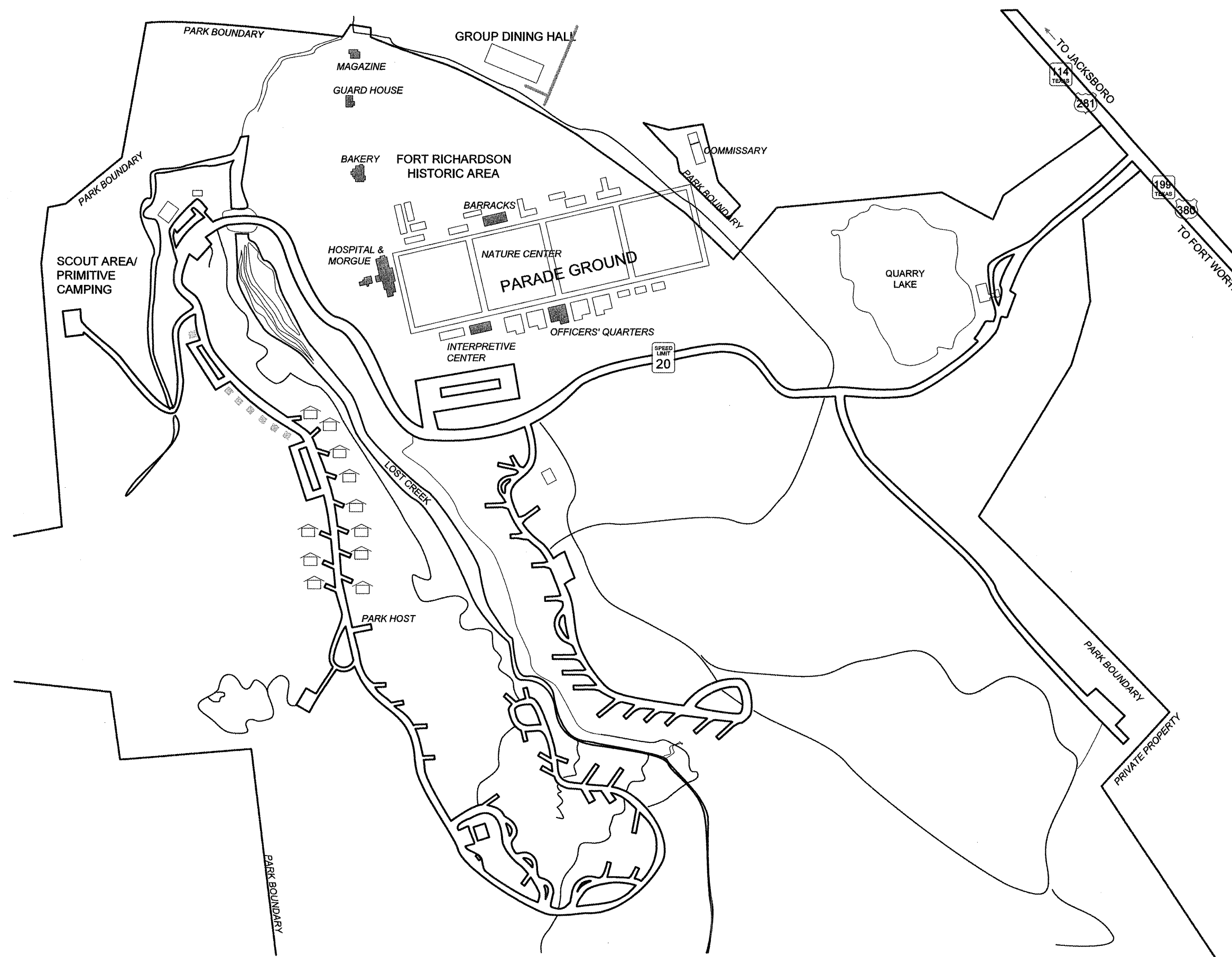


COUNTY LOCATION MAP
NOT TO SCALE



SITE LOCATION MAP
NOT TO SCALE



PROJECT SITE ADDRESS
FORT RICHARDSON STATE PARK
228 PARK ROAD 61
JACKSBORO, TX 76458

PROJECT

**FORT RICHARDSON STATE PARK
WATER AND WASTEWATER
SYSTEM REPLACEMENT**

PROJECT NO: 116818

DATE: 3/28/2019

INDEX OF DRAWINGS

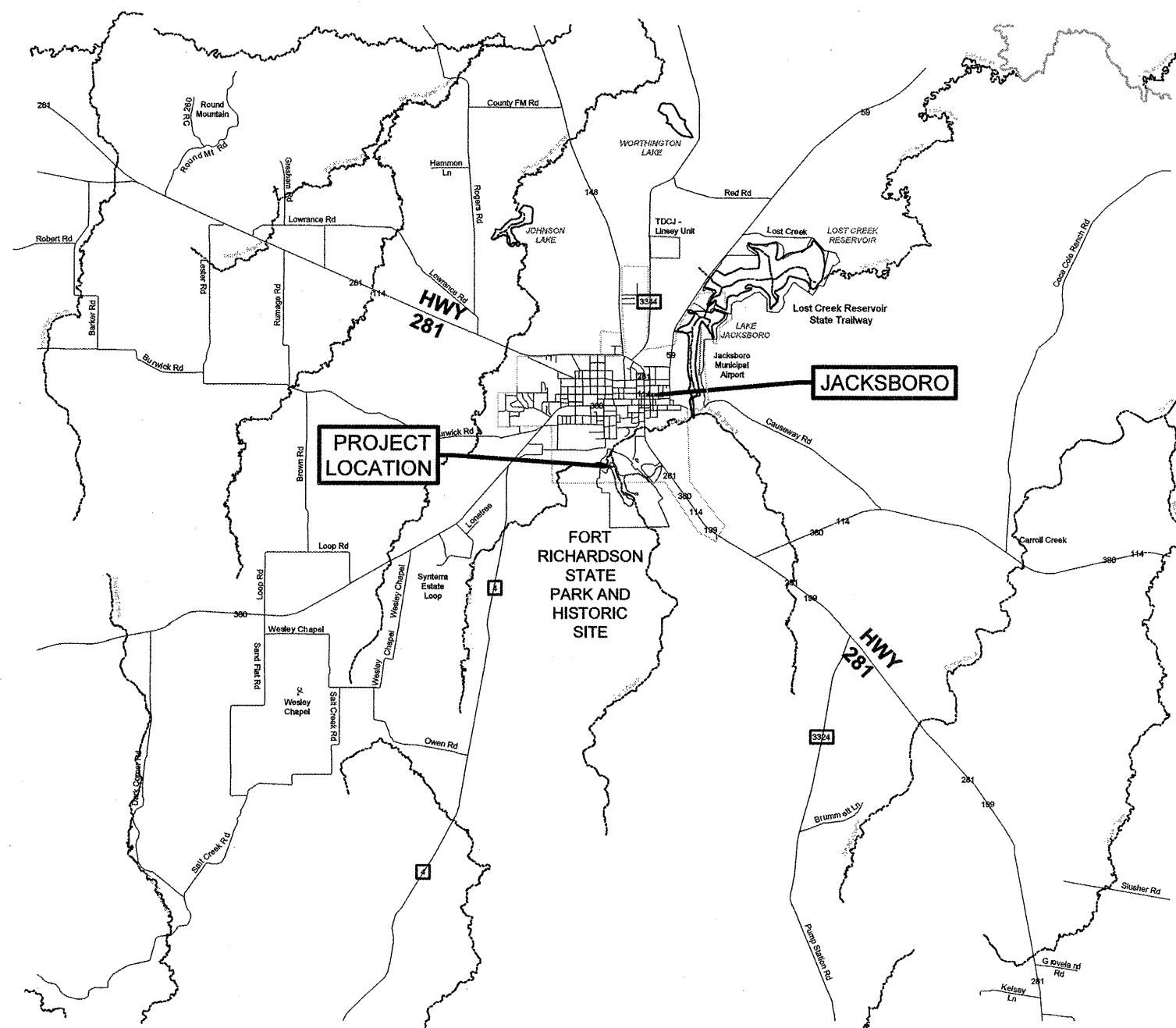
SHEET NO	SHEET INDEX
1	COVER
2	GENERAL ABBREVIATIONS AND CONSTRUCTION NOTES
3	PROPOSED OVERALL SITE
4	LIFT STATION NO.1 SITE PLAN & DETAILS
5	LIFT STATION NO.2 SITE PLAN & DETAILS
6	MISC DETAILS 1
7	MISC DETAILS 2
8	MISC DETAILS 3
9	SEWER LINE A P&P 1
10	SEWER LINE A P&P 2
11	SEWER LINE A P&P 3
12	SEWER LINE A P&P 4
13	SEWER LINE A P&P 5
14	SEWER LINE B P&P
15	FORCE MAIN P&P
16	WATERLINE A P&P-1
17	WATERLINE A P&P-2
18	WATERLINE A P&P-4
19	WATERLINE A P&P-5
20	WATERLINE A P&P-5
21	WATERLINE B P&P
E-6.1	ELECTRICAL DETAILS I
E-6.2	ELECTRICAL DETAILS II
E1-4.1	LIFT STATION NO. 1 ELECTRICAL SITE PLAN
E1-6.1	LIFT STATION NO. 1 ELECTRICAL DETAILS
E2-4.1	LIFT STATION NO. 2 ELECTRICAL SITE PLAN
E2-6.1	LIFT STATION NO. 2 ELECTRICAL DETAILS

SCOPE OF WORK

CONSTRUCTION OF WASTEWATER AND WATER SYSTEM IMPROVEMENTS AT THE FORT RICHARDSON STATE PARK INCLUDING APPROXIMATELY 3,158 LINEAR FEET OF 6-IN SANITARY SEWER LINE, APPROXIMATELY 2,748 LINEAR FEET OF 3-IN WATER LINES, TWO (2) SANITARY SEWER LIFT STATIONS, AND ASSOCIATED APPURTENANCES.

BUILDING CODE SUMMARY

- A. INTERNATIONAL CODE COUNCIL
 - i. BUILDING CODE INTERNATIONAL BUILDING CODE 2012
 - ii. RESIDENTIAL CODE INTERNATIONAL RESIDENTIAL CODE 2012
 - iii. EXISTING BUILDINGS INTERNATIONAL EXISTING BUILDINGS CODE 2012
 - iv. STRUCTURAL CODE INTERNATIONAL BUILDING CODE 2012
 - v. PLUMBING CODE INTERNATIONAL PLUMBING CODE 2012
 - vi. MECHANICAL CODE INTERNATIONAL MECHANICAL CODE 2012
 - vii. ENERGY CODE INTERNATIONAL ENERGY CODE 2012 E
 - viii. GAS CODE INTERNATIONAL FUEL GAS CODE 2012
- *Note: The international fire code specifically excluded from this list/not applicable to TPWD sites and facilities, however fire protection should be followed as stated in all other codes listed.
- B. NATIONAL FIRE PROTECTION ASSOCIATION
 - i. ELECTRICAL CODE NATIONAL ELECTRICAL CODE 2014
- C. STATE ENERGY CONSERVATION OFFICE/TEXAS COMPTROLLERS OFFICE
 - i. ENERGY CODES FOR STATE BUILDINGS Title 34, Part 1, Ch. 19, Sub C, Rule 19.31
 - 1. CERTIFICATION FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS REQUIRED BY ARCHITECT/ENGINEER
- D. ACCESSIBILITY CODE
 - i. AMERICANS WITH DISABILITIES ACT TITLE II, Amended 7-23-2010
 - 1. 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN, 9-15-2010
 - ii. TEXAS ACCESSIBILITY STANDARDS TDLR, ABA-Art. 9102
 - iii. DRAFT FINAL ADA Accessibility Guidelines for Outdoor Developed Areas 10-19-2009
 - a. Proposed Rule, not yet adopted by the Department of Justice and TDLR Architectural Barriers, Variance Required from TDLR for each TPWD project using this guideline.
- E. PLAYGROUND SAFETY CODE
 - i. Public Playground Safety Handbook, U.S. Consumer Product Safety Commission.



VICINITY MAP
NOT TO SCALE



DESIGN TEAM

PROJECT MANAGER

Greg Thelen
Texas Parks & Wildlife
512-389-8804
greg.thelen@tpwd.state.tx.us

DESIGN MANAGER

Mark Urbanovsky
Texas Parks & Wildlife
512-389-4404
mark.urbanovsky@tpwd.state.tx.us

CONTRACT MANAGER

Janie Ramirez
Texas Parks & Wildlife
572-389-8601
janie.ramirez@tpwd.state.tx.us

CONSTRUCTION MANAGER

Marvin Hill
Texas Parks & Wildlife
512-627-4318
325-572-4891 (fax)
marvin.hill@tpwd.texas.gov

CONSTRUCTION INSPECTOR

Brandon Heaton
Texas Parks & Wildlife
817-645-3888
512-627-5548 (cell)
brandon.heaton@tpwd.texas.gov

SITE MANAGER

Robert Frie
Texas Parks & Wildlife
940-567-3506
robert.frie@tpwd.texas.gov

PROJECT ENGINEER

Christopher B. Aylor, P.E.
KSA Engineers, Inc.
903-581-8141
903-581-6853 (fax)
caylor@ksaeng.com

DESIGN ENGINEER

Jeremy R. Orr, P.E.
KSA Engineers, Inc.
903-581-8141
903-581-6853 (fax)
jorr@ksaeng.com

ELECTRICAL ENGINEER

Leslie Shaw, P.E.
KSA Engineers, Inc.
903-236-7700
903-236-7779 (fax)
lshaw@ksaeng.com



**TEXAS
PARKS &
WILDLIFE**

TEXAS PARKS AND WILDLIFE

INFRASTRUCTURE DIVISION

4200 SMITH SCHOOL ROAD · AUSTIN, TEXAS 78744-3292

APPROVED

Craig Shultz
PROJECT MANAGER, INFRASTRUCTURE DIVISION

4.4.19
DATE

Paul
DESIGN BRANCH HEAD, INFRASTRUCTURE DIVISION

4.5.19
DATE

Steve
PM BRANCH HEAD, INFRASTRUCTURE DIVISION

4.5.2019
DATE

Theresa
DEPUTY DIRECTOR, INFRASTRUCTURE DIVISION

4/6/19
DATE

SET NO:

GENERAL NOTES

- FORT RICHARDSON STATE PARK IS ON THE NATIONAL REGISTER OF HISTORIC PLACES (NRHP). ALL WORK WITHIN THE PARK IS SUBJECT TO THE HIGHEST LEVEL OF CULTURAL RESOURCES PROTECTION
- THE CONTRACTOR SHALL ANTICIPATE ALL UNDERGROUND OBSTRUCTIONS SUCH AS, BUT NOT LIMITED TO, WATER MAINS, GAS LINES, STORM AND SANITARY SEWERS, TELEPHONE OR ELECTRIC LIGHT OR POWER DUCTS, CONCRETE, AND DEBRIS. ANY SUCH LINES OR OBSTRUCTIONS INDICATED ON THE DRAWINGS SHOW ONLY THE APPROXIMATE LOCATIONS AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. THE OWNER AND ENGINEER WILL ENDEAVOR TO FAMILIARIZE THE CONTRACTOR WITH ALL KNOWN UTILITIES AND OBSTRUCTIONS, BUT THIS SHALL NOT RELIEVE THE CONTRACTOR FROM FULL RESPONSIBILITY IN ANTICIPATING ALL UNDERGROUND OBSTRUCTIONS WHETHER OR NOT SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, MAINTAIN IN PROPER WORKING ORDER AND WITHOUT INTERRUPTION OF SERVICE ALL EXISTING UTILITIES AND SERVICES WHICH MAY BE ENCOUNTERED IN THE WORK. WITH THE CONSENT OF THE ENGINEER AND UTILITY OWNER SUCH SERVICE CONNECTIONS MAY BE TEMPORARILY INTERRUPTED TO PERMIT THE CONTRACTOR TO REMOVE DESIGNATED LINES OR TO MAKE TEMPORARY CHANGES IN THE LOCATIONS OF SERVICES. THE COST OF MAKING ANY CHANGES SHALL BE AT THE CONTRACTOR'S EXPENSE.
- NOTIFY ALL UTILITY COMPANIES INVOLVED TO HAVE THEIR UTILITIES LOCATED AND MARKED IN THE FIELD. ALL UNDERGROUND UTILITIES SHALL THEN BE UNCOVERED TO VERIFY LOCATION AND ELEVATION BEFORE CONSTRUCTION BEGINS. COORDINATE WITH UTILITY OWNER IF UTILITY INSPECTOR MUST BE ON SITE WHEN LOCATING OR EXCAVATING NEAR UTILITIES.
- SHEETING AND BRACING: INSTALL SHEETING AND BRACING NECESSARY TO SUPPORT THE SIDES OF TRENCHES AND OTHER EXCAVATIONS WITH VERTICAL SIDES, AS REQUIRED BY CURRENT OSHA REGULATIONS.
- WATER IN EXCAVATION: KEEP WORK FREE FROM GROUND OR SURFACE WATER AT ALL TIMES. PROVIDE PUMPS OF ADEQUATE CAPACITY OR OTHER APPROVED METHOD TO REMOVE WATER FROM THE EXCAVATION IN SUCH A MANNER THAT IT WILL NOT INTERFERE WITH THE PROGRESS OF THE WORK OR THE PROPER PLACING OF OTHER WORK. THE COST OF DEWATERING THE EXCAVATION SHALL BE SUBSIDIARY TO CONSTRUCTION.
- MINIMUM COVER: ALL PIPES SHALL HAVE A MINIMUM COVER OF TWO (2) FEET. COVER SHALL BE MEASURED IN ALL DIRECTIONS (HORIZONTAL, VERTICAL, AND DIAGONAL) FROM THE OUTSIDE EDGE OF THE PIPE. IF TWO (2) FEET OF COVER CAN NOT BE MAINTAINED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND CORRECTIVE MEASURES SHALL BE MADE.
- THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL HORIZONTAL AND VERTICAL CONSTRUCTION STAKING AS REQUIRED FOR THE PROJECT DEVELOPMENT.
- ALL DUCTILE IRON PIPE, FITTINGS, AND VALVES SHALL BE ENCASED WITH 8 M.L. POLYETHYLENE WRAP.
- TOPSOIL REPLACEMENT IS REQUIRED IN ALL AREAS. TOPSOIL SHALL INCLUDE THE TOP FOUR (4) INCHES OF TRENCH OR EXCAVATION. TOPSOIL SHALL BE KEPT SEPARATE FROM GENERAL EXCAVATED MATERIAL. IN CULTIVATED AREAS ROCK FROM THE EXCAVATION SHALL NOT BE INCLUDED IN THE TOP FOUR INCHES OF TOPSOIL BACKFILL. ALL AREAS OF BACKFILL OR EXCAVATION SHALL BE BROUGHT TO WITHIN FOUR (4) INCHES OF FINAL GRADE AND BROUGHT TO GRADE WITH COMPACTED TOP SOIL.
- UPON COMPLETION OF FINAL GRADING, ALL AREAS DISTURBED BY CONTRACTOR SHALL BE SEEDED BY HYDOMULCH. CONTRACTOR SHALL INSTALL EROSION CONTROL MATTING ON ALL SLOPES GREATER THAN 5:1. THE CONTRACTOR SHALL WATER, AND MAINTAIN GRASS FOR AT LEAST TWO CUTTINGS, OR AS REQUIRED TO ENSURE GROWTH. SEEDING IS A PLANNED QUANTITY MEASUREMENT AND INCLUDES TOPSOIL AND A 15' WIDE DISTURBED AREA FOR THE LENGTH OF THE PROPOSED UTILITIES DISTURBED AREA OUTSIDE OF THE DESIGNATED AREA SHALL BE SEEDDED AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
- EXISTING SITE IMPROVEMENTS DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED TO EQUAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE.
- ALL BURIED VALVES SHALL BE AWWA COMPLIANT AND SHALL HAVE GEAR ACTUATORS WITH WATERTIGHT VALVE EXTENSION TO ABOVE GRADE. ALL UNDERGROUND VALVES SHALL BE SUPPLIED WITH VALVE BOXES PER TECHNICAL SPECIFICATIONS.
- ALL EXISTING PAVEMENT DAMAGED DURING CONSTRUCTION AND/OR INSTALLATION OF ALL PROPOSED PIPING SHALL BE REPAIRED TO EQUAL OR BETTER CONDITION.
- ALL BENDS SHALL UTILIZE DUCTILE IRON MECHANICAL JOINTS WITH MEGA-LUGS UNLESS SPECIFIED OTHERWISE.
- CONTRACTORS SHALL VERIFY ROUTING OF PROPOSED PIPING PRIOR TO LAYING EACH LINE. ANY GRADES SHOWN FOR SLOPING PIPES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL PROVIDE VERTICAL BENDS AND OTHER FITTINGS AS SHOWN AND AS REQUIRED TO AVOID CONFLICTS WITH NEW, EXISTING, AND FUTURE PIPING AT NO ADDITION COST TO OWNER
- CONTRACTOR SHALL PROVIDE THRUST BLOCKING FOR ALL HORIZONTAL AND VERTICAL BENDS IN ACCORDANCE WITH THE MISCELLANEOUS DETAILS.
- ALL NON-DI PIPES SHALL BE PROVIDED WITH TRACER WIRE (16 GAUGE MINIMUM) AND LOCATION TAPE BURIAL 1.5' BELOW GROUND. TAPE SHALL INDICATE WARNING OF WATERLINE, SEWER LINE OR FORCE MAIN BELOW AS APPLICABLE.
- ALL VALVES AND GATES SHALL BE PROVIDED WITH VALVE MARKERS AS SPECIFIED. CONTRACTOR SHALL SUBMIT MARKERS FOR APPROVAL.
- IN THE EVENT OF A DISCREPANCY IN THE DRAWINGS (PLAN, SECTION, OR DETAILS) OR BETWEEN THE DRAWINGS AND SPECIFICATIONS, THE MOST INVOLVED WORK SHALL BE REQUIRED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL FURNISH THE ENGINEER A COPY OF THE SIGNED AGREEMENT WITH THE PROPERTY OWNER FOR EACH DISPOSAL SITE WHICH THE CONTRACTOR INTENDS TO USE FOR "WASTE" MATERIALS, CONDITIONS AND RESTRICTIONS, IF ANY, WILL BE CLEARLY STATED. COMPLIANCE WILL BE REQUIRED AND A RELEASE FROM THE PROPERTY OWNER MUST BE OBTAINED UPON COMPLETION OF THE PROJECT.
- ALL MANHOLES AND LINES SHALL BE TESTED IN ACCORDANCE WITH THE SPECIFICATIONS AND THE LATEST RULES OF THE TCEQ.
- THE CONTRACTOR SHALL MAINTAIN A CLEAN SAFE CONSTRUCTION AREA. THE CONTRACTOR SHALL PERFORM CLEANUP OPERATIONS ON DAILY BASIS. ALL MUD, DIRT AND DEBRIS TO BE REMOVED DAILY.
- CONTRACTOR MUST MAINTAIN ACCESS TO CABINS, LODGES AND FACILITIES THROUGHOUT THE CONSTRUCTION PHASE. INSTALL TEMPORARY WALKWAYS AND/OR DRIVEWAYS TO EXISTING CABINS, LODGES AND FACILITIES AS NEEDED AND DIRECTED BY OWNER.
- NO OPEN TRENCHES ARE ALLOWED TO REMAIN OVERNIGHT.
- THE STATE PARK WILL REMAIN OPEN TO THE PUBLIC THROUGHOUT THE CONSTRUCTION PHASE, AND ALL CONSTRUCTION SITES SHALL BE MAINTAINED WITH FENCING TO PROTECT THE PUBLIC.
- CONTRACTOR SHALL NOT DRIVE OR PARK OFF MARKED ROADS EXCEPT WITHIN DESIGNATED CONSTRUCTION OR MAINTENANCE ZONES.
- CONTRACTOR SHALL PROVIDE BORROW PIT ASSESSMENT REPORT FOR ALL SELECT FILL, COMMON FILL AND CLAY LINER.
- ALL BACKFILL, SELECT FILL, COMMON FILL AND ROAD BASE SHALL BE STERILE OF CULTURAL RESOURCES. CONTRACTOR SHALL PROVIDE A LETTER CERTIFICATION FROM AN ARCHAEOLOGIST STATING THAT CULTURAL RESOURCES ARE NOT PRESENT FOR ALL BORROW PITS OR SOURCES OF MATERIAL, IE CLAY LINER, GENERAL FILL, SAND, ROAD BASE, ETC. TXDOT CERTIFICATIONS OF EXISTING STOCKPILES ARE ALSO ACCEPTABLE. NO BORROW MATERIAL IS AVAILABLE ON TPWD. CONTRACTOR SHALL PLAN TO PROVIDE ALL BORROW MATERIAL FROM OFF SITE. ASSESSMENT REPORT SHALL INCLUDE SUFFICIENT GEOTECHNICAL DATA TO CONFIRM HE BORROW MATERIAL COMPLIES WITH THE MATERIAL SPECIFICATIONS. IN ADDITION, ALL BORROW MATERIAL MUST BE CERTIFIED AS FREE OF CULTURAL RESOURCES.

LIFT STATION NOTES

- LOCATION OF ALL ANCHOR BOLTS, RELATIVE POSITION OF PUMPS AND ACCESS COVER, MUST BE INSTALLED AND MAINTAINED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
- PUMPS TO BE AS SPECIFIED. LEVEL CONTROL SHALL BE BY FLOAT SWITCHES. ELECTRICAL CONTROLS SHALL INCLUDE HIGH WATER ALARM WITH FLASHING LIGHT AND HORN MOUNTED TO CONTROL PANEL.
- PUMP SUPPLIER SHALL PROVIDE DIMENSIONS OF THE GUIDE RAILS TO ENSURE COMPATIBILITY WITH SUPPLIED EQUIPMENT. THE PUMP SHALL BE EASILY REMOVED FOR INSPECTION OR SERVICE. PERSONNEL SHALL HAVE NO REASON TO ENTER THE WET WELL. GUIDE RAILS SHALL BE SUPPORTED EVERY 10 FEET WITH STAINLESS STEEL SUPPORTS.
- THE GUIDE BRACKETS SHALL BE 316 STAINLESS STEEL. GUIDE BRACKETS FOR EACH PUMP MUST BE SUPPLIED BY THE PUMP MANUFACTURER TO ENSURE COMPATIBILITY WITH SUPPLIED EQUIPMENT.
- EACH PUMPING UNIT SHALL BE PROVIDED WITH A STAINLESS STEEL "GRIP-EYE" LIFTING SYSTEM. LIFTING SYSTEM SHALL EXTEND FROM THE PUMPS TO AT LEAST 4 FEET ABOVE WET WELL.
- ALL HARDWARE IN THE WET WELL SHALL BE 316 SERIES STAINLESS STEEL.
- ALL STATIONARY PIPING USED IN THE LIFT STATION OR VALVE VAULT SHALL BE DUCTILE IRON OR 304 SERIES STAINLESS STEEL.

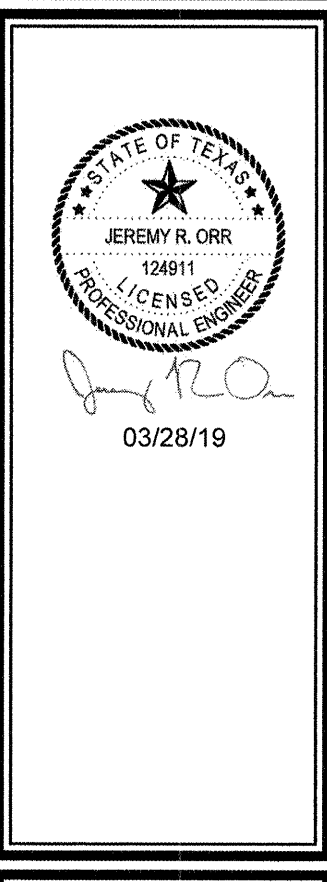
- ALL DISCHARGE LINES SHALL HAVE ADEQUATE THRUST SUPPORT MEMBERS AT EACH FITTING. WHERE POSSIBLE, LONG RADIUS 90 DEGREE BENDS SHALL BE USED.
- ALL FORCE MAIN BENDS SHALL INCLUDE CONCRETE THRUST BLOCKING.
- PIPE AND CONDUIT PENETRATIONS IN WET WELL AND VALVE VAULT SHALL BE GAS TIGHT AND SEALED WITH CORROSION RESISTANT FLEXIBLE GROUT AS PER 30 TAC 217.60(b)(2)
- CONCRETE SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS.
- THE EDGE OF EXPOSED CONCRETE SLAB(S) SHALL RECEIVE A 3/4" CHAMFER.
- REINFORCING STEEL SHALL BE GRADE 60.
- DUCTILE IRON PIPING AND FITTINGS SHALL HAVE A NON-CORROSIVE LINING WITH A WORKING PRESSURE RATING OF NOT LESS THAN 150 PSI. JOINTS SHALL HAVE FULL FACE GASKETS WITH A MIN. THICKNESS OF 1/8". FLANGES SHALL BE DUCTILE IRON CLASS 125, INSTALLED BY THE PIPE MANUFACTURER. PAINT ALL D.I. PIPE PER SPECIFICATIONS.
- CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION OR CONSTRUCTION.
- WET WELL AND VALVE VAULT ACCESS COVERS SHALL INCLUDE AN ALUMINUM DOOR AND SAFETY HATCH FRAME ASSEMBLY.
- PROVIDE COMBINATION LOCKS ON WET WELL, VALVE VAULT, AND HINGED ELECTRICAL PANELS.
- SHOP DRAWINGS AND SUBMITTALS FOR THE LIFT STATION, INCLUDING, BUT NOT LIMITED TO PUMPS, CONTROLS, ELECTRICAL SERVICE, ETC. SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
- PROVIDE AND INSTALL NECESSARY ELECTRICAL, CONTROLS, PIPING, FITTINGS, HOIST, DOORS, HATCHES, ETC. FOR A COMPLETE AND OPERABLE LIFT STATION. TRANSITION FROM D.I. WALL PIPE TO PVC OUTSIDE OF VALVE VAULT.
- THE CONTRACTOR SHALL INSTALL SHEETING AND BRACING NECESSARY TO SUPPORT THE SIDES OF TRENCHES AND OTHER EXCAVATIONS WHERE REQUIRED BY CURRENT OSHA REGULATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF GROUND WATER AND SURFACE WATER AS NECESSARY FOR THE CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL INSTALL AND MAINTAIN PUMPS, WELL POINTS, WELL POINT COLLECTION SYSTEM, AND OTHER DEVICES AS NECESSARY TO MAINTAIN A STABLE AND DRY EXCAVATION OR TRENCH FOR THE CONSTRUCTION OF THE PROJECT. THE CONTRACTOR SHALL IMMEDIATELY INSTALL SURFACE WATER OR GROUND WATER CONTROL SYSTEMS AS NECESSARY TO PROTECT EXISTING PROPERTY AND IS NECESSARY FOR THE CONSTRUCTION. NO DIRECT PAYMENT WILL BE MADE FOR THE CONTROL OF SURFACE WATER OR GROUND WATER.
- THE CONTRACTOR SHALL VERIFY THE LOCATION, DEPTH, AND SIZES OF EXISTING UTILITIES, WHETHER SHOWN ON THESE DRAWINGS OR NOT, PRIOR TO CONSTRUCTION.
- ALL BACKFILL SHALL BE REPLACED TO EXISTING GRADE.

TCEQ WATER DISTRIBUTION SYSTEM GENERAL CONSTRUCTION NOTES

- THIS WATER DISTRIBUTION SYSTEM MUST BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 290 SUBCHAPTER D. WHEN CONFLICTS ARE NOTED WITH LOCAL STANDARDS, THE MORE STRINGENT REQUIREMENT SHALL BE APPLIED. CONSTRUCTION FOR PUBLIC WATER SYSTEMS MUST ALWAYS, AT A MINIMUM, MEET TCEQ'S "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS.
- ALL NEWLY INSTALLED PIPES AND RELATED PRODUCTS MUST CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/NSF INTERNATIONAL STANDARD 61 AND MUST BE CERTIFIED BY AN ORGANIZATION ACCREDITED BY ANSI, AS REQUIRED BY 30 TAC §290.44(A)(1).
- PLASTIC PIPE FOR USE IN PUBLIC WATER SYSTEMS MUST BEAR THE NSF INTERNATIONAL SEAL OF APPROVAL (NSF-PW) AND HAVE AN ASTM DESIGN PRESSURE RATING OF AT LEAST 150 PSI OR A STANDARD DIMENSION RATIO OF 26 OR LESS, AS REQUIRED BY 30 TAC §290.44(A)(2).
- NO PIPE WHICH HAS BEEN USED FOR ANY PURPOSE OTHER THAN THE CONVEYANCE OF DRINKING WATER SHALL BE ACCEPTED OR RELOCATED FOR USE IN ANY PUBLIC DRINKING WATER SUPPLY, AS REQUIRED BY 30 TAC §290.44(A)(3).
- WATER TRANSMISSION AND DISTRIBUTION LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. HOWEVER, THE TOP OF THE WATER LINE MUST BE LOCATED BELOW THE FROST LINE AND IN NO CASE SHALL THE TOP OF THE WATER LINE BE LESS THAN 24 INCHES BELOW GROUND SURFACE, AS REQUIRED BY 30 TAC §290.44(A)(4). REVISED MARCH 4, 2015
- PURSUANT TO 30 TAC §290.44(A)(5), THE HYDROSTATIC LEAKAGE RATE SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY THE MOST CURRENT AWWA FORMULAS FOR PVC PIPE, CAST IRON AND DUCTILE IRON PIPE.
- THE MAXIMUM ALLOWABLE LEAD CONTENT OF PIPES, PIPE FITTINGS, PLUMBING FITTINGS, AND FIXTURES TO 0.25 PERCENT.
- THE SYSTEM MUST BE DESIGNED TO MAINTAIN A MINIMUM PRESSURE OF 35 PSI AT ALL POINTS WITHIN THE DISTRIBUTION NETWORK AT FLOW RATES OF AT LEAST 1.5 GALLONS PER MINUTE PER CONNECTION. WHEN THE SYSTEM IS INTENDED TO PROVIDE FIREFIGHTING CAPABILITY, IT MUST ALSO BE DESIGNED TO MAINTAIN A MINIMUM PRESSURE OF 20 PSI UNDER COMBINED FIRE AND DRINKING WATER FLOW CONDITIONS AS REQUIRED BY 30 TAC §290.44(D). REVISED MARCH 4, 2015
- THE CONTRACTOR SHALL INSTALL APPROPRIATE AIR RELEASE DEVICES IN THE DISTRIBUTION SYSTEM AT ALL POINTS WHERE TOPOGRAPHY OR OTHER FACTORS MAY CREATE AIR LOCKS IN THE LINES. ALL VENT OPENINGS TO THE ATMOSPHERE SHALL BE COVERED WITH 16-MESH OR FINER, CORROSION RESISTANT SCREENING MATERIAL OR AN ACCEPTABLE EQUIVALENT AS REQUIRED BY 30 TAC §290.44(D)(1).
- PURSUANT TO 30 TAC §290.44(D)(4), ACCURATE WATER METERS SHALL BE PROVIDED. SERVICE CONNECTIONS AND METER LOCATIONS SHOULD BE SHOWN ON THE PLANS.
- PURSUANT TO 30 TAC §290.44(D)(5), SUFFICIENT VALVES AND BLOWOFFS TO MAKE REPAIRS. THE ENGINEERING REPORT SHALL ESTABLISH CRITERIA FOR THIS DESIGN.
- PURSUANT TO 30 TAC §290.44(D)(6), THE SYSTEM SHALL BE DESIGNED TO AFFORD EFFECTIVE CIRCULATION OF WATER WITH A MINIMUM OF DEAD ENDS. ALL DEAD-END MAINS SHALL BE PROVIDED WITH ACCEPTABLE FLUSH VALVES AND DISCHARGE PIPING. ALL DEAD-END LINES LESS THAN TWO INCHES IN DIAMETER WILL NOT REQUIRE FLUSH VALVES IF THEY END AT A CUSTOMER SERVICE. WHERE DEAD ENDS ARE NECESSARY AS A STAGE IN THE GROWTH OF THE SYSTEM, THEY SHALL BE LOCATED AND ARRANGED TO ULTIMATELY CONNECT THE ENDS TO PROVIDE CIRCULATION.
- THE CONTRACTOR SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE IN ALL DIRECTIONS OF NINE FEET BETWEEN THE PROPOSED WATERLINE AND WASTEWATER COLLECTION FACILITIES INCLUDING MANHOLES AND SEPTIC TANK DRAINFIELDS. IF THIS DISTANCE CANNOT BE MAINTAINED, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROJECT ENGINEER FOR FURTHER DIRECTION. SEPARATION DISTANCES, INSTALLATION METHODS, AND MATERIALS UTILIZED MUST MEET 30 TAC §290.44(E)(1-4) OF THE CURRENT RULES.
- PURSUANT TO 30 TAC §290.44(E)(5), THE SEPARATION DISTANCE FROM A POTABLE WATERLINE TO A WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SHALL BE A MINIMUM OF NINE FEET. WHERE THE NINE-FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE POTABLE WATERLINE SHALL BE ENCASED IN A JOINT OF AT LEAST 150 PSI PRESSURE CLASS PIPE AT LEAST 18 FEET LONG AND TWO NOMINAL SIZES LARGER THAN THE NEW CONVEYANCE. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE-FOOT INTERVALS WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. THE ENCASEMENT PIPE SHALL BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH CEMENT GROUT OR MANUFACTURED SEALANT.
- PURSUANT TO 30 TAC §290.44(E)(6), FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER LINE, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION.
- PURSUANT TO 30 TAC §290.44(E)(8), WATERLINES SHALL NOT BE INSTALLED CLOSER THAN TEN FEET TO SEPTIC TANK DRAINFIELDS. REVISED MARCH 4, 2015
- PURSUANT TO 30 TAC §290.44(F)(1), THE CONTRACTOR SHALL NOT PLACE THE PIPE IN WATER OR WHERE IT CAN BE FLOODED WITH WATER OR SEWAGE DURING ITS STORAGE OR INSTALLATION.
- PURSUANT TO 30 TAC §290.44(F)(2), WHEN WATERLINES ARE LAID UNDER ANY FLOWING OR INTERMITTENT STREAM OR SEMI-PERMANENT BODY OF WATER THE WATER MAIN SHALL BE INSTALLED IN A SEPARATE WATERTIGHT PIPE ENCASEMENT. VALVES MUST BE PROVIDED ON EACH SIDE OF THE CROSSING WITH FACILITIES TO ALLOW THE UNDERWATER PORTION OF THE SYSTEM TO BE ISOLATED AND TESTED.
- THE CONTRACTOR SHALL DISINFECT THE NEW WATER MAINS IN ACCORDANCE WITH THE LATEST VERSION OF AWWA STANDARD C-651 AND THEN FLUSH AND SAMPLE THE LINES BEFORE BEING PLACED INTO SERVICE. SAMPLES SHALL BE COLLECTED FOR MICROBIOLOGICAL ANALYSIS TO CHECK THE EFFECTIVENESS OF THE DISINFECTION PROCEDURE WHICH SHALL BE REPEATED IF CONTAMINATION PERSISTS. A MINIMUM OF ONE SAMPLE FOR EACH 1,000 FEET OF COMPLETED WATER LINE WILL BE REQUIRED OR AT THE NEXT AVAILABLE SAMPLING POINT BEYOND 1,000 FEET AS DESIGNATED BY THE DESIGN ENGINEER, IN ACCORDANCE WITH 30 TAC §290.44(F)(3).

ABBREVIATIONS

@	AT	MISC.	MISCELLANEOUS
APPROX.	APPROXIMATE	N	NORTH
BLDG.	BUILDING	N.T.S.	NOT TO SCALE
BM	BENCH MARK	N/A	NOT APPLICABLE
BS	BACKWASH SUPPLY	NO.	NUMBER
BWP	BACKWASH PUMP	O.C.E.W.	OFF CENTER EACH WAY
CF	CUBIC FEET	O.D.	OUTSIDE DIAMETER
CI	CAST IRON	P.C.	POINT OF CURVATURE
C.I.P.	CAST IN PLACE	P.R.	PRESSURE RATED
CK	CREEK	P.T.	POINT OF TANGENCY
CO	CLEAN OUT	P/L	PIPELINE
CMP	CORRUGATED METAL PIPE	PP	UTILITY POLE
CONC	CONCRETE	PROP.	PROPOSED
CONST	CONSTRUCT	PSI	POUNDS PER SQUARE INCH
CONT	CONTINUOUS	PVC	POLYVINYL CHLORIDE
CU	CUBIC	PVMT.	PAVEMENT
CULV.	CULVERT	R.O.W.	RIGHT OF WAY
Δ	DEFLECTION ANGLE	RCP	REINFORCED CONCRETE PIPE
DI	DUCTILE IRON	RD.	ROAD
DIA	DIAMETER	REINF.	REINFORCEMENT
DG	DOWN GUY	RT.	RIGHT
EA.	EACH	S	SOUTH
ELEC.	ELECTRIC	S.S.	STAINLESS STEEL
ELEV.	ELEVATION	WW	SANITARY SEWER
ENC.	ENCASEMENT	SB.	SLUDGE BLOWDOWN
EXIST.	EXISTING	SCH.	SCHEDULE
EXP.	EXPOSED	SPEC'S	SPECIFICATIONS
FEN.	FENCE	SQ.	SQUARE
FH	FIRE HYDRANT	ST.	STREET
FL	FLOWLINE	STA.	STATION
FT.	FEET (FOOT)	STD.	STANDARD
GAL.	GALLON	STL.	STEEL
GALV.	GALVANIZED	T.O.B.	TOP OF BANK
HMAC	HOT MIX ASPHALTIC CONCRETE	T.O.P.	TOP OF PIPE
HORZ.	HORIZONTAL	TEL.	TELEPHONE
HP.	HIGH SERVICE PUMP	TFR.	TRANSFORMER
I.D.	INSIDE DIAMETER	TPT	SURVEY TRAVERSE POINT
INST.	INSTALL	V.	VOLT
JT.	JOINT	VERT.	VERTICAL
L.F.	LINEAR FEET	W	WEST
L.S.	LIFT STATION	W.	WATT
LT.	LEFT	W.W. MECH	WELDED WIRE MESH
LEN.	LENGTH	W	WITH
M.H.	MANHOLE	W/O	WITHOUT
M.J.	MECHANICAL JOINT	W.L.	WATER LINE
MIN.	MINIMUM	WM	WATER METER
		WT.	WATERTIGHT
		WV	WATER VALVE



FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

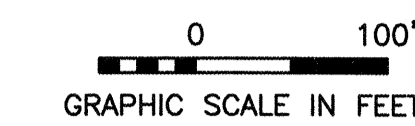
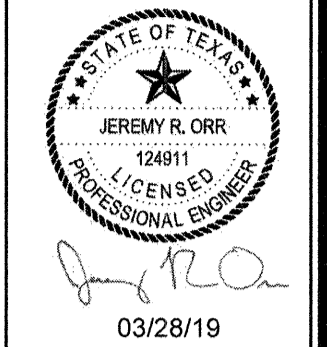
DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:
 REVISED:

SHEET TITLE
GENERAL
ABBREVIATIONS
AND
CONSTRUCTION
NOTES

SHEET NUMBER
2

PERCENTAGE 100% CD DOCUMENT

PATH: \\KSA-TLY-SERVER3\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-01-NOTE-001.dwg



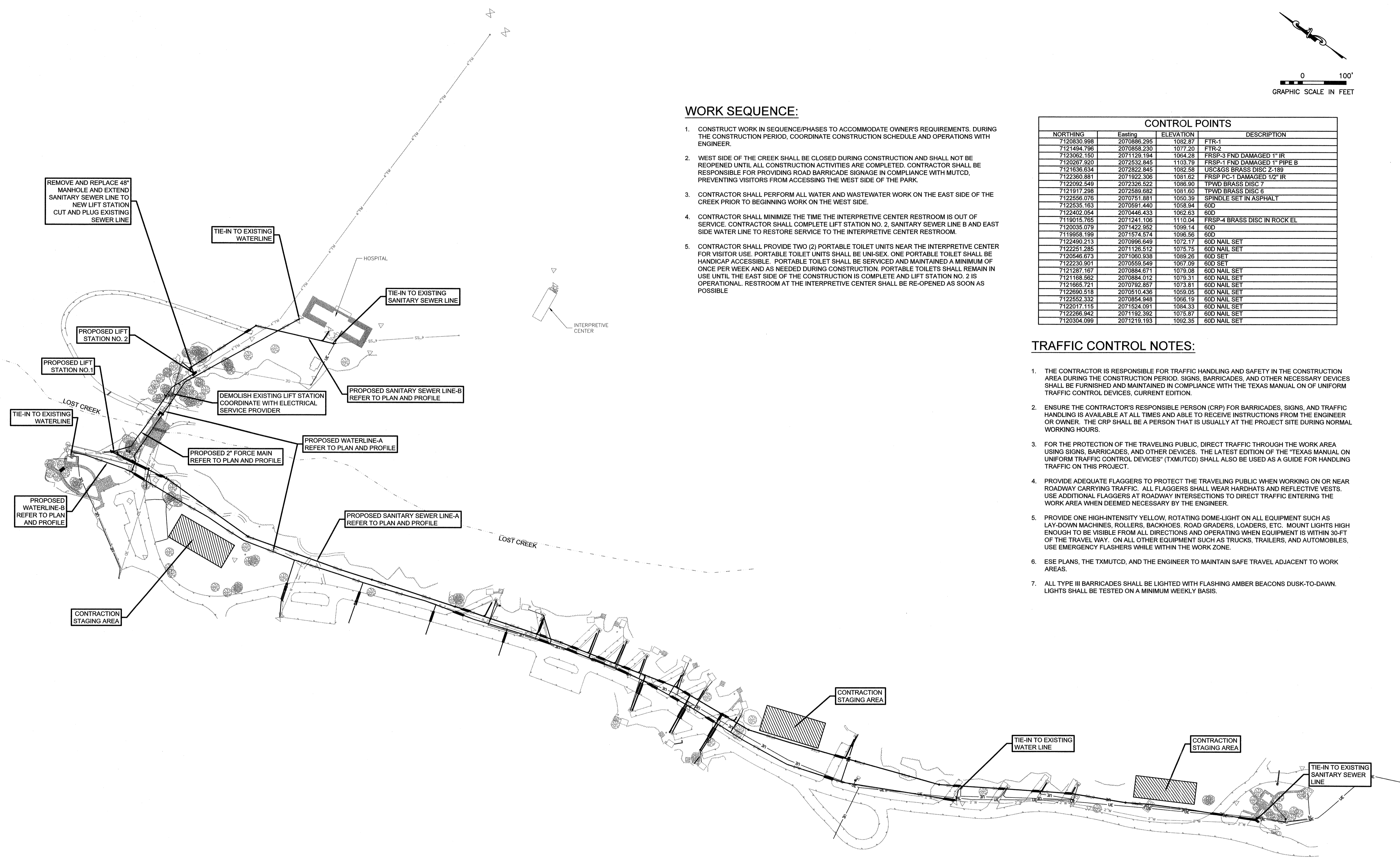
WORK SEQUENCE:

1. CONSTRUCT WORK IN SEQUENCE/PHASES TO ACCOMMODATE OWNER'S REQUIREMENTS. DURING THE CONSTRUCTION PERIOD, COORDINATE CONSTRUCTION SCHEDULE AND OPERATIONS WITH ENGINEER.
2. WEST SIDE OF THE CREEK SHALL BE CLOSED DURING CONSTRUCTION AND SHALL NOT BE REOPENED UNTIL ALL CONSTRUCTION ACTIVITIES ARE COMPLETED. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ROAD BARRICADE SIGNAGE IN COMPLIANCE WITH MUTCD, PREVENTING VISITORS FROM ACCESSING THE WEST SIDE OF THE PARK.
3. CONTRACTOR SHALL PERFORM ALL WATER AND WASTEWATER WORK ON THE EAST SIDE OF THE CREEK PRIOR TO BEGINNING WORK ON THE WEST SIDE.
4. CONTRACTOR SHALL MINIMIZE THE TIME THE INTERPRETIVE CENTER RESTROOM IS OUT OF SERVICE. CONTRACTOR SHALL COMPLETE LIFT STATION NO. 2, SANITARY SEWER LINE B AND EAST SIDE WATER LINE TO RESTORE SERVICE TO THE INTERPRETIVE CENTER RESTROOM.
5. CONTRACTOR SHALL PROVIDE TWO (2) PORTABLE TOILET UNITS NEAR THE INTERPRETIVE CENTER FOR VISITOR USE. PORTABLE TOILET UNITS SHALL BE UNI-SEX. ONE PORTABLE TOILET SHALL BE HANDICAP ACCESSIBLE. PORTABLE TOILET SHALL BE SERVICED AND MAINTAINED A MINIMUM OF ONCE PER WEEK AND AS NEEDED DURING CONSTRUCTION. PORTABLE TOILETS SHALL REMAIN IN USE UNTIL THE EAST SIDE OF THE CONSTRUCTION IS COMPLETE AND LIFT STATION NO. 2 IS OPERATIONAL. RESTROOM AT THE INTERPRETIVE CENTER SHALL BE RE-OPENED AS SOON AS POSSIBLE.

CONTROL POINTS			
NORTHING	Easting	ELEVATION	DESCRIPTION
7120830.998	2070886.295	1082.87	FTR-1
7121494.796	2070858.230	1077.20	FTR-2
7123062.150	2071129.194	1064.28	FRSP-3 FND DAMAGED 1" IR
7120267.920	2072532.845	1103.79	FRSP-1 FND DAMAGED 1" PIPE B
7121636.634	2072822.845	1082.58	USC&GS BRASS DISC Z-189
7122360.881	2071922.306	1081.62	FRSP PC-1 DAMAGED 1/2" IR
7122092.549	2072326.522	1086.90	TPWD BRASS DISC 7
7121917.298	2072589.682	1081.60	TPWD BRASS DISC 6
7122556.076	2070751.881	1050.39	SPINDLE SET IN ASPHALT
7122535.163	2070591.440	1058.94	60D
7122402.054	2070446.433	1062.63	60D
7119015.765	2071241.106	1110.04	FRSP-4 BRASS DISC IN ROCK EL
7120035.079	2071422.952	1099.14	60D
7119958.199	2071574.574	1096.56	60D
7122490.213	2070996.649	1072.17	60D NAIL SET
7122251.285	2071126.512	1075.75	60D NAIL SET
7120546.673	2071060.938	1089.26	60D SET
7122230.901	2070559.549	1067.09	60D SET
7121287.167	2070884.671	1079.08	60D NAIL SET
7121668.562	2070884.012	1079.31	60D NAIL SET
7121665.721	2070792.857	1073.81	60D NAIL SET
7122690.518	2070510.436	1059.05	60D NAIL SET
7122552.332	2070854.948	1066.19	60D NAIL SET
7122017.115	2071524.091	1084.33	60D NAIL SET
7122266.942	2071192.392	1075.87	60D NAIL SET
7120304.099	2071219.193	1062.35	60D NAIL SET

TRAFFIC CONTROL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC HANDLING AND SAFETY IN THE CONSTRUCTION AREA DURING THE CONSTRUCTION PERIOD. SIGNS, BARRICADES, AND OTHER NECESSARY DEVICES SHALL BE FURNISHED AND MAINTAINED IN COMPLIANCE WITH THE TEXAS MANUAL ON OF UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION.
2. ENSURE THE CONTRACTOR'S RESPONSIBLE PERSON (CRP) FOR BARRICADES, SIGNS, AND TRAFFIC HANDLING IS AVAILABLE AT ALL TIMES AND ABLE TO RECEIVE INSTRUCTIONS FROM THE ENGINEER OR OWNER. THE CRP SHALL BE A PERSON THAT IS USUALLY AT THE PROJECT SITE DURING NORMAL WORKING HOURS.
3. FOR THE PROTECTION OF THE TRAVELING PUBLIC, DIRECT TRAFFIC THROUGH THE WORK AREA USING SIGNS, BARRICADES, AND OTHER DEVICES. THE LATEST EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (TXMUTCD) SHALL ALSO BE USED AS A GUIDE FOR HANDLING TRAFFIC ON THIS PROJECT.
4. PROVIDE ADEQUATE FLAGGERS TO PROTECT THE TRAVELING PUBLIC WHEN WORKING ON OR NEAR ROADWAY CARRYING TRAFFIC. ALL FLAGGERS SHALL WEAR HARDHATS AND REFLECTIVE VESTS. USE ADDITIONAL FLAGGERS AT ROADWAY INTERSECTIONS TO DIRECT TRAFFIC ENTERING THE WORK AREA WHEN DEEMED NECESSARY BY THE ENGINEER.
5. PROVIDE ONE HIGH-INTENSITY YELLOW, ROTATING DOME-LIGHT ON ALL EQUIPMENT SUCH AS LAY-DOWN MACHINES, ROLLERS, BACKHOES, ROAD GRADERS, LOADERS, ETC. MOUNT LIGHTS HIGH ENOUGH TO BE VISIBLE FROM ALL DIRECTIONS AND OPERATING WHEN EQUIPMENT IS WITHIN 30-FT OF THE TRAVEL WAY. ON ALL OTHER EQUIPMENT SUCH AS TRUCKS, TRAILERS, AND AUTOMOBILES, USE EMERGENCY FLASHERS WHILE WITHIN THE WORK ZONE.
6. ESE PLANS, THE TXMUTCD, AND THE ENGINEER TO MAINTAIN SAFE TRAVEL ADJACENT TO WORK AREAS.
7. ALL TYPE III BARRICADES SHALL BE LIGHTED WITH FLASHING AMBER BEACONS DUSK-TO-DAWN. LIGHTS SHALL BE TESTED ON A MINIMUM WEEKLY BASIS.



FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:

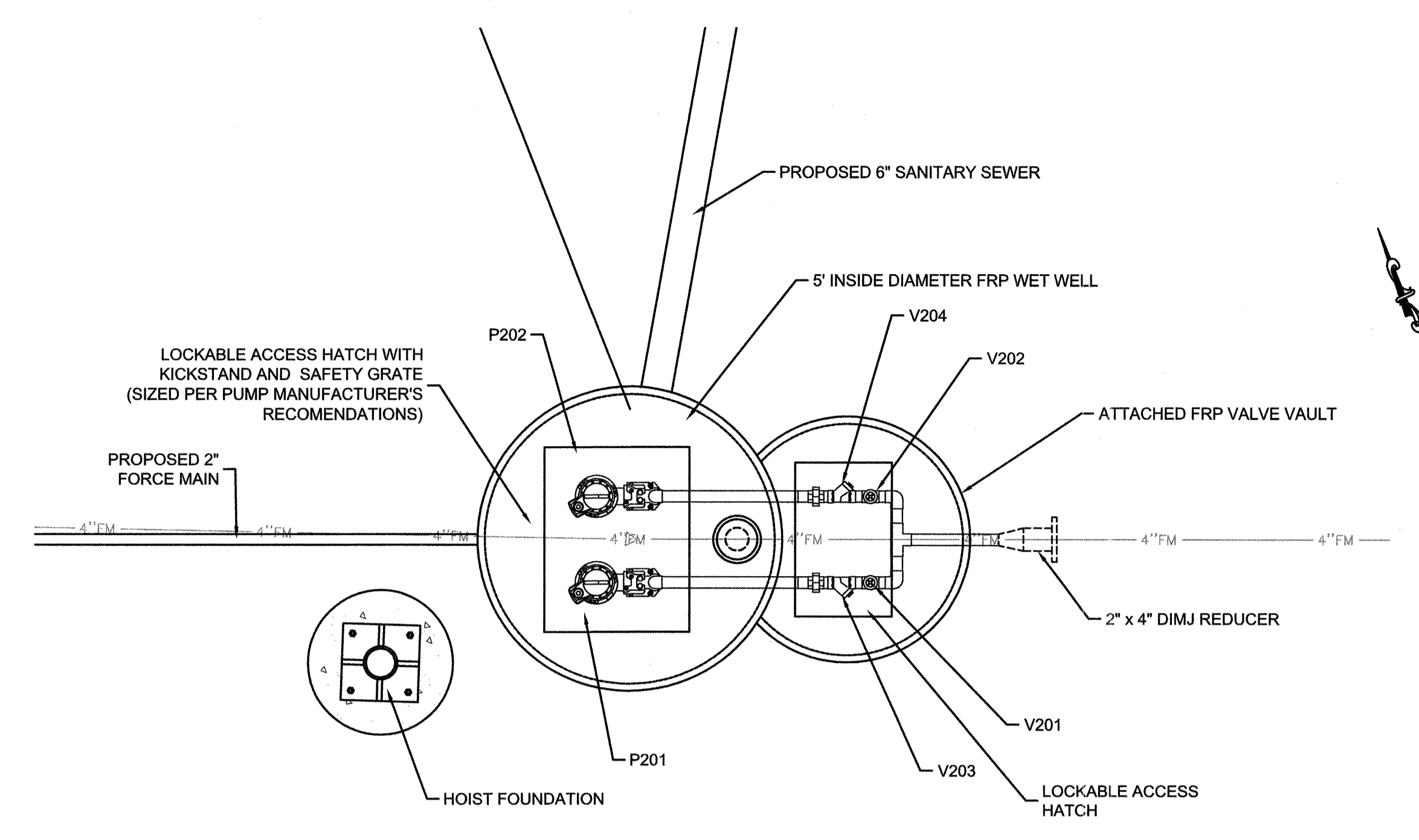
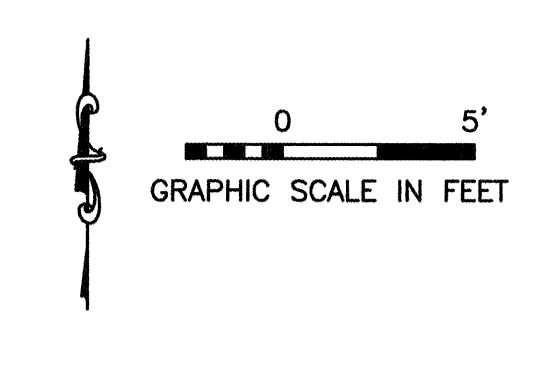
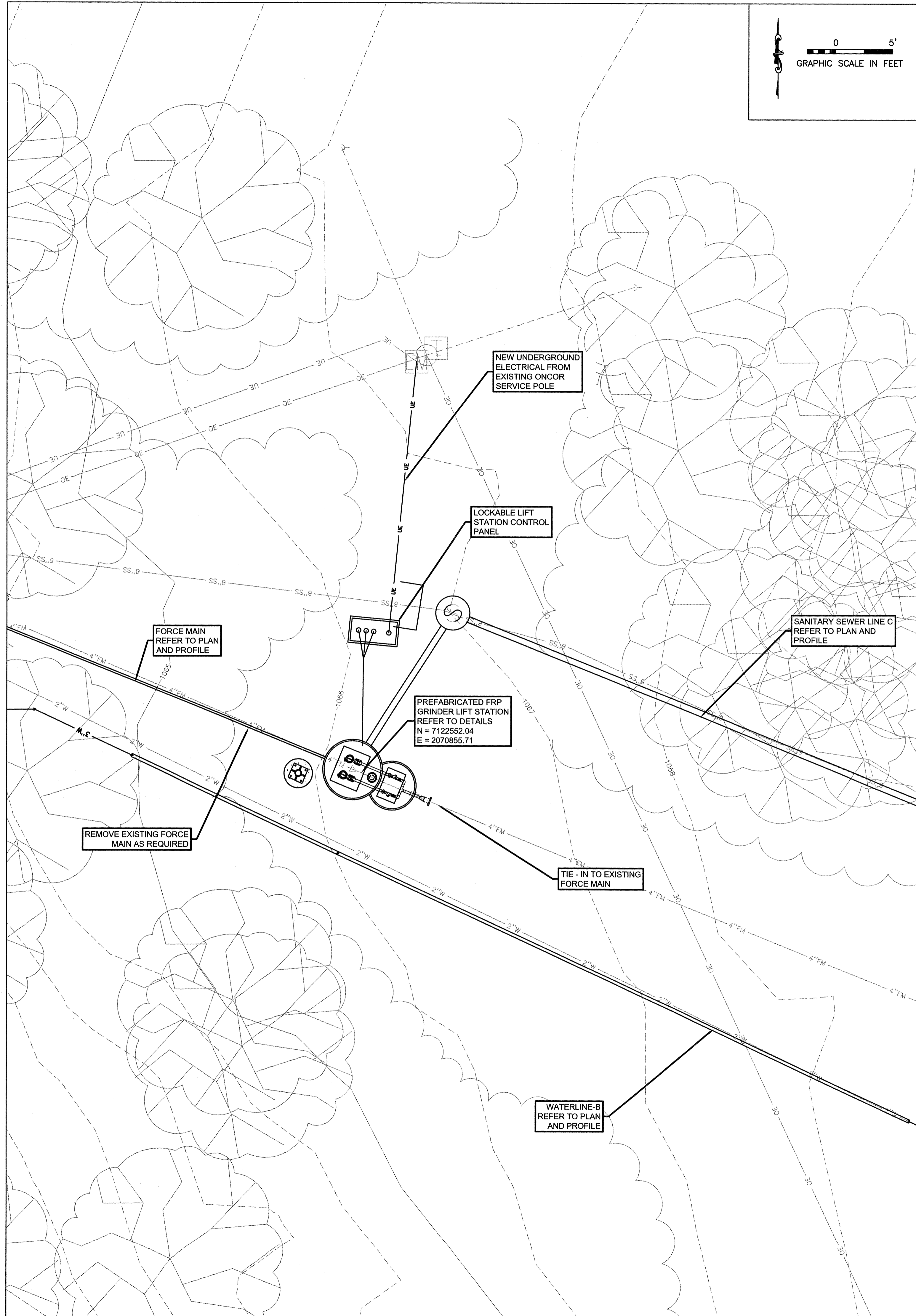
SHEET TITLE
 PROPOSED
 OVERALL SITE

SHEET NUMBER
 3

PERCENTAGE 100% CD DOCUMENT

PATH: \\NSA-TLY-SERVER3\projects\Projects\TPW017-C-LO-SITE.dwg

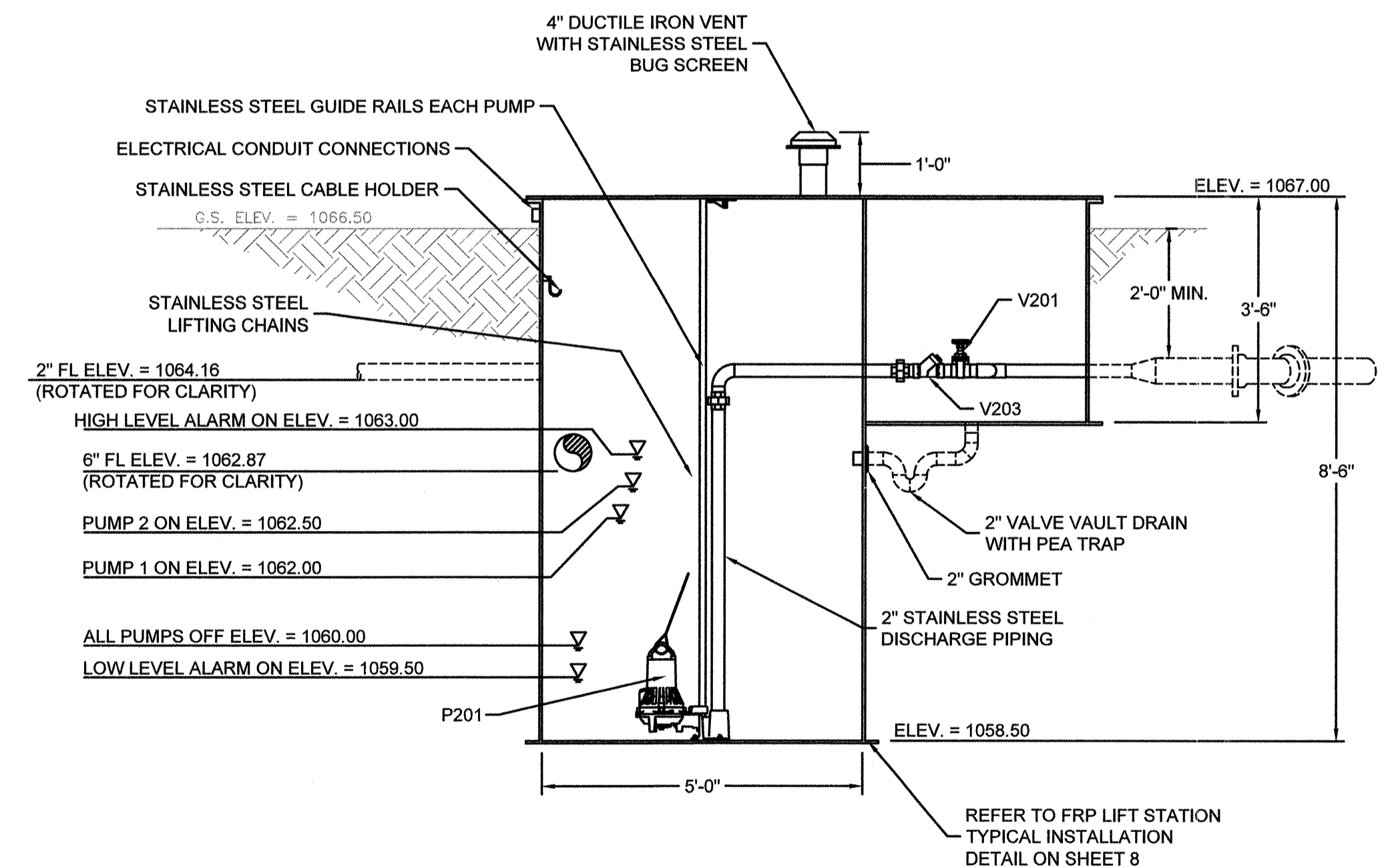
PATH: \\KSA-TL-SERVER3\projects\Projects\TPW017\00.07 CAD\02 Project\02 Sheets\TPW017-C-DT-LIFT STA NO2-001.dwg



PLAN VIEW

VALVE SCHEDULE	
VALVE NO.	DESCRIPTION
V201 - V202	2" ECCENTRIC PLUG VALVE, FL
V203 - V204	2" SWING CHECK VALVE, FL

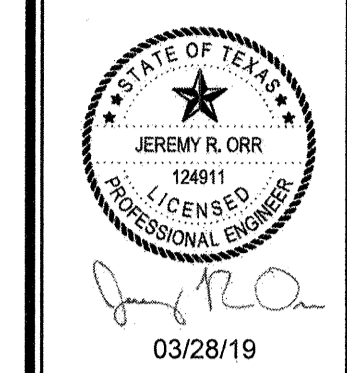
PUMP SCHEDULE	
PUMP NO.	DESIGN POINT
P201 - P202	75 GPM @ 27 TDH



SECTION A-A

TYPICAL PREFABRICATED FRP GRINDER LIFT STATION DETAIL
NTS

- NOTES:
1. ALL PROPOSED DUCTILE IRON VENTS AND PIPING SHALL BE PAINTED IN ACCORDANCE WITH SECTION 09800 OF THE TECHNICAL SPECIFICATIONS.
 2. FIELD VERIFY LOCATION AND SIZE OF PORTABLE HOIST FOUNDATION AND SIZE OF ANCHOR BOLTS BASED UPON MANUFACTURER'S RECOMMENDATIONS FOR ENGINEER APPROVED CRANE.
 3. ALL NUTS, BOLTS, AND WASHERS WITHIN THE WET WELL OR VALVE VAULT SHALL BE 316 STAINLESS STEEL.
 4. THE INLET PIPE CONNECTIONS SHALL BE SHIPPED LOOSE FOR LOCATION AND INSTALLATION BY THE CONTRACTOR.
 5. SEE ELECTRICAL SHEETS FOR CONTROL PANEL DETAILS, CONDUIT, AND ELECTRICAL APPURTENANCES.



**FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT**

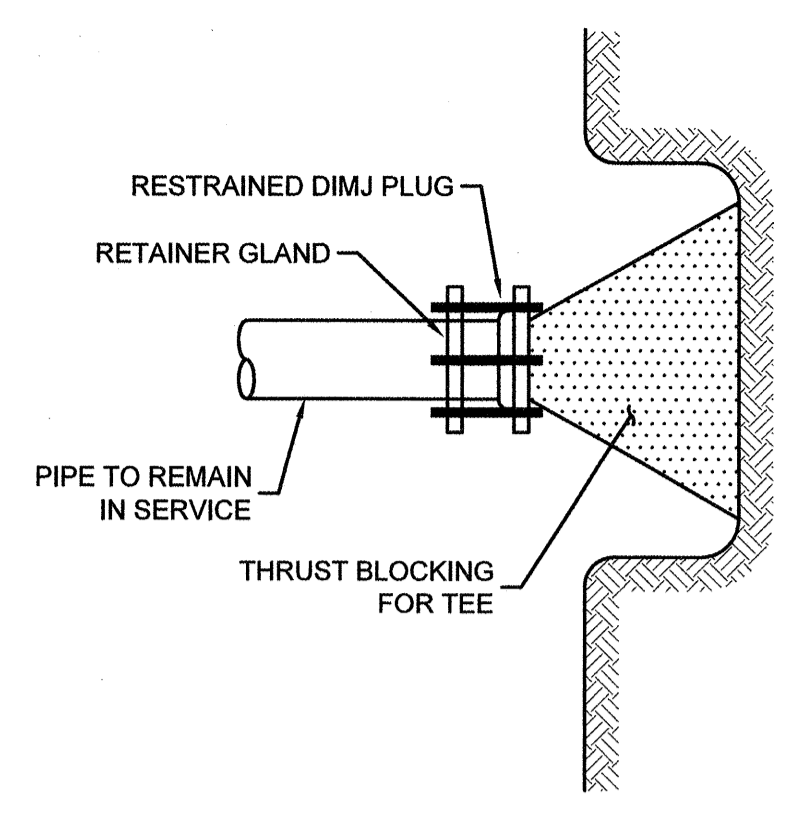
PROJECT NUMBER: 116818

DATE: 3/28/19
DESIGNED BY: CBA
DRAWN BY: JAM
REVIEWED BY: CBA
REVISED:
REVISED:

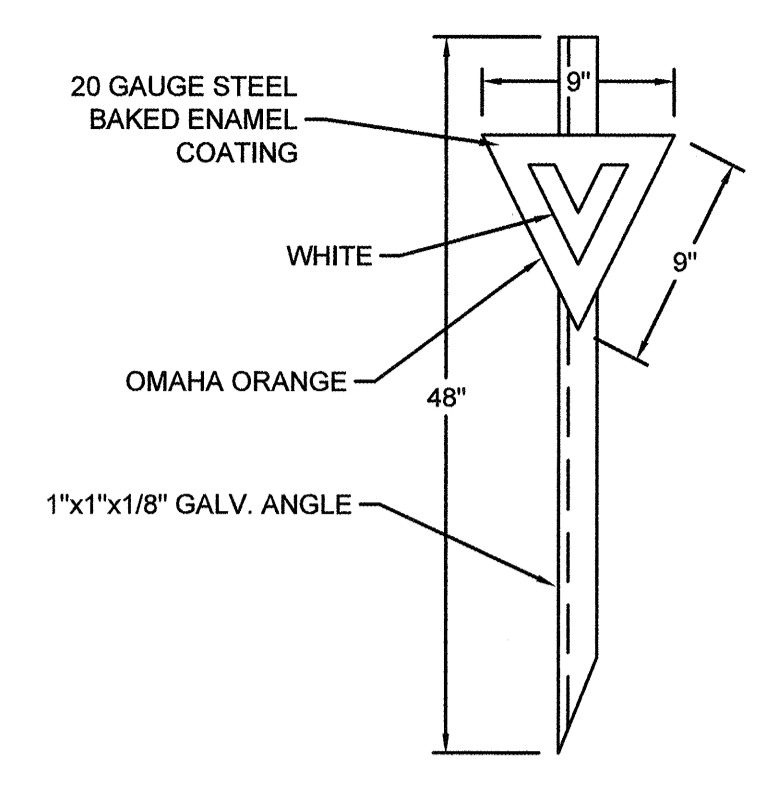
SHEET TITLE
LIFT STATION
NO.2 SITE
PLAN &
DETAILS

SHEET NUMBER
5

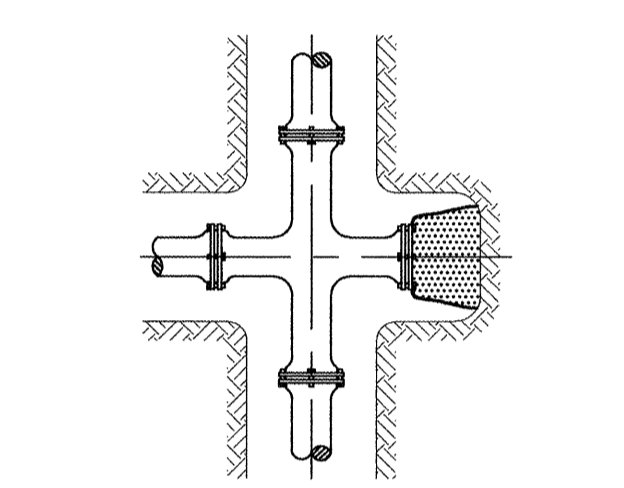
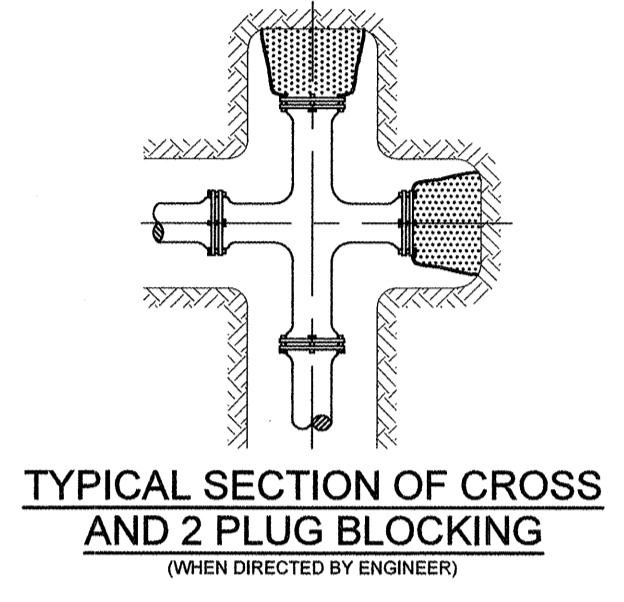
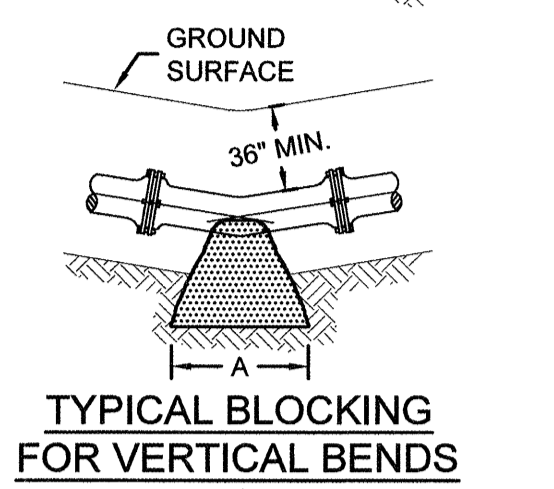
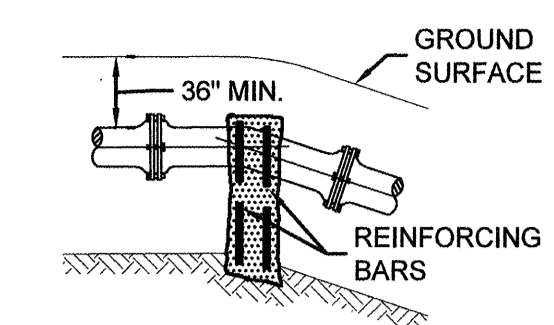
PERCENTAGE 100% CD DOCUMENT



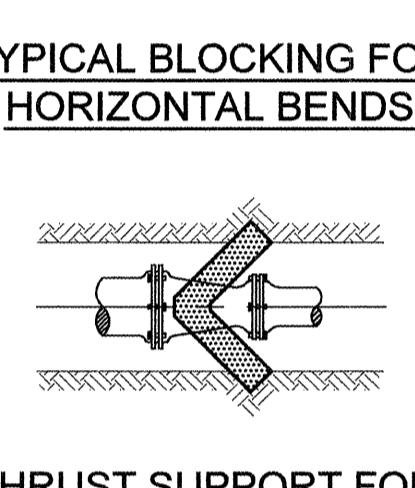
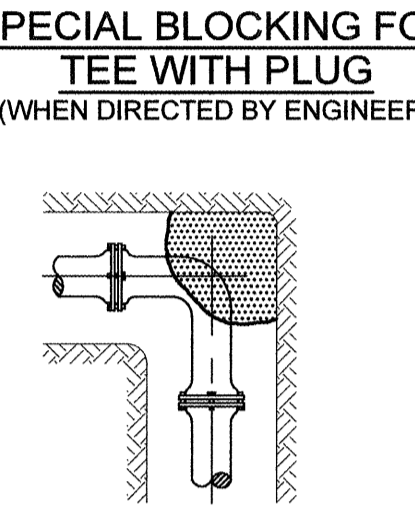
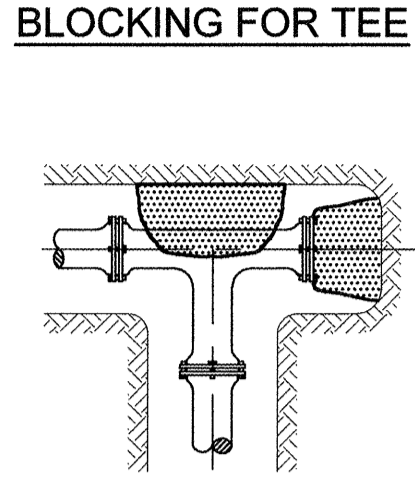
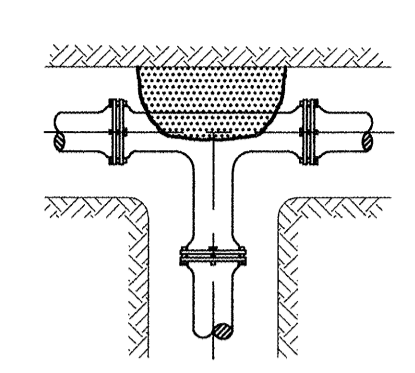
CUT AND PLUG DETAIL
NTS



VALVE MARKER SIGN
NTS



TYPICAL SECTION OF CROSS AND 2 PLUG BLOCKING
(WHEN DIRECTED BY ENGINEER)

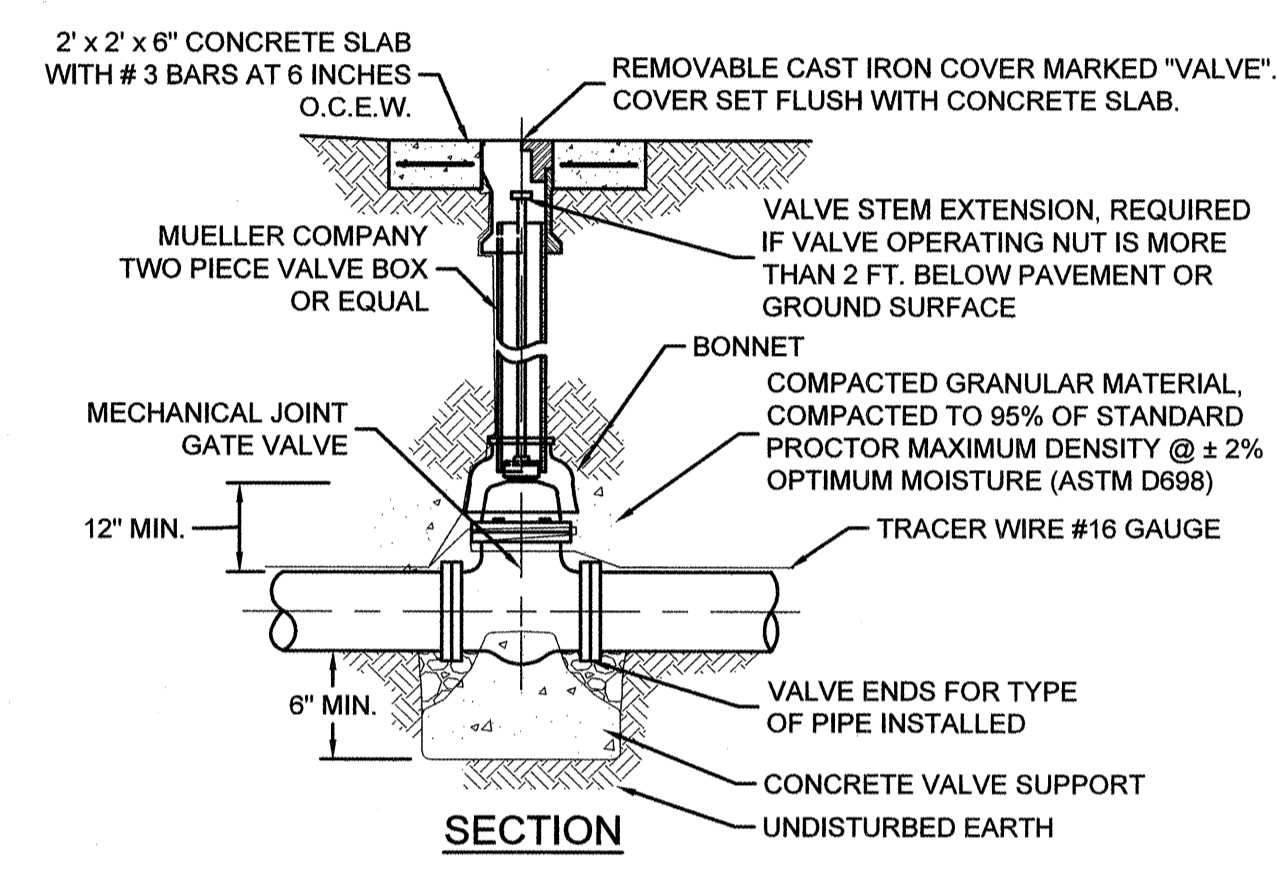


TYPICAL BLOCKING FOR HORIZONTAL BENDS

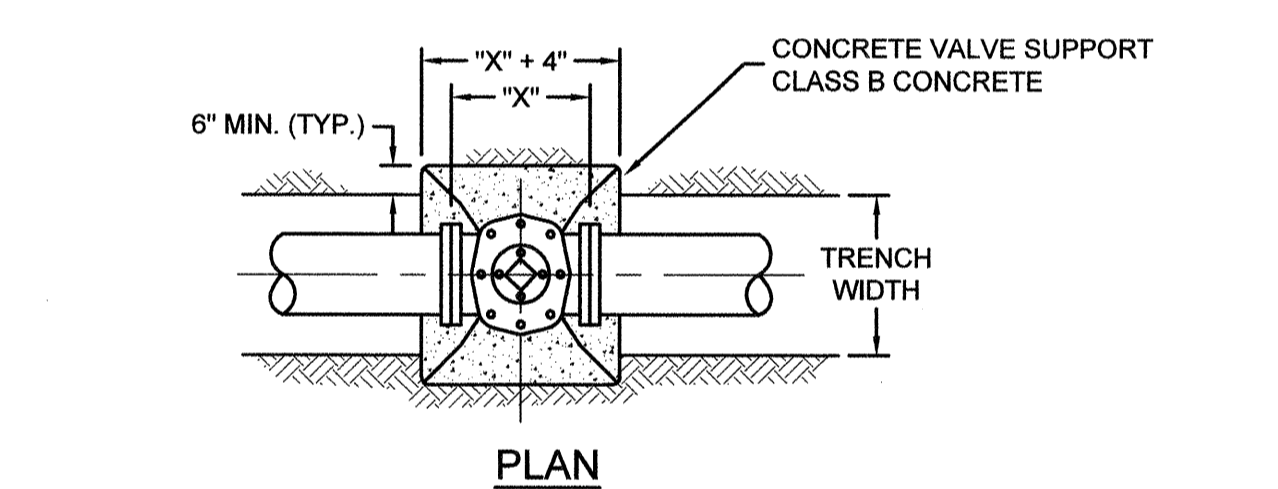
THRUST SUPPORT FOR REDUCER CONNECTION (SIZE TO BE DETERMINED BY ENGINEER)

- NOTES ON THRUST BLOCKING:**
- ALL BLOCKING SHALL BE AGAINST UNDISTURBED HAND DUG SOIL AND SHALL BE CONCRETE HAVING A MINIMUM 28 DAY STRENGTH OF 3000 LB. PER SQUARE INCH.
 - THRUST CALCULATIONS TO BE BASED ON THRUST DUE TO WATER PRESSURE AT 100% OF TEST PRESSURE.
THRUST = $2 AP \sin 1/2 \theta$
WHERE A = AREA OF PIPE
P = WATER PRESSURE
 θ = DEFLECTION ANGLE.
 - VERTICAL UPLIFT BLOCKS SHALL BE DESIGNED ON THE BASIS OF 150 LBS. PER CU. FT. FOR CONCRETE AND SOIL AT 120 LBS. PER CU. FT. OVER THE AREA OF BLOCK.
 - VERTICAL DOWN THRUST BLOCKS SHALL BE DESIGNED ON THE BASIS OF 3000 LB. PER SQ. FT. ALLOWABLE SOIL BEARING PRESSURE. DIMENSIONS MAY BE DECREASED WITH APPROVAL OF THE ENGINEER OR MEASURED SOIL CONDITIONS PERMIT. IN POOR SOIL CONDITIONS, BLOCK DIMENSIONS SHALL BE INCREASED IN PROPORTION TO ALLOWABLE BEARING VALUE.
 - THRUST BLOCKS ON HORIZONTAL BENDS, TEES, CROSSES, AND REDUCERS SHALL BE SIZED BASED ON 2400 LBS. PER SQ. FT. OF BLOCKING SURFACE AREA IN CONTACT WITH UNDISTURBED SOIL. BLOCK DIMENSIONS MAY BE DECREASED WITH APPROVAL OF THE ENGINEER OR MEASURED SOIL CONDITIONS PERMIT. IN POOR SOIL CONDITIONS, BLOCK DIMENSIONS SHALL BE INCREASED IN PROPORTION TO THE ALLOWABLE BEARING VALUE.
 - ALL BLOCKING SHALL HAVE A MINIMUM SOIL COVER OF 1 FT.
 - ADDITIONAL REINFORCING MAY BE REQUIRED FOR HORIZONTAL BLOCKING TO HANDLE UNUSUAL SHEAR LOADING CONDITIONS.
 - ANCHOR COLLARS SHALL BE REINFORCED IN ACCORDANCE WITH REINFORCING BAR SCHEDULE FOR REDUCED BLOCKS SHOWN ABOVE. STEEL ANCHOR RING IN ACCORDANCE WITH DIMENSIONS OF ANCHOR COLLAR.

PIPE SIZE	BENDS				REDUCER		
	90° THRUST BLOCKING REQUIRED (SF)	45° THRUST BLOCKING REQUIRED (SF)	22 1/2° THRUST BLOCKING REQUIRED (SF)	45° THRUST BLOCKING REQUIRED (SF)	PIPE SIZE (IN.)	ANGLE (DEG)	THRUST BLOCKING REQUIRED (SF)
2 1/2"	0.61	0.43	0.23	0.12	4 - 3	8.2	0.05
3"	0.88	0.62	0.34	0.17	6 - 3	19.5	0.45
4"	1.57	1.11	0.60	0.31	6 - 4	12.8	0.22
6"	3.53	2.50	1.35	0.69	8 - 6	10.5	0.25
8"	6.28	4.44	2.40	1.23	10 - 8	9.6	0.30
10"	9.82	6.94	3.76	1.92	12 - 10	8.2	0.31
12"	14.14	10.00	5.41	2.76	14 - 12	7.2	0.32
14"	19.24	13.61	7.36	3.75	18 - 12	18.4	2.83
16"	25.13	17.77	9.62	4.90	20 - 14	17.5	3.04
18"	31.81	22.49	12.17	6.21	20 - 16	11.5	1.42
20"	39.27	27.77	15.03	7.86	24 - 18	14.5	3.12
24"	56.55	39.99	21.64	11.03	24 - 20	9.6	1.44
30"	88.36	62.48	33.81	17.24	30 - 20	19.5	8.30
36"	127.23	89.97	48.69	24.82	30 - 24	11.5	3.20

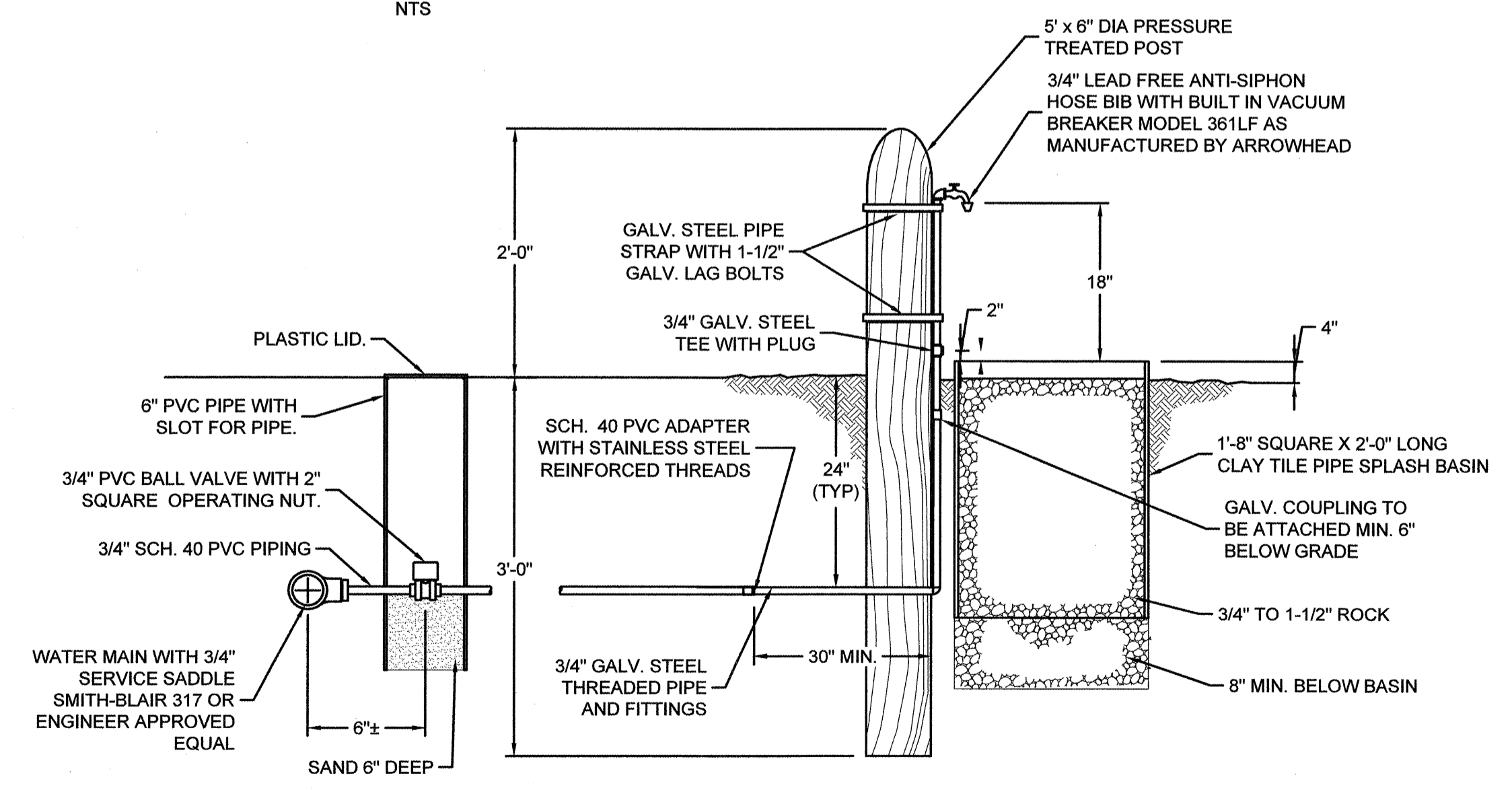


SECTION



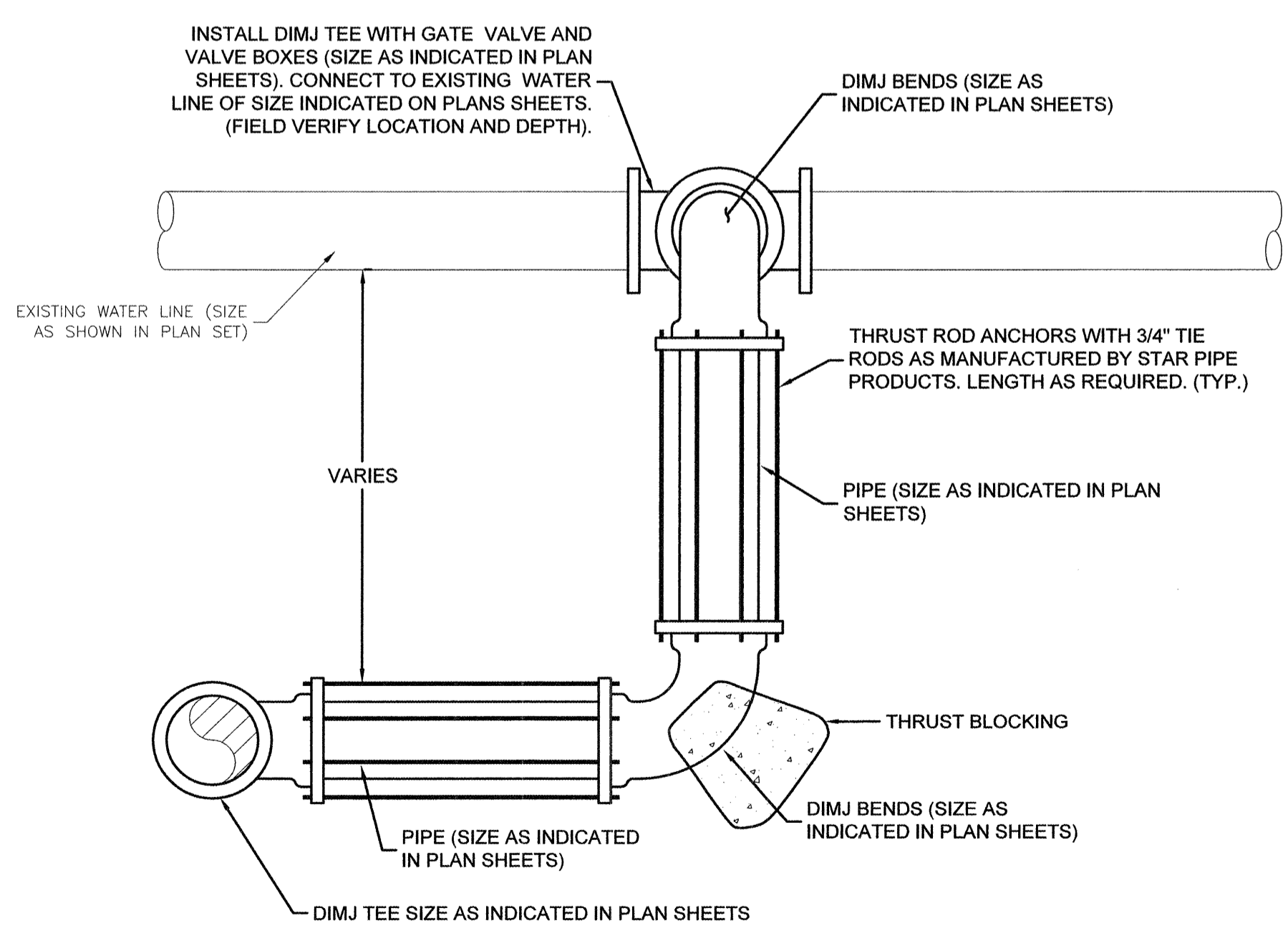
PLAN

TYPICAL VALVE, VALVE BOX, AND EXTENSION STEM DETAIL (VALVES 3" AND LARGER)
NTS



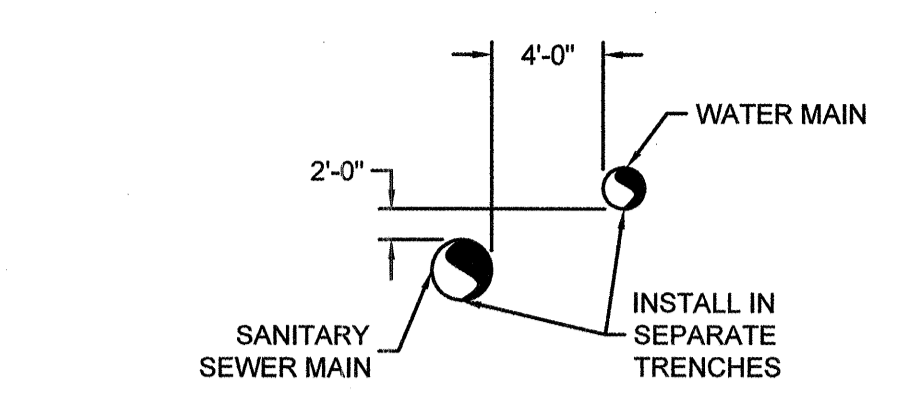
- NOTES:**
- A GALVANIZED THREADED STEEL COUPLING WITH THREADED SCH. 40 PVC PIPE NIPPLE MAY BE USED TO EFFECT TRANSITION FROM PVC TO STEEL PIPING.
 - EXISTING HOSE BIBS SHALL BE REUSED UNLESS SPECIFIED OTHERWISE

TYPICAL HOSE BIB DETAIL
NTS

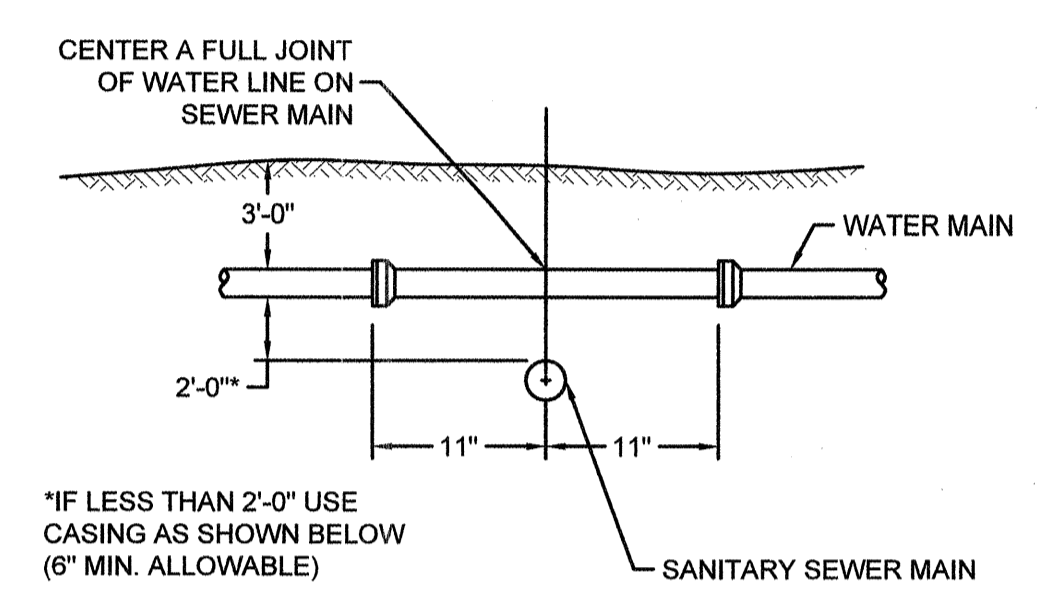


TYPICAL CONNECTION DETAIL ELEVATION VIEW
NTS

NOTE:
THRUST BLOCKING REQUIRED AT ALL FITTINGS. THRUST BLOCKING IS NOT SHOWN IN DETAILS FOR CLARITY.

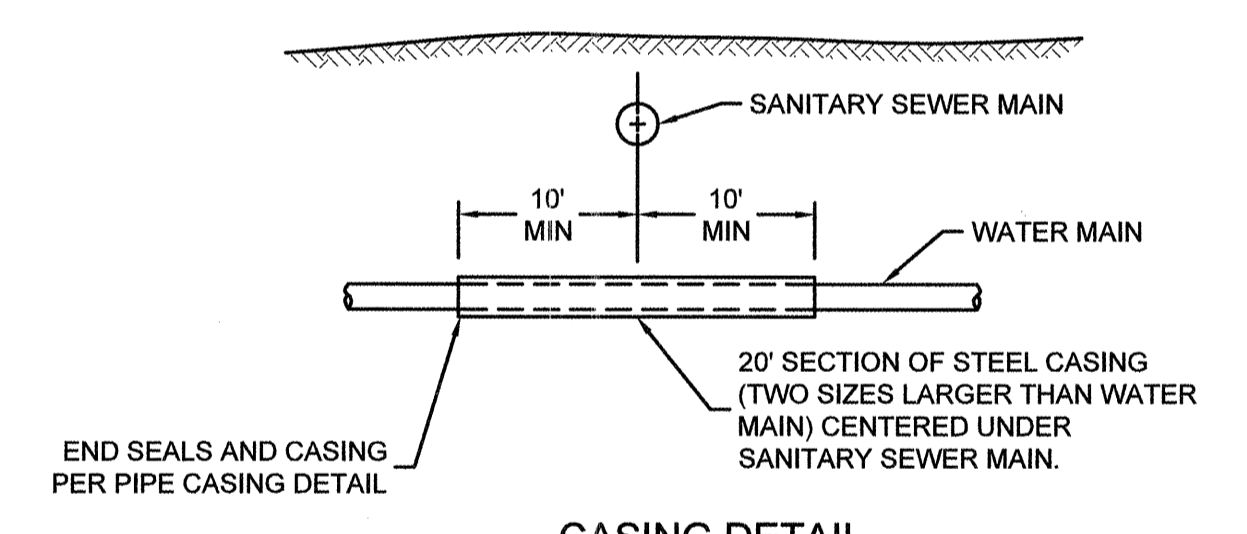


PARALLEL MAINS



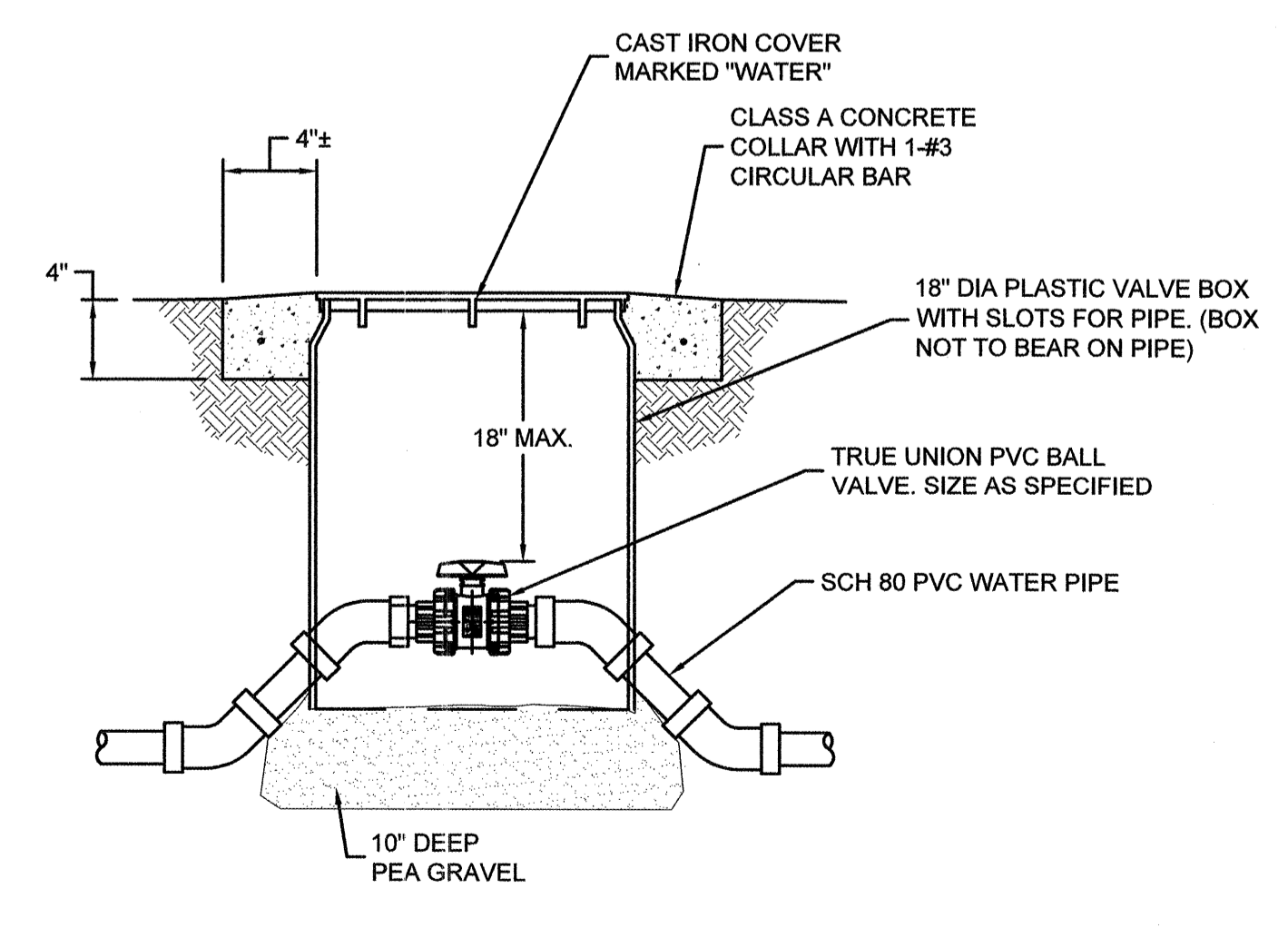
CROSSING MAINS

- NOTES:**
- REQUIRED FOR WATER MAINS CROSSING BELOW, OR WITHIN 2 FEET ABOVE, SANITARY SEWER MAINS.
 - IN LIEU OF THIS PROCEDURE THIS 20' SECTION OF WATER LINE CASING PIPE CAN BE DELETED AND THE SEWER LINE REPLACED WITH DUCTILE IRON PIPE WITH WATERTIGHT JOINTS TO MAINTAIN 10.0 FT. CLEARANCE EITHER SIDE OF WATERLINE.
 - CEMENT STABILIZE SAND BACKFILL INITIAL BACKFILL ZONE OF SEWER FOR 10.0 FT. EACH SIDE OF CROSSING. CENTER ONE JOINT OF WATER MAIN ON SEWER PIPE.

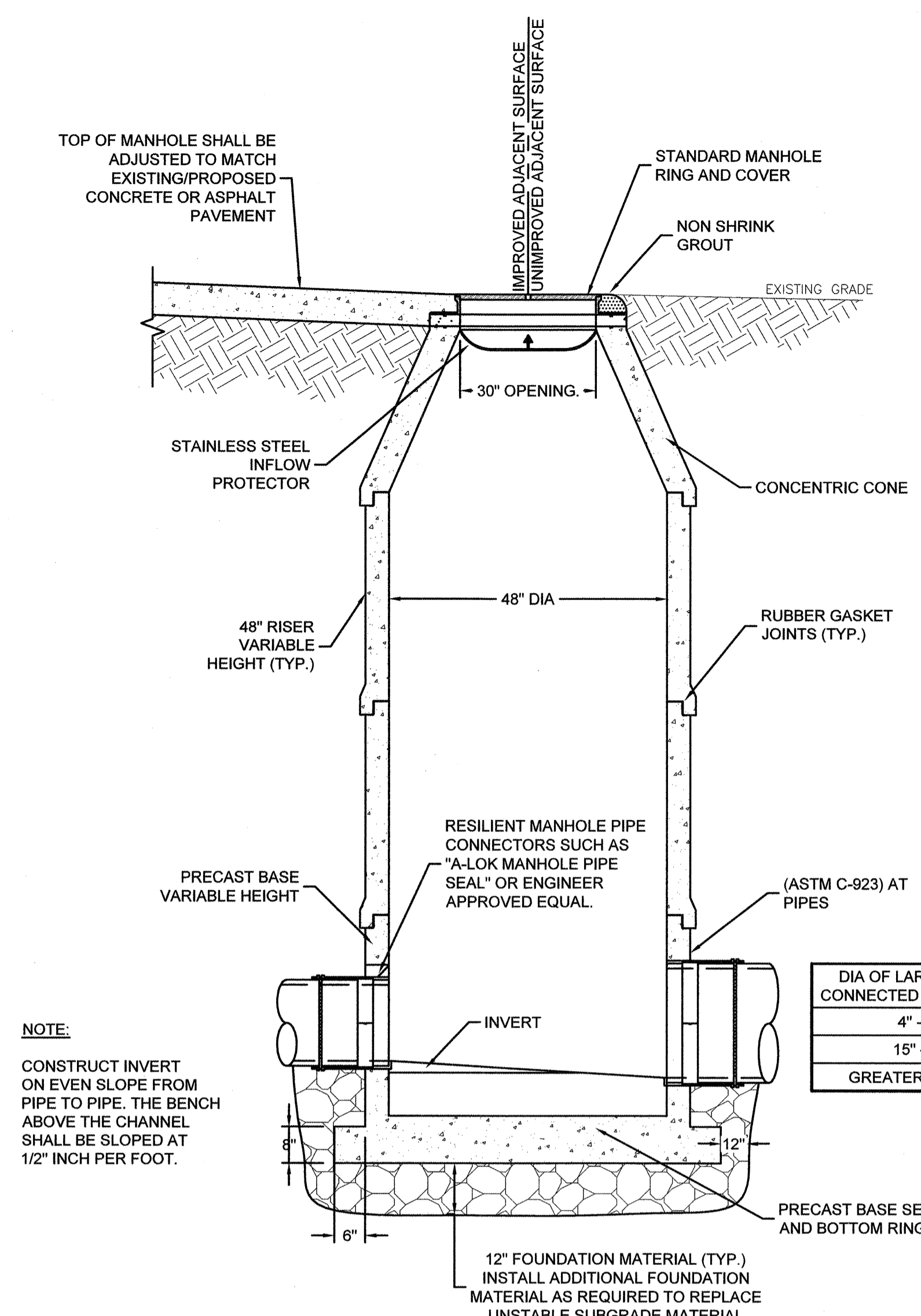


CASING DETAIL

UTILITY CROSSINGS DETAIL
NTS



VALVE IN VALVE BOX DETAIL (FOR VALVE LESS THAN 2")
NTS



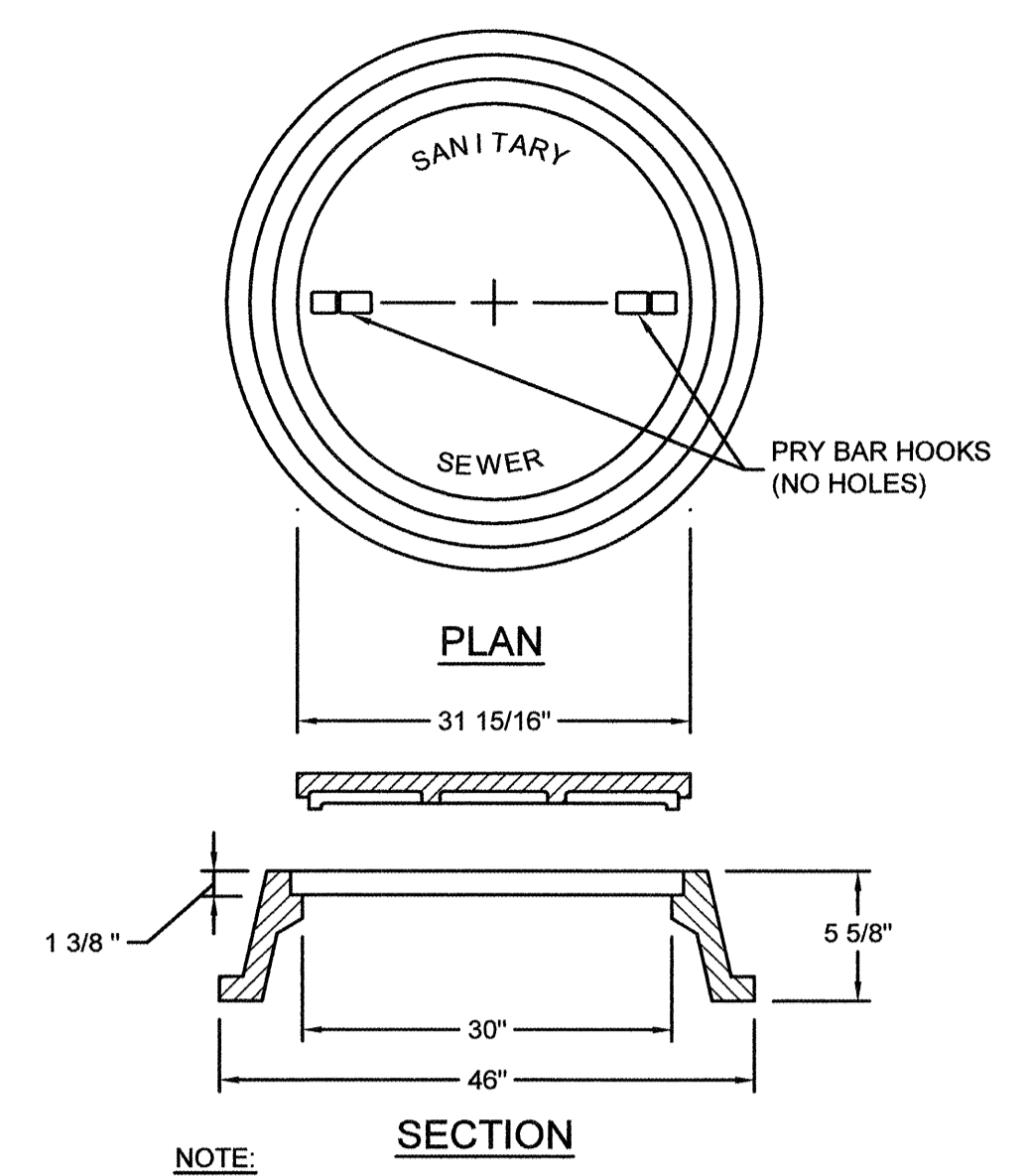
NOTE:
CONSTRUCT INVERT ON EVEN SLOPE FROM PIPE TO PIPE. THE BENCH ABOVE THE CHANNEL SHALL BE SLOPED AT 1/2" INCH PER FOOT.

DIA OF LARGEST PIPE CONNECTED TO MANHOLE	DEPTH OF MANHOLE CHANNEL
4" - 12"	EQUAL TO 1/2 DIA OF LARGEST PIPE
15" - 24"	EQUAL TO 3/4 DIA OF LARGEST PIPE
GREATER THAN 24"	EQUAL TO DIA OF LARGEST PIPE

TYPICAL MANHOLE SECTION
NTS

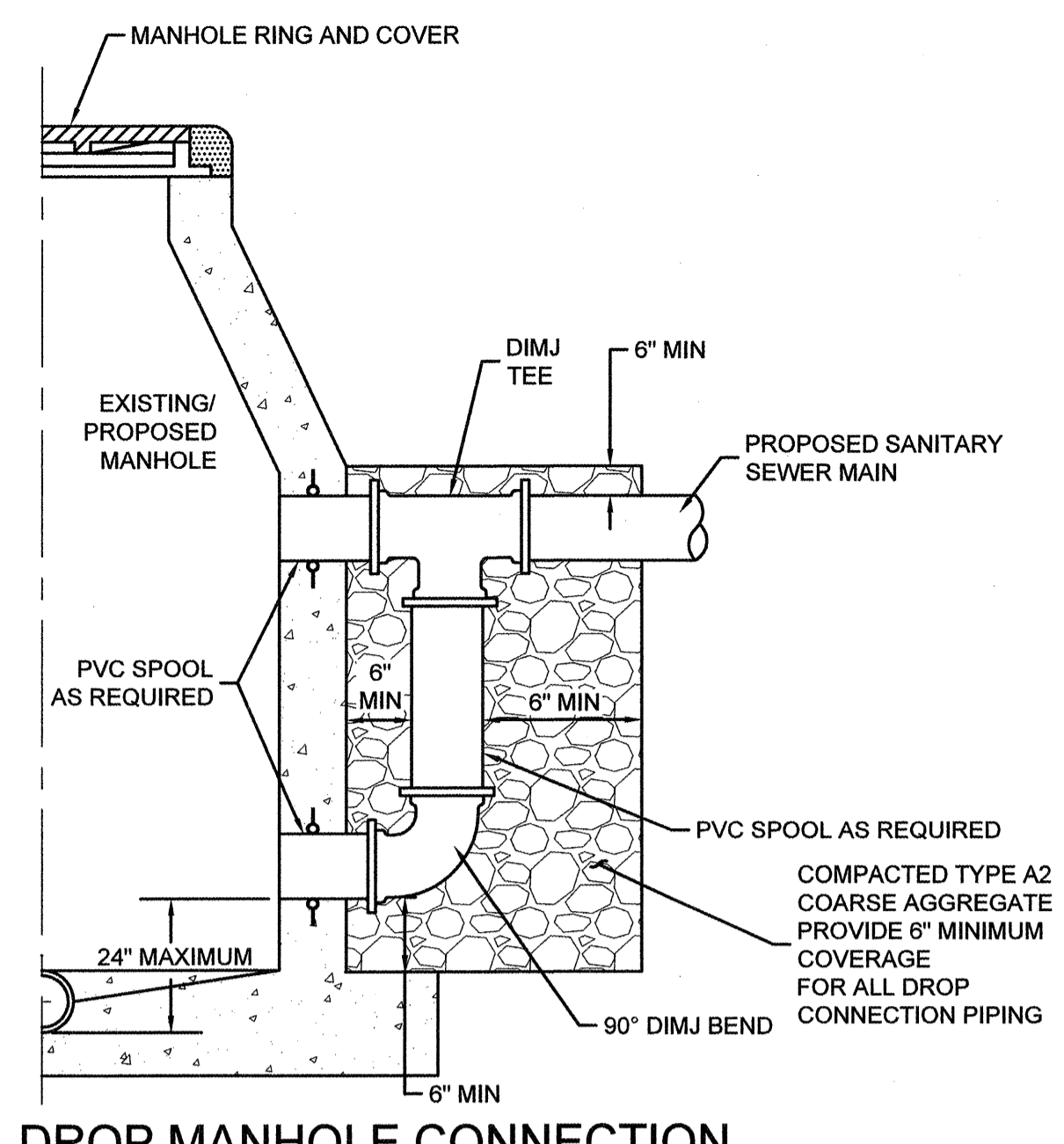
CONCRETE MANHOLE GENERAL NOTES:

1. PRECAST RISERS, CONES, FLOORS, GRADE RINGS, AND RINGS AND COVERS SHALL BE MANUFACTURED ACCORDING TO THE MOST RECENT ASTM C-478
2. ALL MANHOLE CONSTRUCTION SHALL BE WATERTIGHT. JOINTS SHALL BE RUBBER GASKET MANHOLE SECTIONS WITH PROFILE JOINT AND FORSHEDA 114 JOINT SEALS OR APPROVED EQUALS.
3. ANY ERECTION HOLES, STEP HOLES, OR OTHER HOLES THROUGH THE WALL OF THE MANHOLE SHALL BE COVERED WITH 3" NON-SHRINK CONCRETE GROUT.
4. GRADE RINGS SHALL BE FORMED WITH TONGUE AND GROOVE OF JUGS AND NOTCHES. GRADE RINGS SHALL BE SET IN MORTAR OF PLASTIC JOINT COMPOUND.
5. WHEN FIELD CONDITIONS REQUIRE HEIGHT TO BE ADJUSTED, ADDITIONAL GRADE RINGS MAY BE USED AS DIRECTED BY THE ENGINEER.
6. WHENEVER THE SUBGRADE FOR ANY MANHOLE OR DROP MANHOLE IS OF AN UNSATISFACTORY MATERIAL, UNSATISFACTORY MATERIAL SHALL BE REMOVED AND REPLACED WITH FOUNDATION MATERIAL AND COMPACTED TO THE SATISFACTION OF THE ENGINEER.
7. ALL CONCRETE ENCASUREMENT IN ROCK SHALL BE POURED AGAINST THE FACE OF THE ROCK. NO PAYMENT WILL BE MADE FOR EXTRA CONCRETE USED IN OVER BREAKAGE OF THE DIMENSIONS AS SHOWN ON THE TYPICAL SECTION OF CONCRETE ENCASUREMENT.
8. WHENEVER SEWER PIPE IS CONNECTED INTO THE WALL OF A MANHOLE WITHOUT A RESILIENT MANHOLE PIPE CONNECTOR THE FIRST JOINT OF THE SEWER PIPE SHALL BE LOCATED A MAXIMUM OF 12" OUTSIDE THE WALL OF THE MANHOLE. CONNECTION INTO A MANHOLE WITHOUT A RESILIENT CONNECTOR WILL BE USED ONLY UPON APPROVAL OF THE ENGINEER.
9. BACKFILL EXCAVATION WITH SELECT FILL COMPACTED IN 8" LAYERS TO 95% OF MAXIMUM DENSITY WITHIN 2% OF OPTIMUM MOISTURE AS DETERMINED BY ASTM D-698.



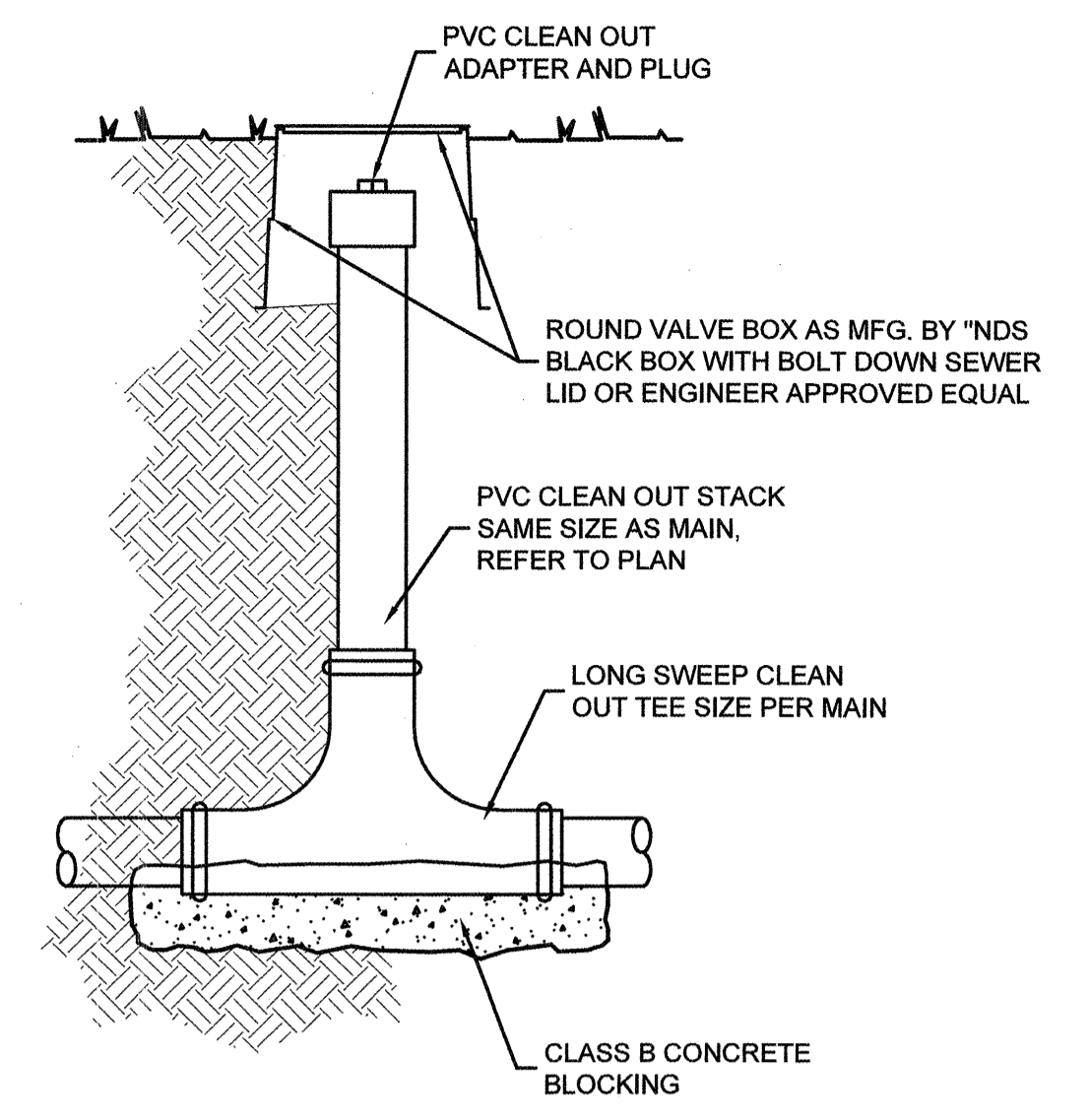
STANDARD MANHOLE RING AND COVER
NTS

NOTE:
FRAME AND COVER TO BE MACHINED SURFACE CAST IRON NON-ROCKING TYPE. (SEE SPECIFICATIONS)

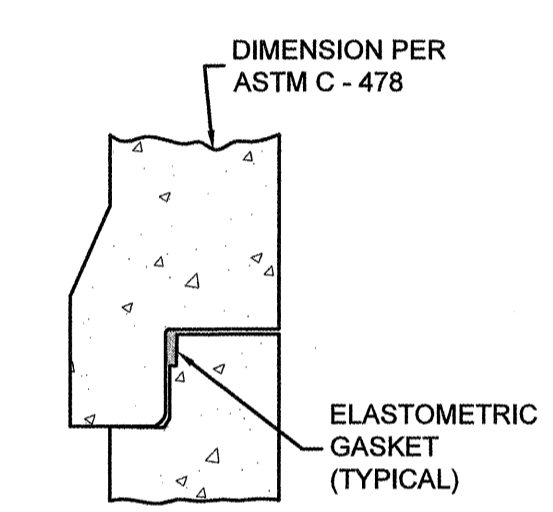


DROP MANHOLE CONNECTION
NTS

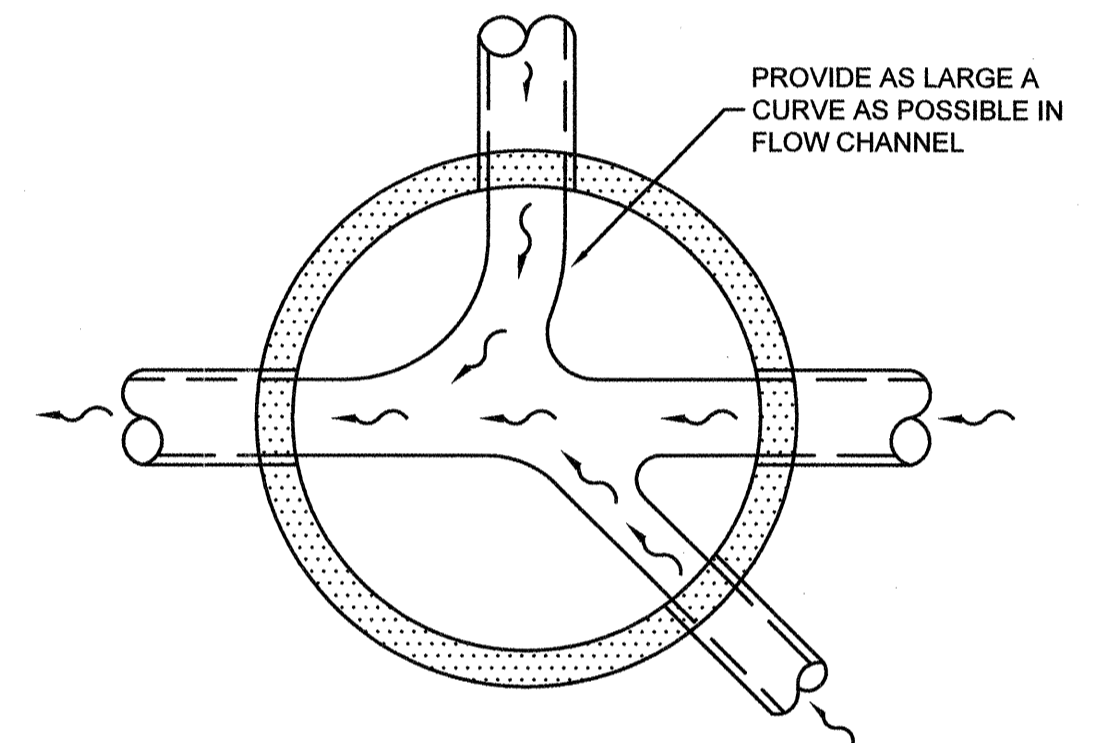
NOTES:
DROP MANHOLE CONNECTIONS SHALL BE CONSTRUCTED WHERE A CONNECTION PIPE ENTERS A MANHOLE MORE THAN 24" ABOVE THE MANHOLE INVERT.



TYPICAL CLEAN OUT
NTS

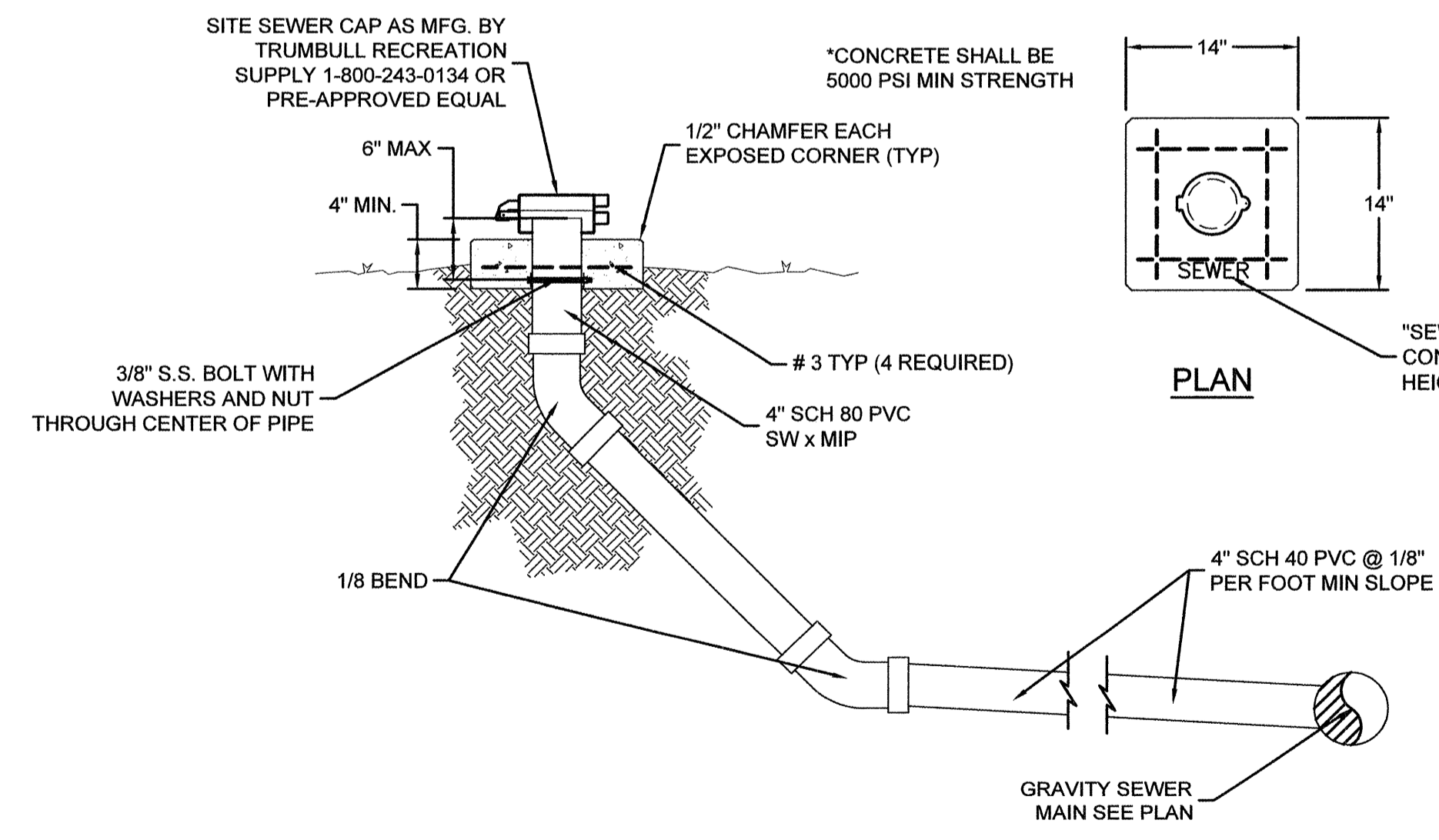


TYPICAL MANHOLE JOINT
NTS

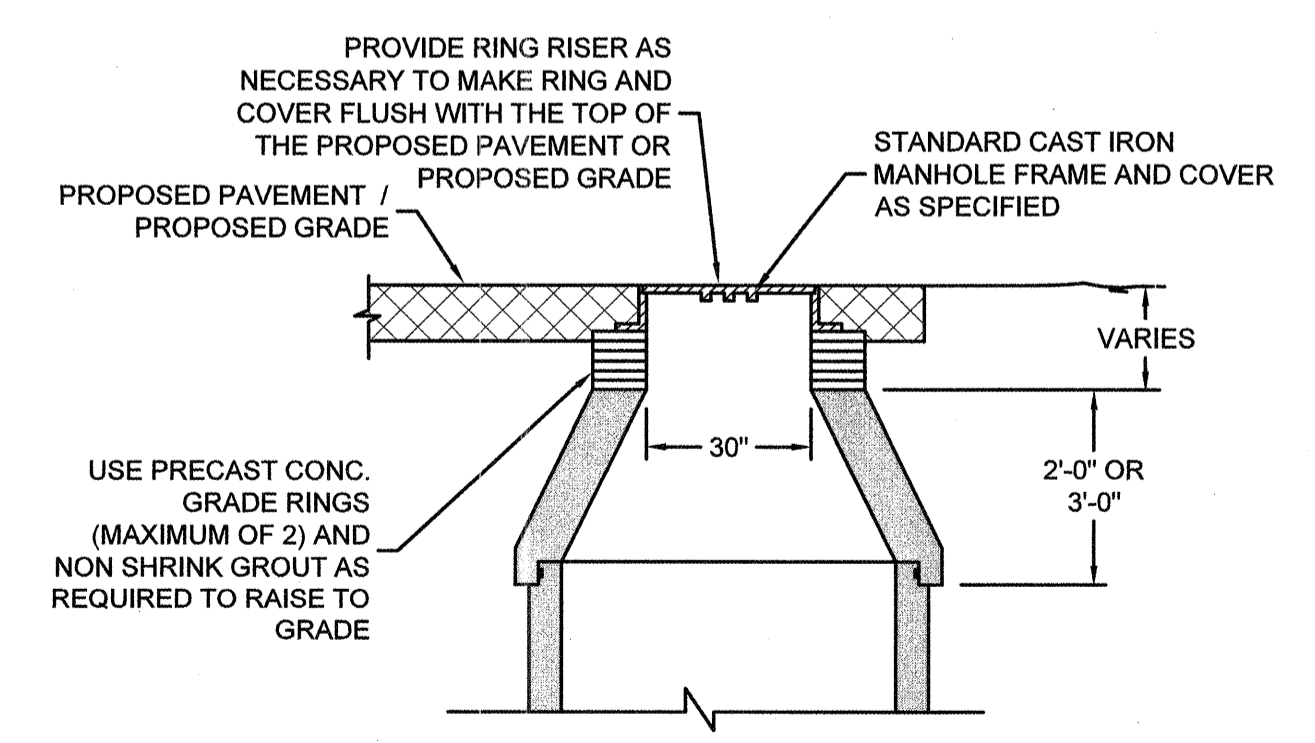


MANHOLE BOTTOM DETAIL
NTS

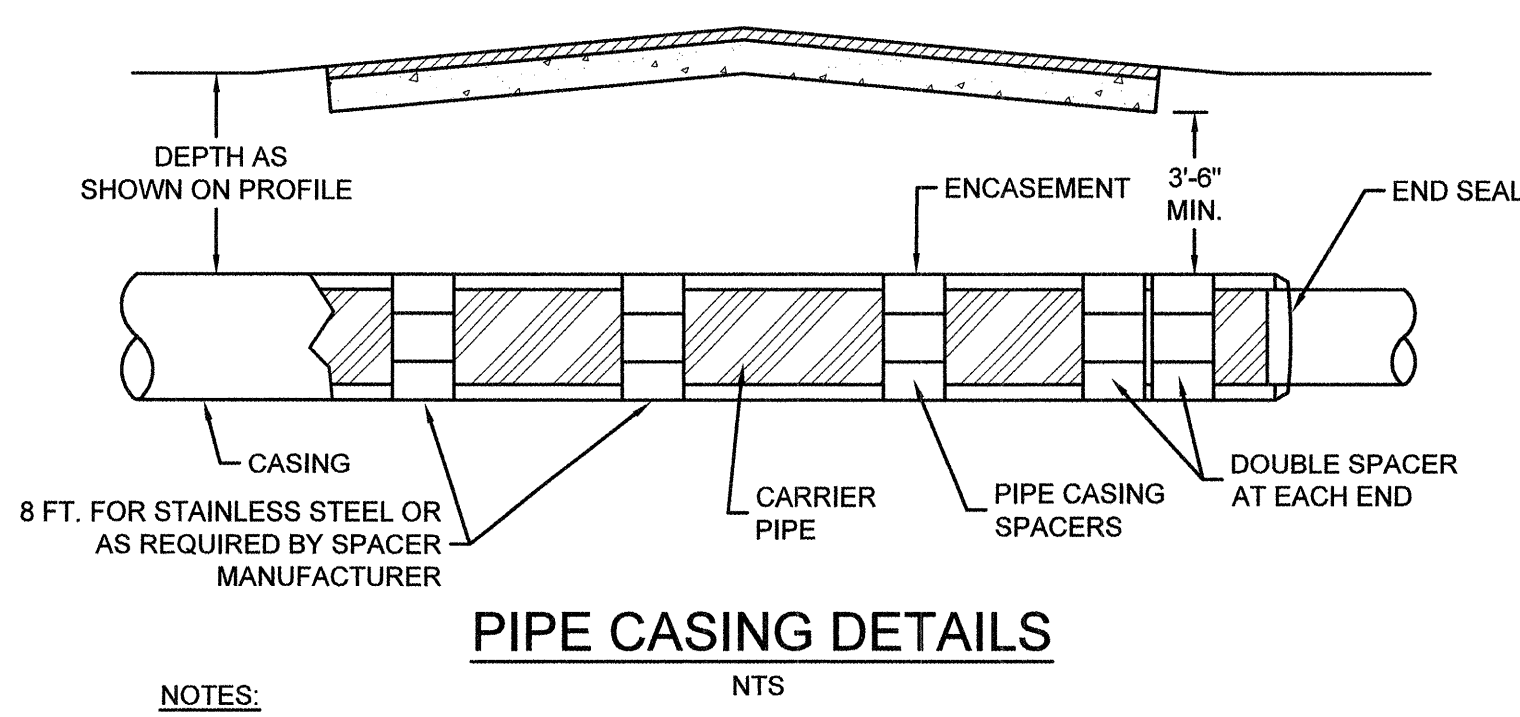
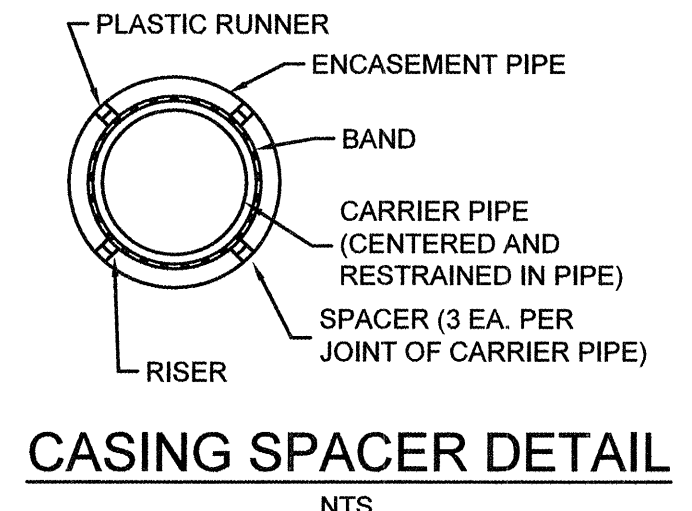
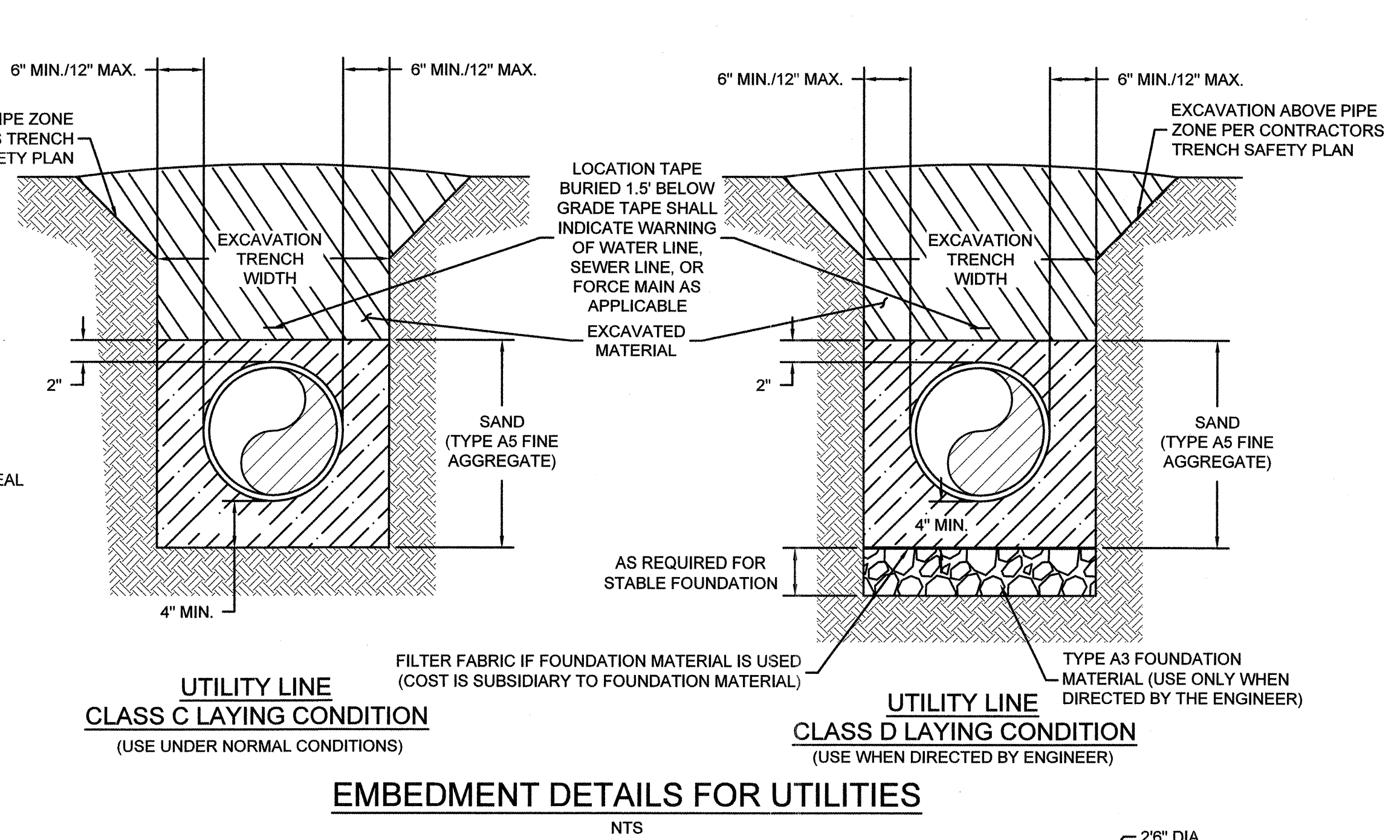
- NOTES:**
1. CENTERLINE OF ALL PIPES ENTERING AND LEAVING MANHOLE SHALL PASS THROUGH CENTER OF MANHOLE.
 2. CONSTRUCT FLOW CHANNEL FOR ALL PIPES ENTERING MANHOLE, INCLUDING SERVICES MAINTAIN A CONSTANT GRADE THROUGHOUT EACH INVERT.
 3. GROUT FILLET MANHOLE INVERTS FOR PIPES ENTERING MANHOLE WITHOUT DROP CONNECTION.



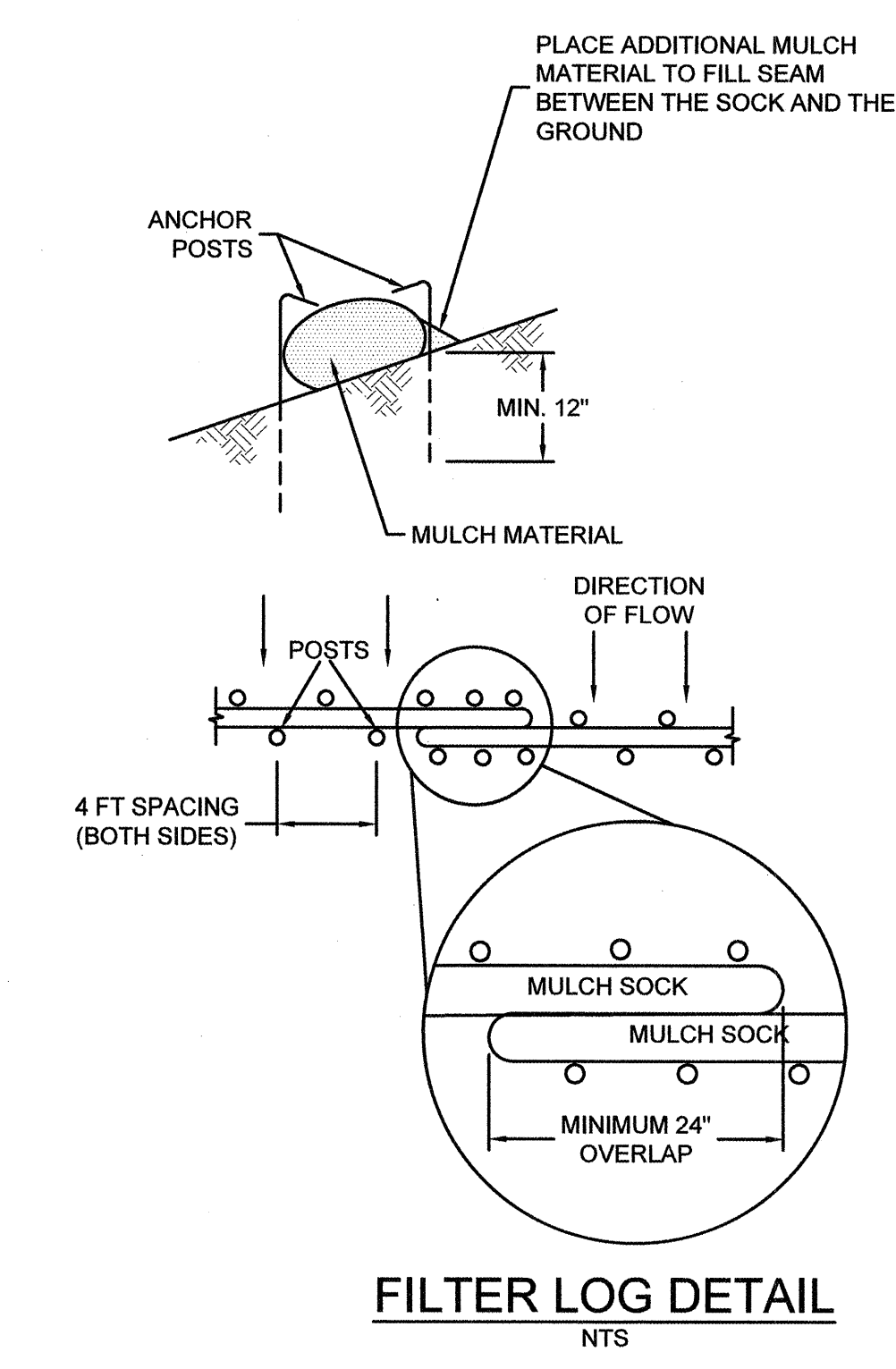
TYPICAL SANITARY SEWER SERVICE CONNECTION
NTS



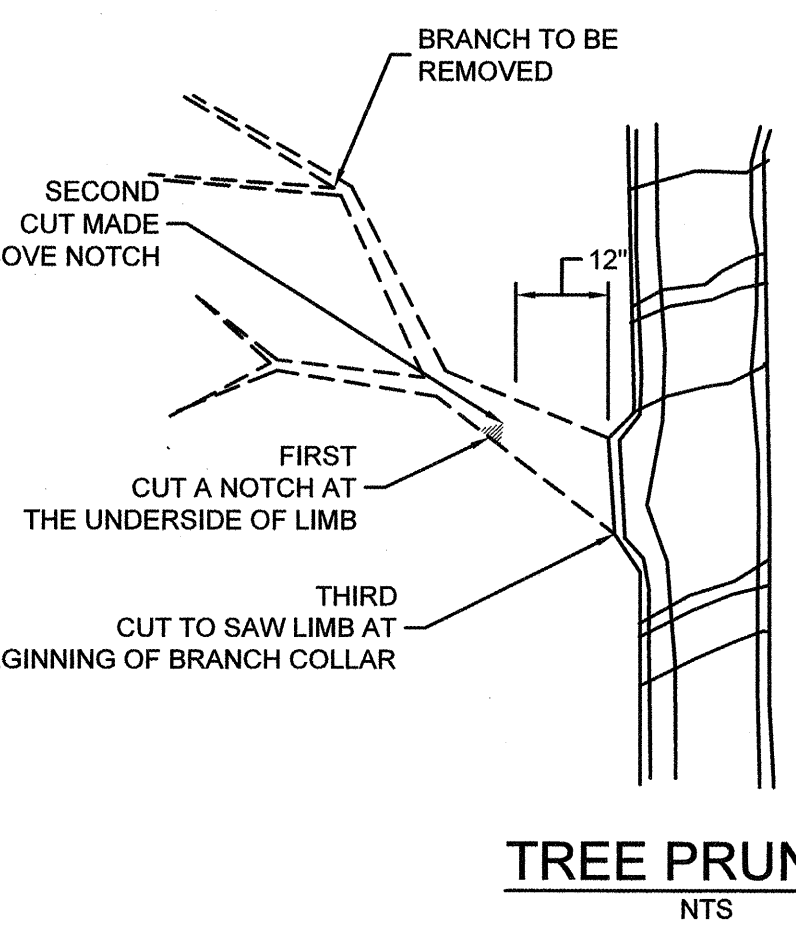
WASTEWATER MANHOLE ADJUSTMENT DETAIL
NTS



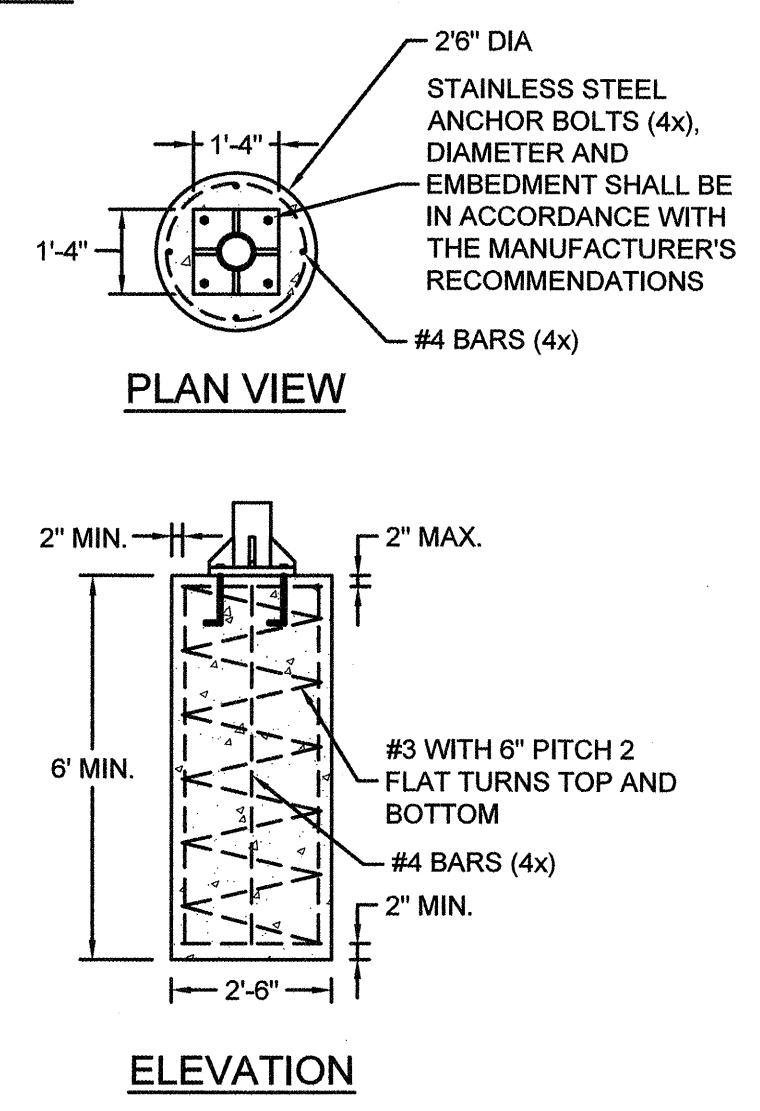
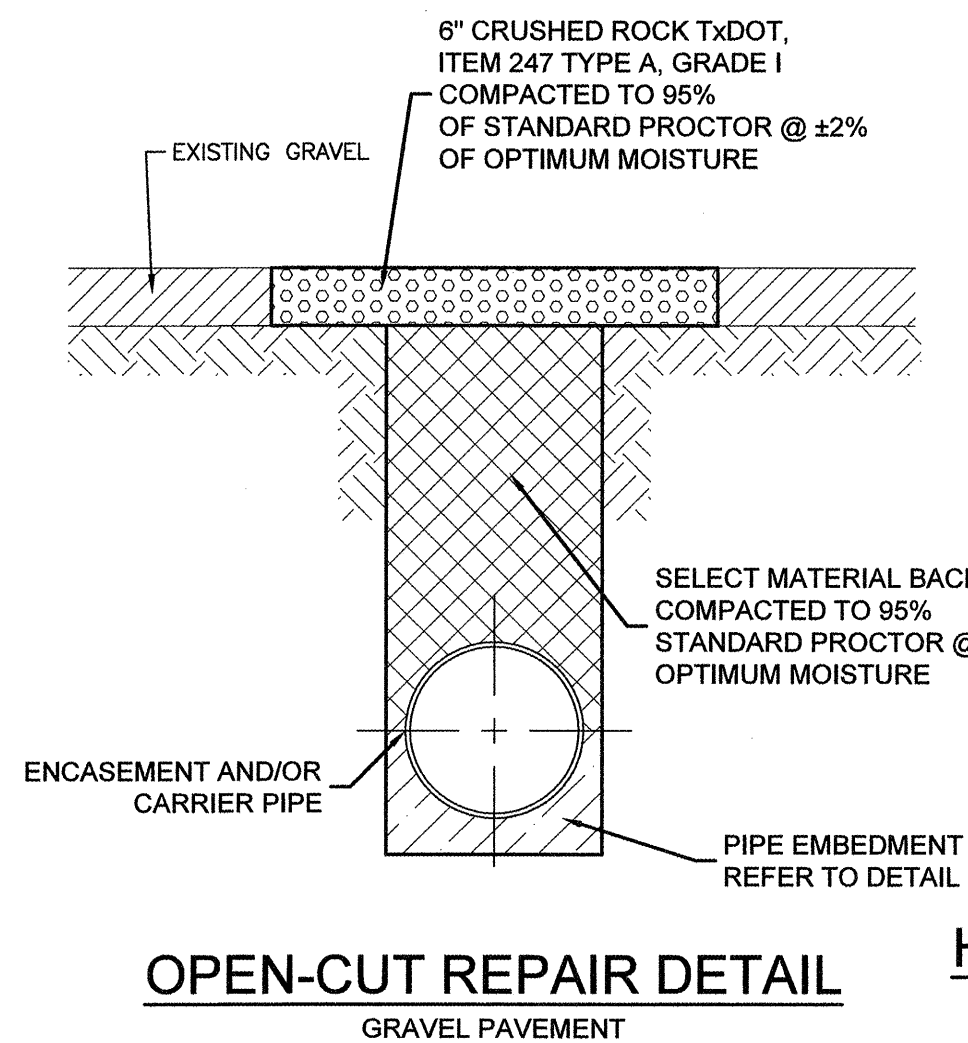
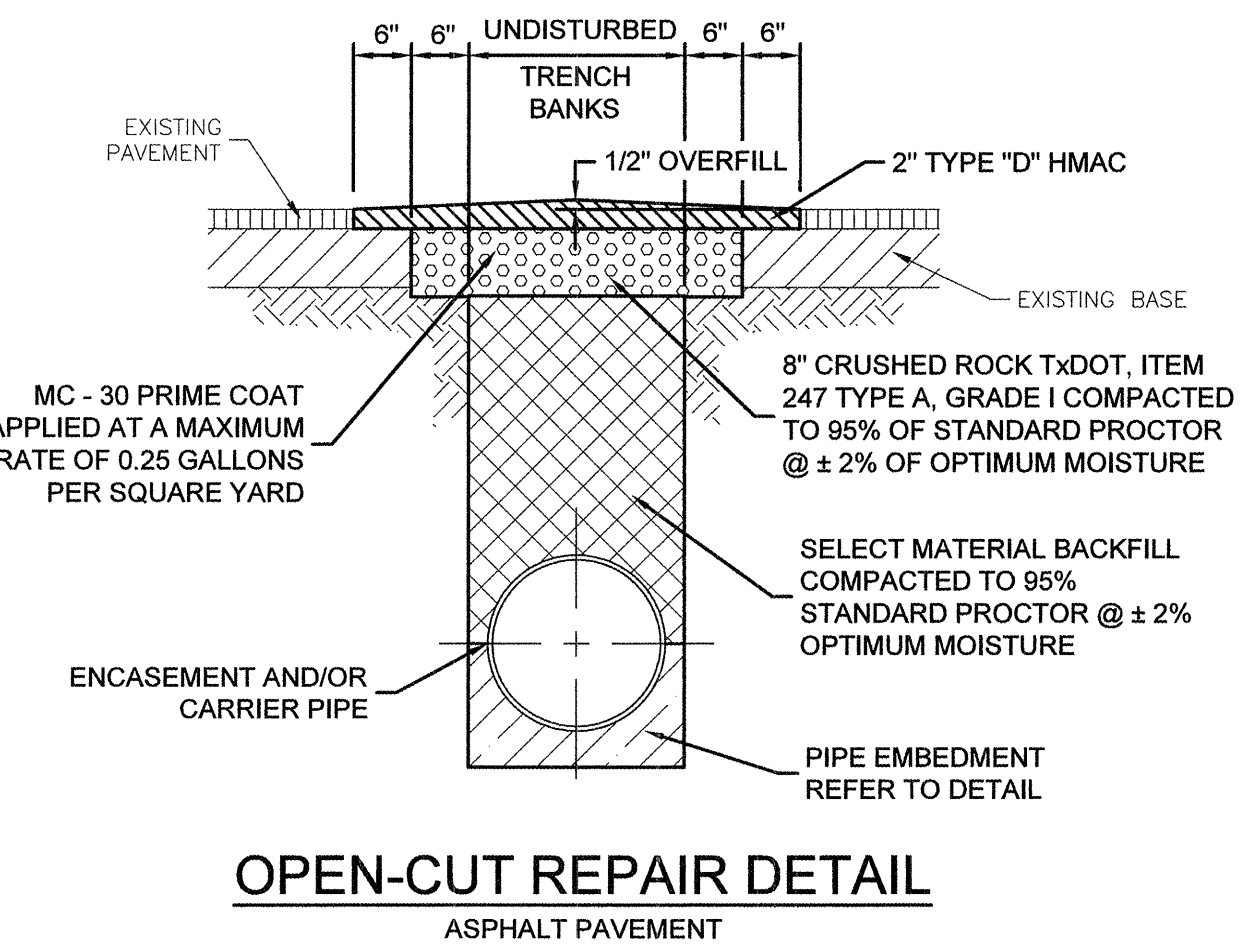
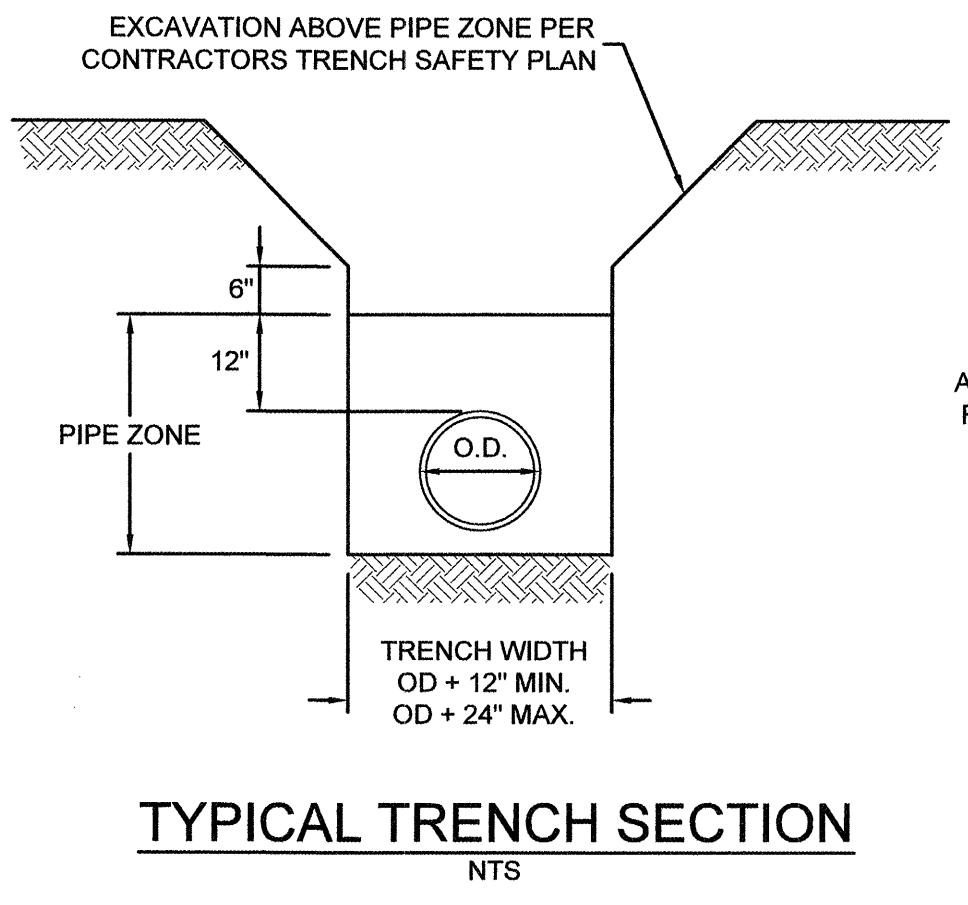
- NOTES:**
- CASING SPACERS SHALL BE STAINLESS STEEL.
 - ENCASMENT PIPE SHALL BE OF SIZE AND THICKNESS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
 - CASING SPACERS SHALL CENTER AND RESTRAIN CARRIER PIPE IN CASING.
 - CASING END SEALS SHALL BE "PULLON" TYPE, "WRAP AROUND" END SEALS ARE PROHIBITED.



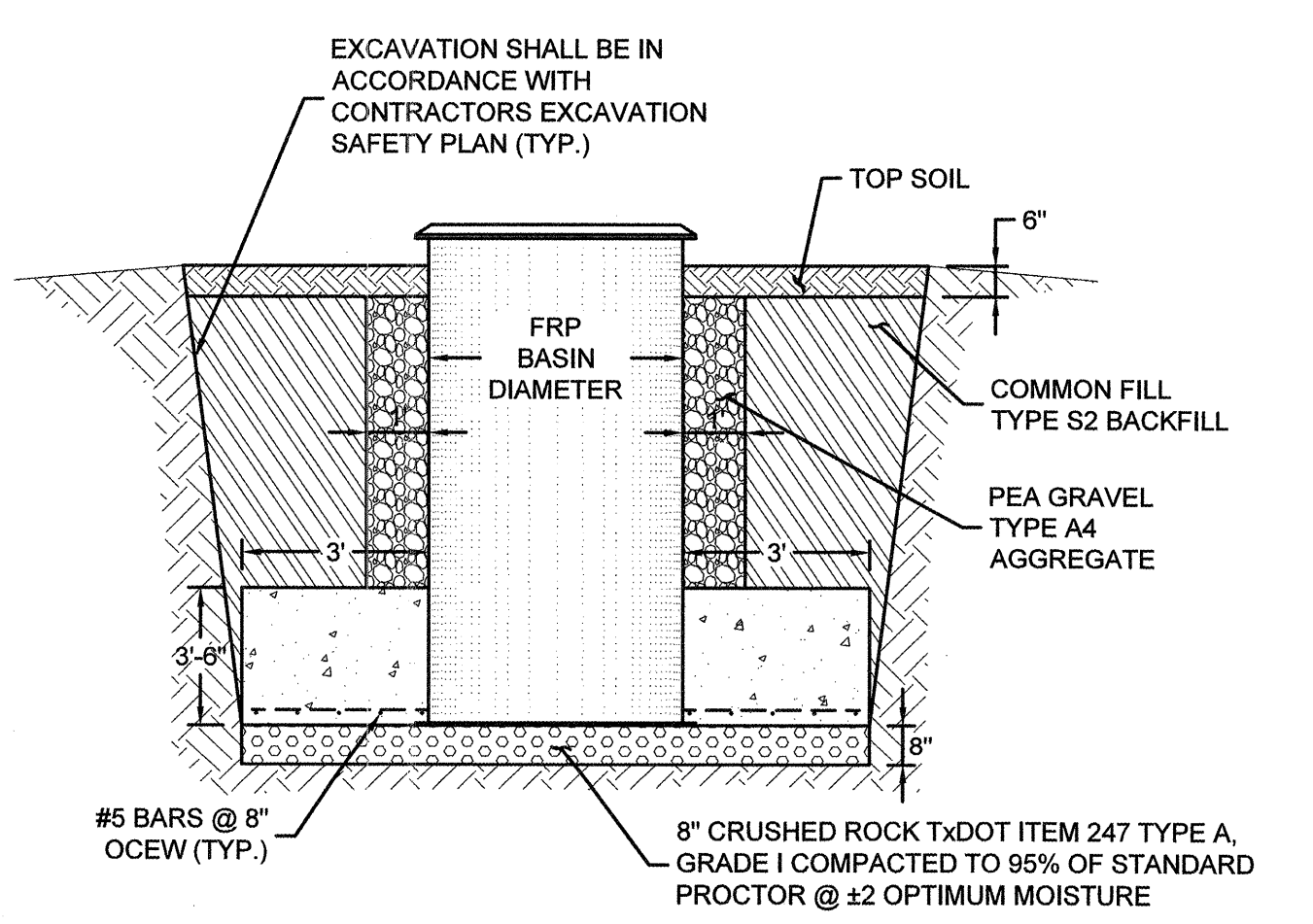
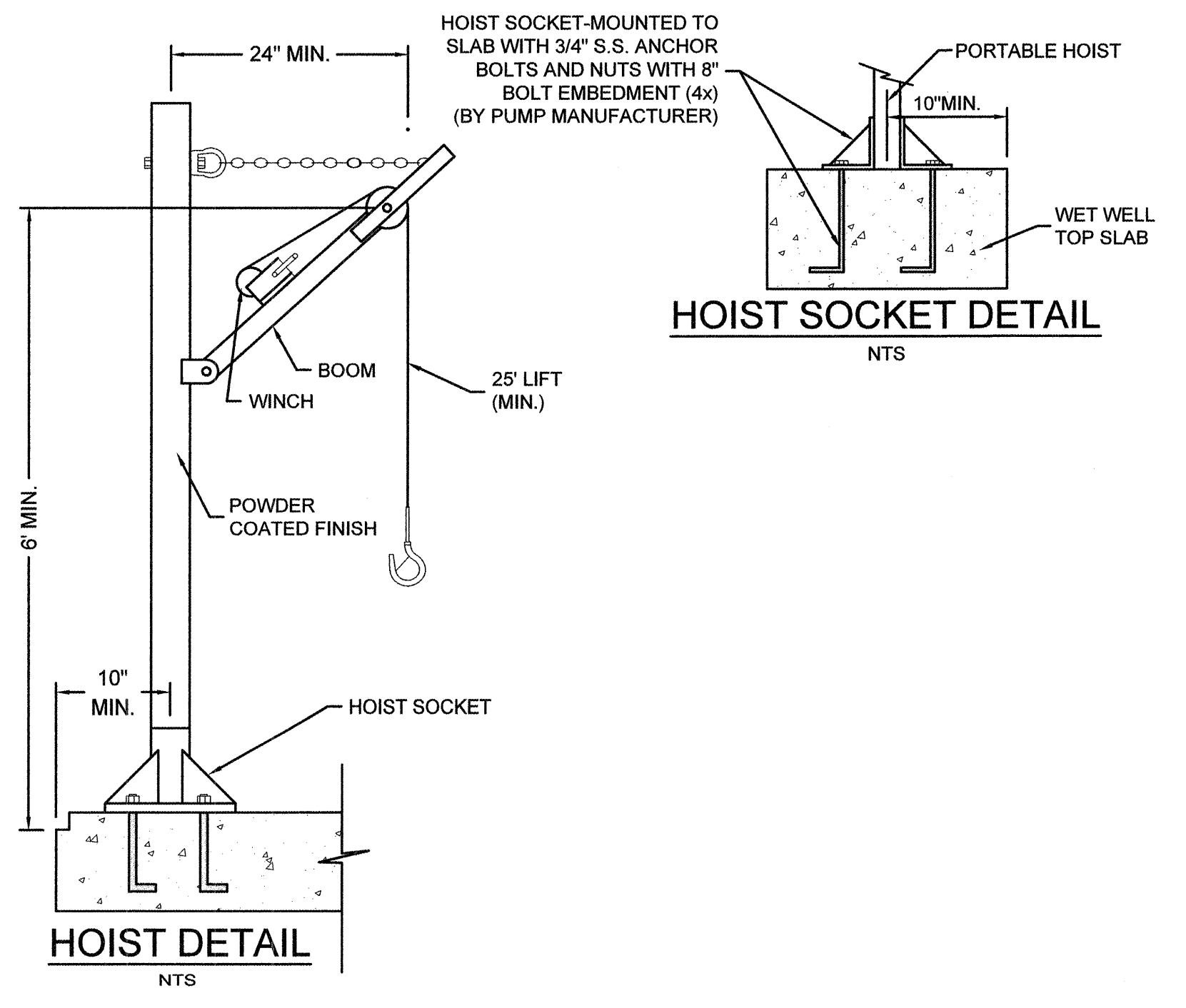
- NOTES:**
- MULCH SOCKS SHALL BE 12" DIAMETER AND MADE OUT OF BIO-DEGRADABLE OR RECYCLABLE MATERIAL SUCH AS BURLAP, TWINE AND SOME DEGRADABLE PLASTICS. IT IS PREFERRED THAT ON-SITE MULCH PRODUCED FROM TREE TRIMMING REQUIRED FOR THIS PROJECT IS USED TO FILL THE SOCKS. OTHER MATERIAL MAY BE ACCEPTABLE AT THE ENGINEER'S DISCRETION.
 - WOOD POSTS ARE PREFERRED IF THEY ARE ABLE TO BE DRIVEN INTO SOIL ON-SITE. END PROTECTION SHALL BE REQUIRED TO PREVENT IMPALEMENT. STAKES SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
 - THE TOE OF THE MULCH SOCK SHALL BE PLACED SO THAT THE MULCH SOCK IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
 - MULCH MATERIAL MUST BE FREE OF INVASIVE PLANT SEEDS, REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH; IT IS NOT ACCEPTABLE FOR THE MULCH MATERIAL TO CONTAIN GROUND CONSTRUCTION DEBRIS, BIOSOLIDS, OR MANURE.
 - ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.
 - AT THE CONCLUSION OF CONSTRUCTION, SOCKS MAY BE CUT OPEN AND MULCH SPREAD ON-SITE. ALL OTHER DEBRIS TO BE REMOVED FROM SITE.



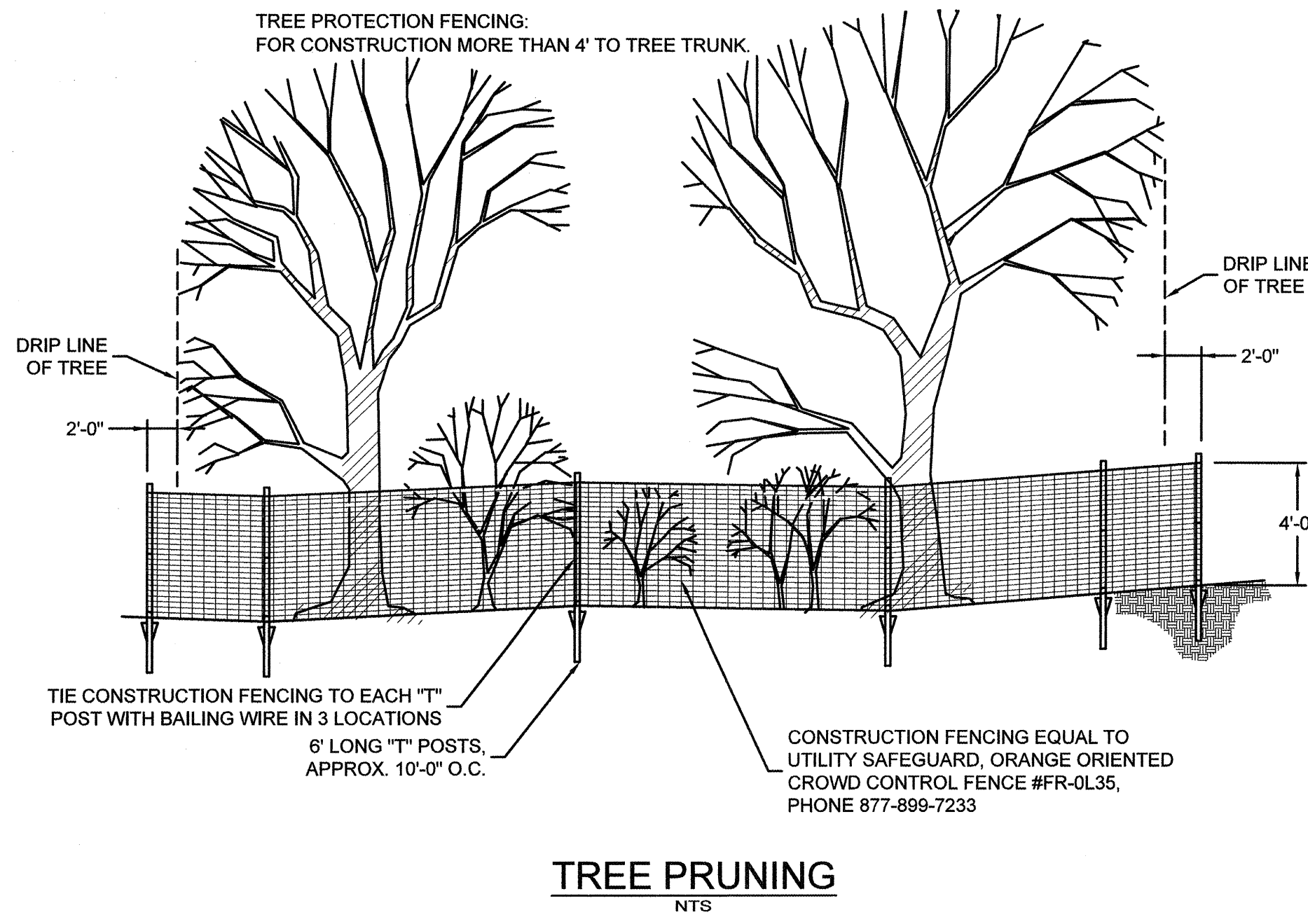
- NOTES:**
- ALL PRUNING SHALL BE PERFORMED BY A ISA CERTIFIED ARBORIST UNLESS AUTHORIZED IN WRITING BY OWNER OTHERWISE.
 - ALL PRUNING SHALL BE DONE WITH CURVED PRUNING SAW, SHARP SHEARS, OR APPROVED EQUAL.
 - OMIT THE FIRST AND SECOND CUTS ON LIMBS THAT CAN BE SUPPORTED BY ONE HAND WHILE TRIMMING.



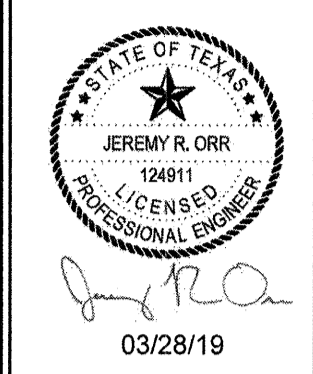
- NOTE:**
CONCRETE SHALL BE CLASS A.



- NOTES:**
- CONCRETE SHALL BE CLASS A.
 - FRP LIFT STATION SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.



- NOTES:**
- TREE PROTECTION IS REQUIRED FOR ALL EXISTING TREES WITHIN 20' OF THE LIMITS OF CONSTRUCTION.
 - INSTALL WOOD SLAT TREE PROTECTION WHEN CONSTRUCTION IS CLOSER THAN 4' TO TREE TRUNK.
 - INSTALL TREE PROTECTION FENCING WHEN CONSTRUCTION IS FURTHER THAN 4' TO TRUNK.
 - PARKING OR VEHICULAR TRAFFIC WITHIN TREE DRIP LINES SHALL BE PROHIBITED UNLESS AUTHORIZED BY OWNER'S REPRESENTATIVE.



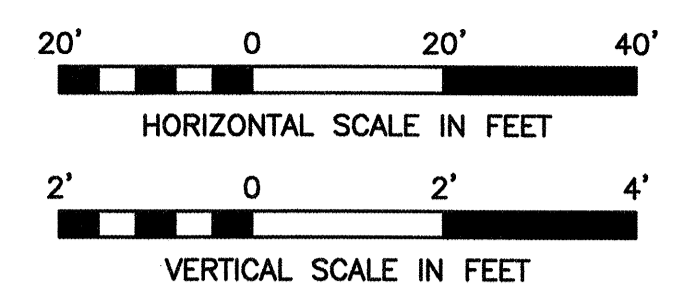
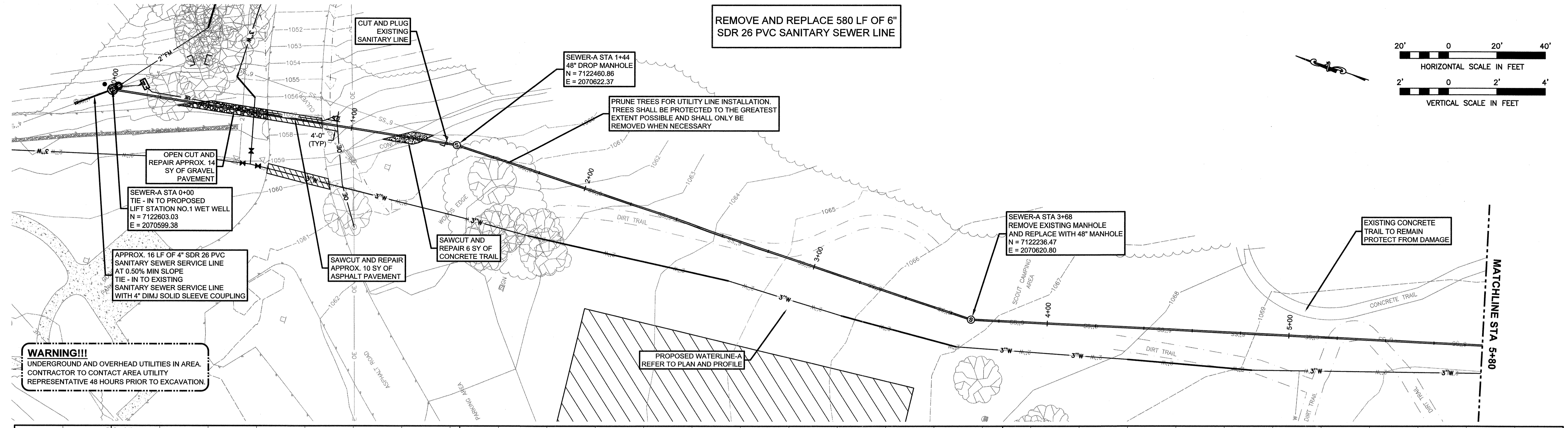
FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT
PROJECT NUMBER: 116818

DATE: 3/28/19
DESIGNED BY: CBA
DRAWN BY: JAM
REVIEWED BY: CBA
REVISED:
REVISED:

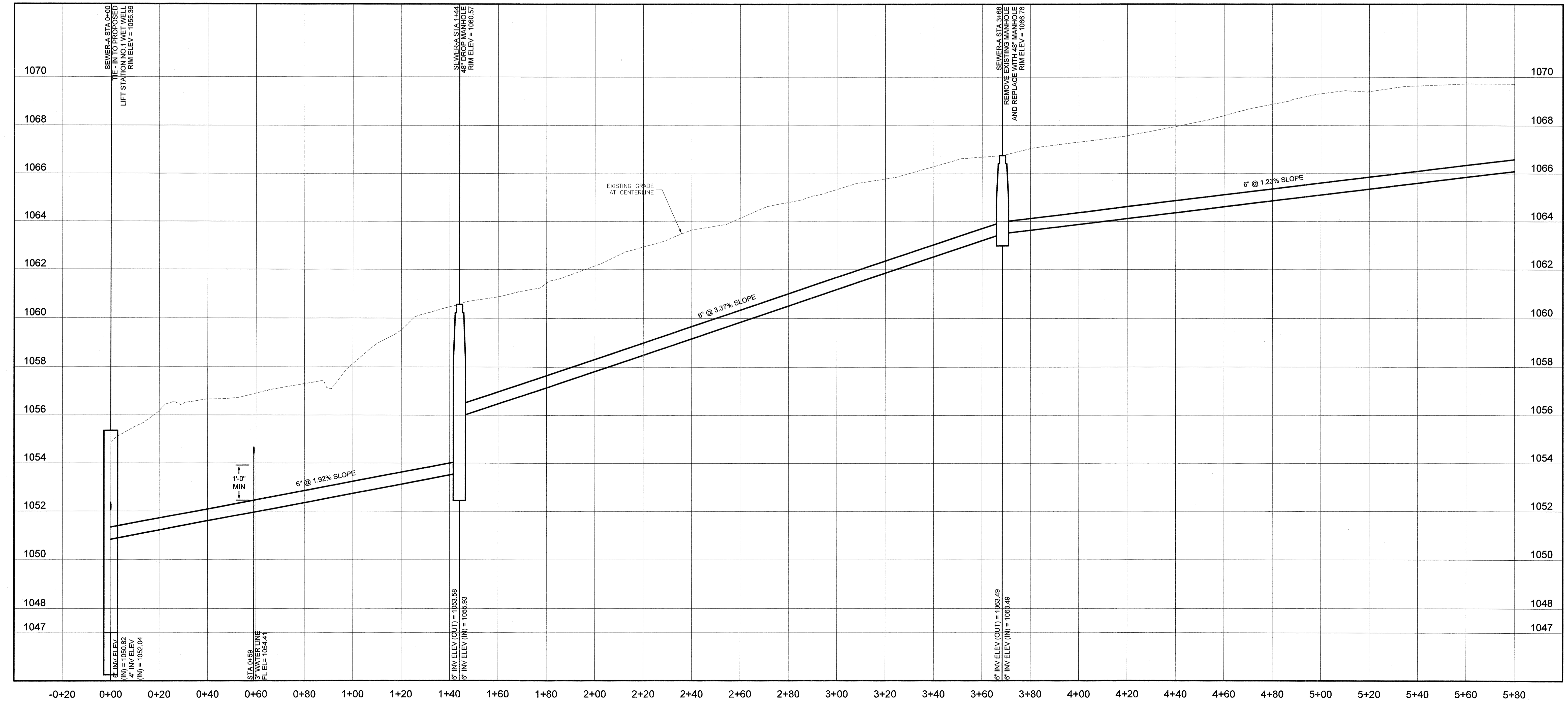
SHEET TITLE
SEWER
LINE A P&P
1

SHEET NUMBER
9

PERCENTAGE 100% CD DOCUMENT



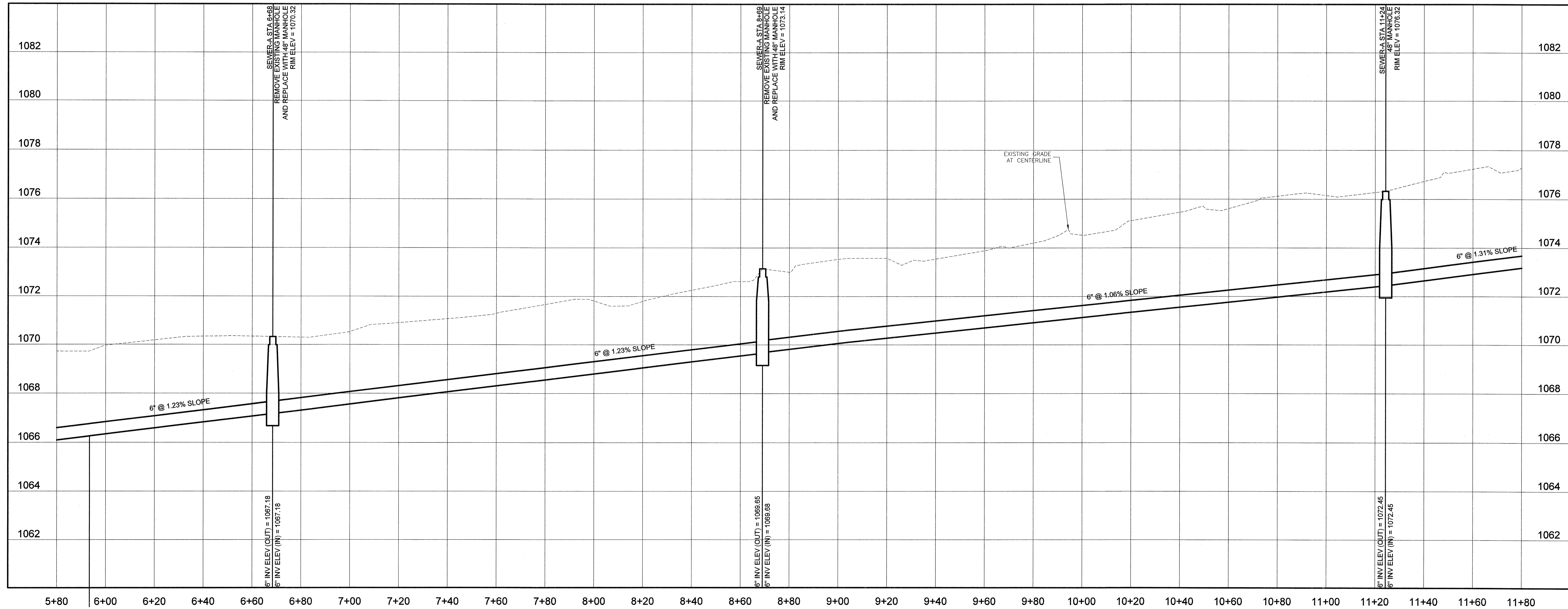
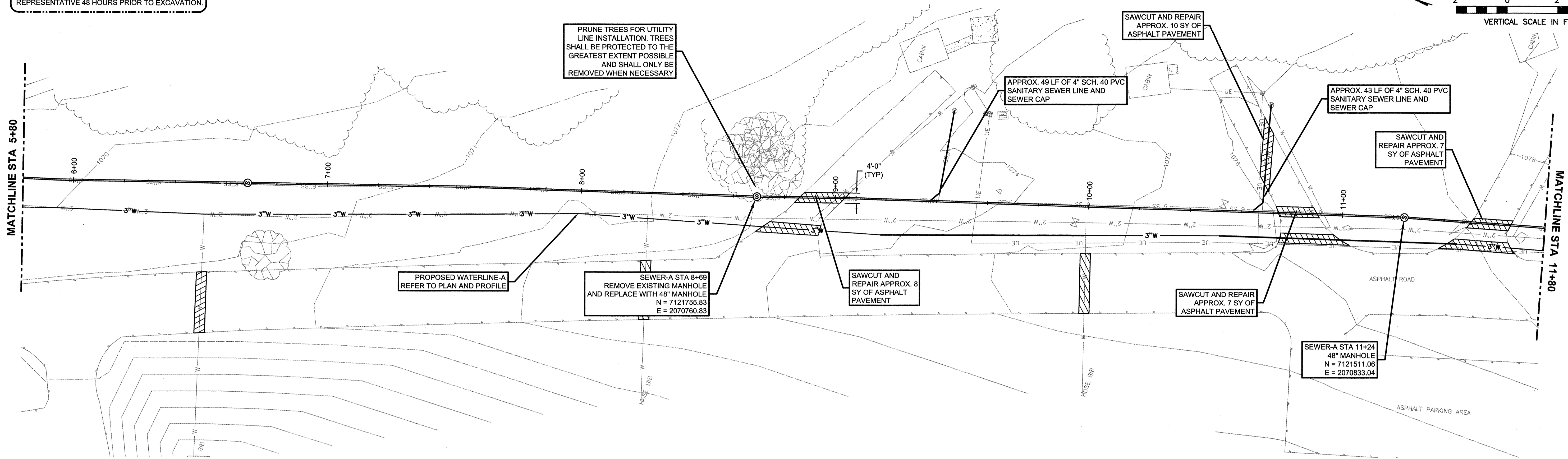
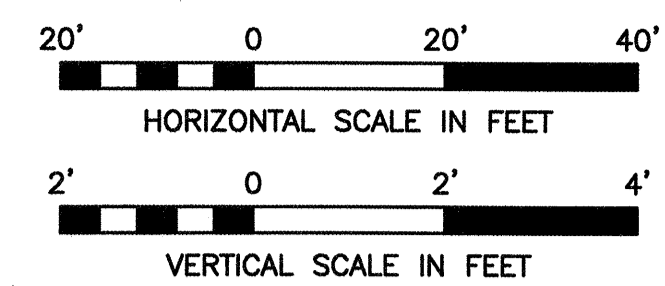
WARNING!!!
UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
CONTRACTOR TO CONTACT AREA UTILITY
REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.



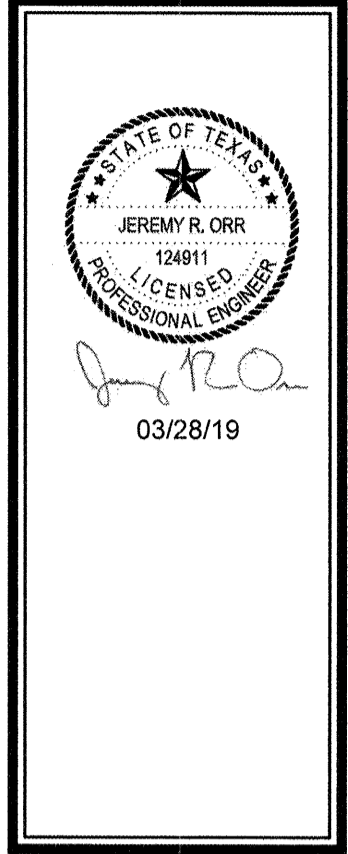
PATH: \\KSA-TL-SERVER3\Projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-PP-SSWR-001.dwg

REMOVE AND REPLACE 600
LF OF 6" SDR 26 PVC
SANITARY SEWER LINE

WARNING!!!
UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
CONTRACTOR TO CONTACT AREA UTILITY
REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.



TEXAS
PARKS &
WILDLIFE



FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:

SHEET TITLE
**SEWER
 LINE A
 P&P 2**

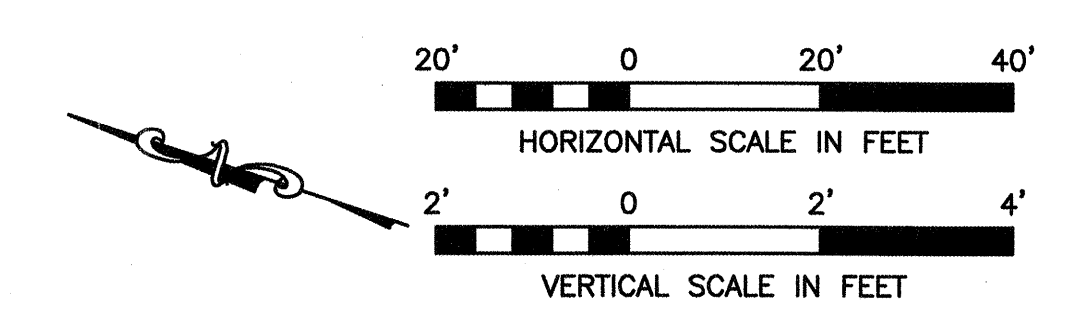
SHEET NUMBER
10

PERCENTAGE 100% CD DOCUMENT

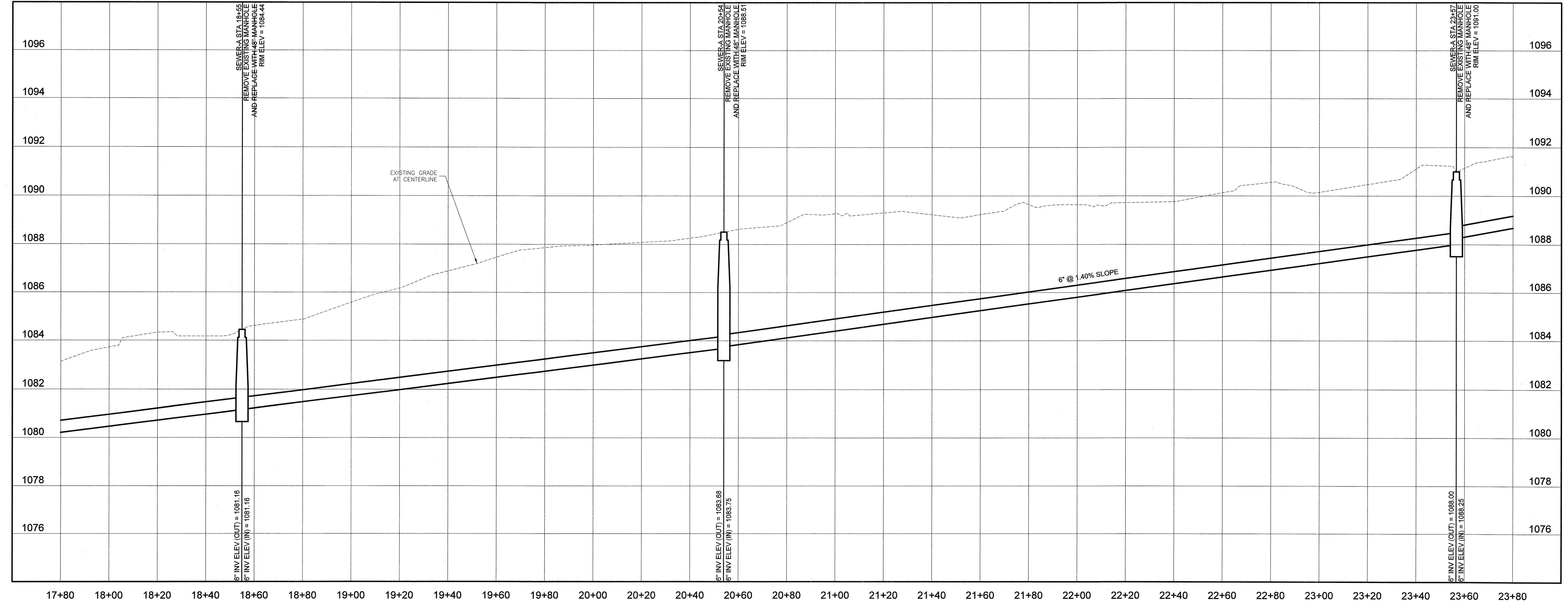
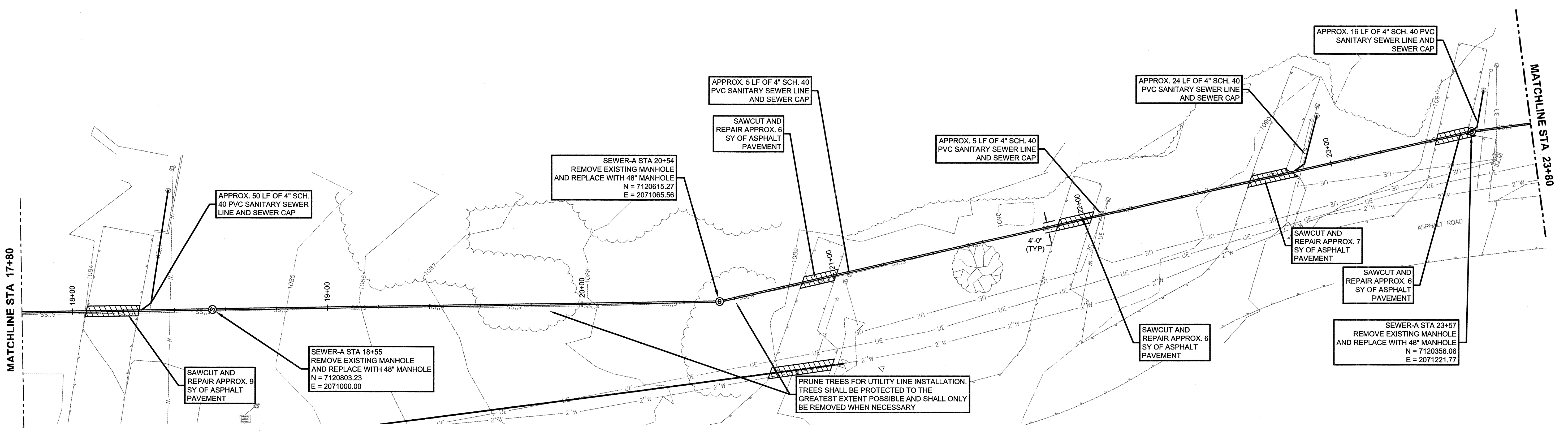
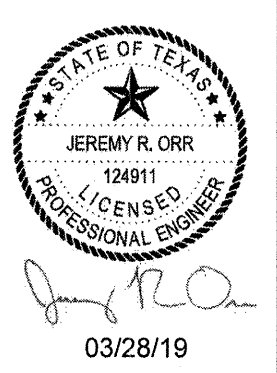
PATH: \\VSA-TL-SERVER3\projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-PP-SSWP-001.dwg

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.

REMOVE AND REPLACE
 600 LF OF 6" SDR 26 PVC
 SANITARY SEWER LINE



TEXAS
 PARKS &
 WILDLIFE



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT

PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:

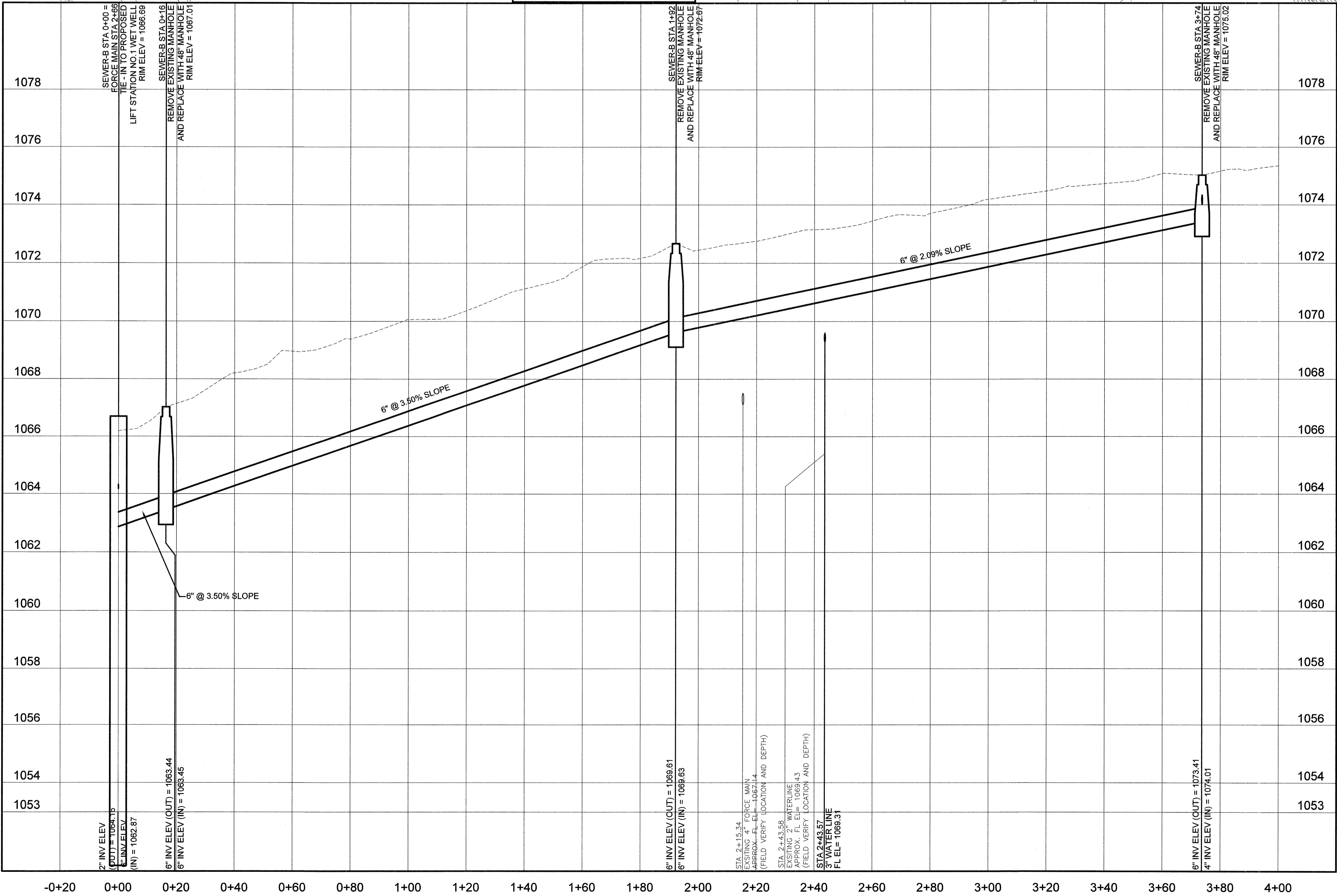
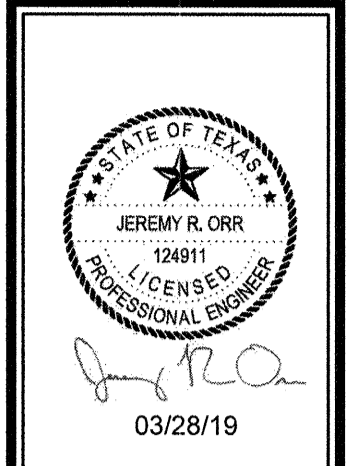
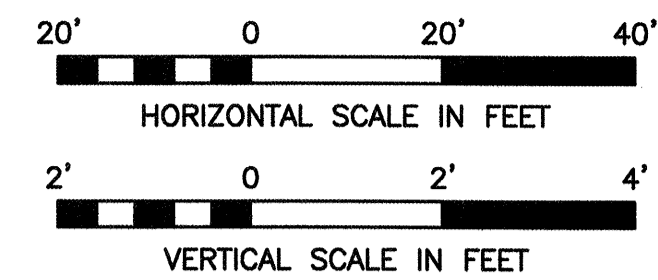
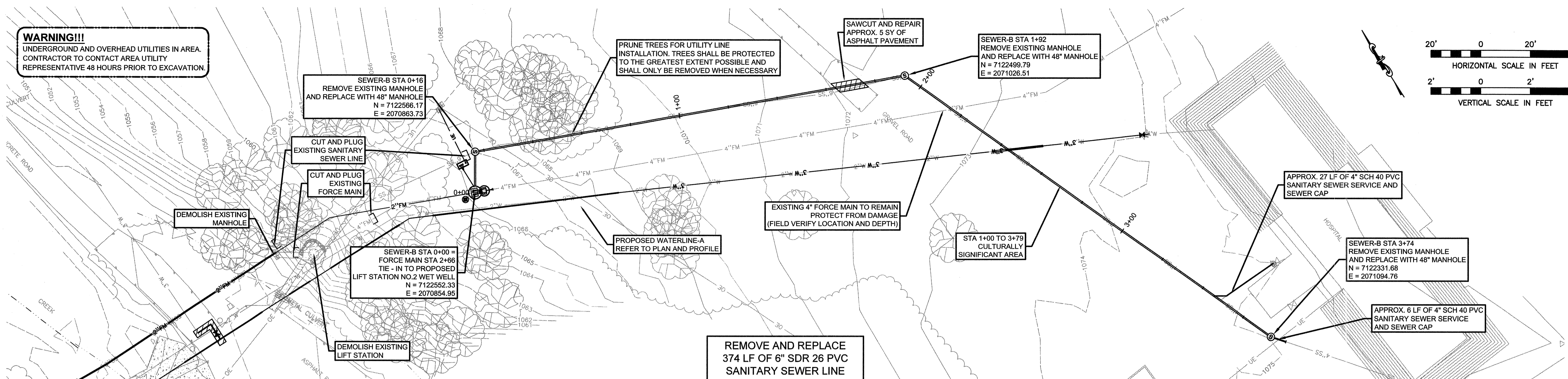
SHEET TITLE
 SEWER
 LINE A P&P
 4

SHEET NUMBER
 12

PERCENTAGE 100% CD DOCUMENT

PATH: \\KSA-TL-SERVER3\projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-P-PP-SSWR-001.dwg

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

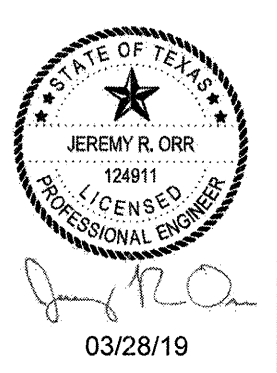
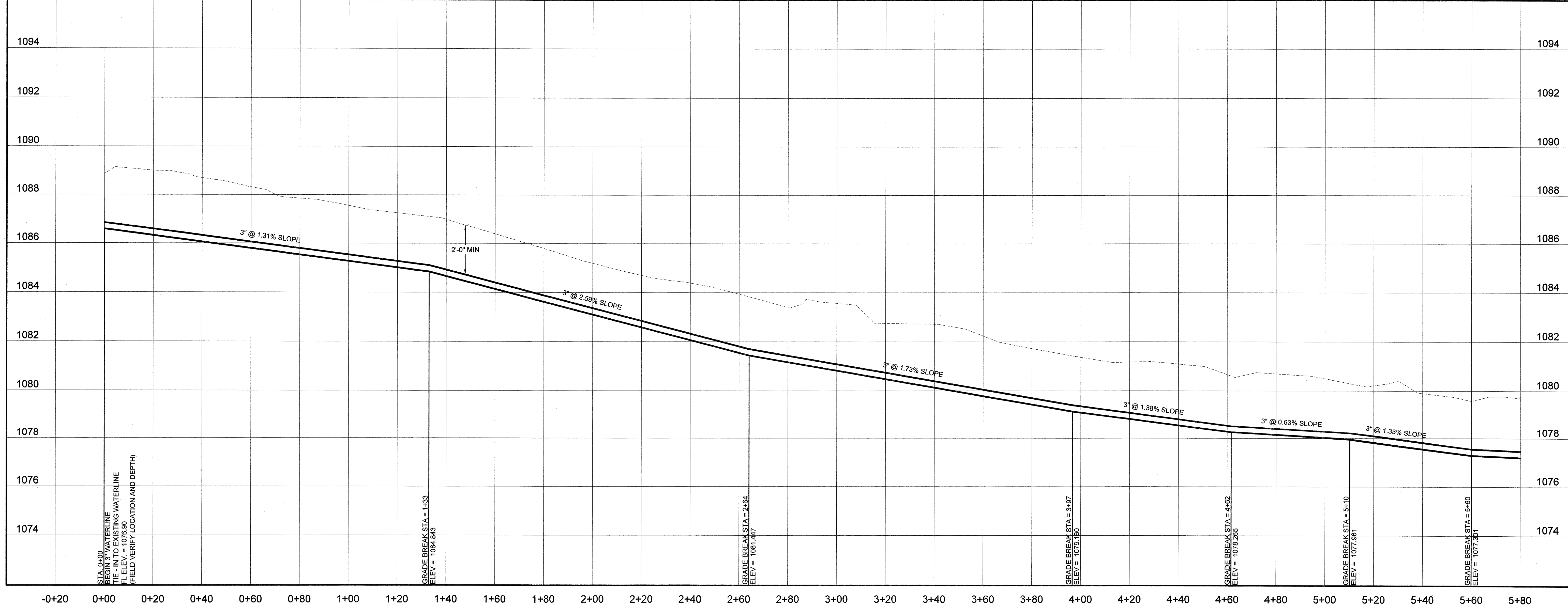
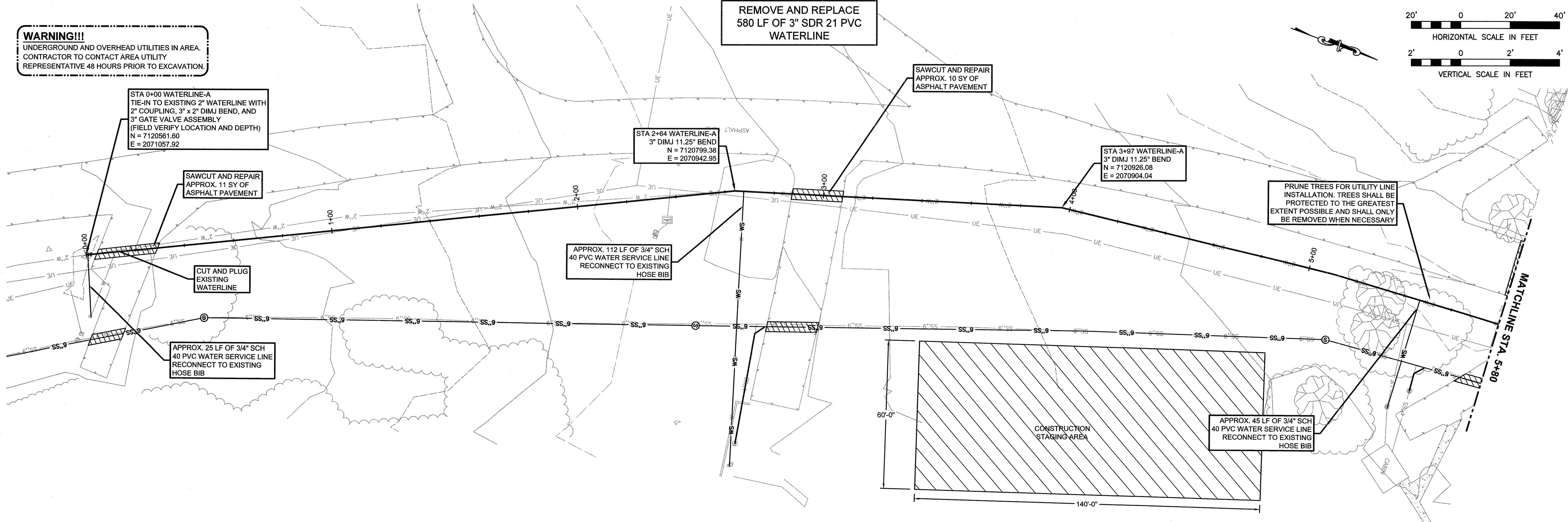
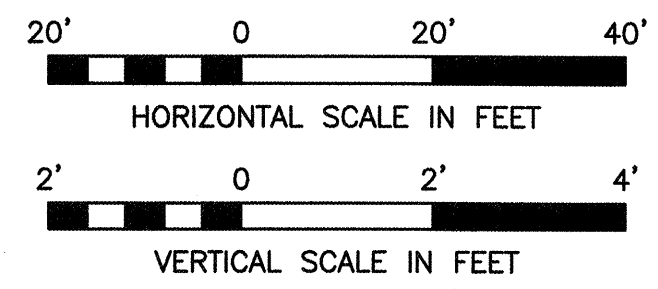
DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:

SHEET TITLE
 SEWER
 LINE B
 P&P

SHEET NUMBER
 14

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.

REMOVE AND REPLACE
 580 LF OF 3" SDR 21 PVC
 WATERLINE



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT

PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:

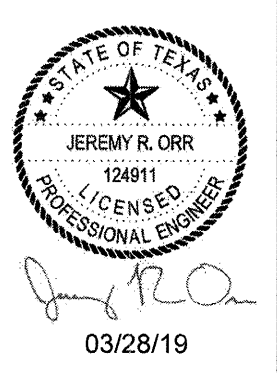
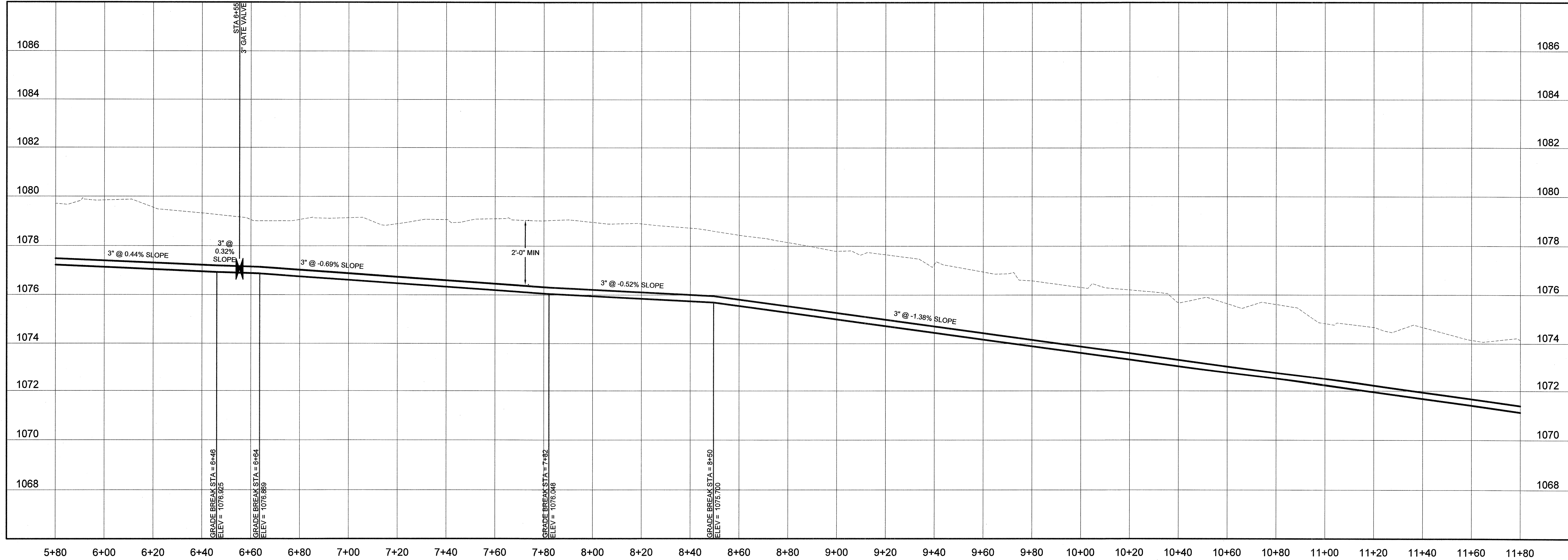
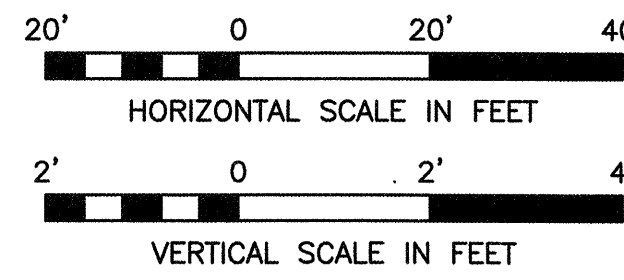
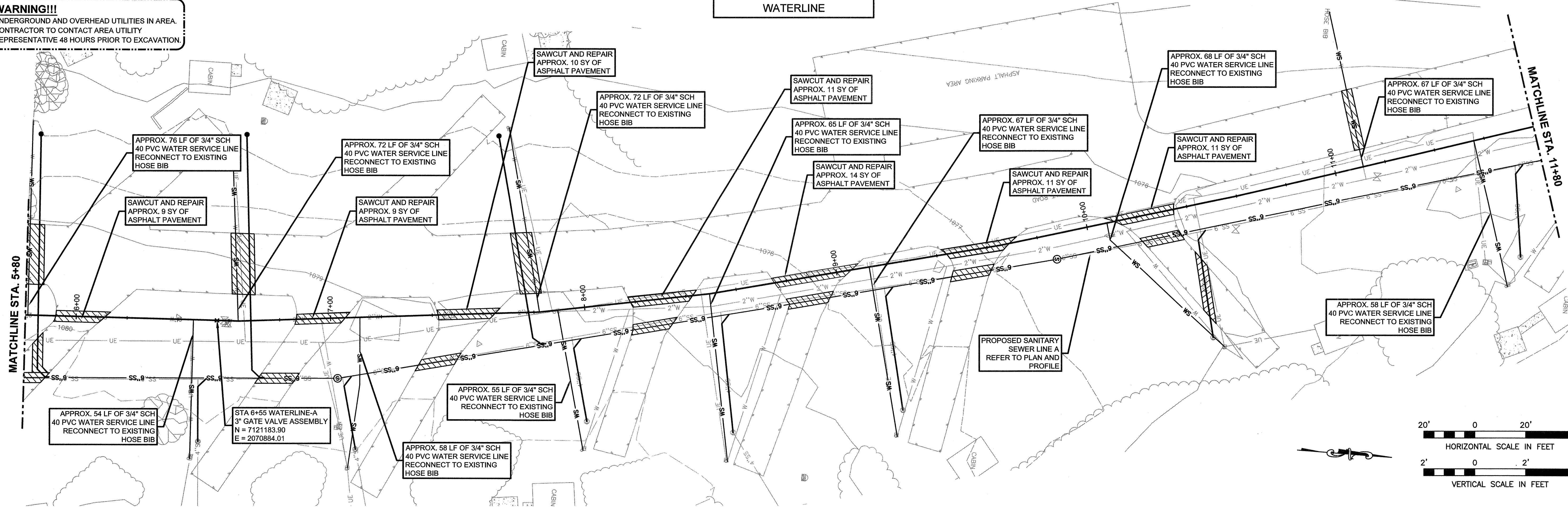
SHEET TITLE
 WATERLINE A
 P&P-1

SHEET NUMBER
 16

PERCENTAGE 100% CD DOCUMENT

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.

REMOVE AND REPLACE
 580 LF OF 3" SDR 21 PVC
 WATERLINE



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT

PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:

SHEET TITLE
 WATERLINE A
 P&P-2

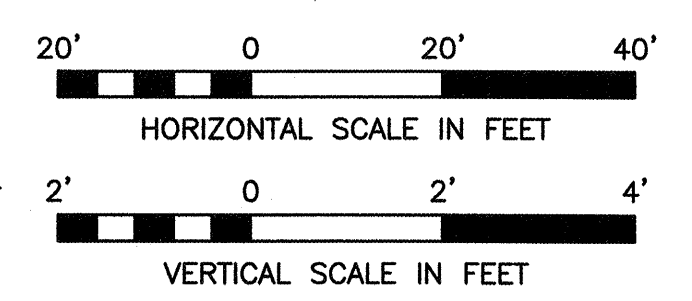
SHEET NUMBER
 17

PERCENTAGE 100% CD DOCUMENT

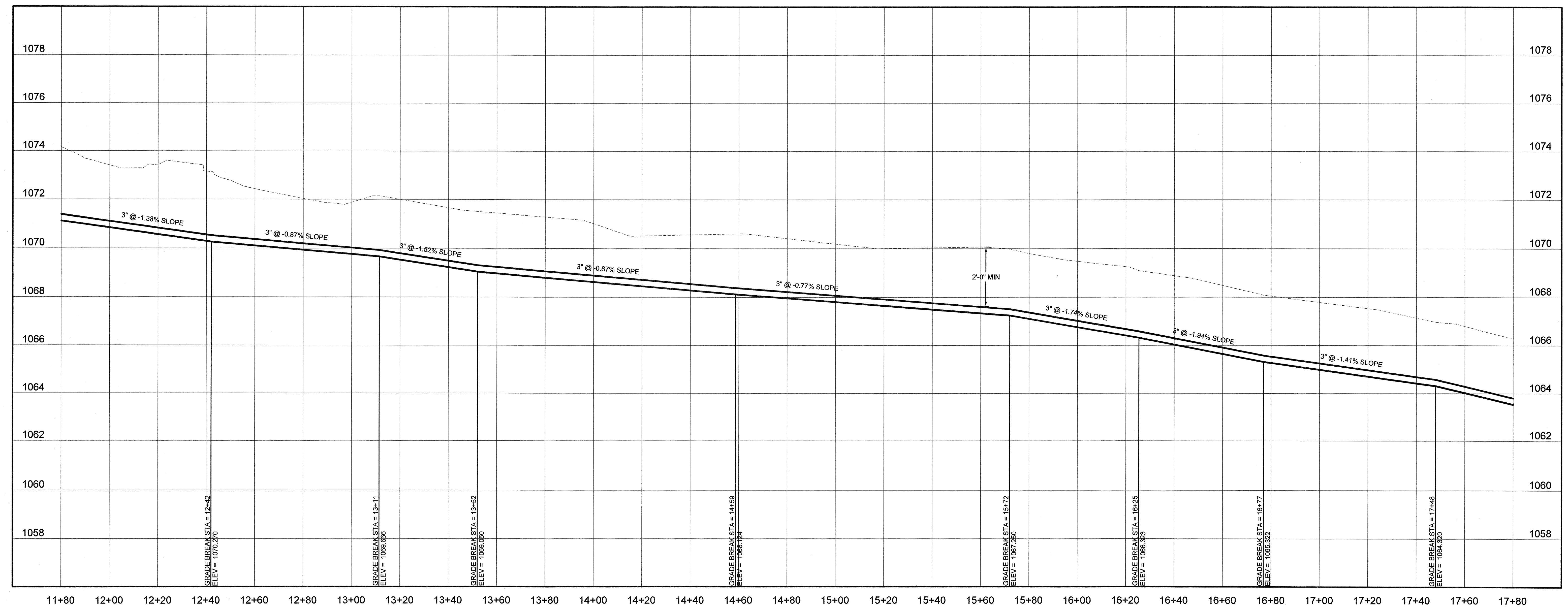
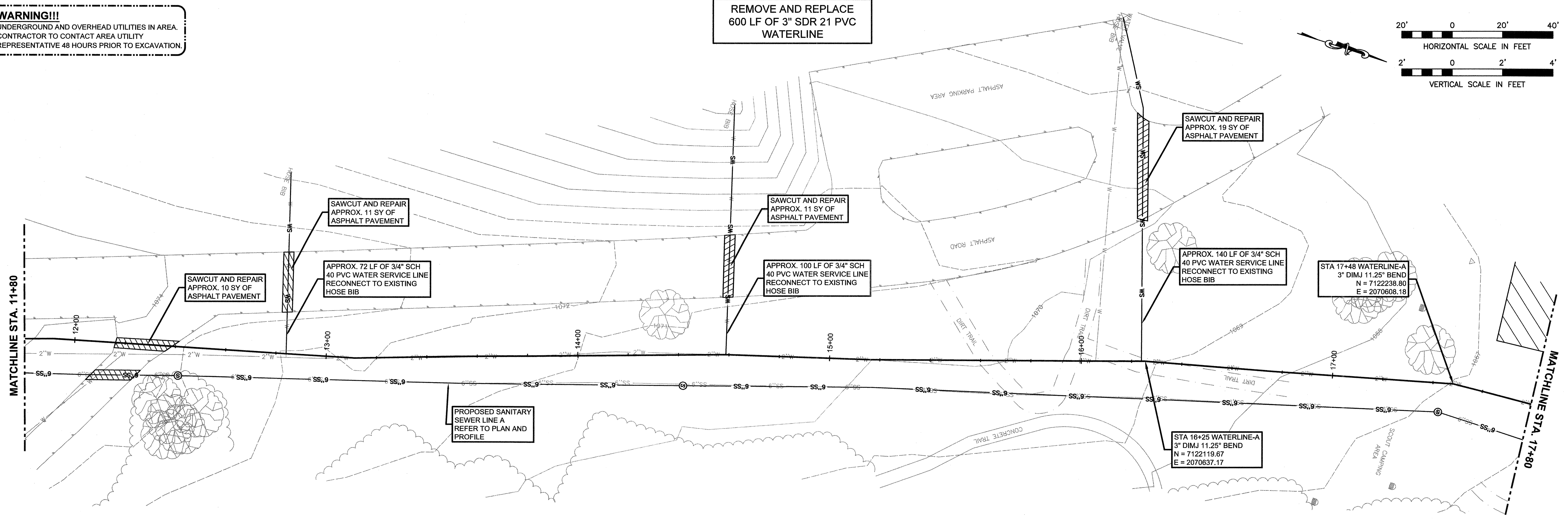
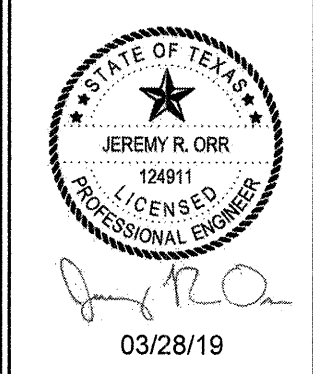
PATH: \\KSA-TLY-SERVER3\projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-PP-WATR-001.dwg

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.

REMOVE AND REPLACE
 600 LF OF 3" SDR 21 PVC
 WATERLINE



TEXAS
 PARKS &
 WILDLIFE



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:

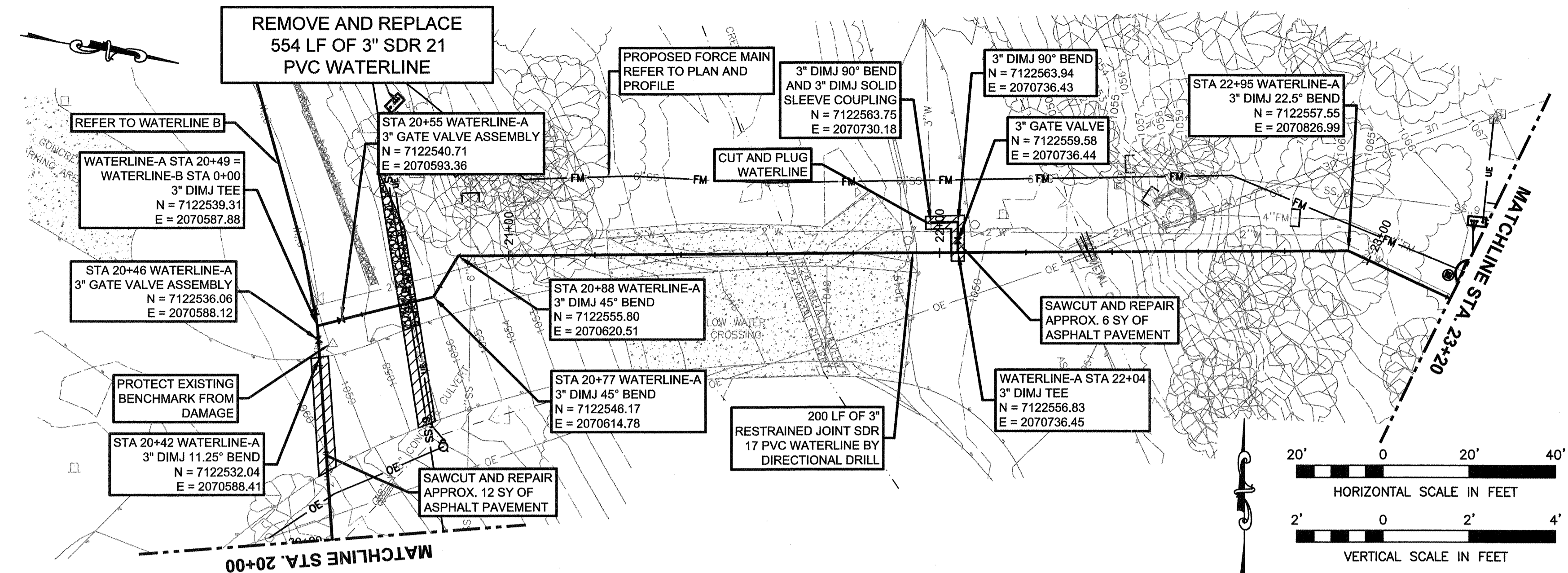
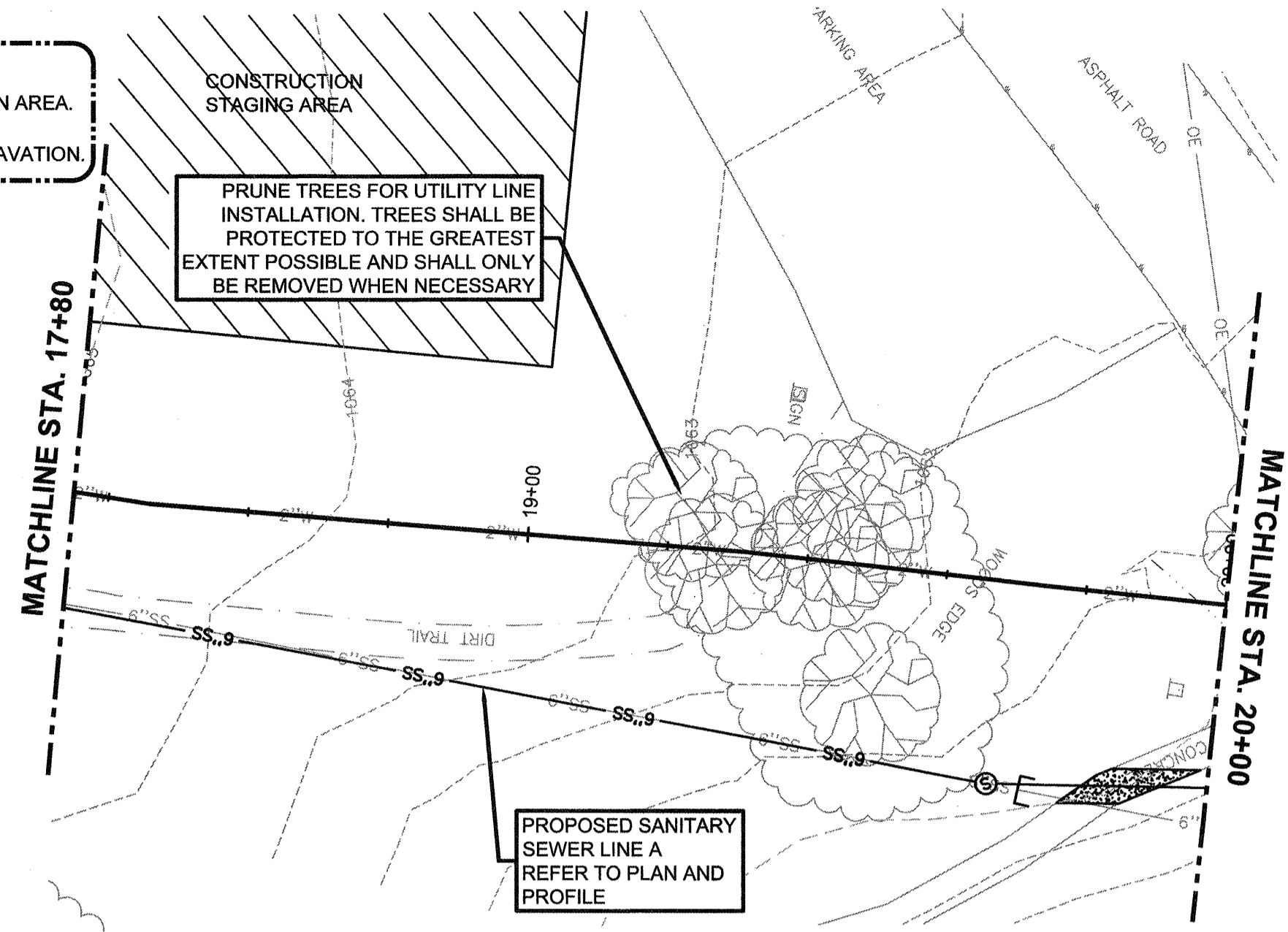
SHEET TITLE
 WATERLINE A
 P&P-4

SHEET NUMBER
18

PERCENTAGE 100% CD DOCUMENT

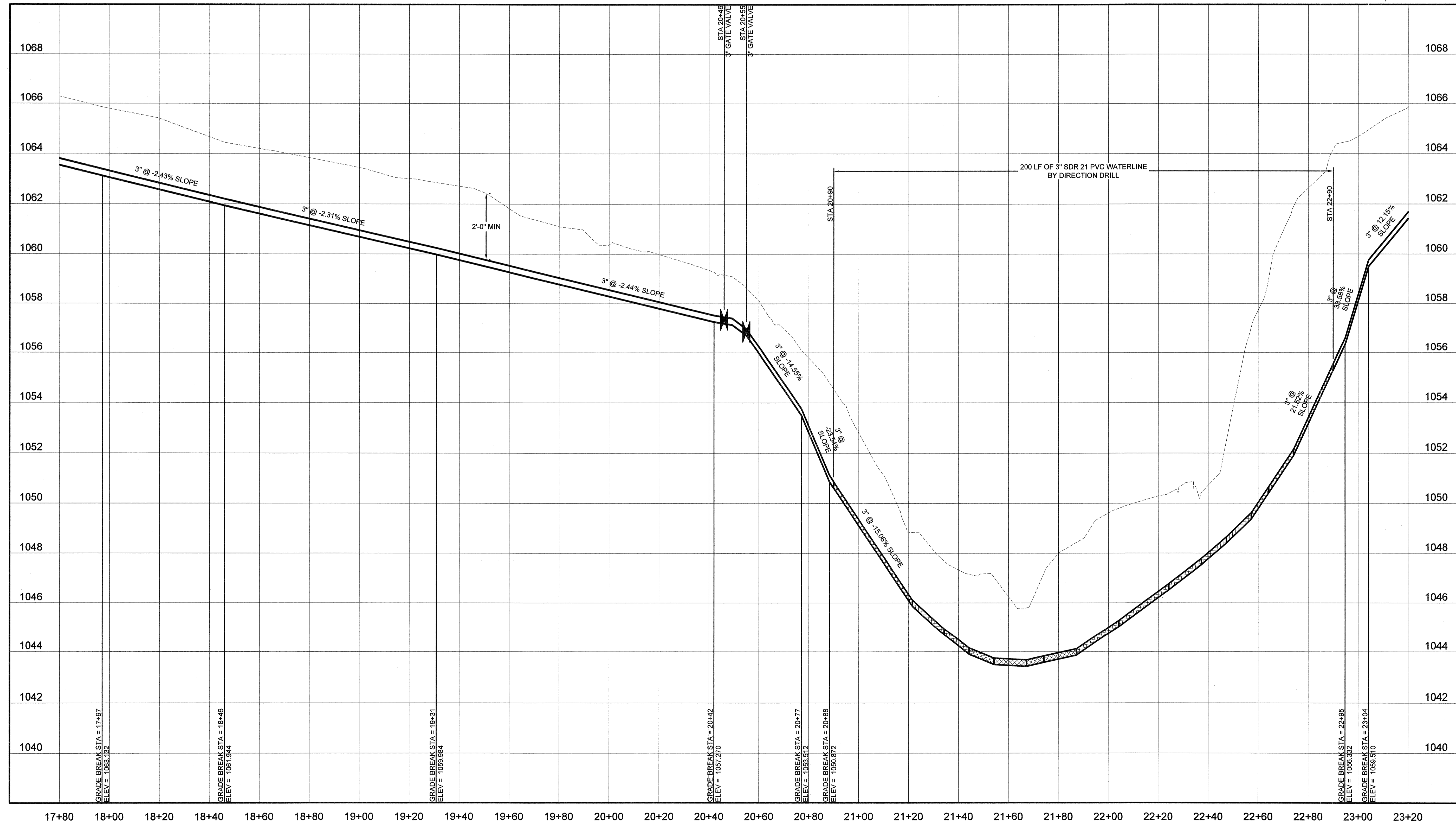
PATH: \\KSA-TL-SERVER3\projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-PP-WATR-001.dwg

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.



TEXAS
PARKS &
WILDLIFE

STATE OF TEXAS
 12691
 JEREMY R. ORR
 LICENSED PROFESSIONAL ENGINEER
 03/28/19



FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT

PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:

SHEET TITLE
 WATERLINE A
 P&P-4

SHEET NUMBER
 19

PERCENTAGE 100% CD DOCUMENT

PATH: \\KSA-TL-SERVERS\projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-PP-WATR-001.dwg

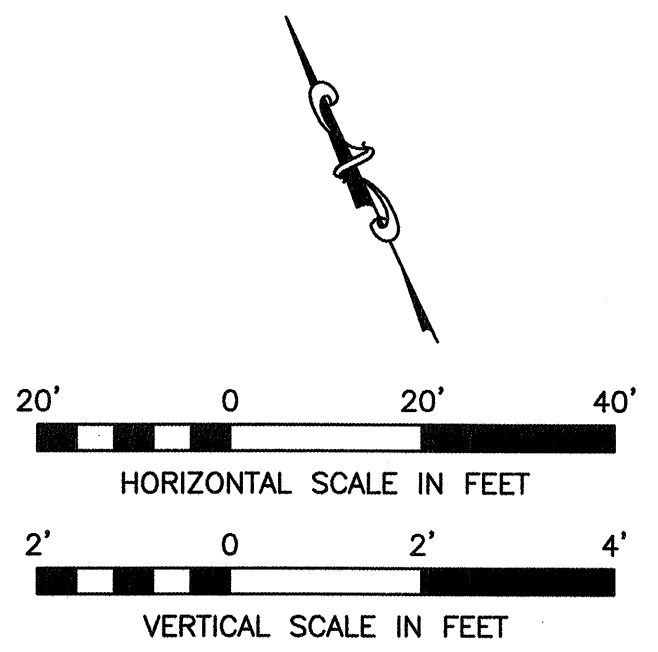
WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.

REMOVE AND REPLACE
 275 LF OF 3" SDR 21
 PVC WATERLINE

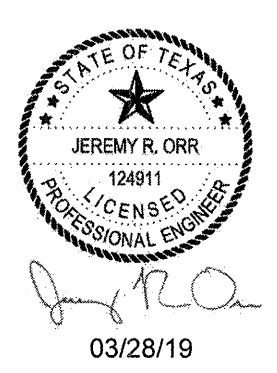
PROPOSED SANITARY
 SEWER LINE C
 REFER TO PLAN AND
 PROFILE

STA 25+95 WATERLINE-A
 TIE-IN TO EXISTING WATERLINE WITH
 3" DIMJ SOILD SLEEVE AND COUPLING, AND
 3" GATE VALVE ASSEMBLY
 (FIELD VERIFY LOCATION AND DEPTH)
 N = 7122427.21
 E = 2071097.09

STA 25+32 TO STA 25+52
 APPROX. 20 LF OF
 6" STEEL ENCASEMENT
 BY OPEN CUT CENTERED
 ON SANITARY SEWER CROSSING



TEXAS
 PARKS &
 WILDLIFE



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT

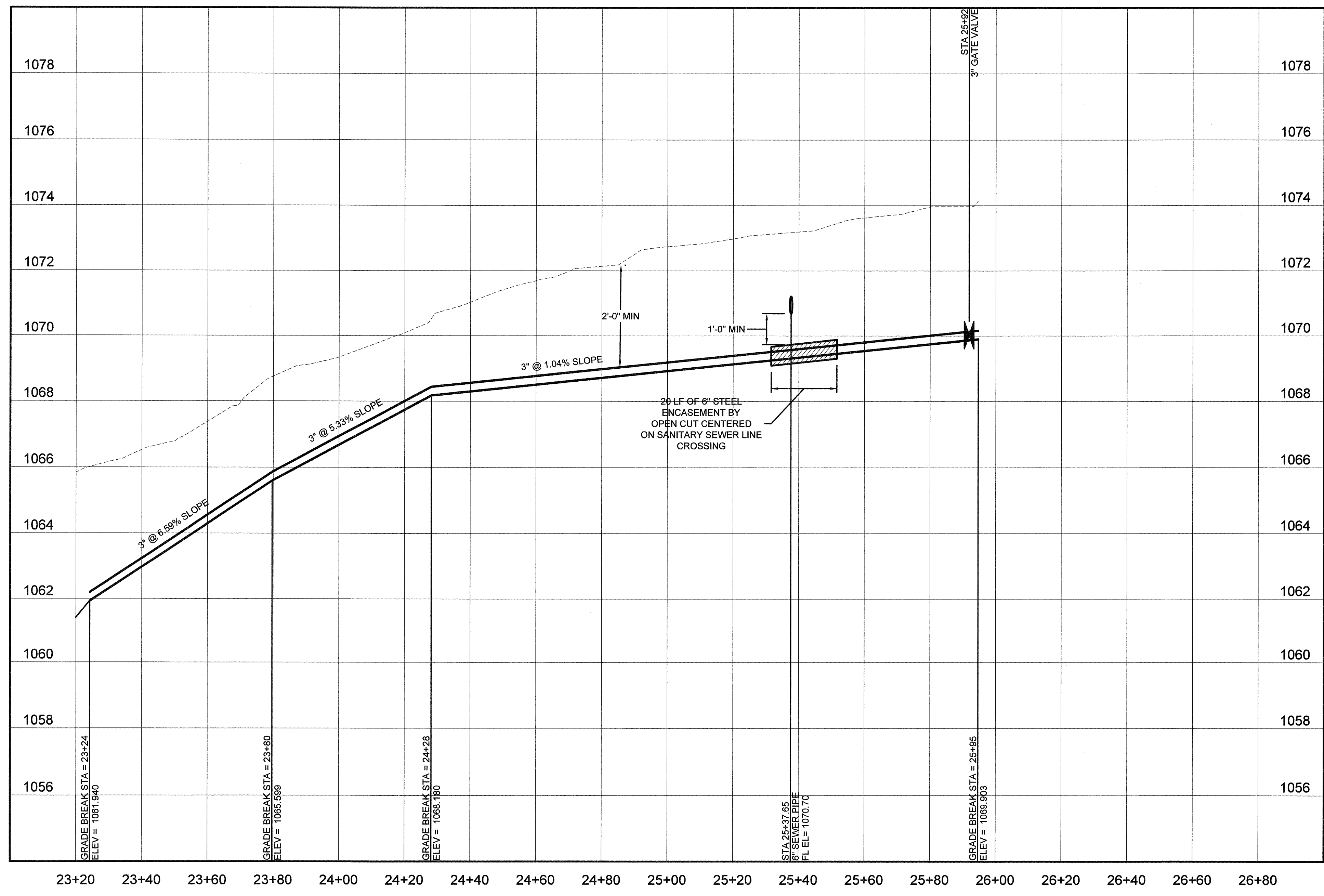
PROJECT NUMBER: 116818

DATE: 2/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:
 REVISED:

SHEET TITLE
 WATERLINE A
 P&P-5

SHEET NUMBER
 20

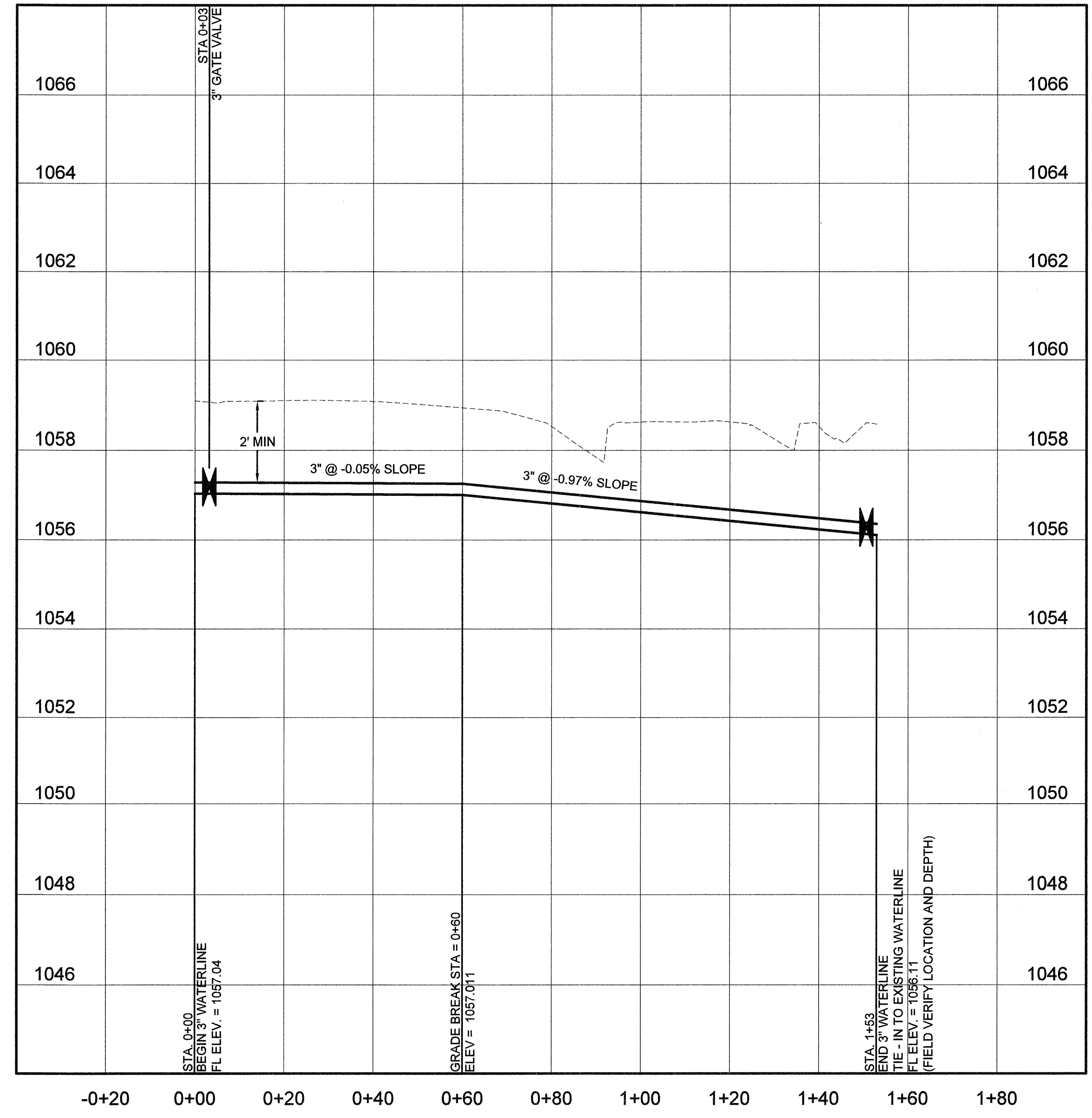
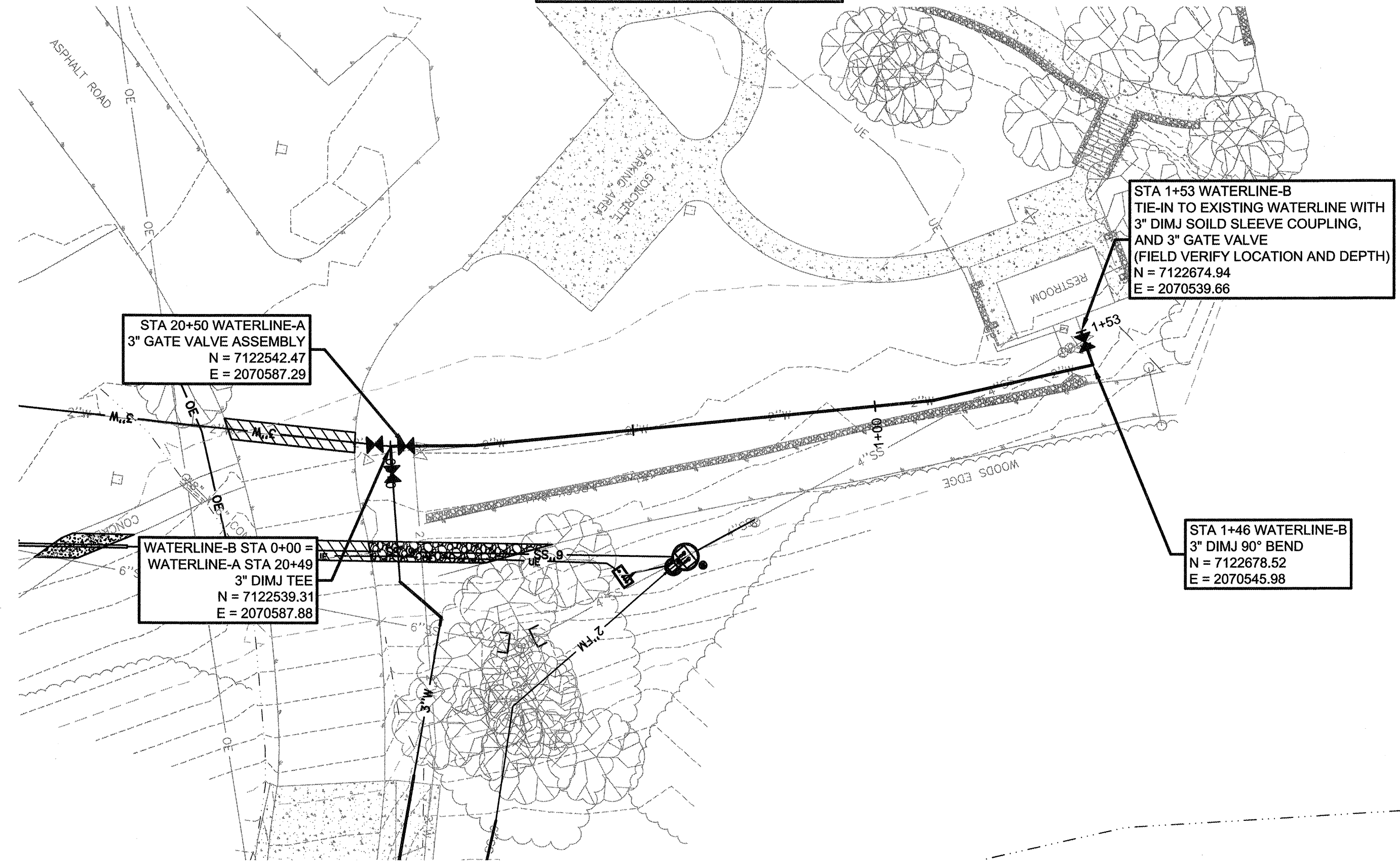
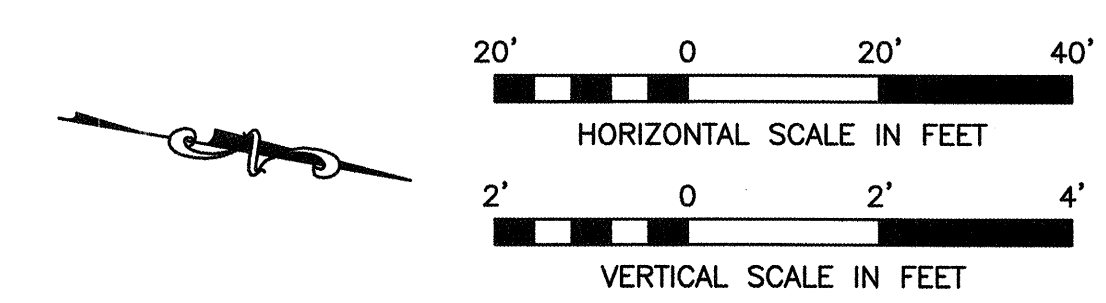
PERCENTAGE 100% CD DOCUMENT



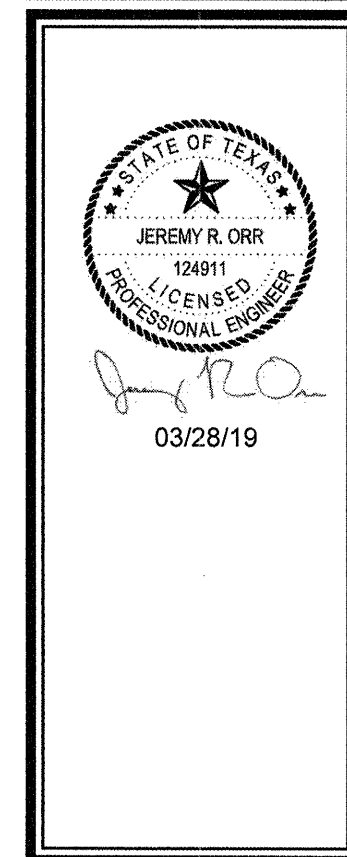
PATH: \\NSA-TLY-SERVER3\projects\Projects\TPW017\00.07 CAD\02 Project\30 Sheets\TPW017-C-PP-WATR-001.dwg

WARNING!!!
 UNDERGROUND AND OVERHEAD UTILITIES IN AREA.
 CONTRACTOR TO CONTACT AREA UTILITY
 REPRESENTATIVE 48 HOURS PRIOR TO EXCAVATION.

REMOVE AND REPLACE
 153 LF OF 3" SDR 21
 PVC WATERLINE



TEXAS
 PARKS &
 WILDLIFE



FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

DATE: 3/28/19
 DESIGNED BY: CBA
 DRAWN BY: JAM
 REVIEWED BY: CBA
 REVISED:

SHEET TITLE
 WATERLINE B
 P&P

SHEET NUMBER
 21

PERCENTAGE 100% CD DOCUMENT

PATH: \\KSA-TLY-SERVERS\Projects\Projects\TPW017\00.07 CAD\02 Project\02 Sheets\TPW017-C-PP-WATR-002.dwg

ELEMENTARY DIAGRAM SYMBOLS

	SELECTOR SWITCH N.C.
	SELECTOR SWITCH N.O.
	TIME DELAY ON DE-ENERGIZATION N.C.
	TIME DELAY ON DE-ENERGIZATION N.O.
	TIME DELAY ON ENERGIZATION N.C.
	TIME DELAY ON ENERGIZATION N.O.
	PRESSURE SWITCH N.C. OPENS ON FALLING PRESSURE
	PRESSURE SWITCH N.O. CLOSES ON FALLING PRESSURE
	PRESSURE SWITCH N.C. OPENS ON RISING PRESSURE
	PRESSURE SWITCH N.O. CLOSES ON RISING PRESSURE
	LIMIT N.C.
	LIMIT N.O.
	LEVEL N.C. OPENS ON RISING LEVEL
	LEVEL N.O. CLOSES ON RISING LEVEL
	THERMOSTAT N.C. OPENS ON RISING TEMP
	THERMOSTAT N.O. CLOSES ON RISING TEMP
	FLOW N.C. OPENS ON RISING FLOW
	FLOW N.O. CLOSES ON RISING FLOW
	NORMALLY OPEN PUSH BUTTON SPRING RETURN
	NORMALLY CLOSED PUSH BUTTON SPRING RETURN
	TORQUE SWITCH
	CONTACT N.O. RELAY OR DEVICE CONTACT
	CONTACT N.C. RELAY OR DEVICE CONTACT
	THERMAL OVERLOAD
	FUSE
	TERMINAL-DEVICE
	TERMINAL-BLOCK
	COIL-RELAY
	COMBINATION STARTER
	3-WAY SWITCH
	3 WIRE RTD
	LED LIGHT
	TIME METER
	PHOTOCELL
	SPACE HEATER
	DUPLEX RECEPTACLE

BOLD LINES INDICATE PROPOSED ELECTRICAL
1/2 TONE LINES INDICATE NON-ELECTRICAL, EXISTING ELECTRICAL, OR FUTURE

SINGLE LINE DIAGRAM SYMBOLS

	SOFT STARTER
	GROUND
	CONNECTOR
	FUSIBLE DISCONNECT
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	SQUIRREL CAGE MOTOR
	TRANSFORMER
	MANUAL OR AUTOMATIC TRANSFER SWITCH
	CIRCUIT BREAKER (MOLDED CASE)
	CIRCUIT BREAKER (INSULATED CASE)
	SWITCH DUTY (INSULATED CASE)
	HIGH INTENSITY DISCHARGE (INSULATED CASE)
	METAL-CLAD, DRAW-OUT, AIR CIRCUIT BREAKER
	METAL-CLAD, DRAW-OUT, VACUUM CIRCUIT BREAKER
	LIGHTNING ARRESTOR
	IEEE C82.11-1999 SURGE ARRESTOR
	UL 1449-TYPE I SURGE PROTECTIVE DEVICE > 600 VAC AHEAD OF SERVICE
	UL 1449-TYPE II SURGE PROTECTIVE DEVICE < 600 VAC BELOW SERVICE
	AMMETER
	LOAD SHED
	UTILITY REVENUE METER
	VOLTMETER
	WATT-OUR METER
	KIRK KEY INTERLOCK
	UNDER VOLTAGE RELAY
	PHASE SEQUENCE RELAY
	INSTANTANEOUS OVER CURRENT RELAY
	GROUND FAULT INSTANTANEOUS OVER CURRENT RELAY GROUND SENSOR
	TIME OVER CURRENT RELAY
	GROUND FAULT TIME OVER CURRENT RELAY
	CIRCUIT BREAKER CONTROL SWITCH
	OVER VOLTAGE RELAY
	AUTOMATIC TRANSFER RELAY NFA 110 TYPE 60 CLASS 12, LEVEL 2
	LOCKOUT RELAY
	REGULATING DEVICE NFA 110 TYPE 60 CLASS 12, LEVEL 2

NOT ALL SYMBOLS AND ABBREVIATIONS ARE SHOWN ON THE DRAWINGS.

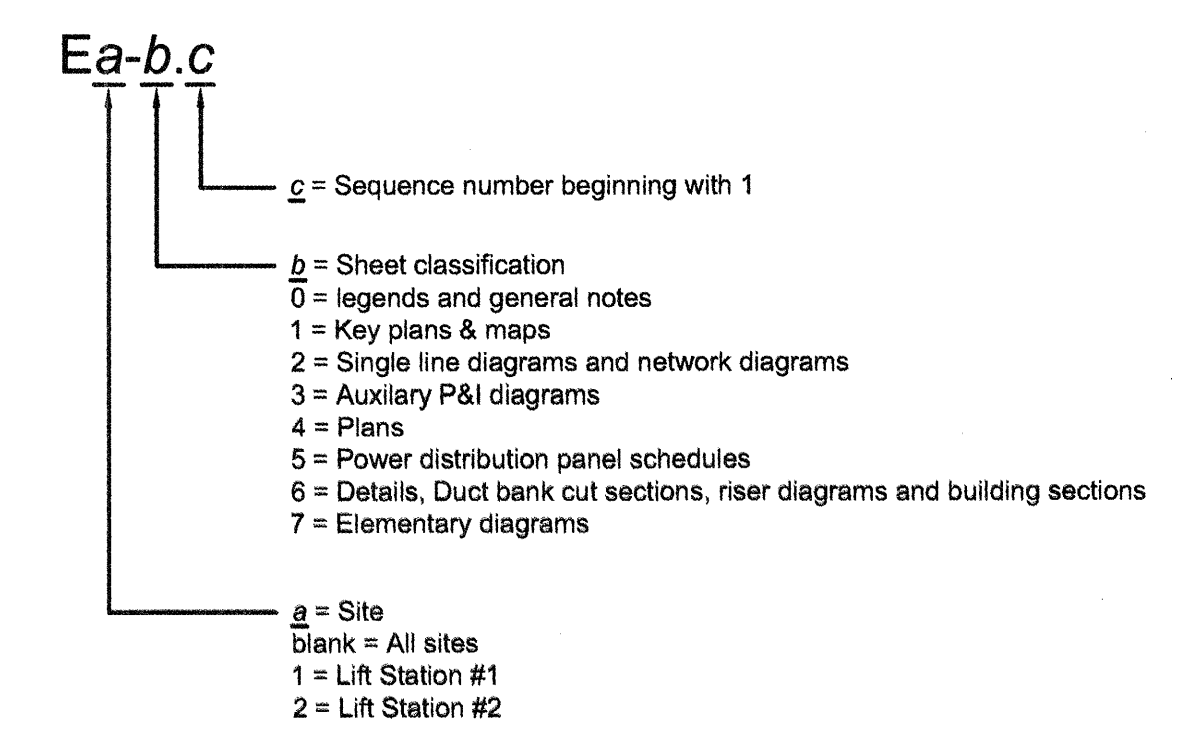
ABBREVIATIONS

AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
ALP	AREA LIGHTING POLE
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
CPT	CONTROL POWER TRANSFORMER
CTR	CONTACTOR
DB/PVC	DIRECT BURIAL POLYVINYL CHLORIDE (DUCT)
EB/PVC	ENCASEMENT BURIAL POLYVINYL CHLORIDE (DUCT)
EEH	ELECTRICAL EQUIPMENT HOUSING
EGC	EQUIPMENT GROUNDING CONDUCTOR
FAO	AUDIOVISUAL FIRE ALARM DEVICE
FB	FIRE BELL
FOP	FIRE CONTROL PANEL
FCS	FIRE CALL SWITCH
FD	FIRE DETECTOR
FDS	FUSED DISCONNECT SWITCH
FWE	FURNISHED WITH EQUIPMENT
FVNR	FULL VOLTAGE NON-REVERSE
GCP	GATE CONTROL PANEL
GE	GROUNDING ELECTRODE CONDUCTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GRS	GALVANIZED RIGID STEEL CONDUIT
HG	HOT DIPPED GALVANIZED
LCP	LOCAL CONTROL PANEL
LFMC	LIQUID TIGHT FLEXIBLE METAL CONDUIT
MCC	MOTOR CONTROL CENTER
MCS	MOLDED CASE SWITCH
MM	MANUAL MOTOR STARTER
MP	MARSHALLING PANEL
MPZ	MINI POWER ZONE
MTS	MANUAL TRANSFER SWITCH
N1	NEMA-1 RATING
N3R	NEMA-3R RATING
N4XSS	NEMA-4X STAINLESS STEEL RATING
NFWE	NOT FURNISHED WITH EQUIPMENT
PDP	POWER DISTRIBUTION PANEL
PLC	PROGRAMMABLE LOGIC CONTROLLER
PMT	PAD MOUNTED TRANSFORMER
POP	POWER OUTLET PANEL
PVC/GRS	PVC COATED GALVANIZED RIGID STEEL CONDUIT
RAC	RIGID ALUMINUM CONDUIT
RGS	RIGID GALVANIZED STEEL CONDUIT
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLIDSTATE SOFT START
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SE	SERVICE ENTRANCE
SPD	SURGE PROTECTIVE DEVICE
TC	TRAY CABLE
TCB	TELECOMMUNICATIONS PANEL
TDDE	TIME DELAY ON ENERGIZATION
TDR	TIME DELAY RELAY
TFR	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE
WDP	WIRING DISTRIBUTION PANEL
WP	WEATHER PROOF
WPIU	WEATHER PROOF WHILE-IN-USE

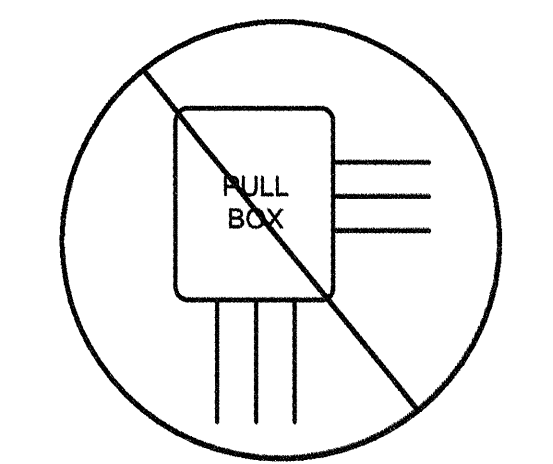
ELECTRICAL PLAN SYMBOLS

	REMOVE OR DEMOLISH
	SEE LIGHT SCHEDULE
	SEE LIGHT SCHEDULE
	FLOOD LIGHT WITH AIMING POINT SEE SCHEDULE
	WALL MOUNT LIGHT SEE LIGHT SCHEDULE
	POLE MOUNT LIGHT SEE LIGHT SCHEDULE
	HEATER
	MARSHALLING PANEL
	EXHAUST/SUPPLY
	HANDHOLE OR MANHOLE
	GFCI DUPLEX RECEPTACLE
	QUAD-DUPLEX RECEPTACLE
	FLOOR MOUNTED FLUSH
	30' COPPER CLAD GROUND ROD
	30' COPPER CLAD GROUND ROD WITH ACCESSIBLE GROUND CONNECTION
	LIGHTNING ROD SEE SCHEDULE
	THERMOSTAT
	EYS CONDUIT SEAL (ELEVATION VIEW)
	CONDUIT SEAL (PLAN VIEW)
	JUNCTION BOX
	ELECTRICAL INSTRUMENTATION
	CONDUIT TURNED UP
	CONDUIT TURNED DOWN
	ABOVE GROUND EXPOSED CONDUIT
	CENTER LINE DUCT BANK 24" BELOW GRADE
	ENCASED IN BUILDING STRUCTURE OR SLAB
	4/0 COPPER GROUND CABLE BURIED 24" BELOW GRADE WITH CADWELD CONNECTOR
	OVERHEAD ELECTRICAL
	OVERHEAD ELECTRICAL/OVERHEAD TELEPHONE
	OVERHEAD FIBER OPTIC
	OVERHEAD CABLE TV
	OVERHEAD TELEPHONE LINE
	BORED CONDUIT
	NATURAL GASLINE
	CASED BORE
	RADIO TELEMETRY
	HOME RUN FROM DEVICE TO PANEL (ABOVE GROUND)
	HOME RUN FROM DEVICE TO PANEL (BELOW GROUND)
	S SWITCH, 125/277V, 20A, SINGLE POLE SINGLE THROW
	S ₂ SWITCH, 125/20A, DOUBLE POLE SINGLE THROW
	S ₃ SWITCH, 125/20A, THREE-WAY
	S ₄ SWITCH, 125/20A, FOUR-WAY

SHEET NUMBER DESIGNATION

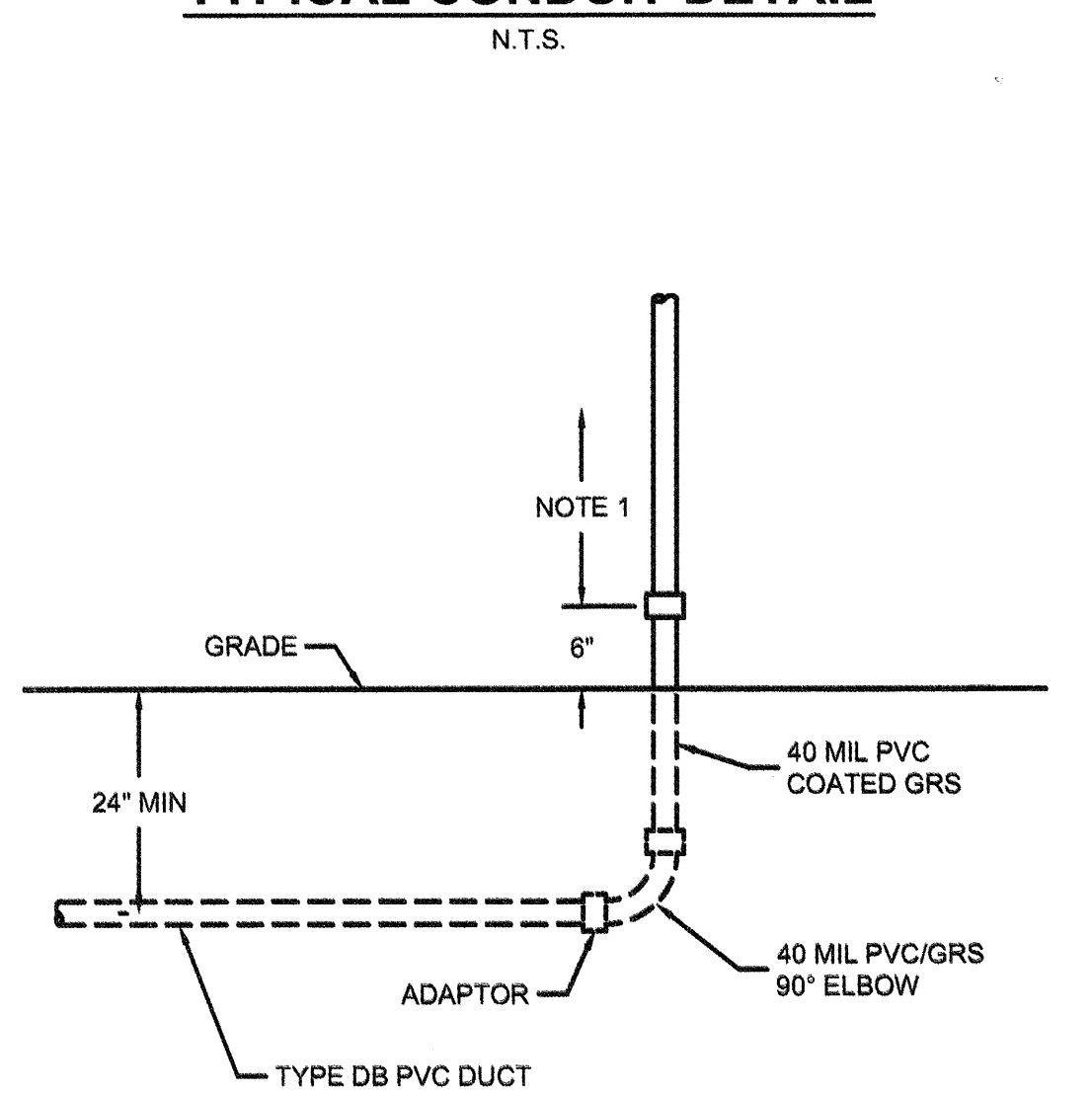


PULL BOX DETAIL

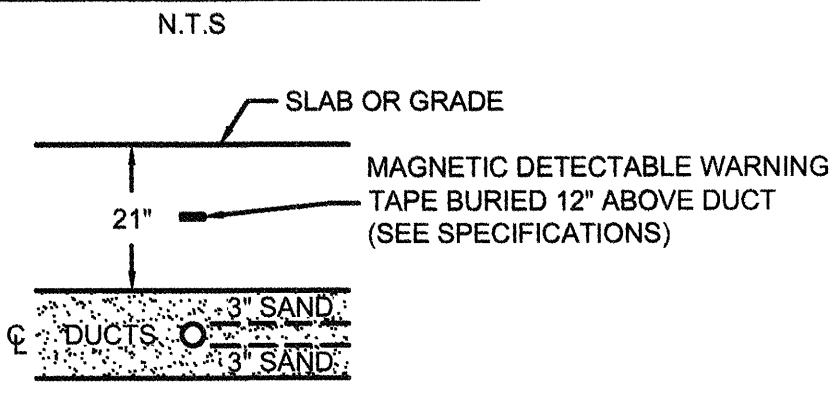


DO NOT PROVIDE PULL BOXES THAT HAVE MORE THAN ONE CONDUIT IN AND ONE CONDUIT OUT UNLESS SPECIFIED ON DRAWINGS.

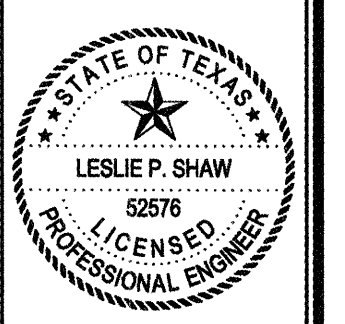
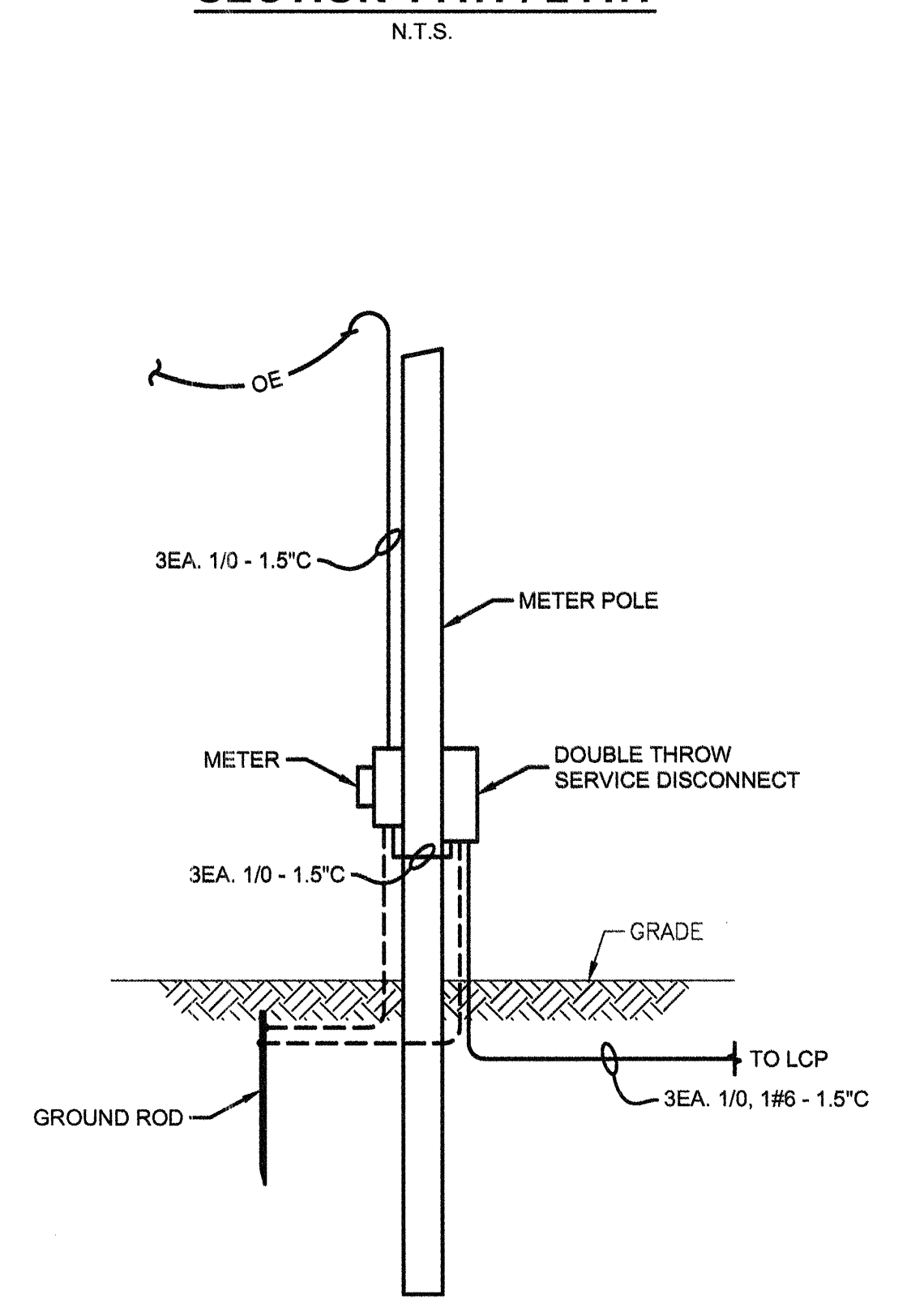
TYPICAL CONDUIT DETAIL



DUCT BANK SECTION



SECTION 141.1 / 241.1



Leslie P. Shaw, P.E.
Digitally signed by Leslie P. Shaw, P.E.
Date: 2019.03.29 10:03:00 -0500

FORT RICHARDSON STATE PARK
 WATER AND WASTEWATER SYSTEM REPLACEMENT
 PROJECT NUMBER: 116818

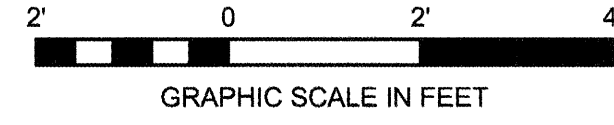
DATE: 3/29/2019
DESIGNED BY: LPS
DRAWN BY: MB
REVIEWED BY:
REVISED:
REVISED:

SHEET TITLE
ELECTRICAL
DETAILS I

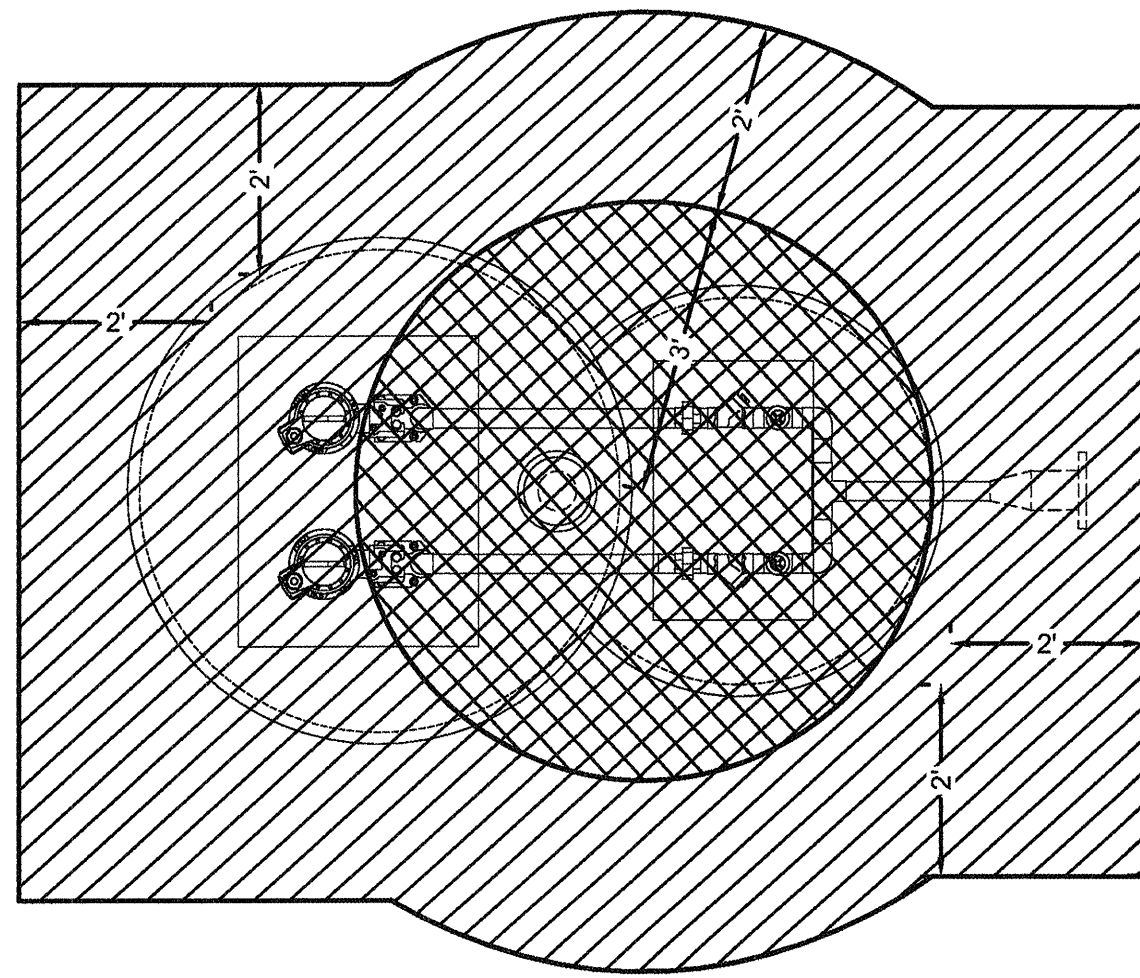
SHEET NUMBER
E-6.1

NOTES:
1. ALL ABOVE GROUND CONDUIT WHETHER OR NOT ASSOCIATED WITH STUB-UP SHALL BE GRS.

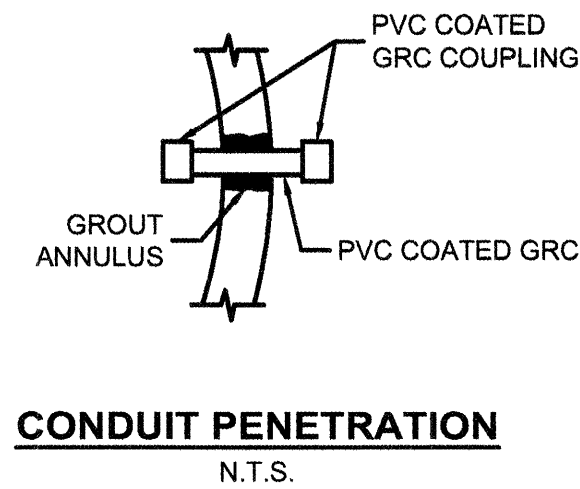
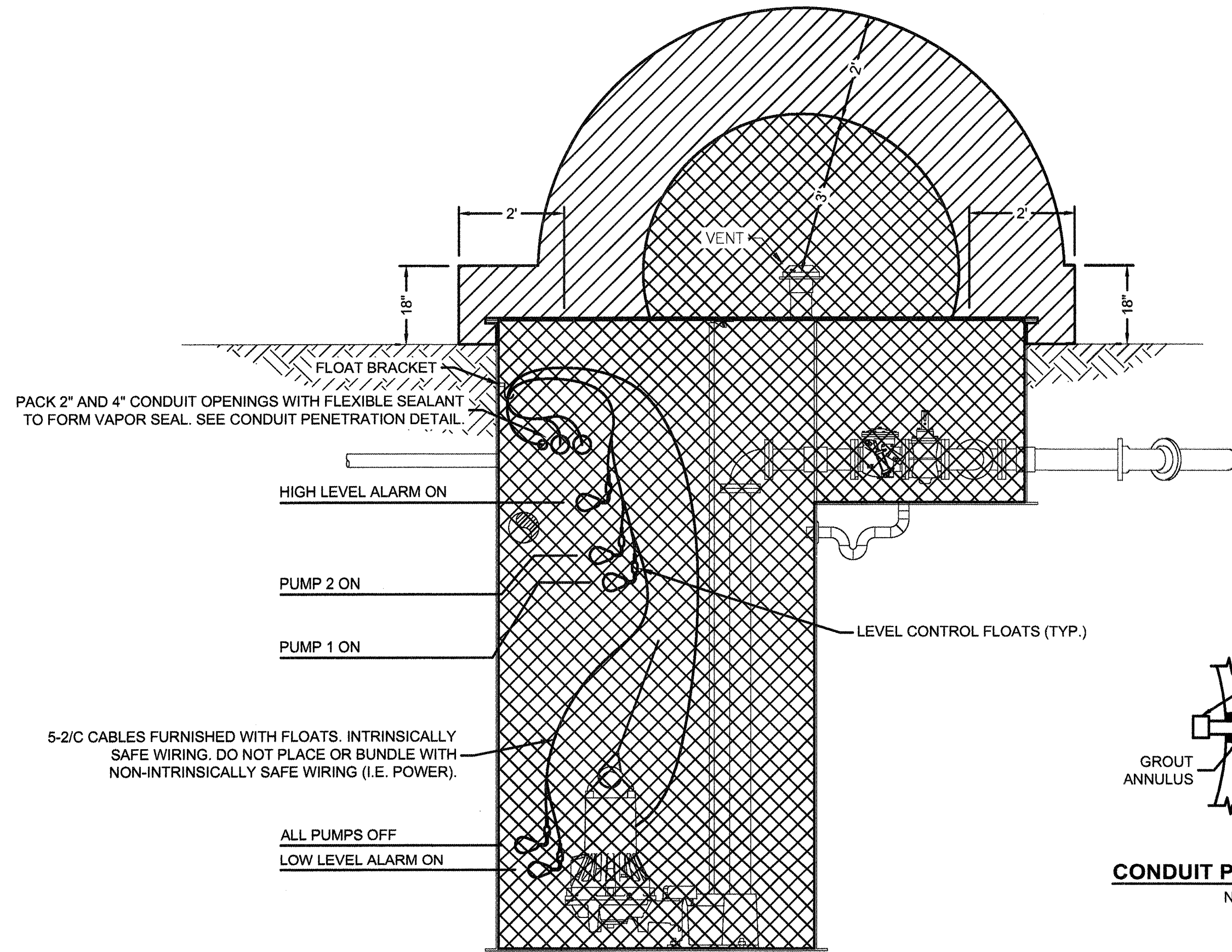
ELECTRICAL AREA CLASSIFICATION
N.T.S.



PLAN VIEW



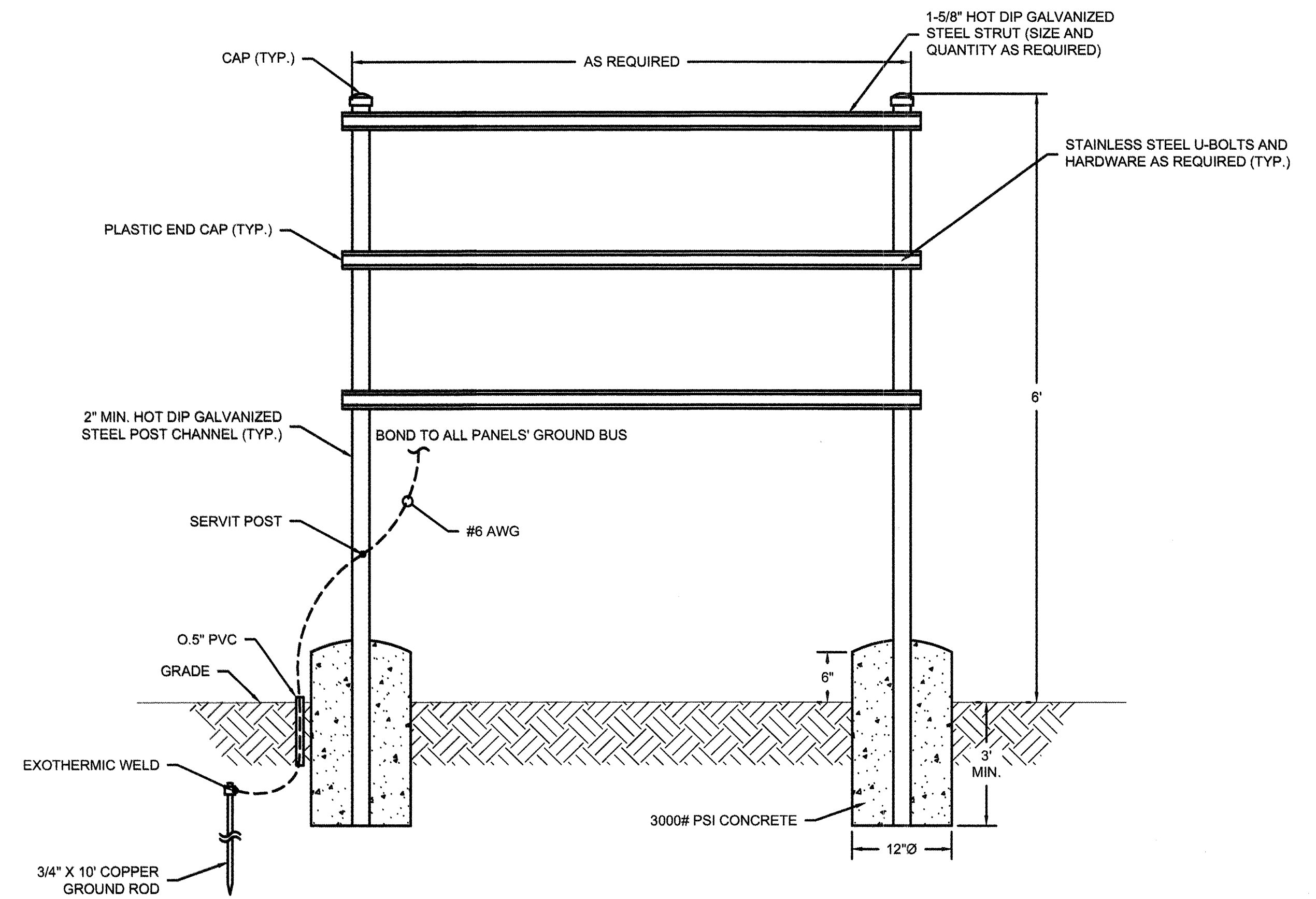
SECTION VIEW



LEGEND	
	CLASS 1, GROUP D, DIVISION 1
	CLASS 1, GROUP D, DIVISION 2 TO 18" ABOVE GRADE

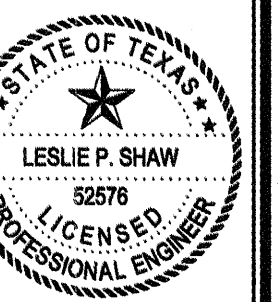
NOTES:
1. THIS AREA CLASSIFICATION APPLIES TO BOTH LIFT STATIONS.

TYPICAL ELECTRICAL RACK DETAIL
N.T.S.



THIS SPACE NOT USED

THIS SPACE NOT USED



Leslie P. Shaw, P.E.
Digitally signed by Leslie P. Shaw, P.E.
DN: cn=Leslie P. Shaw, o=Shaw, ou=Professional Engineer

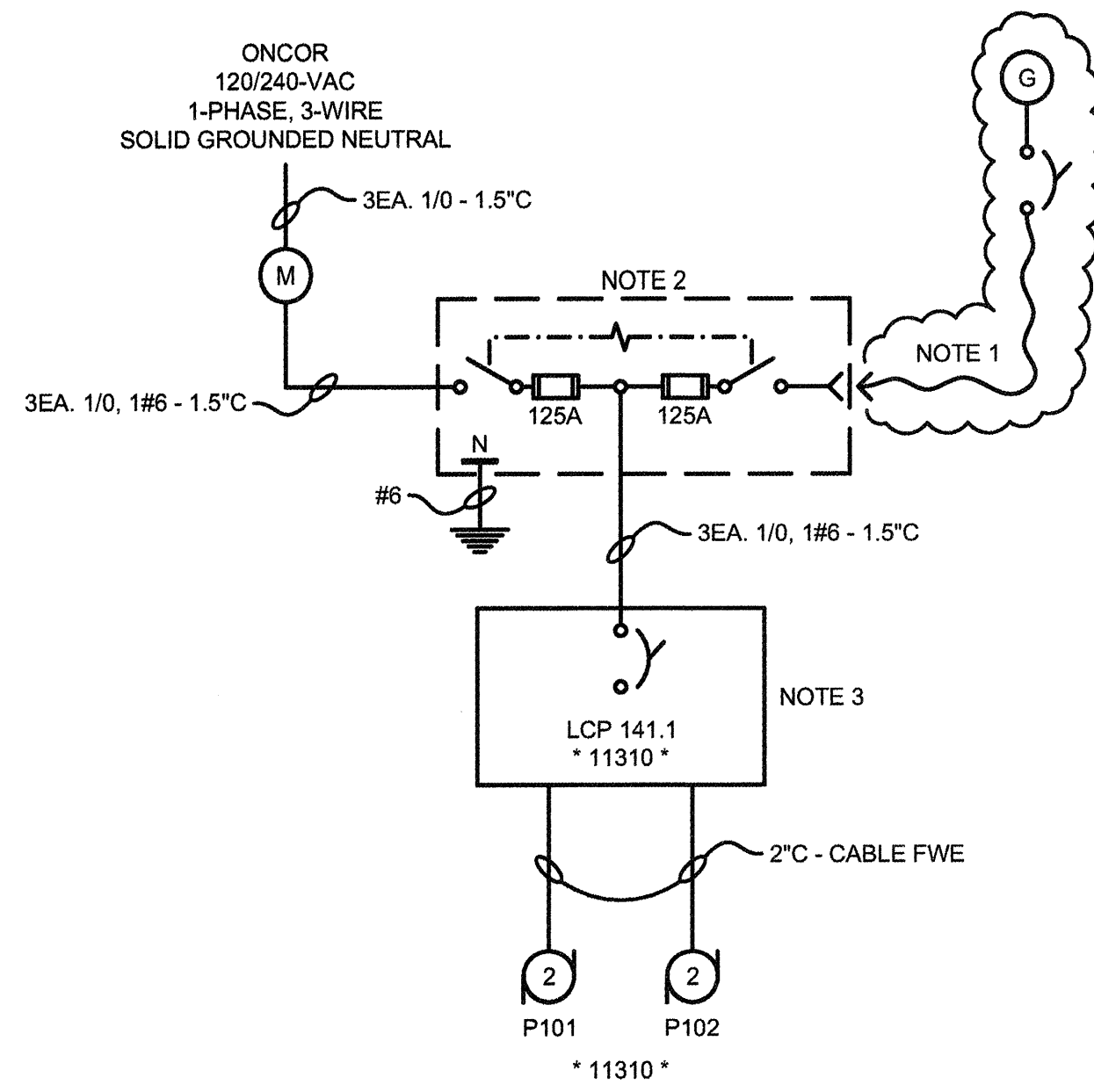
SEAL: TPEE Firm Registration No. F-1356

DATE: 3/29/2019
DESIGNED BY: LPS
DRAWN BY: MB
REVIEWED BY:
REVISED:
REVISED:

SHEET TITLE
ELECTRICAL
DETAILS II

SHEET NUMBER
E-6.2

**LIFT STATION NO. 1
SINGLE LINE DIAGRAM**



NOTES:

1. RENTAL (MOBILE) GENERATOR AND CABLES - NOT PART OF THIS PROJECT.
2. QUICK CONNECT FUSED DOUBLE THROW SAFETY SWITCH WITH POSH-LOK RECEPTACLES, UL LISTED, SERVICE ENTRANCE RATED, NEMA 3R, FURNISHED WITH POSH-LOK PLUGS (SHIPPED LOOSE), 240-VAC, 200-AMP, FUSIBLE, SWITCHED NEUTRAL, PAD-LOCKABLE (BOTH POSITIONS), EATON DT224SNRKLK OR ENGINEER APPROVED EQUAL.
3. PROVIDE A UL 1436 LISTED "ABSENCE OF VOLTAGE TESTER" IN THIS LCP. ENCLOSURE SHALL BE NEMA 3R/12, 316 STAINLESS STEEL, DEAD FRONT AND FREE STANDING ATOP A PEDESTAL.

THIS SPACE NOT USED

THIS SPACE NOT USED

THIS SPACE NOT USED

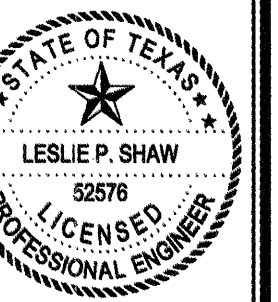
THIS SPACE NOT USED

THIS SPACE NOT USED

THIS SPACE NOT USED

THIS SPACE NOT USED

**TEXAS
PARKS &
WILDLIFE**



Leslie P. Shaw, P.E.
Digitally signed by Leslie P. Shaw, P.E.
Date: 2019.03.29 16:05:00Z

SEAL: TPE Firm Registration No. F-1358

**FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT**

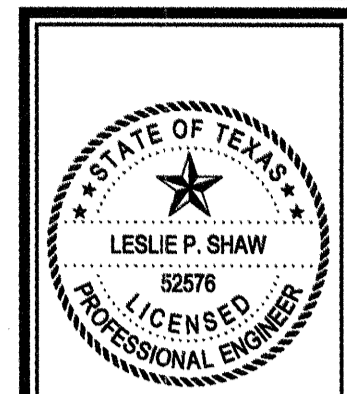
PROJECT NUMBER: 116818

DATE: 3/29/2019
DESIGNED BY: LPS
DRAWN BY: MB
REVIEWED BY:
REVISED:
REVISED:
REVISED:

SHEET TITLE
LIFT STATION
NO. 1
ELECTRICAL
DETAILS

SHEET NUMBER

E1-6.1



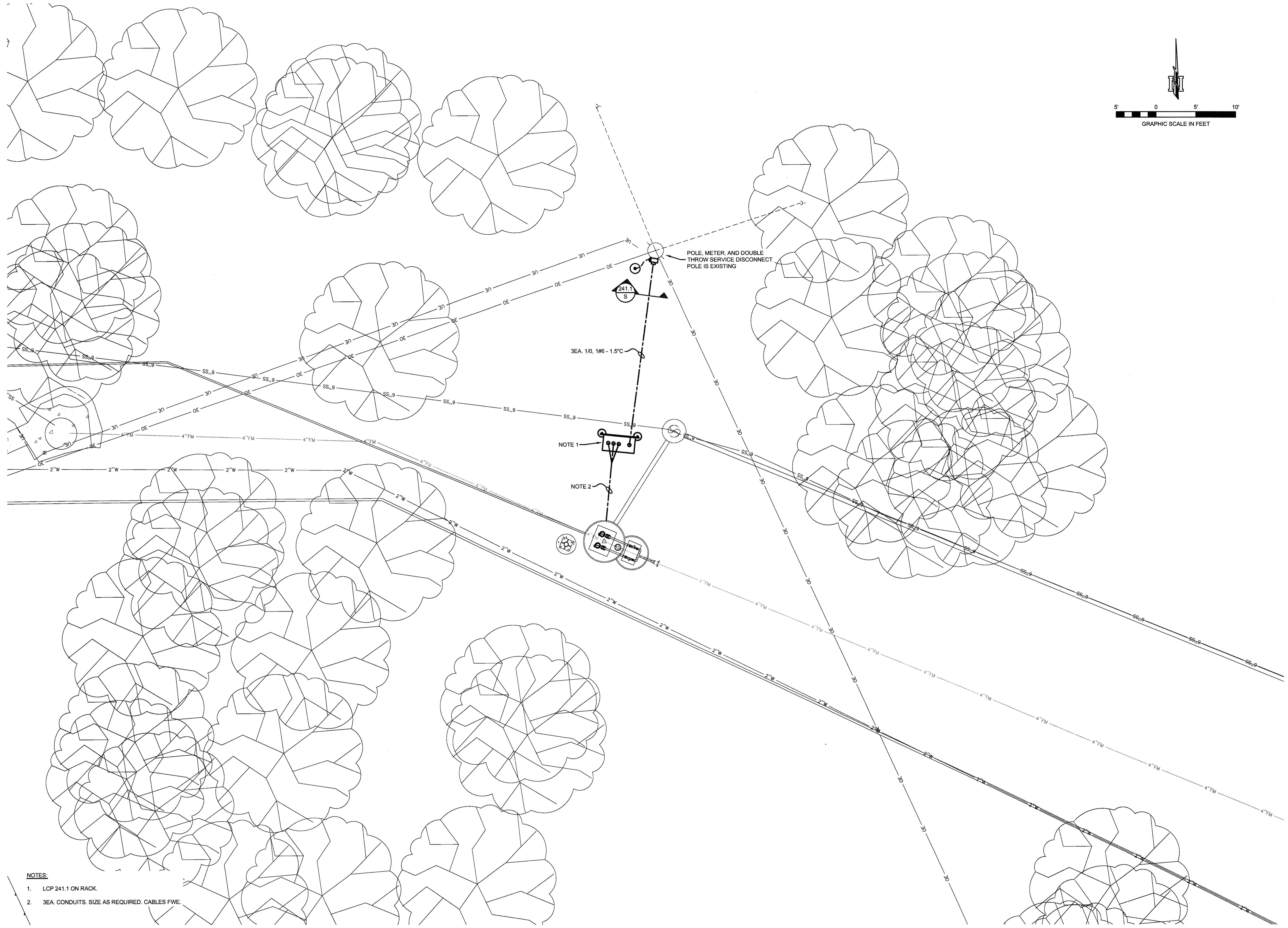
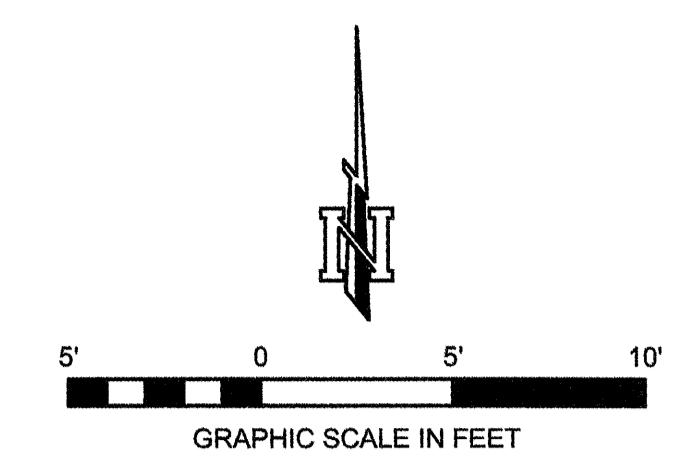
Seal: TPPE Firm Registration No. F-1356

**FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT**
PROJECT NUMBER: 116818

DATE: 3/29/2019
DESIGNED BY: LPS
DRAWN BY: MB
REVIEWED BY:
REVISED:
REVISED:

SHEET TITLE
LIFT STATION
NO. 2
ELECTRICAL
SITE PLAN

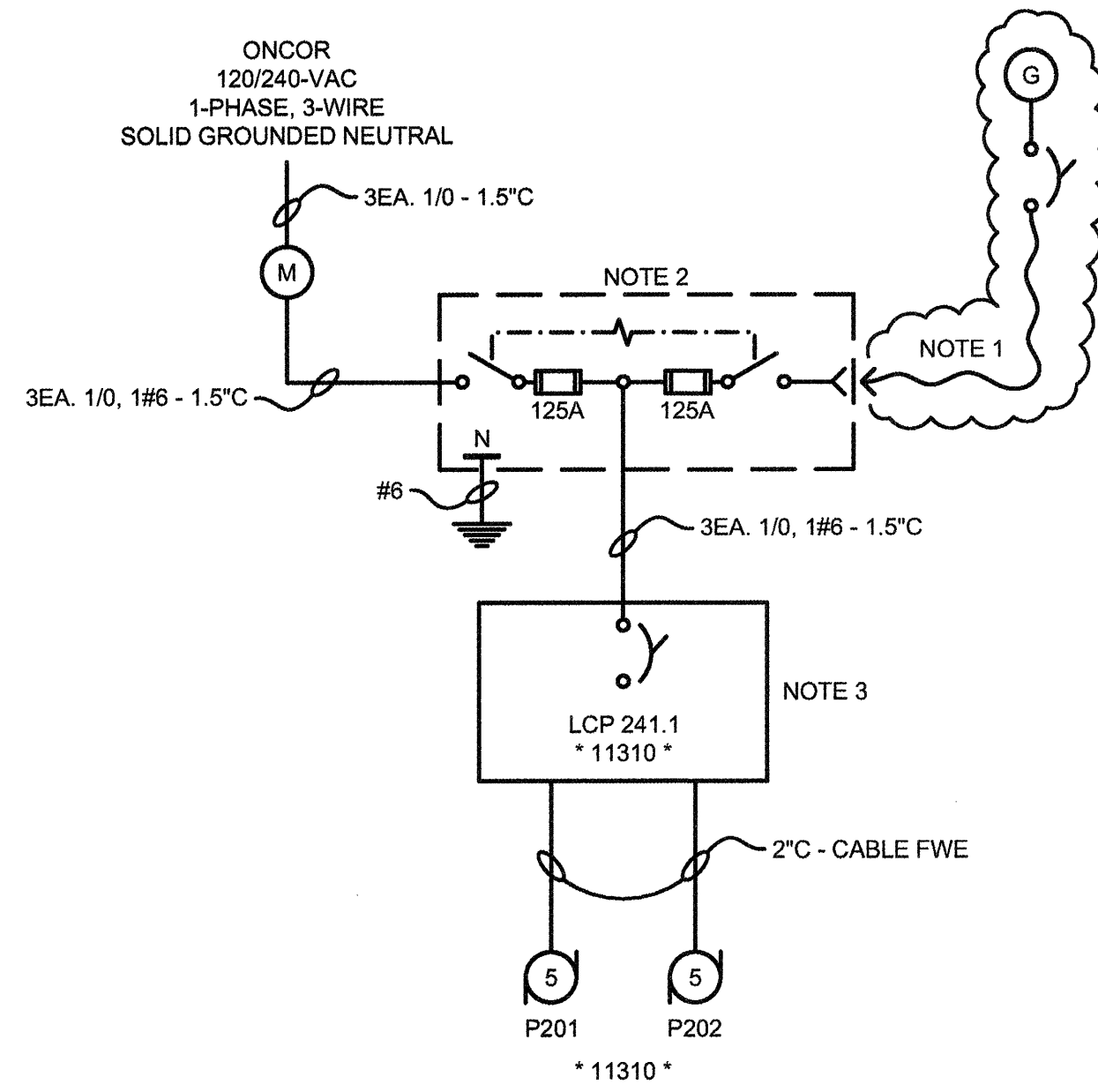
SHEET NUMBER
E2-4.1



- NOTES:**
1. LCP 241.1 ON RACK.
 2. 3EA. CONDUITS. SIZE AS REQUIRED. CABLES FWE.

PATH: \\lsc-server\p Drive\Projects\TPW017\008 CAD\30 Sheets\TPW017-E-LO-SITE.dwg

**LIFT STATION NO. 2
SINGLE LINE DIAGRAM**



- NOTES:**
- RENTAL (MOBILE) GENERATOR AND CABLES - NOT PART OF THIS PROJECT.
 - QUICK CONNECT FUSED DOUBLE THROW SAFETY SWITCH WITH POSH-LOK RECEPTACLES, UL LISTED, SERVICE ENTRANCE RATED, NEMA 3R, FURNISHED WITH POSH-LOK PLUGS (SHIPPED LOOSE), 240-VAC, 200-AMP, FUSIBLE, SWITCHED NEUTRAL, PAD-LOCKABLE (BOTH POSITIONS), EATON DT224SNRKLFP OR ENGINEER APPROVED EQUAL.
 - PROVIDE A UL 1436 LISTED "ABSENCE OF VOLTAGE TESTER" IN THIS LCP. ENCLOSURE SHALL BE NEMA 3R/12, 316 STAINLESS STEEL, DEAD FRONT AND FREE STANDING ATOP A PEDESTAL.

THIS SPACE NOT USED

THIS SPACE NOT USED

THIS SPACE NOT USED

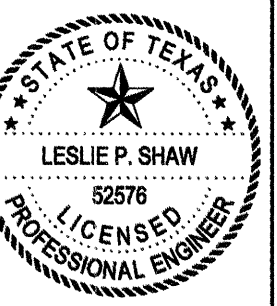
THIS SPACE NOT USED

THIS SPACE NOT USED

THIS SPACE NOT USED

THIS SPACE NOT USED

**TEXAS
PARKS &
WILDLIFE**



Leslie P. Shaw, P.E.
Digitally signed by Leslie P. Shaw, P.E.
Date: 2019.03.29 16:43:29Z

SEAL: TPE Firm Registration No. F-1396

**FORT RICHARDSON STATE PARK
WATER AND WASTEWATER SYSTEM REPLACEMENT**

PROJECT NUMBER: 116818

DATE: 3/29/2019
DESIGNED BY: LPS
DRAWN BY: MB
REVIEWED BY:
REVISED:
REVISED:
REVISED:

SHEET TITLE
LIFT STATION
NO. 2
ELECTRICAL
DETAILS

SHEET NUMBER

E2-6.1