRCUIT BREAKER
MH	MANHOLE
MTD	MOUNTED
MT HT	MOUNTING HEIGHT
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUF. ASSOC.
NF	NON-FUSED
NFSS	NON-FUSED SAFETY SWITCH
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PH or Ø	PHASE
P	POLE
PVC	POLYVINYL CHLORIDE
SW	SWITCH
SCHED	SCHEDULE
SEC	SECONDARY
TEL	TELEPHONE
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
V	VOLT
W	WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER



**FIRE ALARM NOTES:**

- SEE DRAWING E-2 FOR LOCATION OF EXISTING DEVICES IN SIGNAL VAULT.
- EXTEND INITIATION DEVICE LOOP AS INDICATED. ADD BOX EXTENSIONS TO EXISTING DEVICE BOXES AS REQUIRED TO ALLOW FOR NEW CONNECTIONS.
- PROVIDE SIMPLEX 2190-9169, LINE POWERED ISOLATOR.
- SIMPLEX 4090-9001, INDIVIDUAL ADDRESSABLE MODULE.
- SIMPLEX 2190-9163, CONTROL RELAY ZONE ADAPTER MODULE.
- 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.
- 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.
- COIL SPARE CONDUCTORS IN BOX AND CAP/TAPE FOR PROTECTION. SIZE BOX AS REQUIRED.
- 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 CONDUIT.

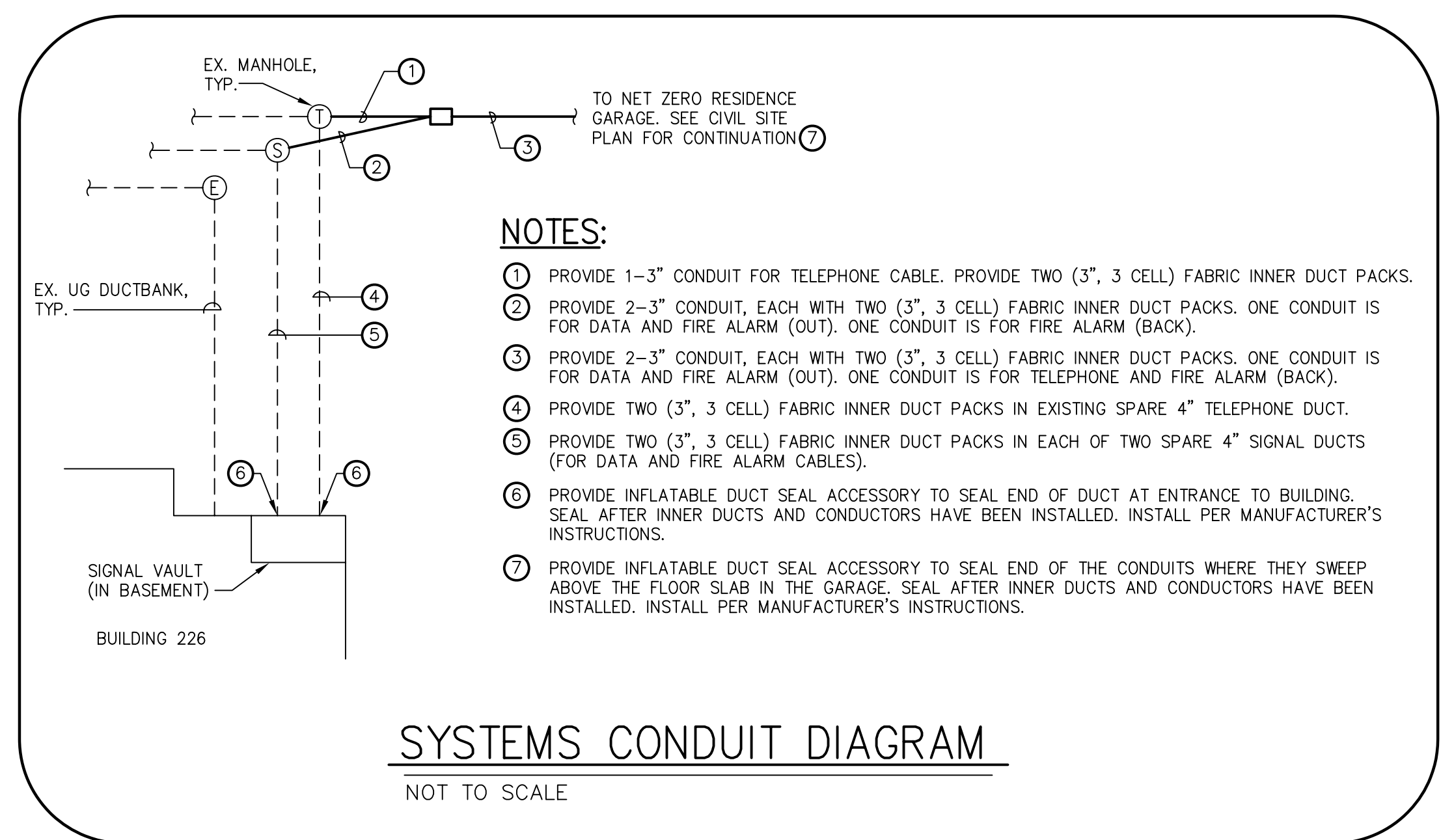


**POWER RISER NOTES:**

- EXISTING USS IS BY EATON/CUTLER-HAMMER. PROVIDE NEW DRAW-OUT CIRCUIT BREAKER IN EXISTING SPARE CUBICLE NO. 19. BREAKER SHALL BE 800AF/300AT, LSIG, MAGNUM DS WITH 400A CURRENT SENSORS AND 300A TRIP PLUG.
- SEE CIVIL PLAN FOR QUANTITY, LOCATION AND DETAIL OF OPEN BOTTOM HANDBOXES.
- PROVIDE 2 SETS OF (3-300 KCMIL + 1 #1 GRD. IN 3" CONDUIT). WIRE IS OVERSIZED, DUE TO VOLTAGE DROP.
- 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.
- 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 REQUIRED.
- 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:**

- ALL FIRE ALARM DEVICES SHALL BE BY SIMPLEX (NO SUBSTITUTION). ALL WORK MUST BE COMPATIBLE WITH THE EXISTING SIMPLEX 4100 FIRE ALARM SYSTEM.
- PAINT CONDUITS WITH A RED STRIPE EVERY 10 FEET. PAINT ALL CONDUIT BODY COVERS AND JUNCTION BOX COVERS WITH RED PAINT.
- SPLICES AND T-TAPS ARE PROHIBITED.
- MINIMUM CONDUIT SIZE SHALL BE 3/4" EMT.
- ALL EXISTING DEVICES MUST REMAIN IN SERVICE WHEN THE NEW WORK IS BEING INSTALLED.
- ALL NEW CIRCUITS SHALL BE NFPA 72 "CLASS A" (STYLE 6).
- ALL TESTING SHALL BE PER MANUFACTURER'S INSTRUCTIONS AND NFPA 72. COMPLETE INTERNAL TESTING PRIOR TO REQUESTING AN OFFICIAL GOVERNMENT TEST.
- 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.
- SEE FIRE ALARM SPECIFICATION FOR ADDITIONAL REQUIREMENTS.

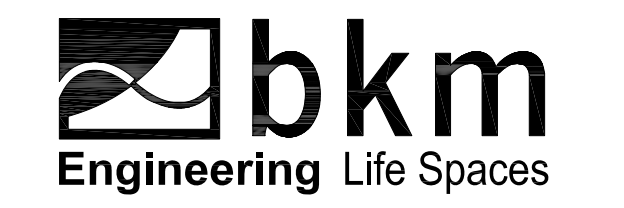


**NOTES:**

- PROVIDE 1-3" CONDUIT FOR TELEPHONE CABLE. PROVIDE TWO (3", 3 CELL) FABRIC INNER DUCT PACKS.
- PROVIDE 2-3" CONDUIT, EACH WITH TWO (3", 3 CELL) FABRIC INNER DUCT PACKS. ONE CONDUIT IS FOR DATA AND FIRE ALARM (OUT). ONE CONDUIT IS FOR FIRE ALARM (BACK).
- PROVIDE 2-3" CONDUIT, EACH WITH TWO (3", 3 CELL) FABRIC INNER DUCT PACKS. ONE CONDUIT IS FOR DATA AND FIRE ALARM (OUT). ONE CONDUIT IS FOR TELEPHONE AND FIRE ALARM (BACK).
- PROVIDE TWO (3", 3 CELL) FABRIC INNER DUCT PACKS IN EXISTING SPARE 4" TELEPHONE DUCT.
- PROVIDE TWO (3", 3 CELL) FABRIC INNER DUCT PACKS IN EACH OF TWO SPARE 4" SIGNAL DUCTS (FOR DATA AND FIRE ALARM CABLES).
- PROVIDE INFLATABLE DUCT SEAL ACCESSORY TO SEAL END OF DUCT AT ENTRANCE TO BUILDING. SEAL AFTER INNER DUCTS AND CONDUCTORS HAVE BEEN INSTALLED. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- PROVIDE INFLATABLE DUCT SEAL ACCESSORY TO SEAL END OF THE CONDUITS WHERE THEY SWEEP ABOVE THE FLOOR SLAB IN THE GARAGE. SEAL AFTER INNER DUCTS AND CONDUCTORS HAVE BEEN INSTALLED. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

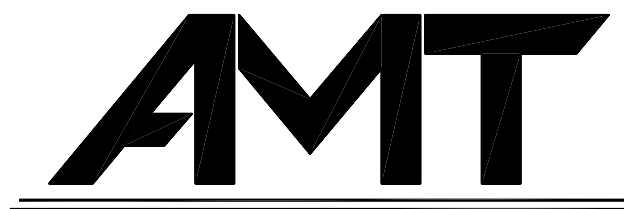
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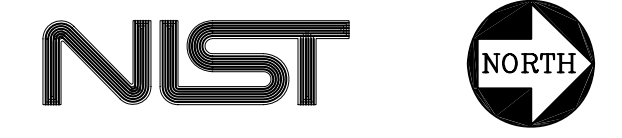
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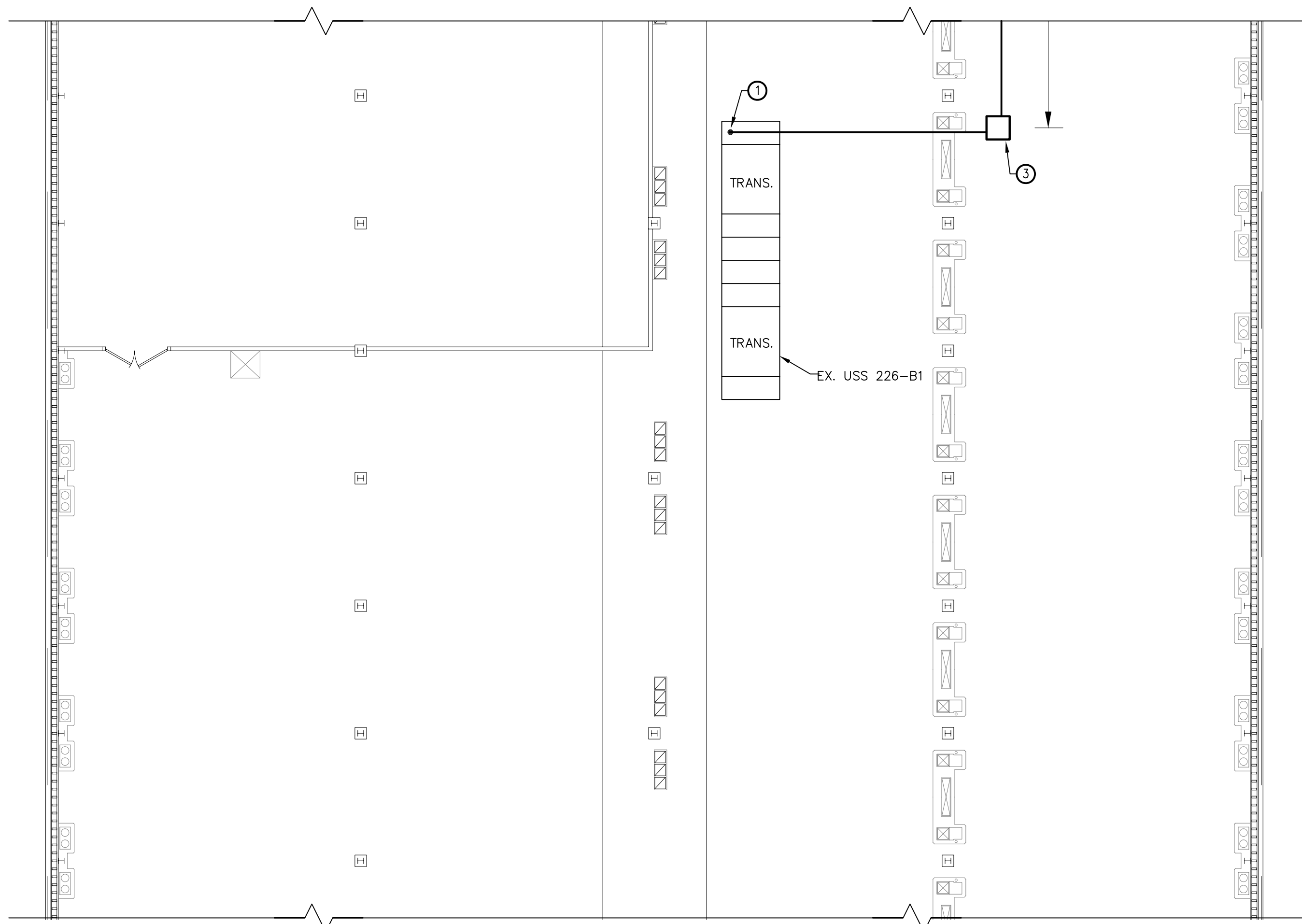
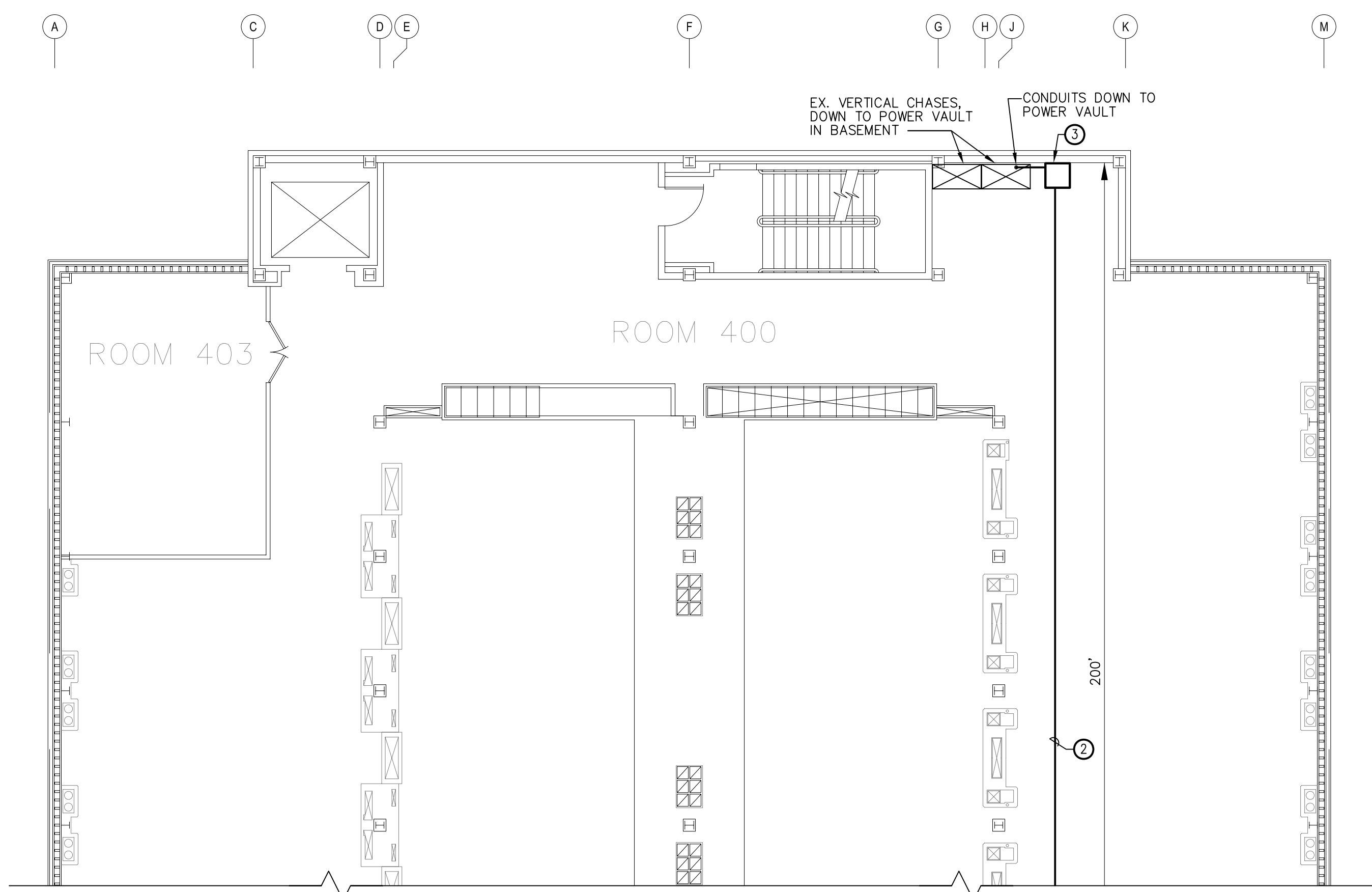
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	ISSUED FOR CONSTRUCTION		3/31/10



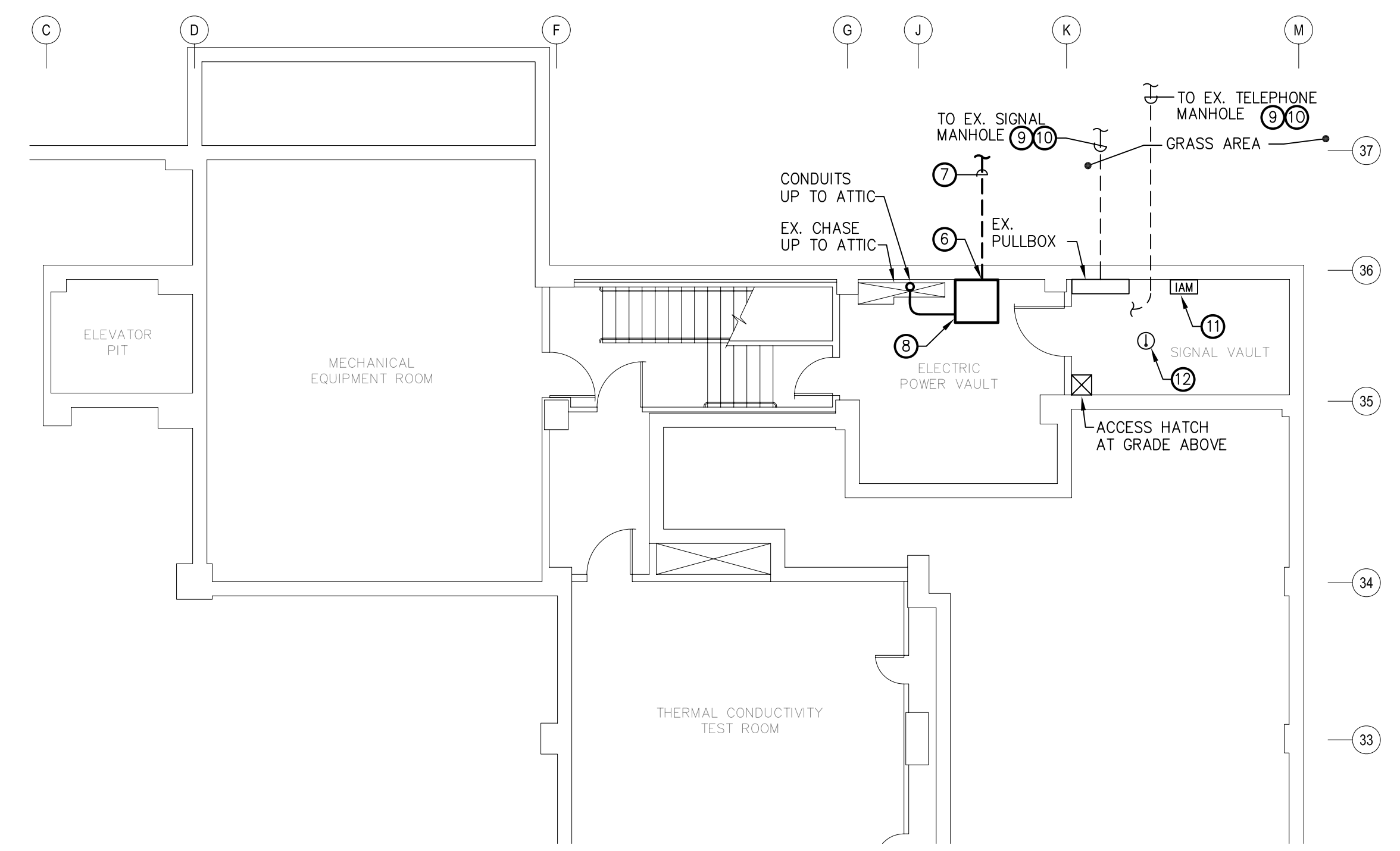
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ELECTRICAL LEGEND, ABBREVIATIONS, DIAGRAMS AND NOTES

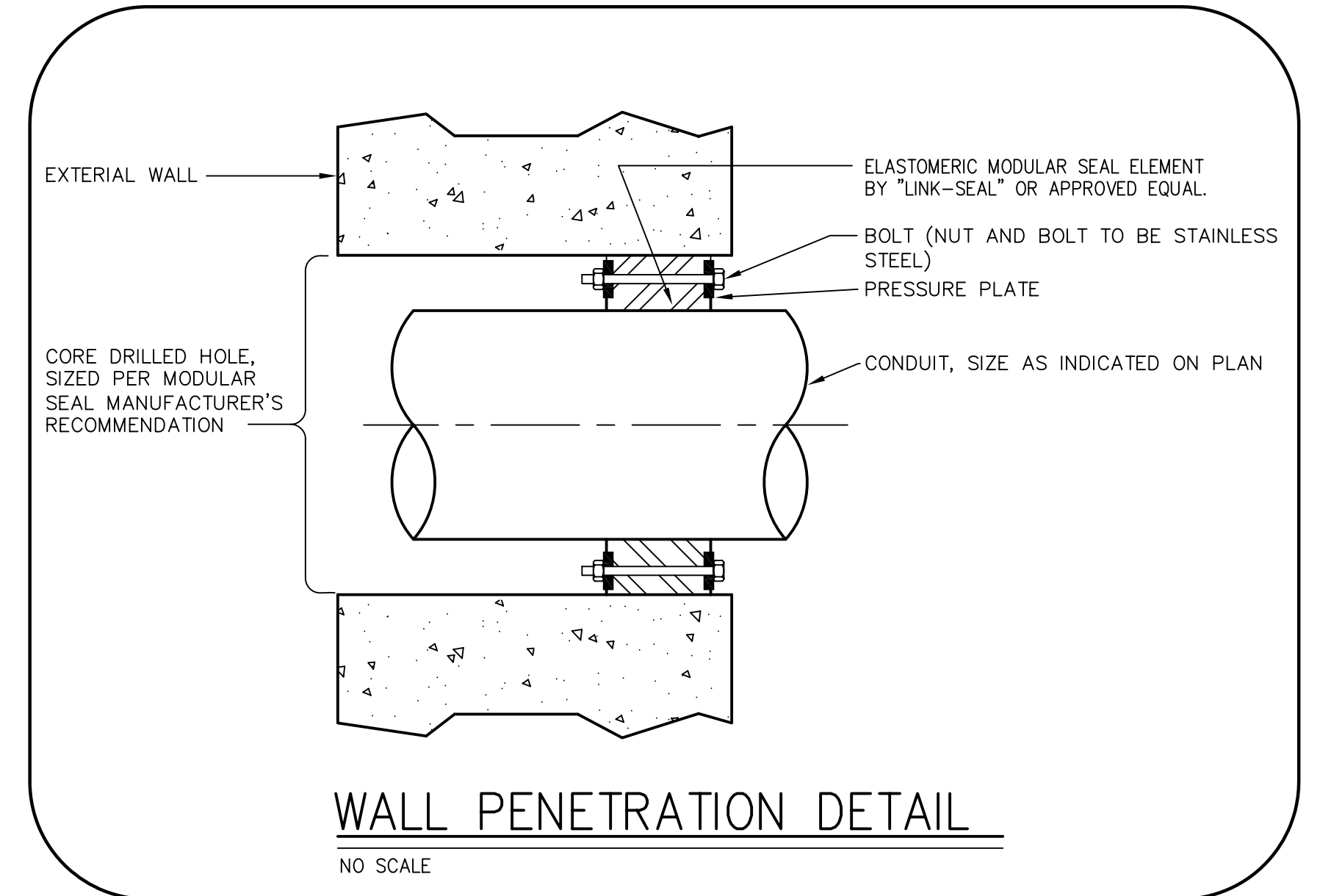
SH. NO. \_\_\_\_ OF \_\_\_\_ DWG. E-1



**1** ATTIC PLAN – ELECTRICAL – NEW WORK  
**E-2** SCALE: 1/8" = 1'-0"



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

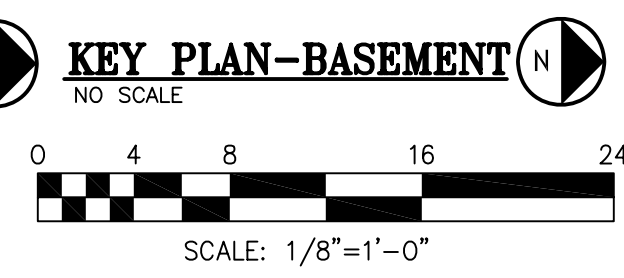
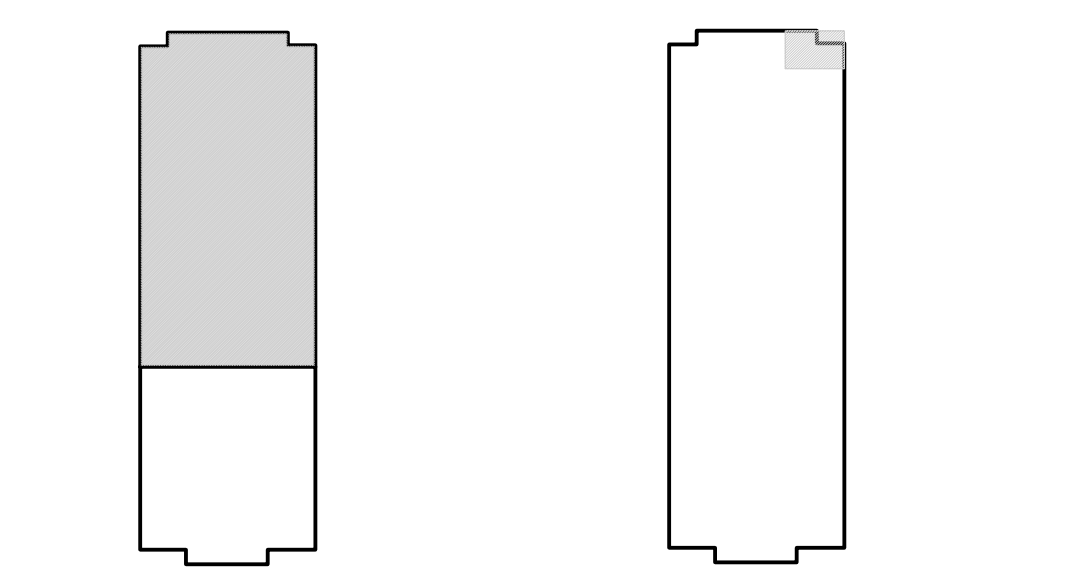


**DRAWING NOTES:**

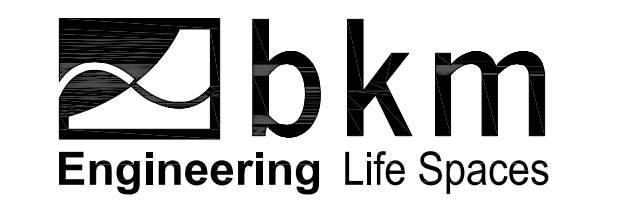
- 1 SEE RISER ON DRAWING E-1 FOR CONNECTION WORK.
- 2 SEE RISER ON DRAWING E-1 FOR CONDUIT AND WIRE SIZE. ADJUST CONDUIT PATH BASED ON FIELD CONDITIONS. PROVIDE PULLBOX(ES) AS REQUIRED.
- 3 PROVIDE 24" x 24" x 8" DEEP (MIN.) PULL BOX. ADJUST LOCATION BASED ON FIELD CONDITIONS.
- 4 NOT USED.
- 5 CUT EXISTING 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.
- 7 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 BURIAL 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.
- 10 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.
- 11 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.

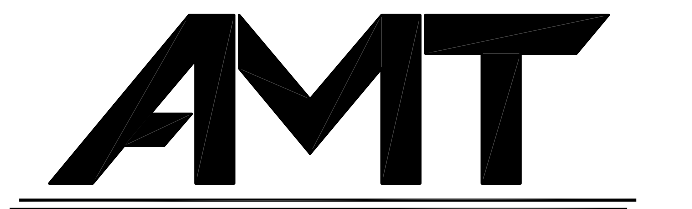


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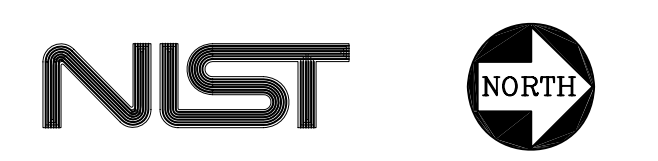
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ATTIC AND BASEMENT FLOOR PLANS  
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