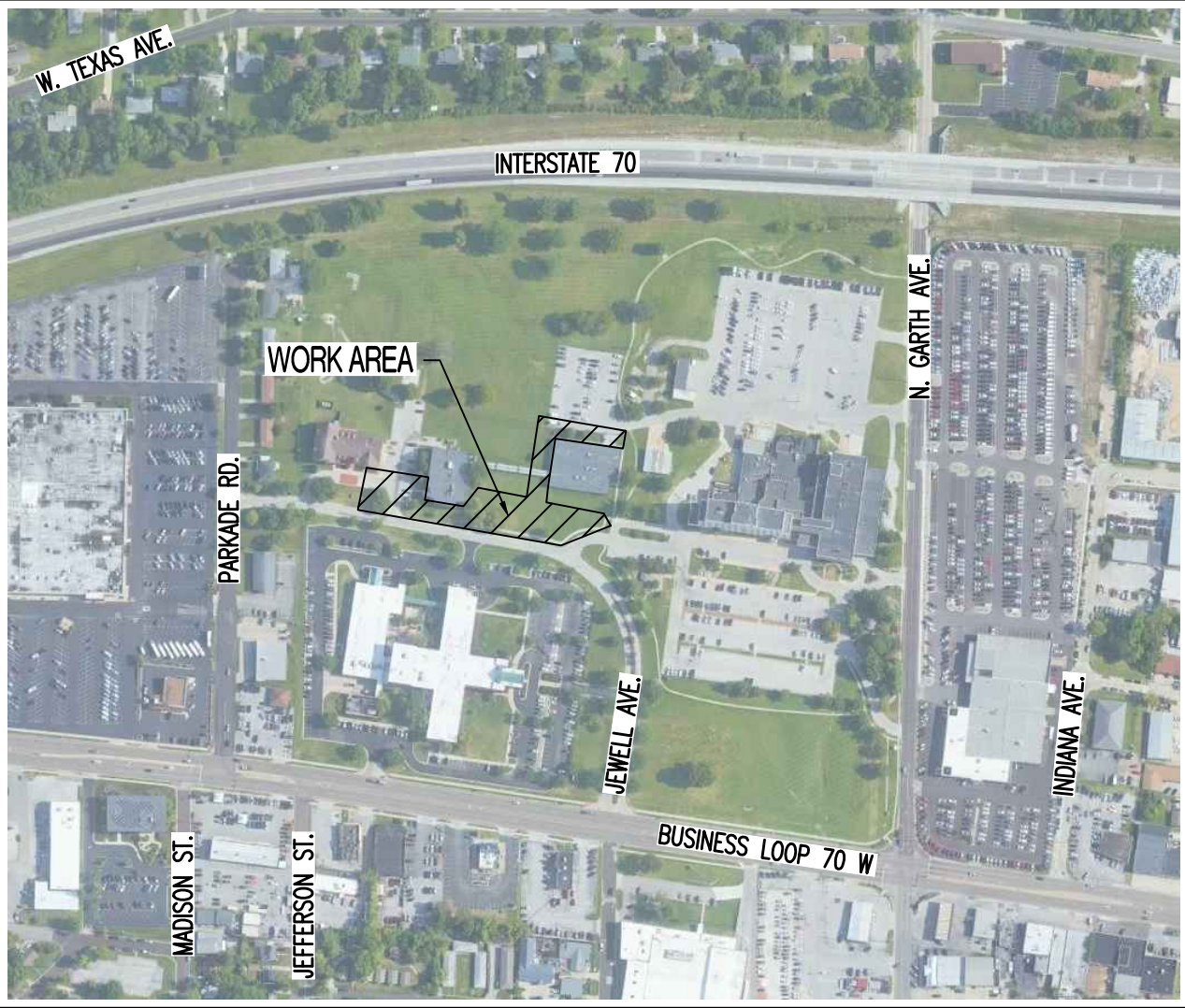




GENERAL SITE - REPLACE WATER MAINS AT ALLTON AND GREEN BUILDINGS

FOR THE CURATORS OF THE UNIVERSITY OF MISSOURI
PROJECT NO. CP 220061

LOCATION MAP NOT TO SCALE



PROJECT BENCHMARK:

TBM #1 – CHISELED SQUARE IN SOUTHWEST CORNER OF GENERATOR CONCRETE PAD LOCATED SOUTHWEST OF THE GREEN BUILDING.
ELEVATION = 769.85'

FLOOD PLAIN STATEMENT:

NO PART OF THIS TRACT IS LOCATED WITHIN THE 100-YEAR FLOODPLAIN AS PER THE BOONE COUNTY FIRM MAP #29019C0280E DATED APRIL 19, 2017.

UTILITY COMPANIES:

LOCATES:

MISSOURI ONE CALL INC.
1022 B NORTHEAST DRIVE
JEFFERSON CITY, MO 65109
1-800-344-7483



TELEPHONE:

CENTURYLINK
625 CHERRY STREET
COLUMBIA, MO 65205
573-886-3700

TELEPHONE:

UNIVERSITY OF MISSOURI, DIVISION OF I.T.
615 LOCUST ST.
COLUMBIA, MO 65211
573-882-5000

CABLE TELEVISION:

CHARTER COMMUNICATIONS
1510 CHARTER BOONE
INDUSTRIAL BOULEVARD
COLUMBIA, MO 65202
573-875-8875

ELECTRIC:

CITY OF COLUMBIA
P.O. BOX 6015
WATER & LIGHT DEPARTMENT
COLUMBIA, MO 65205
573-674-7325

WATER:

ENERGY MANAGEMENT
417 S. 5TH ST.
COLUMBIA, MO 65211
573-882-3094

STORM/SANITARY SEWER
& SECONDARY ELECTRIC:

UNIVERSITY CAMPUS FACILITY OPERATIONS
180 GENERAL SERVICES BUILDING
COLUMBIA, MO 65211
573-882-8211

NATURAL GAS:

AMEREN MISSOURI
2001 MAGUIRE BLVD.
COLUMBIA, MO 65201
573-876-3030

GENERAL NOTES:

CONTRACTOR WILL BE RESPONSIBLE FOR PLACEMENT AND MAINTENANCE OF TRAFFIC CONTROL DEVICES NECESSARY TO COMPLETE THEIR PORTION OF WORK. THE DEVICES AND METHODS EMPLOYED WILL COMPLY WITH THE CURRENT VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

EXISTING UTILITIES SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL COORDINATE LOCATES (HORIZONTAL AND VERTICAL) PRIOR TO ANY EXCAVATION.

ALL EXCAVATION TO BE IN ACCORDANCE WITH SECTIONS 319.010-319.050, REVISED STATUTES OF THE STATE OF MISSOURI. SUCH COMPLIANCE SHALL NOT, HOWEVER, EXCUSE ANY PERSON MAKING ANY EXCAVATION FROM DOING SO IN A CAREFUL AND PRUDENT MANNER, NOR SHALL IT EXCUSE SUCH PERSON FROM LIABILITY FOR ANY DAMAGE OR INJURY TO UNDERGROUND UTILITIES RESULTING FROM THE EXCAVATION.

ALL SLOPES ARE TO BE LEFT 3:1 OR FLATTER UNLESS OTHERWISE NOTED.

IT IS THE INTENT OF THESE PLANS TO COMPLY WITH THE REQUIREMENTS OF THE MO&NR CLEAN WATER COMMISSION.

ALL DISTURBED AREAS WITHIN THE "LIMITS OF DISTURBANCE" SHALL BE FINE GRADED, SEEDED, AND MULCHED.

THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL EROSION CONTROL DEVICES AND REMOVING THEM ONCE THE SITE IS STABILIZED.

LAND DISTURBANCE SITES SHOULD BE INSPECTED ON A REGULAR SCHEDULE AND WITHIN A REASONABLE TIME PERIOD (NOT TO EXCEED 48 HOURS) FOLLOWING HEAVY RAINS. REGULARLY SCHEDULED INSPECTIONS SHALL BE AT A MINIMUM OF ONCE PER WEEK. ANY DEFICIENCIES SHALL BE CORRECTED WITHIN SEVEN CALENDAR DAYS.

TOTAL DISTURBED AREA ON SITE = 0.75 AC.

MISSOURI DNR LAND DISTURBANCE PERMIT NOT NEEDED.

ENGINEER CERTIFICATION:

BY SIGNING AND AFFIXING MY SEAL TO THESE PLANS, I HEREBY CERTIFY THESE DRAWINGS AND/OR SPECIFICATIONS HAVE BEEN PREPARED BY ME, OR UNDER MY SUPERVISION. I FURTHER CERTIFY THAT TO THE BEST OF MY KNOWLEDGE THESE DRAWINGS AND/OR SPECIFICATIONS ARE AS REQUIRED BY AND IN COMPLIANCE WITH THE BUILDING CODES OF THE UNIVERSITY OF MISSOURI.

SPECIAL INSPECTIONS:

THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE:

- a. PLACING OF CONCRETE AND REINFORCING STEEL (CONTINUOUS OF CONCRETE SAMPLING / PERIODIC OF REINFORCING)
- b. IN-SITU SOILS, EXCAVATIONS, FILLING & COMPACTION (PERIODIC)

THE CONTRACTOR SHALL REQUEST SPECIAL INSPECTION OF THE ITEMS LISTED ABOVE PRIOR TO THOSE ITEMS BECOMING INACCESSIBLE AND UNOBSERVABLE DUE TO PROGRESSION OF THE WORK.

SHEET INDEX:

SHEET #	DESCRIPTION	BID SET 12/16/2021	REVISION 1	REVISION 2	REVISION 3
CE 0	COVER SHEET	X			
CE 1	DEMOLITION PLAN	X			
CE 2	EROSION CONTROL AND GRADING PLAN	X			
CE 3	WATERLINE PLAN	X			
CE 4	SITE PLAN	X			
CE 5	DETAILS	X			
CE 6	WATER DETAILS	X			
CE 7	SPECIFICATIONS SHEET 1 OF 2	X			
CE 8	SPECIFICATIONS SHEET 2 OF 2	X			

LEGEND OF SYMBOLS:

---	EXISTING CURB	FF-XXXX	FINISH FLOOR OF STRUCTURE
---	PROPOSED CURB	XXX.XX TC	PROPOSED TOP OF CURB ELEVATION
[Pattern]	RIP RAP	XXX.XX TP	PROPOSED TOP OF PAVEMENT ELEVATION
[Symbol]	EXISTING STRUCTURE	XXX.XX FG	PROPOSED FINISH GRADE ELEVATION
---	EXISTING TREELINE	XXX.XX TW	PROPOSED TOP OF WALL
---	PROPOSED TREELINE	XX	LOT NUMBER
---	EDGE OF WATERWAY	X	STORM SEWER STRUCTURE LABEL
W	EXISTING WATERLINE	X	SANITARY SEWER STRUCTURE LABEL
W	PROPOSED WATERLINE	HP.	HIGH POINT
G	EXISTING GAS LINE	LP.	LOW POINT
G	PROPOSED GAS LINE	---	EXISTING SIGNS
UT	EXISTING UNDERGROUND TELEPHONE	Ø	EXISTING POWER POLE
UTV	EXISTING UNDERGROUND CABLE TELEVISION	Ø	EXISTING GAS VALVE
HVE	EXISTING HIGH VOLTAGE ELECTRIC	Ø	EXISTING WATER VALVE
OE	EXISTING OVERHEAD ELECTRIC	Ø	EXISTING GAS METER
UE	EXISTING UNDERGROUND ELECTRIC	W	EXISTING WATER METER
OETV	EXISTING OVERHEAD ELEC. & TV	Ø	EXISTING FIRE HYDRANT
OETV	EXISTING OVERHEAD ELEC., TV & TELE.	Ø	MANHOLE
S	EXISTING SANITARY SEWER	---	EXISTING SANITARY SEWER LATERAL
S	PROPOSED SANITARY SEWER	---	PROPOSED SANITARY SEWER LATERAL
XXX	EXISTING MINOR CONTOUR	Ø	PROPOSED TRACER WIRE TEST STATION BOX
XXX	EXISTING MAJOR CONTOUR	[AC]	EXISTING AIR CONDITIONER
XXX	PROPOSED MINOR CONTOUR	[T]	EXISTING TELEPHONE PEDESTAL
XXX	PROPOSED MAJOR CONTOUR	[ET]	EXISTING ELECTRICAL TRANSFORMER
TTTTT	100 YEAR FLOOD PLAIN	[E]	EXISTING ELECTRIC METER
TTTTT	FLOODWAY	X	EXISTING LIGHT POLE
---	ORDINARY HIGH WATER MARK	---	EXISTING GUY WIRE
---	STREAM SIDE BUFFER	---	CONSTRUCTION BARRIER FENCING
---	OUTER STREAM BUFFER	---	TREE PROTECTION FENCING
[Symbol]	DEMOLITION LIMITS		
[Symbol]	SILT FENCE		

REVISIONS:

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PREPARED BY:
CROCKETT
ENGINEERS & CONSULTANTS
1000 W. Illinois Blvd., Ste. 100
Columbia, Missouri 65203
(370) 447-0292
www.crockettingeering.com
Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#000000001

OWNER:
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225 UNIVERSITY HALL
C/O CUM BUSINESS SERVICES
COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS AT ALLTON AND GREEN BUILDINGS

PROJECT NO. CP 220061

COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

COVER SHEET

DESIGNED: ATG

DRAWN: ATG

PROJECT NO.: 210471

SHEET:

CE 0

GENERAL EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL PROVIDE FOR CONTROL OF SURFACE EROSION AND SEDIMENT DEPOSITION DURING ALL PHASES OF CONSTRUCTION AND UNTIL THE OWNER ACCEPTS THE WORK AS SUBSTANTIALLY COMPLETE.
2. CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL ROADWAYS AND SIDEWALKS ADJACENT TO THE CONSTRUCTION SITE FREE OF DIRT AND DEBRIS RESULTING FROM ACTIVITIES RELATED TO THE CONSTRUCTION OF THIS PROJECT.
3. CONTRACTOR SHALL KEEP THE ENTIRE PROJECT SITE FREE OF DEBRIS AND TRASH AT ALL TIMES. CONTRACTOR SHALL EXECUTE WORK USING METHODS THAT MINIMIZE EXCESSIVE NOISE OR DUST EMISSIONS. CONTRACTOR SHALL PROVIDE METHODS, MEANS AND FACILITIES TO PREVENT CONTAMINATION OF SOIL OR WATER FROM DISCHARGE OF REGULATED MATERIALS (I.E., DIESEL FUEL) USED DURING CONSTRUCTION.
4. CONTRACTOR MUST INSTALL AND MAINTAIN THE EROSION CONTROL MEASURES SHOWN ON THIS PLAN. IF THE ENGINEER, OWNER'S REPRESENTATIVE, DETERMINES THAT THE INSTALLATION OF THE MAINTENANCE IS INADEQUATE, THE CONTRACTOR MUST IMMEDIATELY CORRECT AT THEIR EXPENSE. IF IT IS DETERMINED THAT ADDITIONAL EROSION CONTROL MEASURES ARE NEEDED THE CONTRACTOR WILL BE DIRECTED TO INSTALL AND MAINTAIN THOSE MEASURES.
5. THE CONTRACTOR SHALL INSPECT THE LAND DISTURBANCE SITE AT LEAST ONCE EVERY SEVEN (7) DAYS AND WITHIN TWENTY-FOUR (24) HOURS FOLLOWING EACH RAINFALL EVENT OF 1/2" OR MORE WITHIN ANY TWENTY-FOUR (24) HOUR PERIOD. THE CONTRACTOR SHALL ALSO INSPECT AND ASSURE THAT ALL SEDIMENT CONTROL DEVICES ARE IN WORKING CONDITION PRIOR TO ANY FORECASTED RAINFALL.
6. THE CONTRACTOR SHALL REMOVE SEDIMENT FROM THE FLOW AREAS AND MAKE ALL NECESSARY REPAIRS TO MAINTAIN THE INTEGRITY OF THE SEDIMENT CONTROL MEASURES. SEDIMENT SHALL BE REMOVED ONCE IT REACHED 1/2 THE INSTALLED HEIGHT OF MEASURE.
7. SOME OF THE EROSION AND SEDIMENT CONTROL MEASURES, WILL REQUIRE THE CONTRACTOR TO INSTALL, REMOVE, AND REINSTALL THE MEASURES AS CONSTRUCTION PROCEEDS. THE PHASING OF THIS WORK IS DEPENDENT ENTIRELY ON THE CONTRACTOR'S SCHEDULE, AND IS NOT SPECIFIED HEREIN. HOWEVER, THE CONTRACTOR SHALL COORDINATE THESE ACTIONS WITH THE ENGINEER AT THE TIMES ADJUSTMENTS ARE NEEDED.
8. CONTRACTOR SHALL DIRECT CONCRETE TRUCKS TO WASHOUT AT PLANT.

LANSCAPE NOTES:

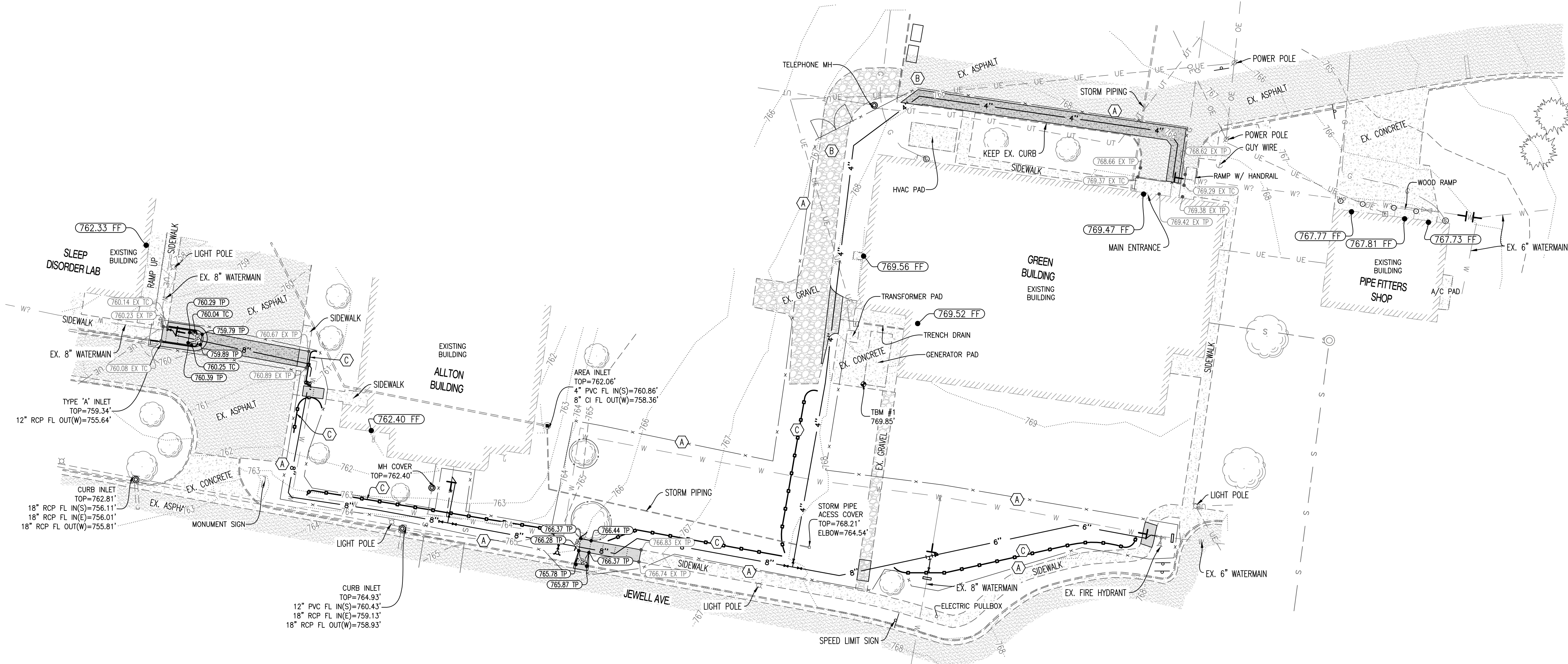
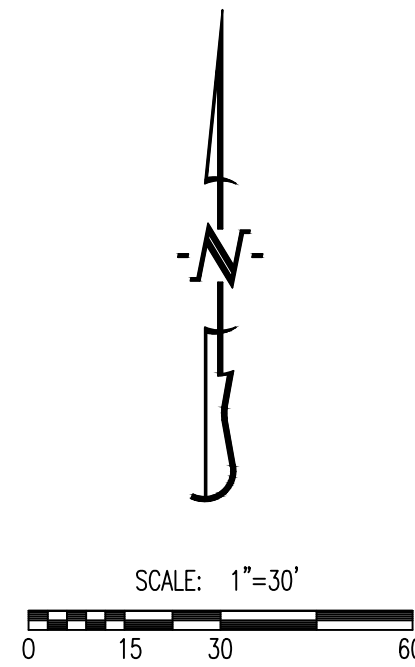
1. VEHICLES ARE TO USE DESIGNATED CONSTRUCTION ENTRANCES AS INDICATED ON DRAWINGS OR CONSTRUCTION DOCUMENTS. IF NO CONSTRUCTION ROUTE IS INDICATED VEHICLES ARE RESTRICTED TO SIDEWALKS OR PAVED AREAS. ALL CONSTRUCTION EQUIPMENT AND OR VEHICLES SHALL VERIFY THE WEIGHT LIMIT AND RESTRICTION ON PAVEMENT PRIOR TO CONSTRUCTION AND NOTIFY OWNERS REPRESENTATIVE OF THE PLANNED ROUTE.
2. THERE SHALL BE NO VEHICLE MOVEMENT IN ANY LANDSCAPED, SHRUB OR PERENNIAL AREAS, MULCH BED AND/OR TREE CANOPY DRIP AND ROOT ZONES, WITHOUT PRIOR MODIFICATIONS AND APPROVAL FROM LANDSCAPE SERVICES. LANDSCAPE SERVICES REQUIRES ONE WEEK NOTICE PRIOR TO ANY VEHICLE MOVEMENT IN THESE AREAS.
3. VEHICLE ACCESS SHALL NOT BREAK OR RUB TREE BRANCHES. OWNER WILL PRUNE TREE BRANCHES TO PROVIDE CLEARANCE AROUND BUILDING ENTRANCE. OWNER REQUIRES ONE WEEKS NOTICE FOR THIS WORK TO BE DONE.
4. DO NOT COMPACT GRADE WITHIN THE DRIP LINE OF TREES TO REMAIN. PROVIDE APPROVED FENCING TO PREVENT DRIVING OR EQUIPMENT PARKING WITHIN DRIP LINE OF TREES, PRIOR TO CONSTRUCTION OR WORK IN THE PROJECT AREA. MU'S CAMPUS STANDARD 6' CHAIN LINK FENCE AND POST SHALL BE USED UNLESS OTHERWISE NOTED AND/OR APPROVED BY OWNERS REPRESENTATIVE.
5. REFER TO THE SPECIAL CONDITIONS WITHIN THE DIVISION 1 SPECIFICATIONS FOR FINAL LANDSCAPE REQUIREMENTS.

LEGEND OF LABELS:

- (A) CONSTRUCTION FENCING AS LIMITS OF DISTURBANCE.
- (B) CONTRACTOR TO USE EXISTING PAVING AS CONSTRUCTION ENTRY AND EXIT AND STAGING AREA WITHIN THE FENCE LIMITS. ALL CONSTRUCTION TRAFFIC SHALL UTILIZE THIS ENTRY AND EXIT TO THE PROJECT. ANY DAMAGED PAVEMENT DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR. CONTRACTOR SHALL CLEAN/POWER WASH CONSTRUCTION AREA PAVEMENT ONCE WORK IS COMPLETE.
- (C) INSTALL SILT FENCE OR STRAW WADDLE (OR APPROVED EQUAL) AS EROSION CONTROL DEVICE AS SHOWN.

LEGEND OF SYMBOLS:

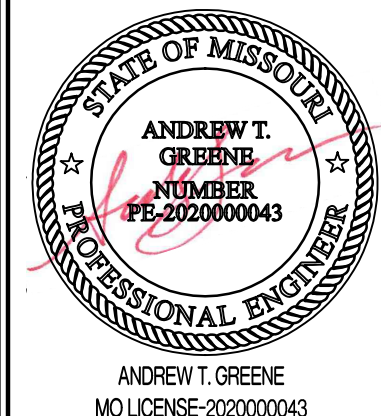
- XXX----- EXISTING MINOR CONTOUR
- - - - -XXX- - - - - EXISTING MAJOR CONTOUR
- XXX----- PROPOSED MINOR CONTOUR
- XXX----- PROPOSED MAJOR CONTOUR
- (XXX.XX TC) PROPOSED TOP OF CURB ELEVATION
TC = (TP+6") UNLESS NOTED OTHERWISE
- (XXX.XX TP) PROPOSED TOP OF PAVEMENT ELEVATION
- (XXX.XX FG) PROPOSED FINISH GRADE ELEVATION
- (XXX.XX FF) PROPOSED FINISH FLOOR AT DOOR



REVISIONS:

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ENGINEERS & ARCHITECTS
1000 W. Illinois Blvd., Ste. 100
Columbia, Missouri 65203
(314) 447-0292
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C/O UMBUSINESS SERVICES
COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS
AT ALLTON AND GREEN BUILDINGS

PROJECT NO. CP 220061

COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

EROSION CONTROL AND
GRADING PLAN

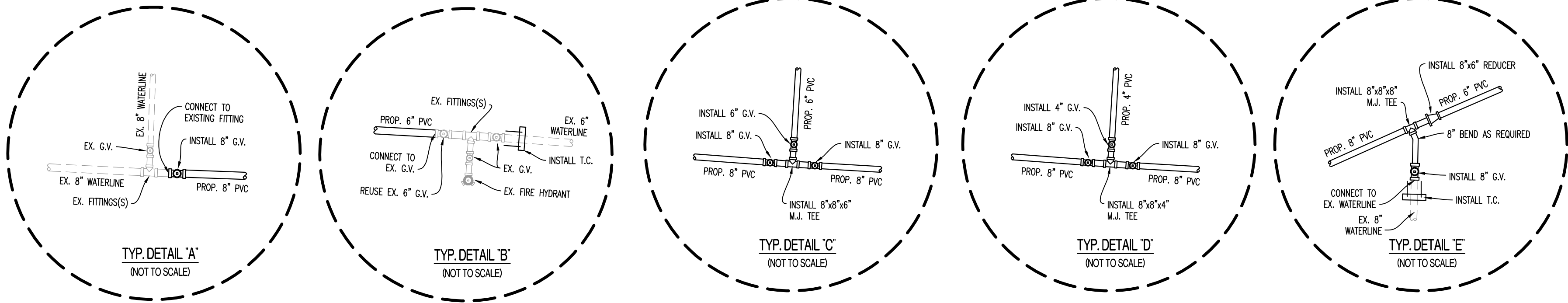
DESIGNED: ATG

DRAWN: ATG

PROJECT NO.: 210471

SHEET:

CE 2



TYP. DETAIL LEGEND:
G.V. GATE VALVE
M.J. MECHANICAL JOINT
RED. REDUCER
T.C. THRUST COLLAR

WATERLINE LEGEND OF LABELS:

- (A) INSTALL WATERLINE WITH 24" VERTICAL SEPARATION FROM SANITARY/STORM SEWER. IF 42" OF COVER AND 24" OF VERTICAL SEPARATION CANNOT BE OBTAINED, ROUTE WATERLINE 24" BELOW SANITARY/STORM SEWER.
- (B) INSTALL 8" C-900 PVC WATERLINE WITH FITTINGS AS REQUIRED. WATERLINE SHALL HAVE A MINIMUM OF 42" OF COVER FROM FINISHED GRADE.
- (C) INSTALL 4" C-900 PVC WATERLINE WITH FITTINGS AS REQUIRED. WATERLINE SHALL HAVE A MINIMUM OF 42" OF COVER FROM FINISHED GRADE.
- (D) INSTALL 8" 45° BEND.
- (E) INSTALL 8" 22.5° BEND.
- (F) INSTALL 4" 45° BEND.
- (G) INSTALL 6" FIRE HYDRANT ASSEMBLY. THIS INCLUDES FIRE HYDRANT, & 6" GATE VALVE WITH VALVE BOX TO SURFACE.
- (H) CONNECT NEW WATERLINE TO EXISTING PIPING OUTSIDE OF BUILDING.
- (I) CAP AND ABANDON IN PLACE WATERLINE AS SHOWN. CAP OR PLUG SHALL BE INSTALLED AT ALL BREAKS IN ABANDONED PIPING.
- (J) ABANDONED WATERLINE.
- (K) INSTALL 6" C-900 PVC WATERLINE WITH FITTINGS AS REQUIRED. WATERLINE SHALL HAVE A MINIMUM OF 42" OF COVER FROM FINISHED GRADE.
- (L) INSTALL 6" 22.5° BEND.
- (M) INSTALL 6" 45° BEND.
- (N) INSTALL THRUST COLLAR AS SHOWN. SEE DETAIL ON CE 6.
- (O) TRANSITION FROM WATERLINE INSTALLED AT NORMAL DEPTH, TO INSTALLED AT 72" OF COVER.
- (P) WATERLINE TO BE INSTALLED WITH 72" OF COVER TO ACCOMMODATE FOR FUTURE PARKING LOT TO THE WEST.

NOTES:

MAINTAIN 24" VERTICAL SEPARATION BETWEEN WATERLINE & SANITARY SEWER LINES.

MAINTAIN 12" VERTICAL SEPARATION BETWEEN WATERLINE & ALL OTHER UTILITIES.

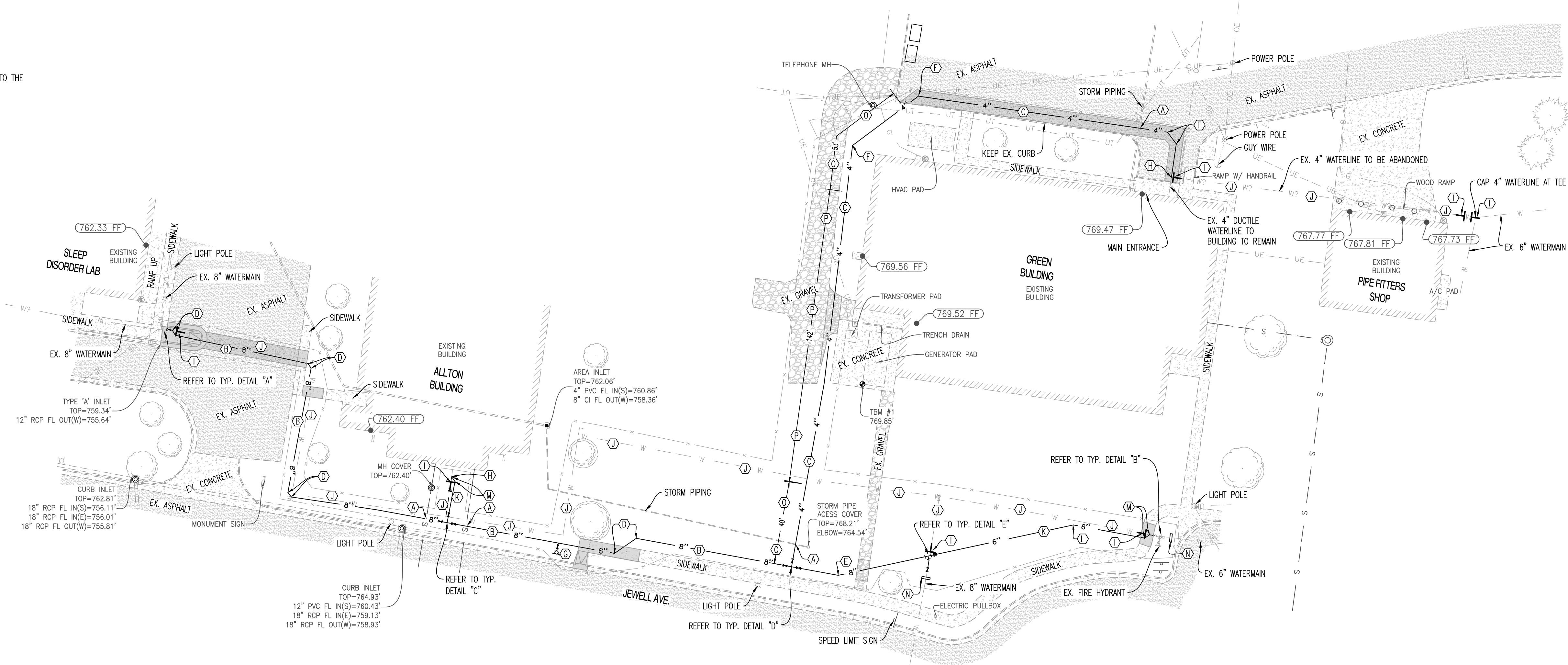
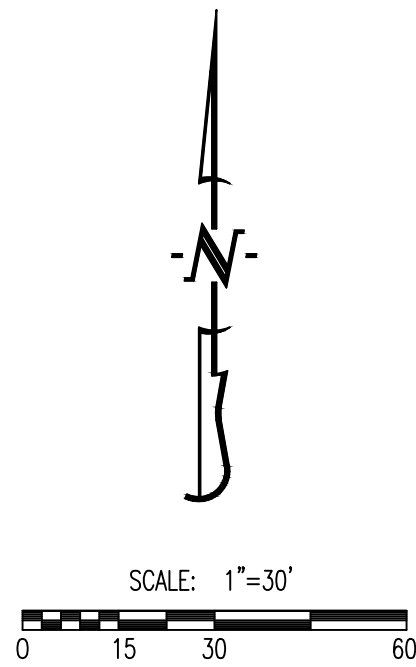
MINIMUM COVER OF 42" REQUIRED ON WATERLINES.

ALL UTILITIES SHOWN ARE FOR REFERENCE AND HAVE BEEN DETERMINED BY FIELD LOCATES AND MAPPING SERVICES. CONTRACTOR SHALL PERFORM LOCATES PRIOR TO WORK.

CONTRACTOR SHALL COORDINATE WITH OWNER AND HOSPITAL ON WATER OUTAGES PRIOR TO SHUTTING ANY SERVICE OFF.

WATER SERVICE TO ALLTON AND GREEN BUILDINGS SHALL BE MAINTAINED EXCEPT FOR FINAL TIE IN CONNECTIONS.

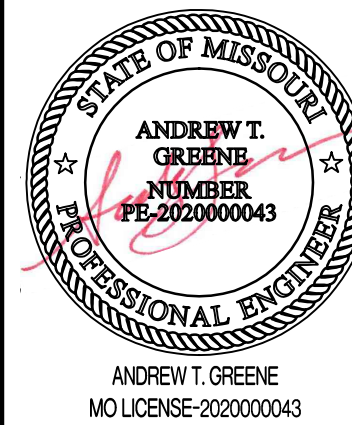
ALL WATER OUTAGES SHALL BE A MAXIMUM OF 4 HOURS. ONCE AN OUTAGE BEGINS, WORK SHALL BE CONTINUOUS UNTIL SERVICE IS RESTORED.



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GENERAL SITE - REPLACE WATER MAINS
AT ALLTON AND GREEN BUILDINGS
PROJECT NO. CP 220061
COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

WATERLINE PLAN

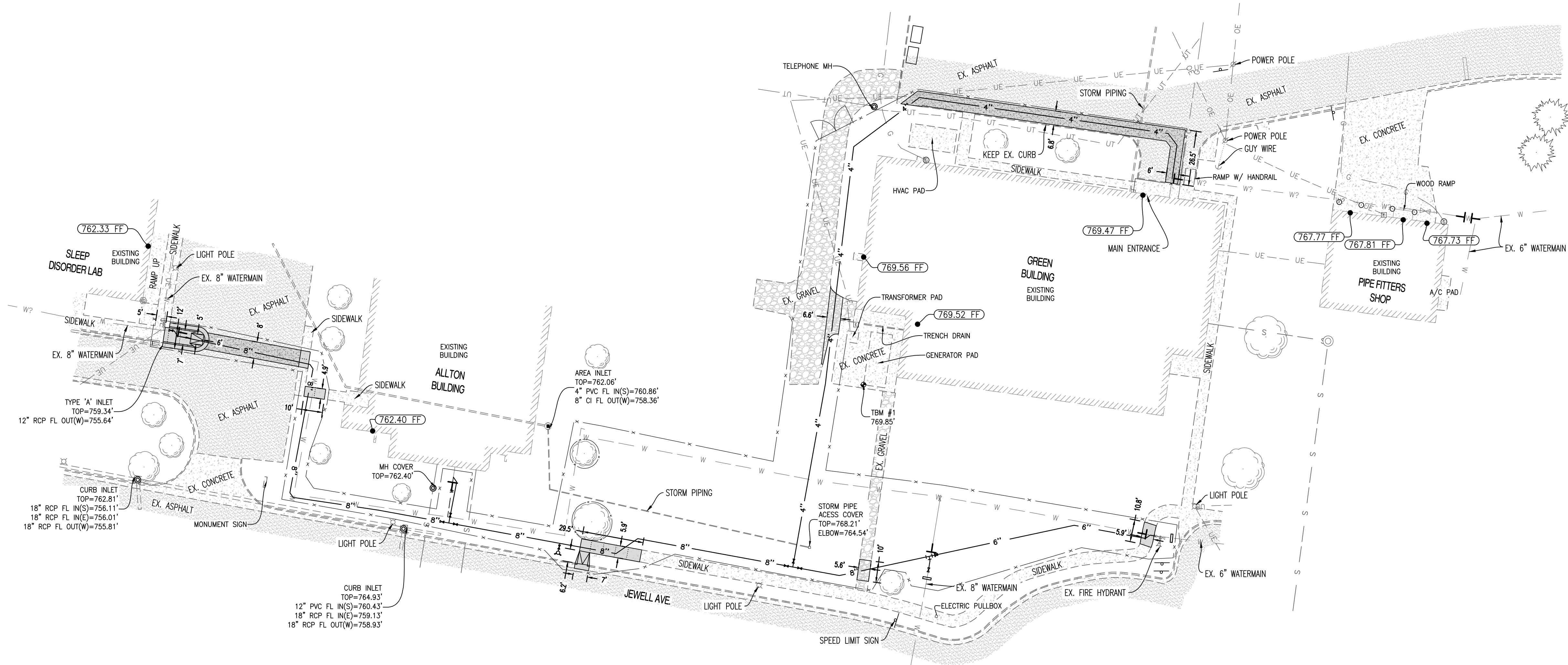
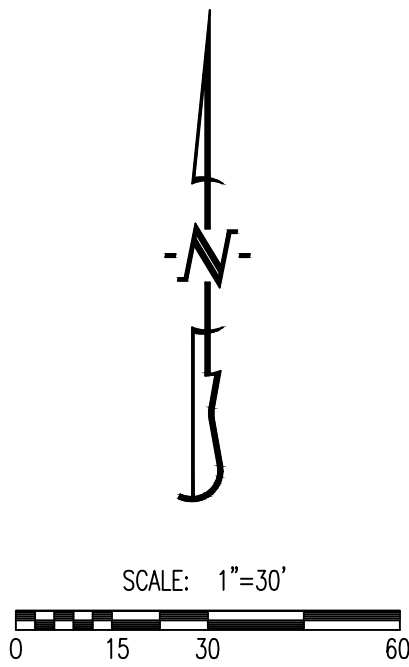
DESIGNED: ATG

DRAWN: ATG

PROJECT NO.: 210471

SHEET:
CE 3

- LEGEND OF LABELS
- (A) PATCH WITH ASPHALT PAVEMENT AS SHOWN. REFER TO CROSS SECTION ON CE 5.
 - (B) CONSTRUCT THICKENED EDGE SIDEWALK WITH SEPARATE GUTTER PAVEMENT OR ABUTTING CURB AND GUTTER SECTION AS SHOWN. REFER TO DETAILS ON CE 5.
 - (C) PATCH TYPICAL CONCRETE SIDEWALK AS SHOWN. REFER TO CROSS SECTION ON CE 5.
 - (D) PATCH GRAVEL AREA AS SHOWN. GRAVEL SECTION SHALL MATCH EXISTING GRAVEL.
 - (E) CONSTRUCT ADA ACCESSIBLE RAMP IN SIDEWALK AS SHOWN. (MAXIMUM LONGITUDINAL SLOPE 1:12. MAXIMUM CROSS SLOPE 1:50). REFER TO SPOT ELEVATIONS ON THE GRADING PLAN.
 - (F) CONSTRUCT ADA ACCESSIBLE RAMP AT STREET AS SHOWN. (MAXIMUM LONGITUDINAL SLOPE 1:12. MAXIMUM CROSS SLOPE 1:50). REFER TO SPOT ELEVATIONS ON THE GRADING PLAN.
 - (G) INSTALL 3/4" EXPANSION JOINT BETWEEN BUILDING AND PAVEMENT.
 - (H) INSTALL TYPE C SAW JOINT WITH SEALANT AS SHOWN (TYPICAL). REFER TO JOINT DETAILS ON CE 5.
 - (I) INSTALL TYPE B KEYED CONSTRUCTION JOINT WITH SEALANT WHERE SIDEWALK ABUTS CONCRETE PAVEMENT. REFER TO DETAIL ON CE 5.



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STATE OF MISSOURI

ANDREW T. GREENE

NUMBER

PE-2020000043

PROFESSIONAL ENGINEER

ANDREW T. GREENE

MO LICENSE-2020000043

PREPARED BY:

CROCKETT

ENGINEERS & ARCHITECTS

1000 W. Illinois Blvd., Suite 100

Columbia, Missouri 65203

(372) 447-0292

www.crockettengineering.com

Crockett Engineering Consultants, LLC

Missouri Certificate of Authority

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COLUMBUS SERVICES

COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS

AT ALLTON AND GREEN BUILDINGS

PROJECT NO. CP 220061

COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

SITE PLAN

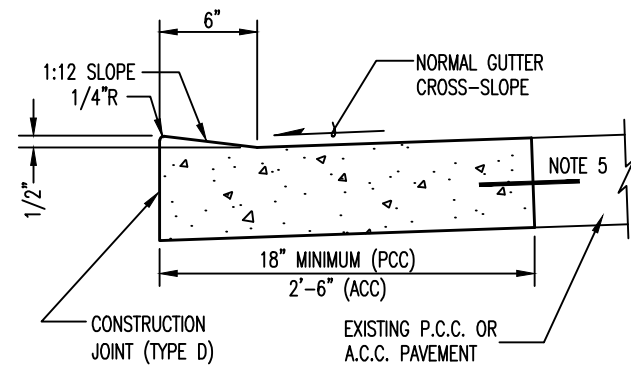
DESIGNED: ATG

DRAWN: ATG

PROJECT NO.: 210471

SHEET:

CE 4

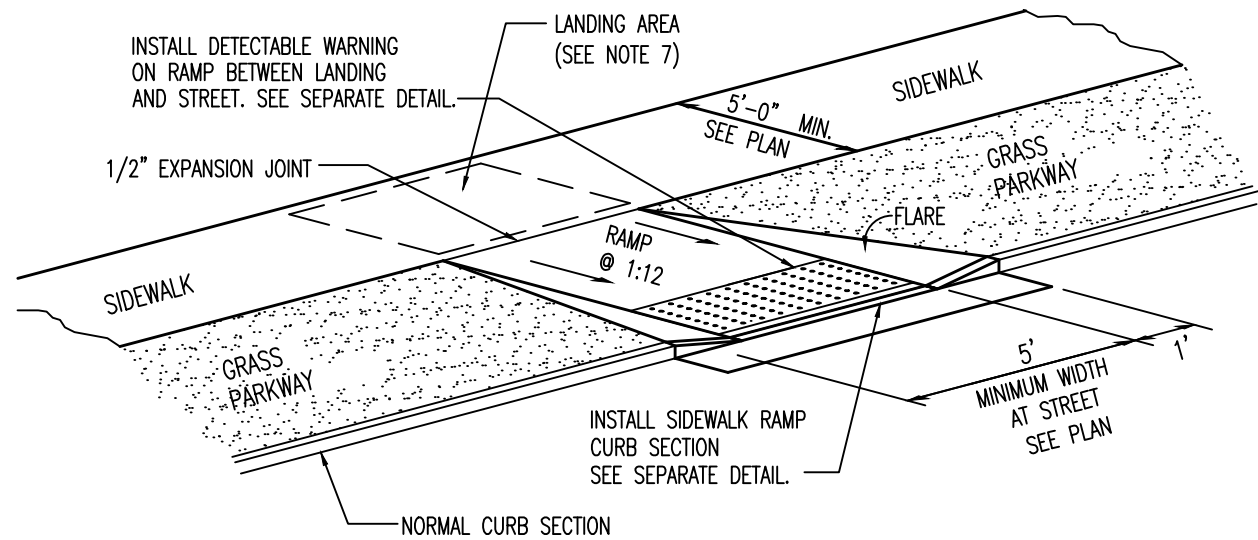


SIDEWALK RAMP CURB

CURB AND GUTTER SECTION AT SIDEWALK RAMP

NOTES:

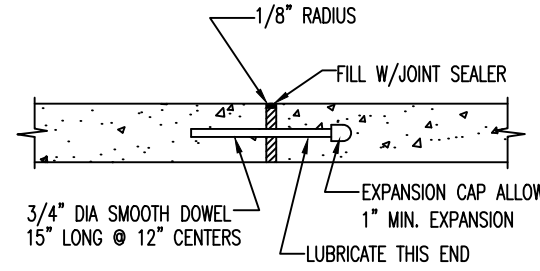
1. CONCRETE SHALL BE CLASS A.
2. PAVEMENT THICKNESS SHALL MATCH EXISTING. BASE SHALL MATCH EXISTING.
3. EXPANSION JOINTS AND CONTRACTION JOINTS SHALL BE PLACED AT LOCATIONS SIMILAR TO THE PAVEMENT WHICH WAS REMOVED.
4. CURB EDGE SHALL BE TOOLED WITH 1/4" RADIUS
5. WHERE EXISTING PAVEMENT IS P.C.C., LOW CURB REPLACEMENT SHALL BE DOWELLED INTO EXISTING. 12" LONG #4 BARS AT 24" CTR.



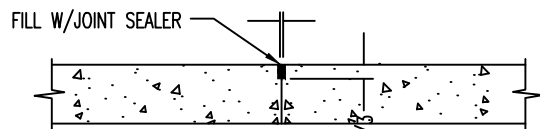
NOTE:

1. RAMP SHALL BE 6" THICK CLASS A CONCRETE WITH #4 BARS AT 12" O.C. E.W.
2. EXPANSION JOINT SHALL BE 1/2" PREFORMED CORK OR BITUMINOUS EXPANSION JOINT MATERIAL.
3. ALL SLOPES ARE MEASURED FROM THE HORIZONTAL.
4. REPLACE STANDARD CURB SECTION WITH SIDEWALK RAMP CURB SECTION.
5. RAMP LENGTH IS DEPENDENT ON 1:12 MAX. SLOPE. USE FLATTER WHEN POSSIBLE.
6. LANDING AREA AT TOP OF RAMP SHALL BE 4'-0" MIN WIDTH, CROSS SLOPE OF LANDING SHALL NOT EXCEED 2.00%.
7. SLOPE BETWEEN 1% AND 2% IN ALL DIRECTIONS
8. FLARES ARE REQUIRED AT RAMP TO KEEP GRASS PARKWAY SLOPES IN CONFORMANCE WITH THE TYPICAL CROSS SECTION.

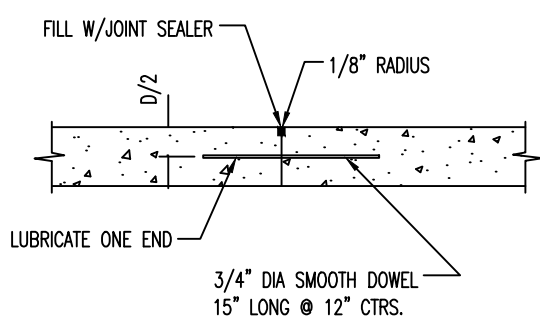
MIDBLOCK SIDEWALK RAMP Sidewalk with Grass Parkway



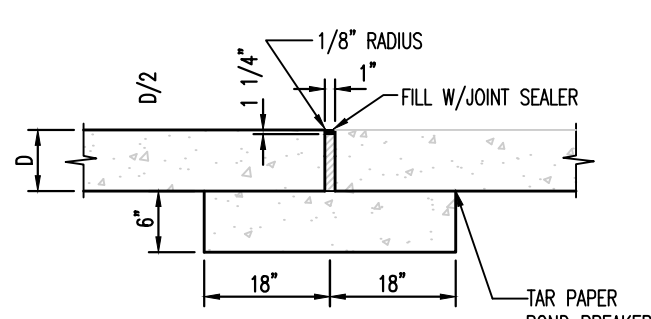
TYPE A
EXPANSION JOINT



TYPE C
SAWED



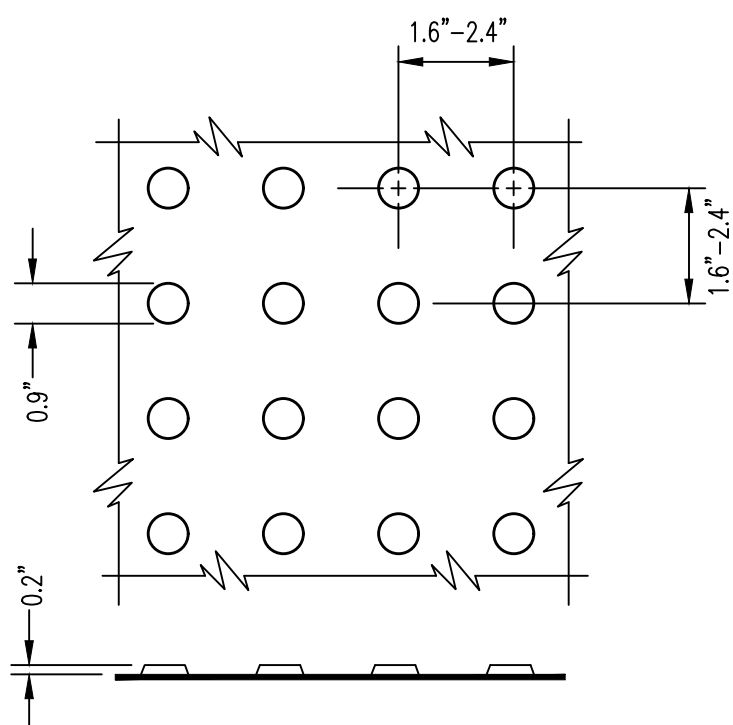
TYPE D
CONSTRUCTION JOINT



TYPE A ALTERNATE
CONCRETE SILL

CONCRETE JOINT DETAILS

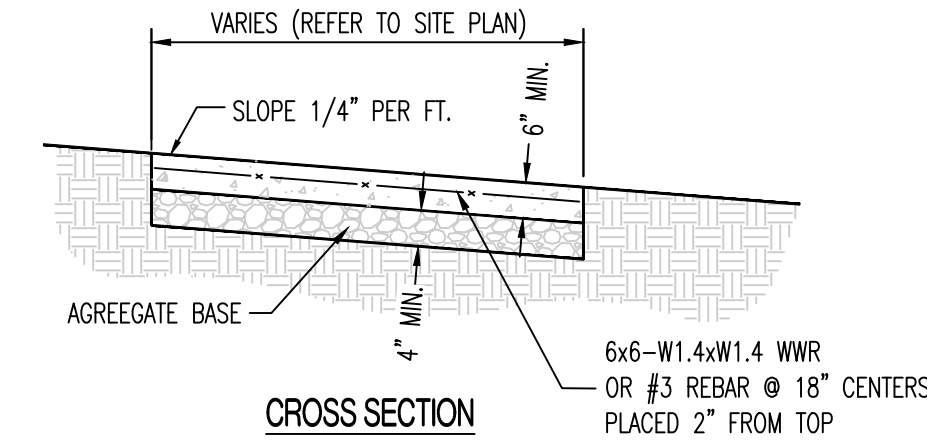
NOTE: JOINT SEALANT TO BE FUEL RESISTANT POLYURETHANE. CONTRACTOR TO SUBMIT SUBMITTAL FOR APPROVAL



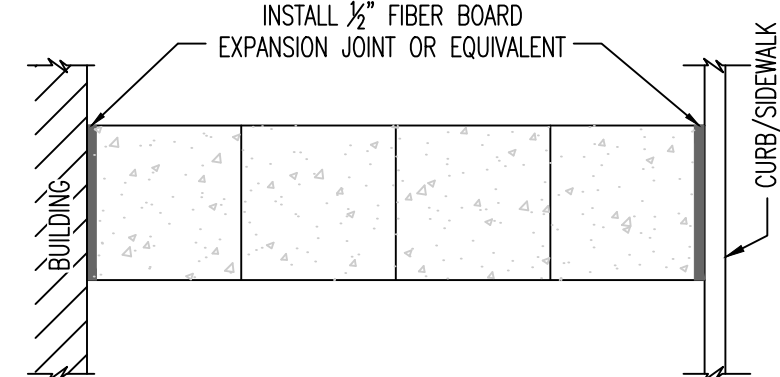
NOTE:

1. DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 0.9", A HEIGHT OF NOMINAL 0.2", AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35", AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, ACHIEVED BY THE INSTALLATION OF ADA SOLUTIONS 2436 REPR, 2448 REPR, OR 2460 REPR (OR APPROVED EQUAL) AND SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.
2. STAMPED CONCRETE IS NOT AN APPROVED EQUAL.
3. DETECTABLE WARNING SURFACES SHALL BE 24" WIDE AND EXTEND THE FULL LENGTH OF THE PUBLIC USE AREA.

DETECTABLE WARNING



CROSS SECTION

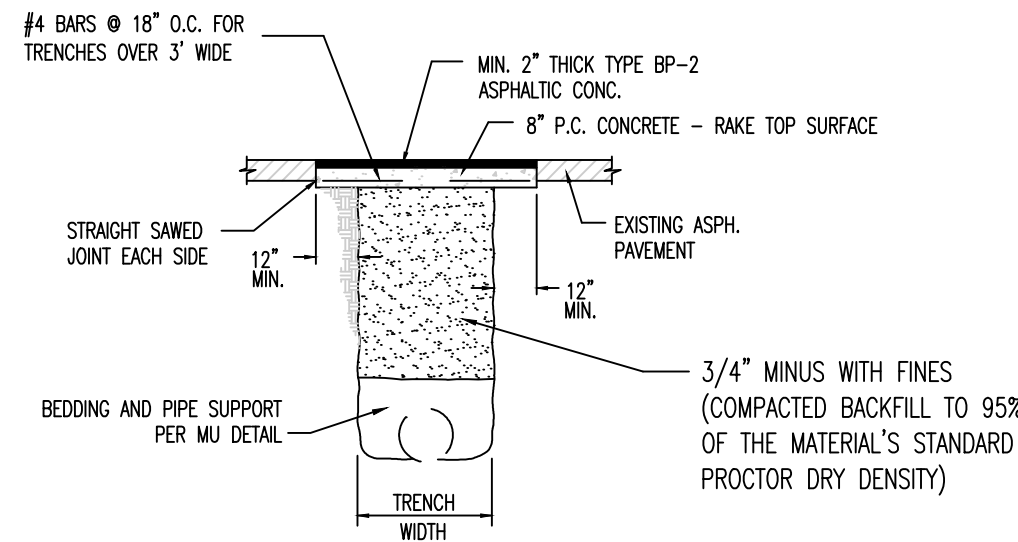


TYPICAL LOCATION OF EXPANSION JOINT AT BUILDING/CURB

NOTE:

1. SIDEWALK SHALL BE 4" THICK CLASS A CONCRETE ON 4" AGGREGATE BASE.
2. INSTALL 1/2" EXPANSION JOINTS AT INTERSECTIONS, RAMPS, STRUCTURES, AND DRIVEWAY APPROACHES. MAX. EXPANSION JOINT SPACING = 150'
3. INSTALL TRANSVERSE SAW JOINTS AT SPACING = SIDEWALK WIDTH.

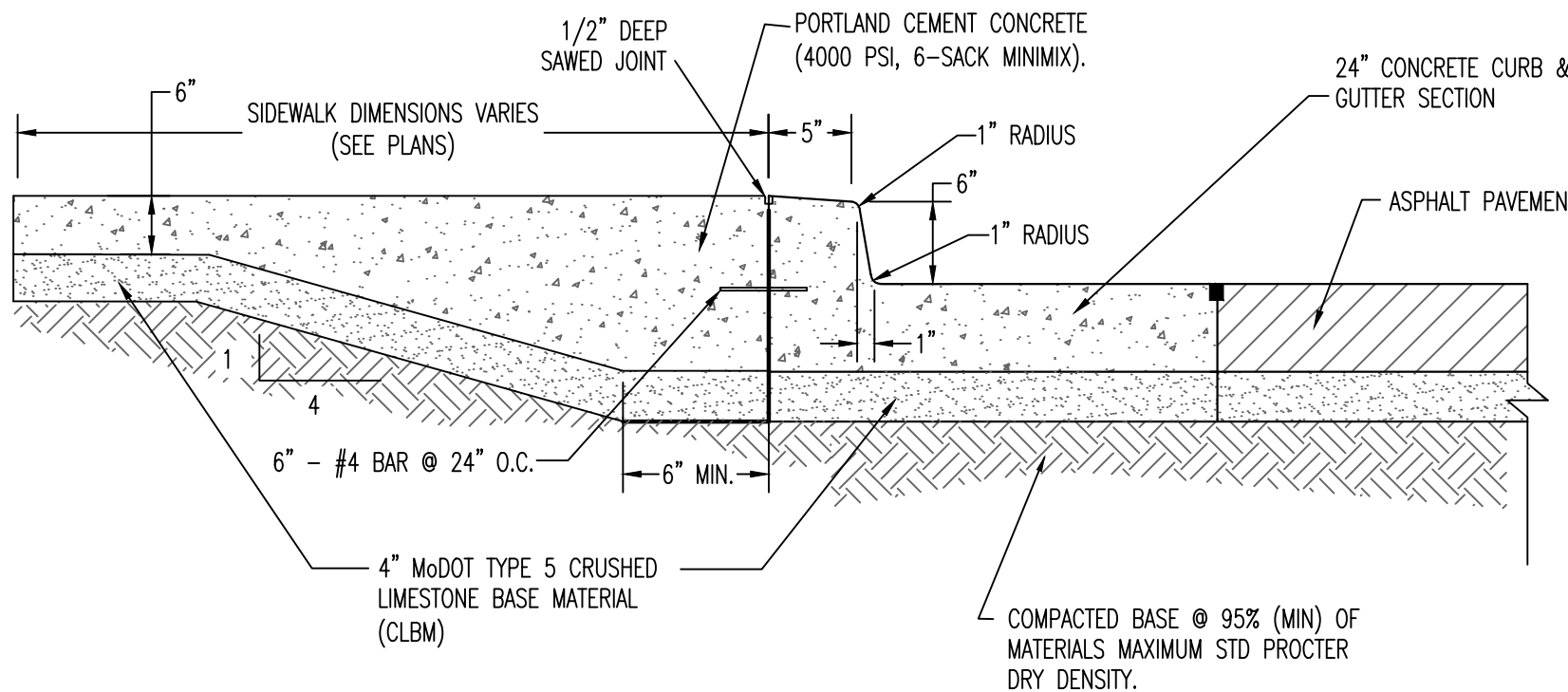
TYPICAL PRIVATE SIDEWALK



EXISTING ASPHALTIC PAVEMENT

NOTES: CONCRETE SHALL BE CLASS AA
REINFORCING STEEL SHALL BE GRADE 60

ASPHALT PAVEMENT PATCH

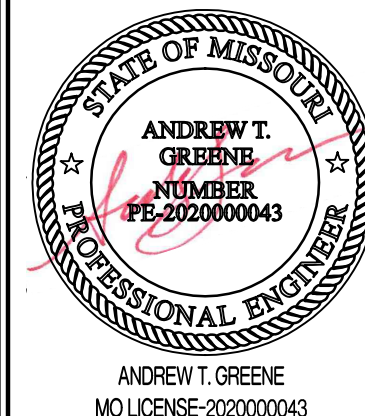


CONCRETE THICKENED EDGE SIDEWALK ABUTTING CURB & GUTTER SECTION

REVISIONS:

NO.	DATE
BID SET	12/16/2021

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY



OWNER:
CURATORS OF THE UNIVERSITY OF MISSOURI
225 UNIVERSITY HALL
COLUMBUS BUSINESS SERVICES
COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS AT ALLTON AND GREEN BUILDINGS

PROJECT NO. CP 220061

COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

DETAILS

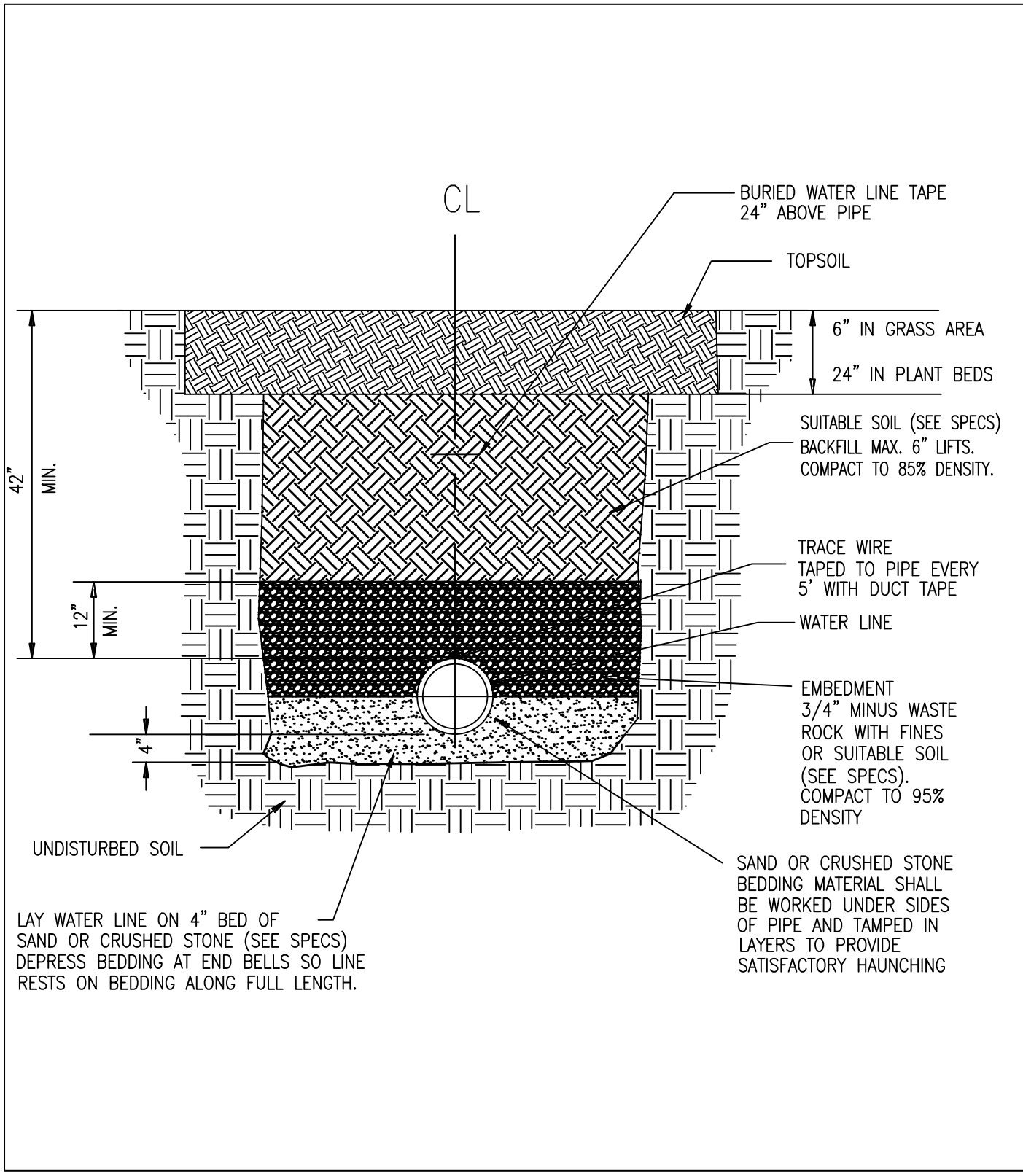
DESIGNED: ATG

DRAWN: ATG

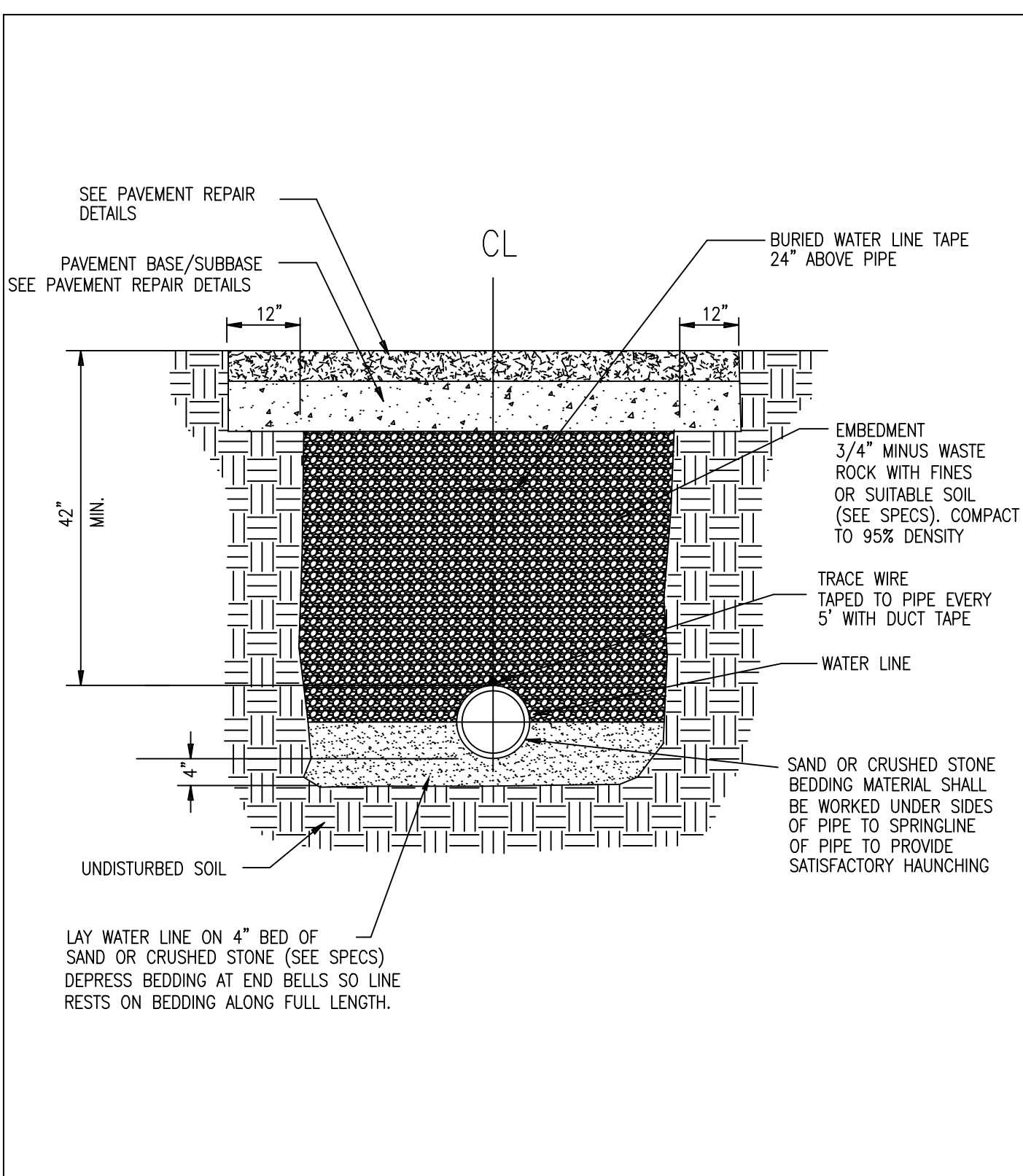
PROJECT NO.: 210471

SHEET:

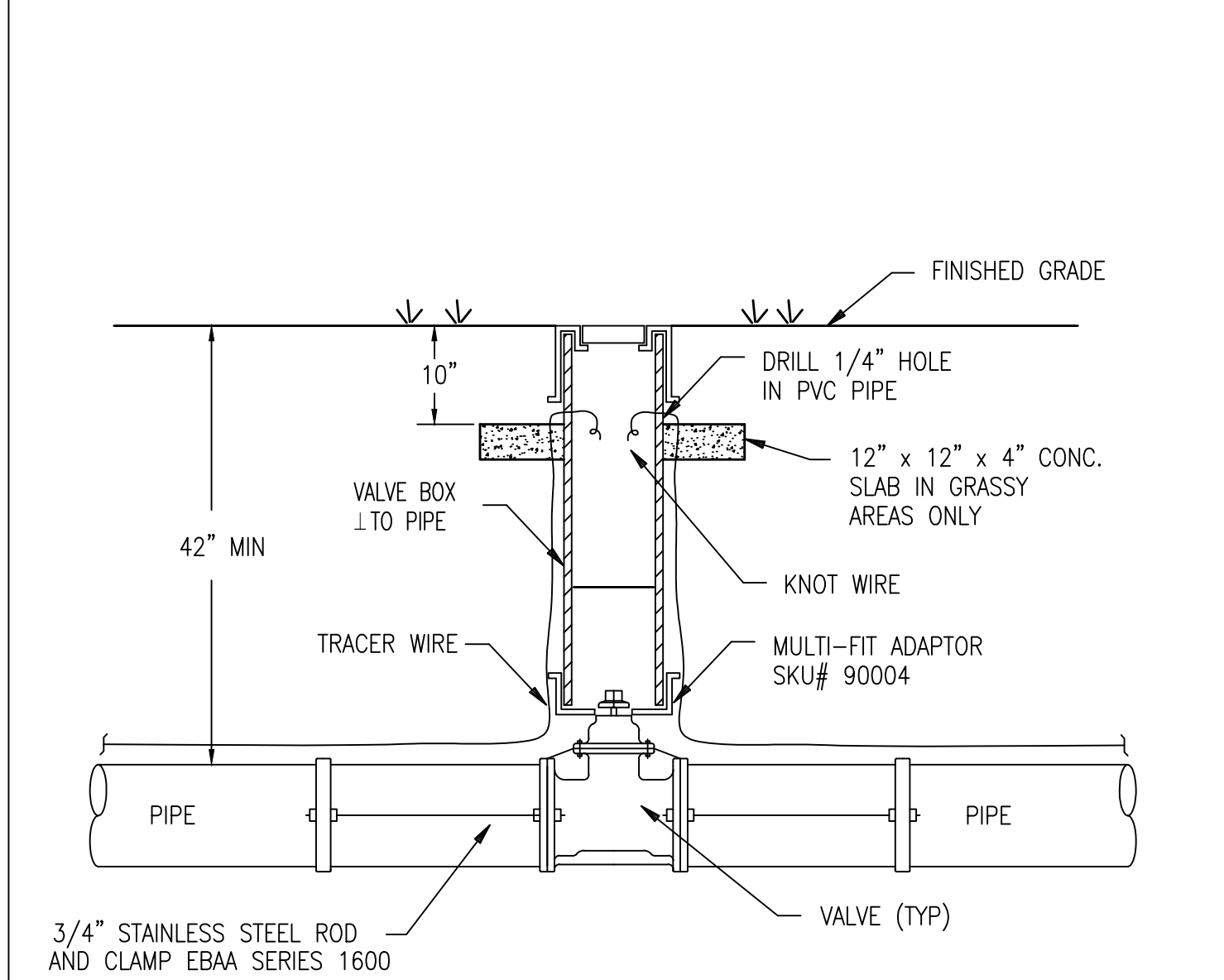
CE 5



REV	DATE	Construction Standard Trench at Grass & Plantings	
2	8/10/06		
3	1/6/14		
4	6/5/14		
5	11/05/15		
DRAWN BY: BB		Energy Management Campus Facilities UNIVERSITY OF MISSOURI	DRAWING NOT TO SCALE
CHECKED BY: TG			DATE: 12/22/02

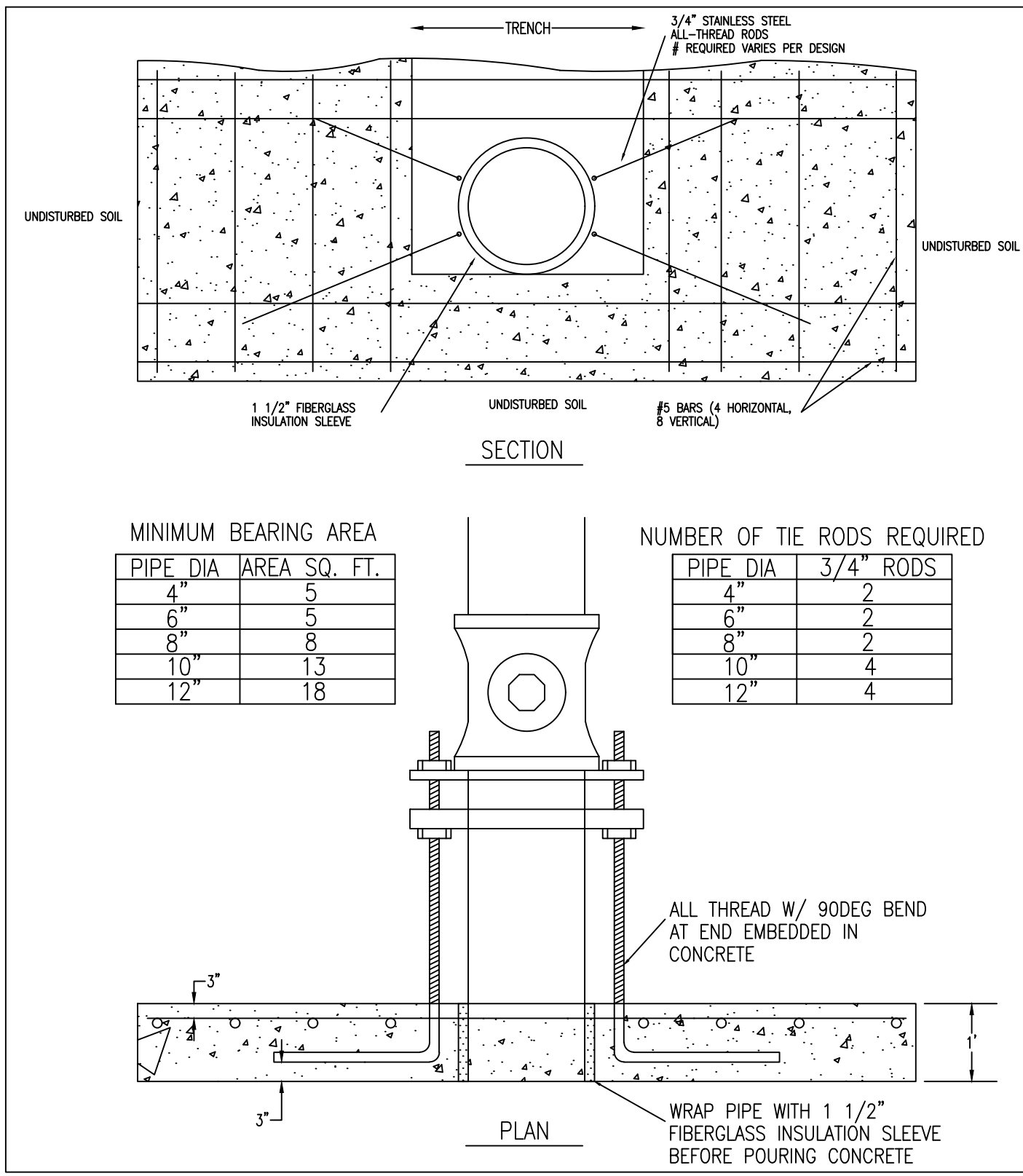


REV	DATE	Construction Standard Trench at Paving	
1	8/10/06		
2	1/6/14		
3	6/5/14		
4	11/05/15		
DRAWN BY: BB		Energy Management Campus Facilities UNIVERSITY OF MISSOURI	DRAWING NOT TO SCALE
CHECKED BY: TG			DATE: 12/22/02

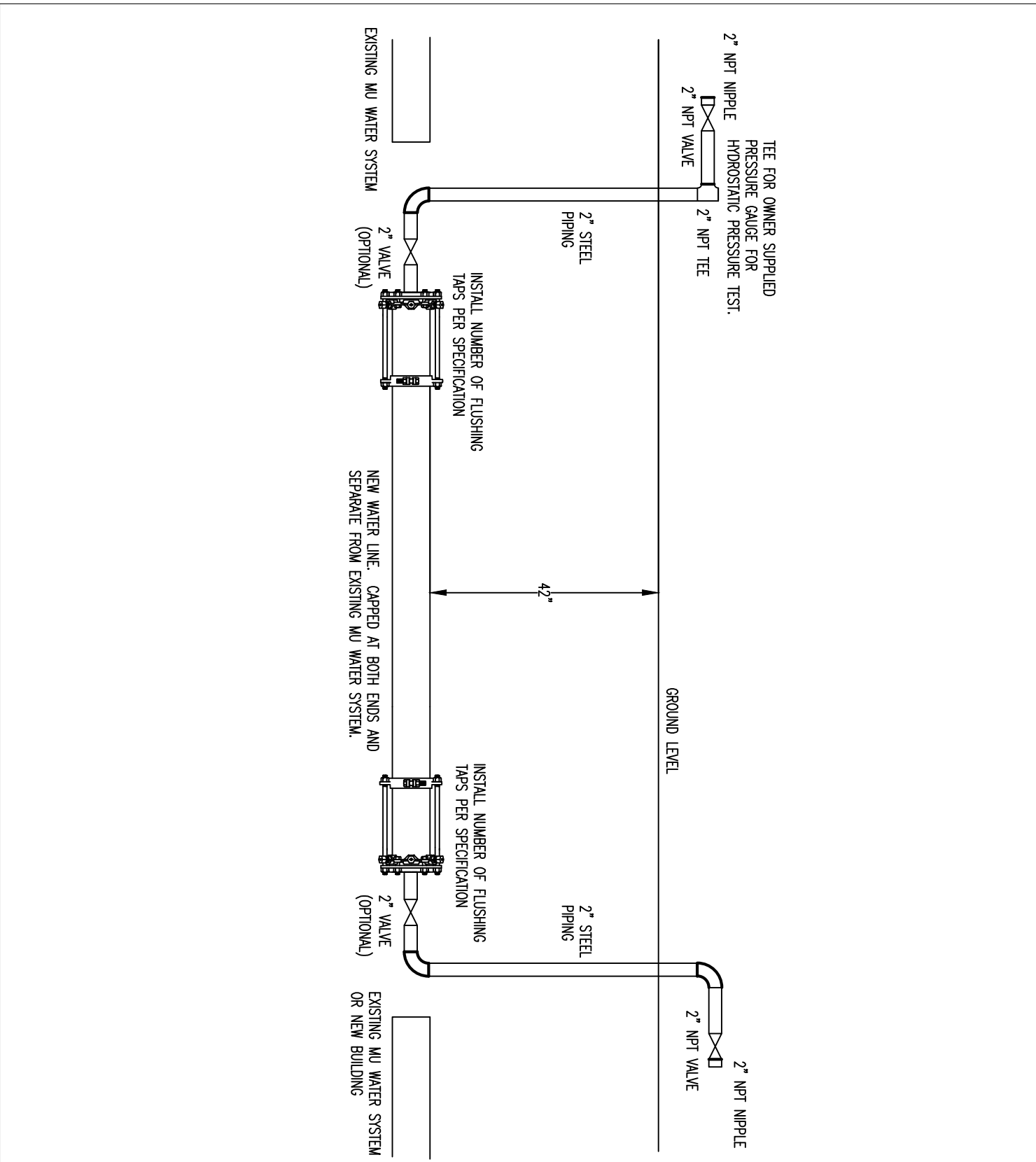


NOTE: ALL METAL PIPE, VALVES, FITTINGS, CLAMPS, ETC. SHALL BE WRAPPED WITH POLYETHYLENE COVER.

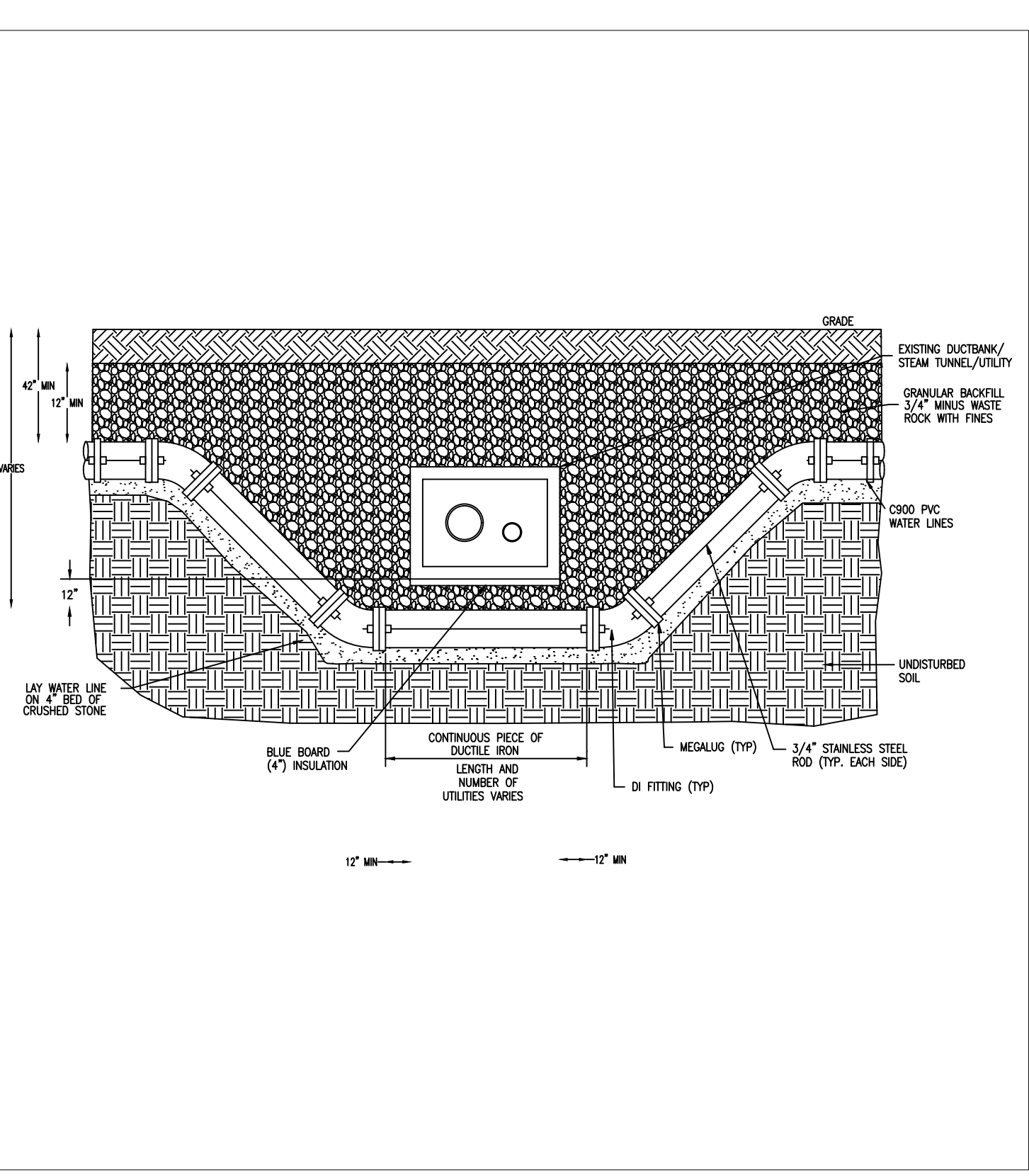
REV	DATE	Construction Standard Gate Valve	PROJECT NUMBER
0	10/26/06		
1	07/17/09		
2	06/05/14		
4	12/7/21		
DRAWN BY: MD		Energy Management Campus Facilities UNIVERSITY OF MISSOURI-COLUMBIA	DRAWING NOT TO SCALE
CHECKED BY: LL			DATE: 12/18/02



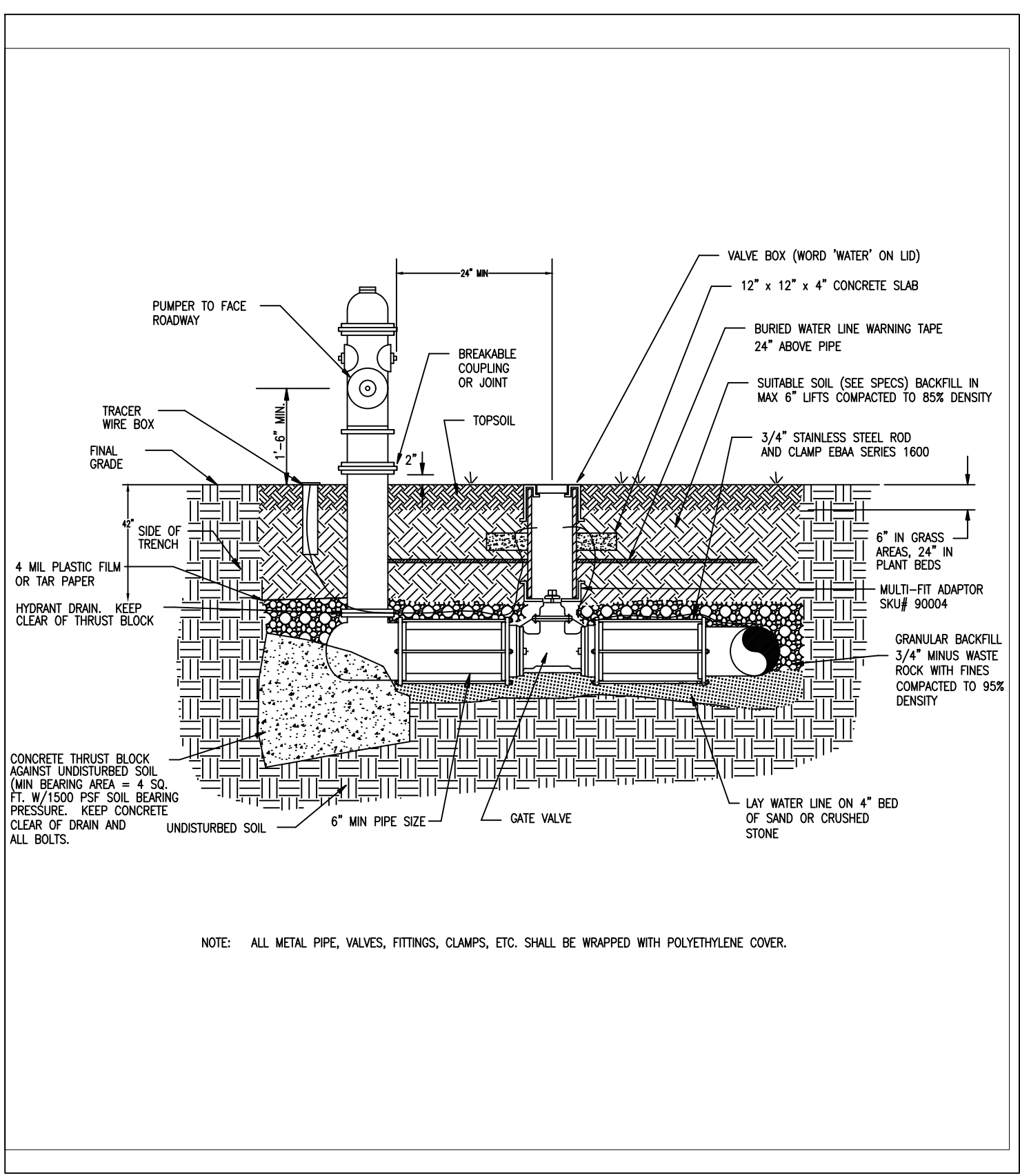
REV	DATE	Construction Standard Thrust Collar	
0	4/18/17		
DRAWN BY: AS		Energy Management Campus Facilities UNIVERSITY OF MISSOURI	DRAWING NOT TO SCALE
CHECKED BY: TG			DATE: 4/18/17



REV	DATE	Taps for Flushing and Disinfection of Water Lines	
0			
DRAWN BY:		Energy Management Campus Facilities UNIVERSITY OF MISSOURI-COLUMBIA	DRAWING NOT TO SCALE
CHECKED BY:			DATE: 1/4/14



REV	DATE	Construction Standards Vertical Offset	
0	12/22/02		
1	8/15/11		
2	6/05/14		
3	11/05/15		
DRAWN BY: BB		Energy Management Campus Facilities UNIVERSITY OF MISSOURI	DRAWING NOT TO SCALE
CHECKED BY: TG			DATE: 12/22/02



REV	DATE	Construction Standard Fire Hydrant Detail	
2	08/15/11		
3	01/6/14		
4	6/5/14		
6	12/7/21		
DRAWN BY: MD		UNIVERSITY OF MISSOURI-COLUMBIA Campus Facilities Energy Management	DRAWING NOT TO SCALE
CHECKED BY: LL			DATE: 12/18/02

REVISIONS:

NO.	DATE
BID SET	12/16/2021

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

ANDREW T. GREENE
NUMBER
2020000043
MO LICENSE 2020000043

PREPARED BY: **CROCKETT** ENGINEERS & ARCHITECTS

OWNER: CURATORS OF THE UNIVERSITY OF MISSOURI
225 UNIVERSITY HALL
COLUMBUS SERVICES
COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS
AT ALLTON AND GREEN BUILDINGS
PROJECT NO. CP 220061
COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

DESIGNED: ATG
DRAWN: ATG
PROJECT NO.: 210471
SHEET: CE 6

CONCRETE PAVING JOINT SEALANTS:

DELIVER MATERIALS TO PROJECT SITE IN ORIGINAL UNOPENED CONTAINERS OR BUNDLES WITH LABELS INDICATING MANUFACTURER, PRODUCT NAME AND DESIGNATION, COLOR, EXPIRATION DATE, POT LIFE, CURING TIME, AND MIXING INSTRUCTIONS FOR MULTICOMPONENT MATERIALS.

STORE AND HANDLE MATERIALS TO COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS TO PREVENT THEIR DETERIORATION OR DAMAGE DUE TO MOISTURE, HIGH OR LOW TEMPERATURES, CONTAMINANTS, OR OTHER CAUSES.

- DO NOT PROCEED WITH INSTALLATION OF JOINT SEALANTS UNDER THE FOLLOWING CONDITIONS:
1. WHEN AMBIENT AND SUBSTRATE TEMPERATURE CONDITIONS ARE OUTSIDE LIMITS PERMITTED BY JOINT SEALANT MANUFACTURER OR ARE BELOW 40 DEG F.
 2. WHEN JOINT SUBSTRATES ARE WET OR COVERED WITH FROST.
 3. WHERE JOINT WIDTHS ARE LESS THAN THOSE ALLOWED BY JOINT-SEALANT MANUFACTURER FOR APPLICATIONS INDICATED.
 4. WHERE CONTAMINANTS CAPABLE OF INTERFERING WITH ADHESION HAVE NOT YET BEEN REMOVED FROM JOINT SUBSTRATES.

PROVIDE JOINT SEALANTS, BACKER MATERIALS, AND OTHER RELATED MATERIALS THAT ARE COMPATIBLE WITH ONE ANOTHER AND WITH JOINT SUBSTRATES UNDER CONDITIONS OF SERVICE AND APPLICATION, AS DEMONSTRATED BY JOINT-SEALANT MANUFACTURER BASED ON TESTING AND FIELD EXPERIENCE.

COLD-APPLIED JOINT SEALANTS ARE TO BE TYPE NS SILICONE SEALANT FOR CONCRETE; SINGLE-COMPONENT, LOW-MODULUS, NEUTRAL-CURING, NONSAG SILICONE SEALANT COMPLYING WITH ASTM D 5983 FOR TYPE NS. PRODUCTS ALLOWED ARE: CRAFCO INC.: ROADSAVER SILICONE , DOW CORNING CORPORATION: 888, PECORA NS 301, OR APPROVED EQUAL.

CONTRACTOR TO PROVIDE JOINT-SEALANT BACKER MATERIALS THAT ARE NONSTAINING; ARE COMPATIBLE WITH JOINT SUBSTRATES, SEALANTS, PRIMERs, AND OTHER JOINT FILLERS; AND ARE APPROVED FOR APPLICATIONS INDICATED BY JOINT-SEALANT MANUFACTURER BASED ON FIELD EXPERIENCE AND LABORATORY TESTING: ROUND BACKER RODS FOR COLD-APPLIED SEALANTS: ASTM D 5549, TYPE 3, OF DIAMETER AND DENSITY REQUIRED TO CONTROL SEALANT DEPTHAND PREVENT BOTTOM-SIDE ADHESION OF SEALANT.

PRIOR TO JOINT INSTALLATION, CONTRACTOR IS TO EXAMINE JOINTS INDICATED TO RECEIVE JOINT SEALANTS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR JOINT CONFIGURATION, INSTALLATION TOLERANCES, AND OTHER CONDITIONS AFFECTING JOINT- SEALANT PERFORMANCE. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

CLEAN OUT JOINTS IMMEDIATELY BEFORE INSTALLING JOINT SEALANTS TO COMPLY WITH JOINT-SEALANT MANUFACTURER'S WRITTEN INSTRUCTIONS.

COMPLY WITH JOINT-SEALANT MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS FOR PRODUCTS AND APPLICATIONS INDICATED, UNLESS MORE STRINGENT REQUIREMENTS APPLY.

COMPLY WITH RECOMMENDATIONS IN ASTM C 1193 FOR USE OF JOINT SEALANTS AS APPLICABLE TO MATERIALS, APPLICATIONS, AND CONDITIONS INDICATED.

INSTALL BACKER MATERIALS OF TYPE INDICATED TO SUPPORT SEALANTS DURING APPLICATION AND AT POSITION REQUIRED TO PRODUCE CROSS-SECTIONAL SHAPES AND DEPTHS OF INSTALLED SEALANTS RELATIVE TO JOINT WIDTHS THAT ALLOW OPTIMUM SEALANT MOVEMENT CAPABILITY. DO NOT LEAVE GAPS BETWEEN ENDS OF BACKER MATERIALS. DO NOT STRETCH, TWIST, PUNCTURE, OR TEAR BACKER MATERIALS. REMOVE ABSORBENT BACKER MATERIALS THAT HAVE BECOME WET BEFORE SEALANT APPLICATION AND REPLACE THEM WITH DRY MATERIALS.

- INSTALL SEALANTS USING PROVEN TECHNIQUES THAT COMPLY WITH THE FOLLOWING AND AT THE SAME TIME BACKING ARE INSTALLED:
1. PLACE SEALANTS SO THEY DIRECTLY CONTACT AND FULLY WET JOINT SUBSTRATES.
 2. COMPLETELY FILL RECESSES PROVIDED FOR EACH JOINT CONFIGURATION.
 3. PRODUCE UNIFORM, CROSS-SECTIONAL SHAPES AND DEPTHS RELATIVE TO JOINT WIDTHS THAT ALLOW OPTIMUM SEALANT MOVEMENT CAPABILITY.

IMMEDIATELY AFTER SEALANT APPLICATION AND BEFORE SKINNING OR CURING BEGINS, TOOL SEALANTS ACCORDING TO REQUIREMENTS SPECIFIED BELOW TO FORM SMOOTH, UNIFORM BEADS OF CONFIGURATION INDICATED; TO ELIMINATE AIR POCKETS; AND TO ENSURE CONTACT AND ADHESION OF SEALANT WITH SIDES OF JOINT. REMOVE EXCESS SEALANTS FROM SURFACES ADJACENT TO JOINTUSE TOOLING AGENTS THAT ARE APPROVED IN WRITING BY JOINT-SEALANT MANUFACTURER AND THAT DO NOT DISCOLOR SEALANTS OR ADJACENT SURFACES.

PROVIDE JOINT CONFIGURATION TO COMPLY WITH JOINT-SEALANT MANUFACTURER'S WRITTEN INSTRUCTIONS, UNLESS OTHERWISE INDICATED.

PROVIDE RECESSED JOINT CONFIGURATION FOR SILICONE SEALANTS OF RECESS DEPTH AND AT LOCATIONS INDICATED.

CLEAN OFF EXCESS SEALANTS OR SEALANT SMEARS ADJACENT TO JOINTS AS THE WORK PROGRESSES BY METHODS AND WITH CLEANING MATERIALS APPROVED BY MANUFACTURERS OF JOINT SEALANTS AND OF PRODUCTS IN WHICH JOINTS OCCUR.

PROTECT JOINT SEALANTS DURING AND AFTER CURING PERIOD FROM CONTACT WITH CONTAMINATING SUBSTANCES AND FROM DAMAGE RESULTING FROM CONSTRUCTION OPERATIONS OR OTHER CAUSES SO SEALANTS ARE WITHOUT DETERIORATION OR DAMAGE AT TIME OF SUBSTANTIAL COMPLETION. IF, DESPITE SUCH PROTECTION, DAMAGE OR DETERIORATION OCCURS, CUT OUT AND REMOVE DAMAGED OR DETERIORATED JOINT SEALANTS IMMEDIATELY AND REPLACE WITH JOINT SEALANT SO INSTALLATIONS WITH REPAIRED AREAS ARE INDISTINGUISHABLE FROM THE ORIGINAL WORK.

CONCRETE PAVING:

CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF THE CURRENT ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS, ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 305 SPECIFICATIONS FOR HOT WATER CONCRETE, AND ACI 306 SPECIFICATIONS FOR COLD WEATHER CONCRETE, WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:

1. CONCRETE SHALL DEVELOP THE FOLLOWING 28-DAY MINIMUM COMPRESSIVE STRENGTH:

FOUNDATIONS	4,000 PSI
CAST-IN-PLACE WALLS	4,000 PSI
FLOOR SLAB	4,000 PSI
EXTERIOR SLABS, WALLS AND CURBS	4,000 PSI
2. ALL FOOTINGS SHALL BEAR ON UNDISTURBED SOIL OR ENGINEERED FILL.
3. CHLORIDE- BASED ADMIXTURES ARE PROHIBITED IN ALL CONCRETE.
4. REINFORCING STEEL SHALL CONFORM TO ASTM A615, OR A617, GRADE 60.
5. ALL CONTINUOUS REINFORCING STEEL THAT MEETS AT A CORNER SHALL BE TIED TOGETHER WITH A CORNER BAR THAT HAS SUFFICIENT LAP DISTANCE IN EACH DIRECTION.
6. CONTINUOUS REINFORCING BARS LAP LENGTH SHALL BE A MINIMUM OF 48 BAR DIAMETERS UNLESS NOTED OTHERWISE.
7. CONCRETE SLUMP SHALL BE A MAXIMUM OF 4" +/- 1" (ASTM C- 143) AS DELIVERED IN THE FIELD. CONTRACTOR MAY USE CHEMICAL ADMIXTURES TO ATTAIN A MAXIMUM SLUMP OF 8" FOR WORKABILITY. NO WATER MAY BE ADDED TO THE CONCRETE MIX ON SITE UNLESS WATER IS WITHHELD AT THE BATCHING FACILITY. IF WATER IS WITHHELD AT THE BATCHING FACILITY IT SHOULD BE REFLECTED ON THE LOAD TICKET. THE TOTAL AMOUNT OF WATER IN THE MIX SHALL NOT EXCEED WHAT IS NOTED ON THE APPROVED MIXED. THIS SHALL BE NOTED IN THE SPECIAL INSPECTOR'S RECORDS.
8. CONCRETE EXPOSED TO WEATHER, VEHICLES, AND/OR DEICING CHEMICALS SHALL BE AIR-ENTRAINED WITH 6% (+/-) 1.5% ENTRAINED AIR BY VOLUME AT POINT OF DISCHARGE. DO NOT ALLOW AIR CONTENT OF TROWELED FINISHED FLOORS TO EXCEED 3%.
9. SUBMIT CONCRETE MIX PROPORTIONS PRIOR TO START OF WORK. DO NOT BEGIN CONCRETE PRODUCTION UNTIL MIXES HAVE BEEN REVIEWED AND ARE ACCEPTABLE TO THE ENGINEER.
10. READY MIX CONCRETE SHALL COMPLY WITH REQUIREMENTS OF ASTM C94.
11. CONCRETE WORK EXECUTION
 - A. CONSTRUCT FORMS TO CORRECT SIZE, SHAPE, ALIGNMENT, ELEVATION AND POSITION; AND TO SUPPORT VERTICAL AND LATERAL LOADS.
 - B. POSITION, SUPPORT, AND SECURE REINFORCEMENT AGAINST DISPLACEMENT. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE, UNLESS NOTED OTHERWISE ON THE DRAWINGS:

CAST AGAINST AND EXPOSED TO EARTH.....	3 INCHES
EXPOSED TO EARTH OR WEATHER.....	2 INCHES
NOT EXPOSED TO WEATHER OR	
IN CONTACT WITH EARTH.....	1 1/2 INCHES
 - C. PROVIDE CONTROL JOINTS IN SLABS-ON-GRADE AT NOT GREATER THAN 15 FEET ON CENTER IN EACH DIRECTION. SAW CUT CONTROL JOINTS MINIMUM 1/8 OF SLAB DEPTH, AS SOON AFTER SLAB FINISHING WITHOUT DISLODGING AGGREGATE.
 - D. STEEL TROWEL FINISH ALL INTERIOR CONCRETE SLABS, BROOM FINISH ALL EXTERIOR CONCRETE SLABS.
 - E. CURE ALL CONCRETE IN COMPLIANCE WITH ACI 301, USING A LIQUID TYPE MEMBRANE, NON-RESIDUAL, CURING COMPOUND COMPLYING WITH ASTM C309. ASSURE COMPATIBILITY WITH FINISH FLOOR COVERING.
12. FLINT AND CHERT WILL BE LIMITED TO 1% MAXIMUM, BY WEIGHT OF THE COURSE AGGREGATE, IN ALL EXPOSED CONCRETE (CAST-IN-PLACE OR PRECAST). LIGHTWEIGHT AGGREGATE WILL BE LIMITED TO 0.07%, BY WEIGHT OF THE FINE AGGREGATE IN ALL EXPOSED CONCRETE. SOME APPLICATIONS MAY BE REQUIRED TO BE LIGHTWEIGHT.
13. WIRE MESH IN PAVEMENTS SHALL CONFORM TO ASTM DESIGNATION A 185-58T WELDED STEEL WIRE FABRIC, OR LATEST REVISION THEREOF.

SITE CLEARING & DEMOLITION :

IT IS THE INTENT THAT THE DEMOLITION BE COMPLETE AND ADEQUATE FOR THE INTENDED PURPOSE. THIS WORK SHALL INCLUDE THE REMOVAL OF ALL ITEMS, WHETHER IN VIEW OR HIDDEN UNDERNEATH THE SURFACE OF THE GROUND, REGARDLESS OF WHETHER SHOWN ON THE DRAWINGS OR ENCOUNTERED DURING CONSTRUCTION.

CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING MATERIALS, METHODS OF WORK, AND DISPOSAL OF EXCESS WASTE MATERIALS.

THE CONTRACTOR SHALL SUBMIT DEMOLITION AND CLEARING PROCEDURES AND OPERATIONAL SEQUENCES AND SCHEDULES FOR REVIEW AND ACCEPTANCE BY THE OWNER'S REPRESENTATIVE.

ERECT BARRIERS TO PROTECT PERSONNEL, STRUCTURES AND UTILITIES REMAINING INTACT.

PROTECT ON-SITE TREES AND PLANTS NOTED ON DRAWINGS. ALL NEIGHBORING LANDSCAPING AND TREES ARE TO BE PROTECTED FROM DAMAGE.

PROTECT ALL EXISTING OBJECTS INTENDED TO REMAIN. IN CASE OF DAMAGE, MAKE REPAIRS OR REPLACEMENTS NECESSARY AT NO ADDITIONAL COST TO THE OWNER.

MINIMIZE INTERFERENCE WITH ROADS, STREETS, DRIVEWAYS, SIDEWALKS, AND ADJACENT FACILITIES.

DO NOT CLOSE OR OBSTRUCT STREETS, SIDEWALKS, ALLEYS OR PASSAGEWAYS WITHOUT PERMISSION FROM AUTHORITIES HAVING JURISDICTION.

IF CLOSURE IS PERMITTED, PROVIDE SIGNAGE INDICATING CLOSURE AND SIGNAGE TO DIRECT TRAFFIC TO ALTERNATE ROUTE.

MOISTEN SURFACES AS REQUIRED TO PREVENT DUST FROM BEING A NUISANCE TO THE PUBLIC, NEIGHBORS, AND CONCURRENT PERFORMANCE OF OTHER WORK ON THE SITE. OWNER TO PROVIDE WATER SOURCE.

PROVIDE THE OWNER'S REPRESENTATIVE A MINIMUM OF TWO BUSINESS DAYS' NOTICE PRIOR TO COMMENCING WORK OF THIS SECTION.

THE CONTRACTOR SHALL LOCATE EXISTING UTILITY LINES AND SERVICES TRAVERSING THE SITE AND DETERMINE THE REQUIREMENTS FOR THEIR PROTECTION. THE CONTRACTOR SHALL PRESERVE ACTIVE UTILITIES ON THE SITE THAT ARE DESIGNATED TO REMAIN.

BEFORE STARTING SITE OPERATIONS, THE CONTRACTOR SHALL DISCONNECT OR ARRANGE FOR THE DISCONNECTION OF ALL UTILITY SERVICES DESIGNATED TO BE REMOVED. THE CONTRACTOR SHALL PERFORM ALL SUCH WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY OR AGENCY INVOLVED.

IN REMOVING PAVEMENT, CURB AND GUTTER, SIDEWALKS, ETC., WHERE A PORTION IS LEFT IN PLACE, REMOVAL SHALL BE TO AN EXISTING JOINT OR TO A JOINT SAWED TO A MINIMUM DEPTH OF 2" WITH A TRUE SAW LINE AND A VERTICAL FACE. REMOVE SUFFICIENT PAVEMENT TO PROVIDE FOR PROPER GRADE AND CONNECTIONS IN THE NEW WORK REGARDLESS OF ANY LIMITS INDICATED ON THE DRAWING.

EXISTING CASTINGS AND CULVERTS, IF SALVAGEABLE AND REMOVED INTACT, REMAIN THE PROPERTY OF THE CONTRACTOR.

ALL SEWERS AND DRAINAGE PIPES, WHICH HAVE BEEN OR ARE TO BE ABANDONED, SHALL BE PERMANENTLY SEALED AT THE ENDS WITH BULKHEADS CONSTRUCTED OF CONCRETE, HAVING A MINIMUM THICKNESS OF 8".

ABANDON STORM OR SANITARY SEWER STRUCTURES BY BREAKING THE CONCRETE BOTTOM OF THE STRUCTURE INTO PIECES NO LARGER THAN 12" IN ANY DIRECTION AND REMOVING THE TOP OF THE STRUCTURE TO 3" BELOW FINISHED GRADE. PLUG ALL PIPES WITH CONCRETE AND FILL STRUCTURE WITH 1" CLEAN GRAVEL.

ALL DEBRIS SHALL BE DISPOSED OF OFF-SITE.

DO NOT STORE OR BURN MATERIALS ON-SITE UNLESS PERMITTED BY THE GOVERNING JURISDICTION.

ALL ASPHALT OR CONCRETE MATERIALS SHALL BE DISPOSED OF OFF-SITE.

MATERIAL ACQUIRED THROUGH DEMOLITION, OTHER THAN THOSE REQUIRED TO COMPLETE THE CONSTRUCTION PROJECT AND DESIGNATED FOR RETURN TO OWNER, WILL BECOME THE PROPERTY OF THE CONTRACTOR AND WILL BE REMOVED FROM THE SITE AND OFF UNIVERSITY PROPERTY. THE MATERIAL WILL BE DISPOSED OF IN A LEGAL MANNER.

THE CONTRACTOR'S OPERATIONS SHALL BE RESTRICTED TO THOSE AREAS INSIDE THE CONSTRUCTION LIMITS INDICATED ON THE DRAWINGS. IF LIMITS ARE NOT INDICATED, RESTRICT WORK TO THE OWNER'S PROPERTY, EASEMENT, OR PUBLIC RIGHTS-OF-WAY.

COMPLETE WORK WITHIN PUBLIC RIGHTS-OF-WAY UNDER THE PERMISSION OF THE GOVERNING AGENCY.

IF ITEMS OUTSIDE THE LIMITS OF DISTURBANCE GET DAMAGED, OWNER COMPLETES THE REQUIRED REPAIRS AND CHARGES THE CONTRACTOR.

THE CONTRACTOR IS RESPONSIBLE FOR THE ADJUSTMENT OF ALL MANHOLES, CASTINGS, WATER VALVES IRRIGATION BOXES, CLEAN OUTS AND ETC. WITHIN THE GRADING LIMITS TO MATCH THE FINISHED SURFACE. ADJUSTMENTS SHALL BE COORDINATED WITH THE UTILITY COMPANIES AND THE COST FOR ALL ADJUSTMENTS SHALL BE INCIDENTAL TO CONSTRUCTION UNLESS NOTED AS A BID ITEM. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO UTILITY STRUCTURES AND APPURTENANCES THAT OCCURS DURING CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.

LANDSCAPING:

THE CONTRACTOR SHALL PLACE TOPSOIL AND GRADE TO THE FINISH ELEVATION AS INDICATED IN THE CONTRACT. TOPSOIL SHALL BE PLACED WITH RUBBER TRACKED EQUIPMENT TO MINIMIZE COMPACTION. PLACEMENT SHALL BE SEQUENCED TO MINIMIZE COMPACTION AND DAMAGE TO THE TOPSOIL. TOPSOIL OR SUBSOIL DAMAGED, CONTAMINATED, OR COMPACTED DURING TOPSOIL PLACEMENT SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE OWNER'S REPRESENTATIVE. HAND WORK SHALL BE REQUIRED NEXT TO ADJACENT STRUCTURES AND AROUND UTILITIES. EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT AND AFTER TOPSOIL PLACEMENT.

THE CONTRACTOR SHALL ADJUST ALL YARD BOXES VALVE BOXES, PULL BOXES, CLEANOUTS, AND MANHOLE LID RINGS ETC. (INCLUDES IRRIGATION, SEWERS, WATER AND ELECTRIC), TO THE INDICATED FINISH GRADE.

THE OWNER WILL WATER AND MAINTAIN ALL SEED AND LANDSCAPING.

CONTRACTOR TO INSTALL SEED AND STRAW PER MUJ SPECIFICATIONS. SEED SHALL BE A TURF TYPE TALL FESCUE.

REFER TO DIVISION 1 SPECIFICATIONS - SPECIAL CONDITIONS FOR FURTHER INSTRUCTIONS.

EARTHMOVING:

CONTRACTOR TO SUBMIT MANUFACTURER'S PRODUCT DATA AND INSTALLATION INSTRUCTIONS FOR EACH MATERIAL AND PRODUCT USED.

TEST REPORTS: SUBMIT FOR APPROVAL TEST REPORTS, LIST OF MATERIALS AND GRADATIONS PROPOSED FOR USE. OBTAIN SAMPLES OF ANY PROPOSED FILL MATERIAL AND, CONTRACTOR TO PROVIDE STANDARD PROCTOR TEST REPORTS TO ENGINEER.

COMPACTION REQUIREMENTS ARE AS FOLLOWS:

1. UNDER STEPS, PAVEMENTS, AND WALKWAYS, 95 PERCENT STANDARD PROCTOR MINIMUM DENSITY, ASTM D 698.
2. UNDER LAWNS OR UNPAVED AREAS, 85 PERCENT, ASTM D 698.

GRADING TOLERANCES OUTSIDE BUILDING LINES ARE AS FOLLOWS:

1. LAWNS, UNPAVED AREAS, AND WALKS, PLUS OR MINUS 1 INCH.
2. PAVEMENTS, PLUS OR MINUS 1/2 INCH.
3. ALL ADA ROUTES AND PARKING ARE TO MEET ADA REQUIREMENTS AT ALL TIMES.

ALL ACTIVITIES WILL BE CONTAINED WITHIN CONSTRUCTION BOUNDARIES INDICATED ON SITE PLAN. SPECIFIED EXCAVATION REQUIREMENTS, PRECAUTIONS, AND PROTECTIVE SYSTEMS WILL BE OBSERVED AT ALL TIMES.

MOVEMENT OF TRUCKS AND EQUIPMENT ON OWNER'S PROPERTY WILL BE IN ACCORDANCE WITH OWNER'S INSTRUCTIONS. DRIVING AND PARKING ON SIDEWALKS IS NOT ALLOWED.

TOPSOIL WILL BE STRIPPED FROM THE CONSTRUCTION SITE AND WILL BE DISPOSED OF LEGALLY OFF SITE.

TRENCHES WILL NOT BE BACKFILLED UNTIL ALL REQUIRED TESTS ARE COMPLETED AND THE UTILITY SYSTEMS, AS INSTALLED, CONFORM TO REQUIREMENTS SPECIFIED BY THE CONTRACT DOCUMENTS.

EXCAVATION IS UNCLASSIFIED AND INCLUDES EXCAVATION TO SUBGRADE REGARDLESS OF MATERIALS ENCOUNTERED. REPAIR EXCAVATIONS BEYOND ELEVATIONS AND DIMENSIONS INDICATED AS FOLLOWS:

1. AT STRUCTURE: CONCRETE OR COMPACTED STRUCTURAL FILL.
 2. ELSEWHERE: BACKFILL AND COMPACT AS DIRECTED.
- MAINTAIN STABILITY OF EXCAVATIONS; CONTRACTOR TO BE RESPONSIBLE FOR DESIGN AND COORDINATION OF SHORING AND BRACING AS REQUIRED. PREVENT SURFACE AND SUBSURFACE WATER FROM ACCUMULATING IN EXCAVATIONS. STOCKPILE SATISFACTORY MATERIALS FOR REUSE, ALLOW FOR PROPER DRAINAGE AND DO NOT STOCKPILE MATERIALS WITHIN DRIP LINE OF TREES TO REMAIN.
- COMPACT MATERIALS AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D 698 BY AERATION OR WETTING TO THE FOLLOWING PERCENTAGES OF MAXIMUM DRY DENSITY:
1. STRUCTURE, PAVEMENT, WALKWAYS: SUBGRADE AND EACH FILL LAYER TO 95% (-2%+4%) OF STANDARD PROCTOR MAXIMUM DRY DENSITY TO SUITABLE DEPTH. COMPACTION TESTING SHALL BE PERFORMED IMMEDIATELY PRIOR TO THE PLACEMENT OF REINFORCING STEEL AND NEW PAVING MATERIALS. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING TESTING WITH OWNERS DESIGNATED TESTING AGENCY.
 2. UNPAVED AREAS: TOP 6" OF SUBGRADE AND EACH FILL LAYER TO 95% MAXIMUM DRY DENSITY.
 3. A PROOF-ROLL SHALL BE REQUIRED OF THE SUBGRADE PRIOR TO PLACEMENT OF THE BASE COURSE. PROOF ROLLING SHALL CONSIST OF PASSING A LOADED, 20-TON, TANDEM DUMP TRUCK OVER THE PREPARED SUBGRADE SOIL WITH A MAXIMUM ALLOWABLE DISPLACEMENT OF 1". ANY AREAS THAT DISPLACE MORE THAN 1" SHALL BE COMPACTED UNTIL THIS CRITERION IS MET, OR THOSE AREAS MAY BE EXCAVATED AND BACKFILLED WITH COMPACTED TYPE 1 AGGREGATE USED FOR BASE MATERIAL. ALL PROOF ROLLING SHALL BE PERFORMED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE.
 4. CUT AREAS UNDER PROPOSED ASPHALT OR CONCRETE PAVEMENTS SHALL BE CUT AND COMPACTED. AFTER GRADING TO SUBGRADE ELEVATION, SCARIFY THE TOP SIX INCHES OF THE SUB-BASE AND COMPACT AS OUTLINED ABOVE.

PLACE ACCEPTABLE MATERIALS IN LAYERS NOT MORE THAN 8" LOOSE DEPTH FOR MATERIALS COMPACTED BY HEAVY EQUIPMENT AND NOT MORE THAN 4" LOOSE DEPTH FOR MATERIALS COMPACTED BY HAND EQUIPMENT TO SUBGRADES INDICATED AS FOLLOWS:

1. STRUCTURAL FILL: USE UNDER FOUNDATIONS, SLABS ON GRADE IN LAYERS AS INDICATED.
2. DRAINAGE FILL: USE UNDER DESIGNATED BUILDING SLABS, AT FOUNDATION DRAINAGE AND ELSEWHERE AS INDICATED.
3. LANDSCAPE AREA FILL:
 - 3.1. ALL SUB-GRADE AREAS SHALL BE "RIPPED" TO A MINIMUM 6" DEEP AND A MAXIMUM OF 12" APART IN OPPOSITE DIRECTIONS WITH MINIMAL TIRE TRAFFIC TO FOLLOW.
 - 3.2. ANY FILL SOIL WITHIN 36" OF FINISHED GRADE IN LAWN AND PLANTER AREAS SHALL BE COHESIVE SOILS IN SOIL CLASSIFICATIONS GROUPS ML, CL, CH OR A COMBINATION THEREOF, FREE OF ROCK OR GRAVEL LARGER THAN 1" IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIAL, VEGETATION AND OTHER DELETERIOUS MATTER.
4. SUB-BASE MATERIAL: USE UNDER PAVEMENT, WALKS, STEPS, PIPING AND CONDUIT.

GRADE TO WITHIN 1/2" ABOVE OR BELOW REQUIRED SUBGRADE AND WITHIN A TOLERANCE OF 1/2" IN 10'.

PROTECT NEWLY GRADED AREAS FROM TRAFFIC AND EROSION. RECOMPACT AND REGRADE SETTLED, DISTURBED AND DAMAGED AREAS AS NECESSARY TO RESTORE QUALITY, APPEARANCE, AND CONDITION OF WORK.

CONTROL EROSION TO PREVENT RUNOFF INTO SEWERS OR DAMAGE TO SLOPED OR SURFACED AREAS.

CONTROL DUST TO PREVENT HAZARDS TO ADJACENT PROPERTIES AND VEHICLES. IMMEDIATELY REPAIR OR REMEDY DAMAGE CAUSED BY DUST INCLUDING AIR FILTERS IN EQUIPMENT AND VEHICLES. CLEAN SOILED SURFACES.

DISPOSAL OF EXCAVATION WASTE AND UNSUITABLE MATERIALS SHALL BE THE RESPONSIBILITY OF THE SITE WORK CONTRACTOR. NO SPECIFIC OR PRE-APPROVED LOCATION IS BEING PROVIDED BY THE OWNER.

ALL PAVEMENTS, SIDEWALKS, ABANDONED SEWERS, PIPELINES, EXCESS EARTHWORK, OR OTHER OBSTRUCTIONS TO CONSTRUCTION THAT ARE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS SPECIFICALLY NOTED AND SHALL BE DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH STATE REGULATION 10 CSR 80-2.010 (9)(A).

ALL EXCAVATION TO BE IN ACCORDANCE WITH SECTIONS 319.010-319.050, REVISED STATUTES OF THE STATE OF MISSOURI. SUCH COMPLIANCE SHALL NOT, HOWEVER, EXCUSE ANY PERSON MAKING ANY EXCAVATION FROM DOING SO IN A CAREFUL AND PRUDENT MANNER, NOR SHALL IT EXCUSE SUCH PERSON FROM LIABILITY FOR ANY DAMAGE OR INJURY TO UNDERGROUND UTILITIES RESULTING FROM THE EXCAVATION.

IT IS THE INTENT OF THESE PLANS TO COMPLY WITH THE REQUIREMENTS OF THE M&NR CLEAN WATER COMMISSION.

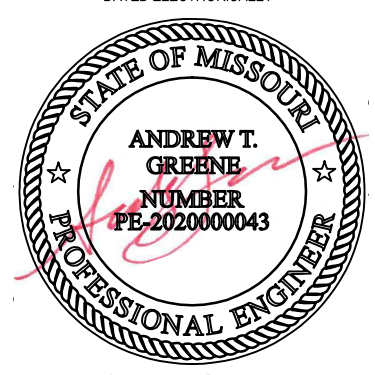
THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL EROSION CONTROL DEVICES AND REMOVING THEM ONCE THE SITE IS STABILIZED.

ALL LAND DISTURBANCE SITES SHOULD BE INSPECTED ON A REGULAR SCHEDULE AND WITHIN A REASONABLE TIME PERIOD (NOT TO EXCEED 48 HOURS) FOLLOWING HEAVY RAINS. REGULARLY SCHEDULED INSPECTIONS SHALL BE AT A MINIMUM OF ONCE PER WEEK. ANY DEFICIENCIES SHALL BE NOTED IN A WEEKLY REPORT OF THE INSPECTION AND CORRECTED WITHIN SEVEN CALENDAR DAYS OF THE REPORT.

REVISIONS:

NO.	DATE
BID SET	12/16/2021

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.



ANDREW T. GREENE
MO LICENSE-202000043



OWNER:
CURATORS OF THE UNIVERSITY OF MISSOURI
265 UNIVERSITY HALL
COLUMBIA BUSINESS SERVICES
COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS
AT ALLTON AND GREEN BUILDINGS
PROJECT NO. CP 220061
COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

SPECIFICATIONS SHEET 1 OF 2

DESIGNED: ATG

DRAWN: ATG

PROJECT NO.: 210471

SHEET:
CE 7

UNIVERSITY OF MISSOURI WATER SPECIFICATIONS:

WATER UTILITIES DISTRIBUTION FIRE HYDRANTS

1. MATERIALS
- 1.1. UNIVERSITY FIRE HYDRANTS SHALL BE LEAD FREE SUPER CENTURION FIRE HYDRANTS, MODEL 250, NUMBER A-423, AS MANUFACTURED BY MUELLER WATER PRODUCTS, DECATUR IL. NO SUBSTITUTIONS WILL BE ALLOWED.
- 1.2. FIRE HYDRANTS SHALL BE PAINTED IN THE FOLLOWING MANNER USING SIGN PAINTERS' 1 SHOT LETTERING ENAMEL OR APPROVED EQUAL:
- 1.2.1. UNIVERSITY WATER: BARREL – METALLIC GOLD, CAPS – BLACK, BONNET BLUE.
- 1.2.2. CITY WATER, UNIVERSITY MAINTAINED FIRE SYSTEM: BARREL – METALLIC GOLD, CAPS BLUE, BONNET – BLUE.
- 1.2.3. MU MAY MODIFY FINAL HYDRANT BONNET COLOR BASED ON MEASURED FLOW.
- 1.3. TRACER WIRE
- 1.3.1. TRACER WIRE SHALL BE #14 AWG SOLID, STEEL CORE SOFT DRAWN HIGH STRENGTH TRACER WIRE, 250# AVERAGE TENSILE BREAK LOAD, 30 MIL HIGH MOLECULAR WEIGHT-HIGH DENSITY BLUE POLYETHYLENE JACKET COMPLYING WITH ASTM-D-1248, 30 VOLT RATING. NO THIN INSULATED WIRE SHALL BE ALLOWED. TRACER WIRE SHALL BE COPPERHEAD INDUSTRIES HS-CCS OR APPROVED EQUAL.
- 1.3.2. TRACER WIRE SHALL HAVE MOISTURE RESISTANT SPLICES FOR DIRECT BURY APPLICATIONS. SPLICES SHALL BE COPPERHEAD INDUSTRIES SHAKBITE OR 3M DBR OR APPROVED EQUAL.
- 1.3.3. TRACER WIRE TEST STATIONS SHALL BE DESIGNED TO BE EASILY DETECTED BY MAGNETIC AND ELECTRONIC LOCATORS. A MAGNET SHALL BE SECURELY ATTACHED AT THE TOP OF THE UPPER TUBE OF THE BOX FOR LOCATING PURPOSES. LID SHALL BE BLUE AND HAVE A BRASS TERMINAL FOR ATTACHING LOCATING EQUIPMENT AND A BRASS 5 SIDED NUT FOR REMOVING CAP. TRACER WIRE TEST STATION SHALL BE COPPERHEAD INDUSTRIES SNAKE PIT OR APPROVED EQUAL.
2. INSTALLATION
- 2.1. THE LOCATION OF NEW FIRE HYDRANTS SHALL BE DETERMINED BY A COLLABORATION OF SYSTEM OWNER, CITY OF COLUMBIA FIRE DEPARTMENT AND THE DESIGN ENGINEERS.
- 2.2. INSTALLATION OF FIRE HYDRANTS MAINTAINED BY THE UNIVERSITY SHALL BE INSTALLED PER "FIRE HYDRANT DETAIL" AND IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
- 2.3. INSTALLATION OF FIRE HYDRANTS MAINTAINED BY THE CITY OF COLUMBIA SHALL BE IN STRICT ACCORDANCE WITH COLUMBIA WATER AND LIGHT SPECIFICATIONS AS LAST REVISED.
- 2.4. THE PUMPER NOZZLE SHALL BE INSTALLED POINTING TO THE STREET AND/OR AWAY FROM THE BUILDING.
3. TESTING
- 3.1. NEWLY INSTALLED FIRE HYDRANTS SHALL BE CLEANED AND PRESSURE TESTED IN ACCORDANCE WITH STANDARDS SET FORTH IN SECTION 331.300 – DISINFECTING OF WATER UTILITY DISTRIBUTION, AND WILL BE FLOW TESTED BY SYSTEM OWNER.
4. COMMISSIONING
- 4.1. WATER WILL BE TURNED ON TO THE HYDRANT BY CAMPUS FACILITIES – ENERGY MANAGEMENT UTILITY DISTRIBUTION PERSONNEL.
- 4.2. HYDRANT WILL BE FLOW TESTED BY OWNER.

DISINFECTION OF WATER UTILITY DISTRIBUTION

1. CLEANING
- 1.1. ALL DOMESTIC POTABLE WATER SYSTEMS SHALL BE CLEAN AND FREE OF FOREIGN MATTER AND SHALL BE DISINFECTED AND TESTED FOR BACTERIOLOGICAL CONTAMINATION BEFORE THE SYSTEM IS PUT INTO OPERATION, AS REQUIRED BY THE STATE DIVISION OF HEALTH AND IN ACCORDANCE WITH ANMA C651 OR C652.
- 1.2. ALL DOMESTIC POTABLE WATER SYSTEMS WILL BE PRESSURE TESTED IN ACCORDANCE WITH ANMA M23.
- 1.3. DISINFECTION SHALL BE PERFORMED AFTER LEAK AND PRESSURE TESTS ARE COMPLETED.
- 1.4. WATER LINE SHALL BE COMPLETELY SEPARATED FROM WATER SYSTEM FOR PRESSURE TEST AND DISINFECTION PURPOSES.
- 1.5. CONTRACTOR SHALL INSTALL NUMBER AND SIZE OF TAPS BASED ON THE WATER LINE SIZE IN THE TABLE BELOW.

PIPE DIAMETER (IN)	2" TAPS NEEDED
4"	1
6"	1
8"	1
10"	2
12"	2

- 1.6. CONTRACTOR SHALL INSTALL WATER LINE ENTRANCE AND EXIT PIPING WHICH ENTERS AND EXITS ABOVE GROUND. THE PURPOSE OF THIS PIPING IS TO PROVIDE A MEANS FOR FLUSHING, PRESSURE TESTING, AND DISINFECTING THE NEW WATER LINE.
- 1.7. MU ONLY: MU WILL PERFORM PRESSURE TESTING AND DISINFECTION OF NEW WATER LINES. CONTRACTOR SHALL PREPARE WATER LINE FOR TESTING AND DISINFECTION. NOTIFY OWNER'S REPRESENTATIVE AT LEAST 72 HOURS PRIOR TO REQUESTING DISINFECTION OF A NEW WATER LINE. OWNER WILL DRAW AND SEND SAMPLES FOR TESTING. ALLOW 24 HOURS FOR DISINFECTION OF THE WATER LINE AND AN ADDITIONAL 48 HOURS FOR RETURN OF TESTING PRIOR TO CONNECTING TO EXISTING SYSTEM.
- 1.8. FILL THE SYSTEM WITH A WATER-CHLORINE SOLUTION CONTAINING AT LEAST 50 PARTS PER MILLION OF CHLORINE, VALVE OFF, AND ALLOW TO STAND FOR AT LEAST TWENTY-FOUR (24) HOURS; OR FILL SYSTEM WITH A WATER-CHLORINE SOLUTION CONTAINING AT LEAST 200 PARTS PER MILLION OF CHLORINE, VALVE OFF, AND LET STAND FOR THREE (3) HOURS.
- 1.9. AFTER ALLOWED STANDING TIME, FLUSH THE SYSTEM WITH CLEAN POTABLE WATER UNTIL NO CHLORINE (IN EXCESS OF PUBLIC WATER SUPPLY) REMAINS AT ANY POINT OF OUTLET.
- 1.10. THE SYSTEM SHALL BE THOROUGHLY AND COMPLETELY FLUSHED AT MAXIMUM WATER PRESSURE, AND IF IT IS SHOWN BY A BACTERIOLOGICAL EXAMINATION MADE BY THE OWNER THAT CONTAMINATION STILL PERSISTS IN THE SYSTEM, THE ABOVE PROCEDURE SHALL BE REPEATED.
- 1.11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING AND SENDING THE SAMPLE FOR TESTING.
- 1.12. THE SYSTEM OWNER WILL BE FINANCIALLY RESPONSIBLE FOR FIRST BACTERIOLOGICAL TEST ON A SECTION OF LINE TO BE TESTED. THE CLEANING PROCEDURE SHALL BE REPEATED IF BIOLOGICAL EXAMINATION SHOWS EVIDENCE OF CONTAMINATION. COSTS INCURRED DUE TO SUBSEQUENT TESTING FROM AN INITIAL POSITIVE SAMPLE SHALL BE PAID FOR BY THE INSTALLERS.
- 1.13. ALLOW FORTY-EIGHT (48) HOURS FOR RETURN OF TESTING BEFORE MAKING TIE-INS TO EXISTING SYSTEM.

2. COMMISSIONING
- 2.1. SYSTEM SHALL BE PLACED IN OPERATION ONLY AFTER TESTING SHOWS THE ABSENCE OF BACTERIOLOGICAL CONTAMINATION AND APPROVED BY SYSTEM OWNER.
- 2.2. MU ONLY: ONLY CAMPUS FACILITIES – ENERGY MANAGEMENT STEAM AND WATER PERSONNEL WILL BE ALLOWED TO OPERATE VALVES ON NEW WATER SYSTEMS.

UNIVERSITY OF MISSOURI WATER SPECIFICATIONS:

WATER UTILITIES DISTRIBUTION VALVES

- THE SCOPE OF THIS DOCUMENT IS TO PROVIDE INSTRUCTION FOR THE INSTALLATION AND TESTING OF DOMESTIC WATER VALVES.
- DESIGN GUIDELINES:
1. MATERIALS
- 1.1. VALVES AND VALVE BOXES
- 1.1.1. NON-RISING STEM GATE VALVES: ANSI/ANMA C509, RESILIENT SEATED, LEAD FREE, BRONZE STEM, CAST-IRON OR DUCTILE-IRON BODY AND BONNET, EPOXY COATED DISC, STEM NUT, 250 PSIG WORKING PRESSURE. MECHANICAL JOINT ENDS. VALVES SHALL BE MODEL A-2360 AS MANUFACTURED BY MUELLER COMPANY, DECATUR IL, OR APPROVED EQUAL. VALVES SHALL TURN CLOCKWISE TO CLOSE.
- 1.1.2. BALL VALVES: THREADED LEAD FREE BRONZE, 125 LB., 2-PIECE DESIGN, FULL PORT. VALVES SHALL BE MODEL T-FP-600A-LF-LL AS MANUFACTURED BY NIBCO, ELKHART IL, OR APPROVED EQUAL.
- 1.1.3. VALVE BOXES: VALVE BOX SHALL BE 6" PVC C900 PIPE WITH CAST IRON COVER NO. 2195 AS MANUFACTURED BY CLAY AND BAILEY MANUFACTURING COMPANY, KANSAS CITY MO, OR APPROVED EQUAL. LID SHALL BE MARKED "WATER". PROVIDE BELOW GRADE CONCRETE COLLAR IN PLANTED AND ASPHALT AREAS.
2. INSTALLATION
- 2.1. VALVE STORAGE:
- 2.1.1. USE THE FOLLOWING PRECAUTIONS FOR VALVES DURING STORAGE:
- 2.1.1.1. DO NOT REMOVE END PROTECTORS UNLESS NECESSARY FOR INSPECTION; THEN REINSTALL FOR STORAGE.
- 2.1.1.2. PROTECT VALVES FROM WEATHER – VALVES SHALL BE STORED INDOORS. MAINTAIN VALVE TEMPERATURE HIGHER THAN THE AMBIENT DOW POINT TEMPERATURE. IF OUTDOOR STORAGE IS NECESSARY, SUPPORT VALVES OFF THE GROUND OR PAVEMENT IN WATER-TIGHT ENCLOSURES.
- 2.2. HANDLING:
- 2.2.1. USE A SLING TO HANDLE VALVES WHOSE SIZE REQUIRES HANDLING BY CRANE OR LIFT. VALVES SHALL BE RIGGED TO AVOID DAMAGE TO EXPOSED VALVE PARTS. DO NOT USE HAND WHEELS OR STEMS AS LIFTING OR RIGGING POINTS.
- 2.2.2. DOMESTIC WATER SERVICE: ANMA-TYPE GATE VALVES: COMPLY WITH ANMA C600. INSTALL BURIED VALVES WITH STEM POINTING UP AND WITH VALVE BOX.
- 2.2.3. VALVE BOXES SHALL BE INSTALLED VERTICALLY WITH TOP OF BOX EVEN WITH FINAL GRADE.
3. TESTING
- 3.1. ALL VALVES SHALL BE PRESSURE TESTED IN ACCORDANCE WITH STANDARDS SET FORTH IN THE WATER PIPING CONSTRUCTION STANDARD.
- 3.2. ALL VALVES SHALL BE DISINFECTED IN ACCORDANCE WITH STANDARDS SET FORTH IN THE WATER PIPING CONSTRUCTION STANDARD.
4. COMMISSIONING
- 4.1. MU ONLY: ALL VALVES UNDER PRESSURE IN THE MU WATER DISTRIBUTION MAINS WILL BE OPERATED ONLY BY CAMPUS FACILITIES – STEAM & WATER DISTRIBUTION PERSONNEL, EXCEPT IN CASES OF EXTREME EMERGENCY. ALL VALVES INSTALLED AS PART OF NEW CONSTRUCTION SHALL REMAIN FULLY CLOSED DURING CONSTRUCTION.

UNIVERSITY OF MISSOURI WATER SPECIFICATIONS:

ALL CONSTRUCTION SHALL COMPLY WITH STANDARDS OF MISSOURI DEPARTMENT OF NATURAL RESOURCES FOR POTABLE-WATER-SERVICE PIPING, INCLUDING MATERIALS, INSTALLATION, TESTING, DISINFECTION, AND ALL REQUIREMENTS OF THE MU SYSTEM GUIDELINES. AND SHALL COMPLY WITH ASTM F 645 FOR SELECTION, DESIGN, AND INSTALLATION OF THERMOPLASTIC WATER PIPING. PIPING MATERIALS SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.

PREPARATION FOR TRANSPORT, PREPARE VALVES, INCLUDING YARD HYDRANTS, ACCORDING TO THE FOLLOWING:

1. ENSURE THAT VALVES ARE DRY AND INTERNALLY PROTECTED AGAINST RUST AND CORROSION.
2. PROTECT VALVES AGAINST DAMAGE TO THREADED ENDS AND FLANGE FACES.
3. SET VALVES IN BEST POSITION FOR HANDLING. SET VALVES CLOSED TO PREVENT RATTLING.

DURING STORAGE, USE PRECAUTIONS FOR VALVES, INCLUDING FIRE HYDRANTS, ACCORDING TO THE FOLLOWING:

1. DO NOT REMOVE END PROTECTORS UNLESS NECESSARY FOR INSPECTION; THEN REINSTALL FOR STORAGE.
2. PROTECT FROM WEATHER, STORE INDOORS AND MAINTAIN TEMPERATURE HIGHER THAN AMBIENT DEW-POINT TEMPERATURE. SUPPORT OFF THE GROUND OR PAVEMENT IN WATER-TIGHT ENCLOSURES WHEN OUTDOOR STORAGE IS NECESSARY.

USE SLING TO HANDLE VALVES AND FIRE HYDRANT IF SIZE REQUIRES HANDLING BY CRANE OR LIFT. RIG VALVES TO AVOID DAMAGE TO EXPOSED PARTS. DO NOT USE HANDWHEELS OR STEMS AS LIFTING OR RIGGING POINTS.

DELIVER PIPING WITH FACTORY-APPLIED END CAPS. MAINTAIN END CAPS THROUGH SHIPPING, STORAGE, AND HANDLING TO PREVENT PIPE-END DAMAGE AND TO PREVENT ENTRANCE DIRT, DEBRIS, AND MOISTURE.

PROTECT STORED PIPING FROM MOISTURE AND DIRT. ELEVATE ABOVE GRADE. DO NOT EXCEED STRUCTURAL CAPACITY OF FLOOR WHEN STORING INSIDE. PROTECT FLANGES, FITTINGS, AND SPECIALTIES FROM MOISTURE AND DIRT. STORE PLASTIC PIPING PROTECTED FROM DIRECT SUNLIGHT. SUPPORT TO PREVENT SAGGING AND BENDING.

SCHEDULING

SITE UTILITY TIE-INS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL NOTIFY OWNER'S REPRESENTATIVE TWO (2) WEEKS IN ADVANCE OF DESIRED TIE-IN TIME. OWNER'S REPRESENTATIVE WILL GIVE CONTRACTOR 72 HOURS ADVANCE NOTICE OF ACTUAL TIME FOR TIE-INS. TIE-INS TO UTILITY SYSTEMS SHALL BE MADE ON WEEKENDS OR NIGHTS, AND WORK SHALL BE DONE AROUND-THE-CLOCK UNTIL THE TIE-IN IS COMPLETED. LINE OUTAGES ARE TO BE KEPT TO A MINIMUM.

UNIVERSITY OF MISSOURI WATER SPECIFICATIONS:

WATER DISTRIBUTION PIPING

THE SCOPE OF THIS DOCUMENT IS TO PROVIDE INSTRUCTION FOR THE INSTALLATION AND TESTING OF UNDERGROUND DOMESTIC WATER LINES.

DESIGN GUIDELINES:

1. MATERIALS, PIPE AND PIPE FITTINGS
- 1.1. ALL UNDERGROUND WATER PIPING SHALL BE PVC.
- 1.1.1. EXCEPTION 1: DOMESTIC WATER SERVICE LINES 2" OR LESS SHALL BE TYPE K COPPER OR HIGH-DENSITY POLYETHYLENE (HDPE) PIPING.
- 1.1.2. EXCEPTION 2: LINES PASSING DIRECTLY OVER OR UNDER STEAM TUNNELS OR DIRECT BURIED STEAM/CONDENSATE LINES MUST BE DUCTILE IRON OR TYPE K COPPER (2" OR LESS) WITH 4" R-5 EXTRUDED POLYSTYRENE INSULATION BOARD BETWEEN THE PIPE AND STEAM LINES.
- 1.2. PVC PIPE (OPEN TRENCH CONSTRUCTION)
- 1.2.1. 4 INCHES TO 12 INCHES: ANMA C909; PRESSURE CLASS 235 (OR 18); CAST IRON O.D. EQUIVALENT; WITH BELL END AND ELASTOMERIC GASKET.
- 1.2.2. 14 INCHES TO 48 INCHES: ANMA C905; PRESSURE RATING 165 (OR 25); CAST IRON O.D. EQUIVALENT; WITH BELL END AND ELASTOMERIC GASKET.
- 1.2.3. GASKETS: ASTM F 477, ELASTOMERIC SEAL.
- 1.3. DUCTILE-IRON PIPE
- 1.3.1. 4 INCHES TO 12 INCHES: ANMA C151; MECHANICAL JOINT PIPE; MINIMUM THICKNESS CLASS 52 OR PRESSURE CLASS 350; WITH INTEGRALLY CAST FLANGED BELL, CAST IRON GLAND, AND RUBBER GASKET.
- 1.3.2. LINING: STANDARD CEMENT LINING WITH ASPHALT COATING.
- 1.3.3. ENCASEMENT: ANMA C105, POLYETHYLENE FILM.
- 1.4. HIGH-DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS
- 1.4.1. 2 INCHES AND LESS: SDR35 CTS PREMIUM GRADE PIPE, ANMA C901, ASTM D3035, NSF 14 AND 61, 200 PSI PRESSURE RATING. PIPE TO BE CENCORE HDPE AS MANUFACTURED BY CATERMANS PLASTICS OR APPROVED EQUAL.
- 1.4.2. FITTINGS AND JOINTS: ALL MOLDED FITTINGS AND FABRICATED FITTINGS SHALL BE FULLY PRESSURE RATED TO MATCH THE PIPE PRESSURE RATING. ALL FITTINGS SHALL BE MOLDED OR FABRICATED BY THE PIPE MANUFACTURER. CONNECTIONS MUST BE MADE BY EITHER THE USE OF BRASS/STAINLESS STEEL COMPRESSION COUPLINGS WITH INSERT RINGS OR BY CREATING A FUSION BUTT WELD ALL IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ALL BRASS FITTINGS SHALL BE LEAD FREE.
- 1.5. PIPE FITTINGS
- 1.5.1. 4 INCHES TO 24 INCHES: ANMA C153; 350-PSI PRESSURE RATING.
- 1.5.2. LINING: STANDARD CEMENT LINING WITH ASPHALT COATING.
- 1.5.3. ALL PIPE FITTINGS SHALL BE DUCTILE-IRON CONSTRUCTION, INSTALLED WRAPPED WITH ANMA C105 POLYETHYLENE FILM.
- 1.6. RESTRAINTS
- 1.6.1. MECHANICAL JOINT: ANMA C111. PROVIDE RETAINER TYPE PACKING GLANDS WITH RUBBER GASKET, FOR USE WITH PVC PIPE AND CONFORMING TO UNI-B-13– 92. PIPE SIZES 4" TO 12" MUST ALSO BE FM APPROVED. MECHANICAL JOINT RESTRAINTS SHALL BE MEGALUG 2000 PV, AS MANUFACTURED BY EBAY IRON INC., EASTLAND TX, OR APPROVED EQUAL.
- 1.6.2. JOINT RETAINERS: PROVIDE DUCTILE IRON SPLIT SERRATED RING HARNESSSES AND ROD TYPE JOINT RETAINERS FOR PVC BELL AND SPOOT JOINTS. CLAMPS SHALL BE DESIGNED FOR USE WITH PVC PIPE AND SHALL MEET UNI-B-13–92 STANDARDS AND BE FM APPROVED ON SIZES 4" TO 12". RESTRAINT HARNESSSES SHALL BE SERIES 1500 FOR PIPE 4 INCHES TO 12 INCHES, AND SERIES 2800 FOR PIPE 14 INCHES AND LARGER, ALL AS MANUFACTURED BY EBAY IRON INC., EASTLAND TX OR APPROVED EQUAL.
- 1.6.3. RODS, NUTS AND WASHERS: 3/4" SDR34 ALL THREAD RODS, NUTS AND WASHERS.
- 1.6.4. ALL PIPE RESTRAINTS AND DUCTILE IRON FITTINGS SHALL BE INSTALLED WRAPPED WITH ANMA C105 POLYETHYLENE FILM.
- 1.6.5. LINK ASSEMBLY: SEAL ANNULAR SPACE FOR PIPING PASSING THROUGH WALLS WITH INTERLOCKING SYNTHETIC RUBBER LINK ASSEMBLY, LINK-SEAL® AS MANUFACTURED BY PS-THUNDERLINE CORPORATION, HOUSTON TX, OR APPROVED EQUAL.
- 1.6.6. PIPES, FITTINGS, VALVES, METERS, AND OTHER APPURTENANCES CONTAINING MORE THAN 0.25 PERCENT LEAD CALCULATED BY WEIGHTED AVERAGE SHALL NOT BE USED.

SYSTEM DESIGN, MATERIALS, AND INSTALLATION OF WATER SYSTEMS SHALL COMPLY WITH "MINIMUM DESIGN STANDARDS FOR MISSOURI COMMUNITY WATER SYSTEMS" (LATEST EDITION) AS PUBLISHED BY MISSOURI DNR.

1.7 TRACE WIRE

- 1.7.1. TRACER WIRE SHALL BE #14 AWG SOLID, STEEL CORE SOFT DRAWN HIGH STRENGTH TRACER WIRE, 250# AVERAGE TENSILE BREAK LOAD, 30 MIL HIGH MOLECULAR WEIGHT-HIGH DENSITY BLUE POLYETHYLENE JACKET COMPLYING WITH ASTM-D- 1248, 30 VOLT RATING. NO THIN INSULATED WIRE SHALL BE ALLOWED. TRACER WIRE SHALL BE COPPERHEAD INDUSTRIES HS-CCS OR APPROVED EQUAL.
- 1.7.2. TRACER WIRE SHALL HAVE MOISTURE RESISTANT SPLICES FOR DIRECT BURY APPLICATIONS. SPLICES SHALL BE COPPERHEAD INDUSTRIES SHAKBITE OR 3M DBR OR APPROVED EQUAL.
- 1.7.3. TRACER WIRE TEST STATIONS SHALL BE DESIGNED TO BE EASILY DETECTED BY MAGNETIC AND ELECTRONIC LOCATORS. A MAGNET SHALL BE SECURELY ATTACHED AT THE TOP OF THE UPPER TUBE OF THE BOX FOR LOCATING PURPOSES. LID SHALL BE BLUE AND HAVE A BRASS TERMINAL FOR ATTACHING LOCATING EQUIPMENT AND A BRASS 5 SIDED NUT FOR REMOVING CAP. TRACER WIRE TEST STATION SHALL BE COPPERHEAD INDUSTRIES SNAKE PIT OR APPROVED EQUAL.

2. INSTALLATION

- 2.1. PREPARATION OF TRENCH
- 2.1.1. FINAL BURY DEPTH SHALL HAVE A MINIMUM OF 42" COVER TO THE TOP OF THE PIPE.
- 2.1.2. TRENCH BOTTOM SHALL BE GRADED TO PROVIDE A SMOOTH, FIRM, STABLE, AND ROCK-FREE FOUNDATION THROUGHOUT THE LENGTH OF THE PIPING.
- 2.1.3. ALL ROCK GREATER THAN ONE INCH IN DIAMETER FOUND IN THE TRENCH SHALL BE REMOVED FOR A DEPTH OF SIX INCHES BELOW THE BOTTOM OF THE PIPE AND REPLACED BY SUITABLE BEDDING MATERIAL.
- 2.1.4. UNSTABLE, SOFT, AND UNSUITABLE MATERIALS SHALL BE REMOVED AT THE SURFACE UPON WHICH PIPES ARE TO BE LAD AND BACKFILL WITH CRUSHED STONE AS INDICATED ON THE DRAWINGS.
- 2.1.5. LAYERS OF CRUSHED STONE SHALL BE INSTALLED IN THE BOTTOM OF TRENCH AS INDICATED ON THE DRAWINGS. SHAPE STONE LAYER TO FIT BOTTOM OF PIPING. DIG BELL HOLES AT EACH PIPE JOINT TO RELIEVE THE BELLS OF ALL LOADS AND TO ENSURE CONTINUOUS BEARING OF THE PIPE BARREL ON THE FOUNDATION.
- 2.2. PIPE SEPARATION
- 2.2.1. FINISHED PIPE INSTALLATION SHALL HAVE MINIMUM 12" SEPARATION TO ALL OTHER UTILITIES.
- 2.2.2. MAINTAIN AT LEAST A TEN FOOT (10') HORIZONTAL SEPARATION OF WATER MAINS FROM ANY EXISTING OR PROPOSED SANITARY SEWER. THE DISTANCE MUST BE MEASURED EDGE TO EDGE. INSTALLATION OF THE WATER MAIN CLOSER TO A SANITARY SEWER IS ACCEPTABLE WHERE THE WATER MAIN IS LAD IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE (1) SIDE OF THE SANITARY SEWER AT AN ELEVATION SO THE BOTTOM OF THE WATER MAIN IS AT LEAST EIGHTEEN INCHES (18") ABOVE THE TOP OF THE SANITARY SEWER.
- 2.2.3. PROVIDE A MINIMUM VERTICAL DISTANCE OF EIGHTEEN INCHES (24") BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SANITARY SEWER WHERE WATER MAINS CROSS THE SANITARY SEWER MAINS. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SANITARY SEWER. AT CROSSINGS, ONE (1) FULL LENGTH OF WATER PIPE MUST BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE SANITARY SEWER LINE AS POSSIBLE. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND SANITARY SEWER PIPES MAY BE REQUIRED.
- 2.2.4. PROVIDE AT LEAST A TEN-FOOT (10') HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWER FORCE MAINS. THERE SHALL BE AN EIGHTEEN-INCH (24") VERTICAL SEPARATION AT CROSSINGS.
- 2.2.5. LOCATE WATER MAINS SO THAT THEY DO NOT PASS THROUGH OR COME IN CONTACT WITH ANY SANITARY SEWER MANHOLE.
- 2.2.6. CONSULT THE SYSTEM OWNER WHERE ABOVE CONDITIONS CANNOT BE MET.

2.3. INSTALLATION OF PIPE AND PIPE FITTINGS

- 2.3.1. PIPING 2" AND LESS
- 2.3.1.1. ALL DOMESTIC WATER SERVICE PIPING FROM THE WATER MAIN TO THE BUILDING WITH A NOMINAL DIAMETER OF TWO INCHES AND LESS SHALL BE TYPE K COPPER OR HDPE PIPING.
- 2.3.1.2. IN ALL INSTALLATIONS, TYPE K COPPER SHALL BE USED WHERE THE WATER LINE ENTERS THE BUILDING. IF THE WATER METER IS LOCATED IN A METER PIT, THE PIPING WITHIN THE METER PIT, AND STUBBED OUT ON EITHER SIDE SHALL ALSO BE TYPE K COPPER.
- 2.3.1.3. ALL BURIED COPPER PIPING SHALL BE WRAPPED.
- 2.3.1.4. FOR PULLED PIPE INSTALLATIONS, TRACER WIRE SHALL BE PULLED WITH PIPE, WITHOUT SPLICES. UPON COMPLETION OF INSTALLATION, A CONTINUITY TEST ON THE WIRE SHALL BE PERFORMED AND ALL BREAKS SHALL BE REPAIRED.
- 2.3.1.5. FOR TRENCHED PIPE INSTALLATION, TRACER WIRE SHALL BE TAPED TO THE PIPE AT THE THREE O'CLOCK POSITION EVERY 5 FEET. UPON COMPLETION OF INSTALLATION, A CONTINUITY TEST ON THE WIRE SHALL BE PERFORMED AND ALL BREAKS SHALL BE REPAIRED.
- 2.3.2. PVC (POLYVINYL CHLORIDE) PIPE: INSTALL IN ACCORDANCE WITH ANMA C605.
- 2.3.3. ALL JOINTS SHALL BE RESTRAINED WITH JOINT RETAINERS. ALL FITTINGS SHALL BE RESTRAINED WITH RETAINER TYPE PACKING GLANDS.
- 2.3.4. INSTALL STAINLESS STEEL RODS BETWEEN FITTINGS ON ALL OFFSETS AND BETWEEN FITTINGS, VALVES, AND BLIND FLANGES, IN ADDITION TO THE MEGALUGS, ON ISOLATED FITTINGS, VALVES, ETC., ATTACH RESTRAINT RINGS TO PVC PIPE AND INSTALL STAINLESS STEEL RODS BETWEEN FITTING AND RESTRAINT RINGS. RODS SHALL BE POSITIONED THROUGH THE BOLT HOLES IN FITTING AND MEGALUG. EACH ROD WILL REQUIRE FOUR NUTS AND WASHERS. DUCT LUOS ARE ACCEPTABLE. THE NUMBER OF STAINLESS STEEL RODS REQUIRED PER FITTING FLANGE SHALL BE AS FOLLOWS:

PIPE DIAMETER	NO. OF RODS
10" AND LESS	2
12"	3
14"	4
16"	5
18"	6

- 2.3.5. ALL DUCTILE IRON PIPE, FITTINGS, VALVES, BELL END RESTRAINTS, ETC. SHALL BE WRAPPED WITH A POLYETHYLENE COVER CONFORMING TO ANMA C105, AND INSTALLED PER ANMA C600.
- 2.3.6. ALL DEAD END MAINS SHALL HAVE A DRY BARREL FIRE HYDRANT AT THE END TO FACILITATE FLUSHING OF THE MAIN.
- 2.3.7. PIPE SHALL BE INSTALLED IN CLEAN CONDITION, AND SHALL NEVER BE LAD IN TRENCHES WITH STANDING WATER. THE TRENCH SHALL BE Dewatered DURING INSTALLATION OF THE WATER LINE. OPEN PIPE ENDS SHALL BE PROTECTED WITH A HARD CAP OR INFLATABLE PLUG AT THE END OF THE WORK DAY. NO PLYWOOD OR DUCTTAPE COVERINGS WILL BE ALLOWED.
- 2.4. BACKFILL
- 2.4.1. UNDER PIPE: ALL BACKFILL UNDER THE BARREL OF THE PIPE SHALL BE FREE FROM DEBRIS, ORGANIC MATTER, AND STONES LARGER THAN ONE INCH AND SHALL BE TAMPED INTO PLACE. SAND OR CRUSHED STONE AGGREGATE (95% PASSING A ½" SCREEN BUT NOT MORE THAN 10% PASSING A #200 SIEVE) ARE ACCEPTABLE SUBSTITUTES FOR SOIL.
- 2.4.2. ADJACENT TO AND TOP OF PIPE: THE FIRST ONE FOOT OF BACKFILL OVER THE TOP OF PIPE SHALL BE ¾"4 INCH MINUS WASTE ROCK WITH FINEST" UNCLEANED CRUSHED STONE AGGREGATE OR SUITABLE SOIL. BACKFILL SHALL BE FREE OF DEBRIS, BRUSH, ROOTS AND STONES OR RUBBLE MORE THAN ONE INCH.
- 2.4.3. SUITABLE SOIL SHALL BE ASTM D 2487 SOIL CLASSIFICATION GROUPS ML, CH AND CL, OR A COMBINATION OF THESE GROUP SYMBOLS; FREE OF ROCK OR GRAVEL LARGER THAN 1 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.
- 2.4.4. ROUGH FINAL GRADING OF SUBGRADE AND THE PLACEMENT OF FINAL TOPSOIL SHALL BE DETAILED ON THE DRAWINGS.
- 2.4.5. ALL SIDEWALKS, PAVING, ETC. WHICH ARE REMOVED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AND SHALL MATCH EXISTING.

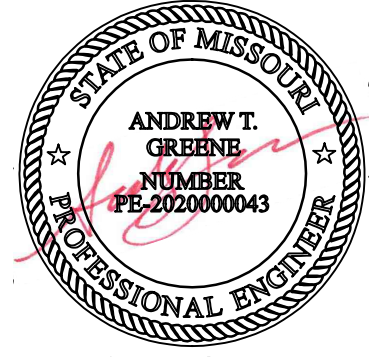
2.5 IDENTIFICATION

- 2.5.1. INSTALL CONTINUOUS PLASTIC UNDERGROUND WARNING TAPE DURING BACK-FILLING OF TRENCH FOR UNDERGROUND WATER PIPING. TAPE SHALL BE LOCATED TWENTY-FOUR (24) INCHES ABOVE PIPE, DIRECTLY OVER EACH WATER LINE.
- 2.5.2. TAPE TRACER WIRE TO THE TOP OF EACH WATER LINE WITH DUCT TAPE EVERY FIVE (5) FEET. WIRE SPLICES SHALL BE MINIMIZED. TERMINATE TRACE WIRES INSIDE BUILDING AND INSIDE VALVE BOXES. DRILL ¼" HOLE IN PVC VALVE BOX ONE INCH BELOW CAST IRON COVER. ROUTE WIRE UP OUTSIDE OF VALVE BOX, THROUGH ¾" HOLE AND KNOT. A TRACER WIRE TEST STATION SHALL BE INSTALLED AT ALL FIRE HYDRANTS AND AT ALL RUNS OF PIPING WITHOUT VALVES EVERY 400 FEET. UPON COMPLETION OF INSTALLATION AND FINAL GRADING, A CONTINUITY TEST ON THE WIRE SHALL BE PERFORMED AND ALL BREAKS SHALL BE REPAIRED.

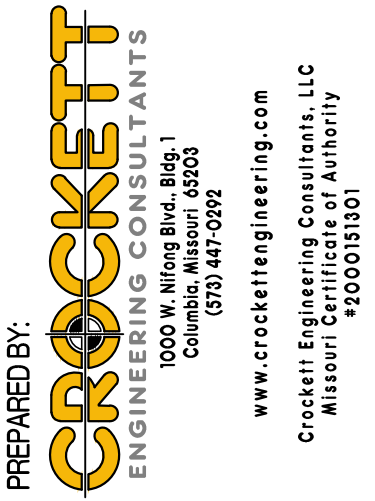
REVISIONS:

NO.	DATE
BID SET	12/16/2021

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY



ANDREW T. GREENE
MO LICENSE 202000043



OWNER:
CURATORS OF THE UNIVERSITY OF MISSOURI
225 UNIVERSITY HALL
COLUMBIA BUSINESS SERVICES
COLUMBIA, MO 65211

GENERAL SITE - REPLACE WATER MAINS
AT ALLTON AND GREEN BUILDINGS
PROJECT NO. CP 220061
COLUMBIA, BOONE COUNTY, MISSOURI

DRAWING INCLUDES:

SPECIFICATIONS SHEET 2 OF 2

DESIGNED: ATG

DRAWN: ATG

PROJECT NO.: 210471

SHEET:
CE 8