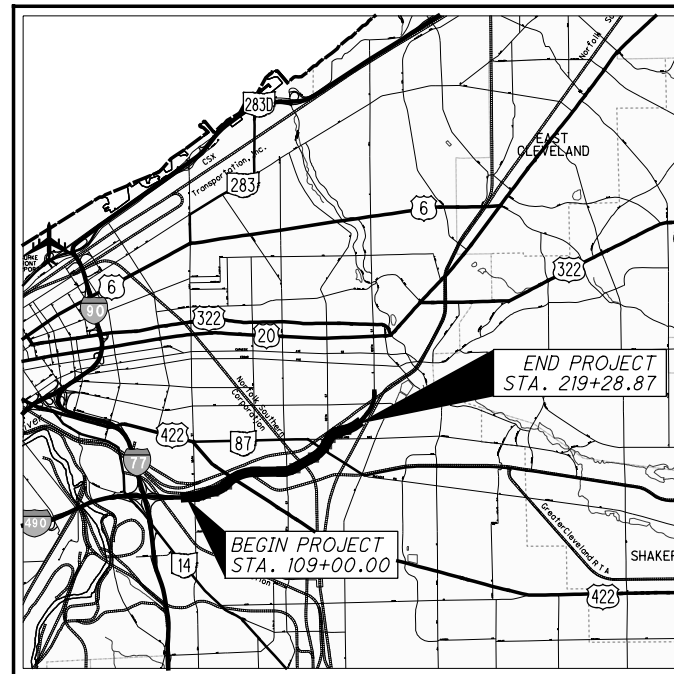
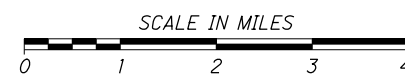


STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
CUY-IR490/ SR010-
2.09 / 19.28
CITY OF CLEVELAND
CUYAHOGA COUNTY



LOCATION MAP

LATITUDE: 41°29'08" LONGITUDE: 81°37'22"



PORTION TO BE IMPROVED.....	_____
INTERSTATE HIGHWAY.....	_____
FEDERAL ROUTES.....	_____
STATE ROUTES.....	_____
COUNTY & TOWNSHIP ROADS.....	_____
OTHER ROADS.....	_____

DESIGN DESIGNATION

CURRENT ADT (2017)	35,820
DESIGN YEAR ADT (2020)	48,230
DESIGN HOURLY VOLUME (2020)	3,580
DIRECTIONAL DISTRIBUTION	58%
TRUCKS (24 HOUR B&C)	6%
DESIGN SPEED	40 MPH
LEGAL SPEED	35 MPH
DESIGN FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL
NHS PROJECT	NO

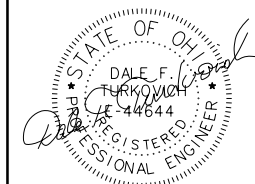
DESIGN EXCEPTIONS

NONE

<p>UNDERGROUND UTILITIES</p> <p>CONTACT BOTH SERVICES TWO WORKING DAYS BEFORE YOU DIG.</p>	<p>OHIO</p>  <p>Utilities Protection SERVICE</p> <p><i>Call Before You Dig</i> 1-800-362-2764</p>
<p>OIL & GAS PRODUCERS UNDERGROUND PROTECTION SERVICE</p> <p>1-800-925-0988</p>	

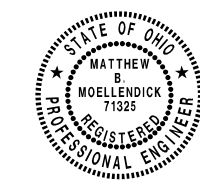


ENGINEERS SEAL:



SIGNED: _____
DATE: 04/02/2019

ENGINEERS SEAL:



SIGNED: Wanda B. McCallister
DATE: 04/02/2019

PLAN PREPARED BY:

Michael Baker
INTERNATIONAL

1111 SUPERIOR AVENUE EAST, SUITE 2300
CLEVELAND, OHIO 44114



ONE CASCADE PLAZA, SUITE 905
AKRON, OH 44308



3100 E 45TH STREET, SUITE 306
CLEVELAND, OH 44127

[illegible]

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF THE CONSTRUCTION OF 2.09 MILES OF A NEW TWO- TO THREE-LANE BOULEVARD FROM E. 55TH ST. TO E. 93RD ST. WORK INCLUDES PAVEMENT, RAILROAD, STRUCTURES, DRAINAGE, WATERWORK, LIGHTING, POWER DISTRIBUTION, TRAFFIC CONTROL, LANDSCAPING, AND ADJUSTMENT OF EXISTING UTILITIES.

EARTH DISTURBED AREAS

PROJECT EARTH DISTURBED AREA: 87.2 ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: 0 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA: 87.2 ACRES
(AREA SERVICED BY COMBINED SEWER)

2016 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO,
DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES
AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE
PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

E140 (249)

968333

17 - 3000

**NORFOLK SOUTHERN
GCRTA**

2.09 / 19.28

$$\frac{1}{97}$$

RECORD PLANS

RECORD PLANS

RECORD PLANS

BU-07 - E 55TH ST. PUBLIC UTILITY RELOCATION
 ... \BU-07\96833_GT007.dgn 4/18/2019 6:39:15 AM smilroy

CLEVELAND WATER NOTES FOR WATER MAIN INSTALLATION AND/OR REPLACEMENT (STD-011)

DEVELOPERS, ENGINEERS, AND CONTRACTORS ARE TO ABIDE BY THE MOST CURRENT VERSION OF THE CLEVELAND WATER NOTES AND DETAILS. THE MOST UP-TO-DATE VERSION CAN BE FOUND AT WWW.CLEVELANDWATER.COM/CONSTRUCTION/

GENERAL:

1. ALL WATER WORK REQUIRED, WHETHER SHOWN ON THE PLANS OR AS DIRECTED BY CLEVELAND WATER, SHALL BE AT THE EXPENSE OF THE PROJECT UNLESS OTHERWISE GREED TO BY THE COMMISSIONER OF THE CLEVELAND DIVISION OF WATER.

2. THE INFORMATION SHOWN ON THE CLEVELAND DIVISION OF WATER’S SUMMARY OF WORK/CHARGE LETTER, STRIP MAPS, AS BUILT DRAWINGS, AND GIS ARE TAKEN FROM EXISTING AVAILABLE RECORDS, AND THEIR ACCURACY IS NOT GUARANTEED.

3. CALL THE INSPECTION AND ENFORCEMENT UNIT AT 216-664-2342 TO SCHEDULE A PRECONSTRUCTION MEETING AT LEAST 1 WEEK PRIOR TO STARTING CONSTRUCTION. THE OPERATION OF ANY VALVE OR ALTERATION OF ANY PART OF THE WATER SYSTEM BY CONTRACTORS OR THEIR EMPLOYEES IS PROHIBITED WITHOUT THE SUPERVISION OF THE CLEVELAND DIVISION OF WATER INSPECTOR. SEE ALSO NOTE 20 REGARDING ADDITIONAL ADVANCE NOTIFICATION REQUIRED IN AREAS SUSPECTED TO CONTAIN LEAD SERVICE CONNECTION (ALL AREAS INSTALLED PRIOR TO 1954).

4. PRIOR TO REQUESTING CHLORINATION, THE CONTRACTOR SHALL SUPPLY THE CLEVELAND WATER INSPECTOR WITH REDLINE DRAWINGS SHOWING CHANGES MADE FROM THE APPROVED DESIGN DRAWINGS AND ACTUAL MEASUREMENTS. CHLORINATION SHALL NOT OCCUR BEFORE THESE DRAWINGS ARE SUBMITTED.

5. FOR THE PURPOSES OF CHLORINATION AND BACTERIOLOGICAL TESTING OF THE WATER MAINS THE CONTRACTOR SHALL PROVIDE AND INSTALL, AT EACH OF THE CHLORINATION PIT LOCATIONS SHOWN AND AT OTHER LOCATIONS DETERMINED BY CLEVELAND WATER. FLUSHING / SAMPLING TAP SIZES ARE TO BE DETERMINED CLEVELAND WATER. CHLORINATION PITS SHALL BE SIX (6) FOOT SQUARE AND ARE TO MEET OSHA STANDARDS. NO CUSTOMER TAPS SHALL BE INSTALLED PRIOR TO CHLORINATION.

6. A TWO YEAR WARRANTY, COMMENCING FROM THE DATE OF ACCEPTANCE OF THE FINAL CHLORINATION OF THE WATER MAIN INSTALLATION SHALL BE PROVIDED BY THE BUILDER/DEVELOPER AND/OR CONTRACTOR FOR ALL WATER MAINS AND SERVICE CONNECTION WORK PERFORMED BY THE CONTRACTOR, INCLUDING TAPS IF PERFORMED. SHOULD ANY LEAKS OCCUR AND REPAIRS BE REQUIRED DUE TO DEFECTIVE MATERIAL OR POOR WORKMANSHIP. A LETTER INDICATING THE COMMENCEMENT DATE AND END DATE OF THE WARRANTY SHALL BE INCLUDE WITH THE AS-BUILT SUBMISSION IN NOTE 12.

7. USE BACKFILL MATERIAL AS SPECIFIED AND COMPACT SUFFICIENTLY IN THOSE AREAS WHERE EXISTING MAINS AND WATER SERVICE CONNECTIONS ARE EXPOSED. (SEE CLEVELAND WATER STANDARD DETAIL STD-001)

8. ALL MATERIALS, INCLUDING BUT NOT LIMITED TO WATER MAINS, FIRE HYDRANTS, VALVES, CONNECTION MATERIALS AND OTHER WATER APPURTENANCES, SHALL BE NEW AND UNUSED AND SHALL CONFORM TO THE MOST CURRENT CLEVELAND WATER SPECIFICATIONS. ALL MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH CLEVELAND WATER’S STANDARDS.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING WATER MAINS AND APPURTENANCES THEREOF WHEN CONSTRUCTING OR CONNECTING THE NEW WATER MAIN. THIS SHALL INCLUDE LEADED JOINTS IN EXISTING FITTINGS WHICH MAY REQUIRE REPLACEMENT FITTINGS AT THE DISCRETION OF THE INSPECTOR IF IT IS DETERMINED THEY WERE DISTURBED. ALL REPAIRS TO DAMAGED EXISTING FACILITIES SHALL BE MADE BY THE CONTRACTOR, AT THE PROJECT’S EXPENSE, TO THE SATISFACTION OF CLEVELAND WATER.

10. ALL HYDROSTATIC PRESSURE TESTING SHALL BE DONE BY THE CONTRACTOR IN THE PRESENCE OF THE CLEVELAND WATER INSPECTOR. THE HYDROSTATIC TEST PRESSURE SHALL BE 75 PSI ABOVE THE STATIC PRESSURE PREVAILING AT THE SITE, BUT IN NO CASE LESS THAN 150 PSI. THE PRESSURE TEST SHALL BE FOR A DURATION OF TWO (2) HOURS WITH THE PRESSURE BEING MAINTAINED WITHIN 5 PSI OF THE REQUIRED TEST PRESSURE. SHOULD THE PRESSURE TEST FAIL THE CONTRACTOR SHALL FIND AND CORRECT THE DEFICIENCY(IES) TO THE SATISFACTION OF CLEVELAND WATER AND REPEAT THE TWO (2) HOUR PRESSURE TEST.

11. ALL BURIED WATER MAINS, FITTINGS, VALVES, FIRE HYDRANT BRANCH PIPING AND APPURTENANCES SHALL BE ENCASED WITH “V-BIO” ENHANCED POLYETHYLENE ENCASEMENT INSTALLED IN ACCORDANCE WITH THE MOST CURRENT REVISION OF ANSI/AWWA C-105/A21.5 MODIFIED METHOD “A”.

12. THE PROJECT’S PROFESSIONAL ENGINEER OR A DESIGNATED PROFESSIONAL SURVEYOR SHALL OBTAIN ACTUAL FIELD MEASUREMENTS OF THE MAIN DURING INSTALLATION AND SHALL FURNISH THE CLEVELAND WATER INSPECTOR WITH AS-BUILT DRAWINGS MEETING CLEVELAND WATER STANDARDS WITHIN 30 DAYS OF THE WATER MAIN GOING INTO SERVICE AND ALL TAPS/RETAPS BEING MADE. ONE HARD COPY AND ONE PDF COPY SHALL BE PROVIDED. DRAWINGS SHALL BE SIGNED, DATED, AND STAMPED WITH THE ENGINEER OR SURVEYOR’S 32S SEAL. REDLINE DRAWINGS ARE NOT SUFFICIENT. CLEVELAND WATER RESERVES THE RIGHT TO WITHHOLD PAYMENT AND/OR APPROVAL OF FUTURE WORK IF AS-BUILTS ARE NOT SUBMITTED.

WATER MAINS:

13. ALL PIPE, UNLESS OTHERWISE APPROVED BY CLEVELAND WATER, SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED HAVING PUSH-ON JOINTS WITH RADIALY COMPRESSED RUBBER RING GASKET AND INSTALLED AS PER THE MOST CURRENT REVISION OF AWWA C600.

14. ALL FITTINGS, UNLESS OTHERWISE CALLED FOR, SHALL BE APPROVED DUCTILE IRON, CLASS 350, CEMENT LINED OR FUSION BONDED EPOXY COATED. ALL FITTINGS AND PIPE CONNECTED TO FITTINGS SHALL BE RESTRAINED USING “RETAINED” MECHANICAL JOINT CONFORMING TO THE MATERIAL AND PERFORMANCE REQUIREMENTS OF ANSI/AWWA C-110/A21.10 AND ANSI/AWWA C-111/A21.11, OR “COMPACT” FITTINGS IN ACCORDANCE WITH ANSI/AWWA C-153/A21.53. EXCEPT FOR ANCHOR TEES, REDUCERS OR OTHER SPECIAL CIRCUMSTANCES WHEN BY CLEVELAND WATER, ALL FITTINGS ARE TO HAVE BELL ENDS.

15. ALL BOLTS AND NUTS ON ALL “RETAINED” MECHANICAL JOINTS SHALL HAVE FIELD APPLIED ONE (1) COAT OF BITUMASTIC PAINTING.

16. WHERE SHOWN ON THE PLANS, OR WHEN OTHERWISE CALLED FOR, PIPE AND FITTINGS SHALL HAVE AN APPROVED “TYPE I” OR “TYPE II” BOLTLESS RESTRAINED PUSH-ON JOINTS TO THE LIMITS SHOWN ON THE DRAWINGS.

17. AT THE END OF EACH WORKDAY, THE CONTRACTOR SHALL PLUG ALL OPEN PIPE ENDS WITH WATER TIGHT PLUGS AS PER THE “PREVENTITIVE AND CORRECTIVE MEASURES DURING CONSTRUCTION” SECTION OF THE MOST CURRENT REVISION OF AWWA C-651 AS TO PREVENT THE INFILTRATION OR INTRUSION OF ANY FOREIGN OBJECTS OR MATERIALS. DATE STAMPED DIGITAL PHOTOS SHALL BE PROVIDED FOR EACH WORKDAY DEMONSTRATING THAT PROPER AWWA C-651 METHODS WERE USED TO PLUG ALL OPEN WATER MAIN ENDS.

EACH PHOTO SHALL CLEARLY IDENTIFY THE STATION AT WHICH THE PIPE IS PLUGGED. THE STATIONING SHALL BE SHOWN BY THE USE OF A STATION MARKER PLACED AT THE PLUGGED PIPE END.

PHOTOS SHALL BE SUBMITTED ON A DAILY BASIS UNLESS OTHERWISE DEFINED BY THE CLEVELAND WATER INSPECTOR OR ENGINEER. ALL PHOTOS TAKEN OVER THE COURSE OF THE PROJECT SHALL BE SUBMITTED BY THE CONTRACTOR AS PART OF THE AS-BUILT SUBMITTAL.

PHOTOS ARE TO INCLUDE STATIONING MARKERS. AS-BUILTS SHALL BE DEEMED INCOMPLETE WITHOUT SAID COLLECTION OF DIGITAL PHOTOS.

HYDRANTS:

18. IN ALL HYDRANT INSTALLATIONS THE CONTRACTOR SHALL FACE ALL HYDRANT’S 4” (STEAMER) NOZZLE TOWARD THE PAVEMENT PRIOR TO TESTING AND CHLORINATION OF WATER MAINS. ONLY CLEVELAND WATER APPROVED HYDRANT MODELS SHALL BE INSTALLED. CONTRACTOR SHALL CONSULT WITH THE LOCAL MUNICIPALITY’S ENGINEERING OR SERVICE DEPARTMENT TO OBTAIN HYDRANT NOZZLE THREAD REQUIREMENTS IF NOT INDICATED ON THE APPROVED PLANS. ALL HYDRANTS SHALL BE FACTORY EQUIPPED WITH THE APPROPRIATE HYDRANT NOZZLE.

HYDRANT BRANCHES SHALL BE FULLY RESTRAINED AND INSTALLED PER THE APPROPRIATE HYDRANT CLEVELAND WATER HYDRANT DETAIL. HYDRANT BRANCH VALVES SHALL BE PLACED DIRECTLY AFTER THE HYDRANT TEE UNLESS OTHERWISE APPROVED BY THE INSPECTOR IN WRITING.

VALVES:

19. ALL VALVES SHALL BE AN APPROVED MODEL RESILIENT SEATED GATE VALVES AS PER THE MOST CURRENT VERSION OF AWWA C509 OR C515. VALVE OPERATING NUTS SHALL BE TAPERED (1 7/8” TO 2” FROM TOP TO BOTTOM) AND 2” DEEP. VALVES MORE THAN 10 YEARS OLD AT TIE IN POINTS TO EXISTING MAINS SHALL BE REPLACED AT THE PROJECT’S EXPENSE UNLESS OTHERWISE DIRECTED.

LEAD SERVICE CONNECTIONS:

20. LEAD SERVICES: A MINIMUM OF 45 DAYS BEFORE THE PRECONSTRUCTION MEETING, CWD SHALL PROVIDE A NOTICE TO ALL AFFECTED CUSTOMERS THAT THEIR WATER SERVICE LINE WILL BE DISTURBED. A MINIMUM OF 75 DAYS BEFORE THE PRECONSTRUCTION MEETING, THE CONTRACTOR OR ENGINEER SHALL PROVIDE CWD (AND THE LOCAL MUNICIPALITY OF OUTSIDE THE CITY OF CLEVELAND) A LIST OF ALL CUSTOMER ADDRESSES THAT WILL BE AFFECTED BY THE WATER MAIN REPLACEMENT PROJECT. FAILURE TO PROVIDE A LIST OF CUSTOMER ADDRESSES IN A TIMELY MANNER MAY RESULT IN PROJECT DELAYS.

ANY CITY-OWNED LEAD SERVICE LINE ENCOUNTERED SHALL BE REPLACED WITH TYPE K COPPER. THE REPLACEMENT SERVICE LINE SHALL BE SIZE-ON-SIZE WITH A 1-INCH MINIMUM DIAMETER. IF A CUSTOMER-OWNED LEAD SERVICE LINE IS ENCOUNTERED,

THE CONTRACTOR SHALL LEAVE A CWD-SUPPLIED CUSTOMER NOTIFICATION DOOR HANGER ON ALL ACCESSIBLE POINTS OF ENTRY TO THE HOME AND IMMEDIATELY NOTIFY THE CWD INSPECTOR. IF THE CWD INSPECTOR IS NOT AVAILABLE, CALL PAYTON HALL AT (216) 664-2444, EXT. 73000 OR (216) 971-2721. CUSTOMERS WITH A CUSTOMER-OWNED LEAD SERVICE LINE SHALL NOT BE RECONNECTED TO THE NEW WATER MAIN WITHOUT EXPRESS WRITTEN APPROVAL FROM PAYTON HALL, OR HIS APPROVED REPRESENTATIVE AT CWD.

AS PART OF THIS CONTRACT, THE CONTRACTOR SHALL OFFER EACH CUSTOMER TO REPLACE LEAD SERVICES FROM THE CORPORATION STOP TO THE INLET STOP & WASTE VALVE INSIDE THE CUSTOMER’S HOME. IF THE REPLACEMENT IS NOT COVERED UNDER THE BID ITEMS, THE CONTRACTOR SHALL PROVIDE CWD (AND THE LOCAL MUNICIPALITY IF OUTSIDE THE CITY OF CLEVELAND) WITH A CHANGE ORDER AND COST ESTIMATES FOR THE CUSTOMER-OWNED LEAD SERVICE LINE REPLACEMENT. UPON APPROVAL FROM CWD (AND THE LOCAL MUNICIPALITY IF OUTSIDE THE CITY OF CLEVELAND), THE CONTRACTOR SHALL PERFORM THE REPLACEMENT OF THE CUSTOMER-OWNED LEAD SERVICE LINE. AS STATED ABOVE, CUSTOMERS WITH CUSTOMER-OWNED LEAD SERVICE LINES SHALL NOT BE RECONNECTED TO THE NEW WATER MAIN WITHOUT EXPRESS WRITTEN APPROVAL FROM PAYTON HALL, OR HIS APPROVED REPRESENTATIVE AT CWD.

IN THE EVENT THAT A CWD WAIVER IS GRANTED SUCH THAT A CUSTOMER-OWNED LEAD SERVICE LINE IS NOT REPLACED, CWD SHALL SUPPLY THE CONTRACTOR WITH LEAD FILTERS AND PITCHERS THAT THE CONTRACTOR SHALL DISTRIBUTE TO EACH RESIDENCE WITHIN THE

PROJECT AREA, INCLUDING TO ALL UNITS OF MULTI-UNIT HOUSING BUILDINGS. THE FILTERS SHALL BE POUR-THROUGH PITCHER TYPE LEAD FILTERS THAT ARE NSF/ANSI-53 CERTIFIED TO REMOVE LEAD. THE PITCHER, A 3-MONTH SUPPLY OF FILTERS, AND CWD-SUPPLIED USE INSTRUCTIONS AND OTHER APPLICABLE MATERIALS SHALL BE DISTRIBUTED. RECORDS OF RESIDENTS WHO RECEIVED AND WHO REFUSED THE FILTERS SHALL BE PROVIDED BY THE CONTRACTOR TO CWD (AND THE LOCAL MUNICIPALITY IF OUTSIDE THE CITY OF CLEVELAND).

AT THE BEGINNING OF THE DAY THAT A CUSTOMER IS SCHEDULED TO BE CONNECTED TO THE NEW WATER MAIN, THE CONTRACTOR SHALL DISTRIBUTE THE APPROPRIATE CWD-SUPPLIED CUSTOMER NOTIFICATION DOOR HANGER AND OTHER APPLICABLE MATERIALS ON ALL ACCESSIBLE POINTS OF ENTRY TO THE HOME AND IN A PROMINENT LOCATION AT ALL MULTI-UNIT HOUSING BUILDINGS. THE APPROPRIATE DOOR NOTIFICATION WILL BE DETERMINED BY (1) WHETHER A CUSTOMER-OWNED LEAD SERVICE LINE REMAINS IN THE PROJECT AREA AND (2) THE TYPE OF MATERIAL OF THE INDIVIDUAL CUSTOMER-OWNED SERVICE LINE.

21. DIELECTRIC COUPLINGS: IN THE EVENT THAT A CWD WAIVER IS GRANTED SUCH THAT A CUSTOMER-OWNED LEAD SERVICE LINE IS NOT REPLACED, AND A NEW SERVICE IS CONNECTED TO A CUSTOMER-OWNED LEAD SERVICE LINE, A DIELECTRIC COUPLING SHALL BE PROVIDED TO TRANSITION FROM THE NEW MATERIALS TO THE LEAD PIPE. THE MODEL COUPLING USED IS SUBJECT TO APPROVAL FROM CWD. HARCO 13#32 PHILMAC UTC OR CWD-APPROVED EQUAL.

0	2019-05-09	DC005
NO.	DATE	DESCRIPTION
ISSUE RECORD		

CLEVELAND WATER NOTES FOR WATER MAIN INSTALLATION AND/OR REPLACEMENT (STD-011)

GENERAL SERVICE CONNECTIONS:

22. AS PART OF THE AS BUILT SUBMISSION IN NOTE 12, THE CONTRACTOR SHALL PROVIDE A TABLE SHOWING ALL EXISTING CONNECTIONS, IDENTIFIED BY CLEVELAND WATER CONNECTION NUMBER, SHOWING THE FOUND CONNECTION MATERIAL FOR BOTH THE CITYSIDE AND OWNERSIDE CONNECTION, AS WELL AS THE NEW CONNECTION MATERIAL FOR ALL CONNECTIONS REPLACED. THE TABLE SHALL ALSO NOTE ANY REVISED CONNECTION MEASUREMENTS AND SIZES. A SAMPLE TABLE WILL BE PROVIDED. THE SUBMISSION SHALL BE IN MICROSOFT EXCEL FORMAT. CLEVELAND WATER SHALL REQUIRE THE DELIVERY AND ACCEPTANCE OF THIS TABLE BEFORE THE PRESSURE TEST AND CHLORINATION / DISINFECTION OF THE MAIN WILL BE PERMITTED.

23. NEW WATER SERVICE CONNECTIONS LOCATIONS SHOWN ON THESE DRAWINGS ARE FOR REFERENCE ONLY AND ARE NOT PART OF THE WATER MAIN APPROVAL. THE SPECIFIC LOCATION FOR EACH CONNECTION WILL BE DETERMINED BY CLEVELAND WATER PRIOR TO THE TAPS BEING INSTALLED. ALL PERMITS FOR TAPS AND METERS FOR PARCELS ASSOCIATED WITH THE WATER MAINS INSTALLED ON THIS PROJECT ARE TO BE OBTAINED BY THE LAND OWNER OF SAID IMPROVEMENT PLANS. IT IS THE LAND OWNERS RESPONSIBILITY TO ARRANGE FOR OBTAINING PERMITS FOR ALL WATER SERVICE CONNECTIONS BEFORE ANY SERVICE CONNECTION WORK MAY PROCEED. ALL FEES CAN BE OBTAINED FROM THE CLEVELAND WATER PERMITS AND SALES SECTION AT 216-664-3130 PROMPT #7 OR 216-664-2444 X75209.

ACCOUNTS SHALL BE INITIATED IN THE LAND OWNER'S NAME AS PART OF THE PERMITTING PROCESS. ALL RESPONSIBILITIES ASSOCIATED WITH EACH WATER SERVICE, INCLUDING, THE OWNER SIDE INSPECTIONS, METER SET/METER PIPING INSPECTION AND THE METER INSTALLATION SHALL BE THE RESPONSIBILITY OF SAID OWNER. METERS INSTALLATIONS WILL NOT BE AUTHORIZED TO BE INSTALLED UNTIL ALL INSPECTIONS HAVE BEEN COMPLETED. ESTIMATED BILLS MAY ENSUE IF A HOME IS IDENTIFIED AS HAVING WATER SERVICE BUT NO METER HAS BEEN INSTALLED. IF NEW OWNERS, ONCE PARCELS ARE SOLD OFF AND TRANSFER TITLE, DO NOT CONTACT CLEVELAND WATER TO ESTABLISH ACCOUNTS IN THEIR NAME, ACCOUNTS AND THEIR ASSOCIATED BILLS WILL REMAIN IN THE NAME OF OUR LAST OWNER OF RECORD WHICH MAY BE THE DEVELOPER OR BUILDER. IT IS THE RESPONSIBILITY OF THE NEW OWNER TO TRANSFER ACCOUNTS INTO THEIR NAME WHEN THE PROPERTIES LEGALLY TRANSFER. UPON TRANSFER OF PROPERTY, SELLER OF PROPERTY MUST COMMUNICATE ALL UNCOMPLETED PORTIONS OF THE REFERENCED RESPONSIBILITIES TO THE NEW OWNER.

24. ONE INCH SERVICE CONNECTIONS SHALL BE PERMITTED TO SERVICE NEW HOMES (AS SHOWN ON APPROVED WATER MAIN EXTENSION PLANS) BASED ON THE FOLLOWING CRITERIA:

A. PEAK FLOW DEMANDS DO NOT EXCEED 25 GPM FOR AN INDIVIDUAL HOME/UNIT. INCLUSIVE OF ALL USAGE (DOMESTIC AND/OR IRRIGATION),

B. LENGTH OF ONE INCH CONNECTION DOES NOT EXCEED 75 FEET AS MEASURED FROM THE MAIN TO THE POINT OF ENTRY INTO THE PROPOSED HOME/UNIT.

C. THE CONNECTIONS DO NOT INCLUDE LIMITED AREA OR NFPA 13D SPRINKLER SYSTEMS

ANY SERVICE REQUESTS DIFFERING FROM THE STATED CRITERIA SHALL REQUIRE THE SUBMITTAL OF A COMPLETE WATER SERVICE APPLICATION FOR EACH WATER SERVICE REQUESTED.

25. ALL CURB VALVE BOXES & METER VAULTS WILL BE INSTALLED IN GRASS AREAS WHEN POSSIBLE. CURB VALVES SHALL BE PLACED APPROXIMATELY 2 FEET OFF THE CURB. CURB VALVES IN EASEMENTS SHALL BE LACED APPROXIMATELY 3 FEET OFF THE WATER MAIN. IF VALVE BOXES OR METER VAULTS ARE INSTALLED OUTSIDE OF A DEDICATED RIGHT OF WAY OR EASEMENT FOR THE PURPOSES OF WATER SUPPLY, A STANDARD CLEVELAND EASEMENT FOR A VAULT SHALL BE PROVIDED.

EMERGENCIES:

26. IF A WATER MAIN OR SERVICE CONNECTION BREAK OCCURS DURING CONSTRUCTION AND EMERGENCY ASSISTANCE IS REQUIRED, PLEASE NOTIFY CLEVELAND WATER AT 216-664-3060. THIS LINE IS AVAILABLE 24/7/365

NOTES:

THE PROJECT SHALL COMPLY WITH ALL APPLICABLE CLEVELAND WATER DEPARTMENT (CWD) STANDARDS, NOTES, AND DETAILS; EXCEPT AS MODIFIED WITHIN THIS PLAN.

FOR PROJECT SPECIFIC NOTES, SEE SHEETS 3- 21
FOR PROJECT SPECIFIC DETAILS, SEE SHEETS 37-59

0	2019-05-09	DC005
NO.	DATE	DESCRIPTION
ISSUE RECORD		

WATERWORK NOTES GENERAL

SCOPE OF WORK

THE WORK CONTEMPLATED UNDER THIS CONTRACT COMPRISES OF THE FURNISHING AND INSTALLING COMPLETE WITH VALVES AND OTHER APPURTENANCES, WATER DISTRIBUTION MAIN, FIRE HYDRANT REPLACEMENT, APPURTENANCE ADJUSTMENTS AND PERFORMING OTHER INCIDENTAL WORK NECESSARY AS SHOWN IN THE PLANS.

GENERAL NOTES

THE FIELD TESTING HEAD SHALL BE 75 PSI PLUS THAT DUE TO THE STATIC HEAD PREVAILING AT THE SITE, BUT IN NO CASE LESS THAN 150 PSI. THE CONTRACTOR SHALL NOTIFY THE CLEVELAND WATER DEPARTMENT INSPECTION AND ENFORCEMENT THREE (3) WEEKS PRIOR TO STARTING ANY WATER WORKS CONSTRUCTION. CALL 216-664-2342. AFTER AWARD OF CONTRACT, THE CONTRACTOR THROUGH THE ENGINEER SHALL SUBMIT TO THE CITY OF CLEVELAND WATER DEPARTMENT, INSPECTION AND ENFORCEMENT SECTION, A CONSTRUCTION SCHEDULE AND CONSTRUCTION SEQUENCE RELATING TO WATER WORK. THE CONTRACTOR SHALL ALSO MAKE PAYMENT TO THE DIVISION OF WATER FOR ALL DIVISION OF WATER LABOR REQUIRED TO COMPLETE THE WORK REQUIRED HEREIN. THE CONTRACTOR SHALL MAKE ALL PAYMENT FOR DIVISION OF WATER LABOR BEFORE ANY WATER WORK IS PERFORMED. SEE PARAGRAPH "DIVISION OF WATER - LABOR CHARGES." ALL DIVISION OF WATER LABOR CHARGES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DEEMED TO BE INCLUDED IN THE APPROPRIATE BID ITEM.

DEFINITIONS

WHEREVER IN THESE SPECIFICATIONS OR IN OTHER CONTRACT DOCUMENTS THE FOLLOWING TERMS OR PRONOUNS IN PLACE OF THEM ARE USED, THE INTENT AND MEANING SHALL BE INTERPRETED AS FOLLOWS:

THE STATE: THE STATE IS THE STATE OF OHIO ACTING THROUGH ITS AUTHORIZED REPRESENTATIVE.

ENGINEER: THE ENGINEER IS DISTRICT DEPUTY DIRECTOR OR DISTRICT ENGINEER, THE DISTRICT CONSTRUCTION ENGINEER OR THE DISTRICT MAINTENANCE ENGINEER OR THE PROJECT ENGINEER ASSIGNED TO ADMINISTER THE CONTRACT, OR THEIR DULY DESIGNATED DEPUTIES, AGENTS, OR REPRESENTATIVES.

THE CITY: THE CITY IS THE DIRECTOR OF THE DEPARTMENT OF PUBLIC UTILITIES OF THE CITY OF CLEVELAND, OR HIS DULY DESIGNATED REPRESENTATIVE(S), CITY INSPECTOR, AND/OR THE WATER DESIGN REVIEW ENGINEER OF THE DIVISION OF WATER.

STATUS OF CITY INSPECTORS

INSPECTORS AS DESIGNATED BY THE DIRECTOR OF PUBLIC UTILITIES ARE AUTHORIZED TO INSPECT ALL WORK DONE AND MATERIALS FURNISHED, SUCH INSPECTION MAY EXTEND TO ALL OR ANY PART OF THE WATER WORK, AND TO THE PREPARATION OR MANUFACTURE OF THE MATERIALS TO BE USED IN THE WATER WORK. THE CITY INSPECTOR AS DESIGNATED BY THE DIRECTOR OF PUBLIC UTILITIES WILL MAKE WORK INSTRUCTIONS THROUGH THE ENGINEER. ARRANGEMENTS FOR CITY INSPECTORS ARE TO BE MADE BY NOTIFYING INSPECTION AND ENFORCEMENT DIVISION OF WATER (216-664-2342), WITHIN THE TIME SPECIFIED. NO WORK SHALL BE ACCEPTED UNLESS INSPECTED.

ACCESS TO WORK AND PLACE OF MANUFACTURE

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND CITY, AT LEAST SEVEN (7) DAYS PREVIOUS TO THE COMMENCEMENT OF THE MANUFACTURE OF ANY MATERIALS, OF THE TIME AND PLACE WHERE THE MANUFACTURE IS TO COMMENCE, IN ORDER THAT A REPRESENTATIVE OF THE ENGINEER AND THE CITY, OR HIS DESIGNEE, MAY BE PRESENT TO INSPECT THE MANUFACTURE. THE CONTRACTOR SHALL PROVIDE, WITHOUT CHARGE OR EXPENSE TO THE STATE AND CITY, ALL NECESSARY ASSISTANCE TO THE ENGINEER AND THE CITY, OR HIS DESIGNEE, WHEN REQUIRED FOR INSPECTION OR VERIFICATION OF WORK DONE.

FLOODS AND FREEZING WEATHER

PROPER FACILITIES SHALL BE PROVIDED FOR PROTECTING THE WORK FROM DAMAGE BY FLOOD RAIN OR FROST, AND WORK DONE IN FREEZING WEATHER SHALL BE DONE IN SUCH MANNER AS THE ENGINEER MAY APPROVE. VALVES SHALL BE PROTECTED FROM FREEZING UNTIL BACKFILLED IN THE COMPLETED WORK.

ADDITIONAL WORK

(A) ATTENTION IS CALLED TO THE FACT THAT THE WORK UNDER THIS CONTRACT INCLUDES CERTAIN PERFORMANCE AS INCIDENTAL TO THE ITEMIZED REQUIREMENTS HEREOF, THOUGH NOT EXCLUSIVE AS FOLLOWS: TO PERFORM ALL EXCAVATION, BACKFILLING, SHEETING, SHORING, AND TO TEST AND CHLORINATE THE INSTALLATION. THE STATE WILL MAKE NO SPECIFIC OR SEPARATE PAYMENT OR ALLOWANCE, BUT THE COST THERE SHALL BE INCLUDED IN THE PRICES STIPULATED TO BE PAID FOR UNDER THE VARIOUS WATER WORK ITEMS TO BE DONE UNDER THIS CONTRACT.

(B) PRELIMINARY FLUSHING: BEFORE BEING PLACED IN SERVICE, ALL DIRT AND FOREIGN MATTER SHALL BE REMOVED FROM THE NEW AND/OR RELOCATED WATER MAIN OR EXTENSIONS TO EXISTING MAINS BY A THOROUGH FLUSHING THROUGH THE HYDRANTS OR BY OTHER APPROVED MEANS. EACH VALVED SECTION OF NEWLY LAID PIPE SHALL BE FLUSHED INDEPENDENTLY. THIS SHALL BE DONE AFTER THE PRESSURE TEST AND MAY BE DONE BEFORE OR AFTER THE TRENCH SHALL HAVE BEEN BACKFILLED.

(C) FLUSH, TEST AND SAMPLE: THE CITY, DIVISION OF WATER, WILL CHARGE TO THE CONTRACTOR A "FLUSHING, TEST AND SAMPLE" FEE FOR DIVISION OF WATER LABOR INCURRED IN THE WORK, PAYABLE TO THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER BEFORE ANY WORK IS PERFORMED. FLUSHING, TEST AND SAMPLING IS LIMITED TO XXXX' OF 12" MAIN. NEW AND/OR RELOCATED WATER MAINS OR EXTENSION OF WATER MAINS EXCEEDING XXXX' OF XX" MAIN SHALL BE CHLORINATED. CHLORINATION FEES WILL BE CHARGED TO THE CONTRACTOR FOR CWD LABOR INCURRED IN THE CHLORINATION OF MAINS. FEE SCHEDULE FOR CHLORINATION OF WATER MAINS APPEARS ELSEWHERE IN THESE NOTES.

TESTING MAINS

(A) ALL PIPES, VALVES, FITTINGS, ETC., SHALL BE LAID IN SUCH A MANNER AS TO LEAVE ALL JOINTS WATERTIGHT. AFTER THE PIPE IS LAID, SUCH LENGTHS OF THE WATER MAIN AS THE CITY OR HIS DESIGNATE MAY DETERMINE, SHALL BE TESTED UNDER HYDROSTATIC PRESSURE INDICATED IN GENERAL NOTES.

(B) THE HYDROSTATIC TEST SHALL BE UNDER THE DIRECTION OF THE CITY, OR HIS DESIGNATE. THE CONTRACTOR MAY OBTAIN WATER FOR TESTING BY OBSERVING THE RULES AND REGULATIONS ENFORCED IN THE MUNICIPALITIES OR TOWNSHIPS IN WHICH THE WORK IS BEING DONE. THE CITY WILL FURNISH A PRESSURE GAUGE FOR MEASURING THE PRESSURE ON THE WATER MAIN, BUT THE CONTRACTOR SHALL FURNISH A SUITABLE PUMP, PIPES, TEST HEADS AND ALL APPLIANCES, LABOR, FUEL AND OTHER APPURTENANCES NECESSARY TO MAKE THESE TESTS.

(C) THE HYDROSTATIC TEST PRESSURE SHALL BE FOR A DURATION OF A MINIMUM OF TWO (2) HOURS WITH ALL VALVES CLOSED DURING WHICH TIME THE INTERNAL PRESSURE SHALL REMAIN WITHIN 5 PSI OF THE SPECIFIED TEST PRESSURE. SHOULD THE TEST PRESSURE DROP MORE THAN 5 PSI, THE CONTRACTOR SHALL RECHARGE THE WATER MAIN TO THE SPECIFIED TEST PRESSURE AND LOCATE AND REPAIR THE LEAK TO THE SATISFACTION OF THE CITY. ANY DAMAGED OR DEFECTIVE PIPE, PIPE JOINTS, FITTINGS, VALVES, HYDRANTS OR APPURTENANCES SHALL BE REPAIRED OR REPLACED WITH SOUND MATERIAL AND THE HYDROSTATIC PRESSURE TEST REPEATED.

(D) AFTER A SECTION OF THE WATER MAIN HAS BEEN TESTED, THE CONTRACTOR SHALL FLUSH THE SAME. IN THE CASE OF SUPPLY MAINS WHERE DRAINS ARE CONNECTED TO VALVE OR DRAIN VAULTS, THE CONTRACTOR SHALL, WITHIN A REASONABLE TIME AFTER THE TEST HAS BEEN COMPLETED, PUMP ALL WATER OUT OF THE VAULTS. FLUSHING SHALL BE DONE IN ACCORDANCE WITH THESE SPECIFICATIONS.

(E) IN COLD WEATHER IMMEDIATELY AFTER TESTING A SECTION OF THE WATER MAIN, THE CONTRACTOR SHALL OPEN ALL VALVES, AND IN THE CASE OF SUPPLY MAINS ALL AIR RELIEF VALVES, BYPASSES AND DRAINS AND PROPERLY DRAIN BONNETS OF ALL VALVES IN THE SECTION OF THE WATER MAIN, AND TAKE ALL OTHER PRECAUTIONS NECESSARY TO PREVENT INJURY TO WATER MAIN AND APPURTENANCES DUE TO FREEZING.

(F) IN ORDER TO BE ABLE TO MAKE PROPER ALLOWANCE FOR LEAKAGE AT VALVES, AIR RELIEF VALVES, BYPASSES, AND DRAINS, ONLY THOSE SECTIONS OF WATER MAIN MAY BE TESTED AS SHALL HAVE SUCH VALVES, TEST PLUGS AND CAPS ACCESSIBLE. THE PERMITTED LEAKAGE SHALL NOT EXCEED A RATE OF SEVENTY-FIVE (75) GALLONS PER TWENTY-FOUR (24) HOURS PER MILE OF PIPE PER INCH OF NOMINAL DIAMETER.

(G) IN TESTING NEW MAINS, THE CONTRACTOR SHALL NOT BE PERMITTED TO USE ANY PART OF THE EXISTING MAINS IN HIS TEST UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS. THE LIMITS OF THE HYDROSTATIC SHALL BE AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL PROVIDE BLIND FLANGES, PLUGS OR CAPS, DEPENDING ON DESIGN, TO THE TESTED LENGTH OF THE PROPOSED MAIN SO THAT IT WILL BE COMPLETELY INDEPENDENT OF THE SAID EXISTING MAINS. PROPER RESTRAINT OF ALL BLIND FLANGES, PLUGS OR CAPS TO PREVENT BLOWOFF SHALL BE PROVIDED AND IN THE CASE OF DEAD END MAINS CONCRETE PIERS WILL BE REQUIRED. NO EXTRA PAYMENT WILL BE MADE AND THE ENTIRE COST SHALL BE DEEMED TO BE INCLUDED IN THE BID PRICE.

WATER MAIN DISINFECTION

WATER MAIN DISINFECTION SHALL CONSIST OF: PRELIMINARY FLUSHING WATER MAINS AFTER THE HYDROSTATIC TEST AND PRIOR TO THE CHLORINATION PROCEDURE, THE CHLORINATION PROCEDURE, THE FINAL FLUSHING, AND SAMPLING. ALL CONTRACTOR LABOR AND MATERIAL REQUIRED TO ASSIST THE CITY IN THE DISINFECTION OF WATER MAINS SHALL BE INCLUDED IN THE PRICE PER FOOT OF WATER MAIN BID. THE CITY, DIVISION OF WATER WILL CHARGE TO THE CONTRACTOR A "CHLORINATION" FEE FOR DIVISION OF WATER LABOR INCURRED IN THE WORK, PAYABLE TO THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER BEFORE ANY WORK IS PERFORMED.

(A) PRELIMINARY FLUSHING:

BEFORE DISINFECTION ALL DIRT AND FOREIGN MATTER SHALL BE REMOVED FROM THE NEW AND/OR RELOCATED WATER MAIN OR EXTENSIONS TO EXISTING MAINS BY A THOROUGH FLUSHING THROUGH THE HYDRANTS OR BY OTHER APPROVED MEANS BY THE CONTRACTOR. EACH VALVED SECTION OF THE NEWLY LAID PIPE SHALL BE FLUSHED INDEPENDENTLY. THIS SHALL BE DONE AFTER THE PRESSURE TEST. FLUSHING SHALL BE IN ACCORDANCE WITH ANSI/AWWA C-651 STANDARD FOR "DISINFECTING WATER MAINS." WHERE THE FLUSHING VELOCITY SPECIFIED THEREIN CANNOT BE ATTAINED FLUSHING RATES AS DETERMINED BY THE CITY TO BE SUFFICIENT WILL BE PERMITTED. IF IN THE OPINION OF THE CITY THE FLUSHING PRIOR TO THE CHLORINATION PROCEDURE DOES NOT REMOVE DIRT OR OTHER ACCUMULATIONS IN THE PIPE, THE PIPE SHALL BE CLEANED BY MECHANICAL MEANS BY THE CONTRACTOR AND THE FLUSHING SHALL BE REPEATED.

(B) CHLORINATION PROCEDURE:

SUCH LENGTHS OF THE WATER MAIN AS THE CITY MAY DETERMINE SHALL BE CHLORINATED; HOWEVER, IN NO CASE SHALL THE LENGTH EXCEED THAT WHICH CAN BE CHLORINATED SATISFACTORILY IN ONE (1) WORK DAY. SUCH MAXIMUM LENGTH IS GENERALLY UP TO THREE (3) MILES TOTAL, INCLUDING BRANCHES AND CONNECTING WATER MAIN(S), FOR SIXTEEN INCH (16") AND SMALLER; AND THREE (3) VALVE SECTIONS, OR TWO (2) MILES, FOR TWENTY INCH (20") OR LARGER WATER MAINS.

THE CONTRACTOR SHALL COOPERATE WITH THE CITY'S CHLORINATION CREW AND/OR INSPECTOR BY OPERATING ANY REQUIRED WATER MAIN APPURTENANCES TO ASSURE THE DISINFECTION OF SUCH APPURTENANCES AND OF ANY PIPE BRANCHES TO ASSURE CHLORINATION SOLUTION IS CONFINED TO WATER MAIN BEING DISINFECTED. NO OPERATION OF WATER MAIN APPURTENANCES BY THE CONTRACTOR SHALL BE PERFORMED WITHOUT THE CONSENT OF THE CITY.

THE CITY OF CLEVELAND, DIVISION OF WATER'S, CHLORINATION CREW WILL DETERMINE THE LENGTH OF TIME THE CHLORINE SOLUTION IS TO REMAIN IN THE WATER MAIN BEING DISINFECTED.

(C) FINAL FLUSHING:

1. THE FLUSHING OF THE CHLORINATION SOLUTION SHALL BE DONE BY THE CONTRACTOR UNTIL THE CHLORINE SOLUTION IS TOTALLY FLUSHED OUT OF THE SYSTEM BEING DISINFECTED. ALL FLUSHING SHALL BE UNDER THE CONTROL OF THE CITY, OR HIS DESIGNATE. THE CONTRACTOR SHALL OBTAIN WATER FOR FLUSHING IN THE SAME MANNER AS FOR TESTING.

2. IN FLUSHING, THE CONTRACTOR SHALL PROPERLY DISPOSE OF THE CHLORINATION SOLUTION. ONLY POINTS OF DISCHARGE APPROVED BY THE ENGINEER AND THE CITY'S CHLORINATION CREW SHALL BE UTILIZED WITHOUT ANY TREATMENT TO CHEMICALLY NEUTRALIZE THE SOLUTION. IN CASES WHERE DIRECT DISPOSAL IS NOT APPROVED, THE CONTRACTOR SHALL NEUTRALIZE THE CHLORINE SOLUTION AS PROVIDED IN APPENDIX B OF AWWA C-651. CONTRACTOR SHALL OBTAIN APPROVAL, IN WRITING, OF THE LOCAL SEWER AUTHORITY BEFORE DISPOSING TO A SANITARY SEWER. A COPY OF SUCH WRITTEN APPROVAL SHALL BE PROVIDED TO THE INSPECTOR AND CHLORINATION CREW BEFORE ANY FLUSHING IS BEGUN.

3. THE CITY'S CHLORINATION CREW WILL DETERMINE WHEN THE DISINFECTION SOLUTION HAS BEEN SATISFACTORILY FLUSHED FROM THE MAIN AND BRANCHES.

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WATER MAIN DISINFECTION (CONT.)

(D) SAMPLING:

1. A TIME PERIOD AS DETERMINED BY THE CITY SHALL ELAPSE BEFORE WATER SAMPLES ARE TAKEN FROM THE WATER MAIN(S) AND BRANCHES) TO DETERMINE THE BACTERIOLOGICAL QUALITY OF THE WATER THEREIN. IN NO CASE, SHALL THE TIME PERIOD BE LESS THAN TWENTY-FOUR (24) HOURS. NO SAMPLES SHALL BE TAKEN FROM FIRE HYDRANTS. THE CONTRACTOR SHALL ASSIST THE CITY'S CHLORINATION CREW IN OBTAINING SAMPLES. THE CITY WILL FURNISH ALL CONTAINERS AND CONTROL PROCEDURES FOR OBTAINING SAMPLES. THE CITY WILL DETERMINE THE NUMBER AND LOCATIONS OF SAMPLES TO BE TAKEN FROM THE DISINFECTED SECTIONS.

2. IN CASES WHERE THE LENGTH OF WATER MAIN IS LESS THAN 350 FEET, AFTER HYDROSTATIC TESTING ONLY, PRELIMINARY FLUSHING AND SAMPLING WILL BE DONE; HOWEVER, IF THERE ARE TWO (2) POSITIVE SAMPLES, AFTER FLUSHING, THE ENTIRE PROCEDURE OF PRELIMINARY FLUSHING, CHLORINATION, FLUSHING AND SAMPLING SHALL BE REQUIRED. THE CITY'S CHLORINATION CREW WILL COMPLETE AND DISTRIBUTE THE CHLORINATION APPROVAL FORM.

THE CITY WILL DETERMINE THE BACTERIOLOGICAL QUALITY OF THE WATER SAMPLES. IF SAMPLING RESULTS IN TWO (2) CONSECUTIVE POSITIVE SAMPLES, THE PROCEDURE OF CHLORINATION, FLUSHING AND SAMPLING SHALL BE REPEATED. FIGURE 1, SUGGESTED COMBINATION AND SAMPLING TAP, TAKEN FROM AWWA C-651, IS HEREIN MADE A PART OF THESE SPECIFICATIONS.

CONTRACTOR'S LABOR

THE CONTRACTOR SHALL FURNISH AT LEAST TWO (2) TRAINED WORKMEN TO PERFORM ALL LABOR UNDER THE SUPERVISION AND DIRECTION OF THE CITY'S CHLORINATION CREW. THE CONTRACTOR'S LABORERS SHALL PERFORM ALL DUTIES SPECIFIED IN WATER MAIN DISINFECTION GENERAL NOTE. THE CONTRACTOR SHALL PROVIDE PROPER EQUIPMENT AND PROTECTIVE CLOTHING AS MAY BE REQUIRED BY THE LABORERS IN PERFORMING THE NEEDED TASK.

ACCESS PIT

(A) THE CONTRACTOR SHALL PROVIDE TIGHTLY WOOD SHEETED ACCESS PITS, CONFORMING TO THE REQUIREMENTS OF "THE SPECIFIC SAFETY REQUIREMENTS OF THE INDUSTRIAL COMMISSION OF OHIO RELATING TO CONSTRUCTION" RULE 4121:1-3-13, FOR ACCESS TO ALL WATER MAIN APPURTENANCES TO BE UTILIZED IN DISINFECTING WATER MAINS.

(B) THE CONTRACTOR SHALL HAVE ON HAND READY FOR USE, PUMPING EQUIPMENT TO DEWATER ANY AND ALL ACCESS PITS USED FOR DISINFECTING WATER MAINS AND SHALL DEWATER THE ACCESS PITS WHEN ORDERED BY THE CITY.

CONNECTION OF NEW MAINS

WHEN THE NEW AND/OR RELOCATED WATER MAINS HAVE BEEN TESTED AND CHLORINATED AND ARE READY TO BE CONNECTED TO THE EXISTING MAIN, THE CONTRACTOR SHALL MAKE SUCH CONNECTIONS AT A TIME DESIGNATED BY THE CITY. PRIOR TO SHUTTING DOWN THE EXISTING MAINS, THE CONTRACTOR SHALL TAKE SUITABLE PRECAUTIONS TO ASSURE A MINIMUM INTERRUPTION TO SERVICE, INCLUDING THE FOLLOWING:

CONNECTION OF NEW MAINS. CONT'D

(A) PERFORM ALL NECESSARY EXCAVATION, INCLUDING BELL HOLES, EXPOSING THE EXISTING MAIN SUFFICIENTLY FOR THE OPERATION OF THE PIPE SAW BY THE CITY, OR PIPE CUTTING BY THE CONTRACTOR.

(B) REMOVE THE CAP OR PLUG FROM THE END OF THE NEW MAIN.

(C) SWAB THE INSIDE OF ALL PIPES, BENDS, SLEEVES, COUPLINGS AND OTHER FITTINGS TO BE USED IN CONNECTION THOROUGHLY WITH A CHLORINE SOLUTION OF AT LEAST 100 P.P.M.

(D) MAKE UP AS MUCH OF THE WATER MAIN CONNECTION AS POSSIBLE OUTSIDE THE DITCH TO ELIMINATE THE NEED FOR MAKING MOST OF THE NECESSARY JOINTS DURING THE SHUTDOWN. BY CAREFUL MEASUREMENT ALL PIPE CUTS MAY BE MADE BY THE CONTRACTOR PRIOR TO SHUTTING DOWN.

(E) HAVE SUFFICIENT MANPOWER AND EQUIPMENT ON THE SITE TO PERFORM THE OPERATION IN A MINIMUM AMOUNT OF TIME.

(F) PERFORM AS MUCH OF THE SERVICE AND HYDRANT CONNECTION WORK ALONG RELOCATED MAINS AS IS POSSIBLE.

(G) IN THE TIME PERIOD FROM APRIL 1, THRU TO NOVEMBER 1, NO SHUTDOWNS WILL BE PERMITTED DUE TO SEASONAL AND SYSTEM DEMANDS UNLESS OTHERWISE APPROVED BY THE CITY.

PAINTING

(A) IT IS THE INTENTION OF THESE SPECIFICATIONS TO PROVIDE THAT ALL METAL WORK SUBJECT TO CORROSION SHALL BE SATISFACTORILY PROTECTED BY A DURABLE COATING OF PAINT OR OTHER APPROVED MATERIAL AND THAT ALL METAL SURFACES NOT BURIED IN EARTH, OR IN CONCRETE SHALL BE LEFT CLEAN AND WELL PAINTED AT THE COMPLETION OF THE CONTRACT. UNLESS OTHERWISE SPECIFIED, THE PROTECTION SHALL BE AT LEAST THAT GIVEN BY THREE (3) COATS OF APPROVED PAINT. THE FIRST COAT IS TO BE APPLIED AT THE SHOP BEFORE THE METAL HAS RUSTED AND AFTER ALL GREASE, DIRT AND SCALE HAS BEEN REMOVED. BOLTS AND NUTS SHALL NOT BE SHOP COATED, BUT SHALL RECEIVE THREE (3) COATS OF APPROVED PAINT AFTER INSTALLATION.

(B) ALL METAL WORK WHICH HAS NOT BEEN COATED BEFORE THE ARRIVAL ON THE JOB SHALL BE GIVEN A TEMPORARY PROTECTIVE COATING OF SUCH A NATURE AS TO PERMIT THE READY ADHERENCE OF FUTURE COATINGS. THE TEMPORARY COATING SHALL BE A GOOD GRADE ASPHALTIC PAINT OR OTHER APPROVED MATERIAL. THE TEMPORARY PROTECTION SHALL APPLY PARTICULARLY TO THE VALVE BOXES AND COVERS, MANHOLE RINGS AND COVERS, LADDERS AND LADDER RUNGS, DRESSER TYPE/VICTAULIC TYPE COUPLINGS AND ELSEWHERE WHEN IN THE OPINION OF THE CITY, SUCH PROTECTION IS NECESSARY.

(C) ALL SURFACES OF METAL WHICH WILL BE IN CONTACT AFTER ASSEMBLING SHALL BE PAINTED, AT LEAST ONE (1) COAT, BEFORE ASSEMBLING. THE FINAL COAT OF PAINT ON ALL EXPOSED WORK SHALL BE GIVEN SHORTLY BEFORE THE COMPLETION OF THE CONTRACT.

(D) WHERE PAINTING CLAUSES APPEAR HEREINAFTER, THEY SHALL TAKE PRECEDENCE OVER THIS SECTION, EXCEPT THAT TEMPORARY PROTECTION HEREIN DESCRIBED MAY BE REQUIRED.

(E) ALL OF THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR THE PARTICULAR ITEM REQUIRING THE PAINTING.

TESTS. INSPECTION AND REPORTS

NOTWITHSTANDING THE REQUIREMENTS OF ANY OTHER PROVISIONS OF THESE SPECIFICATIONS, THE CONTRACTOR SHALL ARRANGE FOR AND PAY ALL COSTS INVOLVED FOR SHOP INSPECTION OF ALL MATERIALS FURNISHED, MANUFACTURE OF ALL PIPE, VALVES, FITTINGS, ETC., FIELD AND SHOP WELDS AND WELDING, AND FURNISH TO THE STATE AND THE CITY OF CLEVELAND COPIES OF ALL SHOP, FABRICATION, MANUFACTURE AND OTHER RELATED INSPECTION REPORTS OF MATERIALS FURNISHED. THIS INSPECTION SHALL BE DONE BY A RECOGNIZED INSPECTION LABORATORY APPROVED BY THE CITY OF CLEVELAND. IN THE CASE OF ANY ITEM NOT SPECIFICALLY MENTIONED IN THE "WATER WORK NOTES," OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS - JANUARY 15, 2016 SHALL GOVERN.

HANDLING PIPE AND ACCESSORIES

(A) UNLOADING PIPE, FITTINGS, VALVES, HYDRANTS, AND OTHER ACCESSORIES SHALL, UNLESS OTHERWISE DIRECTED, BE UNLOADED AT THE POINT OF DELIVERY, HAULED TO AND DISTRIBUTED AT THE SITE OF THE PROJECT BY THE CONTRACTOR. THEY SHALL AT ALL TIMES BE HANDLED WITH CARE TO AVOID DAMAGE. IN LOADING AND UNLOADING, THEY SHALL BE LIFTED BY HOISTS OR SLID, OR ROLLED ON SKIDWAYS IN SUCH MANNER AS TO AVOID SHOCK. UNDER NO CIRCUMSTANCES SHALL THEY BE DROPPED. PIPE HANDLED ON SKIDWAYS MUST NOT BE SKIDDED OR ROLLED AGAINST PIPE ALREADY ON THE GROUND.

(B) AT SITE OF WORK: IN DISTRIBUTING THE MATERIAL AT THE SITE OF THE WORK, EACH PIECE SHALL BE UNLOADED OPPOSITE OR NEAR THE PLACE WHERE IT IS TO BE LAID IN THE TRENCH.

(C) PROTECTION OF PIPE COATING: PIPE SHALL BE HANDLED IN SUCH MANNER THAT A MINIMUM AMOUNT OF DAMAGE TO THE COATING WILL RESULT. ANY PIPE OR FITTING, THE COATING OF WHICH HAS BEEN DAMAGED IN SHIPPING OR HANDLING, SHALL HAVE THE DAMAGED PORTION WELL CLEANED AND COATED IN THE SHOP WITH A MATERIAL EQUAL TO THAT APPLIED TO THE PIPE AND FITTINGS AND APPROVED BY THE CITY BEFORE BEING PLACED IN THE WORK. THE CONTRACTOR SHALL THOROUGHLY COAT ALL EXPOSED PARTS OF BOLTS AND NUTS WITH AN APPROVED ASPHALT PAINT, AFTER ALL PIPE HAS BEEN LAID AND BEFORE BACKFILLING HAS BEEN PLACED. ALL FIELD COATINGS SHALL BE FURNISHED AND APPLIED BY THE CONTRACTOR.

(D) PROTECTION OF CONCRETE PIPE: IF, IN THE PROCESS OF MANUFACTURE, TRANSPORTATION, OR HANDLING, ANY CONCRETE PIPE, FITTING OR SPECIAL RECEIVES ANY INDENTATION OR DEFORMATION TO THE CONCRETE, STEEL ENDS OR CONNECTIONS, THE REMOVAL OF WHICH WILL IN ANY DEGREE INJURE IT, SUCH PIPE, FITTING OR SPECIAL SHALL BE REJECTED AND REPLACED WITH NEW MATERIAL TO THE SATISFACTION OF THE CITY AT THE CONTRACTOR'S EXPENSE.

(E) PIPE KEPT CLEAN: THE INTERIOR OF THE PIPE, FITTINGS, AND OTHER ACCESSORIES SHALL BE KEPT FREE FROM DIRT AND FOREIGN MATTER AT ALL TIMES.

(F) FROST PROTECTION: VALVES AND HYDRANTS BEFORE INSTALLATION SHALL BE DRAINED AND STORED IN A MANNER THAT WILL PROTECT THEM FROM DAMAGE BY FREEZING.

CHANGES IN WATER MAINS

WHEREVER IT BECOMES NECESSARY, IN THE OPINION OF THE ENGINEER OR THE CITY TO CHANGE THE LOCATION OR ELEVATION OF WATER MAINS AND HYDRANTS AND WHERE WATER MAIN CONNECTIONS ARE TO BE MADE BETWEEN EXISTING DISTRIBUTION MAINS AND WATER MAINS INSTALLED UNDER THIS CONTRACT, THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING LINE MATERIALS AS REQUIRED IN ORDER TO RECONNECT THE WATER MAIN AND SHALL FURNISH AND INSTALL COMPLETE, ALL NEW WATER MAIN MATERIALS INCLUDING PIPE, FITTINGS AND VALVES TO MAKE THE CONNECTIONS INDICATED, EXCEPT BRANCH SLEEVES AND VALVES WHICH SHALL BE FURNISHED BY THE CONTRACTOR BUT WILL BE INSTALLED BY THE CITY, EXCEPT WHERE OTHERWISE SPECIFIED UNDER THE SECTION ENTITLED "WORK TO BE DONE BY THE CITY." THE CONTRACTOR SHALL ALSO FURNISH ALL NECESSARY LABOR, MATERIALS, TOOLS AND EQUIPMENT AND MAKE THE EXCAVATION, BACKFILL AND REPAVING FOR SUCH CONNECTIONS. PAYMENT FOR THIS SHALL BE INCLUDED IN PRICE BID UNDER THE APPROPRIATE ITEM FOR SIZE OF WATER MAIN OR CONNECTION TO BE INSTALLED. ALL WATER MAIN MATERIALS, VALVES, AND APPURTENANCES REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR. (SEE WORK TO BE DONE BY THE CITY).

WORK TO BE DONE BY THE CITY

(A) TAPPING MAINS: THE CONTRACTOR SHALL FURNISH ALL BRANCH SLEEVES, TAPPING SADDLES AND TAPPING VALVES OF THE SIZES AND TYPES INDICATED ON THE CONTRACT DRAWINGS. THE CONTRACTOR SHALL DO ALL THE NECESSARY EXCAVATION, BACKFILLING, SEEDING OR SODDING AND REPAVING REQUIRED THEREFORE. THE CONTRACTOR SHALL ALSO FURNISH ALL EQUIPMENT, TOOLS AND INCIDENTALS, INCLUDING AIR COMPRESSOR, REQUIRED TO DO THIS WORK.

1) THE CITY WILL INSTALL ALL BRANCH SLEEVES, TAPPING SLEEVES AND TAPPING VALVES ON ALL CAST IRON, DUCTILE IRON AND CONCRETE PIPE OF ALL SIZES.

2) THE CITY WILL MAKE THE PRESSURE TAPS ON CAST IRON OR DUCTILE IRON WATER MAINS FOR TAP SIZES UP TO AND INCLUDING 16-INCHES, AND ON CONCRETE WATER MAINS FOR TAP SIZES UP TO AND INCLUDING 12-INCHES.

3) THE CONTRACTOR SHALL ARRANGE FOR AND SHALL PAY FOR ALL PRESSURE TAPS OF 20-INCH AND LARGER ON CAST IRON OR DUCTILE IRON WATER MAINS AND FOR ALL PRESSURE TAPS OF 16-INCH AND LARGER ON CONCRETE AND STEEL WATER MAINS. THE CONTRACTOR'S COSTS FOR SUCH ARRANGEMENTS FOR PRESSURE TAPPING SHALL BE INCLUDED IN THE APPROPRIATE BID ITEM.

4) THE CITY WILL NOT OPERATE EQUIPMENT PROVIDED BY THE CONTRACTOR. HOWEVER, THE CITY WILL INSTALL ALL BRANCH SLEEVES, TAPPING SADDLES AND TAPPING VALVES AS INDICATED HEREIN AND WILL ASSIST IN MAKING THE PRESSURE TAP WHERE PRESSURE TAPPING IS PROVIDED BY THE CONTRACTOR. THE CITY WILL ONLY OPERATE EQUIPMENT BELONGING TO THE CITY. ALL LABOR COSTS INCURRED BY THE CITY FOR WORK REQUIRED TO BE DONE BY THE CITY IN THE TAPPING OF WATER MAINS WILL BE CHARGED TO THE CONTRACTOR IN ACCORDANCE WITH THE FEE SCHEDULE APPEARING ELSEWHERE IN THESE NOTES. THE CITY, DIVISION OF WATER, WILL CHARGE TO THE CONTRACTOR A "TAPPING FEE" FOR DIVISION OF WATER LABOR INCURRED IN THE WORK, PAYABLE TO THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER BEFORE ANY WORK IS PERFORMED.

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WORK TO BE DONE BY THE CITY (CONT.)

(B) PIPE CUTTING: IN LOCATIONS WHERE BRANCH SLEEVES AND VALVES CANNOT BE INSTALLED, THE CONTRACTOR WILL BE REQUIRED TO CUT IN TEES AND SLEEVE-IN THE REMAINDER OF THE CUT SECTION OF THE EXISTING MAIN, OR, WHEN OTHERWISE REQUIRED WHERE THE CONTRACTOR MUST MAKE PIPE CUTS, IT IS CALLED TO THE CONTRACTOR'S ATTENTION THAT THE DIVISION OF WATER HAS ON HAND AT HARVARD YARDS MOTOR OPERATED PIPE CUTTERS WHICH ARE AVAILABLE FOR CUTTING PIPE BY CITY FORCES.

THE COSTS CHARGED FOR PIPE CUTTING BY CITY FORCES MAY BE OBTAINED FROM THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER, PUBLIC UTILITIES BUILDING, 1201 LAKESIDE AVENUE, CLEVELAND, OHIO 44114. THE CONTRACTOR SHALL DO ALL NECESSARY EXCAVATION, BACKFILLING AND REPAVING AND ALL AIR COMPRESSOR AND CRANE SERVICE SHALL BE FURNISHED BY THE CONTRACTOR. THE CITY, DIVISION OF WATER, WILL CHARGE TO THE CONTRACTOR A "PIPE CUTTING FEE" FOR DIVISION OF WATER LABOR INCURRED IN THE WORK, PAYABLE TO THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER BEFORE ANY WORK IS PERFORMED.

DIVISION OF WATER – LABOR CHARGES

THE CITY, DIVISION OF WATER, WILL CHARGE TO THE CONTRACTOR CERTAIN CHARGES PURSUANT TO SECTION 531.03(a) OF THE CODIFIED ORDINANCES OF THE DIVISION OF WATER, AS AMENDED BY ORDINANCE 1043-75 AND ADOPTED BY THE CITY OF CLEVELAND BOARD OF CONTROL RESOLUTION NO: 003-82, AND PER ORDINANCE NO: 2661-81, FOR DIVISION OF WATER LABOR REQUIRED IN THE WORK, PAYABLE TO THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER BEFORE ANY WORK IS PERFORMED. NOTE THAT THE CHARGES INDICATED HEREIN ARE SUBJECT TO CHANGE AND THAT THE CONTRACTOR SHALL VERIFY THE LATEST PRICES WITH THE PERMITS AND SALES SECTION OF THE DIVISION OF WATER.

THE CONTRACTOR SHALL PROVIDE IN HIS BID, INCLUDED WITH THE APPROPRIATE PAY ITEM FOR WATER WORK TO BE PERFORMED IN THIS CONTRACT, ANY AND ALL CITY OF CLEVELAND, DIVISION OF WATER, LABOR CHARGES IN THE AMOUNTS INDICATED HEREIN. NO COMPENSATION WILL BE PROVIDED TO THE CONTRACTORS BY THE STATE FOR DIVISION OF WATER LABOR CHARGES FOR WORK REQUIRED TO BE PERFORMED BY THE DIVISION OF WATER BUT THE REQUIRED DIVISION OF LABOR CHARGES WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) AND SHALL BE DEEMED TO BE INCLUDED IN THE PRICE BID FOR THE APPROPRIATE WATER WORK PAY ITEM.

DIVISION OF WATER CHARGES STIPULATED HEREIN ARE ON A FLAT RATE BASIS, UNLESS OTHERWISE SPECIFIED AS A "DEPOSIT - COST PLUS" BASIS.

CHARGES INDICATED HEREIN ARE PER EACH FOR THE QUANTITIES LISTED IN THE "SUMMARY OF WATER WORK."

FOR CURRENT CWD SERVICES AND ASSOCIATED FEES SEE:
<http://www.clevelandwater.com/construction/construction-fees>

EXCAVATION

(A) THE CONTRACTOR SHALL REMOVE ALL EXISTING STRUCTURES, ROADWAYS, DRIVEWAYS AND OTHER SIMILAR MATERIALS AND MAKE ALL EXCAVATION NECESSARY FOR THE PROPER CONSTRUCTION OF THE WATER MAIN, PIPE CONNECTIONS AND APPURTENANT STRUCTURES, INCLUDING TUNNEL AND SHAFT EXCAVATION. THE EXCAVATION SHALL INCLUDE THE REMOVAL, HANDLING, REHANDLING AND DISPOSAL OF MATERIALS ENCOUNTERED IN THE WORK AND SHALL INCLUDE ALL PUMPING, BAILING, DRAINAGE, SHEETING AND BRACING. MOREOVER, THE CONTRACTOR MUST ASSUME ALL RESPONSIBILITY FOR ANY ADDED EXPENSE OR OTHER LIABILITY WHICH MAY ARISE BY MEANS OF QUICKSAND, OBSTACLES OR CONDITIONS FORESEEN AND UNFORESEEN OR ENCOUNTERED IN THE WORK OF THIS CONTRACT.

(B) TRENCHES SHALL IN EVERY CASE BE OF SUFFICIENT WIDTH TO PERMIT SOLID PACKING OF BACKFILL UNDER AND AROUND PIPES, AND SATISFACTORY CONSTRUCTION OF ALL APPURTENANCES AND FOR SUCH SHEETING AND SHORING, PUMPING AND DRAINING AS MAY BE NECESSARY.

(C) THE TRENCH SHALL BE DUG TO THE ALIGNMENT AND DEPTH REQUIRED AND ONLY SO FAR IN ADVANCE OF PIPE LAYING AS THE ENGINEER SHALL PERMIT. THE TRENCH SHALL BE SO BRACED AND DRAINED THAT WORKMEN MAY WORK THEREIN SAFELY AND EFFICIENTLY. IT IS ESSENTIAL THAT THE DISCHARGE FROM PUMPS BE LED TO NATURAL DRAINAGE CHANNELS, TO DRAINS, OR TO SEWERS.

(D) THE TRENCH WIDTH MAY VARY WITH AND DEPEND UPON THE DEPTH OF TRENCH AND THE NATURE OF THE EXCAVATED MATERIAL ENCOUNTERED, BUT IN ANY CASE SHALL BE OF AMPLE WIDTH TO PERMIT THE PIPE TO BE LAID AND JOINTED PROPERLY AND OF THE BACKFILL TO BE PLACED AND COMPACTED PROPERLY. THE MINIMUM WIDTH OF UNSHEETED TRENCH SHALL BE EIGHTEEN (18) INCHES LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE EXCEPT BY CONSENT OF THE CITY; THE MAXIMUM CLEAR WIDTH OF TRENCH SHALL BE NOT MORE THAN TWO (2) FEET GREATER THAN THE OUTSIDE PIPE DIAMETER. WHEN SHEETING AND BRACING IS USED, THE TRENCH WIDTH SHALL BE INCREASED ACCORDINGLY.

(E) THE TRENCH, UNLESS OTHERWISE SPECIFIED, SHALL HAVE A FLAT BOTTOM CONFORMING TO THE GRADE TO WHICH THE PIPE IS TO BE LAID. THE PIPE SHALL BE LAID UPON SOUND SOIL CUT TRUE AND EVEN, SO THAT THE BARREL OF THE PIPE WILL HAVE A BEARING FOR ITS FULL LENGTH.

(F) ANY PART OF THE TRENCH EXCAVATED BELOW GRADE SHALL BE CORRECTED WITH APPROVED MATERIAL, THOROUGHLY COMPACTED.

(G) WHEN THE UNCOVERED TRENCH BOTTOM AT SUBGRADE IS SOFT AND IN THE OPINION OF THE ENGINEER CANNOT SUPPORT THE PIPE, A FURTHER DEPTH AND OR WIDTH SHALL BE EXCAVATED AND BACKFILLED TO PIPE FOUNDATION GRADE AS REQUIRED UNDER (F), OR OTHER APPROVED MEANS SHALL BE ADOPTED TO ASSURE A FIRM FOUNDATION FOR THE PIPE.

(H) LEDGE ROCK, BOULDERS, LARGE STONES, AND SHALE SHALL BE REMOVED TO PROVIDE A CLEARANCE OF AT LEAST SIX (6) INCHES BELOW ALL PARTS OF THE PIPE, VALVES, OR FITTINGS AND A CLEAR WIDTH OF NINE (9) INCHES ON EACH SIDE OF ALL IRON PIPE, CONCRETE PIPE, AND STEEL PIPE SHALL BE PROVIDED.

(I) EXCAVATION BELOW SUBGRADE IN ROCK, SHALE OR IN BOULDERS SHALL BE BACKFILLED TO SUBGRADE WITH APPROVED MATERIAL, THOROUGHLY COMPACTED.

(J) BELL HOLES OF AMPLE DIMENSIONS SHALL BE DUG IN EARTH TRENCHES AT EACH JOINT TO PERMIT THE JOINTING TO BE MADE PROPERLY. ADEQUATE CLEARANCE FOR PROPER JOINTING OF PIPE LAID IN ROCK SHALL BE PROVIDED AT BELL HOLES.

(K) THE USE OF EXCAVATING MACHINERY WILL BE PERMITTED EXCEPT IN PLACES WHERE ITS OPERATION WILL CAUSE DAMAGE TO TREES, BUILDINGS, OR EXISTING STRUCTURES ABOVE OR BELOW GROUND, IN WHICH CASE HAND METHODS SHALL BE EMPLOYED.

(L) TREES, FENCES, POLES AND ALL OTHER PROPERTY SHALL BE PROTECTED UNLESS THEIR REMOVAL IS AUTHORIZED. ANY PROPERTY DAMAGED SHALL BE SATISFACTORILY RESTORED BY THE CONTRACTOR.

(M) HYDRANTS UNDER PRESSURE, VALVE PIT COVERS, VALVE BOXES, CURB STOP BOXES FIRE OR POLICE CALL BOXES, OR OTHER UTILITY CONTROLS SHALL BE LEFT UNOBSTRUCTED AND ACCESSIBLE DURING THE CONSTRUCTION PERIOD.

(N) THE CONTRACTOR SHALL MAINTAIN ALL EXCAVATIONS IN GOOD ORDER DURING THE CONSTRUCTION, SO AS NOT TO HINDER OR INJURE THE PIPE LAYING, MASONRY OR OTHER WORK. HE SHALL TAKE ALL REASONABLE PRECAUTIONS TO PREVENT MOVEMENT OF THE SIDES OF SUCH EXCAVATION, AND SHALL REMOVE AT HIS OWN EXPENSE ANY MATERIAL SLIDING INTO THE EXCAVATION.

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BACKFILLING (CONT.)

F. ONLY AFTER THE ONE (1) FOOT SAND BEDDING BACKFILL HAS BEEN SATISFACTORILY COMPACTED, MAY WORK PROCEED IN PLACING THE REMAINING BACKFILL WHICH MUST BE CAREFULLY PLACED AND COMPACTED BY TAMPING, PUDDLING, OR ROLLING. ALL PRECAUTIONS MUST BE TAKEN TO ELIMINATE FUTURE SETTLEMENT. THE NUMBER OF MEN TAMPING SHALL BE NOT LESS THAN THE NUMBER BACKFILLING, AND ADDITIONAL MEN SHALL BE KEPT IN THE TRENCH TO SPREAD THE MATERIAL.

G. PREMIUM BACKFILL CONSISTING OF CONTROLLED LOW STRENGTH MATERIAL CONTROLLED DENTISTY FILL (CLSM-CDF) "FLOWABLE FILL" IS REQUIRED:

A: UNDER ALL EXISTING OR FUTURE PAVEMENTS, SIDEWALKS, AND DRIVES WITHIN MEETING THE FOLLOWING REQUIREMENTS:

B: AS SPECIFIED IN THE WATER MAIN TRENCH DETAIL FOUND ON SHEET 37

WHEN PREMIUM BACKFILL IS REQUIRED BY THE LOCAL MUNICIPALITY FOR CASES OTHER THAN THOSE LISTED ABOVE, IT SHALL BE LIMESTONE GRADED PER ODOT 304.02 OR ODOT 411. NO SLAG IS PERMITTED.

SIEVE % PASSING GRADING	
2-INCH	100
1-INCH	70-100
3/4-INCH	50-90
NO. 4	30-60
NO. 30	9-33
NO. 200	0-13

THE FRACTION OF THESE MATERIALS PASSING A #40 SIEVE SHALL HAVE A LIQUID LIMIT NOT GREATER THAN 30 (THIRTY) AND A PLASTICITY INDEX NOT GREATER THAN 6 (SIX).

SLAG; NATURAL OR SYNTHETIC CRUSHED AGGREGATE SUCH AS BROKEN OR CRUSHED ROCK; CRUSHED CONCRETE; OR OTHER TYPE OF MATERIAL IN LIEU OF THE SAND BEDDING BACKFILL AND THE LIMESTONE SCREENING BACKFILL MATERIAL WILL NOT BE PERMITTED.

THE MINIMUM COMPACTION FOR ALL SAND BEDDING BACKFILL, BACKFILL AND PREMIUM BACKFILL SHALL BE 95% STANDARD PROCTER.

H. BACKFILLING SHALL NOT BE DONE IN FREEZING WEATHER, EXCEPT BY PERMISSION OF THE ENGINEER AND THE CITY, AND IT SHALL NOT BE MADE WITH FROZEN MATERIAL, NOR SHALL ANY FILL BE MADE WHERE THE MATERIAL ALREADY IN THE DITCH IS FROZEN.

I. SPECIAL TREATMENT OF THE TRENCH WILL BE REQUIRED WHERE CINDER EXCAVATION, EXCEEDING ONE (1) FOOT MEASURED FROM THE GROUND OR PAVEMENT SURFACE IS ENCOUNTERED. BEFORE LAYING THE PIPE, THE BOTTOM OF THE TRENCH SHALL BE DUG EIGHT (6) INCHES BELOW PIPE GRADE AND THEN BROUGHT TO THE GRADE OF THE PIPE IN THE FOLLOWING MANNER. A FOUR (4) INCH LAYER OF CRUSHED LIMESTONE SHALL BE PLACED ON THE ENTIRE WIDTH OF THE BOTTOM OF THE TRENCH, FOLLOWED BY A FILLER OF HYDRATED LIME AND A LAYER OF SAND BEDDING TO SIX (6) INCHES ABOVE THE TOP OF THE PIPE. THE FOUR (4) INCH CRUSHED LIMESTONE SHALL BE WELL GRADED FROM FINE TO COARSE, AND FREE FROM SLAG, CINDERS, ASHES, RUBBISH OR OTHER OBJECTIONABLE MATERIAL. ALL LIMESTONE MUST BE CAPABLE OF BEING PASSED THROUGH A 3/4 INCH SIEVE. ON TOP OF THIS LAYER OF CRUSHED LIMESTONE, HYDRATED LIME SHALL BE SUPPLIED IN THE AMOUNT OF 3/8 OF A POUND PER SQUARE FOOT OF TRENCH.

THIS BED OF CRUSHED LIMESTONE, WITH FILLER OF HYDRATED LIME IN PLACE, SHALL BE THOROUGHLY TAMPED BEFORE THE PIPE IS LAID IN THE TRENCH AND THE SAND BEDDING BACKFILL IS PLACED. THE SAND BEDDING BACKFILL SHALL BE FOR THREE (3) INCHES UNDER, AROUND AND TO A DEPTH OF SIX (6) INCHES ABOVE THE TOP OF THE PIPE. THE CONTRACTOR MUST USE SPECIAL CARE IN PLACING THIS PORTION OF THE BACKFILL SO AS TO AVOID SCRAPING OF THE EXTERIOR COATING, INJURING THE PIPE, AND DISTORTING OR MOVING THE PIPE WHEN COMPACTING THE SAME. ON TOP OF THE SAND BEDDING BACKFILL THE CONTRACTOR SHALL PLACE ANOTHER LAYER OF CRUSHED LIMESTONE SIX (6) INCHES THICK FOR THE ENTIRE WIDTH OF THE TRENCH. ON TOP OF THIS SIX (6) INCH LAYER OF COMPACTED LIMESTONE A SECOND FILLER OF HYDRATED LIME SHALL THEN BE APPLIED IN THE AMOUNT OF 3/4 OF A POUND PER SQUARE FOOT OF TRENCH. THE REMAINING BACKFILL SHALL BE MADE WITH LIMESTONE SCREENINGS AS ELSEWHERE SPECIFIED HEREIN, CAREFULLY PLACED AND COMPACTED BY TAMPING, OR ROLLING. ALL PRECAUTIONS SHALL BE TAKEN TO ELIMINATE FUTURE SETTLEMENT. THE TREATMENT OF THE TRENCH BOTTOM PREVIOUSLY DESCRIBED MAY BE OMITTED WHERE THE CINDER DEPTH, MEASURED FROM THE TOP SURFACE DOES NOT EXCEED 2'-6".

PROVISIONS FOR PROTECTING THE WORK

THE CONTRACTOR SHALL FURNISH ALL THE NECESSARY EQUIPMENT, SHALL TAKE ALL NECESSARY PRECAUTIONS AND SHALL ASSUME THE ENTIRE COST OF HANDLING ANY SEWAGE, SEEPAGE, STORM SURFACE AND FLOOD FLOWS OR ICE, WHICH MAY BE ENCOUNTERED AT ANY TIME DURING THE CONSTRUCTION OF THE WORK. THE MANNER OF PROVIDING FOR THESE OCCURRENCES SHALL MEET WITH THE APPROVAL OF THE ENGINEER. AFTER INSTALLATION, THE CONTRACTOR SHALL FURNISH AND MAINTAIN SATISFACTORY PROTECTION TO ALL EQUIPMENT WHETHER OF THIS OR OTHER CONTRACT AGAINST INJURY BY WEATHER, FLOODING OR BY DIRECT OR INCIDENTAL DAMAGE FROM HIS OWN OPERATIONS, LEAVING ALL WORK IN A PERFECT CONDITION AT THE COMPLETION OF THE CONTRACT. NO EXTRA PAYMENT WILL BE MADE FOR THIS WORK BUT THE ENTIRE COST OF THE SAME SHALL BE INCLUDED IN THE WORK TO BE DONE IN THIS CONTRACT.

DRAWINGS

(A) THE CONTRACTOR SHALL SUBMIT TO THE CITY THROUGH THE ENGINEER FOR APPROVAL, SIX (6) SETS OF PRINTS OF ALL SHOP DRAWINGS. SHOP DRAWINGS SHALL BE FULLY DIMENSIONED LEGIBLE DRAWINGS AS DEVELOPED BY THE MATERIALS FABRICATOR. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL BOLTLESS RESTRAINED IRON PIPE AND FITTINGS, PRESTRESSED CONCRETE PIPE AND FITTINGS, STEEL PIPE AND FITTINGS, SPECIAL FITTINGS, COUPLINGS, SPECIALS, AND MISCELLANEOUS DETAILS, SUCH AS VALVES, DRAIN FORGINGS, PRECAST VAULTS, CASTINGS, ETC. DRAWINGS SHALL INCLUDE DETAILS, LAYOUTS AND LAYING SCHEDULE FOR ALL PIECES FURNISHED REQUIRING DRAWING SUBMITTAL.

(B) TWO (2) SETS OF PRINTS OF EACH OF THE DRAWINGS SUBMITTED WILL BE RETURNED TO THE CONTRACTOR THROUGH THE ENGINEER WITH THE CRITICISMS OR APPROVAL OF THE CITY NOTED THEREON. IN CASE THE DRAWINGS ARE NOT APPROVED, THE CONTRACTOR SHALL AGAIN SEND FOR APPROVAL SIX (6) SETS OF REVISED PRINTS OF EACH OF THE DRAWINGS TO TAKE CARE OF THE CRITICISMS NOTED. NO WORK SHALL BE DONE IN THE SHOP UNTIL AFTER THE DRAWINGS HAVE BEEN FINALLY APPROVED.

(C) AFTER THE DRAWINGS HAVE BEEN FINALLY APPROVED, THE CONTRACTOR SHALL FURNISH THE CITY THROUGH THE ENGINEER WITH ONE (1) COMPLETE SET OF REPRODUCIBLE TRACINGS ON MYLAR OF EACH OF THE FINAL SHOP DRAWINGS. MYLAR SHALL BE OF MINIMUM 4-MIL THICKNESS, SHALL BE OF A SINGLE BASE STOCK WITH AN ETCHED SURFACE TO PROVIDE A MATTE FINISH ON THE FRONT AND SHALL BE OF A PERMANENT NON-ERASABLE, "WASH-OFF" TYPE, OF WHICH THE IMAGE ON THE MYLAR MEDIUM CANNOT BE REMOVED BY ERASURE. ALL SHOP DRAWINGS SHALL BE REPRODUCED FROM THEIR FULL SIZED ORIGINAL TRACINGS AND NOT AS REDUCED SIZES AS MAY HAVE BEEN SUBMITTED DURING THE REVIEW PROCESS.

(C) CONT'D, SMALL SIZED DRAWINGS PERTAINING TO A GIVEN ITEM SHALL BE GROUPED FOR REPRODUCTION SO THAT ALL TRACINGS SHALL BE 24" X 36" OVERALL. TRACINGS NOT 24" X 36" IN SIZE WILL NOT BE ACCEPTED.

(D) THE APPROVAL OF THE DRAWINGS BY THE ENGINEER AND THE CITY SHALL NOT RELIEVE THE CONTRACTOR OF ANY OF HIS OBLIGATIONS IN CONNECTION WITH THIS CONTRACT.

PAVEMENTS, ROAD SURFACES, BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS

(A) THE CONTRACTOR SHALL REMOVE ALL PAVEMENTS AND ROAD SURFACES INCLUDING BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS WITHIN THE LINES OF EXCAVATION. AFTER THE PIPE HAS BEEN LAID, ALL APPURTENANT WORK CONSTRUCTED AND BACKFILL COMPLETED, HE SHALL FURNISH, PLACE AND MAINTAIN, WHEREVER THE PAVEMENT OR ROAD SURFACE INCLUDING BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS HAS BEEN REMOVED OR DAMAGED BY HIM, A TEMPORARY PAVEMENT IN THE PAVED PORTION OF STREETS, OR A TEMPORARY ROAD SURFACE IN THE UNPAVED PORTION OF STREETS, SO AS TO PROVIDE A SAFE AND PASSABLE ROADWAY UNTIL SUCH TIME AS THE FINAL PAVEMENT OR ROAD SURFACE INCLUDING BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS IS COMPLETED.

(B) WHEN ONLY A PORTION OF THE STREET IS PAVED AND THE LINES OF EXCAVATION ARE IN THE UNPAVED PORTION OF SAME, THE CONTRACTOR SHALL USE THE UTMOST CARE IN PREVENTING INJURY TO THE PAVEMENT. IF, IN MAKING THE EXCAVATION OR FOR ANY OTHER CAUSE, THE PAVEMENT IS REMOVED OR INJURED BY THE CONTRACTOR, HE SHALL FURNISH, PLACE AND MAINTAIN A TEMPORARY PAVEMENT WHEREVER THE PAVEMENT HAS BEEN REMOVED OR DAMAGED, SO AS TO PROVIDE A SAFE AND PASSABLE ROADWAY UNTIL SUCH TIME AS THE FINAL PAVEMENT IS COMPLETED.

(C) ALL FINAL PAVING OF ROAD SURFACE, INCLUDING BASE PAVEMENT, BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS SHALL BE DONE BY THE CONTRACTOR IN CONFORMITY TO ODOT SPECIFICATIONS DATED 2016 OR APPLICABLE STANDARD CUYAHOGA COUNTY DRAWINGS. THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF WORK. THE BASE OF PAVEMENT CONCRETE SHALL BE INSTALLED ON A CAREFULLY PREPARED BED (LEVEL WITH THE BOTTOM OF THE ABUTTING BASE) OVER DISTURBED AREAS AND SHALL BE OF THE THICKNESS SPECIFIED, BUT IN NO CASE LESS THAN 7" THICK. WHERE PAVEMENT OR BASE OF PAVEMENT HAS BEEN DAMAGED BY CAVE-IN, OR BY TRENCH CUT LEAVING A PORTION OR PORTIONS OF PAVEMENT 18 INCHES OR LESS IN WIDTH (BETWEEN SUCH CUT OR DAMAGE) TO CURB OR OTHER SUBSTRUCTURE, THAT REMAINING PORTION OF PAVEMENT SHALL BE REMOVED AND RESTORED MONOLITHIC WITH THE TYPE AND KIND OF PAVEMENT SPECIFIED FOR THE ADJACENT TRENCH AREA. THE WEARING COURSE OVER TRENCH OR OTHER DISTURBED AREAS SHALL BE RESTORED TO MATCH EXISTING PAVEMENT UNLESS OTHERWISE SPECIFIED. ASPHALTIC CONCRETE WEARING COURSE OVER SUCH AREAS SHALL BE NEATLY AND SQUARELY CUT, NOT LESS THAN 3 FEET WIDE, BEFORE THE INSTALLATION OF A CAREFULLY TOOTHED-IN TO ADJACENT PAVEMENT, UNLESS OTHERWISE SPECIFIED. EXPANSION JOINTS SHALL BE INSTALLED BETWEEN BRICK WEARING COURSE (IF GROUTED) AND CURB OR OTHER SUBSTRUCTURE, WHERE SUCH RESTORATION IS REQUIRED BY THESE SPECIFICATIONS.

(D) ALL DAMAGED OR DISPLACED CURB AND UNDERDRAIN SHALL BE RENEWED, OR REPLACED OR RESET TO THE SATISFACTION OF THE ENGINEER. NO FAULTY CURB OR CURB LESS THAN 30" LONG WILL BE PERMITTED FOR REUSE.

(E) AT LOCATIONS NOT SPECIFICALLY MENTIONED, THE CONTRACTOR SHALL RESTORE THE SAME TYPE OF PAVEMENT INCLUDING BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAIN AS ENCOUNTERED. IF THE THICKNESS OF THE CONCRETE BASE IS GREATER THAN THE RECORD CALLS FOR, THE CONTRACTOR SHALL RESTORE THE THICKNESS GIVEN IN THE RECORD. IF RECORDS ARE NOT AVAILABLE, THE CONTRACTOR SHALL MATCH EXISTING THICKNESSES.WHICH HAS BEEN DONE BY THE CONTRACTOR, THEN HE SHALL RELAY SAME AFTER ALL WORK, INCLUDING BACKFILLING HAS BEEN COMPLETED.

(F) IF PRIOR TO THE EXPIRATION OF THIS CONTRACT, ANY OF THE PAVEMENTS, OR ROAD SURFACES, WITHIN THE LINES OF EXCAVATION OR ADJACENT THERETO, SHALL HAVE BEEN DAMAGED OR INJURED, DUE TO UNDERMINING, OR FOR ANY OTHER CAUSE WHICH MAY BE ATTRIBUTED TO THE WORK WHICH IS BEING DONE BY THE CONTRACTOR, THEN THE CONTRACTOR SHALL REMOVE SUCH DAMAGED OR INJURED PAVEMENTS OR ROAD SURFACES, FOUNDATIONS OF SAME AND ALL LOOSE EARTH. HE SHALL THEN BACKFILL WITH MATERIAL SPECIFIED HEREIN, PROPERLY COMPACTED AND REPLACE THE FINAL PAVEMENT, ROAD SURFACE INCLUDING BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS.

(G) IF ANY SIDEWALKS, DRIVEWAYS, CURBS, OR UNDERDRAINS ARE REMOVED OR INJURED BY THE CONTRACTOR IN THE COURSE OF MAKING EXCAVATION OR HANDLING MATERIALS, OR FOR ANY REASON WHICH MAY BE ATTRIBUTED TO WORK WHICH HAS BEEN DONE BY THE CONTRACTOR, THEN HE SHALL RELAY SAME AFTER ALL WORK, INCLUDING BACKFILLING HAS BEEN COMPLETED.

IF ANY STONE SIDEWALKS, DRIVEWAYS, OR CURBS WHICH HAVE BEEN REMOVED OR INJURED, ARE UNFIT TO BE RELAID, THEN THE CONTRACTOR SHALL FURNISH NEW MATERIAL AND RELAY SAME. ALL CONCRETE OR CEMENT SIDEWALKS, DRIVEWAYS OR CURBS, WHICH ARE REMOVED OR INJURED BY THE CONTRACTOR SHALL BE BROKEN UP BY HIM AND HE SHALL FURNISH ALL LABOR AND MATERIALS AND CONSTRUCT NEW SIDEWALKS, DRIVEWAYS OR CURBS, TO REPLACE THOSE REMOVED OR INJURED. AT INTERSECTING WALKS, DRIVE, ETC., ADDITIONAL CONCRETE SLABS BEYOND THE EXCAVATION LIMITS SHALL BE REMOVED AND REPLACED WITH NEW MATERIAL, IN ORDER TO AVOID HAVING MORE JOINTS THAN IN THE ORIGINAL WORK. ALL SLABS REPLACED SHALL BE OF FULL WIDTH. THE CONTRACTOR SHALL FURNISH, PLACE AND MAINTAIN, WHEREVER THE SIDEWALK HAS BEEN REMOVED OR DAMAGED BY HIM, A TEMPORARY SIDEWALK SO AS TO PROVIDE A SAFE AND PASSABLE SIDEWALK UNTIL SUCH TIME AS THE FINAL SIDEWALK IS COMPLETED.

(H) ALL PAVEMENTS, BASE PAVEMENTS, ROAD SURFACES, BERMS, SIDEWALKS, DRIVEWAYS, CURBS, OR UNDERDRAINS WHICH THE CONTRACTOR IS REQUIRED TO REPLACE OR TO HAVE REPLACED, SHALL, AT THE EXPIRATION OF THE PERIOD OF MAINTENANCE, BE IN AT LEAST AS GOOD CONDITION AS AT THE TIME OF AWARDDING THE CONTRACT.

(I) ALL WORK WHICH THE CONTRACTOR MAY DO IN CONNECTION WITH THE OPENING UP OR REPLACING OF PAVEMENTS, ROAD SURFACES, BERMS, SIDEWALKS, DRIVEWAYS, CURBS, OR UNDERDRAINS AS WELL AS THE FINAL REPAVING, SHALL BE DONE AT HIS EXPENSE, IN ACCORDANCE WITH THE RULES AND REQUIREMENTS OF THE STREET OR SIDEWALK DEPARTMENTS OF THE CITY OF CLEVELAND, MUNICIPALITY OR TOWNSHIP IN WHICH THE WORK IS BEING DONE, AND IN ACCORDANCE WITH THE ADDITIONAL REQUIREMENTS OF THESE SPECIFICATIONS AND CONTRACT DRAWINGS. THE CONTRACTOR SHALL FURNISH EVIDENCE TO THE ENGINEER THAT THE WORK HAS BEEN COMPLETED TO THEIR SATISFACTION.

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PAVEMENTS, ROAD SURFACES, BERMS, SIDEWALKS, DRIVEWAYS, CURBING, AND UNDERDRAINS (CONT.)

(J) THE CONTRACTOR SHALL MAKE ALL PAVEMENT CUTS BY CHANNELING MACHINE, HAND-OPERATED PNEUMATIC TOOLS OR BY SUCH OTHER METHODS AS WILL FURNISH A CLEAN CUT IN THE PAVEMENT AND PAVEMENT BASE WITHOUT UNDUE SHATTERING. THE USE OF BALL OR WEIGHT TO BREAK PAVEMENT WILL NOT BE PERMITTED.

(K) NO SPECIFIC OR SEPARATE PAYMENT WILL BE MADE FOR ALL OF THIS WORK, BUT THE COST OF ALL PAVEMENT REPLACEMENT, BOTH TEMPORARY AND PERMANENT INCLUDING PAVEMENT, BASE PAVEMENTS, ROAD SURFACES, BERMS, SIDEWALKS, CURBING, DRIVEWAYS, AND UNDERDRAINS SHALL BE INCLUDED IN THE PRICES BID FOR THE VARIOUS ITEMS OF WORK TO BE DONE UNDER THIS CONTRACT.

PAVEMENT SAW CUTS

WHERE "VERMEER" TYPE SAW, OR ANY OTHER TYPE OF MACHINERY OR MEANS IS USED TO CUT THE EXISTING PAVEMENT IN ADVANCE OF THE PAVEMENT REMOVAL, THE CONTRACTOR SHALL IMMEDIATELY FILL THE SAW-CUT GAP WITH ASPHALT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR, AND AT HIS EXPENSE, MAINTAIN, THE SAW-CUT GAPS AND SHALL REPAIR AND/OR REPLACE ASPHALT AS NECESSARY.

PAVEMENT DAMAGE - CONTRACTOR'S RESPONSIBILITY

THE CONTRACTOR SHALL BE RESPONSIBLE FOR, AND AT HIS EXPENSE, MAINTAIN, REPAIR AND/OR REPLACE ANY PAVEMENT, ROADWAYS, DRIVEWAYS, BERMS, CURBS, SIDEWALKS AND TREELAWNS OR OTHER AREAS WITHIN THE LIMITS OF THIS PROJECT, THAT MAY BE DAMAGED BY HIM OR BY THOSE IN HIS EMPLOY DUE TO MANEUVERING OF CONSTRUCTION EQUIPMENT, OR DAMAGED BY VEHICULAR TRAFFIC REROUTED DUE TO CONSTRUCTION AND TRAFFIC MAINTENANCE.

THE CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE ALL DAMAGED OR INJURED PAVEMENT, ROADWAYS, DRIVEWAYS, BERMS, CURBS, SIDEWALKS AND TREELAWNS, BOTH TEMPORARY AND PERMANENT, IN ACCORDANCE WITH THESE SPECIFICATIONS, CONTRACT DRAWINGS OR APPLICABLE CONSTRUCTION AND MATERIAL SPECIFICATIONS OF THE CUYAHOGA COUNTY ENGINEER OR STATE OF OHIO DEPARTMENT OF TRANSPORTATION (O.D.O.T.).

REMOVED ITEMS

ALL MATERIALS CONSISTING OF PIPE, FITTINGS, VALVES, CASTINGS AND OTHER WATER MAIN STRUCTURES, UNLESS SPECIFICALLY INDICATED OTHERWISE HEREIN, WHICH ARE DESIGNATED FOR REMOVAL BY THE CONTRACTOR SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED AND DISPOSED BY HIM.

ITEM 202 - REMOVAL MISC.: WATER MAIN REMOVED

ALL WATER MAINS AND APPURTENANCES WHICH ARE NOT TO REMAIN IN SERVICE SHALL BE REMOVED. ALL SUCH WATER WORK SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF BY HIM.

ALL WATER MAINS AND APPURTENANCES WHICH WOULD NORMALLY BE REMOVED WITH ROADWAY EXCAVATION OR OTHER ITEMS OF WORK CALLED FOR IN THESE PLANS SHALL NOT BE PAID FOR SEPARATELY.

VALVE AND VALVE BOX REMOVAL

REMOVAL AND DISPOSAL OF EXISTING WATERMAIN AND WATER SERVICE CONNECTION VALVES AND VALVE BOXES, WHEN PERFORMED IN CONJUNCTION WITH SERVICE CONNECTION AND WATERMAIN REMOVALS SHALL BE CONSIDERED INCIDENTAL TO THE RESPECTIVE "SERVICE CONNECTION REMOVED" AND "WATERMAIN REMOVED" PAY ITEMS. NO SEPARATE PAYMENT SHALL BE MADE.

ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 20" AND SMALLER

WORK INCLUDED

(A) THE CONTRACTOR SHALL, UNDER ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 20" AND SMALLER, FURNISH ALL THE MATERIALS FOR AND SHALL PROPERLY CONSTRUCT AND CONNECT IN PLACE AT THE LOCATIONS SHOWN ON THE DRAWINGS OR AS DIRECTED, ALL DUCTILE IRON PIPE AND FITTINGS, INCLUDING ALL EXCAVATION WORK, THE CUTTING INTO AND REMOVAL OF EXISTING PIPE, BACKFILLING, SAND BEDDING AND PREMIUM BACKFILL, AND REPAVING (BOTH TEMPORARY AND PERMANENT), ALL AS REQUIRED FOR THE PROPER COMPLETION OF THE WORK INCLUDED UNDER THIS CONTRACT. IN GENERAL THIS WORK SHALL INCLUDE THE FURNISHING, LAYING, CONNECTING, PAINTING, TESTING OF PIPE AND FITTINGS, THE EXCAVATION, REMOVAL AND RESTORATION OF MISCELLANEOUS ITEMS, SHEETING AND SHORING, BACKFILLING, SAND BEDDING AND PREMIUM BACKFILL, SEEDING AND SODDING, THE PERMANENT REPAVING, IF SO NOTED ON THE CONTRACT DRAWINGS, THE CUTTING INTO, REMOVAL AND STORAGE OF EXISTING MAINS, AND THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT TO COMPLETE THE WORK AS SPECIFIED, SHOWN OR ORDERED.

(B) IN MAKING THE CONNECTION TO EXISTING MAINS WHERE BRANCH SLEEVES CAN BE USED, THE CONTRACTOR SHALL SUPPLY THE SAME. THE DIVISION OF WATER WILL INSTALL THE BRANCH SLEEVE AND WILL MAKE THE PRESSURE TAP (IF APPLICABLE) IN ACCORDANCE WITH THE REQUIREMENTS INDICATED UNDER "WORK TO BE DONE BY CITY." IF THE INSTALLATION OF BRANCH SLEEVES AND VALVES CANNOT BE ACCOMPLISHED, THE CONTRACTOR WILL BE REQUIRED TO FURNISH AND INSTALL TEES WITH SLEEVES OR COUPLINGS TO COMPLETE THE CONNECTION. THE CONTRACTOR WILL BE REQUIRED TO MAKE THE NECESSARY EXCAVATION, BACKFILL AND REPAVING (IF NOT PAID FOR SEPARATELY AS PART OF THIS CONTRACT).

DUCTILE IRON PIPE AND FITTINGS - 20" AND SMALLER

(A) ALL PIPE AND FITTINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH AND IN ALL RESPECTS WITH THE REQUIREMENTS OF THE LATEST SPECIFICATIONS OF THE "AMERICAN NATIONAL STANDARD" FOR ANSI/AWWA C151/A21.51-86, "DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS, AND DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS," AND ANSI/AWWA C111/A21.11-85, "RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS," ADOPTED BY THE AMERICAN WATER WORKS ASSOCIATION; WHICH STANDARDS EXCEPT AS HEREIN MODIFIED ARE MADE A PART OF THESE SPECIFICATIONS. PIPE AND FITTINGS UP TO AND INCLUDING 20-INCHES SHALL HAVE RETAINED MECHANICAL JOINTS EXCEPT WHERE BOLTLESS RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS IS CALLED FOR ON THE CONTRACT DRAWINGS OR DIRECTLY SPECIFIED.

(B) ALL PIPE AND FITTINGS SHALL BE CEMENT LINED AND OF THE SIZE AND THICKNESS AND PRESSURE CLASSES NOTED ON THE RESPECTIVE CONTRACT DRAWINGS OR DIRECTLY SPECIFIED. FITTINGS ON PIPE SIZES UP TO AND INCLUDING 12-INCHES MAY BE OF THE SHORT BODIED (COMPACT) TYPE.

(C) ALL DUCTILE IRON FITTINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C110/A21.10-87, "DUCTILE IRON AND GRAY-IRON FITTINGS, 3-INCH THROUGH 48-INCH, FOR WATER OTHER LIQUIDS," AND ALL SUBSEQUENT AMENDMENTS THERETO. METAL FOR FITTINGS SHALL CONFORM TO AMERICAN NATIONAL STANDARD ANSI A21.10-87. FITTINGS ON PIPE SIZE UP TO AND INCLUDING 12" MAY BE OF THE SHORT BODIED TYPE IN ACCORDANCE WITH ANSI/AWWA C153/A21.53-88, "DUCTILE IRON COMPACT FITTINGS, 3" THROUGH 16" FOR WATER AND OTHER LIQUIDS," AND ALL SUBSEQUENT AMENDMENTS THERETO.

(D) THE CONTRACTOR SHALL FURNISH CENTRIFUGAL CAST DUCTILE IRON CEMENT LINED PIPE. DUCTILE IRON METAL SHALL HAVE A MINIMUM TENSILE STRENGTH OF 60,000 PSI, MINIMUM YIELD STRENGTH OF 42,000 PSI AND MINIMUM ELONGATION OF 10 PERCENT AND SHALL BE FOR THE THICKNESS CLASS NOTED ON THE CONTRACT DRAWINGS OR DIRECTLY SPECIFIED. PIPE MAY BE FURNISHED IN 18 OR 20 FEET NOMINAL LAYING LENGTHS. THE CENTRIFUGALLY CAST DUCTILE SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD ANSI/AWWA C151/A21.51-86, "DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS, AND DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS," AND ALL SUBSEQUENT AMENDMENTS THERETO. PIPE ON STRAIGHT RUNS SHALL HAVE PUSH-ON SINGLE RUBBER-GASKET COMPRESSION JOINTS, ALL IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, "RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS," AND ALL SUBSEQUENT AMENDMENTS THERETO. FOR PIPE SIZES UP TO AND INCLUDING 20-INCHES RETAINED MECHANICAL JOINTS SHALL BE FURNISHED AT BENDS, TEES, CROSSES, SPECIAL FITTINGS AND BETWEEN VERTICAL OFFSETS OR BENDS, ON HYDRANT BRANCHES AND SHALL BE RETAINED AS SPECIFIED IN SECTION "JOINTS", (B), "MECHANICAL JOINTS/RETAINED MECHANICAL JOINTS."

(E) STANDARD THICKNESS AND PIPE CLASS TABLES THE THICKNESS OF THE CENTRIFUGALLY CAST DUCTILE IRON PIPE SHALL CONFORM TO THE FOLLOWING TABLE: STANDARD THICKNESS OF CENTRIFUGALLY CAST, DUCTILE IRON PIPE

PIPE SIZE	WORKING CLASS					FITTINGS PRESSURE PSI
	52	53	54	56		
4"	.350	.29	.32	.35	.41	350
6"	.350	.31	.34	.37	.43	350
8"	.350	.33	.36	.39	.45	350
10"	.350	.35	.38	.41	.47	350
12"	.350	.37	.40	.43	.49	350
16"	.350	.40	.43	.46	.52	350
20"	.350	.42	.45	.48	.54	350

(F) ALL FITTINGS, UNLESS OTHERWISE NOTED ON THE CONTRACT DRAWINGS, SUCH AS BENDS, TEES, CROSSES, HYDRANT BRANCHES, ETC. SHALL HAVE BELL AND BELL, BELL AND PLAIN ENDS OF THE MECHANICAL BOLTED STUFFING-BOX TYPE WITH PIPE OR FITTING PLAIN END SEALING GASKET AND BOLTED FOLLOWER GLAND. MECHANICAL JOINT FITTINGS SHALL BE THE MECHANICAL JOINTED BOLTED STUFFING-BOX TYPE IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, "RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS," AND ALL SUBSEQUENT AMENDMENTS THERETO. ALL FITTINGS SHALL BE CEMENT LINED. ALL MECHANICAL JOINTS SHALL BE RETAINED AS SPECIFIED IN SECTION, "JOINTS", (B) "RETAINED MECHANICAL JOINTS".

(G) WHERE CALLED FOR ON THE CONTRACT DRAWINGS OR DIRECTLY SPECIFIED, PIPE AND FITTINGS HAVING BOLTLESS RESTRAINED TYPE JOINTS SHALL BE FURNISHED. BOLTLESS RESTRAINED TYPE JOINTS SHALL BE AS SPECIFIED IN SECTION "JOINTS", (D) "BOLTLESS RESTRAINED SLIP-ON JOINTS."

(H) GLANDS FOR ALL MECHANICAL JOINT PIPE AND FITTINGS SHALL BE DUCTILE IRON.

(H) CONT'D, BOLTS AND NUTS SHALL BE CORROSION RESISTANT, HIGH-STRENGTH, LOW ALLOY STEEL IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, "RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS," AND ALL SUBSEQUENT AMENDMENTS THERETO.

GASKETS SHALL BE OF RUBBER OR OTHER EQUALLY EFFECTIVE PROTECTION AGAINST UNEVEN DISTORTION OF GASKET.

(I) WHERE FITTINGS ARE SHOWN WHICH ARE NOT COVERED BY THE ABOVE SPECIFICATIONS, THEY IN SUCH PARTICULARS AS ARE LACKING THEREON SHALL CONFORM TO THE DIMENSIONS AND OTHERWISE MEET THE SPECIFICATIONS FOR THE RESPECTIVE TYPE WHICH ARE CARRIED IN THE LATEST REVISIONS TO THE CURRENT EDITION OF THE DUCTILE IRON PIPE RESEARCH ASSOCIATION "HANDBOOK OF DUCTILE IRON PIPE" OR WHICH ARE OTHERWISE SHOWN ON THE CONTRACT DRAWINGS.

(J) WHEREVER CHANGES IN LINE AND GRADES OF THE MAIN AS SHOWN ON THE DRAWINGS ARE NOT STANDARD FITTING DEFLECTIONS, THE CONTRACTOR WILL BE PERMITTED TO SUBMIT DETAILS USING COMBINATIONS OF STANDARD FITTINGS AND SMALL DEFLECTIONS (NOT TO EXCEED THE MANUFACTURER'S MAXIMUM SUGGESTED JOINT OPENING) IN THE ADJOINING LENGTHS OF PIPE.

(K) ON NEW AND/OR RELOCATED OR EXTENDED WATER MAINS, UP TO AND INCLUDING 20-INCH DIAMETER, WHERE WATER MAINS END OR TERMINATE AND ARE NOT CONNECTED TO EXISTING MAINS, RETAINED MECHANICAL BELL JOINT PLUGS ARE TO BE INSTALLED. PLUGS CAPS SHALL BE FURNISHED WITH TWO (2) PLUGGED TWO (2")-INCH TAPS FOR DRAIN AND AIR RELIEF CONNECTIONS.

(L) CLOSURE PIECES SHALL BE ACCURATELY MEASURED AND CUT IN THE FIELD AND INSTALLED USING SOLID SHORT PATTERN SLEEVES HAVING MECHANICAL BELL JOINTS. MECHANICAL BELL JOINT SLEEVES SHALL BE OF THE RETAINED TYPE AS SPECIFIED IN SECTION, "JOINTS", (B) "MECHANICAL JOINTS/RETAINED MECHANICAL JOINTS."

(M) TESTS, INSPECTION, REPORTS AND ANALYSES OF TESTS OF SAMPLES FOR ALL MATERIALS SHALL BE FURNISHED IN ACCORDANCE WITH PARAGRAPH "TEST, INSPECTION AND REPORTS" OF THE GENERAL NOTES.

(N) BITUMASTIC COATING SHALL BE APPLIED ON THE EXTERIOR OF ALL DUCTILE IRON PIPE AND FITTINGS IN ACCORDANCE WITH AWWA SPECIFICATIONS.

CEMENT LINING

ALL PIPE FITTINGS, SHALL BE GIVEN A CEMENT MORTAR LINING AT THE POINT OF MANUFACTURE. THE LINING SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD, ANSI/AWWA C104/A21.4-1990, "CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS," AND ALL SUBSEQUENT AMENDMENTS THERETO.

MARKING

ALL PIPE AND FITTINGS SHALL BE SUITABLY MARKED TO DENOTE THE MANUFACTURER, CLASS, DATE, WEIGHT AND OTHER ELEMENTS OF IDENTIFICATION.

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ITEM SPECIAL – DUCTILE IRON PIPE AND FITTINGS – 20" AND SMALLER (CONT.)

FACING AND DRILLING

ALL FLANGES SHALL BE CAST SOLID AND FACED ACCURATELY AT RIGHT ANGLES TO THE AXIS OF THE PIPE. ALL FLANGES SHALL BE SHOP COATED WITH A COAT OF COAL TAR EPOXY, EXCEPT THE FACE OF THE FLANGE WHICH SHALL RECEIVE ONE (1) COAT OF A ZINC RICH PRIMER AT THE SHOP IMMEDIATELY AFTER THEY HAVE BEEN FACED AND DRILLED. ALL FLANGED PIPE AND FITTINGS SHALL BE FACED AND DRILLED TO ANSI B16-1, 125 LB. DRILLING, UNLESS SPECIAL DRILLING IS CALLED FOR. WHERE TAP OR STUD BOLTS ARE REQUIRED, FLANGES SHALL ALSO BE TAPPED.

LAYING

(A) PROPER AND SUITABLE TOOLS AND APPLIANCES FOR THE SAFE AND CONVENIENT HANDLING AND LAYING OF THE PIPE AND FITTINGS SHALL BE USED. GREAT CARE SHALL BE TAKEN TO PREVENT THE PIPE COATING AND FITTINGS FROM BEING DAMAGED PARTICULARLY ON THE INSIDE OF THE PIPES AND FITTINGS AND ANY SUCH DAMAGE SHALL BE REMEDIED AS DIRECTED. ALL PIPES AND FITTINGS SHALL BE CAREFULLY EXAMINED BY THE CONTRACTOR FOR DEFECTS JUST BEFORE LAYING AND NO PIPE OR FITTINGS SHALL BE LAID WHICH IS KNOWN TO BE DEFECTIVE.

(B) IF ANY DEFECTIVE PIPE IS DISCOVERED AFTER HAVING BEEN LAID, IT SHALL BE REMOVED AND REPLACED WITH A SOUND PIPE OR FITTING IN A SATISFACTORY MANNER, BY THE CONTRACTOR AT HIS OWN EXPENSE. ALL PIPES AND FITTINGS SHALL BE THOROUGHLY CLEANED BEFORE THEY ARE LAID, SHALL BE KEPT CLEAN UNTIL THEY ARE USED IN THE COMPLETED WORK, AND WHEN LAID, SHALL CONFORM TO THE LINES AND GRADES GIVEN BY THE ENGINEER. OPEN ENDS OF PIPES SHALL BE KEPT PLUGGED WITH A BULK HEAD DURING CONSTRUCTION.

(C) PIPE LAID IN TRENCH SHALL BE LAID TO A FIRM AND EVEN BEARING FOR ITS FULL LENGTH. PRECAUTIONS SHALL BE TAKEN AGAINST FLOATING.

(D) IT IS THE INTENTION OF THESE SPECIFICATIONS TO SECURE FIRST CLASS WORKMANSHIP IN THE PLACING OF PIPE AND ACCESSORIES. IN SUCH DETAILS AS ARE NOT SPECIFICALLY MENTIONED HEREIN OR CALLED FOR ON THE DRAWINGS, THE CONTRACTOR WILL BE REQUIRED TO CONFORM WITH THE APPLICABLE SECTIONS OF THE LATEST AMERICAN NATIONAL STANDARD, ANSI/AWWA C 600-87, INSTALLATION OF GRAY AND DUCTILE CAST IRON WATER MAINS AND APPURTENANCES," AS ADOPTED BY THE AMERICAN WATER WORKS ASSOCIATION.

PROTECTION OF UTILITIES

CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION.

CUTTING PIPE

WHENEVER THE PIPES REQUIRE CUTTING TO FIT INTO THE LINES, THE WORK SHALL BE DONE IN A SATISFACTORY MANNER SO AS TO LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AXIS OF THE PIPE. WHEN A PIECE OF PIPE IS CUT TO FIT INTO THE LINE, NO PAYMENT WILL BE MADE FOR THE PORTION CUT OFF AND NOT USED IN THE LINE. THE CONTRACTOR’S ATTENTION IS CALLED TO THE PARAGRAPH “WORK TO BE DONE BY THE CITY.”

JOINTS

(A) SLIP-ON JOINTS:

ALL PIPE UNLESS OTHERWISE REQUIRED, SHOWN ON CONTRACT DRAWINGS, DIRECTLY SPECIFIED OR CONNECTED TO FITTINGS, VALVES AND HYDRANTS SHALL HAVE SOCKET BY PLAIN END RUBBER-GASKET PUSH-ON JOINTS WITH RADIAL Y COMPRESSED LOCKED IN PLACE RUBBER RING GASKETS APPROVED BY THE COMMISSIONER OF WATER. SLIP-ON COMPRESSION JOINTS SHALL CONFORM TO THE REGULAR AND SPECIAL REQUIREMENT FOR PUSH-ON JOINTS IN AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, “RUBBER GASKET JOINTS FOR DUCTILE-IRON AND GRAY-IRON PRESSURE PIPE AND FITTINGS,” AND ALL SUBSEQUENT AMENDMENTS THERETO.

(B) MECHANICAL JOINTS/RETAINED MECHANICAL JOINTS:

1. ALL FITTINGS AND PIPE BELL ENDS CONNECTED TO FITTINGS, UNLESS OTHERWISE REQUIRED, SHOWN ON CONTRACT DRAWINGS, OR DIRECTLY SPECIFIED SHALL HAVE BELL OR PLAIN END JOINTS OF THE MECHANICAL BOLTED STUFFING-BOX TYPE WITH SEALING GASKET AND BOLTED DUCTILE IRON FOLLOWER GLAND AND SHALL BE OF THE SPECIFIED RETAINED TYPE. BOLTS AND NUTS FOR MECHANICAL JOINTS SHALL BE CORROSION RESISTANT, HIGH STRENGTH, LOW ALLOY STEEL.

2. MECHANICAL JOINTS SHALL CONFORM TO THE REGULAR AND SPECIAL REQUIREMENT THAT ALL GLANDS SHALL BE DUCTILE IRON WITH JOINT DIMENSIONS AND TOLERANCES, BOLT HOLES AND SLOTS, GASKETS, RUBBER, QUALITY CONTROL, BOLTS AND NUTS AND MARKING BE IN CONFORMANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, “RUBBER GASKET JOINTS FOR DUCTILE IRON AND GRAY IRON PRESSURE PIPE AND FITTINGS.” ON ALL PIPE AND FITTINGS AT BENDS, TEES, CROSSES, SPECIAL FITTINGS, BETWEEN VERTICAL OFFSETS OR BENDS, ON HYDRANT BRANCHES, ON VALVES AND HYDRANT BASE ELBOWS, UP TO AND INCLUDING 16-INCH SIZE, THE CONTRACTOR SHALL FURNISH AND INSTALL RETAINED TYPE MECHANICAL JOINTS.

3. ON ALL PIPE AND FITTINGS AT BENDS, TEES, CROSSES, SPECIAL FITTINGS, BETWEEN VERTICAL OFFSETS OR BENDS, ON HYDRANT BRANCHES, ON VALVES AND HYDRANT BASE ELBOWS, UP TO AND INCLUDING 16-INCH SIZE, THE CONTRACTOR SHALL FURNISH AND INSTALL RETAINED TYPE MECHANICAL JOINTS.

4. PIPE AND FITTING BELL JOINT AND GASKETS SHALL BE FURNISHED AS SPECIFIED. GLANDS FOR RETAINED MECHANICAL JOINTS SHALL BE BOLTED TYPE OF DUCTILE-IRON MATERIAL CONFORMING TO AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, “RUBBER-GASKET JOINTS FOR DUCTILE-IRON AND GRAY-IRON PRESSURE PIPE AND FITTINGS,” AND/OR CONFORMING WITH ASTM A 536-84, “SPECIFICATION FOR DUCTILE-IRON CASTINGS.” RETAINED MECHANICAL JOINT FOLLOWER GLANDS SHALL BE EQUAL TO THE “MEG-A-LUG” AS MANUFACTURED BY EBAA IRON SALES, INC., THE “SUPER-LUG” AS MANUFACTURED BY THE SIGMA CORPORATION OR THE “UNI-FLANGE SERIES 1400” AS MANUFACTURED BY THE FORD METER BOX COMPANY, INC. PROPER TORQUE SHALL BE THAT AS RECOMMENDED BY THE RETAINER GLAND MANUFACTURER. WHERE JOINT DEFLECTION IS NECESSARY FOR ALIGNMENT SUCH DEFLECTION SHALL BE LIMITED TO MANUFACTURER’S MAXIMUM JOINT OPENING. ALL RETAINED JOINTS SHALL BE RATED FOR MINIMUM 250 PSI PRESSURE. ALL RETAINED JOINTS SHALL BE POLYETHYLENE ENCASED AS SPECIFIED IN SECTION, “JOINTS”, (C), EXCEPT WHERE SUCH RETAINED MECHANICAL JOINTS ARE BONDED JOINTS WHERE NO POLYETHYLENE ENCASEMENT WILL BE REQUIRED.

5. RETAINER GLANDS USING PERPENDICULAR SET SCREWS AS A MEANS RESTRAINT WILL NOT BE PERMITTED.

(C) POLYETHYLENE ENCASEMENT:

1. ALL BURIED WATER MAINS, FITTINGS, VALVES, FIRE HYDRANT BRANCH PIPING AND APPURTENANCES SHALL BE ENCASED WITH “V-Bio” POLYETHYLENE WRAPPING IN ACCORDANCE WITH THE MOST CURRENT REVISION OF ANSI/AWWA C-105/A21.5 INSTALLATION METHOD A. ALTERNATE INSTALLATION METHOD A FOR WET TRENCH CONDITIONS SHALL BE USED WHEN WATER MAIN ARE INSTALLED IN UNPAVED LOCATIONS SUCH AS TREE LAWNS AND EASEMENTS TRAVERSING PRIVATE PROPERTY.

2. ALL BOLTS AND NUTS ON ALL MECHANICAL JOINTS, RETAINED MECHANICAL JOINTS, FLANGES, VICTAULIC AND COMPRESSION TYPE BOLTED SLEEVED COUPLINGS, SHALL HAVE FIELD APPLIED THREE (3) COATS OF BITUMASTIC COATING PRIOR TO POLYETHYLENE ENCASEMENT.

(D) BOLTLESS RESTRAINED SLIP-ON JOINTS:

1) WHERE CALLED FOR ON THE CONTRACT DRAWINGS OR DIRECTLY SPECIFIED ALL JOINT RESTRAINT SHALL BE OF THE BOLTLESS RESTRAINED SLIP-ON JOINT DESIGN DESIGNATED AS EITHER “TYPE I” OR “TYPE II” AS SPECIFIED HEREIN. VALVES AND VALVE JOINT TYPE WITHIN THE LIMITS OF THE BOLTLESS RESTRAINED PIPE AND FITTINGS SHALL BE OF THE TYPE INDICATED ON THE CONTRACT DRAWINGS OR AS SPECIFIED.

2) TYPE I - BOLTLESS RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS DESIGNATED AS “TYPE I” SHALL BE OF A DESIGN CONSISTING OF A SHOP WELDED RETAINER RING OR SEGMENT ON THE SPIGOT END OF THE PIPE THAT WHEN THE JOINT IS FULLY ASSEMBLED “LOCKS” INTO THE BELL OF THE ADJACENT PIPE OR FITTING PROVIDING A POSITIVE RESTRAINED JOINT. NO FIELD WELDED RESTRAINED JOINTS ARE PERMITTED EXCEPT ON LENGTHS OF PIPE LESS THAN NOMINAL LENGTH NEED TO CLOSE THE LINE. BOLTLESS RESTRAINED JOINTS SHALL BE OF A DESIGN THAT PROVIDES RESTRAINED ACTION BETWEEN THE SPIGOT AND BELL OF THE PIPE OR FITTING INDEPENDENT OF THE GASKET. “TYPE I” BOLTLESS RETRAINED PUSH-ON JOINTS SHALL BE EQUAL TO: “FLEX-RING” AS MANUFACTURED BY AMERICAN CAST IRON PIPE COMPANY; “SUPER-LOCK” AS MANUFACTURED BY CLOW CORPORATION (MCWANE, INC.); OR “TR-FLEX” AS MANUFACTURED BY U. S. PIPE AND FOUNDRY.

3) TYPE II - BOLTLESS RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS DESIGNATED AS “TYPE II” SHALL BE OF A DESIGN IN WHICH A PUSH-ON BELL JOINT PIPE END OR PUSH-ON BELL FITTING JOINTS UTILIZE A WEDGING TYPE APPROVED GASKET TO PROVIDE RESTRAINT. THE “TYPE II” BOLTLESS RESTRAINED JOINT SHALL EQUAL TO THE “FIELD-LOK” GASKET AS MANUFACTURED BY U.S.PIPE AND FOUNDRY OR THE “FAST-GRIP” GASKET AS MANUFACTURED BY THE AMERICAN CAST IRON COMPANY. THE GASKET SHALL COMPLY WITH THE MATERIAL REQUIREMENTS OF ANSI/AWWA C111/A21.11, “RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS”. THE PUSH-ON JOINT USED IN THE “TYPE II” BOLTLESS RESTRAINED JOINT PIPE AND FITTINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI/AWWA C110/A21.10-87, “DUCTILE IRON AND GRAY-IRON FITTINGS, 3-INCH THROUGH 48-INCH, FOR WATER AND OTHER LIQUIDS,” OR ANSI/AWWA C153/A21.53, “DUCTILE IRON COMPACT FITTINGS, 3” THROUGH 16” FOR WATER AND OTHER LIQUIDS”.

(E) COMPRESSION COUPLINGS:

1. ALL PIPE COMPRESSION COUPLINGS SHALL BE OF A GASKETED, SLEEVE TYPE WITH DIAMETERS TO PROPERLY FIT PLAIN END IRON PIPE. EACH COUPLING SHALL CONSIST OF ONE (1) MIDDLE RING WITH STOPS REMOVED; TWO (2) FOLLOWER GLANDS; TWO (2) RUBBER-COMPOUND, BUNA-N BLEND, WEDGE SECTION GASKETS; AND SUFFICIENT TRACKHEAD STAINLESS STEEL BOLTS AND NUTS (ASTM A276-89A, TYPE 304) TO PROPERLY COMPRESS THE GASKETS. THE MIDDLE RING AND FOLLOWER GLANDS SHALL BE OF EITHER STEEL OR DUCTILE IRON (ASTM-A536). THE COMPRESSION COUPLING SHALL HAVE A MINIMUM WORKING PRESSURE RATING OF 250 PSI AND SHALL BE EQUAL TO THE DRESSER STYLE NOS: 38, 138, OR 162 (TRANSITION TYPE), OR SMITH-BLAIR 441 STRAIGHT AND TRANSITION COUPLINGS. ALL COMPRESSION COUPLINGS SHALL BE FURNISHED WITH ELECTROLIC INSULATION.

2. ALL COMPRESSION COUPLINGS SHALL BE COATED IN THE SHOP WITH A FACTORY COATING COMPATIBLE WITH FIELD APPLIED PRIMER AND ENAMEL COATINGS. COMPRESSION COUPLINGS SHALL BE CLEANED AND PAINTED WITH THREE (3) FIELD COATS OF KOPPERS BITUMASTIC SUPER TANK SOLUTION OR EQUIVALENT.

(F) FLANGED JOINTS:

1. FLANGED JOINTS SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS OR AS SPECIFIED. FLANGES SHALL BE EITHER CAST STEEL, FORGED OR ROLLED STEEL, OR PROPERLY WELDED AND MACHINED FABRICATED STEEL PLATES, WELDED TO PIPE WITH TWO CONTINUOUS WELDS. THEY SHALL HAVE PLAIN FACES AND SHALL BE FACED TRUE AND SMOOTH AT RIGHT ANGLES TO THE AXIS OF THE PIPE AND SHALL BE SPOT FACED ON THE BACK. DRILLING SHALL CONFORM TO ANSI B16.1, 125 LBS. EACH BLIND FLANGE SHALL BE CAST IRON AND HAVE BOSSES TAPPED AT TOP AND BOTTOM FOR TWO (2) INCH STANDARD PIPE AND FURNISHED WITH PLUGS.

2. ALL MACHINED STEEL SURFACES AT THE ENDS OF PIPE AND/OR FITTINGS TO RECEIVE VICTAULIC TYPE COUPLINGS OR PIPE ENDS HAVING FLANGES (FACE OF FLANGE) SHALL BE COATED WITH ONE (1) SHOP COAT OF AN APPROVED ZINC RICH PAINT.

3. ALL BOLTS AND NUTS USED IN THE FINISHED WORK FOR FLANGES SHALL BE MADE OF SILICON BRONZE (ASTM B 98-84, ALLOY A, “SPECIFICATION FOR COPPER-SILICON ALLOY ROD, BARS, AND SHAPES”) OR STAINLESS STEEL (ASTM A 276-89A, TYPE 304, “SPECIFICATION FOR STAINLESS AND HEAT-RESISTING STEEL BARS AND SHAPES”). THE ENDS OF ALL BOLTS MUST BE FINISHED TO STANDARD RADIUS IN ACCEPTABLE MANNER. ALL SCREW THREADS SHALL BE AMERICAN STANDARD COARSE THREAD (N.C.). STUD BOLTS DOUBLE END (ROD) SHALL BE USED TO MAKE THE FLANGED JOINTS ON PIPE. ALL DIMENSIONS TO BE ACCORDING TO AMERICAN STANDARD HEAVY. BOLTS AND NUTS SHALL BE DELIVERED TO THE FIELD FREE FROM GREASE, RUST AND DIRT AND SHALL BE PROPERLY PROTECTED FROM MOISTURE AND DIRT IN THE FIELD. GASKETS FOR FLANGED PIPE SHALL BE 5X MANILA ROPE PATTERN OR OTHER APPROVED TYPE.

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ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 20" AND SMALLER (CONT.)

JOINTS (CONT.)

(G) TRANSITION COUPLINGS:

THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS TO THE CITY THROUGH THE ENGINEER FOR APPROVAL OF THE TRANSITION COUPLING ASSEMBLY. THE TRANSITION COUPLING SHALL BE "DRESSER STYLE 63/39, TYPE 1" SLIP TYPE WITH ELECTROLIC INSULATION, OR APPROVED EQUAL, WITH MINIMUM 1/2" THICK BODY AND SLIP, WITH AN 8-IN, TRAVERSE. THE TRANSITION COUPLING SHALL INCLUDE ALL MATERIALS, BOLTS, NUTS AND WASHERS, WELDED NECK FLANGES A.S.A. 150# AND GASKETS. ALL BOLTS AND NUTS SHALL BE MADE OF STAINLESS STEEL: ASTM A 276--89A, TYPE 304, "SPECIFICATION FOR STAINLESS AND HEAT--RESISTING SHEET BARS AND SHAPES." NO FIELD WELDING OF GALVANIZED STEEL PIPE WILL BE PERMITTED. THE TRANSITION COUPLING SHALL BE GALVANIZED EXCEPT SLIP PIPE. THE TRANSITION COUPLING SHALL HAVE FIELD APPLIED INSULATION AS PER DETAILS ON THE CONTRACT DRAWINGS.

PAINTING

AFTER INSTALLATION AND BEFORE POLYETHYLENE ENCASEMENT, ALL EXPOSED OR DAMAGED COATING AND ALL BOLTS FOR MECHANICAL JOINTS, RETAINED MECHANICAL JOINTS, FLANGES AND VICTAULIC OR COMPRESSION TYPE BOLTED SLEEVED COUPLINGS SHALL BE CLEANED AND PAINTED WITH THREE (3) FIELD COATS OF KOPPERS BITUMASTIC SUPER TANK SOLUTION OR EQUIVALENT.

DRAWINGS

(A) THE CONTRACTOR SHALL SUBMIT TO THE CITY THROUGH THE ENGINEER FOR APPROVAL SIX (6) SETS OF PRINTS OF ALL SHOP DRAWINGS FOR PIPE AND FITTINGS AND MISCELLANEOUS OR SPECIAL DETAILS OF PIPE AND FITTING JOINTS WHICH ARE NOT STANDARD CONSTRUCTION OR FULLY DETAILED IN THE REGULAR CATALOGUE OF THE COMPANY FURNISHING THE PIPE, FITTINGS AND SPECIALS. NO WORK SHALL BE DONE IN THE SHOP UNTIL AFTER THE DRAWINGS HAVE BEEN APPROVED.

(B) THE APPROVAL OF THE DRAWINGS BY THE CITY SHALL NOT RELIEVE THE CONTRACTOR OF ANY OF HIS OBLIGATIONS IN CONNECTION WITH THIS CONTRACT.

MEASUREMENT

THE NUMBER OF FEET OF DUCTILE IRON PIPE AND FITTINGS TO BE PAID FOR SHALL BE THE ACTUAL NUMBER OF FEET FURNISHED AND PLACED IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND THESE SPECIFICATIONS AS MEASURED ALONG THE AXIS OF THE PIPING, INCLUDING FITTINGS AND VALVES CONNECTED UP IN PLACE. FOR CONNECTIONS BETWEEN NEW AND/OR EXISTING WATER MAINS THE NUMBER OF FEET OF DUCTILE IRON PIPE AND FITTINGS, INCLUDING CONNECTIONS THERETO, TO BE PAID FOR SHALL BE ACTUAL NUMBER OF FEET FURNISHED AND PLACED IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND THESE SPECIFICATIONS AS MEASURED ALONG THE AXIS OF THE PIPING FROM CENTER TO CENTER OF EXISTING MAINS.

ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 24" AND LARGER

WORK INCLUDED

(A) THE CONTRACTOR SHALL UNDER ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 24" AND LARGER, FURNISH ALL THE MATERIALS FOR AND SHALL PROPERLY CONSTRUCT AND CONNECT IN PLACE AT THE LOCATIONS SHOWN ON THE DRAWINGS OR AS DIRECTED, ALL DUCTILE IRON PIPE AND FITTINGS, INCLUDING ALL EXCAVATION WORK, THE CUTTING INTO AND REMOVAL OF EXISTING PIPE, BACKFILLING, SAND BEDDING AND PREMIUM BACKFILL, AND REPAVING (BOTH TEMPORARY AND PERMANENT), ALL AS REQUIRED FOR THE PROPER COMPLETION OF THE WORK INCLUDED UNDER THIS CONTRACT. IN GENERAL THIS WORK SHALL INCLUDE THE FURNISHING, LAYING, CONNECTING, PAINTING, SPECIAL EXTERIOR COATING, JOINT BONDING, AND TESTING OF PIPE AND FITTINGS, THE EXCAVATION, REMOVAL AND RESTORATION OF MISCELLANEOUS ITEMS, SHEETING AND SHORING, BACKFILLING, SAND BEDDING AND PREMIUM BACKFILL, SEEDING AND SODDING, THE PERMANENT REPAVING, IF SO NOTED ON THE CONTRACT DRAWINGS, THE CUTTING INTO, REMOVAL AND STORAGE OF EXISTING MAINS, AND THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT TO COMPLETE THE WORK AS SPECIFIED, SHOWN OR ORDERED.

(B) IN MAKING THE CONNECTION TO EXISTING MAINS WHERE BRANCH SLEEVES CAN BE USED, THE CONTRACTOR SHALL SUPPLY THE SAME. THE DIVISION OF WATER WILL INSTALL THE BRANCH SLEEVE AND WILL MAKE THE PRESSURE TAP (IF APPLICABLE) IN ACCORDANCE WITH THE REQUIREMENTS INDICATED UNDER "WORK TO BE DONE BY THE CITY." IF THE INSTALLATION OF BRANCH SLEEVES AND VALVES CANNOT BE ACCOMPLISHED, THE CONTRACTOR WILL BE REQUIRED TO FURNISH AND INSTALL TEES WITH SLEEVES OR COUPLINGS TO COMPLETE THE CONNECTION. THE CONTRACTOR WILL BE REQUIRED TO MAKE THE NECESSARY EXCAVATION, BACKFILL AND REPAVING (IF NOT PAID FOR SEPARATELY AS PART OF THIS CONTRACT.

LAYOUT OF DUCTILE IRON PIPE AND FITTINGS 24" AND LARGER

(A) AS ONE (1) OF THE ALTERNATE MATERIALS THE CONTRACTOR SHALL FURNISH, UNDER ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 24" AND LARGER. CLASS OF PIPE SHALL BE MINIMUM CLASS 52 OR HIGHER AS SPECIFIED HEREIN UNDER PARAGRAPHS F, G AND H. CLASS OF FITTINGS SHALL BE AS SPECIFIED IN PARAGRAPH E. VALVE ASSEMBLIES, PLAIN ANCHORS, ACCESS MANHOLES, DRAIN ASSEMBLIES, AIR RELIEF OUTLETS, PITOMETER OUTLETS AND JOINT BONDING AND CATHODIC TEST STATION ASSEMBLIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DETAIL DRAWINGS. THE PLANS THE DUCTILE IRON PIPE AND FITTINGS FURNISHED UNDER THIS ITEM SHALL HAVE A SPECIAL EXTERIOR PIPE COATING AS SPECIFIED IN PARAGRAPH I. ALL TEES SHALL HAVE FLANGED OUTLETS EXCEPT AS OTHERWISE SPECIFIED HEREIN. ALL RESTRAINED JOINTS SHALL BE OF THE BOLTLESS TYPE AS SPECIFIED HEREIN.

(B) PIPE LAYOUT INDICATED ON THE CONTRACT DRAWINGS IS BASED UPON GEOMETRIC DESIGN THAT WILL ALLOW INSTALLATION OF EITHER DUCTILE IRON PIPE AND FITTINGS OR STEEL PIPE AND FITTINGS. IN ORDER TO ACHIEVE THE HORIZONTAL AND VERTICAL DEFLECTIONS SHOWN ON THE CONTRACT DRAWINGS STANDARD BENDS OF 11- 1/4, 22-1/2, OR 45 DEGREES SHALL BE USED (45 DEGREE BENDS SHALL NOT BE USED FOR VERTICAL DEFLECTIONS). JOINT OPENINGS AS REQUIRED, NOT TO EXCEED THE MANUFACTURER'S MAXIMUM SUGGESTED JOINT OPENING, SHALL BE USED TO MEET THE HORIZONTAL AND VERTICAL DEFLECTIONS SHOWN ON THE DRAWINGS. THE MAXIMUM PIPE LENGTH SHALL BE 20'-0". IN SOME CASES DUE TO RESTRAINED JOINTS ON CURVES, LENGTHS LESS THAN 20'-0" MAY BE USED. THESE SHALL BE INCLUDED IN THE BID PRICE PER FEET OF PIPE.

(B) CONT'D, CONTRACTOR SHALL MAINTAIN ALL HORIZONTAL POINTS OF INTERSECTION (HPI), AND AS CLOSE AS POSSIBLE, THE VERTICAL POINTS OF INTERSECTION (VPI), AS SHOWN ON THE CONTRACT DRAWINGS.

(C) WHERE "RESTRAINED DISTANCE" IS SHOWN ON THE CONTRACT DRAWINGS AND STANDARD FITTINGS ARE USED TO OBTAIN THE REQUIRED LINE AND GRADE, THE CONTRACTOR SHALL FURNISH DUCTILE IRON MINIMUM CLASS 52 (SEE PARAGRAPHS F, G, AND H) CEMENT LINED BOLTLESS RESTRAINED PUSH-ON JOINT FITTINGS TO THE LIMITS OF THE "RESTRAINED DISTANCE" SHOWN ON THE CONTRACT DRAWINGS. ALL RESTRAINED JOINTS SHALL BE DESIGNED FOR A BULKHEAD THRUST WITH A PRESSURE OF MINIMUM 225 PSI

(D) IN VALVE ASSEMBLIES ALL PIPE JOINTS, FITTINGS, AND VALVE JOINTS, BETWEEN THE TWO PLAIN ANCHORS OR ACCESS MANHOLES AND ANCHORAGES WHETHER WITHIN "RESTRAINED DISTANCE" OR WHERE NO "RESTRAINED DISTANCE" IS SHOWN ON THE DRAWINGS SHALL HAVE JOINTS DESIGNED FOR A BULKHEAD THRUST WITH A PRESSURE OF MINIMUM 225 PSI. VALVE ENDS SHALL BE OF THE TYPE CALLED FOR ON THE CONTRACT DRAWINGS OR AS SPECIFIED HEREIN.

(E) SUPPLEMENTAL CONNECTIONS, WHERE CALLED FOR ON THE PLANS, SHALL BE CONSTRUCTED WITH STANDARD FULL BODIED FITTINGS FOR THOSE CONNECTIONS 16-INCHES AND LARGER; SHORT BODIED FITTINGS MAY BE USED FOR THOSE SUPPLEMENTAL CONNECTIONS 12-INCHES IN SIZE. OUTLET FOR SUPPLEMENTAL CONNECTIONS ON SUPPLY MAINS SHALL BE FURNISHED BY PROVIDING INSULATED FLANGED OUTLET TEES; SEE SECTION ENTITLED "JOINTS, PARAGRAPH (E)(4). THE TEES WHERE FALLING WITHIN "RESTRAINED DISTANCE" SHOWN ON THE DRAWINGS SHALL BE A FULL BODIED BOLTLESS RESTRAINED FITTING. WHERE THE SUPPLEMENTAL CONNECTION FALLS OUTSIDE THE LIMITS OF RESTRAINED DISTANCE THE TEE MAY BE A RETAINED MECHANICAL JOINT FITTING IF SUCH IS AVAILABLE OTHERWISE THE TEE SHALL BE A BOLTLESS RESTRAINED FITTING. THE RESTRAINED JOINTS AND RETAINED MECHANICAL SHALL BE DESIGNED FOR BULKHEAD THRUST WITH A PRESSURE OF MINIMUM 225 PSI.

(F) WHERE DEPTH OF COVER FOR 30-INCH, 36-INCH, 42-INCH AND 48-INCH DUCTILE IRON PIPE EXCEEDS TWENTY (20) FEET, PIPE THICKNESS SHALL BE INCREASED TO MINIMUM CLASS 53. WHERE DEPTH OF COVER EXCEEDS TWENTY-FOUR (24) FEET, PIPE THICKNESS SHALL BE INCREASED TO MINIMUM CLASS 54.

(G) WHERE DEPTH OF COVER FOR 24-INCH DUCTILE IRON PIPE EXCEEDS TWENTY-FOUR (24) FEET, PIPE THICKNESS SHALL BE INCREASED TO MINIMUM CLASS 54.

(H) WHERE DEPTH OF COVER FOR 20-INCH DUCTILE IRON PIPE EXCEEDS TWENTY-EIGHT (28) FEET, PIPE THICKNESS SHALL BE INCREASED TO MINIMUM CLASS 54.

(I) SPECIAL EXTERIOR COATING:

DUCTILE IRON PIPE AND FITTINGS (24" AND LARGER) SHALL HAVE SHOP APPLIED A 16 MIL THICKNESS OF AN APPROVED COAL TAR EPOXY EXTERIOR COATING. THE COATING SHALL BE APPLIED IN TWO (2) COATS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND SHALL HAVE A DRY FILM THICKNESS (DFT) OF 16 MILS.

(J) BONDED JOINTS:

1. GENERAL: ALL DUCTILE IRON PIPE JOINTS AND PIPE FITTING JOINTS ON DUCTILE IRON PIPE SHALL HAVE APPROVED TYPE BONDED JOINTS. THE BONDED TYPE JOINTS SHALL BE OF A TYPE THAT CAN BE USED IN CONJUNCTION WITH A CATHODIC PROTECTION SYSTEM AND BE OF A TYPE THAT WILL PROVIDE POSITIVE ELECTRICAL CONTINUITY ACROSS THE JOINTS OF ALL PUSH-ON JOINT PIPE; ALL RESTRAINED MECHANICAL JOINT FITTINGS; ALL BOLTLESS RESTRAINED JOINT PIPE AND FITTINGS; ALL FLANGED JOINTS, EXCEPT WHERE INSULATED FLANGED JOINTS ARE REQUIRED OR ORDERED; ALL COMPRESSION TYPE COUPLING JOINTS, EXCEPT WHERE INSULATED COMPRESSION COUPLINGS ARE REQUIRED OR ORDERED; ALL VICTAULIC TYPE JOINTS; AND ANY OTHER SPECIALS. CATHODIC TEST STATIONS SHALL BE FURNISHED AND INSTALLED WHERE SHOWN ON THE CONTRACT DRAWINGS. THE BONDING WIRE, CONNECTORS, AND TEST STATION ASSEMBLIES SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE DETAILED DRAWINGS EXCEPT THAT BONDING CONNECTORS SHALL BE INSTALLED AT EACH PIPE JOINT AT THE ELEVEN (11) AND ONE (1) O'CLOCK POSITIONS ON PIPE SIZES 30", 36", 42", AND 48". AFTER THE JOINT BONDING HAS BEEN INSTALLED THE CONTRACTOR SHALL COMPLETE THE EXTERIOR JOINT PER CONTRACT DRAWING DETAILS INCLUDING EXTERIOR COATING REPAIR.

2. CATHODIC TEST STATIONS: WHERE SHOWN ON THE PLANS OR WHERE ORDERED THE CONTRACTOR SHALL FURNISH AND INSTALL CATHODIC TEST STATION ASSEMBLIES. ALL MATERIALS REQUIRED FOR THE CATHODIC TEST STATION ASSEMBLIES SHALL CONFORM WITH THE DETAILS SHOWN ON THE DETAIL DRAWINGS OR AS SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

3. PAYMENT: PAYMENT FOR FURNISHING AND INSTALLING BONDED JOINTS AND CATHODIC TEST STATIONS SHALL BE INCLUDED IN THE COST PER FOOT OF DUCTILE IRON PIPE AND FITTINGS FURNISHED AND INSTALLED IN THE WORK. ADDITIONAL JOINT BONDING AND TEST STATIONS REQUIRED AS A RESULT OF CATHODIC PROTECTION REQUIREMENTS SHALL BE FURNISHED, INSTALLED AND PAID FOR UNDER THAT ITEM.

DRAWINGS - WATER MAINS 24" AND LARGER

(A) THE CONTRACTOR SHALL SUBMIT TO THE CITY THROUGH THE ENGINEER FOR REVIEW AND/OR APPROVAL, SIX (6) COMPLETE SETS OF ALL SHOP DRAWINGS FOR FITTINGS AND SPECIALS, AND MISCELLANEOUS DETAILS, SUCH AS AIR RELIEF AND DRAIN OUTLETS, BONDING OF JOINTS, ANCHORS, PITOMETER OPENING, RESTRAINED JOINT, ACCESS OPENINGS, DRAIN PIPE ASSEMBLY, PIPING FOR GATE VALVE ASSEMBLY, ETC.

(B) THE CONTRACTOR SHALL ALSO INITIALLY FURNISH TO THE CITY THROUGH THE ENGINEER A MINIMUM OF SIX (6) SETS OF A COMPLETE ASSEMBLY PLAN FOR THE ENTIRE LENGTH OF THE PIPE LINE INCLUDING A DETAILED TABULATED LAYING SCHEDULE. THIS ASSEMBLY PLAN SHALL ALSO SHOW THE CORRECT LOCATION OF ALL FITTINGS TO BE FURNISHED, INCLUDING AIR RELIEF VALVES, DRAINS, ANCHORS, MANHOLES, PITOMETER VAULTS, VALVE VAULTS, RESTRAINED JOINTS, ACCESS MANHOLES, CATHODIC TEST STATIONS, VALVES, ETC.

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ITEM SPECIAL – DUCTILE IRON PIPE AND FITTINGS – 24” AND LARGER (CONT.)

DRAWINGS – WATER MAINS 24” AND LARGER (CONT.)

(C) AT LEAST TWO (2) SETS OF EACH OF THE SHOP DRAWINGS AND ASSEMBLY PLAN SUBMITTED WILL BE RETURNED TO THE CONTRACTOR WITH THE CRITICISMS OR APPROVAL OF THE ENGINEER. IN CASE THE DRAWINGS ARE NOT APPROVED, THE CONTRACTOR SHALL AGAIN SUBMIT FOR APPROVAL, SIX (6) COMPLETE SETS OF REVISED SHOP DRAWINGS AND ASSEMBLY PLAN REQUIRED FOR REVIEW AND/OR APPROVAL. AFTER THE DRAWINGS HAVE BEEN FINALLY APPROVED, THE CONTRACTOR SHALL AGAIN FURNISH TO THE CITY, THROUGH THE ENGINEER, A SUFFICIENT NUMBER OF ADDITIONAL SETS OF SHOP DRAWINGS AND ASSEMBLY PLAN ON PAPER FOR HIS USE AND FOR THE CITY’S INTERNAL DISTRIBUTION AND FINALLY ONE (1) MYLAR OR REPRODUCIBLE CLOTH TRACING OF EACH DRAWING AS PREVIOUSLY SPECIFIED. NO WORK SHALL BE DONE IN THE SHOP OR IN THE FIELD UNTIL ALL THE DRAWINGS HAVE BEEN FINALLY APPROVED. MYLAR TRACINGS SHALL BE SUBMITTED AS SPECIFIED IN THE GENERAL NOTES “DRAWINGS.”

(D) THE APPROVAL OF THE DRAWINGS BY THE CITY SHALL NOT RELIEVE THE CONTRACTOR OF ANY OF HIS OBLIGATIONS IN CONNECTION WITH THIS CONTRACT.

MATERIALS DATA WITH PROPOSAL

EACH BIDDER SHALL SUBMIT WITH HIS PROPOSAL, AND IN FORM PROVIDED, THE INFORMATION CALLED FOR BELOW:

- A. NAME OF PIPE MANUFACTURER AND LOCATION OF PLANT.
- B. NAME OF COUPLING MANUFACTURER AND LOCATION OF PLANT.
- C. NAME OF EXTERIOR PIPE COATING MANUFACTURER.
- D. NAME OF PIPE INSULATION MANUFACTURER.

CONNECTING TO EXISTING WATER MAINS

(A) THE CONTRACTOR SHALL LOCATE ALL PIPE ENDS AND/OR ALL EXISTING PIPE JOINTS WHERE CONNECTIONS ARE TO MADE, INCLUDING WHERE EXISTING MAINS ARE TO BE TAPPED, ALONG WITH THE NEXT EXISTING PIPE JOINT TO DETERMINE THE EXACT LOCATION AND ELEVATION (LINE AND GRADE) OF THE EXISTING WATER MAIN. THE CONTRACTOR SHALL ALSO EXPOSE THE EXISTING PIPE JOINTS WHERE CONNECTIONS ARE TO MADE TO DETERMINE THE TYPE OF EXISTING JOINT AND THE DIRECTION OF THE EXISTING JOINT. NO PIPE FABRICATION DRAWING WILL BE APPROVED UNTIL THIS INFORMATION IS SUBMITTED TO THE ENGINEER AND TO THE CITY. ALL FIELD DATA SHALL BE OBTAINED IN THE PRESENCE OF THE DIVISION OF WATER’S RESIDENT INSPECTOR.

(B) IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL FIELD DIMENSIONS PRIOR TO PREPARING THE VARIOUS SHOP DRAWING SUBMITTALS. AT THE TIME OF EACH SUBMISSION, THE CONTRACTOR SHALL GIVE THE CITY SPECIFIC WRITTEN NOTICE OF EACH VARIATION THAT THE SHOP DRAWINGS MAY HAVE FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. IN ADDITION, THE CONTRACTOR SHALL CAUSE A SPECIFIC NOTATION TO BE MADE ON EACH SHOP DRAWING SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL OF EACH SUCH VARIATION. THE CITY’S REVIEW AND APPROVAL OF SHOP DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ANY VARIATION FROM THE REQUIREMENTS OF THE CONTRACT DRAWINGS.

(B) CONT’D, THE CITY’S APPROVAL SHALL NOT EXTEND TO ANY SUCH VARIATION UNLESS CONTRACTOR HAS, IN WRITING, CONSPICUOUSLY CALLED THE CITY’S ATTENTION TO EACH SUCH VARIATION AT THE TIME OF SUBMITTAL, AS REQUIRED BY THIS PARAGRAPH, AND THE CITY HAS GIVEN WRITTEN APPROVAL OF THAT PARTICULAR VARIATION BY A SPECIFIC WRITTEN NOTATION THEREOF INCORPORATED IN OR ACCOMPANYING THE SHOP DRAWING APPROVAL.

(C) THE FIELD DATA SHALL BE OBTAINED IN SUFFICIENT TIME IN ADVANCE OF THE PROPOSED CONNECTION IN ORDER TO DETERMINE IF ANY ADJUSTMENTS TO THE LINE AND GRADE OF THE PROPOSED WATER MAIN IS REQUIRED DUE TO THE INFORMATION OBTAINED IN THE FIELD DATA. THE INFORMATION OBTAINED IN THE FIELD DATA SHALL ALSO BE FORWARDED TO THE PIPE FABRICATOR WITH SUFFICIENT TIME TO ALLOW FOR THE PREPARATION OF REVISED SHOP DRAWINGS AND FOR FABRICATION OF THOSE PIPE AND FITTINGS REQUIRED TO MAKE THE CONNECTION. NO EXTRA COMPENSATION TO THE CONTRACTOR WILL BE ALLOWED FOR ANY DELAYS AND/OR ADDITIONAL PIPE AND FITTINGS FOR FAILURE TO HAVING PROPERLY OBTAINED FORWARDED THE REQUIRED FIELD INFORMATION DATA.

DUCTILE-IRON PIPE AND FITTINGS – GENERAL

(A) ALL PIPE AND FITTINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH AND IN ALL RESPECTS WITH THE REQUIREMENTS OF THE LATEST SPECIFICATIONS OF THE “AMERICAN NATIONAL STANDARD” FOR ANSI/AWWA C151/A21.51-86, “DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS, AND DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS,” AND ANSI/AWWA C111/A21.11-85, “RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS,” ADOPTED BY THE AMERICAN WATER WORKS ASSOCIATION; WHICH STANDARDS EXCEPT AS HEREIN MODIFIED ARE MADE A PART OF THESE SPECIFICATIONS. PIPE AND FITTINGS ON 24-INCH AND LARGER WATER MAIN INSTALLATIONS SHALL HAVE BOLTLESS RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS WITHIN “RESTRAINED DISTANCE” SHOWN ON THE CONTRACT DRAWINGS AND WHERE CALLED OUT TO BE RESTRAINED.

(B) ALL PIPE AND FITTINGS SHALL BE CEMENT LINED AND OF THE SIZE AND THICKNESS AND PRESSURE CLASSES NOTED ON THE RESPECTIVE CONTRACT DRAWING OR DIRECTLY SPECIFIED.

(C) ALL DUCTILE IRON FITTINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C110/A21.10-87, “DUCTILE IRON AND GRAY-IRON FITTINGS, 3-INCH THROUGH 48-INCH, FOR WATER OTHER LIQUIDS,” AND ALL SUBSEQUENT AMENDMENTS THERETO. METAL FOR FITTINGS SHALL CONFORM TO AMERICAN NATIONAL STANDARD ANSI A21.10-87.

(D) THE CONTRACTOR SHALL FURNISH CENTRIFUGAL CAST DUCTILE IRON CEMENT LINED PIPE. DUCTILE IRON METAL SHALL HAVE A MINIMUM TENSILE STRENGTH OF 60,000 PSI, MINIMUM YIELD STRENGTH OF 42,000 PSI AND MINIMUM ELONGATION OF 10 PERCENT AND SHALL BE FOR THE THICKNESS CLASS NOTED ON THE CONTRACT DRAWINGS OR DIRECTLY SPECIFIED. PIPE MAY BE FURNISHED IN 18 OR 20 FEET NOMINAL LAYING LENGTHS. THE CENTRIFUGALLY CAST DUCTILE SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD ANSI/AWWA C151/A21.51-86, “DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS, AND DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS,” AND ALL SUBSEQUENT AMENDMENTS THERETO. PIPE ON STRAIGHT RUNS SHALL HAVE PUSH-ON SINGLE RUBBER-GASKET COMPRESSION JOINTS, ALL IN ACCORDANCE WITH AMERICAN NATIONAL STANDARD, ANSI/AWWA C111/A21.11-85, “RUBBER-GASKET JOINTS FOR DUCTILE-IRON PIPE AND GRAY-IRON PRESSURE PIPE AND FITTINGS,” AND ALL SUBSEQUENT AMENDMENTS THERETO.

(E) STANDARD THICKNESS AND PIPE CLASS TABLES

THE THICKNESS OF THE CENTRIFUGALLY CAST DUCTILE IRON PIPE SHALL CONFORM TO THE FOLLOWING TABLE:

STANDARD THICKNESS

PIPE WORKING SIZE	PIPE CLASS				FITTINGS PSI
	52	53	54	56	
24”	350	.44	.47	.50	350
30”	350	.47	.51	.55	250
36”	350	.53	.58	.63	250
42”	350	.59	.65	.71	250
48”	350	.65	.72	.79	250

(F) WHERE “RESTRAINED DISTANCES” ARE SHOWN ON THE PLANS OR DIRECTLY SPECIFIED, PIPE AND FITTINGS HAVING BOLTLESS RESTRAINED TYPE JOINTS SHALL BE FURNISHED. BOLTLESS RESTRAINED TYPE JOINTS SHALL BE AS SPECIFIED IN SECTION “JOINTS, D: “BOLTLESS RESTRAINED SLIP-ON JOINTS.”

(G) WHERE FITTINGS ARE SHOWN WHICH ARE NOT COVERED BY THE ABOVE SPECIFICATIONS, THEY IN SUCH PARTICULARS AS ARE LACKING THEREON SHALL CONFORM TO THE DIMENSIONS AND OTHERWISE MEET THE SPECIFICATIONS FOR THE RESPECTIVE TYPE WHICH ARE CARRIED IN THE LATEST REVISIONS TO THE CURRENT EDITION OF THE DUCTILE IRON PIPE RESEARCH ASSOCIATION “HANDBOOK OF DUCTILE IRON PIPE” OR WHICH ARE OTHERWISE SHOWN ON THE CONTRACT DRAWINGS.

(H) WHEREVER CHANGES IN LINE AND GRADES OF THE MAIN AS SHOWN ON THE DRAWINGS ARE NOT STANDARD FITTING DEFLECTIONS, THE CONTRACTOR WILL BE PERMITTED TO SUBMIT DETAILS USING COMBINATIONS OF STANDARD FITTINGS AND SMALL DEFLECTIONS (NOT TO EXCEED THE MANUFACTURER’S MAXIMUM SUGGESTED JOINT OPENING) IN THE ADJOINING LENGTHS OF PIPE.

(I) ON NEW AND/OR RELOCATED OR EXTENDED WATER MAINS, 24-INCH DIAMETER AND LARGER, WHERE WATER MAINS END OR TERMINATE AND ARE NOT CONNECTED TO EXISTING MAINS, AN APPROVED TYPED BOLTLESS RESTRAINED CAP/PLUG SHALL BE FURNISHED AND INSTALLED. PLUGS AND CAPS SHALL BE FURNISHED WITH TWO (2) PLUGGED TWO (2’)-INCH TAPS FOR DRAIN AND AIR RELIEF CONNECTIONS.

(J) CLOSURE PIECES SHALL BE ACCURATELY MEASURED AND CUT IN THE FIELD AND INSTALLED USING SOLID SHORT PATTERN SLEEVES HAVING RETAINED MECHANICAL BELL JOINTS OR APPROVED COMPRESSION TYPE COUPLINGS. RETAINED MECHANICAL BELL JOINT SLEEVES AND COMPRESSION TYPE COUPLINGS SHALL BE AS SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

(K) TESTS, INSPECTION, REPORTS AND ANALYSES OF TESTS OF SAMPLES FOR ALL MATERIALS SHALL BE FURNISHED IN ACCORDANCE WITH THE PARAGRAPH “TEST, INSPECTION AND REPORTS” OF THE GENERAL NOTES.

CEMENT LINING

ALL PIPE FITTINGS, SHALL BE GIVEN A CEMENT MORTAR LINING AT THE POINT OF MANUFACTURE. THE LINING SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD, ANSI/AWWA C104/A21.4-1990, “CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS,” AND ALL SUBSEQUENT AMENDMENTS THERETO.

MARKING

ALL PIPE AND FITTINGS SHALL BE SUITABLY MARKED TO DENOTE THE MANUFACTURER, CLASS, DATE, WEIGHT AND OTHER ELEMENTS OF IDENTIFICATION.

FACING AND DRILLING

ALL FLANGES SHALL BE CAST SOLID AND FACED ACCURATELY AT RIGHT ANGLES TO THE AXIS OF THE PIPE. ALL FLANGES SHALL BE SHOP COATED WITH A COAT OF COAL TAR EPOXY, EXCEPT THE FACE OF THE FLANGE WHICH SHALL RECEIVE ONE (1) COAT OF A ZINC RICH PRIMER AT THE SHOP IMMEDIATELY AFTER THEY HAVE BEEN FACED AND DRILLED. ALL FLANGED PIPE AND FITTINGS SHALL BE FACED AND DRILLED TO ANSI B16-1, 125 LB. DRILLING, UNLESS SPECIAL DRILLING IS CALLED FOR. WHERE TAP OR STUD BOLTS ARE REQUIRED, FLANGES SHALL ALSO BE TAPPED.

LAYING

(A) PROPER AND SUITABLE TOOLS AND APPLIANCES FOR THE SAFE AND CONVENIENT HANDLING AND LAYING OF THE PIPE AND FITTINGS SHALL BE USED. GREAT CARE SHALL BE TAKEN TO PREVENT THE PIPE COATING AND FITTINGS FROM BEING DAMAGED PARTICULARLY ON THE INSIDE OF THE PIPES AND FITTINGS AND ANY SUCH DAMAGE SHALL BE REMEDIED AS DIRECTED. ALL PIPES AND FITTINGS SHALL BE CAREFULLY EXAMINED BY THE CONTRACTOR FOR DEFECTS JUST BEFORE LAYING AND NO PIPE OR FITTINGS SHALL BE LAID WHICH IS KNOWN TO BE DEFECTIVE.

(B) IF ANY DEFECTIVE PIPE IS DISCOVERED AFTER HAVING BEEN LAID, IT SHALL BE REMOVED AND REPLACED WITH A SOUND PIPE OR FITTING IN A SATISFACTORY MANNER, BY THE CONTRACTOR AT HIS OWN EXPENSE. ALL PIPES AND FITTINGS SHALL BE THOROUGHLY CLEANED BEFORE THEY ARE LAID, SHALL BE KEPT CLEAN UNTIL THEY ARE USED IN THE COMPLETED WORK, AND WHEN LAID, SHALL CONFORM TO THE LINES AND GRADES GIVEN BY THE ENGINEER. OPEN ENDS OF PIPES SHALL BE KEPT PLUGGED WITH A BULK HEAD DURING CONSTRUCTION.

(C) PIPE LAID IN TRENCH SHALL BE LAID TO A FIRM AND EVEN BEARING FOR ITS FULL LENGTH. PRECAUTIONS SHALL BE TAKEN AGAINST FLOATING.

(D) IT IS THE INTENTION OF THESE SPECIFICATIONS TO SECURE FIRST CLASS WORKMANSHIP IN THE PLACING OF PIPE AND ACCESSORIES. IN SUCH DETAILS AS ARE NOT SPECIFICALLY MENTIONED HEREIN OR CALLED FOR ON THE DRAWINGS, THE CONTRACTOR WILL BE REQUIRED TO CONFORM WITH THE APPLICABLE SECTIONS OF THE LATEST AMERICAN NATIONAL STANDARD, ANSI/AWWA C 600-87, INSTALLATION OF GRAY AND DUCTILE CAST IRON WATER MAINS AND APPURTENANCES,” AS ADOPTED BY THE AMERICAN WATER WORKS ASSOCIATION.

PROTECTION OF UTILITIES

CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION.

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ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 24" AND LARGER (CONT.)

DRAWINGS

(A) THE CONTRACTOR SHALL SUBMIT TO THE CITY THROUGH THE ENGINEER FOR APPROVAL SIX (6) SETS OF PRINTS OF ALL SHOP DRAWINGS FOR PIPE AND FITTINGS AND MISCELLANEOUS OR SPECIAL DETAILS OF PIPE AND FITTING JOINTS WHICH ARE NOT STANDARD CONSTRUCTION OR FULLY DETAILED IN THE REGULAR CATALOGUE OF THE COMPANY FURNISHING THE PIPE, FITTINGS AND SPECIALS. NO WORK SHALL BE DONE IN THE SHOP UNTIL AFTER THE DRAWINGS HAVE BEEN APPROVED.

(B) THE APPROVAL OF THE DRAWINGS BY THE CITY SHALL NOT RELIEVE THE CONTRACTOR OF ANY OF HIS OBLIGATIONS IN CONNECTION WITH THIS CONTRACT.

PIPE SUPPORT ASSEMBLIES

PIPE SUPPORT ASSEMBLIES SHALL BE FABRICATED AS DETAILED ON THE PLANS AND SHALL BE COMPLETE IN ALL RESPECTS INCLUDING ALL MATERIALS, CADMIUM PLATED SHOULDER AND CLAMP BOLTS, FASTENERS AND NUTS. THE SUPPORT ASSEMBLY CLAMP, SEAT PLATE ("LUBRITE" PLATE) AND SHIMS SHALL ALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A-123, LATEST REVISION THEREOF. NO FIELD WELDING OF GALVANIZED STEEL PIPE WILL BE PERMITTED. THERE SHALL BE A MINIMUM OF TWO (2) PIPE SUPPORTS FOR EACH PIPE LENGTH.

MEASUREMENT

THE NUMBER OF FEET OF DUCTILE IRON PIPE AND FITTINGS TO BE PAID FOR UNDER ITEM SPECIAL - DUCTILE IRON PIPE AND FITTINGS - 20" AND LARGER, SHALL BE THAT ACTUALLY FURNISHED AND PLACED IN ACCORDANCE WITH THESE SPECIFICATIONS ALONG THE AXIS OF THE PIPING, INCLUDING FITTINGS AND VALVES CONNECTED UP IN PLACE.

ITEM SPECIAL - INSULATION AND OUTER PROTECTIVE JACKET

THE INSULATION SHALL BE FOAMGLAS AS MANUFACTURED BY PITTSBURGH CORNING CORPORATION OR APPROVED EQUAL THAT IS CERTIFIED TO MEET THE REQUIREMENTS OF ISO 9002. INSULATION SHALL BE MINIMUM TWO (2") CELLUALR GLASS MANUFACTURED IN ACCORDANCE WITH ASTM C552, "STANDARD SPECIFICATION FOR CELLULAR GLASS THERMAL INSULATION", FOR 12" O.D. PIPE AND LARGER AND HAVING A MINIMUM DENSITY OF 8 POUNDS PER CUBIC FOOT AND COMPRESSIVE STRENGTH OF 100 PSI. THE CELLULAR INSULATION SHALL BE FABRICATED IN MINIMUM CURVED 24" LONG SIDEWALL SEGMENTS EMPLOYING TAPERED GROOVES THAT CLOSE COMPLETELY FILLING THE SPACE BETWEEN THE PIPE AND THE OUTER WEATHERPROOF JACKET. SEGMENTS SHALL BE JOINED WITH LONGITUDINAL AND BUTT JOINTS THAT ARE TIGHTLY FITTED TO ELIMINATE VOIDS. BUTT JOINTS SHOULD BE STAGGERED. THE OUTER JACKET SHALL BE PITTWRAF CW PLUS OR APPROVED EQUAL FOR DIRECT-BURIAL. THE BURIED JACKETING SHALL BE 50 MIL THICK SELF-SEALING, MODIFIED BITUMINOUS MEMBRANE FOR PROTECTING UNDERGROUND INSULATION SYSTEMS. EXPOSED JACKETING SHALL BE ALUMINUM JACKETING, 0.016" THICKNESS, AND INSTALLED WITH ALL LAPS POSITIONED TO SHED WATER. ALL LAPS SHALL BE A MINIMUM OF 2". JACKETING SHALL BE SECURED USING BANDS AND SEALS FOR BURIED AND EXPOSED JACKETING. JOINT SEALANT SHALL BE PITTSEAL 727 (A STYRENE-BUTADIENE RUBBER SEALANT) AVAILABLE FROM PITTSBURGH CORNING CORPORATION OR EQUAL. BAND SPACING SHALL BE TWO BANDS EQUALLY SPACED PER SECTION OF INSULATION OR 12" ON CENTER AND 6" FROM EACH END. BANDING SHALL BE ALUMINUM OR STAINLESS STEEL BANDS, 1/2" WIDE X 0.010" THICK WITH MATCHING SEALS. JACKETING SHALL BE FACTORY-APPLIED ON THE INSULATION. ALL SURFACES TO BE INSULATED SHALL BE CLEANED OF ALL SCALE, RUST, OIL, AND FOREIGN MATTER AND SHOULD BE DRY AND FREE OF FROST BEFORE AND DURING THE APPLICATION OF THE INSULATION. CLEANING, SUCH AS SAND BLASTING AND PRIMING OF SURFACES TO BE INSULATED IS REQUIRED. WHEN PRIMED THE PRIMER MUST BE THOROUGHLY DRY BEFORE APPLICATION OF ANY INSULATION MATERIALS.

PIPE JOINTS, INCLUDING EXPANSION JOINTS AND SUPPORT AREAS, AND PIPE BETWEEN THE BACKWALLS OF THE BRIDGE ABUTMENTS SHALL BE FIELD INSULATED WITH PREFORMED POLYURETHANE FOAM (OR FRP IF APPLICABLE) OR CELLULAR GLASS AND JACKETING CUT IN SHAPES TO FIT, OR WITH A FIVE LAYER APPLICATION OF PITTCOTE 300 FINISH AND REINFORCING FABRIC. FOLLOW CELLULAR GLASS MANUFACTURES RECOMMENDATIONS FOR COVERING IRREGULAR SHAPES. ALL FIELD APPLIED INSULATION SHALL BE INSTALLED TO FULLY FILL ANY VOIDS.

FIELD PLACED INSULATION AND JACKET SHALL BE REMOVABLE IN ORDER TO PERFORM MAINTENANCE OR MAKE ADJUSTMENTS TO THE PACKING GLAND OF THE EXPANSION JOINT(S).

BURIED PIPE 15 FEET BEYOND THE BACKWALLS OF THE PROPOSED BRIDGE ABUTMENTS HAVING LESS THAN FOUR AND ONE-HALF (4-1/2') FEET OF COVER SHALL BE INSULATED WITH A MINIMUM OF A ONE (1) FOOT INSULATION ENVELOPE EQUAL TO "WITCOLITE" OR "GILSULATE 500XR", OR INSULATE WITH DIRECT-BURIAL CELLULAR GLASS INSULATION.

THE VOID BETWEEN THE SPLIT SLEEVE AND THE STEEL WATER MAIN THROUGH EACH BRIDGE ABUTMENT WALL SHALL BE FILLED WITH JUTE PACKING OR BACKER ROD AND SEALED AT BOTH ENDS WITH THREE (3") INCHES OF NON-SHRINKING GROUT.

PIPE SUPPORTS

STEEL WATER MAIN SHALL BE SUPPORTED ON THE INSULATION EXTERIOR USING A HANGER SYSTEM SHOWN ON THE PLANS. ROLLED STEEL PIPE CRADLES OF ONE-HALF (1/2) THE CIRCUMFERENCE OF THE INSULATED PIPING, INCLUDING THE INSULATION JACKETING OR FINISH. HIGH DENSITY MOLDED RIGID POLYURETHANE FOAM SADDLE SHALL BE MONOLITHICALLY MOLDED IN 180 DEGREE SEAMLESS SECTIONS AND FACTORY OR SHOP SECURED TO THE STEEL CRADLES PER THE SADDLE MANUFACTURER'S RECOMMENDATIONS. THE DENSITY OF THE MOLDED RIGID POLYURETHANE FOAM SHALL BE 20 POUNDS PER CUBIC FOOT HAVING AN ULTIMATE COMPRESSIVE STRENGTH OF 1322 PSI WITH A DESIGN COMPRESSIVE STRENGTH OF 264.4 PSI. TYPICAL MANUFACTURES FOR FOAM PIPE SADDLES ARE POWER PIPING, BERGEN POWER, AND PIPE SHIELDS, INC.

GATE VALVES - 20 INCH AND LARGER

(A) BYPASSES:

BYPASSES ON GATE VALVES SHALL BE PROVIDED ON VALVES 20-INCH AND LARGER. THE BYPASSES SHALL BE LOCATED ON OR BELOW THE HORIZONTAL CENTERLINE OF THE VALVES. BYPASS VALVES SHALL BE OF THE SAME SIZE AS THE BYPASS AND SHALL CONFORM TO THE REQUIREMENT OF THESE SPECIFICATIONS FOR THE SPECIFIC VALVE USED. THE SIZE REQUIREMENTS OF BYPASSES SHALL BE AS FOLLOWS: 20-INCH VALVES SHALL BE PROVIDED WITH 3-INCH BYPASSES; VALVES 24-INCH THRU 30-INCH INCLUSIVE, SHALL BE PROVIDED WITH 4-INCH BYPASSES; VALVES 36-INCH THRU 42-INCH INCLUSIVE SHALL BE PROVIDED WITH 6-INCH BYPASSES; AND 48-INCH VALVES SHALL BE PROVIDED WITH 8-INCH BYPASSES.

(B) INDICATORS:

ALL VALVES 20-INCHES IN DIAMETER AND OVER SHALL BE EQUIPPED WITH INDICATORS DENOTING THE POSITIONS OF THE GATE. THE MOVING PARTS AND BEARINGS TO BE OF BRONZE OR BRONZE-LINED.

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GATE VALVES AND CHECK VALVES (CONT.)

(I) SLIP-ON JOINT ENDS:

ALL VALVES 4" UP TO AND INCLUDING 12" IN DIAMETER WHEN SPECIFICALLY ORDERED SHALL BE FURNISHED WITH SLIP-ON JOINT ENDS COMPLETE WITH GASKETS WHICH WILL FIT THE PLAIN-END OF ALL DUCTILE IRON PIPE CLASSES 150, 200, AND 250 MANUFACTURED TO SPECIFICATIONS ASA A21.8, OR LATEST REVISION THEREOF, INCLUDING THE PLAIN-END OF ALL MAKES OF DUCTILE IRON PIPE OF THE SLIP-ON CONNECTION TYPE.

THE DESIGN OF THE MECHANICAL WEDGING ACTION SHALL BE SUCH THAT SEATING FORCE IS APPLIED EQUALLY TO TWO OR MORE CONTACT POINTS NEAR THE OUTER EDGE OF EACH DISC AT OR ABOVE AND BELOW THE HORIZONTAL CENTERLINE OF DISC. THE MECHANISM SHALL BE DESIGNED SO THAT ALL WEDGING MEMBERS ARE ACTIVATED AT ONE TIME. IT SHOULD BE OF THE TYPE WHICH WILL ELIMINATE UNBALANCED SEATING PRESSURE AND MINIMIZE DISTORTION OF THE DISCS.

GATE VALVES - GENERAL

(A) TYPE OF VALVES:

THE GATE VALVES SHALL BE MANUFACTURED IN FULL COMPLIANCE WITH THE STANDARD SPECIFICATIONS FOR "GATE VALVES FOR WATER AND SEWERAGE SYSTEMS" OF THE AMERICAN WATER WORKS ASSOCIATION AWWA C 500-86, OR LATEST REVISION THEREOF, AND IN ADDITION SHALL COMPLY WITH THE FOLLOWING SUPPLEMENTARY REQUIREMENTS. ALL GATE VALVES SHALL BE OF THE DOUBLE-DISC PARALLEL SEAT BOTTOM WEDGE OR SIDE WEDGE TYPE OR DOUBLE REVOLVING DISC PARALLEL SEAT BOTTOM WEDGE OR SIDE WEDGE TYPE. ALL GATE VALVES 20-INCHES AND OVER IN SIZE SHALL INCLUDE BYPASS VALVES ATTACHED THERETO. IN OPENING OR CLOSING THE VALVE, THE GATES SHALL BE FORCED TO ASCENT OR DESCENT BY REASON OF THE THRUST EXERTED UPON THE GATES DIRECTLY BY THE VALVE STEM WRENCH NUT, THIS THRUST BEING GENERATED BY THE ROTATION OF THE VALVE STEM. IN CLOSING THE VALVE, THE DISCS, WHEN OPPOSITE THE PORTS, SHALL BE PRESSED FIRMLY AGAINST THE BODY SEATS BY WEDGES OR SOME OTHER DEVICE EQUALLY SUITABLE AND APPROVED BY THE COMMISSIONER OF WATER.

THE DESIGN OF THE MECHANICAL WEDGING ACTION SHALL BE SUCH THAT SEATING FORCE IS APPLIED EQUALLY TO TWO OR MORE CONTACT POINTS NEAR THE OUTER EDGE OF EACH DISC AT OR ABOVE AND BELOW THE HORIZONTAL CENTERLINE OF DISC. THE MECHANISM SHALL BE DESIGNED SO THAT ALL WEDGING MEMBERS ARE ACTIVATED AT ONE TIME. IT SHOULD BE OF THE TYPE WHICH WILL ELIMINATE UNBALANCED SEATING PRESSURE AND MINIMIZE DISTORTION OF THE DISCS.

(B) CAST IRON PARTS:

THE VALVE BODIES, COVERS, DISCS, FRAMES, ETC., OF ALL GATE VALVES 3-INCH AND OVER, SHALL BE CAST IRON.

(C) VERTICAL AND HORIZONTAL VALVES:

ALL GATE VALVES, 16-INCH AND UNDER, SHALL BE CONSTRUCTED TO WORK VERTICALLY. VALVES HAVING 20-INCH AND OVER WATERWAY SHALL BE CONSTRUCTED TO WORK HORIZONTALLY.

(D) WATERWAY OPENING:

WITH THE GATE VALVE OPEN, AN UNOBSTRUCTED WATERWAY SHALL BE AFFORDED; THE DIAMETER OF WHICH IS NOT TO BE LESS THAN THE FULL NOMINAL DIAMETER OF THE VALVE, EXCEPT WHERE LUGS ARE PROVIDED FOR INSERTING OR REMOVING THE BODY-SEAT RINGS. THE LUGS NEED NOT BE REMOVED AFTER THE VALVE IS ASSEMBLED.

(E) STUFFING BOXES:

THE STUFFING BOX ON EACH GATE VALVE 3-INCH OR OVER, MUST BE SEPARATE FROM THE DOME AND FASTENED TO IT BY BOLTS. FOR 2-INCH VALVES AND UNDER, THE STUFFING BOXES MAY BE FORMED IN THE DOME OF THE VALVE. WHEN REQUIRED BY THE CITY, VALVES 16-INCH AND SMALLER, SHALL BE FURNISHED WITH "O" RING TYPE SEALS. THE SEALS SHALL BE FITTED WITH AT LEAST TWO (2) "O" RINGS; THE LOWER "O" RING SERVING AS THE PRESSURE SEAL AND THE UPPER "O" RING AS A COMBINED DIRT AND MOISTURE SEAL. THE "O" RING SHALL BE COMPOUNDED TO MEET ASTM D 2000-86, "CLASSIFICATION SYSTEM FOR RUBBER PRODUCTS IN AUTOMOTIVE APPLICATIONS," AND HAVE PHYSICAL PROPERTIES SUITABLE FOR THE APPLICATION.

THE DIMENSIONS OF THE STUFFING BOX FLANGES SHALL BE OF A THICKNESS AND UNIFORMITY PROPORTIONED TO FIT THE VARIOUS EXTERNALLY APPLIED TORQUE AND INTERNAL THRUST PRESSURE. BOLT HOLES SHALL BE FITTED AND OF A NUMBER SUCH THAT WILL LEAVE A SUFFICIENT CROSS SECTIONAL AREA OF METAL THEREBY PROVIDING SATISFACTORY STRENGTH TO THE UPPER AND LOWER STUFFING BOX FLANGE.

(F) VALVE STEMS:

THE STEM SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE REMOVAL OF PACKING WITHOUT NECESSITATING THE REMOVAL OF THE OPERATING NUT. THE STEM OPENING AND THRUST BEARING RECESS SHALL BE BRONZE BUSHED WITH TWO (2) "O" RINGS LOCATED ABOVE THE THRUST COLLAR AND ONE (1) "O" RING BELOW FORMING A LUBRICANT CHAMBER. THE NUMBER OF THREADS PER INCH SHALL BE AS INDICATED IN AWWA C 500-86.

(G) VALVES WITH STATIONARY STEMS:

ALL GATE VALVES, UNLESS OTHERWISE ORDERED, SHALL BE MADE WITH SINGLE, NON-RISING STEMS.

(H) VALVES TO OPEN CLOCKWISE, EXCEPT 2-INCH AND UNDER:

ALL GATE VALVES 3-INCH AND OVER, INCLUDING BYPASS VALVES, SHALL BE MADE TO OPEN BY TURNING IN A CLOCKWISE DIRECTION. VALVES 2-INCH AND UNDER SHALL BE MADE TO OPEN BY TURNING IN A COUNTERCLOCKWISE DIRECTION. ALL VALVES TO BE MADE SO THAT THEY CAN BE EASILY OPERATED.

(I) WRENCH CAPS:

THE WRENCH CAPS (OPERATING NUTS) AND RETAINING NUTS ON HEADS OF VALVE STEMS AND PINION SHAFTS SHALL BE OF BRONZE OR DUCTILE IRON SPECIFICATION A-536. ON VALVES 24-INCH AND OVER, WRENCH CAPS SHALL BE 2-INCH SQUARE AND 2-INCH DEEP. ON VALVES 3-INCH THRU 20-INCH INCLUSIVE, THEY SHALL BE 1-3/4 INCH SQUARE ON TOP, 1-7/8 INCH SQUARE AT BASE AND 1-3/4 INCH DEEP. ON 2-INCH VALVES AND UNDER, THEY SHALL BE 1-1/4 INCH SQUARE ON TOP, 1-3/8 INCH SQUARE AT BASE AND 1-1/2 INCH DEEP. MACHINED WRENCH CAPS FOR VALVES 3-INCH TO 48-INCH INCLUSIVE SHALL BE FITTED TO A MACHINED SQUARE STEM OR PINION SHAFT AND HELD IN PLACE BY A RETAINING NUT OF BRONZE, ASTM B 584-90, C.A. 867, "SPECIFICATION FOR COPPER ALLOY SAND CASTINGS FOR GENERAL APPLICATIONS." ON 1-1/2 INCH AND 2-INCH VALVES THE WRENCH CAP SHALL BE SECURED TO THE SHAFT WITH A BRASS PIN. WRENCH CAPS SHALL HAVE A CUT-AWAY SKIRT TO PERMIT EASY ACCESS TO GLAND BOLTS.

(J) FACING OF GATES:

ALL DISCS OF GATES AND THREADS FOR SEAT RINGS IN THE BODY SHALL BE MACHINED TRUE AND ANY GROOVE OR GROOVES SHALL BE MACHINED IN EACH DISC OR GATE FOR THE RECEPTION OF THE FACE RING. THE DISC AND SEAT RINGS SHALL BE SECURELY AND RIGIDLY ATTACHED TO THE DISCS OR BODY SEATS IN A MANNER APPROVED BY THE CITY; THE RINGS ARE TO BE FINISHED TO A TRUE SURFACE.

(K) OUTSIDE SCREW AND YOKE VALVES:

GATE VALVES WITH OUTSIDE SCREW AND YOKES, SHALL BE MADE WITH SINGLE RISING STEMS. ALL OUTSIDE SCREW AND YOKE VALVES SHALL BE EQUIPPED WITH WHEELS FOR OPERATING SAME. WHEELS ARE TO BE OF CAST IRON OR DUCTILE IRON. WHEELS SHALL HAVE CAST ON THEM AN ARROW INDICATING THE DIRECTION OF TURNING FOR OPENING THE VALVE. OUTSIDE SCREW AND YOKE GATE VALVES 6-INCH AND LARGER IN SIZE SHALL BE PROVIDED WITH TWO BOSSES ON ONE SIDE OF THE BODY, LOCATED ON THE HORIZONTAL CENTERLINE OF GATE VALVES, TO PERMIT THE INSTALLATION OF BYPASS AROUND THE GATE. BOSSES ARE TO BE LEFT SOLID AND OF AMPLE SIZE TO PERMIT DRILLING AND TAPPING FOR BYPASSES.

(L) MARKING:

ALL GATE VALVES 3-INCH AND OVER SHALL HAVE THE IDENTITY OF THE MAKER, SIZE AND YEAR WHEN MADE AND ALSO THE LETTERS "C.W.D." CAST UPON ITS BODY OR DOME IN RAISED LETTERS OR HAVE AN PERMANENT BRONZE TAG OF SUFFICIENT SIZE AFFIXED TO THE BODY OF THE VALVE WITH THE IDENTITY OF THE MAKER, SIZE AND YEAR WHEN MADE AND THE LETTERS "C.W.D." INDICATED THEREON.

GATE VALVES MATERIAL SPECIFICATIONS

(A) BOLTS AND NUTS:

ALL BOLTS AND NUTS ON THE EXTERNAL VALVE BODIES OF ALL GATE, CHECK AND BACKFLOW DEVICES SHALL BE MADE OF STAINLESS STEEL: ASTM A 276-89A, TYPE 304, "SPECIFICATION FOR STAINLESS AND HEAT-RESISTING SHEET BARS AND SHAPES."

(B) BRONZE PARTS:

ALL GRADES OF BRONZE SHALL BE IN ACCORDANCE WITH AWWA C 500-86 UNLESS OTHERWISE SPECIFIED HEREIN.

(C) CAST IRON:

CAST IRON SHALL CONFORM TO ASTM SPECIFICATION A 126-84, CLASS B, "SPECIFICATION FOR GRAY IRON CASTINGS FOR VALVES, FLANGES, AND PIPE FITTINGS," OR LATEST REVISION THEREOF. ALL IRON CASTINGS SHALL BE TOUGH AND WITHOUT BRITTLINESS, SUCH AS MAY BE CUT, DRILLED AND CHIPPED BY HAND WITH DUE EASE. A BLOW FROM A HAMMER SHALL PRODUCE AN INDENTATION ON THE EDGE OF THE CASTING WITHOUT FLAKING THE METAL.

(D) SILICON BRONZE:

THIS BRONZE SHALL CONFORM TO ASTM SPECIFICATION B 98-84, ALLOY 655, "SPECIFICATION FOR COPPER-SILICON ALLOY ROD, BAR AND SHAPES;

(E) STAINLESS STEEL:

THE STAINLESS STEEL SHALL CONFORM TO ASTM SPECIFICATION A 276-89A, TYPE 304 AND TYPE 316, "SPECIFICATION FOR STAINLESS AND HEAT-RESISTING SHEET BARS AND SHAPES."

(F) OTHER MATERIALS:

ALL OTHER MATERIALS USED IN THE MANUFACTURE OF THESE VALVES AND NOT SPECIFIED IN THE SPECIFICATIONS, SHALL BE OF THE BEST QUALITY OF THEIR RESPECTIVE KINDS, AND SUBJECT TO INSPECTION, TESTS, AND APPROVAL BY THE CITY.

(G) CHEMICAL ANALYSIS:

CHEMICAL ANALYSIS OF THE MATERIAL USED SHALL BE FURNISHED BY THE CONTRACTOR WHENEVER REQUIRED BY THE ENGINEER OR THE CITY.

(H) CLEANING OF CASTINGS:

ALL IRON CASTINGS SHALL BE THOROUGHLY CLEANED ON THE OUTSIDE AND INSIDE SURFACES AND PROTECTED FROM RAIN OR MOISTURE UNTIL THEY ARE PAINTED.

(I) HYDROSTATIC TESTS AT SHOP:

ALL GATE VALVES SHALL BE TESTED IN THE SHOP BY HYDROSTATIC PRESSURE, BY CLOSING THE VALVE AND APPLYING THE REQUIRED TEST PRESSURE IN THE BODY AND DOME OF THE VALVE AS SPECIFIED BELOW.

3" THROUGH 12" ... 400 PSI. - NO TIME REQUIREMENT
14" THROUGH 20" ..300 PSI. - FOR 15 MINUTES, DROP PRESSURE TO 150 PSI, THEN ELEVATE AGAIN TO 300 PSI FOR 15 MIN. - A TOTAL OF 1/2 HOUR.

24" THROUGH 48" .. 300 PSI - FOR 1/2 HR., DROP PRESSURE TO 150 PSI, THEN ELEVATE AGAIN TO 300 PSI FOR 30 MIN. - A TOTAL OF 1 HR.

THIS IS MODIFICATION OF SECTION 5.1 OF THE STANDARD SPECIFICATIONS, AWWA DESIGNATION: C 500-86. ALL LEAKS, FLAWS OR OTHER DEFECTS DEVELOPED IN MAKING THESE TESTS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER AND/OR THE CITY OR THE ENTIRE PIECE SHALL BE REJECTED. AFTER TESTING, ALL VALVES SHALL BE THOROUGHLY DRAINED. ALL EQUIPMENT FOR TESTING AND ALL TESTS SHALL BE MADE AT THE CONTRACTOR'S EXPENSE.

THE CONTRACTOR SHALL INCLUDE WITH EACH VALVE THREE (3) CERTIFIED COPIES OF REPORTS SHOWING THE RESULTS OF ALL SHOP TESTS, AND A BRIEF DESCRIPTION OF HOW THE TESTS WERE PERFORMED.

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GATE VALVES MATERIAL SPECIFICATIONS (CONT.)

(J) PERFORMANCE TESTS:

EACH VALVE SHALL BE OPERATED IN THE POSITION THAT IT WILL ASSUME IN SERVICE AND FOR THE FULL LENGTH OF GATE TRAVEL IN BOTH DIRECTION, TO DEMONSTRATE THE FREE AND PERFECT FUNCTIONING OF ALL PARTS IN THE INTENDED MANNER. ANY DEFECTS OF WORKMANSHIP SHALL BE CORRECTED AND THE TEST REPEATED UNTIL SATISFACTORY PERFORMANCE IS DEMONSTRATED.

PLACING AND TESTING

(A) ALL VALVES SHALL BE TESTED ACCURATELY AND CAREFULLY TO THE LINES AND GRADES GIVEN. ALL CONNECTIONS TO PIPE SHALL HAVE THE NECESSARY MECHANICAL JOINT, FLANGED, SCREWED, VICTAULIC OR SOLDERED ENDS AS REQUIRED.

(B) AFTER THE VALVES ARE SET IN PLACE AND READY TO OPERATE, THE CONTRACTOR SHALL TEST THEM UNDER THE TEST PRESSURE AND CONDITIONS HEREIN SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS AND ANY VALVE FOUND TO LEAK SHALL BE MADE WATERTIGHT AND, IF FOUND TO BE OF FAULTY DESIGN, SHALL BE SATISFACTORILY REPAIRED OR REPLACED BY THE CONTRACTOR.

(C) ALL BURIED VALVES SHALL COME COMPLETE WITH VALVE BOXES TO GRADE. THIS SHALL INCLUDE MAIN VALVE OPERATION AND THE BYPASS VALVE.

VALVE BOXES AND COVERS

A) THE CONTRACTOR SHALL FURNISH AND INSTALL, OVER EACH VERTICALLY SET VALVE AT THE LOCATIONS SHOWN ON THE DRAWINGS, OR AS REQUIRED, VALVE BOXES WITH COVERS OF THE ASSEMBLED TYPES AND SIZES INDICATED ON THE CONTRACT PLANS. ASSEMBLED TYPE VALVE BOXES SHALL EXTEND FROM THE VALVE BONNET TO THE FINISHED GRADE OR THE ELEVATION REQUIRED, BEING CAREFULLY LOCATED OVER THE VALVE OPERATING NUT(S) AND SHALL BE SET PLUMB AND TRUE AS REQUIRED.

(B) VALVE BOXES AND COVER ASSEMBLIES SHALL BE COMPLETED AND THEIR PARTS SHALL COMPLY WITH THOSE PARTS SHOWN ON STANDARD DETAIL DRAWINGS.

PAINTING

(A) IRON BODY VALVES SHALL EITHER BE DIPPED IN ASPHALT PAINT AND ALL BRONZE AND PLASTIC COATED INTERNAL PARTS CLEANED, OR AFTER PASSING THE HYDRAULIC TEST, SHALL BE GIVEN AT LEAST TWO (2) COATS OF APPROVED PAINT OUTSIDE.

(B) ALL INTERIOR OR EXTERIOR FERROUS METAL SURFACES, EXCEPT MACHINE SURFACES, SHALL BE THOROUGHLY CLEANED OF ALL RUST, WIRE BRUSHED AND WASHED WITH BENZENE BEFORE PAINTING OR COATING.

(C) AFTER INSTALLATION, ALL EXPOSED METAL SURFACES OF VALVES EXCEPT BRASS OR BRONZE SHALL BE PAINTED WITH TWO (2) FIELD COATS OF COAL TAR PITCH PAINT EQUAL TO KOPPERS BITUMASTIC SUPER TANK SOLUTION.

INSPECTION

THE ENGINEER, CITY, OR HIS AUTHORIZED DESIGNATE, WILL INSPECT THE MATERIAL AND WORK DONE, AS THE INTEREST OF THE CITY MAY REQUIRE. SUCH OFFICER SHALL HAVE UNRESTRICTED ACCESS TO THE CONTRACTOR'S PLANT, AND TO ALL PARTS OF THE WORK AND OTHER PLACES AT WHICH THE PREPARATION OF THE MATERIAL AND THE CONSTRUCTION OF THE DIFFERENT PARTS OF THE WORK TO BE DONE UNDER THESE SPECIFICATIONS ARE CARRIED ON, AND HE SHALL RECEIVE ALL FACILITIES AND ASSISTANCE TO CARRY OUT HIS WORK OF INSPECTION AND TESTING, IN A MANNER SATISFACTORY TO THE CITY. SUCH INSPECTION SHALL NOT RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM SAID WORK STRICTLY IN ACCORDANCE WITH THE SPECIFICATIONS, OR ANY MODIFICATIONS THEREOF, AS HEREIN PROVIDED, AND WORK NOT SO CONSTRUCTED SHALL BE REMOVED AND MADE GOOD BY THE CONTRACTOR, AT HIS OWN EXPENSE.

DATA WITH PROPOSALS

PROPOSALS SHALL BE ACCOMPANIED BY DRAWINGS FURNISHED BY THE MANUFACTURER, FULLY AND DISTINCTLY ILLUSTRATING, DESCRIBING AND GIVING THE WEIGHT OF EACH OF THE VALVES PROPOSED TO BE FURNISHED. VALVE DRAWINGS PREVIOUSLY APPROVED AND ON FILE WITH DIVISION OF WATER NEED NOT BE FURNISHED IN PROPOSAL BUT WILL BE REQUIRED AS SUBMITTAL FOR APPROVAL AS INDICATED IN THE PARAGRAPH "DRAWINGS".

FLANGED VALVE INSULATORS

THE CONTRACTOR SHALL FURNISH, WHERE REQUIRED, FLANGED VALVE INSULATORS. ALL OF THE FLANGED BOLT HOLES ON EACH OF THE TWO (2) FLANGES OF THE VALVE SHALL BE INCREASED BY 1/16 INCH IN DIAMETER TO ACCEPT THE BOLT INSULATOR SLEEVES. THE BOLT INSULATOR SLEEVE SHALL EXTEND FOR THE FULL THICKNESS OF THE TWO (2) MATING FLANGES. THE DRILLING OF THE ENLARGED FLANGE BOLT HOLES SHALL BE DONE BY THE VALVE MANUFACTURER IN THE SHOP.

FLANGE INSULATING MATERIALS FOR EACH FLANGE SHALL BE PROVIDED AT EACH OF THE SUPPLEMENTAL CONNECTIONS, OR WHERE ORDERED, AND SHALL INCLUDE THE FOLLOWING:

- 1) TWO (2) FULL FACED INSULATING FLANGE GASKETS OF PYROX IE GLASS REINFORCED EPOXY, 1/8 INCH THICK;
- 2) ONE FULL LENGTH MYLAR BOLT INSULATING SLEEVE, 1/32 INCH THICK, FOR EACH FLANGE BOLT ON EACH OF THE TWO (2) VALVE FLANGES;
- 3) TWO (2) FLAT PHENOLIC LAMINATE INSULATING WASHERS, 1/8 INCH THICK, FOR EACH FLANGE BOLT ON EACH OF THE TWO (2) VALVE FLANGES;
- 4) TWO (2) FLAT STEEL WASHERS, 1/8 INCH THICK, FOR EACH FLANGE BOLT ON EACH OF THE TWO (2) VALVE FLANGES. THE STEEL WASHER OUTSIDE DIAMETER SHALL NOT BE LARGER THAN THE OUTSIDE DIAMETER OF THE INSULATING WASHER.

FLANGE INSULATOR SIZES SHALL BE AS REQUIRED FOR THE TYPE AND SIZE FLANGES SPECIFIED HEREIN OR AS INDICATED ON THE DRAWINGS FOR EACH OF THE INSULATED FLANGE LOCATIONS REQUIRED.

TEST TO VERIFY ACCEPTABLE INSULATED FLANGED VALVE INSTALLATIONS SHALL BE PERFORMED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS, AND LABOR FOR THE PERFORMANCE OF THE TESTS. IF THE TESTS INDICATE THAT AN INSULATING FLANGED CONNECTION IS NOT PROVIDING SATISFACTORY ISOLATION OF CONNECTING PIPING, THE CONTRACTOR SHALL PERFORM ADDITIONAL TESTS AND WORK AS REQUIRED TO LOCATE AND CORRECT ANY SUCH DEFICIENCIES THAT MAY EXIST.

PAYMENT FOR THE FURNISHING AND INSTALLATION OF THE FLANGED VALVE INSULATORS SHALL BE INCLUDED, UNDER THIS ITEM, WITH THE APPROPRIATE INSULATED FLANGED VALVE TO BE BID AS INDICATED IN THE SCHEDULE OF BID ITEMS. PAYMENT FOR THE PERFORMANCE AND ALL NECESSARY EQUIPMENT, MATERIALS AND LABOR FOR THE TESTING FOR THE ACCEPTABILITY OF THE INSULATED FLANGED VALVE CONNECTIONS SHALL BE INCLUDED.

DRAWINGS

(A) PRIOR TO THE MANUFACTURE OF ANY VALVES, THE CONTRACTOR SHALL SUBMIT TO THE CITY THROUGH THE ENGINEER FOR APPROVAL OF THE CITY, SIX (6) COMPLETE WORKING, DETAIL, AND DIMENSION DRAWINGS SHOWING THICKNESSES AND KINDS OF MATERIAL AND SIMILAR INFORMATION.

(B) TWO (2) PRINTS OF EACH OF THE DRAWINGS SUBMITTED WILL BE RETURNED WITH THE CRITICISMS OR APPROVAL OF THE CITY. IN CASE THE DRAWINGS ARE NOT APPROVED, THE CONTRACTOR SHALL AGAIN SEND FOR APPROVAL, SIX (6) REVISED PRINTS OF THE DRAWINGS TO TAKE CARE OF THE CRITICISMS NOTED, AND AFTER THE DRAWINGS HAVE BEEN FINALLY APPROVED, THE CONTRACTOR SHALL FURNISH TO THE CITY SIX (6) ADDITIONAL PRINTS, AND ONE (1) MYLAR OR REPRODUCIBLE CLOTH TRACING OF EACH DRAWING. MYLAR TRACINGS SHALL BE SUBMITTED AS SPECIFIED IN THE GENERAL NOTES "DRAWINGS." NO WORK SHALL BE DONE IN THE SHOP UNTIL AFTER THE DRAWINGS HAVE BEEN FINALLY APPROVED.

ITEM SPECIAL - CUT-IN-VALVE ASSEMBLY WITH VALVE BOX. COMPLETE

THE CONTRACTOR SHALL FURNISH AND INSTALL AT THE LOCATION(S) NOTED ON THE CONTRACT DRAWINGS OR WHERE ORDERED ALL CUT-IN-VALVE ASSEMBLIES WITH VALVE BOX COMPLETE INCLUDING THE FURNISHING AND INSTALLATION OF A VALVE STEM EXTENSION IF SO REQUIRED. THE DIVISION OF WATER WILL SET THE TIME OF INSTALLATION OF THE CUT-IN-VALVE AND THE CONTRACTOR SHALL DO ALL PIPE CUTTING AND INSTALLATION. THE INSTALLATION OF THE CUT-IN-VALVE SHALL BE DONE UNDER THE SUPERVISION OF THE DIVISION OF WATER. THE CONTRACTOR SHALL FURNISH AND DELIVER TO AND INSTALL AT THE LOCATION(S) SHOWN ON THE PLANS A RETAINED MECHANICAL JOINT BELL END GATE VALVE, VALVE BOX COMPLETE, STAR NATIONAL TIEANCHOR HARNESSSES AND COMPRESSION COUPLINGS (WITH STOPS REMOVED) EQUAL TO DRESSER STYLE NO. 38, 138 OR 162 OR SMITH-BLAIR NO. 441, HAVING STAINLESS STEEL BOLTS AND NUTS (ASTM A276-89A, TYPE 304), DUCTILE IRON PIPE SHORTS AND, IF REQUIRED, A VALVE STEM EXTENSION. COMPRESSION COUPLINGS SHALL HAVE A MINIMUM PRESSURE RATING OF 250 PSI. THE CONTRACTOR SHALL FURNISH ALL MATERIALS AND DO ALL NECESSARY EXCAVATION, SHEETING, SHORING, BACKFILLING, MISCELLANEOUS REMOVAL AND RESTORATION, SEEDING AND/OR SODDING, REPAVING AND REPLACEMENT OF SIDEWALK REQUIRED TO COMPLETE THE WORK AS HEREIN SPECIFIED.

QUALITY OF VALVES

THE GATE VALVES FURNISHED AND INSTALLED AS PART OF THE CUT-IN-VALVE ASSEMBLE SHALL CONFORM WITH THE REQUIREMENTS OF THE "ITEM SPECIAL - VALVES" OF THESE SPECIFICATIONS, INSOFAR AS THEY APPLY.

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ITEM SPECIAL – FURNISHING AND SETTING 6” HYDRANT COMPLETE

WORK INCLUDED

THE CONTRACTOR SHALL FURNISH ALL HYDRANTS, HYDRANT BRANCH PIPE AND FITTINGS, TAPPING, VALVES, VALVE BOXES AND COVERS, CAULKING MATERIAL, LABOR, TOOLS, AND EQUIPMENT FOR AND SHALL PROPERLY CONNECT AT THE LOCATION SHOWN ON THE CONTRACT DRAWINGS, 6” HYDRANTS, COMPLETE, AS REQUIRED FOR THE PROPER COMPLETION OF THE WORK INCLUDED UNDER THIS CONTRACT.

HYDRANTS

THE 6” HYDRANT DETAILS SHOWN IN THE PLANS IS A CITY OF CLEVELAND STANDARD IN ADDITION TO THE 6” HYDRANT DETAILS IN THE PLANS, THE CITY OF CLEVELAND HAS APPROVED THREE ADDITIONAL 6” HYDRANT DETAILS ON FILE AT 1201 LAKESIDE AVENUE, CLEVELAND, OHIO 44114. THE DRAWING NOS. ARE D525, D526, AND D530.

SETTING

(A) GENERAL LOCATION; THE HYDRANT SHALL BE LOCATED IN A MANNER TO PROVIDE COMPLETE ACCESSIBILITY, AND IN SUCH MANNER THAT THE POSSIBILITY OF DAMAGE FROM VEHICLES OR INJURY TO PEDESTRIANS WILL BE MINIMIZED.

(B) LOCATION REGARDING CURB LINES: WHEN PLACED BEHIND CURB THE HYDRANT BARREL SHALL BE SET SO THAT NO PORTION OF THE HYDRANT WILL BE LESS THAN TWO (2) FEET FROM THE FACE OF THE CURB EXCEPT BY CONSENT OF THE ENGINEER.

(C) LOCATION REGARDING SIDEWALK: WHEN SET IN THE LAWN SPACE BETWEEN THE CURB AND THE SIDEWALK, OR BETWEEN THE SIDEWALK AND THE PROPERTY LINE, NO PORTION OF THE HYDRANT OR NOZZLE CAP SHALL BE WITHIN 6 INCHES OF THE SIDEWALK.

(D) POSITION OF NOZZLE: THE HYDRANT SHALL STAND PLUMB WITH THE NOZZLES POINTING TOWARD THE ROAD AT AN ANGLE OF FORTY-FIVE DEGREES THEREFROM. WHERE HYDRANT BRANCH PIPING IS PARALLEL WITH OR NOT AT RIGHT ANGLES TO THE CURB, THE CONTRACTOR SHALL RELEASE SWIVEL HEAD BOLTS AND ADJUST THE HYDRANT NOZZLES TO FACE THE ROAD AT THE PROPER ANGLE. A HYDRANT WITHOUT SWIVEL HEADS WILL BE ADJUSTED BY THE CITY WHERE NECESSARY TO CORRECT THE ANGLE OF NOZZLES. THE ELEVATION SHALL CONFORM TO THE ESTABLISHED GRADE WITH TOPS OF FROST CASING AT LEAST FOUR (4) INCHES ABOVE THE GRADE.

(E) CONNECTION TO MAIN: THE HYDRANT SHALL BE CONNECTED TO THE MAIN PIPE WITH A BRANCH CONTROLLED BY THE INDEPENDENT GATE VALVES OF THE SAME SIZE AS THE HYDRANT, EXCEPT AS OTHERWISE DIRECTED.

(F) DRAINAGE AT HYDRANT: DRAINAGE SHALL BE PROVIDED AT THE BASE OF THE HYDRANT BY FILLING AROUND THE ELBOW WITH COURSE GRAVEL OR CRUSHED STONE TO AT LEAST SIX (6) INCHES ABOVE THE WASTE OPENING. WHEREVER A HYDRANT IS SET IN ROCK, CLAY OR OTHER IMPERVIOUS SOIL, THE TRENCH SHALL BE WIDENED AND DEEPENED ON EACH SIDE OF THE HYDRANT BASE AND THE SPACE SHALL BE FILLED COMPACTLY WITH COARSE GRAVEL OR BROKEN STONE MIXED WITH COARSE SAND OF SUFFICIENT QUANTITY TO ABSORB ALL WATER TO BE DRAINED FROM THE HYDRANT WHEN THE VALVE IS CLOSED.

(G) ANCHORAGE FOR HYDRANT: THE HYDRANT SHALL BE SET ON A STONE SLAB OR A SIMILAR FOUNDATION AND THE BASE OF THE HYDRANT AND THE HYDRANT TEE SHALL BE WELL BRACED AGAINST UNEXCAVATED EARTH AT THE END OF THE TRENCH WITH CONCRETE BACKING, OR IT SHALL BE TIED TO THE PIPE WITH SUITABLE RODS OR CLAMPS, TIED WITH MECHANICAL JOINT FITTING OR AS DIRECTED BY THE ENGINEER.

(H) CLEANING: THE HYDRANT SHALL BE THOROUGHLY CLEANED OF DIRT OR FOREIGN MATTER BEFORE SETTING.

ITEM 638 – WATERWORK MISC.: FURNISHING AND SETTING 6” HYDRANT. COMPLETE WITH 6” X (X) CUT IN TEE

IN ADDITION TO THE REQUIREMENTS OF NOTE “ITEM SPECIAL – FURNISHING AND SETTING 6” HYDRANT, COMPLETE”, THIS ITEM SHALL INCLUDE CUTTING A NEW HYDRANT BRANCH TEE AND SPOOL PIECES INTO EXISTING WATERMAINS, PER “CUT-IN TEE DETAIL METHOD NO. 1” WITHIN THE WATERLINE DETAILS.

ITEM SPECIAL – VAULTS, MANHOLES OR CHAMBERS

WORK INCLUDED

UNDER THESE ITEMS THE CONTRACTOR SHALL FURNISH ALL NECESSARY LABOR, MATERIALS, INCLUDING FRAMES, COVERS AND STEPS, TOOLS AND EQUIPMENT FOR THE CONSTRUCTION, COMPLETE, OF ALL MISCELLANEOUS MASONRY STRUCTURES AND INCLUDING ALL WATER MAIN DRAIN AND PITOMETER VAULTS, METER AND FIRE SERVICE VAULTS, AND APPURTENANT WORK TOGETHER WITH THE HAULING, MIXING, PLACING, FORMING, SCAFFOLDING, SHEETING AND BRACING, GROUTING, PLASTERING, CURING, ETC., ALL AS SPECIFIED, REQUIRED OR SHOWN ON THE CONTRACT DRAWINGS.

BRICK AND MASONRY MATERIAL

THE MATERIAL FURNISHED BY THE CONTRACTOR FOR THE VARIOUS KINDS OF MASONRY CONSTRUCTION TO BE CONSTRUCTED SHALL CONFORM TO THE FOLLOWING OHIO DEPARTMENT OF TRANSPORTATION (ODOT) SPECIFICATIONS:

(A) ALL BRICK FURNISHED AND USED SHALL BE NO. 2 SHALE BRICK AND SHALL COMPLY WITH THE REQUIREMENTS FOR “GRADE SA” ASTM C 32, OR ODOT 704.02 CONCRETE BRICK.

(B) PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS OF 701.04 (ASTM C 150 TYPE 1) ODOT.

(C) FINE AGGREGATE FOR MORTAR OR GROUT SHALL CONFORM TO THE REQUIREMENTS OF 703.03 ODOT.

(D) AGGREGATE FOR PORTLAND CEMENT CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF 703.02 ODOT.

(E) ALL WATER SHALL BE CLEAN AND ACCURATELY MEASURED FOR EACH BATCH OF CONCRETE.

(F) ALL PLAIN CONCRETE SHALL BE THE ODOT 499 CLASS “QC 1”.

(G) ALL REINFORCING STEEL SHALL BE ODOT ITEM 509.

(H) ALL CEMENT MORTAR SHALL BE MIXED IN THE PROPORTION OF ONE (1) PART OF CEMENT TO THREE (3) PARTS OF SAND, EXCEPT THE MORTAR FOR BRICK CATCH BASINS AND SEWER MANHOLES WHICH SHALL BE 1 TO 2 MIX.

(I) PRECAST MASONRY VAULT SECTIONS MAY BE FURNISHED IF THEY MEET THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS ON FILE WITH THE CLEVELAND DIVISION OF WATER OR APPROVED BY THE ENGINEER.

VAULT, MANHOLE, AND CHAMBER CONSTRUCTION

(A) ALL VAULTS, MANHOLES, CHAMBERS, BRICK NECKS & EXTENSION, AND TEMPORARY EXTENSIONS SHALL BE BUILT IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

(B) THE WALLS OF CIRCULAR STRUCTURES SHALL BE BUILT OF NO. 2 SHALE BRICK OR CONCRETE BRICK LAID IN 1:3 PORTLAND CEMENT MORTAR, WITH BRICK ARRANGED RADially AS HEADERS, FORMING A WALL NINE (9) INCHES THICK. IN DEEP MANHOLES, THE WALL SHALL BE THIRTEEN (13) INCHES THICK BELOW A POINT 12 FEET FROM THE SURFACE, ALL OF THE BRICK COMPOSING SAID STRUCTURES SHALL BE LAID IN FULL MORTAR BEDS AND JOINTS, WITH NO MORTAR JOINTS APPEARING ON THE INNER SURFACE OF THE MANHOLE EXCEEDING THREE-EIGHTHS (3/8) INCHES THICK.

(C) THE TOP OF THE WALL OF THE STRUCTURES SHALL BE PROPERLY LEVELED OFF WITH MORTAR SO AS TO FORM A FLAT SURFACE UPON WHICH THE CAST IRON MANHOLE RING IS TO REST, AND THE STRUCTURE SHALL BE BUILT TO PROPER HEIGHT AS INDICATED BY THE CONTRACT DRAWINGS.

(D) THE ENTIRE OUTER SURFACE OF ALL BRICK STRUCTURES SHALL BE PLASTERED WITH A SMOOTH COATING OF 1:3 PORTLAND CEMENT MORTAR, AT LEAST ONE-HALF (1/2) INCH THICK.

(E) PRECAST OR CAST IN PLACE CONCRETE MASONRY CONSTRUCTION SHALL FOLLOW THE APPLICABLE SECTION OF ITEM 611 ODOT SPECIFICATION.

ITEM SPECIAL – 2” AIR RELIEF VALVE WITH VALVE BOX. COMPLETE

WORK INCLUDED

THE CONTRACTOR SHALL FURNISH PIPE WITH A 2” AIR RELIEF CONNECTION AND FURNISH AND INSTALL THE 2” AIR RELIEF COMPLETE, INCLUDING VALVE BOXES, AS SHOWN IN THE “WATER WORK DETAILS” AT THE LOCATIONS SHOWN IN THE PLANS.

AIR RELIEF VALVE ASSEMBLY COMPLETE WITH VALVE BOXES COMPLETE

EACH “2” AIR RELIEF/FLUSHING OUTLET VALVE ASSEMBLY COMPLETE” SHALL CONSIST OF A 2-INCH BRONZE BALL ANGLE METER VALVE (F.I.P. X METER FLANGE), 2-INCH IRON PIPE THREADED METER COMPANION FLANGE, AND A 2-INCH EXTRA HEAVY BRASS “CLOSE” (2-INCH LONG) NIPPLE, TAPERED AT EACH END. THE BRONZE 2-INCH AIR RELIEF BALL ANGLE METER VALVE SHALL BE RATED FOR MINIMUM 300 PSI WORKING PRESSURE AND BE EQUAL IN ALL RESPECTS TO THE 2-INCH BALL ANGLE METER VALVE MANUFACTURED BY FORD METER BOX CO. NO: BFA13-777W; A.Y. MCDONALD MFG. CO. NO: 4604B; OR MUELLER CO. NO: B-24286. THE THREADED METER COMPANION FLANGE SHALL ALSO BE RATED FOR MINIMUM 300 PSI WORKING PRESSURE. THE AIR RELIEF/FLUSHING OUTLET VALVE ASSEMBLY SHALL ALSO INCLUDE ALL 2” GALVANIZED BLACK IRON PIPE AND BRASS PIPE AS REQUIRED AND SPECIFIED UNDER “2-INCH GALVANIZED BLACK IRON AND BRASS PIPE” AND ALL VALVE BOXES AS REQUIRED AND SPECIFIED UNDER “MISCELLANEOUS METAL.” THE AIR RELIEF/FLUSHING OUTLET VALVE ASSEMBLY WITH VALVE BOXES COMPLETE SHALL CONFORM WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS.

2” GALVANIZED BLACK IRON PIPE AND BRASS PIPE

THE CONTRACTOR SHALL ALSO UNDER “ITEM SPECIAL – 2” AIR RELIEF VALVE ASSEMBLY WITH VALVE BOX, COMPLETE” FURNISH ALL THE MATERIALS FOR AND SHALL PROPERLY CONNECT IN PLACE AT THE LOCATIONS SHOWN ON THE DRAWINGS OR AS ORDERED, ALL 2-INCH EXTRA STRONG BRASS PIPE AND FITTINGS AND ALL 2-INCH EXTRA HEAVY GALVANIZED BLACK IRON PIPE AND FITTINGS RESPECTIVELY, WHICH ARE NECESSARY FOR THE PROPER COMPLETION OF THE WORK INCLUDED UNDER THIS CONTRACT.

BRASS PIPE AND FITTINGS

ALL BRASS PIPE AND FITTINGS SHALL BE EXTRA STRONG 2-INCH PIPE SIZE RATED FOR MINIMUM 150 PSI WORKING PRESSURE AND 225 PSI TEST PRESSURE AND SHALL CONFORM TO ASTM B 43-88, “SPECIFICATION FOR SEAMLESS RED BRASS PIPE, STANDARD SIZES,” AND BE EQUAL TO REVERSE RED BRASS PIPE AS MANUFACTURED BY REVERSE COPPER AND BRASS, INCORPORATED. FITTINGS SHALL BE EXTRA STRONG WEIGHT AND SHALL HAVE SOUND WELL-FITTING THREADS.

GALVANIZED BLACK IRON PIPE AND BRASS FITTINGS

ALL GALVANIZED BLACK IRON PIPE, NIPPLES AND FITTINGS SHALL BE EXTRA HEAVY BLACK IRON PIPE RATED FOR MINIMUM 150 PSI WORKING PRESSURE AND 225 PSI TEST PRESSURE AND SHALL CONFORM TO ASTM DESIGNATION A 53-89A, “SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT-DIPPED, ZINC COATED WELDED AND SEAMLESS,” OR EQUAL. THE FITTINGS SHALL BE BEADED, OR MALLEABLE IRON EXTRA HEAVY WEIGHT. ALL PIPE AND FITTINGS SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE, AND SHALL HAVE SOUND, WELL-FITTING THREADS.

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ITEM SPECIAL – MISCELLANEOUS METAL WORK

WORK INCLUDED

(A) THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MISCELLANEOUS METAL WORK WHICH IS REQUIRED UNDER THIS CONTRACT AND IS NOT SPECIFICALLY INCLUDED UNDER THE OTHER ITEMS OF THESE SPECIFICATIONS.

(B) IN GENERAL, THE WORK SHALL INCLUDE THE REPLACEMENT OF ANY VALVE BOXES, COVERS, MANHOLE RINGS AND COVERS, WATER SERVICE STOP BOXES. BRONZE BOLTS, MANHOLE STEPS, EXTENSION STEMS, BRACE STRUCTURAL MEMBERS AND OTHER SIMILAR ITEMS DETERMINED BY THE ENGINEER AS BEING UNSUITABLE.

MATERIALS

ALL CASTINGS SHALL CONFORM TO THE REQUIREMENTS OF ITEM 611 OF THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIALS SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL MEET THE REQUIREMENTS OF THE ASTM SPECIFICATIONS A 36. ALL BRONZE BOLTS AND NUTS SHALL CONFORM TO THE U.S. STANDARDS SIZES, AND SHALL BE CLEAN CUT AND HAVE WELL FITTED THREADS. ALL BRONZE BOLTS AND NUTS SHALL BE TOBIN OR MANGANESE BRONZE, OR OF SIMILAR APPROVED MATERIAL.

ALUMINUM, EXCEPT AS OTHERWISE REQUIRED, SHALL BE ALUMINUM ALLOY EQUIVALENT TO SPECIFICATION 6063; RIVETS AND SCREWS BE 2017 ALLOY; ALUMINUM PLATE AND STRUCTURAL SHAPES SHALL BE 2017 ALLOY; ALUMINUM PLATE AND STRUCTURAL SHAPES SHALL BE 6061-T6 AND EXTRUDED SHAPES SHALL BE 6063-T5; ALL AS MANUFACTURED BY THE ALUMINUM COMPANY OF AMERICA, OR EQUAL.

BRASS SHALL BE OF A COMMERCIAL GRADE CONFORMING TO THE “STANDARD SPECIFICATIONS FOR GRASS PLATE, SHEET, STRIP AND ROLLED BAR”, ASTM DESIGNATION B 36-71, ALLOY NO. 3.

COPPER-SILICON ALLOY OR “EVERDUR” SHALL CONFORM TO THE “STANDARD SPECIFICATIONS FOR COPPER-SILICON ALLOY PLATE, SHEET, STRIP AND ROLLED BAR FOR GENERAL PURPOSES”, ASTM DESIGNATION B97-70, TYPE B.

STAINLESS STEEL RODS AND FASTENERS SHALL CONFORM TO THE REQUIREMENTS OF “SPECIFICATIONS FOR HOT ROLLED AND COLD-FINISHED STAINLESS AND HEAT-RESISTANT BARS”. ASTM DESIGNATION A 276-72, TYPE 304. ALL WROUGHT IRON SHALL MEET THE REQUIREMENTS OF “SPECIFICATION FOR ROLLED WROUGHT IRON SHAPES AND BARS”, ASTM DESIGNATION A 207-68, OR THE “SPECIFICATIONS FOR WROUGHT IRON PLATES”, ASTM DESIGNATION A42-66.

CAST IRON VALVE BOXES AND COVERS SHALL BE GRAY IRON CASTINGS, IN WHICH APPEARANCE AND DIMENSION TOLERANCES ARE PRIMARY CONSIDERATIONS AND STRENGTH IS NOT A PRIMARY OR MAJOR CONSIDERATION. VALVE BOXES AND COVERS SHALL BE ASTM DESIGNATION A-48 WITH NO SPECIFIC REQUIREMENT AS TO CLASS. CHEMICAL COMPOSITION SHALL NOT BE CONSIDERED, BUT THE MATERIAL SHALL BE OF GOOD QUALITY AND OF SUCH CHARACTER AS SHALL MAKE THE METAL OF THE CASTINGS STRONG, TOUGH AND OF EVEN GRAIN. THE METAL SHALL BE MADE WITHOUT ANY ADMIXTURE AND SURFACE SMOOTHNESS IN COMPARISON WITH SAMPLES ACCEPTED AS STANDARD.

CLEANING AND TESTING

ALL CASTINGS SHALL BE THOROUGHLY CLEANED AND SUBJECTED TO A CAREFUL HAMMER TEST.

NO CASTINGS SHALL BE COATED UNLESS CLEAN AND FREE FROM RUST, AND APPROVED IN THESE RESPECTS BY THE ENGINEER OR HIS AUTHORIZED INSPECTOR IMMEDIATELY BEFORE BEING DIPPED.

SAMPLE CASTINGS FROM EACH PATTERN, WHEN REQUIRED BY THE ENGINEER, SHALL BE SUBMITTED BY THE MANUFACTURER FOR THE PURPOSE OF ESTABLISHING STANDARDS OF APPEARANCE AND DIMENSIONAL TOLERANCES. THE MANUFACTURER SHALL CERTIFY THAT HIS PRODUCT CONFORMS TO THESE SPECIFICATIONS. EACH CERTIFICATION SO FURNISHED SHALL BE SIGNED BY AN AUTHORIZED AGENT OF THE MANUFACTURER.

COATING

EACH COATING SHALL BE SPRAYED OR BRUSHED INSIDE AND OUT WITH ONE COAT OF ASPHALTIC COMPOUND VARNISH. THE VARNISH SHALL BE MADE OF HIGH GRADE ASPHALT FLUXED AND BLENDED WITH PROPERLY TREATED DRYING OILS AND TINNED TO A PROPER CONSISTENCY WITH A VOLATILE SOLVENT. THE VARNISH SHALL BE MADE TO COMPLY WITH FEDERAL SPECIFICATION 77-V-51A OR JOINT ARMY-NAVY SPECIFICATION JAN-P- 450. OTHER METHODS OF COATING AND TYPES OR COATING MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER. IN ADDITION TO THE SHOP COAT, THE CASTINGS SHALL RECEIVE TWO (2) COATS OF APPROVED PAINT.

INSPECTION

THE ENGINEER OR HIS AUTHORIZED REPRESENTATIVE SHALL HAVE THE RIGHT TO INSPECT THE MATERIAL AND WORK DONE, AS THE INTERESTS OF THE CITY OR STATE MAY REQUIRE. SUCH INSPECTION SHALL NOT RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM SAID WORK STRICTLY IN ACCORDANCE WITH THE SPECIFICATIONS, AND ANY MODIFICATION THEREOF, AS HEREIN PROVIDED, AND WORK NOT SO CONSTRUCTED SHALL BE REMOVED AND MADE GOOD BY THE CONTRACTOR AT HIS EXPENSE. ALL MANHOLE RINGS AND COVERS MUST BE SOUND AND SHALL CONFORM TO THESE SPECIFICATIONS, AND ANY DEFECTIVE CASTINGS WHICH MAY HAVE PASSED THE INSPECTOR AT THE WORKS, OR ELSEWHERE, SHALL BE AT ALL TIMES LIABLE TO REJECTION WHEN DISCOVERED, UNTIL THE DATE OF FINAL PAYMENT UNDER THIS CONTRACT.

STEPS AND LADDERS

DUCTILE IRON STEPS AND LADDERS OF THE SIZE AND SHAPE SHOWN ON THE CONTRACT DRAWINGS SHALL BE BUILT INTO THE BRICK AND CONCRETE MASONRY OF THE MANHOLES AS INDICATED ON THE DRAWINGS.

RIMS AND COVERS

(A) ALL CAST IRON MANHOLE RIMS AND COVERS OF THE FORMS, DIMENSIONS AND DETAILS SHOWN ON THE CONTRACT DRAWINGS SHALL BE FURNISHED AND INSTALLED AS DIRECTED.

(B) THE RIMS SHALL BE PROPERLY SET IN PLACE IN A FULL BED OF MORTAR OR POURED MONOLITHIC IN THE MASONRY, AT SUCH ELEVATION AS TO MAKE THE TOP OF THE RIM CONFORM TO THE FINISHED SURFACES OF THE STRUCTURES OR THE FINISHED GRADE AS ESTABLISHED BY THE ENGINEER.

DETAIL DRAWINGS

COMPLETE DETAIL DRAWINGS OF MISCELLANEOUS METAL WORK SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL, PRIOR TO THE MANUFACTURE OF ANY WORK TO BE FURNISHED UNDER THIS ITEM IN ACCORDANCE WITH THESE SPECIFICATIONS.

PAINTING

ALL MISCELLANEOUS METAL WORK NOT GALVANIZED SHALL BE THOROUGHLY CLEANED AND GIVEN THREE (3) COATS OF COAL TAR PITCH, USING INTERTOL 50 OR BITUMASTIC 50, OR APPROVED EQUAL.

MEASUREMENT

THE MISCELLANEOUS METAL WORK SHALL BE THE METAL WORK ACTUALLY FURNISHED AND PLACED IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE DETAILED DRAWINGS APPROVED BY THE DIRECTOR. IN THE COMPUTING OF WEIGHTS, IF NOT DETERMINED BY WEIGHING, ONE (1) CUBIC FOOT OF CAST IRON SHALL BE ASSUMED TO WEIGH FOUR HUNDRED AND FIFTY (450) POUNDS, AND ONE (1) CUBIC FOOT OF STEEL SHALL BE ASSUMED TO WEIGH FOUR HUNDRED AND NINETY (490) POUNDS. THE WEIGHT OF CAST IRON SHALL BE USED FOR CAST IRON VALVE BOXES AND COVERS AND ANY CAST IRON SECTIONS OF THE VALVE BOXES AND COVERS. WHERE PLASTIC PIPE IS USED AS THE EXTENSION, THE PIPE SHALL BE INCLUDED IN THE CAST IRON WEIGHT WITH NO SEPARATE ALLOWANCE FOR LENGTH OR WEIGHT.

ITEM SPECIAL – WATER SERVICE CONNECTIONS

GENERAL

ALL NEW AND UNUSED MATERIALS SHALL BE USED IN THE FOLLOWING SITUATION(S) INVOLVING WATER SERVICE CONNECTIONS.

(A) WHERE A GENERAL SUPPLY WATER SERVICE CONNECTION OR FIRE SERVICE CONNECTION IS DAMAGED OR IS DISTURBED FOR LOWERING, RAISING, EXTENDING, OR RELOCATING BETWEEN THE WATER MAIN AT THE “CORPORATION SHUTOFF VALVE” AND THE “CURB SHUTOFF VALVE”, IT SHALL BE TOTALLY REPLACED WITH NEW AND UNUSED MATERIALS FROM THE “CORPORATION SHUTOFF VALVE” TO “CURB SHUTOFF VALVE.”

(B) WHERE AN EXISTING CONNECTION REQUIRES TOTAL REPLACEMENT AND IS FOUND TO HAVE A FERRULE TYPE “TAP” THE CONNECTION SHALL BE REINSTALLED BY THE CONTRACTOR WITH A BRONZE DOUBLE STRAP TAP SADDLE. REPLACEMENT OF EXISTING 5/8” AND 3/4” WATER SERVICE CONNECTIONS SHALL INCLUDE ALL FITTINGS, ADAPTERS, CORPORATIONS AND STRAP SADDLES AS REQUIRED TO INSTALL A 3/4” COPPER WATER SERVICE CONNECTION COMPLETE. EXISTING ONE (1”) INCH WATER SERVICE CONNECTIONS, WHEN REQUIRED TO BE TOTALLY REPLACED, SHALL BE REPLACED AS A ONE (1”) INCH COPPER WATER SERVICE CONNECTION COMPLETE INCLUDING ALL FITTINGS, CORPORATIONS AND ADAPTERS. WHEN REPLACING EXISTING LEAD OR GALVANIZED 5/8” WATER SERVICE CONNECTIONS THE REPLACEMENT SHALL ALSO INCLUDE A NEW CURB SHUT-OFF VALVE AND CURB VALVE BOX COMPLETE.

(C) WHERE AN EXISTING COPPER GENERAL SUPPLY WATER SERVICE CONNECTION OR FIRE SERVICE CONNECTION IS DAMAGED OR IS DISTURBED FOR LOWERING, RAISING, EXTENDING BETWEEN THE “CORPORATION SHUTOFF VALVE” AND THE “CURB SHUTOFF VALVE”, IT MAY BE RECONNECTED USING APPROVED COMPRESSION COUPLING. NO MORE THAN TWO (2) SUCH COMPRESSION COUPLINGS SHALL BE USED ON ONE (1) WATER SERVICE CONNECTION.

(D) WHERE A GENERAL SUPPLY WATER SERVICE CONNECTION OR FIRE SERVICE CONNECTION IS DISTURBED ON THE “PROPERTY SIDE” OF THE CURB SHUT-OFF VALVE, FOR LOWERING, RAISING AND/OR EXTENDING, OR NEEDS REPLACEMENT BECAUSE IT IS OF LEAD OR GALVANIZED PIPING MATERIAL, THE PIPING MATERIALS AND FITTINGS SHALL BE TOTALLY REPLACED WITH NEW AND UNUSED MATERIALS FROM THE EXISTING CURB SHUT-OFF VALVE TO THE NEW CURB SHUT-OFF VALVE REQUIRED AS A RESULT OF THE EXTENSION LOWERING, RAISING OR REPLACEMENT.

(E) WHERE A GENERAL SUPPLY WATER SERVICE CONNECTION OR FIRE SERVICE CONNECTION IS DISTURBED FOR LOWERING, RAISING AND/OR EXTENDING, IT SHALL BE EXTENDED IN A STRAIGHT PROLONGATION OF THE EXISTING CONNECTION. WHERE THE “PROPERTY SIDE” CONNECTION PIPING IS NOT IMMEDIATELY CONTIGUOUS TO THE EXTENDED CONNECTION CURB SHUTOFF, ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED TO RECONNECT SHALL BE PROVIDED AS PROJECT WORK. ALL RECONNECTION ON THE “PROPERTY SIDE” OF THE CURB SHUT-OFF MUST BE PARALLEL TO THE STREET CENTERLINE OR RIGHT-OF-WAY FROM THE CURB SHUT-OFF. IF UPON INSPECTION OF THE “PROPERTY SIDE” PIPING IT IS FOUND UNSUITABLE FOR SUCH RECONNECTION, THE CONNECTION SHALL NOT BE DISTURBED UNTIL SUCH TIME AS THE ENGINEER HAS ARRANGED FOR REPLACEMENT.

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ITEM SPECIAL – WATER SERVICE CONNECTIONS (CONT.)

GENERAL (CONT.)

(F) WHERE A CONNECTION IS INADVERTENTLY DAMAGED OR BROKEN WHICH WAS NOT TO BE DISTURBED, ONLY THE DAMAGED PORTION NEEDS TO BE REPLACED. IF THE EXTENT OF DAMAGE CANNOT BE FULLY ASSESSED, THE CONNECTION SHALL BE REPLACED AS NOTED IN PARAGRAPH A AT THE CONTRACTOR’S EXPENSE.

(G) ANY CLEVELAND WATER DEPARTMENT VALVE BOXES, CURB SHUT-OFF VALVE BOXES OR OTHER CASTINGS DAMAGED DURING CONSTRUCTION OR FOUND UNSUITABLE FOR REUSE SHALL BE REPLACED WITH NEW AND UNUSED MATERIAL IN ACCORDANCE WITH THE SPECIFICATION, MISCELLANEOUS METAL WORK. PAYMENT FOR ADDITIONAL REQUIRED VALVE BOXES, CURB SHUT-OFF VALVE BOXES OR OTHER CASTINGS WILL BE MADE UNDER “ITEM SPECIAL, MISCELLANEOUS METAL WORK”.

(H) ALL GENERAL SUPPLY WATER SERVICE CONNECTIONS AND FIRE SERVICE CONNECTIONS SHALL BE LAID NOT LESS THAN SIX (6) FEET BELOW ESTABLISHED STREET GRADE AND NOT LESS THAN FIVE AND ONE-HALF (5-1/2) FEET BELOW GROUND SURFACE.

WORK INCLUDED

IN ADDITION TO THE WORK DESCRIBED ABOVE, THE CONTRACTOR SHALL INSTALL NEW AND/OR RECONSTRUCT GENERAL SUPPLY WATER SERVICE CONNECTIONS AND FIRE LINE SERVICE CONNECTIONS AS DETAILED IN THE PLANS.

PIPE MATERIAL FOR SERVICE CONNECTIONS

THE FOLLOWING PIPE MATERIAL SHALL BE USED FOR THE SERVICE CONNECTIONS ON THIS PROJECT:

COPPER WATER TUBING, TYPE K, ASTM B88-74, 3/4” TO 2” DIAMETER

DUCTILE IRON PIPE AND FITTINGS, ANSI CLASS 52 (NEW); ANSI CLASS 56 (RECONSTRUCT), CEMENT LINED, 3” DIAMETER AND UP UNLESS OTHERWISE NOTED.

MATERIALS REQUIRED FOR INSTALLATION

GENERAL SUPPLY WATER SERVICE CONNECTIONS ON DUCTILE/CAST IRON WATER MAINS SHALL BE PER CLEVELAND WATER DEPARTMENT SPECIFICATIONS AND STANDARD DETAILS. SIZES (X FT AND X”) SHALL BE AS NOTED IN THE PLANS OR MATCH EXISTING WHERE NOT LISTED.

A GENERAL LISTING OF MATERIALS IS AS FOLLOWS:

X” CORPORATION STOP – COPPER TO IRON

X” CURB STOP VALVE – COPPER TO IRON

CURB STOP VALVE BOX COVER

CURB STOP VALVE BOX TOP

CURB STOP VALVE BOX BOTTOM
X FT X” TYPE K, ASTM B88, COPPER TUBING OR
X” COMPRESSION CORPORATION STOP

X” ORISEAL COMPRESSION VALVE

ORISEAL VALVE BOX

ORISEAL VALVE BOX FOOTPIECE

X FT X” TYPE K, ASTM B88, COPPER TUBING ON CONCRETE WATER MAINS:

SOM x X” TAPPING SADDLE FOR CONCRETE PIPE

X” CORPORATION STOP – COPPER TO IRON

X” CURB STOP VALVE – COPPER TO IRON

CURB STOP VALVE BOX TOP

CURB STOP VALVE BOX BOTTOM
X FT X” TYPE K, ASTM B88, COPPER TUBING OR
SOM x X” TAPPING SADDLE FOR CONCRETE PIPE

X” COMPRESSION CORPORATION STOP

X” ORISEAL COMPRESSION VALVE

ORISEAL VALVE BOX

ORISEAL VALVE BOX FOOTPIECE
X FT X” TYPE K, ASTM B88, COPPER TUBING

NOTE: SOM = SIZE OF MAIN

WATER MAIN DUCTILE IRON PIPE WITH BOLTLESS RESTRAINED JOINTS AND FITTINGS, ANSI CLASS 52

WHERE INDICATED ON THE CONTRACT DRAWINGS OR WHERE ORDERED, THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND EQUIPMENT TO TRANSFER AND TO EXTEND EXISTING GENERAL SUPPLY WATER SERVICE CONNECTIONS, FIRE SERVICE CONNECTIONS AND COMBINATION SERVICE CONNECTIONS WITH NEW PIPING MATERIAL FROM THE EXISTING WATER MAIN TO THE REPLACEMENT OR RELOCATED WATER MAIN TO AND INCLUDING A NEW RELOCATED SERVICE CURB SHUT-OFF VALVE AND CURB VALVE BOX. WHERE EXTENDING CONNECTION CONTRACTOR SHALL REMOVE THE EXISTING CURB VALVE BOX AND ABANDON EXISTING CURB VALVE IN-PLACE. ALL WORK AND MATERIALS REQUIRED FOR CONNECTIONS TO BE TRANSFERRED SHALL CONFORM TO THE GENERAL REQUIREMENTS SPECIFIED HEREIN.

THE CONTRACTOR SHALL ARRANGE WITH THE DIVISION OF WATER FOR THE DIVISION OF WATER TO MAKE THE PRESSURE TAPS ON ALL GENERAL SUPPLY WATER SERVICE CONNECTIONS AND FIRE LINE CONNECTIONS. THE DIVISION OF WATER WILL NOT FURNISH ANY MATERIALS. THE CONTRACTOR SHALL FURNISH ALL MATERIALS AND DO ALL NECESSARY EXCAVATION, SHEETING, SHORING, BACKFILLING, MISCELLANEOUS REMOVAL AND RESTORATION, SEEDING AND/OR SODDING, REPAVING AND REPLACEMENT OF SIDEWALK REQUIRED TO COMPLETE THE WORK. THE COST OF BORING AND/OR JACKING AND EXCAVATION FOR SERVICE CONNECTIONS SHALL BE AS HEREIN SPECIFIED TO COMPLETE THE WORK.

SEE LISTS FOR MATERIALS REQUIRED FOR GENERAL SUPPLY AND FIRE SERVICE CONNECTIONS INSTALLATIONS IN THE CONTRACT DRAWINGS.

ITEM 611 – MANHOLE ADJUSTED TO GRADE, AS PER PLAN

THE CONTRACTOR SHALL ADJUST THE EXISTING MANHOLE FRAME AND COVER TO FIT THE REVISED GRADE BY EXCAVATING AROUND THE FRAME AND RAISING OR LOWERING THE FRAME AND COVER BY ADDING TO OR REMOVING THE EXISTING BRICKS AND MORTAR. USE OF ADJUSTING RINGS SHALL NOT BE PERMITTED. IF REQUIRED BY THE ENGINEER, NEW FRAMES AND/OR COVERS WILL BE PAID FOR UNDER “ITEM SPECIAL-MISCELLANEOUS METAL WORK”.

ITEM 638 – VALVE BOX ADJUSTED TO GRADE, AS PER PLAN
ITEM 638 – SERVICE BOX ADJUSTED TO GRADE, AS PER PLAN

THE CONTRACTOR SHALL RESET EXISTING VALVE BOXES OR EXISTING CURB SHUT-OFF VALVE BOXES TO ESTABLISHED GRADE BY RAISING OR LOWERING THE EXISTING CASTINGS OR BY EITHER ADDING, DELETING OR CUTTING THE APPROPRIATE VALVE BOX STEM SECTIONS. IN RAISING OF THE CASTINGS, NO INSERTS WILL BE PERMITTED. ANY VALVE BOXES OR CURB SHUT-OFF VALVE BOXES FOUND TO BE DAMAGED OR UNSUITABLE FOR REUSE SHALL BE REPLACED BY THE CONTRACTOR AND PAID FOR UNDER ITEM SPECIAL – MISCELLANEOUS METAL. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY AS REQUIRED OR AS ORDERED TO COMPLETE THE ITEM.

ITEM SPECIAL – MAINTENANCE OF WATER SERVICE

(A) THE CONTRACTOR SHALL PROVIDE, INSTALL, MAINTAIN AND REMOVE ALL TEMPORARY WATER MAINS AND TEMPORARY SERVICE CONNECTIONS, INCLUDING NECESSARY VALVES AND TEMPORARY HYDRANTS FOR FIRE PROTECTION ON THE TEMPORARY WATER MAINS, TO ALL AFFECTED PREMISES WHERE THE RELOCATIONS OF THE EXISTING WATER MAIN AND CONSTRUCTION OF NEW SERVICE CONNECTIONS WILL RESULT IN THE INTERRUPTION OF SERVICE FOR PERIODS LONGER THAN FOUR (4) HOURS BETWEEN 6:00 A.M. AND MIDNIGHT. BETWEEN MIDNIGHT AND 6:00 A.M. SERVICES MAY BE INTERRUPTED FOR THE ENTIRE SIX (6) HOUR PERIOD. THE PROVIDING OF TEMPORARY WATER MAINS SHALL ALSO INCLUDE FLUSHING, TESTING, SAMPLING AND, IF REQUIRED, CHLORINATION; ALL AS SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

THE FAILURE OF THE CONTRACTOR TO INSTALL TEMPORARY MAINS OF SUFFICIENT SIZE MAY MAKE THE CONTRACTOR LIABLE WHERE CONFLAGRATION DUE TO LACK OF WATER FOR FIRE PROTECTION MAY GIVE RISE TO ACTIONABLE CLAIMS FOR DAMAGES CHARGEABLE TO THE CONTRACTOR BY REASON OF SAID FAILURE.

(B) THE CONTRACTOR SHALL SUBMIT A PLAN FOR MAINTAINING WATER SERVICE IN CONFORMANCE WITH THE REQUIREMENTS HEREIN STIPULATED 2 WEEKS PRIOR TO INSTALLATION. THE PLAN SHALL ALSO SPECIFY ALL CONSTRUCTION METHODS, MATERIALS UTILIZED, VALVE LOCATIONS AND MEET THE APPROVAL OF THE ENGINEER, LOCAL FIRE DEPARTMENT AND THE CLEVELAND WATER DEPARTMENT BEFORE THE CONTRACTOR BEGINS ANY OF THE WATERWORK. APPROVAL OF SUCH A PLAN FOR TEMPORARY WATER MAINS SHALL NOT RELIEVE THE CONTRACTOR RESPONSIBILITY FOR PROVIDING SUFFICIENT SUPPLY. THE CONTRACTOR SHALL AT HIS OWN EXPENSE INCREASE THE SIZES OF THE TEMPORARY WATER MAINS BEYOND THE SIZES INDICATED HEREIN IF THE SIZES AS NOTED IN THESE SPECIFICATIONS ARE FOUND TO BE INSUFFICIENT.

(C) TEMPORARY WATER MAINS SHALL BE PLACED ON ONE OR BOTH SIDES OF THE STREET. CONNECTIONS ARE PERMISSIBLE ONLY ON THE SIDE OF THE STREET ON WHICH THE PARTICULAR TEMPORARY MAIN IS LOCATED. THE TEMPORARY MAINS SHALL NOT OBSTRUCT ANY STREETS, SIDEWALKS OR DRIVEWAYS. TRENCHING OR RAMPING SHALL BE PERFORMED AS REQUIRED TO PROVIDE PROTECTION FOR THE TEMPORARY WATER MAINS AND TO PROVIDE FOR THE SAFE MOVEMENT OF VEHICULAR AND PEDESTRIAN TRAFFIC. TEMPORARY WATER MAINS THAT CROSS DRIVEWAYS AND SIDEWALKS SHALL BE RAMPED WITH RUBBERIZED/NEOPRENE TYPE RAMPING; NO ASPHALT OR STONE RAMPING SHALL BE ALLOWED FOR THIS PURPOSE. ALL LINES CROSSING STREETS SHALL BE TRENCHED ACROSS TO ALLOW BYPASS PIPE TO LIE FLUSH WITH THE PAVEMENT SURFACE. NO RAMPING WILL BE ALLOWED ON STREET CROSSINGS EXCEPT FOR SIDE STREETS APPROVED BY THE CITY. THE CONTRACTOR SHALL PROVIDE SUPPLEMENTARY CONNECTIONS WHERE VALVES WITH NIPPLES HAVE BEEN REMOVED, WHERE ADJACENT WATER MAINS CONNECT, OR WHERE ORDERED BY THE CITY.

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ITEM SPECIAL - MAINTENANCE OF WATER SERVICE (CONT.)
WORK INCLUDED (CONT.)

(D) SIZES FOR TEMPORARY WATER MAINS SHALL BE AS FOLLOWS:

1. WHERE IT IS NOT POSSIBLE TO HAVE BOTH RELOCATED/NEW AND EXISTING WATER MAINS SIMULTANEOUSLY IN SERVICE IN ORDER TO TRANSFER AND RECONNECT EXISTING SERVICE CONNECTIONS TO THE RELOCATED/NEW WATER MAIN, OR WHEN THE TIME REQUIRED TO PUT THE RELOCATED/NEW WATER MAIN, EXCLUDING SERVICE CONNECTIONS, INTO SERVICE EXCEEDS THE RATIONS SPECIFIED IN PARAGRAPH "A", THE SIZES FOR TEMPORARY WATER MAINS SHALL BE AS FOLLOWS:

A. WHEN WITHIN THE LIMITS OF THE WATER MAIN RELOCATION NO SERVICE CONNECTIONS EXIST, OR SERVICE CONNECTIONS EXIST ON ONLY ONE SIDE OF THE STREET, THE TEMPORARY WATER MAIN SHALL NOT BE LESS THAN TWO (2) NOMINAL PIPE DIAMETERS SMALLER THAN EXISTING PIPE BUT IN NO CASE LESS THAN FOUR (4) INCHES IN DIAMETER AND SUCH TEMPORARY WATER MAIN SHALL BE PLACED ON ONLY ONE SIDE OF THE STREET. FOR EXAMPLE, IF EXISTING WATER MAIN IS TWELVE (12) INCH NOMINAL DIAMETER, TEMPORARY WATER MAIN SHALL NOT BE LESS THAN EIGHT (8) INCH NOMINAL DIAMETER.

B. WHEN THE LIMITS OF THE WATER MAIN RELOCATION SERVICE CONNECTIONS EXIST ON BOTH SIDES OF THE STREET, THE TEMPORARY WATER MAINS SHALL NOT BE LESS THAN ONE (1) NOMINAL PIPE DIAMETER SMALLER THAN THE EXISTING PIPE BUT IN NO CASE LESS THAN SIX (6) INCHES IN DIAMETER AND SUCH TEMPORARY WATER MAINS SHALL BE PLACED ON BOTH SIDES OF THE STREET.

C. FOR EXAMPLE, IF EXISTING WATER MAIN IS TWELVE (12) INCH NOMINAL DIAMETER, TEMPORARY WATER MAINS SHALL NOT BE LESS THAN TEN (10) INCH NOMINAL DIAMETER, ON EACH SIDE.

2. WHEN TEMPORARY WATERLINES AS DESCRIBED IN PARAGRAPH D-1 ARE NOT REQUIRED, BUT THE INTERRUPTION IN WATER SERVICE EXCEEDS THE DURATIONS SPECIFIED IN PARAGRAPH "A" BECAUSE OF THE TIME REQUIRED TO CONNECT NEW/RELOCATED WATER MAINS TO EXISTING MAINS AND/OR TO RE-CONNECT EXISTING SERVICE CONNECTIONS TO THE NEW/RELOCATED MAIN, THE SIZES FOR TEMPORARY WATER MAINS, ON ONE OR BOTH SIDES OF THE STREET, AS REQUIRED, SHALL NOT BE LESS THAN THAT INDICATED BELOW PROVIDED THAT THESE SIZES ARE APPROVED BY THE FIRE DEPARTMENT OF THE MUNICIPALITY IN WHICH THE WORK IS BEING PERFORMED.

3.THE SIZE OF THE TEMPORARY CONNECTION SHALL BE OF AT LEAST THE SAME SIZE AS THE PERMANENT CONNECTION THAT HAS GONE TO THE BUILDING UNLESS THE CONNECTION IS LARGER THAN THE BYPASS PIPING. IF THE PERMANENT CONNECTION IS LARGER THAN THE BYPASS PIPING, THEN THE TEMPORARY CONNECTION WILL BE OF THE SAME SIZE AS THE BYPASS PIPING.

THE CONTRACTOR SHALL PROVIDE ENOUGH ISOLATION VALVES IN THE TEMPORARY WATER MAIN SYSTEM SUCH THAT PIPE SEGMENTS ON EACH SIDE OF THE STREET OF EACH STREET BLOCK CAN BE ISOLATED. IN NO CASE SHALL SEGMENTS OF PIPE BETWEEN VALVES BE LONGER THAN 1000 FEET.

MINIMUM FLOWS THAT SHALL BE AVAILABLE FROM TEMPORARY BYPASS WATER LINES, 4-INCHES IN DIAMETER OR LARGER, SHALL BE:

1. ON RESIDENTIAL DEAD END AND SIDE STREETS WHICH MUST BE OR ARE SUPPLIED FROM THE EXISTING WATER LINE BEING CLEANED AND LINED, A MINIMUM OF 600 GALLONS PER MINUTE (GPM) AT A 20 POUND PER SQUARE INCH (PSI) RESIDUAL PRESSURE AT ANY POINT ALONG SAID TEMPORARY BYPASS WATER LINE.

2. ON RESIDENTIAL MAIN OR THROUGH STREETS CONNECTING TWO (2) OR MORE DEAD END OR SIDE STREETS WHICH MUST BE OR ARE SUPPLIED FROM THE EXISTING WATER LINE BEING CLEANED AND LINED, A MINIMUM OF 1,000 GPM AT A 20 PSI RESIDUAL PRESSURE AT ANY POINT ALONG SAID TEMPORARY BYPASS WATERLINE.

3. ON A STREET IN COMMERCIAL, INDUSTRIAL OR MULTI-FAMILY COMPLEX AREAS, WHICH MUST BE OR ARE SUPPLIED FROM THE EXISTING WATER LINE BEING CLEANED AND LINED, A MINIMUM OF 1,300 GPM AT 20 PSI RESIDUAL PRESSURE AT ANY POINT ALONG SAID TEMPORARY BYPASS WATERLINE.

THE CONTRACTOR SHALL FURNISH NECESSARY HOSES, VALVES, PIPE AND FITTINGS FOR WATER SERVICE CONNECTIONS. THE CONTRACTOR SHALL ONLY CONNECT TO AN OUTSIDE HOSE BIB OR SILL COCK, UNLESS OTHERWISE APPROVED BY THE CITY. ALL CONNECTIONS TO OUTSIDE HOSE BIBS OR SILL COCKS SHALL BE SUPPLIED WITH Y CONNECTORS.

THE CONTRACTOR SHALL MAKE A REASONABLE EFFORT TO SHUT OFF CONNECTIONS AT THE SERVICE STOP BOX WHERE POSSIBLE. IF A SERVICE STOP BOX IS NOT AVAILABLE, THE CONTRACTOR SHALL SHUT OFF THE CONNECTIONS INSIDE THE RESIDENCE OR BUILDING, AND SHALL CLEAR SERVICE CONNECTIONS USING INTERNAL PLUMBING.

THE CONTRACTOR SHALL NOT BE PAID ANY EXTRA ALLOWANCE IF REQUIRED TO SHUT A CONNECTION WITHIN A BUILDING OR CLEAR SERVICE CONNECTIONS USING INTERNAL PLUMBING. ALL SUCH COSTS SHALL BE INCLUDED IN THE BID.

(E) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REQUIRED REPAIRS TO, OR REPLACEMENT OF, DAMAGED TEMPORARY WATER MAINS AND APPURTENANCES. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR MAINTAINING AND REPAIRING ANY DAMAGED PAVEMENT, SIDEWALKS, CURBS, TREE LAWNS OR OTHER AREAS DISTURBED BY THE INSTALLATION; AND FOR MAINTENANCE OR REPAIR OF THE TEMPORARY WATER MAINS, TEMPORARY SERVICE CONNECTIONS AND APPURTENANCES THERETO. PAYMENT FOR THIS WORK SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR "ITEM SPECIAL - MAINTENANCE OF WATER SERVICE".

(F) THE CONTRACTOR SHALL NOT PUT ANY TEMPORARY WATER MAINS INTO SERVICE WITHOUT AN APPROVED PLAN AS INDICATED IN PARAGRAPH B.

(G) THE TEMPORARY WATER MAIN AND ALL APPURTENANCES SHALL BE FURNISHED, MAINTAINED AND REMOVED BY THE CONTRACTOR. THE TEMPORARY WATER MAIN PIPE AND APPURTENANCES FURNISHED SHALL BE CLEAN AND IN SUCH CONDITION THAT THEY MAY BE TESTED, FLUSHED, CHLORINATED AND PRODUCE SATISFACTORY WATER SAMPLES AS REQUIRED BY THE CITY. ANY NECESSARY CHLORINATION SHALL BE DONE BY THE CITY AS STIPULATED ELSEWHERE IN THESE SPECIFICATIONS AND SHALL BE DONE AT THE CONTRACTOR'S EXPENSE. ALL CONNECTIONS TO THE TEMPORARY WATER MAIN SHALL BE MADE BY THE CONTRACTOR UNDER THE SUPERVISION OF THE CITY.

(H) THE CONTRACTOR SHALL PROVIDE TEMPORARY FOUR (4) INCH FIRE HYDRANTS ON THE TEMPORARY WATERLINE IN ACCORDANCE WITH THE "TEMPORARY WATER MAIN & HYDRANT CONNECTION ASSEMBLY" DETAIL, SEE CWD STANDARD DETAILS . THE CONTRACTOR SHALL PROVIDE A SUFFICIENT NUMBER OF VALVES ON THE TEMPORARY WATER MAIN AS TO ALLOW PROPER SEQUENCING OF THE NEW/RELOCATED WATER MAIN WORK WITHOUT UNDUE DELAY. WATER TO THE TEMPORARY WATER MAIN WILL BE PROVIDED FROM THE EXISTING PERMANENT HYDRANTS THROUGH THE TEMPORARY HYDRANTS JUST BEYOND THE LIMITS OF THE SHUTDOWN AND/OR FROM ADJACENT WATER MAINS.

(I) THE CONTRACTOR SHALL MINIMALLY INSTALL TEMPORARY FOUR (4) INCH FIRE HYDRANTS AT EACH LOCATION WHERE A PERMANENT FIRE HYDRANT IS TAKEN OUT OF SERVICE OR USED TO SUPPLY A TEMPORARY WATER MAIN

PAYMENT

THE DIVISION OF WATER WILL REQUIRE THAT THE CONTRACTOR PAY ALL DIVISION OF LABOR CHARGES FOR "FLUSHING AND SAMPLING" OF TEMPORARY WATER MAINS. CHARGES OR FEES FOR CHLORINATION WORK OR ANY WORK PERFORMED BY THE CITY MAY BE OBTAINED FROM THE PERMITS AND SALES UNIT OF THE DIVISION OF WATER AND HEAT. PAYMENT FOR DIVISION OF WATER LABOR SHALL BE MADE TO THE PERMITS AND SALES SECTION PRIOR TO ANY WATER WORK BEING PERFORMED.

CATHODIC PROTECTION FOR WATER MAIN

GENERAL

THE WORK UNDER CATHODIC PROTECTION FOR WATER MAINS INCLUDES FURNISHING THE SERVICES OF A QUALIFIED CORROSION ENGINEERING FIRM CAPABLE OF PROVIDING ALL NECESSARY MATERIALS, EQUIPMENT, EXPERTISE AND KNOW-HOW AND ALL LABOR FOR CONSTRUCTION OF A CATHODIC PROTECTION SYSTEM AS INDICATED HEREIN AND NECESSARY FOR THE PROPER COMPLETION OF THE PROJECT INCLUDED UNDER THIS ITEM INCLUDING THE GEOTECHNICAL SURVEY; THE FURNISHING AND INSTALLATION OF A GALVANIC ANODE SYSTEM; AND A FOLLOWUP BASELINE SURVEY.

ADDITIONALLY, THE QUALIFIED CORROSION ENGINEERING FIRM SHALL BE RESPONSIBLE FOR THE INSTALLATION, TESTS, AND THE CATHODIC PROTECTION SYSTEM SPECIFIED AND PROVIDE NECESSARY REPORTS, DESIGN CALCULATION DRAWINGS AND SYSTEM OPERATION AND MAINTENANCE (O&M) MANUALS.

"QUALIFIED" IMPLIES THAT THE WORK IS PERFORMED BY EXPERIENCED FIELD ENGINEERING PERSONNEL UNDER SUPERVISION OF A NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE) ACCREDITED CORROSION SPECIALIST OR REGISTERED PROFESSIONAL CORROSION ENGINEER. CERTIFICATION OF QUALIFICATIONS SHALL BE SUBMITTED WITH THE SUBMITTAL PACKAGE.

GEOTECHNICAL SURVEY

IMMEDIATELY AFTER AWARD OF THIS CONTRACT AND BEFORE THE BEGINNING OF ANY WORK THE CONTRACTOR SHALL, UNDER ITEM SPECIAL - CATHODIC PROTECTION FOR WATER MAINS, HAVE AN CORROSION ENGINEERING FIRM PERFORM THE GEOTECHNICAL SURVEY.

THE RESULTS OF THIS SURVEY SHALL DETERMINE THE EXTENT OF THE DESIGN REQUIRED FOR THE GALVANIC CELL (SACRIFICIAL ANODE) SYSTEM TO BE INSTALLED.

SOIL BORINGS SHALL BE PREFORMED EVERY 500 FEET DIRECTLY ALONG THE PROPOSED PIPELINE. THE SOIL SAMPLE SHALL BE TAKEN AT ONE (1) FOOT DEPTH BELOW THE GROUND SURFACE AND AT THE PROPOSED PIPE DEPTH AND ANALYZED FOR MOISTURE CONTENT, PH, CONDUCTIVITY, CHLORIDE ION CONCENTRATION, AND SULFIDE ION CONCENTRATION. THIS WORK SHALL BE PREFORMED BY THE CATHODIC PROTECTION ENGINEERING FIRM. ALL BORING SAMPLES SHALL BE OBTAINED UNDER THE DIRECT SUPERVISION OF THE CORROSION ENGINEER.

AFTER COMPLETION OF THE SOIL SAMPLE ANALYSIS THE CONTRACTOR SHALL SUBMIT TO THE CITY THROUGH THE ENGINEER SIX (6) BOUND COPIES OF THE RESULTS OF THE GEOTECHNICAL SURVEY THAT INCLUDES AT LEAST THE FOLLOWING INFORMATION: (1) SOIL BORING LOG INDICATING LOCATION, DEPTH; (2) ANALYSIS OF SAMPLE; (3) PRESENCE OF ANY OTHER CATHODIC PROTECTION SYSTEM THAT MAY AFFECT THE WORK UNDER THIS CONTRACT; AND (3) RECOMMENDATIONS FOR CORRECTIVE ACTIONS TO TAKEN WHERE ADVERSE CONDITIONS EXISTS.

CATHODIC TEST STATIONS

CATHODIC TEST STATIONS SHALL BE INSTALLED WHERE SHOWN ON THE CONTRACT DRAWING AND SHALL BE OF THE FLUSH-TO-GRADE TYPE AS SHOWN ON THE CONTRACT DRAWINGS. ADDITIONAL CATHODIC TEST STATIONS SHALL BE INSTALLED AT STEEL PIPE CASINGS, SUPPLEMENTAL CONNECTIONS OR OTHER LOCATIONS AS REQUIRED BY EITHER THE GEOTECHNICAL SURVEY OR AS ORDERED BY THE CITY. PAYMENT FOR ADDITIONAL CATHODIC TEST STATIONS SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE CATHODIC PROTECTION SYSTEM BEING INSTALLED. THE CATHODIC TEST STATION ASSEMBLY SHALL CONSIST OF:

(A) TERMINAL BOARD: TERMINAL BOARD SHALL BE MICARTA OR PHENOLIC, DIMENSIONED AS SHOWN 1/4-INCH THICK WITH BRASS MACHINE SCREWS, NUTS, AND WASHERS AND COPPER ALLOY TERMINALS SIZED TO ACCOMMODATE WIRE AS SHOWN.

(B) SHUNT: HAVING A 0.01 OHM, 6 AMPERE CAPACITY, WITH ACCURACY OF PLUS OR MINUS ONE (+/- 1%) PERCENT, OF THE MANGANIC WIRE TYPE.

(C) TEST LEAD WIRES: U.L. 93. ALL TEST LEAD WIRES SHALL BE AWG #12 TYPE TW STRANDED COPPER, COLOR CODED AS SHOWN ON THE CONTRACT DRAWINGS. NO SPLICES WILL BE PERMITTED. ALL TEST STATIONS SHALL HAVE 24" OF SLACK IN THE LEAD WIRES, COILED WITHIN THE TEST STATION BOX FOR CORE REMOVAL AND TESTING PURPOSES.

(D) DRAIN CABLES: ALL DRAIN CABLES FURNISHED AND INSTALLED SHALL COMPLY WITH ASTM STANDARD D1248 AND SHALL BE AWG #6 WHERE APPLICABLE WITH HMWPE INSULATION. NO SPLICES WILL BE PERMITTED.

(E) CONNECTION TO PIPE:

1. DUCTILE IRON PIPE AND FITTINGS: THE CONNECTIONS OF TEST LEADS, ANODE LEADS, AND DRAIN CABLES TO DUCTILE IRON PIPE AND FITTINGS SHALL BE BY THERMITE WELDING AS SPECIFIED HEREIN.

2. PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS: FOR CONNECTIONS OF ANODE LEADS, TEST LEADS, AND DRAIN CABLES, THE PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS SHALL BE PROVIDED WITH MILD STEEL RODS FOR WELDING TO THE STEEL PIPE CYLINDER. THE ANODE LEAD CABLES SHALL BE PROVIDED 1/4" DIAMETER BY 6" LONG RODS. THE DRAIN CABLES AND TEST LEADS SHALL BE PROVIDED WITH 5/8" DIAMETER BY 6" LONG MILD STEEL RODS. EACH CABLE-TO-ROD CONNECTION SHALL BE SHOP ASSEMBLED USING APPROPRIATELY SIZED THERMITE WELDED CONNECTION AND EACH WELDED CONNECTION SHALL BE SHOP COVERED WITH ADHESIVE LINED HEAT SHRINKABLE POLYETHYLENE SLEEVE. CADWELDING, BONDING CABLES, TEST LEAD WIRES, AND ANODE LEAD WIRES TO STEEL ANGLE PLATES INCORPORATED INTO THE PIPE MANUFACTURE IS AN ACCEPTABLE ALTERNATE METHOD.

3. STEEL PIPE AND FITTINGS: THE CONNECTIONS OF TEST LEADS, ANODE LEADS, AND DRAIN CABLES TO STEEL PIPE AND FITTINGS SHALL BE BY THERMITE WELDING AS SPECIFIED HEREIN.

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CATHODIC TEST STATIONS (CONT.)

(F) COPPER-COPPER SULFATE REFERENCE ELECTRODES: REFERENCE ELECTRODES SHALL BE OF COPPER-COPPER SULFATE TYPE, ENCASED IN A 2-INCH DIAMETER BY 8-INCH LONG SCHEDULE 80 POLYVINYL CHLORIDE TUBE. THE COPPER ROD SHALL BE 99.9% PURITY 1/4-INCH DIAMETER BY 7-INCH LONG. THE ELECTRODE SHALL BE PACKAGED IN A 8-INCH DIAMETER BY 15-INCH LONG PERMEABLE CLOTH BAG CONTAINING A SPECIAL NON-POLARIZING BACKFILL MATERIAL. THE REFERENCE ELECTRODE SHALL BE EQUIPPED WITH 1/4-INCH DIAMETER BY 4-INCH LONG PVC REINFORCING RODS AT THE DISTAL END TO ENSURE INTIMATE CONTACT OF THE REFERENCE ELECTRODE WITH THE SPECIAL BACKFILL. TOTAL PACKAGE WEIGHT SHALL BE 15-POUNDS. REFERENCE ELECTRODE LEAD CABLES SHALL BE AWG NO. 14 HMWPE LENGTH AS NECESSARY. THE LEAD CABLES SHALL BE SILVER SOLDERED TO THE COPPER ROD AND COVERED WITH A HEAT SHRINKABLE SLEEVE AND AN EPOXY ENCAPSULATION 2-INCH DIAMETER BY 2-INCH LONG. REFERENCE ELECTRODE LEAD WIRES SHALL NOT BE SPLICED. THE CABLE INSULATION SHALL BE FREE OF NICKS, CUTS AND ABRASIONS OVER THE ENTIRE LENGTH. THE REFERENCE ELECTRODES SHALL HAVE A STABILITY OF +5 MILLIVOLTS WITH 3.0 MICROAMP LOAD. REFERENCE ELECTRODE SHALL BE DELIVERED IN PLASTIC OR PAPER SHIPPING BAGS TO PREVENT MOISTURE INTRUSION AND DAMAGE TO THE CLOTH BAG.

BONDING CABLES

CONTINUITY BOND CABLES: ALL PIPE AND FITTING JOINTS, EXCEPT DIELECTRIC INSULATED JOINTS AND WELDED JOINTS SHALL BE BONDED TO MAKE THE ENTIRE PIPELINE ELECTRICALLY CONTINUOUS.

(A) DUCTILE IRON PIPE: BOND CABLES SHALL BE 18-INCH LONG.

(B) PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS: ALL PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS AND SPECIAL FITTINGS SHALL BE FABRICATED IN SUCH A MANNER AS TO ESTABLISH ELECTRICAL CONTINUITY BETWEEN ALL APPLICABLE METALLIC COMPONENTS OF THE PIPING, INCLUDING CYLINDER, TENSILE WIRES, ANCHOR SOCKETS, ANCHOR SOCKET BRACKETS, JOINT RINGS, FLANGES, LUGS, DRAWBOLTS, AND SADDLE PLATES. BOND CABLES SHALL BE 18-INCH LONG.

(C) STEEL PIPE AND FITTINGS: ALL STEEL PIPE AND FITTINGS AND SPECIAL FITTINGS SHALL BE FABRICATED IN SUCH A MANNER AS TO ESTABLISH ELECTRICAL CONTINUITY BETWEEN ALL APPLICABLE METALLIC COMPONENTS OF THE PIPING, INCLUDING CYLINDER, ANCHOR SOCKETS, ANCHOR SOCKET BRACKETS, JOINT RINGS, FLANGES, LUGS, DRAWBOLTS, AND SADDLE PLATES. CONTINUITY SHALL BE ESTABLISHED THROUGH WELDING OR BONDING OF JOINTS. BOND CABLES SHALL BE 18-INCH LONG.

(D) BONDING AND DRAIN CABLES:

1. JOINT BONDING CABLES SHALL BE MINIMUM NO.4 AWG STRANDED COPPER CABLE WITH HMWPE INSULATION MINIMUM EIGHTEEN (18 INCHES IN LENGTH TWO (2) PER BOND PER JOINT.

2. DRAIN CABLES SHALL BE NO.6 AWG (MIN.) COPPER CABLE WITH HMWPE INSULATION AND SHALL BE OF SUFFICIENT LENGTH TO REACH THE ADJACENT CATHODIC TEST STATION.

THERMITE WELDING

(A) MATERIALS:

1. THERMITE WELD EQUIPMENT: ALL CATHODIC PROTECTION CABLE AND WIRE CONNECTIONS TO DUCTILE IRON PIPE AND FITTINGS, PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS, AND STEEL PIPE AND FITTINGS SHALL BE MADE BY THE THERMITE WELD METHOD. THERMITE WELD MATERIALS SHALL BE EQUAL TO THOSE MANUFACTURED BY: "CADWELD" OF ERICO PRODUCTS, INC.; "THERMOWELD" OF CONTINENTAL INDUSTRIES, INC.; OR APPROVED EQUAL.

2. PLASTIC BACKFILL SHIELD FOR THERMITE WELD CONNECTIONS SHALL BE A ONE (1) PIECE MOLDED PLASTIC CAP RECESSED TO COVER CABLE AND THERMITE WELD CONNECTIONS WITH DIELECTRIC SEALER AS DEVELOPED BY ROYSTON LABORATORIES FOR COVERING THERMITE WELDS, OR APPROVED EQUAL.

3. BITUMINOUS COATING COMPOUND FOR THERMITE WELDS: SHALL BE EQUAL TO THAT MANUFACTURED BY KOPPERS COMPANY, B-50, OR APPROVED EQUAL AND SHALL BE SHIPPED TO THE JOB SITE IN ONE (1) GALLON SEALED CONTAINERS. THE MATERIAL SHALL CONFORM TO SPECIFICATION MIL-C-18480A FOR BITUMASTIC COATINGS.

(B) THERMITE WELD EQUIPMENT:

THE CONNECTION OF JOINT BONDING WIRE, TEST LEADS, DRAIN CABLES AND OTHER WELDED CONNECTIONS TO DUCTILE IRON PIPE AND FITTINGS SHALL BE AS FOLLOWS:

APPLICATION MOLD SLEEVE CHARGE

30" & LARGER CAHBA-IG CAB-133-1H CA25XF-19 DIA. DUCTILE IRON/STEEL PIPE

4" TO 24" CAHBA-IG-24 NONE CA25XF-19 DIA. DUCTILE IRON/STEEL PIPE

30" & LARGER CAHBA-IV NONE CA45XF-19 DIA. DUCTILE IRON/STEEL PIPE

4" TO 24" CAHBA-IV NONE CA45XF-19 DIA. DUCTILE IRON/STEEL PIPE

GALVANIC ANODE SYSTEM

(A) MATERIALS AND EQUIPMENT: MATERIALS AND EQUIPMENT FURNISHED AND INSTALLED TO PROVIDE A GALVANIC ANODE CATHODIC PROTECTION SYSTEM SHALL BE NEW AND STANDARD PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH MATERIAL OR EQUIPMENT. MATERIALS AND EQUIPMENT SHALL BE MANUFACTURER'S LATEST STANDARD DESIGN AND COMPLYING WITH THAT SPECIFIED HEREIN.

1. GALVANIC ANODES: THERE SHALL BE ONE ANODE OF THE FOLLOWING SIZE AND WEIGHT PER AVERAGE LENGTH OF PIPE INSTALLED ALONG THIS NEW WATER MAIN SECTION.

MAGNESIUM ANODES 32# PRE-PACKAGED, HIGH POTENTIAL WITH 40 FEET # 10 TW WIRE.

CHEMICAL COMPOSITION: (ELEMENT CONTENT %)
AL 0.010
MN 0.500 - 1.300
CU 0.020 MAX.
NI 0.001 MAX.
FE 0.030 MAX.
OTHER 0.050 EACH OR 0.300 MAX TOTAL
MAGNESIUM REMAINDER

2. ANODE CONSTRUCTION: 32# PACKAGED HI-POT MAGNESIUM ANODE 40' #10THHN STRANDED - RED WIRE THE MAGNESIUM ANODE SHALL BE PACKAGED IN A PERMEABLE CLOTH BAG CONTAINING A BACKFILL MATERIAL WEIGHING 70 POUNDS HAVING THE FOLLOWING CHECMICAL COMPOSITION:

GROUND HYDRATED GYPSUM 75%
POWDERED BENTONITE 20%
ANHYDROUS (SODIUM SULFATE) 5%

BACKFILL SHALL HAVE A GRAIN SIZE SO THAT 100% IS CAPABLE OF PASSING THROUGH A 20 MESH SCREEN AND 50% WILL BE RETAINED BY A 100 MESH SCREEN. THE MIXTURE SHALL BE FIRMLY PACKAGED AROUND THE ZINC WITHIN THE CLOTH BAG WITH PACKAGED DIMENSIONS OF 5" DIA. X 21" LONG. THE PACKAGED ANODE SHALL WIEGH NO LESS THAN 70 POUNDS.

3. ANODE LEAD CABLES: LEAD CABLES SHALL BE SHOP CONNECTED TO THE STEEL STRAP CORE WITH SILVER SOLDER. THE CONNECTION SHALL BE INSULATED WITH AN ELECTRICAL POTTING COMPOUND. ANODE LEAD CABLES SHALL BE AWG NO. 10 WITH THERMOPLASTIC INSULATION LENGTH AS NECESSARY. NO SPLICES WILL BE PERMITTED BETWEEN THE ANODE CONNECTION AND THE PIPE OR TEST STATION. SPLICES AND ANODE LEAD WIRE TO MILD STEEL ROD FOR CONNECTION TO CONCRETE PIPE WILL BE PERMITTED.

(B) INSTALLATION:

1. ANODES:

A. AUGER OR DIG HOLES TO DEPTH INDICATED HEREIN. IF AUGER IS USED, HOLE SHALL BE 10-INCH MINIMUM DIAMETER. PLACE ANODE IN BOTTOM OF HOLE THREE (3) TO FIVE (5) FEET BELOW WATER MAIN OR THREE (3) TO FIVE (5) FEET Laterally FROM SIDE OF WATER MAIN. IF FOR ANY REASON THE LATERAL LOCATION OF THE ANODE CANNOT BE ACHIEVED, SUFFICIENT SOIL SHALL BE REMOVED (EITHER BY BACKHOE, BUCKET OR MANUALLY) ON THE BOTTOM OR IMMEDIATELY ADJACENT TO THE WATER MAIN TO ACHIEVE THE MINIMUM THREE (3) FOOT DISTANCE. DO NOT SUPPORT THE ANODE WITH LEAD WIRE.

BACKFILL THE ANODE IN 6-INCH LIFTS OF NATIVE SOIL. COMPACT THE SOIL AROUND THE ANODE. WHEN THE BACKFILL IS LEVEL WITH THE TOP OF THE ANODE, POUR MINIMUM TEN (10) GALLONS OF FRESH WATER INTO THE HOLE. WHEN THE ANODE HAS ABSORBED ALL THE WATER, COMPLETE THE BACKFILL OPERATION TO THE BOTTOM OF THE PIPE TRENCH.

B. BACKFILL THE ANODE LEAD WIRE IN STONE FREE EARTH OR SAND AT CONNECTION POINT ON PIPE.

C. CONNECT THE ANODE LEAD WIRE TO THE PIPE AFTER THE NECESSARY TESTING HAS BEEN PERFORMED.

2. TEST STATIONS: THERE SHALL BE A MINIMUM OF THREE TEST STATIONS INSTALLED. ADDITIONAL TEST STATIONS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR WHERE ORDERED OR DIRECTED OR AS DETERMINED FROM THE GEOTECHNICAL SURVEY USING APPLICABLE EQUIPMENT AS SHOWN ON THE CONTRACT DRAWINGS, OR AS SPECIFIED HEREIN. ALL TEST STATIONS SHALL HAVE 24" OF SLACK IN THE LEAD WIRES, IN COILED WITHIN THE TEST STATION BOX FOR CORE REMOVAL AND TESTING PURPOSES.

A. INSTALL ANODES AS SPECIFIED HEREIN;

B. INSTALL REFERENCE ELECTRODE AT LOCATIONS SHOWN ON THE CONTRACT DRAWINGS, SHOP DRAWINGS OR THE CORROSION FIRM'S RECOMMENDATIONS. THE REFERENCE ELECTRODE SHALL BE COMPLETELY SURROUNDED BY NATIVE SOIL, POSITIONED 4-INCHES BELOW THE BOTTOM OF THE TRENCH. SATURATE THE REFERENCE ELECTRODE WITH 5 GALLONS MINIMUM FRESH WATER (ONLY APPLICABLE WHERE PIPELINE IS UNDER PAVEMENT).

C. INSTALL DRAIN CABLE AND TEST LEAD CABLE ON PIPE AS SPECIFIED HEREIN;

D. RUN ALL TEST STATION CABLES IN 1-1/2 INCH DIAMETER PVC CONDUIT TO THE CATHODIC TEST STATION ASSEMBLY BOX LOCATIONS INDICATED ON THE CONTRACT DRAWINGS.

E. SET TEST BOX FLUSH TO GRADE AND LEVEL. INSTALL A CONCRETE COLLAR AROUND TEST STATION BOX IF IN UNPAVED AREA AS SHOWN ON THE CONTRACT DRAWINGS.

F. LEAVE THE TEST STATION LEAD WIRES COILED IN THE TEST BOX. EXCESS SLACK WIRE SHALL BE LEFT SUCH THAT ALL WIRES WILL EXTEND 24-INCHES ABOVE THE TOP OF THE TEST BOX. PLACE THE SPECIFIED TEST BOARD IN THE BOX FOR LATER CONNECTION BY THE CONTRACTOR'S CORROSION ENGINEER. PERFORM REQUIRED TESTING PRIOR TO BACKFILLING TO ENSURE PROPER OPERATION AND INSTALLATION OF ANODE AND REFERENCE ELECTRODE.

3. CASING TEST STATIONS: INSTALL ONE (1) CASING TEST STATION AT EACH END OF ALL CASING PIPE.

A. INSTALL ANODES AS SPECIFIED HEREIN;

B. INSTALL REFERENCE ELECTRODE AS HEREIN SPECIFIED (ONLY APPLICABLE AT PAVED LOCATIONS);

C. INSTALL DRAIN CABLES AND TEST LEADS AS SPECIFIED HEREIN;

D. INSTALL TEST BOX(ES) AS SPECIFIED HEREIN;

E. INSTALL TEST STATION LEAD WIRES AS SPECIFIED HEREIN;

4. LINE CROSSING (INTERFERENCE) TEST STATIONS: INTERFERENCE TEST STATIONS SHALL BE INSTALLED AT SELECTED FOREIGN CATHODICALLY PROTECTED LINE CROSSING LOCATIONS WHERE ORDERED.

A. INSTALL REFERENCE ELECTRODE MIDWAY BETWEEN CROSSING PIPES IN NATIVE BACKFILL SO THAT THE ELECTRODE IS UNIFORMLY SURROUNDED BY 4 INCHES NATIVE SOIL. SATURATE REFERENCE ELECTRODE WITH MINIMUM FIVE (5) GALLONS FRESH WATER DURING BACKFILLING.

B. INSTALL DRAIN CABLES AND TEST LEADS AS SPECIFIED HEREIN. DRAIN LEAD CABLE AND TEST LEAD CABLES TO FOREIGN PIPELINES SHALL BE INSTALLED BY THE FOREIGN PIPELINE OWNER. CONTACT THE FOREIGN PIPELINE OWNER TWO (2) WEEKS IN ADVANCE OF CONSTRUCTION TO COORDINATE INSTALLATION.

C. INSTALL TEST BOX(ES) AS SPECIFIED HEREIN;

D. INSTALL TEST STATION LEAD WIRES AS SPECIFIED HEREIN.

5. DIELECTRIC ISOLATION TEST STATIONS: INSTALL ELECTRIC ISOLATION TEST STATIONS AT ALL DIELECTRIC INSULATOR LOCATIONS. DIELECTRIC INSULATORS AND TEST STATIONS SHALL BE INSTALLED AT BOTH ENDS OF THE PROPOSED WATERLINE AT THE CONNECTION TO THE EXISTING WATERLINE.

A. INSTALL REFERENCE ELECTRODE AS SPECIFIED HEREIN;

B. INSTALL DRAIN CABLES AND TEST LEADS AS SPECIFIED HEREIN;

C. INSTALL TEST BOX(ES) AS SPECIFIED HEREIN;

D. INSTALL TEST STATION LEAD WIRES AS SPECIFIED HEREIN;

6. DIELECTRIC MATERIAL: DIELECTRIC FLANGE MATERIAL AND DIELECTRIC UNIONS SHALL BE OF PROPER SIZE AND BE EQUAL TO THAT MANUFACTURED BY F.H. MALONEY, PIPELINE SEAL & INSULATOR INC. OR APPROVED EQUAL.

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

REF NO.	SHEET NO.	STATION	WATER MAIN BASELINE	FOR INFORMATION ONLY - ALL ITEMS PER CLEVELAND WATER DEPARTMENT SPECIFICATIONS AND STANDARD DETAILS, SEE NOTES AND DETAILS BU-07																										
				8X12 REDUCER	16X30 REDUCER	12" TEE	16X30 REDUCING TEE	16 " TEE	16X12 CROSS	8" 22.5 BEND	12" 22.5 BEND	12" 45 BEND	16" 11.25 BEND	16" 22.5 BEND	16" 45 BEND	30" 22.5 BEND	30" 45 BEND	8" CUTTING IN SLEEVE	30" CUTTING IN SLEEVE	12" - ABUTMENT SLEEVE	30" - ABUTMENT SLEEVE									
				EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH								
	25	11+00.00	12"	1													1													
	25	11+70.41	12"			1																								
	25	11+70.06	12"	1					1																					
	25	13+33.23	12"									1																		
	25	13+40.70	12"									1																		
	26	18+23.16	12"	1																										
	29	14+01.76	12"								1																			
	29	14+07.20	12"								1																			
	29	14+25.20	12"								1																			
	29	14+29.95	12"								1																			
	29	14+65.37	12"								1																			
	29	14+75.00	12"								1																			
	29	16+22.00	12"								1																			
	25	51+00.00	30"															1												
	25	51+55.37	30"				1																							
	25	53+13.54	30"													1														
	25	53+27.67	30"													1														
	26	56+22.00	30"													1														
	26	56+52.91	30"													1														
	26	57+87.82	30"															1												
	28	51+58.88	30"													1														
	28	51+65.03	30"													1														
	28	54+18.13	30"													1														
	28	54+24.65	30"													1														
	28	54+76.85	30"													1														
W-1	32	55+01.60	30"																	1										
W-2	32	55+97.43	30"																	1										
W-3	32	14+98.00	12"																1											
W-4	32	15+94.23	12"																1											
	33	51+55.37, 50.41 RT	30"					1					1	1																
	33	52+05.71, 50.41 RT	30"										1	1																
	33	56+74.09	30"		1								1	1																
	25	51+55.39, 22.00 RT	30"					1																						
	25	51+55.89, 51.71 RT	30"										1																	
	25	51+55.89, 56.82 RT	30"										1																	
	25	11+70.28, 16.38 RT	12"							1																				
	25	11+70.28, 20.00 RT	12"							1																				
TOTALS FOR INFORMATION ONLY				3	1	1	1	2	1	2	7	2	2	4	0	7	2	1	2	2	2									

WATER WORK SCHEDULE

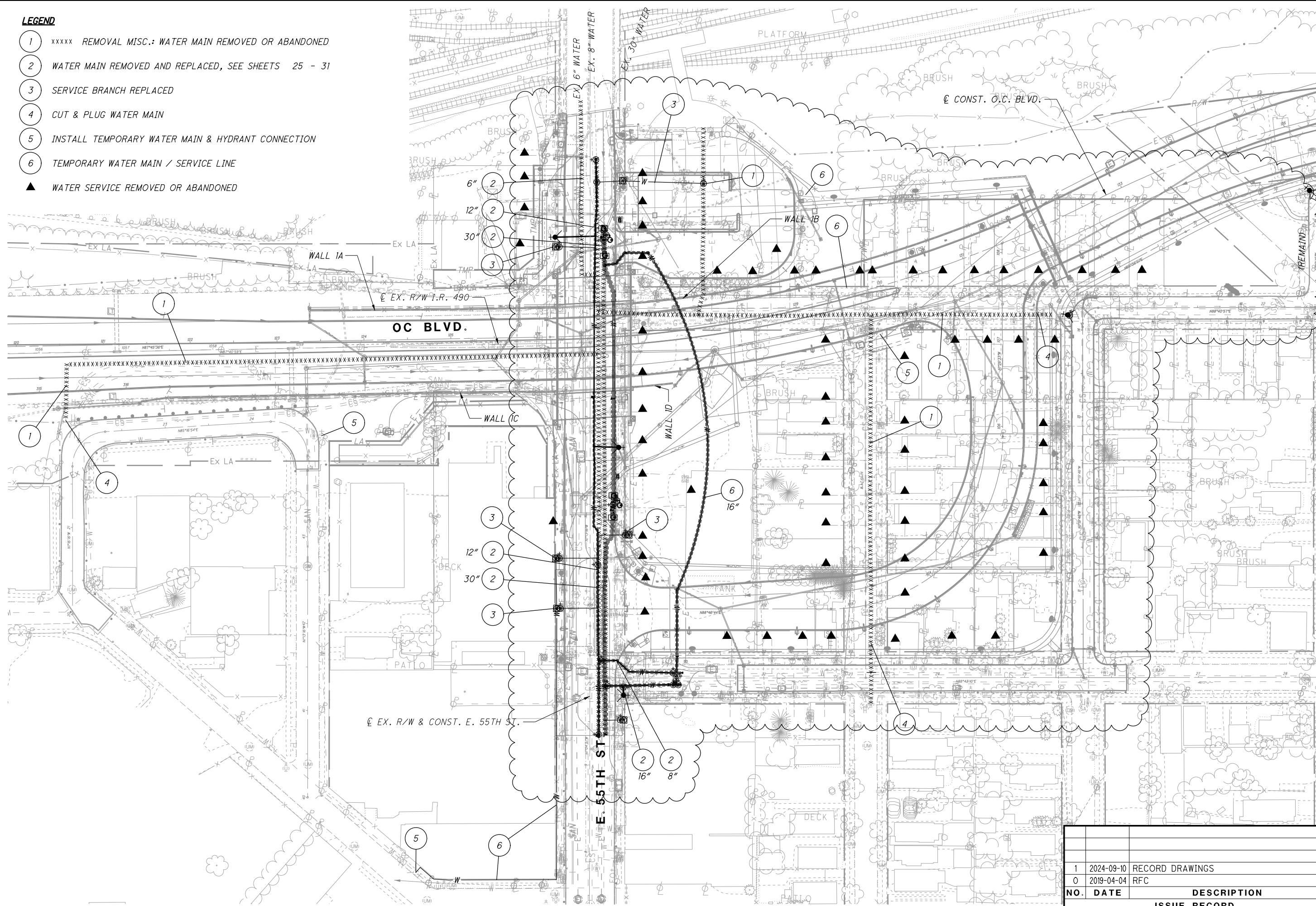
CUY-IR490/ SR010-2.09 / 19.28

2397

RECORD PLANS

RECORD PLANS

- 1 xxxxx REMOVAL MISC.: WATER MAIN REMOVED OR ABANDONED
- 2 WATER MAIN REMOVED AND REPLACED, SEE SHEETS 25 - 31
- 3 SERVICE BRANCH REPLACED
- 4 CUT & PLUG WATER MAIN
- 5 INSTALL TEMPORARY WATER MAIN & HYDRANT CONNECTION
- 6 TEMPORARY WATER MAIN / SERVICE LINE
- ▲ WATER SERVICE REMOVED OR ABANDONED



1	2024-09-10	RECORD DRAWINGS
0	2019-04-04	RFC
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ISSUE RECORD		

(WS-1) NOT USED

WS-2 STA. 12+43.65, @ CONST. 12" WATER MAIN,
STA. 10+80.12 RT, @ EX. R/W & CONST. E. 55TH ST.
2" WATER SERVICE, COMPLETE (CWD #55022)

WS-3 STA. 13+01.36, @ CONST. 12" WATER MAIN,
STA. 11+37.83 RT, @ EX. R/W & CONST. E. 55TH ST.
1" WATER SERVICE, COMPLETE (CWD #55035)

WS-4 STA. 13+28.23, @ CONST. 12" WATER MAIN,
STA. 11+64.00 LT, @ EX. R/W & CONST. E. 55TH ST.
1" WATER SERVICE, COMPLETE
(NEW SERVICE FOR FUTURE PUBLIC PLAZA)

WS-5 STA. 11+15.50, @ CONST. 12" WATER MAIN,
STA. 9+52.00 RT, @ EX. R/W & CONST. E. 55TH ST.
1" WATER SERVICE, COMPLETE
(NEW SERVICE FOR FUTURE PUBLIC PLAZA)

FH-1 STA. 51+42.78, 22.44 RT, 6" CONST. 30" WATER MAIN,
STA. 9+80.34, 38.70 RT, 6" EX. R/W & CONST. E. 55TH ST.
6" FIRE HYDRANT ASSEMBLY COMPLETE, PER DETAIL B

STA. 51+54.48, @ CONST. 30" WATER MAIN
STA. 9+90.96, 17.00' RT, @ EX. R/W & CONST. E. 55TH ST.
INSTALL 16"X30" REDUCING TEE
RESTRAINED LENGTH = 141'

STA. 9+62.00, 17.09 RT., @ EX. R/W & CONST. E. 55TH ST.
STA. 51+25.50, @ CONST. 30" WATER MAIN
INSTALL 30" VALVE ASSEMBLY COMPLETE

STA. 51+25.50, @ CONST. 30" WATER MAIN
O, 17.09 RT., @ EX. R/W & CONST. E. 55TH ST.
INSTALL 30" VALVE ASSEMBLY COMPLETE

STA. 10+98.75,
@ CONST. 12" WATER MAIN
STA. 9+35.24, 10.22 RT.
@ EX. R/W & CONST. E. 55TH ST.
INSTALL AIR RELIEF ASSEMBLY

STA. 10+95.73, @ CONST. 12" WATER MAIN
STA. 9+32.23, 10.36 RT,
@ EX. R/W & CONST. E. 55TH ST.
BEGIN 12" WATER MAIN
EXPOSE EXISTING WATER MAIN TO NEAREST JOINT,
INSTALL 12" VALVE AND VALVE BOX COMPLETE
INSTALL 8X12 REDUCER AND 8" CUTTING-IN SLEEVE
RESTRAINED LENGTH = 99'

— TEMPORARY SERVICE LINE
SEE SHEET 35

STA. 50+98.22, @ CONST. 30" WATER MAIN
STA. 9+34.72, 18.35 RT, @ EX. R/W & CONST. E. 55TH ST.
BEGIN 30" WATER MAIN
EXPOSE EXISTING WATER MAIN TO NEAREST JOINT,
INSTALL 30" CUTTING-IN SLEEVE

FOR FRANCIS PROP. 16" AND PROP. 12", INCLUDING THE
CONNECTION TO THE 16" TEMP. WATER MAIN,
SEE DETAILS AND NOTES ON SHEET 33

STA. 53+59.66,
 @ CONST. 30" WATER MAIN
 STA. 11+93.37, 9.04 RT,
 @ EX. R/W & CONST. E. 55TH ST.
 INSTALL AIR RELIEF ASSEMBLY

— STA. 11+83.47, @ CONST. 12" WATER MAIN
STA. 10+19.96, 10.00' RT,
@ EX. R/W & CONST. E. 55TH ST.
INSTALL 12" TEE
RESTRAINED LENGTH = 56'

STA. 11+91.25, @ CONST. 12" WATER MAIN
STA. 10+27.20, 10.00' RT,
@ EX. R/W & CONST. E. 55TH ST.
INSTALL 12" VALVE AND VALVE BOX COMPLETE

— STA. 10+99.63 @ EX. R/W &
CONST. E. 55TH ST. =
STA. 100+00.00 @ CONST.
QUADRANT RD.

— INSTALL 12" VALVE (CLOSED)
SEE TEMP. WATER MAIN PLAN

— STA. 13+33.43,
B CONST. 12" WATER MAIN
STA. 11+69.89, 8.73 RT
C EX. R/W & CONST. E. 55TH ST.
INSTALL 12" - 45° BEND
RESTRAINED LENGTH = 28'

STA. 13+40.15,
@ CONST. 12" WATER MAIN
STA. 11+74.84, 4.19 RT,
@ EX. R/W & CONST. E. 55TH ST.
INSTALL 12" - 45° BEND
RESTRAINED LENGTH = 28'

STA. 53+65.66,
@ CONST. 30" WATER MAIN
STA. 11+99.34, 26.38 RT,
@ EX. R/W & CONST. E. 55TH ST
INSTALL 30" VALVE ASSEMBLY
COMPLETE

STA. 53+28.64,
@ CONST. 30" WATER MAIN
STA. 11+62.46, 25.12 RT,
@ EX. R/W & CONST. E. 55TH ST.
INSTALL 30" - 45° BEND
RESTRAINED LENGTH = 60'

STA. 53+19.72, @ CONST. 30" WATER MAIN
STA. 11+56.07, 18.90 RT,
@ EX. R/W & CONST. E. 55TH ST.
INSTALL 30" - 45° BEND
RESTRAINED LENGTH = 60'

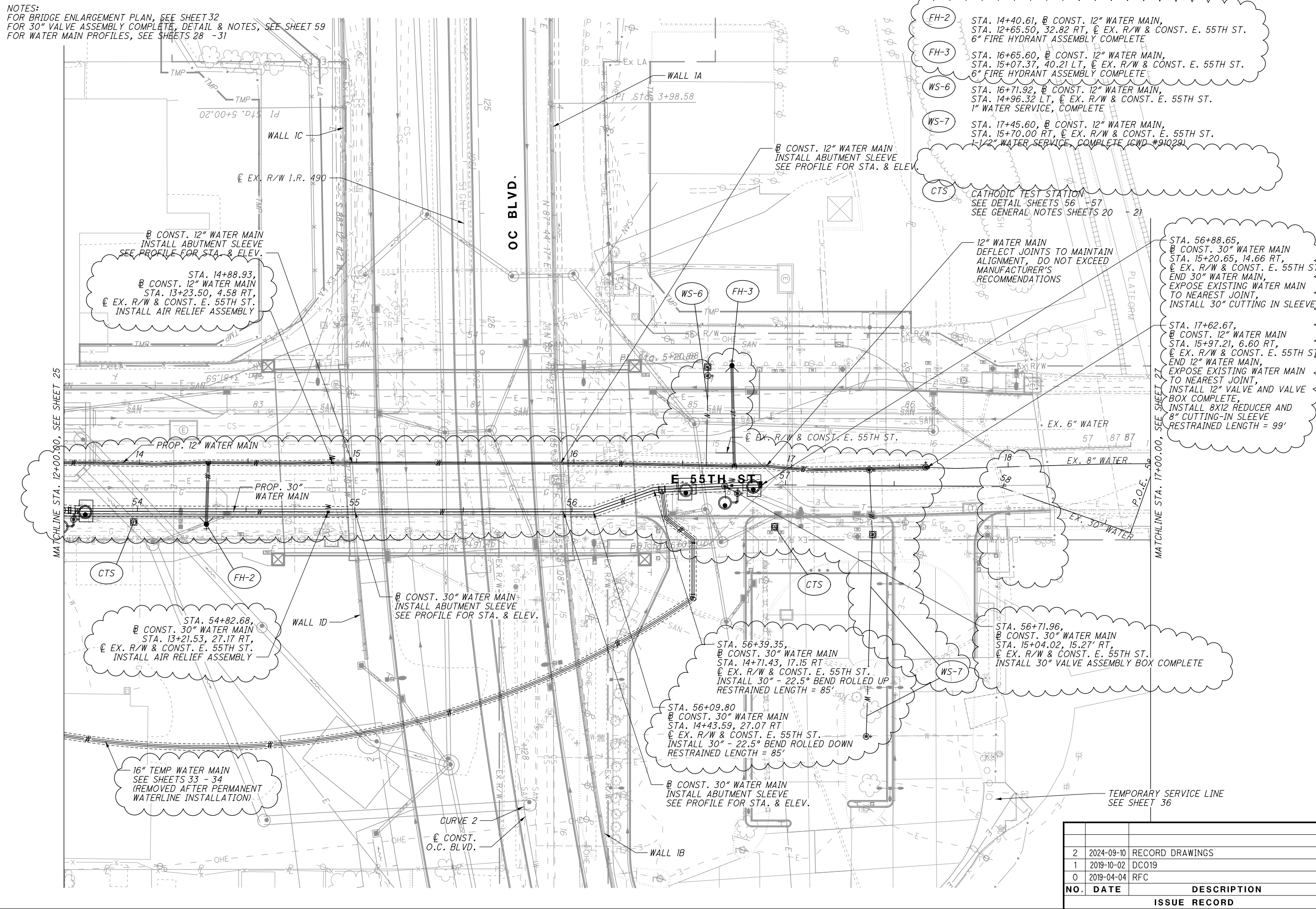
— 16" TEMP WATER MAIN
SEE SHEETS 33 - 34

GRANT RD.

1	2024-09-10	RECORD DRAWINGS
0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

NOTES:
1. FOR 30" VALVE ASSEMBLY COMPLETE, DETAIL & NOTES, SEE SHEET 59
2. FOR WATER MAIN PROFILES, SEE SHEETS 28 -31

NOTES:
FOR BRIDGE ENLARGEMENT PLAN, SEE SHEET 32
FOR 30" VALVE ASSEMBLY COMPLETE, DETAIL & NOTES, SEE SHEET 59
FOR WATER MAIN PROFILES, SEE SHEETS 28 - 31



2	2024-09-10	RECORD DRAWINGS
1	2019-10-02	DC019
0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

CUY-IR490/ SR010-2.09 / 19.28

2797

WATER WORK PLAN - E. 55TH ST.

STA. 17+00.00 TO END

RECORD PLANS

RECORD PLANS

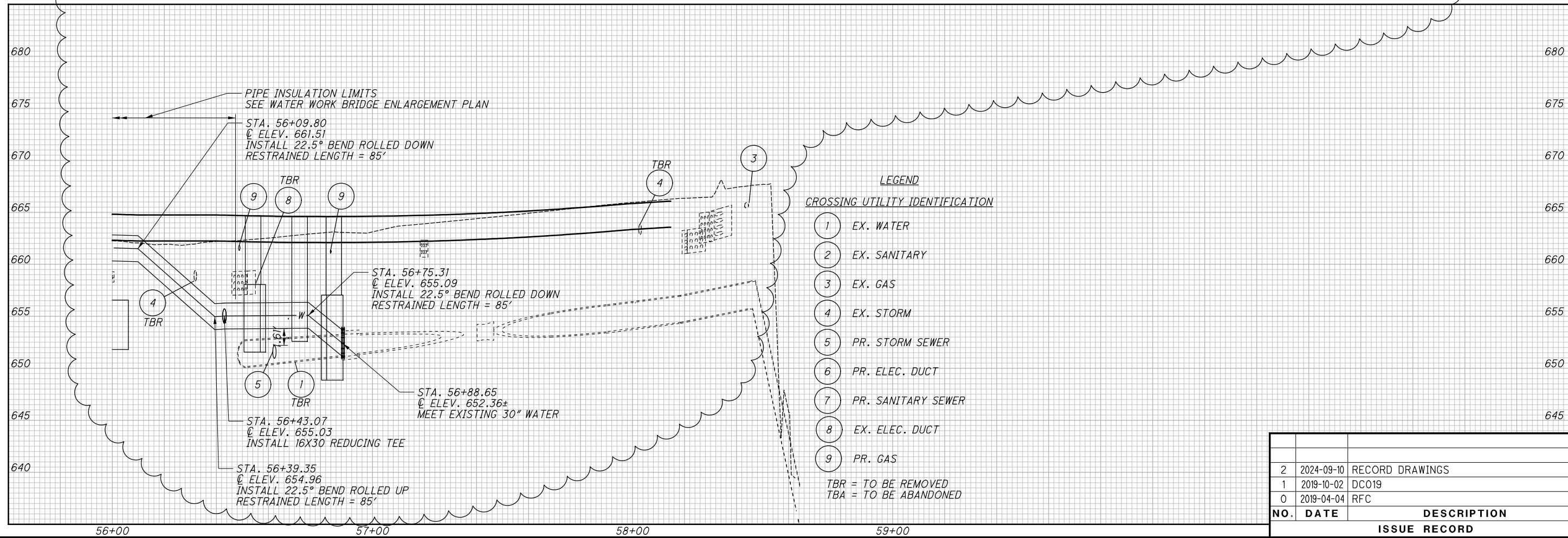
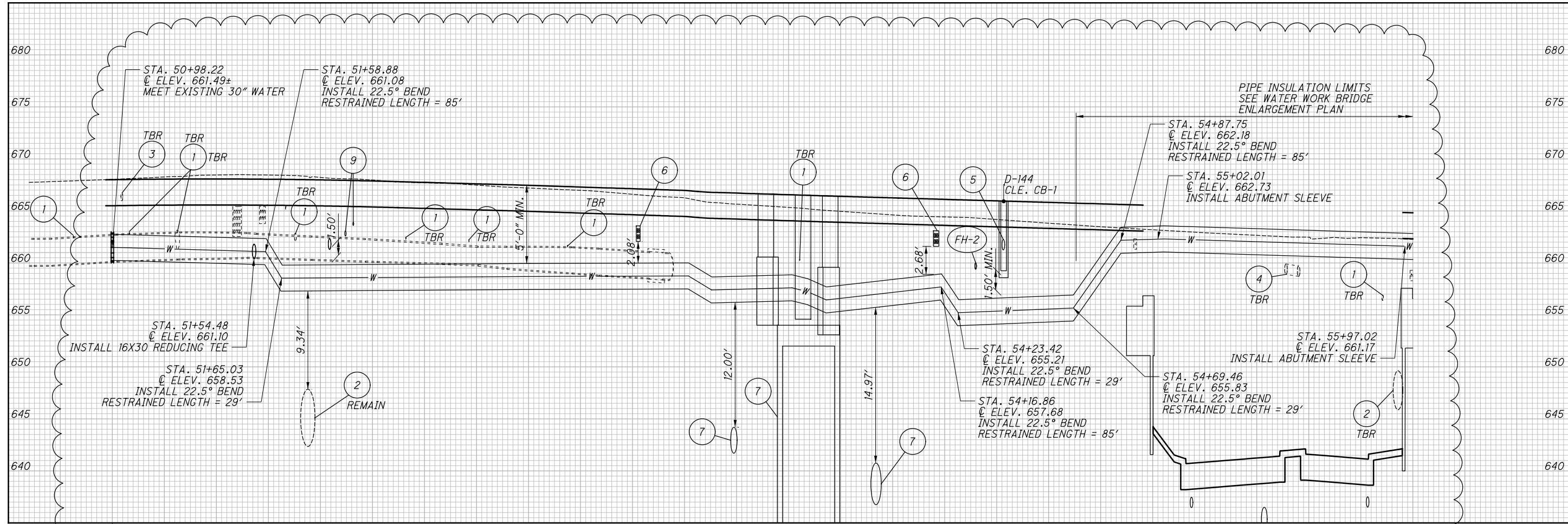
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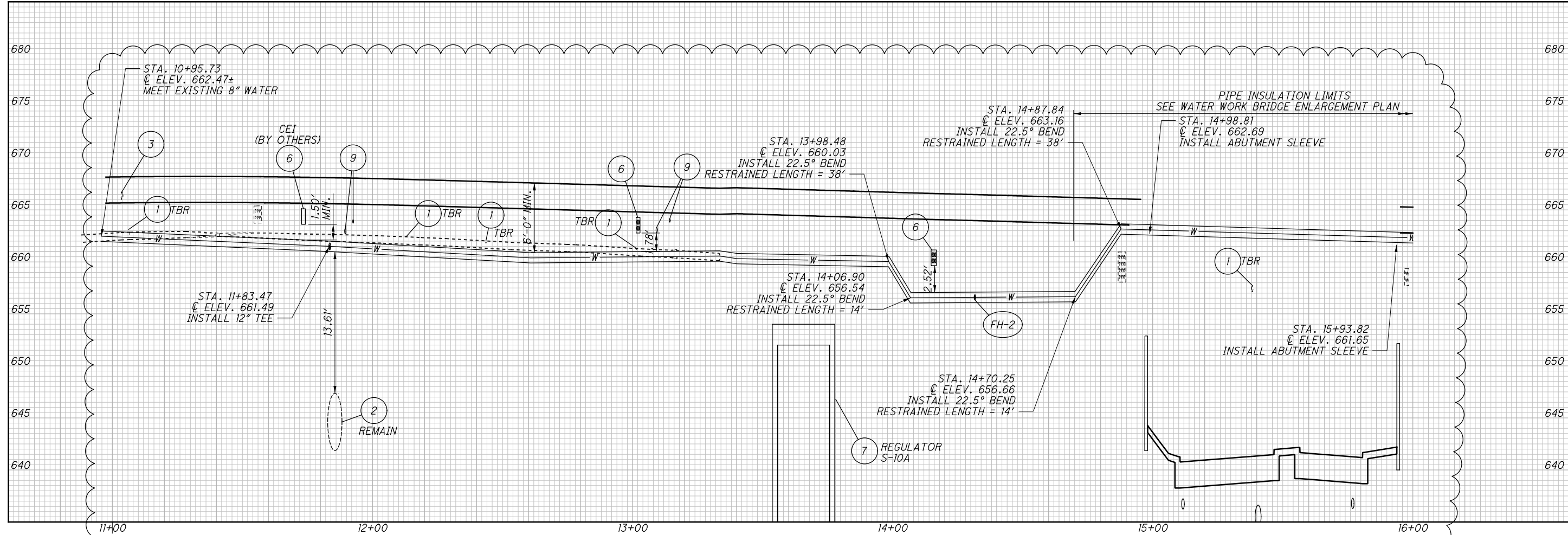
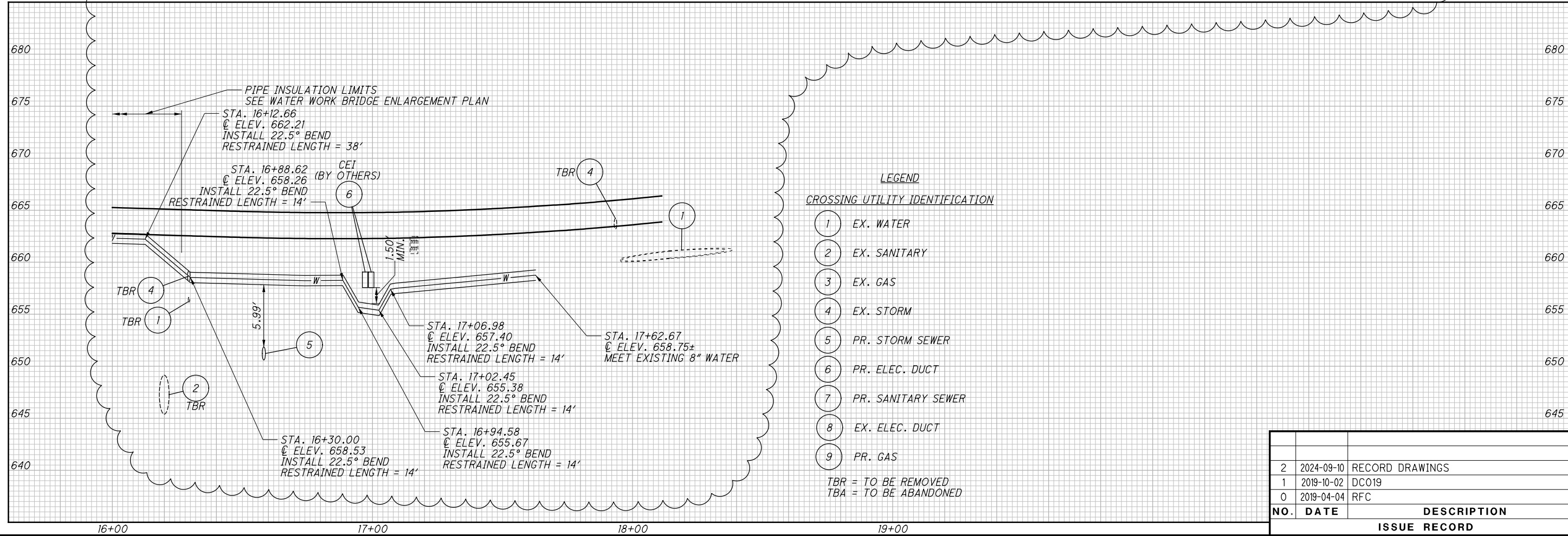
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SCALE IN FEET

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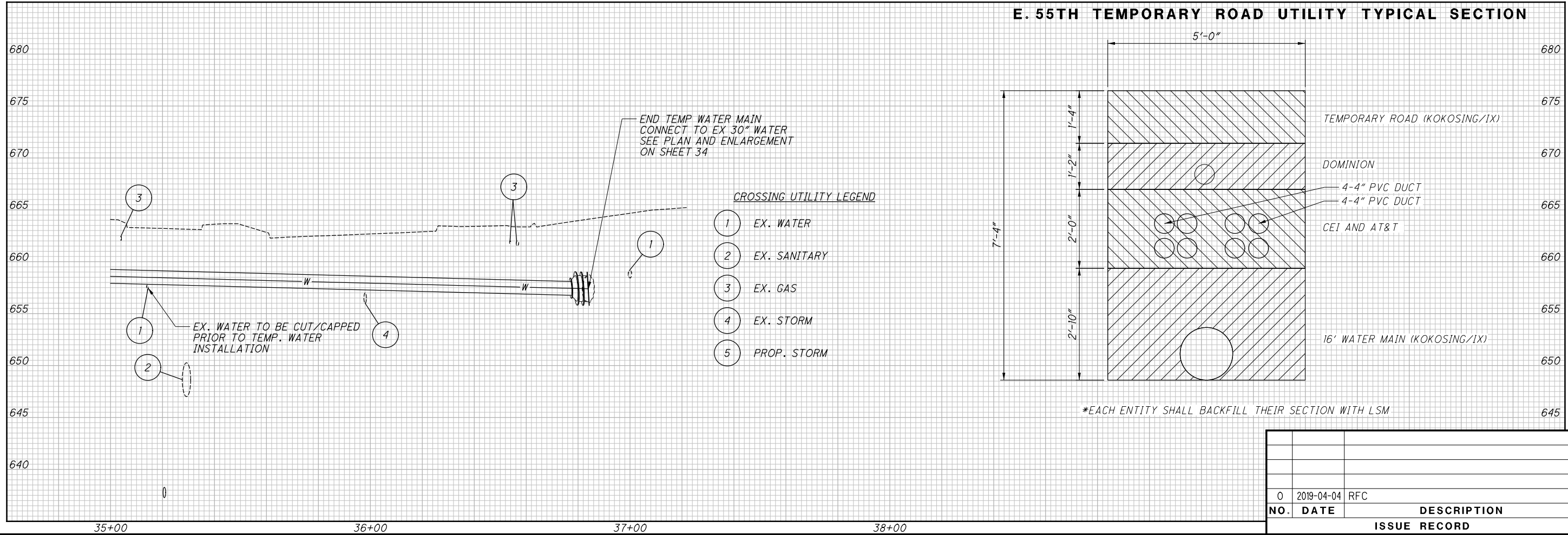
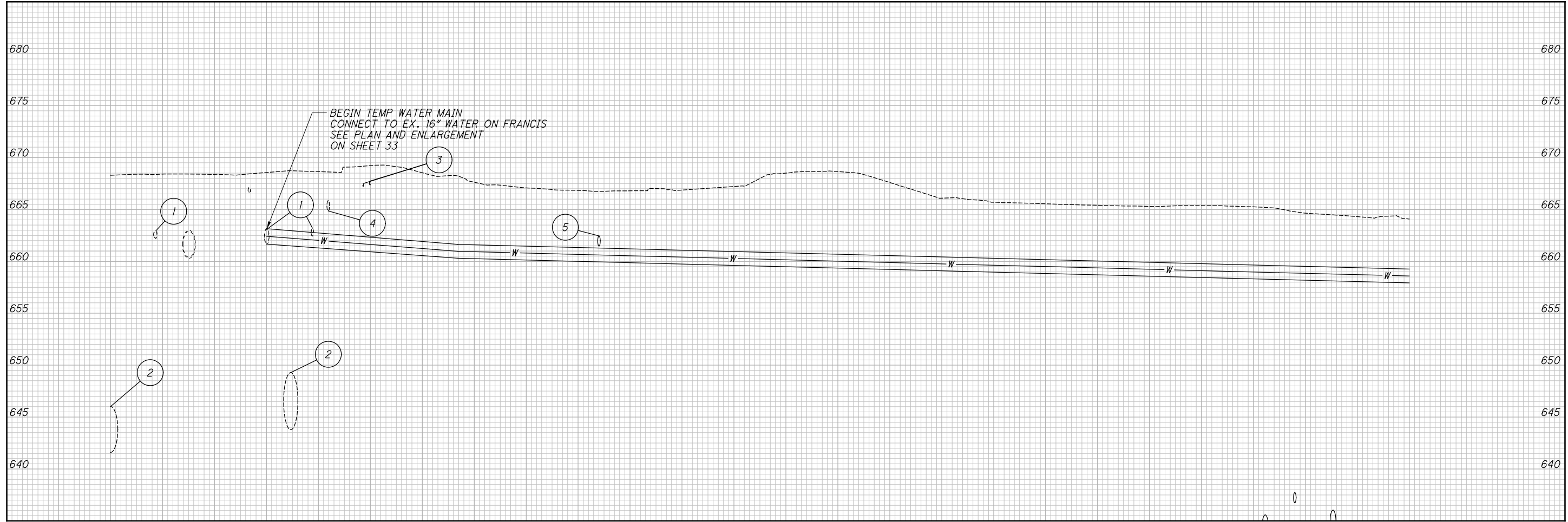
NO.	DATE	DESCRIPTION
2	2024-09-10	RECORD DRAWINGS
1	2019-10-02	DC019
0	2019-04-04	RFC



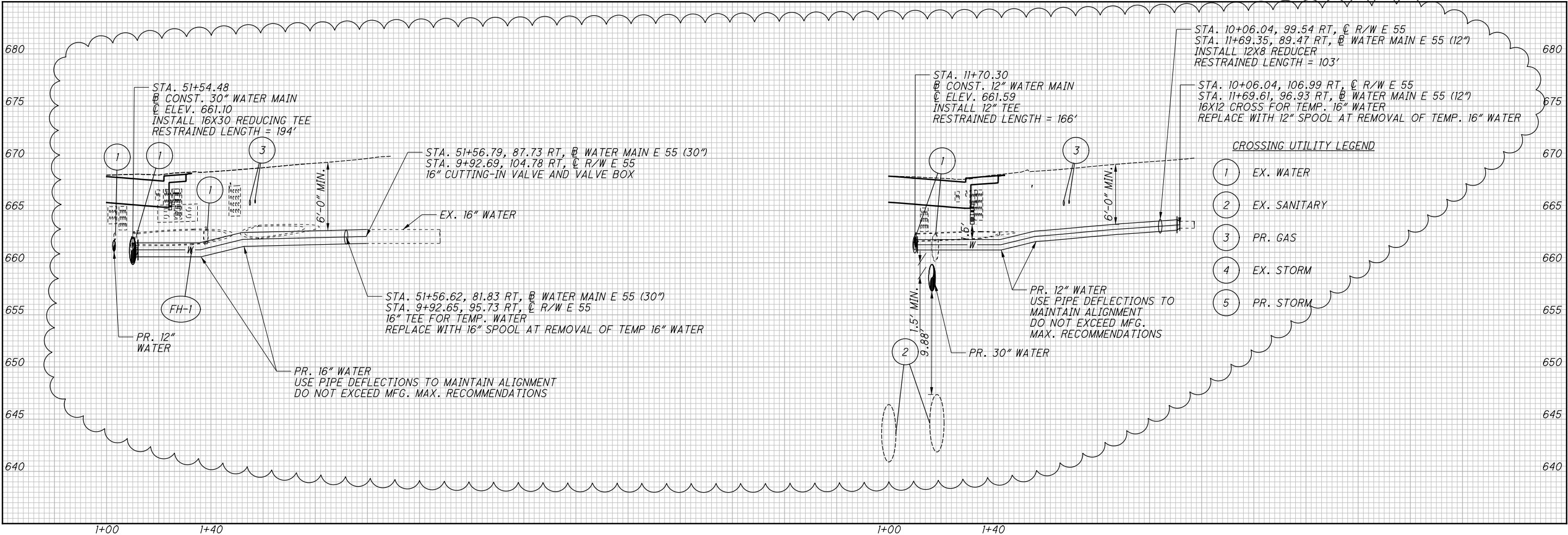
- LEGEND**
- CROSSING UTILITY IDENTIFICATION**
- 1 EX. WATER
 - 2 EX. SANITARY
 - 3 EX. GAS
 - 4 EX. STORM
 - 5 PR. STORM SEWER
 - 6 PR. ELEC. DUCT
 - 7 PR. SANITARY SEWER
 - 8 EX. ELEC. DUCT
 - 9 PR. GAS
- TBR = TO BE REMOVED
TBA = TO BE ABANDONED

NO.	DATE	DESCRIPTION
2	2024-09-10	RECORD DRAWINGS
1	2019-10-02	DC019
0	2019-04-04	RFC

ISSUE RECORD

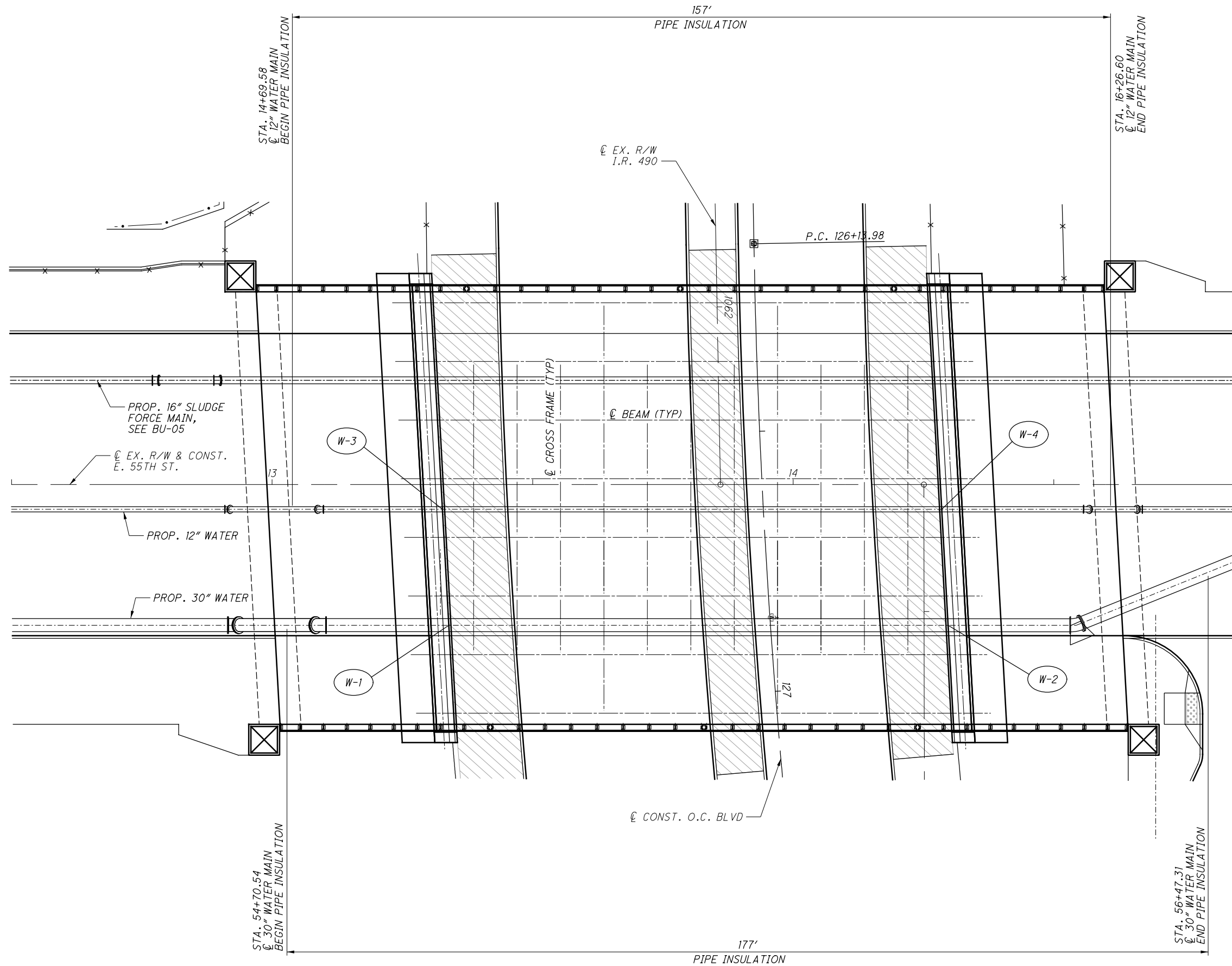


NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		



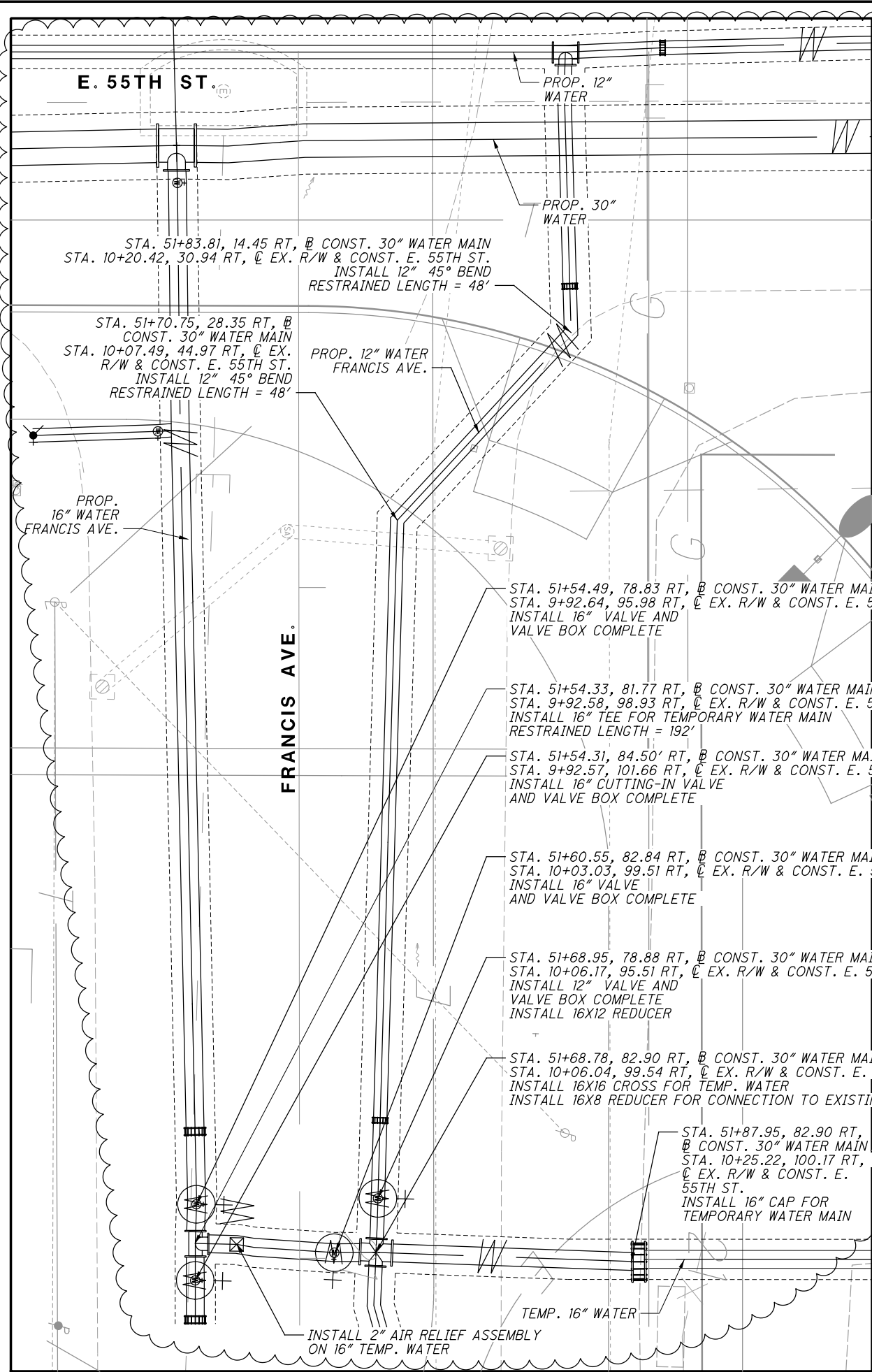
NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-04-04	RFC
ISSUE RECORD		

NOTES:
FOR BRIDGE CROSS FRAMES & PIPE SUPPORT DETAILS, SEE BU-03.
FOR PIPE INSULATION DETAILS, SEE SHEET 39

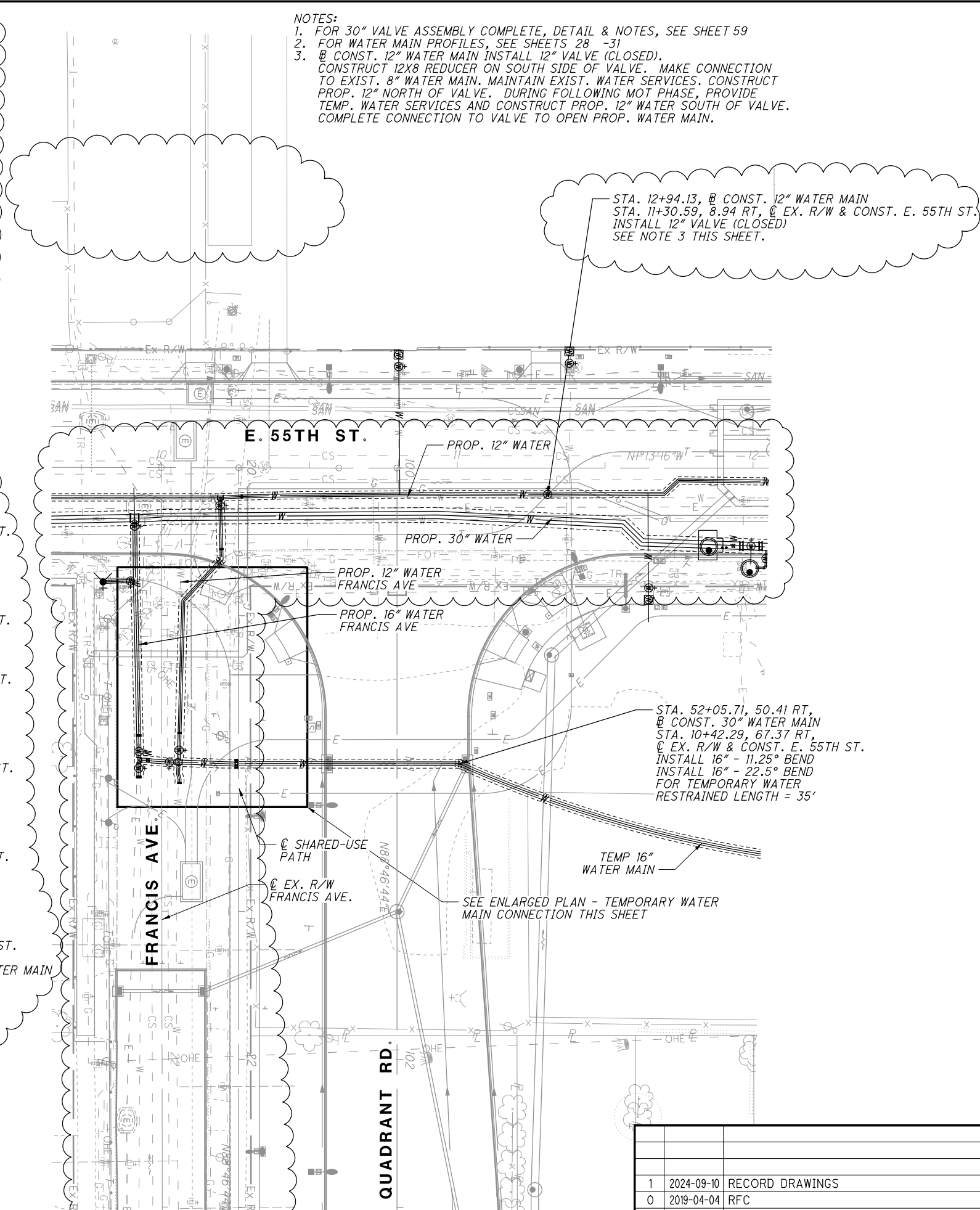


- W-1 STA. 55+01.60,
 @ 30" WATER MAIN
 INSTALL 30" ABUTMENT SLEEVE
- W-2 STA. 55+97.43
 @ WATER MAIN
 INSTALL 30" ABUTMENT SLEEVE
- W-3 STA. 14+98.40
 @ 12" WATER MAIN
 INSTALL 12" ABUTMENT SLEEVE
- W-4 STA. 15+94.23
 @ EX. 12" WATER MAIN
 INSTALL 12" ABUTMENT SLEEVE

1	2019-10-02	DCO19
0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



ENLARGED PLAN - TEMPORARY WATER MAIN CONNECTION
NOT TO SCALE

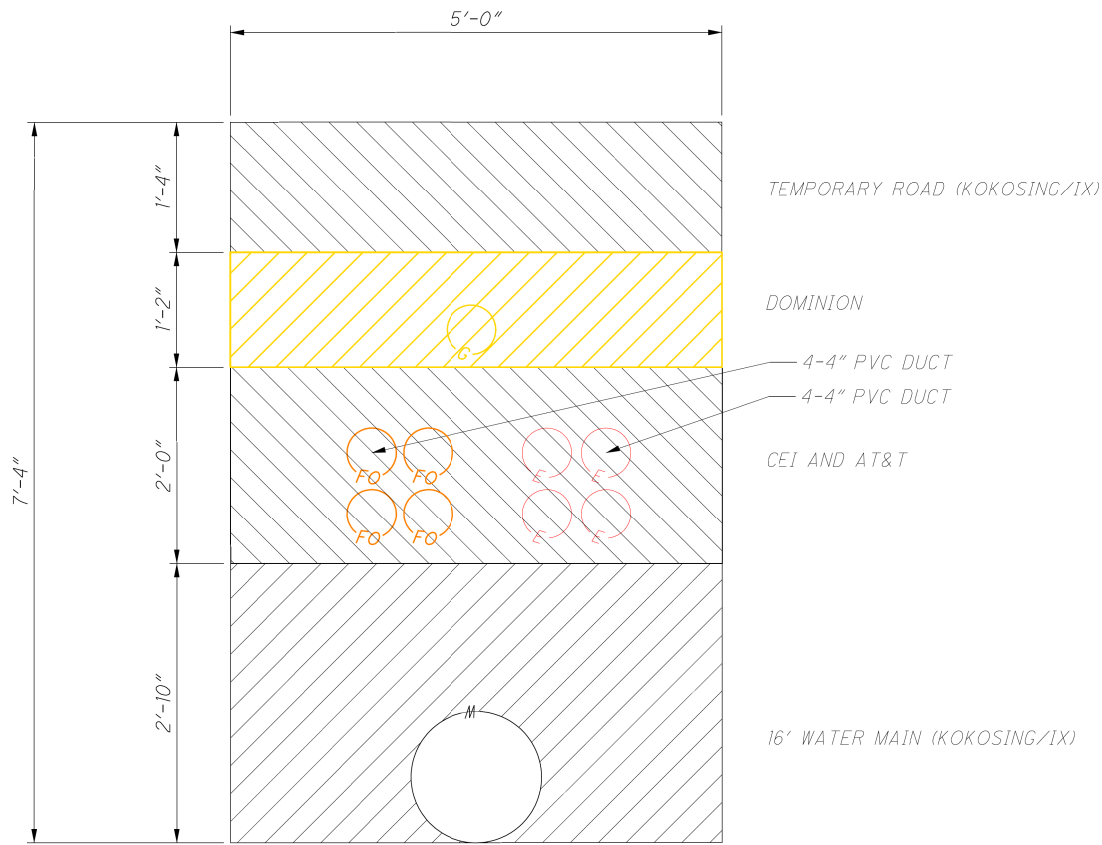


- NOTES:
1. FOR 30" VALVE ASSEMBLY COMPLETE, DETAIL & NOTES, SEE SHEET 59
 2. FOR WATER MAIN PROFILES, SEE SHEETS 28 - 31
 3. @ CONST. 12" WATER MAIN INSTALL 12" VALVE (CLOSED).
CONSTRUCT 12X8 REDUCER ON SOUTH SIDE OF VALVE. MAKE CONNECTION TO EXIST. 8" WATER MAIN. MAINTAIN EXIST. WATER SERVICES. CONSTRUCT PROP. 12" NORTH OF VALVE. DURING FOLLOWING MOT PHASE, PROVIDE TEMP. WATER SERVICES AND CONSTRUCT PROP. 12" WATER SOUTH OF VALVE. COMPLETE CONNECTION TO VALVE TO OPEN PROP. WATER MAIN.

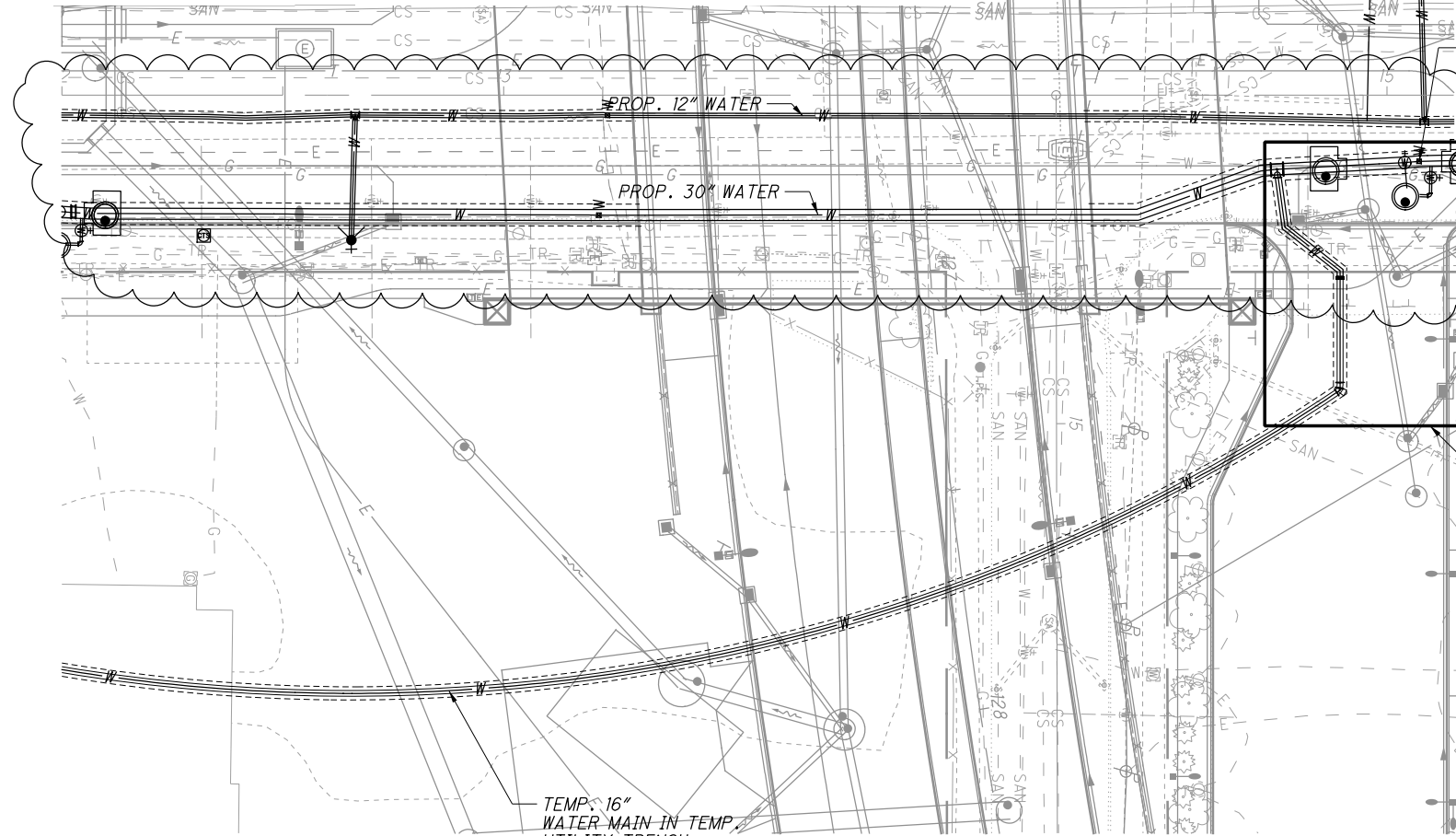
NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-04-04	RFC

ISSUE RECORD

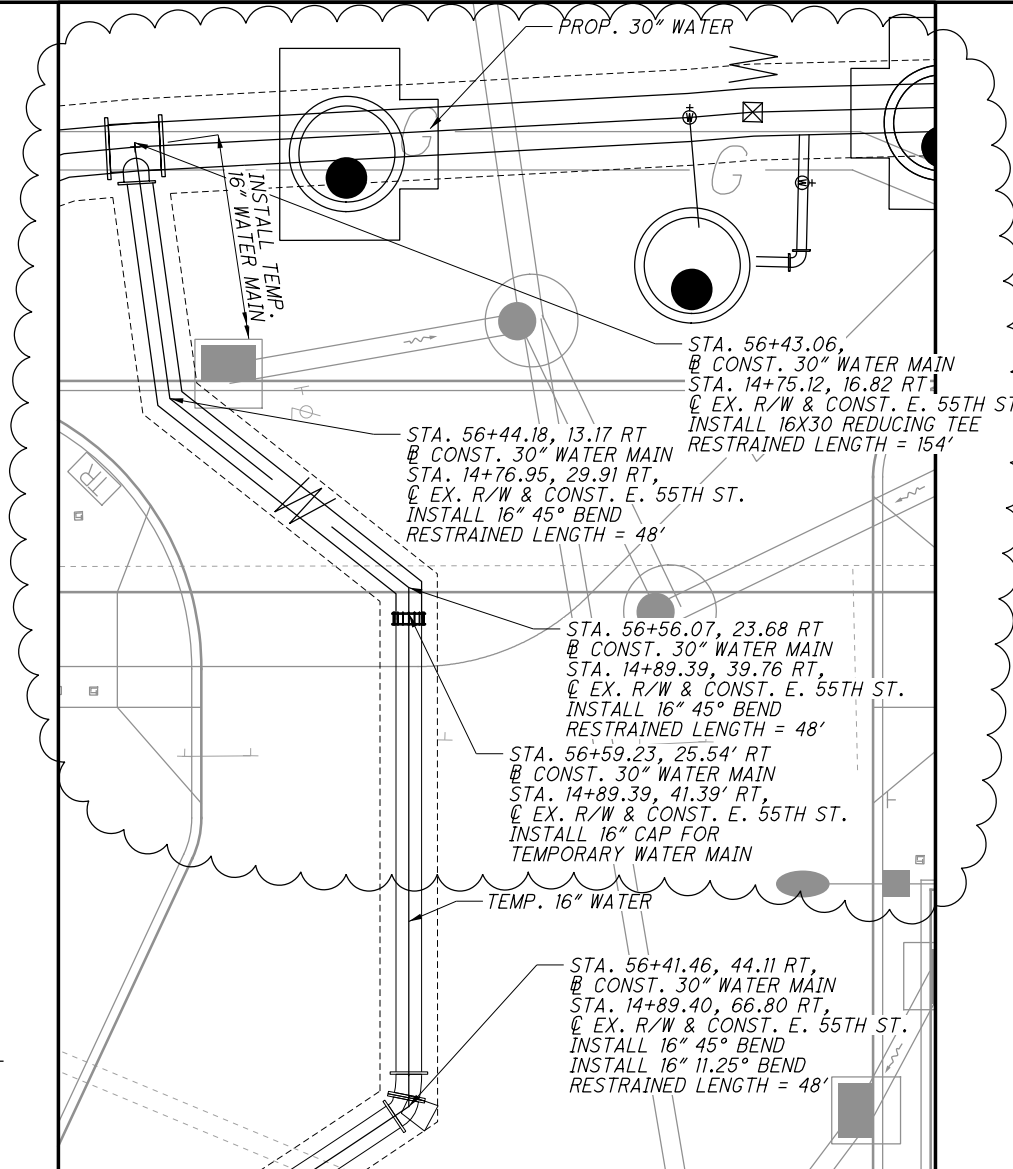
E. 55TH TEMPORARY ROAD UTILITY TYPICAL SECTION



*EACH ENTITY SHALL BACKFILL THEIR SECTION WITH LSM



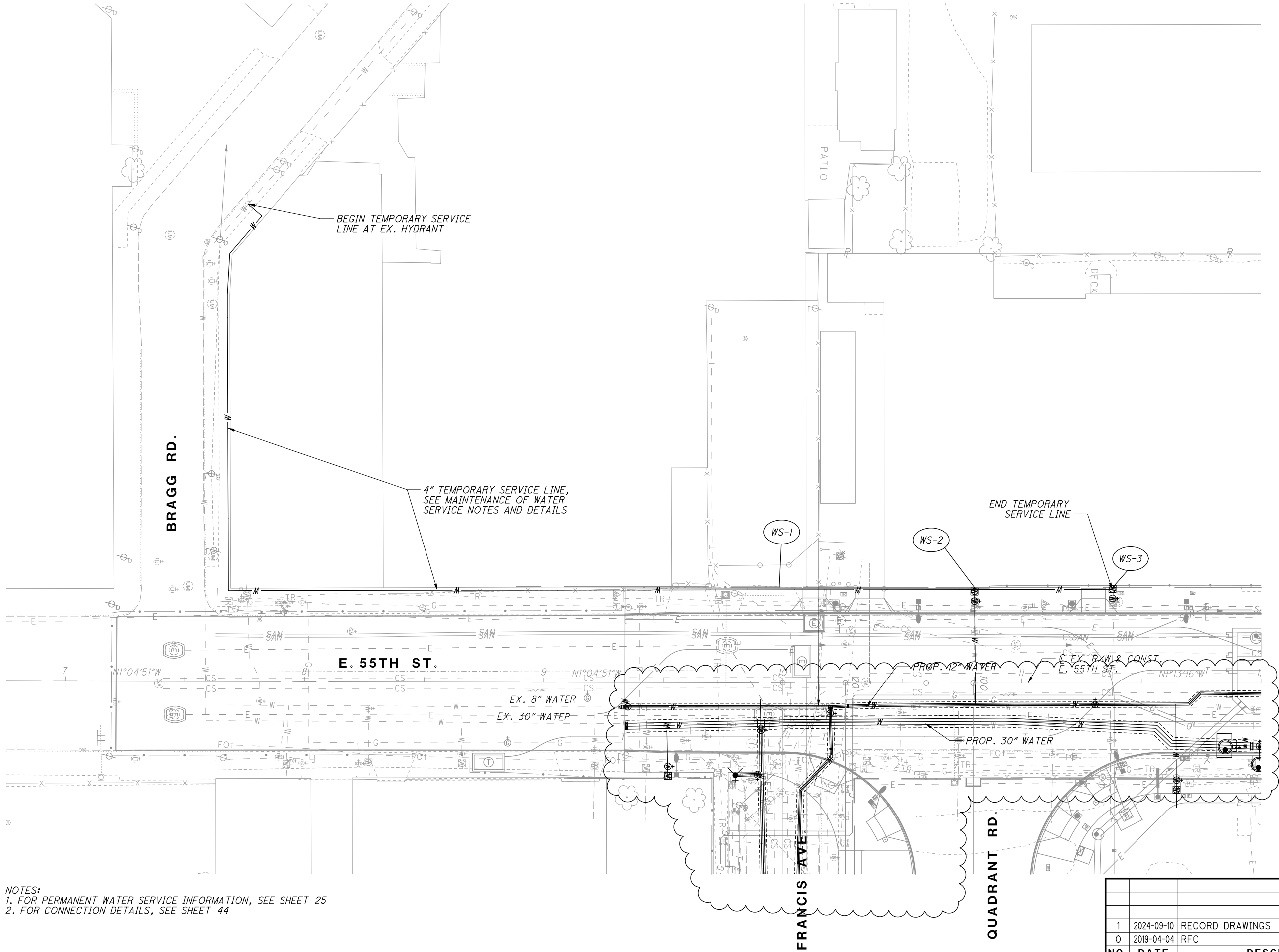
ENLARGED PLAN - TEMPOARY WATER MAIN CONNECTION
NOT TO SCALE



NOTES:
FOR 30" VALVE ASSEMBLY COMPLETE, DETAIL & NOTES, SEE SHEET 59
FOR WATER MAIN PROFILES, SEE SHEETS 28 - 31

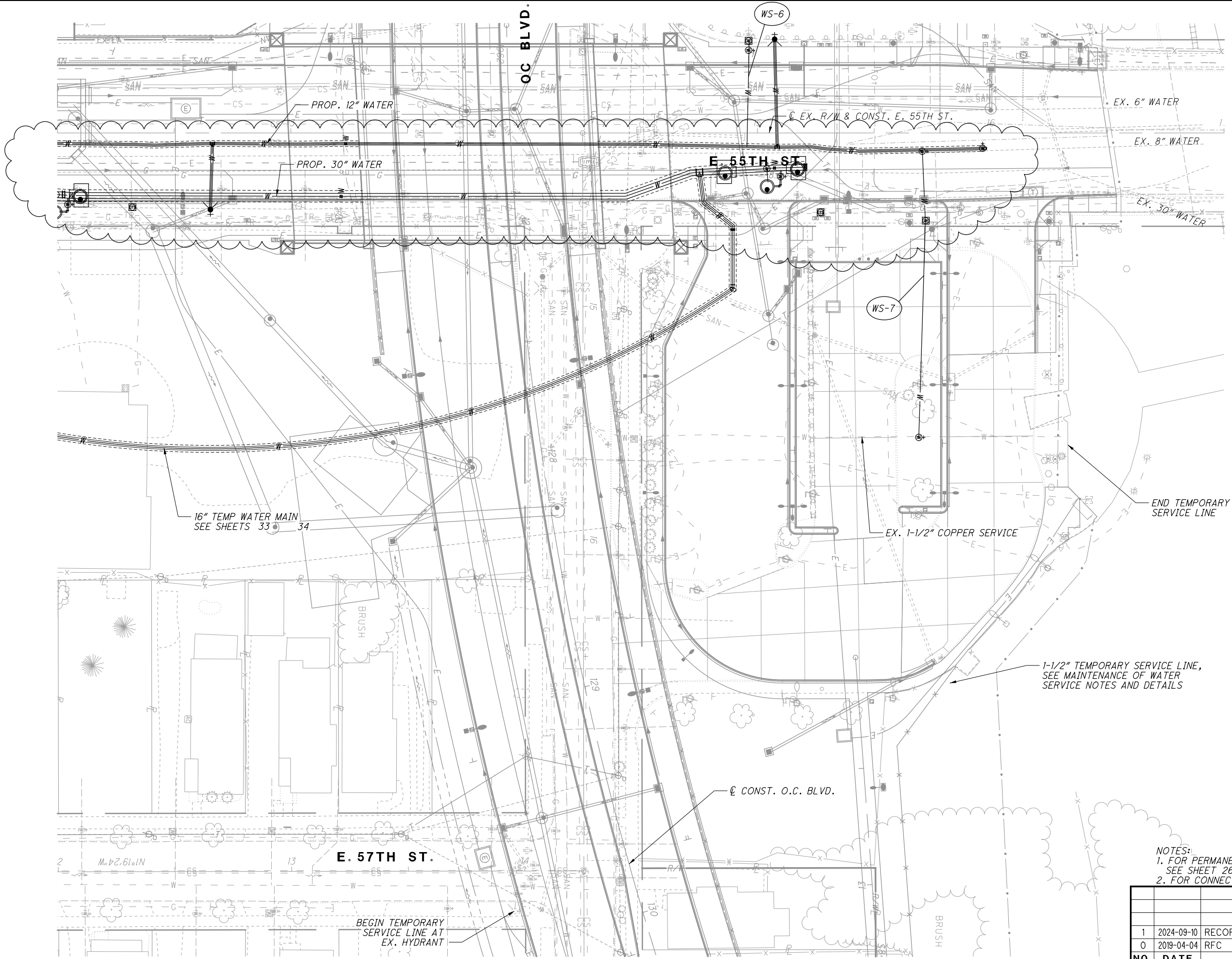
NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-04-04	RFC

ISSUE RECORD



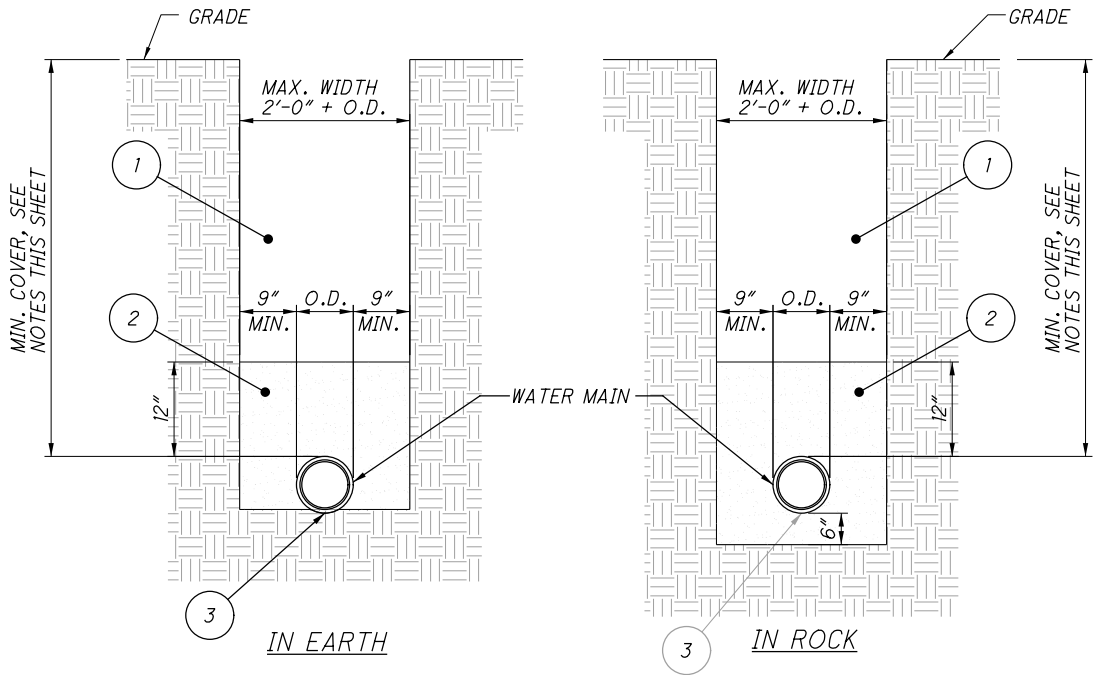
NOTES:
1. FOR PERMANENT WATER SERVICE INFORMATION, SEE SHEET 25
2. FOR CONNECTION DETAILS, SEE SHEET 44

NO.		DATE	DESCRIPTION
1		2024-09-10	RECORD DRAWINGS
0		2019-04-04	RFC
ISSUE RECORD			



NOTES:
1. FOR PERMANENT WATER SERVICE INFORMATION,
SEE SHEET 26
2. FOR CONNECTION DETAILS, SEE SHEET 44

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-04-04	RFC
ISSUE RECORD		



- 1 COMPACTED SUITABLE BACKFILL. SEE NOTES 1, 2, OR 3 THIS SHEET.
- 2 BACKFILL TAMPED SAND
- 3 AMPLE BELL HOLES SHALL BE FORMED TO PERMIT PROPER JOINTING

NOTES:

1. PREMIUM BACKFILL REQUIRED UNDER EXISTING OR FUTURE PAVEMENTS, SIDEWALKS, AND/OR DRIVES OR WHEN REQUIRED BY LOCAL MUNICIPALITY.
2. PREMIUM BACKFILL SHALL BE LIMESTONE GRADED PER ODOT 304.02 OR ODOT 411. NO SLAG IS PERMITTED.
3. UNLESS OTHERWISE SPECIFIED, ALL BACKFILLING OF TRENCHES WITHIN PAVEMENT LIMITS, WITH THE EXCEPTION OF UNDERDRAINS, SHALL BE BACKFILLED TO THE TOP OF THE TRENCH OR BOTTOM OF SUBGRADE, WHICHEVER IS LOWER, WITH LOW STRENGTH MORTAR (LSM) PER CITY OF CLEVELAND SPECIFICATIONS.

LSM SHALL CONSIST OF THE FOLLOWING PROPORTIONS PER CUBIC YARD:

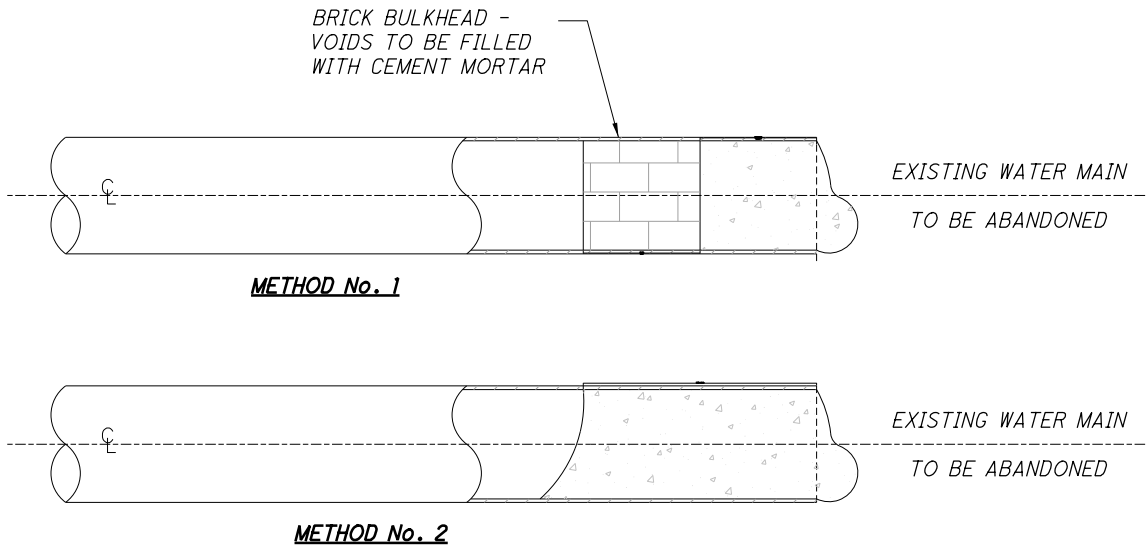
CEMENT (ASTM C-150, TYPE 1): 50 LBS
SAND (PER C&MS 703.03, SSD): 2475 LBS
WATER: 25 GALLONS
ADMIXTURE (AIR): 3 OZ.

APPROVED ADMIXTURES: MASTER BUILDERS-RHEOFILL, AXIM-FLOW AIR, W.R. GRACE-DARAFILL (AN EQUAL MAY BE USED ONLY WITH DEPARTMENT APPROVAL)

USE OF FLY ASH, SPENT FOUNDRY SAND, OR CORE SAND IS STRICTLY PROHIBITED.

4. CONTRACTOR SHALL USE SPECIAL CARE IN PLACING THE SAND BEDDING BACKFILL, SO AS TO AVOID SCRAPING OF THE EXTERIOR COATING, INJURING THE PIPE, DISTORTING OR MOVING THE PIPE WHEN COMPACTING THE SAME. THE SAND BEDDING BACKFILL SHALL BE TAMPED IN SIX (6) INCH LAYERS, SIMULTANEOUSLY ON EACH SIDE OF THE PIPE, AND THOROUGHLY COMPACTED SO AS TO PROVIDE A SOLID BACKING AGAINST THE EXTERNAL SURFACE OF THE PIPE.
5. MINIMUM COMPACTION FOR ALL SAND BEDDING BACKFILL, BACKFILL AND PREMIUM BACKFILL SHALL BE 95% STANDARD PROCTOR.
6. PAVEMENT, SIDEWALK OR DRIVES TO BE INSTALLED IN ACCORDANCE WITH LOCAL MUNICIPALITY'S SPECIFICATIONS.

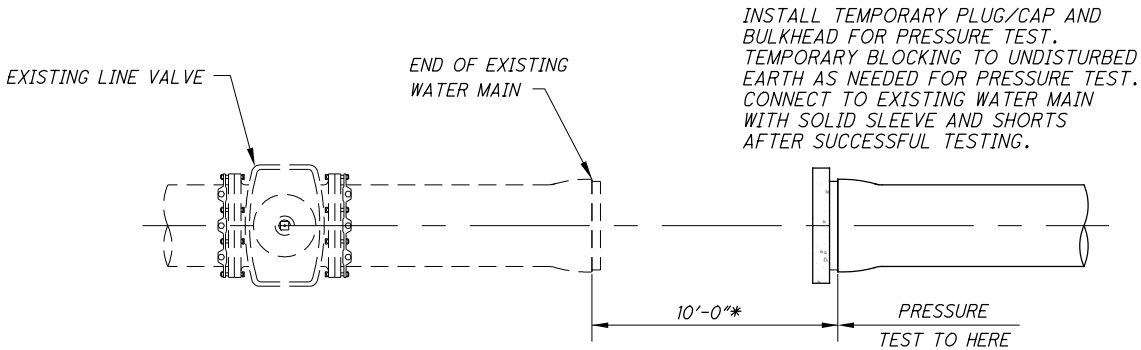
WATER MAIN TRENCH DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-001
(MODIFIED)



NOTES:

1. UTILITY CONDUITS 10 INCHES IN DIAMETER OR LARGER WHICH ARE BEING ABANDONED IN PLACE MUST BE FILLED WITH ITEM 613 (LOW STRENGTH MORTAR BACKFILL) SO THAT, AFTER SETTLEMENT, AT LEAST 90 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CONDUIT, FOR THE ENTIRE LENGTH IS FILLED.
2. PROPERLY DRAIN MAIN PRIOR TO ABANDONMENT.

PLUGGING ABANDONED WATER MAIN ENDS
- NOT TO SCALE -
CLEVELAND DIVISION OF WATER - STD-004
(MODIFIED)

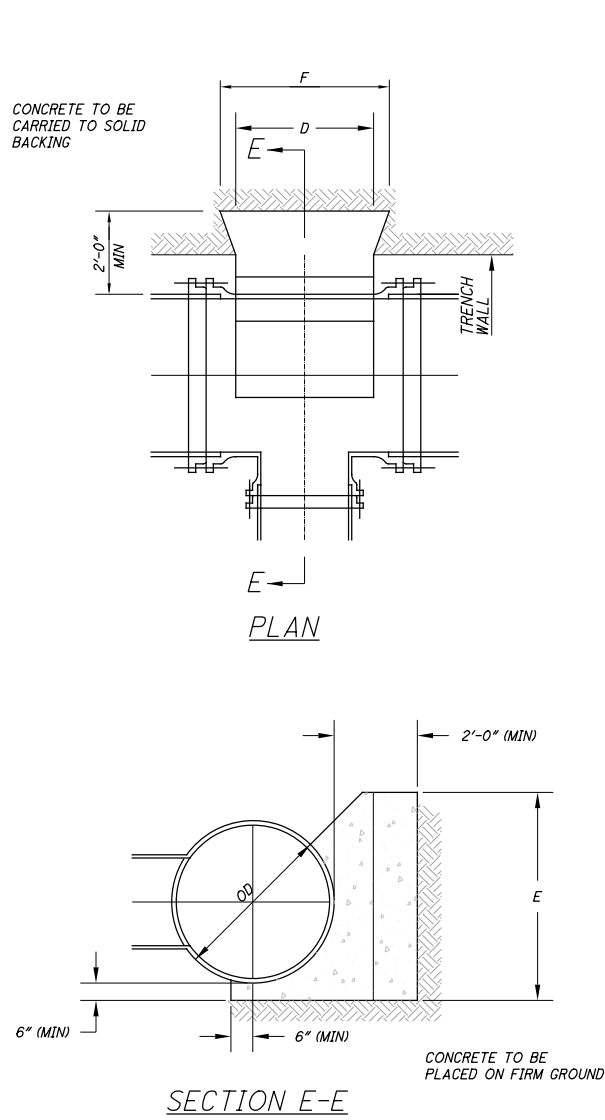


NOTE:

PRESSURE TESTING OF WATER MAINS:
WHERE NEW/EXTENDED WATER MAINS ARE CONNECTED TO AN EXISTING WATER MAIN FOR PRESSURE TEST, RESULTING IN FAILURE OF THE PRESSURE TEST OR ANY DAMAGE TO THE EXISTING WATER MAIN, OR ITS APPURTENANCES, THE REPAIR THEREOF SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ALL REPAIRS SHALL BE DONE TO THE SATISFACTION OF THE DIVISION OF WATER.

ALTERNATE PRESSURE TESTING DETAIL
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-002

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



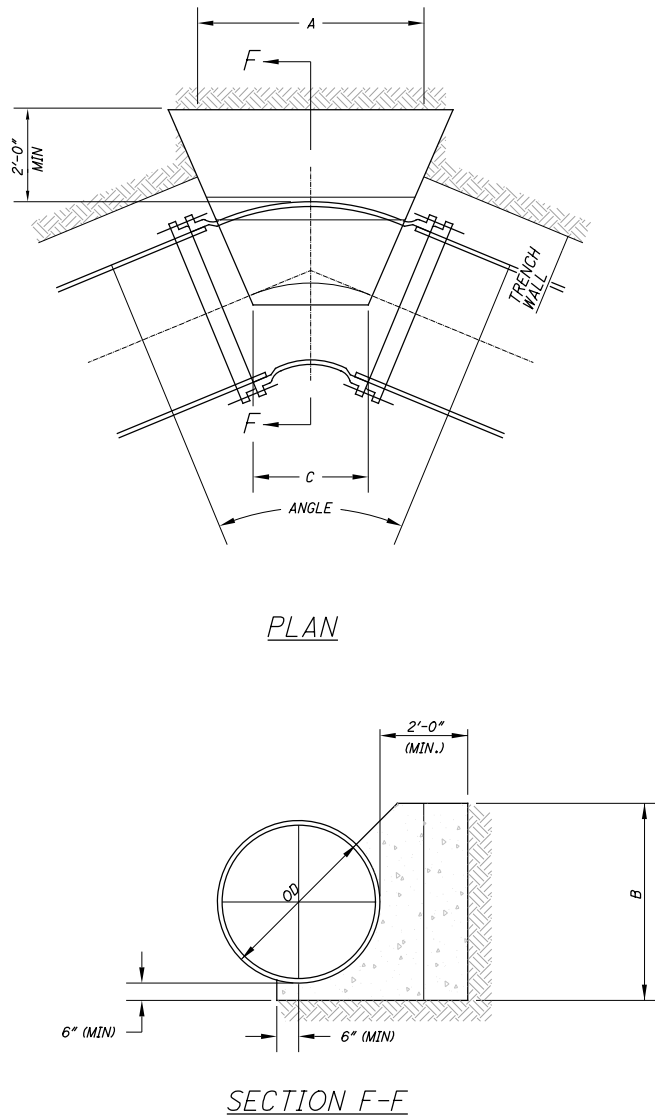
THRUST BLOCKS FOR TEES
NOT TO SCALE
(DUCTILE IRON, STEEL, AND PCC PIPE)

THRUST BLOCKS-SCHEDULE

PIPE SIZE	D (APPROX.)	E (MIN)	F (MIN)
6"-8"	1'-6"	1'-6"	3'-6"
12"	2'-0"	1'-10"	4'-0"
16"	2'-6"	2'-2"	4'-6"
20"	3'-0"	3'-2"	5'-0"
24"	3'-8"	3'-8"	5'-8"
30"	4'-2"	4'-2"	6'-2"
36"	4'-8"	4'-8"	6'-8"
42"	5'-2"	5'-4"	7'-2"
48"	5'-8"	5'-10"	7'-8"
54"	6'-2"	6'-4"	8'-2"

NOTE:
DIMENSIONS HEREON FOR THRUST BLOCKS ARE APPROXIMATE
AND FOR REFERENCE ONLY. ALL CONCRETE SHALL BE FORMED AND POURED TO
UNDISTURBED EARTH.

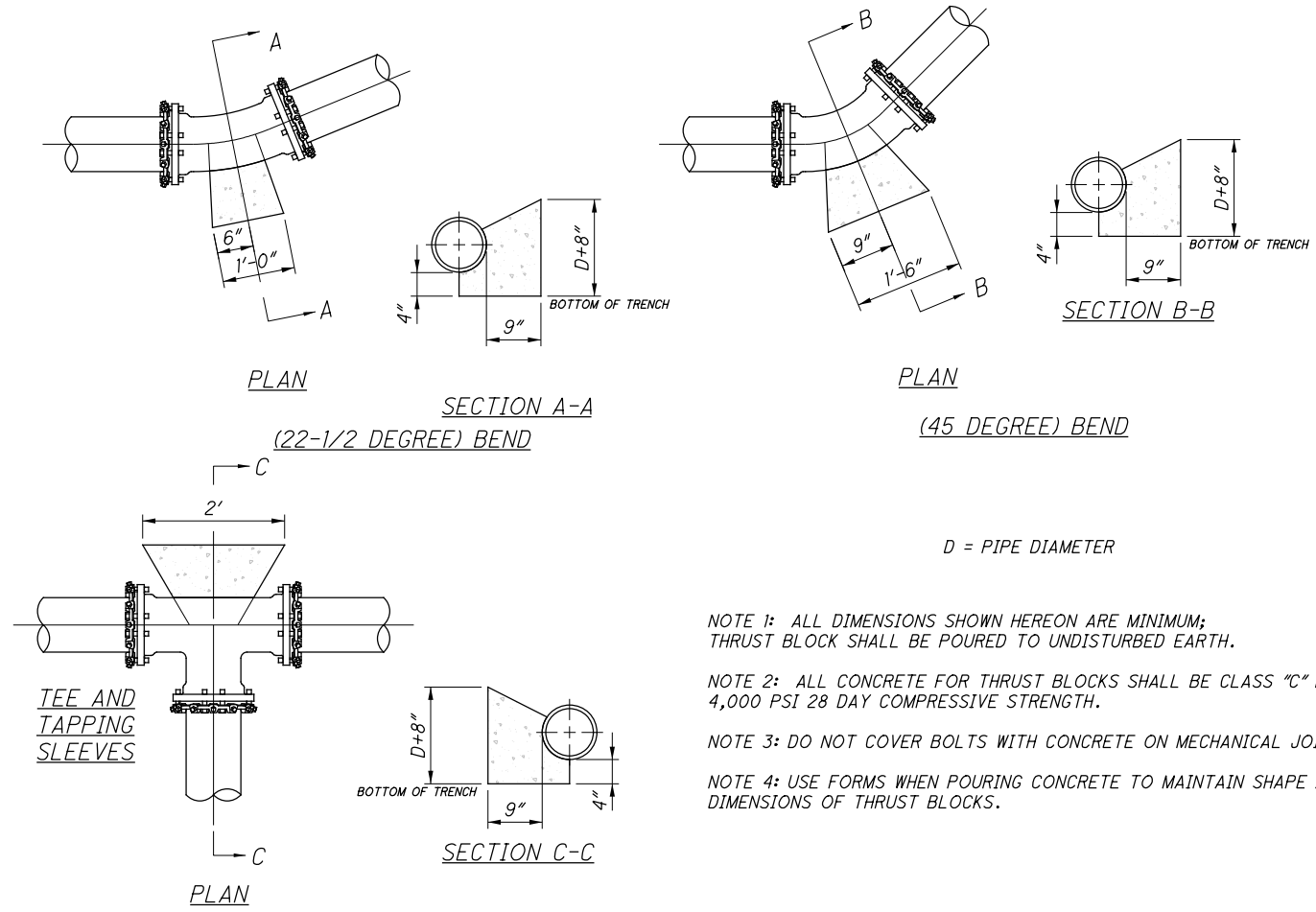
SUPPLY MAIN THRUST BLOCK DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD11



THRUST BLOCKS FOR BENDS
NOT TO SCALE
(DUCTILE IRON, STEEL, AND PCC PIPE)

THRUST BLOCKS-SCHEDULE

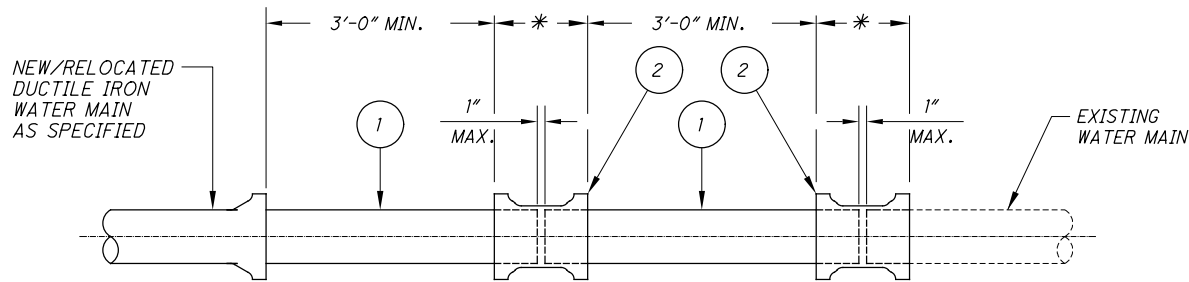
PIPE SIZE	11-1/4°, 22-1/2°, 45°		
	A (MIN)	B (MIN)	C (APPROX.)
6"-8"	2'-8"	1'-6"	0'-8"
12"	3'-0"	1'-10"	1'-0"
16"	3'-2"	2'-2"	1'-0"
20"	3'-10"	3'-2"	1'-3"
24"	4'-3"	3'-8"	1'-6"
30"	5'-0"	4'-2"	2'-0"
36"	5'-6"	4'-8"	2'-6"
42"	6'-0"	5'-4"	3'-0"
48"	7'-0"	5'-10"	3'-6"
54"	8'-0"	6'-4"	4'-0"



TYPICAL THRUST BLOCK DETAIL
FOR HORIZONTAL DEFLECTION FOR PIPE UP TO 16" DIAMETER
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-008

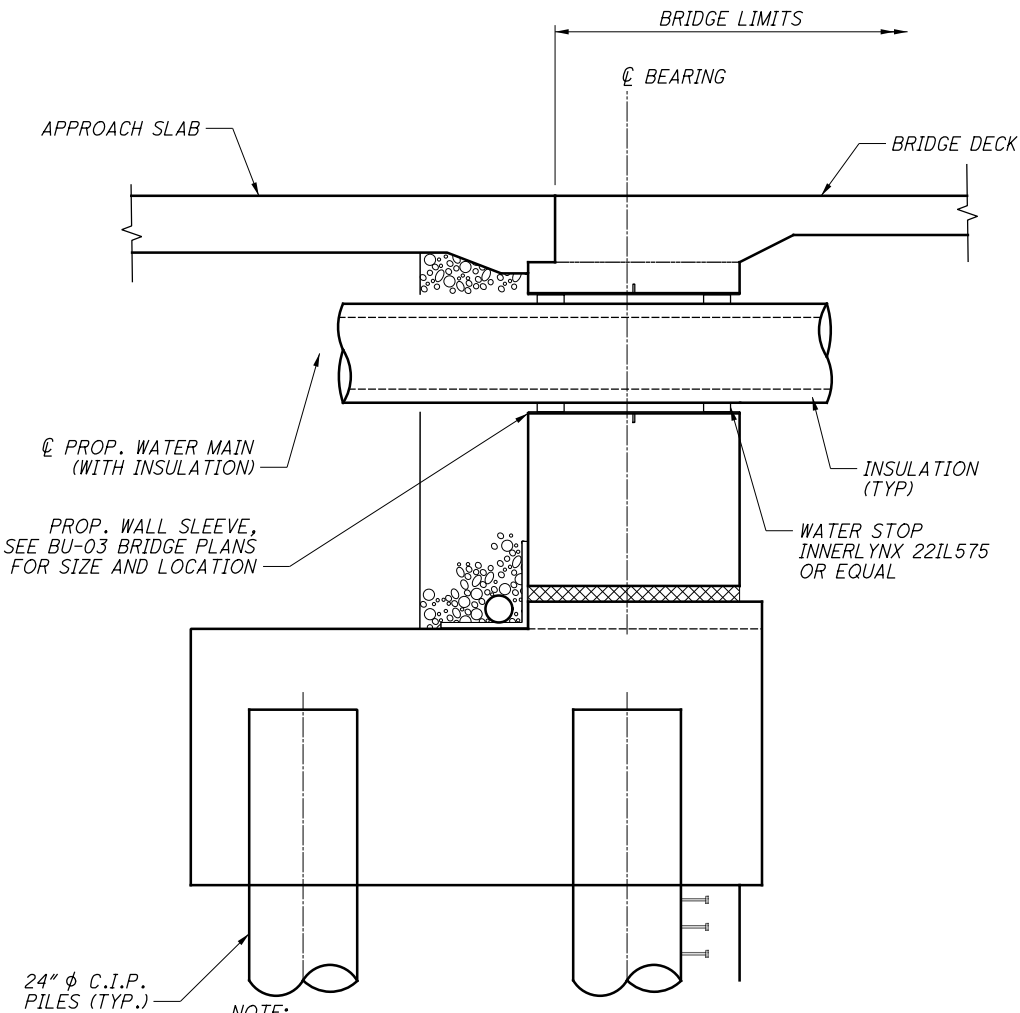
NOTE 1: ALL DIMENSIONS SHOWN HEREON ARE MINIMUM;
THRUST BLOCK SHALL BE POURED TO UNDISTURBED EARTH.
NOTE 2: ALL CONCRETE FOR THRUST BLOCKS SHALL BE CLASS "C" HAVING
4,000 PSI 28 DAY COMPRESSIVE STRENGTH.
NOTE 3: DO NOT COVER BOLTS WITH CONCRETE ON MECHANICAL JOINTS.
NOTE 4: USE FORMS WHEN POURING CONCRETE TO MAINTAIN SHAPE AND
DIMENSIONS OF THRUST BLOCKS.

NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		

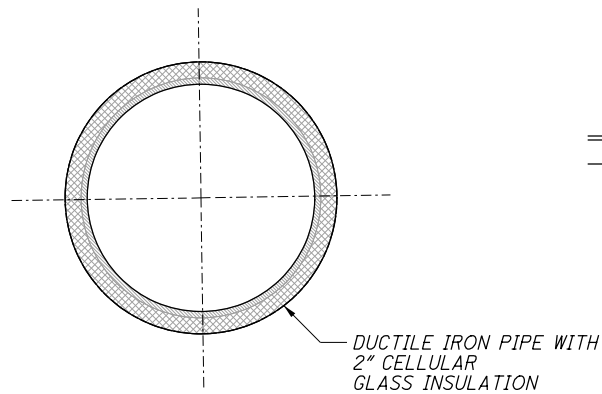


- 1) PLAIN END x PLAIN END DUCTILE IRON PIPE AS SPECIFIED (CUT TO SUIT).
- 2) *CONNECTION SHALL BE MADE WITH RETAINED MECHANICAL JOINT SOLID SLEEVES (SHORT OR LONG PATTERN) DUCTILE IRON CLASS 350 OR CAST IRON CLASS 250 OR COMPRESSION COUPLINGS.
- COMPRESSION COUPLINGS SHALL BE OF A GASKETED, SLEEVE TYPE WITH DIAMETERS TO PROPERLY FIT PLAIN END IRON PIPE. EACH COUPLING SHALL CONSIST OF ONE (1) MIDDLE RING, WITHOUT STOPS; TWO (2) FOLLOWER GLANDS; TWO (2) ER-COMPOUND BUNA-N BLEND, WEDGE SECTION GASKETS; AND SUFFICIENT TRACKHEAD STAINLESS STEEL BOLTS AND NUTS (ASTM A276/A193/194, TYPE 304, EXTRA HEAVY HEX) TO PROPERLY COMPRESS THE GASKETS.
- MIDDLE RING AND FOLLOWER GLANDS SHALL BE OF EITHER STEEL OR DUCTILE IRON (ASTM-A536).
- THE COMPRESSION COUPLING SHALL BE WITHOUT STOPS AND BE RATED FOR A MINIMUM WORKING PRESSURE OF 250 PSI AND SHALL BE EQUAL TO THE DRESSER STYLE No's 38, 138 OR 162 (TRANSITION TYPE), OR SMITH-BLAIR 441 STRAIGHT AND TRANSITION COUPLINGS.
- 3) ALL BOLTS AND NUTS ON ALL MECHANICAL JOINTS, INCLUDING THOSE ON THE "RETAINED" TYPE, SHALL HAVE FIELD APPLIED ONE (1) COAT OF BITUMASTIC PAINTING FOLLOWED BY AN ENCASEMENT OF POLYETHYLENE WRAPPING IN ACCORDANCE WITH ANSI/AWWA C-105/A21.5-88, CLASS "C", METHOD "B".

SLEEVE-IN INSTALLATION DETAIL
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-007

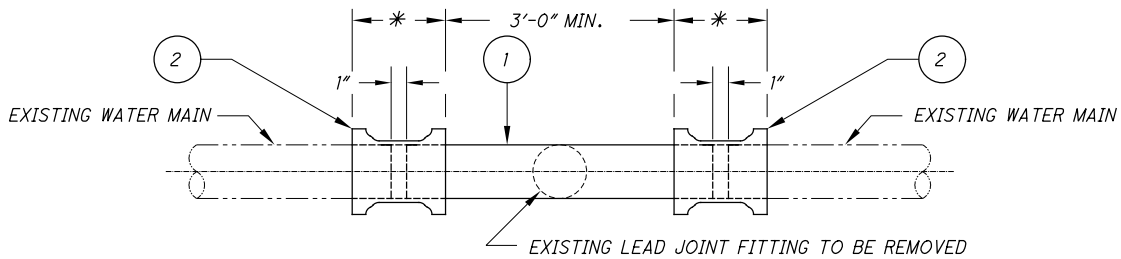


ABUTMENT SLEEVE FOR WATERMAINS DETAIL
- NOT TO SCALE -



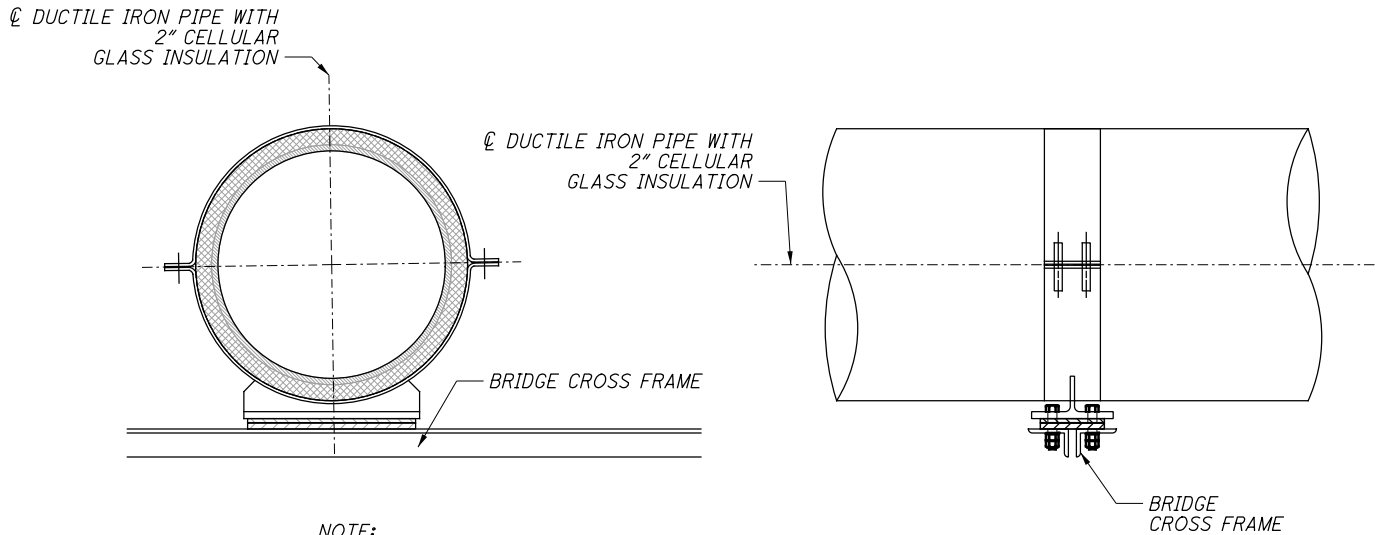
NOTE:
FOR INSULATION NOTES AND SPECIFICATIONS, SEE
ITEM 638 - INSULATION AND OUTER PROTECTIVE
JACKET NOTES ON SHEET 13

TYPICAL PIPE INSULATION DETAIL
- NOT TO SCALE -



- 1) PLAIN END x PLAIN END DUCTILE IRON PIPE AS SPECIFIED (CUT TO SUIT).
- 2) *CONNECTION SHALL BE MADE WITH RETAINED MECHANICAL JOINT SOLID SLEEVES (SHORT OR LONG PATTERN) DUCTILE IRON CLASS 350 OR CAST IRON CLASS 250 OR COMPRESSION COUPLINGS.
- COMPRESSION COUPLINGS SHALL BE OF A GASKETED, SLEEVE TYPE WITH DIAMETERS TO PROPERLY FIT PLAIN END IRON PIPE. EACH COUPLING SHALL CONSIST OF ONE (1) MIDDLE RING, WITHOUT STOPS; TWO (2) FOLLOWER GLANDS; TWO (2) ER-COMPOUND BUNA-N BLEND, WEDGE SECTION GASKETS; AND SUFFICIENT TRACKHEAD STAINLESS STEEL BOLTS AND NUTS (ASTM A276/A193/194, TYPE 304, EXTRA HEAVY HEX) TO PROPERLY COMPRESS THE GASKETS.
- MIDDLE RING AND FOLLOWER GLANDS SHALL BE OF EITHER STEEL OR DUCTILE IRON (ASTM-A536).
- THE COMPRESSION COUPLING SHALL BE WITHOUT STOPS AND BE RATED FOR A MINIMUM WORKING PRESSURE OF 250 PSI AND SHALL BE EQUAL TO THE DRESSER STYLE No's 38, 138 OR 162 (TRANSITION TYPE), OR SMITH-BLAIR 441 STRAIGHT AND TRANSITION COUPLINGS.
- 3) ALL BOLTS AND NUTS ON ALL MECHANICAL JOINTS, INCLUDING THOSE ON THE "RETAINED" TYPE, SHALL HAVE FIELD APPLIED ONE (1) COAT OF BITUMASTIC PAINTING FOLLOWED BY AN ENCASEMENT OF POLYETHYLENE WRAPPING IN ACCORDANCE WITH ANSI/AWWA C-105/A21.5-88, CLASS "C", METHOD "B".

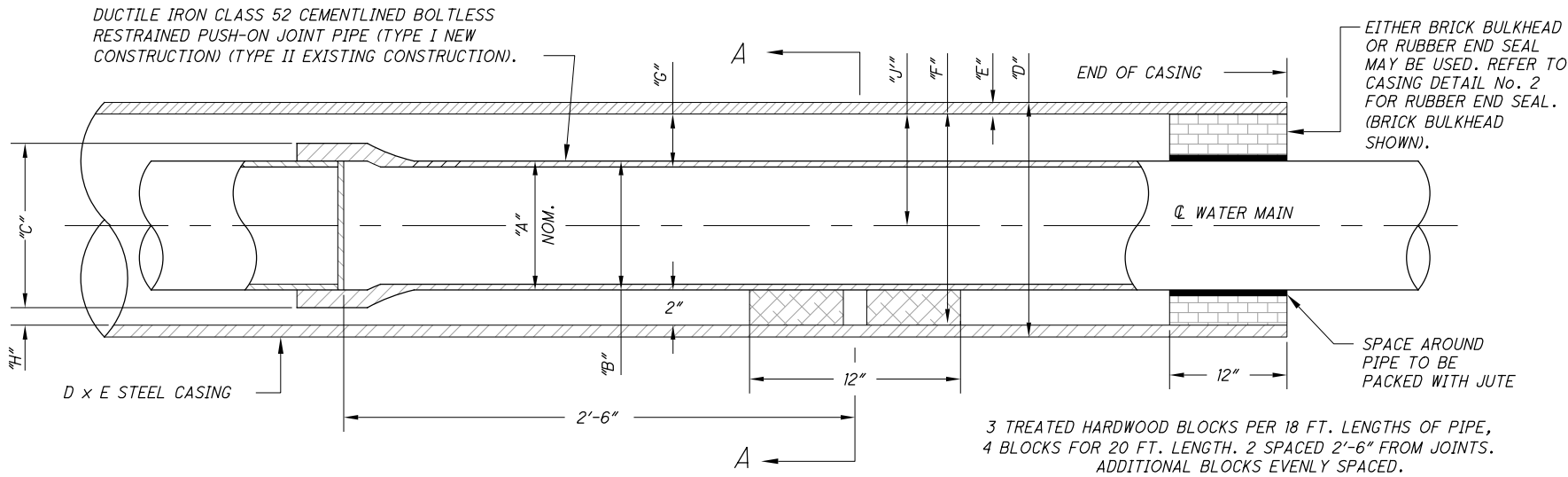
SPOOL-IN INSTALLATION DETAIL
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-008



- NOTE:
1. PIPE SUPPORTS ARE TO BE FABRICATED AS DETAILED IN THE SHOP DRAWINGS.
 2. THERE SHALL BE A MINIMUM OF TWO (2) PIPE SUPPORTS FOR EACH PIPE LENGTH, NO MORE THAN 20' OF PIPE SHALL BE UNSUPPORTED.
 3. PIPE SUPPORTS ARE REQUIRED TO ALLOW MOVEMENT ONLY IN THE AXIAL DIRECTIONS. ALL OTHER MOVEMENT IS RESTRICTED.
 4. PIPE SUPPORTS SHALL NOT CRUSH PIPE INSULATION.
 5. REFER TO BU-03, E 55TH STREET BRIDGE, PLANS FOR MORE DETAILED INFORMATION ON PIPE SUPPORT DESIGN.

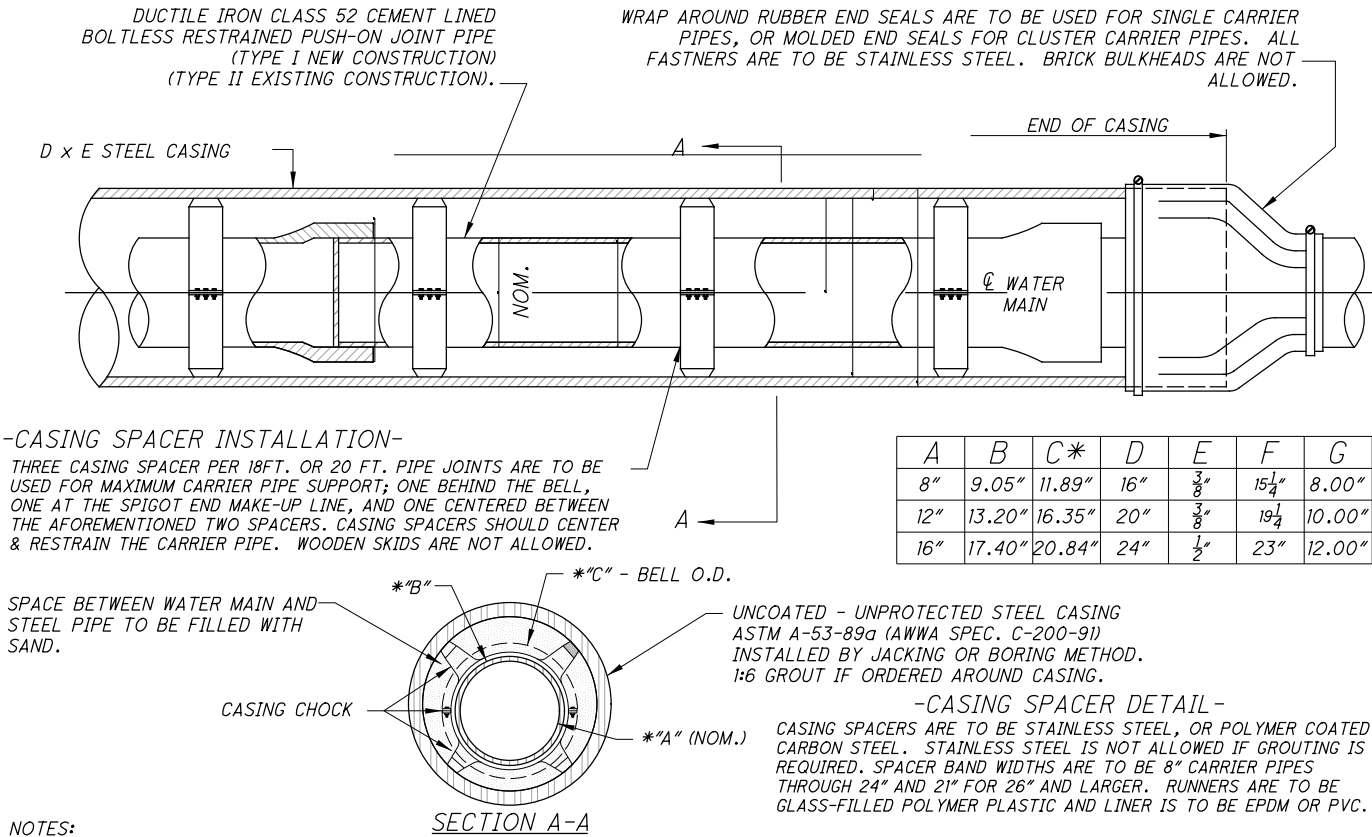
TYPICAL PIPE SUPPORT DETAIL
- NOT TO SCALE -

NO.	DATE	DESCRIPTION
1	2019-10-02	DC019
0	2019-04-04	RFC
ISSUE RECORD		



A	B	C*	D	E	F	G	H	J
8"	9.05"	11.89"	16"	$\frac{3}{8}"$	$15\frac{1}{4}"$	4.20"	0.58"	8.73"
12"	13.20"	16.35"	20"	$\frac{3}{8}"$	$19\frac{1}{4}"$	4.05"	0.43"	10.65"
16"	17.40"	20.84"	24"	$\frac{1}{2}"$	23"	3.60"	0.28"	12.30"

CASING DETAIL No. 1
- NOT TO SCALE -



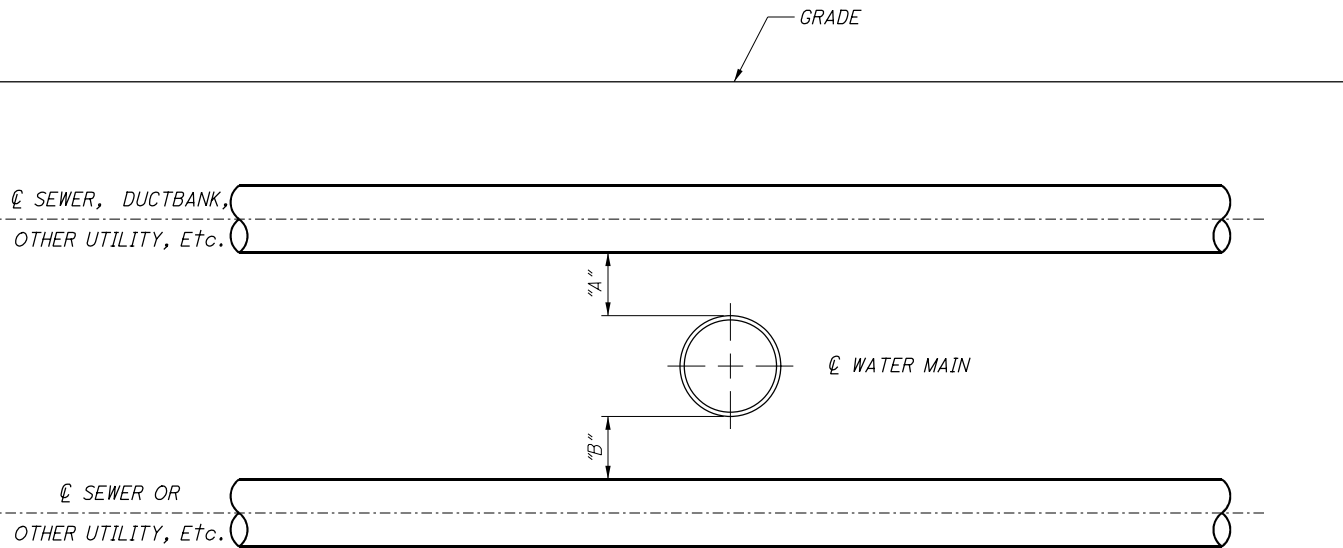
A	B	C*	D	E	F	G
8"	9.05"	11.89"	16"	$\frac{3}{8}"$	$15\frac{1}{4}"$	8.00"
12"	13.20"	16.35"	20"	$\frac{3}{8}"$	$19\frac{1}{4}"$	10.00"
16"	17.40"	20.84"	24"	$\frac{1}{2}"$	23"	12.00"

NOTES:
1. CONTRACTOR'S FAILURE TO MAINTAIN THE CASING PIPE ON THE LINE AND GRADE AS SHOWN OR DIRECTED, RESULTING IN THE USE OF ADDITIONAL PIPE AND/OR FITTINGS TO MAKE CONNECTIONS TO EXISTING WATER MAIN WILL BE CAUSE FOR REJECTION OF CASING INSTALLATION.
*2. OUTSIDE DIAMETER OF BELL OF BOLTLESS RESTRAINED PIPE MAY VARY WITH MANUFACTURE, THEREFORE, CONTRACTOR SHALL VERIFY O.D. OF BELL AND INCREASE SIZE OF STEEL CASING AS REQUIRED.

CASING DETAIL No. 2 END OF CASING AND CASING CHOCK DETAIL
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-016

NOTES:
1. CONTRACTOR'S FAILURE TO MAINTAIN THE CASING PIPE ON THE LINE AND GRADE AS SHOWN OR DIRECTED, RESULTING IN THE USE OF ADDITIONAL PIPE AND/OR FITTINGS TO MAKE CONNECTIONS TO EXISTING WATER MAIN WILL BE CAUSE FOR REJECTION OF CASING INSTALLATION.
*2. OUTSIDE DIAMETER OF BELL OF BOLTLESS RESTRAINED PIPE MAY VARY WITH MANUFACTURE, THEREFORE, CONTRACTOR SHALL VERIFY O.D. OF BELL AND INCREASE SIZE OF STEEL CASING AS REQUIRED.

NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		

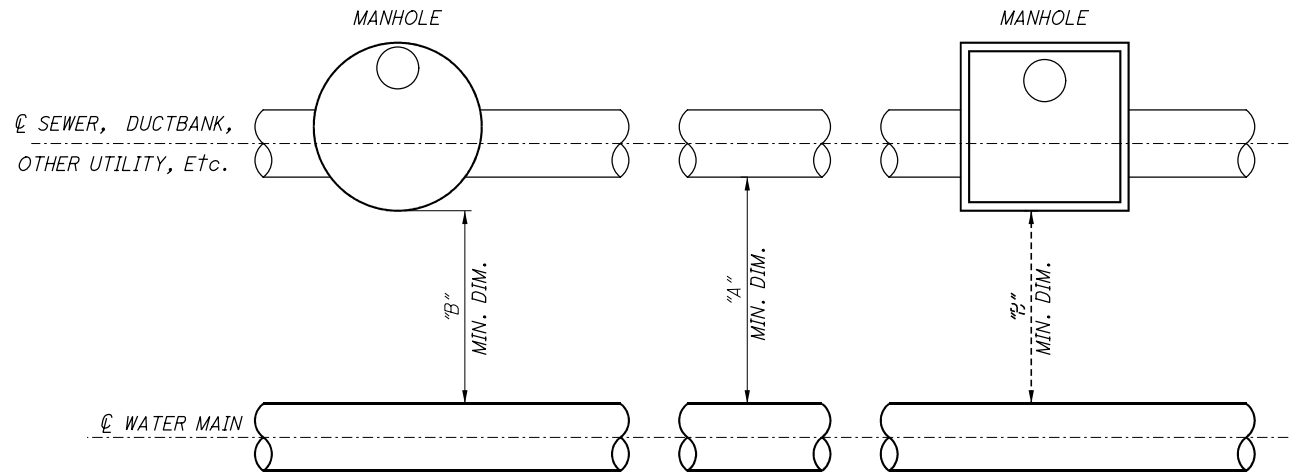


PROFILE VIEW
- SEE STD-017 FOR PLAN VIEW -

VERTICAL CLEARANCE	SANITARY SEWER LESS THAN 24"	SANITARY SEWER 24" & LARGER	STORM SEWER, DUCTBANK, GAS, OTHER UTILITY LESS THAN 24"	STORM SEWER, DUCTBANK, GAS, OTHER UTILITY 24" & LARGER	REMARKS
"A"	18" Min.	*18" Min.	***12"	*12"	*WATER MAIN IN CASING: CLEARANCE TO TOP OF CASING
"B"	18" Min.	**18" Min.	12"	**12"	**CLEARANCE TO TOP OF UTILITY OR TOP OF CASING; WHEN UTILITY IS IN CASING

***INCREASE TO 18" WHEN WIDTH OR
DIAMETER OF UTILITY IS GREATER THAN
DIAMETER OF WATER MAIN

VERTICAL CLEARANCE FOR UTILITIES
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-018

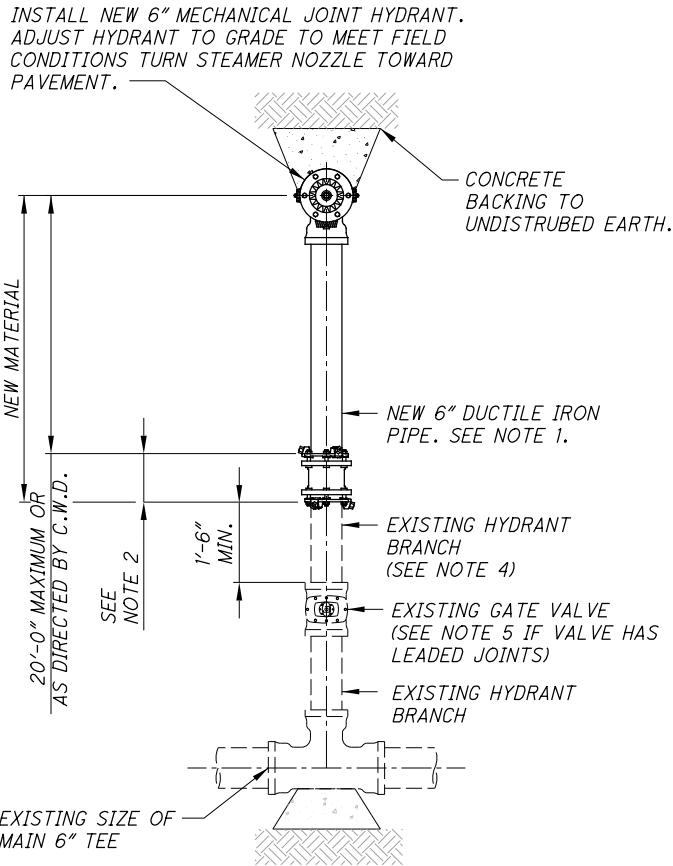


PLAN VIEW
- SEE STD-018 FOR PROFILE VIEW -

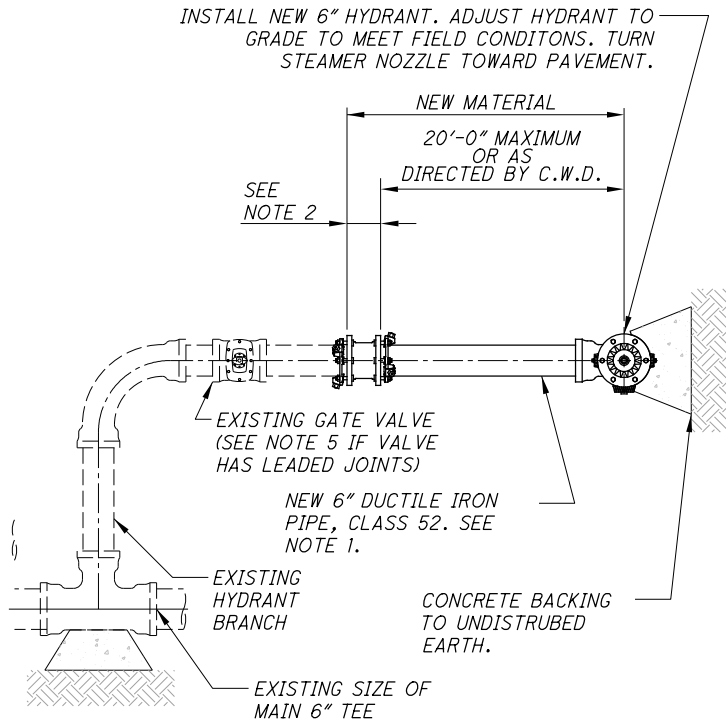
	HORIZONTAL CLEARANCE	STORM SEWER	SANITARY SEWER	GAS, DUCTBANK, OTHER UTILITY, ETC.
WHEN BOTTOM OF UTILITY PIPE IS AT OR ABOVE BOTTOM OF WATER MAIN	"A"	4'-0"	10'-0" MIN.	3'-0"
	"B"	4'-0"	7'-0" MIN.	3'-0"
WHEN BOTTOM OF UTILITY PIPE IS BELOW BOTTOM OF WATER MAIN	"A"	5'-0"	10'-0" MIN.	5'-0"
	"B"	5'-0"	7'-0" MIN.	5'-0"

HORIZONTAL CLEARANCE FOR UTILITIES
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-017

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

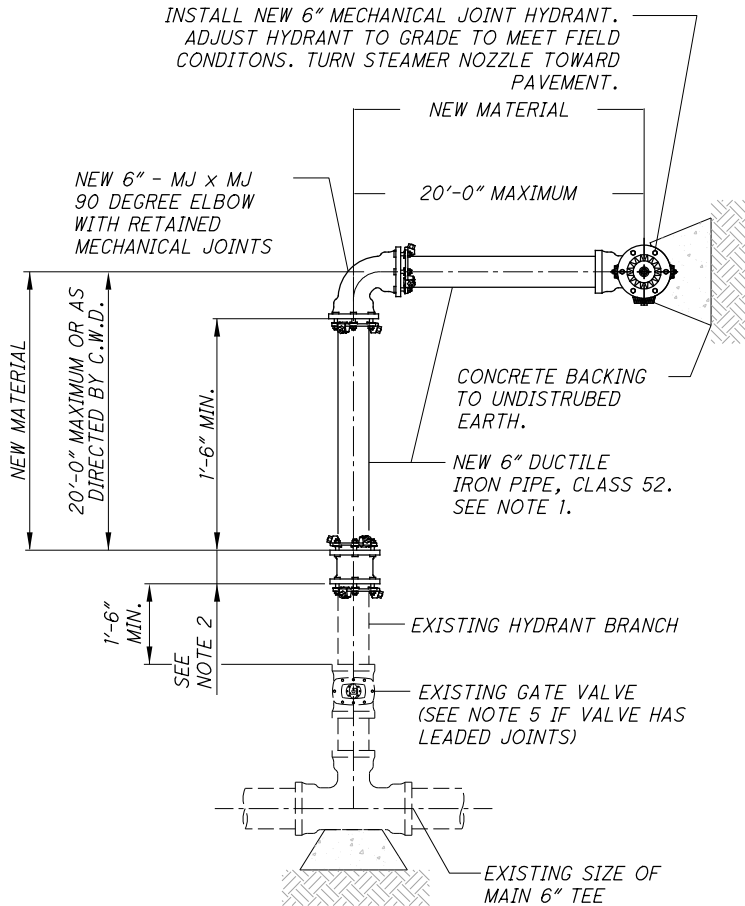


STRAIGHT TYPE HYDRANT DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H02



OFFSET TYPE 3 HYDRANT DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H05

NOTE: EXISTING 6" HYDRANT BRANCHES TO BE EXTENDED.
EXISTING 4" HYDRANT BRANCHES TO BE REMOVED
AND NEW 6" CUT-IN TEE'S INSTALLED.

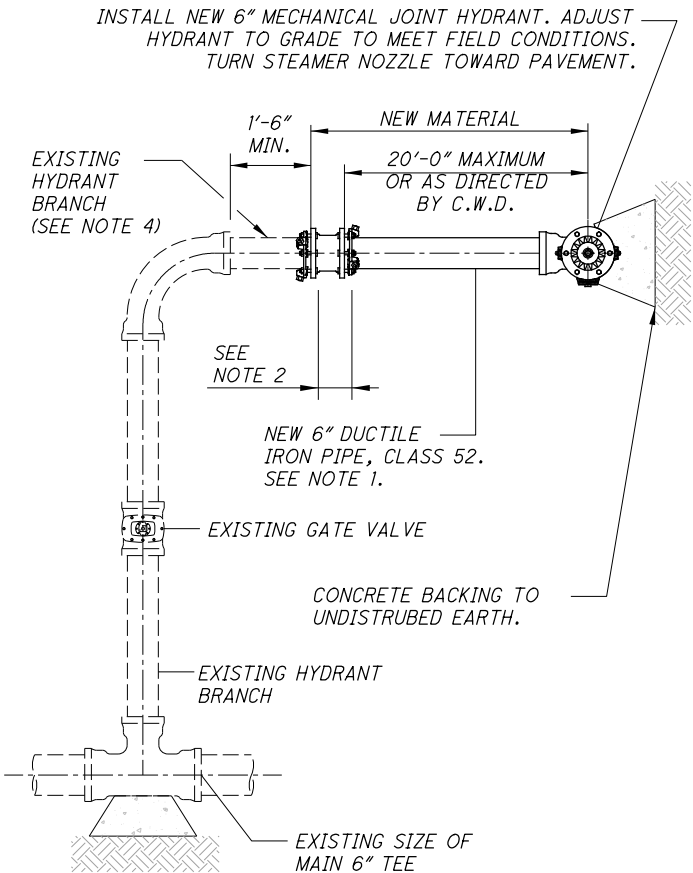


OFFSET TYPE 1 HYDRANT DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H03

- 1) PLAIN END x PLAIN END DUCTILE IRON PIPE AS SPECIFIED (CUT TO SUIT).
- 2) CONNECTION SHALL BE MADE WITH RETAINED MECHANICAL JOINT SOLID SLEEVES (SHORT OR LONG PATTERN) DUCTILE IRON CLASS 350 OR CAST IRON CLASS 250, RETAINED MECHANICAL JOINT REDUCERS WHERE EXISTING PIPE IS 4" IN DIAMETER, OR COMPRESSION COUPLINGS WITH ROD AND CLAMPS AS DIRECTED BY C.W.D. INSPECTOR.

COMPRESSION COUPLINGS SHALL BE OF A GASKETED, SLEEVE TYPE WITH DIAMETERS TO PROPERLY FIT PLAIN END IRON PIPE. EACH COUPLING SHALL CONSIST OF ONE (1) MIDDLE RING, WITHOUT STOPS; TWO (2) FOLLOWER GLANDS; TWO (2) RUBBER-COMPOUND BUNA-N BLEND, WEDGE SECTION GASKETS; AND SUFFICIENT TRACKHEAD STAINLESS STEEL BOLTS AND NUTS (ASTM A276/A193/194, TYPE 304, EXTRA HEAVY HEX) TO PROPERLY COMPRESS THE GASKETS. MIDDLE RING AND FOLLOWER GLANDS SHALL BE OF EITHER STEEL OR DUCTILE IRON (ASTM-A536). THE COMPRESSION COUPLING SHALL BE WITHOUT STOPS AND BE RATED FOR A MINIMUM WORKING PRESSURE OF 250 PSI AND SHALL BE EQUAL TO THE DRESSER STYLE No's 38, 138 (STRAIGHT TYPE), 162 (TRANSITION TYPE), 253 (REDUCING TYPE); OR SMITH-BLAIR 441 (STRAIGHT AND TRANSITION TYPE), R441 (REDUCING TYPE); OR ROMAC STYLE 501 (STRAIGHT AND TRANSITION TYPE), STYLE RC501 (REDUCING TYPE).

IF THE BRANCH IS TO BE SHORTENED, NO NEW IS PIPE REQUIRED.

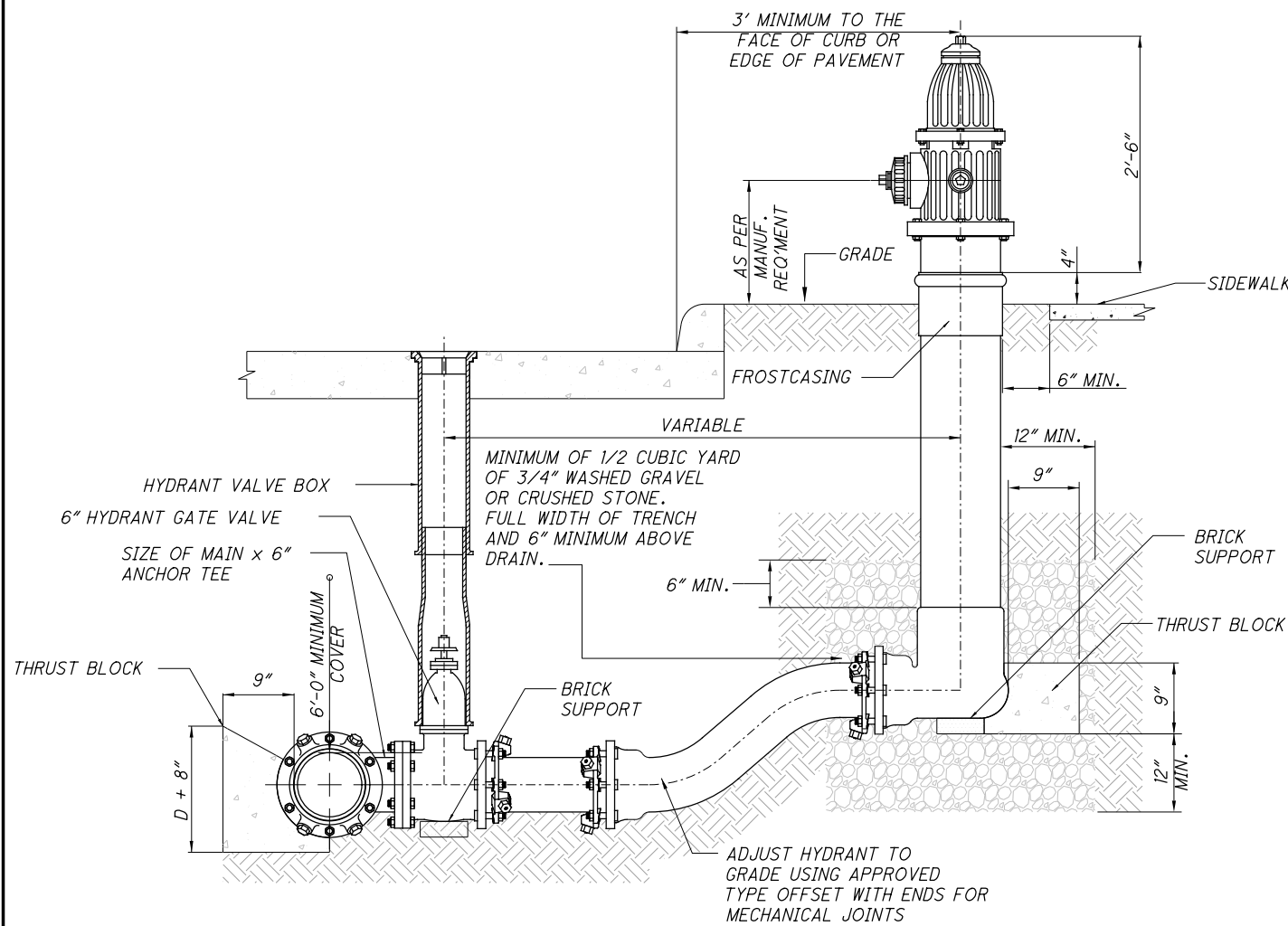


OFFSET TYPE 2 HYDRANT DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H04

- 3) ALL BOLTS AND NUTS ON ALL MECHANICAL JOINTS, INCLUDING THOSE ON THE "RETAINED" TYPE, SHALL HAVE FIELD APPLIED ONE (1) COAT OF BITUMASTIC PAINTING FOLLOWED BY AN ENCASEMENT OF POLYETHYLENE WRAPPING IN ACCORDANCE WITH ANSI/AWWA C-105/A21.5-88, CLASS "C", METHOD "B".
- 4) IF EXISTING PIPING IS 4" USE 4" TO 6" REDUCING MJ REDUCER OR REDUCING TRANSITION COUPLING WITH ROD & CLAMP IF APPROVED BY CWD.
- 5) IN HIGH PRESSURE AREAS THE EXISTING VALVE MAY NEED TO BE RESTRAINED TO EXISTING TEE OR FITTING USING ROD & CLAMP AS DIRECTED BY CWD.

NO.	DATE	DESCRIPTION
0	2018-04-04	RFC
ISSUE RECORD		

BU-07 - E 55TH ST. PUBLIC UTILITY RELOCATION
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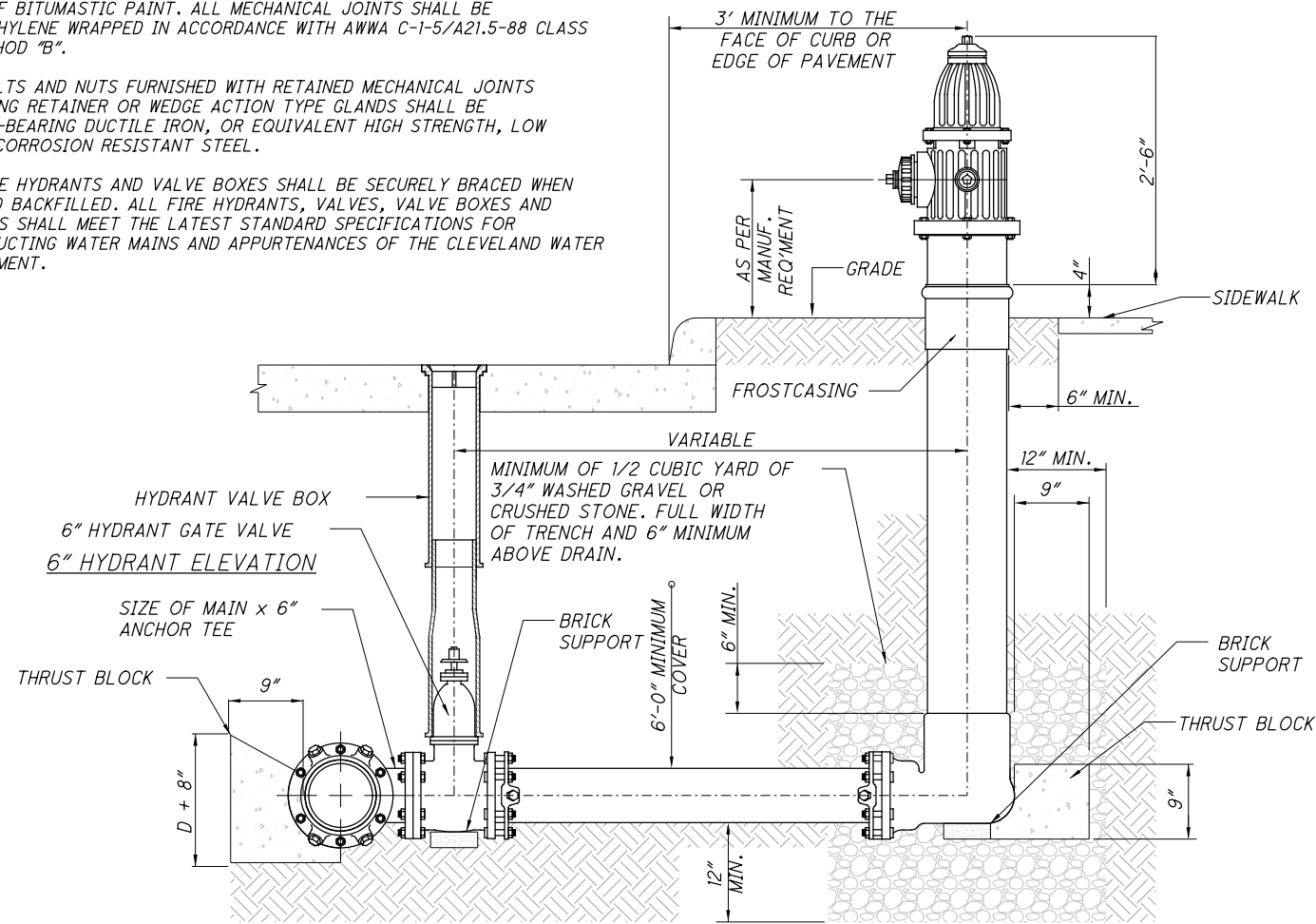


ADJUSTING 6" HYDRANT ELEVATION
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H12

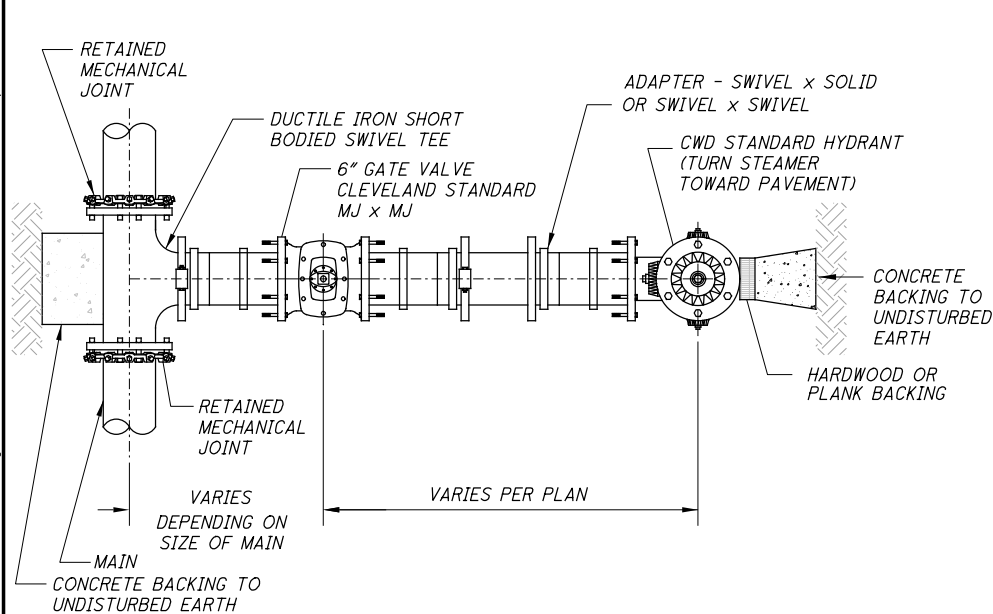
NOTE:
IN LIEU OF SWIVEL BRANCH TEES AND ADAPTERS CONTRACTORS MAY FURNISH HYDRANT BRANCHES HAVING RETAINED MECHANICAL JOINTS INCLUDING HYDRANT SHOE. ALL MECHANICAL JOINTS SHALL HAVE FIELD APPLIED ONE (1) COAT OF BITUMASTIC PAINT. ALL MECHANICAL JOINTS SHALL BE POLYETHYLENE WRAPPED IN ACCORDANCE WITH AWWA C-1-5/A21.5-88 CLASS "C" METHOD "B".

ALL BOLTS AND NUTS FURNISHED WITH RETAINED MECHANICAL JOINTS INCLUDING RETAINER OR WEDGE ACTION TYPE GLANDS SHALL BE COPPER-BEARING DUCTILE IRON, OR EQUIVALENT HIGH STRENGTH, LOW ALLOY CORROSION RESISTANT STEEL.

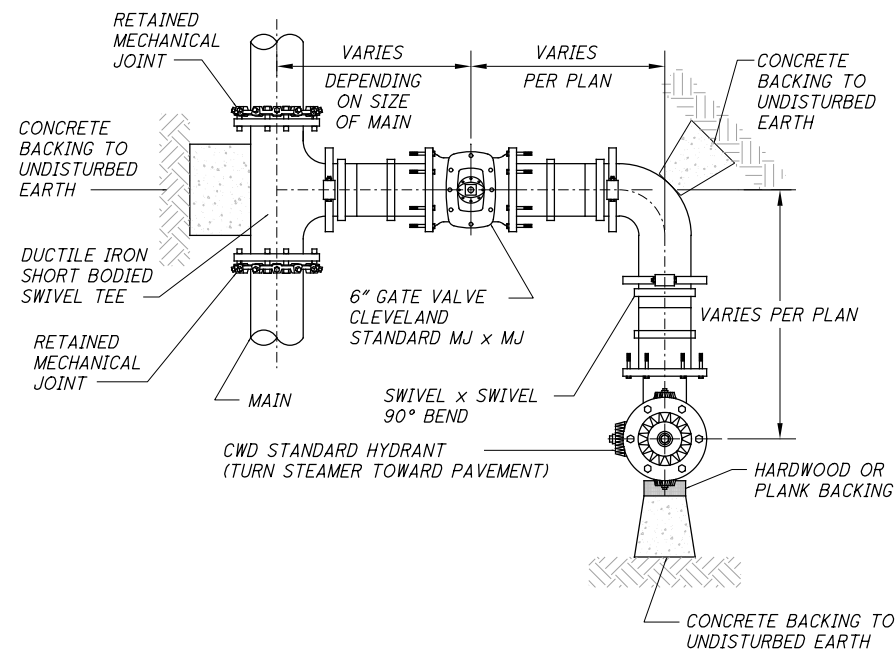
ALL FIRE HYDRANTS AND VALVE BOXES SHALL BE SECURELY BRACED WHEN SET AND BACKFILLED. ALL FIRE HYDRANTS, VALVES, VALVE BOXES AND FITTINGS SHALL MEET THE LATEST STANDARD SPECIFICATIONS FOR CONSTRUCTING WATER MAINS AND APPURTENANCES OF THE CLEVELAND WATER DEPARTMENT.



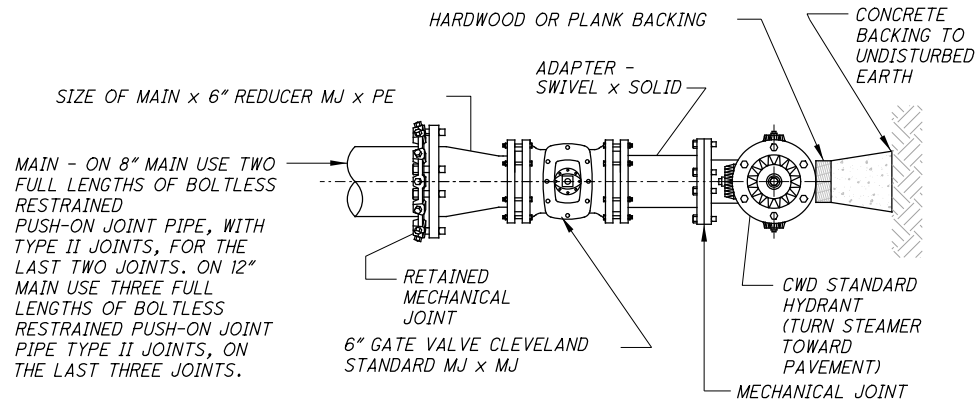
6" HYDRANT ELEVATION
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H13



TYPICAL NEW HYDRANT INSTALLATION DETAIL "A"
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H09



TYPICAL NEW HYDRANT INSTALLATION DETAIL "B"
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H10

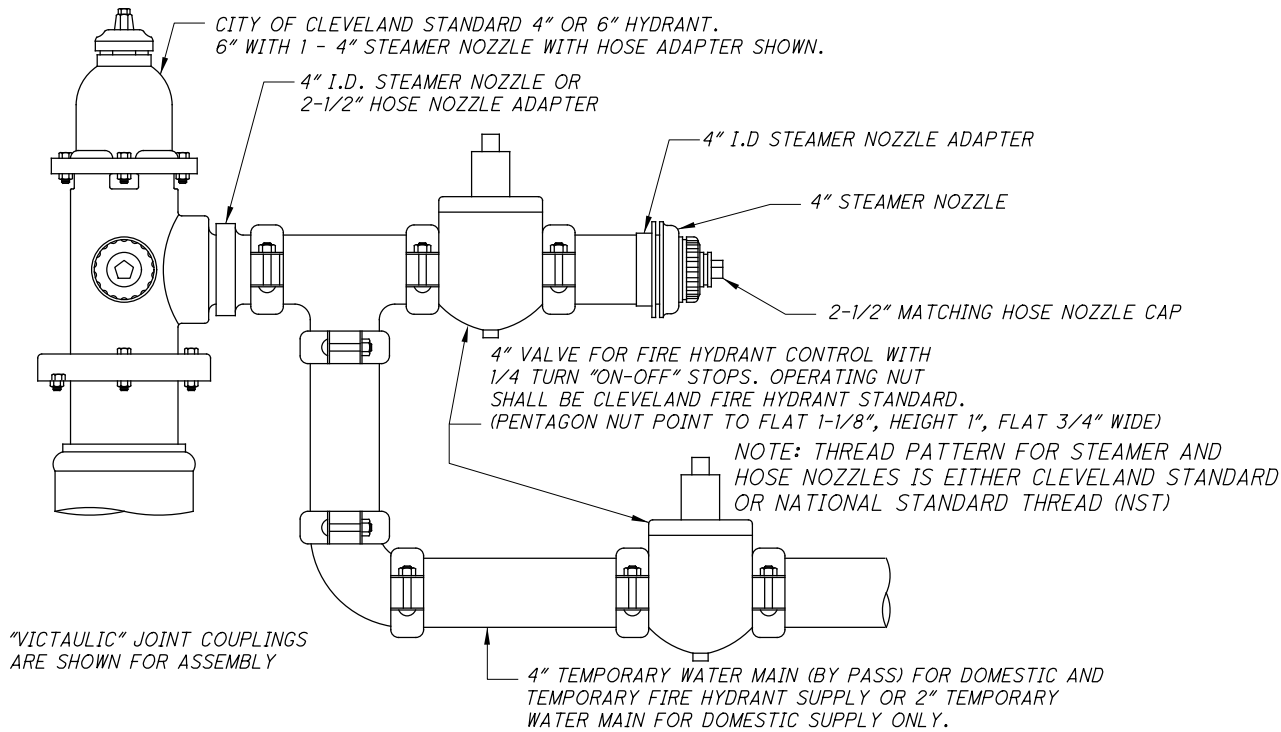


TYPICAL NEW HYDRANT INSTALLATION DETAIL "C"
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H11

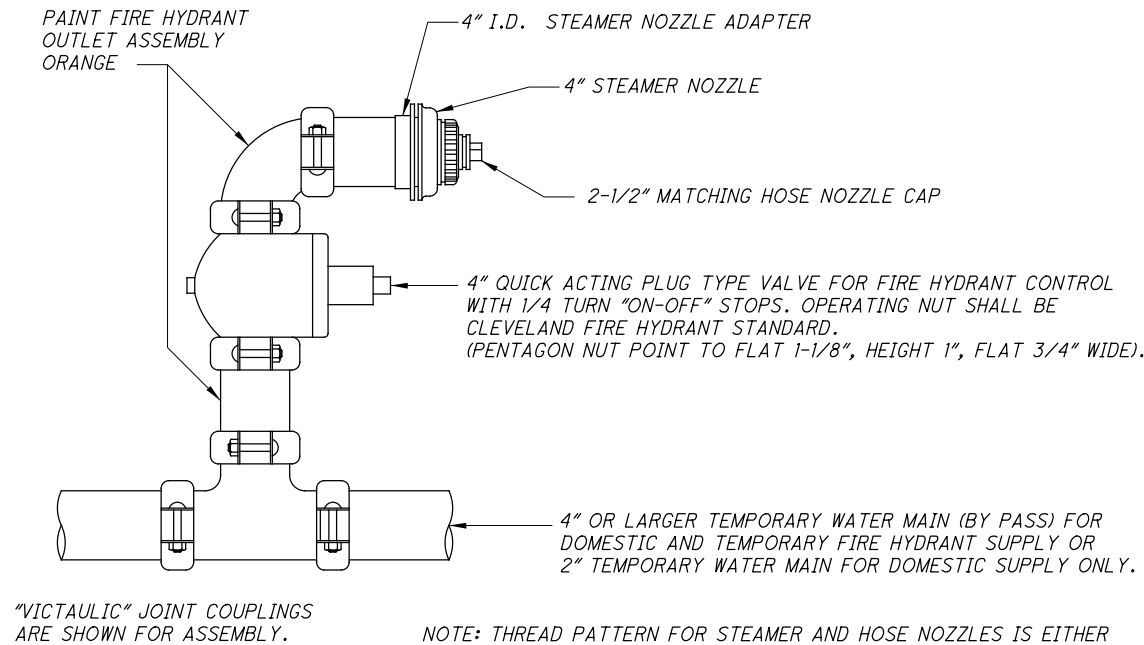
MAIN - ON 8" MAIN USE TWO FULL LENGTHS OF BOLTLESS RESTRAINED PUSH-ON JOINT PIPE, WITH TYPE II JOINTS, FOR THE LAST TWO JOINTS. ON 12" MAIN USE THREE FULL LENGTHS OF BOLTLESS RESTRAINED PUSH-ON JOINT PIPE TYPE II JOINTS, ON THE LAST THREE JOINTS.

ISSUE RECORD		
NO.	DATE	DESCRIPTION
0	2019-04-04	RFC

BU-07 - E 55TH ST. PUBLIC UTILITY RELOCATION
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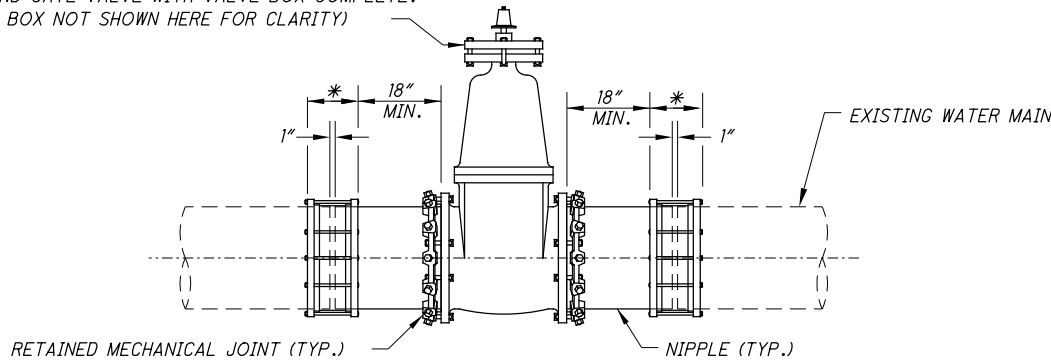


TEMPORARY WATER MAIN & HYDRANT CONNECTION ASSEMBLY-A
TO PROVIDE SIMULTANEOUS SERVICE IN EXISTING HYDRANT AND TEMPORARY BYPASS MAIN
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H14



TEMPORARY WATER MAIN & HYDRANT CONNECTION ASSEMBLY-C OUTLET END
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-H16

C.W.D. SQUARE HEAD RETAINED MECHANICAL JOINT
BELL END GATE VALVE WITH VALVE BOX COMPLETE.
(VALVE BOX NOT SHOWN HERE FOR CLARITY)



NOTE:
BEFORE CUTTING EXISTING WATER MAIN, THE
NIPPLES SHALL BE CONNECTED TO THE
CUTTING PIPE. FINAL CONNECTIONS SHALL BE
MECHANICAL JOINT BELL END GATE VALVE. AFTER
MADE WITH COUPLINGS/SOLID SLEEVES AS
SPECIFIED.

*CONNECTION SHALL BE MADE WITH RETAINED MECHANICAL JOINT SOLID SLEEVES (SHORT OR LONG PATTERN) DUCTILE IRON
CLASS 350 OR CAST IRON CLASS 250 OR COMPRESSION COUPLINGS.

COMPRESSION COUPLINGS SHALL BE OF A GASKETED, SLEEVE TYPE WITH DIAMETERS TO PROPERLY FIT PLAIN END IRON PIPE. EACH
COUPLING SHALL CONSIST OF ONE (1) MIDDLE RING, WITHOUT STOPS; TWO (2) FOLLOWER GLANDS; TWO (2) RUBBER-COMPOUND BUNA-N
BLEND, WEDGE SECTION GASKETS; AND SUFFICIENT TRACKHEAD STAINLESS STEEL BOLTS AND NUTS (ASTM A276/A193/194, TYPE 304,
EXTRA HEAVY HEX) TO PROPERLY COMPRESS THE GASKETS.

MIDDLE RING AND FOLLOWER GLANDS SHALL BE OF EITHER STEEL OR DUCTILE IRON (ASTM-A536).

THE COMPRESSION COUPLING SHALL BE WITHOUT STOPS AND BE RATED FOR A MINIMUM WORKING PRESSURE OF 250 PSI AND SHALL BE
EQUAL TO THE DRESSER STYLE No's 38, 138 OR 162 (TRANSITION TYPE), OR SMITH-BLAIR 441 STRAIGHT AND TRANSITION COUPLINGS.

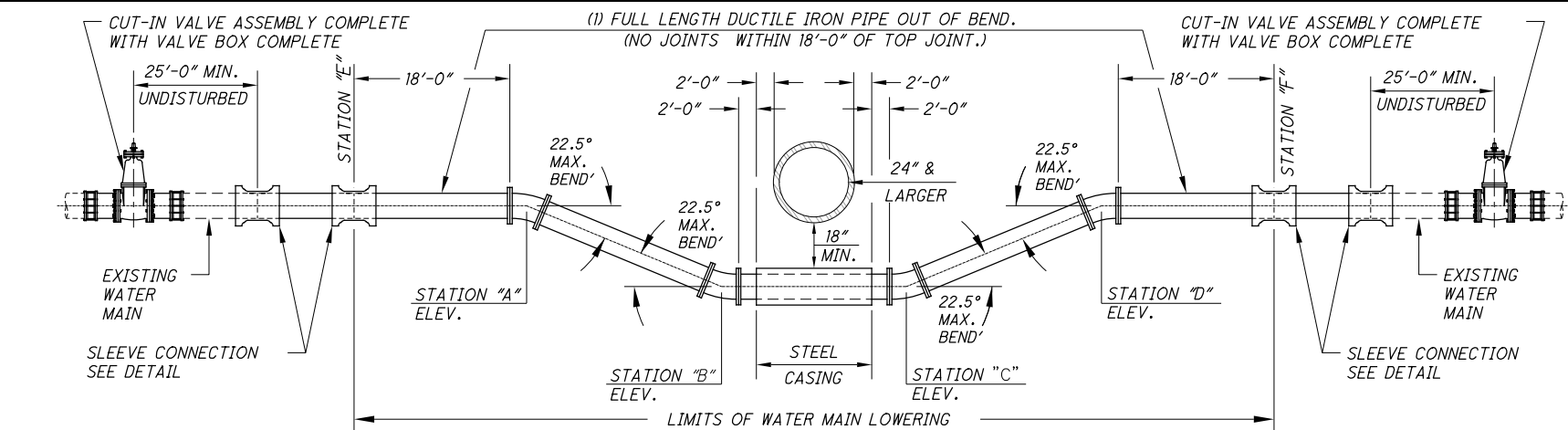
ALL BOLTS AND NUTS ON ALL MECHANICAL JOINTS, INCLUDING THOSE ON THE "RETAINED" TYPE, SHALL HAVE FIELD APPLIED ONE (1)
COAT OF BITUMASTIC PAINTING FOLLOWED BY AN ENCASEMENT OF POLYETHYLENE WRAPPING IN ACCORDANCE WITH ANSI/AWWA
C-105/A21.5-88, CLASS "C", METHOD "B".

THE DIVISION OF WATER WILL DETERMINE THE FIELD LOCATION OF THE CUT-IN-VALVE ASSEMBLY. THE DIVISION OF WATER WILL ALSO SET
THE TIME OF INSTALLATION OF THE CUT-IN-VALVE ASSEMBLY.

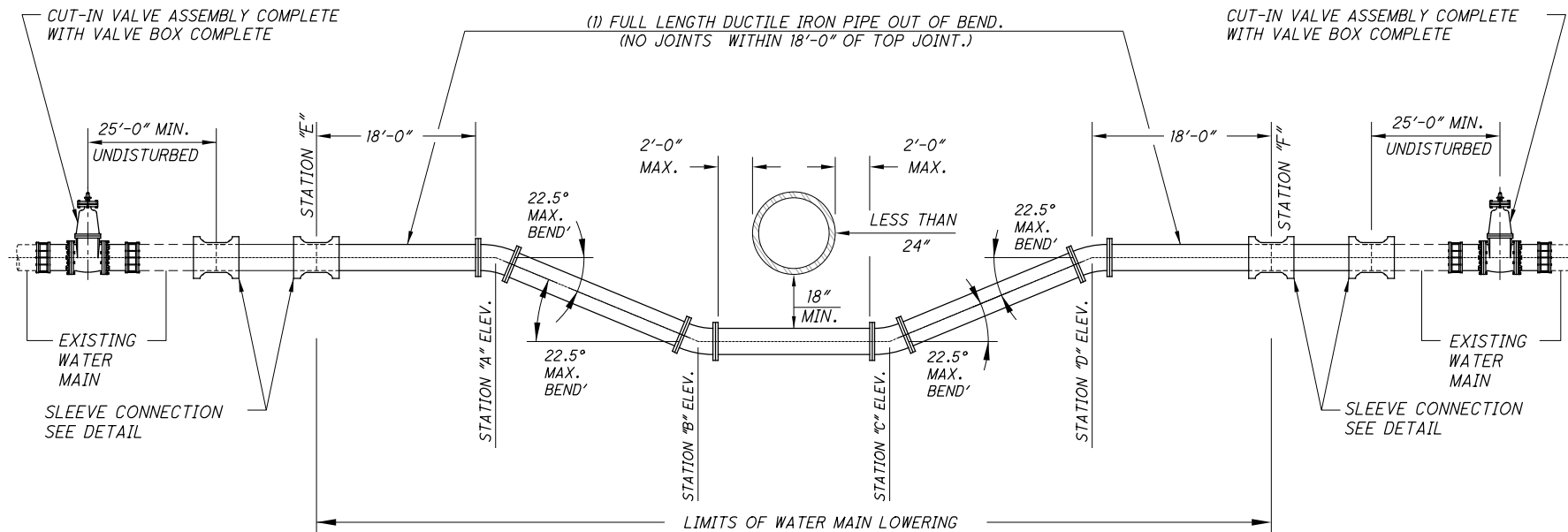
THE CONTRACTOR SHALL DO ALL PIPE CUTTING AND INSTALLATION. HOWEVER, THE INSTALLATION OF THE CUT-IN-VALVE ASSEMBLY SHALL
BE DONE UNDER THE SUPERVISION OF THE DIVISION OF WATER.

CUT-IN-VALVE DETAIL
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-005

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS 24" & LARGER IN DIAMETER OR WIDTH FOR "EXISTING CONSTRUCTION"
- NOT TO SCALE -
CLEVELAND DIVISION OF WATER - STD-L03

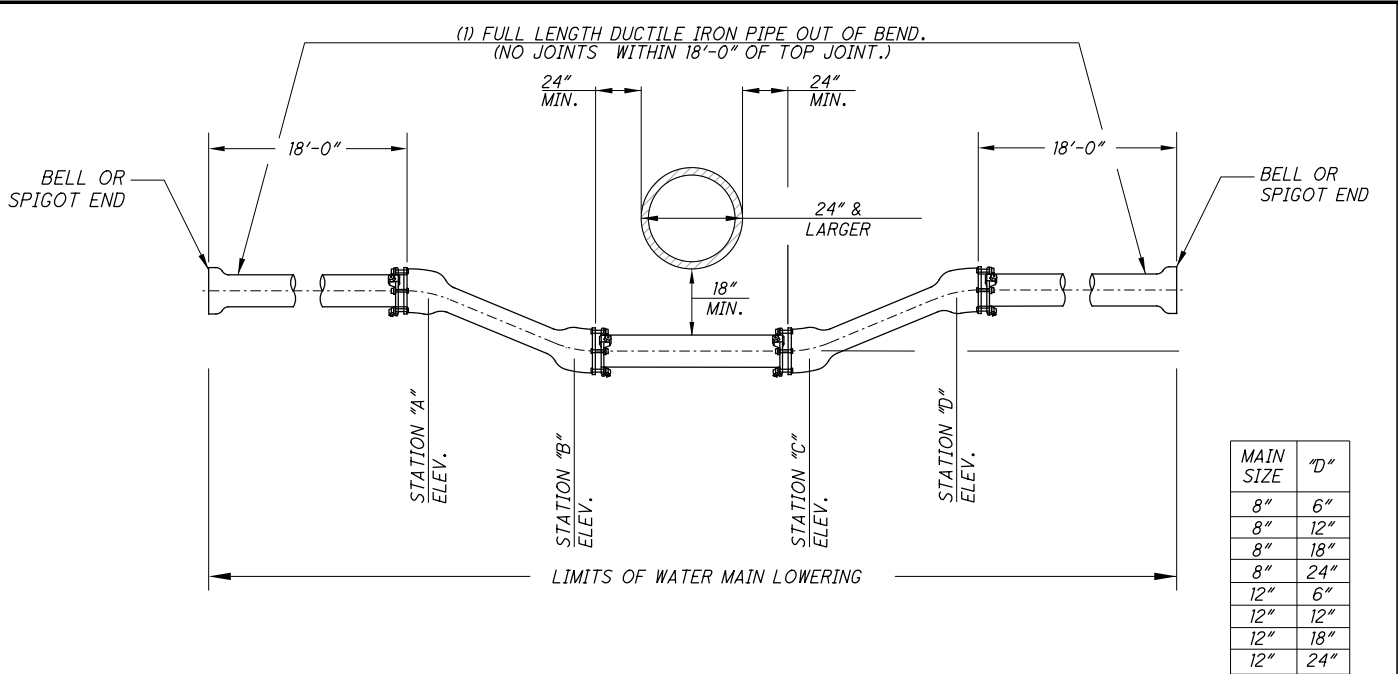


DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS LESS THAN 24" IN DIAMETER OR WIDTH FOR "EXISTING CONSTRUCTION"
- NOT TO SCALE -
CLEVELAND DIVISION OF WATER - STD-L02

NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
- 2) WHERE DEPTH OF LOWERING REQUIRES AN INTERMEDIATE JOINT BETWEEN STATIONS "A" & "B" AND/OR "C" & "D" THE ENTIRE LOWERING SHALL BE MADE WITH DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PIPE AND DUCTILE IRON CLASS 350, CEMENT LINED FITTINGS ALL HAVING BOLTLESS RESTRAINED PUSH-ON JOINTS, TYPE II.
- 3) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT "C", THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
- 4) WHERE EXISTING WATER MAIN IS SIX (6)-INCHES IN DIAMETER THE PIPE LOWERING SHALL BE MADE WITH PIPE AND FITTINGS NO LESS THAN EIGHT (8)-INCH IN DIAMETER WITH REDUCERS INSTALLED AT STATIONS "E" AND "F". THE REDUCERS SHALL BE RETAINED MECHANICAL JOINT WITH SMALL END OF REDUCER PLAIN END FOR CONNECTION WITH SLEEVES OR COMPRESSION COUPLINGS.
- 5) ALL EXISTING WATER SERVICE CONNECTIONS BETWEEN THE CUT-IN-VALVE ASSEMBLIES SHALL BE MAINTAINED BY "TEMPORARY SERVICE CONNECTIONS" PROVIDED AND MAINTAINED BY THE CONTRACTOR.
- 6) EXISTING WATER SERVICE CONNECTIONS NEEDED TO BE RETAPPED AND RECONNECTED WILL ONLY BE PERMITTED BETWEEN STATIONS "A" AND "E" AND STATIONS "D" AND "F". NO RETAPPING OF SERVICE CONNECTIONS WILL BE ALLOWED BETWEEN STATIONS "A" AND "D".

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



NOTE:
1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
* ALL FITTINGS MUST FOLLOW ANSI/AWWA C110/A21.10 FOR FULL BODY FITTINGS AND ANSI/AWWA C153/A221.5 FOR COMPACT FITTINGS.
ALL FITTINGS ARE NOT AVAILABLE FROM ALL APPROVED MANUFACTURES.

2) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" AND "C", AND PIPE JOINTS ARE AS INDICATED IN NOTE "1" ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.

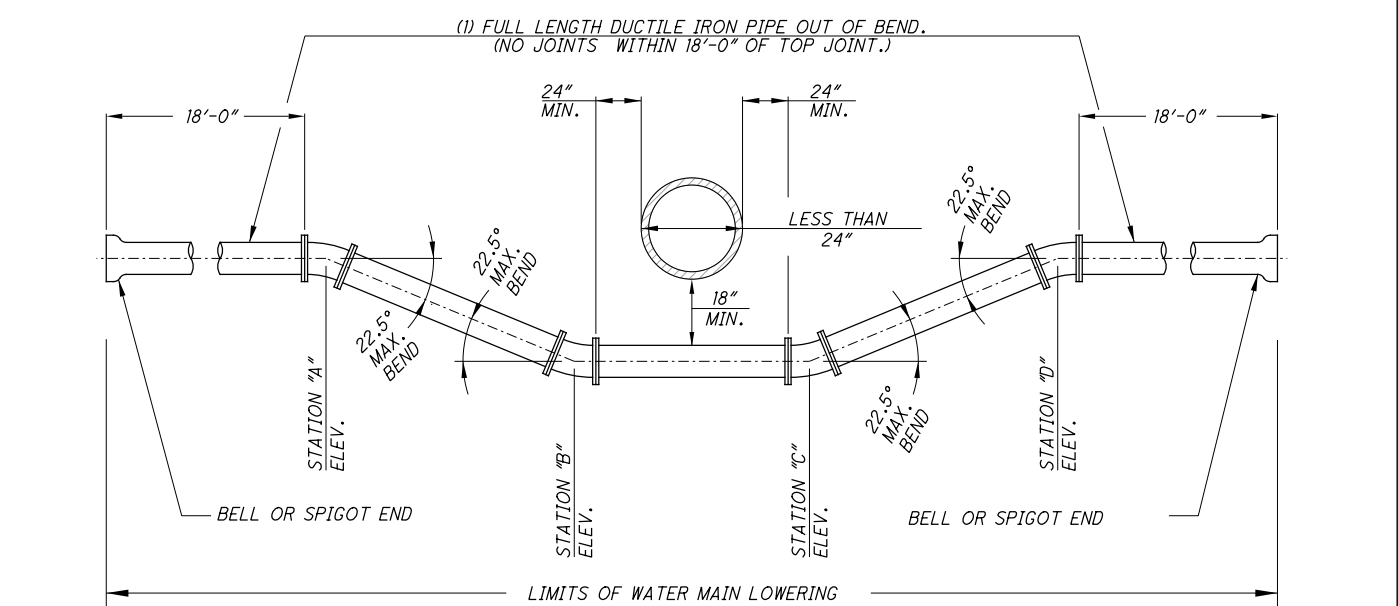
**DETAIL FOR WATER MAIN LOWERING USING MECHANICAL JOINT OFFSETS
UNDER OBSTRUCTIONS 24" & LARGER IN DIAMETER OR WIDTH FOR "NEW CONSTRUCTION"**

STD-L07

- NOT TO SCALE -

DATE: 12-3-2009

BY: RSK



NOTE:
1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS. 2) WHERE DEPTH OF LOWERING REQUIRES AN INTERMEDIATE JOINT BETWEEN STATIONS "A" & "B" AND/OR "C" & "D" THE ENTIRE LOWERING SHALL BE MADE WITH DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PIPE AND DUCTILE IRON CLASS 350, CEMENT LINED FITTINGS ALL HAVING BOLTLESS RESTRAINED PUSH-ON JOINTS, TYPE I.3) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" & "C", AND PIPE JOINTS ARE AS INDICATED IN NOTE "1" ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.4) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN "B" AND "C" AND PIPE JOINTS ARE AS INDICATED IN NOTE "2" ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE I.

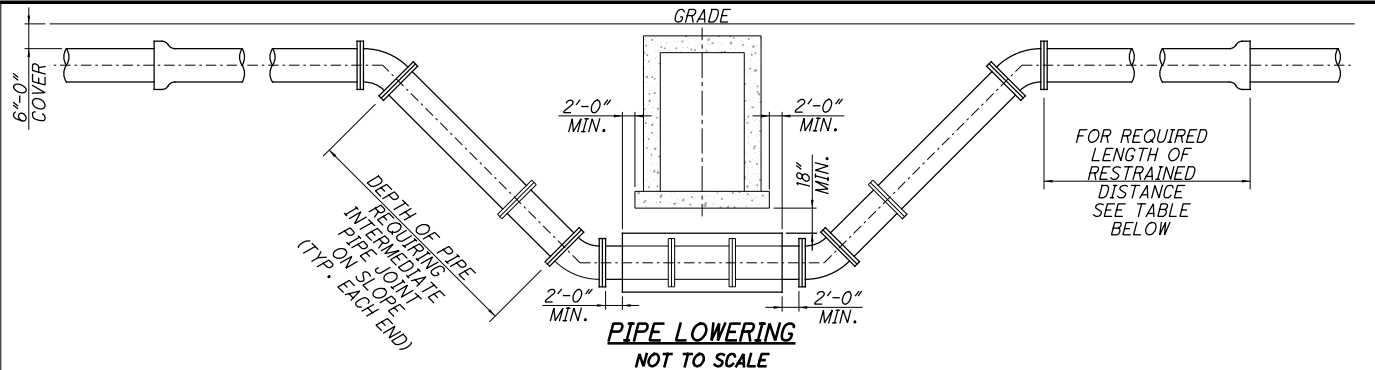
**DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS
LESS THAN 24" IN DIAMETER OR WIDTH FOR "NEW CONSTRUCTION"**

STD-L04

- NOT TO SCALE -

DATE: 10-1-97

BY: RSK



TO LOWER WATER MAIN TO CLEAR OBSTACLE WHERE DEPTH OF PIPE LOWERING REQUIRES AN INTERMEDIATE JOINT ON SLOPE THE ENTIRE OFFSET SHALL HAVE BOLTLESS RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS AS SPECIFIED. JOINT RESTRAINT SHALL EXTEND BEYOND TOP VERTICAL BEND TO THE LIMITS SHOWN IN TABLE.

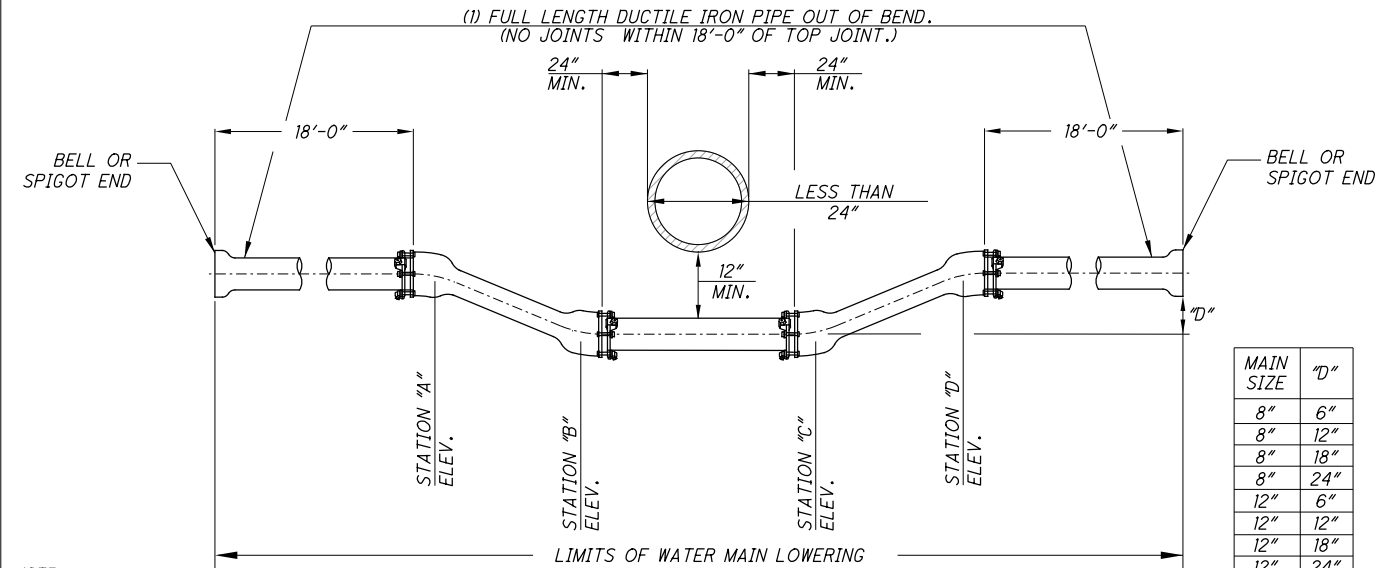
① CALCULATIONS FOR RESTRAINED LENGTHS INCLUDE 75 PSI FOR TESTING.

DIAMETER	BEND	STATIC PRESSURE ①	* RESTRAINED LENGTHS
8"	11°15'	0 to 275 PSI	ONE (1)
		0 to 250 PSI	ONE (1)
	22°30'	251 to 275 PSI	TWO (2)
		0 to 125 PSI	ONE (1)
12"	45°	126 to 275 PSI	TWO (2)
		0 to 165 PSI	ONE (1)
	22°30'	166 to 275 PSI	TWO (2)
		0 to 65 PSI	ONE (1)
16"	45°	66 to 215 PSI	TWO (2)
		216 to 275 PSI	THREE (3)
	22°30'	0 to 275 PSI	ONE (1)
		0 to 115 PSI	ONE (1)
20"	45°	116 to 275 PSI	TWO (2)
		0 to 45 PSI	ONE (1)
	22°30'	46 to 165 PSI	TWO (2)
		166 to 275 PSI	THREE (3)

STD-L01

DATE: 11-24-2003

BY: RSK



NOTE:
1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
* ALL FITTINGS MUST FOLLOW ANSI/AWWA C110/A21.10 FOR FULL BODY FITTINGS AND ANSI/AWWA C153/A221.5 FOR COMPACT FITTINGS.
ALL FITTINGS ARE NOT AVAILABLE FROM ALL APPROVED MANUFACTURES.

2) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" AND "C", AND PIPE JOINTS ARE AS INDICATED IN NOTE "1" ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.

**DETAIL FOR WATER MAIN LOWERING USING MECHANICAL JOINT OFFSETS
UNDER OBSTRUCTIONS LESS THAN 24" IN DIAMETER OR WIDTH FOR "NEW CONSTRUCTION"**

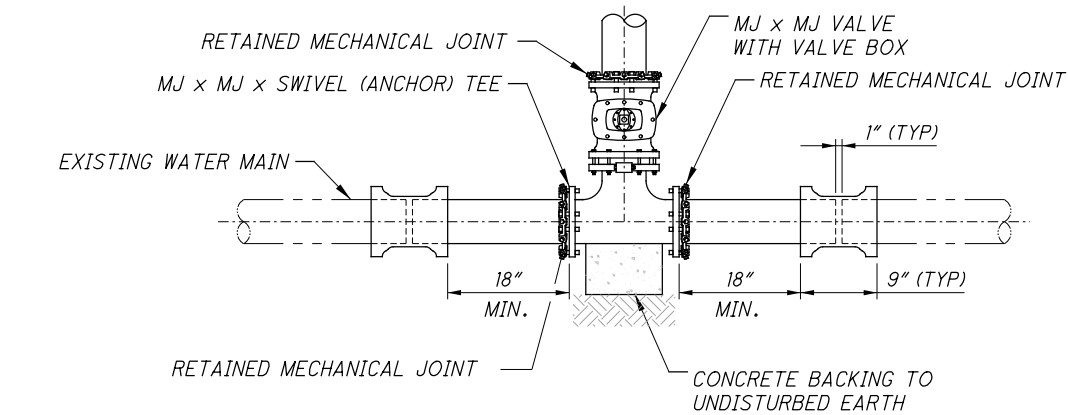
STD-L06

- NOT TO SCALE -

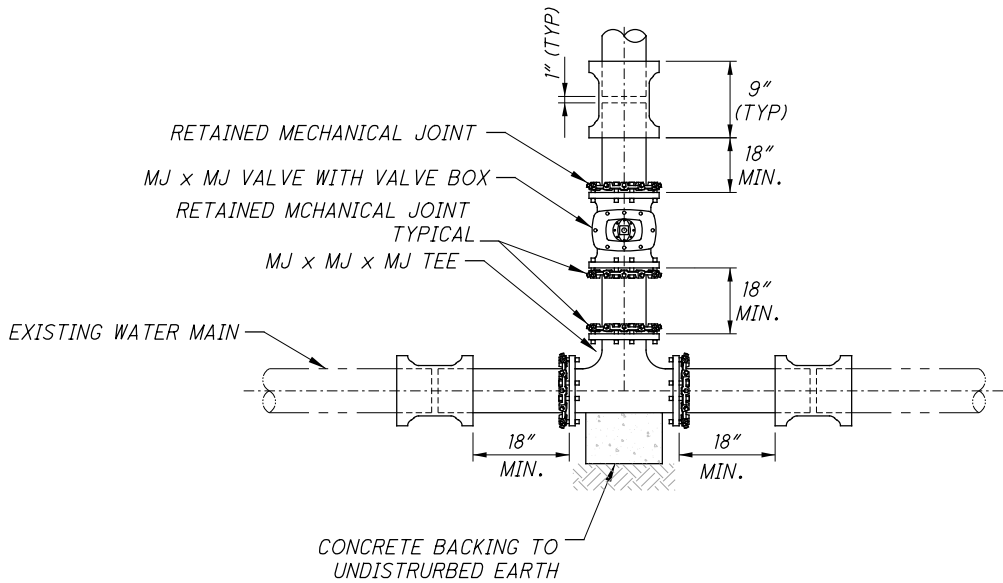
DATE: 12-3-2009

BY: RSK

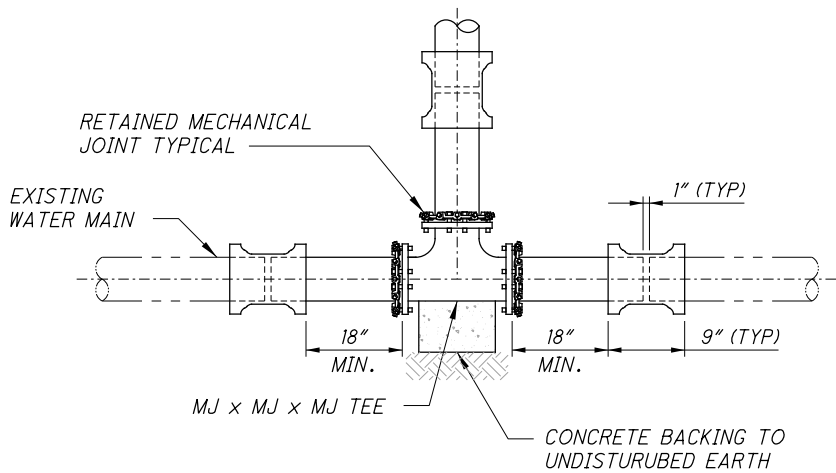
NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		



CUT-IN TEE DETAIL METHOD No.1
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-T01



CUT-IN TEE DETAIL METHOD No.2
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-T02



CUT-IN TEE DETAIL METHOD No.3
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-T03

* CONNECTION SHALL BE MADE WITH RETAINED MECHANICAL JOINT SOLID SLEEVES (SHORT OR LONG PATTERN) DUCTILE IRON CLASS 350 OR CAST IRON CLASS 250 OR COMPRESSION COUPLINGS.

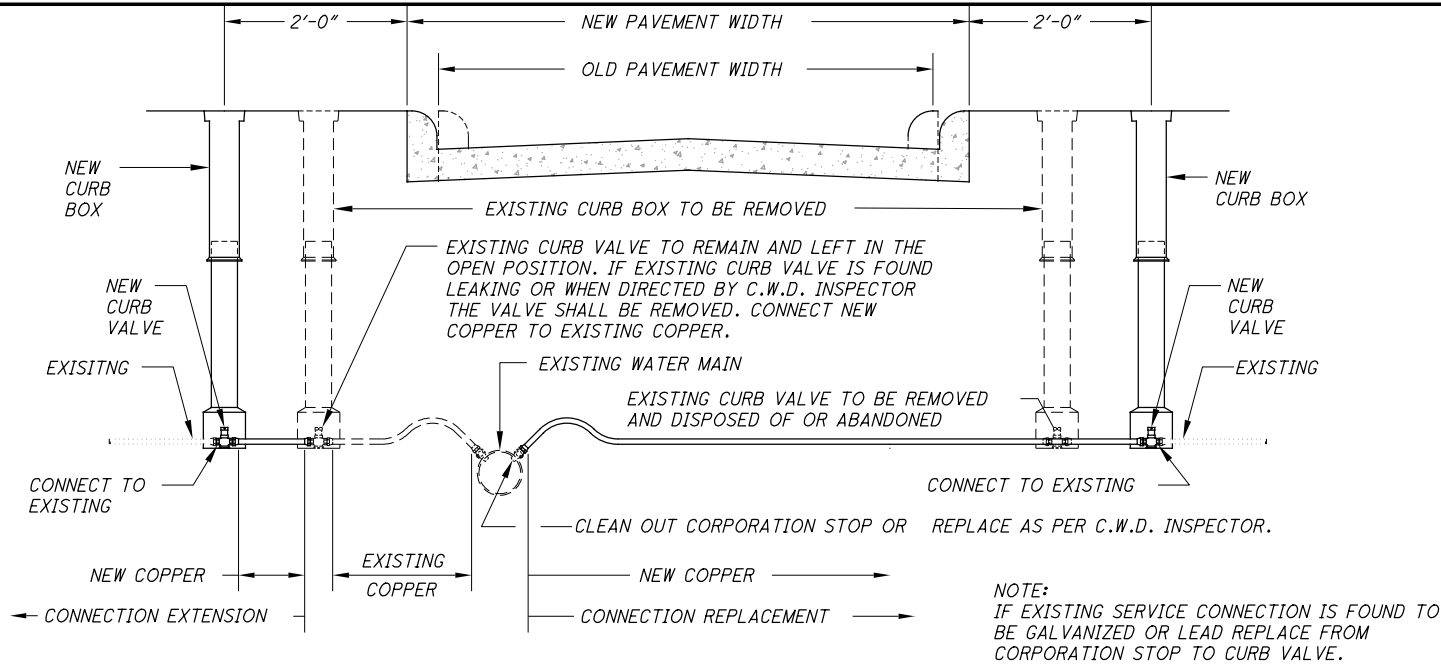
COMPRESSION COUPLINGS SHALL BE OF A GASKETED, SLEEVE TYPE WITH DIAMETERS TO PROPERLY FIT PLAIN END IRON PIPE. EACH COUPLING SHALL CONSIST OF ONE (1) MIDDLE RING, WITHOUT STOPS; TWO (2) FOLLOWER GLANDS; TWO (2) RUBBER-COMPOUND BUNA-N BLEND, WEDGE SECTION GASKETS; AND SUFFICIENT TRACKHEAD STAINLESS STEEL BOLTS AND NUTS (ASTM A276/A193/A194, TYPE 304, EXTRA HEAVY HEX) TO PROPERLY COMPRESS THE GASKETS.

MIDDLE RING AND FOLLOWER GLANDS SHALL BE OF EITHER STEEL OR DUCTILE IRON (ASTM-A536).

THE COMPRESSION COUPLING SHALL BE WITHOUT STOPS AND BE RATED FOR A MINIMUM WORKING PRESSURE OF 250 PSI AND SHALL BE EQUAL TO THE DRESSER STYLE No's 38, 138 OR 162 (TRANSITION TYPE), OR SMITH-BLAIR 441 STRAIGHT AND TRANSITION COUPLINGS.

ALL BOLTS AND NUTS ON ALL MECHANICAL JOINTS, INCLUDING THOSE ON THE "RETAINED" TYPE, SHALL HAVE FIELD APPLIED ONE (1) COAT OF BITUMASTIC PAINTING FOLLOWED BY AN ENCASEMENT OF POLYETHYLENE WRAPPING IN ACCORDANCE WITH ANSI/AWWA C-105/A21.5-88, CLASS "C", METHOD "B".

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

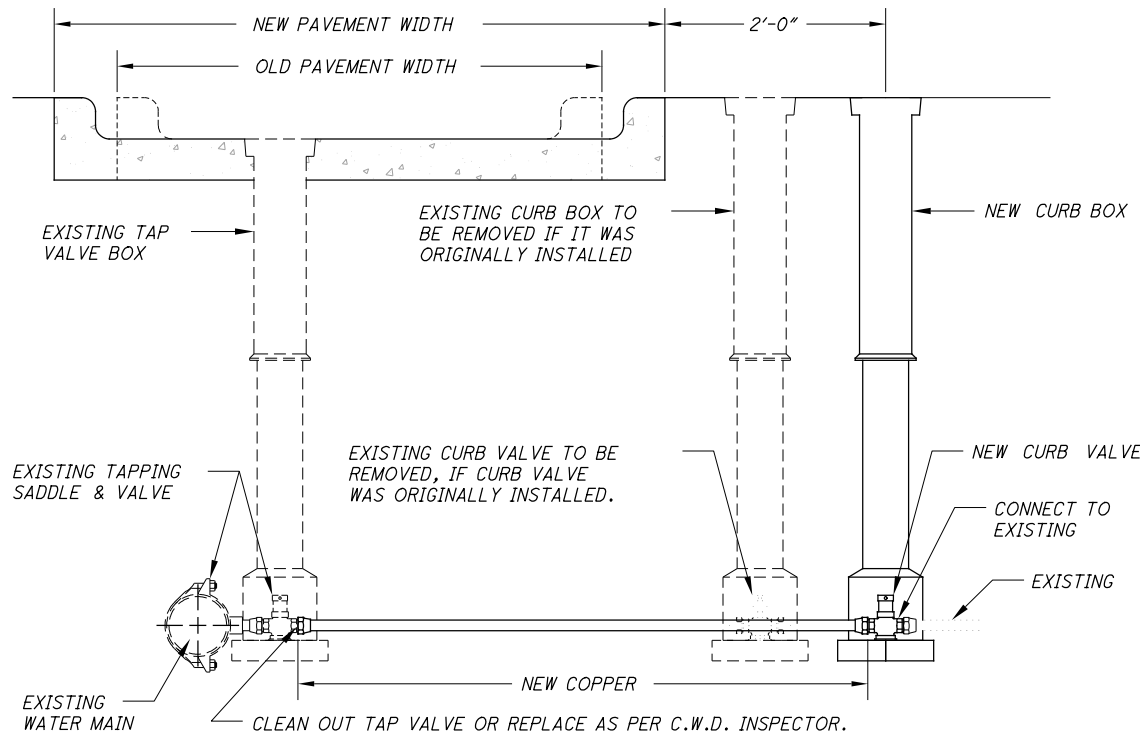


NOTE:
PAYMENT INCLUDED IN ITEM SPECIAL - WATER SERVICE CONNECTION EXTENSION.

ALL CONNECTION REPLACEMENTS SHALL BE 1" MINIMUM SIZE.

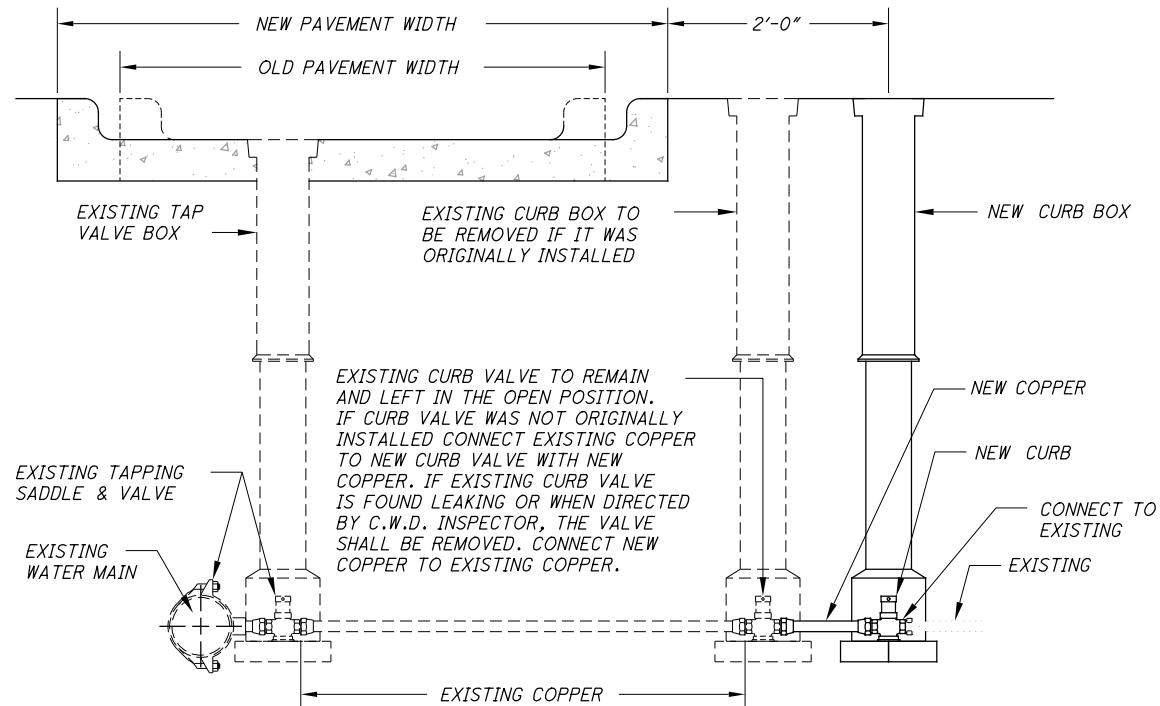
WATER SERVICE CONNECTION EXTENSION OR REPLACEMENT FOR 1" & SMALLER

- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-C01



WATER SERVICE CONNECTION REPLACEMENT FOR 1-1/2" & 2"

- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-C03

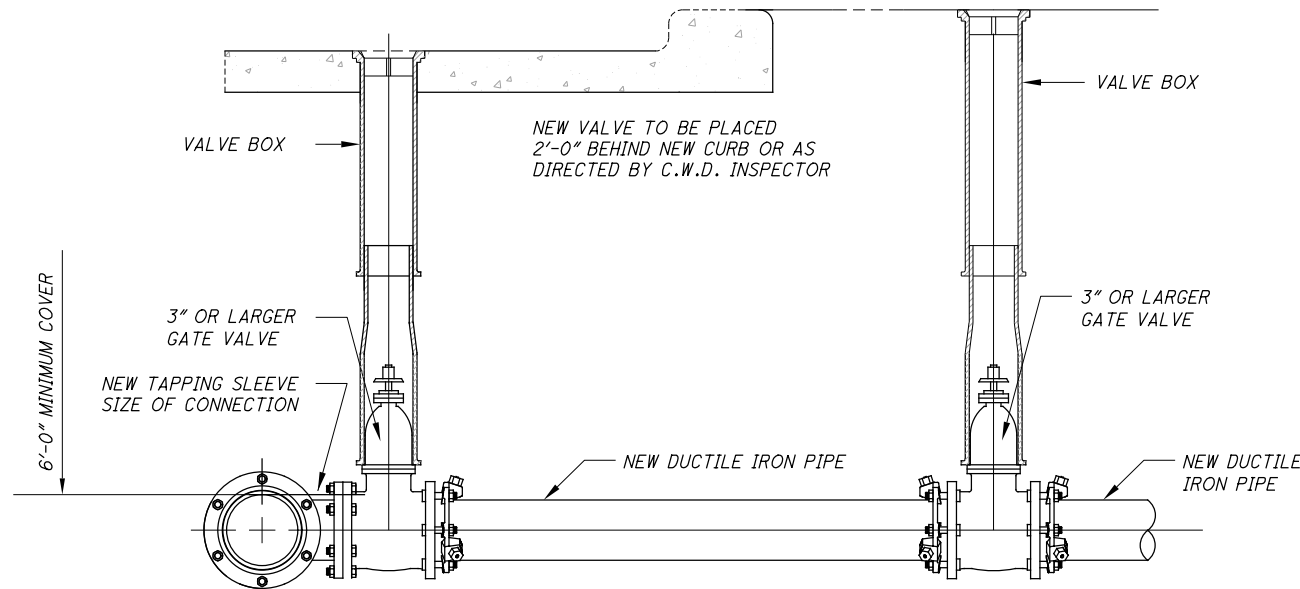


NOTE:
IF EXISTING SERVICE CONNECTION IS FOUND TO BE GALVANIZED OR LEAD REPLACE FROM TAP VALVE TO CURB VALVE AS DETAILED IN "WATER SERVICE REPLACEMENT".

NOTE:
PAYMENT INCLUDED IN ITEM SPECIAL - WATER SERVICE CONNECTION EXTENSION.

WATER SERVICE CONNECTION EXTENSION FOR 1-1/2" & 2"

- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-C02



WATER SERVICE CONNECTION 3" AND LARGER

- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-C03

FOR SINGLE FEED DUAL SERVICE CONNECTIONS (FIRE & COMESTIC) SEE STANDARD DETAILS V-03, V-04, V-05 AND V-06.

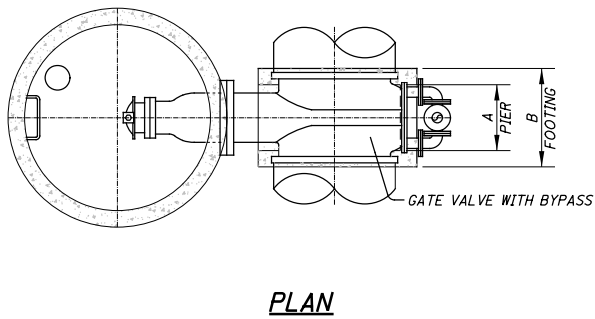
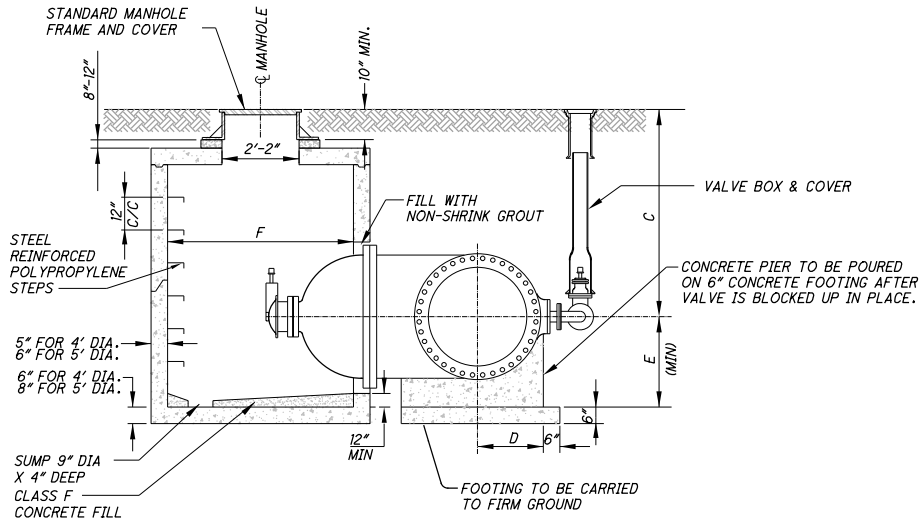
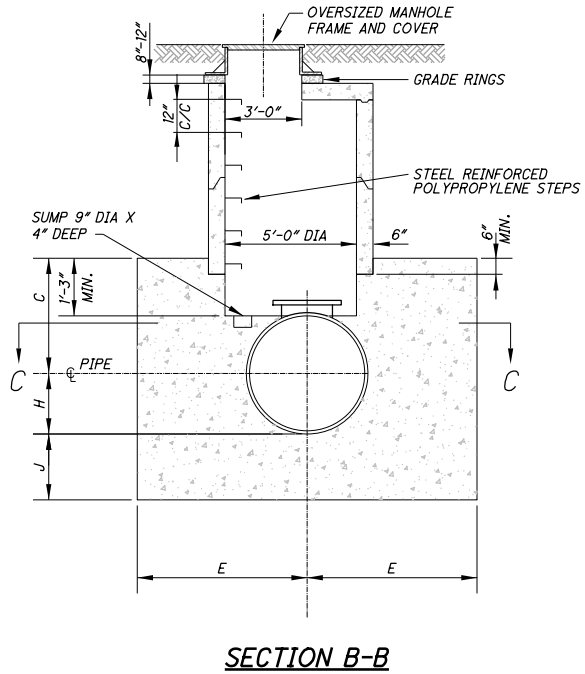
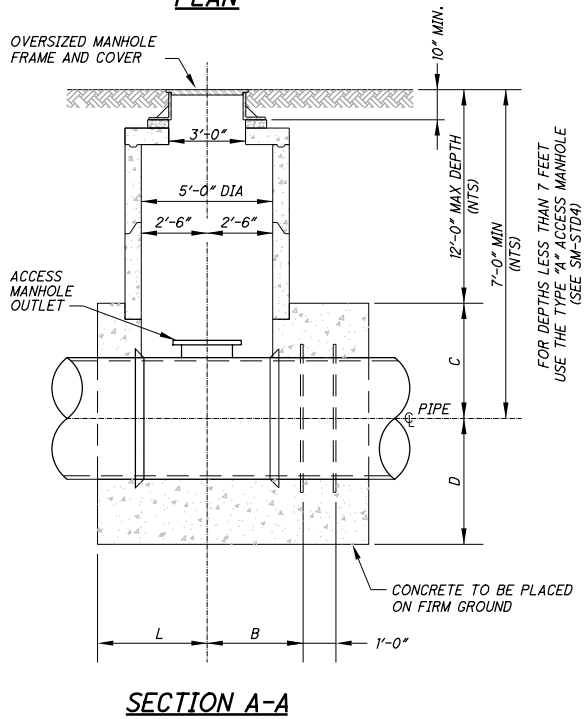
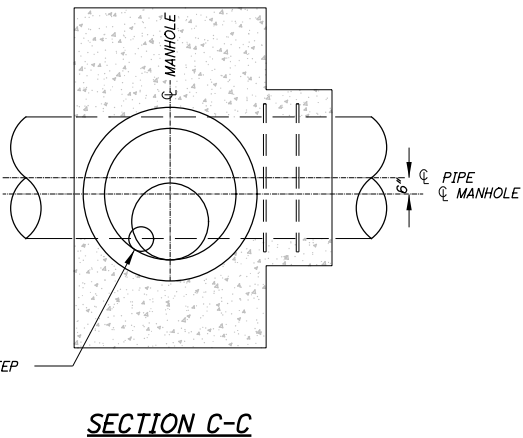
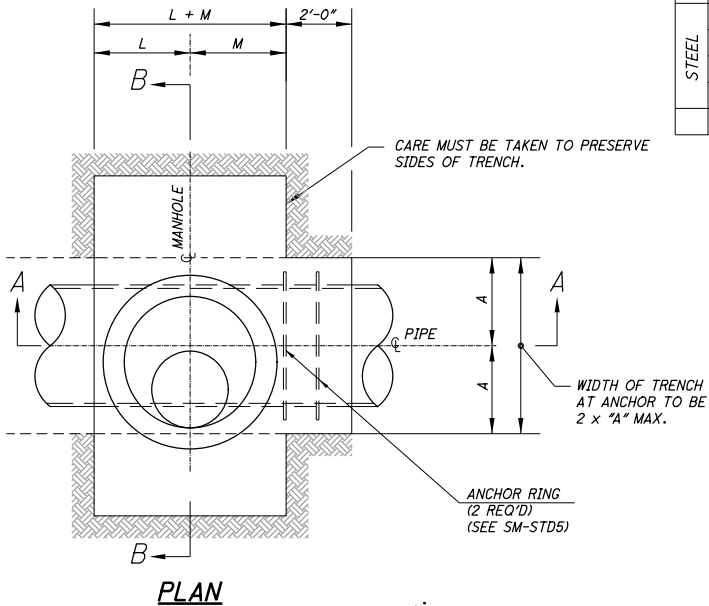
NO.	DATE	DESCRIPTION
0	2018-04-04	RFC
ISSUE RECORD		

ACCESS MANHOLE - TYPE "B" SCHEDULE

	PIPE SIZE	PIPE O.D.	DEPTH (MIN)	A (MAX)	B (MIN)	C (MIN)	D (MIN)	E (MIN)	H	J (MIN)	L (MIN)	M (MIN)
DUCTILE	30"	32.00"	7'-0"	2'-4"	3'-0"	2'-7"	3'-4"	5'-0"	1'-4"	2'-0"	3'-6"	2'-9"
	36"	38.30"	7'-0"	2'-8"	3'-2"	2'-10"	3'-7"	5'-0"	1'-7 1/8"	2'-0"	3'-6"	2'-11"
	42"	44.50"	7'-0"	2'-11"	3'-5"	3'-2"	4'-4"	5'-2"	1'-10 1/4"	2'-6"	3'-6"	3'-2"
	48"	50.80"	7'-0"	3'-2"	3'-8"	3'-5"	5'-0"	5'-6"	2'-1 3/8"	2'-10"	3'-6"	3'-5"
	54"	57.56"	7'-0"	3'-5"	3'-10"	3'-8"	5'-7"	5'-9"	2'-4 3/4"	3'-2 1/4"	3'-6"	3'-2"
PCC	30"	35.75"	7'-0"	2'-6"	2'-9"	2'-9"	3'-6"	5'-0"	1'-5 7/8"	2'-0"	3'-6"	2'-6"
	36"	42.50"	7'-0"	2'-10"	2'-9"	3'-1"	3'-9"	5'-0"	1'-9 1/4"	2'-0"	3'-6"	2'-6"
	42"	49.25"	7'-0"	3'-1"	2'-9"	3'-4"	4'-7"	5'-2"	2'-0 5/8"	2'-6"	3'-6"	2'-6"
	48"	56.00"	7'-0"	3'-4"	2'-9"	3'-7"	5'-2"	5'-6"	2'-4"	2'-10"	3'-6"	2'-6"
	54"	62.77"	7'-0"	3'-8"	2'-9"	3'-11"	5'-10"	5'-9"	2'-7 3/8"	3'-2 5/8"	3'-6"	2'-6"
STEEL	30"	30.00"	7'-0"	2'-3"	2'-9"	2'-6"	3'-4"	5'-0"	1'-3"	2'-0"	3'-6"	2'-6"
	36"	36.00"	7'-0"	2'-6"	2'-9"	2'-9"	3'-7"	5'-0"	1'-6"	2'-0"	3'-6"	2'-6"
	42"	42.00"	7'-0"	2'-9"	2'-9"	3'-0"	4'-4"	5'-2"	1'-9"	2'-6"	3'-6"	2'-6"
	48"	48.25"	7'-0"	3'-2"	2'-9"	3'-4"	5'-0"	5'-6"	2'-0 1/8"	2'-10"	3'-6"	2'-6"
	54"	54.25"	7'-0"	3'-4"	2'-9"	3'-6"	5'-6"	5'-9"	2'-3 1/8"	3'-2 7/8"	3'-6"	2'-6"

VALVE CHAMBER SCHEDULE

SIZE	A	B	C (MIN)	D	E	F
20"	1'-4"	2'-4"	5'-0"	1'-3"	2'-3"	4'-0"
24"	1'-4"	2'-4"	5'-0"	1'-3"	2'-3"	4'-0"
30"	1'-9"	2'-9"	5'-0"	1'-6"	2'-6"	5'-0"
36"	2'-0"	3'-0"	5'-0"	2'-0"	2'-9"	5'-0"
42"	2'-3"	3'-6"	5'-0"	2'-4"	3'-0"	5'-0"
48"	2'-6"	4'-0"	5'-0"	2'-8"	3'-3"	5'-0"
54"	2'-9"	4'-6"	5'-0"	3'-0"	3'-6"	5'-0"

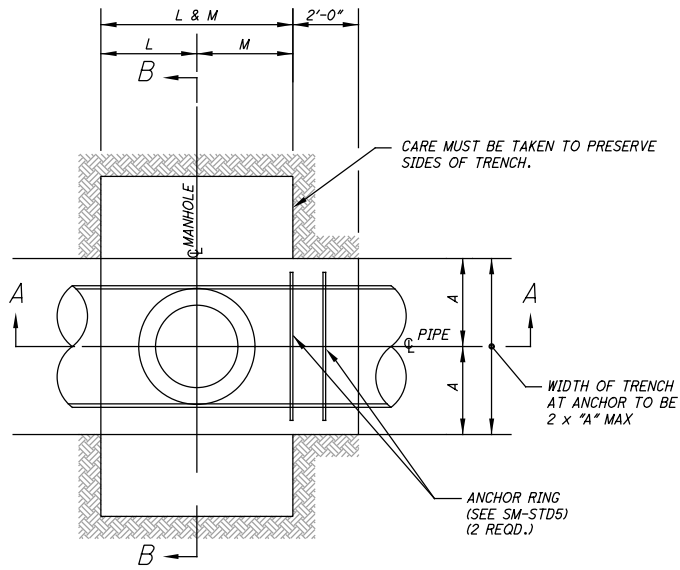


VALVE VAULT FOR GATE VALVE 20" AND OVER
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD3

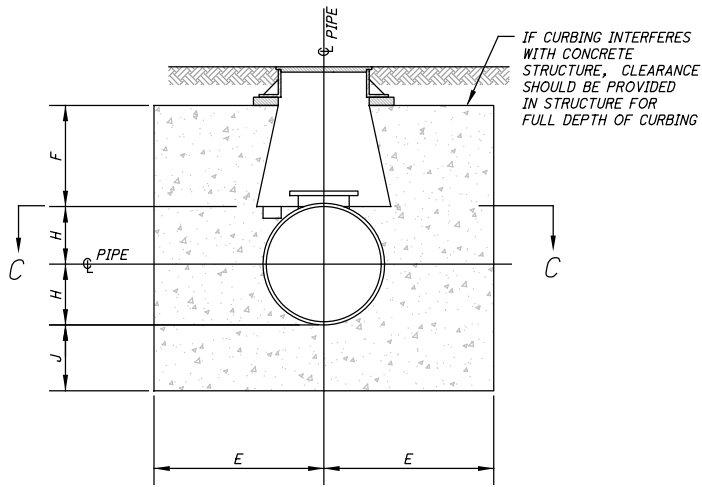
- NOTES:
- ACCESS MANHOLE COVER SHALL BE 20" DISHED FLANGE RATED FOR MINIMUM 250 PSI.
 - ACCESS MANHOLE OUTLET FOR DUCTILE IRON PIPE SHALL BE 20" FLANGED OUTLET TEE. CONSULT WITH FITTING MANUFACTURER FOR OUTLETS ON DUCTILE IRON PIPE GREATER THAN 48".

ACCESS MANHOLE AND ANCHORAGE - TYPE "B"
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD3

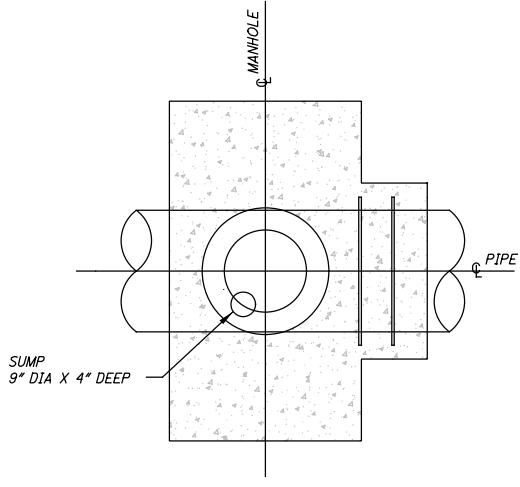
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NO.	DATE	DESCRIPTION
ISSUE RECORD		



PLAN

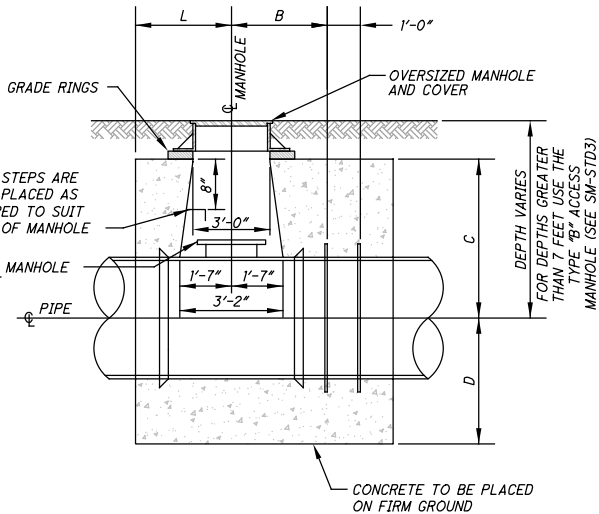


SECTION B-B

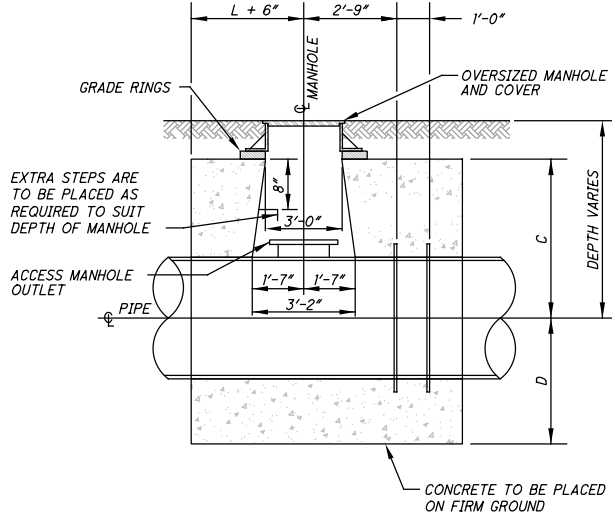


SECTION C-C

ACCESS MANHOLE AND ANCHORAGE - TYPE "A"
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD4



SECTION A-A
(DUCTILE IRON PIPE)

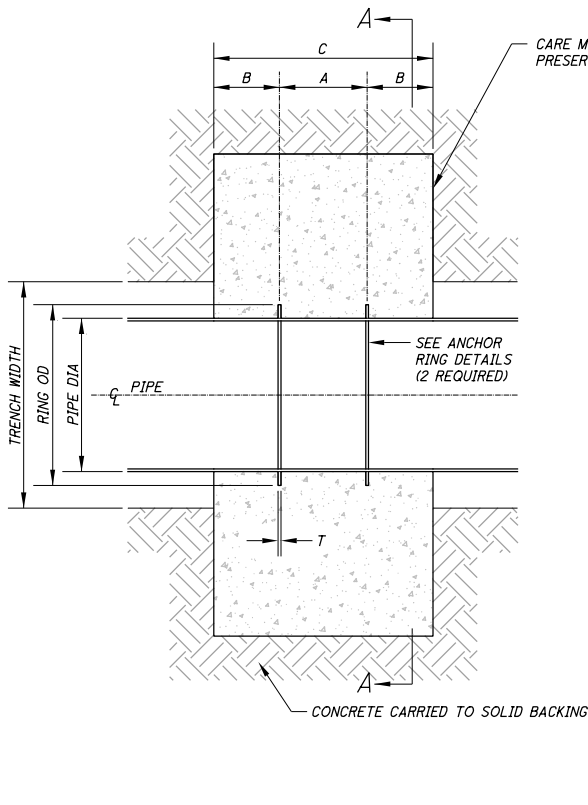


SECTION A-A
(STEEL & PCC PIPE)

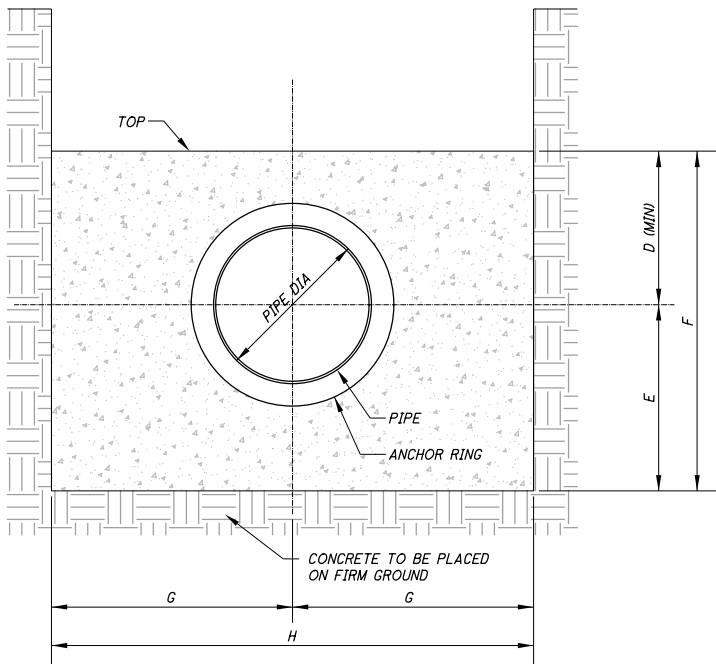
ACCESS MANHOLE - TYPE "A" SCHEDULE

	PIPE SIZE	PIPE O.D.	DEPTH (MIN)	DEPTH (MAX)	A (MAX)	B (MIN)	C (MIN)	D (MIN)	E (MIN)	F (MIN)	H	J (MIN)	L (MIN)	M (MIN)
DUCTILE	30"	32.00"	5'-6"	7'-0"	2'-4"	3'-0"	4'-4"	3'-4"	5'-0"	3'-0"	1'-4"	2'-0"	3'-6"	2'-9"
	36"	38.30"	5'-6"	7'-0"	2'-8"	3'-2"	4'-4"	3'-7"	5'-0"	2'-8 7/8"	1'-7 1/8"	2'-0"	3'-6"	2'-11"
	42"	44.50"	6'-0"	7'-0"	2'-11"	3'-5"	4'-10"	4'-4"	5'-2"	2'-11 3/4"	1'-10 1/4"	2'-6"	3'-6"	3'-2"
	48"	50.80"	6'-6"	7'-0"	3'-2"	3'-8"	4'-10"	5'-0"	5'-6"	2'-8 5/8"	2'-1 3/8"	2'-10"	3'-6"	3'-5"
PCC	30"	35.75"	5'-6"	7'-0"	2'-6"	2'-9"	4'-4"	3'-6"	5'-0"	2'-10 1/8"	1'-5 7/8"	2'-0"	3'-6"	2'-6"
	36"	42.50"	5'-6"	7'-0"	2'-10"	2'-9"	4'-4"	3'-9"	5'-0"	2'-6 3/4"	1'-9 1/4"	2'-0"	3'-6"	2'-6"
	42"	49.25"	6'-0"	7'-0"	3'-1"	2'-9"	4'-10"	4'-7"	5'-2"	2'-9 3/8"	2'-0 5/8"	2'-6"	3'-6"	2'-6"
	48"	56.00"	6'-6"	7'-0"	3'-4"	2'-9"	4'-10"	5'-2"	5'-6"	2'-8"	2'-4"	2'-10"	3'-6"	2'-6"
STEEL	30"	30.00"	5'-6"	7'-0"	2'-3"	2'-9"	4'-4"	3'-4"	5'-0"	3'-1"	1'-3"	2'-0"	3'-6"	2'-6"
	36"	36.00"	5'-6"	7'-0"	2'-6"	2'-9"	4'-4"	3'-7"	5'-0"	2'-10"	1'-6"	2'-0"	3'-6"	2'-6"
	42"	42.00"	6'-0"	7'-0"	2'-9"	2'-9"	4'-10"	4'-4"	5'-2"	3'-1"	1'-9"	2'-6"	3'-6"	2'-6"
	48"	48.25"	6'-6"	7'-0"	3'-2"	2'-9"	4'-10"	5'-0"	5'-6"	2'-9 7/8"	2'-0 1/8"	2'-10"	3'-6"	2'-6"

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



PLAN

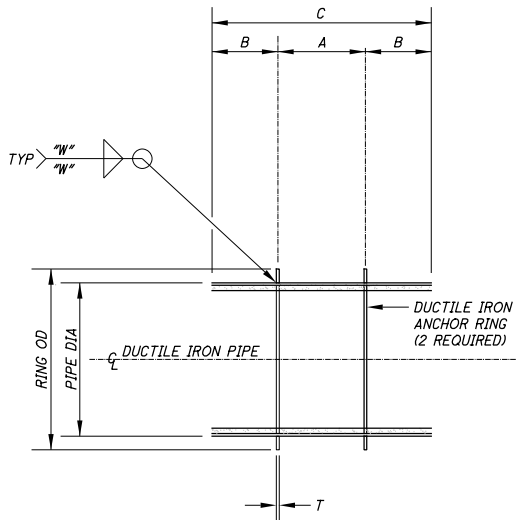


SECTION A-A

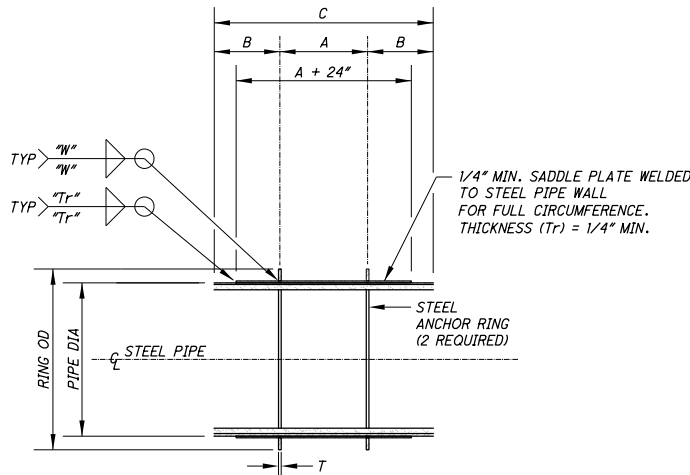
NOTES:

1. ALL WELDS, REINFORCEMENT PLATES AND OTHER PERTINENT INFORMATION SHALL BE OF THE TYPE AND SIZE SHOWN ON APPROVED SHOP DRAWINGS.
2. ALL WELDS SHALL BE SHOP WELDS AND SHALL BE FULL AND CONTINUOUS.

PLAIN CONCRETE ANCHOR



DUCTILE IRON PIPE



STEEL PIPE

ANCHOR RING DETAILS

ANCHOR AND FLANGE SCHEDULE

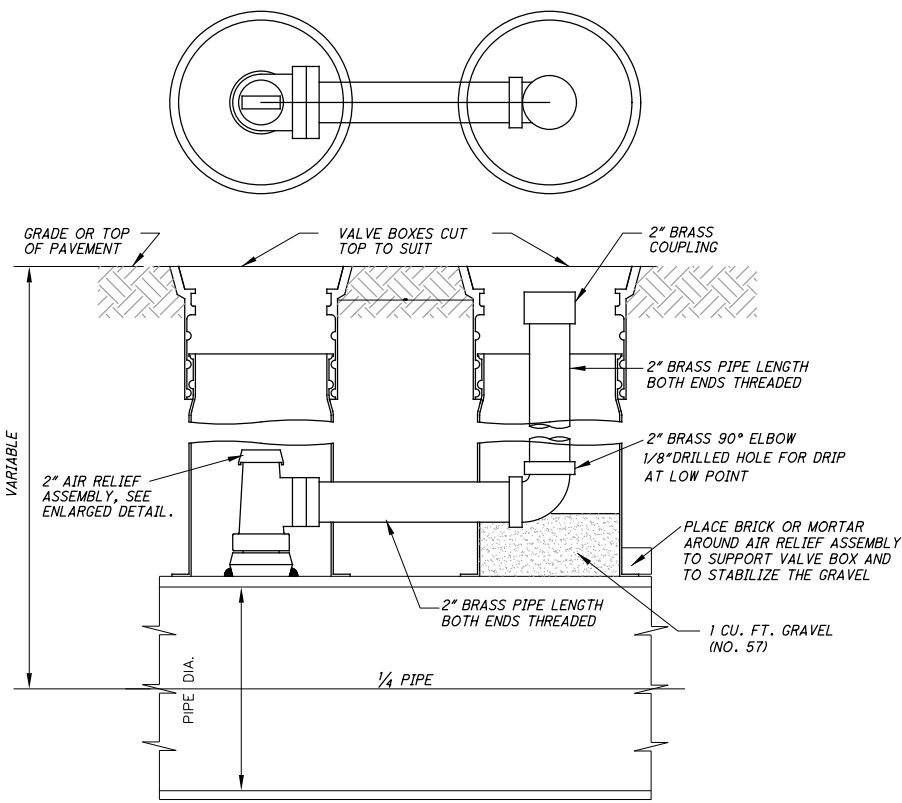
DIA	A	B	C ***	D (MIN)	E (MIN)	F (MIN)	G (MIN)	H (MIN)	TRENCH WIDTH (MAX)	DUCTILE IRON PIPE			STEEL PIPE			RING OD (MIN)
										RING OD (MIN)	T (MIN)	W (MIN)	RING OD (MIN)	T (MIN)	W (MIN)	
20"	1'-0"	1'-0"	3'-0"	2'-3"	2'-3"	4'-6"	3'-6"	7'-0"	4'-0"	24.60"	3/8"	1/4"	26.00"	1/2"	1/8"	29.75"
24"	1'-0"	1'-0"	3'-0"	2'-8"	3'-0"	5'-8"	4'-0"	8'-0"	4'-6"	28.80"	3/8"	1/4"	30.00"	1/2"	3/16"	35.00"
30"	1'-0"	1'-3"***	3'-6"	3'-0"	3'-6"	6'-6"	5'-0"	10'-0"	5'-0"	36.00"	1/2"	3/8"	38.00"	5/8"	3/16"	43.75"
36"	1'-0"	1'-3"***	3'-6"	3'-3"	3'-9"	7'-0"	5'-6"	11'-0"	5'-6"	42.30"	1/2"	3/8"	44.00"	3/4"	1/4"	50.50"
42"	2'-0"*	1'-6"***	5'-0"	3'-6"	4'-6"	8'-0"	6'-0"	12'-0"	6'-0"	50.75"	3/4"	5/8"	50.00"	3/4"	1/4"	57.25"
48"	2'-0"*	1'-6"***	5'-0"	4'-0"	5'-0"	9'-0"	6'-6"	13'-0"	6'-8"	57.05"	3/4"	5/8"	56.00"	7/8"	5/16"	64.00"
54"	2'-0"*	1'-6"***	5'-0"	4'-3"	5'-3"	9'-6"	7'-0"	14'-0"	7'-0"	66.06"	1"	3/4"	60.00"	7/8"	3/8"	70.75"

- NOTES:
1. RING DIAMETERS AND RING THICKNESS ARE MINIMUMS. DIAMETER AND/OR THICKNESS SHALL BE INCREASED WHEN WORKING PRESSURES EXCEED 150 PSI.
 - * 2. FOR ANCHORAGE ON "TYPE A" AND "TYPE B" ACCESS MANHOLES ON 42" THRU 54" PIPE, DIMENSION "A" IS 1'-0".
 - ** 3. FOR ANCHORAGE ON TYPE "A" AND TYPE "B" ACCESS MANHOLES DIMENSION "B" IS 1'-0".
 - *** 4. FOR PLAIN ANCHORS ONLY.

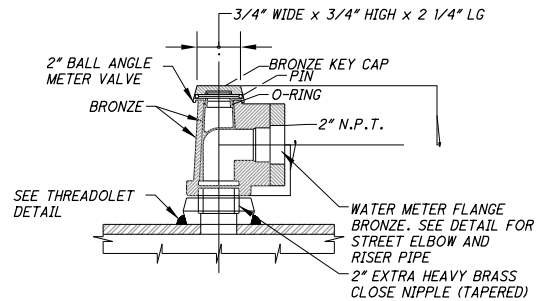
ANCHOR RING AND PLAIN CONCRETE ANCHOR DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD5

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

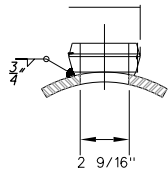
BU-07 - E 55TH ST. PUBLIC UTILITY RELOCATION
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DOUBLE VALVE BOX ASSEMBLY

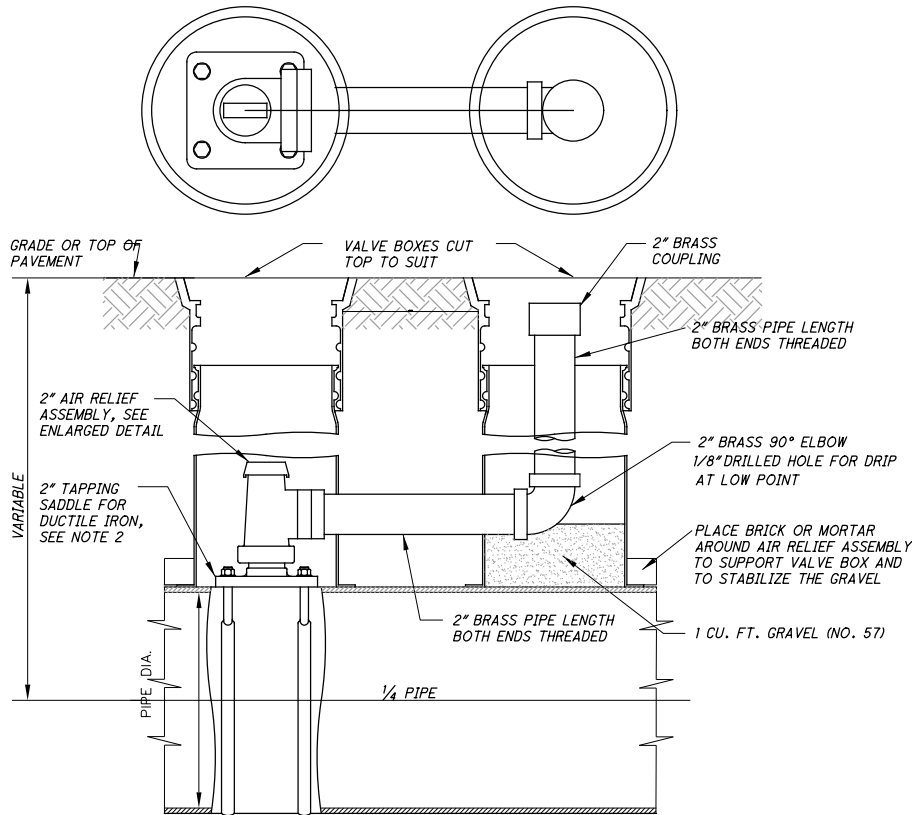


AIR RELIEF VALVE ASSEMBLY

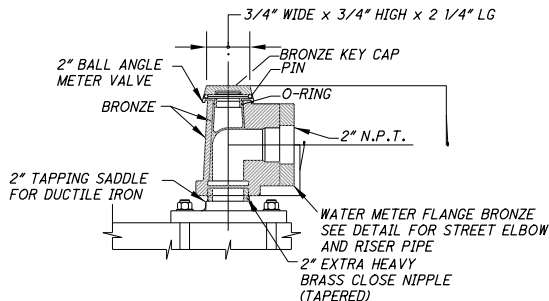


THREDOLET DETAIL

2" AIR RELIEF FOR STEEL WATER MAINS



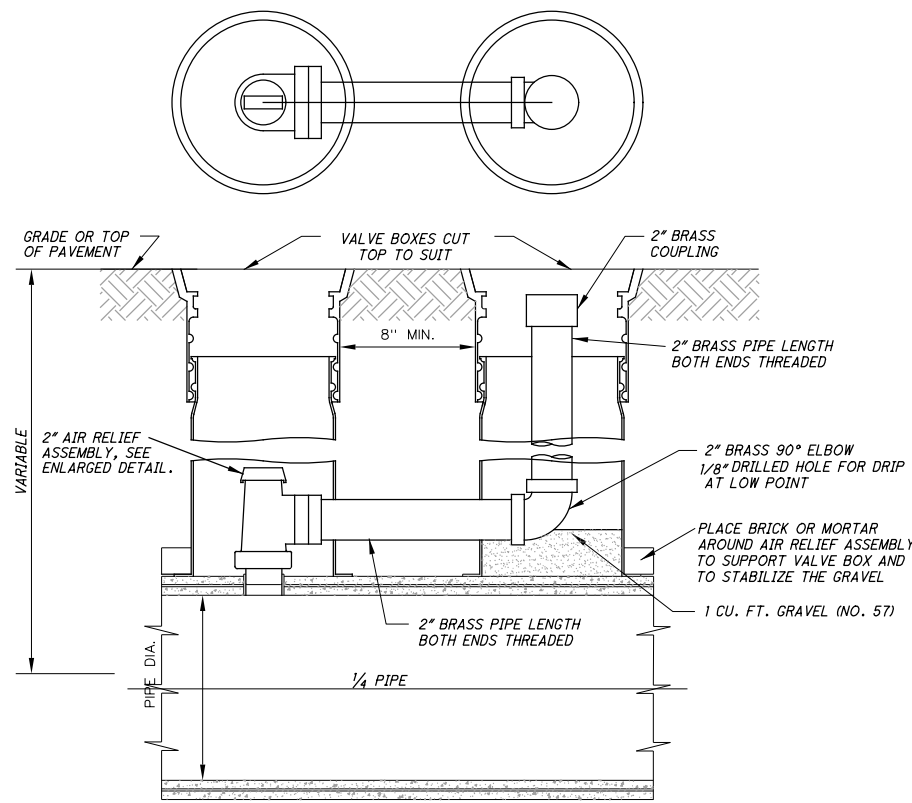
DOUBLE VALVE BOX ASSEMBLY



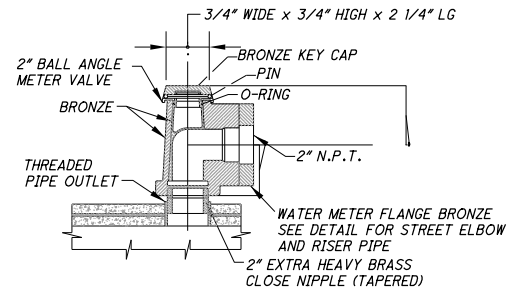
AIR RELIEF VALVE ASSEMBLY

2" AIR RELIEF FOR DUCTILE IRON MAINS

2" AIR RELIEF DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD6



DOUBLE VALVE BOX ASSEMBLY

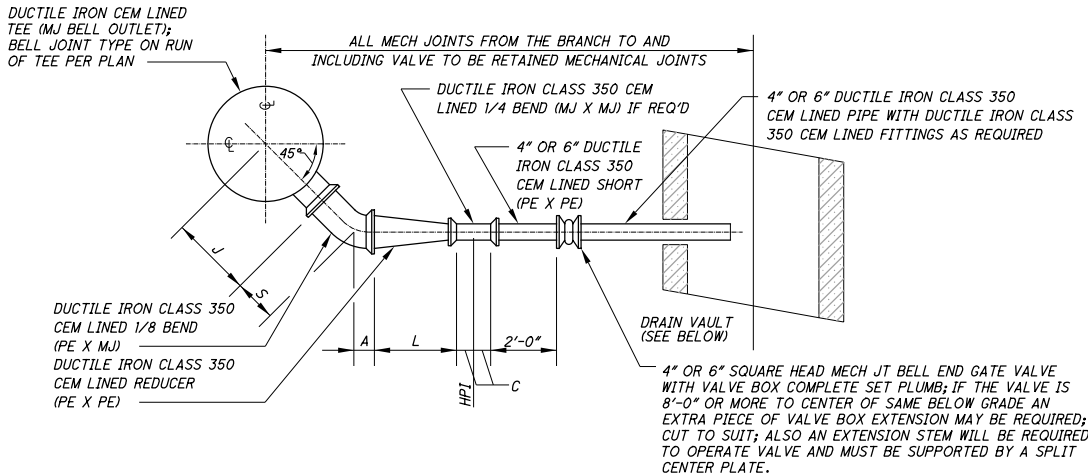


AIR RELIEF VALVE ASSEMBLY

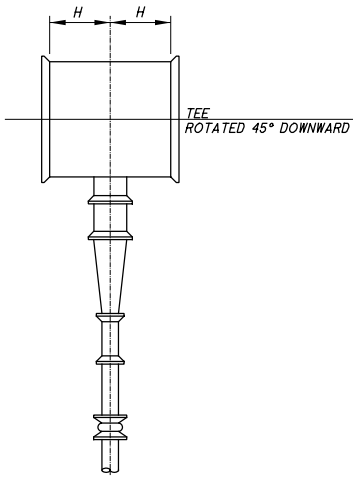
2" AIR RELIEF FOR CONCRETE MAINS

- NOTES:
1. ALL THREADED OUTLETS SHALL BE FURNISHED AND SHIPPED WITH MALLEABLE IRON PLUGS IN PLACE.
 2. FOR DUCTILE IRON PIPE PROVIDE 2" IRON PIPE THREADED TAPPING SADDLE OR WELDED TAPPED BOSS.

NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		



ELEVATION



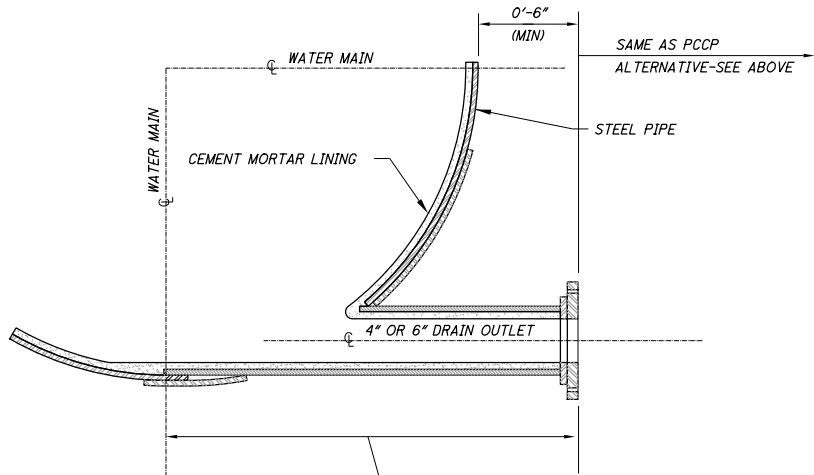
PLAN

- NOTES:
1. IF DRAIN VAULT CANNOT BE PLACED AS SHOWN, USE A 90° BEND WITH FLANGE AND BELL OR FLANGE AND SPIGOT PIPE TO SUIT
 2. 4" DRAIN ASSEMBLIES REQUIRED ON 20", 24" & 30" PIPE
 3. 6" DRAIN ASSEMBLIES REQUIRED ON 36", 42", 48" & 54" PIPE
 4. CONSULT WITH FITTING MANUFACTURER FOR OUTLETS ON PIPE GREATER THAN 48".

DUCTILE IRON DRAIN ASSEMBLY-SCHEDULE

TEE			1/8 BEND		REDUCER		1/4 BEND	
SIZE	H	J	S	A	SIZE	L	4"	6"
20"X6"	14"	17"	13"	5"	6"X 4"	25"	6 1/2"	-
24"X6"	15"	19"	13"	5"	6"X 4"	25"	6 1/2"	-
30"X6"	18"	23"	13"	5"	6"X 4"	25"	6 1/2"	-
36"X8"	20"	26"	13.5"	5.5"	8"X 6"	27"	-	8"
42"X12"	23"	30"	15.5"	7.5"	12"X 6"	30"	-	8"
48"X12"	26"	34"	15.5"	7.5"	12"X 6"	30"	-	8"

4" OR 6" DRAIN ASSEMBLY FOR DUCTILE IRON PIPE DETAIL

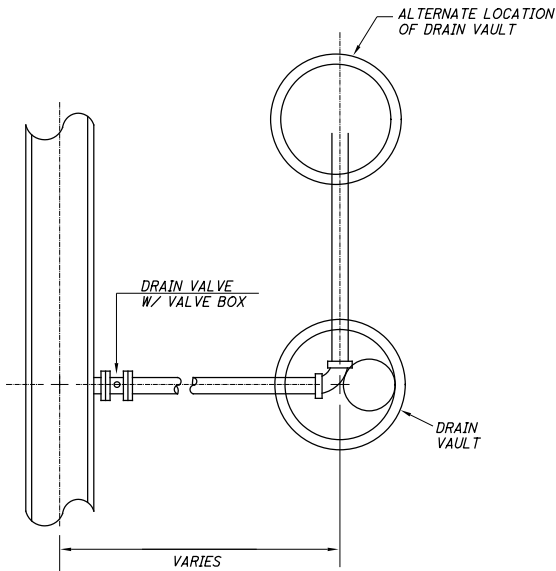


- NOTES:
1. IF DRAIN VAULT CANNOT BE PLACED AS SHOWN, USE A 90° BEND WITH FLANGE AND BELL OR FLANGE AND SPIGOT PIPE TO SUIT
 2. 4" DRAIN ASSEMBLIES REQUIRED ON 20", 24" & 30" PIPE
 3. 6" DRAIN ASSEMBLIES REQUIRED ON 36", 42", 48" & 54" PIPE
- 4" OR 6" DIA. TANGENT OUTLET WITH NOT LESS THAN 1/2" THICK STEEL CONTINUOUSLY WELDED TO PIPE WITH CLASS "E" (RING) STEEL FLANGE WELDED TO OUTLET. BARE PART OF STEEL TO BE COATED. IF VALVE SHOULD INTERFERE WITH ANY UTILITY, A FLG. & FLG. PIPE TO BE ADDED.

4" OR 6" DRAIN ASSEMBLY FOR STEEL PIPE DETAIL

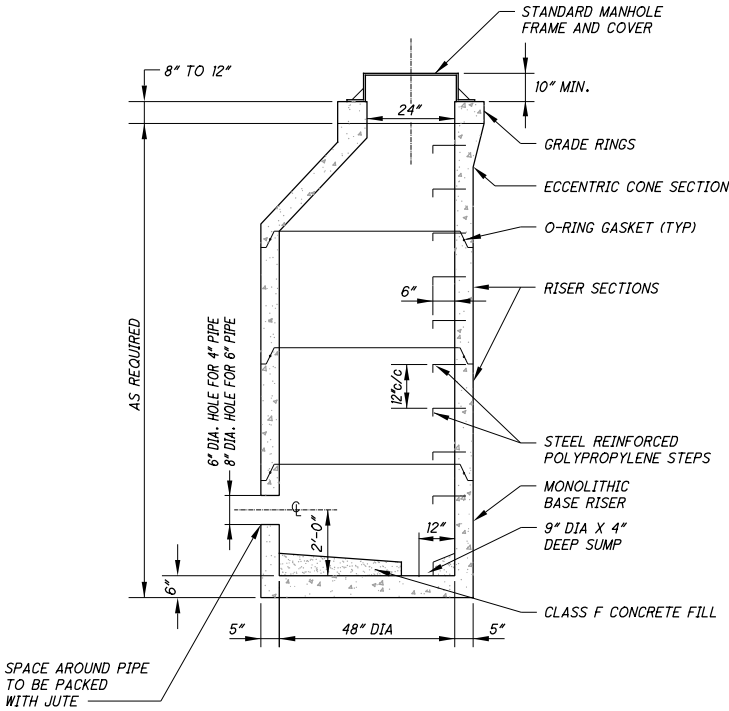
DRAIN ASSEMBLY AND VAULT DETAILS

- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD7



PLAN VIEW

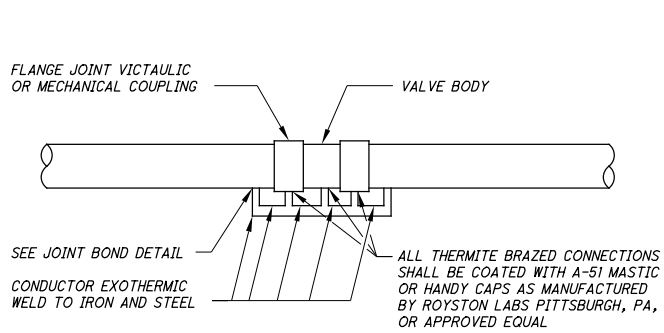
TYPICAL DRAIN ASSEMBLY



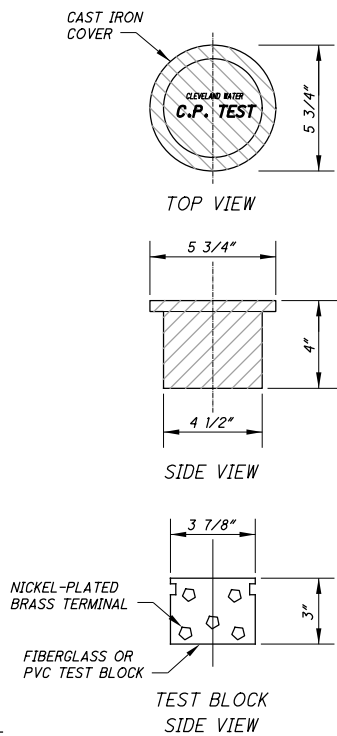
- NOTE
1. PRECAST MANHOLE PER ASTM C 478, TO BE DESIGNED FOR AASHTO H-20 LOADING.

TYPICAL PRECAST DRAIN VAULT DETAIL

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

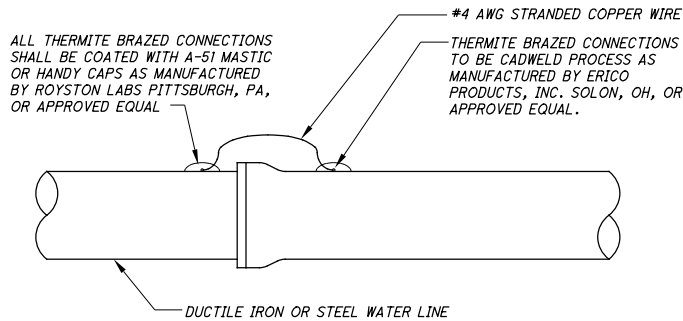


**CONTINUITY BOND DETAIL FOR
VICTAULIC OR MECHANICAL COUPLING
FLANGE JOINT AND VALVE BODY**

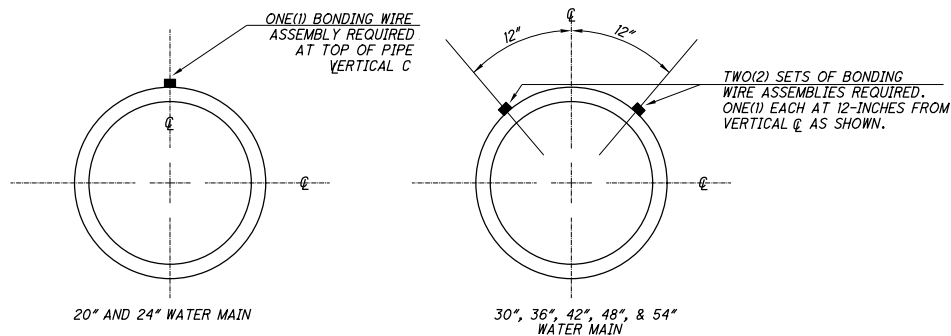


NOTE: NEAREST BONDED PIPE JOINT TO BE USED FOR CONNECTION TO TEST STATION BOX WITH SECOND (WHITE) WIRE TO BE DETERMINED IN FIELD BY C.W.D. CADWELD SECOND CONNECTION AT PIPE JOINT (BLACK WIRE) AND CONNECT TO CADWELD AT PIPE JOINT AND TO TEST STATION BOX.

**DETAIL OF TAP ASSEMBLY FOR
CATHODIC PROTECTION TEST STATION**

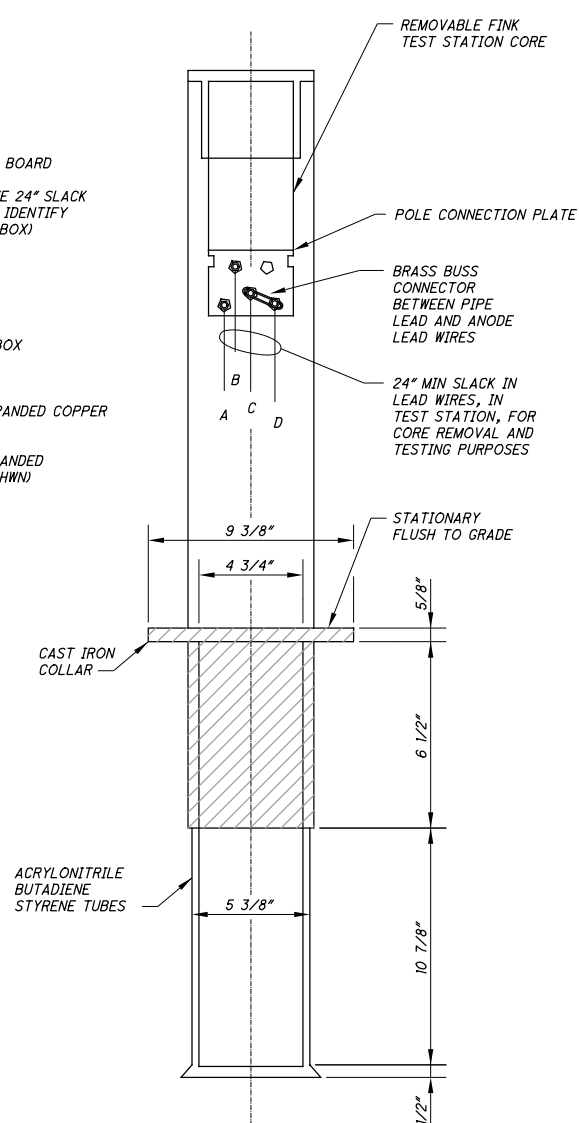
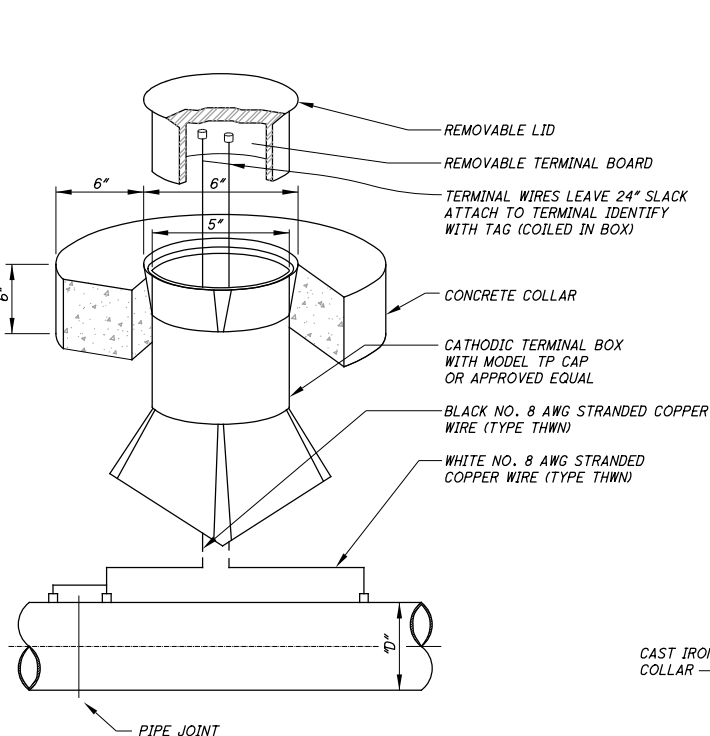


BONDED PIPE JOINT

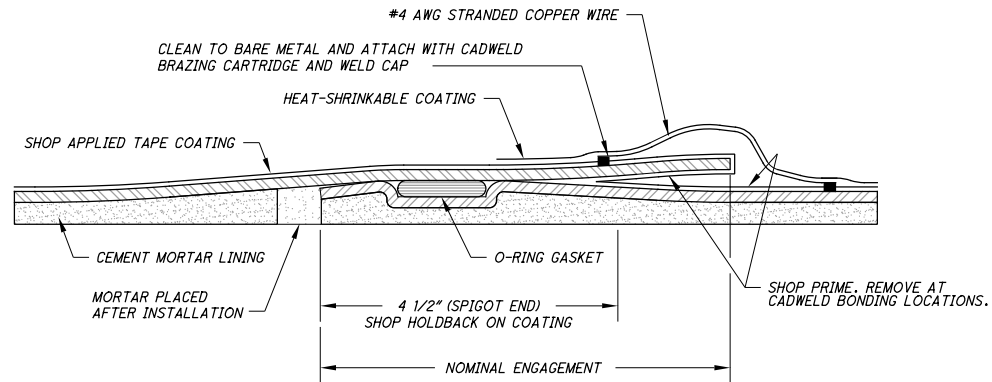
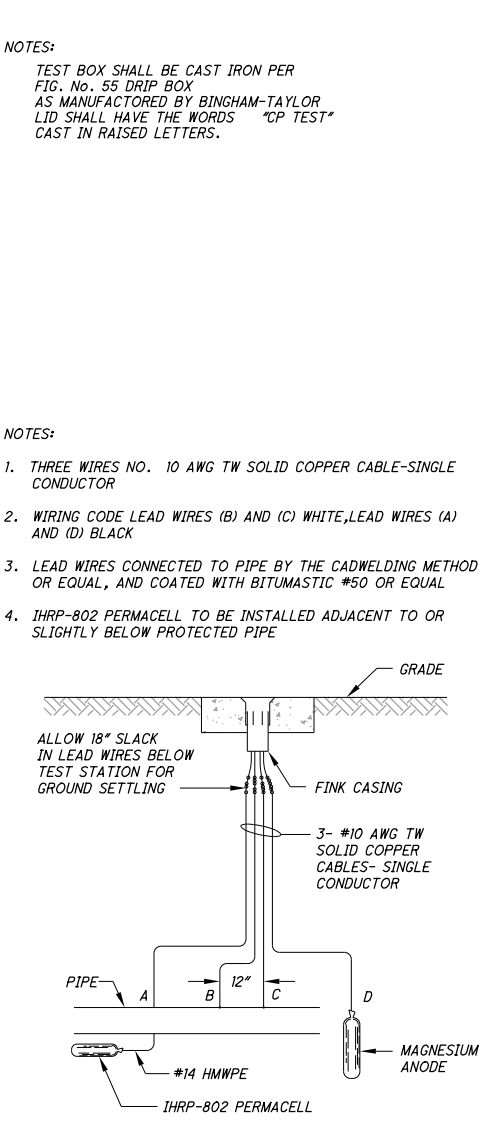


**POSITION OF BONDING WIRE/CONNECTORS
DUCTILE IRON, CONCRETE AND STEEL PIPE ALTERNATES**

BONDING AND CATHODIC PROTECTION DETAILS
- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - SM-STD10

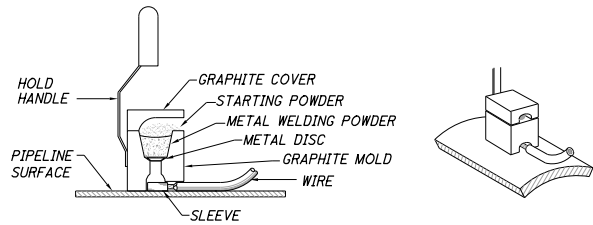


CATHODIC PROTECTION TEST STATION DETAIL



**STEEL PIPE
BELL AND SPIGOT TYPICAL BONDED JOINT DETAIL**

NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		

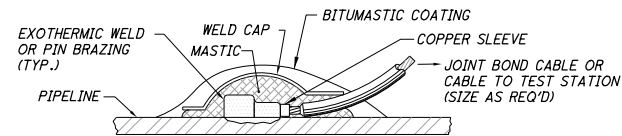


- STEP 1. GRIND STRUCTURE CONNECTION AREA (3"x3") TO BARE SHINY METAL AND CLEAN.
- STEP 2. STRIP INSULATION FROM WIRE. ATTACH SLEEVE
- STEP 3. HOLD MOLD FIRMLY WITH OPENING AWAY OPERATOR & IGNITE WITH FLINT GUN.
- STEP 4. REMOVE SLAG FROM CONNECTION & PEEN WELD FOR SOUNDNESS.
- STEP 5. COVER CONNECTION AND EXPOSED STRUCTURE SURFACE WITH A WELD CAP AND BITUMINOUS COATING COMPOUND.

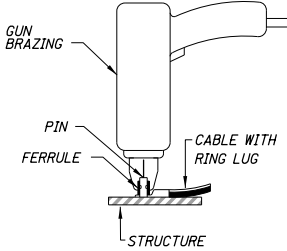
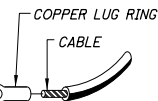
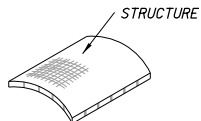
NOTE:

PROCEDURE SHOWN ABOVE IS TO BE USED AS A GENERAL GUIDE ONLY. CONSULT MANUFACTURER'S LITERATURE FOR SPECIFIC INSTALLATION INSTRUCTIONS. ALL WELD'S SHALL BE A MINIMUM OF 6" APART.

EXOTHERMIC WELD

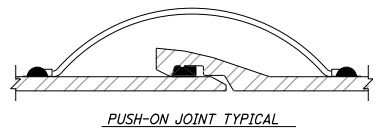


WIRING-TO-STRUCTURE WELD DETAIL
- NOT TO SCALE -

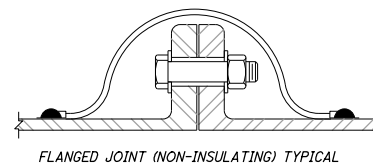


PIN BRAZING

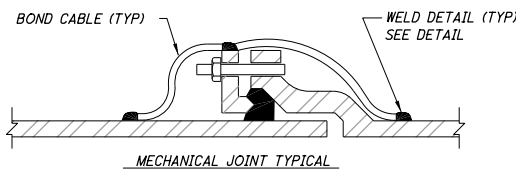
1. DEGREASE AND CLEAN STRUCTURE TO BARE, BRIGHT METAL WITH MECHANICAL DEVICES.
2. STRIP WIRE INSULATION AND ATTACH A BAC MI LUG OR APPROVED EQUAL TO WIRE.
3. LOAD THE BRAZING GUN WITH A DIRECT BRAZING PIN AND FERRULE. USE A THREADED TYPE CONNECTION FOR ABOVE-GROUND USE ONLY.
4. BRAZE THE CABLE TO THE PIPE. EXTRA MATERIAL REQUIRED FOR DI OR CI PIPE.
5. TEST BRAZE BY BREAKING OFF THE SHANK OF THE PLAIN PIN WITH A HAMMER.
6. COVER CONNECTION WITH MASTIC FILLED WELD CAP AND BITUMASTIC COATING 80% SOLIDS BY VOLUME OVER WELD CAP AND ALL EXPOSED METAL.
7. ALL WELDS SHALL BE A MINIMUM OF 6" APART.
8. ALLOW WELD COATING TO CURE PER MANUF. RECOM. BEFORE BURIAL.



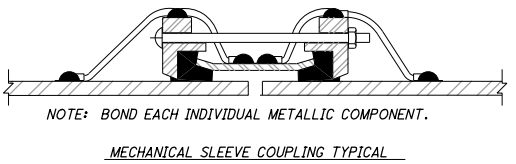
PUSH-ON JOINT TYPICAL



FLANGED JOINT (NON-INSULATING) TYPICAL

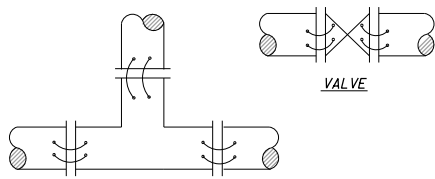


MECHANICAL JOINT TYPICAL



MECHANICAL SLEEVE COUPLING TYPICAL

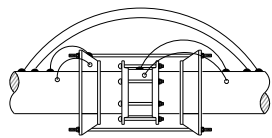
NOTE: BOND EACH INDIVIDUAL METALLIC COMPONENT.



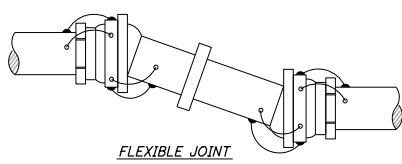
TEE



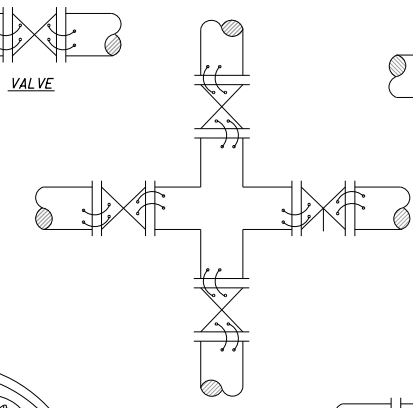
VICTAULIC COUPLING



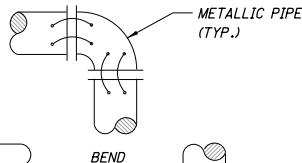
FLEX COUPLING WITH RESTRAINER



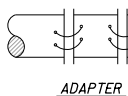
FLEXIBLE JOINT



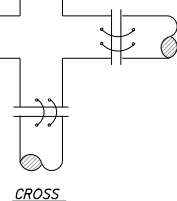
VALVE CROSSING



BEND



ADAPTER



CROSS

NOTES:

1. ALL BOND WIRES SHALL BE STRD. COPPER WIRE W/HMWPE INSULATION, INSTALLED AT MIN. LENGTH.
2. TWO #8 BOND CABLES ARE REQUIRED PER JOINT FOR PIPE DIAMETERS 16" AND SMALLER. THREE #4 BOND CABLES ARE REQUIRED PER JOINT FOR PIPE DIAMETERS GREATER THAN 16".
3. BOND WIRES SHALL BE SPACED 6" APART MIN.
4. ALL WIRE CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD OR PIN BRAZING PROCESS, EXCEPT WIRE CONNECTIONS ON SOIL CAST IRON PIPE. WIRE CONNECTIONS ON SOIL CAST IRON PIPE SHALL BE MADE BY PIN BRAZING PROCESS ONLY. SEE DETAIL.
5. WAX TAPE ALL BURIED BOLTED FITTINGS PER AWWA C217.

PIPE JOINT AND MECHANICAL JOINT BONDING
- NOT TO SCALE -

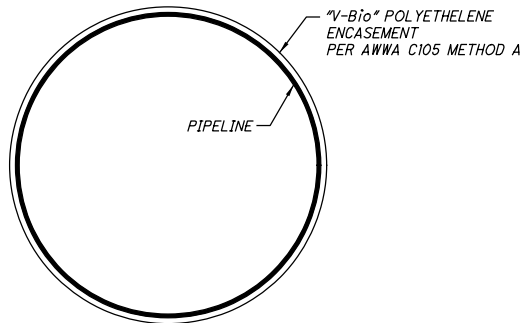
WIRE SCHEDULE

DESCRIPTION	WIRE SIZE (AWG)	WIRE INSULATION TYPE	WIRE COLOR
14-IN DIP	#8 STRANDED	THHN/THWN	BLACK
REFERENCE CELL	#14 STRANDED	RHH-RHW	YELLOW
STEEL COUPON	#14 STRANDED	THHN/THWN	GREEN
ZINC ANODE	#12 STRANDED	HMWPE	BLACK

TEST STATION SCHEDULE**

CTS NO.	STATION	INSTALLATION TYPE	NO. OF ANODES
1	14+00.00	4-WIRE TEST STATION	0
2	11+00.00	ANODE BED	9
3	12+50.00	ANODE BED	9
4	16+50.00	ANODE BED	9
5	18+00.00	ANODE BED	9
6	17+00.00	4-WIRE TEST STATION	0

** FIELD ADJUST PER CORROSION ENGINEERS RECOMMENDATIONS.

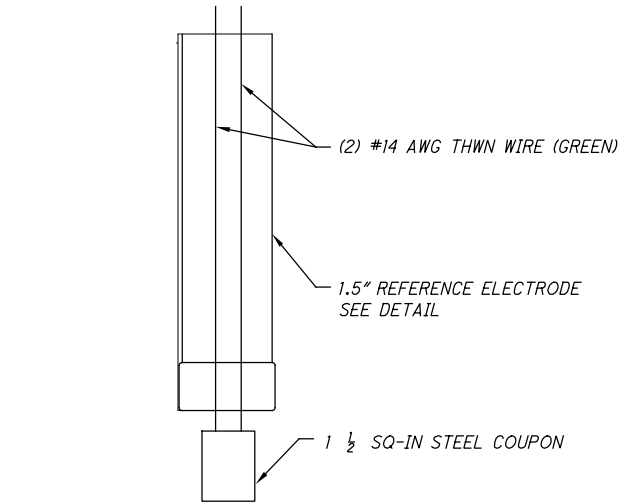


NOTES:

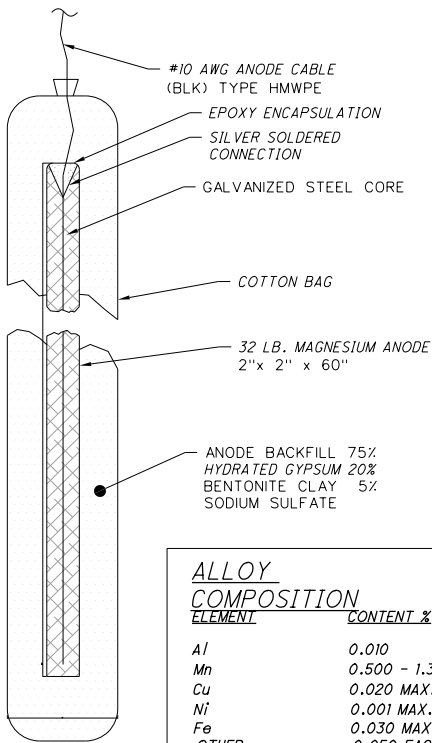
1. WRAP PIPE WITH "V-Bio" POLYETHYLENE ENCASEMENT PER AWWA C105 METHOD A.
2. ROUTE TEST AND REFERENCE CELL WIRES THROUGH END OF ENCASEMENT AT JOINTS AND SEAL ENCASEMENT PER AWWA C105.

POLYETHYLENE ENCASEMENT
- NOT TO SCALE -

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

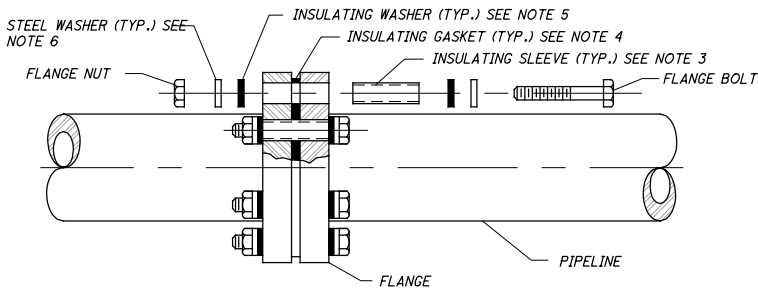


STEEL COUPON
- NOT TO SCALE -



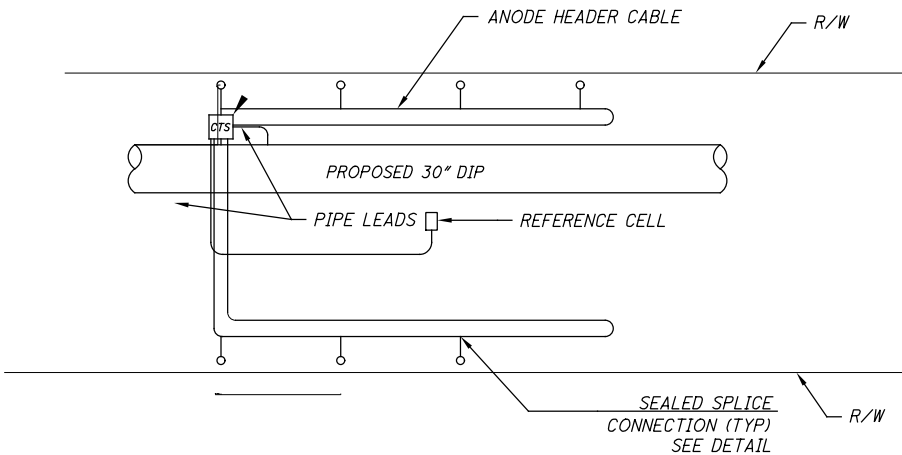
ALLOY COMPOSITION	
ELEMENT	CONTENT %
Al	0.010
Mn	0.500 - 1.300
Cu	0.020 MAX.
Ni	0.001 MAX.
Fe	0.030 MAX.
OTHER	0.050 EACH OR 0.300 MAX. TOTAL
MAGNESIUM	REMAINDER

32LB MAGNESIUM ANODE
- NOT TO SCALE -



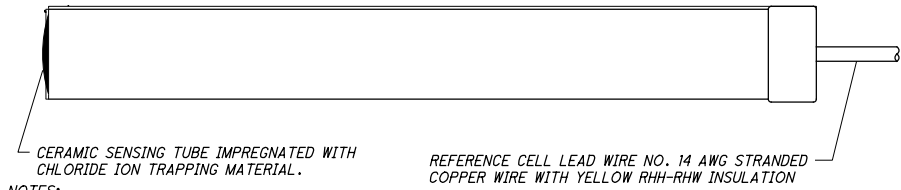
- NOTES:
1. APPLY AN INTERNAL LINING TO THE PIPELINE AT INSULATING FLANGES FOR A DISTANCE OF 2', THE COATING SHALL BE A TWO PART, SMOOTH, THIXOTROPIC LIQUID EPOXY CONSISTING OF 100 PERCENT SOLID. COATING SHALL BE RAVEN 404 COATING AS MANUFACTURED BY RAVEN LININGS CORPORATION, OR APPROVED EQUAL.
 2. MANUFACTURER SHALL BE PACIFIC SEAL, INC. (LINEBACKER), ADVANCED PRODUCTS & SYSTEMS, INC. (TROJAN), OR APPROVED EQUAL.
 3. INSULATING SLEEVE SHALL BE FULL-LENGTH FIBERGLASS-REINFORCED EPOXY (NEMA G-10 GRADE).
 4. INSULATING GASKET SHALL BE FULL-FACE TYPE E WITH ELASTIC SEALING ELEMENT.
 5. INSULATING WASHERS SHALL BE FIBERGLASS REINFORCED (NEMA G-10 GRADE).
 6. STEEL WASHERS SHALL BE PLATED, HOT-ROLLED STEEL, 1/8" THICK.
 7. AFTER ASSEMBLY, TEST THE FLANGE TO ENSURE PROPER ELECTRICAL ISOLATION.
 8. COAT ALL UNDERGROUND INSULATING FLANGES WITH WAZ TAPE PER AWWA C-217 AFTER ASSEMBLY.

INSULATING FLANGE ASSEMBLY
- NOT TO SCALE -



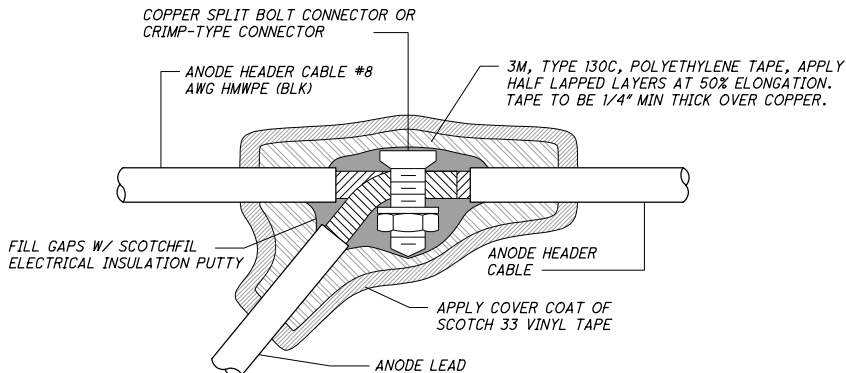
- NOTES:
1. INSTALL PLASTIC WARNING TAPE ALONG ENTIRE LENGTH OF WIRES. USE 6" WIDE 4 MIL THICK INERT PLASTIC TAPE PRINTED WITH "CAUTION CATHODIC PROTECTION CABLE BELOW."
 2. INSTALL TEST STATION AT EACH LOCATION SHOWN ON DRAWINGS WITH THE SPECIFIED NUMBER OF ANODES. SEE TEST STATION SCHEDULE DETAIL

TYPICAL ANODE BED
- NOT TO SCALE -



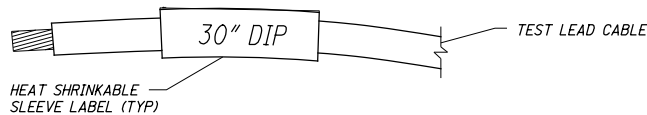
- NOTES:
1. REFERENCE ELECTRODE SHALL BE CAPABLE OF MAINTAINING A STABLE POTENTIAL WITHIN PLUS OR MINUS 10 MILLIVOLTS TO THAT OF A FRESHLY MADE COPPER SULFATE REFERENCE ELECTRODE WHILE A 3 MICROAMPERE ELECTRICAL CURRENT IS APPLIED TO IT. PROVIDE STELTH 2 MODEL SRE-002-CFY BY BORIN MANUFACTURING OR STAPERM BY GMC CORROSION, OR APPROVED EQUAL
 2. MEASURE THE ACCURACY OF EACH COPPER SULFATE REFERENCE ELECTRODE BEFORE INSTALLING IT BY MEASURING THE DC VOLTAGE DIFFERENCE BETWEEN IT AND ONE OR MORE REFERENCE ELECTRODES OF KNOWN ACCURACY. THE MEASUREMENTS SHALL BE LESS THAN PLUS OR MINUS 0.010 DC VOLTS FOR ALL REFERENCE ELECTRODES. PERFORM THESE MEASUREMENTS AFTER TOTALLY SUBMERGING THE REFERENCE ELECTRODES IN A FIVE-GALLON BUCKET OF WATER FOR A MINIMUM PERIOD OF 15 MINUTES. USE ONLY POTABLE DRINKING WATER FOR THIS TEST. BRACKISH WATER OR SALTWATER WILL AFFECT THE TEST RESULTS AND DAMAGE THE REFERENCE ELECTRODE. PROVIDE FIVE DAYS WRITTEN NOTICE TO THE ENGINEER TO ALLOW THESE TESTS TO BE WITNESSED.

COPPER SULFATE REFERENCE ELECTRODE
- NOT TO SCALE -



- NOTES:
1. MAKE SPLICE WATERPROOF
 - A. SMOOTH ALL IRREGULAR SURFACES WITH 3M SCOTCHFIL ELECTRICAL INSULATION PUTTY OR APPROVED EQUAL.
 - B. APPLY 2 LAYERS OF HALF LAPPED RUBBER SPLICING TAPE, SCOTCH LINERLESS RUBBER SPLICING TAPE 130C OR APPROVED EQUAL.
 - C. APPLY 2 LAYERS OF HALF LAPPED VINYL ELECTRICAL TAPE, SCOTCH SUPER 33+ OR APPROVED EQUAL.
 2. NUMBER OF WIRES MAY VARY PER SPLICE

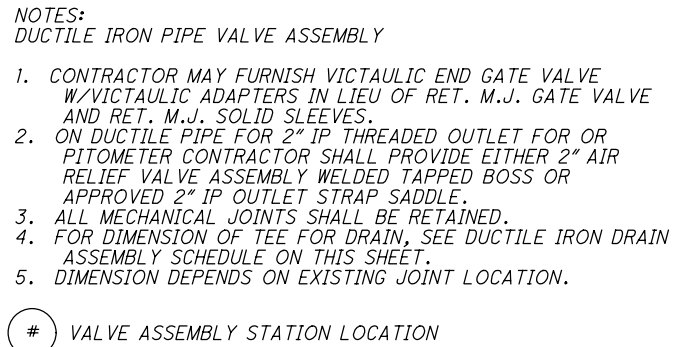
SEALED SPLICE CONNECTION
- NOT TO SCALE -



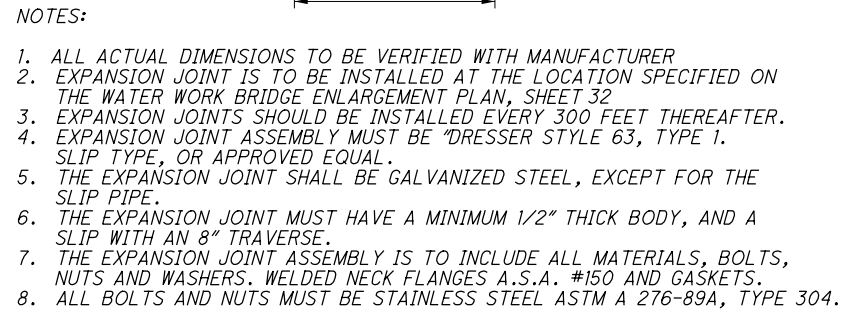
- NOTE:
1. FOR PIPE IDENTIFICATION, PRINT DIAMETER AND MATERIAL OF PIPELINE
 2. FOR ANODE, PRINT "ANODE"
 3. FOR COUPON, PRINT "COUPON"
 4. FOR REFERENCE CELL, PRINT "REF CELL"

HEAT SHRINKABLE TAGS
- NOT TO SCALE -

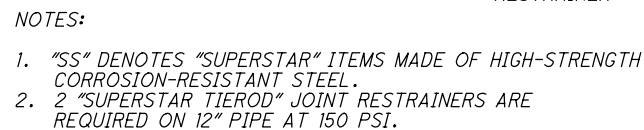
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- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-005-1 (MODIFIED)



- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-005-1 (MODIFIED)



- NOT TO SCALE -
CLEVELAND WATER DEPARTMENT - STD-005-1 (MODIFIED)

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CLEVELAND PUBLIC POWER GENERAL CONSTRUCTION NOTES

ALL CONSTRUCTION NOTES ARE MINIMUM DESIRABLE STANDARDS, ALL EXCEPTIONS TO BE APPROVED BY CPP REPRESENTATIVE TO COMPLY WITH SAFETY CODES AND REGULATIONS.

CONTACT OHIO UTILITIES PROTECTION SERVICE (OUPS), TWO WORKING DAYS PRIOR TO START OF CONSTRUCTION. IN OHIO, CALL TOLL FREE 1-800-362-2764. IT’S THE LAW.

UTILITIES SHOWN ARE FROM BEST AVAILABLE RECORDS AND FIELD INVESTIGATION, AND ARE NOT NECESSARILY COMPLETE OR EXACT. THE CONTRACTOR IS RESPONSIBLE FOR THE INVESTIGATION, LOCATION, SUPPORT, PROTECTION AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES WHETHER SHOWN ON THIS PLAN OR NOT.

PROPOSED WORK

A. THE CONTRACTOR SHALL RELOCATE AND/OR REMOVE ALL OVERHEAD AND UNDERGROUND CLEVELAND PUBLIC POWER (CPP) FACILITIES OF THE CITY OF CLEVELAND, AS INDICATED IN THE PLANS OR AS DIRECTED BY THE ENGINEER ONLY AFTER CPP HAS VISIBLY CONFIRMED THAT SAID CPP FACILITIES HAVE BEEN DE-ENERGIZED & DISCONNECTED. THIS WORK SHALL BE PROPERLY COMPLETED, INCLUDING INCIDENTALS, AS SHOWN ON THE DRAWINGS AND HEREINAFTER SPECIFIED.

B. ALL WORK IN THIS CONTRACT SHALL CONFORM TO THE LATEST NATIONAL ELECTRIC SAFETY CODE (NESC) AND OSHA, EXCEPT WHERE LOCAL REGULATIONS ARE MORE STRINGENT, IN WHICH CASE LOCAL REGULATIONS SHALL GOVERN. ALL WORK SHALL BE IN CONFORMANCE WITH CPP REGULATIONS.

C. THE MAJOR ITEMS TO BE PERFORMED BY THE CONTRACTOR SHALL BE AS FOLLOWS:

FURNISH & INSTALL OVERHEAD POLE LINE CONSTRUCTION.

FURNISH & INSTALL UNDERGROUND CONDUIT BANK AND MANHOLE CONSTRUCTION INCLUDING CABLES.

REMOVAL OF OVERHEAD AND UNDERGROUND UTILITY FACILITIES WHERE DIRECTED TO.

ALL POWER CONDUIT RUNS ARE TO BE CONSTRUCTED BY USING 2", 4", 5", OR 6" PVC SCHEDULE CONDUITS, AS DEPICTED ON THE PLANS, ENCASED WITH A 3" CONCRETE ENVELOPE, UNLESS OTHERWISE NOTED ON THE PLANS OR SPECIFICATIONS. THE CONCRETE ENVELOPE IS TO BE 4000PSI (CITY OF CLEVELAND CONCRETE MIX). EACH CONDUIT SHALL HAVE A PULLING LINE INSTALLED WITH SLACK AT EACH END.

A RUGGED POLYETHYLENE MATERIAL WARNING TAPE CAPABLE OF RESISTING HIGH OR LOW PH CONDITIONS MUST BE PLACED ABOVE THE ELECTRICAL CONDUIT BANK. THIS WARNING TAPE IS TO BE SIX INCHES WIDE, RED IN COLOR, AND IMPRINTED WITH THE WORDS, "DANGER - BURIED HIGH VOLTAGE CABLES BELOW". THIS TAPE IS TO BE PLACED 6" ABOVE THE NEWLY INSTALLED DUCT BANK. THIS SHALL CONFORM WITH THE STANDARDS AS SET BY OHIO UTILITIES PROTECTION SERVICE (OUPS) . WARNING TAPE PAYMENT INCLUDED IN APPROPRIATE CONDUIT, PAY ITEM.

AS AN OPTION, CONTRACTOR MAY ELECT TO ENCASE CPP’S CONDUITS IN RED CONCRETE. BOTH METHODS ARE APPROVED BY CLEVELAND PUBLIC POWER (CPP) AND ARE RECOMMENDED BY OHIO UTILITIES PROTECTION SERVICE (OUPS). PAYMENT FOR TINTED DUCT CONCRETE, OR TINTED CONCRETE PROTECTIVE SLABS INCLUDED IN APPROPRIATE CONDUIT PAY ITEM.

PROPOSED WORK (CONT.)

THE TOP OF THE CONCRETE ENCASED CONDUIT ENVELOPE SHALL BE INSTALLED AT A MINIMUM DEPTH OF 3'-0" BELOW THE EXISTING AND/OR PROPOSED GRADES. THE TOTAL TRENCH DEPTH WILL BE BASED UPON THE CONDUIT FORMATION. THOSE CONDUITS THAT ARE CROSSING UNDER ANY RAILROAD OR RTA TRACKS, SHALL BE INSTALLED AT A MINIMUM DEPTH OF 60" FROM TOP OF RAIL TIES TO THE TOP OF CONCRETE ENVELOPE/STEEL CASING. SEE DRAWINGS ISSUED BY CLEVELAND PUBLIC POWER (CPP) FOR DETAILS.

VERTICAL AND HORIZONTAL CURVES SHALL HAVE A MINIMUM RADIUS OF NO LESS THAN 30 FEET. THESE CURVES ARE TO BE CONDUITS AS NOTED CONSTRUCTED BY USING THE APPROPRIATE 5° COUPLINGS, AND ASSOCIATED CHORD LENGTHS AS SHOWN ON THE PLAN VIEW AND/OR AS SHOWN ON THE CONDUIT CURVE CONSTRUCTION CHART. ANY OTHER CURVE DESIGN, FIELD CHANGES, OR THE USE OF PREFORMED RADIUS BENDS MUST BE APPROVED BY THE ENGINEERING DEPARTMENT OF CLEVELAND PUBLIC POWER (CPP).

ALL MANHOLES OUTSIDE WALLS AND CONDUITS RUNS ARE TO HAVE A MINIMUM CLEARANCE OF 5’ (FACE TO FACE), HORIZONTALLY FROM ALL WATER LINES. VERTICAL CLEARANCE SHALL BE AT A MINIMUM OF 1'-6". CLEARANCE BETWEEN OTHER UTILITIES SHALL BE 1 FOOT, UNLESS NOTED OTHERWISE. CPP’S DUCT BANK SHALL CROSS OVER OR UNDER OTHER UTILITIES AT AN ANGLE OF NO LESS THAN 45°.

ANY CONDUIT RUNS THAT ARE CROSSING ANY STEAM LINES SHALL HAVE A MINIMUM CLEARANCE OF 5’, OR AS SHOWN ON THE PROFILE SHEET OF THE PROJECT. IN THE EVENT THAT THIS CAN NOT BE ACCOMPLISHED, NOTIFY THE ENGINEERING DEPARTMENT OF CLEVELAND PUBLIC POWER (CPP) PRIOR TO THE INSTALLATION OF CONDUITS.

EACH NEWLY CONSTRUCTED MANHOLE SHALL BE FREE OF ALL FOREIGN OBJECTS AND DEBRIS. THE CONTRACTOR SHALL ALSO PROVIDE A PULLING LINE IN EACH OF THE NEW CONDUITS. ALL MANHOLE COVERS SHOULD BE INSCRIBED WITH THE CLEVELAND PUBLIC POWER LOGO "CPP". LETTERS SHALL HAVE A MINIMUM HEIGHT OF 2 INCHES.

THE CONTRACTOR SHALL PROVIDE CLEVELAND PUBLIC POWER (CPP) WITH AS-BUILT PLANS OF THE NEWLY INSTALLED CONDUIT SYSTEM, SHOWING BOTH VERTICAL AND HORIZONTAL LOCATIONS. THESE LOCATIONS SHALL BE AT 50’ INTERVALS (MAX). ALL COORDINATES AND ELEVATIONS ARE TO BE BASED ON THE STATE PLANE COORDINATE SYSTEM. IN ADDITION, THE CONTRACTOR SHALL PROVIDE AS-BUILT INFORMATION OF THE MANHOLES, INCLUDING BUT NOT LIMITED TO AS-BUILT PHOTOGRAPHS OF ALL INTERIOR SURFACES (WALLS, FLOORS AND CEILINGS). PAYMENT INCLUDED IN APPROPRIATE CONDUIT PAY ITEM.

BACKFILL MATERIAL AND BACKFILLING PROCEDURES

FOR ALL BACKFILL UNDER ROADWAY PAVEMENT, REFER TO FLOWABLE FILL SPECIFICATIONS IN THIS SHEET. FOR ALL OTHER LOCATIONS, THE BACKFILL MATERIAL USED SHALL BE CRUSHED LIMESTONE OR GRAVEL AS PER ODOT ITEM 304-AGGREGATE BASE. CRUSHED AIR-COOLED SLAG MEETING #304 GRADATION MAY BE USED WITH PRIOR WRITTEN APPROVAL OF THE CPP ENGINEERING DEPARTMENT. THE USE OF SAND OR #57 AGGREGATE AS A PREMIUM BACKFILL IS PROHIBITED. SAND MAY ONLY BE USED AS INDICATED ON THE PLAN DETAILS FOR ITEMS SUCH AS CONDUIT COVER. THE SAND MATERIAL SHALL BE NATURAL RIVER OR BANK SAND; FREE OF SILT, CLAY, LOAM, FRIABLE OR SOLUBLE MATERIALS AND ORGANIC MATTER. THE BACKFILL SHALL BE INSTALLED IN 4 INCH (4") LIFTS AND COMPACTED USING MECHANICAL MEANS ONLY. COMPACT TO WITHIN 12" OF SUBGRADE AND EACH LAYER OF BACKFILL TO 95% MAXIMUM DRY DENSITY AS DETERMINED BY STANDARD PROCTOR TEST (ASTM D698). THE USE OF WATER FOR COMPACTION IS PROHIBITED, E.G. FLOODING OR PUDDLING. SAND USED AS EMBANKMENT CONSTRUCTION AND AS BACKFILL AROUND STRUCTURES SHALL BE ODOT ITEM 203-EMBANKMENT OR MEETING THE REQUIREMENTS OF 703 - SPECIAL BACKFILL MATERIAL OF THE SECTION.

EMPLOY A PLACEMENT METHOD THAT DOES NOT DISTURB OR DAMAGE CONDUIT ENCASEMENT.

DO NOT BACKFILL OVER WET, FROZEN OR UNSTABLE SUBGRADE SURFACES.

FLOWABLE FILL SPECIFICATION FOR UTILITY TRENCHES

PART I - CERTIFICATE OF COMPLIANCE

MATERIAL MUST COME FROM A PLANT WITH A CURRENT CERTIFICATE OF COMPLIANCE DEMONSTRATING THE ABILITY OF THE MIX DESIGN TO MEET THE SPECIFIED REQUIREMENTS. CERTIFICATES IN EXCESS OF ONE YEAR WILL NOT BE ACCEPTED. CERTIFICATES MUST CONTAIN THE NAME OF SUPPLIER, DATE, CONTRACT NUMBER AND MIX DESIGN DATA ON EACH DELIVERY TICKET.

PART II - MATERIALS

ALL MATERIALS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS STATED HEREIN.

- CEMENT SHALL BE ASTM C-150 TYPE I.
- THE USE OF FLY ASH IS STRICTLY PROHIBITED.
- FINE AGGREGATE SHALL CONFORM TO ODOT SPECIFICATION 703.03. FINE AGGREGATE FOR MORTAR OR GROUT. (ODOT CONSTRUCTION AND MATERIALS SPECIFICATIONS MOST CURRENT EDITION). THE USE OF SPENT FOUNDRY SAND OR CORE SAND IS STRICTLY PROHIBITED.

PART III - PERFORMANCE ENHANCING ADMIXTURE

AN AIR-ENHANCING ADMIXTURE SHALL BE INCORPORATED IN THE MIX THAT WILL HAVE THE EFFECT OF LOWERING THE WATER/CEMENT RATIO TO BETWEEN 95 AND 105 LBS/CUBIC FOOT. THE AIR ENTRAINED CONTENT FOR THE MIX SHALL BE 30% TO ELIMINATE/MINIMIZE THE EXCESSIVE WATER AND SEGREGATION. COMPRESSIVE STRENGTHS SHALL HAVE A RANGE OF 50 PSI TO 100 PSI AT 28 DAYS.

APPROVED ADMIXTURES:	
MANUFACTURER	PRODUCT
A. MASTER BUILDERS	RHEOFILL
B. AXIM	FLOW AIR
C. W.R. GRACE	DARAFILL
D. OR APPROVED EQUAL	

FLOWABLE FILL SPECIFICATION FOR UTILITY TRENCHES (CONT.)

PART IV - FLOWABLE FILL MIX DESIGN

THE MIX DESIGN SHALL BE PROPORTIONED AS FOLLOWS:

CEMENT (TYPE I)	50 LBS/CUBIC YARD
SAND (SSD)	2475 LBS/CUBIC YARD
WATER	25 GALLONS/CUBIC YARD
ADMIXTURE (AIR)	3 OZ/CUBIC YARD

VARIATIONS OF THE AFOREMENTIONED MIX DESIGN ARE STRICTLY PROHIBITED.

PART V - APPLICATION

- FLOWABLE FILL SHALL BEGIN 12 INCHES ABOVE THE TOP OF PIPE AND CONTINUE IN THE TRENCH TO THE CONCRETE BASE.
- MATERIAL FOR PIPE BEDDING AND PIPE ZONE TO A MAXIMUM DEPTH OF 12 INCHES OVER THE TOP OF PIPE SHALL BE AS SPECIFIED BY THE UTILITY.
- EXPOSED BOLTS AND VALVES EXPOSED IN THE TRENCH SHOULD BE WRAPPED WITH POLYETHYLENE MATERIAL CONFORMING TO ODOT 748.07 (8 MIL THICK).
- COVER ALL JOINTS IN CLAY PIPE IN THE TRENCH AREA WITH POLYETHYLENE MATERIAL BEFORE POURING FLOWABLE FILL. REPAIR ALL OBSERVED OPENINGS IN ANY PIPE OR MANHOLE IN THE TRENCH AREA PRIOR TO BACKFILLING WITH FLOWABLE FILL. REPAIR TECHNIQUES SHALL BE IN ACCORDANCE WITH THE UTILITY COMPANY’S STANDARD REPAIR PROCEDURES.
- CONTACT THE RESPECTIVE UTILITY OWNER FOR REPAIR PROCEDURES.

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CONCRETE DESIGN MIX (CITY OF CLEVELAND MIX)

UNDER THIS SECTION OF THESE SPECIFICATIONS THE CONTRACTOR IS REQUIRED TO SUBMIT A SEPARATE MIX DESIGN FOR EACH COMBINATION OF CEMENT TYPE, AGGREGATE TYPE, AND CONCRETE SUPPLIER THEY WILL USE UNDER THIS CONTRACT. EACH MIX SHALL BE DESIGNED IN ACCORDANCE WITH ASTM C94-94 OPTION C AND AS HEREIN MODIFIED.

MINIMUM COMPRESSIVE STRENGTH

4000 PSI FOR 28 DAYS COMPRESSIVE STRENGTH TEST. FOUR CYLINDERS WILL BE TAKEN AND TESED AS PER ASTM C-39-94. ONE TO BE TESTED AT SEVEN DAYS AND THE REMAINING THREE WILL BE TESTED AT TWENTY-EIGHT DAYS. ACCEPTANCE WILL BE BASED ON THE AVERAGE RESULTS OF THE THREE CYLINDERS.

MINIMUM CEMENT CONSTANT

650 LBS. PER CUBIC YARD. THE CEMENT SHALL CONFORM TO ASTM C-150-94 OR C-595-94.

WATER CEMENT RATIO

0.45 MAXIMUM

SLUMP

NOMINAL THREE INCHES (3") AS PER ASTM C-94-94 (2"-4" ACTUAL). THE USE OF CHEMICAL ADMIXTURES MEETING ASTM C-494, TO INCREASE THE SLUMP TO A MAXIMUM OF 7", MAY BE USED WITH PRIOR WRITTEN APPROVAL OF THE DIVISION OF ENGINEERING AND CONSTRUCTION INSPECTOR. IF THIS OPTION IS SELECTED THE ADMIXTURE AND RESULTANT MAXIMUM SLUMP SHALL BE SUBMITTED FOR APPROVAL.

AIR CONTENT

FOUR PERCENT (4%) TO SEVEN AND ONE-HALF PERCENT (7-1/2 %) ASTM C-173-94 OR C-231-94.

AGGREGATE SIZE

NO. 57 FOR COARSE AGGREGATE SHALL BE LIMESTONE, GRAVEL OR CRUSHED AIR-COOLED BLAST FURNACE SLAG. BOTH COARSE AND FINE AGGREGATE AS PER ASTM C 33-94.

IF CRUSHED AIR-COOLED BLAST FURNACE SLAG IS USED IT SHALL MEET ALL OF THE REQUIREMENTS OF ODOT 703.01 AND ODOT 703.02. COPIES OF ALL TESTS AND CERTIFICATIONS FOR THE CRUSHED AIR-COOLED BLAST FURNACE SLAG, IF USED, SHALL BE SUBMITTED AS PART OF THE CONCRETE MIX DESIGN.

WHEN HIGH EARLY STRENGTH IS REQUIRED, ASTM C-150-94 TYPE III A CEMENT OR ADMIXTURES IN ACCORDANCE WITH ASTM C-494-94 SHALL BE USED.

PAVEMENT REPAIR

CONCRETE PAVEMENT

ALL PAVEMENT OPENINGS SHALL BE SAWED FULL DEPTH AND HAVE SMOOTH VERTICAL FACES. DOWELS SHALL BE REQUIRED AS PER DOWEL TABLE.

CONCRETE REPAVING SHALL BE PERFORMED IN SUCH A MANNER THAT THE ENTIRE LANE AND/OR SLAB IN WHICH THE REPAIR AREA IS LOCATED SHALL BE RESTORED. SHOULD ANY PORTION OF THE REPAIR AREA EXTEND INTO AN ADJACENT LANE AND/OR SLAB, THAT LANE OR SLAB SHALL ALSO BE REPAVED.

ASPHALT PAVEMENT

ALL PAVEMENT OPENINGS SHALL BE SAWED FULL DEPTH AND HAVE SMOOTH VERTICAL FACES. DOWELS SHALL BE REQUIRED AS PER DOWEL TABLE.

ASPHALT RESURFACING SHALL BE PERFORMED IN SUCH A MANNER THAT THE ENTIRE LANE IN WHICH THE REPAIRS ARE LOCATED SHALL BE RESTORED. SHOULD ANY PORTION OF THE REPAIR AREA EXTEND INTO AN ADJACENT LANE, THAT LANE SHALL ALSO BE RESURFACED. FOR PAVEMENTS WITH A WIDTH OF 40' OR LESS, A LANE SHALL BE CONSIDERED 1/2 THE PAVEMENT WIDTH.

EXTEND OVERCUT IN LONGITUDINAL DIRECTION TWO FEET (2') UNTO UNDISTURBED SUBGRADE.

BRICK PAVEMENT

ALL STREETS WITHIN THE CITY OF CLEVELAND THAT ARE CURRENTLY BRICK PAVED, SHALL BE REPLACED WITH BRICK, OR AS DIRECTED BY THE INSPECTOR REPRESENTING THE DIVISION OF ENGINEERING AND CONSTRUCTION OF THE CITY OF CLEVELAND.

THE CONTRACTOR UNDER THIS SECTION OF THE SPECIFICATIONS SHALL CONSTRUCT CONCRETE BASE, PAVEMENT, SIDEWALK, DRIVEWAY APRONS, CURB, CURB AND GUTTER SECTIONS, HANDICAP RAMPS, AND INTEGRAL RADIUS CURB AND WALK. THIS INCLUDES THE RESTORATION OF ALL ADJACENT SURFACES WHICH ARE DISTURBED BY THIS CONSTRUCTION AT NO COST TO THE CITY OF CLEVELAND AND/OR CLEVELAND PUBLIC POWER (CPP). CONTRACTOR SHALL TAKE ANY AND ALL MEASURES NECESSARY TO ENSURE CONCRETE IS NOT DEFACED WITH GRAFFITI, FOOT PRINTS, TIRE TRACKS, AND ROCKS, ETC. BY VANDALS.

SPECIFICATIONS

ALL WORK IN THIS CONTRACT SHALL CONFORM TO THE LATEST STATE OF OHIO DEPARTMENT OF TRANSPORTATION (ODOT) CONSTRUCTION AND MATERIALS SPECIFICATIONS, NATIONAL ELECTRIC SAFETY CODE (NESC) AND OSHA REQUIREMENTS, EXCEPT WHERE LOCAL REGULATIONS ARE MORE STRINGENT, IN WHICH CASE LOCAL REGULATIONS SHALL GOVERN.

REGULATIONS GOVERNING THE LAYING OF CONCRETE

SIDEWALKS, APRONS, AND CURBING

CONCRETE WALKS SHALL BE OF ONE-COURSE CONSTRUCTION AND SHALL BE FOUR INCHES (4") IN THICKNESS, EXCEPT IN THE DOWNTOWN DISTRICT WHERE THEY MUST BE SIX INCHES (6") IN THICKNESS. CONCRETE FOR WALKS, CURBS, DRIVES, AND APRONS SHALL BE CLASS "C" CONCRETE AS PER ITEM 608 AND SPECIAL OF THE "SUPPLEMENTAL TO STATE SPECIFICATIONS FOR THE CITY OF CLEVELAND - 1967".

WHEN CONCRETE WALKS ARE LAID ON CLAY, AND EXTRA EXCAVATION TO A DEPTH OF ONE-AND-ONE-HALF INCHES (1 1/2") MUST BE MADE AND FILLED WITH SAND OR GRAVEL, TO ACT AS A FOUNDATION TO THE FOUR INCHES OF SIDEWALK PROPER.

NO BLOCKS OF CONCRETE SHALL BE LARGER THAN SIX FEET (6') AND THE JOINTS MUST BE CUT BY THE USE OF AN APPROVED "GROOVING TOOL" MAKING A GROOVE ONE-FOURTH INCHES (1/4") DEEP. ALL EDGES SHALL BE ROUNDED WITH AN APPROVED "EDGING TOOL" TO A RADIUS OF ONE-FOURTH INCH (1/4").

EXISTING APRONS AND "DRIVE AREAS" OF THE WALK MUST BE CONSTRUCTED OF CONCRETE. APRONS AND THE AREA OF WALK OVER WHICH VEHICLES DRIVE MUST BE NO LESS THAN SIX INCHES (6") IN THICKNESS, AND MUST BE LAID IN ACCORDANCE WITH SUPPLEMENTAL TO STATE SPECIFICATIONS FOR THE CITY OF CLEVELAND.

AT ALL WATER-METER COVERS, GAS BOXES, HYDRANTS, OR OTHER OBSTRUCTIONS, NEATLY FITTED OPENINGS SHALL BE CUT IN THE SIDEWALK. NO WALK SHALL BE LAID UNTIL ALL THESE OBSTRUCTIONS HAVE BEEN RAISED OR LOWERED TO THE CORRECT ELEVATIONS.

NO OBSTRUCTIONS SHALL BE PLACED IN FRONT OF ANY CATCH-BASIN, FIRE HYDRANT, FIRE ALARM BOX OR LETTER BOX, OR NEAR ENOUGH TO THE SAME TO INTERFERE WITH THEIR USE.

NO CHANGE IN THE WIDTH OF THE WALK TO BE LAID SHALL BE MADE FROM THAT OF EXISTING WALKS ON THE STREET AT THE TIME WORK IS DONE UNDER THIS PERMIT, UNLESS SPECIALLY PERMITTED BY THE DIRECTOR OF PUBLIC SERVICE. TREES, LAWNS, AND SHRUBBERY SHALL NOT BE INTERFERED WITH OR DESTROYED BY ANY WORK PERFORMED BY THE CONTRACTOR. WALKS MUST BE LAID TO THE SAME GRADE AS EXISTING WALKS ON THE STREET, UNLESS PERMISSION FOR CHANGE OF GRADE IS OBTAINED FROM THE DIRECTOR OF PUBLIC SERVICE.

ONLY ONE-HALF (1/2) OF THE SIDEWALK IN THE BUSINESS DISTRICT CAN BE OBSTRUCTED AT ONE TIME, UNLESS CONTRACTOR HAS AN OBSTRUCTION PERMIT. GUTTERS MUST BE LEFT OPEN AT ALL TIMES.

THE SPACING BETWEEN THE WALK AND THE CURB LINE MUST BE GRADED TO ALLOW WATER DRAINAGE, AND MUST BE OF A GRADUAL SLOPE FROM THE WALK TO THE CURB LINE.

THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DIRT AND RUBBISH CAUSED BY HIS WORK.

FAILURE OF A CONTRACTOR TO COMPLY WITH THESE REGULATIONS SHALL RESULT IN THE WITHHOLDING OF FUTURE PERMITS AND SHALL SUBJECT THE HOLDER OF THIS PERMIT TO THE PENALTIES PRESCRIBED IN THE SIDEWALK ORDINANCE.

CURBING: CURBING SHALL CONFORM TO THE STANDARDS ESTABLISHED FOR SIZE AND QUALITY IN THE DISTRICT IN WHICH IT IS TO BE INSTALLED. CAST-IN-PLACE CONCRETE CURBS AND INTEGRAL CURBS, WHERE USED, SHALL CONFORM TO DETAIL PLAN NO. ME-246 OF THE CITY OF CLEVELAND.

COPIES OF THESE SPECIFICATIONS AND PLANS FOR PAVEMENT REPAIR AND LAYING OF CONCRETE SIDEWALKS MAY BE OBTAINED, UPON REQUEST, FROM THE DIVISION OF ENGINEERING AND CONSTRUCTION OF THE CITY OF CLEVELAND.

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SCOPE OF WORK

- A. THE CONTRACTOR SHALL RELOCATE OR REMOVE ALL CLEVELAND PUBLIC POWER (CPP) FACILITIES AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER ONLY AFTER CPP HAS VISIBLY CONFIRMED THAT SAID CPP FACILITIES HAVE BEEN DE-ENERGIZED & DISCONNECTED. THIS WORK SHALL BE PROPERLY COMPLETED, INCLUDING INCIDENTALS, AS SHOWN ON THE DRAWINGS AND HEREINAFTER SPECIFIED.
- B. THE MAJOR ITEMS OF WORK TO BE FURNISHED AND INSTALLED BY THE CONTACTOR SHALL BE AS FOLLOWS:

WORK BY THE PROJECT CONTRACTOR:

THE CONTRACTOR SHALL CONSTRUCT THE CPP UNDERGROUND POWER DISTRIBUTION NETWORK WITHIN THE PROJECT LIMITS. THIS WORK INCLUDES BUT IS NOT LIMITED TO:

- FURNISHING AND INSTALLING CONCRETE ENCASED PVC DUCT BANKS OF VARIOUS ARRANGEMENTS
- FURNISHING AND INSTALLING PRECAST AND BUILT-IN-PLACE ELECTRICAL VAULTS AND MANHOLES
- FURNISHING AND INSTALLING ELECTRICAL CABLES IN DUCTS AND INSTALLING CABLE ID TAGS ON CABLES IN MANHOLES AND ON RISER POLES.
- TESTING ELECTRICAL SYSTEM
- FURNISHING AND INSTALLING ELECTRICAL VAULT RACKING SYSTEMS WITHIN VAULTS AND MANHOLES
- FURNISHING AND INSTALLING ELECTRICAL SPLICES, TRAINING AND BONDING WITHIN VAULTS AND MANHOLES
- REMOVING EXISTING UNDERGROUND DUCT BANKS, VAULTS, MANHOLES AND PULLBOXES
- COORDINATING WITH CPP AND ITS CONTRACTORS
- REMOVING EXISTING CPP OWNED POWER POLES
- FURNISHING AND INSTALLING FRE DUCT BANK SYSTEMS ACROSS BRIDGES INCLUDING BEAM SUPPORT SYSTEMS
- FURNISHING AND INSTALLING WOODEN POWER POLES FOR TRANSITIONS FROM UNDERGROUND TO OVERHEAD SYSTEMS AND WHERE OVERHEAD SYSTEMS ARE IMPACTED BY PROJECT CONTRACTOR’S WORK
- FURNISHING AND INSTALLING OVERHEAD ELECTRICAL CABLES, SPLICES AND HARDWARE

WORK BY CPP:

- FURNISHING AND INSTALLING WOODEN POWER POLES FOR TRANSITIONS FROM UNDERGROUND TO OVERHEAD SYSTEMS
- ENERGIZING ELECTRICAL SYSTEM
- DE-ENERGIZING AND REMOVAL OF EXISTING ELECTRICAL CABLES WITHIN DUCTS

ALONG PORTIONS OF THE CORRIDOR THE PROJECT CONTRACTOR SHALL BE REQUIRED TO MAINTAIN THE EXISTING ELECTRICAL SYSTEM UNTIL COMPLETION AND ACTIVATION OF THE PROPOSED UNDERGROUND POWER SYSTEM. THE CONTRACTOR SHALL COORDINATE THE DETAILS OF THIS WORK WITH CPP.

CABLE MARKING (TAGGING)

FEEDER CABLE LOCATION IN CONDUIT BANK SHALL BE ASSIGNED BY CPP. EACH CABLE UPON ENTERING AND LEAVING MANHOLES SHALL BE MARKED WITH TAGS, INDICATING THE FEEDER NUMBER AND CABLE SIZE. THE LETTER SIZE SHALL BE 1/2 IN. HIGH MINIMUM BUT 1 IN. HIGH IS PREFERRED.

SUBMITTALS

IN ADDITION TO THE REQUIREMENTS OF CMS105 THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BY CPP ENGINEERING DEPARTMENT ON ALL EQUIPMENT AND MATERIAL FURNISHED AND REQUIRED TO PERFORM THE WORK.

DEFINITIONS

WHENEVER IN THESE SPECIFICATIONS OR IN ANY DOCUMENT OR INSTRUCTIONS ON CONSTRUCTION WHERE THESE SPECIFICATIONS GOVERN. THE FOLLOWING TERMS (OR PRONOUNS IN PLACE OF THEM) ARE USED. THE INTENT AND MEANING SHALL BE INTERPRETED AS FOLLOWS: THE CITY OF CLEVELAND, IS THE DIRECTOR OF THE CITY OF CLEVELAND DEPARTMENT OF PUBLIC UTILITIES.

STATUS OF CITY INSPECTOR

INSPECTORS AS DESIGNATED BY THE CITY OF CLEVELAND SHALL BE AUTHORIZED TO INSPECT ALL WORK DONE AND MATERIALS FURNISHED. SUCH INSPECTING MAY EXTEND TO ALL OR ANY PART OF THE WORK, AND TO THE PREPARATION OR MANUFACTURE OF THE MATERIALS TO BE USED IN THE WORK. THE CITY INSPECTOR AS DESIGNATED BY THE DIRECTOR OF PUBLIC UTILITIES SHALL GIVE WORK INSTRUCTIONS THROUGH THE PROJECT ENGINEER.

SPECIFICATIONS

ALL WORK IN THIS CONTRACT SHALL CONFORM TO THE LATEST STATE OF OHIO DEPARTMENT OF TRANSPORTATION (ODOT) CONSTRUCTION AND MATERIALS SPECIFICATIONS. NATIONAL ELECTRIC SAFETY CODE (NESC) AND OSHA REQUIREMENTS, EXCEPT WHERE LOCAL REGULATIONS ARE MORE STRINGENT. IN WHICH CASE LOCAL REGULATIONS SHALL GOVERN.

ITEM 625 - CONDUIT, CONCRETE ENCASED, AS PER PLAN (5" PVC AND/OR 5" FRE)

A. WORK INCLUDED

THE CONTRACTOR SHALL FURNISH ALL MATERIALS FOR AND SHALL PROPERLY CONSTRUCT AND CONNECT TO MANHOLES, AS SHOWN ON THE PLANS OR AS DIRECTED, ALL NON-REINFORCED AND REINFORCED CONCRETE-ENCASED PVC CONDUIT AS REQUIRED FOR THE PROPER COMPLETION OF THE WORK INCLUDED UNDER THIS CONTRACT. ALL CONDUITS SHALL BE CONCRETE ENCASED UNLESS NOTED OTHERWISE.

B. CONDUIT AND FITTINGS

POLYVINYL CHLORIDE (PVC) CONDUIT SHALL CONFORM TO THE UL651 STANDARDS, 5 INCH IRON PIPE SIZE (I.P.S) WITH CONCRETE ENCASEMENT AS DETAILED ON PLANS, COUPLINGS SHALL BE SOCKET TYPE, END BELLS AT MANHOLE ENTRANCE, 5 DEGREE SWEEPS, 11-1/4 DEGREE TO 90 DEGREES INCLUDING FILED DEGREES ANGLE COUPLINGS, STANDARD COUPLINGS, VARIOUS BENDS AND PLUGS OR CAPS TO CLOSE UNUSED CONDUITS, SHALL BE MADE OF THE SAME MATERIAL AS THE CONDUIT. CONDUIT SPACERS SHALL BE AS SHOWN IN THE PLAN DETAILS. CONCRETE BLOCK SPACERS WILL NOT BE ACCEPTED.

FRE CONDUIT SHALL CONFORM TO UL 1684 AND UL1684A. FRE CONDUIT SHALL HAVE A MINIMUM WALL THICKNESS OF 0.110 INCHES. FRE CONDUIT SHALL HAVE A 5 INCH INSIDE DIAMETER EITHER CONCRETE ENCASED OR RACK MOUNTED AS INDICATED ON THE DRAWINGS. COUPLINGS SHALL HAVE A BELL ON ONE END AND A SPIGOT ON THE OTHER END. ALL COUPLINGS SHALL BE MADE OF THE SAME MATERIAL. EXPANSION FITTINGS SHALL BE PROVIDED ON ALL EXPOSED CONDUIT RUNS.

C. CONCRETE

CONCRETE USED FOR ENCASEMENT OF CONDUITS SHALL CONFORM TO ROADWAY PLAN GENERAL NOTE CONCRETE DESIGN MIX (CLEVELAND 650). 4000 PSI CITY OF CLEVELAND MIX.

D. INSTALLATION

CONDUIT SHALL BE INSTALLED BY THE BUILT-UP METHOD WITH JOINTS IN ADJACENT DUCTS STAGGERED. NECESSARY SPACERS SHALL BE PLACED NO GREATER THAN 8-FEET INTERVALS TO HOLD DUCTS IN THE DESIRED CONFIGURATION, WITH THE DUCT BANK BRACED SECURELY TO KEEP IT FROM SHIFTING AND FLOATING WHILE CONCRETE IS POURED. SEALER COMPOUND FURNISHED BY THE CONDUIT AND EACH SECTION SHALL BE TAPPED SECURELY INTO PLACE IN THE PREVIOUS COUPLING TO OBTAIN JOINTS THAT ARE TIGHT AND LEAK-PROOF.

1. CONCRETE SHALL BE WORKED INTO THE SPACES BETWEEN DUCTS SO THAT THE CONDUIT BANK IS EFFECTIVELY ENCASED IN CONCRETE WITHOUT VOIDS OR EMPTY SPACES, REINFORCING RODS SHALL BE INSTALLED AS REQUIRED AND WHERE SHOWN ON THE PLANS.
2. CONDUIT WHICH IS CUT TO FIT SHORT SECTIONS SHALL BE DEBURRED ON THE DUCT END AND THE END OF THE BELL SHALL BE REAMED IN THE INSIDE DIAMETER FOR EACH ENTRY OF THE DUCT INTO COUPLING TO PRODUCE THE SAME JOINTING CONDITIONS AS PROVIDED BY FACTORY-MADE CONDUIT SECTIONS.
3. THE END BELLS SHALL BE GROUTED IN PLACE.
4. INSTALL PULLING LINE IN EACH CONDUIT.

ITEM 625 - CONDUIT, CONCRETE ENCASED, AS PER PLAN (5" PVC AND/OR 5" FRE) (CONT.)

E. BACKFILLING

REFER TO NOTES "BACKFILL MATERIAL AND BACKFILLING PROCEDURES AND FLOWABLE FILL SPECIFICATION FOR UTILITY TRENCHES".

F. MEASUREMENT

THE NUMBER OF FEET OF CONDUIT TO BE PAID FOR SHALL BE THE ACTUAL NUMBER OF FEET FURNISHED AND PLACED AND ACCEPTED IN ACCORDANCE WITH THESE SPECIFICATIONS, AS MEASURED ALONG THE AXIS OF THE CONDUIT LINE, INCLUDING FITTINGS.

G. PAYMENT

THE FOOTAGE MEASURED AS PROVIDED ABOVE SHALL BE PAID FOR AT THE CONTRACTOR PRICE BID PER FOOT UNDER ITEM 625 AS DESCRIBED BELOW, CLASSIFIED AS TO SIZE AND TYPE, WHICH PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR EXCAVATING AND FOR FURNISHING, HAULING, PLACING THE CONDUIT, FITTINGS, CAPPING, PULLING LINES, SPACERS, CONCRETE, REINFORCING STEEL, SHEETING AND BRACING, BACKFILL, PLASTIC CAUTION TAPE (OR RED TINTED CONCRETE), INCIDENTAL CONCRETE, REMOVAL OF ALL SURPLUS EXCAVATION AND DISCARDED MATERIAL, BREAKING AND RESTORATION OF EXISTING MANHOLE WALLS AND ALL LABOR, EQUIPMENT, TOOLS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK AS SPECIFIED. THESE ITEMS AS MEASURED AS PROVIDED ABOVE SHALL BE PAID FOR UNDER:

ITEM	UNIT	DESCRIPTION
625	FT	CONDUIT, CONCRETE ENCASED, AS PER PLAN, (XX)-5" PVC

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ITEM 632 - POWER CABLE MISC.: (VARIES)

A. WORK INCLUDED

THE CONTRACTOR SHALL FURNISH ALL NECESSARY LABOR MATERIALS, TOOLS AND EQUIPMENT FOR INSTALLING ALL UNDERGROUND POWER CABLES, AS SPECIFIED, REQUIRED OR SHOWN ON THE PLANS.

B. DETAILED SPECIFICATIONS

MEDIUM VOLTAGE CABLES - EPR URD

1. ALL ETHYLENE PROPYLENE RUBBER INSULATED URD CABLE IS MANUFACTURED, TESTED AND WARRANTED IN ACCORDANCE WITH:

- A. A.E.I.C CS-8 (LATEST VERSION)
B. ANSI/I.C.E.A S-94-649 (LATEST VERSION)

2. CHARACTERISTICS

- A. BARE ANNEALED COPPER CENTER CONDUCTOR, COMPACT CLASS B STRANDING PER ASTM B-3
B. 1/3 COPPER CONCENTRIC NEUTRAL
C. ETHYLENE PROPYLENE RUBBER INSULATION
D. AVERAGE MINIMUM INSULATION THICKNESS 220 MILS
E. POLYETHYLENE JACKET

15KV 133% 220-MIL INSULATION THICKNESS

3. FOR 3-PHASE APPLICATION:

- ITEM 1. 750KCMIL, 15KV 133%, EPR URD, 33% NEUTRAL
ITEM 2. 500KCMIL, 15KV 133%, EPR URD, 33% NEUTRAL
ITEM 3. 4/0 AWG, 15KV 133%, EPR URD, 33% NEUTRAL

C. MOLDED SPLICES

1. DESIGNED AND TESTED PER IEEE STANDARD 404.

2. VOLTAGE RATING:

- A. 15 KV CLASS (8.7 KV PHASE-TO-GROUND)
B. IMPULSE WITHSTAND : A = 110 KV, 1.2 X 50 MICROSECOND WAVE.
C. CORONA EXTINCTION VOLTAGE : A = 13 KV, MINIMUM, 3PC SENSITIVITY.
D. DC WITHSTAND : DURING INSTALLATION : 56 KV
E. DC WITHSTAND : 18 KV FOR XLPE INSULATED CABLES
45 KV FOR EPR INSULATED CABLES REFERENCE AEIC CS6 AND CS8, SECTION L.2.0

3. FOR STRAIGHT SPLICES:

SPLICE FOR 750 KCMIL, 15 KV URD, EPR URD, ELASTIMOLD 15 PCJ 1 M 2 380
SPLICE FOR 500 KCMIL, 15 KV URD, EPR URD, ELASTIMOLD 15 PCJ 1 LM 2 330
SPLICE FOR 4/0 AWG, 15 KV URD, EPR URD, ELASTIMOLD 15 PCJ 1 J 2 270
ITEMS 1, 2 AND 3 FOR SINGLE PHASE APPLICATIONS.

ITEM 632 - POWER CABLE MISC.: (VARIES) (CONT.)

D. CABLE SPLICING AND ACCESSORIES:

1. ELASTIMOLD; A THOMAS AND BETTS COMPANY OR EQUIVALENT APPROVED BY CPP ENGINEERING DEPARTMENT PRIOR TO PURCHASE AND INSTALLATION.
2. OBTAIN CABLE SPLICE KITS AND ACCESSORIES FROM A SINGLE SOURCE MANUFACTURER.
3. SPLICE KITS: COMPLY WITH IEEE 404; TYPE AS RECOMMENDED BY CABLE OR SPLICING KIT MANUFACTURER FOR THE APPLICATION. SUBMIT TO CPP ENGINEERING DEPARTMENT FOR APPROVAL.
4. SPLICING PRODUCTS: AS RECOMMENDED, IN WRITING, BY SPLICING KIT MANUFACTURER FOR SPECIFIC SIZES, MATERIALS, RATINGS, AND CONFIGURATIONS OF CABLE CONDUCTORS. INCLUDE ALL COMPONENTS REQUIRED FOR COMPLETE SPLICE, WITH DETAILED INSTRUCTIONS. SUBMIT TO CPP ENGINEERING DEPARTMENT FOR APPROVAL.
5. HIGH-VOLTAGE TAPES: ETHYLENE/PROPYLENE RUBBER-BASED, 30-MIL SPLICING TAPE, RATED FOR 130 DEG C OPERATION. MINIMUM 1-1/2 INCH WIDE. VARIOUS SIZES. SUBMIT TO CPP ENGINEERING DEPARTMENT FOR APPROVAL.

E. CABLE LUBRICANT

USE MANUFACTURERS APPROVED PULLING COMPOUND OR LUBRICANTS FOR CABLE BEING INSTALLED THAT DO NOT DETERIORATE CONDUCTOR OR INSULATION.

ITEM 632 - POWER CABLE MISC.: (VARIES) (CONT.)

F. BONDING WIRE

1. BONDING CONDUCTOR: VARIES, STRANDED COPPER, ASTM B 8. SUBMIT TO CPP ENGINEERING DEPARTMENT FOR APPROVAL ON CASE BY CASE BASIS.
2. LISTED AND LABELED BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION FOR APPLICATIONS IN WHICH USED AND FOR SPECIFIC TYPES, SIZES AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS CONNECTED.

G. CABLE PULLING

1. BEFORE STARTING CABLE INSTALLATION, THE DUCTS TO BE OCCUPIED SHOULD BE SELECTED THROUGHOUT THE ENTIRE LENGTH OF THE RUN AND THE DUCTS SELECTED MUST BE CHECKED TO SEE THAT THEY ARE CLEAN AND FREE FROM ALL OBSTRUCTIONS.
- A. PROOF CONDUITS PRIOR TO CONDUCTOR INSTALLATION BY PASSING A WIRE BRUSH MANDREL AND THEN A RUBBER DUCT SWAB THROUGH THE CONDUIT.
1. WIRE BRUSH MANDREL: CONSISTS OF A LENGTH OF BRUSH APPROXIMATELY THE SIZE OF THE CONDUIT INNER DIAMETER WITH STIFF STEEL BRISTLES AND AN EYE ON EACH END FOR ATTACHING THE PULL ROPES. IF AN OBSTRUCTION IS FELT, PULL THE BRUSH BACK AND FORTH REPEATEDLY TO BREAK UP THE OBSTRUCTION.
2. RUBBER DUCT SWAB: CONSISTS OF A SERIES OF RUBBER DISCS APPROXIMATELY THE SIZE OF THE CONDUIT INNER DIAMETER ON A LENGTH OF STEEL CABLE WITH AN EYE ON EACH END FOR ATTACHING THE PULL ROPES. PULL THE RUBBER DUCT SWAB THROUGH THE DUCT TO EXTRACT LOOSE DEBRIS FROM THE DUCT.
- B. USE PULLING MEANS, INCLUDING FISH TAPE, ROPE, AND BASKETWEAVE CABLE GRIPS, THAT DO NOT DAMAGE CABLES AND RACEWAYS. DO NOT USE ROPE HITCHES FOR PULLING ATTACHMENT TO CABLE.
- C. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM PULLING TENSIONS AND SIDEWALL PRESSURE VALUES.

ITEM 632 - POWER CABLE MISC.: (VARIES) (CONT.)

G. CABLE PULLING (CONT.)

- D. USE PULL-IN GUIDES, CABLE FEEDERS, AND DRAW-IN PROTECTORS AS REQUIRED TO PROTECT CABLES DURING INSTALLATION.
- E. DO NOT PULL CABLES WITH ENDS UNSEALED. SEAL CABLE ENDS WITH RUBBER TAPE.
- F. SUPPORT CABLES USING GALVANIZED STEEL CHANNEL AND PORCELAIN OR MAPLE BLOCKS.
2. IF REELS ARE LEFT IN THE STREET, WARNING LIGHTS SHALL BE PLACED AROUND THEM.
3. LUBRICANT SHALL BE APPLIED TO THE CABLE JUST BEFORE IT ENTERS THE FEEDING TUBE. A COATING ABOUT 1/6TH INCH THICK IS AMPLE. NO LUBRICANT SHALL BE APPLIED FIRST AND LAST 5-FEET OF CABLE FOR CONVENIENCE AND CLEANLINESS IN SPLICING.
4. THE REEL OF CABLE MUST BE PROPERLY PLACED AT THE FEEDING END TO CAUSE MINIMUM FLEXING OF THE CABLE. IT SHOULD ALWAYS BE LOCATED ON THE SIDE OF THE MANHOLE TOWARD WHICH THE CABLE IS PULLED.
5. WHERE THERE IS A BEND IN THE DUCT LINE, THE PULLING SET-UP, WHENEVER POSSIBLE, SHOULD BE PLANNED FOR FEEDING-IN AT THE MANHOLE NEAREST THE BEND.
6. THE AMOUNT OF SLACK IN THE CABLE AT THE FEEDING END SHALL BE REGULATED BY WORKERS STATIONED AT THE CABLE REEL SO THAT THE CABLE PASSES FREELY INTO THE FEEDING TUBE WITHOUT SCRAPING THE MANHOLE FRAME.
7. THE CABLE SHALL BE DRAWN INTO THE DUCT JUST FAST ENOUGH TO KEEP THE CABLE AND REEL MOVING SMOOTHLY AND SO THE CABLE CAN BE PROPERLY INSPECTED AND LUBRICATED.
8. EYES OR SEALS DAMAGED DURING PULLING SHALL BE REPAIRED UNLESS SPLICING FOLLOWS IMMEDIATELY.
9. WHEN THE CABLE IS CUT, UNLESS SPLICING IS TO BE DONE IMMEDIATELY, THE ENDS SHALL BE PREPARED AND SEALED BY AN APPROVED METHOD. ALL SEALED ENDS SHOULD BE RACKED HIGH.

H. CABLE RACKING AND TRAINING

1. RACK AND TRAIN CABLES ON CABLE RACK ASSEMBLIES CONSISTING OF HOT-DIP GALVANIZED, EXCEPT INSULATORS.
2. IDENTIFY CABLES PHASE AND CIRCUIT NUMBER OF EACH CONDUCTOR AT EACH SPLICE, TERMINATION, PULL POINT, AND JUNCTION BOX. ARRANGE IDENTIFICATION SO THAT IT IS UNNECESSARY TO MOVE THE CABLE OR CONDUCTOR TO READ THE IDENTIFICATION.

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ITEM 632 – POWER CABLE MISC.: (VARIES) (CONT.)

I. BONDING

1. MAINTAIN SHIELD CONTINUITY AND CONNECTIONS TO METAL CONNECTION HARDWARE AT ALL CONNECTION POINTS.
2. GROUNDING CONDUCTORS: ROUTE ALONG SHORTEST AND STRAIGHTEST PATHS POSSIBLE UNLESS OTHERWISE INDICATED OR REQUIRED BY CODE. AVOID OBSTRUCTING ACCESS OR PLACING CONDUCTORS WHERE THEY MAY BE SUBJECTED TO STRAIN, IMPACT OR DAMAGE.
3. BONDING STRAPS AND JUMPERS: INSTALL IN LOCATIONS ACCESSIBLE FOR INSPECTION AND MAINTENANCE EXCEPT WHERE ROUTED THROUGH SHORT LENGTHS OF CONDUIT.

A. BONDING TO STRUCTURE: BOND STRAPS DIRECTLY TO BASIC STRUCTURE, TAKING CARE NOT TO PENETRATE ANY ADJACENT PARTS.

J. TESTING

1. VISUAL AND MECHANICAL INSPECTIONS.
2. INSPECT EXPOSED CABLE SECTIONS FOR PHYSICAL DAMAGE.
3. INSPECT SHIELD GROUNDING AND CABLE SUPPORT. VISUALLY INSPECT CABLE TERMINATIONS PERFORMED BY CPP.
4. INSPECT COMPRESSION CONNECTORS FOR CORRECT CABLE MATCH AND IDENTIFICATION.
5. TESTING AGENCY: ENGAGE A QUALIFIED TESTING AGENCY TO PERFORM TESTS AND INSPECTIONS.
6. PERFORM THE FOLLOWING TESTS AND INSPECTIONS WITH THE ASSISTANCE OF A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE:

A. PERFORM EACH VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL TEST STATED IN NETA ATS. CERTIFY COMPLIANCE WITH TEST PARAMETERS.

B. AFTER INSTALLING MEDIUM-VOLTAGE CABLES AND BEFORE ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS.

C. PERFORM DIRECT-CURRENT HIGH POTENTIAL TEST OF EACH NEW CONDUCTOR ACCORDING TO NETA ATS, CH. 7.3.3. DO NOT EXCEED CABLE MANUFACTURER’S RECOMMENDED MAXIMUM TEST VOLTAGE.
7. MEDIUM-VOLTAGE CABLES WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS.
8. PREPARE TEST AND INSPECTION REPORTS.

K. MEASUREMENT

THE NUMBER OF FEET OF CABLE TO BE PAID FOR SHALL INCLUDE CABLE LENGTH IN DUCT PLUS LENGTH IN MANHOLES PER THE CABLE WIRING PLANS, INSTALLED IN PLACE INCLUDING CABLE RACKING, TRAINING, TESTING, CABLE TAGS, AND OTHER INCIDENTAL WORK.

ITEM 690 – SPECIAL MISC.: PRECAST ELECTRIC MANHOLE

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING COMPLETE IN PLACE PRECAST REINFORCED CONCRETE MANHOLE (VAULT) STRUCTURES IN ACCORDANCE WITH CLEVELAND PUBLIC POWER (CPP) REQUIREMENTS AND DESIGNED TO MEET OR EXCEED THE LATEST ASTM STANDARDS FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES (ASTM C858-10E1) AND MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST UTILITY STRUCTURES (ASTM 857-14) HS25 LOADING. THE FOLLOWING CPP DEVELOPED PLAN DETAILS HAVE BEEN INCLUDED IN THE PLAN SET FOR THIS WORK:

- SAMPLE INDIVIDUAL MANHOLE DETAILS INCLUDING WINDOW OPENING DETAILS AND LIST OF MANHOLE REQUIREMENTS
- TYPICAL INSTALLATION DETAILS
- SAMPLE PRECAST NECK RING SCHEDULE
- GENERAL UNDERGROUND CONSTRUCTION NOTES
- BACKFILL MATERIAL AND BACKFILLING PROCEDURES

IT IS NOTED THAT NUMEROUS UNDERGROUND UTILITIES ARE PRESENT ALONG THE CORRIDOR THAT COULD NECESSITATE CHANGES TO MANHOLE DEPTHS AND WINDOW DIMENSIONS. THE CONTRACTOR SHALL PERFORM UTILITY TEST HOLES AT ALL VAULT LOCATIONS PRIOR TO DEVELOPING SHOP DRAWINGS FOR ELECTRIC MANHOLES. IN ADDITION, THE CONTRACTOR WILL BE SUPPLYING AND INSTALLING ELECTRICAL RACK AND BOND SYSTEMS WITHIN THE MANHOLES. CABLE RACKING ASSEMBLIES SHALL CONSIST OF STEEL, HOT-DIP GALVANIZED STANCHIONS AND ARMS, AND PORCELAIN INSULATORS MANUFACTURED BY HUBBELL POWER SYSTEMS, INC OR APPROVED EQUIVALENT.

1. STANCHIONS: NOB-LOC; 1-3/4 INCH NOMINAL SIZE; DUIB SERIES FOR CABLE-ARM ATTACHMENT.
2. ARMS: 1.97 INCHES WIDE, LENGTHS RANGING FROM 3-7/8 INCHES WITH 400 LB MINIMUM CAPACITY TO 14-7/8 INCHES WITH 200 LB MINIMUM CAPACITY. ARMS SHALL BE ARRANGED FOR SECURE MOUNTING IN HORIZONTAL POSITION AT ANY VERTICAL LOCATION ON STANCHIONS.
3. INSULATORS: HIGH-GLAZE, DRY-PROCESS PORCELAIN ARRANGED FOR MOUNTING ON CABLE ARMS. THE CONTRACTOR SHALL COORDINATE MANHOLE WORK WITH CPP TO ENSURE COMPATIBILITY AND TIMELY COMPLETION OF RELATED WORK ELEMENTS.

SEALING DUCT ENDS IN MANHOLES: USE SEALING COMPOUND IN DUCT ENDS CONTAINING CABLES AND PLUGS IN SPARE DUCTS TO WITHSTAND AT LEAST 15 PSIG HYDROSTATIC PRESSURE. DUCT SEALING COMPOUND SHALL BE NON-HARDENING, SAFE FOR CONTACT WITH HUMAN SKIN, NOT DELETERIOUS TO CABLE INSULATION AND WORKABLE AT TEMPERATURES AS LOW AS 35 DEG F. CAPABLE OF WITHSTANDING TEMPERATURE OF 300 DEG F WITHOUT SLUMP, AND ADHERING TO CLEAN SURFACES OF PLASTIC DUCTS, METALLIC CONDUITS, CONDUIT COATINGS, CONCRETE, MASONRY, LEAD, CABLE SHEATHS, CABLE JACKETS, INSULATION MATERIALS AND COMMON METALS.

THE MANHOLES TO BE PAID WILL BE THE ACTUAL NUMBER COMPLETED AND ACCEPTED, INCLUDING CONCRETE LEVELING PAD, GROUND ROD (5/8 INCH X LENGTH PER DETAILS – PER CPP), CLAMP, GROUND WIRE, BONDING, RACK SYSTEM, NECK RINGS, CAP RINGS, PULLING IRONS, AND CASTINGS.

ITEM 690 – SPECIAL MISC.: PRECAST ELECTRIC MANHOLE (CONT.)

PAYMENT: THE WORK INCLUDED IN THIS ITEM AND THE CONTRACT UNIT PRICE FOR EACH MANHOLE BID UNDER “ITEM 690 MISC.: PRECAST ELECTRIC MANHOLE” IN PLACE, COMPLETED AND ACCEPTED, SHALL FORM THE BASIS OF PAYMENT AND SHALL CONSTITUTE FULL COMPENSATION FOR ALL EXCAVATION AND BACKFILL, FOR FURNISHING, HAULING AND PLACING ALL CASTINGS AND TYING EXISTING OR NEW DUCTS INTO MANHOLES INCLUDING RAISING OR LOWERING DUCTS, REINFORCING STEEL, CONCRETE BRICK AND CONCRETE MASONRY, PULLING IRONS, GROUND RODS, BONDING, RACK SYSTEM AND OTHER MATERIAL, ETC., AND FOR ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THESE ITEMS. ALL MANHOLE CUT SHEETS SHALL BE APPROVED BY CPP ENGINEERING BEFORE THEY ARE CAST.

ITEM 690 – SPECIAL: BUILT-IN-PLACE ELECTRIC MANHOLE

THIS ITEM SHALL CONSIST OF THE REMOVAL OF EXISTING REINFORCED CONCRETE MANHOLES AND CONSTRUCTING COMPLETE REINFORCED CONCRETE MASONRY UNIT (CMU) CONCRETE MANHOLE (VAULT) STRUCTURES IN ACCORDANCE WITH CLEVELAND PUBLIC POWER (CPP) REQUIREMENTS. THE FOLLOWING CPP DEVELOPED PLAN DETAILS HAVE BEEN INCLUDED IN THE PLAN SET FOR THIS WORK:

- BUILT-IN-PLACE CMU MANHOLE DETAILS
- TIMBER BEAM SUPPORTING DETAILS
- TYPICAL INSTALLATION DETAILS
- GENERAL UNDERGROUND CONSTRUCTION NOTES
- BACKFILL MATERIAL AND BACKFILLING PROCEDURES

THE CONTRACTOR IS ALERTED THAT THE REMOVAL OF EXISTING MANHOLES AND CONSTRUCTION OF BUILT-IN-PLACE MANHOLES SHALL BE PERFORMED AROUND ENERGIZED CPP ELECTRICAL CIRCUITS. THE CONTRACTOR SHALL USE EXTREME CARE WHEN WORKING AROUND ACTIVE CPP LINES. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE TO TEMPORARILY SUPPORT THE EXISTING ACTIVE CPP FACILITIES WHILE CONSTRUCTING THE BUILT-IN-PLACE MANHOLES. THE CONTRACTOR SHALL COORDINATE ALL MANHOLE WORK WITH CPP TO ENSURE COMPATIBILITY AND TIMELY COMPLETION OF RELATED WORK ELEMENTS.

THE MANHOLES TO BE PAID WILL BE THE ACTUAL NUMBER COMPLETED AND ACCEPTED, INCLUDING, GROUND ROD (5/8” X LENGTH PER DETAILS – PER CPP), CLAMP, GROUND WIRE, BONDING, RACK SYSTEM, NECK RINGS, CAP RINGS, PULLING IRONS, AND CASTINGS.

PAYMENT: THE WORK INCLUDED IN THIS ITEM AND THE CONTRACT UNIT PRICE FOR EACH MANHOLE BID UNDER “ITEM 690 SPECIAL: BUILT-IN-PLACE ELECTRIC MANHOLE” IN PLACE, COMPLETED AND ACCEPTED, SHALL FORM THE BASIS OF PAYMENT AND SHALL CONSTITUTE FULL COMPENSATION FOR ALL EXCAVATION AND BACKFILL, MANHOLE REMOVAL, SUPPORT OF EXISTING FACILITIES, FOR FURNISHING, HAULING AND PLACING ALL CASTINGS AND TYING EXISTING OR NEW DUCTS INTO MANHOLES INCLUDING RAISING OR LOWERING DUCTS, REINFORCING STEEL, CONCRETE BRICK AND CONCRETE MASONRY, PULLING IRONS, GROUND RODS, BONDING, RACK SYSTEM, AND OTHER MATERIAL, ETC., AND FOR ALL LABOR, EQUIPMENT, TOOLS, AND INCIDENTALS NECESSARY TO COMPLETE THESE ITEMS.

MAINTAIN EXISTING LIGHTING AND POWER

THE CONTRACTOR SHALL NOT INTERRUPT EXISTING LIGHTING AND POWER EXCEPT FOR SUCH PERIODS AS THE ENGINEER MAY REQUIRE FOR THE PROPER CONSTRUCTION OF NEW FACILITIES TO BE IN PLACE AND OPERATIONAL. FINAL CONNECTION SHALL BE MADE BY CPP AFTER ALL TESTING HAS BEEN CONDUCTED AND FACILITIES HAVE BEEN ACCEPTED BY CPP.

ITEM 625 – LIGHTING, MISC.: REMOVAL OF UTILITY FACILITIES

EXISTING CPP OR CEI UTILITY FACILITIES TO BE ABANDONED, INCLUDING BUT NOT LIMITED TO, SERVICE CONNECTIONS FOR BUILDINGS TO BE RAZED AS PART OF THE PROJECT, MUST BE DISCONNECTED AND REMOVED OR ABANDONED TO GROUND (ABANDONED IN PLACE). WOODEN POLES SHALL BE REMOVED IN THEIR ENTIRETY.

ALL EXISTING MATERIALS SHALL BE REMOVED AS INDICATED ON THE PLANS BUT NOT LIMITED TO: OVERHEAD POLE LINES, TRANSFORMERS, POLES, CROSSARMS, POLE LINE HARDWARE, PRIMARY AND SECONDARY CONDUCTORS, STREET LIGHT LUMINAIRES, UNDERGROUND CONDUITS AND CABLES, ETC., INCLUDING EXCAVATION AND BACKFILL INCIDENTAL TO THEIR REMOVAL. ALL EXISTING MATERIALS INDICATED ON THE PLANS TO BE REMOVED SHALL BE OFFERED TO CPP FOR THEIR USE. ALL MATERIALS NOT ACCEPTED BY CPP SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED.

ALL EXISTING MATERIALS INDICATED ON THE PLANS TO BE RELOCATED SHALL BE REMOVED BY THE CONTRACTOR, STORED IN A DRY LOCATION FOR RE-INSTALLATION PER CPP REQUIREMENTS.

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GENERAL OVERHEAD UTILITY POWER CONSTRUCTION

OC.01 SCOPE OF WORK

- A. ALL OVERHEAD CONSTRUCTION WORK UNDER THIS PART OF THE CONTRACT SHALL BE PERFORMED IN A SAFE, THOROUGH AND WORKMANLIKE MANNER IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE CONSTRUCTION DRAWINGS.
- B. THE LATEST EDITION OF THE NATIONAL ELECTRICAL SAFETY CODE (NESC) SHALL BE FOLLOWED EXCEPT WHERE LOCAL REGULATIONS ARE MORE STRINGENT, IN WHICH CASE LOCAL REGULATIONS SHALL GOVERN. ALL WORK SHALL BE IN CONFORMANCE WITH CPP REGULATIONS.
- C. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY OVERHEAD FACILITIES AND MISCELLANEOUS CONNECTIONS AND AS INDICATED ON THE PLANS AND POLE DETAILS.
- D. OVERHEAD DISTRIBUTION CIRCUITS SHALL BE CONSTRUCTED WITH NOT LESS THAN THE GRADE C STRENGTH REQUIREMENTS AS DESCRIBED IN SECTION 26, STRENGTH REQUIREMENTS, OF THE NESC WHEN SUBJECTED TO THE LOADS SPECIFIED IN NESC SECTION 25, LOADINGS FOR GRADES B AND C. DISTRIBUTION LINES THAT UNDERBUILD TRANSMISSION CIRCUITS OR THAT CROSS OVER LIMITED ACCESS HIGHWAYS AND RAILROAD TRACKS SHALL BE CONSTRUCTED WITH NOT LESS THAN THE GRADE B STRENGTH REQUIREMENTS AS DESCRIBED IN NESC SECTION 26.

OC.02 POLES

- A. POLES SHALL BE CLASS 3 OR BETTER AS INDICATED ON THE PLANS, WESTERN RED CEDAR, SOUTHERN PINE OR DOUGLAS FIR AND SHALL BE MANUFACTURED AND MARKED AND SHALL CONFORM IN TREATMENT AND LIMITATION OF DEFECTS FOR WOOD POLES, LATEST ANSI 05.1, EXCEPT AS NOTED BELOW. SUBMIT TO CPP ENGINEERING DEPARTMENT FOR APPROVAL.
1. SPIRAL GRAIN (TWIST GRAIN): NO POLE SHALL HAVE MORE THAN 1 TWIST IN ANY 20 FEET.
2. KNOTS: POLES WITH 3 OR MORE KNOTS IN A CLUSTER ARE NOT ACCEPTABLE.
3. SWEEP: SWEEP OF POLES SHALL BE MEASURED BETWEEN BUTT AND TOP OF POLE AND SHALL BE NO MORE THAN 1 INCH FOR EVERY 10 FEET OF TOTAL LENGTH.
4. SHORT CROOK: NO MORE THAN 1 INCH DEVIATION IN ANY FIVE-FOOT SECTION OF POLE WILL BE ALLOWED.
- B. ALL POLES SHALL BE INCISED OVER AN AREA STARTING FROM TWO FEET BELOW GROUND LINE AND EXTENDING TO ONE FOOT ABOVE GROUND LINE. ALL POLES SHALL BE MACHINE SHAVED FULL LENGTH ABOVE THE INCISED AREA. ALL POLES SHALL BE ROOFED AT A 15 DEGREE ANGLE, GAINED AND DRILLED AS DETAILED ON DRAWINGS AND IN ACCORDANCE WITH CPP DRAWING NO.1-2-1-3.
- C. PRESERVATION TREATMENT:
1. PRESERVATIVE: THE PRESERVATIVE USED IN THE TREATMENT OF POLES, CROSS ARMS AND CROSS ARM BRACES SHALL BE PENTACHLOROPHENOL MEETING THE REQUIREMENTS OF AWP A P35-16 OR LATEST. THE SOLVENT USED TO PREPARE SOLUTIONS OF PENTACHLOROPHENOL SHALL COMPLY WITH AWP A STANDARD P35-16 OR LATEST. ALL POLES SHALL BE BORED, ROOFED AND GAINED BEFORE TREATMENT.
2. PROCESS: ALL WOOD PRODUCTS SHALL BE FULL-LENGTH TREATED BY AN EMPTY-CELL PROCESS IN ACCORDANCE WITH AWP A T1 AND U1. POLES SHALL BE CLEAN AND DRY AFTER TREATMENT. BLEEDERS SHALL BE REJECTED.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.02 POLES (CONT.)

- C. PRESERVATION TREATMENT (CONT.):
3. THE PROCESS SHALL PRODUCE AND GUARANTEE AN AVERAGE MINIMUM FINAL RETENTION OF PRESERVATIVE IN POUNDS PER CUBIC FOOT OF WOOD IN ACCORDANCE WITH THE FOLLOWING:
- | | SOUTHERN | WESTERN | DOUGLAS FIR | DEEP |
|----------------|----------|---------|-------------|---------|
| PENETRATION | PINE | CEDAR | BRAND | INCISED |
| INCHES | 3.0" | 0.5" | 0.75" | 2.5" |
| % OF SAPWOOD | 90% | 100% | 85% | 100% |
| RETENTION MIN. | 0.38 | 0.80 | 0.60 | 0.30 |

OC.03 POLE SETTING

- A. EXCEPT WHERE SPECIFIED OTHERWISE THE MINIMUM DEPTH FOR SETTING POLES SHALL BE AS FOLLOWS:
- | LENGTH
OF POLE
(FT) | SETTING
IN SOIL
(FT) | SETTING IN ALL
SOLID ROCK
(FT) |
|---------------------------|----------------------------|--------------------------------------|
| 30 | 5.5 | 3.5 |
| 35 | 6.0 | 4.0 |
| 40 | 6.0 | 4.0 |
| 45 | 6.5 | 4.5 |
| 50 | 7.0 | 4.5 |
| 55 | 7.5 | 5.0 |
| 60 | 8.0 | 5.0 |
| 65 | 8.5 | 6.0 |
| 70 | 9.0 | 6.0 |
| 75 | 9.5 | 6.5 |
| 80 | 10.0 | 6.5 |
| 85 | 10.5 | 7.0 |
| 90 | 11.0 | 7.5 |
| 95 | 11.0 | 7.5 |
| 100 | 11.0 | 7.5 |
| 105 | 12.0 | 8.0 |
| 110 | 12.0 | 8.0 |
- B. "SETTING IN SOIL" DEPTHS APPLY WHERE:
1. POLES ARE TO BE SET IN SOIL.
2. THERE IS A LAYER OF SOIL OF MORE THAN TWO (2) FEET IN DEPTH OVER SOLID ROCK.
3. THE HOLE IN SOLID ROCK IS NOT SUBSTANTIALLY VERTICAL OR THE DIAMETER OF THE HOLE AT THE SURFACE OF THE ROCK EXCEEDS APPROXIMATELY TWICE THE DIAMETER OF THE POLE AT THE SAME LEVEL.
- C. SETTING IN ALL SOLID ROCK" SPECIFICATIONS SHALL APPLY WHERE POLES ARE TO BE SET IN SOLID ROCK AND WHERE THE HOLE IS SUBSTANTIALLY VERTICAL, APPROXIMATELY UNIFORM IN DIAMETER AND LARGE ENOUGH TO PERMIT THE USE OF TAMPING BARS THE FULL DEPTH OF THE HOLE.
- D. WHERE THERE IS A LAYER OF SOIL TWO (2) FEET OR LESS IN DEPTH OVER SOLID ROCK, THE DEPTH OF THE POLE SHALL BE THE DEPTH OF THE SOIL IN ADDITION TO THE DEPTH SPECIFIED UNDER "SETTING IN ALL SOLID ROCK" PROVIDED, HOWEVER, THAT SUCH DEPTH SHALL NOT EXCEED THE DEPTH SPECIFIED UNDER "SETTING IN SOIL".

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.03 POLE SETTING (CONT.)

- E. WHERE THE POLE IS TO BE SET IN SOIL AND THE GROUND SLOPES AWAY FROM THE POLE PERPENDICULAR TO THE LINE, SETTING DEPTH SHALL BE INCREASED TO ACCOUNT FOR THE REDUCED VOLUME OF BEARING SOIL AT GROUND LINE. THE ADDITIONAL DEPTH OF SETTING SHALL BE EQUAL TO THE DROP IN ELEVATION IN 5 FEET MEASURED HORIZONTALLY.
- F. ON SLOPING GROUND, THE DEPTH OF THE HOLE ALWAYS SHALL BE MEASURED FROM THE LOW SIDE OF THE HOLE. WHERE MULTIPLE POLE STRUCTURES ARE PLACED ON SLOPING GROUND, UPHILL POLE SETTING DEPTHS SHALL BE INCREASED AS NECESSARY TO LEVEL THE POLE TOPS. CPP STD.2-9. DWG.8517.3.
- G. SET POLES IN AUGURED HOLES APPROXIMATELY 8 INCHES LARGER IN DIAMETER THAN THE POLE BUTT. OTHER METHODS OF POLE INSTALLATION SHALL BE APPROVED BY CPP ENGINEERING DEPARTMENT.
- H. POLES SHALL BE SET SO THAT ALTERNATE CROSS ARM GAINS FACE IN OPPOSITE DIRECTIONS, EXCEPT AT TERMINALS AND DEPENDS WHERE THE GAINS OF THE LAST TWO POLES SHALL BE ON THE SIDE FACING THE TERMINAL OR DEADENDED. ON UNUSUALLY LONG SPANS, THE POLES SHALL BE SET SO THAT THE CROSS ARM COMES ON THE SIDE OF THE POLE AWAY FROM THE LONG SPAN. WHERE POLE TOP PINS ARE USED, THEY SHALL BE ON THE OPPOSITE SIDE OF THE POLE FROM THE GAIN, WITH THE FLAT SIDE AGAINST THE POLE.
- I. RAKE AND OFFSET POLES SHALL BE SET IN ALIGNMENT AND PLUMB EXCEPT AT CORNERS, TERMINALS, ANGLES, JUNCTIONS, OR OTHER POINTS OF STRAIN, WHERE THEY SHALL BE SET AND RAKED AGAINST THE STRAIN SO THAT THE CONDUCTORS SHALL BE IN LINE.
- J. POLES SHALL BE RAKED AGAINST STRAIN NOT LESS THAN ONE INCH FOR EACH TEN FEET OF POLE LENGTH NOR MORE THAN TWO INCHES FOR EACH TEN FEET OF POLE LENGTH AFTER CONDUCTORS ARE INSTALLED AT THE REQUIRED TENSION.
- K. POLE BACKFILL MUST BE THOROUGHLY TAMPED THE FULL DEPTH. EXCESS DIRT MUST BE BANKED AROUND THE POLE. REMOVE EXCESS DIRT AND RESTORE SIDEWALK OR SOD AFTER SETTING.
- L. FIELD CUTTING OF WOOD POLES: WHERE NEW GAINS OR HOLES ARE REQUIRED, PAINT GAINS AND TREAT HOLES WITH 5 PERCENT PENTACHLOROPHENOL PRESERVATIVE COMPOUND.
- M. DO NOT CUT TOPS OF WOOD POLES EXCEPT UNDER VERY UNUSUAL CONDITIONS AND ONLY ON APPROVAL OF CPP ENGINEERING DEPARTMENT. IF CUTTING IS DEEMED NECESSARY, THE POLE TOP SHALL BE COVERED WITH A MASTIC TYPE CAP MANUFACTURED FOR THIS PURPOSE. DO NOT CUT THE BUTT OF WOOD POLES.
- N. UNUSED HOLES: IN WOOD POLES, PLUG UNUSED OR ABANDONED HOLES USING TREATED WOOD DOWELS. FOR HOLES IN USED POLES, WHERE THE HOLE HASS BEEN ENLARGED, TREAT THE HOLE WITH 5 PERCENT PENTACHLOROPHENOL PRESERVATIVE COMPOUND.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.04 POLE LINE HARDWARE

- A. ALL POLE LINE HARDWARE SHALL BE HOT-DIPPED GALVANIZED PER CMS 711.02, ROLLED, THREADED, BUFFER POINT, SQUARE HEADS, AND SQUARE NUTS. PROVIDE ALL EYENUTS EYE BOLTS, WASHERS, LOCKNUTS, CONNECTORS AS SHOWN ON THE DRAWINGS AND REQUIRED FOR A COMPLETE INSTALLATION. ALL HARDWARE SHALL BE UNIFORM WITH STANDARD THREADS AND SHALL BE IN ACCORDANCE WITH ASTM SPECIFICATION A-575 OR A-576. ALL POLE LINE HARDWARE SHALL BE NEW AND DESIGNED TO SERVE THE FUNCTION INTENDED.
- B. A 3 INCH BY 3 INCH (MINIMUM), SQUARE, CURVED WASHER SHALL BE USED ABUTTING THE POLE WHEN INSTALLING PRIMARY DEADEND, NEUTRAL DEADEND AND GUY ASSEMBLIES DIRECTLY TO THE POLE. THESE WASHERS MITIGATE THE CRUSHING OF WOOD FIBERS AND FACILITATE THE PERMITTED THE APPLIED LONGITUDINAL LOADS.
- C. POLE LINE HARDWARE SHALL BE MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, MACLEAN POWER SYSTEMS OR APPROVED EQUAL.

OC.05 LOCKNUTS

- A. A LOCKNUT SHALL BE INSTALLED WITH EACH NUT, EYENUT OR OTHER FASTENER ON ALL BOLTS OR THREADED HARDWARE SUCH AS INSULATOR PINS, UPSET BOLTS, DOUBLE ARMING BOLTS, ETC. REFER TO HARDWARE FOR ADDITIONAL REQUIREMENTS.
- B. LOCKNUTS SHALL BE INSTALLED ON ALL THREADED MATERIAL AND HARDWARE IN ADDITION TO NUTS AND WASHERS. THE THREADS ON INSTALLED BOLTS SHALL PROTRUDE PAST THE LOCK WASHERS A MINIMUM OF ONE INCH BUT NOT MORE THAN TWO INCHES.

OC.06 CROSS ARMS

- A. ALL CROSS ARMS SHALL BE MANUFACTURED FROM DOUGLAS FIR TIMBER AND MANUFACTURED IN ACCORDANCE WITH SPECIFICATION REA DT5-B.
- B. CROSS ARMS SHALL BE INCISED TO A DEPTH OF 1/8 INCH ON ALL SIX SIDES.
- C. DIMENSIONS AND DRILLING SHALL BE AS DETAILED ON THE DRAWINGS AND IN ACCORDANCE WITH CPP DRAWING NO. 8288-3.
- D. CROSS ARMS SHALL BE TREATED AS SPECIFIED IN OC.02 C; PENETRATION: THE PRESERVATIVE SHOULD PENETRATE ALL THE SAPWOOD. IT SHALL PENETRATE LONGITUDINALLY NOT LESS THAN ONE INCH FROM PINHOLES, BOLT HOLES AND FROM THE ENDS. EFFECTS OF TREATMENT AND CLEANLINESS: THE TREATING METHOD SHALL NOT INJURE THE WOOD. AFTER TREATMENT, CROSS ARMS SHALL BE REASONABLY CLEAN TO THE TOUCH AND SHOULD REMAIN SO. THE PROCESS SHALL COMPLY WITH AWP A STANDARDS P9 AND IN ACCORDANCE WITH AWP A T1 AND U1.
- E. PROVIDE A 4.5" GRID TYPE GAIN FOR EACH CROSSARM, DUCTILE IRON AND HOT DIPPED GALVANIZED PER CMS 711.02.

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GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.06 CROSS ARMS (CONT.)

F. DEADEND CLEVIS AND INSULATOR:

- INSULATOR SHALL BE A PRIMARY SPOOL INSULATOR MADE BY WET PROCESS PORCELAIN AND SHALL CONFORM TO THE LATEST EEI-NEMA STANDARDS WITH RATING AND SIZE MEETING CLASS 53-5 REQUIREMENTS. COLOR SHALL BE BROWN GLAZED.
- CLEVIS SHALL BE MADE OF HOT-DIPPED GALVANIZED 1/4" X 1-1/2" FLAT STEEL WITH 5/8" DIAMETER GALVANIZED STEEL BOLT WITH NON-FERROUS SELF-LOCKING COTTER AND AN ULTIMATE MECHANICAL STRENGTH OF 5000 POUNDS MINIMUM. ALL METAL PARTS SHALL BE HOT-DIPPED GALVANIZED PER CMS 711.02.
- CLEVIS WITH INSULATOR ABOVE SHALL BE MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, MACLEAN POWER SYSTEMS OR APPROVED EQUAL.

OC.07 CROSS ARM BRACES

MATERIAL FOR BRACES SHALL BE WOOD SPECIES DOUGLAS FIR, 1"x1 3/4" RECTANGULAR CROSS-SECTION WITH 26" CENTER HOLE MEASUREMENT. ALL METAL PARTS SHALL BE HOT-DIPPED GALVANIZED PER CMS 711.02. CROSS ARM BRACES SHALL BE HUGHES BROTHERS, APITONG OR EQUAL.

OC.08 CONDUCTORS

A. OVERHEAD CONDUCTORS

- EXISTING AND NEW CONDUCTORS MUST BE HANDLED WITH CARE. CONDUCTORS SHALL NOT BE TRAMPED ON NOR RUN OVER BY VEHICLES. EACH REEL SHALL BE EXAMINED AND THE WIRE SHALL BE INSPECTED FOR CUTS, KINKS, OR OTHER INJURIES. INJURED PORTIONS SHALL BE CUT OUT AND THE CONDUCTOR SPLICED. THE CONDUCTORS SHALL BE PULLED OVER SUITABLE ROLLERS OR STRINGING BLOCKS PROPERLY MOUNTED ON POLE OR CROSS ARM TO PREVENT BINDING WHILE STRINGING.
- ALL CONDUCTORS SHALL BE CLEANED THOROUGHLY BY WIRE-BRUSHING BEFORE SPLICING OR THE INSTALLATION OF A CONNECTOR OR CLAMP. A SUITABLE OXIDATION INHIBITOR SHALL BE APPLIED BEFORE SPLICING OR APPLYING CONNECTORS OVER ALUMINUM CONDUCTOR. ALL SPLICING OF EXISTING OVERHEAD CONDUCTORS SHALL PER CPP REQUIREMENTS.
- ALUMINUM CONDUCTOR STEEL REINFORCED (ACSR) ACSR CONDUCTOR SHALL BE MANUFACTURED TO CONFORM TO THE LATEST REVISION OF THE FOLLOWING ASTM SPECIFICATIONS:

- ASTM-B230, HARD-DRAWN ALUMINUM WIRE FOR ELECTRICAL PURPOSED
- ASTM-B232, CONCENTRIC-LAY STRANDED ALUMINUM CONDUCTORS, STEEL REINFORCED
- ASTM-B261, ZINC COATED (CLASS "A") STEEL CORE WIRE FOR ALUMINUM CONDUCTORS

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.08 CONDUCTORS (CONT.)

BARE ACSR CONDUCTORS APPROVED FOR USE BY CPP INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

SIZE	ACSR STRAND	CODE NAME
#2 AWG	6/1	SPARATE
#1/0 AWG	6/1	RAVEN
#3/0 AWG	6/1	PIGEON
#4/0 AWG	6/1	PENGUIN
336.4 KCMIL	26/7	LINNET
477 KCMIL	26/7	HAWK
636 KCMIL	26/7	GROSBEAK

ACSR "COVERED" CONDUCTORS APPROVED FOR USE BY CPP INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

SIZE	ACSR STRAND	CODE NAME
#2 AWG	6/1	BEECH/XLP
#1/0 AWG	6/1	ALMOND/XLP
336.4 KCMIL	26/7	ASPEN/XLP

4. ALUMINUM TRIPLEX AND QUADRUPLX

- PHASE CONDUCTORS SHALL BE MANUFACTURED TO CONFORM TO THE LATEST REVISION OF ASTM-B231, CONCENTRICALLY-STRANDED CONDUCTORS.
- NEUTRAL CONDUCTOR SHALL BE MANUFACTURED TO CONFORM TO THE LATEST REVISION OF THE FOLLOWING ASTM SPECIFICATIONS:
 - ASTM-B230, HARD-DRAWN ALUMINUM WIRE FOR ELECTRICAL PURPOSES
 - ASTM-B232, CONCENTRIC-LAY STRANDED ALUMINUM CONDUCTORS, STEEL REINFORCED
 - ASTM-B261, ZINC COATED (CLASS "A") STEEL CORE WIRE FOR ALUMINUM CONDUCTORS, STEEL REINFORCED (ACSR)

ALUMINUM TRIPLEX WITH ACSR MESSENGER APPROVED FOR USE BY CPP INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

PHASE	CONDUCTOR	MESSENGER	ACSR STRAND	CODE NAME
#4 AWG	7 STRAND	#4 AWG	6/1	PERIWINKLE/XLP
#2 AWG	7 STRAND	#2 AWG	6/1	CONCH/XLP
1/0 AWG	7 STRAND	1/0 AWG	6/1	NERITINA/XLP
4/0 AWG	18 STRAND	4/0 AWG	6/1	ZUZARA/XLP
336.4 KCMIL	19 STRAND	336.4 KCMIL	18/1	LIMPET/XLP

ALUMINUM QUADRUPLX WITH ACSR MESSENGER APPROVED FOR USE BY CPP INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

PHASE	CONDUCTOR	MESSENGER	ACSR STRAND	CODE NAME
#4 AWG	7 STRAND	#4 AWG	6/1	HACKNEY/XLP
#2 AWG	7 STRAND	#2 AWG	6/1	PALOMINO/XLP
1/0 AWG	9 STRAND	1/0 AWG	6/1	COSTENA/XLP
4/0 AWG	18 STRAND	4/0 AWG	6/1	APPALOOSA/XLP
336.4 KCMIL	19 STRAND	336.4 KCMIL	18/1	BRONCO/XLP

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.08 CONDUCTORS (CONT.)

B. DEADEND GRIPS

PROVIDE PREFORMED DEADENDS FOR USE IN DEADENDING WEATHERPROOF COVERED COPPER OR ALUMINUM CONDUCTORS WITHOUT REMOVING THE INSULATION ON THE WIRE. THESE DEADENDS ARE TO BE MADE OF ALUMINUM ALLOY AND GENEROUSLY COATED WITH A DURABLE PVC, POLYMERIZED CHLOROBUTADIENE OR PLASTIC COATING OVER THE ENTIRE METAL SURFACE. EACH DEADEND GRIP MUST HAVE A TAG ATTACHED SHOWING MANUFACTURER'S NAME, CATALOG NUMBER, AND THE SIZE WIRE TO WHICH IT CAN BE ATTACHED. DEADEND GRIP SHALL BE A.B. CHANCE-HUBBELL POWER SYSTEMS TYPE PCAG OR APPROVED EQUAL.

C. DEADEND GRIPS FOR TRIPLEX

PROVIDE PREFORMED DEADENDS FOR USE IN DEADENDING TRIPLEX WIRE WITH ALUMINUM ALLOY NEUTRALS. THESE DEADENDS ARE TO BE MADE OF HARD DRAWN ALUMINUM CLAD STEEL WIRE (ASTM B-415-64T). EACH DEADEND GRIP SHALL HAVE A TAG ATTACHED SHOWING MANUFACTURER'S NAME, CATALOG NUMBER, AND THE SIZE WIRE WHICH IT CAN BE ATTACHED. DEADEND GRIP SHALL BE A.B. CHANCE-HUBBELL POWER SYSTEMS SUPERLOCK OR APPROVED EQUAL.

D. SECONDARY CLEVIS:

- SECONDARY CLEVIS WITH ONE INSULATOR SPOOL COMPLETELY ASSEMBLED. SPOOLS MANUFACTURED BY WET PROCESS METHOD AND MEET ANSI CLASS 53-1. ALL METAL PARTS SHALL BE HOT-DIPPED GALVANIZED PER CMS 711.02.
- CLEVIS SHALL BE AS DETAILED ON DRAWINGS AND MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, MACLEAN POWER SYSTEMS OR APPROVED EQUAL.

E. SECONDARIES:

- OVERHEAD SECONDARY CONDUCTORS SHALL BE INSULATED WIRES OR MULTI CONDUCTOR SERVICE CABLE IN ACCORDANCE WITH NESC RULE 234C3. THE CONDUCTORS SHALL BE SAGGED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- SECONDARY AND SERVICE DROP CONDUCTORS SHALL BE INSTALLED SUCH THAT THE CLIMBING SPACE IS NOT OBSTRUCTED. THERE SHALL NOT BE MORE THAN ONE SPLICE PER CONDUCTOR IN ANY SPAN, AND SPLICING SHALL BE LOCATED AT LEAST TEN FEET FROM THE CONDUCTOR SUPPORT. WHERE THE SAME INSULATED CONDUCTORS OR SERVICE CABLES ARE TO BE USED FOR THE SECONDARY AND SERVICE DROP, THEY SHALL BE INSTALLED IN ONE CONTINUOUS RUN.

OC.09 SAGGING OF CONDUCTORS

- CONDUCTORS SHALL BE SAGGED IN ACCORDANCE WITH THE CONDUCTOR MANUFACTURER'S RECOMMENDATION. ALL CONDUCTORS SHALL BE SAGGED EVENLY. THE AIR TEMPERATURE AT THE TIME AND PLACE OF SAGGING SHALL BE DETERMINED BY A CERTIFIED ETCHED GLASS THERMOMETER.
- THE SAG OF ALL CONDUCTORS AFTER STRINGING SHALL BE IN ACCORDANCE WITH THE CONDUCTOR MANUFACTURER'S RECOMMENDATIONS.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.10 TAPS AND JUMPERS

- JUMPERS AND OTHER LEADS CONNECTED TO LINE CONDUCTORS SHALL HAVE SUFFICIENT SLACK TO ALLOW FREE MOVEMENT OF THE CONDUCTORS WITHOUT CAUSING THE JUMPERS TO BE PULLED FROM THEIR CONNECTORS. WHERE SLACK IS NOT SHOWN ON THE CONSTRUCTION DRAWINGS IT WILL BE PROVIDED BY AT LEAST TWO BENDS IN A VERTICAL PLANE, OR ONE IN A HORIZONTAL PLANE, OR THE EQUIVALENT.
- ALL LEADS ON EQUIPMENT SUCH AS TRANSFORMERS, LIGHTNING ARRESTERS, CUTOUTS, ETC. SHALL BE A MINIMUM OF #4 COPPER OR ACSR CONDUCTORS.

OC.11 SPLICES AND DEADENDS

CONDUCTORS SHALL BE SPLICED AND DEADENDED AS SHOWN ON THE CONSTRUCTION DRAWINGS. THERE SHALL BE NOT MORE THAN ONE SPLICE PER CONDUCTOR IN ANY SPAN AND SLICING SHALL BE LOCATED AT LEAST TEN FEET FROM THE CONDUCTOR SUPPORT.

OC.12 HOT-LINE CLAMPS AND CONNECTORS

CONNECTORS AND HOT-LINE CLAMPS SUITABLE FOR THE PURPOSE SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS AND ALSO IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS. ON ALL HOT-LINE CLAMP INSTALLATIONS, THE CLAMP AND JUMPER SHALL BE SO INSTALLED SO THAT THEY ARE PERMANENTLY BONDED TO THE LOAD SIDE OF THE LINE, ALLOWING THE JUMPER TO BE DE-ENERGIZED WHEN THE CLAMP IS DISCONNECTED.

OC.13 DEADEND INSULATORS

INSULATORS SHALL BE 15 KV CLASS POLYMER DISTRIBUTION DEADEND OR SUSPENSION INSULATORS CONFORMING TO THE LATEST EDITION OF THE ANSI/IEEE STANDARDS 1024, IEC-1109 AND MANUFACTURED WITH ISO 9002-1994 AS MANUFACTURED BY HUBBELL/OHIO BRASS, COPPER OR EQUAL.

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GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.14 GUYS

- A. GUYS SHALL BE PLACED AND TIGHTENED BY TURNBUCKLE BEFORE THE CONDUCTORS ARE STRUNG AND SHALL BE ATTACHED TO THE POLE AND CONSTRUCTED AS SHOWN ON THE PLANS AND AS NOTED HERE AND AS PER CPP GUIDELINES.
- B. THE DISTANCE FROM THE POLE TO THE ANCHOR ROD (THE GUY LEAD) IS RECOMMENDED TO BE THE SAME DISTANCE AS FROM THE GROUND TO THE GUY ATTACHMENT ON THE POLE. THIS 1:1 GUY SLOPE IS ESPECIALLY RECOMMENDED ON DEADEND STRUCTURES.
- C. IF THE SEPARATION ON THE POLE BETWEEN ANY GUY ATTACHMENT BOLT OR HARDWARE AND ANY PHASE CONDUCTOR ATTACHMENT BOLT IS LESS THAN 15 INCHES, THEN A GUY STRAIN INSULATOR ASSEMBLY SHALL BE INSTALLED AT THE TOP OF THE GUY AND THE GUY WIRE SHALL BE EFFECTIVELY GROUNDED BELOW THE INSULATOR BY BONDING THE GUY WIRE TO THE SYSTEM NEUTRAL AND THE POLE GROUND IF PRESENT. ALTERNATIVELY, AN INSULATED EXTENSION LINK SHALL BE INSTALLED IN THE PRIMARY CONDUCTOR TAP, DEADEND, OR SUSPENSION ANGLE SUBASSEMBLY WHERE IT ATTACHES TO THE POLE.
- D. ALL ANCHORS AND RODS SHALL BE IN ACCORDANCE WITH CONSTRUCTION DRAWINGS AND IN LINE WITH AND IN THE OPPOSITE DIRECTION OF, THE RESULTANT STRAIN OF THE CONDUCTORS. ANCHOR ASSEMBLIES SHALL BE INSTALLED SO THAT APPROXIMATELY SIX INCHES OF THE ROD REMAIN OUT OF THE GROUND. IN CULTIVATED FIELDS OR OTHER LOCATIONS AS DEEMED NECESSARY, THE PROJECTION OF THE ANCHOR ROD ABOVE EARTH MAY BE INCREASED TO A MAXIMUM OF 12 INCHES TO PREVENT BURIAL OF THE ROD EYE. THE BACKFILL OF ALL ANCHOR HOLES MUST BE THOROUGHLY TAMPED THE FULL DEPTH.

E. GUY HOOKS:

GUY HOOK SHALL BE THE COMBINATION TYPE TO TERMINATE GUY WIRE OR FIBERGLASS GUY STRAIN INSULATOR, FOR USE ON ROUND OR FLAT SURFACES. HOOK SHALL BE MADE OF DUCTILE IRON AND SHALL BE HOT-DIPPED GALVANIZED AS PER CMS 711.02. GUY HOOK SHALL HAVE A MINIMUM ULTIMATE STRENGTH OF 35,000 LBS. GUY HOOK SHALL BE MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, MACLEAN POWER SYSTEMS OR APPROVED EQUAL.

F. GUY STRAIN INSULATOR:

GUY STRAIN INSULATOR SHALL HAVE A ROD LENGTH OF 36" THE FIBERGLASS ROD SHALL BE COATED IN SILICONE RUBBER. GUY STRAIN INSULATOR SHALL HAVE A MINIMUM ULTIMATE STRENGTH OF 30,000 LBS. GUY STRAIN INSULATOR SHALL BE MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, MACLEAN POWER SYSTEMS OR APPROVED EQUAL.

G. GUY WIRE STRAND:

1. GUY WIRE SHALL BE UTILITIES GRADE; TWISTED STRAND GALVANIZED COATED STEEL WIRE CONFORMING TO ASTM A475 CLASS B AND AS PER CMS 711.02.
2. THE STRAND WIRE SHALL BE A MINIMUM 3/8" DIAMETER CONFORMING TO ASTM A475.
3. THE ACTUAL TENSION OF THE CABLE SHALL BE DETERMINED BY THE GUY WIRE AND SHALL NEVER EXCEED 20 PERCENT OF THE BREAKING STRENGTH ON THE GUY CABLE USED.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.14 GUYS (CONT.)

H. ANCHOR RODS:

ANCHOR RODS SHALL BE COMPLETE WITH EYENUT, THREADED HOT-DIPPED GALVANIZED AS PER CMS 711.02. RODS SHALL BE A MINIMUM OF 1" DIA. X 7' LONG.

I. ANCHORS:

ANCHORS SHALL BE DOUBLE HELIX TYPE, 10" SIZE CAPABLE OF WITHSTANDING A GUY TENSION OF 7000 LBS AND SHALL BE HOT-DIPPED GALVANIZED AS PER CMS 711.02. ANCHORS SHALL BE MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, COOPER POWER SYSTEMS OR APPROVED EQUAL.

J. GUY GRIPS:

GUY GRIPS SHALL BE MADE OF HARD DRAWN ALUMINUM CLAD STEEL WIRE. THE HOLDING POWER OF THE GRIP SHALL BE IN EXCESS OF THE RATED BREAKING STRENGTH OF THE GUY WIRE ON WHICH IT CAN BE USED. EACH GUY GRIP SHALL HAVE A TAG ATTACHED SHOWING MANUFACTURER'S NAME, CATALOG NUMBER, AND THE SIZE GUY WIRE TO WHICH IT CAN BE ATTACHED.

K. GUY WIRE GUARDS (MARKERS):

GUARDS TO BE MADE OF RIGID VINYL AND SHALL COMPLETELY ENIRCLE THE GUY STRAND. THE CLAMPS MUST NOT WEAKEN THE GUARD AND SHALL BE YELLOW PLASTIC TYPE COMPLETE WITH GALVANIZED MOUNTING HARDWARE. GUARDS SHALL BE 8'-0" LONG. GUARDS SHALL BE MANUFACTURED BY: A.B CHANCE-HUBBELL POWER SYSTEMS, MACLEAN POWER SYSTEMS OR APPROVED EQUAL.

OC.15 GROUNDING, CPP STD. 9-2, DRAWING 8295

- A. GROUND RODS SHALL BE COPPERCLAD STEEL OR STAINLESS STEEL, UL LISTED, DRIVEN FULL LENGTH IN AN UNDISTURBED EARTH A MINIMUM OF 3 FEET FROM THE FACE OF THE POLE AS SHOWN ON THE PLANS IN ACCORDANCE WITH THE SPECIFICATIONS. THE TOP SHALL BE BURIED AT LEAST 12" BELOW THE SURFACE OF THE EARTH. THE MAXIMUM ACCEPTABLE EARTH RESISTANCE VALUE SHALL BE 20 OHMS.

IF THE 20 OHM MAXIMUM RESISTANCE IS EXCEEDED BY THE USE OF A SINGLE GROUND ROD A SECOND 5/8" DIAMETER BY 8 FOOT ROD SHALL BE COUPLED OR WELDED TO THE FIRST ROD AND DRIVEN INTO THE EARTH. IF THE MAXIMUM RESISTANCE IS STILL EXCEEDED A THIRD 5/8" DIAMETER BY 8 FOOT LONG ROD SHALL BE DRIVEN APPROXIMATELY 4' FROM INITIAL ROD AND CONNECTED IN PARALLEL WITH THE FIRST SET. PROCEDURE SHALL CONTINUE UNTIL RESISTANCE OF 20 OHMS OR LESS IS OBTAINED. THE GROUND WIRE SHALL BE ATTACHED TO THE ROD WITH A CLAMP AND SECURED TO THE POLE WITH COPPERCLAD ROLLED POINT STAPLES OF ADEQUATE SIZE TOP AND BOTTOM. THE GROUND WIRE SHALL BE COVERED BY A GROUND MOLDING. THE STAPLES ON THE GROUND MOLDING SHALL BE SPACED TWO FEET APART EXCEPT FOR THE FIRST EIGHT FEET ABOVE THE GROUND AND EIGHT FEET DOWN FROM THE TOP OF THE POLE WHERE THEY SHALL BE SIX INCHES APART. THE CONTRACTOR SHALL TEST EACH POLE AND MANHOLE GROUNDING SYSTEM PER CMS 625.19.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.15 GROUNDING, CPP STD. 9-2, DRAWING 8295 (CONT.)

- B. THE CONNECTION BETWEEN THE GROUND ROD AND THE SYSTEM NEUTRAL SHOULD BE MADE BY ONE CONTINUOUS PIECE OF CONDUCTOR (THE POLE GROUND WIRE), AND SHALL BE INSTALLED IN THE SHORTEST AND MOST DIRECT PATH ACCORDING TO THE CONSTRUCTION DRAWINGS. SPLICES, IF REQUIRED, SHALL BE MADE USING A COMPRESSION TYPE CONNECTOR AND SHALL BE INSTALLED A MINIMUM OF 6 INCHES ABOVE THE GROUND LINE. THE POLE GROUND WIRE SHALL BE CONNECTED TO THE SYSTEM NEUTRAL USING A COMPRESSION TYPE CONNECTOR.

- C. ALL EQUIPMENT SHALL HAVE AT LEAST 2 CONNECTIONS FROM THE FRAME, CASE, OR TANK TO THE MULTI-GROUNDED SYSTEM NEUTRAL CONDUCTOR AS SHOWN ON THE CONSTRUCTION DRAWINGS. THE POLE GROUND WIRE MAY BE USED FOR ONE OR BOTH OF THESE CONNECTIONS.

- D. ALL NEUTRAL CONDUCTORS ON THE POLE SHALL BE BONDED DIRECTLY TO EACH OTHER, AND CONNECTED TO THE POLE GROUND WIRE IF PRESENT. ALL EQUIPMENT GROUND WIRES, NEUTRAL CONDUCTORS, DOWNGUYS, MESSENGER WIRES, AND LIGHTNING-PROTECTION GROUND WIRES SHALL BE INTERCONNECTED AND ATTACHED TO A COMMON (POLE) GROUND WIRE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL SAFETY CODE (NESC).

- E. IN ADDITION TO GROUND ROD(S), EACH LINE POLE SHALL BE EQUIPPED WITH A "BUTT GROUND" AS DETAILED IN THE PLANS. THE BUTT GROUND SHALL BE CONSIDERED SUPPLEMENTARY AND SHALL BE SEPARATE FROM THE RESISTANCE TESTING SPECIFIED ABOVE. THE BUTT GROUND SHALL BE ATTACHED TO THE GROUND ROD. CPP STD. 9-1, DRAWING 8243.

F. ELECTRICAL GROUNDING STANDARDS:

1. NO PHASE CONDUCTORS SHALL BE GROUNDED.
2. ALL TRANSFORMER CASES WHERE MOUNTED ON POLES OR CROSS ARMS SHALL BE BONDED TO THE POLE GROUND DOWN CONDUCTOR.
3. ALL STREET LIGHTING REGULATOR CASES SHALL BE BONDED TO THE POLE GROUND DOWN CONDUCTOR.
4. ALL METALLIC EQUIPMENT SUPPORTS, RACKS AND HOUSINGS SHALL BE BONDED TO THE POLE GROUND DOWN CONDUCTOR.

- G. THE NEUTRAL WIRES, DOWN GUYS AND LIGHTNING-PROTECTIVE EQUIPMENT SHALL BE INTERCONNECTED AND ATTACHED TO BONDED TO THE POLE GROUND DOWN CONDUCTOR.

- H. PROVIDE ALL GROUND RODS AND GROUND WIRES AS INDICATED ON THE DRAWINGS. ALL CONNECTIONS AT THE ROD SHALL BE MADE WITH A CAST BRONZE CLAMP HAVING BRONZE SET SCREW, ALL GROUNDING CLAMPS INSTALLED BELOW GRADE SHALL BE HEAVY DUTY CLAMP LISTED FOR DIRECT BURIAL. WIRE SHALL BE #4 COPPER WEATHERPROOF TYPE AND #3/0 COPPER. WEATHERPROOF TYPE WHERE DETAILED ON THE DRAWINGS IN MANHOLES. GROUND MOLDING SHALL BE WOOD OR PLASTIC MIN. 8 FOOT IN LENGTH OF SUFFICIENT WIDTH AND GROOVE DEPTH TO COMPLETELY ENCLOSE THE GROUNDING DOWN CONDUCTOR.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.16 MEDIUM VOLTAGE CABLE TERMINATIONS

- A. TERMINATION KITS SHALL TO CAPABLE OF PROPERLY TERMINATING 15KV CLASS SINGLE CONDUCTOR EPR INSULATED CABLE FOR OUTDOOR APPLICATIONS PER ASTM D2303. KITS SHALL ACCOMMODATE ANY COMMON FORM OF CABLE SHIELDING/CONSTRUCTION WITHOUT THE NEED FOR LIGHTING ADAPTORS OR ACCESSORIES. TERMINATIONS FOR SINGLE-CONDUCTOR CABLES SHALL CONSIST OF HOT OR COLD SHRINKABLE STRESS CONTROL AND OUTER NON-TRACKING INSULATION TUBINGS ALONG WITH A HIGH RELATIVE PERMITTIVITY STRESS RELIEF MASTIC FOR INSULATION SHIELD CUTBACK TREATMENT FOR ENVIRONMENTAL SEALING. PROVIDE PROPER CONNECTOR FOR TERMINATION TO CUTOUT. GROUND WIRE/SHIELD LEADS SHALL BE GROUNDED TO POLE GROUND. CABLE TERMINATORS SHALL BE BY RAYCHEM TYPE HVT-150 OR 3M QT SERIES OR EQUIVALENT APPROVED BY CPP ENGINEERING DEPARTMENT.

B. CABLE SUPPORT BRACKET:

1. CABLE SUPPORT BRACKET SHALL BE COMPLETE FOR POLE MOUNTING, NON-METALLIC ARMS.
2. ALL STEEL MATERIALS AND HARDWARE SHALL BE HOT-DIPPED GALVANIZED AS PER CMS 711.02.
3. BRACKET SHALL BE ARRANGED AS DETAILED ON THE DRAWINGS.

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GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.17 LIGHTNING ARRESTER

- A. LIGHTNING ARRESTERS SHALL BE AN IEEE RISER POLE DISTRIBUTION ARRESTER; POLYMER HOUSED METAL OXIDE VARISTOR WITH TOP AND BOTTOM CONNECTION TERMINALS (NO PIG-TAILS). EXPULSION TYPE WILL NOT BE ACCEPTED. LIGHTNING ARRESTER SHALL CONFORM TO ALL APPLICABLE NEMA STANDARDS AND ANSI IEEE C62.11.
- B. TERMINALS:
1. THE TERMINALS SHALL BE STAINLESS STEEL TO BE COMPATIBLE TO BOTH COPPER AND ALUMINUM CONDUCTORS FROM #6 SOLID TO #2 STRANDED. INSULATING TOP CAP MUST BE FIRMLY ATTACHED OR CLIPPED TO THE TERMINAL AND MUST BE GUARANTEED TO STAY FIRMLY IN PLACE FOR THE LIFE OF THE ARRESTER.
2. BOTTOM TERMINAL SHALL BE STAINLESS STEEL TO BE COMPATIBLE TO BOTH COPPER AND ALUMINUM CONDUCTORS FROM #6 SOLID TO #2 STRANDED.
- C. DROPOUT DEVICE OR GROUND LEAD DISCONNECTOR:
- THE ARRESTER SHALL BE EQUIPPED WITH A NON-EXPLOSIVE DROP-OUT ASSEMBLY TO ISOLATE THE ARRESTER FROM THE GROUND LEAD IN EVENT OF FAILURE, AND TO GIVE A VISIBLE INDICATION OF FAILURE.
- D. CONSTRUCTION:
1. SEALING GASKETS MUST BE POSITIVE TO INSURE MOISTURE PROOF SEAL FOR THE LIFE OF THE ARRESTER.
2. LIGHTNING ARRESTERS SHALL BE RATED AS FOLLOWS: NOMINAL SYSTEM VOLTAGE 2.4KV, MAXIMUM 2.54KV,:11KV, MAX. 11KV :13.8KV, MAX. 14.63KV. EFFECTIVELY GROUNDED CIRCUIT. COORDINATE ARRESTER BRACKET WITH CROSS ARM SIZE.
- E. MOUNTING BRACKET:
1. A CROSS ARM MOUNTING BRACKET SHALL BE COMPLETE FOR POLE MOUNTING EACH ARRESTER TO ACCOMMODATE STANDARD CROSS ARM SECTIONS. STANDARD NEMA TYPE WITH LOCKNUTS FOR ARRESTER MOUNTING AND GROUND CLAMP. ALL MOUNTING HARDWARE & ARRESTERS SHALL BE PROVIDED AS A SINGLE UNIT BY THE SAME EQUIPMENT MANUFACTURER.
2. ALL STEEL MATERIALS AND HARDWARE SHALL BE HOT-DIPPED GALVANIZED AS PER CMS 711.02.
3. BRACKET SHALL BE ARRANGED AS DETAILED ON THE DRAWINGS.
- F. LIGHTNING ARRESTERS SHALL BE HUBBELL POWER SYSTEMS-OHIO BRASS TYPE PVR-OPTIMA, COOPER POWER SYSTEMS VARISTAR OR APPROVED EQUAL.

GENERAL OVERHEAD UTILITY POWER CONSTRUCTION (CONT.)

OC.18 FUSED CUTOUTS

- STANDARD TYPE CUTOUT SHALL HAVE AN ALL COPPER CURRENT PATH WITH SILVER PLATED CONTACTS. TERMINALS SHALL BE TIN PLATED BRONZE FOR USE WITH COPPER OR ALUMINUM CONDUCTORS. LOAD BREAK HOOKS OF GALVANIZED STEEL AND MOUNTED ON TOP SUPPORT. ASSEMBLY COMPLETE WITH BIRD PROOFED ONE-PIECE SOLID POLYMER OR PORCELAIN INSULATOR, CAST BRONZE HINGE, STAINLESS STEEL SPRINGS FOR PROPER TOGGLE ACTION AND TO MAINTAIN CONTACT PRESSURE, HIGH STRENGTH FIBERGLASS FUSE TUBE AND 15KV, 110KV BIL. CUTOUTS SHALL BE TYPE C STYLE PER CPP RECOMMENDATIONS. ALL NON-STAINLESS STEEL MATERIALS AND HARDWARE SHALL BE HOT-DIPPED GALVANIZED AS PER CMS 711.02.CUTOUTS SHALL BE HUBBELL POWER SYSTEMS- CHANCE TYPE C, COOPER POWER SYSTEMS HX-CB OR APPROVED EQUAL. SUBMIT TO CPP ENGINEERING DEPARTMENT FOR APPROVAL ON A CASE BY CASE BASIS.
- OC.19 FUSES FOR CUTOUTS
- FUSES FOR CUTOUTS SHALL BE THE TYPE & STYLE COMPATIBLE WITH CUTOUT PROVIDED AND AS REQUIRED PER CPP RECOMMENDATIONS. EXACT AMPERE AND VOLTAGE RATING SHALL BE DETERMINED BY CPP. PROVIDE FUSES BY THE SAME MANUFACTURER AS THE CUTOUT.
- THE POLE CONSTRUCTION REQUIREMENTS CAN VARY BY SITUATION. THEREFORE, THE POLE CONSTRUCTION DESIGN SHOULD BE SUBMITTED TO CPP ENGINEERING FOR REVIEW ON A CASE-BY-CASE BASIS.

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1	2019-08-07	DC014
0	2019-04-04	RFC
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CPP WORK

- IN EX. MH 99-9
CUT AND CAP ALL CABLES

IN EX. MH 99-8 TO BE REMOVED
OPEN ALL SPLICES
REM. CABLES TO MH 99-9

AT EX. RISER POLE ON BRAGG RD.
DISCONNECT LATERAL CABLES

IN EX MH 99-14 TO BE REMOVED
OPEN ALL SPLICES
REMOVE CABLES TO EX. RISER POLE

IN EX. MH 99-7 TO BE REMOVED
OPEN ALL SPLICES
REMOVE CABLES TO EX. MH 99-8
REMOVE CABLES TO EX. MH 99-14

IN EX. MH 99-6
OPEN ALL SPLICES
CAP CABLES EXITING NORTH
REMOVE CABLES TO EX. MH 99-7
- AT NEW MH 99-8 (EMH01)
INST. 1-(500KCMIL-500KCMIL-4/0)-1C-CU ELASTIMOLD 3-WAY SPLICE
INST. 3 TEST CAPS
INST. CABLE ID TAGS

AT NEW MH 99-7 (EMH02)
INST. 3-500KCMIL-1C-CU-15KV ELASTIMOLD 3-WAY SPLICES
INST. CABLE ID TAGS

AT EX. MH 99-6 (EMH03)
INST. 3-TEST CAPS
INST. CABLE ID TAGS

AT NEW MH 99-14 (EMH41)
INST. 3-500KCMIL-1C-CU-15KV ELASTIMOLD STRAIGHT SPLICES
INST. CABLE ID TAGS

AT EX. CPP RISER POLE
INST. CABLE ID TAGS

EAST 55TH STREET

- IN NEW MH 99-8
INST. 1-5/8" X 8' CU GROUND ROD
INST. BOND FRAME
INST. CABLE RACKS
INST. 1-#6-CU 600V SOLID GROUND WIRE

IN NEW MH 99-7
INST. 1-5/8" X 8' CU GROUND ROD
INST. BOND FRAME
INST. CABLE RACKS
INST. 1-#6-CU 600V SOLID GROUND WIRE

FROM NEW MH 99-8 (EMH01) TO NEW MH 99-7 (EMH02)
INST. 3-500KCMIL-1C-CU-15KV CABLES

FROM NEW MH 99-8 (EMH01) TO PADMOUNT TRANSFORMER
INST. 1-4/0-1C-CU-15KV CABLE

FROM NEW MH 99-7 (EMH02) TO EX. MH 99-6 (EMH03)
INST. 3-500KCMIL-1C-CU-15KV CABLES

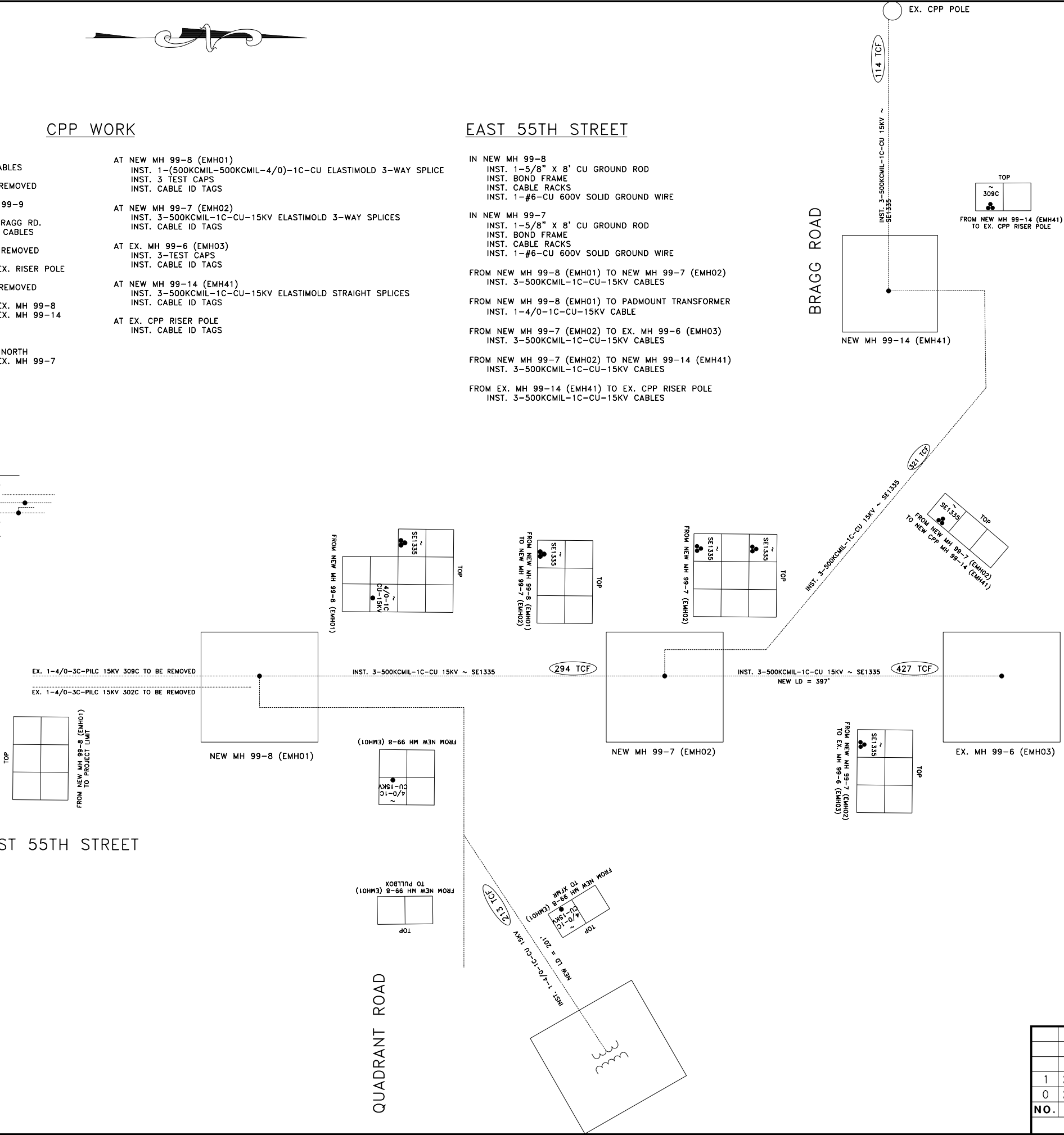
FROM NEW MH 99-7 (EMH02) TO NEW MH 99-14 (EMH41)
INST. 3-500KCMIL-1C-CU-15KV CABLES

FROM EX. MH 99-14 (EMH41) TO EX. CPP RISER POLE
INST. 3-500KCMIL-1C-CU-15KV CABLES

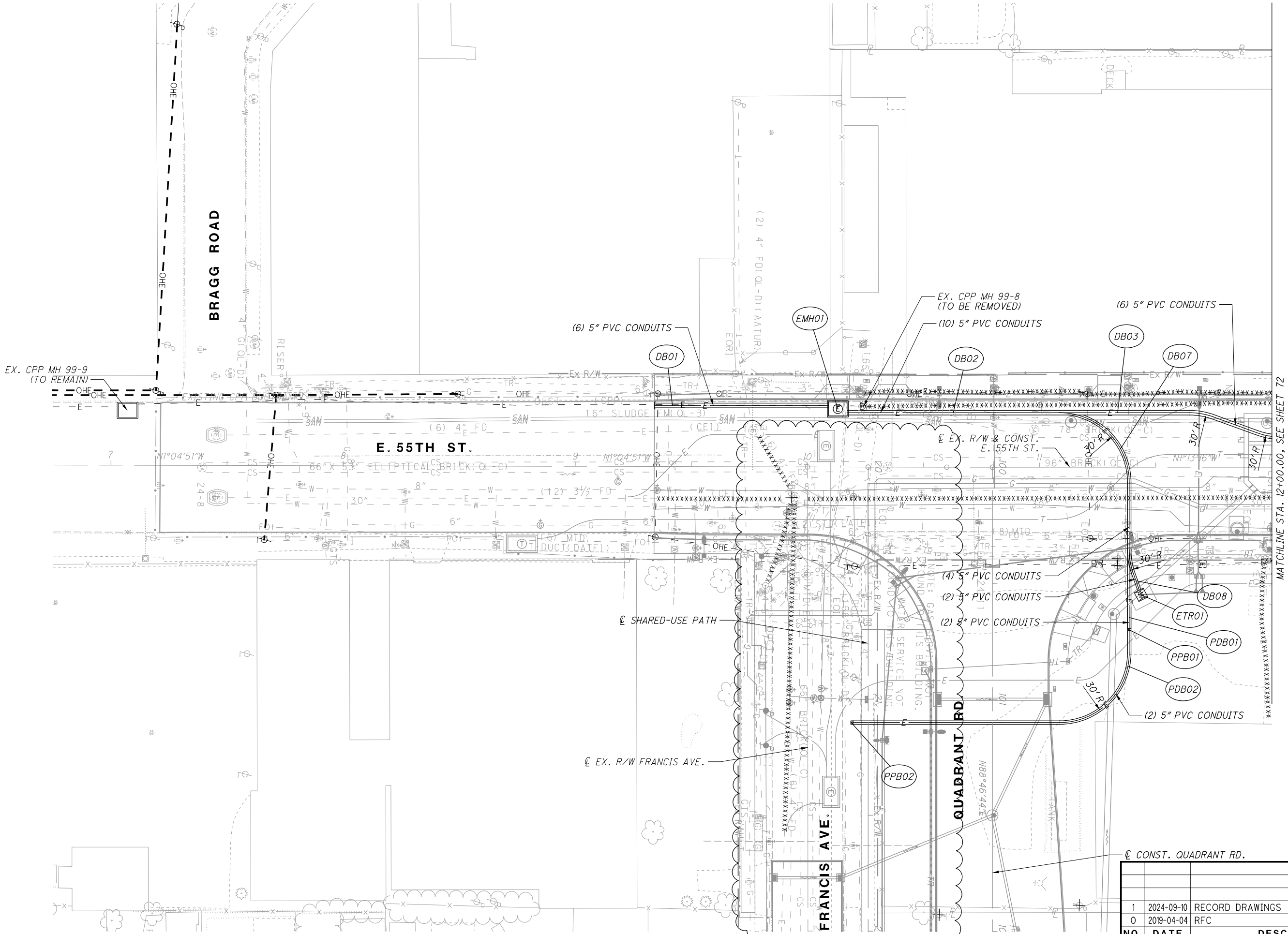
CABLE SYMBOLS:
EXISTING CABLE: _____
NEW CABLE: _____
CABLE TO BE REMOVED: _____
NEW STRAIGHT SPLICE: _____
NEW BRANCH SPLICE: _____
CABLE CUT: _____
TO BE: ~
TCF: TOTAL CIRCUIT FEET

EAST 55TH STREET

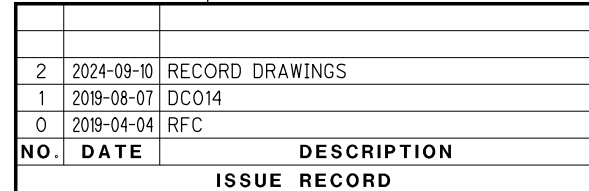
EAST 55TH STREET



NO.	DATE	DESCRIPTION
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0	2019-04-04	RFC
ISSUE RECORD		

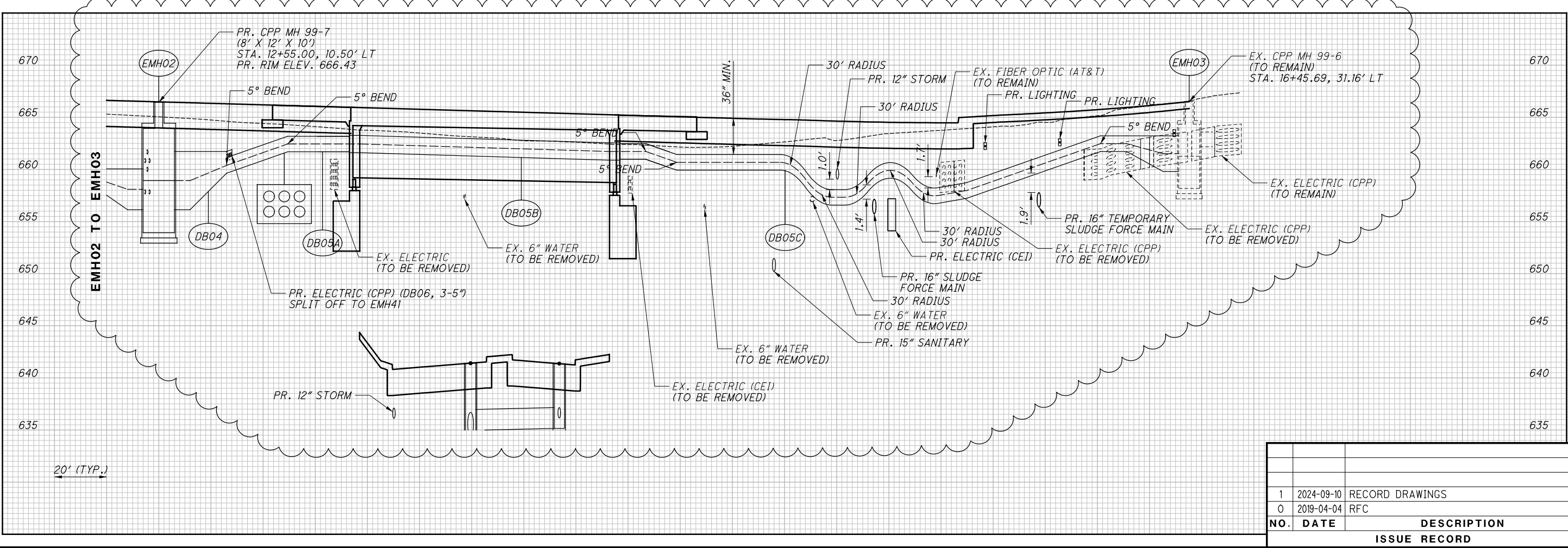
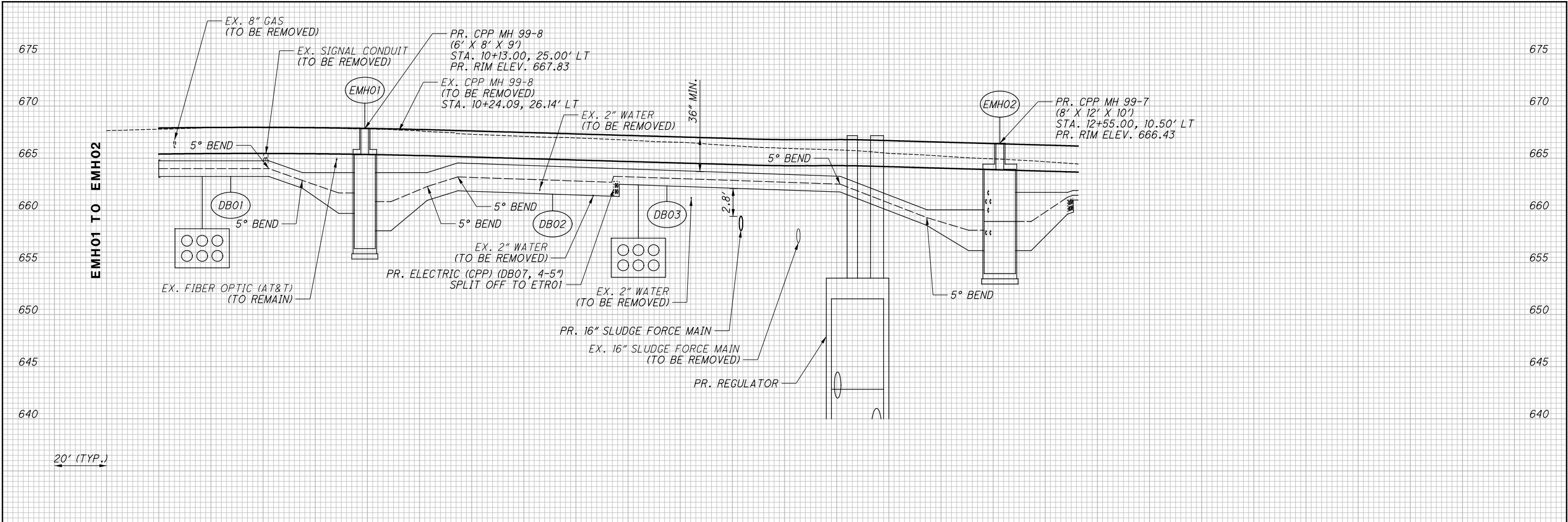


NO.	DATE	DESCRIPTION
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0	2019-04-04	RFC



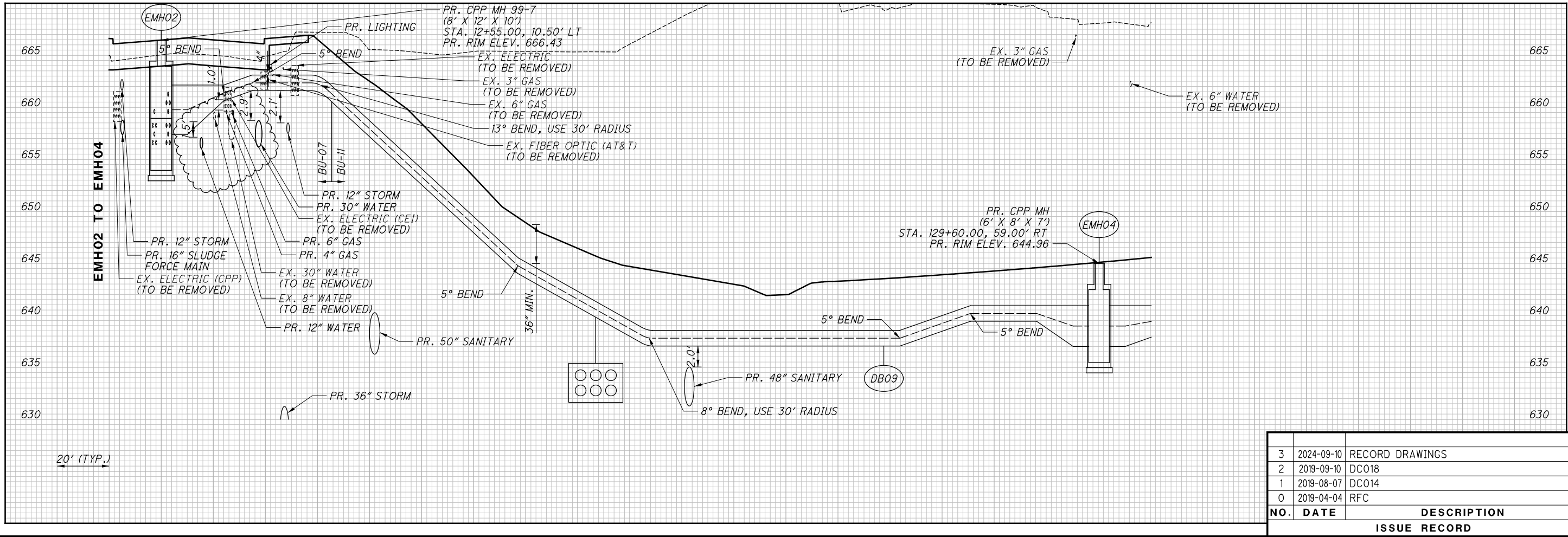
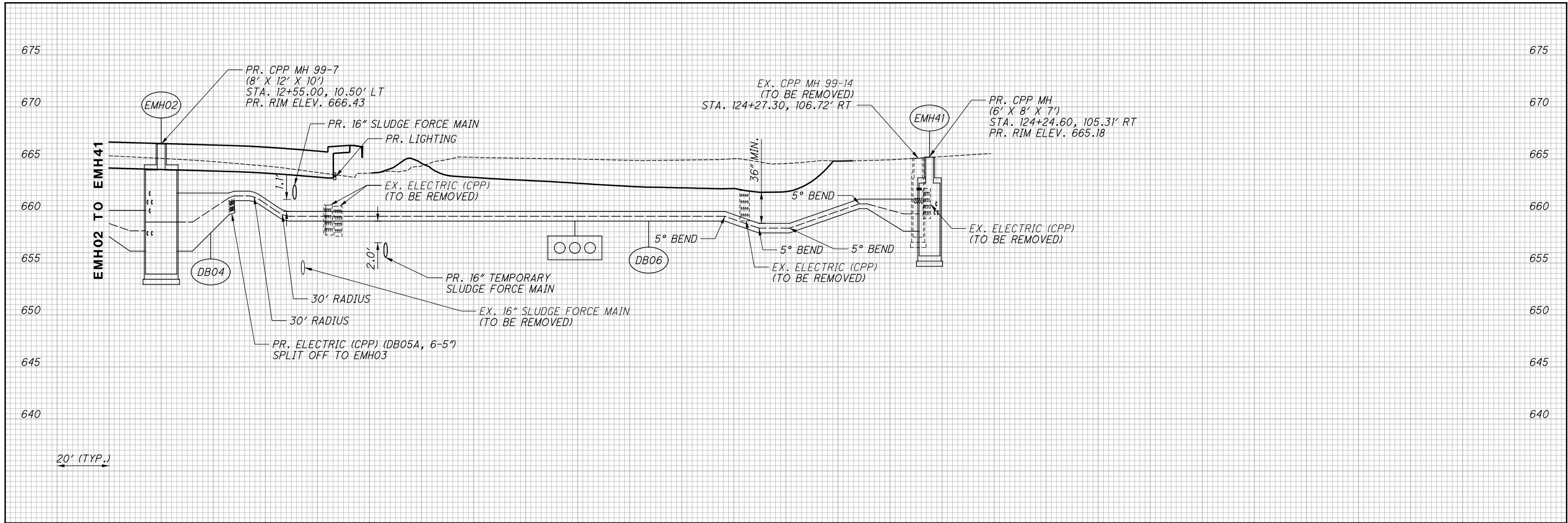


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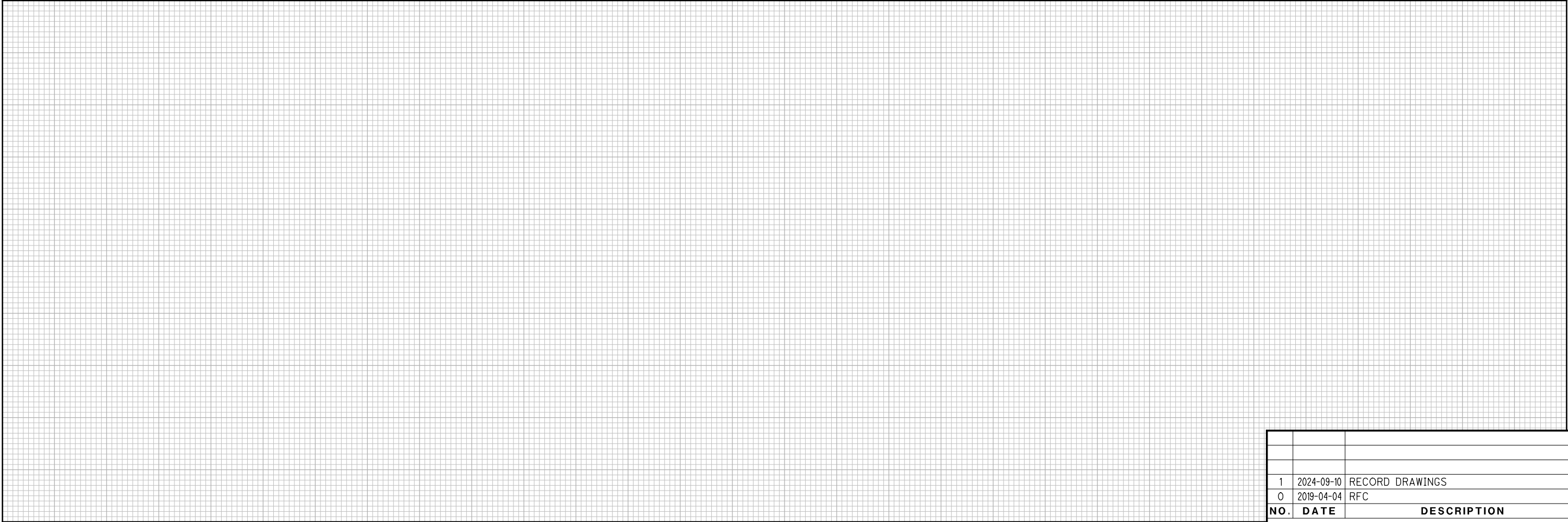
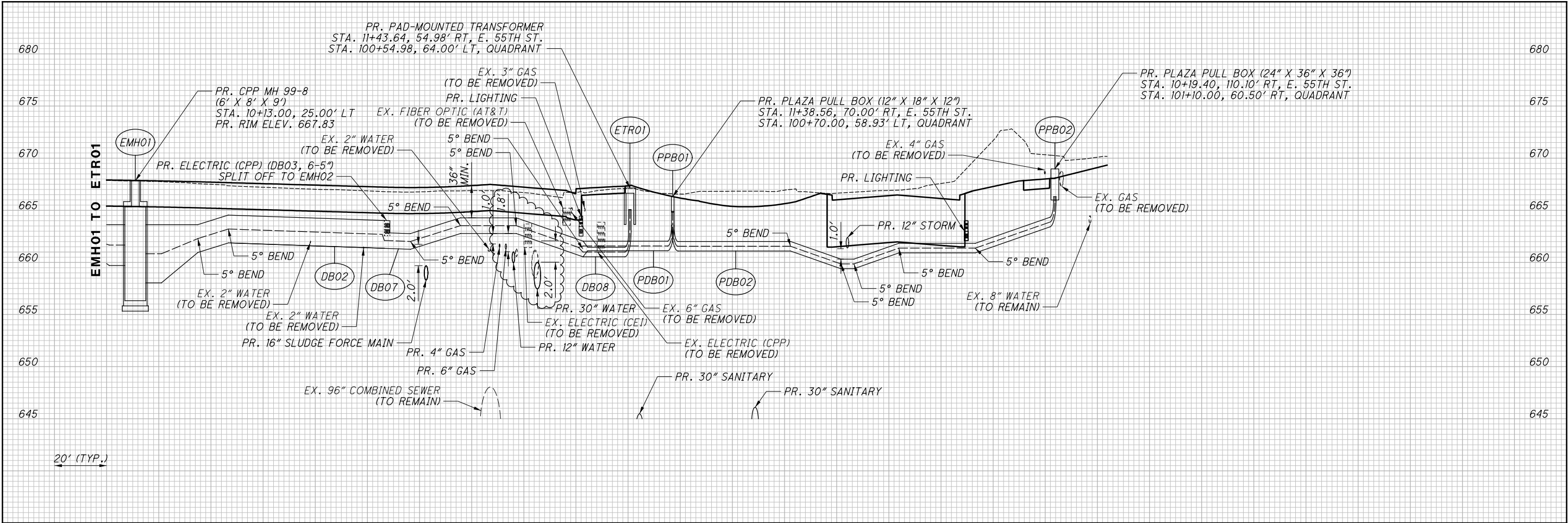


NO.	DATE	DESCRIPTION
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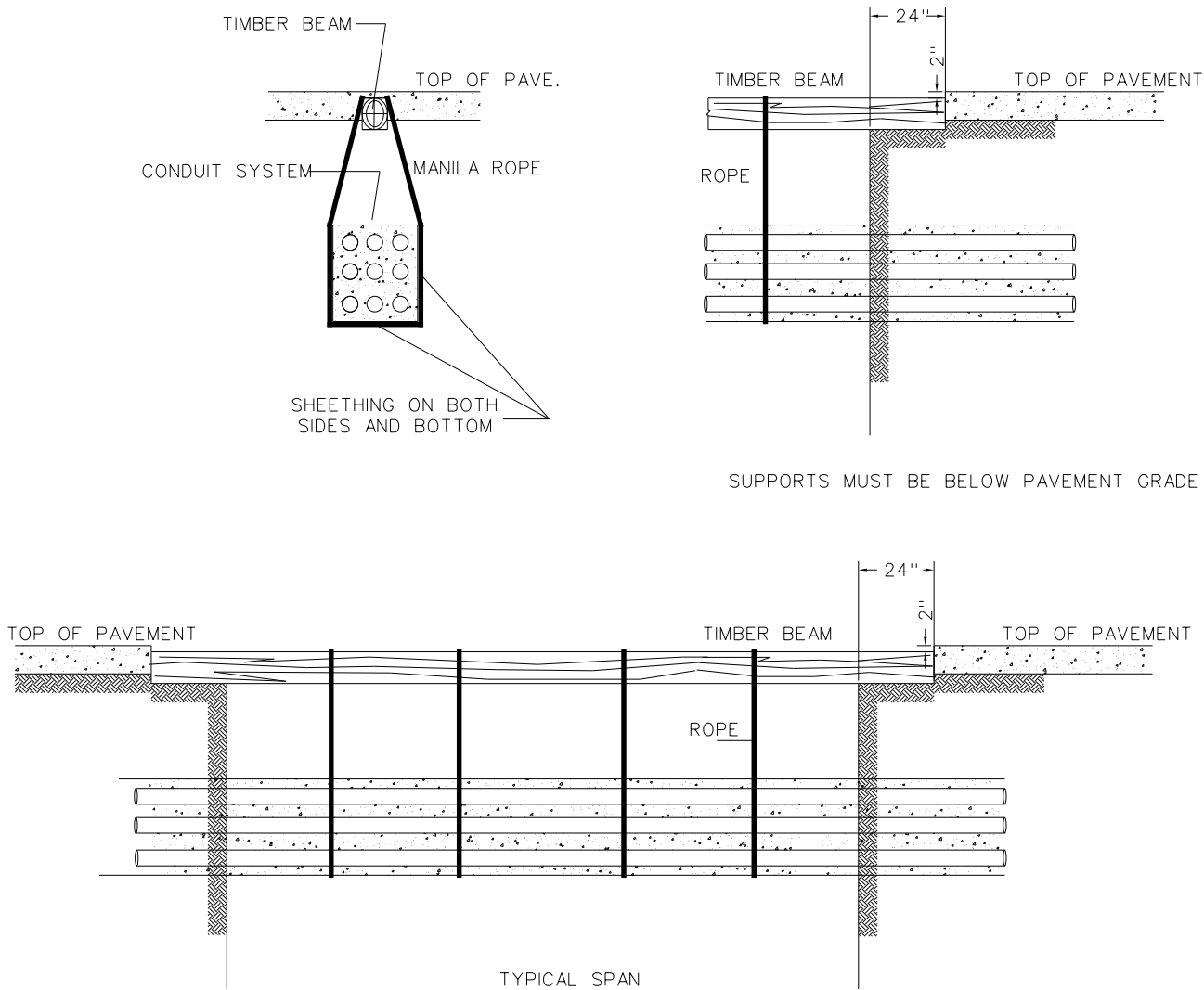
ISSUE RECORD		
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NO.	DATE	DESCRIPTION
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2	2019-09-10	DC018
1	2019-08-07	DC014
0	2019-04-04	RFC
		ISSUE RECORD



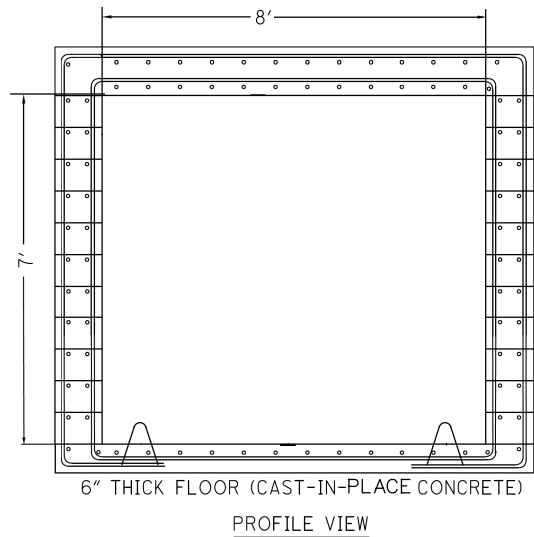
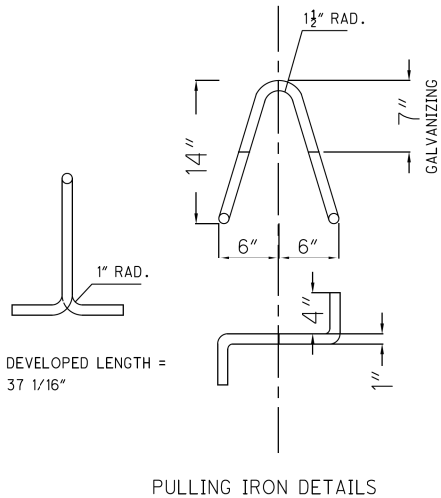
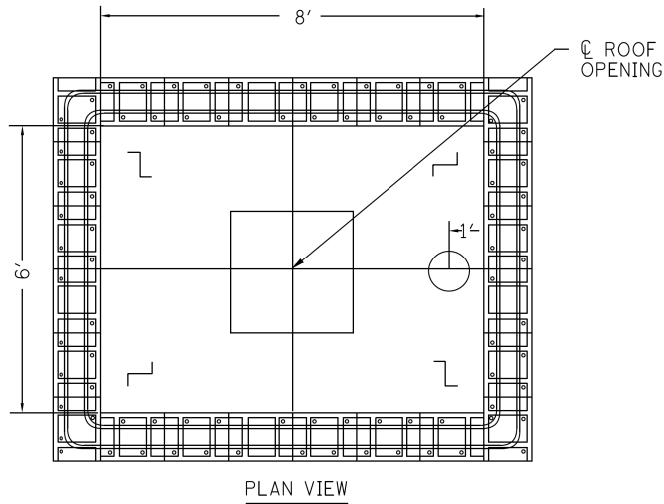
NO.		DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS	
0	2019-04-04	RFC	
ISSUE RECORD			



- NOTES:
- THIS APPLICATION IS DESIGNED TO ALLOW THE INSTALLATION OF A STEEL PLATE OVER THE OPENING DURING NON-WORKING HOURS. THE ABOVE CONDITIONS WITH THE STEEL PLATE PLACED ON THE TIMBERS IS NOT DESIGNED TO SUPPORT TRAFFIC CONDITIONS DURING THE WINTER MONTHS.
- THIS APPLICATION MAY BE USED ON ANY AND ALL CONDUIT FORMATIONS
- TIMBERS MUST SPAN OPEN TRENCH AS SHOWN ABOVE. SIZE TIMBER FOR LOAD BEING SUPPORTED.
- USE 2" SHEETING ON BOTH SIDES AND BOTTOM OF CONDUIT SYSTEM.
- SIZE ROPE FOR LOAD BEING SUPPORTED.

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SAMPLE
BUILT-IN-PLACE CMU MANHOLES DETAILS
FOR 6'x8' 6'x10' 8'x10'
(6'x8' SHOWN)



MATERIAL - 1" DIA. HOT ROLLED STEEL

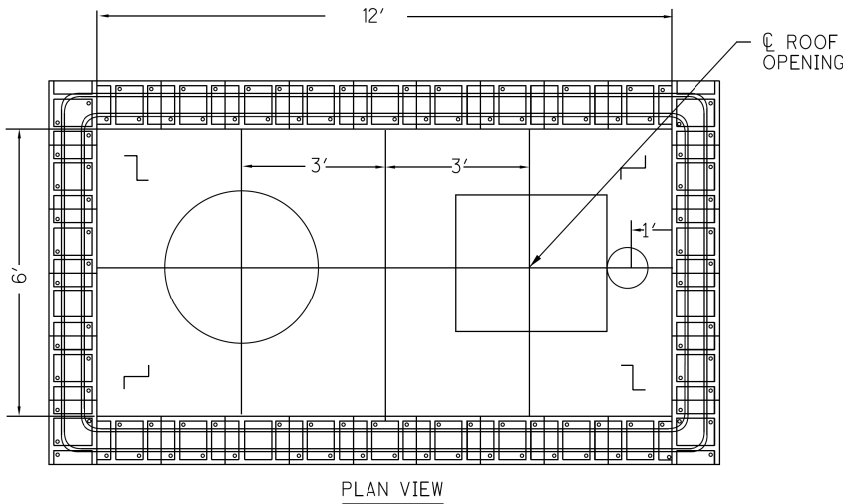
FOR BUILT IN PLACE MANHOLES, CABLE PULLING IRONS SHALL BE INSTALLED IN THE MANHOLE FLOOR 12" AWAY FROM THE WALL, DIRECTLY OPPOSITE ALL DUCT FORMATIONS AND 12" FROM THE ADJACENT WALL WHEN DUCTS ENTER THE MANHOLE AT RIGHT ANGLES.

SAMPLE C.M.U. MANHOLE DETAILS
SEE PLAN SPECIFIC CMU MANHOLE DETAILS
PRECAST SLAB DESIGN PER ASTM C858-10E1.

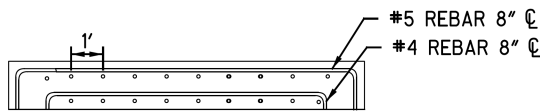
GENERAL NOTES:

- USE 12" X 8" X 16" REBAR BLOCKS (NORMAL WEIGHT, HIGH STRENGTH - 4000PSI)
- ALL VOIDS ARE TO BE FILLED WITH GROUT.
- EXTRA REINFORCEMENT TO BE INSTALLED AROUND ALL OPENINGS.
- HIGH STRENGTH CONCRETE TO BE USED IN FLOOR AND ROOF.
- OUTER RING REINFORCEMENT
A. #5 REBAR, 8" ON-CENTER
B. WALL REINFORCEMENT TO EXTEND INTO FLOOR AND ROOF WITH MINIMUM OVERLAP OF 26".
C. FLOOR AND ROOF REINFORCEMENT TO EXTEND INTO WALLS WITH MINIMUM OVERLAP OF 26".
- INNER RING REINFORCEMENT
A. #4 REBAR, 8" ON-CENTER
B. WALL REINFORCEMENT TO EXTEND INTO FLOOR AND ROOF WITH MINIMUM OVERLAP OF 30".
C. FLOOR AND ROOF REINFORCEMENT TO EXTEND INTO WALLS WITH MINIMUM OVERLAP OF 30".

SAMPLE
BUILT-IN-PLACE CMU MANHOLES DETAILS
FOR 6'x12' 8'x12'
(6'x12' SHOWN)

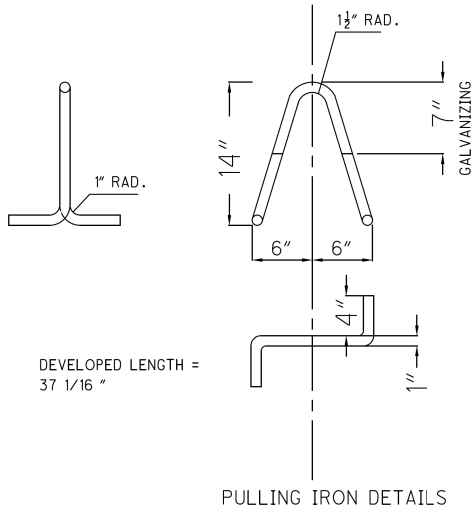
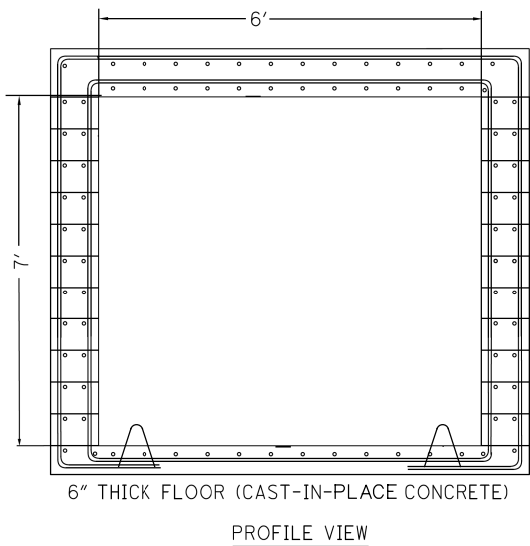


12" THICK ROOF CAST-IN-PLACE CONCRETE



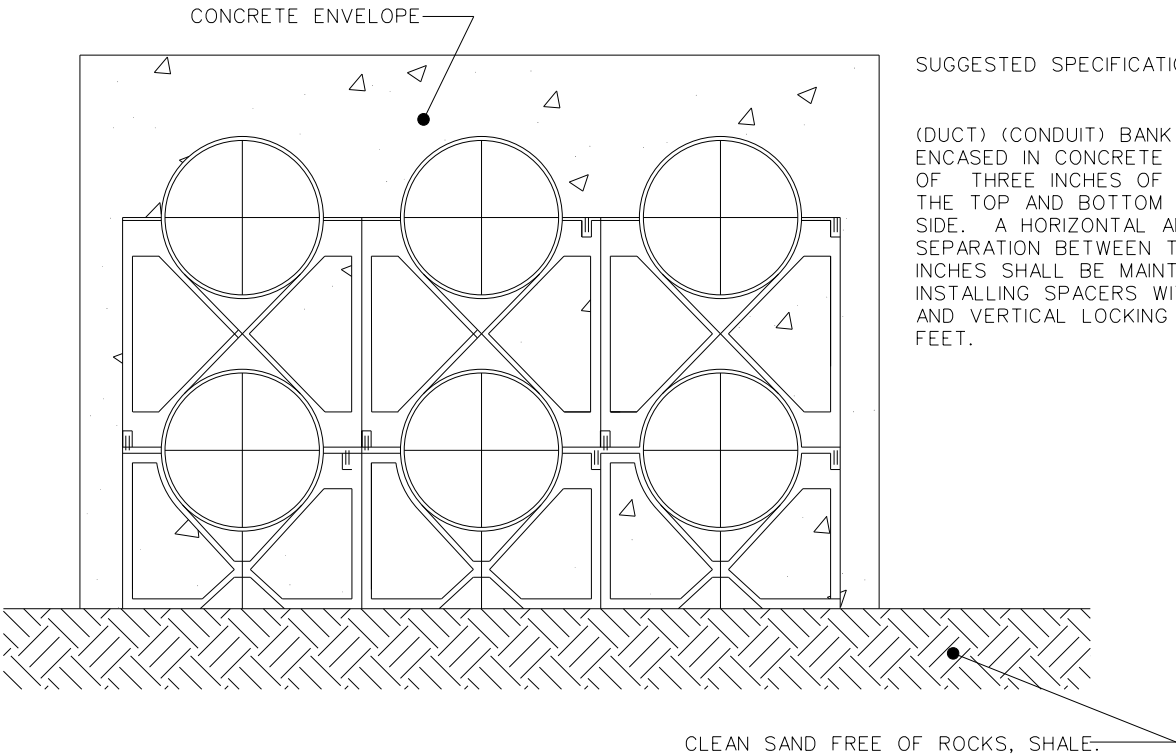
MATERIAL - 1" DIA. HOT ROLLED STEEL

FOR BUILT IN PLACE MANHOLES, CABLE PULLING IRONS SHALL BE INSTALLED IN THE MANHOLE FLOOR 12" AWAY FROM THE WALL, DIRECTLY OPPOSITE ALL DUCT FORMATIONS AND 12" FROM THE ADJACENT WALL WHEN DUCTS ENTER THE MANHOLE AT RIGHT ANGLES.



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TYPICAL SNAP-LOC NONMETALLIC SPACER INSTALLATION



SUGGESTED SPECIFICATIONS

(DUCT) (CONDUIT) BANK SHALL BE ENCASED IN CONCRETE WITH A MINIMUM OF THREE INCHES OF CONCRETE AT THE TOP AND BOTTOM AND ON EACH SIDE. A HORIZONTAL AND VERTICAL SEPARATION BETWEEN THE DUCTS OF 2 INCHES SHALL BE MAINTAINED BY INSTALLING SPACERS WITH HORIZONTAL AND VERTICAL LOCKING INTERVALS OF 8 FEET.

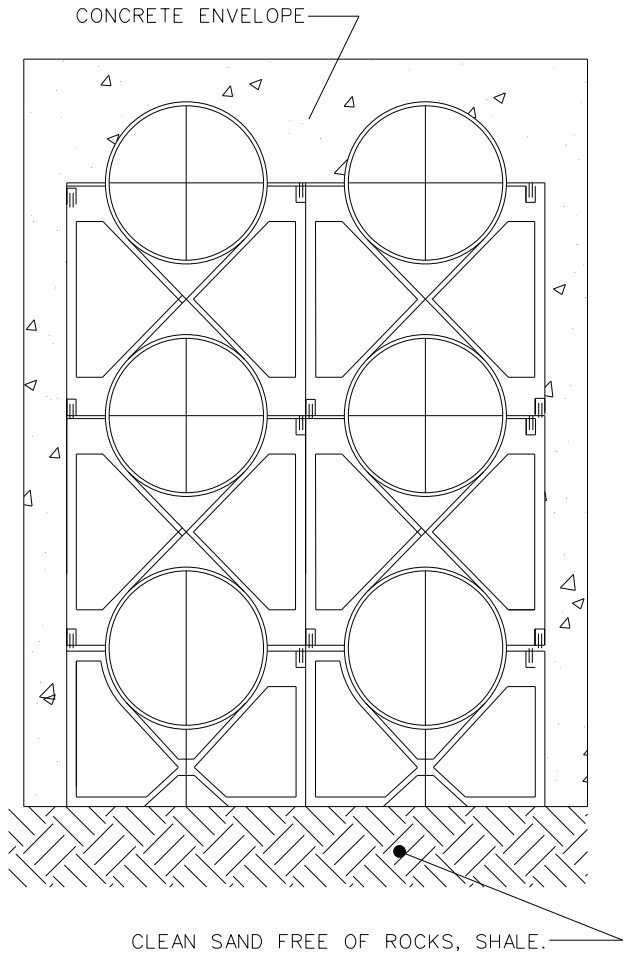
SNAP-LOC SPACERS ARE DESIGNED SPECIFICALLY FOR USE WITH NONMETALLIC DUCT.

THE SPACERS AND REBAR HOLDER ARE DESIGNED WITH A DOVETAIL TONGUE AND GROOVE FEATURE FOR EASY INSTALLATION.

IF REQUIRED TO PERMANENTLY FIX THE POSITION OF A GROUP OF SPACERS AND/OR REBAR HOLDER THE FOLLOWING ARE RECOMMENDED PROCEDURES.

1. USE QUICK-SET CEMENT GLUE DURING ASSEMBLY OR SPOT GLUE AFTER ASSEMBLY TO SECURE
2. DURING ASSEMBLY DEFORM THE EDGE OF THE TONGUE OR GROOVE PORTION OF THE DOVETAIL SLIDE WITH A PAIR OF PLIERS OR SIMILAR TOOL. THIS DEFORMATION WILL CREATE AN INTERFERENCE RESTRICTING MOVEMENT.
3. AN ASSEMBLED SYSTEM MAY BE WIRED TOGETHER FOR ADDITIONAL SUPORT.

TYPICAL SNAP-LOC NONMETALLIC SPACER INSTALLATION






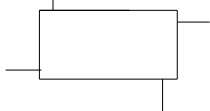

SUGGESTED SPECIFICATIONS

(DUCT) (CONDUIT) BANK SHALL BE ENCASED IN CONCRETE WITH A MINIMUM OF THREE INCHES OF CONCRETE AT THE TOP AND BOTTOM AND ON EACH SIDE. A HORIZONTAL AND VERTICAL SEPARATION BETWEEN THE DUCTS OF 2 INCHES SHALL BE MAINTAINED BY INSTALLING SPACERS WITH HORIZONTAL AND VERTICAL LOCKING INTERVALS OF 8 FEET.

0	2019-04-04	RFC
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BUILT-IN-PLACE CMU MANHOLES DETAILS
FOR 6'x12' 8'x12' (6'x12' SHOWN)

BUILT-IN-PLACE CMU MANHOLES DETAILS
FOR 6'x8' 6'x10' 8'x10' (6'x8' SHOWN)

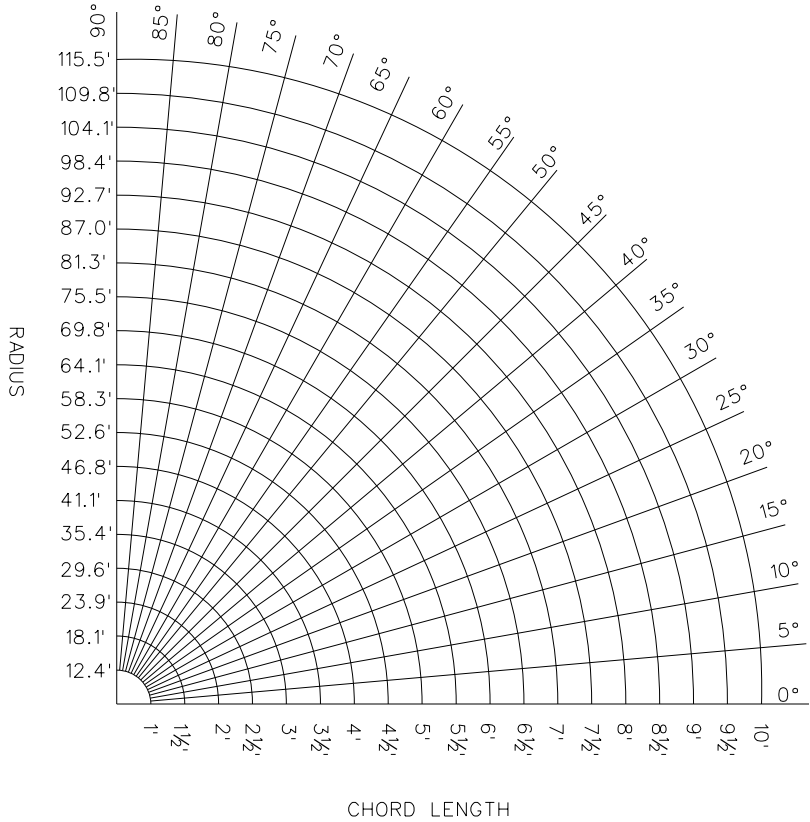
	No. OF DUCTS	No. LAT. DUCTS	4" DUCTS			5" DUCTS			HEAD ROOM	6" DUCTS				
			WIDTH	LENGTH	HEAD ROOM	WIDTH	LENGTH	WIDTH		LENGTH	HEAD ROOM			
Straight Through 	2		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	4		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	6		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	8		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	9		8'	10'	7'	8'	10'	10'	8'	10'	10'			
	12		8'	10'	7'	8'	10'	10'						
90 Deg. Corner 	2		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	4		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	6		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	8		6'	8'	7'	6'	8'	7'	6'	8'	7'			
	9		8'	10'	7'	8'	10'	10'	8'	12'	10'			
	12		8'	10'	7'	8'	10'	10'	Consult with UG Engineering					
3 Way * 	4	2	6'	12'	7'	6'	12'	7'	Consult with UG Engineering					
	6	2	6'	12'	7'	8'	12'	7'						
	6	4	6'	12'	7'	8'	12'	7'						
	9	4	6'	12'	10'	8'	12'	10'						
	9	6	6'	12'	10'	8'	12'	10'						
	12	6	Consult with Underground Engineering											
4 Way * 	4	4	6'	12'	7'	6'	12'	7'	Consult with UG Engineering					
	6	6	6'	12'	7'	8'	12'	10'						
	9	9	Consult with Underground Engineering											
	12	12	Consult with Underground Engineering											
Angled Corner 	4		6'	8'	7'	8'	10'	7'	Consult with UG Engineering					
	6		8'	10'	7'	8'	12'	7'						
	9		8'	10'	10'	8'	12'	10'						
	12		8'	12'	10'	8'	12'	10'						

All dimensions given are minimum.
These manhole sizes are based on a cable bending radius of 25" or less.
For other variations please contact Underground Engineering for assistance.
* All lateral ducts are to be at an elevation different from those of the main run.

SPECIAL NOTE:
For additional manhole information see Norwalk Concrete Industries Precast Products Book for details.

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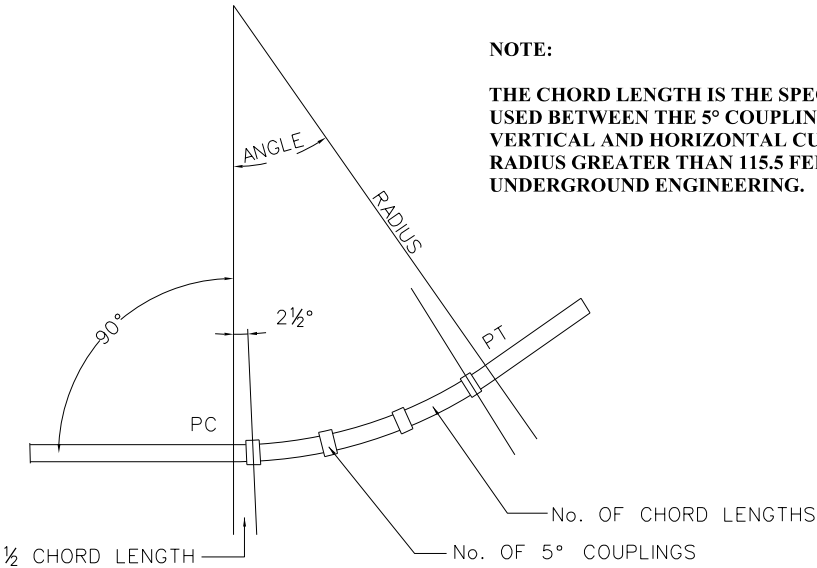
CONDUIT RADUIS CHART AND CHORD LENGTH DATA



ANGLE	5° COUPLINGS	No. OF CHORDS
10°	2	1
15°	3	2
20°	4	3
25°	5	4
30°	6	5
35°	7	6
40°	8	7
45°	9	8
50°	10	9
55°	11	10
60°	12	11
65°	13	12
70°	14	13
75°	15	14
80°	16	15
85°	17	16
90°	18	17

MIN. RADIUS	LENGTH OF CHORD
12.4'	1'
18.1'	1½'
23.9'	2'
29.6'	2½'
35.4'	3'
41.1'	3½'
46.8'	4'
52.6'	4½'
58.3'	5'
64.1'	5½'
69.8'	6'
75.5'	6½'
81.3'	7'
87.0'	7½'
95.7'	8'
98.4'	8½'
104.1'	9'
109.8'	9½'
115.5'	10'

TYPICAL CURVE CONSTURCTION USING 5° COUPLINGS

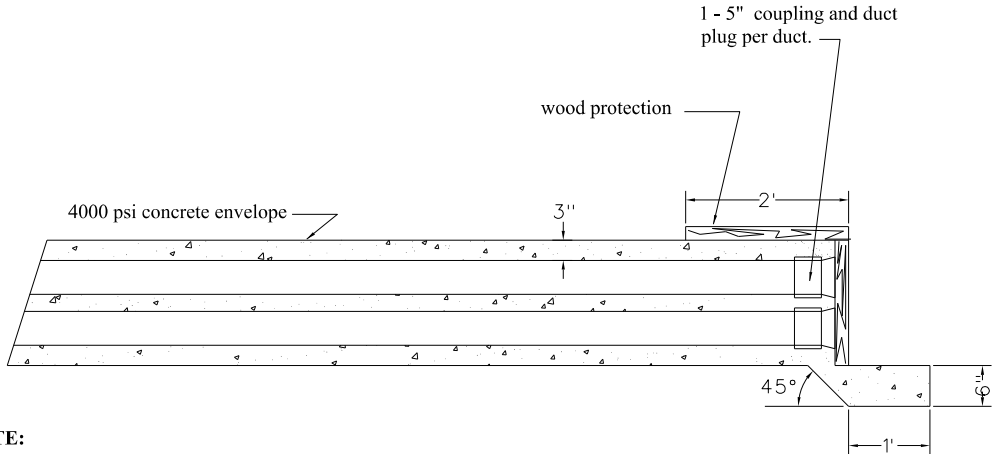


CONDUIT LENGTH	APPROX. OFFSET
1'	0'-1"
5'	0'-5"
10'	0'-10"
15'	1'-4"
20'	1'-9"

NOTE: OFFSET = APPROX. 1" PER CONDUIT FOOT

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

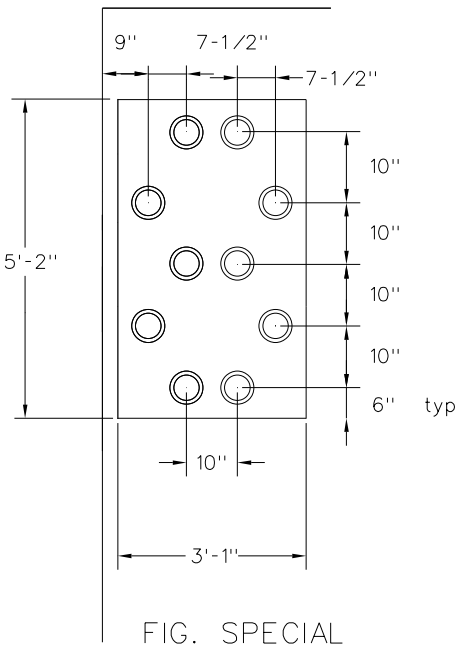
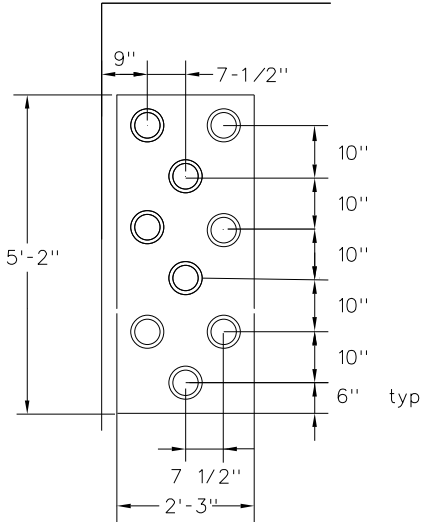
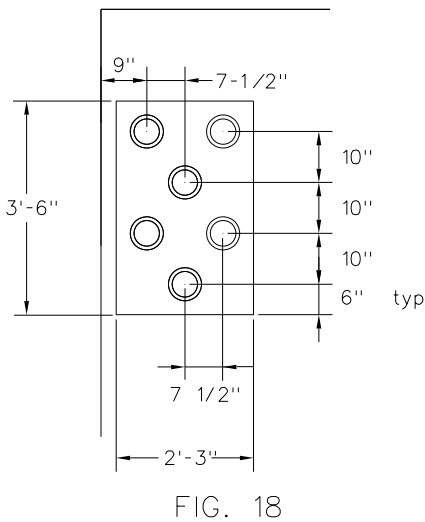
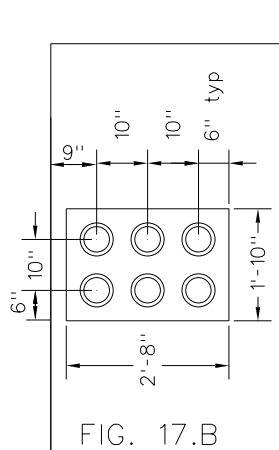
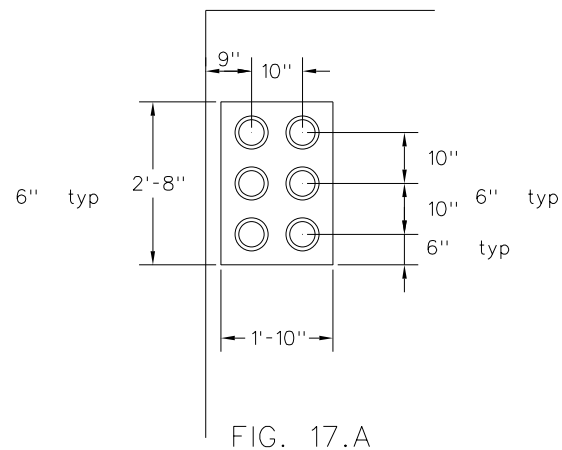
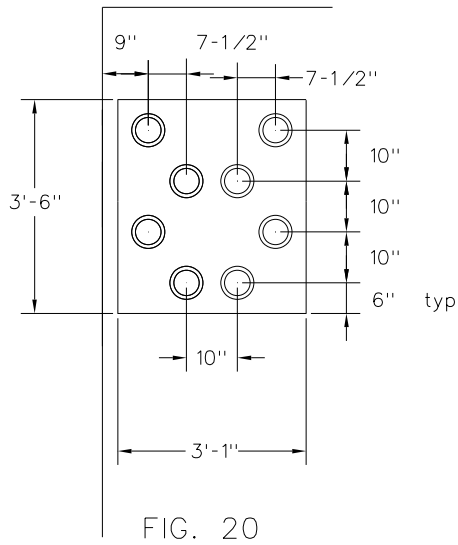
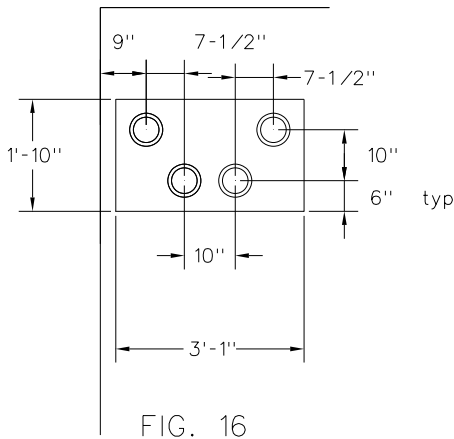
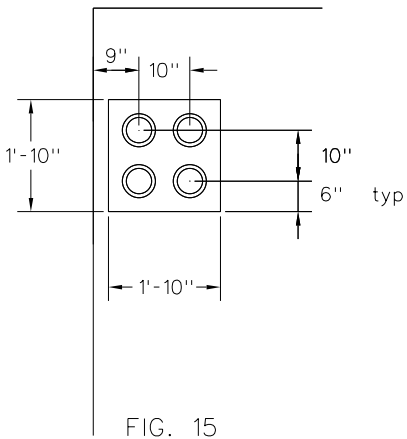
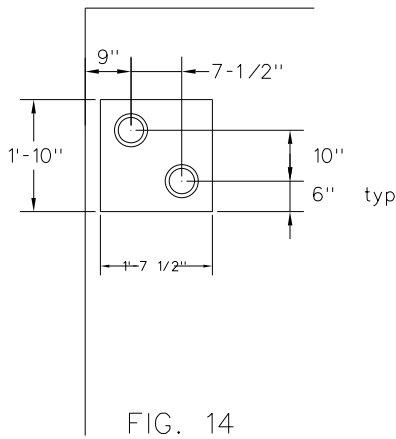
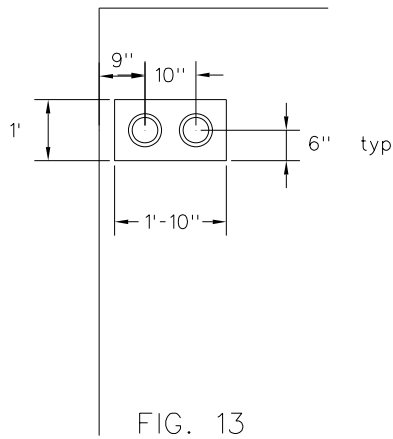
TYPICAL DETAIL FOR
STUBBING CONDUITS



NOTE:

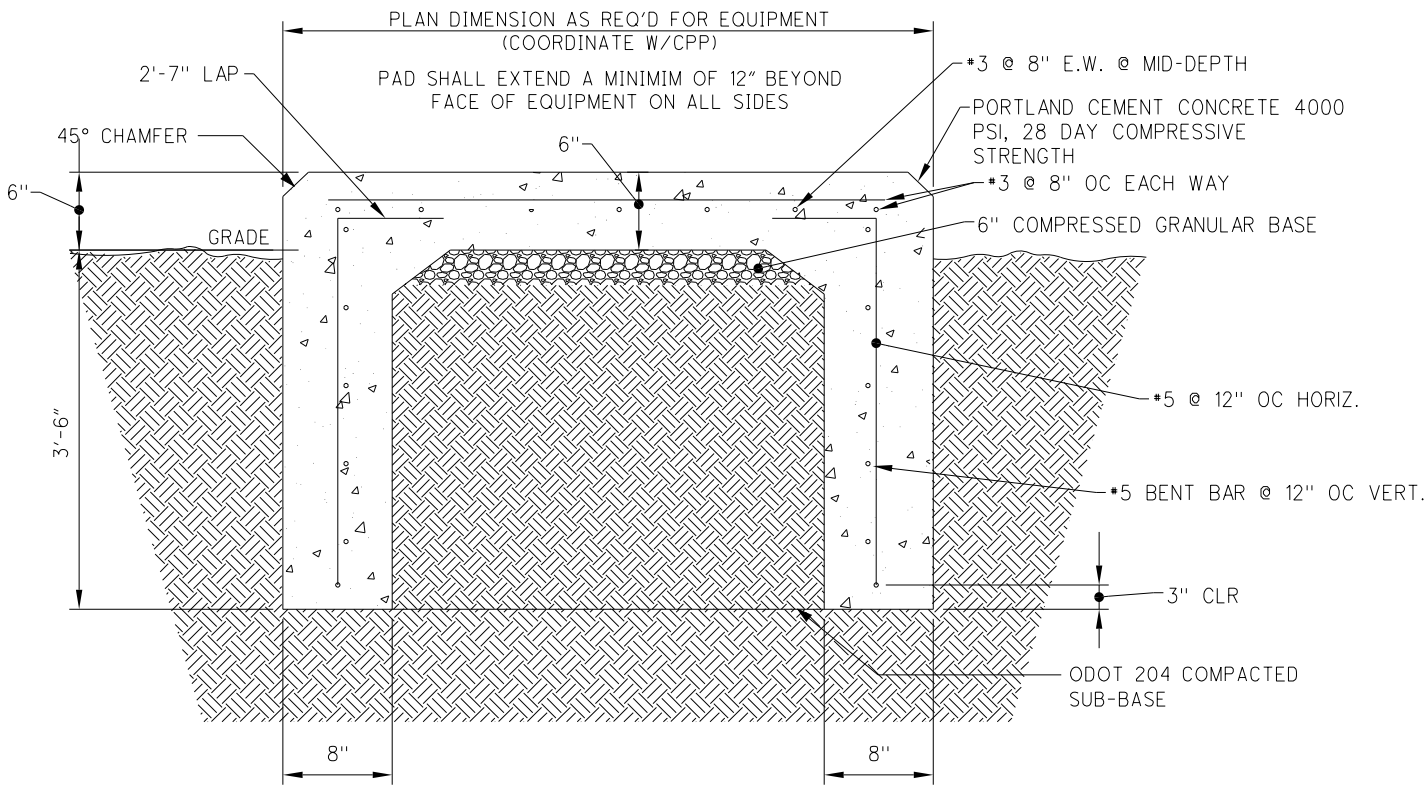
THIS TYPICAL DETAIL SHOULD BE USED IN THE INSTALLATION OF ALL
2", 4", 5", AND 6" DUCTS.

FOR THE HEIGHT AND WIDTH OF THE DUCT BANK SEE THE PLAN SHEETS
OF THE PROJECT.



- 1) All bell end formations are shown facing an inside wall.
- 2) The top row of bell ends shall be at a minimum of 24" below the ceiling line unless noted.
- 3) Bell ends shall not be installed by the precast manhole manufacturer. Should this be an option, please consult with Underground Engineering for details.
- 4) Formations are designed to be used in a standard 6' x 8' x 7' headroom manhole unless noted.

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



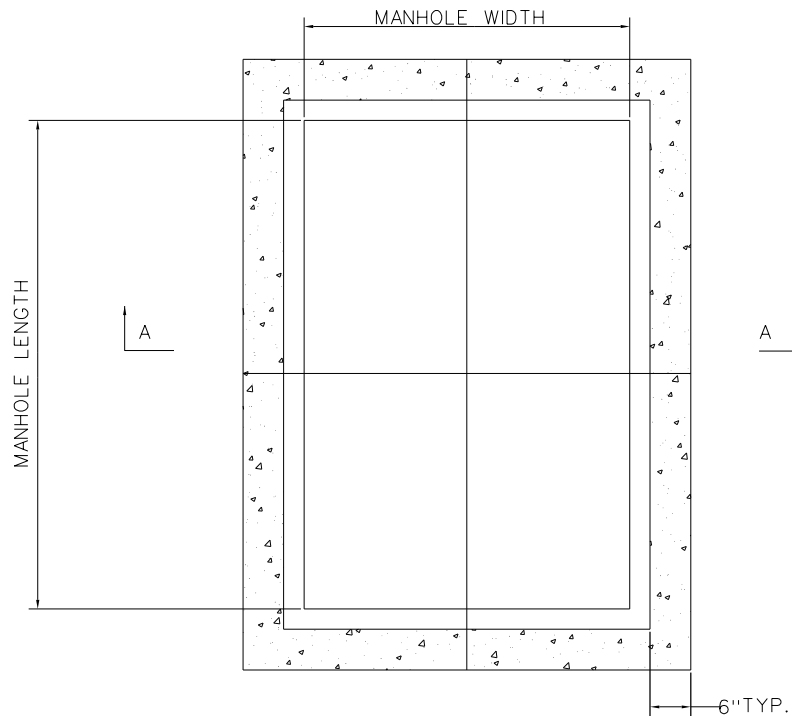
- GENERAL DETAIL NOTES:
- A. COORDINATE THE REQUIRED OPENING(S) IN THE EQUIPMENT BASE WITH THE EQUIPMENT BEING PROVIDED. TO BE APPROVED BY CPP ENGINEERING ON A CASE-BY-CASE BASIS.
 - B. SECTION INDICATES CONSTRUCTION OF FOOTING. THE FOOTING IS TO BE CONSTRUCTED ON ALL SIDES OF THE PAD

DETAIL-PADMOUNT TRANSFORMER CONCRETE BASE

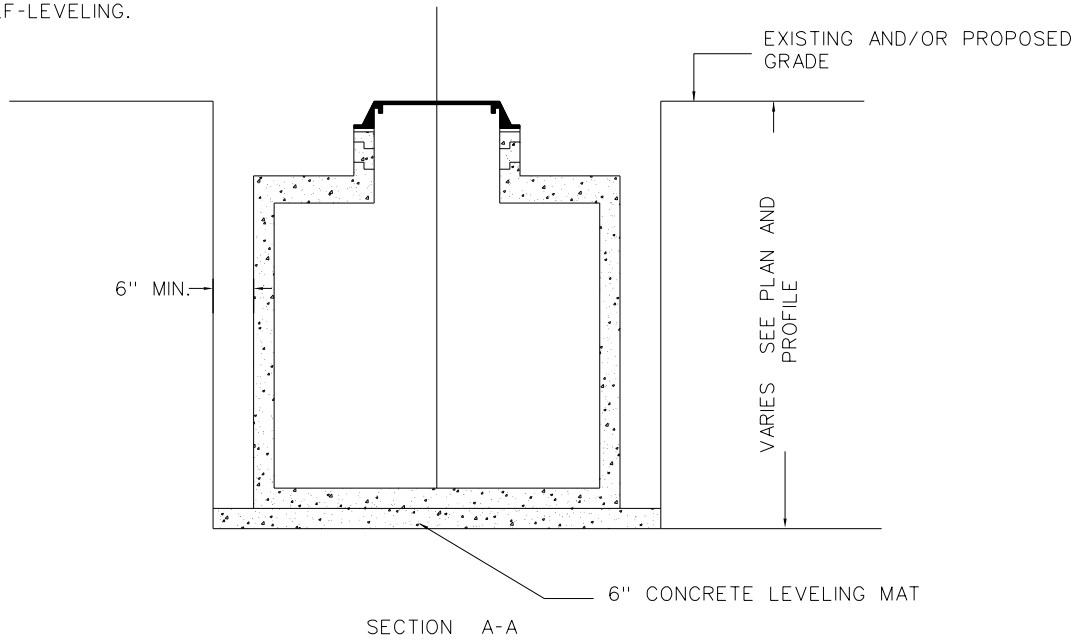
SCALE: NTS

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

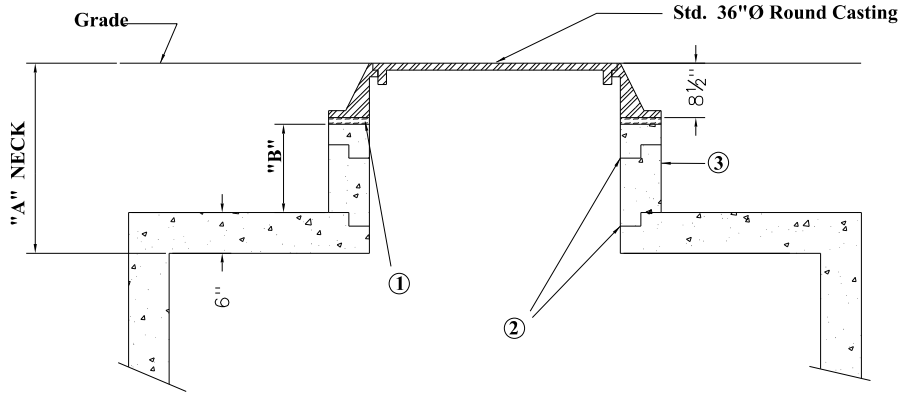
TYPICAL MANHOLE INSTALLATION DETAILS



NOTE: USE 4000 PSI CONCRETE. ADD SUFFICIENT AMOUNT OF WATER; MIX TO BE FLOWABLE AND SELF-LEVELING.



PRECAST NECK RING SCHEDULE



NOTES:

- 1 Bricks or blocks to be flush with inside face of neck rings.
- 2 Place sealant in all neck ring joints before assembly.
- 3 Apply 1/2" thick layer of waterproof mortar to outside surface of neck. Waterproofing additive to be added to mortar per manufacturer's recommendation.

"A" NECK	"B" NECK RING HEIGHT	PREFERRED RING COMBINATION
MINIMUM 2' - 6" *	15"	1 - 3" CAP RING 1 - 12" NECK RING
3' - 0"	21"	1 - 3" CAP RING 2 - 9" NECK RINGS
4' - 0"	33"	1 - 3" CAP RING 1 - 6" NECK RING 2 - 12" NECK RINGS

NOTE:

For intermediate neck heights, please consult with Underground Engineering.

CPP standard round cover and casting --- East Jordan Iron Works No. 1585.

* CPP minimum standard neck.

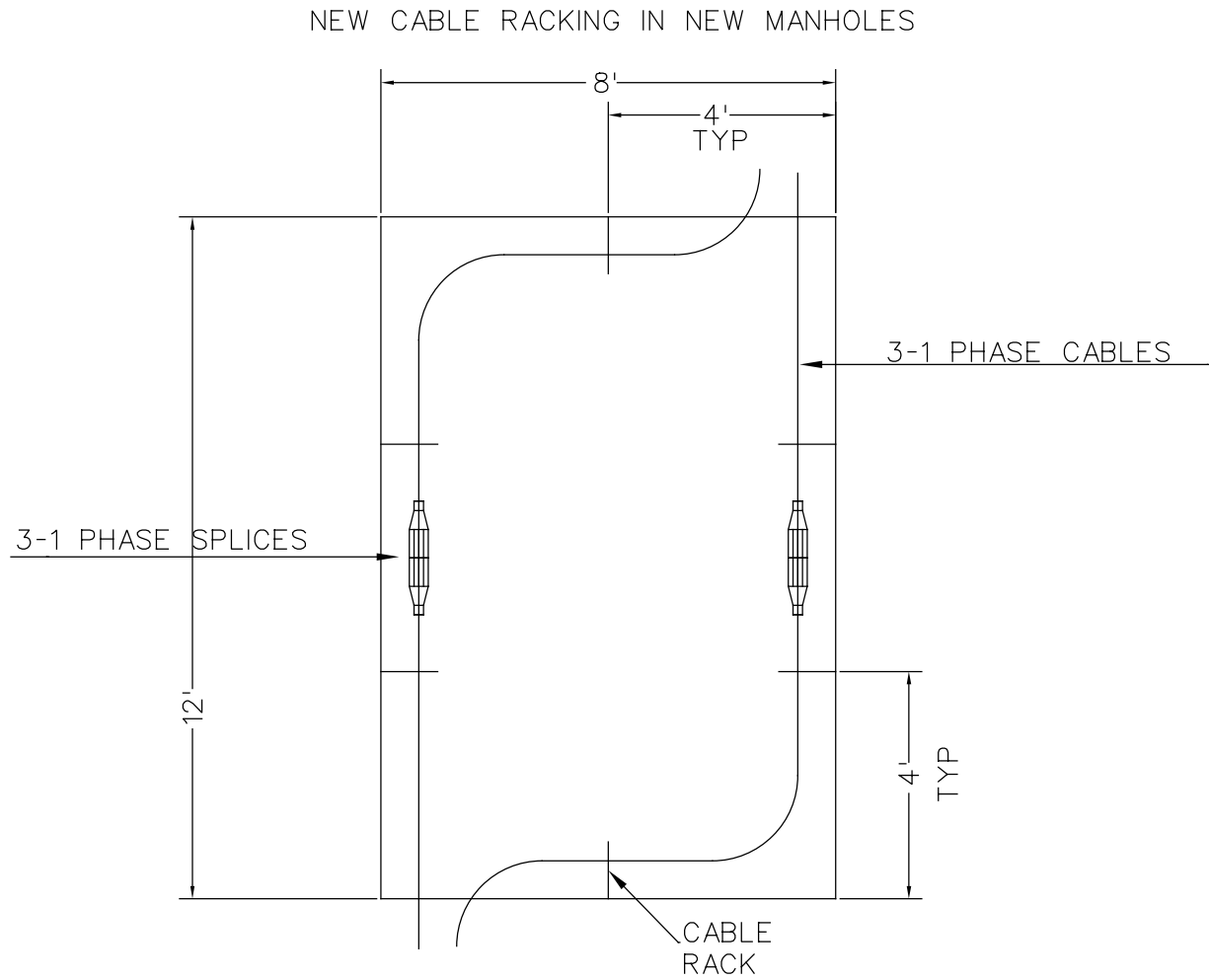
REVISED NECK RING SCHEDULE 7-22-11

RING SIZE (EFFECTIVE HEIGHT)	WEIGHT	NORWALK CONCRETE CATALOG NO.
3"	265#	R-3-37-C
6"	425#	R-6-37-N
9"	635#	R-9-37-N
12"	845#	R-12-37-N

NOTE:

The use of cap rings and neck rings by other manufacturers must be equivalent to those of Norwalk Concrete Industries. See above for Norwalk cataloge numbers.

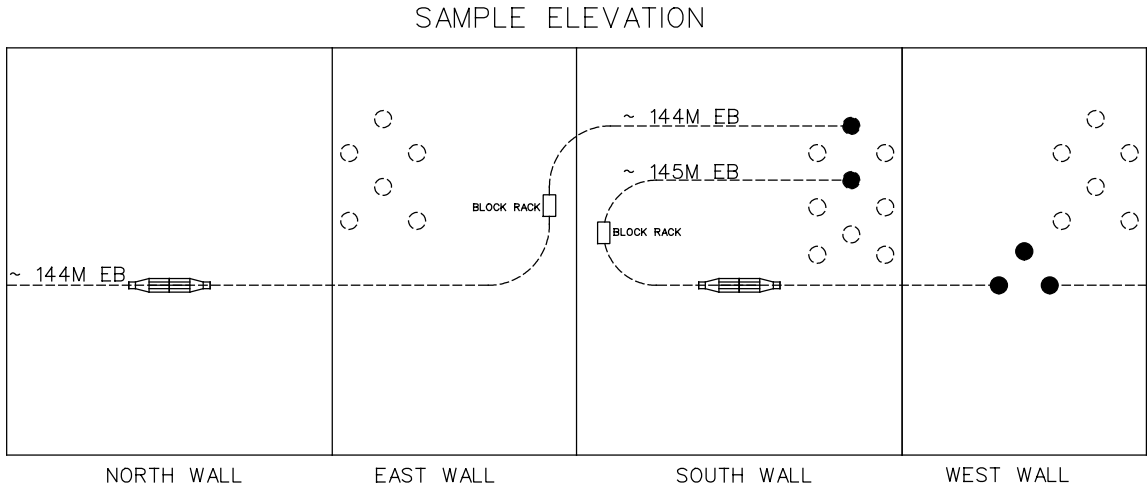
0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



TYPICAL DETAIL OF CABLE RACKING IN NEW MANHOLES (LOOKING DOWN INTO MANHOLE). ALL MEASUREMENTS FROM INSIDE WALLS.

RACKS ARE FASTENED ON WALLS AT 6" FROM CEILING AND 6" ABOVE FLOOR.

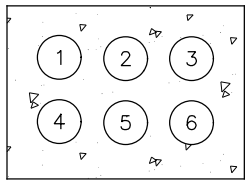
NEW CABLE RACKING IN NEW MANHOLES



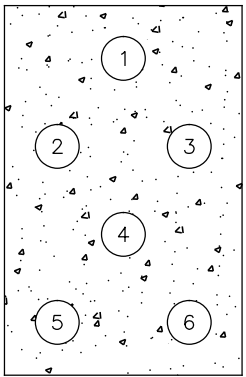
SAMPLE MATERIAL LIST

- 6-750KCMIL-1C-CU-15KV STRAIGHT SPLICES
- 2-8" OFFSET BLOCK RACKS
- 6-6' CABLE RACKS AND ASSOCIATED ARMS

3 OVER 3
TYPICAL CONDUIT
NUMBERING DETAIL

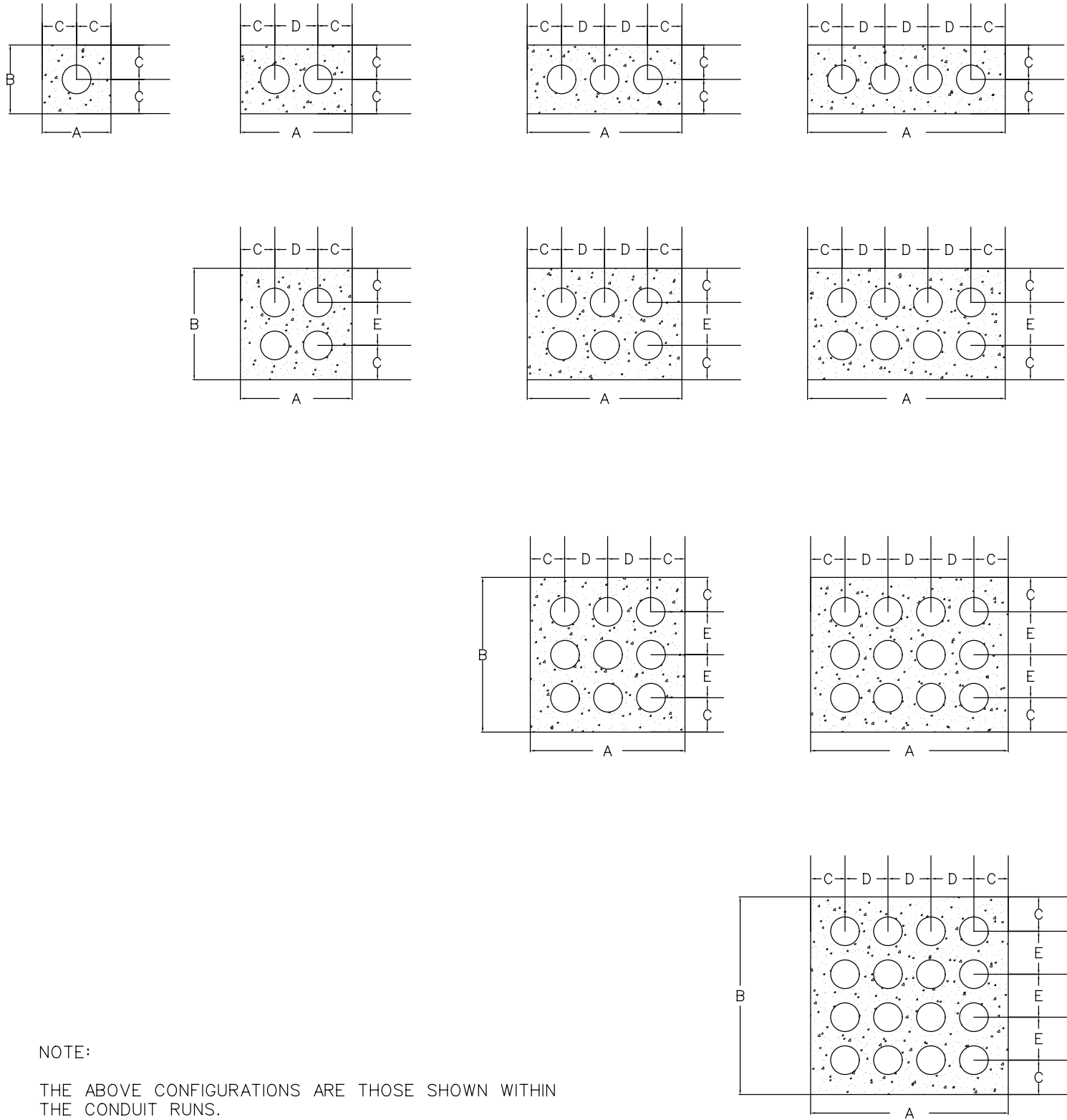


DUCT
CONFIGURATION



VAULT
CONFIGURATION

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		



NOTE:

THE ABOVE CONFIGURATIONS ARE THOSE SHOWN WITHIN THE CONDUIT RUNS.

DIMENSIONS ARE BASED ON THE USE OF CARLON SNAP-LOC INTERMEDIATE AND BASE SPACERS.

SEE MANHOLE DETAILS FOR CONDUIT CONFIGURATION AT MANHOLE WALLS

NO REINFORCEMENT RODS ARE TO BE USED WITHIN THE CONDUIT FORMATIONS

TYPE W x H	4" PVC CONDUITS				
	A	B	C	D	E
1 x 1	10"	10"	5"	-	-
2 x 1	16.75"	10"	5"	6.75"	-
3 x 1	23.5	10"	5"	6.75"	-
4 x 1	30.25"	10"	5"	6.75"	-
2 x 2	16.75"	16.51"	5"	6.75"	6.51"
3 x 2	23.5	16.51"	5"	6.75"	6.51"
4 x 2	30.25"	16.51"	5"	6.75"	6.51"
3 x 3	23.5	23"	5"	6.75"	6.51"
4 x 3	30.25"	23"	5"	6.75"	6.51"
4 x 4	30.25"	29.5"	5"	6.75"	6.51"

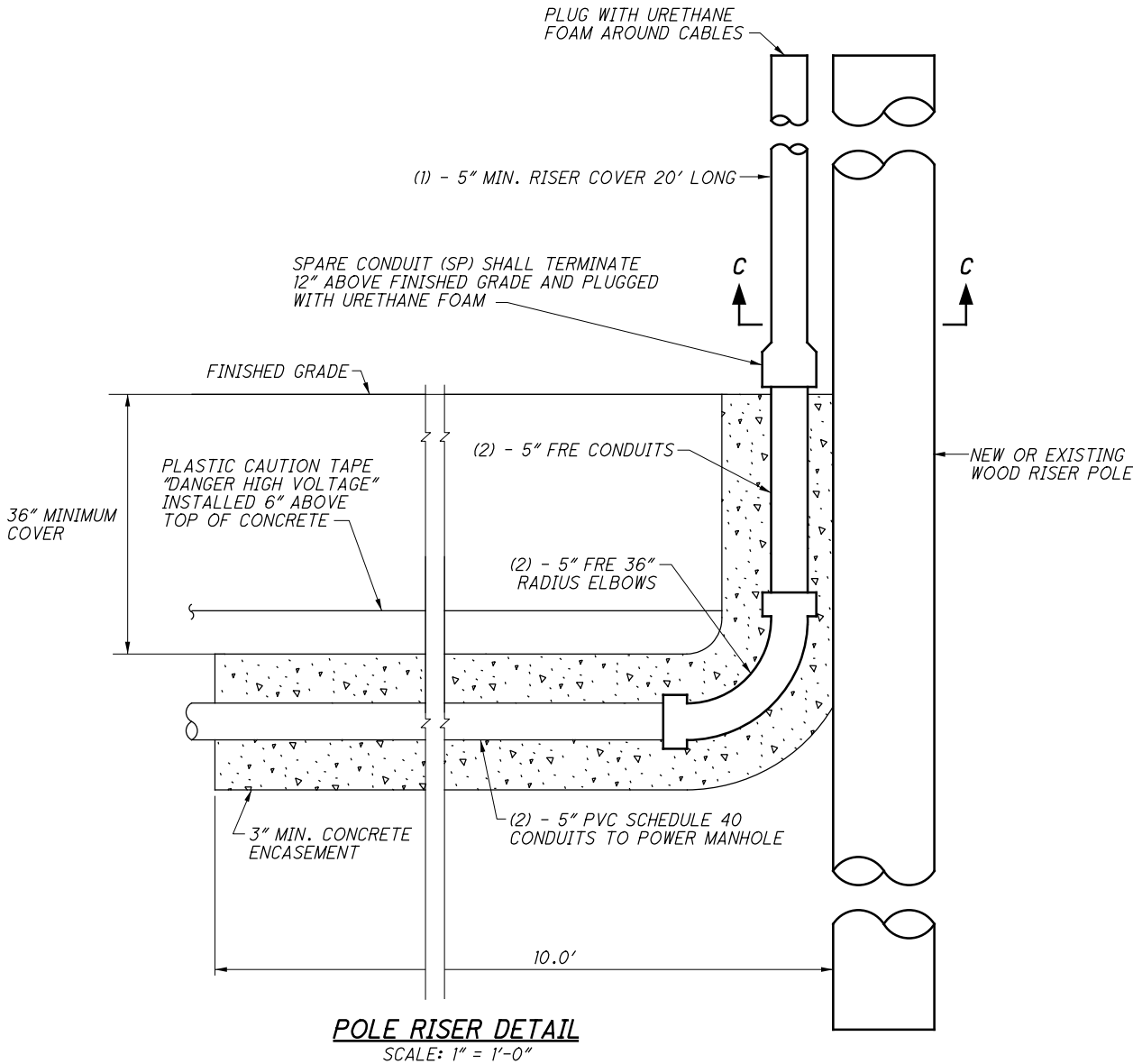
TYPE W x H	5" PVC CONDUITS				
	A	B	C	D	E
1 x 1	12"	12"	6"	-	-
2 x 1	19.81"	12"	6"	7.81"	-
3 x 1	27.62"	12"	6"	7.81"	-
4 x 1	35.43"	12"	6"	7.81"	-
2 x 2	19.81"	19.57"	6"	7.81"	7.57"
3 x 2	27.62"	19.57"	6"	7.81"	7.57"
4 x 2	35.43"	19.57"	6"	7.81"	7.57"
3 x 3	27.62"	27.14"	6"	7.81"	7.57"
4 x 3	35.43"	27.14"	6"	7.81"	7.57"
4 x 4	35.43"	34.71"	6"	7.81"	7.57"

TYPE W x H	6" PVC CONDUITS				
	A	B	C	D	E
1 x 1	13"	13"	6.5"	-	-
2 x 1	21.88"	13"	6.5"	8.88"	-
3 x 1	30.76"	13"	6.5"	8.88"	-
4 x 1	38.5"	13"	6.5"	8.88"	-
2 x 2	21.88"	21.64"	6.5"	8.88"	8.64"
3 x 2	30.76"	21.64"	6.5"	8.88"	8.64"
4 x 2	39.64"	21.64"	6.5"	8.88"	8.64"
3 x 3	30.76"	30.28"	6.5"	8.88"	8.64"
4 x 3	39.64"	30.28"	6.5"	8.88"	8.64"
4 x 4	39.64"	38.92"	6.5"	8.88"	8.64"

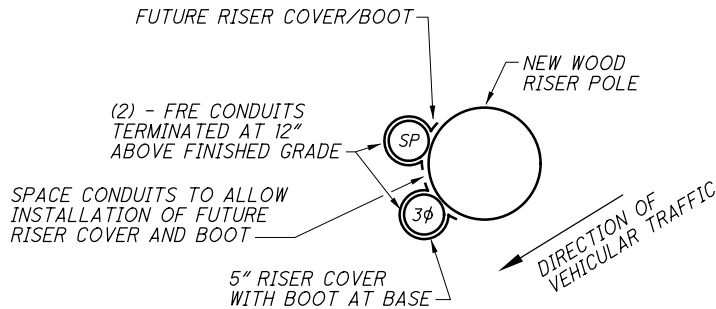
0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

LEGEND:

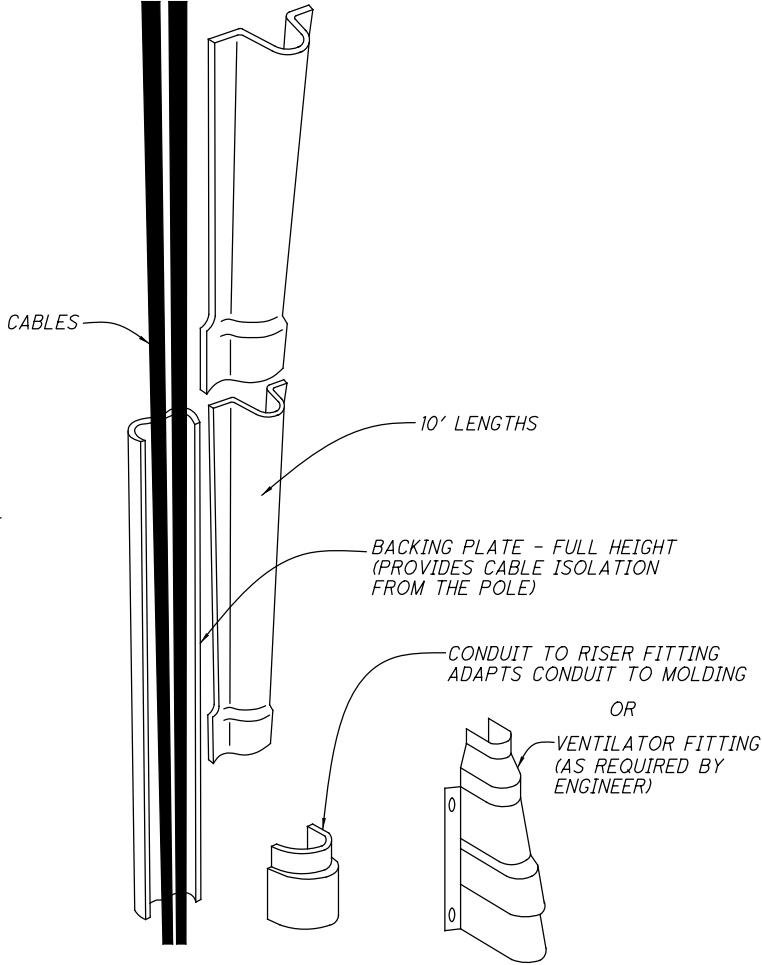
FRE - FIBERGLASS REINFORCED EPOXY CONDUIT
SP - SPARE



NOTES:
SEE RISER COVER DETAIL FOR
ADDITIONAL INFORMATION.



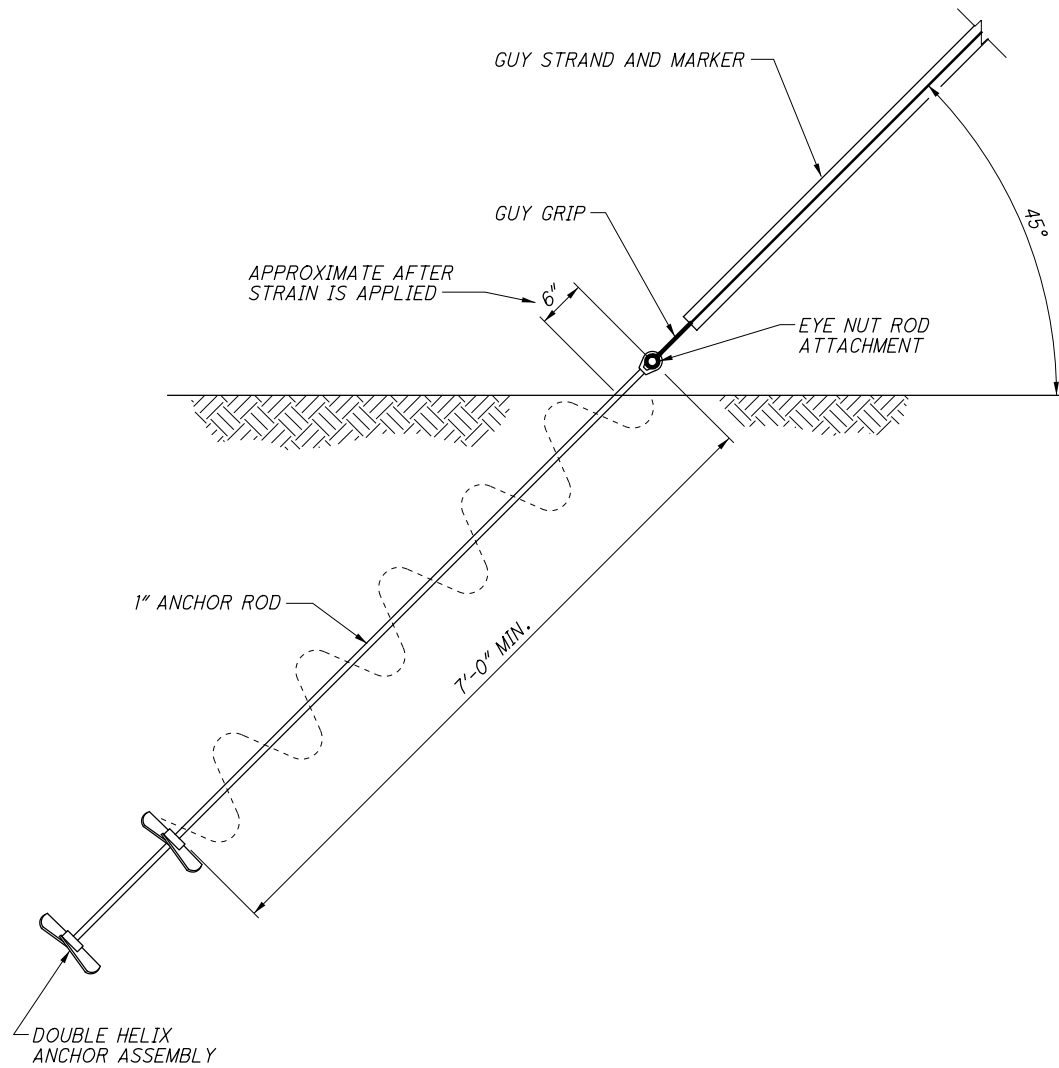
SECTION C-C
SCALE: 1" = 1'-0"



- NOTES:
1. INSTALL VENTILATOR OR CONDUIT TO RISER FITTINGS AT THE BASE OF THE POLE.
 2. NAIL BACKING PLATE SECTIONS TO THE SURFACE OF THE POLE. THREE NAIL HOLES PROVIDED IN EACH SECTION. PLACE THE "U" SECTIONS OVER THE CABLE AND BALL PLATE, WITH BELLED END AT THE BOTTOM, AND ATTACH USING 1/4" LAG BOLTS, GALVANIZED PER CMS 711.02
 3. PRIME PV-MOLD SCHEDULE 40 POLE RISER SYSTEM OR EQUAL.
 4. SIZE AS REQUIRED BY CONDUCTORS OR CONDUITS.
 5. REFER TO POLE RISER DETAIL FOR ADDITIONAL INFORMATION.

RISER COVER DETAIL

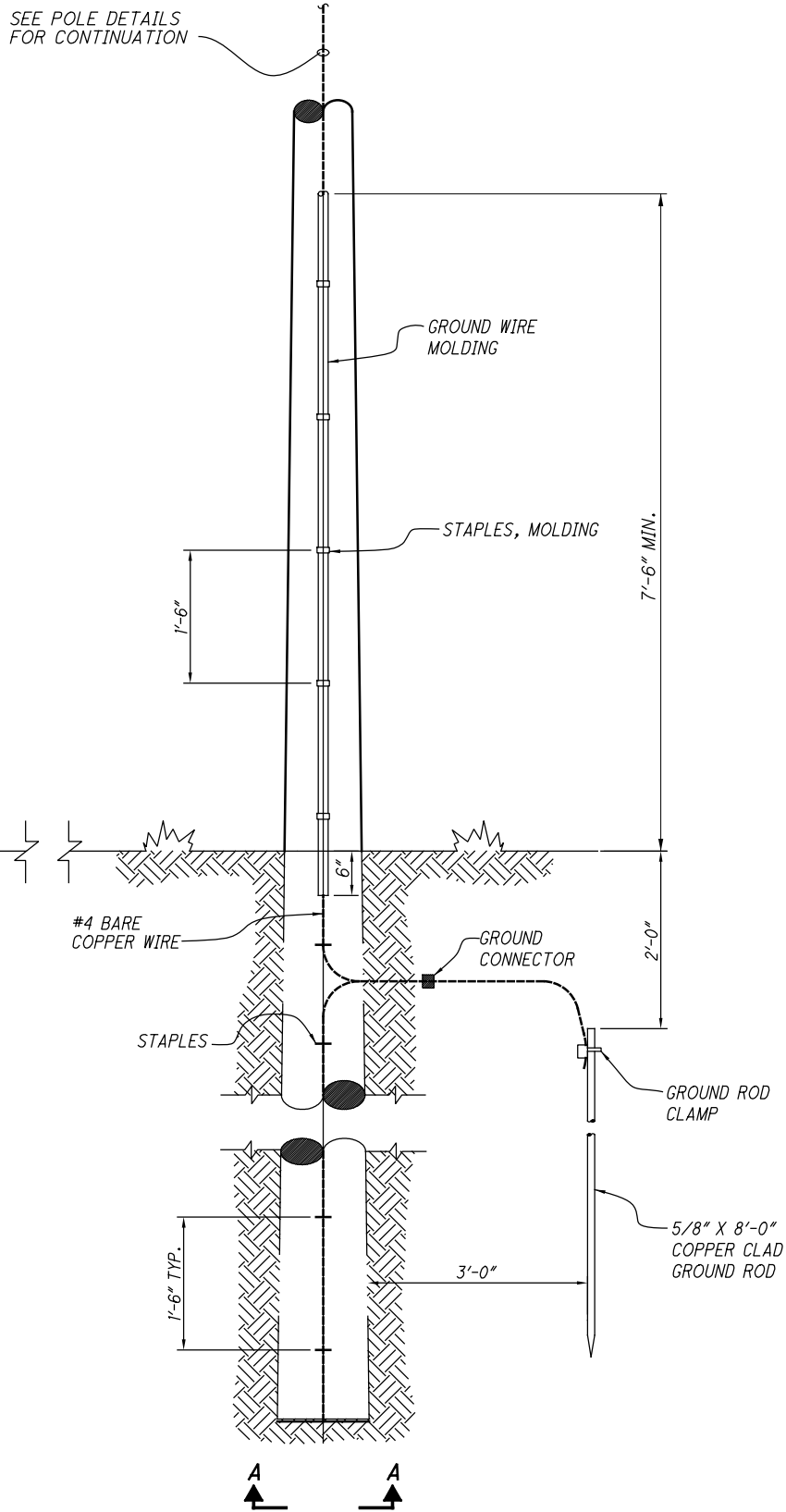
NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		



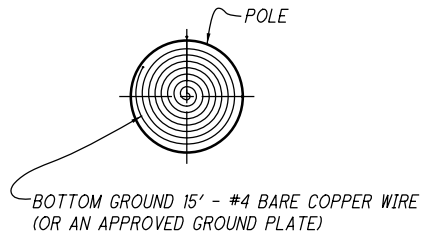
TYPICAL GUY ANCHOR DETAIL

NOTE:

REFER TO CPP POLE DETAIL.



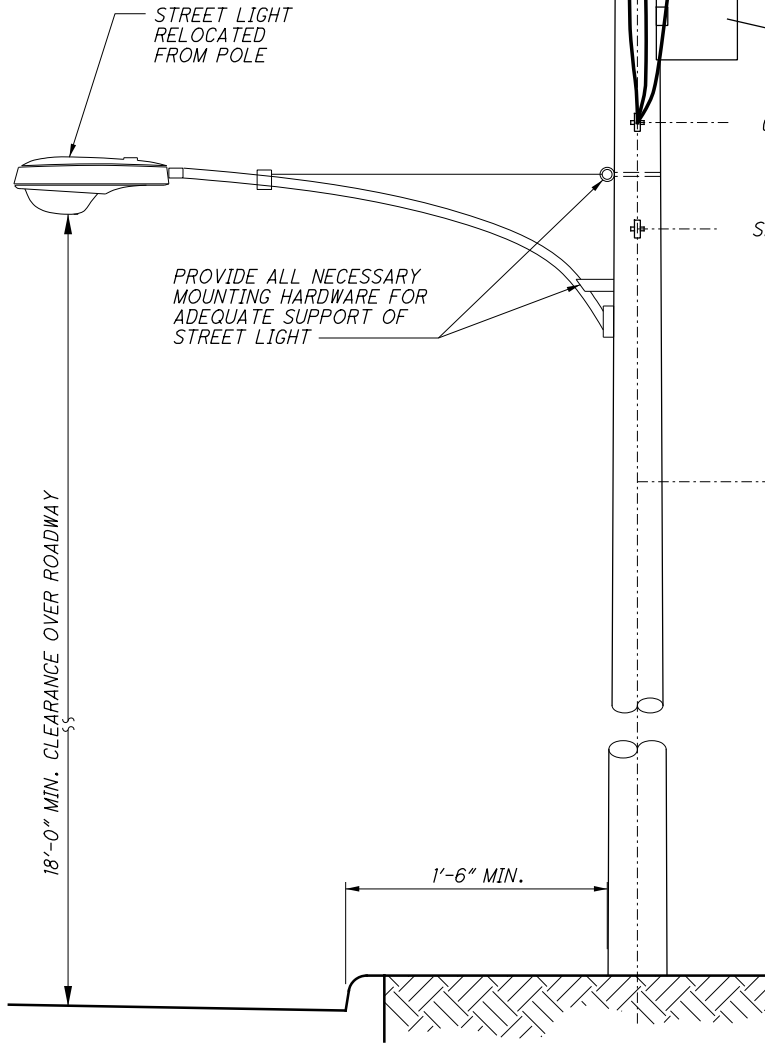
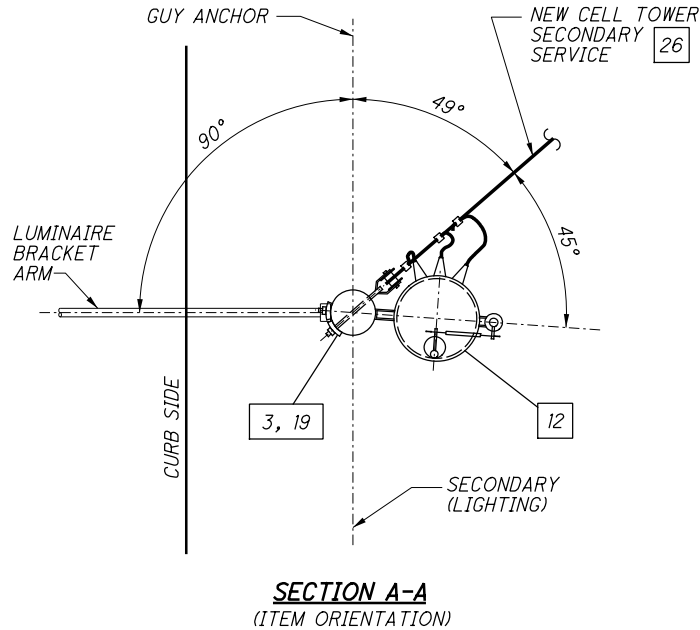
POLE GROUNDING DETAIL
(TYPICAL ALL POLES)



SECTION A-A

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

ITEM	MATERIAL
1	BOLT, MACHINE 5/8" x REQUIRED LENGTH
2	WASHER, 2 1/4" SQUARE
3	WASHER, 3" SQUARE, CURVED
4	BOLT, CARRIAGE, 1/2" x 4 1/2"
5	SCREW, LAG, 1/2" x 4" FETTER DRIVE AND POINT
6	CONNECTORS, GROUNDING NO. 4 AWG COPPER
7	EYE NUT 5/8", OVAL EYE
8	GUY HOOK
9	GUY STRAND
10	LIGHTNING ARRESTER, RELOCATED FROM POLE
11	CUTOUT, FUSE, OPEN LINK, RELOC. FROM POLE
12	TRANSFORMER, RELOCATED FROM POLE
13	CLAMP, DEAD END
14	JUMPERS, STRANDED, AS REQUIRED, NO. 4 AWG COPPER
15	GROUNDING JUMPER, NO. 4 AWG COPPER
16	BOLT DOUBLE ARMING, 5/8" x REQUIRED LENGTH
17	EXISTING PRIMARY CONDUCTORS
18	BRACE, WOOD, 26"
19	LOCKNUTS, SIZE AS REQUIRED
20	3 1/2" x 4 1/2" x 8' WOOD CROSSARM
21	INSULATOR SUSPENSION TYPE, DEADEND
22	EYE BOLT 5/8" x REQUIRED LENGTH
23	CLEVIS, SECONDARY, SWINGING, INSULATED
24	SPLICING SLEEVE
25	COMPRESSION SLEEVE CONNECTORS
26	#26 AWG. ALUMINUM AERIAL TRIPLEX CABLE ACSR
27	GUY STRAIN INSULATOR 36"
28	WASHER 5/8" ROUND FLAT
29	EXISTING SECONDARY (LIGHTING) CONDUCTORS
30	MACHINE BOLT 7/8" x REQUIRED LENGTH
31	LOCK WASHER 7/8"
32	WASHER SQ. CURVED 3 1/2" x 3/8" x 15/16" HOLE
33	WASHER 1/2" ROUND FLAT
34	GRID GAIN
35	GUY GRIP

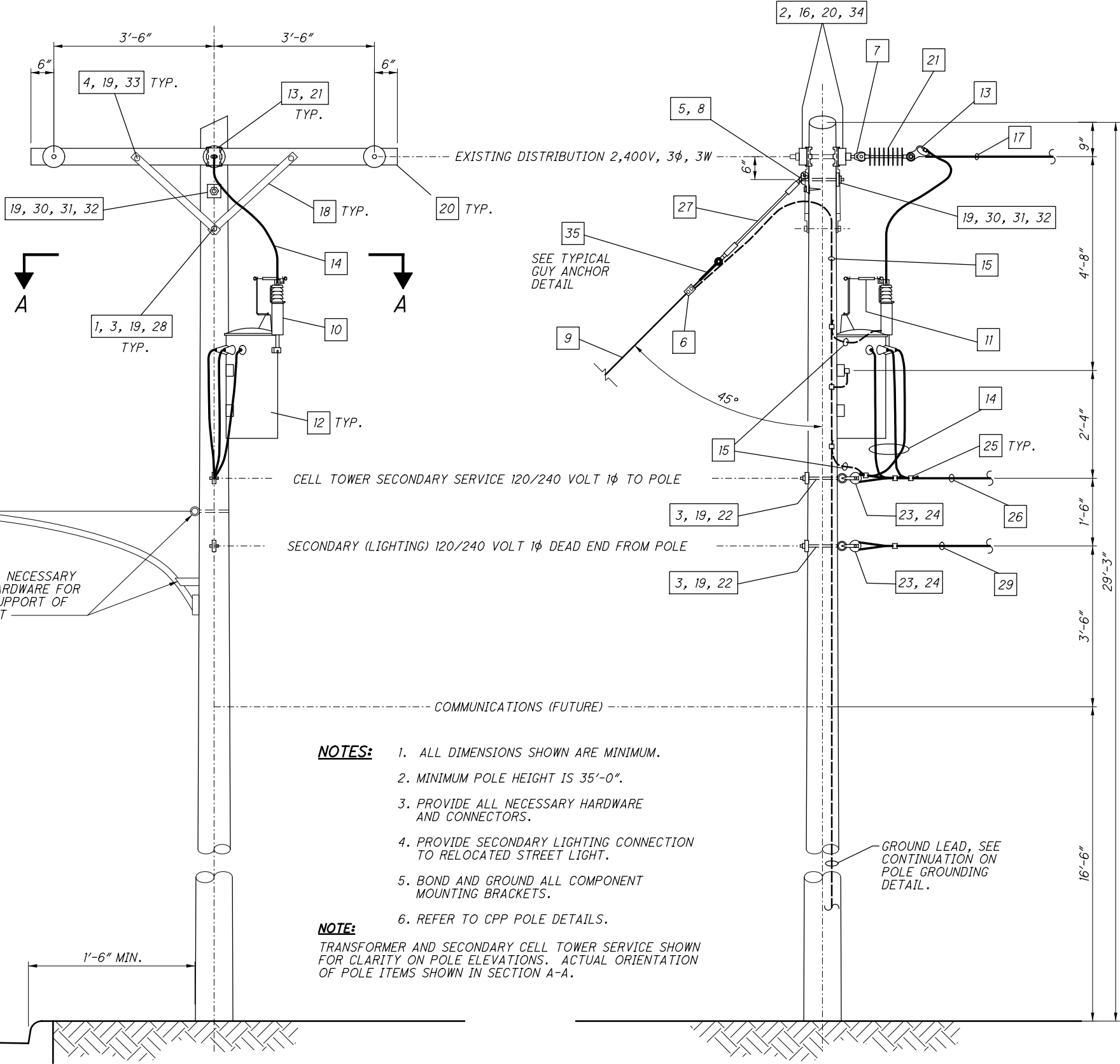


FRONT ELEVATION

- NOTES:**
1. ALL DIMENSIONS SHOWN ARE MINIMUM.
 2. MINIMUM POLE HEIGHT IS 35'-0".
 3. PROVIDE ALL NECESSARY HARDWARE AND CONNECTORS.
 4. PROVIDE SECONDARY LIGHTING CONNECTION TO RELOCATED STREET LIGHT.
 5. BOND AND GROUND ALL COMPONENT MOUNTING BRACKETS.
 6. REFER TO CPP POLE DETAILS.

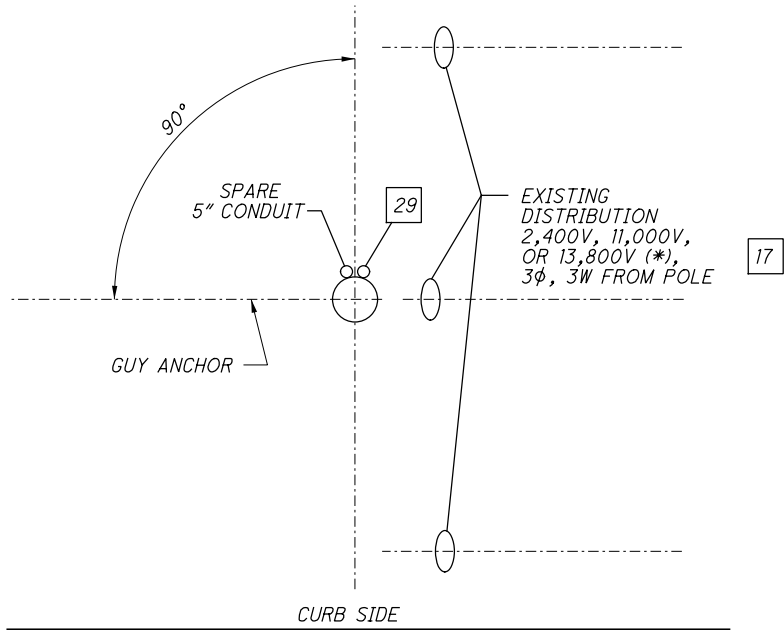
NOTE:
TRANSFORMER AND SECONDARY CELL TOWER SERVICE SHOWN FOR CLARITY ON POLE ELEVATIONS. ACTUAL ORIENTATION OF POLE ITEMS SHOWN IN SECTION A-A.

EXAMPLE CPP POLE DETAIL



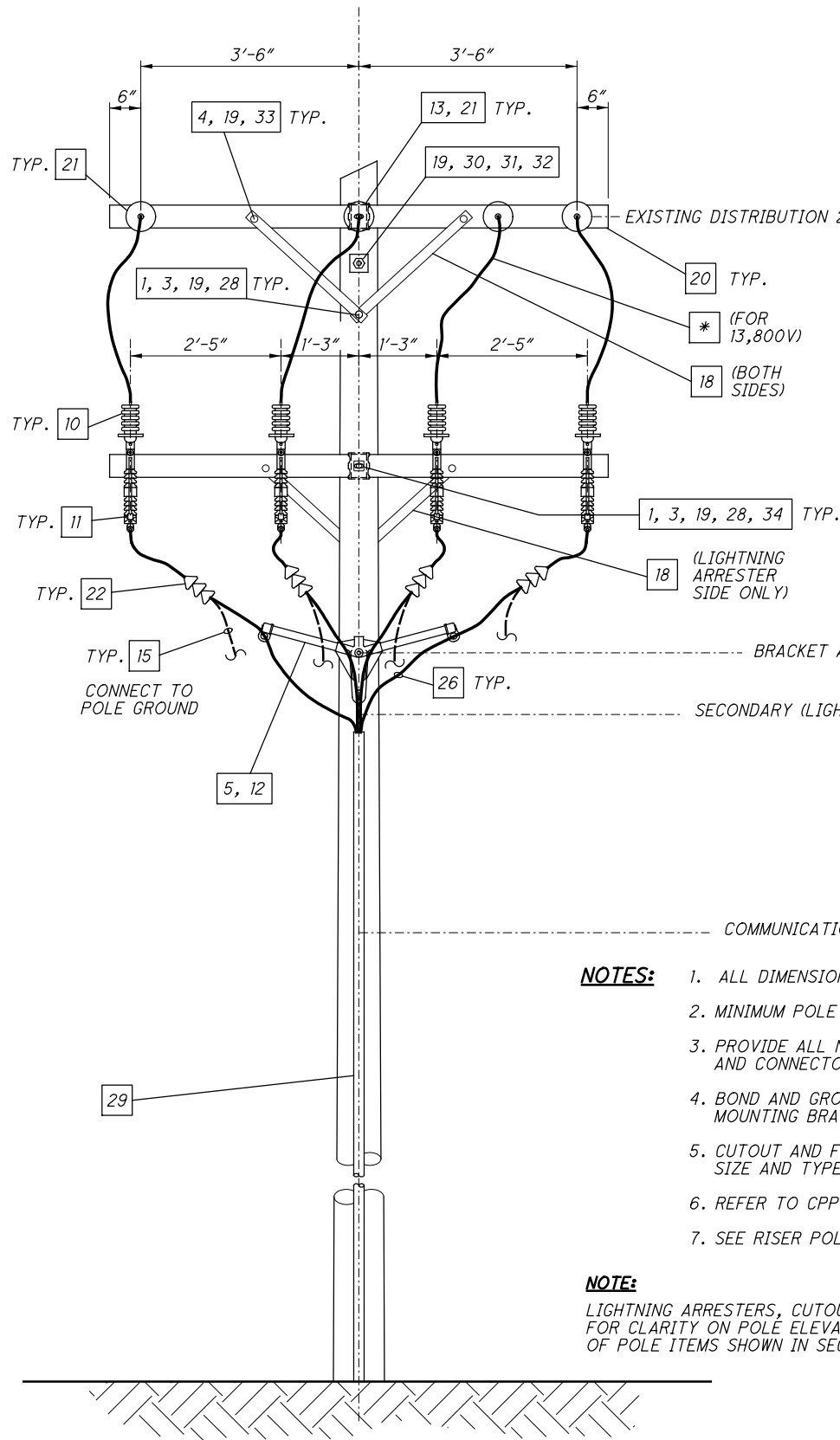
SIDE ELEVATION

NO.	DATE	DESCRIPTION
0	2018-04-04	RFC
ISSUE RECORD		

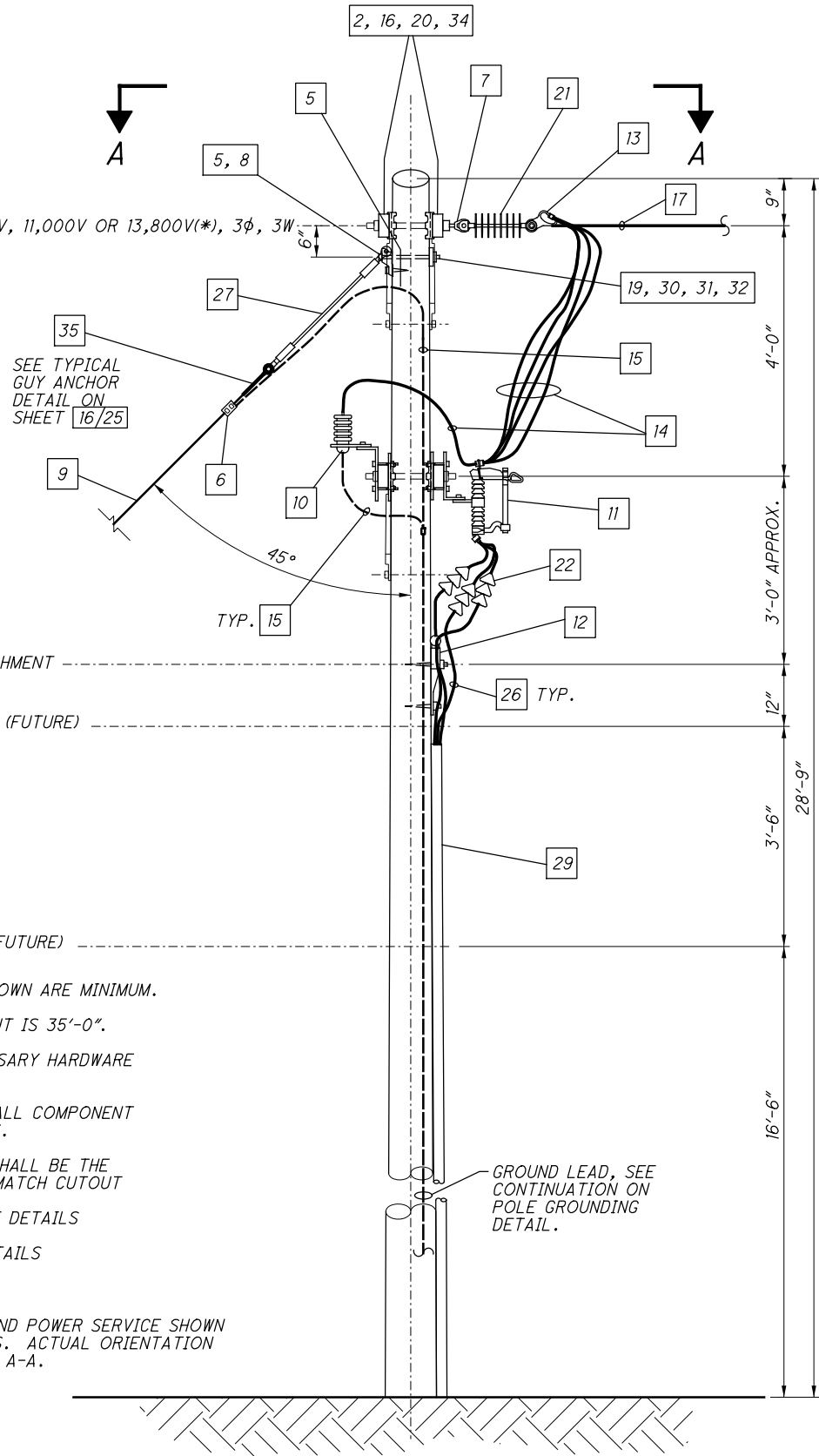


SECTION A-A
(ITEM ORIENTATION)
(LIGHTNING ARRESTERS, CUTOUPS AND
WOOD CROSSARMS NOT SHOWN FOR CLARITY)

ITEM	MATERIAL
1	BOLT, MACHINE 5/8" x REQUIRED LENGTH
2	WASHER, 2 1/4" SQUARE
3	WASHER, 3" SQUARE, CURVED
4	BOLT, CARRIAGE, 1/2" x 4 1/2"
5	SCREW, LAG, 1/2" x 4" FETTER DRIVE AND POINT
6	CONNECTORS, GROUNDING NO. 4 AWG COPPER
7	EYE NUT 5/8", OVAL EYE
8	GUY HOOK
9	GUY STRAND
10	LIGHTNING ARRESTER
11	CUTOUT, LOAD BREAK TYPE WITH FUSE (SEE NOTE 5)
12	CABLE SUPPORT ASSEMBLY
13	CLAMP, DEAD END
14	JUMPERS, STRANDED, AS REQUIRED, NO. 4 AWG COPPER
15	GROUNDING JUMPER, NO. 4 AWG COPPER
16	BOLT DOUBLE ARMING, 5/8" x REQUIRED LENGTH
17	EXISTING PRIMARY CONDUCTORS
18	BRACE, WOOD, 26"
19	LOCKNUTS, SIZE AS REQUIRED
20	3 1/2" x 4 1/2" x 8' WOOD CROSSARM
21	INSULATOR SUSPENSION TYPE, DEADEND
22	CABLE TERMINATOR
23	NOT USED
24	NOT USED
25	NOT USED
26	15 KV PRIMARY CABLE
27	GUY STRAIN INSULATOR 36"
28	WASHER 5/8" ROUND FLAT
29	RISER COVER
30	MACHINE BOLT 7/8" x REQUIRED LENGTH
31	LOCK WASHER 7/8"
32	WASHER SQ. CURVED 3 1/2" x 3/8" x 15/16" HOLE
33	WASHER 1/2" ROUND FLAT
34	GRID GAIN
35	GUY GRIP



FRONT ELEVATION



SIDE ELEVATION

- NOTES:**
1. ALL DIMENSIONS SHOWN ARE MINIMUM.
 2. MINIMUM POLE HEIGHT IS 35'-0".
 3. PROVIDE ALL NECESSARY HARDWARE AND CONNECTORS.
 4. BOND AND GROUND ALL COMPONENT MOUNTING BRACKETS.
 5. CUTOUT AND FUSE SHALL BE THE SIZE AND TYPE TO MATCH CUTOUT
 6. REFER TO CPP POLE DETAILS
 7. SEE RISER POLE DETAILS

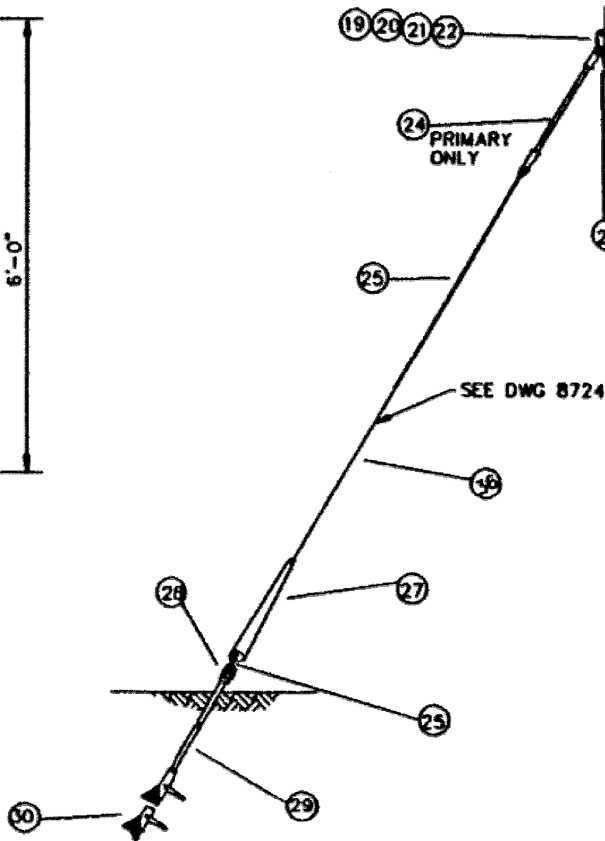
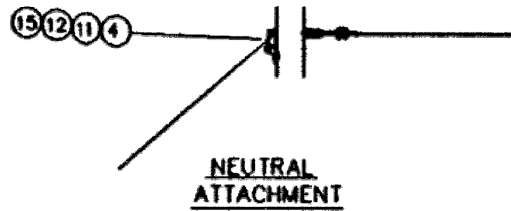
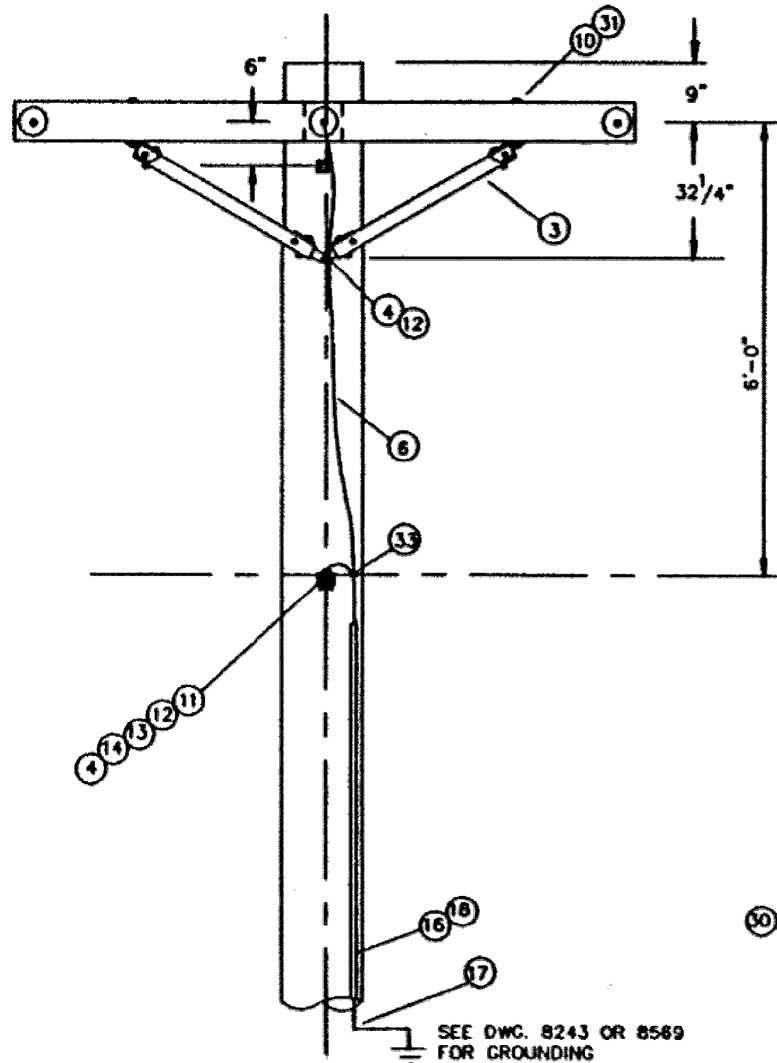
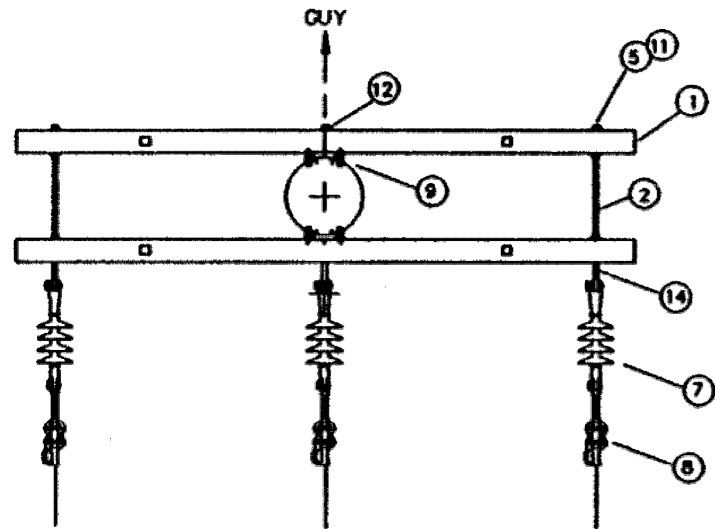
NOTE:
LIGHTNING ARRESTERS, CUTOUPS AND POWER SERVICE SHOWN FOR CLARITY ON POLE ELEVATIONS. ACTUAL ORIENTATION OF POLE ITEMS SHOWN IN SECTION A-A.

* - FOR 13,800V POWER SERVICE, 4W ARE REQUIRED WITH 1W SYSTEM NEUTRAL.

EXAMPLE CPP RISER POLE DETAIL

NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
ISSUE RECORD		

15 - 6



GUY DETAIL

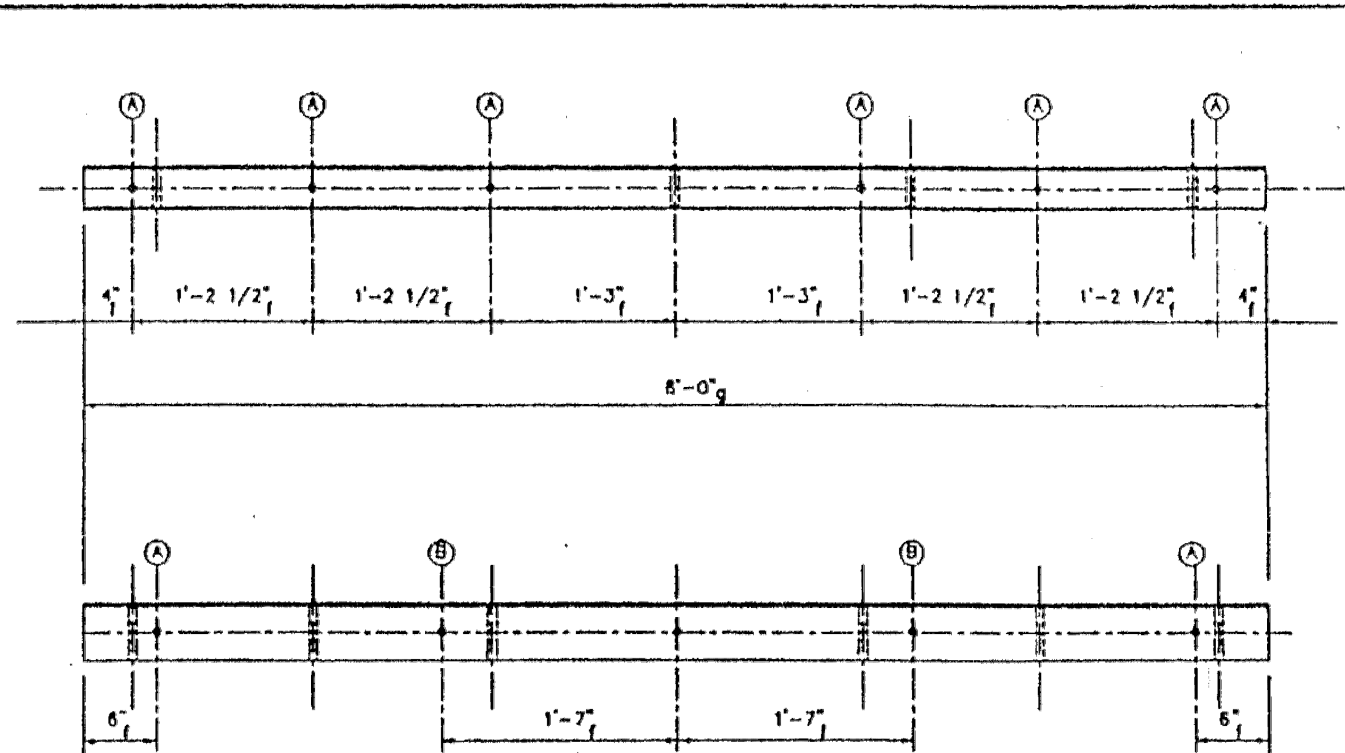
BILL OF MATERIALS			
ITEM NO.	ITEM	STOCK NO.	NO. REQ'D
1	3 1/2 X 4 1/2 X 8'-0" STL PIN CROSSARM		2
2	DBL ARMING EYEBOLT, 5/8" X LENGTH REQ'D	JOSLYN J8814 TO J8828	3
3	WOOD BRACE, 60" SPAN	JOSLYN J4730W-R	4
4	BOLT, 5/8" X LENGTH REQ'D, MACHINE	JOSLYN J8808 TO 8824	5
5	WASHER, 5/8", ROUND FLAT	HUGHES RWJ-80	8
6	#4 W.P. CU SOLID		AS REQ'D
7	INSULATORS, SUSPENSION 13KV, PDI-15 TYPE	O.B. 233194	3
8	DEADEND CLAMP	PER CONDUCTOR SIZE	3
9	GRID GAIN	FLAGG P122	2
10	BOLT, 1/2 X 6", MACHINE	JOSLYN J8708	4
11	SPRING WASHER, FOR 5/8" BOLT	JOSLYN J3540	3
12	WASHER, CURVED 11/16" HOLE 3X3X1/4	JOSLYN J1113	4
13	CONNECTOR #4CU TO NEUTRAL/MESSENGER	PER NEUT/MESS SIZE	1
14	EYENUT FOR 5/8", OVALEYE	JOSLYN J1093	4
15	GUY HOOK	FLAGG P135A	1
16	WOOD MOULDING, 8' LENGTHS	HUGHES 2501.8	3
17	STAPLES, ROLLED	JOSLYN J6497	100
18	STAPLES, GALV.	HUGHES 2501.4	50
19	MACHINE BOLT 7/8" X LENGTH REQ'D.	JOSLYN J9062-9074	1
20	WASHER, SPRING FOR 7/8" BOLT	JOSLYN J3542	1
21	WASHER, SQ. CURVED 3 1/2 X 3 1/2 X 3/8 15/16" HOLE	JOSLYN J6828	1
22	GUY HOOK, COMBINATION TYPE, MIN ULT. 35K	FLAGG P139	1
23	LAG SCREW, 3 X 1/2", FETTER DRIVE & POINT	JOSLYN J8753P	1
24	FIBERGLASS GUY STRAIN INSULATOR, 36", 30K MIN.	FLAGG 300-36	1
25	GUY GRIP	PER STRAND SIZE	4
26	GUY STRAND	PER ENGINEER	AS REQ'D.
27	GUY GUARD, PLASTIC 8' YELLOW	JOSLYN J1493Y	AS REQ'D.
28	EYENUT FOR 1" ANCHOR ROD	CHANCE 6562	2
29	ANCHOR ROD 7' X 1"	CHANCE 12334P	2
30	ANCHOR, SINGLE OR DOUBLE HELIX	CHANCE E102-08207 TO 0823	2
31	WASHER, 1/2, ROUND FLAT	JOSLYN J1095	4
32	DEADEND CLAMP	PER NEUT. SIZE	1
33	CONNECTOR #4 CU - #4 CU	BURNDY YC4CA	1

NOTE: 1. ALL STOCK ITEMS ARE "OR EQUIVALENT" WITH ENGINEER APPROVAL.
2. BOND ALL HAREWARE TO NEUTRAL.

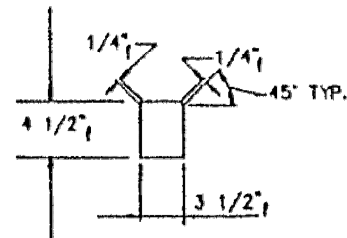
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30	2018-04-04	RFC	
31	2018-04-04	RFC	
32	2018-04-04	RFC	
33	2018-04-04	RFC	

BECK POLYTECH	
CLEVELAND PUBLIC POWER	
THREE PH. DEADEND WOOD CROSSARM ASSEMBLY	
8564.3	

NO.	DATE	DESCRIPTION	ISSUE RECORD
0	2018-04-04	RFC	
1	2018-04-04	RFC	
2	2018-04-04	RFC	
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27	2018-04-04	RFC	
28	2018-04-04	RFC	
29	2018-04-04	RFC	
30	2018-04-04	RFC	
31	2018-04-04	RFC	
32	2018-04-04	RFC	
33	2018-04-04	RFC	



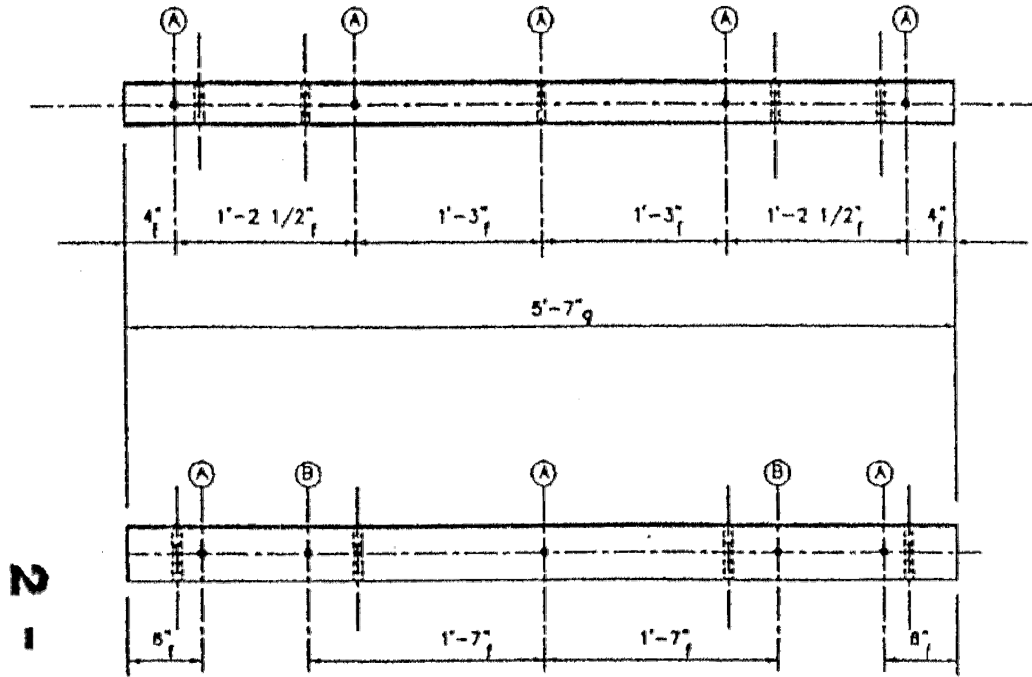
8'-0" CROSSARM



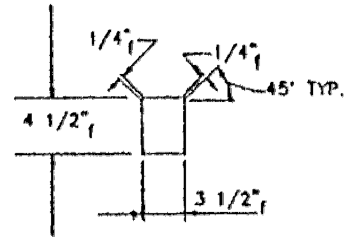
TOLERANCES SIZES OF HOLES

	NOMINAL	GO	NO GO
(A)	11/16"	5/8"	3/4"
(A)	7/16"	3/8"	1/2"

f ----- ± 1/8"
g ----- ± 1/4"



5'-7" CROSSARM



NOTE: THIS CROSSARM IS THE SAME AS REA
SPEC. DT-5B DWG. M-19 TYPE 04

1	1/10/19	FILES FOR CONSTRUCTION	LAC	LCH
2	1/10/19	FILES FOR CONSTRUCTION	LAC	LCH
3	1/10/19	FILES FOR CONSTRUCTION	LAC	LCH
4	1/10/19	FILES FOR CONSTRUCTION	LAC	LCH

BECK

FOOTLOCK

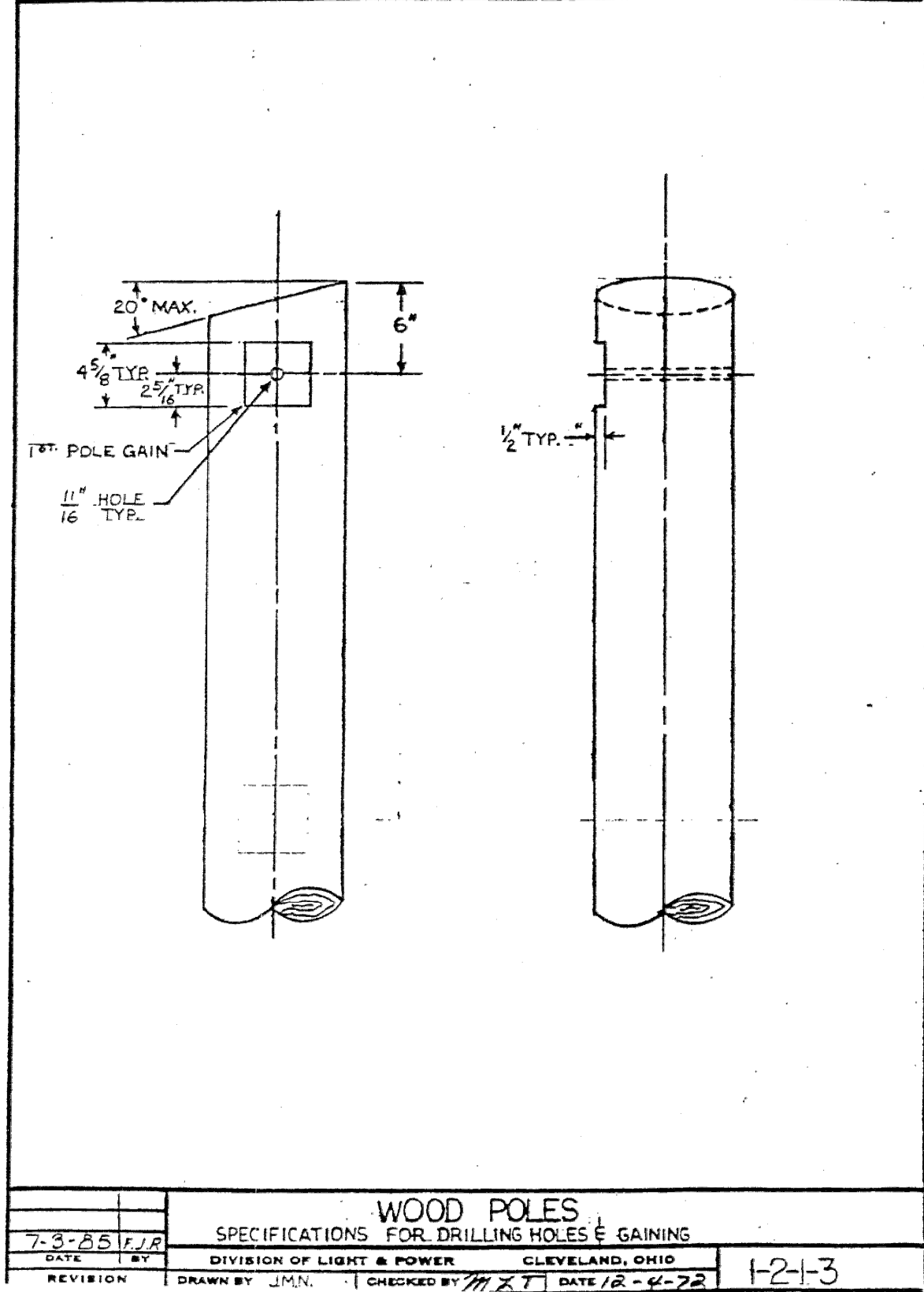
CLEVELAND PUBLIC POWER

STANDARD CROSSARM FRAMING

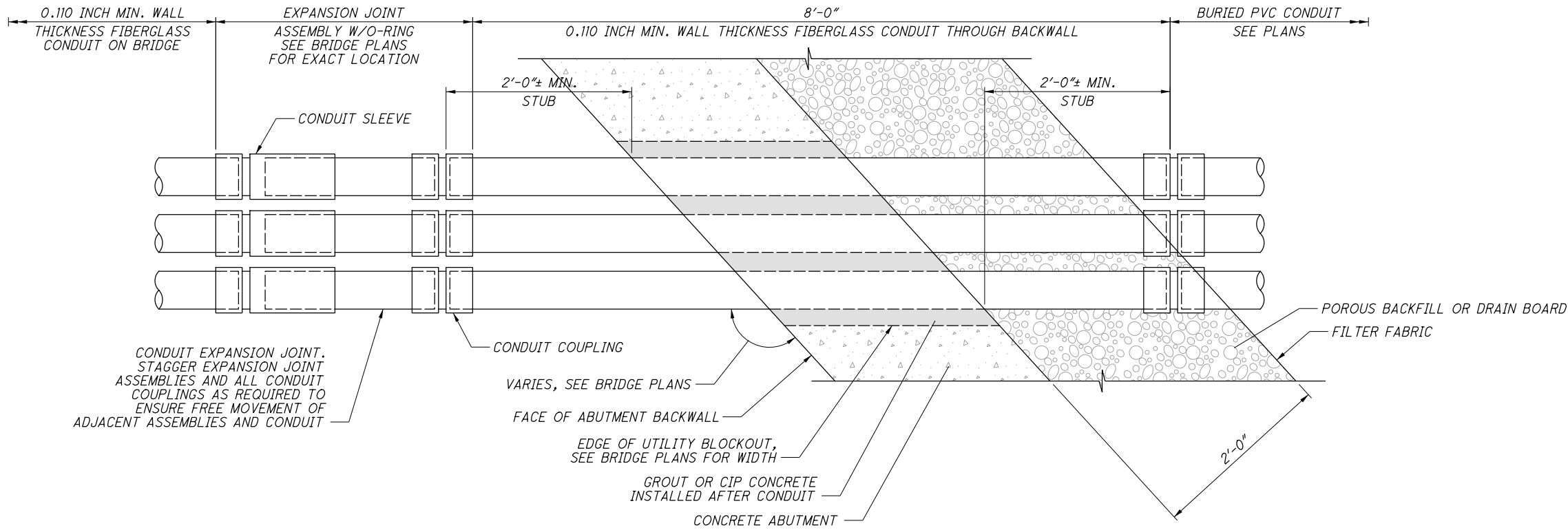
5'-7" & 8'-0" CROSSARM

8288.3

NO.	DATE	DESCRIPTION
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ISSUE RECORD		



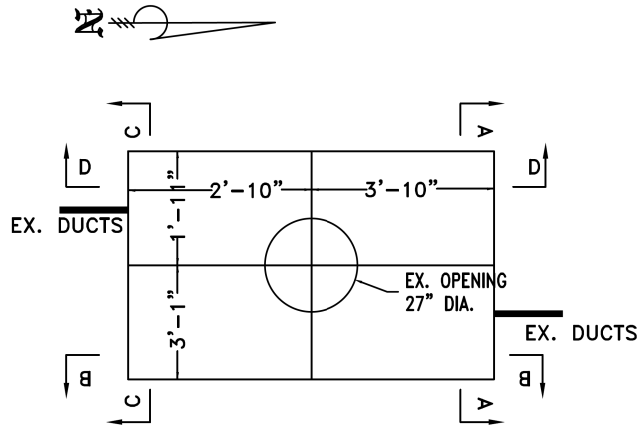
NO.		DATE	DESCRIPTION
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ISSUE RECORD			



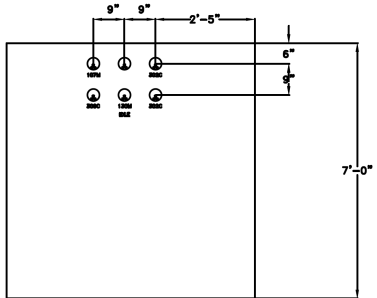
CPP DUCT AT ABUTMENT BACKWALL
TYP. FOR BOTH ABUTMENTS

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

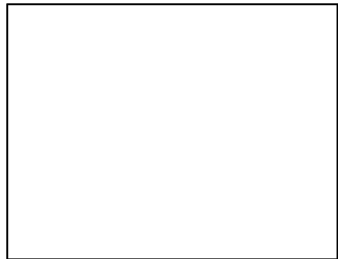
5'-0" WIDE	6'-8" LONG	6'-0" H.R.	NECK:2'-10"	COVER: ROUND	EX. MH 99-8 TO BE REMOVED
LOCATION: STA. 10+24.09, 26.14 LT, E.55th ST.					



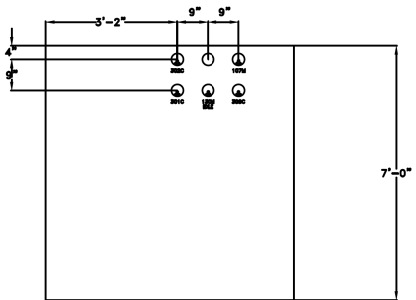
REQUIREMENTS:
CPP TO CUT EX. CABLE AT N. WALL
AND CAP
CABLE N. OF MH TO BE REMOVED



SECTION A-A



SECTION B-B

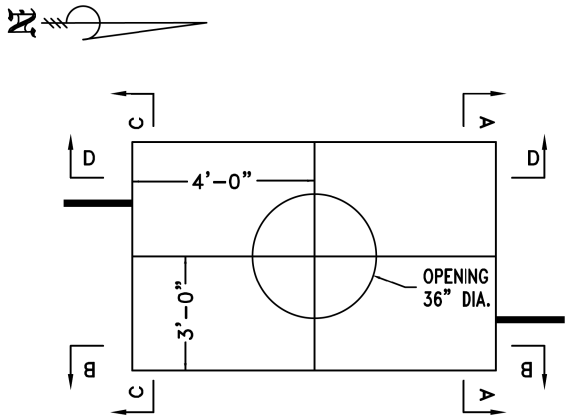


SECTION C-C

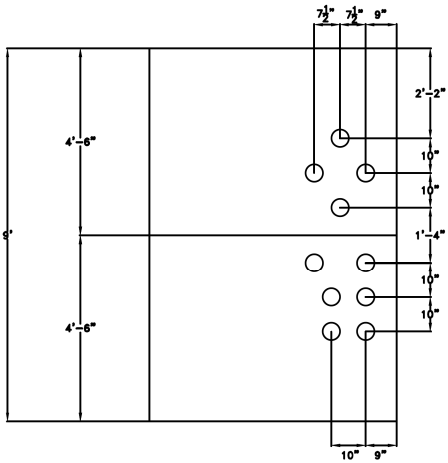


SECTION D-D

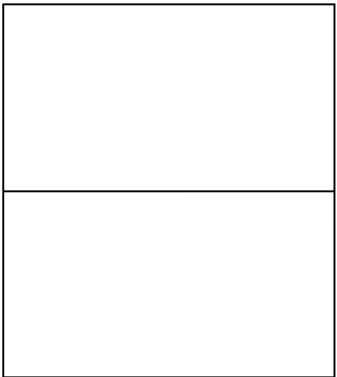
6'-0" WIDE	8'-0" LONG	9'-0" H.R.	NECK: 2'-6"	COVER: AS SHOWN	NEW MH 99-8 (EM01)
LOCATION: STA. 10+13.00, 25.0 LT, E.55th ST.					



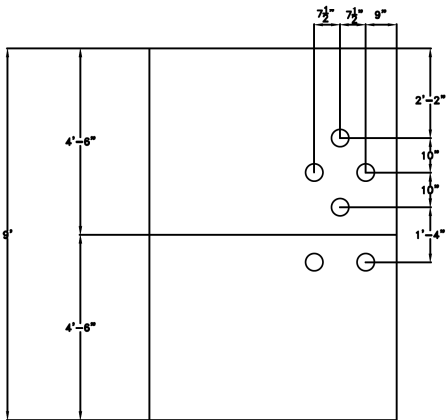
REQUIREMENTS:
1-36"Ø ROOF OPENING
16-5" PVC FLARED BELL ENDS
6-PULLING IRONS
1-12" PRECAST NECK RING
1-3" PRECAST CAP RING
1-12" Ø SUMP HOLE
1-36"Ø COVER AND CASTING
EJIW # 1585 W/HOLES



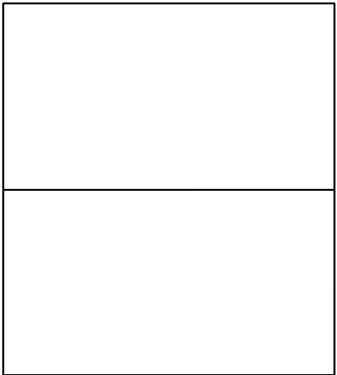
SECTION A-A



SECTION B-B



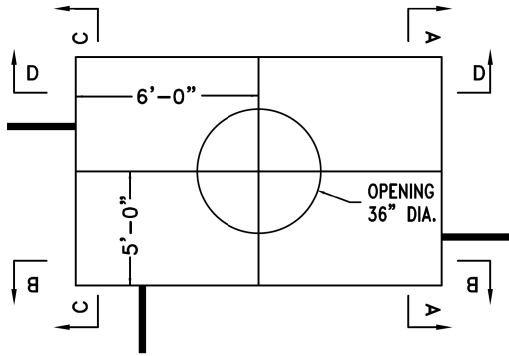
SECTION C-C



SECTION D-D

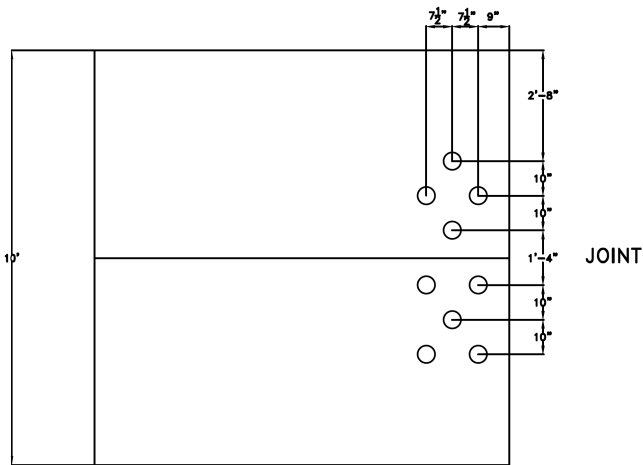
0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

8'-0" WIDE	12'-0" LONG	10'-0" H.R.	NECK: 2'-6"	COVER: AS SHOWN	NEW MH 99-7 (EM02)
LOCATION: STA. 12+55.00, 10.5 LT, E.55th ST.					

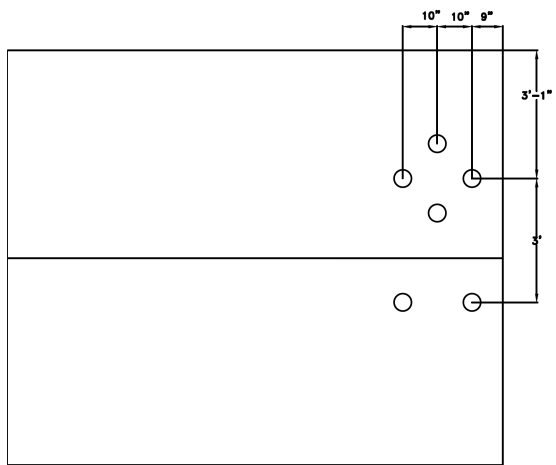


REQUIREMENTS:

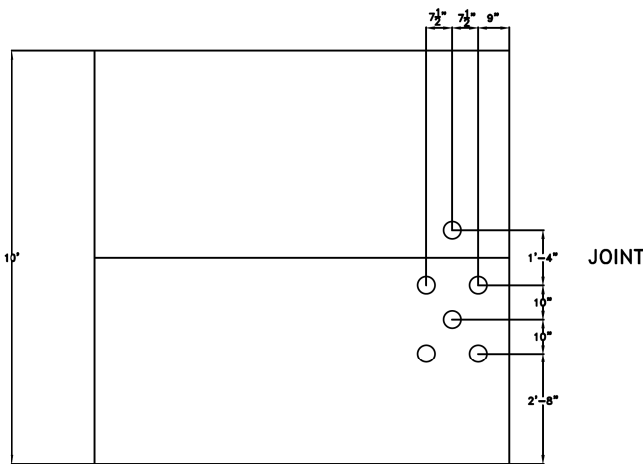
- 1-36"Ø ROOF OPENING
- 21-5" PVC FLARED BELL ENDS
- 6-PULLING IRONS
- 1-12" PRECAST NECK RING
- 1-3" PRECAST CAP RING
- 1-12" Ø SUMP HOLE
- 1-36"Ø COVER AND CASTING
- EJIW # 1585 W/HOLES



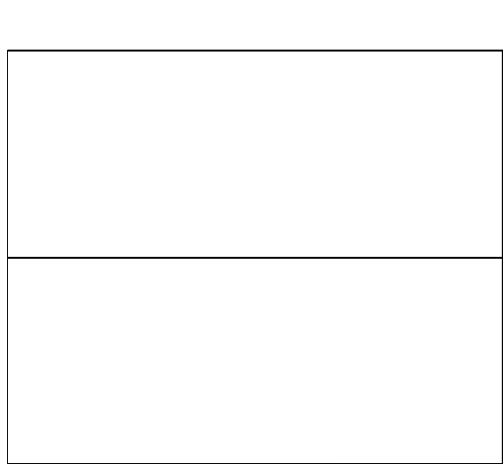
SECTION A-A



SECTION B-B

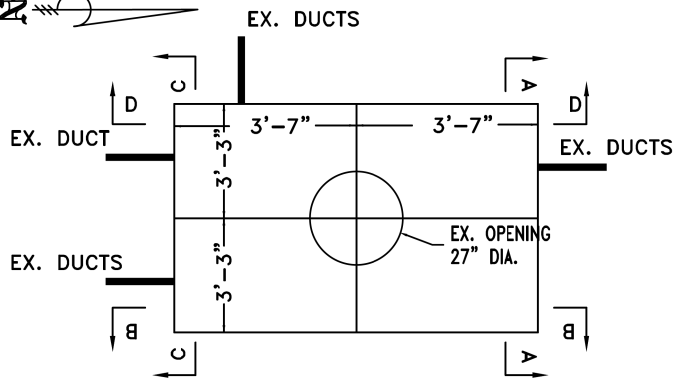


SECTION C-C



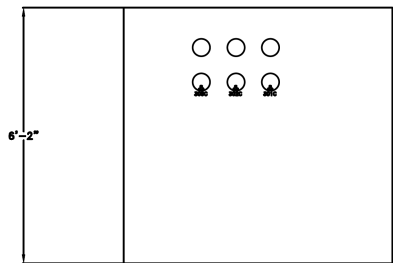
SECTION D-D

6'-6" WIDE	7'-2" LONG	6'-2" H.R.	NECK: 2'-2"	COVER: AS SHOWN	EX. MH 99-6 (EM03)
LOCATION: STA. 16+45.69, 31.16 LT, E.55th ST.					

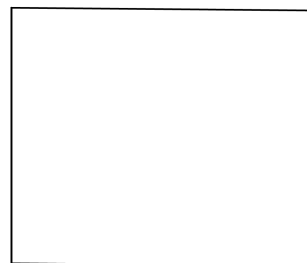


REQUIREMENTS:

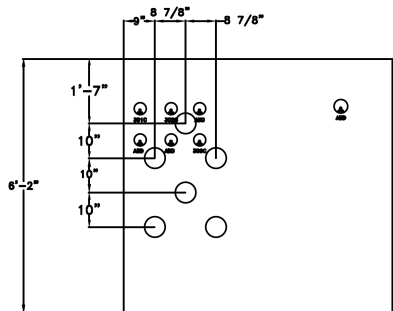
- CPP TO CUT EX. CABLE AND CAP
- CABLE S. OF MH TO BE REMOVED
- PLUG EX. 6-3.5" DUCTS AND 1-4" DUCT IN S. WALL
- CORE-DRILL 6-6" HOLES IN S. WALL
- INST. 6-5" PVC FLARED BELL ENDS



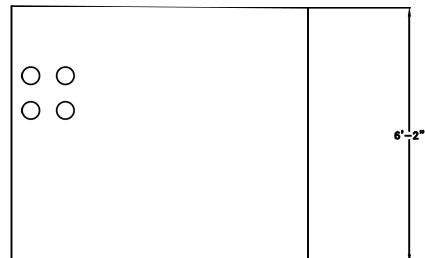
SECTION A-A



SECTION B-B



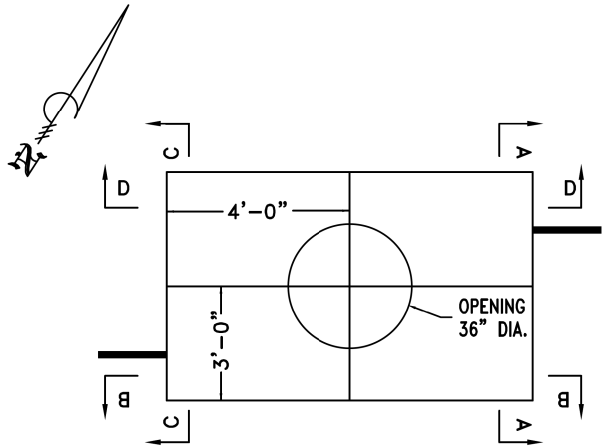
SECTION C-C



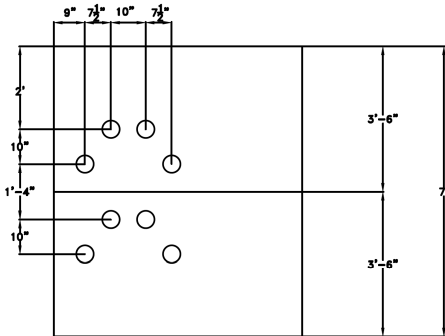
SECTION D-D

0	2019-04-04	RFC
NO.	DATE	DESCRIPTION
ISSUE RECORD		

6'-0" WIDE	8'-0" LONG	7'-0" H.R.	NECK: 2'-6"	COVER: AS SHOWN	NEW MH xx-xx (EMH04)
LOCATION: STA. 129+60.00, 59.0 RT, OC Blvd.					



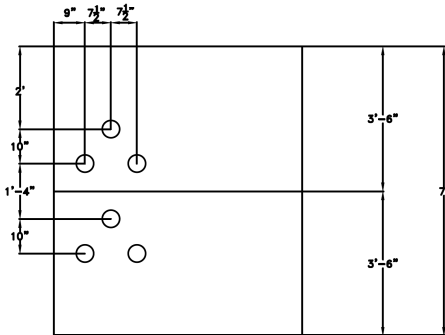
- REQUIREMENTS:
- 1-36"Ø ROOF OPENING
 - 14-5" PVC FLARED BELL ENDS
 - 6-PULLING IRONS
 - 1-12" PRECAST NECK RING
 - 1-3" PRECAST CAP RING
 - 1-12" Ø SUMP HOLE
 - 1-36"Ø COVER AND CASTING
 - EJIW # 1585 W/HOLES



SECTION A-A



SECTION B-B

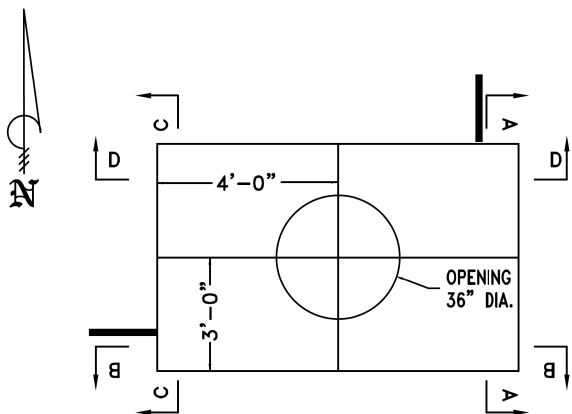


SECTION C-C



SECTION D-D

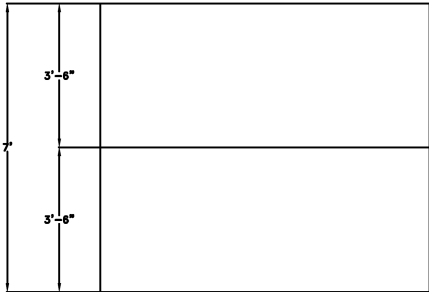
6'-0" WIDE	8'-0" LONG	7'-0" H.R.	NECK: 2'-6"	COVER: AS SHOWN	NEW MH 99-14 (EM41)
LOCATION: STA. 12+83.80, 233.71 LT, E.55th ST.					



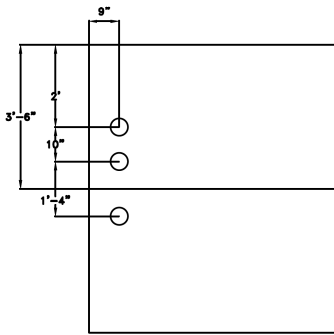
- REQUIREMENTS:
- 1-36"Ø ROOF OPENING
 - 6-5" PVC FLARED BELL ENDS
 - 6-PULLING IRONS
 - 1-12" PRECAST NECK RING
 - 1-3" PRECAST CAP RING
 - 1-12" Ø SUMP HOLE
 - 1-36"Ø COVER AND CASTING
 - EJIW # 1585 W/HOLES



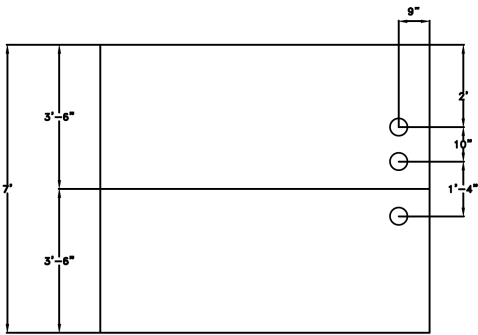
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

NO.	DATE	DESCRIPTION
2	2019-09-10	DC018
1	2019-08-07	DC014
0	2019-04-04	RFC
ISSUE RECORD		



**McWANE
DUCTILE**

IRON STRONG

TR FLEX

**® RESTRAINED JOINT DUCTILE IRON PIPE
AND FITTINGS**



SIZES - 4" to 36"

4" - 36" DUCTILE IRON TR FLEX[®] PIPE

MATERIAL	Ductile Iron per AWWA C150/ANSI A21.50, AWWA C151/ANSI A21.51, ASTM A536
PRESSURE	350 PSI Water Working Pressure 4" - 24" & 250PSI FOR 30 & 36"
TESTING	ANSI / AWWA C151 / ANSI 21.51 & UL - FM requirements
LAYING LENGTH	18 foot Nominal Length
CEMENT LINING	ANSI / AWWA C104 / ANSI 21.4
COATING	ANSI / AWWA C104 / ANSI 21.4
GASKETS	ANSI / AWWA C111/ ANSI A21.11
STANDARDS	AWWA C150/ANSI A21.50, AWWA C151/ANSI A21.51, AWWA C104 / ANSI 21.4, AWWA C111/ ANSI A21.11



❖ visit pe.mcwane.com for more information

❖ All Dimensions are in Inches

DUCTILE IRON TR FLEX® Pulling Force at Equivalent Pressure for HDD Applications

Nominal Pipe Size	Pipe O.D. (in)	350 psi Equivalent Force	500 psi Equivalent Force	Recommended Maximum Pulling Force	Absolute Maximum Pulling Force
4	4.80	6,333	9,048	6,000	9,000
6	6.90	13,087	18,696	13,000	18,000
8	9.05	22,514	32,163	22,000	32,000
10	11.10	33,869	48,384	33,000	48,000
12	13.20	47,897	68,424	47,000	68,000
14	15.30	64,349	91,927	64,000	91,000
16	17.40	83,226	118,894	83,000	118,000
18	19.50	104,527	149,324	104,000	149,000
20	21.60	128,252	183,218	128,000	183,000
24	25.80	182,977	261,396	182,000	261,000
30	32.00	201,062	281,487	201,000	281,000
36	38.30	288,023	403,232	288,000	403,000

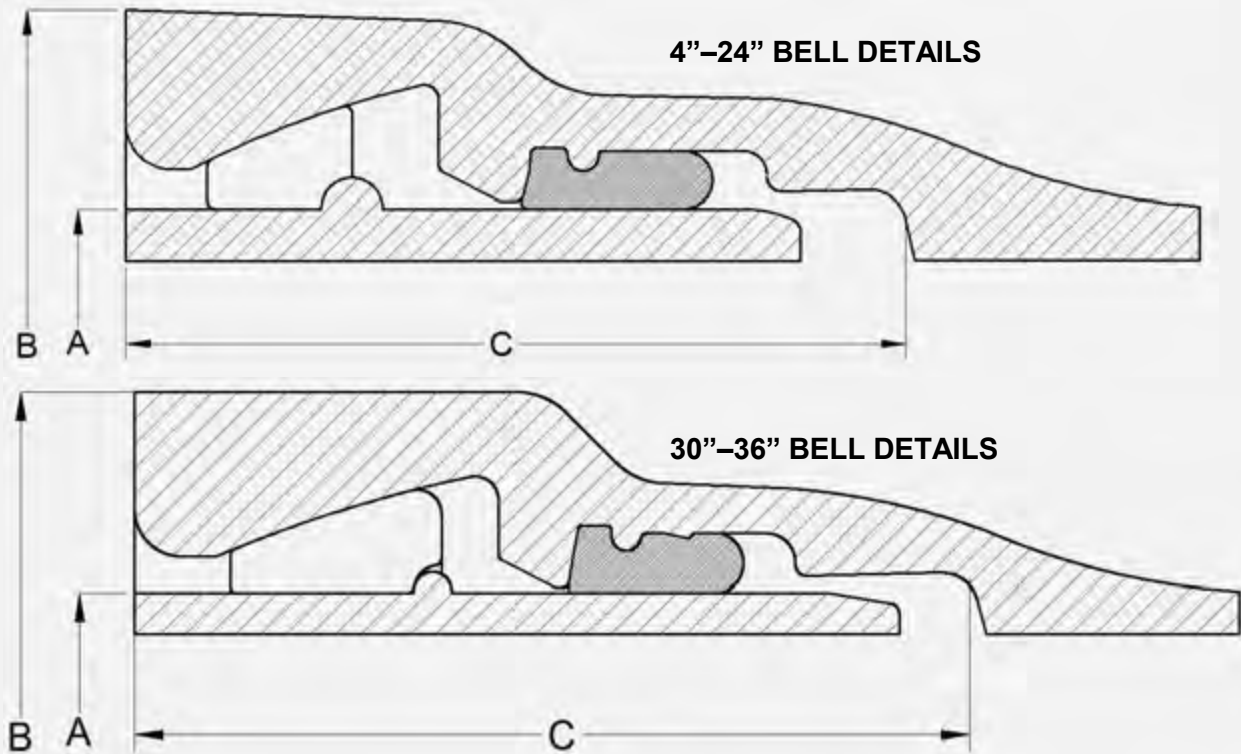
Notes:

- 350 psi is the rated pressure of the joint.
- 500 psi equivalent is the absolute maximum pulling force that should be used.
- 30" and 36" Equivalent Forces are 250 psi equivalent

Actual Laying Length

Nominal Size	Feet	Inch
4	18	1
6	18	1
8	18	1
10	17	11
12	17	11
14	17	10
16	17	10
18	17	10
20	17	9
24	17	9
30	17	9
36	17	7

DUCTILE IRON TR FLEX® PIPE 4" - 36" Bell Details



Pipe Size In.	*Pressure Rating psi	A In.	B In.	C In.	# of D.I Locking Segments	# of Rubber Segments Retainers	Max Deflection Degrees	Pullout
4	350	4.80	7.25	4.84	2	1	5	0.03
6	350	6.90	9.52	5.27	2	1	5	0.04
8	350	9.05	11.93	5.82	2	1	5	0.04
10	350	11.10	14.37	6.03	2	1	5	0.05
12	350	13.20	16.68	6.30	4	2	5	0.06
14	350	15.30	19.16	7.75	4	2	3-1/4	0.05
16	350	17.40	21.46	7.95	4	2	3-1/4	0.05
18	350	19.50	23.76	8.19	4	2	3	0.05
20	350	21.60	26.04	8.40	4	2	2-1/2	0.05
24	350	25.80	30.61	8.86	8	4	2-1/4	0.05
30	250	32.00	36.88	10.28	8	4	1-3/4	0.05
36	250	38.30	43.85	10.87	8	4	1-1/2	0.05

*The TR FLEX® Restrained Joint has a working pressure rating equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi for 4 in. through 24 in. and 250 psi for 30 in. through 36 in.

NOTE: These deflections are based on joints with nominal dimensions.

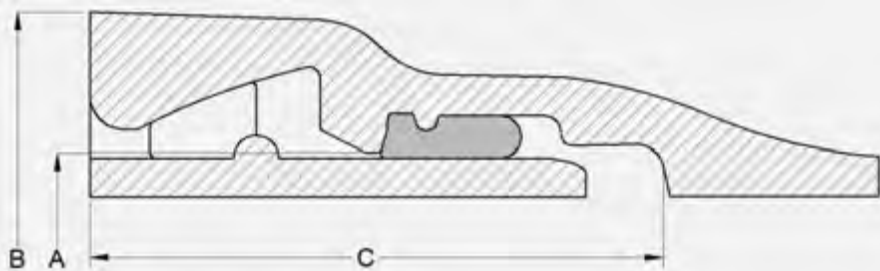
❖ visit pe.mcwane.com for more information

❖ All Dimensions are in Inches

DUCTILE IRON TR FLEX® FITTINGS

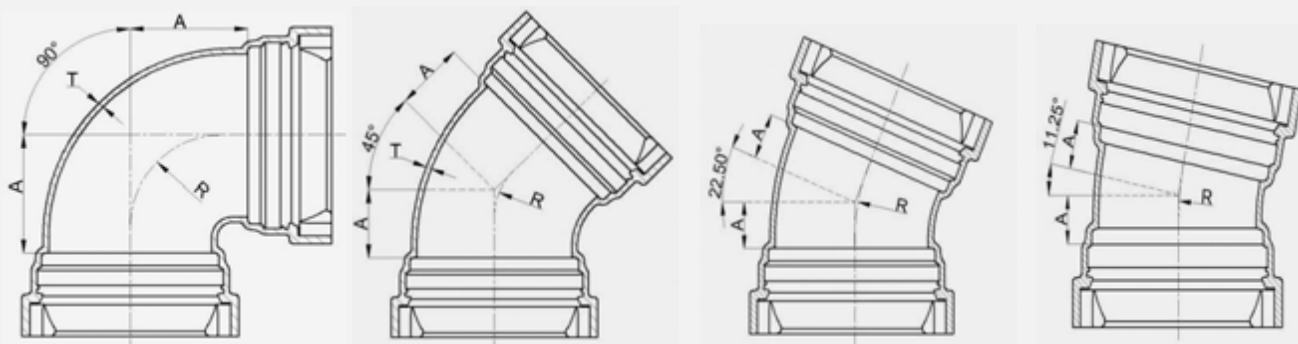
MATERIAL	Ductile Iron Grade 70-50-05 in accordance with AWWA C153 / ANSI A21.53
PRESSURE	350 PSI Water Working Pressure for 4" - 24" & 250PSI for 30 & 36"
TESTING	AWWA C153 / ANSI A21.53 & UL - FM requirements
LAYING LENGTH	AWWA C153 / ANSI A21.53
CEMENT LINING	AWWA C104 / ANSI A21.4
COATING	AWWA C104 / ANSI A21.4
GASKETS	AWWA C111 / ANSI A21.11
STANDARDS	AWWA C153 / ANSI A21.53, AWWA C104 / ANSI A21.4, AWWA C111 / ANSI A21.11

BASIC SPECIFICATIONS



SIZE	A in	B in	C in
4	4.80	7.11	4.84
6	6.90	9.39	5.27
8	9.05	11.85	5.82
10	11.10	14.12	6.03
12	13.20	16.46	6.30
14	15.30	19.13	7.75
16	17.40	21.33	7.95
18	19.50	23.53	8.19
20	21.60	25.75	8.40
24	25.80	30.15	8.86
30	32.00	37.19	10.28
36	38.30	43.85	10.87

TR FLEX® FITTING THICKNESS & DIMENSIONS BENDS

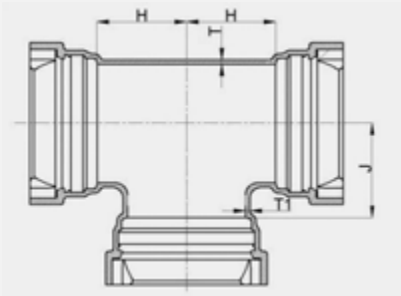


SIZE	90°			45°			22 1/2°			11 1/4°		
	A in	R in	T in	A in	R in	T in	A in	R in	T in	A in	R in	T in
4	4.00	3.34	0.34	2.00	3.24	0.34	1.50	4.23	0.34	1.25	6.01	0.34
6	5.00	4.31	0.36	3.00	5.57	0.36	2.00	6.57	0.36	1.50	8.19	0.36
8	6.50	5.60	0.38	3.50	6.28	0.38	2.50	8.04	0.38	1.75	8.62	0.38
10	7.50	6.68	0.40	4.50	8.89	0.40	3.00	10.97	0.40	2.00	12.00	0.40
12	9.00	7.76	0.42	5.50	11.00	0.42	3.50	13.50	0.42	2.25	14.50	0.42
14	11.50	10.00	0.47	5.00	8.50	0.47	3.75	12.00	0.47	2.50	11.00	0.47
16	12.50	11.00	0.50	5.50	9.50	0.50	3.75	11.50	0.50	2.50	10.00	0.50
18	14.00	12.50	0.54	6.00	10.50	0.54	4.50	14.50	0.54	3.00	14.00	0.54
20	15.00	13.50	0.57	7.00	13.00	0.57	4.50	14.00	0.57	3.00	13.00	0.57
24	16.75	15.00	0.61	7.50	14.00	0.61	4.50	14.00	0.61	3.00	13.50	0.61
30	21.50	19.00	0.66	10.50	20.50	0.66	6.75	24.00	0.66	4.75	29.00	0.66
36	24.50	22.00	0.74	11.50	22.50	0.74	7.75	28.00	0.74	5.00	30.00	0.74

❖ visit pe.mcwane.com for more information

❖ All Dimensions are in Inches

TR FLEX® FITTING THICKNESS & DIMENSIONS TEES

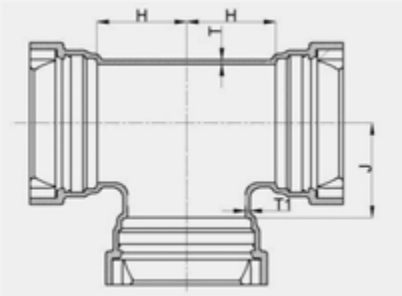


SIZE		H in	J in	T in	T1 in
Run	Branch				
4	4	4.00	4.00	0.34	0.34
6	4	4.00	5.00	0.36	0.34
6	6	5.00	5.00	0.36	0.36
8	4	4.00	6.50	0.38	0.34
8	6	5.00	6.50	0.38	0.36
8	8	6.50	6.50	0.38	0.38
10	4	4.00	7.50	0.40	0.34
10	6	5.00	7.50	0.40	0.36
10	8	6.50	7.50	0.40	0.38
10	10	7.50	7.50	0.40	0.40
12	4	4.00	8.75	0.42	0.34
12	6	5.00	8.75	0.42	0.36
12	8	6.50	8.75	0.42	0.38
12	10	7.50	8.75	0.42	0.40
12	12	8.75	8.75	0.42	0.42
14	14	10.50	10.50	0.47	0.47
16	12	9.50	11.50	0.50	0.42
16	14	10.50	11.50	0.50	0.47
16	16	11.50	11.50	0.50	0.50
18	12	9.50	12.50	0.54	0.42
18	14	10.50	12.50	0.54	0.47
18	16	11.50	12.50	0.54	0.50
18	18	12.50	12.50	0.54	0.54
20	12	10.00	14.00	0.57	0.42
20	14	11.00	14.00	0.57	0.47
20	16	12.00	14.00	0.57	0.50
20	18	13.00	14.00	0.57	0.54
20	20	14.00	14.00	0.57	0.57

❖ visit pe.mcwane.com for more information

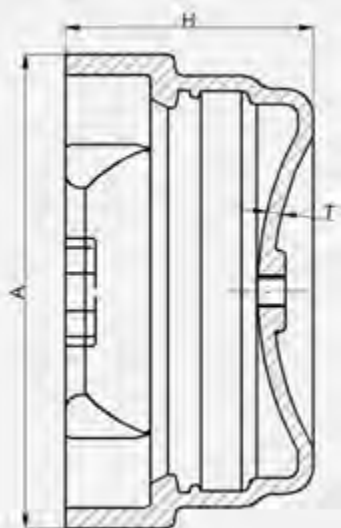
❖ All Dimensions are in Inches

TR FLEX® FITTING THICKNESS & DIMENSIONS TEES

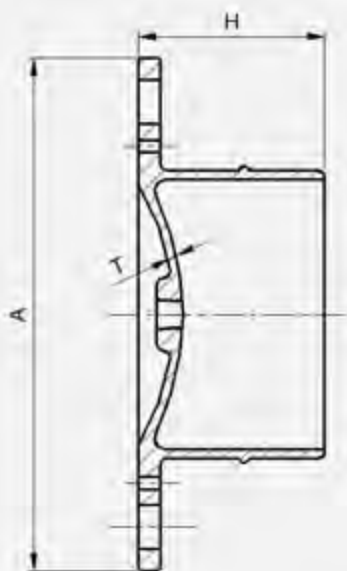


SIZE		H in	J in	T in	T1 in
Run	Branch				
24	12	10.00	16.00	0.61	0.42
24	14	11.00	16.00	0.61	0.47
24	16	12.00	16.00	0.61	0.50
24	18	13.00	16.00	0.61	0.54
24	20	14.00	16.00	0.61	0.57
24	24	16.00	16.00	0.61	0.61
30	14	12.50	20.00	0.66	0.47
30	16	12.50	20.00	0.66	0.50
30	18	15.00	20.00	0.66	0.54
30	20	15.00	20.00	0.66	0.57
30	24	16.00	20.00	0.66	0.61
30	30	20.00	20.00	0.66	0.66
36	14	16.00	23.50	0.74	0.47
36	16	16.00	23.50	0.74	0.50
36	18	16.00	23.50	0.74	0.54
36	20	16.00	23.50	0.74	0.57
36	24	16.00	23.50	0.74	0.61
36	30	20.00	23.50	0.74	0.66
36	36	23.50	23.50	0.74	0.74

TR FLEX[®] FITTING THICKNESS & DIMENSIONS CAPS & PLUGS



SIZE	A in	T in	H in
4	7.11	0.34	5.18
6	9.39	0.36	5.63
8	11.85	0.38	6.20
10	14.12	0.40	6.43
12	16.46	0.42	6.72
14	19.13	0.47	8.22
16	21.33	0.50	8.45
18	23.53	0.54	8.73
20	25.75	0.57	8.97
24	30.15	0.61	9.47
30	37.19	0.66	10.94
36	43.85	0.74	11.61



SIZE	A in	T in	H in
4	12.00	0.34	6.50
6	14.50	0.36	7.00
8	17.00	0.38	7.50
10	20.00	0.80	8.00
12	23.50	0.80	11.00
14	21.75	0.47	10.25
16	24.00	0.50	10.25
18	26.25	0.54	10.50
20	28.50	0.57	10.75
24	32.50	0.61	11.25
30	40.25	0.66	13.50
36	46.50	0.74	14.25

4" - 36" DUCTILE IRON TR FLEX[®] PIPE ASSEMBLY INSTRUCTIONS

TR Flex[®] pipes and fittings assembly instructions:

- When laying a pipe or fitting in a trench, orient the locking segment insertion bell slots so that:
 - The 2 slots on 4" - 20" pipe are at the horizontal or 3 and 9 o'clock positions
 - The 4 slots on 24" - 36" pipe are at the 2, 4, 8 and 10 o'clock positions or forming an 'X' when looking at the bell face



4"-20"



24"-36"

- Thoroughly clean the bell cavity area including the gasket seat and the locking segment groove to remove all dirt, debris and any foreign material(s) that could inhibit proper gasket sealing or locking segment placement. Ensure the gasket seat area is dry
- Insert a standard Tyton gasket in the bell socket, make sure the retainer bead on the heel of the gasket is fully inserted into the corresponding socket groove
- Apply a thin but continuous layer of lubricant on the installed gasket and the pipe spigot up to the weld bead
- Keeping the mating pipe aligned, insert the pipe spigot into the corresponding pipe bell and push home
- There are two locking segments for 4" - 10" joints, four locking segments for 12" - 20" joints and eight locking segments for 24" - 36" joints
- Insert the locking segments one at a time into the bell slots and rotate / slide each locking segment into the bell cavity. Red segments rotate to the right and black segments rotate to the left
- Insert the rubber retainer into the bell slot between two installed locking segments to retain the locking segments in their correct position
- Once all locking segments and rubber retainers are properly installed, pull back on the installed joint to fully extend the joint and set any desired deflection

- WS-1 NOT USED
- WS-2 STA. 12+43.65, @ CONST. 12" WATER MAIN, STA. 10+80.12 RT, @ EX. R/W & CONST. E. 55TH ST. 2" WATER SERVICE, COMPLETE (CWD #55022)
- WS-3 STA. 13+01.36, @ CONST. 12" WATER MAIN, STA. 11+37.83 RT, @ EX. R/W & CONST. E. 55TH ST. 1" WATER SERVICE, COMPLETE (CWD #55035)
- WS-4 STA. 13+28.23, @ CONST. 12" WATER MAIN, STA. 11+64.00 LT, @ EX. R/W & CONST. E. 55TH ST. 1" WATER SERVICE, COMPLETE (NEW SERVICE FOR FUTURE PUBLIC PLAZA)
- WS-5 STA. 11+15.50, @ CONST. 12" WATER MAIN, STA. 9+52.00 RT, @ EX. R/W & CONST. E. 55TH ST. 1" WATER SERVICE, COMPLETE (NEW SERVICE FOR FUTURE PUBLIC PLAZA)
- FH-1 STA. 51+42.78, 22.44 RT, @ CONST. 30" WATER MAIN, STA. 9+79.31, 39.50 RT, @ EX. R/W & CONST. E. 55TH ST. 6" FIRE HYDRANT ASSEMBLY COMPLETE, PER DETAIL B

NOTES:
1. FOR 30" VALVE ASSEMBLY COMPLETE, DETAIL & NOTES, SEE SHEET 59
2. FOR WATER MAIN PROFILES, SEE SHEETS 28 -31

0 20 40

HORIZONTAL SCALE IN FEET

CALCULATED

AJL

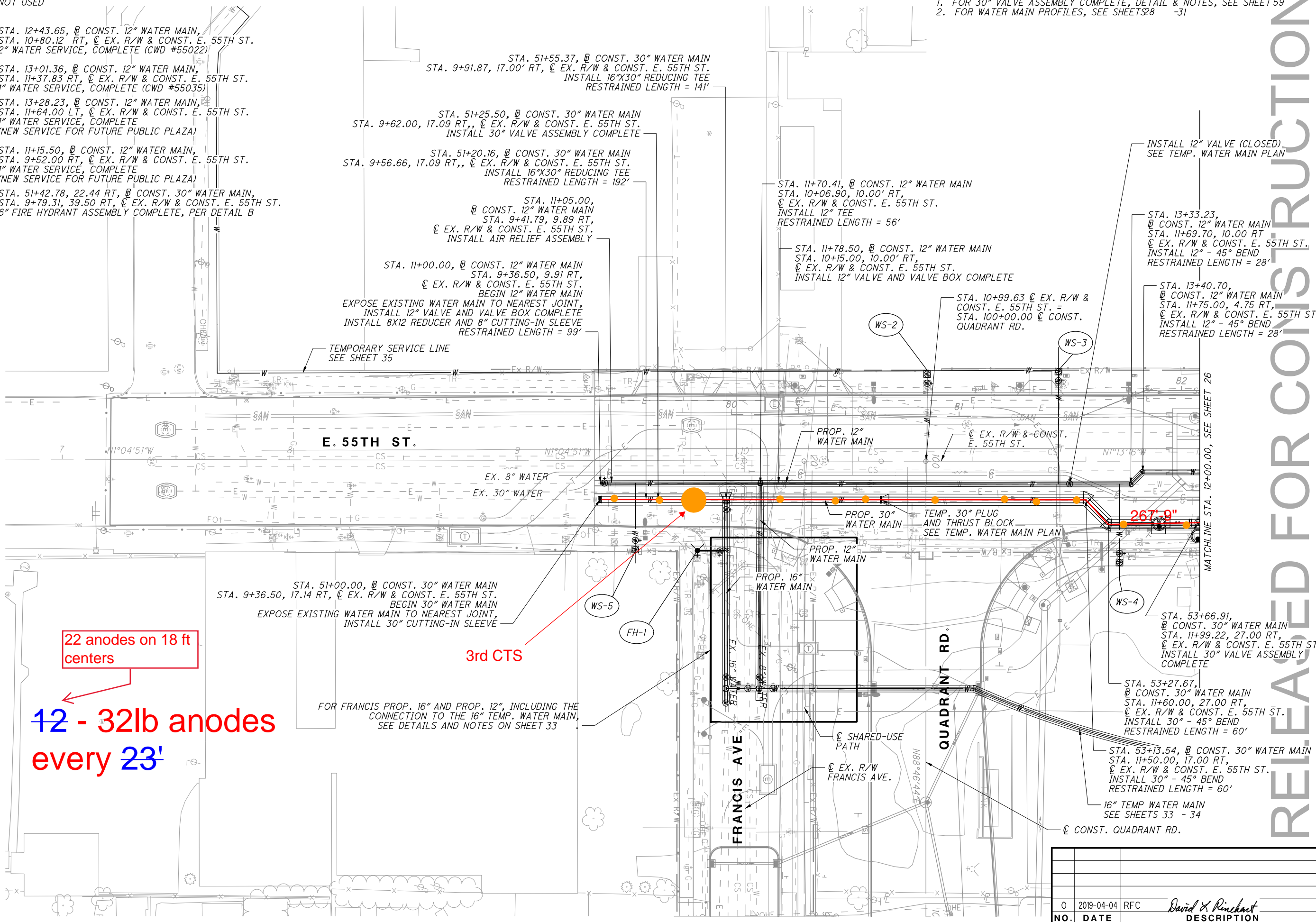
CHECKED

MBM

WATER WORK PLAN - E. 55TH ST.
BEGIN TO STA. 12+00.00

CUY-IR490/ SR010-
2.09 / 19.28

RELEASED FOR CONSTRUCTION

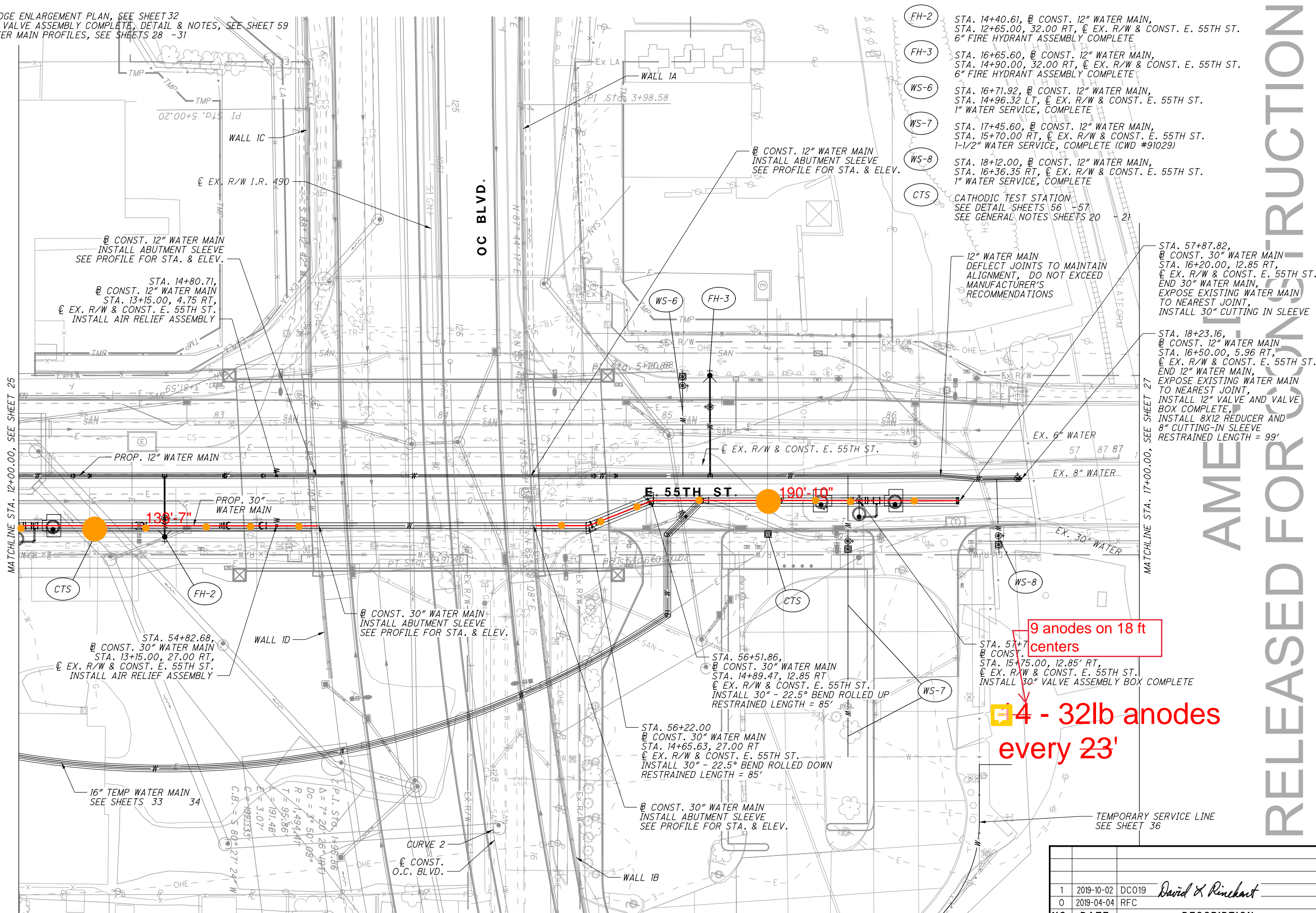


22 anodes on 18 ft centers
12 - 32lb anodes every 23'

3rd CTS

NO.	DATE	DESCRIPTION
0	2019-04-04	RFC
David X. Rinehart		
ISSUE RECORD		

NOTES:
FOR BRIDGE ENLARGEMENT PLAN, SEE SHEET 32
FOR 30" VALVE ASSEMBLY COMPLETE, DETAIL & NOTES, SEE SHEET 59
FOR WATER MAIN PROFILES, SEE SHEETS 28 - 31



NO.		DATE	DESCRIPTION
1	2019-10-02	DC019	David & Rinehart
0	2019-04-04	RFC	
ISSUE RECORD			

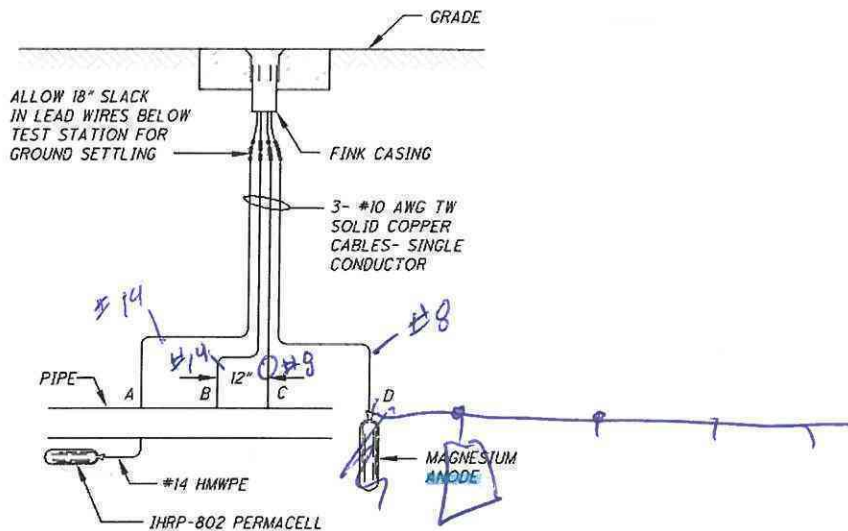
ANODE INFO

BU-07

Page 56 BU-07

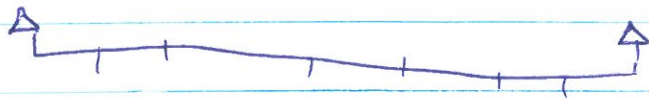
NOTES:

1. THREE WIRES NO. 10 AWG TW SOLID COPPER CABLE-SINGLE CONDUCTOR
2. WIRING CODE LEAD WIRES (B) AND (C) WHITE, LEAD WIRES (A) AND (D) BLACK
3. LEAD WIRES CONNECTED TO PIPE BY THE CADWELDING METHOD OR EQUAL, AND COATED WITH BITUMASTIC #50 OR EQUAL
4. JHRP-802 PERMACELL TO BE INSTALLED ADJACENT TO OR SLIGHTLY BELOW PROTECTED PIPE



31 Anodes

23' SPACING



26 Anodes



5 Anodes

Submittal: 047

Revision:

Date Submitted: 10/21/2019

Response Due: 11/4/2019



Project: ODOT 3000(17) – Opportunity Corridor 3
Subject: Precast Electrical Manhole Shop Drawings

To: Julie Meyer, P.E.
Ohio Department of Transportation – District 12
Email: Julie.Meyer@dot.ohio.gov

From: Marty Fritz
Kokosing Construction Company, Inc.
Email: mwf@kokosing.biz

We Are Sending:	Submitted For:
<input type="checkbox"/> As-Built Construction Drawings	<input checked="" type="checkbox"/> Approval
<input type="checkbox"/> Certifications / Test Results	<input type="checkbox"/> Acceptance
<input type="checkbox"/> Engineered / Working Drawings	<input type="checkbox"/> Record
<input type="checkbox"/> Product Data / Samples	
<input type="checkbox"/> Quality Control Procedures	
<input checked="" type="checkbox"/> Shop Drawings	<input checked="" type="checkbox"/> Attached (Electronic)
<input type="checkbox"/> Other:	<input type="checkbox"/> Attached (Hard Copy)

Submittal #	Spec	Revision	Description	Status
047		N/A	Precast Electrical Manhole Shop Drawings	For Approval

Comments:

Please see the attached shop drawing submittal for Electrical Manholes (BU07). Included with this submittal are the following:

- Shop Drawings-Precast electrical manhole structures, with pulling irons and terminators
- NPCA Certification for Precast Plants
- East Jordan Iron Works- 1581Z Frame/1585BVH Cover with CPP Name Plate

Please note the Cook Paving provided this submittal and will be ultimately responsible for proper installation.

Please feel free to contact me for any questions/concerns regarding this submittal.

Signed: _____

A handwritten signature in blue ink, appearing to read "Marty Fritz", is written over the signature line.

**Cook Paving & Construction Co., Inc.**

11360 Brookpark Rd. Brooklyn, Ohio 44130

Office 216-267-7705 / Fax 216-267-7595

Submittal Transmittal

Date: 10/7/19
Project Name: Opportunity Corridor PH-3
Cook Project #: 18171
P.O. #

Transmitted To: Michael Luyster PE
Kokosing
1539 Lowell Street
Elyria, Ohio 44035
614-206-3475
MRL@KOKOSING.BIZ

Transmitted By: Greg Gipko
Cook Paving & Construction
11360 Brookpark Road
Brooklyn, Ohio 44130
Tel: 216-267-7705

Qty	Submittal No	Description	Due Date
1	#02	Electrical Manholes	10/21/2019

Transmitted For	Delivered Via	Spec Section
Approval	Email	CPP -specifications

Remarks

Attached please find the following

1. Precast Electrical manhole structures, with pulling irons and terminators - Buildable Unit #7 CPP
 2. NPCA Certification for precast Plants
 3. East Jordan Iron Works- 1581Z Frame / 1585BVH Cover with CPP Name Plate
- Supplier - Lindsay Precast , PO Box 578 , 6845 Erie Avenue N.W., Canal Fulton , Ohio 44614

Signature

10/7/19

Date



Submittal Package #173423

Cook Paving & Construction

**ODOT 173000
Opportunity Corridor, Ph 3
BU-07**

Cleveland, Ohio

**REVISED
Sept 23, 2019**

**SUBMITTAL FOR:
Electrical Manholes
W/ REVD EMH-41**

**RALPH HASTINGS
LINDSAY PRECAST
PO BOX 578
6845 ERIE AVE. N.W.
CANAL FULTON, OHIO 44614
1-800-837-7788**

Ph: 440 543-5468
Fax: 440 543-1152
Mobile: 440 336-4162
Email: rhastings@lindsayprecast.com
Web : www.lindsayconcrete.com

LINDSAY PRECAST

6845 ERIE AVE. N.W., P.O. BOX 578
CANAL FULTON, OHIO 44614
PH (330) 854-4511 / FAX (330) 854-6664
Miranda King's cell #:
(330) 265-0062
email: mking@lindsayprecast.com

Date: August 2019

To: Greg Gipko
Cook Packing & Construction Co., Inc.

From: Miranda King

Project: **ODOT 173000**
Opportunity Corridor PHASE 3
BU-07

QUESTIONS, COMMENTS and/or EXCEPTIONS

N/A AT THIS TIME

This is to certify that the quality control procedures of

Lindsay Precast Inc.

6845 Erie Ave. N.W.
Canal Fulton, OH 44614-8509

were audited during an on-site plant inspection on April 29, 2019 and have met the

Precast Concrete Requirements

stated in the (14th Edition 2-7-19 of the NPCA Quality Control Manual for Precast Concrete Plants

Participation in the NPCA Plant Certification program affirms an ongoing commitment to producing quality precast concrete products to recognized standards of the *American Association of State Highway and Transportation Officials (AASHTO)*, the American Concrete Institute (ACI), the ASTM International (ASTM), the American Welding Society (AWS), the Precast Prestressed Concrete Institute (PCI), and the Concrete Reinforcing Steel Institute (CRSI).

This certificate is valid through December 31, 2019.



A handwritten signature in black ink, appearing to read "Michael J. Hoffman".

Michael J. Hoffman, Chairman of the Board

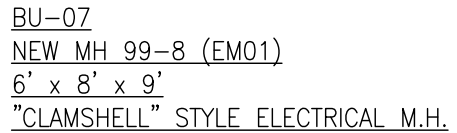
A handwritten signature in black ink, appearing to read "Ty E. Gable".

Ty E. Gable, NPCA President

A handwritten signature in black ink, appearing to read "Phillip B. Cutler".

Phillip B. Cutler, P.E., Director of Quality Assurance Programs

NPCA | 1320 City Center Drive, Suite 200 | Camel, IN 46032
This document shall be reproduced in its entirety



TOP VIEW



- 1.) CONCRETE MIN. 5,000 PSI @ 28 DAYS
- 2.) REINFORCING GRADE 60 ASTM A615-A617
60,000 PSI YIELD STRENGTH
- 3.) HS-25 LOADING
- 4.) ALL WALL ELEVATION VIEWS ARE INSIDE LOOKING OUT.
- 5.) GRADE RINGS ARE AVAILABLE IN HEIGHTS OF 6", 9" & 12".
- 6.) WEIGHTS: BASE: 16,945 #, TOP: 15,990 #

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1.	12" GRADE RING	8/7/19	DJ
2.			
3.			
4.			
5.			
6.			
7.			

LP Lindsay
P R E C A S T

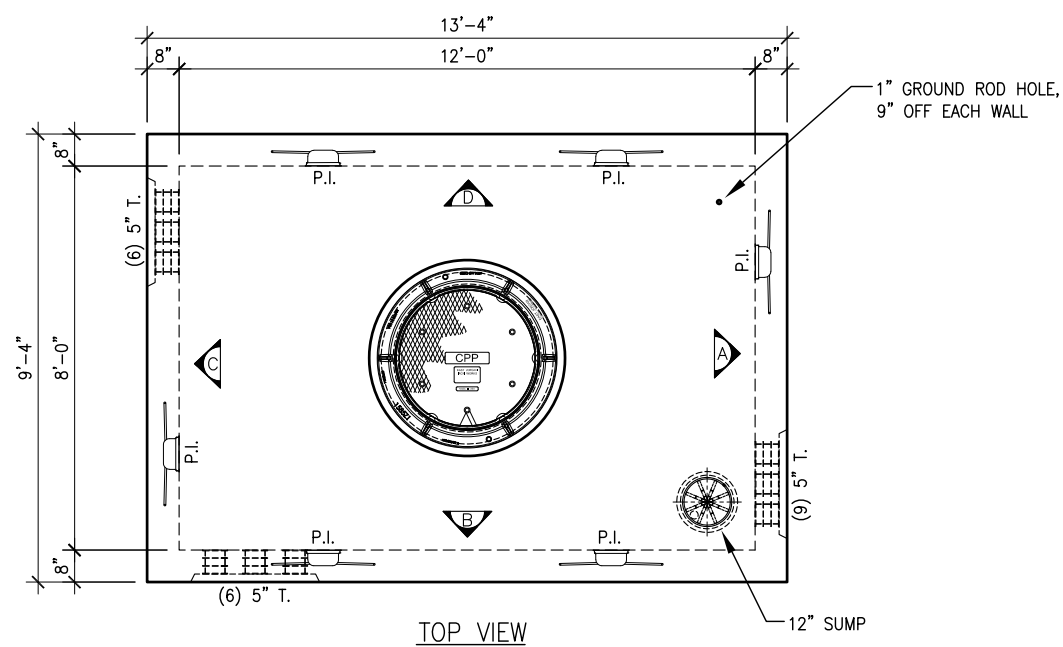
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CUSTOMER: **COOK PAVING & CONSTRUCTION CO., INC.**

JOB: ODOT 17-3000 ~ OPPORTUNITY CORRIDOR ~ PH 3 ~ BU-07 ~ CPP MH's

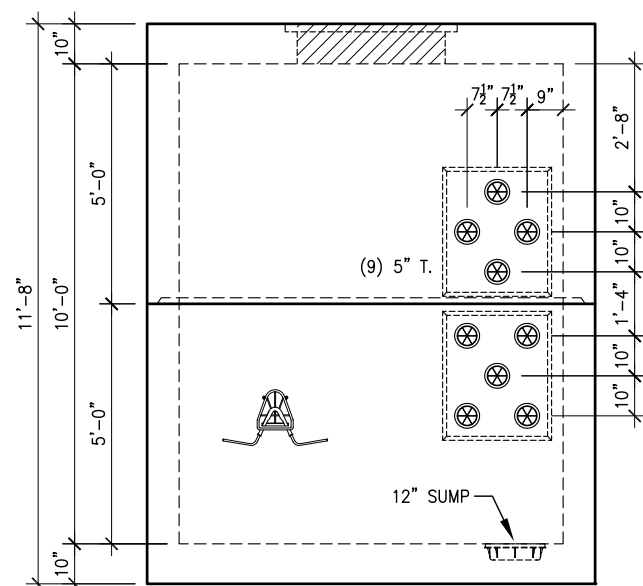
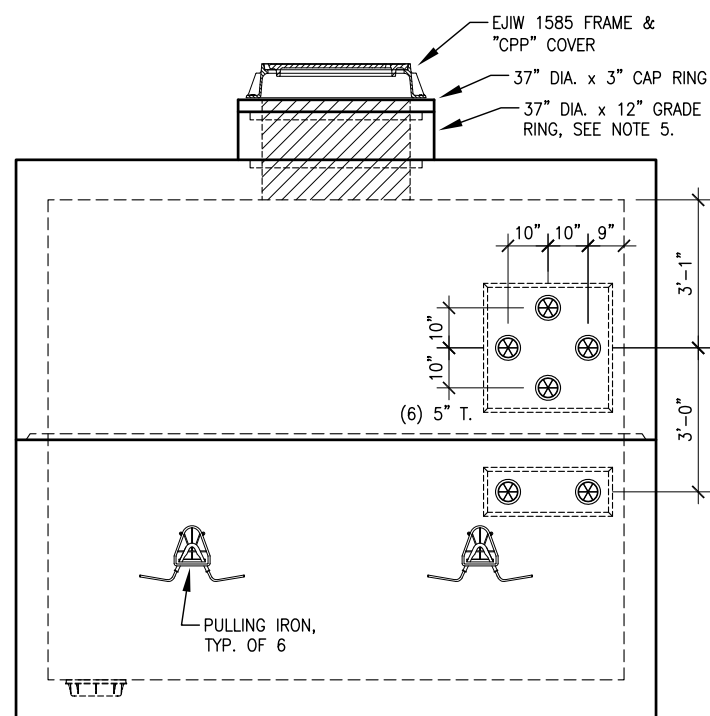
DRAWN BY:	CHECKED BY:	SCALE:	DATE:	JOB NO:	DWG NO:
DJF	RH	1/4"=1'-0"	8/7/19	173423	LP-001



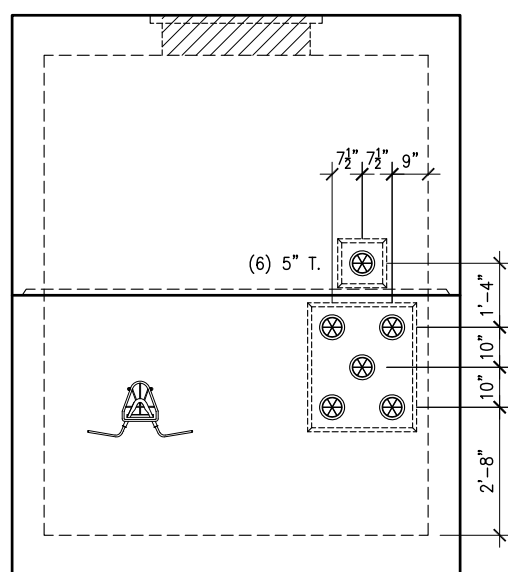


BU-07
NEW MH 99-7 (EM02)
8' x 12' x 10'
"CLAMSHELL" STYLE ELECTRICAL M.H.

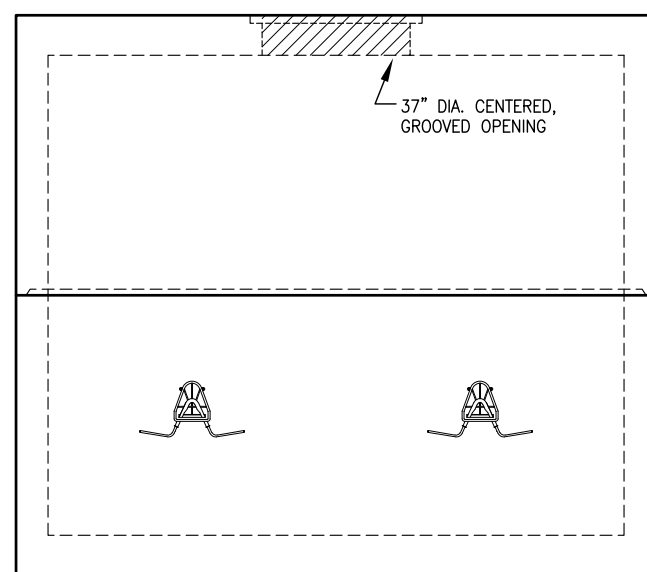
ELEVATION VIEWS ARE
INSIDE LOOKING OUT

WALL ELEVATION A

WALL ELEVATION B




WALL ELEVATION C



WALL ELEVATION D

- NOTES:**
- 1.) CONCRETE MIN. 5,000 PSI @ 28 DAYS
 - 2.) REINFORCING GRADE 60 ASTM A615-A617
60,000 PSI YIELD STRENGTH
 - 3.) HS-25 LOADING
 - 4.) ALL WALL ELEVATION VIEWS ARE INSIDE LOOKING OUT.
 - 5.) GRADE RINGS ARE AVAILABLE IN HEIGHTS OF 6", 9" & 12".
 - 6.) WEIGHTS: BASE: 37,990 #, TOP: 36,675 #

REVISONS			
NO.	DESCRIPTION	DATE	BY
1.	12" GRADE RING	8/7/19	DJF
2.			
3.			
4.			
5.			
6.			
7.			



Lindsay
P R E C A S T


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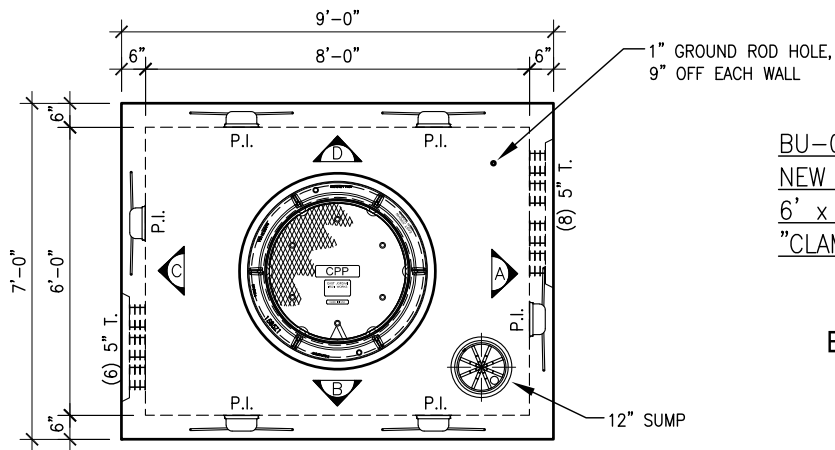
CUSTOMER:
COOK PAVING & CONSTRUCTION CO., INC.

JOB: **ODOT 17-3000 ~ OPPORTUNITY CORRIDOR ~ PH 3 ~ BU-07 ~ CPP MH's**

DRAWN BY: CHECKED BY: SCALE: DATE: JOB NO: DWG NO:

D.J.F. R.H. 1/4"=1'-0" 8/7/19 173423 1P-002

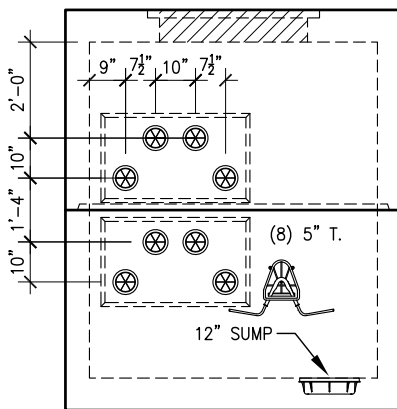




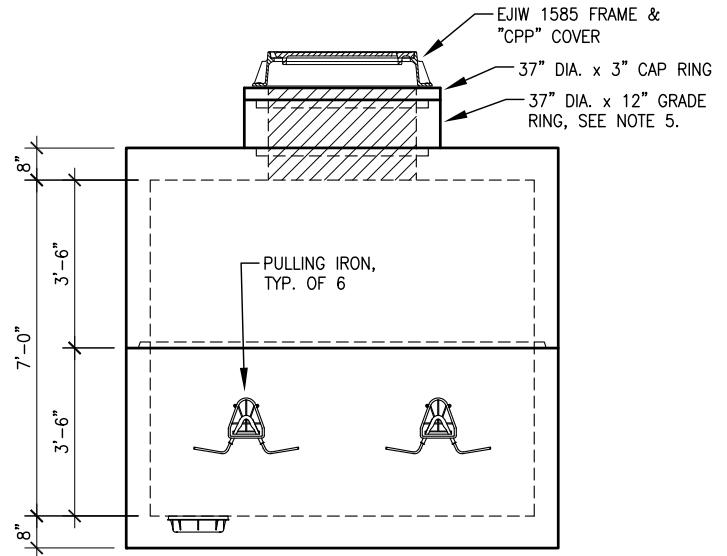
TOP VIEW

BU-07
NEW MH (EMH 04)
6' x 8' x 7'
"CLAMSHELL" STYLE ELECTRICAL M.H.

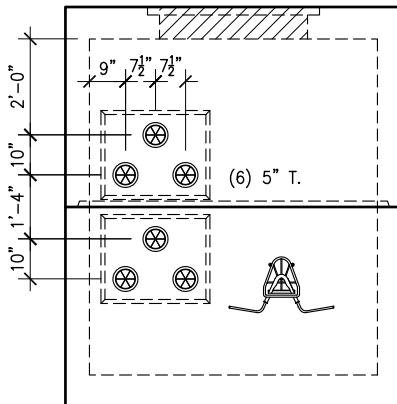
ELEVATION VIEWS ARE
INSIDE LOOKING OUT



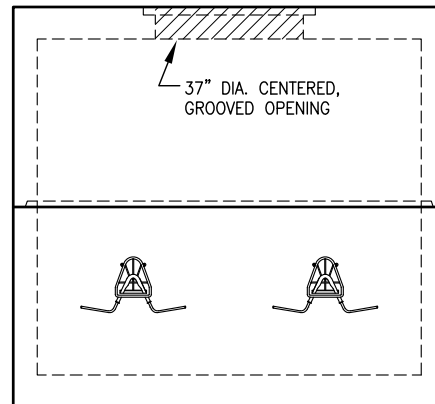
WALL ELEVATION A



WALL ELEVATION B



WALL ELEVATION C



WALL ELEVATION D

NOTES:

- 1.) CONCRETE MIN. 5,000 PSI @ 28 DAYS
- 2.) REINFORCING GRADE 60 ASTM A615-A617
60,000 PSI YIELD STRENGTH
- 3.) HS-25 LOADING
- 4.) ALL WALL ELEVATION VIEWS ARE INSIDE LOOKING OUT.
- 5.) GRADE RINGS ARE AVAILABLE IN HEIGHTS OF 6", 9" & 12".
- 6.) WEIGHTS: BASE: 14,650 #, TOP: 13,695 #

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1.	WALL "A" TERMINATORS	7/25/19	DJF
2.	12" GRADE RING	8/7/19	DJF
3.			
4.			
5.			
6.			
7.			

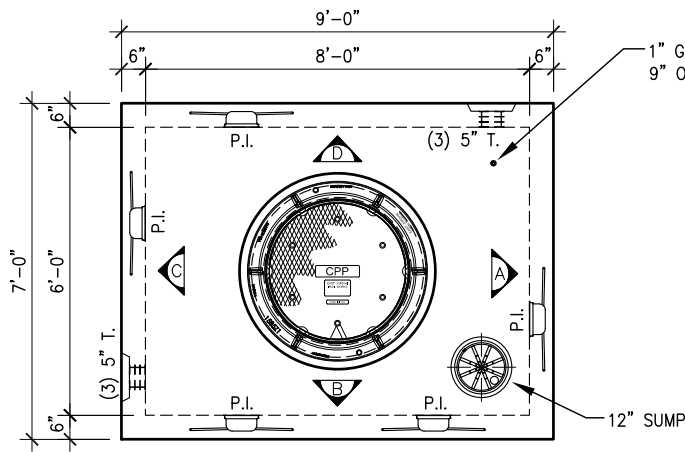


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CUSTOMER:
COOK PAVING & CONSTRUCTION CO., INC.
JOB: ODOT 17-3000 ~ OPPORTUNITY CORRIDOR ~ PH 3 ~ BU-07 ~ CPP MH's

DRAWN BY: DJF CHECKED BY: RH SCALE: 1/4"=1'-0" DATE: 8/7/19 JOB NO: 173423 DWG NO: LP-003

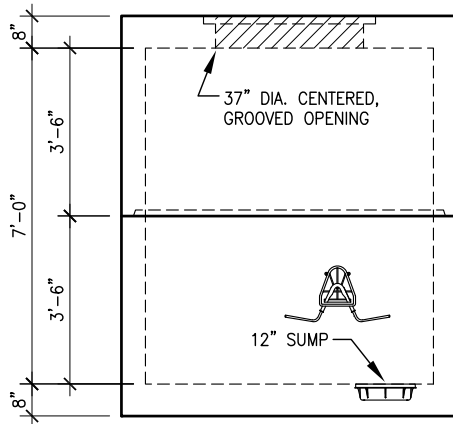




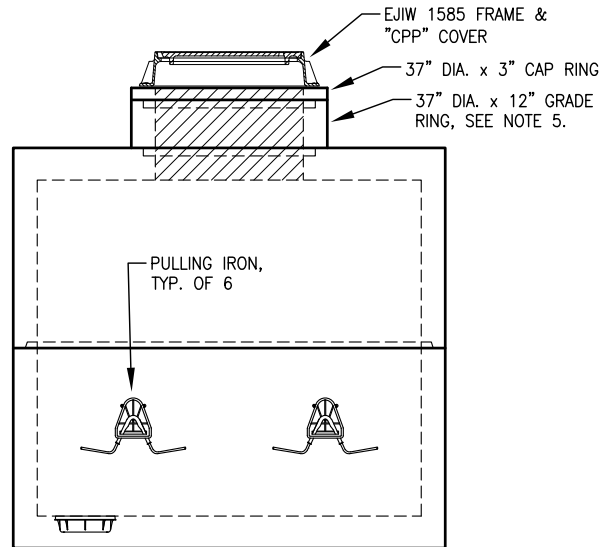
TOP VIEW

BU-07
NEW MH 99-14 (EMH 41)
6' x 8' x 7'
"CLAMSHELL" STYLE ELECTRICAL M.H.

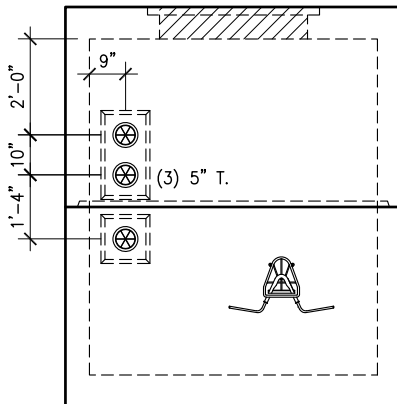
ELEVATION VIEWS ARE
INSIDE LOOKING OUT



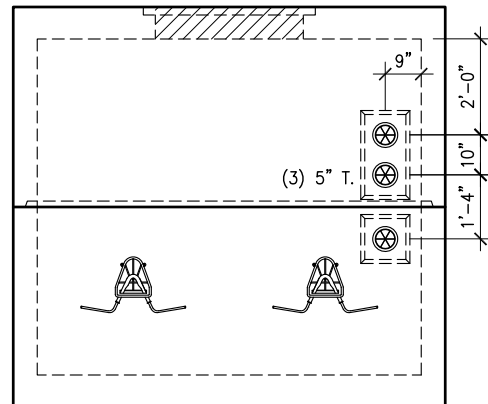
WALL ELEVATION A



WALL ELEVATION B



WALL ELEVATION C



WALL ELEVATION D

NOTES:

- 1.) CONCRETE MIN. 5,000 PSI @ 28 DAYS
- 2.) REINFORCING GRADE 60 ASTM A615-A617
60,000 PSI YIELD STRENGTH
- 3.) HS-25 LOADING
- 4.) ALL WALL ELEVATION VIEWS ARE INSIDE LOOKING OUT.
- 5.) GRADE RINGS ARE AVAILABLE IN HEIGHTS OF 6", 9" & 12".
- 6.) WEIGHTS: BASE: 14,650 #, TOP: 13,695 #

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1.	BU-07 - DC018 - 9-10-19	9/23/19	DJF
2.			
3.			
4.			
5.			
6.			
7.			

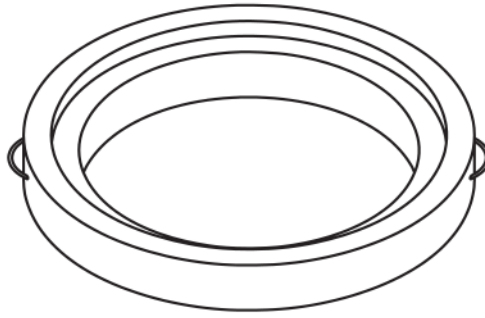


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CUSTOMER:
COOK PAVING & CONSTRUCTION CO., INC.
JOB: ODOT 17-3000 ~ OPPORTUNITY CORRIDOR ~ PH 3 ~ BU-07 ~ CPP MH's

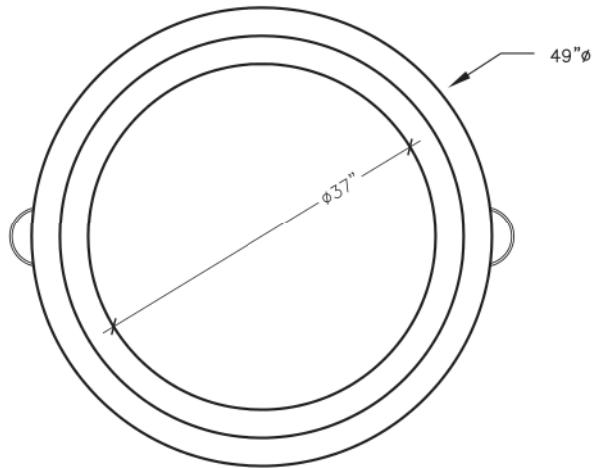
DRAWN BY: DJF CHECKED BY: RH SCALE: 1/4"=1'-0" DATE: 9/23/19 JOB NO: 173423 DWG NO: LP-004





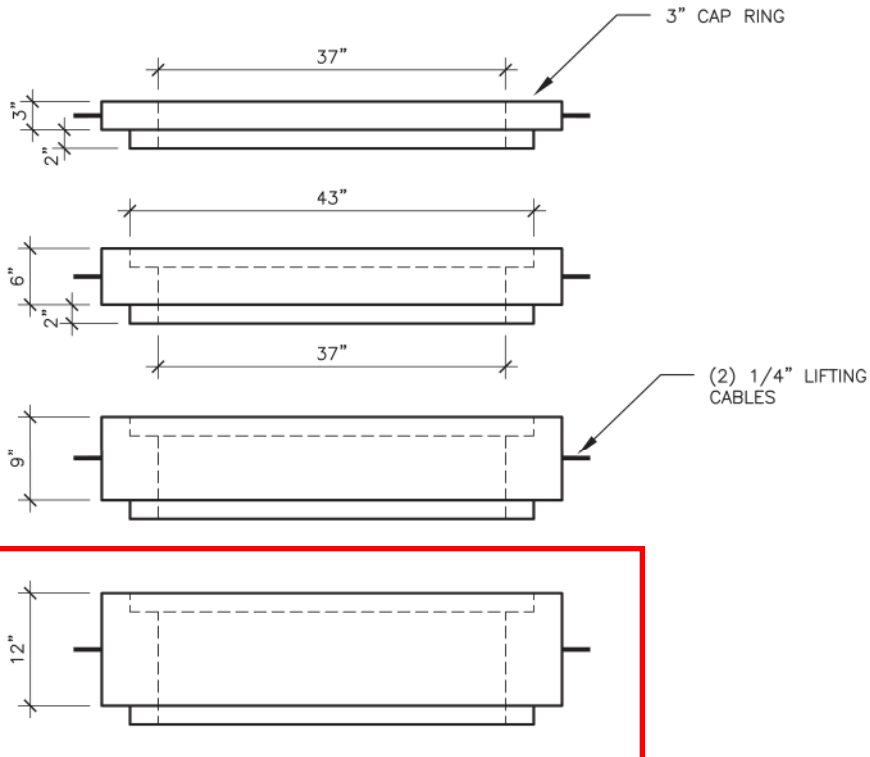
LINDSAY PRECAST GRADE RINGS

DIA.	HEIGHT	POUNDS
37"	6"	422
37"	9"	633
37"	12"	843



CAP RING

DIA.	HEIGHT	POUNDS
37"	3"	270



37" DIA MANHOLE GRADE RINGS

NOTES:

1. CONCRETE MIN. 5,000 PSI @ 28 DAYS
2. REINFORCING GRADE 60 ASTM A615-A617 60,000 PSI YIELD STRENGTH
3. HS-20 LOADING

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1.			
2.			
3.			
4.			
5.			
6.			
7.			



THIS DRAWING IS THE PROPRIETARY PROPERTY OF LINDSAY PRECAST. REPRODUCTION, DISCLOSURE OR USE OF ANY PART OF THIS DRAWING OR ANY INFORMATION THEREIN IS EXPRESSLY PROHIBITED WITHOUT PRIOR WRITTEN CONSENT OF LINDSAY PRECAST.

CUSTOMER:

JOB: 37" DIA MANHOLE GRADE RINGS

DRAWN BY: CHECKED BY: SCALE:

DATE:

JOB NO:

DWG NO:

LP-001



EJIW EAST JORDAN
IRON WORKS EST.1883

800-626-4653

www.ejiw.com

MADE IN USA

PRODUCT NUMBER

00158514

CATALOG NUMBER

1585Z1

MANHOLE FRAME

LOAD RATING

HEAVY DUTY

COATING

DIPPED

ESTIMATED WEIGHT

FRAME: 242 LBS 110kg

MATERIAL SPECIFICATION

FRAME — GRAY IRON
ASTM A48 CL35B

OPEN AREA

N/A

✓ DESIGNATES MACHINED
SURFACE

DRAWN
DEW

DATE
01/18/07

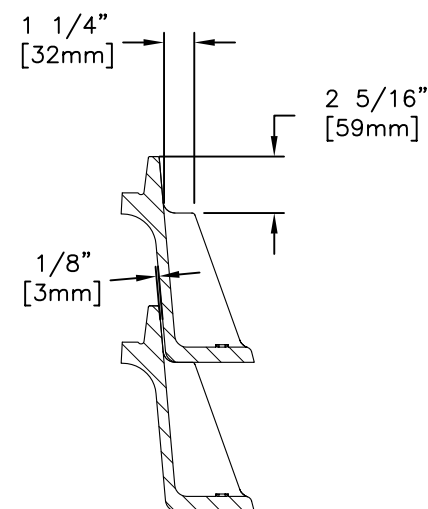
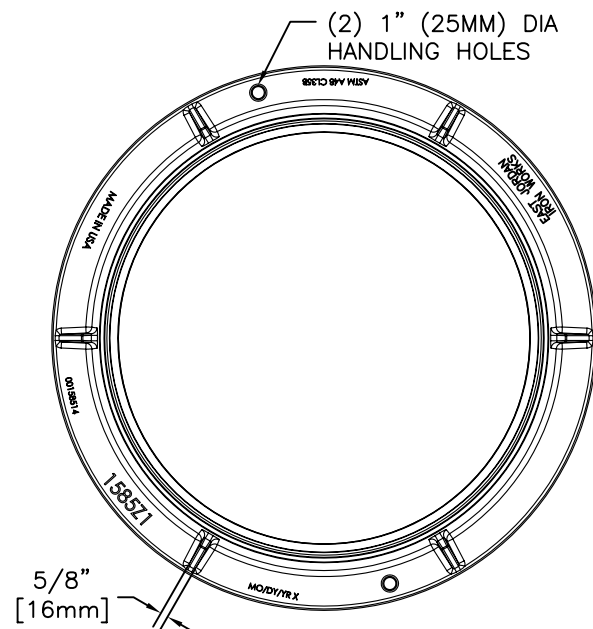
LAST REVISED

DATE

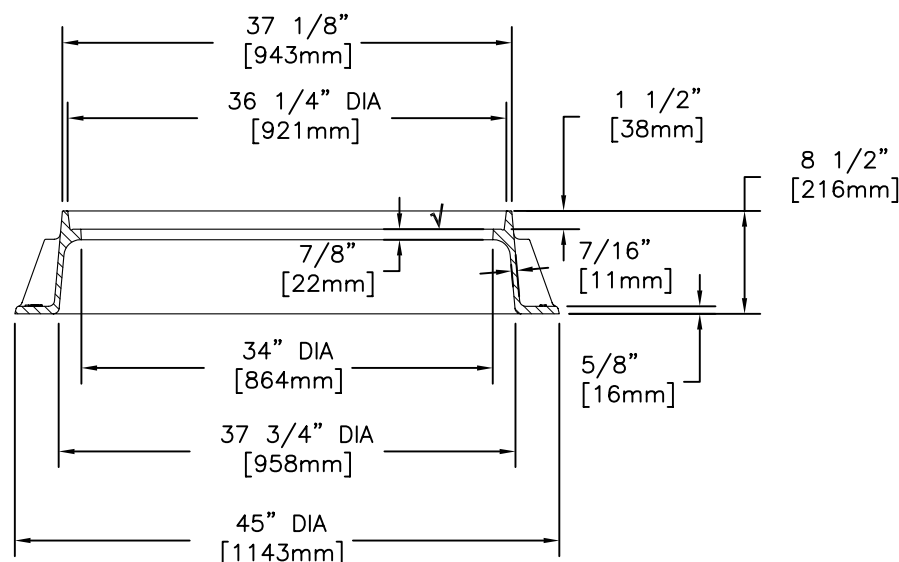
REFERENCE INFORMATION

00158513

SLD

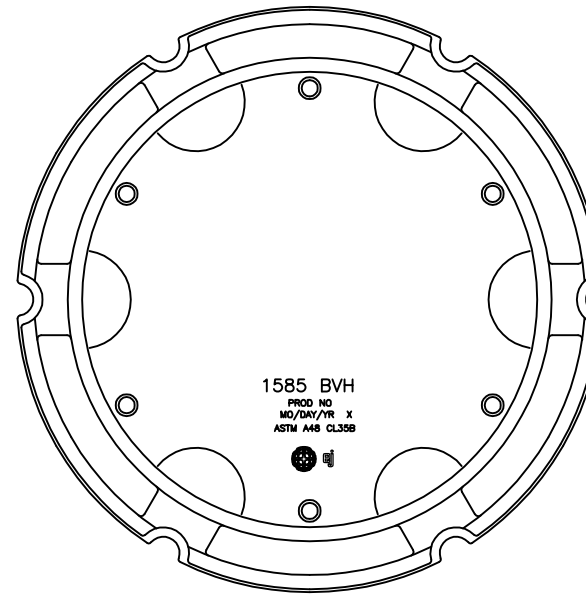
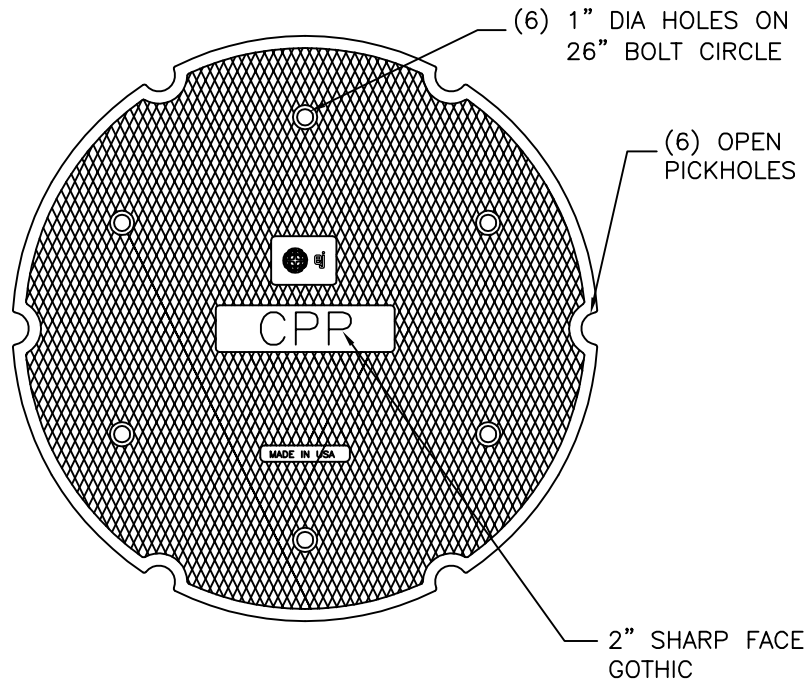


STACK DETAIL

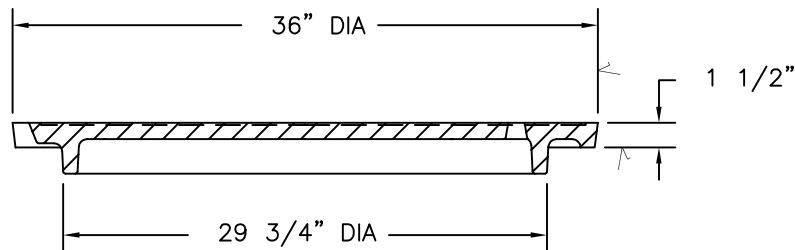


SECTION

1585BVH Cover



BOTTOM VIEW



SECTION VIEW

Product Number

00158526

Design Features

- Materials
Gray Iron (CL35B)
- Design Load
Heavy Duty
- Open Area
n/a
- Coating
Dipped
- ✓ Designates Machined Surface

Certification

- ASTM A48
-
-
- Country of Origin: USA

Drawing Revision

08/12/2004 Designer: SBB
6/26/2015 Revised By: DAE

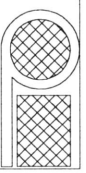
Disclaimer

Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

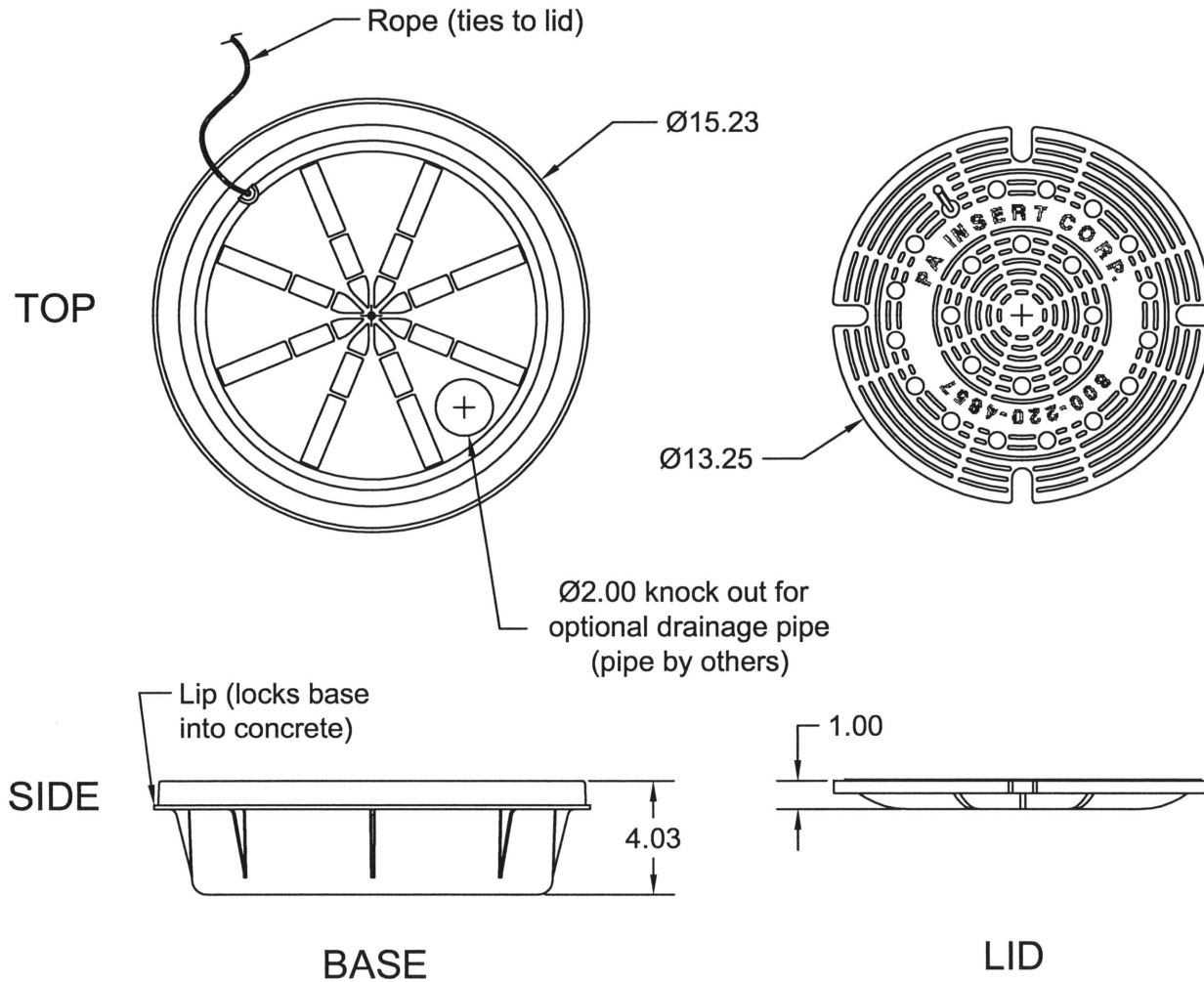
CONFIDENTIAL: This drawing is the property of EJ GROUP, Inc., and embodies confidential information, registered marks, patents, trade secret information, and/or know how that is the property of EJ GROUP, Inc. Copyright © 2012 EJ GROUP, Inc. All rights reserved.

Contact

800 626 4653
ejco.com

Fax to:	Customer		Approved/Notes	PA Insert Corp PO Box 199 Spring City PA 19475 tel: 610-948-9688 fax: 610-948-4975 email: sales@pennsylvaniainsert.com web: www.pennsylvaniainsert.com	
Fax#	Project				
From	Job#	Ship Date			
Date	PA Insert Quote/Order#	Page ____ of ____			

NEW PLASTIC SUMP

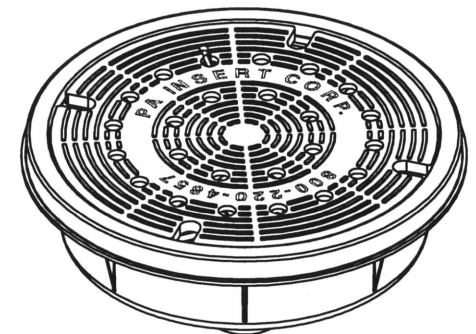


BASE:

- Material - Propylene
- Rope connects to lid
- Lip positively locks base into concrete
- 2" knock out hole in base for optional drain pipe (drain pipe by others)

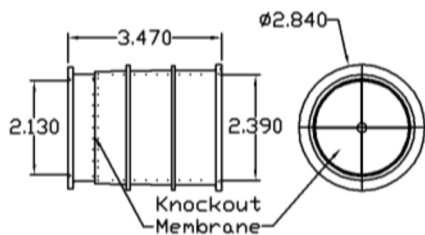
LID:

- Material - 30% Glass filled Propylene
- Top surface has raised areas to provide traction
- Ribbed construction provides increased strength and rigidity

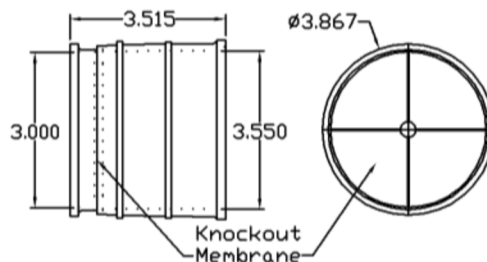


3D VIEW

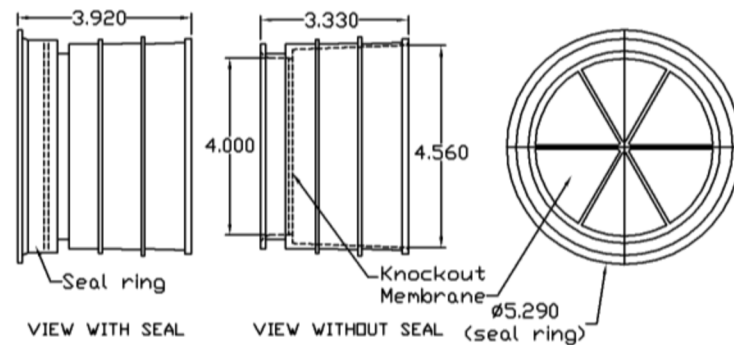
DATE:	CUSTOMER:	<h1 style="text-align: center;">ELECTRIC / TELEPHONE DUCT TERMINATORS</h1> <p style="text-align: center;">You can find this information online at: PENNSYLVANIAINSERT.COM OR EMAIL YOUR REQUEST TO: SALES@PENNSYLVANIAINSERT.COM</p>	<h2 style="text-align: center;">PENNSYLVANIA INSERT</h2> <p style="text-align: center;">490 FIRST AVENUE ROYERSFORD, PA 19468 P. 610.948.9688 F. 610.948.4975</p>	
REV 1:	JOB:			
REV 2:	OWNER:			



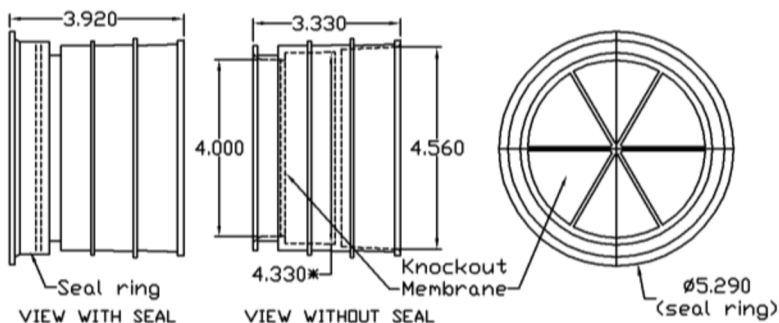
TE-2 2" TERMINATOR
(ACCEPTS SCH 40 ONLY)



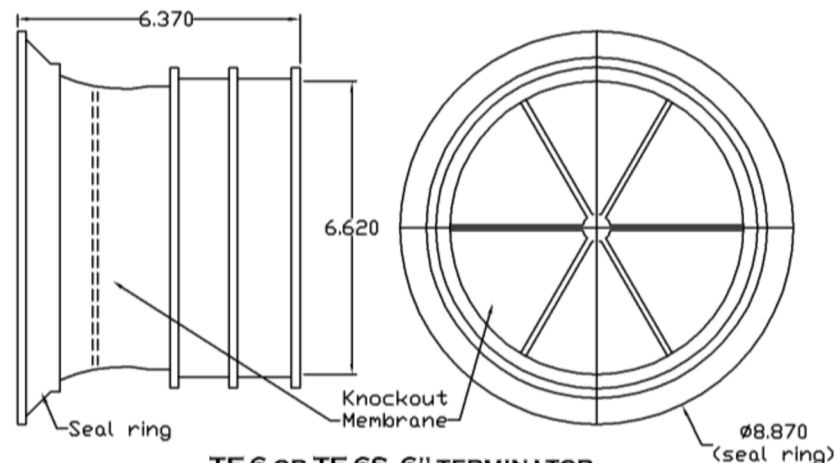
TE-3 3" TERMINATOR
(ACCEPTS SCH 40 ONLY)



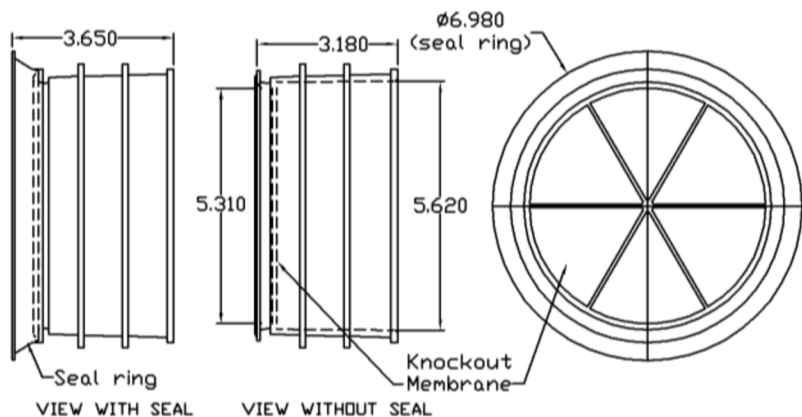
TE-4G OR TE-4GS 4" TERMINATOR
(ACCEPTS SCH 40 ONLY)



TE-4B OR TE-4BS 4" STEP-DOWN TERMINATOR
(ACCEPTS SCH 40 OR SCH 20)



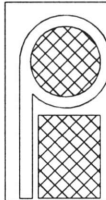
TE-6 OR TE-6S 6" TERMINATOR
(ACCEPTS SCH 40/80)



TE-5 OR TE-5S 5" STEP-DOWN TERMINATOR
(ACCEPTS SCH 40 OR SCH 80)

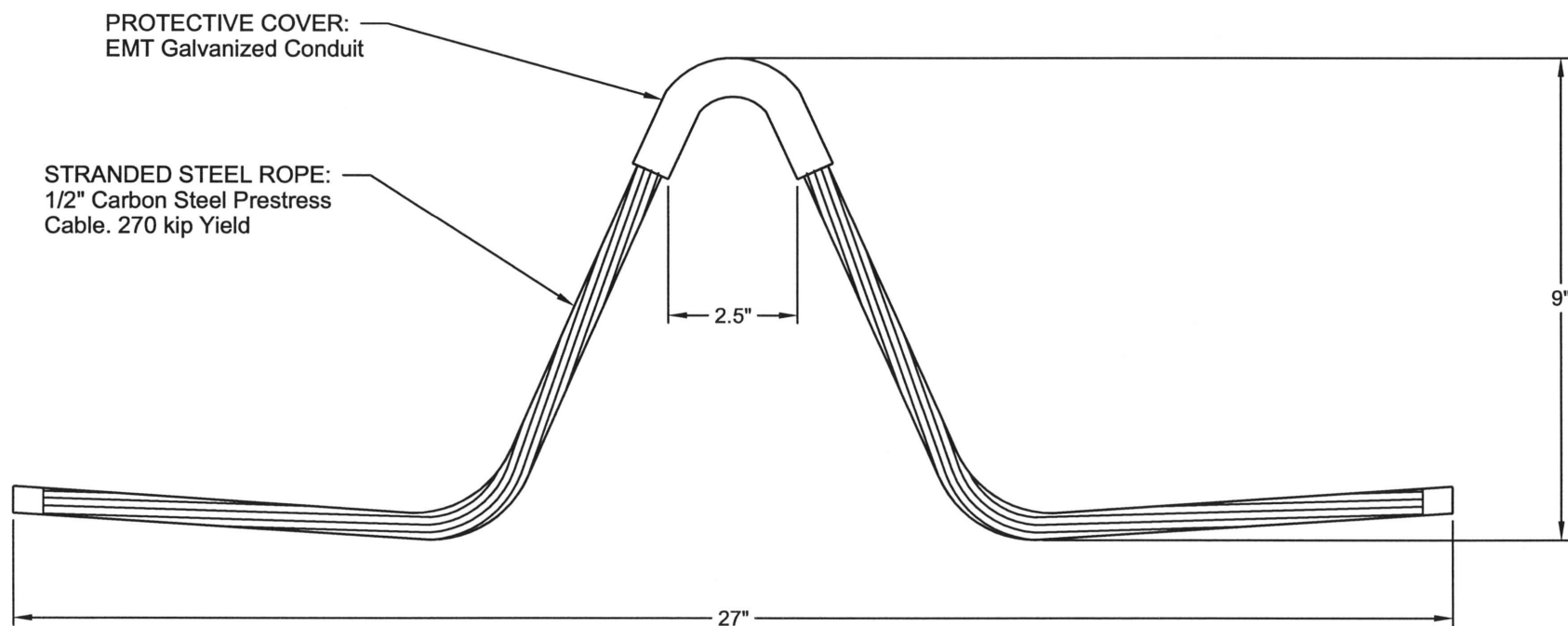
Model	TE-2	TE-3	TE-4B	TE-4BS	TE-4G	TE-4GS	TE-5	TE-5BS	TE-6	TE-6BS
Color	black	black	black	black	black	black	black	black	black	black
Duct Size	2"	3"	4"	4"	4"	4"	5"	5"	6"	6"
Pipe Wall	SCH40	SCH40	SCH20	SCH20	SCH40	SCH40	SCH40	SCH40	SCH40	SCH40
			SCH40	SCH40			SCH80	SCH80	SCH80	SCH80
Seal	n/a	n/a	no	yes	no	yes	no	yes	no	yes
Material	PVC	PVC	PVC	PVC	PVC	PVC	Polystyrene	Polystyrene	Polystyrene	Polystyrene

Specifications: Penetrations for cables shall be Electric/Telephone Duct Terminators as manufactured by Pennsylvania Insert Corp., Spring City, PA. Terminators shall be sized to accept 2" (3", 4", 5", 6") Sch 40 (20, 80) pipe and will provide a bonding surface for glueing cable or duct to the terminator, creating a watertight penetration. Terminators shall be manufactured from polystyrene or polyvinylchloride (PVC).

Fax to:	Customer		Approved/Notes	PA Insert Corp PO Box 199 Spring City PA 19475 tel: 610-948-9688 fax: 610-948-4975 email: sales@pennsylvaniainsert.com web: www.pennsylvaniainsert.com	
Fax#	Project				
From	Job#	Ship Date			
Date	PA Insert Quote/Order#	Page ____ of ____			

SINGLE STRAND, UPI CABLE: MODEL# PI-U1 (#1003)

SWL = 11,000 lbs



NO SCALE

12/08

Proposal:

SPECIFICATION SHEETS
PVC & ACCESSORIES

Project:

Opportunity Corridor
Phase III
Project # 16118

Prepared For:

Cook Paving & Construction Co
4545 Spring Road
Cleveland, Ohio 44131

Prepared By:

RA STRAUSS Electric Supply Co.
4300 Superior Ave
Cleveland, Ohio 44103
216-361-4541 Phone
216-361-4542 Fax

Date:

April 8, 2019

MFGR	CAT #	Description	
CANTEX	A77FA42	5IN PVC EB20 TC-6	
PRIME	48716-020	5IN PVC EB20 TC-6	
ALLIED		5IN PVC EB20 TC-6	
CANTEX	A77EA43	4IN PVC EB20 TC-6	
PRIME	48715-020	4IN PVC EB20 TC-6	
ALLIED		4IN PVC EB20 TC-6	
CANTEX	A79CA42	2IN PVC DB60 TC-6	
PRIME	48811-020	2IN PVC DB60 TC-6	
ALLIED		2IN PVC DB60 TC-6	
GS INDUSTRIES	131-1	BASE SPACERS 5IN X 2IN SEPARATION	
GS INDUSTRIES	130-2	BASE SPACERS 5IN X 2IN SEPARATION	
NATIONAL PIPE		5IN PVC 5 DEGREE COUPLINGS, BELL TO BELL	
ALLIED	59683	5IN PVC END BELL	
MORRIS	404	MEDIUM GRADE PVC CEMENT	
DOTTIE	D640	PULL STRING	
PRO-LINE SAFETY	605	3IN X 1000FT DETECTABLE WARNING TAPE	

INDUSTRY ORGANIZATIONS

CANTEX actively supports those organizations which set standards and promote professional practices in the electrical industry. These include NEMRA, NAED, IAEI, IEEE, along with other associations in the construction industry.

QUALITY ASSURANCE

CANTEX has a comprehensive quality control program to ensure compliance with industry standards established by Underwriters Laboratories, National Electrical Code, the American Society for Testing and Materials and Canadian Standards Association.

From virgin raw materials blended into compounds through extrusion or injection molding to final inspection and testing of the finished product, the manufacturing process is monitored to make sure quality standards are met or exceeded.

Each plant is graded and held accountable for the quality control performance of its total output.

To further strengthen the company's goal for quality products, a centralized quality control review procedure ensures that every plant is producing at a consistent level of quality for all similar products. You know you're getting the very best every time you buy from CANTEX.

PVC CONDUIT

MFGR: CANTEX

2PVC EB20 OR 2PVC DB60

4PVC EB20

5PVC EB20

PVC ELECTRICAL STANDARDS BY PRODUCT

Schedule 40 Conduit

UL 651, NEMA TC-2 and NEC-Article 352
CSA C22.2 No. 211.2

Schedule 80 Conduit

UL 651, NEMA TC-2 and NEC-Article 352

PVC Electrical Fittings

Fittings for electrical applications conform to one or more of the following specifications:
NEMA TC-3 and UL 514B, UL651,
NEMA TC-6&8, ASTM F-512, UL 50,
CSA 22.2 No. 211.2 85-M89

Utility Duct - Extra Strength

NEMA TC 6&8 and ASTM F-512

Utility Duct Fittings

NEMA TC-9

EZ-FLEX ENT (Electrical Nonmetallic Tubing) & Fittings

NEMA TC-13 and NEC Article 362 UL 1653A

ENVIRO-FLEX Liquidtight Conduit

UL1660, NEC 356
CSA 22.2 No. 227.2.1

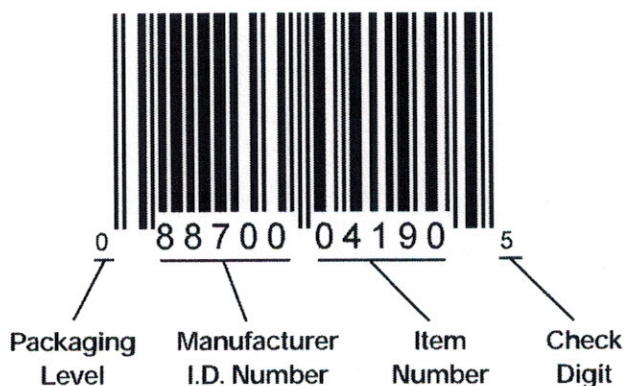
ENVIRO-FLEX Liquidtight Fittings

UL 514B and NEMA FB-1

Uniform Product Code

UPC-A

Item bar code identifies a single product unit.

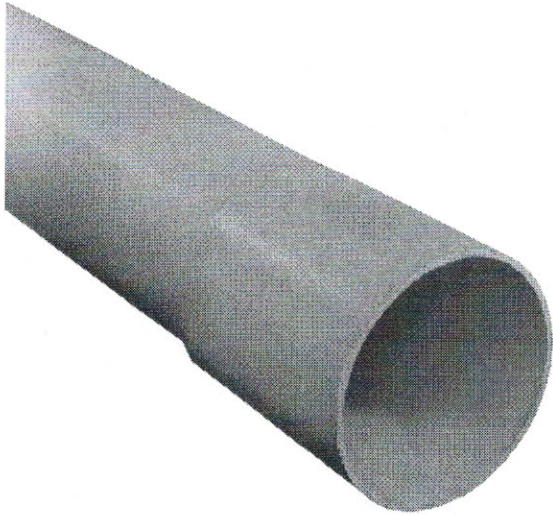


UPC-ITF

Shipping container bar code identifies each standard carton of products.



5 in. x 20 ft. EB-20 PVC Utility Duct



Item Number: A77FA42
Pack Weight: 1,000 Lbs
Pack Quantity: 760
Quantity UOM: FT

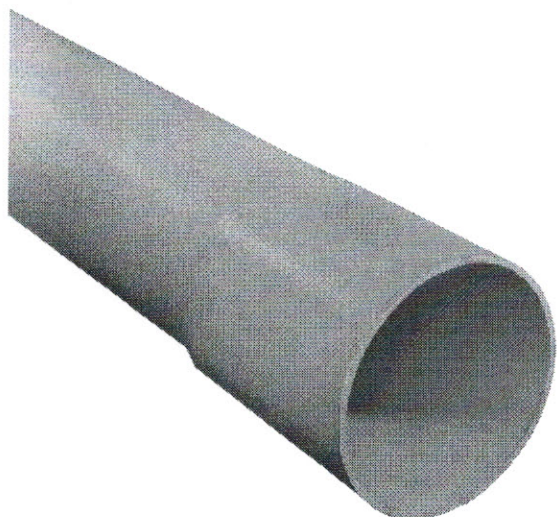
Description:

CANTEX A77FA42 is a 5 in. x 20 ft. EB-20 PVC Utility Duct designed for the power and communication industry to protect underground cables and raceways

Features:

- Designed to be used in concrete encased burial applications only
- Made with High Modulus (HM) PVC material and rated for 90-degree C cable
- Does not support combustion and is self extinguishing
- Meets NEMA Standard TC-6 & TC-8 and ASTM F-512 Requirements
- ETL Listed
- Made in USA

4 in. x 20 ft. EB-20 PVC Utility Duct



Item Number: A77EA42

Pack Weight: 967 Lbs

Pack Quantity: 1,140

Quantity UOM: FT

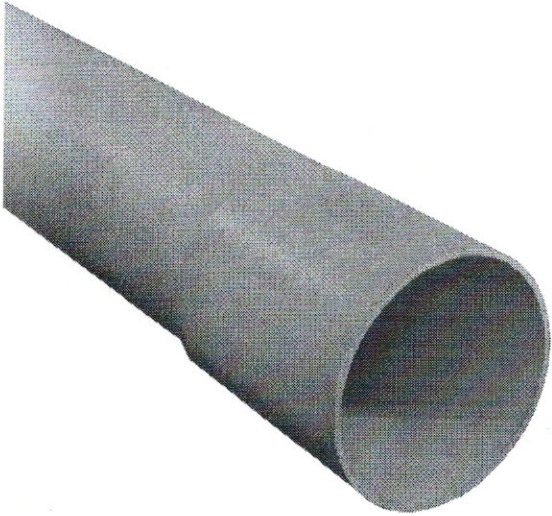
Description:

CANTEX A77EA42 is a 4 in. x 20 ft. EB-20 PVC Utility Duct designed for the power and communication industry to protect underground cables and raceways

Features:

- Designed to be used in concrete encased burial applications only
- Made with High Modulus (HM) PVC material and rated for 90-degree C cable
- Does not support combustion and is self extinguishing
- Meets NEMA Standard TC-6 & TC-8 and ASTM F-512 Requirements
- ETL Listed
- Made in USA

2 in. x 20 ft. EB-20 PVC Utility Duct



Item Number: A77CA42

Pack Weight: 910 Lbs

Pack Quantity: 2,800

Quantity UOM: FT

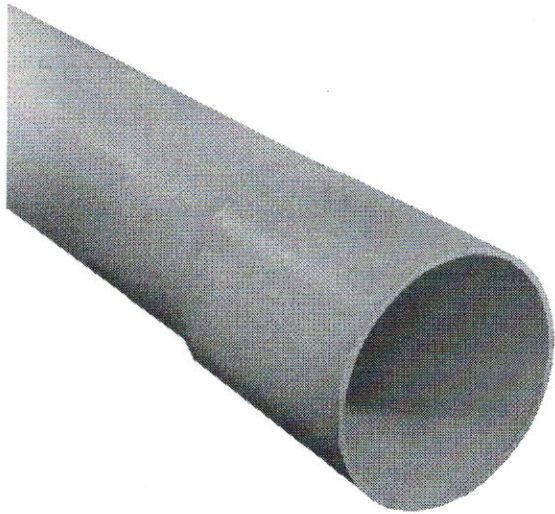
Description:

CANTEX A77CA42 is a 2 in. x 20 ft. EB-20 PVC Utility Duct designed for the power and communication industry to protect underground cables and raceways

Features:

- Designed to be used in concrete encased burial applications only
- Made with High Modulus (HM) PVC material and rated for 90-degree C cable
- Does not support combustion and is self extinguishing
- Meets NEMA Standard TC-6 & TC-8 and ASTM F-512 Requirements
- ETL Listed
- Made in USA

2 in. x 20 ft. DB-60 PVC Utility Duct



Item Number: A79CA42

Pack Weight: 910 Lbs

Pack Quantity: 2,800

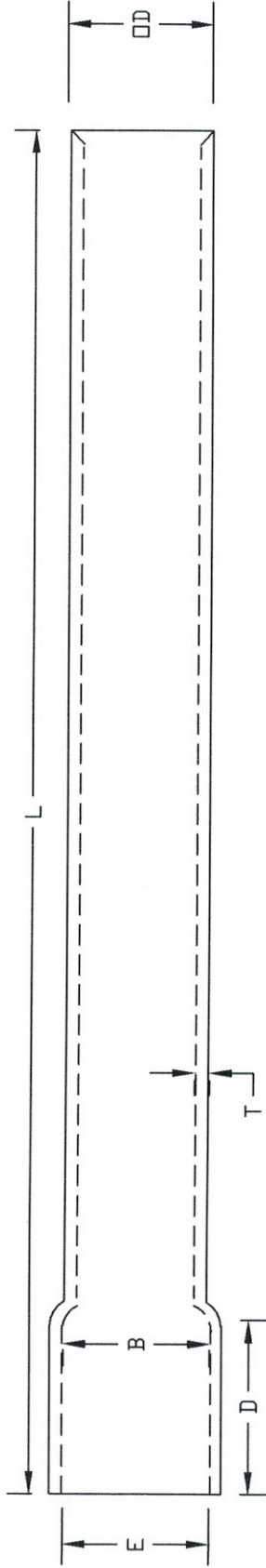
Quantity UOM: FT

Description:

CANTEX A79CA42 is a 2 in. x 20 ft. DB-60 PVC Utility Duct designed for the power and communication industry to protect underground cables and raceways

Features:

- Designed to be used in direct burial or concrete encased burial applications
- Made with High Modulus (HM) PVC material
- Does not support combustion and is self extinguishing
- Meets NEMA Standard TC-6 & TC-8 and ASTM F-512 Requirements
- Rates for 90-degree C Cable
- Made in USA



Part Number	Size	T Min.	OD	Oval.	E	B	D Min.	L Min.
A77BA42	1"	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A77BE42	1 1/2"	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A77CA42	2"	0.060"	2.375"	0.060"	2.396"	2.378"	1.750"	240"
A77DA42	3"	0.061"	3.500"	0.060"	3.529"	3.503"	2.875"	240"
A77EA42	4"	0.082"	4.500"	0.100"	4.533"	4.502"	3.375"	240"
A77FA42	5"	0.103"	5.563"	0.100"	5.601"	5.565"	4.000"	240"
A77GA42	6"	0.125"	6.625"	0.100"	6.669"	6.627"	5.000"	240"

Dimensions are Nominal.

ETL Listed
 Meets requirements of NEMA TC 6&8.
 Meets ASTM F-512.
 Material is Rigid PVC
 Bells are interference fit.
 Must be encased in concrete.
 Spigot I.D. is chamfered.



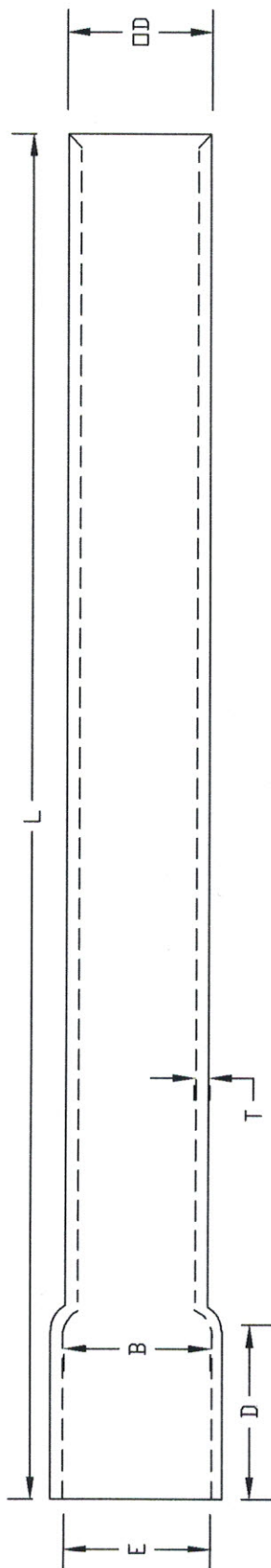
CANTEX
 INC.

Fort Worth, TEXAS

EB-20 Rigid PVC Conduit
 High Modulus 500,000 psi

Drawn By: D.G. 1/2/19 A77BA42

Complies with Federal and
 military specifications by conforming to UL 651



Part Number	Size	T Min.	DD	Oval.	E	B	D Min.	L Min.
A79CA42	2"	0.060"	2.375"	0.060"	2.400"	2.381"	1.750"	240"
A79DA42	3"	0.092"	3.500"	0.060"	3.538"	3.508"	2.875"	240"
A79EA42	4"	0.121"	4.500"	0.100"	4.544"	4.509"	3.375"	240"
A79FA42	5"	0.152"	5.563"	0.100"	5.614"	5.573"	4.000"	240"
A79GA42	6"	0.182"	6.625"	0.100"	6.687"	6.636"	5.000"	240"

Dimensions are Nominal. See NEMA TC 6&8 for tolerances.

Meets requirements of NEMA TC 6&8.
 Meets ASTM F-512.
 Material is Rigid PVC
 Bells are clearance fit.
 For Direct Bury only.
 Spigot I.D. is chamfered.

CANTEX

INC.
 Fort Worth, TEXAS

DB-60 Rigid PVC Conduit
 High Modulus 500,000 psi

Drawn By: D. Gwinn

Date: 10/10/18

A79CA42

Prime Conduit, Inc.

P&C® Duct

PVC CONDUIT
MFGR: PRIME
2PVC EB20 OR 2PVC DB60
4PVC EB20
5PVC EB20

Prime Conduit P&C® (Power & Communications) Duct and fittings are designed and formulated specifically for concrete encased and direct burial applications of power utility primaries, secondaries, street lighting and distribution systems. Prime Conduit P&C Duct complies with NEMA Standard TC-6 & 8, and ASTM F-512 for utility duct. Both EB and DB duct are rated for use with 90°C conductors. P&C Duct fittings comply with NEMA TC-9 Standard.

Advantages:

- Manufactured for high modulus PVC compound
- High impact strength
- Excellent structural strength
- Superior load bearing
- Multiple duct banks can be pre-assembled and lowered into trench
- No special cutting or tapering devices required
- Provides easy bending around obstructions minimizing the need for special angle couplings and sweeps
- Superior aging and weathering characteristics

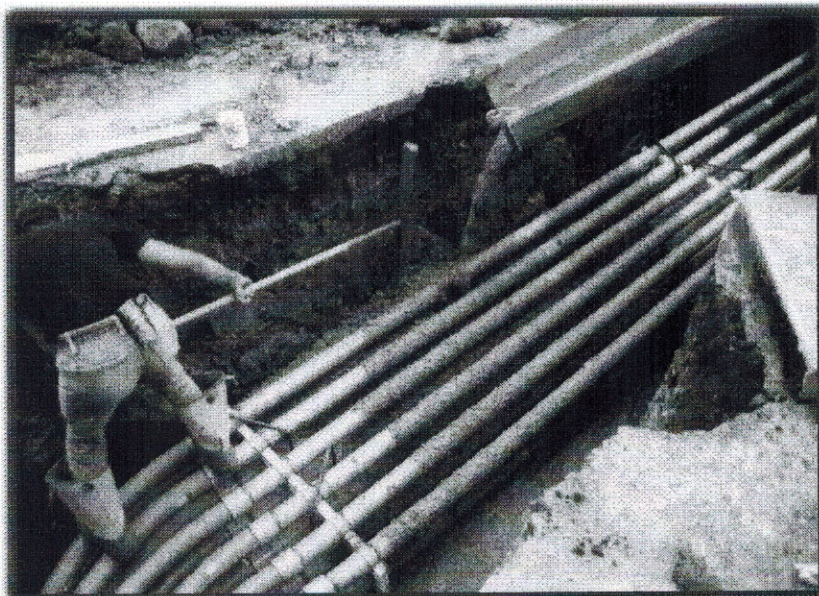
Features:

- Heat resistant
- Fire resistant
- Conforms to NEMA Standard TC-6 & 8 and ASTM Standard F-512 for utility duct
- Sweeps conform to NEMA Standard TC-9
- Prime Conduit P&C Duct Type EB-20 is ETL Listed
- Low coefficient of expansion
- Continuous rigid control
- Smooth inner wall and smooth transition between joints

Engineering Features:

Chemical Inertness resists water absorption and is totally immune to galvanic or electrolytic attacks.

Solvent Cemented Joints provide leak proof duct runs tested at 25 psi. This type of joint eliminates the need for costly mechanical rodding procedure. Prime Conduit P&C Duct can be rodded pneumatically.



Prime Conduit, Inc.

P&C® Duct - Type EB

Prime Conduit nonmetallic P&C Duct Type EB is manufactured from Prime Conduit's exclusive high modulus PVC compound, developed especially for power and communications applications, and is designed for use in concrete encased installations. Type EB is rated for 90°C Cable.



P&C Duct Type EB-20

Nom. Size	Part Number 10'	Part Number 20'	Std. Crate Qty. 10' (ft.)	Std. Crate Qty. 20' (ft.)	Approx. Wt. per 100 ft (lbs.)	Avg. O.D. (in.)	*Min. Wall (in.)
2"	-	48711-020	-	2,800	37	2.375	0.060
3"	-	48713-020	-	2,000	60	3.500	0.061
4"	48715-010	48715-020	570	1,140	99	4.500	0.082
5"	48716-010	48716-020	380	760	148	5.563	0.103
6"	48717-010	48717-020	260	520	211	6.625	0.125

ETL Listed to UL651 in compliance with the NEC

Meets NEMA Standard TC-6 & 8

EB-20/ASTM F-512

*Minimum wall thickness relates to 500,000 modulus

One belled end per 10' & 20' length

P&C Duct Type EB-35 Heavy Wall

Nom. Size	Part Number 10'	Part Number 20'	Std. Crate Qty. 10' (ft.)	Std. Crate Qty. 20' (ft.)	Approx. Wt. per 100 ft (lbs.)	Avg. O.D. (in.)	*Min. Wall (in.)
2"	-	68711-020	-	2,800	39	2.375	0.060
3"	-	68713-020	-	2,000	72	3.500	0.076
4"	-	68715-020	-	1,140	115	4.500	0.100
5"	68716-010	68716-020	380	760	174	5.563	0.126
6"	-	68717-020**	-	520	248	6.625	0.152

Meets NEMA Standard TC-6&8

EB-35/ASTM F-512

*Minimum wall thickness relates to 500,000 modulus

One belled end per 10' & 20' length

** Special order

Use DB Sweeps with EB Duct

Prime Conduit, Inc.

P&C® Duct – Type DB

Prime Conduit nonmetallic P&C Duct Type DB is manufactured from Prime Conduit's exclusive high modulus PVC compound, developed especially for power and communications applications, and is designed for use in direct burial or concrete encased installations. Type DB is rated for 90°C Cable.

Trenching:

Trench should be graded true and free from stones and soft spots. Backfill should also be free of stones and be firmly tamped around the sides of the conduit, to develop maximum supporting strength. Tamping on top of the conduit is not recommended.

Backfill:

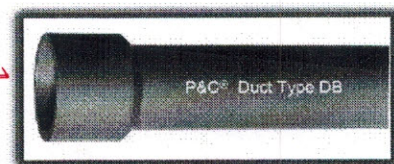
In rocky soil where it is impossible to have an even trench bottom, a selected backfill should be put in before laying the conduit. Selected backfill (not tamped) at least 6" over the top of the conduit is recommended. After final backfill is placed, tamping may be used to finish the grade.

The method of direct burial varies with soil condition, load conditions, and engineering preferences. A common practice is to lay one tier at a time, backfill, and repeat with the desired spacing of ducts being made as ducts are layered.

Many companies have used the heavier wall Type DB-120 in a duct-to-duct formation. Where limited loads occur, this type of installation has proven satisfactory.

P&C Duct Type DB-60

Nom. Size	Part Number	Std. Crate Qty. (ft.)	Approx. Wt. per 100 ft (lbs.)	Avg. O.D. (in.)	¹ Min. Wall (in.)
2"	48811-020	2,800	38	2.375	0.060
3"	48813-020	2,000	83	3.500	0.092
3-1/2"	48814-020	2,000	108	4.000	0.107
4"	48815-020	1,140	133	4.500	0.121
5"	48816-020	760	203	5.563	0.152
6"	48817-020	520	283	6.625	0.182



P&C Duct Type DB-120 Heavy Wall

Nom. Size	Part Number 10'	Part Number 20'	Std. Crate Qty. 10' (ft.)	Std. Crate Qty. 20' (ft.)	Approx. Wt. per 100 ft (lbs.)	Avg. O.D. (in.)	² Min. Wall (in)
1"	-	48808-020	-	8,000	19	1.315	0.060
1-1/2"	-	48810-020	-	4,500	28	1.900	0.060
2"	-	68811-020	-	2,800	47	2.375	0.077
3"	-	68813-020	-	2,000	98	3.500	0.118
4"	-	68815-020	-	1,140	162	4.500	0.154
5"	-	68816-020	-	760	252	5.563	0.191
6"	68817-010	68817-020	260	520	351	6.625	0.227

P&C Duct Type DB-120 Heavy Wall Utility

Nom. Size	Part Number	Std. Crate Qty. (ft.)	Approx. Wt. per 100 ft (lbs.)	Avg. O.D. (in.)	³ Min. Wall (in.)
2"	68811UTL-020	2,800	44	2.375	0.083
3"	68813UTL-020	2,000	98	3.500	0.127
4"	68815UTL-020	1,140	165	4.500	0.166
5"	68816UTL-020	760	252	5.563	0.205
6"	68817UTL-020	520	356	6.625	0.244

¹Type DB-60 meets DB-60/ASTM F-512; Minimum wall thickness relates to 500,000 modulus

²Type DB-120 meets DB-120/ASTM F-512; Minimum wall thickness relates to 500,000 modulus

³Type DB-120 Heavy Wall Utility meets DB-120/ASTM F-512; Minimum wall thickness relates to 400,000 modulus

Meets NEMA Standard TC-6 & 8

One belled end per 10' or 20' length

Rigid PVC Conduit & Fittings

- Commercial, Industrial and Utility Usage
- Corrosion Resistant
- Non-Magnetic and non-galvanic
- Self Extinguishing
- Impact Resistant

FEATURES & SPECIFICATIONS

Allied Tube & Conduit offers a complete line of rigid PVC conduit and fittings and PVC utility duct. For commercial, industrial and utility usage, Allied PVC conduit and duct is proven durable and effective for years of maintenance-free performance in underground, encased and exposed applications in accordance with the National Electrical Code.

Corrosion Proof:

Resistant to most chemicals, PVC is typically not affected by corrosive soils or salts.

Non-Magnetic and Non-Galvanic:

Properties of Allied PVC Conduit provide good insulation and no power loss or conductor heating.

Self Extinguishing:

Properties make PVC fire resistant.

Impact Resistant:

Tough, durable, with high tensile strength, yet easy to handle and install right on the jobsite.

Schedule 40 & 80 rigid PVC conduit systems are sunlight resistant and are used exposed, encased in concrete, concealed in walls and in direct burial applications including systems for:

- Utilities
- Cable, data and communication lines
- Institutional, commercial, industrial buildings
- Residential applications, & service entrances
- Street and highway underground feeds
- Transportation systems - subways, bridges, tunnels, airports
- Water and wastewater treatment plants
- Marinas
- Mines and mills

Type DB-60 and DB-120 utility duct are designed for direct burial applications. **Type EB-20 and EB-35** are designed for burial encased in concrete.

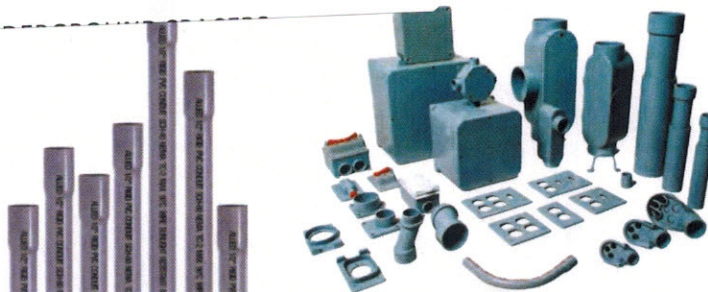
Project Information

Company Name: Cook Paving
Address: 4545 Spring road
City: Brooklyn Heights
State & Zip: 44131
Phone: _____
Project Name: Opportunity Corridor PH3
City: Cleveland
State: OH

PVC CONDUIT
MFGR: ALLIED
2PVC EB20 OR 2PVC DB60
4PVC EB20
5PVC EB20

 **allied**
TUBE & CONDUIT*

A PART OF  **atkore**
INTERNATIONAL



Codes And Standards Compliance

Allied Schedule 40 and Schedule 80 rigid conduits are third-party certified to UL 651 and are allowed for use with 90° C conductors, in accordance with the National Electrical Code. They are manufactured in accordance with NEMA TC2.

Allied Type DB and EB ducts are manufactured in accordance with NEMA TC 6&8 and are allowed for use with 90° C conductors.

Allied PVC fittings are manufactured in accordance with NEMA TC3. The UL standard for PVC fittings is UL 651; for boxes UL 514C, for cover plates UL 514D and for enclosures UL 50.

See product pages for UL listing information.

Specification

All wiring shall be installed in Allied Tube & Conduit rigid PVC conduit and secured by means of proper fittings. All fittings shall be offered by Allied Tube & Conduit. All outlets, pull boxes and junction points shall be fitted with Allied outlet boxes, fittings and junction boxes.

Exposed conduit shall be securely attached and supported by means of straps. The straps shall be installed at the recommended spacing as specified in the National Electrical Code (NEC). The straps must allow for linear expansion and contraction of the conduit due to temperature change. If the variance in temperature exceeds 25°F, expansion joints shall be installed according to the manufacturer's recommendations.

If rigid PVC conduit is embedded in concrete or direct buried, support straps are not required.

PVC Utility Duct

Type EB-20 for Encased Burial Duct Rated for use with 90°C Wire

- Duct is intended for concrete encased applications
- Duct is produced with integral solvent-weld bells standard



Nominal Size	Dimensions (inches)		Approximate Weight per Foot (Pounds)	Standard Crate Quantity (Feet)
	Outside Diameter (Average)	Wall Thickness (Minimum)		
2	2.375	0.060	0.318	2800
3	3.500	0.061	0.482	1760
4	4.500	0.082	0.901	1140
5	5.563	0.103	1.292	760
6	6.625	0.125	1.867	520

Duct is manufactured to be in conformance with **NEMA TC 6 & 8** and **ASTM F 512**

Item availability may vary by region.

NOTE: Special orders are non-cancelable, non-returnable and non-refundable

Rigid PVC Conduit - Utility Duct



A PART OF **atkore**
INTERSTATE

Rigid PVC Utility Duct - Type DB-60 for Direct Burial Rated for 90° C Wiring

ALLIED TUBE 2" PVC NEMA TC-6 TYPE DB 1/2" RIGID PVC CONDUIT

Trade Size	Metric Designator	Average Outside Diameter (in)	Min. Wall Thickness (in)	Weight/Ft	Master Bundle Qty. (ft)	Nominal Bell (Socket) Depth/Inches
2	53	2.375	.060	.361	2800	3
3	78	3.500	.092	.716	1760	4
4	103	4.500	.121	1.171	1140	4.5
5	129	5.563	.152	1.778	760	5
6	155	6.625	.182	2.500	520	5

SPECIAL INFORMATION: 1. 20' lengths are standard, 10' lengths available on special request. 2. Minimum shipment: full pallet quantity per size. Type DB-60 for direct burial meets NEMA TC-6 and 8

Rigid PVC Utility Duct - Type DB-120 for Direct Burial Rated for 90° C Wiring

ALLIED TUBE 2" PVC NEMA TC-8 TYPE DB 1/2" RIGID PVC CONDUIT

Trade Size	Metric Designator	Average Outside Diameter (in)	Min. Wall Thickness (in)	Weight/Ft	Master Bundle Qty. (ft)	Nominal Bell (Socket) Depth/Inches
2	53	2.375	.077	.371	2800	3
3	78	3.500	.118	.836	1760	4
4	103	4.500	.154	1.402	1140	4.5
5	129	5.563	.191	2.150	760	5
6	155	6.625	.227	3.045	520	5

SPECIAL INFORMATION: 1. 20' lengths are standard, 10' lengths available on special request. 2. Minimum shipment: full pallet quantity per size. Type DB-120 for direct burial meets NEMA TC-6 and 8

PVC Conduit & Fittings are not available in all markets.

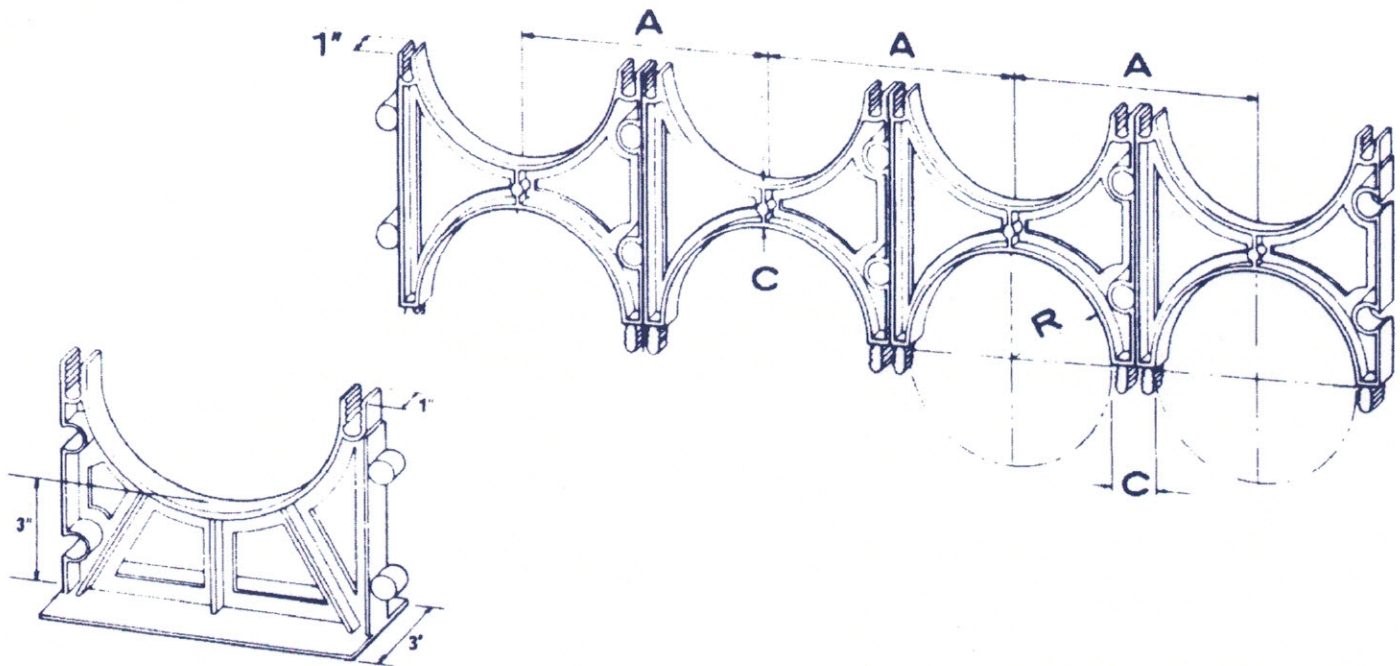
Please contact your Allied representative or distributor for details.

16100 S. Lathrop Ave., Harvey, IL 60426
Phone / 708.339.1610 • Toll-Free / 800.882.5543

NOTE: Special orders are non-cancelable, non-returnable and non-refundable

www.alliedeg.com

Underground Products Intermediate and Base Spacer Dimensions



Base spacers provide a 3" separation between the bottom row of ducts and the trench floor, except for the 4" x 1" size which is 1 3/4" separation

Dimensional Data

	1" Separation			1 1/2" Separation			2" Separation			3" Separation		
Nominal Size	R	A	C	R	A	C	R	A	C	R	A	C
2"	Saddle Spacers Only			1.2	4.0	1.5	1.2	4.5	2.0	1.2	5.5	3.0
3"	Saddle Spacers Only			1.8	5.1	1.5	1.8	5.6	2.0	1.8	6.6	3.0
4"	2.3	5.6	1.0	2.3	6.1	1.5	2.3	6.6	2.0	2.3	7.6	3.0
5"	Saddle Spacers Only			2.9	7.3	1.5	2.9	7.9	2.0	2.9	8.9	3.0
6"				3.3	8.2	1.5	3.3	8.7	2.0	3.4	9.8	3.0
8"				4.3	10.2	1.5	4.3	10.7	2.0	4.3	11.7	3.0





GS Industries of Bassett, Ltd.
85 Rosemont Road - Bassett, VA 24055

Base Spacers

Part Number	Description	Standard Pack	Weight	Carton Dimensions	Cartons/Skid	Cube per Carton
121-1	4X1 Base	175	32	25 3/4X21X11 1/2	24	3.6
125-1	4X2 Base	140	37	25 3/4X21X11 1/2	24	3.6
129-1	5X1 1/2 Base	120	37	25 3/4X21X14	20	4.4
131-1	5X2 Base	120	38	25 3/4X21X14	20	4.4
133-1	6X1 1/2 Base	100	31	25 3/4X21X14	20	4.4
135-1	6X2 Base	100	35	25 3/4X21X14	20	4.4
151-1	2X1 1/2 Base	250	29	25 3/4X21X9 3/4	28	3.1
153-1	2X2 Base	225	29	25 3/4X21X11 1/2	24	3.6
155-1	2X3 Base	225	30	25 3/4X21X14	20	4.4
157-1	3X1 1/2 Base	175	27	25 3/4X21X11 1/2	24	3.6
159-1	3X2 Base	155	26	25 3/4X21X11 1/2	24	3.6
161-1	3X3 Base	150	29	25 3/4X21X11 1/2	24	3.6
163-1	6X3 Base	95	33	25 3/4X21X14	20	4.4
186-1	4X1 1/2 Base	140	35	25 3/4X21X11 1/2	24	3.6
190-1	4X3 Base	120	36	25 3/4X21X11 1/2	24	3.6
192-1	5X3 Base	100	33	25 3/4X21X14	20	4.4
197-1	8X1 1/2 Base	50	25	25 3/4X21X14	20	4.4
199-1	8X2 Base	50	29	25 3/4X21X14	20	4.4
201-1	8X3 Base	50	29	25 3/4X21X14	24	4.4

Intermediate Spacers

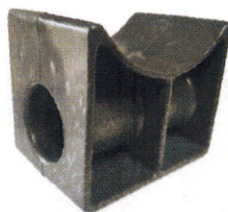
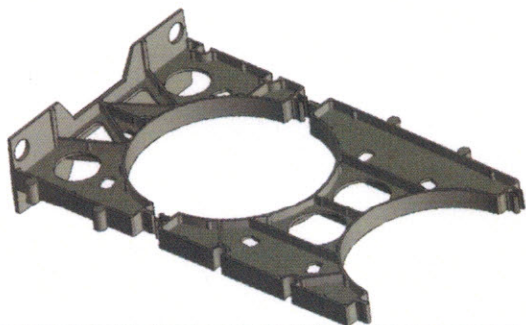
Part Number	Description	Standard Pack	Weight	Carton Dimensions	Cartons/Skid	Cube per Carton
120-1	4X1 Intermediate	200	33	25 3/4X21X11 1/2	24	3.6
124-1	4X2 Intermediate	125	24	25 3/4X21X11 1/2	24	3.6
128-1	5X1 1/2 Intermediate	100	24	25 3/4X21X11 1/2	24	3.6
130-1	5X2 Intermediate	100	30	25 3/4X21X11 1/2	24	3.6
132-1	6X1 1/2 Intermediate	100	24	25 3/4X21X14	20	4.4
134-1	6X2 Intermediate	90	24	25 3/4X21X14	20	4.4
150-1	2X1 1/2 Intermediate	350	29	25 3/4X21X9 3/4	28	3.1
152-1	2X2 Intermediate	300	28	25 3/4X21X11 1/2	24	3.6
154-1	2X3 Intermediate	200	24	25 3/4X21X11 1/2	24	3.6
156-1	3X1 1/2 Intermediate	225	29	25 3/4X21X11 1/2	24	3.6
158-1	3X2 Intermediate	200	28	25 3/4X21X11 1/2	24	3.6
160-1	3X3 Intermediate	125	22	25 3/4X21X11 1/2	24	3.6
162-1	6X3 Intermediate	70	22	25 3/4X21X14	20	4.4
185-1	4X1 1/2 Intermediate	150	27	25 3/4X21X11 1/2	24	3.6
189-1	4X3 Intermediate	90	23	25 3/4X21X11 1/2	24	3.6
191-1	5X3 Intermediate	80	22	25 3/4X21X14	20	4.4
196-1	8X1 1/2 Intermediate	60	24	25 3/4X21X14	20	4.4
198-1	8X2 Intermediate	60	26	25 3/4X21X14	20	4.4
200-1	8X3 Intermediate	50	26	25 3/4X21X14	24	4.4

Accessories

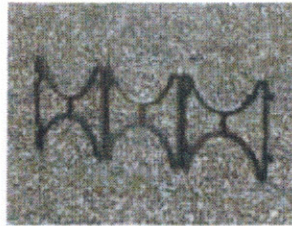
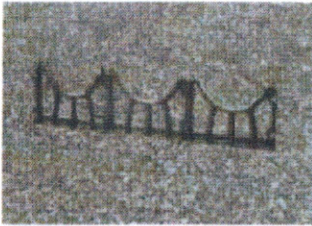
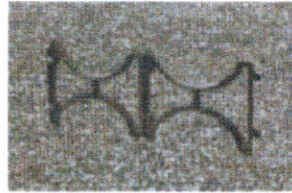
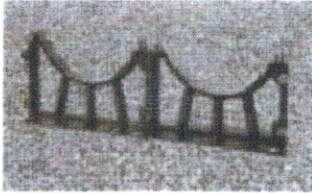
Part Number	Description	Standard Pack	Weight	Carton Dimensions	Cartons/Skid	Cube per Carton
119-1	1" Adapter	1000	7	12X12X12		1
145-1	4" Long Plug	100	20	25 3/4X21X11 1/2	20	3.6
65-1	4" Water Tight Plug	36	21	12X12X12		1
71-1	1" Dual Sizer	100	5	12X12X12		1
72-1	2" Dual Sizer	100	7	12X12X12		1
83-1	Cable Block	75	18	12x12x12		1
86-1	3 1/2" Internal Loc Coupling	24	5	12X12X12		1
87-1	4" Internal Loc Coupling	24	5	12X12X12		1
89-1	1" Spacer Link	1200	36	12X12X12		1
90-1	2" Spacer Link	400	20	12X12X12		1
91-1	3" Spacer Link	212	13	12X12X12		1
92-1	2-3" Rebar Holder	100	5	12X12X12		1
93-1	4-8" Rebar Holder	100	5	12X12X12		1
94-1	2" Cap Strap	200	7	12X12X12		1
95-1	3" Cap Strap	200	9	12X12X12		1
96-1	4" Cap Strap	150	8	12X12X12	72	1
97-1	5" Cap Strap	100	7	12X12X12		1
98-1	6" Cap Strap	100	7	12X12X12		1

Plugs

Part Number	Description	Standard Pack	Weight	Carton Dimensions	Cartons/Skid	Cube per Carton
139-1	2" Universal Plug	176	11	12X12X12		1
143-1	3" Universal Plug	200	36	25 3/4X21X11 1/2	20	3.6
140-1	4" Universal Plug	180	38	25 3/4X21X11 1/2	20	3.6
141-1	5" Universal Plug	100	27	25 3/4X21X11 1/2	20	3.6
142-1	6" Universal Plug	90	32	25 3/4X21X11 1/2	20	3.6
54-1	2" Regular Plug	100	10	12X12X12	20	1
55-1	3" Regular Plug	100	18	25 3/4X21X11 1/2	24	3.6
56-1	3 1/2" Regular Plug	100	20	25 3/4X21X11 1/2	24	3.6
57-1	4" Regular Plug	100	20	25 3/4X21X11 1/2	24	3.6
60-1	5" Regular Plug	80	25	25 3/4X21X11 1/2	24	3.6
61-1	6" Regular Plug	60	26	25 3/4X21X11 1/2	24	3.6

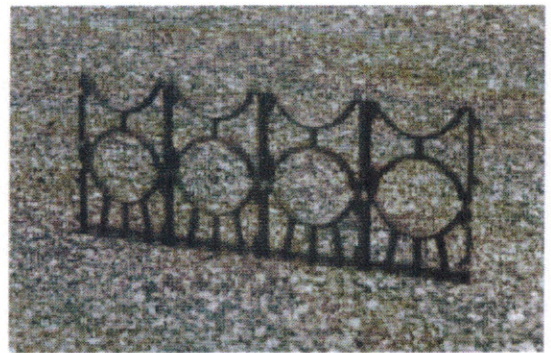
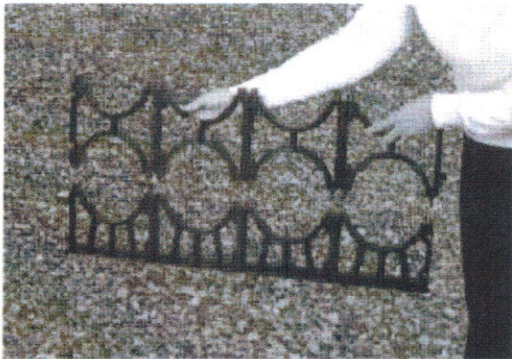


Mfgr: GS Industries
Cat # 130-1 & 131-1
5IN PVC Base & Intermediate Spacer



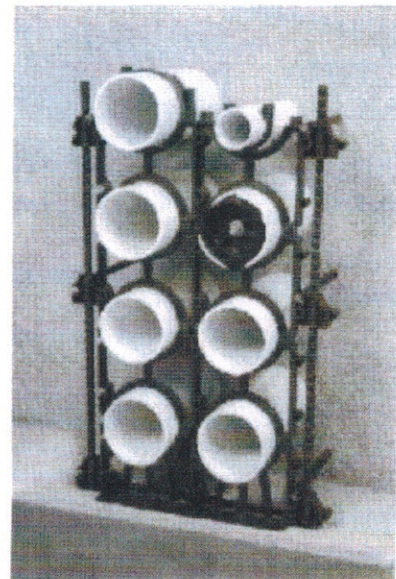
"Underground Products" Multiple Assembly Spacer

Underground Products offers assembled base and intermediate spacers configured 2, 3 and 4 wide. By performing the assemblies during our production process the cost is eliminated at the job site making the installation more cost effective. Receiving the pre-assembled base and intermediate spacers allows for quicker installation of bases into the trench, installation of conduit and with one action locking the intermediates into place.



- Eliminates the need for hold down bars
- Compatible with Dual Sizer
- Rebar Holder standard
- Original vertical lock design
- 2", 3", 4", 5", 6" and 8" sizes available
- More stable horizontal locking using two locking pins
- Molded with corrosive resistant, nonconductive resins

GS Industries of Bassett, Ltd.
"Underground Products"
85 Rosemont Road
Bassett, Virginia 24055
Phone: 276-629-5317
Toll-Free: 800-445-2192
Fax: 276-629-1264



Plastic duct spacers

For completely enclosed and locked duct banks.

They snap together, vertically, slide together horizontally

For fast, secure field assembly.

Only two components, base and intermediate, are needed.

Banding is not necessary.

With the Vertical-lok spacer, ducts are accurately separated.

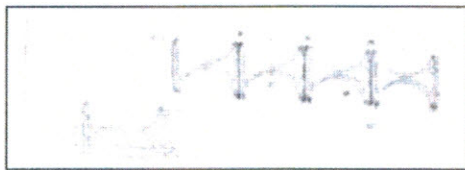
Spacers lock firmly together, preventing separation.

Alignment of the duct bank sections is relatively easy with this completely locked-in construction.

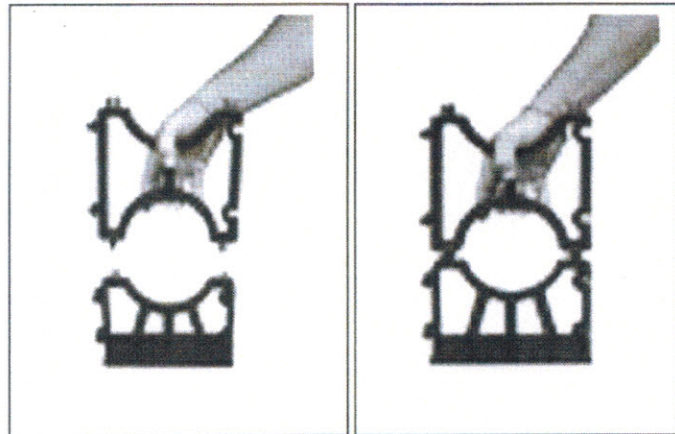
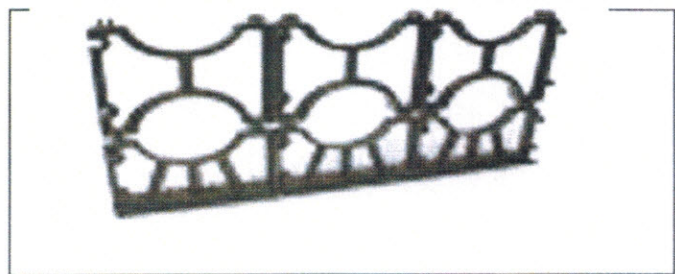
To prevent the top tier from floating during encased burial, it is suggested that an intermediate spacer be used as a cap.

Used in both EB and DB installations.

Intermediate and Base Spacer Dimensions



Base spacers provide a 3" separation between bottom row of ducts & trench floor, except for 4" x 1" which is 1-3/4"

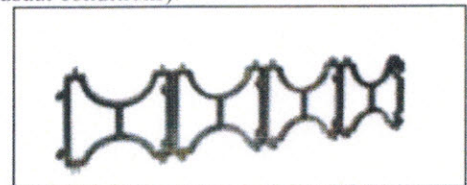


1" Separation				1 1/2" Separation				2" Separation				3" Separation			
R	A	C		Nominal Size	R	A	C	R	A	C		R	A	C	
Saddle spacers only				2"	1.2	4.0	1.5	1.2	4.5	2.0		1.2	5.5	3.0	
Saddle spacers only				3"	1.8	5.1	1.5	1.8	5.6	2.0		1.8	6.6	3.0	
2.3 5.6 1.0				4"	2.3	6.1	1.5	2.3	6.6	2.0		2.3	7.6	3.0	
Saddle spacers only				5"	2.9	7.3	1.5	2.9	7.9	2.0		2.9	8.9	3.0	
-- -- --				6"	3.3	8.2	1.5	3.4	8.7	2.0		3.4	9.8	3.0	
-- -- --				8"	4.3	10.2	1.5	4.3	10.7	2.0		--	--	--	

Vertical and horizontal interlocking permits building strong, lock-in duct bank. A wide baseplate provides solid support for heaviest loads.

2 Just a push gives firm vertical locking (Suggested Method)

3 Units slide together for horizontal locking (For unusual conditions).



No extra charge for factory assembled multiples in 2 or 3 or 4 way units

SPECIFY WHEN ORDERING.

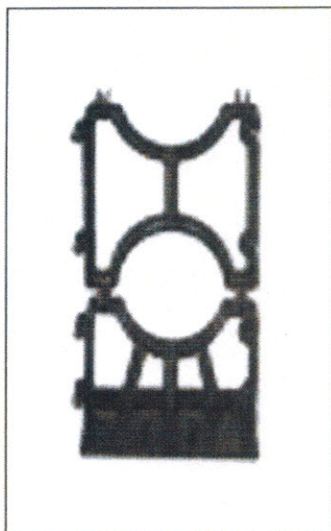
ALL DIMENSIONS ARE IN INCHES

Intermediate Spacers

1" Sep.				1-1/2" Sep.				2" Sep.				3" Sep.			
Duct Size	Prod. Code	Std. Pack	Wght. Lbs.	Duct Size	Prod. Code	Std. Pack	Wght. Lbs.	Duct Size	Prod. Code	Std. Pack	Wght. Lbs.	Duct Size	Prod. Code	Std. Pack	Wght. Lbs.
				2"	150-1	350	34	2"	152-1	300	31	2"	154-1	200	27
				3"	156-1	225	32	3"	158-1	200	31	3"	160-1	125	23
4"	120-1	200	37	4"	185-1	150	30	4"	124-1	125	28	4"	189-1	90	26
				5"	128-1	100	28	5"	130-1	100	30	5"	191-1	80	23
				6"	132-1	100	27	6"	134-1	90	31	6"	162-1	70	26
				8"	196-1	60	28	8"	198-1	60	31				

Base Spacers

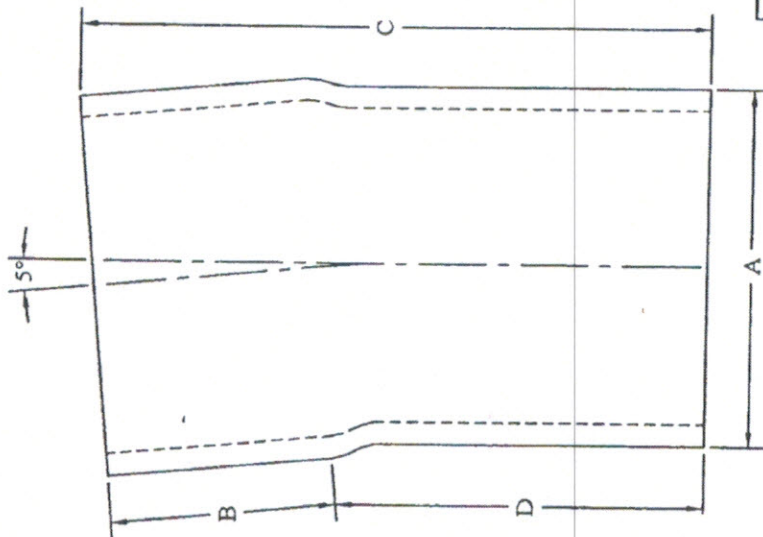
1" Sep.				1-1/2" Sep.				2" Sep.				3" Sep.			
Duct Size	Prod. Code	Std. Pack	Wght. Lbs.	Duct Size	Prod. Code	Std. Pack	Wght. Lbs.	Duct Size	Prod. Code	Std. Pack	Wght. Lbs.	Duct Size	Prod. Code	Std. Pack	Wght. Lbs.
				2"	151-1	250	31	2"	153-1	225	33	2"	155-1	225	35
				3"	157-1	175	31	3"	159-1	155	28	3"	161-1	150	32
4"	121-1	175	37	4"	186-1	140	39	4"	125-1	140	42	4"	190-1	120	40
				5"	129-1	120	40	5"	131-1	120	48	5"	192-1	100	38
				6"	133-1	100	33	6"	135-1	100	42	6"	163-1	95	38
				8"	197-1	50	27	8"	199-1	50	29				



NOTES:

1. COUPLING BELL TO BE FABRICATED WITH ELECTRICAL CONDUIT MANUFACTURED IN ACCORDANCE WITH NEMA TC-6.

Mfr: National Plastics
5IN 5 Degree Coupling



REVISIONS			
ZONE	REV	DESCRIPTION	DATE
-	-	RELEASED	11/19/99
-	A	NOTE	08/14/00
			TGG

Size Inches	A		B		C		D	
	AVG.		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
2	2.375		1.750	2.250	5.000	6.000	3.250	3.750
3	3.500		2.875	3.375	7.000	8.000	4.125	4.625
4	4.500		3.125	3.625	7.500	8.500	4.375	4.875
5	5.563		3.375	3.875	9.500	10.500	6.125	6.625
6	6.625		3.500	4.000	10.000	11.000	6.500	7.000

UNLESS OTHERWISE SPECIFIED

TOLERANCE:
X = ± -
XX = ± -
XXX = ± .005
Δ = ± 1"

MAT: TC6 DB



COUPLING BELL, 5° FABRICATED TC6 DB

DRAWN BY: MDW	REV: A	-
APPROVED BY: TGG	SCALE	-
DATE: 08/14/00	SHEET 1 OF 1	SIZE: A

3421 OLD VESTAL ROAD, VESTAL NY 13850
PHONE: 800-836-4350, FAX: 607-729-6130

PIPE & PLASTICS, INC.



Atkore (<http://atkore.com>) News (<http://www.alliedeg.us/news/>) Rep Locator (<http://www.alliedeg.us/rep-locator/>) Contact (<http://www.alliedeg.us/contact/>)

PVC FITTINGS – MISCELLANEOUS

Mfgr: Allied Tube & Conduit
Cat # 59683
5IN PVC End Bell

Home (<http://www.alliedeg.us/>) / Products (<http://www.alliedeg.us/products/>) / PVC (<http://www.alliedeg.us/pvc/>) / PVC Fittings – Miscellaneous



Caps

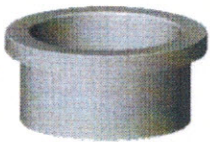
TRADE SIZE	SYSTEM PART NUMBER	STANDARD PACKAGE QTY
1/2	59645	100
3/4	59646	100
1	59647	50
1-1/4	59648	25
1-1/2	59649	25
2	59125	50
2-1/2	59126	25
3	59127	25
3-1/2	59131	25
4	59128	25
5	59129	25
6	59130	10
8	924585	1

Reducer Bushings

TRADE SIZE	SYSTEM PART NUMBER	STANDARD PACKAGE QTY
3/4 x 1/2	59897	100

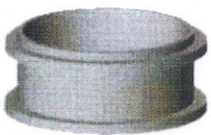


TRADE SIZE	SYSTEM PART NUMBER	STANDARD PACKAGE QTY
1 x 1/2	802738	100
1 x 3/4	59899	100
1-1/4 x 3/4	802739	50
1-1/4 x 1	59901	50
1-1/2 x 1	802740	25
1-1/2 x 1-1/4	59903	50
2 x 1	802741	50
2 x 1-1/4	802742	25
2 x 1-1/2	59905	25
2-1/2 x 2	59906	25
3 x 2	802743	25
3 x 2-1/2	59909	25
4 x 2	802744	15
4 x 3	59908	20
4 x 3-1/2	59910	20



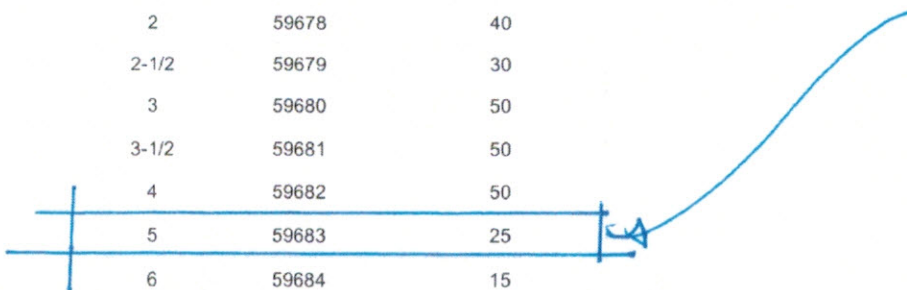
Junction Box Adapters

TRADE SIZE	SYSTEM PART NUMBER	STANDARD PACKAGE QTY
1/2	33715	100
3/4	33716	100
1	33717	100
1 1/4	33718	50
1 1/2	33719	50
2	33720	25
2 1/2	33721	10
3	33722	10
3-1/2	33723	10
4	33724	10



End Bells

TRADE SIZE	SYSTEM PART NUMBER	STANDARD PACKAGE QTY
1/2	59673	100
3/4	59674	100
1	59675	50
1-1/4	59676	50
1-1/2	59677	50
2	59678	40
2-1/2	59679	30
3	59680	50
3-1/2	59681	50
4	59682	50
5	59683	25
6	59684	15
8	59685	1



Expandable Plugs

TRADE SIZE	SYSTEM PART NUMBER	STANDARD PACKAGE QTY
1	925094	50

Mfgr: Morris Products
Cat # 40446s
PVC Cement



Morris Products Inc.
Ph: 518-743-0523
Fax: 518-743-0536
www.morrisproducts.com

PLASTI-WELD™
404 SERIES MEDIUM CLEAR
PVC SOLVENT CEMENT
Page 1 of 2

TECHNICAL SPECIFICATION: Plasti-Weld 404 Series Medium Clear PVC Solvent Cement is recommended for solvent welding all schedules and classes of PVC pipe and fittings up to 6" with interference fit. Medium Clear PVC Solvent Cement can be used for potable water, sewer and drain, waste and vent systems. This product is compliant with California South Coast Air Quality Management District (SCAQMD) Rule 1168 and Ozone Transport Commission (OTC) regulations for Volatile Organic Compound emission levels. **Note: This product is not for use in a system using or being tested by compressed air or gases.**



INGREDIENTS (CAS Number)

Acetone (67-64-1)
Amorphous Silica (112945-52-5)
Cyclohexanone (108-94-4)
Methyl Ethyl Ketone (78-93-3)
PVC Resin (9002-86-2)
Tetrahydrofuran (109-99-9)

APPROVALS AND LISTINGS



NSF Standard 61
for PW, DWV, SEWER



IAPMO Listed

Meets ASTM Standard D 2564

PHYSICAL/CHEMICAL PROPERTIES

Appearance Clear Liquid
Viscosity minimum 500 cps @ 73° F ± 2° F
Density 7.74 ± 0.2 lbs/gallon
Lap Shear Strength (minimum per ASTM Standards)
2 hours 250 psi
16 hours 500 psi
72 hours 900 psi
Set Up Time
30° F to 50° F 5 – 6 minutes
50° F to 70° F 3 – 4 minutes
70° F to 90° F 1 – 2 minutes
Shelf Life 3 years from manufacture date

Maximum VOC per SCAQMD 1168/316A or BAAQMD
Method 40: 510 g/L

PRODUCT NUMBER	SIZE	PACK	CARTON WEIGHT
40466S	4 fl. oz.	24	9 lbs.
40456S	8 fl. oz.	24	16 lbs.
40446S	16 fl. oz.	24	27 lbs.
40436S	32 fl. oz.	12	26 lbs.
40424	Gallon	6	52 lbs.



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PLASTI-WELD™
404 SERIES MEDIUM CLEAR
PVC SOLVENT CEMENT

Page 2 of 2

DIRECTIONS FOR USE

Read all directions carefully before using this product.

- Do not breathe vapors. Use only in well ventilated area. If forced air ventilation is used, be sure it does not cause a fire hazard from solvent vapors. If adequate ventilation cannot be provided, wear a NIOSH-approved respirator for organic solvents.
- Do not use or store near heat, sparks, or flames. Do not smoke, eat or drink when using. Do not take internally. Vapors may accumulate in low places and may ignite explosively.
- Store and use at temperatures between 40°F and 110°F. At temperatures outside of this range, special care must be taken to prepare good joints and prevent exposures to solvents.
- Stir or shake before using; if jelly-like, don't use. Keep container closed when not in use.
- Avoid eye and skin contact - wear safety glasses with side shields and wear rubber gloves.
- Do not thin.

1. Square pipe ends and remove all burrs and dirt.
2. Check dry fit of pipe and fitting. Pipe should easily go 1/3 of the way into the fitting. If the pipe bottoms, it should be snug.
3. Use a suitable applicator at least 1/2 the size of the pipe diameter. For larger size pipe systems use a natural bristle brush or roller.
4. Clean pipe and fitting with a listed primer.
5. Apply liberal coat of cement to pipe to the depth of the socket; leave no uncoated surface.
6. Apply a thin coat of cement to inside of fitting; avoid puddling of cement. Puddling can cause weakening and premature failure of pipe or fitting. Apply a second coat of cement to the pipe.
7. Assemble parts QUICKLY. Cement must be fluid. If cement surface has dried, recoat both parts.
8. Push pipe FULLY into fitting using a 1/4 turning motion until pipe bottoms.
9. Hold pipe and fitting together for 30 seconds to prevent pipe push-out - longer at low temperatures. Wipe off excess.
10. Allow 15 minutes for good handling strength and 2 hours cure time at temperatures above 60°F before hydrostatic pressure testing up to 180 psi. Longer cure times may be required at temperatures below 60°F or with pipe diameters over 3". DO NOT TEST WITH AIR.

This product is not for use with caustic or acidic chemical solutions. Consult Technical Department for more information.

PRECAUTIONS

Read all information carefully before using this product.

DANGER: EXTREMELY FLAMMABLE. VAPORS MAY CAUSE FLASH FIRES. MAY IRRITATE EYES AND SKIN. VAPOR HARMFUL. MAY IRRITATE RESPIRATORY TRACT AND CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION. HARMFUL OR FATAL IF SWALLOWED.

May cause irritation to eyes, skin, and nose, throat, and respiratory tract. May cause coughing, sore throat, difficulty breathing, headache, dizziness, nausea. Long term repeated overexposures to solvents may cause damage to the brain, nervous system, reproductive system, respiratory system, mucous membranes, liver, and kidneys. **KEEP OUT OF REACH OF CHILDREN.**

FIRST AID: If swallowed, **DO NOT INDUCE VOMITING.** Drink water and call a doctor or poison control center immediately. This product may be aspirated into the lungs and cause chemical pneumonitis, a potentially fatal condition. If contact with eyes, flush with water for 15 minutes and seek medical attention if irritation persists. If contact with skin, flush with water and then use baby oil or hand cleaner to remove residue. If inhaled and ill feelings develop, get fresh air and obtain medical attention if ill feelings persist. **FOR EMERGENCY FIRST AID INSTRUCTIONS CALL 1-877-740-5015.**

FIRE: Use dry chemical, foam, or carbon dioxide extinguisher. Water spray may be applied to reduce potential vapors or for cooling. Burning liquid extinguished with water will float and may re-ignite on surface of water.

SPILLS: Remove all sources of ignition and ventilate area. Personnel cleaning up the spill should wear appropriate personal protective equipment, including respirators if vapor concentrations are high. Soak up spill with absorbent material. Put absorbent material in covered, labeled containers. Dispose of in accordance with local regulations.

A fire or explosion may result if dry granular calcium hypochlorite is used to disinfect plastic piping systems and is exposed to organic vapors found in solvent cements, cleaners or primers. Do not disinfect piping system with dry granules. Do not store dry granular calcium hypochlorite near solvent cements, cleaners or primers. **DO NOT REUSE EMPTY CONTAINER. KEEP OUT OF REACH OF CHILDREN.**

Refer to material safety data sheet for more information.

Before purchase and use of a product, review the product application and be certain the product, installation and use will be in compliance with any applicable codes and regulations.



"Building a Better Brand"

L.H. Dottie Company

6131 Garfield Avenue

Commerce, California 90040

Call: 323-725-1000 • Fax: 323-721-0000

Mfgr:Dottie

Cat # D640

PVC Pull String

Item # 6502P, (6502P) Pull Line

6500' Pull Line Two Ply Dispensing - Pail



Packaging Specifications | Product Specifications

Packaging Specifications

Package Type	3.5 Gallon Pail
Unit Quantity	1
Carton Quantity	1
Unit (UM)	Each
Package Length	11.60 in.
Package Width	11.40 in.
Package Height	11.00 in.
Package Weight	12.0000 lb.
United Nations Standard Products & Services Code (UNSPSC)	27113101

DETECTABLE TAPE (5.0 MIL)

Solid Aluminum Foil Core • Virgin Clear Polypropylene Film Laminated Top Structure
Virgin Clear Polyethylene Film Laminated Base Structure • Reverse Printed Polyprop
Acid, Alkali, Chemical, and Oil Resistant • Direct Burial Rated • Made in the USA

Mfgr: Pro-Line Safety Products
Cat # 605 x 3in Wide
Detectable Warning Tape

CAUTION BURIED GAS LINE BELOW

Applications and Information

- **Pro-Line's Detectable Marking Tape** is used for detecting, locating, identifying, and protecting buried utility lines for gas, water, sewer, telecommunication, and electrical markets. The width of tape used, is determined by the size of, and depth at which the underground utility line is buried. The depth at which detectable tape is buried, is determined by the width of the tape used.
- **DETECT:** Aluminum core is detected through means of inductive locating.
- **LOCATE:** Line is located and marked after inductive locating is performed.
- **IDENTIFY:** Utility type is identified by both the APWA color-code and utility legend printed on the marking tape.
- **PROTECT:** Detectable tape works 24 hours a day and year round, even if tape is not inductively located during excavation, the tape provides a "stop-sign" effect that is highly visible.

Standards and References

Pro-Line's Detectable Marking Tape meets or exceeds all applicable ASTM specifications.

- ASTM D2103-08: Standard Specification for Polyethylene Films and Sheeting.
- ASTM D882-09: Standard Test Method for Tensile Properties and Elongation of Thin Plastic Sheeting.
- ASTM D2578-08: Standard Test Method for Wetting Tension of Polyethylene and Polypropylene Films.
- ASTM D792-08: Standard Test Methods for Density of Plastics by Displacement.
- ASTM D671-93: Standard Test Method for Flexural Fatigue of Plastics.

Construction

Pro-Line's Detectable Marking Tape consists of a minimum 5.0 mil overall thickness. Construction is 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a 0.35 solid aluminum foil core and then laminated to a 3.75 mil clear virgin polyethylene film. Tape is printed with our APWA Color-Coded, patented "Diagonally Striped" design with big, bold, black lettering to identify a specific buried utility line.

Specifications

DETECTABLE UNDERGROUND MARKING TAPE

Underground marking tape shall be a (2", 3", 4", 6", or 12" width), detectable marking tape, with a minimum 5.0 mil overall thickness. Tape shall be manufactured using a 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a **0.35 mil solid aluminum foil core**, and then laminated to a 3.75 mil clear virgin polyethylene film. Tape shall be printed using a diagonally striped design for maximum visibility, and meet the APWA Color-Code standard for identification of buried utilities. Detectable marking tape shall be **Pro-Line Safety Products** or approved equal and made in the USA.

TABLE 1: DETECTABLE TAPE CONSTRUCTION (Polypropylene, Aluminum Foil, and Polyethylene)

PROPERTY	2" WIDTH	3" WIDTH	4" WIDTH	6" WIDTH	12" WIDTH
Nominal Overall Thickness	5.0 mil	5.0 mil	5.0 mil	5.0 mil	5.0 mil
Aluminum Foil Core Thickness	0.35 mil	0.35 mil	0.35 mil	0.35 mil	0.35 mil
Polyethylene Film Thickness	3.75 mil	3.75 mil	3.75 mil	3.75 mil	3.75 mil
Polypropylene Film Thickness	0.80 mil	0.80 mil	0.80 mil	0.80 mil	0.80 mil
Polypropylene Print Method	Reverse Printed	Reverse Printed	Reverse Printed	Reverse Printed	Reverse Printed
Print Design #1 (Patented)	Diagonal Striped	Diagonal Striped	Diagonal Striped	Diagonal Striped	Diagonal Striped
Print Design #2 (Custom)	Solid Block	Solid Block	Solid Block	Solid Block	Solid Block
Print Design #3 (Custom)	Solid Flood	Solid Flood	Solid Flood	Solid Flood	Solid Flood
Print Design Color-Code	APWA Color-Code	APWA Color-Code	APWA Color-Code	APWA Color-Code	APWA Color-Code

*Diagonal striped design is a **PATENTED** design of Pro-Line Safety Products that enhances tape visibility for superior protection.

*Please note that there may be a nominal + or - 10% difference throughout the overall thickness.

TABLE 2: TESTING SPECIFICATIONS (Physical and Mechanical Properties)

TEST DESCRIPTION	STANDARD	2" WIDTH	3" WIDTH	4" WIDTH	6" WIDTH	12" WIDTH
Aluminum Foil Core	MFG. SPECS	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade
Polyethylene Film	MFG. SPECS	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade
Polypropylene Film	MFG. SPECS	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade
Adhesive Type	MFG. SPECS	AV1257/CA100	AV1257/CA100	AV1257/CA100	AV1257/CA100	AV1257/CA100
Adhesive Bond Strength	BOILING WATER	5 hrs W/O Peel	5 hrs W/O Peel	5 hrs W/O Peel	5 hrs W/O Peel	5 hrs W/O Peel
Printed Inks	MFG. SPECS	Chromabond	Chromabond	Chromabond	Chromabond	Chromabond
Print Repeat	MFG. SPECS	Varies by Legend	Varies by Legend	Varies by Legend	Varies by Legend	Varies by Legend
Coefficient Friction	ASTM D4521-96	0.247 Static	0.247 Static	0.247 Static	0.247 Static	0.247 Static
Density	ASTM D792-66	1.09 g/cm ³	1.09 g/cm ³	1.09 g/cm ³	1.09 g/cm ³	1.09 g/cm ³
Elongation (MD)	ASTM D882-80A	139%	139%	139%	139%	139%
Elongation (TD)	ASTM D882-80A	80%	80%	80%	80%	80%
Flexural Fatigue	ASTM D671-93	Pliable Hand	Pliable Hand	Pliable Hand	Pliable Hand	Pliable Hand
Printability	ASTM D2578-08	45 Dynes	45 Dynes	45 Dynes	45 Dynes	45 Dynes
Tensile Strength	ASTM D882-09	15,000 psi	15,000 psi	15,000 psi	15,000 psi	15,000 psi

WEIGHTS, MEASUREMENTS AND PACKAGING

PRODUCT PART NO.	SIZE (WIDTH)	NOMINAL OVERALL THICKNESS	NOMINAL THICKNESS OF STRUCTURAL MATERIALS			RECOMMENDED BURIAL DEPTHS FOR DETECTION	PRODUCT WEIGHT PER ROLL	STANDARD PACKAGING
			ALUMINUM FOIL THICKNESS	POLYETHYLENE THICKNESS	POLYPROPYLENE THICKNESS			
10311XXX3	2" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	6-9 inches	4.75 lbs	9 / CARTON
10312XXX3	3" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	9-12 inches	7.13 lbs	6 / CARTON
10313XXX3	4" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	12-15 inches	9.50 lbs	4 / CARTON
10314XXX3	6" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	15-18 inches	14.25 lbs	3 / CARTON
10316XXX3	12" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	18-24 inches	28.50 lbs	1 / CARTON

FOR CUSTOM LEGENDS OR SIZES CALL 800.554.3424

PRINT LEGEND	PART #
CAUTION BURIED CHILLED WATER LINE BELOW	103
CAUTION BURIED GEOTHERMAL LINE BELOW	128
CAUTION BURIED POTABLE WATER LINE BELOW	115
CAUTION BURIED WATER LINE BELOW	125
CAUTION BURIED FORCE MAIN BELOW	208
CAUTION BURIED FORCE MAIN BELOW	308
CAUTION BURIED SANITARY SEWER LINE BELOW	318
CAUTION BURIED SEWER LINE BELOW	319
CAUTION BURIED STORM DRAIN LINE BELOW	321
CAUTION BURIED STORM SEWER LINE BELOW	322

PRINT LEGEND	PART #
CAUTION BURIED CATV LINE BELOW	402
CAUTION BURIED COMMUNICATION LINE BELOW	404
CAUTION BURIED FIBER OPTIC CABLE BELOW	406
CAUTION BURIED TELEPHONE LINE BELOW	423
CAUTION BURIED NON-POTABLE WATER LINE	512
CAUTION BURIED RECLAIMED WATER LINE BELOW	517
CAUTION BURIED ELECTRIC LINE BELOW	605
CAUTION BURIED HIGH VOLTAGE LINE BELOW	610
CAUTION BURIED GAS LINE BELOW	809
CAUTION BURIED PIPELINE BELOW	814



PRO-LINE SAFETY PRODUCTS COMPANY
1099 ATLANTIC DRIVE, UNIT 1 • WEST CHICAGO, IL 60185
TOLL FREE: 800.554.3424

