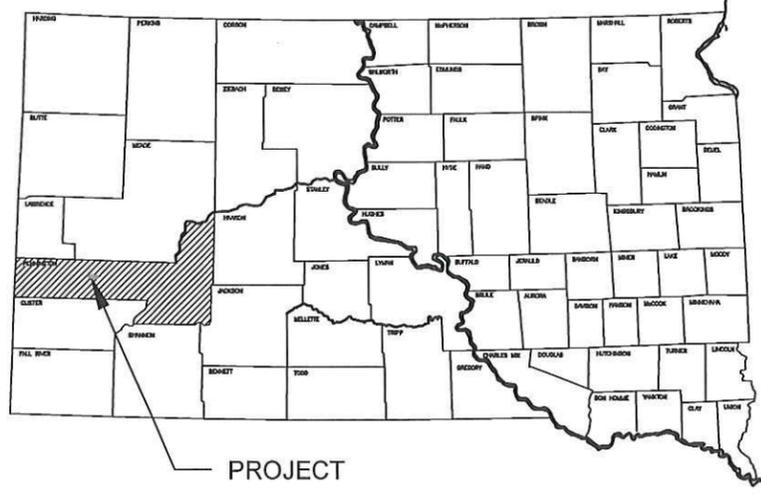


FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	1	40
TITLE SHEET, LAYOUT & INDEX			

CITY OF RAPID CITY PROJECT NO. 13-2125, CIP NO.50946
CENTURY ROAD CONNECTION
PENNINGTON COUNTY
SEWER & WATER MAIN CONSTRUCTION
X02X

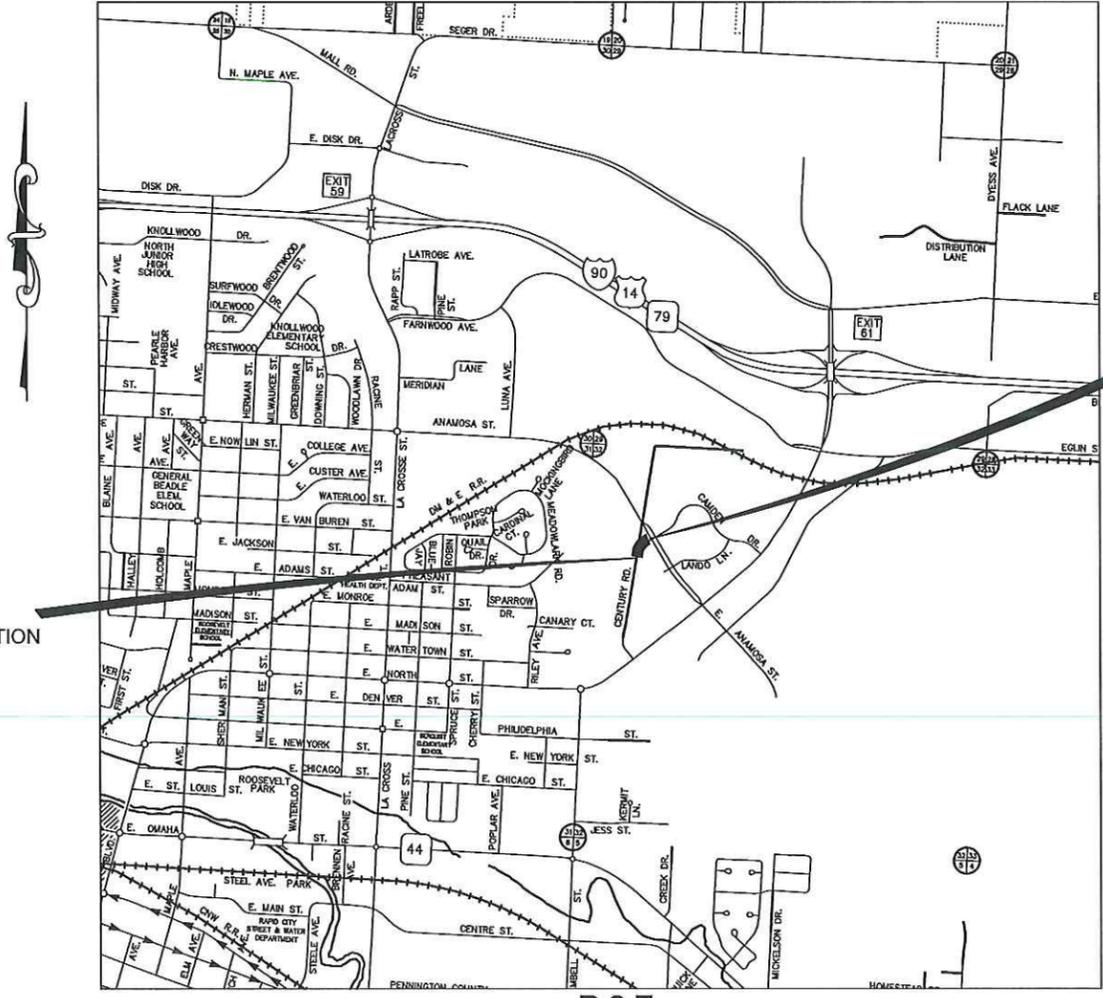


PROJECT

INDEX OF SHEETS

- 1 TITLE SHEET, LAYOUT & INDEX
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- 7 WATER & SEWER PIPE TABLES
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- 18-33 CATHODIC PROTECTION
- 34 SPECIAL DETAILS
- 35-40 CITY STANDARD DETAILS

RAPID CITY, SD



BEGIN 13-2125
 CENTURY ROAD
 STA. 12+25 - APPROX. 425 FEET
 SOUTHWEST OF THE INTERSECTION
 WITH EAST ANAMOSA STREET
 SECTION 32, T2N, R8E, BHM
 RAPID CITY, SD

END 13-2125
 CENTURY ROAD
 STA 18+13 - APPROX. 20 FEET
 SOUTHWEST OF THE INTERSECTION
 WITH EAST ANAMOSA STREET
 SECTION 32, T2N, R8E, BHM
 RAPID CITY, SD

STORM WATER PERMIT
 MAJOR RECEIVING BODY OF WATER: BOX ELDER CREEK
 AREA DISTURBED: 0.5 ACRES
 TOTAL PROJECT AREA: 0.5 ACRES
 BEGIN PROJECT: N 44°05'48.00", W 103°12'06.35"

I, DANA FOREMAN CERTIFY THAT I HAVE READ AND UNDERSTAND THE PROVISIONS CONTAINED IN THE CITY OF RAPID CITY STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT EDITION AND THE CITY OF RAPID CITY'S ADOPTED DESIGN CRITERIA MANUALS. THE DRAWINGS AND SPECIFICATIONS CONTAINED HERE WITHIN, TO THE BEST OF MY KNOWLEDGE, WERE PREPARED IN ACCORDANCE WITH THESE DOCUMENTS OR A PROPERLY EXECUTED EXCEPTION TO THE STANDARD SPECIFICATIONS AND INFRASTRUCTURE DESIGN CRITERIA MANUAL HAS BEEN SECURED.

Dana Foreman
 DANA FOREMAN, PE



330 KNOLLWOOD DRIVE
 RAPID CITY, SD 57701
 PH: 605.721.5553
 FAX: 605.721.5575
 www.kljeng.com

6

ONE CALL
 BEFORE DIGGING
 1-800-781-7474

FOR BIDDING PURPOSES ONLY

 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	2	40
ESTIMATE OF QUANTITIES			

SDDOT BID ITEM NUMBER	SDDOT BID ITEM DESCRIPTION	QUANTITY	UNIT	CITY OF RAPID CITY SPECIFICATIONS DESCRIPTION
009E0010	MOBILIZATION	LUMP SUM	LS	MOBILIZATION
009E3200	CONSTRUCTION STAKING	LUMP SUM	LS	CONSTRUCTION STAKING
110E5790	SALVAGE WATER MAIN FITTING	1	EACH	REMOVE & SALVAGE WATER MAIN FITTING
250E0010	INCIDENTAL WORK	LUMP SUM	LS	INCIDENTAL
451E0301	PIPE ENCASEMENT	2	EACH	WATER MAIN CONCRETE ENCASEMENT
451E0606	6" PVC WATER MAIN	50	FT	6" PVC WATER MAIN C-900, CLASS 150
451E0610	10" PVC WATER MAIN	512	FT	10" PVC WATER MAIN C-900, CLASS 150
451E0802	1" COPPER PIPE	118	FT	1" COPPER SERVICE
451E1008	8" PVC SEWER PIPE	531	FT	8" PVC SEWER MAIN (0'-6')
				8" PVC SEWER MAIN (6'-8')
				8" PVC SEWER MAIN (8'-10')
				8" PVC SEWER MAIN (10'-12')
451E1204	4" SEWER SERVICE	66	FT	4" PVC SEWER SERVICE LINE
451E1504	4" SANITARY SEWER SERVICE CLEANOUT	2	EACH	4" PVC SEWER CLEANOUT
451E2221	10"x6" PIPE TEE	1	EACH	10"x10"x6" TEE
451E2500	TAPPING SADDLE	2	EACH	1" TAPPING SADDLE
451E2902	1" CURB STOP WITH BOX	2	EACH	1" CURB STOP & BOX
451E3010	10" PIPE BEND	4	EACH	10" 22 1/2 DEGREE BEND
				10" 45 DEGREE BEND
451E3110	10" PIPE CAP	1	EACH	10" MJ PLUG
451E4210	10" GATE VALVE WITH BOX	1	EACH	10" GATE VALVE W/BOX
451E4380	TRACER WIRE ACCESS BOX	3	EACH	TRACER WIRE BOX
451E4400	PIPE INSULATION	1484	SQFT	WATER & SEWER MAIN INSULATION
451E4585	FIRE HYDRANT WITH AUXILIARY VALVE & BOX	1	EACH	FIRE HYDRANT W/AUX VALVE, BOX AND LEAD
451E4918	IMPORTED TRENCH BACKFILL	500	CUYD	IMPORTED BACKFILL MATERIAL (TRENCH)
451E4920	PIPE BEDDING MATERIAL	50	TON	TYPE IV FOUNDATION MATERIAL
451E6105	CONNECT TO EXISTING WATER MAIN	1	EACH	CONNECT TO EXISTING WATER MAIN
451E7016	CONNECT TO EXISTING SEWER MAIN	1	EACH	CONNECT TO EXISTING SEWER MAIN
451E7402	TEST STATION	1	EACH	CATHODIC CONTROL TEST STATION
451E7520	EXPLORATORY EXCAVATION	10	HOUR	EXCAVATION, EXPLORATORY
671E1048	48" MANHOLE	3	EACH	STANDARD MANHOLE, 48"
671E5510	EXTRA DEPTH FOR 48" MANHOLE	5.9	FT	EXTRA MANHOLE DEPTH, 48"





PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
13-2125	3	40
GENERAL NOTES		

SPECIFICATIONS TO BE USED

UTILITY WORK SHALL BE IN ACCORDANCE WITH THE 2007 EDITION OF THE CITY OF RAPID CITY STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND ANY CURRENT REVISIONS AND ADDITIONS, SPECIAL PROVISIONS OR REQUIREMENTS ON THE DRAWINGS OR SPECIFICATIONS.

CORROSION SPECIFICATIONS SHALL BE CITY OF RAPID CITY SECTION 8B AND THE STANDARD DETAILS.

UTILITIES

SD ONE-CALL WAS CONTACTED TO LOCATE UTILITIES ASSOCIATED WITH THIS PROJECT. EXISTING SUBSURFACE UTILITIES SHOWN ON THE PLANS WERE MAPPED FROM LOCATIONS MARKED BY OTHERS. KLJ MAKES NO GUARANTEE ON THE TRUE LOCATION, SIZE, DEPTH, OR NATURE OF ANY SUBSURFACE UTILITIES.

THE CONTRACTOR SHALL BECOME, BEFORE STARTING ANY EXCAVATION OR TRENCHING, FAMILIAR WITH THE LOCATION OF ALL UNDERGROUND UTILITIES AND SHALL CONTACT SD ONE-CALL AT 1-800-781-7474. ANY UNDERGROUND UTILITIES WHICH ARE ENCOUNTERED AND SEVERED OR OTHERWISE DAMAGED SHALL BE IMMEDIATELY REPAIRED. ANY DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE SATISFACTORILY REPAIRED AT THE CONTRACTOR'S EXPENSE.

ADJUSTMENTS TO PRIVATE UTILITIES SHALL BE MADE BY THE INDIVIDUAL UTILITY OWNERS OR BY THE CONTRACTOR WITH THEIR PERMISSION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THEIR WORK SCHEDULE WITH THE VARIOUS PRIVATE UTILITIES WHEREVER CONSTRUCTION INTERCEPTS OR CONFLICTS WITH EXISTING UTILITY SERVICES SUFFICIENTLY TO WARRANT RELOCATION OR ADJUSTMENT OF THE UTILITY. PAYMENT FOR SUCH UTILITY COORDINATION WORK SHALL BE INCIDENTAL TO THE PROJECT.

NOTIFICATION

DO NOT DISTURB EXISTING UTILITIES AND SERVICES WITHOUT PROPER NOTICE. UTILITIES SHALL REMAIN IN SERVICE EXCEPT FOR SCHEDULED OUTAGES. PROVIDE CITY ENGINEERING SERVICES DIVISION WITH WRITTEN PLAN OF WORK TO INCLUDE SERVICES AFFECTED, SEQUENCE OF THE WORK, AND PLANNED DURATION OF THE WORK.

PROJECT COORDINATION

CONTRACTOR IS RESPONSIBLE FOR COORDINATING WORK WITH ALL ADJACENT PROPERTY OWNERS THAT WILL BE TEMPORARILY IMPACTED BY CONSTRUCTION OF THIS PROJECT.

CONTRACTOR FURNISHED STAKING

ALL STAKING ON THE PROJECT WILL BE BY THE CONTRACTOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. PAYMENT FOR CONTRACTOR FURNISHED STAKING SHALL BE AT THE CONTRACT UNIT PRICE FOR "CONSTRUCTION STAKING."

NOTICE-TO-PROCEED

A "NOTICE-TO-PROCEED WITH SUBMITTAL DOCUMENTATION" WILL BE ISSUED AFTER THE CONTRACT IS SIGNED.

A "NOTICE-TO-PROCEED WITH CONSTRUCTION" WILL BE ISSUED ONLY AFTER ALL CONTRACT DOCUMENTATION AND SUBMITTALS HAVE BEEN EXECUTED.

PROGRESS MEETING

A PROGRESS MEETING WILL BE HELD AT LEAST WEEKLY, AND MORE FREQUENTLY IN CRITICAL AREAS. THE WEEKLY MEETING SCHEDULE WILL BE ESTABLISHED AT THE PRE-CONSTRUCTION CONFERENCE.

THE ENGINEER WILL PREPARE THE MEETING AGENDAS AND MEETING MINUTES. THE CONTRACTOR SHALL MAKE AVAILABLE APPROPRIATED SPACE FOR PROGRESS

MEETINGS. THE CONTRACTOR SHALL SUPPLY SUFFICIENT TABLES AND CHAIRS TO ACCOMMODATE THE CONTRACTOR/SUBCONTRACTOR ATTENDEES AS WELL AS 12 ADDITIONAL PEOPLE, WHICH MAY INCLUDE AFFECTED ADJACENT LANDOWNERS, ENGINEER'S REPRESENTATIVES, CITY PERSONNEL, ECT.

PROGRESS MEETINGS WILL BE HELD AT AN OFFSITE LOCATION ARRANGED BY THE CONTRACTOR.

DEWATERING

NO PAYMENT WILL BE MADE FOR ANY TYPE OF DEWATERING THAT MAY BE NECESSARY. CONTRACTOR SHALL OBTAIN NECESSARY SD DENR PERMITS FOR DEWATERING.

CONTRACTOR SCHEDULE

THE CONTRACTOR IS REQUIRED TO FURNISH A CONSTRUCTION SCHEDULE SEVEN DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING. THE CONSTRUCTION SCHEDULE SHALL BE IN ACCORDANCE WITH THE SPECIAL PROVISIONS AND TRAFFIC CONTROL PHASING IN SECTION C OF ROAD CONSTRUCTION PLANS EM 1648(06) PCN 04P6.

TRAFFIC CONTROL

TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH ROAD CONSTRUCTION PROJECT EM 1648(06) PCN 04P6 SECTION C - TRAFFIC CONTROL PLANS OF THIS PROJECT. IT MAY BE NECESSARY AT TIMES FOR ADJUSTMENT TO THE TRAFFIC CONTROL DEVICES DUE TO CONSTRUCTION OUTSIDE THE PHASING LIMITS AND THE TRAVELED WAY. ADJUSTMENTS TO TRAFFIC CONTROL DEVICES, INCLUDING ALL LABOR AND MATERIALS NECESSARY FOR SAID ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL WORK AND PAID FOR AS INCIDENTAL WORK.

INGRESS AND EGRESS TO EACH BUSINESS SHALL BE PROVIDED DURING NORMAL OPERATING HOURS FOR THAT PARTICULAR BUSINESS. ANY EXCEPTIONS SHALL BE OBTAINED IN WRITING BY THE CONTRACTOR AND PROVIDED TO THE ENGINEER 24 HOURS IN ADVANCE OF CLOSURE.

WATER PIPE

6" AND 10" WATER MAINS SHALL BE PVC PRESSURE PIPE CONFORMING TO THE REQUIREMENTS OF AWWA SPECIFICATION C-900 D.R. 18 (C.I.O.D.).

MEASUREMENT AND PAYMENT SHALL BE IN ACCORDANCE WITH THE CITY STANDARD SPECIFICATIONS, EXCEPT FOR SPECIAL ITEMS NOTED.

WATER MAIN JOINT AND FITTING RESTRAINT

ALL VALVES, FITTINGS AND PIPE JOINTS WITHIN THE SPECIFIED RESTRAINED LENGTH OF A VALVE OR FITTING SHALL BE RESTRAINED USING THE EBBA, OR EQUAL, RESTRAINING SYSTEMS. RESTRAINED LENGTHS WERE CALCULATED USING EBBA RESTRAINT DESIGN CALCULATION SOFTWARE VERSION 7.0.1 WITH THE FOLLOWING FACTORS:

SOIL TYPE:	CL
SAFETY FACTOR	2.0
TRENCH TYPE	5
BURY DEPTH	6'
TEST PRESSURE	150 PSI

MAIN LINE GATE VALVES:

SIZE	RESTRAINED LENGTH
6"	43 FT. BOTH SIDES
10"	69 FT. BOTH SIDES

TEES (6' RESTRAINED LENGTH ON MAINLINE UNLESS OTHERWISE NOTED):

SIZE	RESTRAINED LENGTH
10"x10"x6"	1 FT. ON BRANCH

HORIZONTAL BENDS:

SIZE	RESTRAINED LENGTH
10" 22½°	5 FT. EACH SIDE OF BEND

VERTICAL BENDS (BASED ON 11' LOWSIDE DEPTH):

SIZE	LOWER BEND	UPPER BEND
10" 45°	7 FT. EACH SIDE	39 FT. EACH SIDE

FIRE HYDRANTS:

LEAD SIZE	RESTRAINED LENGTH
6"	43 FT.

RESTRAINED JOINTS SHALL BE USED FOR ALL FIRE HYDRANTS, AUXILIARY VALVES, AND TEES FOR CONNECTING THE FIRE HYDRANTS. CONTACT THE ENGINEER FOR RESTRAINING LENGTHS FOR FITTINGS NOT SHOWN ABOVE.

THRUST BLOCKS

THRUST BLOCKS ARE REQUIRED AS INDICATED ON THE PLANS AND SHALL MEET THE REQUIREMENTS CALLED FOR IN THE THRUST BLOCK TABLE ON SHEET 34.

WATER MAIN AND WATER SERVICE RECONNECTS

ALL COSTS ASSOCIATED WITH PERMITS AND FEES FOR WATER MAIN AND SERVICE RECONNECTS SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEM FOR "CONNECT TO EXISTING WATER MAIN".

ALL WATER SERVICE CONNECTIONS SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 8 OF THE STANDARD SPECIFICATIONS. RAPID CITY UTILITY MAINTENANCE GROUP SHALL PROVIDE CORPORATION STOPS FOR 1" WATER SERVICE CONNECTIONS.

EXPLORATORY EXCAVATIONS

THE CONTRACTOR SHALL DETERMINE DEPTHS OF EXISTING WATER MAIN, SANITARY SEWER AND SERVICE LINES PRIOR TO INSTALLING PIPE OR HYDRANTS AT THOSE LOCATIONS. USE OF VERTICAL OFFSETS AND FITTINGS TO MATCH GRADE OF EXISTING MAINS WILL NOT BE PERMITTED. USE OF FIRE HYDRANT EXTENSIONS WILL NOT BE PERMITTED. ALL COSTS ASSOCIATED WITH DETERMINING DEPTHS AND LOCATIONS OF THESE LINES SHALL BE CONSIDERED INCIDENTAL TO BID ITEM "EXPLORATORY EXCAVATIONS" AND NO ADDITIONAL PAYMENT WILL BE MADE. CONTRACTOR MUST HAVE PRIOR APPROVAL BY THE ENGINEER BEFORE ANY PAYMENT WILL BE MADE UNDER THIS BID ITEM.

SERVICE LINE INSPECTION

ALL WATER AND SEWER LINE SERVICE INSTALLATIONS SHALL BE INSPECTED BY THE CITY UTILITY MAINTENANCE GROUP PRIOR TO THE CONTRACTOR BACKFILLING THE TRENCH. THE CONTRACTOR SHALL CONTACT THE CITY UTILITY MAINTENANCE GROUP A MINIMUM OF FOUR HOURS PRIOR TO THE NEED FOR AN INSPECTION.





PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
13-2125	4	40
GENERAL NOTES		

EXISTING UTILITY CROSSINGS

REFER TO THE STANDARD SPECIFICATIONS FOR CROSSING OF EXISTING STORM SEWERS, SANITARY SEWERS, WATER MAINS AND WATER MAIN LOWERINGS. AT ALL LOCATIONS WHERE THE PROPOSED UTILITY IMPROVEMENT CROSSES OR IS ADJACENT TO EXISTING UTILITIES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING THE EXISTING UTILITY TO ENSURE THAT THEY ARE NOT DISTURBED DURING THE WORK. NO SEPARATE PAYMENT SHALL BE MADE FOR CROSSED UTILITY PROTECTION. ANY REPAIR WORK NECESSARY TO REPAIR A CROSSED UTILITY RESULTING FROM THE CONTRACTOR'S ACTIVITY SHALL BE AT THE CONTRACTOR'S EXPENSE.

PIPE ENCASEMENT

WHERE INDICATED ON THE PLANS OR REQUIRED BY STANDARD SPECIFICATIONS, PIPE SHALL BE ENCASED WITH CONTROLLED LOW STRENGTH MATERIAL IN ACCORDANCE WITH SECTION 200 OF THE STANDARD SPECIFICATIONS. THE PIPE ENCASEMENT, ALL MATERIAL AND LABOR SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH FOR "PIPE ENCASEMENT".

SEWER & WATER MAIN INSULATION

A QUANTITY OF "PIPE INSULATION" HAS BEEN INCLUDED FOR USE WHERE IT IS NOT POSSIBLE FOR THE PROPOSED SEWER OR WATER MAINS TO BE INSTALLED AT THE PROPER MINIMUM BURY DEPTH OR IN CLOSE PROXIMITY TO STORM SEWER LINE OR INLETS. THESE AREAS SHOULD BE LIMITED TO CONNECTIONS OF NEW WATER MAINS INTO EXISTING WATER MAINS. ANTICIPATED INSULATION AREAS ARE AS INDICATED ON THE PLANS. PRIOR APPROVAL FROM THE ENGINEER IS NECESSARY FOR THIS BID ITEM AND THE ENGINEER SHALL DETERMINE THE LIMITS AND USE OF INSULATION.

CORROSION PROTECTION

THE CONTRACTOR SHALL PROVIDE CORROSION PROTECTION OF ALL WATER MAIN FITTINGS, RESTRAINTS, APPURTENANCES, AND WATER SERVICES IN ACCORDANCE WITH THE SPECIFICATIONS FOR CORROSION CONTROL, SECTION 8B AND THE STANDARD DETAILS.

1. FURNISHING AND INSTALLING ZINC ANODES AND ASSOCIATED BONDING, BONDING WIRES ETC. PER SPECIFICATIONS AND DETAILS FOR ALL BURIED METALLIC COMPONENTS.
2. INSTALLATION OF FLUSH MOUNTED CORROSION TEST STATION ADJACENT TO PROPOSED FIRE HYDRANTS.

STANDARD DETAILS HAVE BEEN INCLUDED IN THE CONTRACT DOCUMENTS.

ANODES AND ATTACHMENT OF LEAD WIRES TO FITTINGS, VALVES OR OTHER METALLIC COMPONENTS SHALL BE INCIDENTAL TO EACH OF THE NEW METALLIC WATER SYSTEM COMPONENTS INSTALLED. NO SEPARATE MEASUREMENT WILL BE MADE.

TRACER WIRE AND TRACER WIRE ACCESS BOX

TRACER WIRE AND ALL ACCESSORY ITEMS NECESSARY FOR THE INSTALLATION OF AN ELECTRICALLY-CONTINUOUS TRACING SYSTEM SHALL BE INCIDENTAL TO THE PIPE INSTALLED. NO SEPARATE MEASUREMENT WILL BE MADE.

ALL COSTS FOR FURNISHING AND INSTALLING MATERIALS FOR FLUSH MOUNTED TRACER WIRE BOXES SHALL PAID FOR BY THE CONTRACT UNIT PRICE "TRACER WIRE ACCESS BOX".

NEUTRALIZATION OF HEAVILY-CHLORINATED WATER

HEAVILY-CHLORINATED WATER USED TO DISINFECT ALL WATER MAINS SHALL BE NEUTRALIZED PRIOR TO RELEASE. THE HEAVILY-CHLORINATED WATER SHALL BE NEUTRALIZED BY INTRODUCING A SODIUM ASCORBATE (VITA-D-CHLOR™ NEUTRAL OR APPROVED EQUAL) SOLUTION BY VENTURI DEVICE, RESULTING IN PH NEUTRAL RELEASE WATER. THE VENTURI DEVICE SHALL BE THE COMBO DECHLORINATION KIT WITH THE LPD-250 DIFFUSER AS MANUFACTURED BY POLLARD WATER, NEW HYDE PARK, NY, OR APPROVED EQUAL. AT THE OPTION OF THE CONTRACTOR, THE HEAVILY-CHLORINATED WATER SHALL BE CONTAINED AND TRANSPORTED TO AN APPROVED LOCATION FOR LAND APPLICATION. THE CONTRACTOR SHALL REMAIN RESPONSIBLE FOR MEETING ALL REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR REQUIRED FLOW AND MINIMUM FLOW DURATION TO FLUSH PIPELINES AND SURFACE WATER QUALITY STANDARDS.

NEUTRALIZATION OF THE HEAVILY-CHLORINATED WATER SHALL BE INCIDENTAL TO THE INSTALLATION OF ALL WATER MAINS.

DISINFECTION AND FLUSHING OF MAINS SHALL BE ACCORDING TO THE STANDARD SPECIFICATIONS.

TRENCH EXCAVATION AND BACKFILL

TRENCH EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH THE CITY STANDARD SPECIFICATIONS. ALL COSTS RELATED TO TRENCH EXCAVATION AND BACKFILL ARE CONSIDERED INCIDENTAL TO THE BID ITEMS FOR THE VARIOUS PIPES INSTALLED.

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH OSHA AND OTHER APPLICABLE FEDERAL AND STATE SAFETY REGULATIONS. THE CONTRACTOR SHALL BE REQUIRED TO UTILIZE TRENCH BOXES, SHEET PILING, SHORING AND BRACING, OR OTHER TRENCH PROTECTION MEASURES TO CONTROL EXCAVATION WITHIN THE LIMITS SHOWN ON THE DRAWINGS. NO SEPARATE PAYMENT SHALL BE MADE FOR TRENCH PROTECTION MEASURES, AND ALL COSTS OF PROVIDING SUCH MEASURES SHALL BE INCIDENTAL TO THE PIPE INSTALLATION.

DISPOSAL OF WASTE MATERIALS FROM UNDERGROUND TRENCHES

CONSTRUCTION AND/OR DEMOLITION DEBRIS MAY NOT BE DISPOSED OF WITHIN THE RIGHT-OF-WAY.

THE WASTE DISPOSAL SITE(S) SHALL NOT BE LOCATED IN A WETLAND, WITHIN 200 FEET OR SURFACE WATER, OR IN AN AREA THAT ADVERSELY AFFECTS WILDLIFE, RECREATION, AESTHETIC VALUE OF AN AREA, OR ANY THREATENED OR ENDANGERED SPECIES, AS APPROVED BY THE PROJECT ENGINEER.

IF THE WASTE DISPOSAL SITE(S) IS LOCATED SUCH THAT IT IS WITHIN VIEW OF ANY RIGHT-OF-WAY, THE FOLLOWING ADDITIONAL REQUIREMENTS SHALL APPLY:

THE ABOVE REQUIREMENTS WILL NOT APPLY TO WASTE DISPOSAL SITES THAT ARE COVERED BY AN INDIVIDUAL SOLID WASTE PERMIT AS SPECIFIED IN SDCL 34A-6-58, SDCL 34A-6-1.13 AND ARSD 74:27:10:06.

FAILURE TO COMPLY WITH THE REQUIREMENTS STATED ABOVE MAY RESULT IN CIVIL PENALTIES IN ACCORDANCE WITH SOUTH DAKOTA SOLID WASTE LAW, SDCL 34A6-1.31.

ALL COSTS ASSOCIATED WITH DISPOSING OF WASTE, MAINTAINING CONTROL OF ACCESS (FENCE, GATES AND SIGNS) AND RECLAMATION OF THE WASTE DISPOSAL SITE(S) SHALL BE INCIDENTAL TO THE VARIOUS CONTRACT ITEMS.

FIRE HYDRANT WITH AUXILIARY VALVE, BOX, AND LEAD

FURNISH AND INSTALL NEW FIRE HYDRANT ASSEMBLIES (HYDRANT WITH AUXILIARY VALVE) AT THE LOCATIONS SHOWN ON THE PLANS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 8. NEW LEADS WILL BE CONNECTED TO EXISTING LEADS WITH APPROVED RESTRAINED JOINT COUPLING. THE COST OF FURNISHING AND INSTALLING A COUPLING FOR CONNECTION TO AN EXISTING PIPE SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM "FIRE

HYDRANT W/ AUX VALVE AND BOX". NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PIPE BETWEEN THE AUXILIARY VALVE AND HYDRANT. ANY OTHER WORK, INCLUDING EXPLORATORY EXCAVATION, BACKFILL, THRUST RESTRAINTS AND THRUST BLOCKS, CORROSION PROTECTION, TRACER WIRE AND ACCESS BOX, DRAIN ROCK AND OTHER INCIDENTALS NECESSARY FOR A COMPLETE INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR EACH.

FIRE HYDRANT COATINGS

THE CITY OF PUBLIC WORKS DIRECTOR ISSUED A WAIVER TO THE 2007 EDITION STANDARD SPECIFICATIONS REQUIRING THE INTERNAL EPOXY COATING FOR FIRE HYDRANTS. ANY FIRE HYDRANT THAT DOESN'T HAVE THE INTERNAL EPOXY COATING PER THE SPECIFICATION SHALL DOUBLE THE CATHODIC PROTECTION (ANODES) REQUIRED FOR THE FIRE HYDRANT. THE COST OF THE EXTRA CATHODIC PROTECTION SHALL BE ABSORBED INTO THE UNIT PRICE OF THE FIRE HYDRANT. FIRE HYDRANTS WITH THE INTERNAL EPOXY COATING DO NOT NEED TO HAVE DOUBLE THE CATHODIC PROTECTION.

FIRE HYDRANTS AND ANY OTHER BURIED FERROUS OR METALLIC OBJECTS THAT REQUIRE EPOXY COATINGS SHALL HAVE COATING THICKNESS AS DETAILED IN SECTIONS 8A AND 8B OF THE STANDARD SPECIFICATIONS. ITEMS THAT DON'T MEET THE EXTERNAL EPOXY COATING MIL THICKNESS REQUIREMENT SHALL HAVE DOUBLE CATHODIC PROTECTION (ANODES) REQUIRED. A 30 LB ZINC ANODE WILL BE CONSIDERED EQUAL TO TWO 18 LB ZINC ANODES.

DISCREPANCIES

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF LOCATIONS ARE IDENTIFIED WHERE WATER AND SEWER MAINS ARE FOUND AT LOCATIONS OR ELEVATIONS OTHER THAN SHOWN ON THE DRAWINGS.

PVC SEWER PIPE

SECTION 9.5.A OF THE STANDARD SPECIFICATIONS INDICATES THAT PAYMENT FOR SEWER WILL BE AT THE UNIT PRICE BID FOR THE APPROPRIATE SIZE AND DEPTH OF SEWER PIPE. TYPICAL PAY DEPTHS ARE ESTIMATED ON THE PROFILE DRAWINGS AND ARE FOR INFORMATION ONLY. ALL COSTS FOR FURNISHING AND INSTALLING THE PVC SEWER PIPE REGARDLESS OF DEPTH SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER FOOT FOR THE APPLICABLE SEWER PIPE SPECIFIED.

4" SEWER SERVICE

FURNISH AND INSTALL A NEW SERVICE LINE WHERE SHOWN ON THE PLANS, INCLUDING ALL PIPE, FITTINGS AND MATERIALS NECESSARY FOR CONNECTING THE NEW SERVICE LINE TO EXISTING SERVICE LINE OR FOR FUTURE SERVICE LINE. FITTINGS AND CONNECTIONS USED FOR SERVICE LINES, EXCEPT FOR CLEANOUTS, SHALL BE CONSIDERED INCIDENTAL WORK AND SHALL BE INCLUDED IN THE UNIT PRICE BID. CONTRACTOR SHALL OBTAIN A PERMIT FOR CONNECTION TO SEWER MAIN.



 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	5	40
GENERAL NOTES			

REMOVAL OF CLEANOUT

EXISTING SANITARY SEWER CLEANOUT NOTED ON THE PLANS TO BE REMOVED SHALL BE FULLY REMOVED AND DISPOSED OF AT A LOCATION PROVIDED BY THE CONTRACTOR. REMOVING CLEANOUT SHALL INCLUDE EXCAVATION, BACKFILL, COMPACTION, AND ALL INCIDENTALS NECESSARY TO COMPLETE WORK SHALL BE INCLUDED IN THE BID PRICE FOR INCIDENTAL WORK.

WORK WITHIN PRIVATE UTILITY EASEMENTS

EXCAVATIONS ON PRIVATE PROPERTY SHALL BE CONTAINED WITHIN TEMPORARY AND PERMANENT EASEMENTS, AND SHALL BE AS MINIMAL AS POSSIBLE TO COMPLETE THE WORK. EXISTING SOD SHALL BE CUT, ROLLED, AND REPLACED WITHIN 24 HOURS OF COMPLETION OF BACKFILL.

INCIDENTAL WORK

INCIDENTAL WORK SHALL BE IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, AND SHALL INCLUDE ALL ITEMS SPECIFICALLY MENTIONED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS FOR WHICH THERE IS NO BID ITEM INCLUDED IN THE BID PROPOSAL, BUT WHICH MUST BE PERFORMED TO COMPLETE THE WORK.

WARRANTY PERIOD & BOND

THE WARRANTY PERIOD FOR THIS PROJECT SHALL CONFORM TO SECTION 7.65 OF THE 2007 CITY OF RAPID CITY SPECIFICATIONS FOR PUBLIC WORKS WITH THE EXCEPTION THAT THE WARRANTY PERIOD FOR THIS PROJECT SHALL START WHEN THE PROJECT IS 100% COMPLETE, A LETTER OF ACCEPTANCE HAD BEEN ISSUED, AND SHALL NOT BE BASED ON COMPLETION OF INDIVIDUAL PHASES OF THE PROJECT.

ANY SURFACING ITEM REMOVED AND REPLACED AS A RESULT OF REPAIR OF UTILITIES AS RELATED TO THE WARRANTY ITEM BEING REPAIRED WILL BE CONSIDERED INCIDENTAL TO THE REPAIR OF THE WARRANTY ITEM. THE CITY OF RAPID CITY WILL NOT BE RESPONSIBLE FOR PAYMENT TO REPLACE THESE ITEMS.

IMPORTED TRENCH BACKFILL

IMPORTED TRENCH BACKFILL MAY BE USED WHEN UTILITY TRENCH BACKFILL MATERIAL IS DEEMED UNSUITABLE FOR USE AS TRENCH BACKFILL BY THE ENGINEER. PRIOR APPROVAL FROM THE ENGINEER IS REQUIRED BEFORE PLACING IMPORTED TRENCH BACKFILL

PAYMENT FOR IMPORTED TRENCH BACKFILL WILL BE AT THE UNIT PRICE PER CUBIC YARD OF IMPORTED TRENCH BACKFILL PLACED AND COMPACTED, AND SHALL INCLUDE DISPOSAL OF UNSUITABLE MATERIAL.

AS-BUILT DRAWINGS

THE CONTRACTOR SHALL MEASURE AND RECORD ANY HORIZONTAL OR VERTICAL DEVIATIONS ON A MASTER SET OF PLANS. THE CHANGES SHALL BE RECORDED IN AN ACCURATE AND NEAT FASHION AND FURNISHED TO THE ENGINEER WITHIN 14 DAYS OF COMPLETION OF THE PROJECT. THE RECORD DRAWINGS SHALL BE MAINTAINED ON SITE AND AVAILABLE FOR REVIEW BY THE ENGINEER OR OWNER UPON REQUEST.

CONSTRUCTION REQUIREMENTS

- PIPE DEFLECTION: DEFLECTION OR BENDING OF THE PIPE JOINT (BELL AND SPIGOT) SHALL NOT BE PERMITTED EXCEPT AS APPROVED BY THE ENGINEER. CHANGES IN DIRECTION SHALL BE ACHIEVED BY USING COUPLINGS AND THE ALLOWABLE MANUFACTURER DEFLECTION AT FITTINGS FOR THE 10" PVC. A SIGNED CERTIFICATION BY THE MANUFACTURER STATING THE ALLOWABLE DEFLECTION SHALL BE PROVIDED TO THE ENGINEER.

- JOINT RESTRAINING DEVICES FOR 10" PVC: JOINT RESTRAINING DEVICES ARE REQUIRED FOR THE FOLLOWING INSTALLATIONS: (REFER TO THE "RESTRAINED LENGTH" PROVIDED IN THE GENERAL NOTES UNDER "WATER MAIN JOINT AND FITTING RESTRAINT").

- ALL VALVES, REDUCERS, INCREASERS, BENDS AND PIPE JOINTS WITHIN THE CORRESPONDING RESTRAINED LENGTHS SHALL BE RESTRAINED.
 - ALL WATER MAIN LOWERING AND CORRESPONDING PIPE JOINTS SHALL BE RESTRAINED. THIS INCLUDES RESTRAINING ALL JOINTS BETWEEN THE START OF THE LOWERING AND THE END OF THE LOWERING, REGARDLESS OF WHETHER OR NOT THE JOINT IS LOCATED WITHIN THE FITTING'S RESTRAINED LENGTH.
 - JOINT RESTRAINING DEVICES SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS FOR THE APPROPRIATE WATER PRESSURES AND SOIL CONDITIONS AS SHOWN IN THE PLANS.
- 10" PVC BEDDING REQUIREMENTS: TYPICAL TRENCH DETAILS AND BEDDING REQUIREMENTS ARE PROVIDED IN THE PLANS.

METHOD OF MEASUREMENT

- INSTALLED PIPE QUANTITIES SHALL BE DETERMINED BY MEASURING FROM CENTERLINE TO CENTERLINE OF ALL PIPE AND FITTINGS. MEASUREMENT SHALL BE TO THE NEAREST FOOT.

MANUFACTURER'S CERTIFICATIONS

MANUFACTURER'S CERTIFICATIONS OF MATERIALS AND INSTALLATION ARE TO BE PROVIDED FOR PVC PIPE AND DUCTILE IRON FITTINGS.

- FOR PIPE AND PIPE MATERIALS, JOINTS AND FITTINGS TO BE SUPPLIED ON THE PROJECT, THE PIPE AND FITTING MANUFACTURER SHALL CERTIFY IN WRITING ATTACHMENT B1 & B2 AS PROVIDED IN SPECIAL PROVISIONS.
- FOR MATERIAL HANDLING AND INSTALLATION OF 10" PVC PIPE, THE MANUFACTURER SHALL PROVIDE TO THE CONTRACTOR ESSENTIALLY ATTACHMENT A CERTIFICATE AS PROVIDED IN SPECIAL PROVISIONS. THIS CERTIFICATION SHALL BE PROVIDED TO THE ENGINEER BY THE CONTRACTOR.

CONSTRUCTION SEQUENCING

SEQUENCING OF INSTALLATION TO CONFORM WITH ROAD CONSTRUCTION PROJECT EM 1648(06) PCN 04P6.



FOR BIDDING PURPOSES ONLY

 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	6	40
WATER & SEWER TABLES			

TABLE OF SALVAGE WATER MAIN FITTINGS

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
18+12.3	RT	CENTURY ROAD (PLUG)	1
TOTAL:			1

TABLE OF 10"x6" PIPE TEE

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
13+37.8	RT	CENTURY ROAD	1
TOTAL:			1

TABLE OF 1" CURB STOP WITH BOX

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
13+82.9	LT	CENTURY ROAD	1
16+00.8	LT	CENTURY ROAD	1
TOTAL:			2

TABLE OF 10" PIPE BEND

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
15+65.6	RT	CENTURY ROAD (45°)	1
15+70.0	RT	CENTURY ROAD (45°)	1
16+29.1	RT	CENTURY ROAD (22 1/2°)	1
17+45.9	RT	CENTURY ROAD (22 1/2°)	1
TOTAL:			4

TABLE OF 10" PIPE CAP

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
12+80.0	RT	CENTURY ROAD	1
TOTAL:			1

TABLE OF 10" GATE VALVE WITH BOX

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
13+32.8	RT	CENTURY ROAD	1
TOTAL:			1

TABLE OF FIRE HYDRANT W/AUXILIARY VALVE & BOX

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
13+37.8	LT	CENTURY ROAD	1
TOTAL:			1

TABLE OF CONNECT TO EXISTING WATER MAIN

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
18+12.3	RT	CENTURY ROAD	1
TOTAL:			1

TABLE OF 4" SANITARY SEWER SERVICE CLEANOUT

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
13+92.9	LT	CENTURY ROAD	1
16+09.6	LT	CENTURY ROAD	1
TOTAL:			2

TABLE OF CONNECT TO EXISTING SEWER MAIN

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
18+04.08	RT	CENTURY ROAD	1
TOTAL:			1

TABLE OF 48" MANHOLE

STATION	LT/RT	DESCRIPTION	QUANTITY (EACH)
12+80.0	RT	CENTURY ROAD (S3)	1
16+49.8	LT	CENTURY ROAD (S2)	1
18+04.8	RT	CENTURY ROAD (S1)	1
TOTAL:			3

TABLE OF EXTRA DEPTH FOR 48" MANHOLE

STATION	LT/RT	DESCRIPTION	QUANTITY (FT)
18+04.8	RT	CENTURY ROAD (S1)	5.9
TOTAL:			5.9



 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	7	40
WATER & SEWER PIPE TABLES			

WATER PIPE TABLE

STATION OFFSET (LT/RT)	COPPER	PVC		CONCRETE ENCASEMENT
	1"	6"	10"	
	LF	LF	LF	EA
CENTURY ROAD				
12+80.0, 25.8' RT TO 16+00.0, 24.8' RT			319	1
13+37.8, 25.7' RT TO 13+37.8, 24.7' LT		50		1
13+82.9, 25.7' RT TO 13+82.9, 33.3' LT	59			
16+00.0, 24.8' RT TO 18+12.3, 26.8' RT			193	
16+04.2, 24.5' RT TO 16+00.8, 33.9' LT	59			
TOTALS:	118	50	512	2

SEWER PIPE TABLE

STATION OFFSET (LT/RT)	4"	PVC 8"				CONCRETE ENCASEMENT
		8"				
		0'-6'	6'-8'	8'-10'	10'-12'	EA
LF	LF	LF	LF	LF	EA	
CENTURY ROAD						
12+75.0, 0.0' RT TO 12+80.0, 0.0' RT		5				
12+80.0, 0.0' RT TO 16+00.0, 0.0' RT		320				
13+92.9, 0.0' RT TO 13+92.9, 33.3' RT	33					
16+00.0, 0.0' RT TO 16+49.8, 7.9' LT		51				
16+12.5, 1.2' LT TO 16+09.6, 34.6' LT	33					
16+49.8, 7.9' LT TO 18+04.8, 0.1' RT			60	57	38	
TOTALS:	66	376	60	57	38	0



FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	8	40
HORIZONTAL ALIGNMENT & SURVEY CONTROL DATA			

RAPID CITY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1030	652279.22	1217691.89	3275.79	BRASS CAP
2048	655509.89	1223063.14	3196.66	BRASS CAP
2131	655510.37	1218616.71	3272.56	BRASS CAP

BASIS OF SURVEY

BEARINGS FOR THIS PROJECT ARE BASED ON SOUTH DAKOTA STATE PLANE SOUTH ZONE NAD 83/96, GRID BEARINGS DERIVED FROM THE RAPID CITY SURVEY CONTROL NETWORK.

VERTICAL DATUM IS NGVD-29 PER RAPID CITY CONTROL.

COMBINED SCALE FACTOR TO CONVERT FROM GROUND DISTANCES TO STATE PLANE DISTANCES (GRID) IS 0.999786.

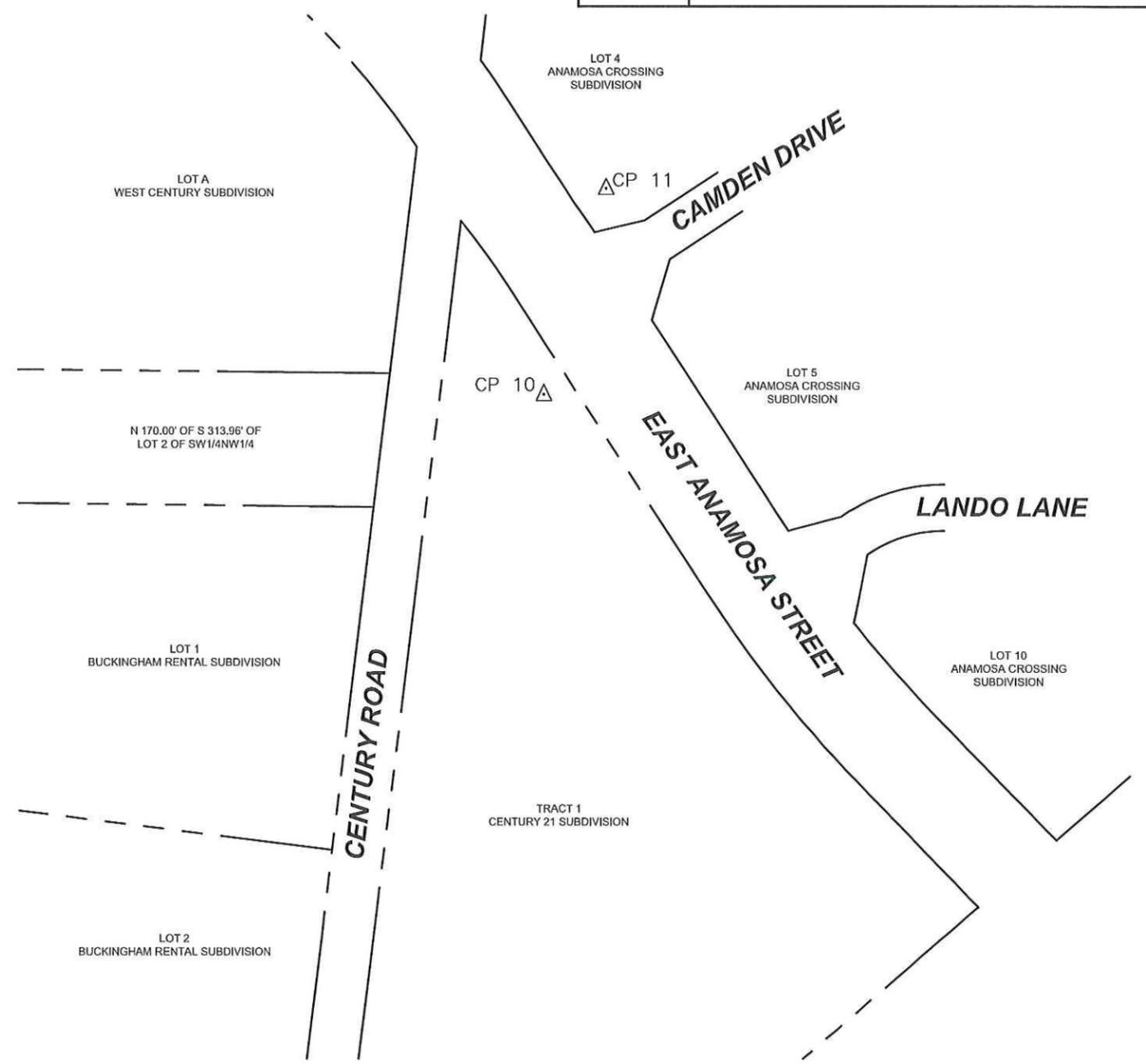
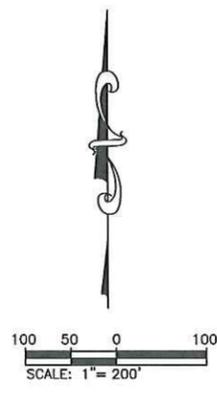
BASIS OF COORDINATES IS BM2131, ALL DISTANCES ARE SCALED FROM THIS POINT.

SURVEY NOTES

THIS SURVEY DOES NOT CONSTITUTE A BOUNDARY SURVEY. THE PROPERTY AND RIGHT-OF-WAY LINES DEPICTED HEREIN ARE FOR PLANNING PURPOSES ONLY. THE LOCATIONS OF LOT AND PROPERTY LINES WERE DETERMINED FROM RECORD DOCUMENTS AND FOUND MONUMENTS.

THE LOCATION OF UTILITIES DEPICTED HEREON WERE DERIVED FROM UTILITY LOCATES FROM SOUTH DAKOTA ONE CALL, UTILITY MAPS AND FOUND APPURTENANCES. CONTACT THE APPROPRIATE UTILITY COMPANIES FOR THE EXACT LOCATION AND NATURE OF UTILITIES.

FIELD SURVEY CONDUCTED IN THE FALL OF 2013.



HORIZONTAL AND VERTICAL CONTROL POINTS					
POINT	STATION & OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP 10	41+59.48 - 110.79' RT	654205.10	1218554.51	3289.93	REBAR
CP 11	39+83.71 - 100.06' LT	654465.29	1218641.99	3293.05	REBAR

CENTURY ROAD CENTERLINE					
TYPE	STATION	DISTANCE	DIRECTION	NORTHING	EASTING
BOP	0+00.00			652521.21	1218130.46
		TL = 1587.65	N08° 37' 24.77"E		
PC	15+87.65			654090.92	1218368.52
PI	17+03.46	R = 229.20	Delta = 55° 20' 16.54" R	654205.42	1218385.88
PT	18+04.56			654266.21	1218484.45
		TL = 195.44	N58° 20' 03.82"E		
EOP	20+00.00			654368.81	1218650.80

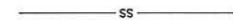
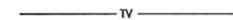


SYMBOLOLOGY & LEGEND

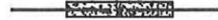
FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	9	40
SYMBOLOLOGY & LEGEND			

EXISTING SYMBOLS

	FLAG POLE		STORM SEWER MANHOLE
	BOREHOLE		SANITARY SEWER MANHOLE
	MONITORING WELL		CLEAN OUT
	PULL BOX		SET PROPERTY CORNER
	TRAFFIC SIGNAL		FOUND PROPERTY CORNER
	CABLE TV OR TELEPHONE RISER		CONTROL POINT
	CONIFEROUS TREE		BENCHMARK
	DECIDUOUS TREE		GAS VALVE
	BUSH		GAS METER
	HEDGE/TREE LINE		GAS MANHOLE
	RAILROAD CROSSING SIGNAL		ELECTRICAL MANHOLE
	RAILROAD BATTERY BOX		LIGHT POLE
	1 POLE SIGN		GUY WIRE ANCHOR
	MAILBOX		POWER POLE
	POST/BOLLARD		ELECTRICAL METER
	YARD HYDRANT		INLET
	WATER METER		SANITARY SEWER LINE
	FIRE HYDRANT		STORM SEWER LINE
	GATE VALVE		WATER LINE
	IRRIGATION VALVE		TELEPHONE LINE
	SPRINKLER HEAD		POWER LINE
	WATER MANHOLE		OVERHEAD LINES
	CURB STOP		GAS LINE
	TELEPHONE MANHOLE		FIBEROPTIC LINE
			CABLE TV LINE
			FENCE
			PROPERTY LINE
			EASEMENT LINE
			CENTER OF RAILROAD TRACKS

PROPOSED SYMBOLS

	THRUSTBLOCK		BUTTERFLY VALVE
	11 1/4' BEND		CURB STOP
	22 1/2' BEND		FIRE HYDRANT
	45' BEND		GATE VALVE
	CAP		POST INDICATOR VALVE (PIV)
	COUPLER		WATER MANHOLE
	CROSS		VERTICAL FIRE HYDRANT
	DEFLECTION COUPLER		GUY WIRE ANCHOR
	TEE		POWER POLE
	REDUCER		LUMINAIRE - STANDARD
	GAS MANHOLE		LUMINAIRE - DECORATIVE
	GAS METER		WATER LINE
	BUSH		WATER INSULATION
	CONIFEROUS TREE		WATER ENCASUREMENT
	DECIDUOUS TREE		JOINT RESTRAINT LENGTH
	HEDGE/TREE LINE		SANITARY SEWER LINE
	ELECTRICAL MANHOLE		STORM SEWER LINE
	CLEANOUT		STORM SEWER LINE GREATER THAN 36"
	SANITARY SEWER MANHOLE		ELECTRICAL LINE
	1 POST SIGN		GRADING CATCH LINE
	DRAINAGE ARROW		RIGHT-OF-WAY
	STORM SEWER JUNCTION BOX		EASEMENT
	STORM SEWER MANHOLE		TEMPORARY EASEMENT
	TYPE "B" INLET		
	HANDICAP MARKING		
	TELEPHONE MANHOLE		



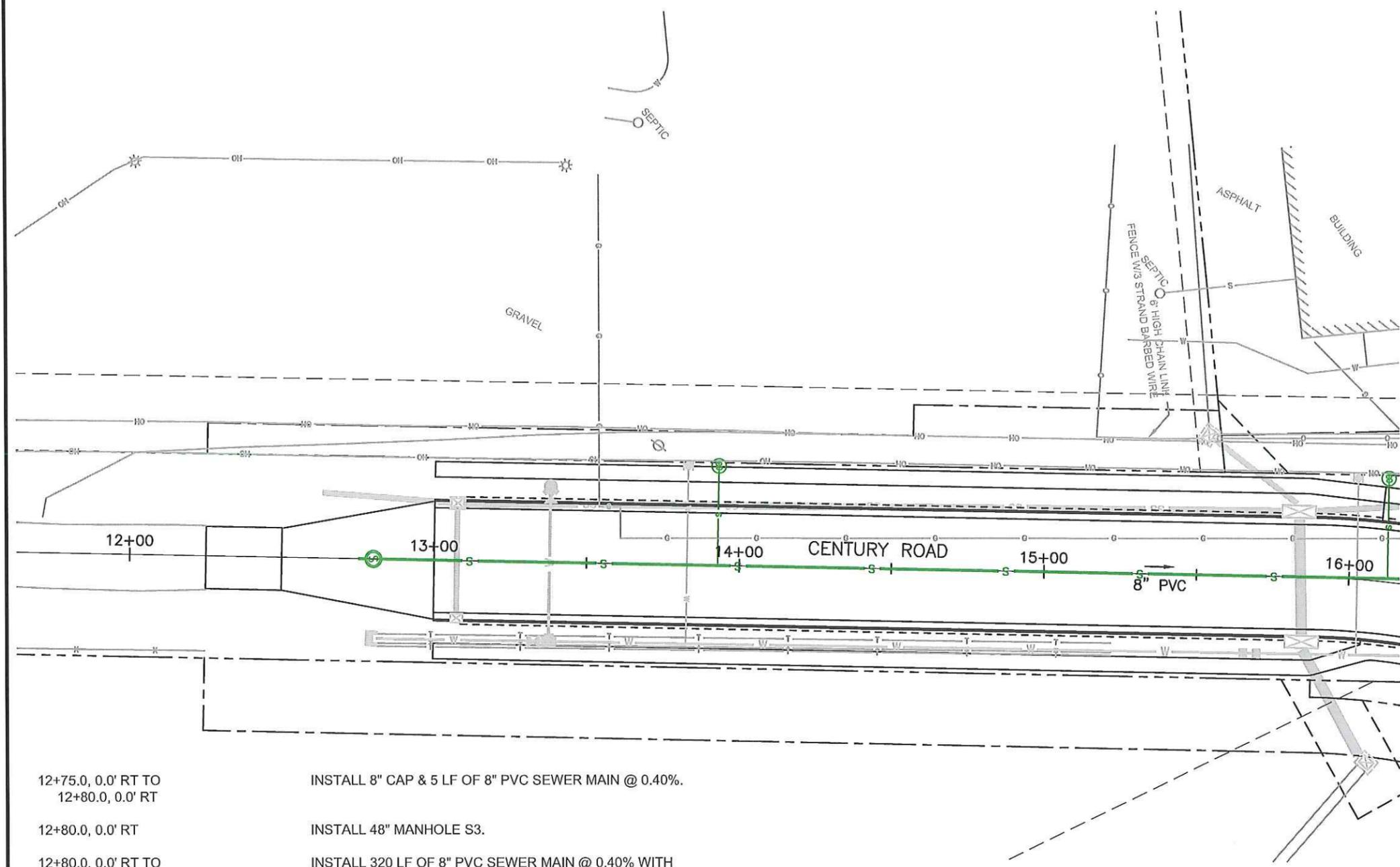
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	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	10	40
SEWER PLAN 12+00 TO 16+00			

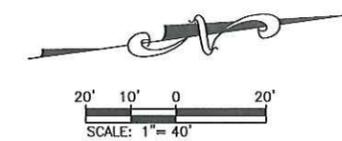
NOTE:
UTILITIES SHALL BE LOCATED & VERIFIED IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION.

ALL PIPE & STRUCTURES ARE SHOWN TO OUTSIDE DIMENSIONS.

8" CAP IS INCIDENTAL TO 8" PVC SEWER MAIN.



- 12+75.0, 0.0' RT TO 12+80.0, 0.0' RT
INSTALL 8" CAP & 5 LF OF 8" PVC SEWER MAIN @ 0.40%.
- 12+80.0, 0.0' RT
INSTALL 48" MANHOLE S3.
- 12+80.0, 0.0' RT TO 16+00.0, 0.0' RT
INSTALL 320 LF OF 8" PVC SEWER MAIN @ 0.40% WITH 2" INSULATION BOARD.
- 13+92.9, 0.0' RT TO 13+92.9, 33.3' RT
INSTALL 33 LF OF 4" PVC SEWER SERVICE @ 1.0% & CAP.
- 13+92.9, 33.3' LT
INSTALL 4" PVC SEWER CLEANOUT.



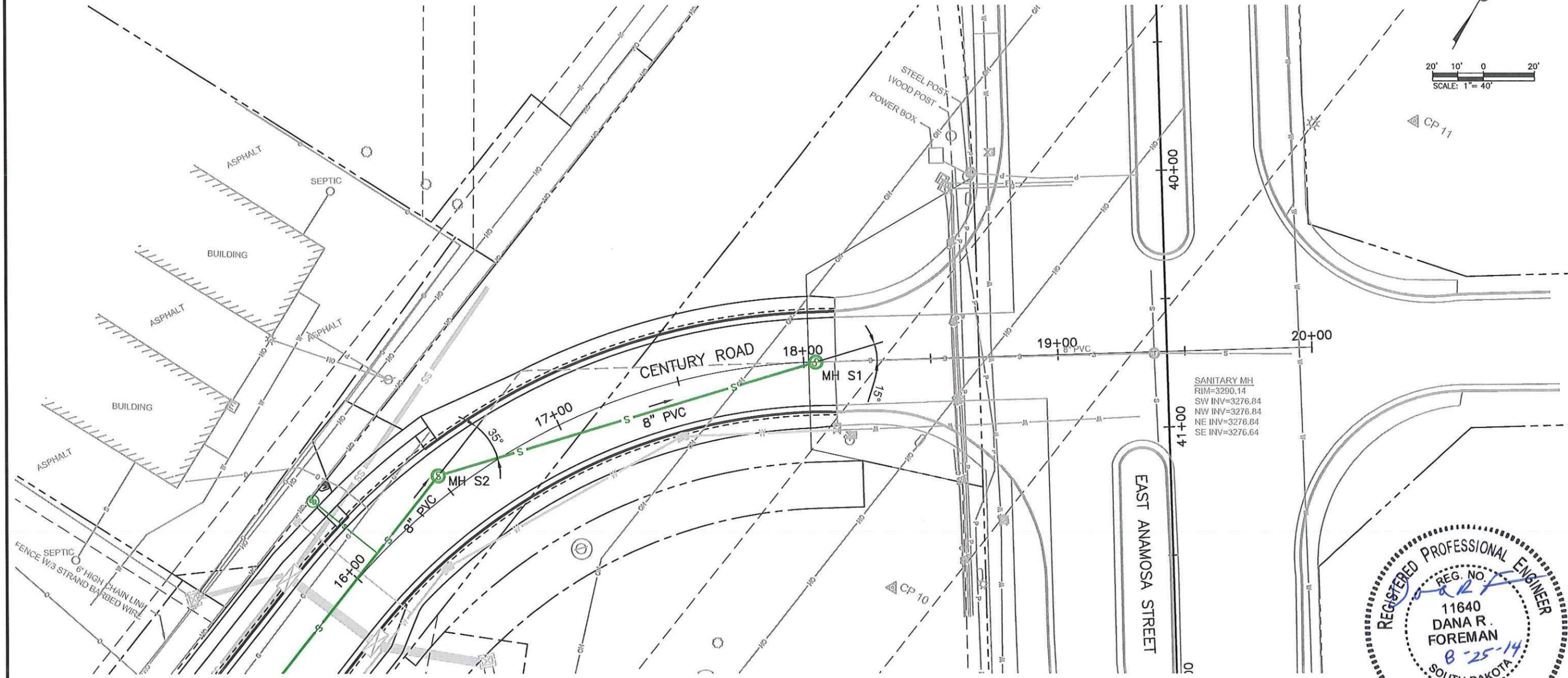
FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	12	40
SEWER PLAN 16+00 TO 19+00			

- 16+00.0, 0.0' RT TO 16+49.8, 7.9' LT
INSTALL 51 LF 8" PVC SEWER MAIN @ 0.40% WITH 2" INSULATION BOARD.
- 16+12.5, 1.2' LT TO 16+09.6, 34.6' LT
INSTALL 33 LF 4" PVC SEWER SERVICE @ 1.0% & CAP.
- 16+09.6, 34.6' LT
INSTALL 4" PVC SEWER CLEANOUT.
- 16+49.8, 7.9' LT
INSTALL 48" MANHOLE S2.
- 16+49.8, 7.9' LT TO 18+04.8, 0.1' RT
INSTALL 155 LF 8" PVC SEWER MAIN @ 0.40%.
- 18+04.8, 0.1' RT
REMOVE EXISTING CLEANOUT, INSTALL 48" MANHOLE S1, 5.9 VF EXTRA MANHOLE DEPTH & CONNECT TO EXISTING 8" PVC SEWER MAIN.

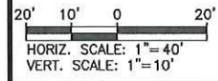
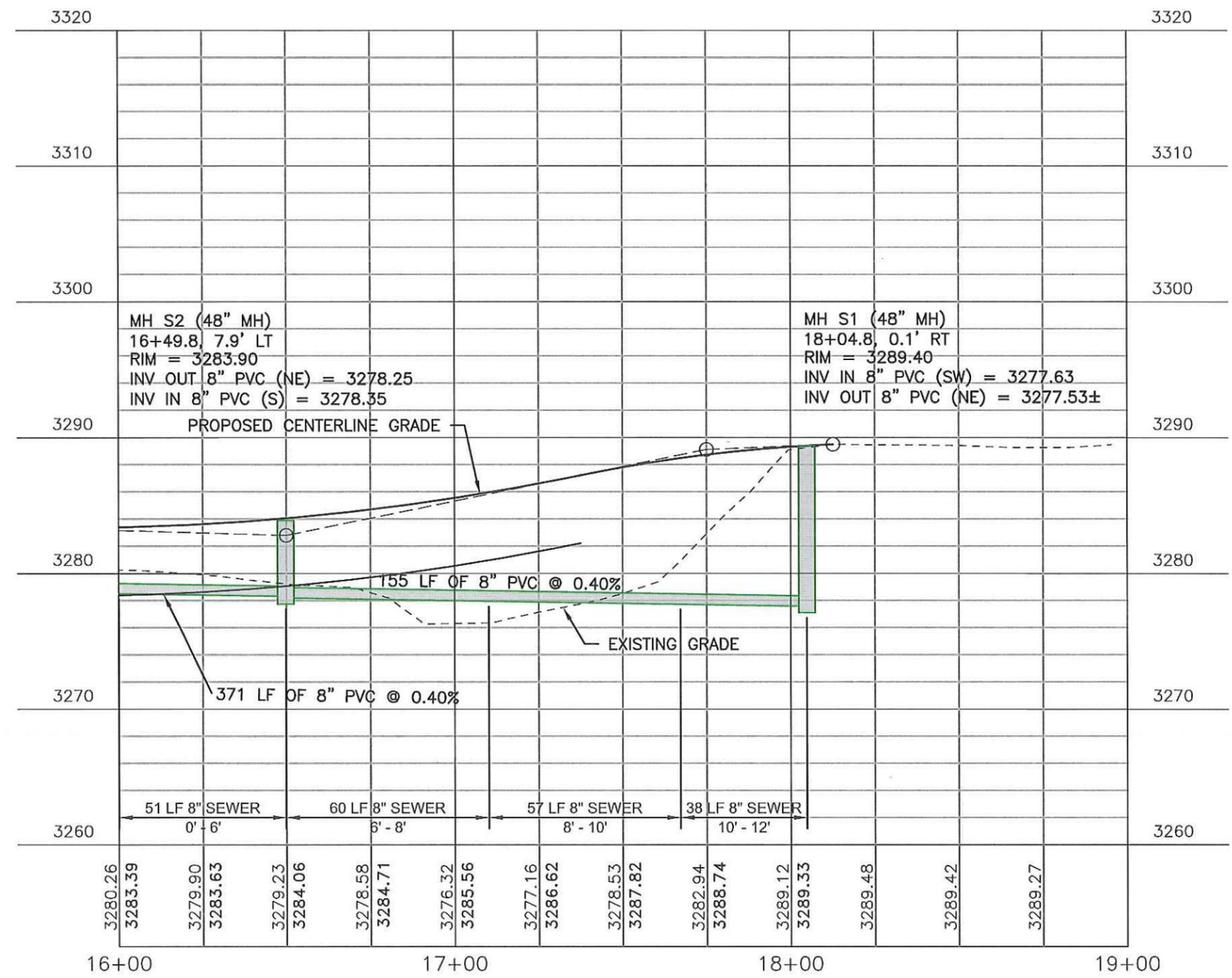
NOTE:
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ALL PIPE & STRUCTURES ARE SHOWN TO OUTSIDE DIMENSIONS.



FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	13	40
SEWER PROFILE 16+00 TO 19+00			



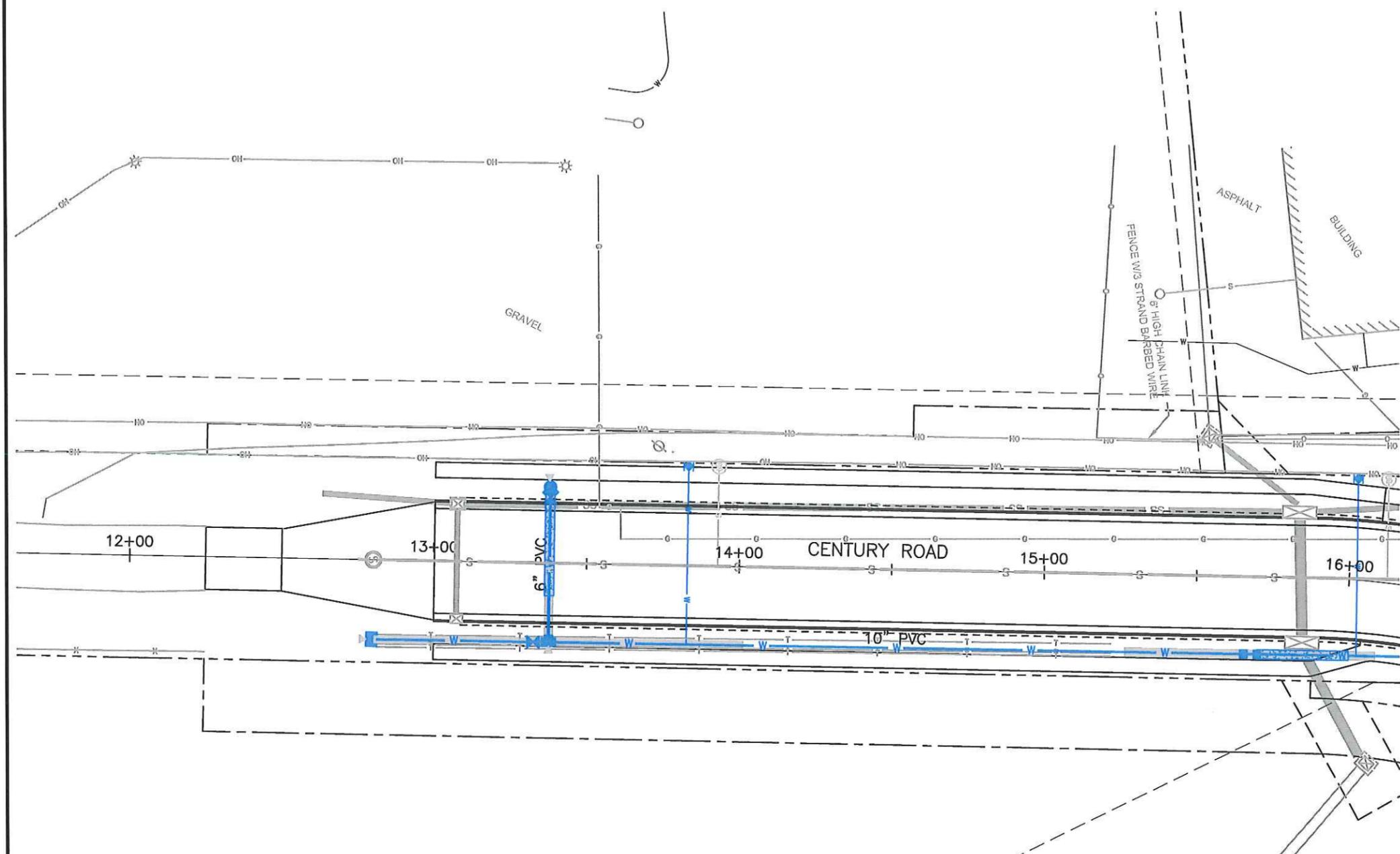
FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	14	40
WATER PLAN 12+00 TO 16+00			

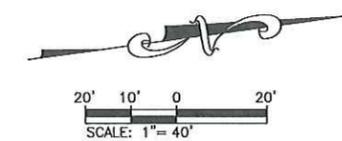
NOTE:
 UTILITIES SHALL BE LOCATED & VERIFIED IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION.

ALL PIPE & STRUCTURES ARE SHOWN TO OUTSIDE DIMENSIONS.

WATER MAIN ELEVATIONS ARE TO THE TOP OF PIPE.

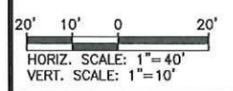
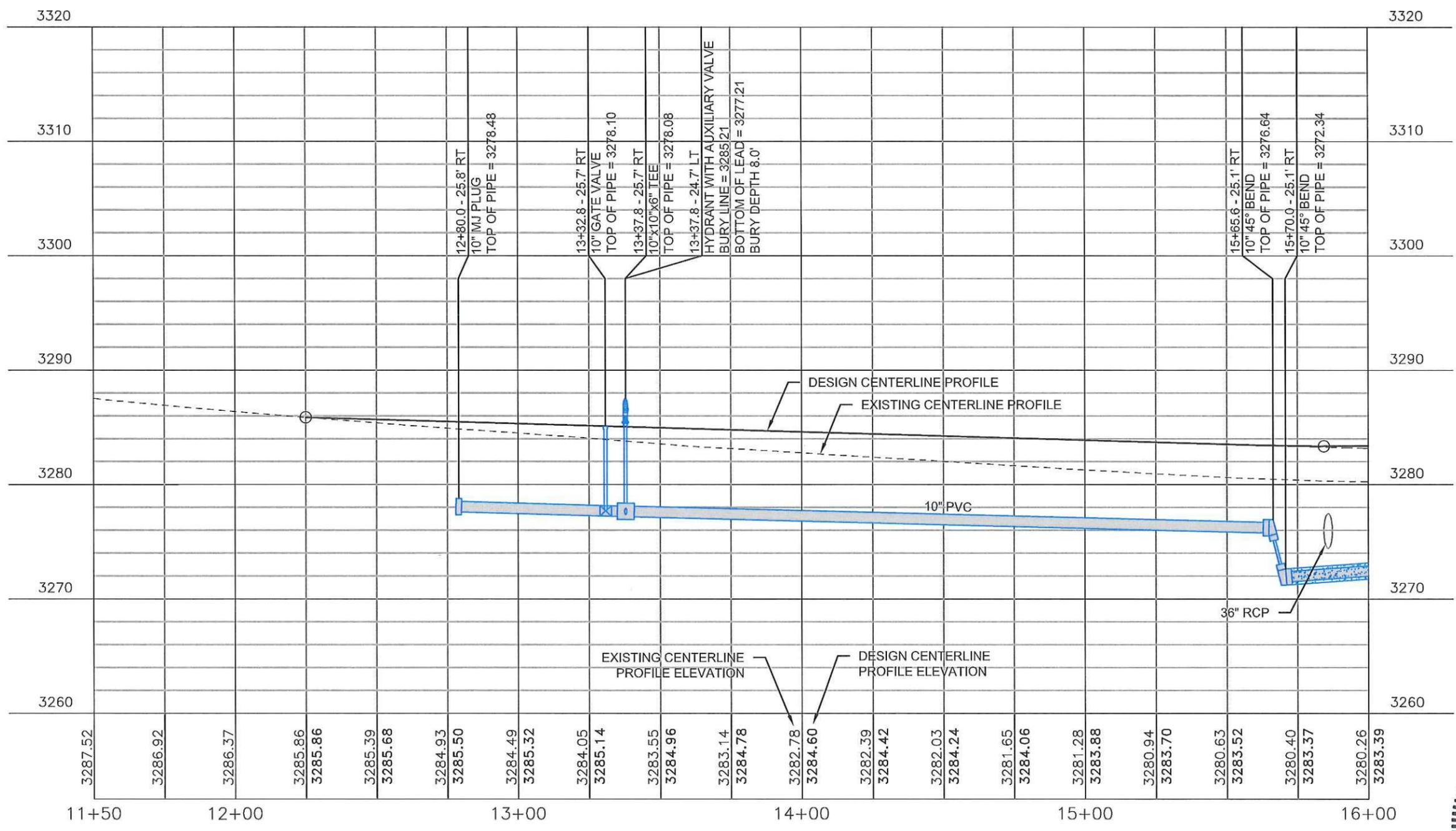


12+80.0, 25.8' RT	INSTALL 10" MJ PLUG & TRACER WIRE ACCESS BOX.	13+82.9, 25.7' RT TO 13+82.9, 33.3' LT	INSTALL 59 LF 1" WATER SERVICE LINE.
12+80.0, 25.8' RT TO 16+00.0, 24.8' RT	INSTALL 319 LF OF 10" PVC WATER MAIN.	13+82.9, 33.3' LT	INSTALL 1" CURB STOP.
13+32.8, 25.7' RT	INSTALL 10" GATE VALVE.	15+65.6, 25.1' RT	INSTALL 10" 45° BEND (VERTICAL).
13+37.8, 25.7' RT	INSTALL 10"x10"x6" TEE.	15+70.0, 25.1' RT	INSTALL 10" 45° BEND (VERTICAL).
13+37.8, 25.7' RT TO 13+37.8, 24.7' LT	INSTALL 50 LF 6" PVC WATER MAIN.	15+70.0, 25.1' RT TO 16+01.4, 24.7' RT	ENCASE 30 LF 10" PVC WATER MAIN.
13+37.8, 10.5' RT TO 13+37.8, 24.7' LT	ENCASE 35 LF 6" PVC WATER MAIN.		
13+37.8, 24.7' LT	INSTALL FIRE HYDRANT WITH AUXILIARY VALVE, TRACER WIRE ACCESS BOX AND TEST STATION.		



FOR BIDDING PURPOSES ONLY

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	15	40
WATER PROFILE 12+00 TO 16+00			



FOR BIDDING PURPOSES ONLY

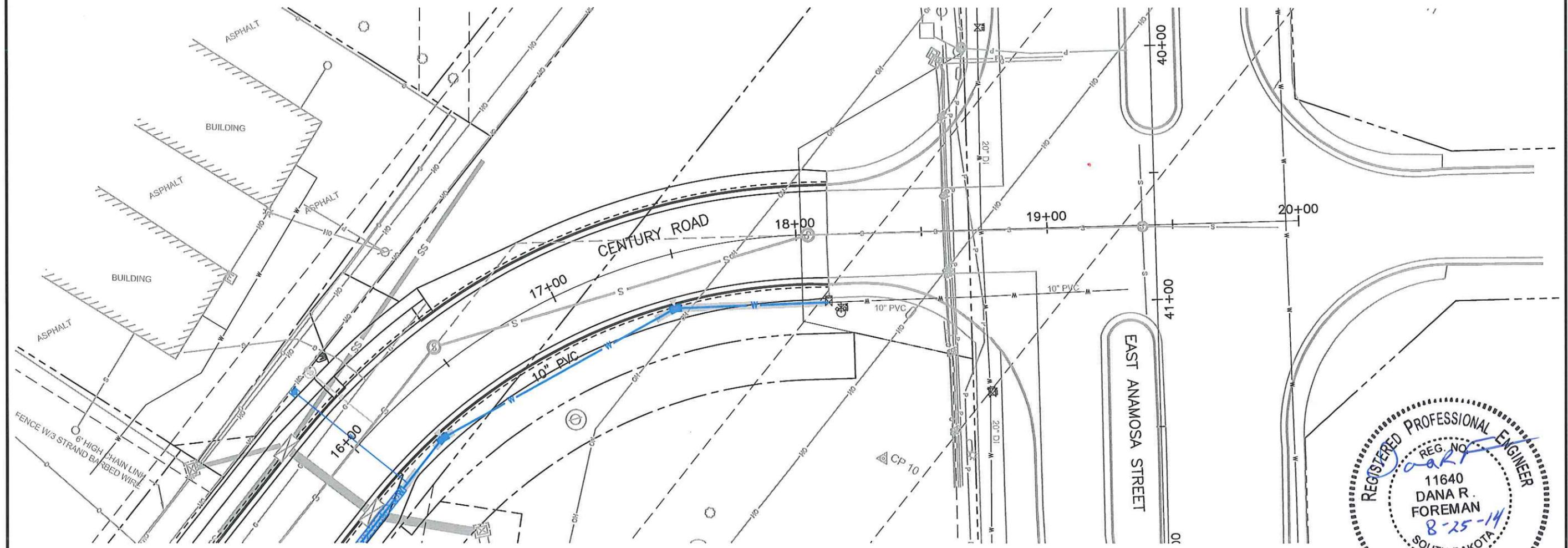
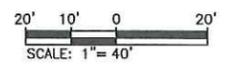
 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	16	40
WATER PLAN 16+00 TO 19+00			

- 16+00.0, 24.8' RT TO 18+12.3, 26.8' RT±
INSTALL 193 LF OF 10" PVC WATER MAIN.
- 16+04.2, 24.5' RT TO 16+00.8, 33.9' LT
INSTALL 59 LF 1" WATER SERVICE.
- 16+00.8, 33.9' LT
INSTALL 1" CURB STOP.
- 16+29.1, 21.9' RT
INSTALL 10" 22 1/2° BEND (HORIZONTAL).
- 17+45.9, 21.2' RT
INSTALL 10" 22 1/2° BEND (HORIZONTAL).
- 18+12.3, 26.8' RT±
REMOVE & SALVAGE 10" PLUG, CONNECT TO EXISTING 10" PVC WATER MAIN & INSTALL TRACER WIRE ACCESS BOX.

NOTE:
UTILITIES SHALL BE LOCATED & VERIFIED IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION.

ALL PIPE & STRUCTURES ARE SHOWN TO OUTSIDE DIMENSIONS.

WATER MAIN ELEVATIONS ARE TO THE TOP OF PIPE.

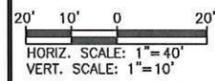
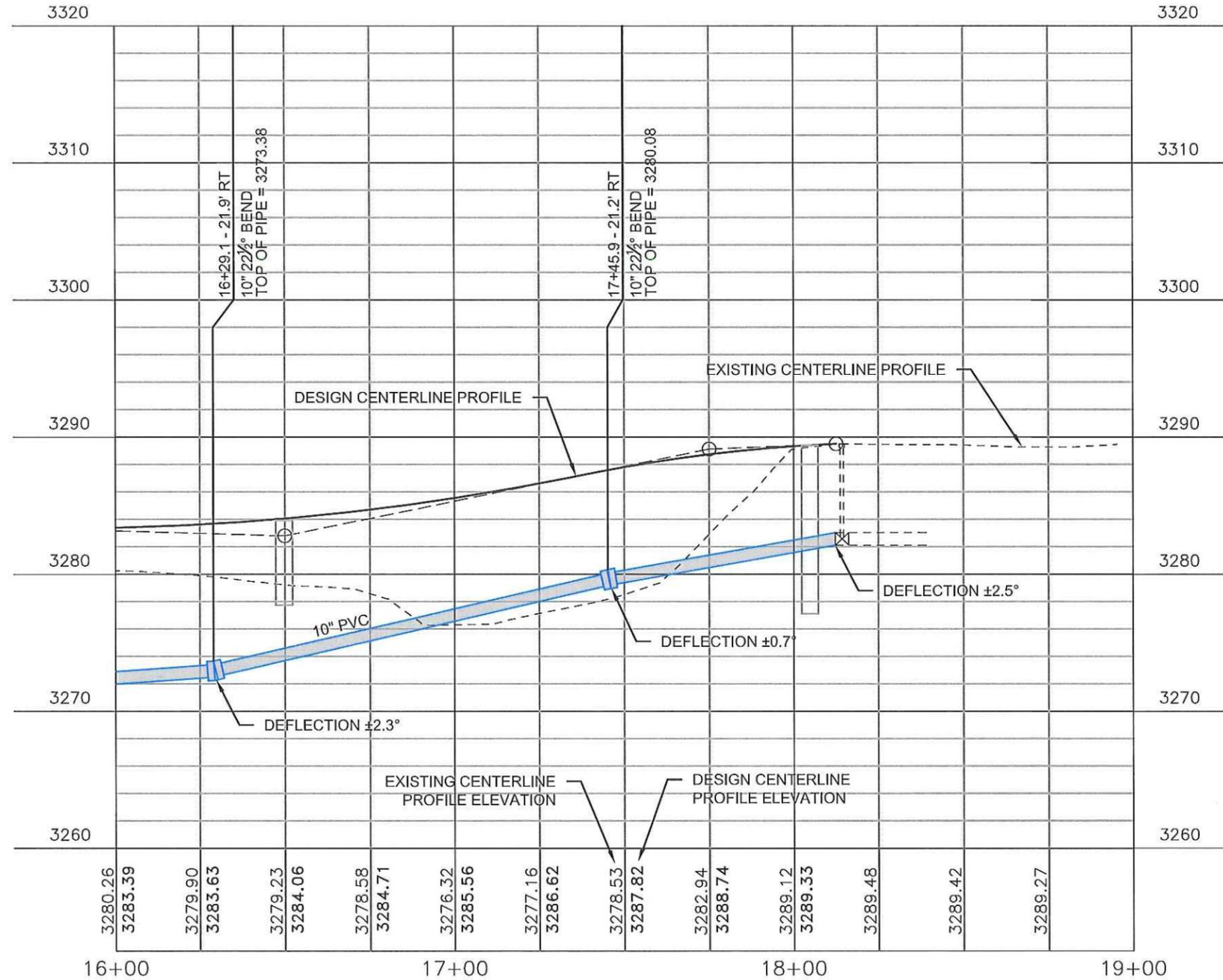


FOR BIDDING PURPOSES ONLY



PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
13-2125	17	40

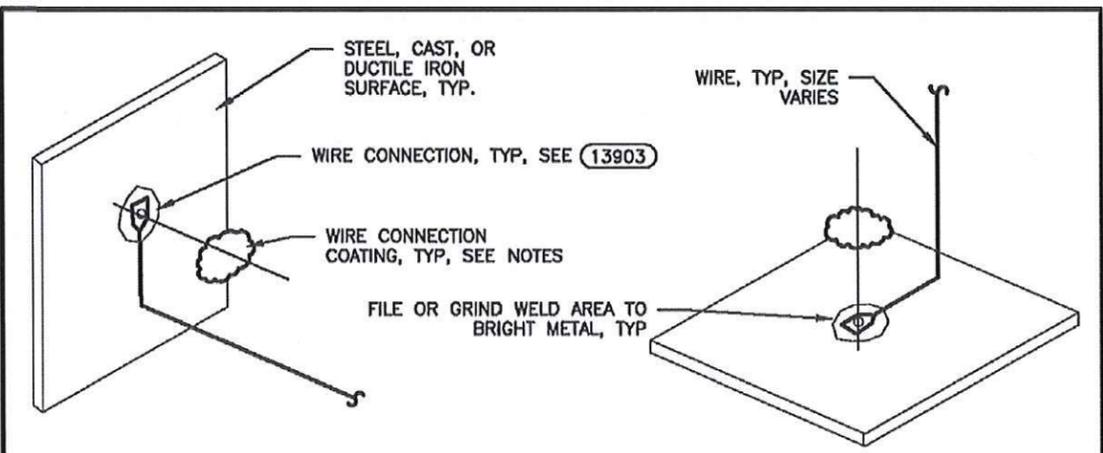
WATER PROFILE 16+00 TO 19+00



 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	18	40
CATHODIC PROTECTION			

TABLE OF CATHODIC PROTECTION TEST STATION AND TRACER WIRE ACCESS BOX LOCATIONS				
STATION	OFFSET	TYPE	DETAIL NO.	REMARKS
12+80.0	25.8' RT	TW-TRACER WIRE ACCESS BOX	13947B	INSTALL TRACER WIRE ACCESS BOX
13+37.8	24.7' LT	TS-TEST STATION TW-TRACER WIRE ACCESS BOX	13942FH	INSTALL TEST STATION AND TRACER WIRE ACCESS BOX BEHIND FIRE HYDRANT
18+12.3	26.8' RT	TW-TRACER WIRE ACCESS BOX	13947F	INSTALL TRACER WIRE ACCESS BOX





NOTES:

1. COPPER SLEEVE REQUIRED FOR THERMITE WELDING OF No. 10 AWG AND SMALLER WIRE AND No. 4 AND No. 2 AWG SIZE WIRES.
2. WELDER AND CARTRIDGE SIZE VARIES ACCORDING TO SURFACE SHAPE, MATERIAL, AND HORIZONTAL OR VERTICAL SURFACE. CONSULT WELDER MANUFACTURER FOR RECOMMENDED WELDER AND CARTRIDGE.
3. FOR MULTIPLE WIRE CONNECTIONS TO PIPE SEPARATE THERMITE WELD CONNECTIONS BY ONE PIPE DIAMETER MINIMUM, 2'-0" MAXIMUM.
4. WIRE CONNECTIONS TO FOREIGN PIPELINES SHALL BE MADE BY FOREIGN PIPELINE REPRESENTATIVE.
5. USE 15 GRAM MAXIMUM SIZE WELD CARTRIDGES FOR CONNECTIONS TO PETROLEUM AND NATURAL GAS PIPELINES OR STRUCTURES. THERMITE CONNECTIONS ONLY AS SPECIFIED & APPROVED BY OWNER. CROW'S FOOT LARGER WIRE CONNECTIONS IF SPECIFIED & APPROVED BY OWNER.
6. COAT COMPLETED THERMITE WELD CONNECTIONS WITH EPOXY REPAIR COATING, OR AS OWNER SPECIFIED.
7. UTILIZE INSULATED STRANDED COPPER WIRE ONLY, SIZE AS SPECIFIED. COLOR CODE WIRES ACCORDING TO WIRE COLOR CODE, SEE (13902PRC)
8. CONNECT BOND AND TEST WIRES TO METALLIC FITTINGS PRIOR TO ASSEMBLY, AS REQUIRED TO ALLOW CONNECTIONS TO BE MADE TO LEVEL FLAT (HORIZONTAL TYPE) SURFACES ON TOP OF FITTINGS.
9. ATTACH THERMITE WELD TO STUD OR WELD BASE PLATE IF PROVIDED OR TO DRY SIDE OF JOINT IF APPROVED BY PIPE MANUFACTURER.

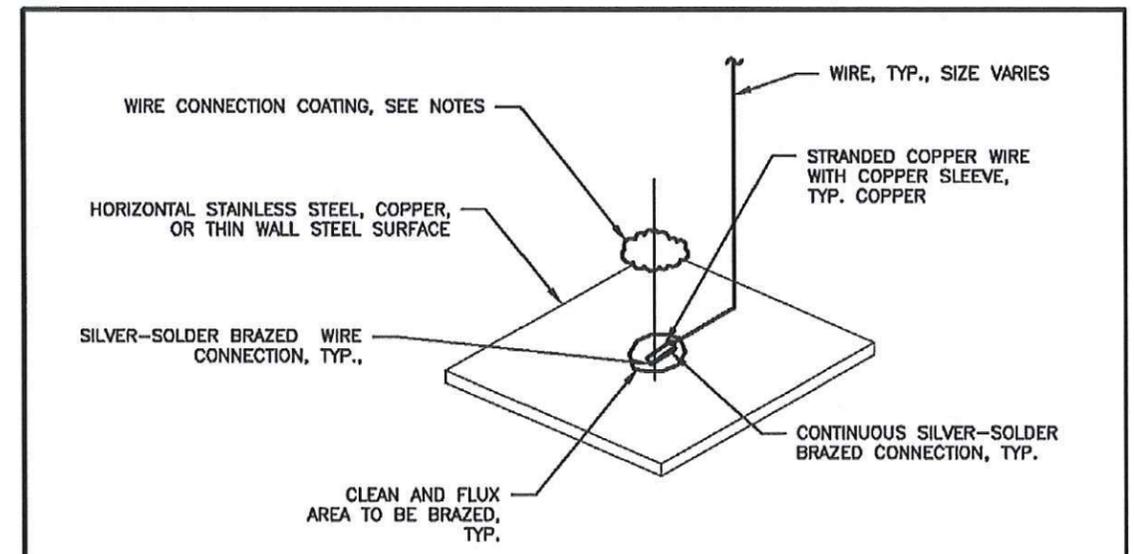


NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

**VERTICAL AND HORIZONTAL
WIRE THERMITE WELD CONNECTIONS**

DATE: 2-19-13
(13901A)



NOTES:

1. BRAZE (SILVER-SOLDER) COPPER WIRE ELECTRICAL CONNECTION TO COPPER, STAINLESS STEEL, AND THIN WALL STEEL (0.035" OR LESS) PIPING OR TUBING.
2. SELECT A LOCATION TO BRAZE ON FITTING EDGE OR LIP, SO AS TO NOT DAMAGE INTERNAL COATINGS, RUBBER LINING, OR GASKETS.
3. CLEAN AND PREPARE SURFACE FOR BRAZING. FLUX SURFACE WITH A SUITABLE TYPE FLUX FOR MATERIAL TYPES BEING SOLDERED IN ACCORDANCE WITH THE SILVER SOLDER MANUFACTURER'S INSTRUCTIONS..
4. BRAZE THE SLEEVED COPPER WIRE WITH A SUITABLE TYPE SILVER BRAZING ALLOY FOR THE MATERIALS BEING CONNECTED IN ACCORDANCE WITH BRAZE MATERIAL MANUFACTURER'S DIRECTIONS.
5. SILVER-SOLDER WIRE TO PROPERLY PREPARED AND FLUXED AREA IN A MANNER SO AS TO NOT LEAVE CRACKS OR CREVICES IN THE COMPLETED BRAZED CONNECTION. VISUALLY INSPECT AND TAP WITH HAMMER TO TEST ADHESION.
6. ALLOW TO COOL AND REMOVE REMAINING FLUX WITH (STAINLESS STEEL) WIRE BRUSH AND SOLVENT CLEAN (SSPC SP-1).
7. ONLY COAT WIRE CONNECTIONS TO COPPER AND THIN WALL STEEL PIPING OR TUBING IN SPECIFIED THERMITE WELD COATING METHOD. STAINLESS STEEL WIRE CONNECTIONS DO NOT NEED TO BE COATED.
8. UTILIZE INSULATED STRANDED COPPER WIRE ONLY, SIZE AS SPECIFIED.

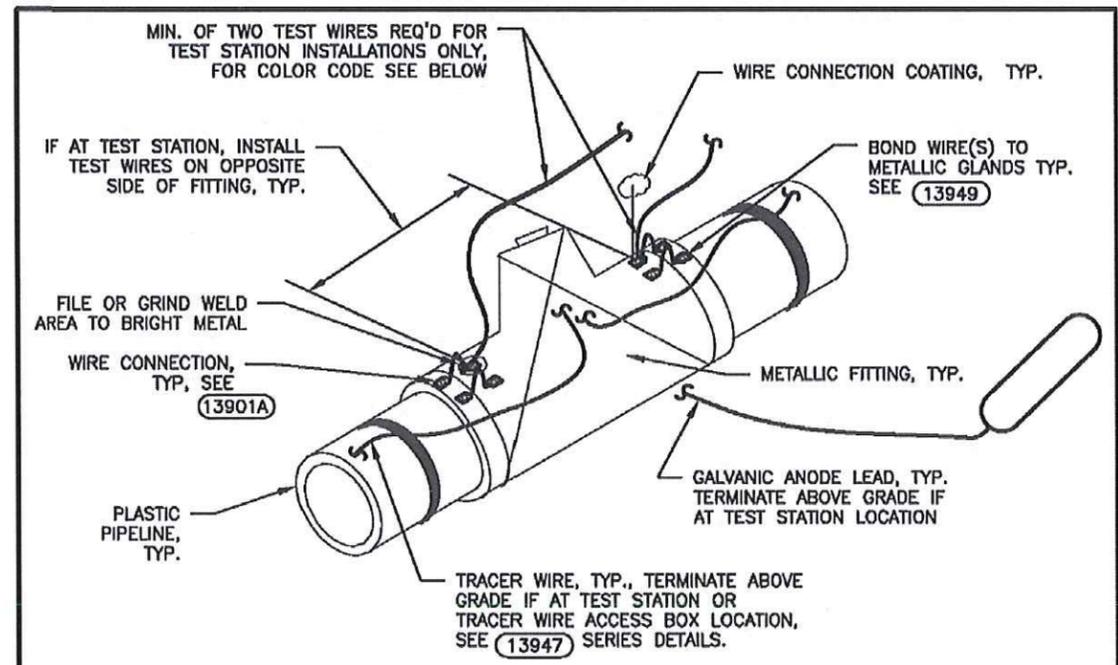


NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

BRAZED WIRE CONNECTIONS

DATE: 2-19-13
(13901B)



NOTES:

1. THERMITE OR PIN BRAZE WELD TO METALLIC PIPE, FITTINGS, & STRUCTURES ONLY.
2. STANDARD LOCATION FOR ANODE PLACEMENT IS ON EAST SIDE OF NORTH-SOUTH MAIN AND NORTH SIDE OF EAST-WEST MAIN. ACTUAL PLACEMENT LOCATION WILL VARY BASED UPON OTHER UTILITY CONFLICTS.
3. UTILIZE INSULATED STRANDED COPPER WIRE ONLY, SIZE AS SPECIFIED.
4. UTILIZE PURPLE TAPE TO IDENTIFY NORTH (1 STRIP) OR WEST (2 STRIPS) WIRE DIRECTION & GRAY TAPE TO IDENTIFY SOUTH (1 STRIP) OR EAST (2 STRIPS) WIRE DIRECTION, AS REQ'D.

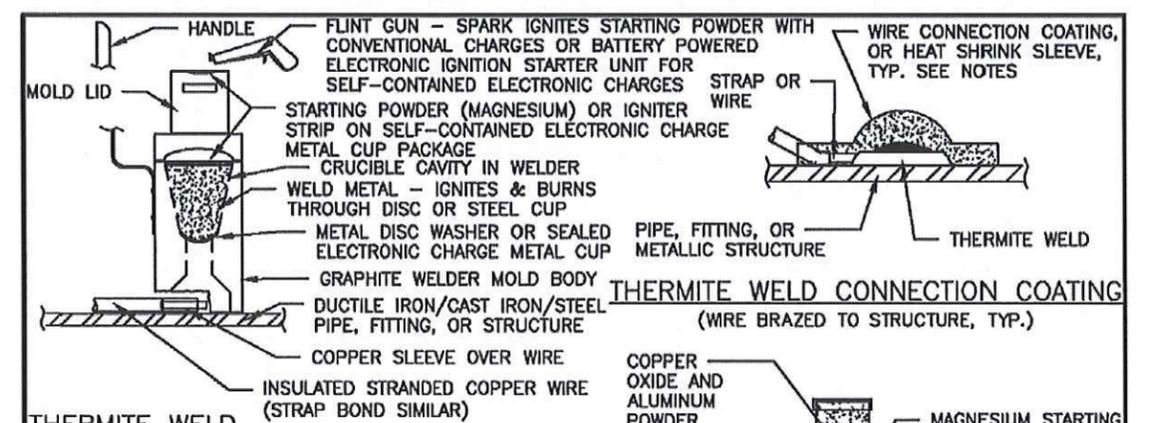
WIRE COLOR CODE

1. PIPELINE TEST WIRES:
 WATER - BLUE
 HIGH LEVEL - DARK BLUE WITH 1 STRIP OF BLUE TAPE
 LOW LEVEL - LIGHT BLUE WITH 1 STRIP OF WHITE TAPE
2. UNPROTECTED PIPELINE (NOT CATHODICALLY PROTECTED-e.g. PUMP STATION SIDE OF METALLIC PIPE) - BLACK
3. ANODE LEADS - BLACK
4. REFERENCE ELECTRODE WIRES - YELLOW
5. TRACER WIRES NON-METALLIC PIPE - GREEN W/ 2 STRIPS BLACK TAPE AND STRIPS OF PURPLE OR GRAY TAPE PER WIRE DIRECTION, SEE NOTE ABOVE



NTS

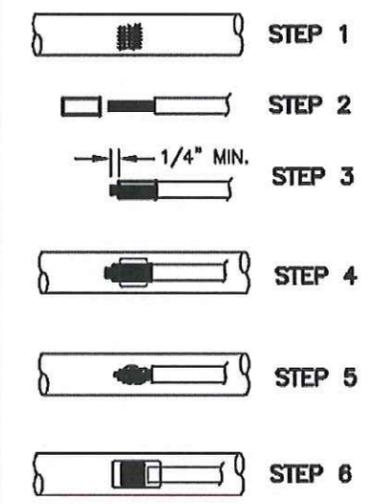
CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
PLASTIC PIPELINE METALLIC FITTING WIRE CONNECTION AND COLOR CODE	
DATE: 2-19-13	
(13902PRC)	



THERMITE WELD

USE CAST IRON CHARGES FOR DUCTILE IRON AND CAST IRON STRUCTURES. USE STEEL CHARGES FOR STEEL STRUCTURES.
 (SIMILAR SIZE AND TYPE OF CONVENTIONAL OR ELECTRONIC IGNITION TYPE CHARGES ACCEPTABLE)
 COMPLETE WELDS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS

CONVENTIONAL WELD METAL CAPSULE
 TYPE & SIZE VARIES (MAXIMUM 25 GRAM FOR STEEL, 32 GRAM FOR CAST & DUCTILE IRON, & 15 GRAM SIZE FOR OIL & GAS TYPE PIPELINES)



- FILE STRUCTURE CONNECTION AREA (2"x2") TO BARE BRIGHT SHINY METAL & CLEAN. ALL WIRE WELDS SHALL BE A MINIMUM OF ONE PIPE DIAMETER APART UP TO A MAXIMUM OF 2 FEET SEPARATION DISTANCE.
- STRIP INSULATION FROM WIRE. ATTACH COPPER SLEEVE (REQUIRED ON No. 10 AWG WIRE & SMALLER & No. 2 & No. 4 AWG JOINT BOND WIRES AS SPECIFIED)
- ATTACH COPPER SLEEVE TO WIRE WITH CORRECT HAMMER DIE OR CRIMP TOOL. FACTORY SLEEVES SHALL BE ANGLED AND FIELD MADE BONDS SHALL HAVE WIRE EXTEND 1/4" PAST SLEEVE SO WIRE IS EXPOSED TO THERMITE WELD.
- PLACE WASHER IN BOTTOM OF MOLD AND FILL CRUCIBLE W/POWDER OR INSERT PREPACKED ELECTRONIC CANISTER CHARGE, CLOSE LID, HOLD FIRMLY W/OPENING AWAY FROM OPERATOR, & IGNITE W/FLINT GUN OR ELECTRONIC IGNITION STARTER.
- REMOVE SLAG FROM CONNECTION, VISUALLY INSPECT & TAP WELD TO TEST FOR SOUNDNESS & ADHESION W/ HAMMER. MEASURE JOINT BOND RESISTANCE AS SPECIFIED. REPLACE ALL POORLY FORMED, UNSIGHTLY, POROUS, HIGH RESISTANT, OR DEFECTIVE WELDS. INSTALL ADDITIONAL BOND WIRE OR STRAP IF REQUIRED.
- CLEAN AND COAT CONNECTION AND EXPOSED STRUCTURE SURFACE WITH HEAT SHRINK SLEEVE, PRIMERLESS HANDYCAP, OR EPOXY REPAIR COATING MATERIALS PER BELOW, APPLY IN ACCORDANCE WITH COATING MANUFACTURER'S RECOMMENDATIONS.

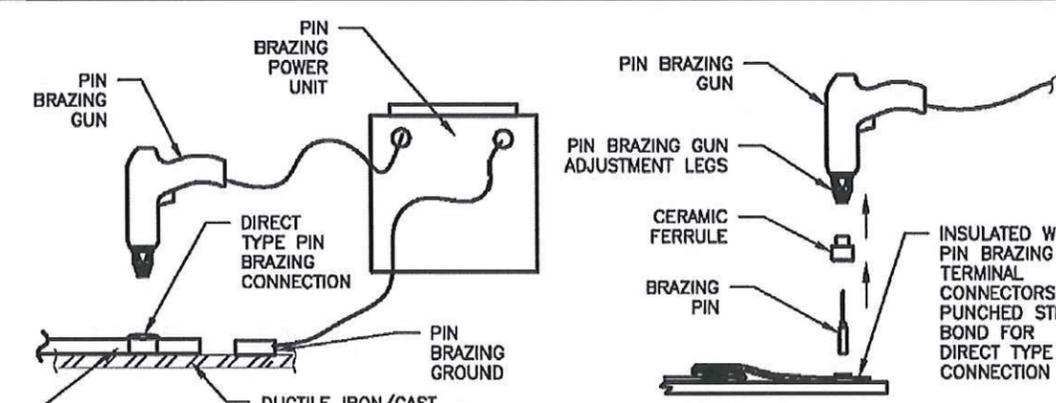
- 6-A. IF THERMITE WELD CONNECTION LOCATED AT PIPE JOINT TO BE COATED WITH HEAT SHRINK SLEEVE, APPLY MASTIC FILLER & HEAT SHRINK SLEEVE OVER CONNECTION. NO WELD CAP REQUIRED. IF NOT HEAT SHRINKED, THEN EITHER:
- 6-B. UTILIZE REGULAR SIZE PRIMERLESS THERMITE WELD CAP FOR No. 8 AWG AND SMALLER WIRE.
- 6-C. UTILIZE PRIMERLESS HANDYCAP XL-IP (EXTRA LARGE) OR EQUAL FOR No. 6 AND LARGER WIRE AND PIN WELD TYPE CONNECTIONS.
- 6-D. OR UTILIZE 100 PERCENT MOISTURE TOLERANT EPOXY REPAIR COATING FOR HARD TO COAT CONNECTIONS AND SPOT EXTERNAL COATING REPAIRS.
- 6-E. REPAIR PIPE OR STRUCTURE COATING DAMAGE WITH SPECIFIED AND APPROVED COATING REPAIR MATERIALS FOR ORIGINAL COATING TYPE.

GENERAL EXOTHERMIC WELD AND COATING PROCEDURES



NTS

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
THERMITE WELD WIRE CONNECTIONS	
DATE: 2-19-13	
(13903)	



PIN BRAZING MATERIALS
 PROVIDE PIN BRAZING MANUFACTURER'S RECOMMENDED CONSUMABLES (CERAMIC FERRULES, BRAZING PINS, TERMINALS, ETC.) FOR DIRECT TYPE CONNECTIONS.

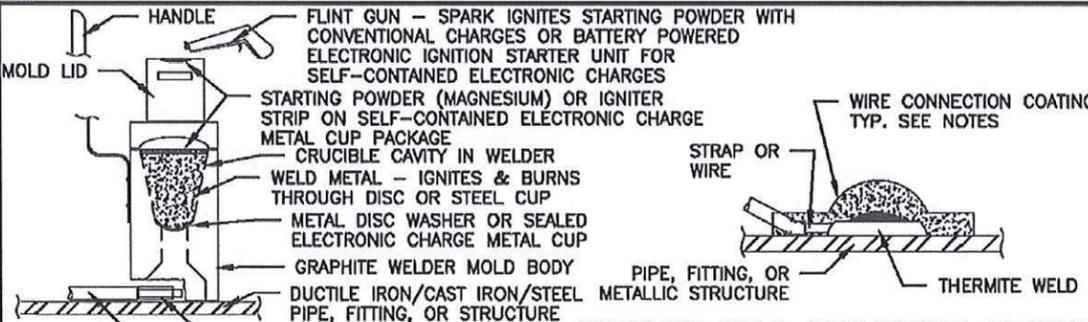
PIN BRAZING DIRECT TYPE WELD
 COMPLETE WELDS IN ACCORDANCE WITH PIN BRAZING MANUFACTURER'S INSTRUCTIONS

	STEP 1	FILE STRUCTURE CONNECTION AREA (2"x2") TO BARE BRIGHT METAL FINISH (WHITE METAL) & CLEAN.
	STEP 2	PLACE SPECIFIED TYPE OF TERMINAL ON END OF INSULATED WIRE OR IN CENTER OF PUNCHED STRAP BOND HOLE FOR DIRECT TYPE OF PIN BRAZING CONNECTIONS.
	STEP 3	LOAD GUN BY PLACING BRAZING PIN AND CERAMIC FERRULE SECURELY INTO FRONT OF GUN. ADJUST THE PIN HOLDER LEGS AS NECESSARY TO OBTAIN THE RECOMMENDED PIN BRAZING "LIFT HEIGHT" WITH THE GUN RESTING FIRMLY AND FLUSH ON THE STRUCTURE SURFACE.
	STEP 4	ATTACH THE EARTH GROUND CONNECTION TO A BRIGHT GROUND LOCATION ON THE STRUCTURE, PLACE THE LOADED PIN BRAZING GUN IN THE CENTER OF THE STRAP BOND PUNCHED HOLE OR OF THE HOLE IN THE WIRE TERMINAL AND SQUEEZE TRIGGER UNTIL THE BRAZING PIN FUSE BURNS INTO. HOLD GUN FIRMLY IN PLACE UNTIL BRAZING PROCESS COMPLETED AND THE MOLTEN METAL ATTACHED TO THE TERMINAL AND STRUCTURE SURFACE.
	STEP 5	REMOVE SLAG FROM CONNECTION, VISUALLY INSPECT & TAP WELD TO TEST FOR SOUNDNESS & ADHESION W/ HAMMER. MEASURE JOINT BOND RESISTANCE AS SPECIFIED. REPLACE ALL POORLY FORMED, UNSIGHTLY, POROUS, HIGH RESISTANT, OR DEFECTIVE WELDS. INSTALL ADDITIONAL BOND WIRE OR STRAP IF REQUIRED.
	STEP 6	CLEAN AND COAT CONNECTION AND EXPOSED STRUCTURE SURFACE WITH SPECIFIED COATING SYSTEM, APPLY IN ACCORDANCE WITH COATING MANUFACTURER'S RECOMMENDATIONS.

GENERAL PIN BRAZING AND COATING PROCEDURES

NTS 

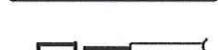
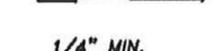
CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
DATE: 2-19-13	
PIN BRAZED WIRE CONNECTIONS	13903B



THERMITE WELD
 USE CAST IRON CHARGES FOR DUCTILE IRON AND CAST IRON STRUCTURES. USE STEEL CHARGES FOR STEEL STRUCTURES.
 (SIMILAR SIZE AND TYPE OF CONVENTIONAL OR ELECTRONIC IGNITION TYPE CHARGES ACCEPTABLE)
 COMPLETE WELDS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS

THERMITE WELD CONNECTION COATING
 (WIRE BRAZED TO STRUCTURE, TYP.)

CONVENTIONAL WELD METAL CAPSULE
 TYPE & SIZE VARIES (MAXIMUM 25 GRAM FOR STEEL, 32 GRAM FOR CAST & DUCTILE IRON, & 15 GRAM SIZE FOR OIL & GAS TYPE PIPELINES)

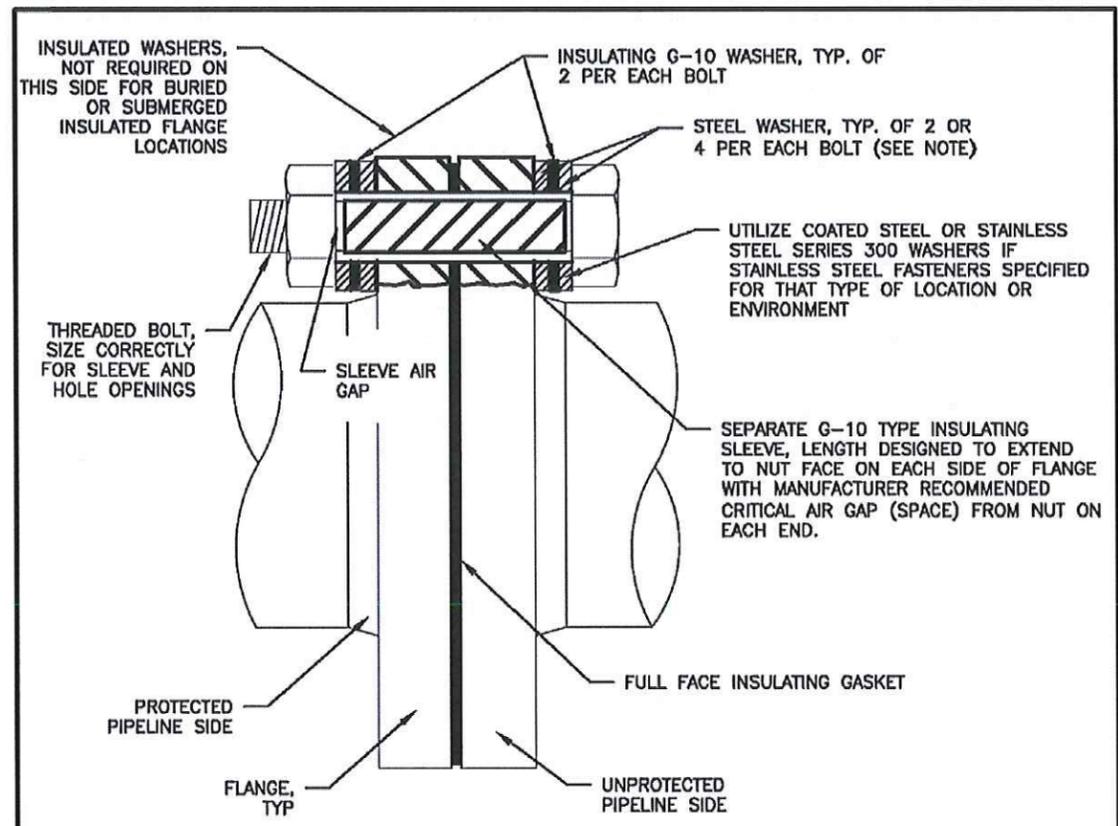
	STEP 1	FILE STRUCTURE CONNECTION AREA (2"x2") TO BARE BRIGHT SHINY METAL & CLEAN. ALL WIRE WELDS SHALL BE A MINIMUM OF ONE PIPE DIAMETER APART UP TO A MAXIMUM OF 2 FEET SEPARATION DISTANCE.
	STEP 2	STRIP INSULATION FROM WIRE. ATTACH COPPER SLEEVE (REQUIRED ON No. 10 AWG WIRE & SMALLER & No. 2 & No. 4 AWG JOINT BOND WIRES AS SPECIFIED)
	STEP 3	ATTACH COPPER SLEEVE TO WIRE WITH CORRECT HAMMER DIE OR CRIMP TOOL. FACTORY SLEEVES SHALL BE ANGLED AND FIELD MADE BONDS SHALL HAVE WIRE EXTEND 1/4" PAST SLEEVE SO WIRE IS EXPOSED TO THERMITE WELD.
	STEP 4	PLACE WASHER IN BOTTOM OF MOLD AND FILL CRUCIBLE W/POWDER OR INSERT PREPACKED ELECTRONIC CANISTER CHARGE, CLOSE LID, HOLD FIRMLY W/OPENING AWAY FROM OPERATOR, & IGNITE W/FLINT GUN OR ELECTRONIC IGNITION STARTER.
	STEP 5	REMOVE SLAG FROM CONNECTION, VISUALLY INSPECT & TAP WELD TO TEST FOR SOUNDNESS & ADHESION W/ HAMMER. MEASURE JOINT BOND RESISTANCE AS SPECIFIED. REPLACE ALL POORLY FORMED, UNSIGHTLY, POROUS, HIGH RESISTANT, OR DEFECTIVE WELDS. INSTALL ADDITIONAL BOND WIRE OR STRAP IF REQUIRED.
	STEP 6	CLEAN AND COAT CONNECTION AND EXPOSED STRUCTURE SURFACE WITH COATING MATERIALS, SEE NOTE BELOW. APPLY IN ACCORDANCE WITH COATING MANUFACTURER'S RECOMMENDATIONS.

6-A. UTILIZE 100 PERCENT MOISTURE TOLERANT EPOXY REPAIR COATING FOR WIRE CONNECTIONS AND FOR SPOT EXTERNAL COATING REPAIRS.
 OR
 6-B. REPAIR FITTING OR STRUCTURE COATING DAMAGE WITH SPECIFIED AND APPROVED COATING REPAIR MATERIALS FOR ORIGINAL COATING TYPE.

NTS 

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
DATE: 2-19-13	
GENERAL EXOTHERMIC WELD AND COATING PROCEDURES	13903P

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	22	40
CATHODIC PROTECTION			



NOTES:

1. ABOVE GRADE INSULATED FLANGE INSTALLATION SHOWN. FOR BURIED OR SUBMERGED INSULATING FLANGE INSTALLATIONS, DO NOT INSTALL INSULATING WASHER ON PROTECTED SIDE OF INSULATING FLANGE.
2. COAT BURIED OR SUBMERGED FLANGE AFTER ASSEMBLY PER SPECIFICATIONS.
3. INSULATED FLANGES IN BURIED APPLICATIONS ALLOWED ONLY FOR PIPE UP TO 36" DIAMETER.
4. TEST INSULATED FLANGES FOR ELECTRICAL ISOLATION. TEST BURIED INSULATORS BOTH PRIOR TO AND AFTER BURIAL.



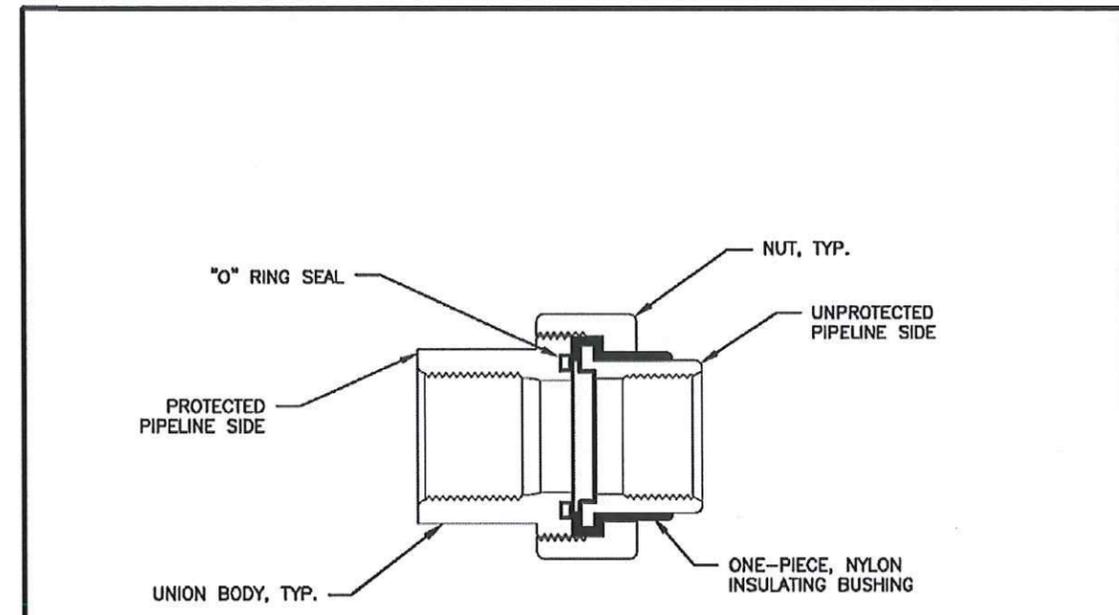
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CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

INSULATING FLANGE

13911



NOTES:

1. "O" RING TYPE INSULATING UNION SHOWN. OTHER TYPES (BRASS INSULATED CURB BALL VALVES, STRAIGHT COUPLINGS, CORPORATION BALL VALVES, METER COUPLINGS, ETC.) SIMILAR.
2. INSULATING O-RING AND NYLON INSULATOR BUSHING SHALL BE MOLDED & BONDED TO THE UNION BODY BY MANUFACTURER.
3. ABOVEGRADE IRON PIPE SHALL HAVE GALV. OR COATED STEEL BODIES, UNIONS IN BURIED OR CORROSIVE AREAS SHALL BE COATED.
4. COPPER SERVICE LINE INSULATORS SHALL HAVE BRASS UNION BODY WITH INSULATORS FORMED AND MOLDED INTO BRASS BODY, MUELLER OR APPROVED EQUAL.
5. STAINLESS STEEL LINE INSULATORS SHALL HAVE STAINLESS STEEL BODY WITH INSULATORS FORMED AND MOLDED INTO STAINLESS STEEL FITTING BODY.



NTS

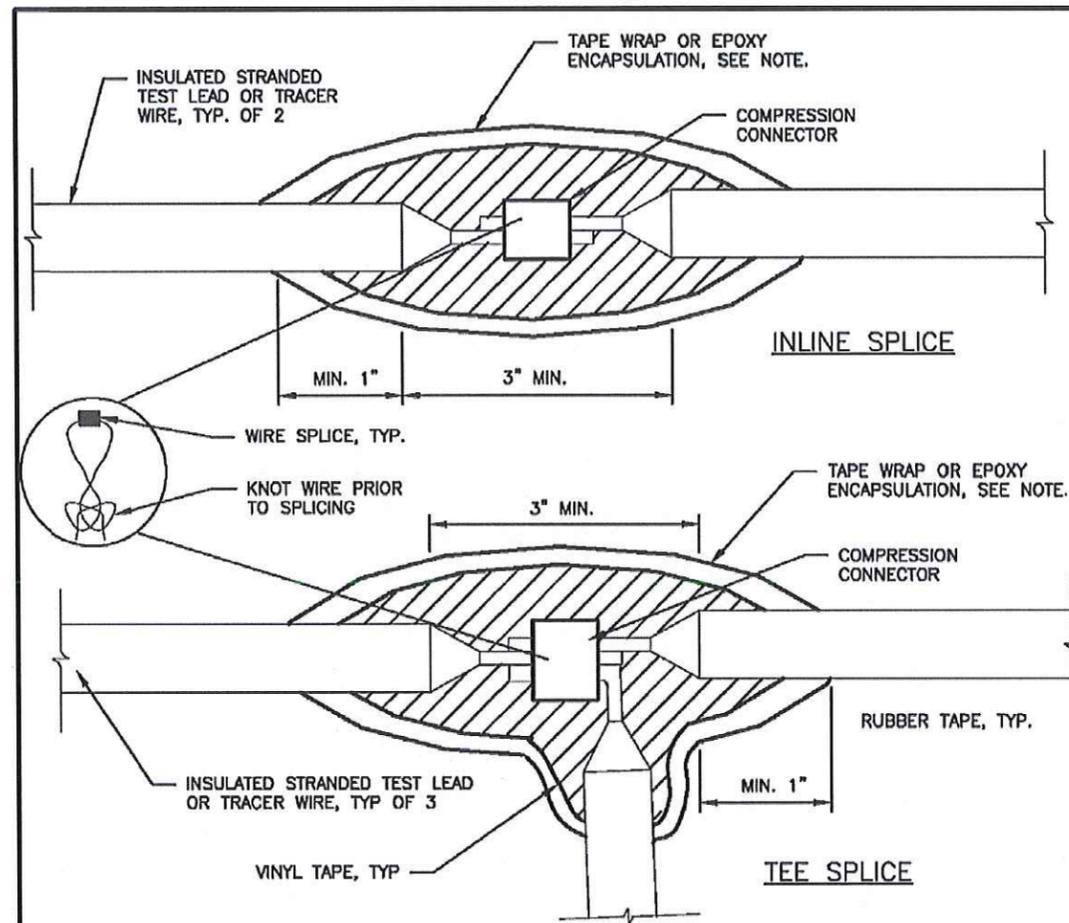
CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

INSULATING UNIONS AND/OR COPPER SERVICE INSULATORS

13913

 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	23	40
CATHODIC PROTECTION			



NOTES:

1. KNOT WIRES PRIOR TO MAKING SPLICE TO MINIMIZE STRESS ON SPLICE.
2. MAKE WIRE SPLICE CONNECTION WITH COMPRESSION TYPE CONNECTOR IN ACCORDANCE WITH COMPRESSION CONNECTOR MANUFACTURER RECOMMENDATIONS OR SECURE WITH SPLIT BOLT AND SILVER SOLDER FOR TEST WIRES DO NOT USE BUTT SPLICES OR WIRE NUTS. COMPLETE ALL SPLICES ONLY IN THE PRESENCE OF THE ENGINEER.
3. WRAP ENTIRE CONNECTION WITH TWO (2) LAYERS OF HIGH VOLTAGE RUBBER TAPE AND THEN WRAP WITH TWO (2) LAYERS OF VINYL ELECTRICAL TAPE AND COAT WITH SEALER OR ENCAPSULATE IN EPOXY SPLICE KIT. EXTEND A MINIMUM OF 1-INCH ONTO INTACT WIRE INSULATION.
4. TEST LEADS SHALL BE COMPLETED PER DETAIL.



NTS

CITY OF RAPID CITY

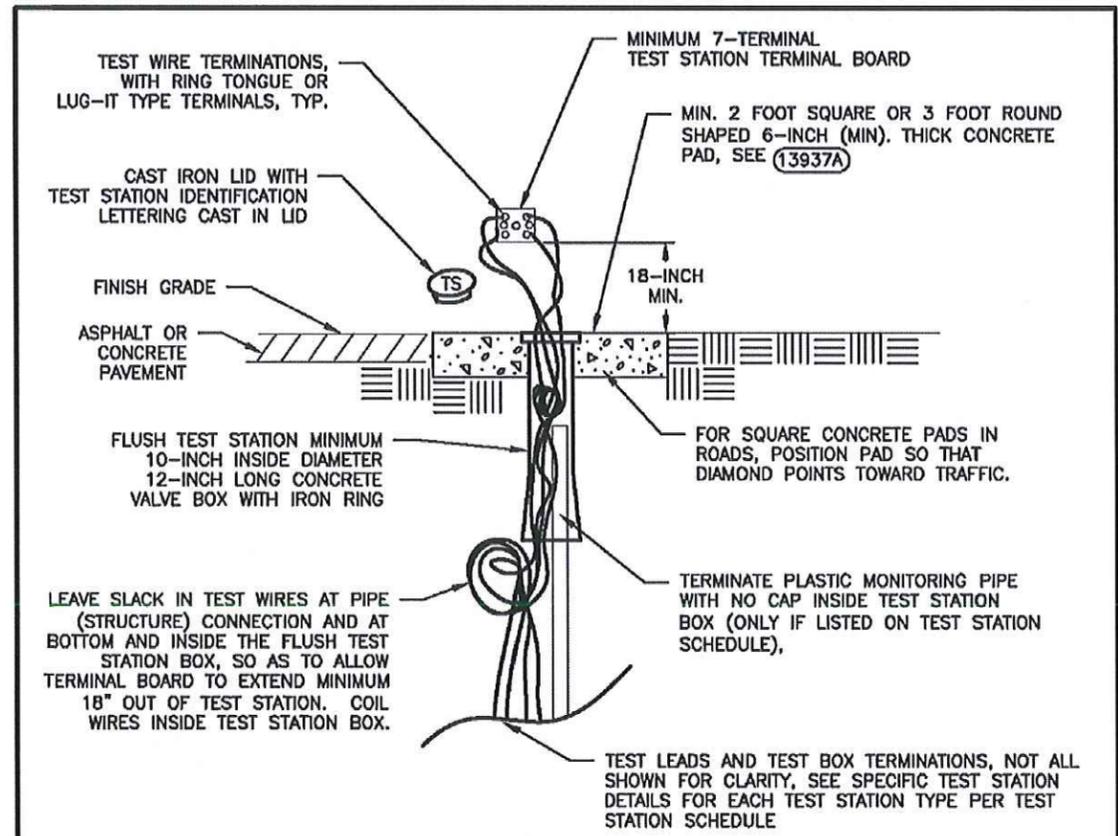
PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

TEST LEAD SPLICES

13929S

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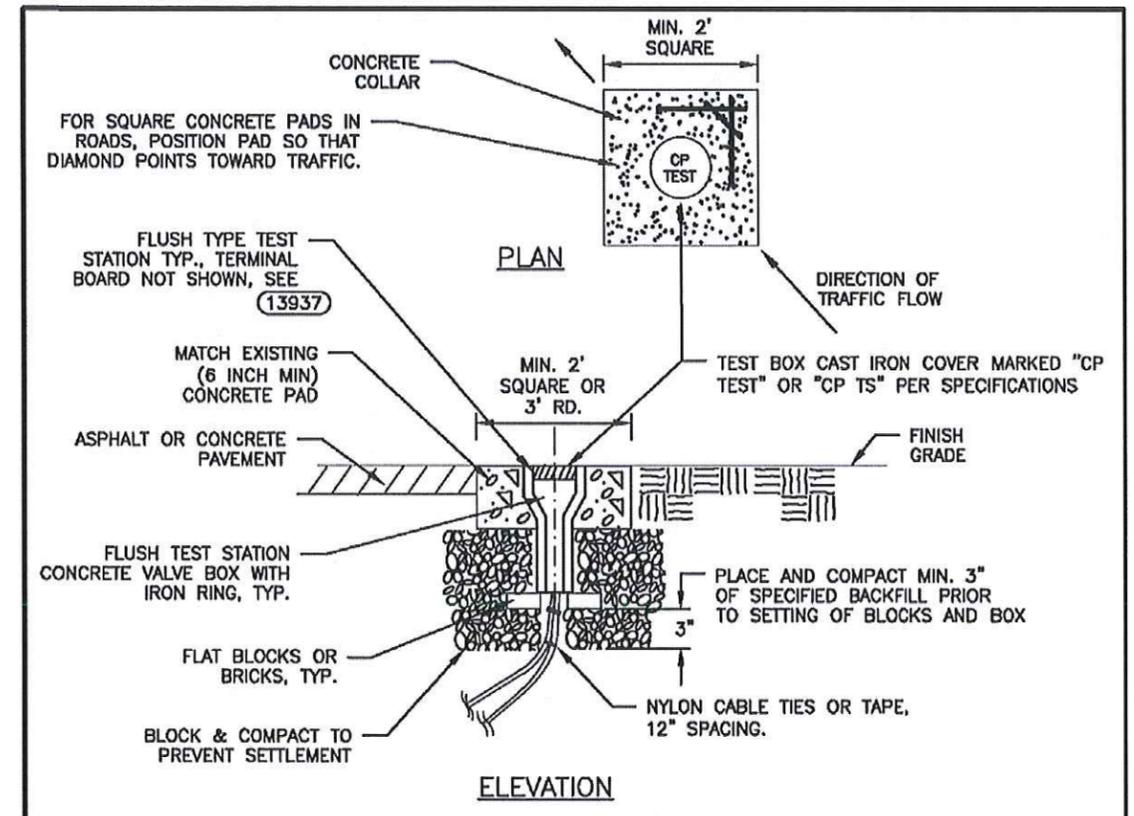


- NOTES:**
1. INSTALL PLASTIC MONITORING PIPE OR REFERENCE ELECTRODE ONLY AT TEST STATION LOCATIONS INDICATED ON TEST STATION LOCATION SCHEDULE OR DRAWINGS. INSTALL PIPE MARKING SIGNS NEXT TO TEST STATIONS IF SPECIFIED.
 2. UTILIZE INSULATED STRANDED COPPER WIRE ONLY, SIZE AS SPECIFIED. COLOR CODE WIRES ACCORDING TO WIRE COLOR CODE, SEE (13902PRC)
 3. LOCATE TEST STATION IN PROTECTED LOCATION DIRECTLY OVER PIPE UNLESS OFFSET REQUIRED BY SPECS. OR FIELD CONDITIONS (IN ROAD, FIELD, ETC.). OFFSET TO APPURTENANCES, R.O.W. FENCELINE OR EDGE OF ROADWAY, IF NO PROTECTED LOCATION AVAILABLE OVER PIPELINE. COORDINATE LOCATIONS WITH ENGINEER.
 4. IF TEST STATION AND TRACER WIRE ACCESS BOXES AT SAME LOCATION, SEE INSET ON (13942FH)

NTS



CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
FLUSH-MOUNTED TEST STATION STANDARD FLUSH TYPES	DATE: 2-19-13 (13937)

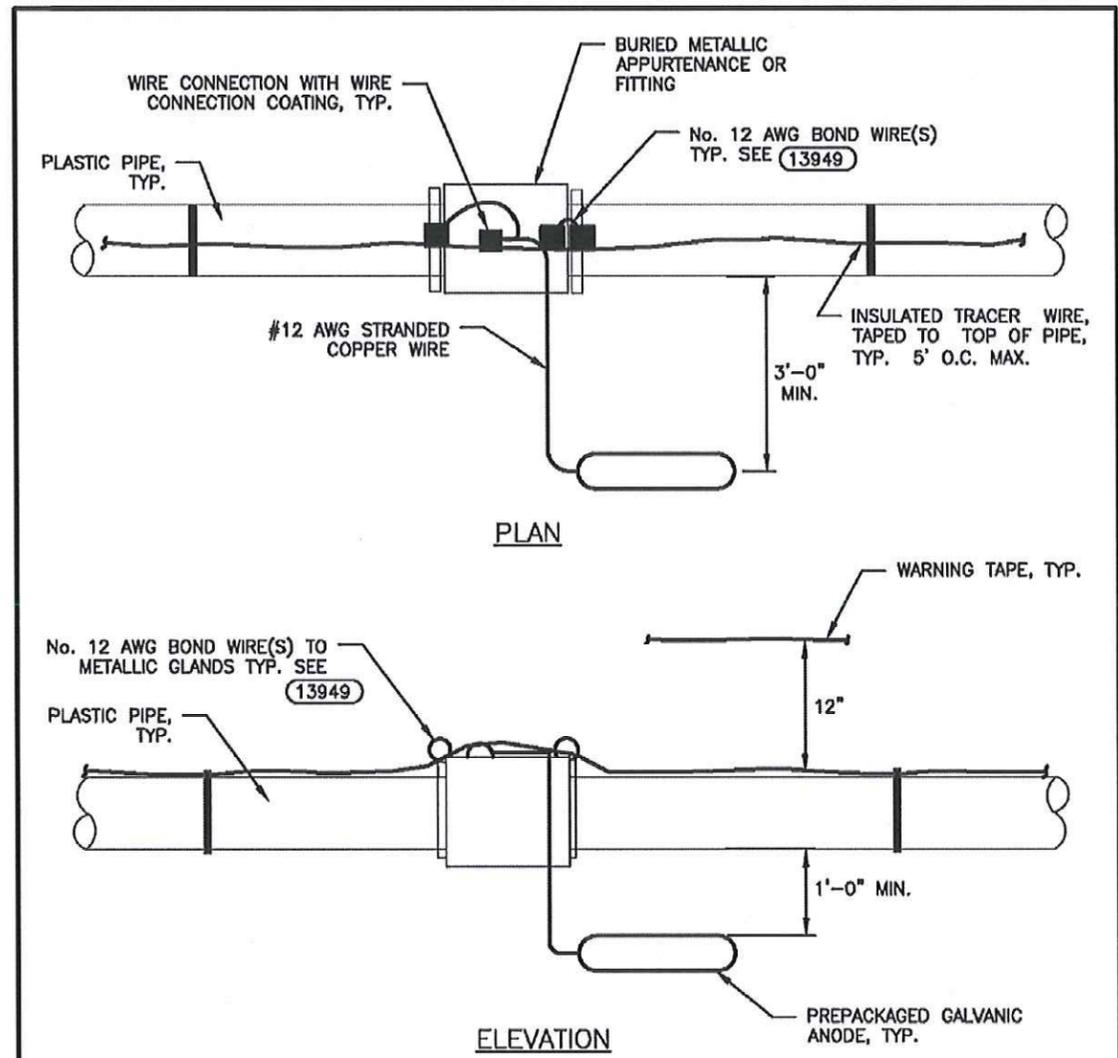


- NOTES:**
1. TEST STATION TYPE AND NUMBER OF TEST LEADS SHALL BE AS INDICATED ON TEST STATION SCHEDULE OR DRAWINGS. UTILIZE INSULATED STRANDED COPPER WIRE ONLY, SIZE AS SPECIFIED. COLOR CODE WIRES ACCORDING TO WIRE COLOR CODE SPECIFIED, SEE (13902PRC)
 2. ALL WIRES SHALL BE RUN WITHOUT SPLICES FROM THE CONNECTION TO THE TEST STATION BOX. TERMINATE WITH RING TONGUE OR LUG-IT TYPE TERMINALS AND BUNDLE WIRES TOGETHER AT 12-INCH INTERVALS WITH ELECTRICAL TAPE OR NYLON CABLE TIES.
 3. PROVIDE ALL WIRES WITH SUFFICIENT SLACK SO THAT THE TERMINAL BOARD MAY BE EXTENDED A MINIMUM 18-INCHES ABOVE THE TOP OF THE TEST BOX. COIL WIRES IN TEST STATION. LOOP WIRES BOTH AT BOTTOM OF TEST STATION AND AT PIPE OR STRUCTURE TO MINIMIZE DAMAGE DURING BACKFILLING AND FUTURE SETTLEMENT.

NTS



CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
TYPICAL FLUSH MOUNTED TEST STATION BOX SUPPORT	DATE: 2-19-13 (13937A)



- NOTES**
1. MINIMUM OF TWO No. 12 AWG BOND WIRES EACH FOR 12" AND LARGER PIPE, ONE BOND WIRE FOR SMALLER PIPE.
 2. PROVIDE TYPE, NUMBER & SIZE OF ANODES AS SPECIFIED, MINIMUM SHALL BE ONE ANODE PER FITTING

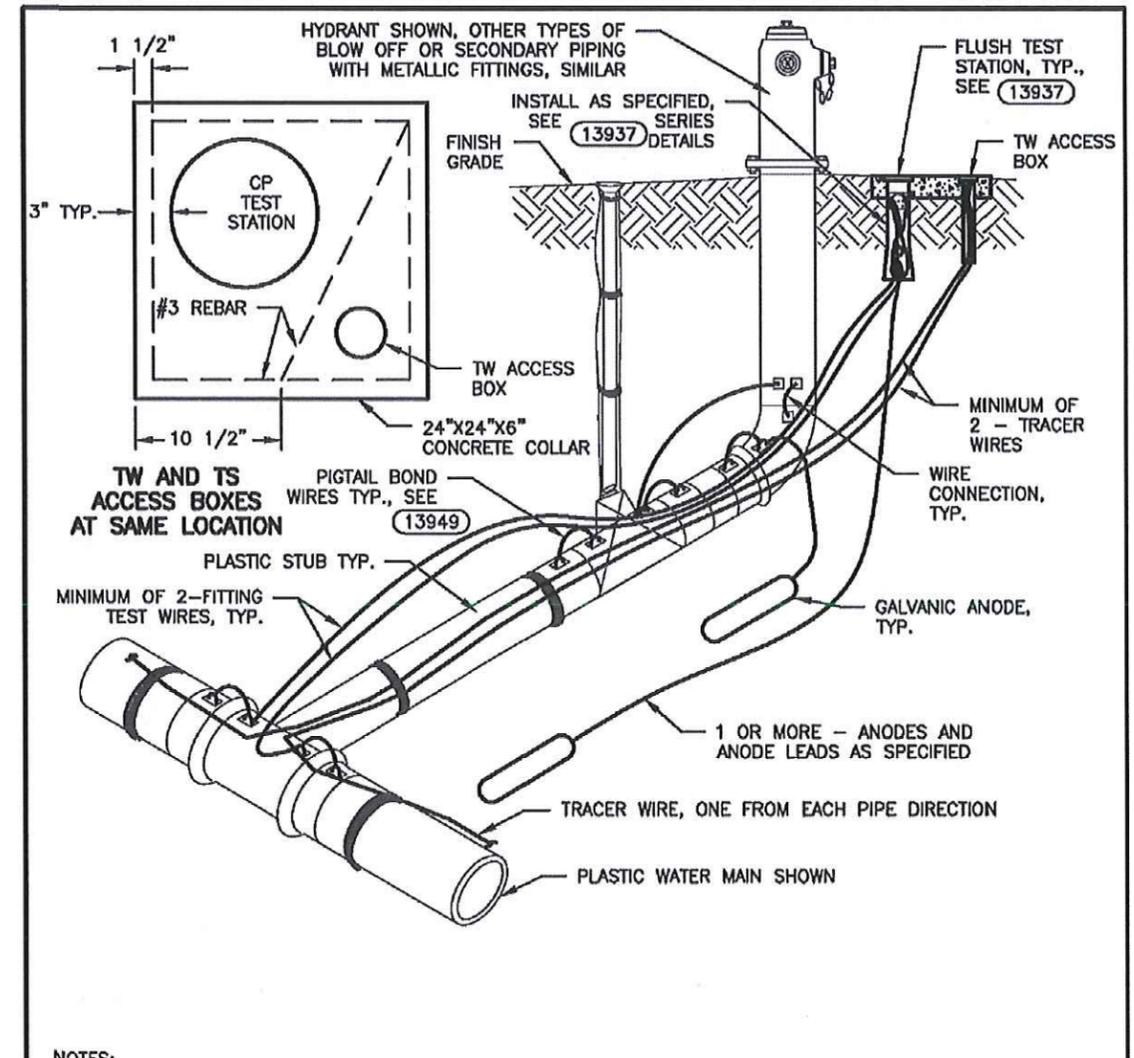
NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

GALVANIC ANODE INSTALLATION AT BURIED METALLIC FITTINGS

(13940)



- NOTES:**
1. PLACE TEST STATION IN A PROTECTED LOCATION SO AS TO NOT INTERFERE WITH OPERATION OF VALVES OR FIRE HYDRANT. TERMINATE FITTING TEST WIRES, ANODE LEAD AND TRACER WIRES IN TEST STATION WITH MIN. 18" SLACK.
 2. INSTALL GALVANIC ANODE MINIMUM 3'-0" FROM AND 1'-0" BELOW PIPELINE, FITTING, OR VALVE INVERT ELEVATION. INSTALL MINIMUM NUMBER, TYPE, & SIZE OF GALVANIC ANODES SPECIFIED,

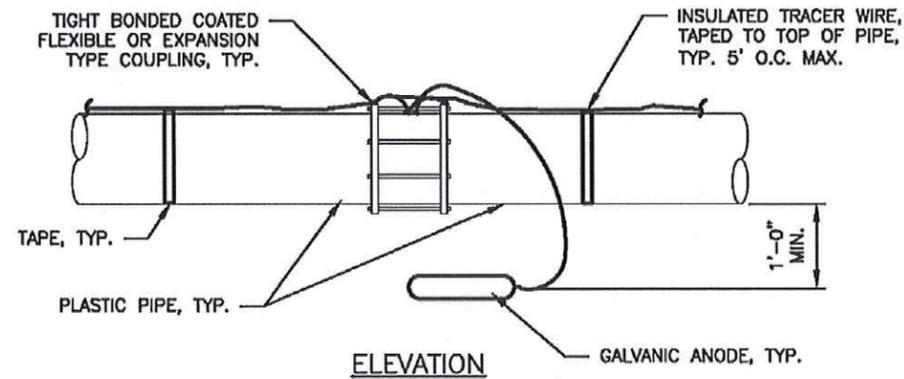
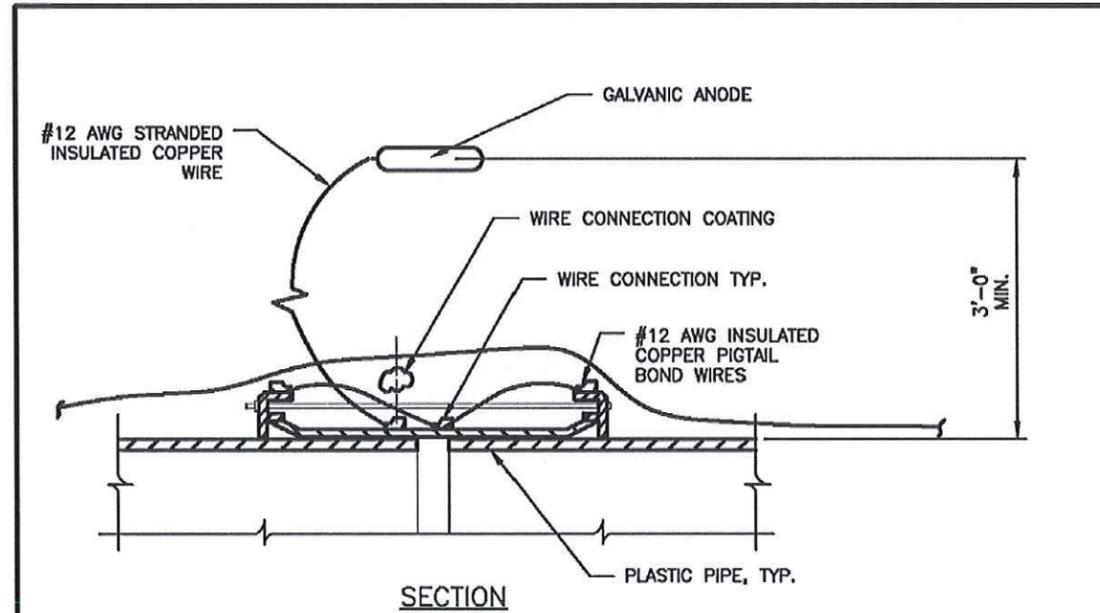
NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

FLUSH TYPE TEST STATIONS AT HYDRANT ASSEMBLIES W/ PLASTIC STUB

(13942FH)



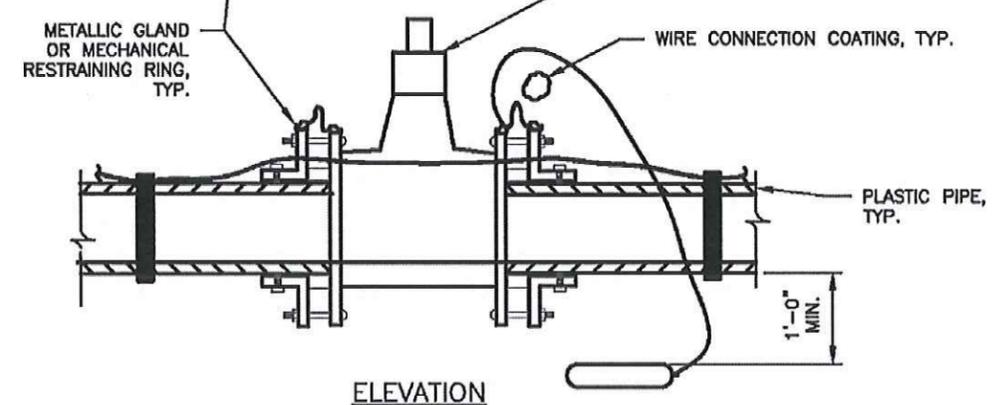
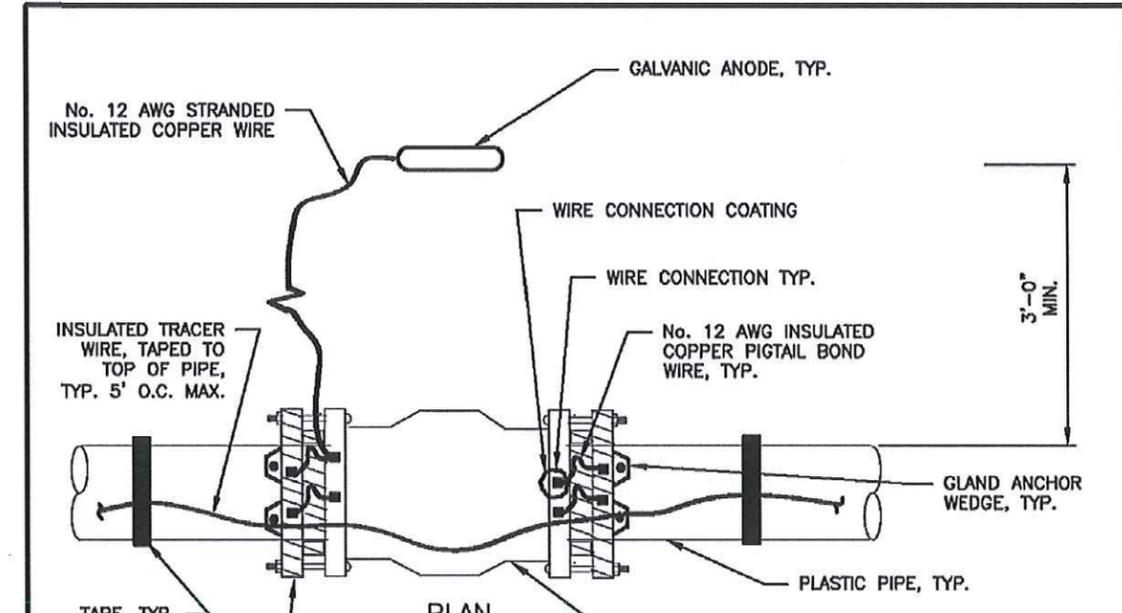
NOTES:

1. MIN. TWO EACH No. 12 AWG BONDS EACH FOR 12" AND LARGER PIPE, ONE BOND ALLOWED FOR SMALLER PIPE.
2. PROVIDE TYPE, NUMBER & SIZE OF ANODES AS SPECIFIED, MINIMUM SHALL BE ONE ANODE PER FITTING

NTS



CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
CORROSION PROTECTION FOR FLEXIBLE METALLIC COUPLINGS ON PLASTIC PIPE
 DATE: 2-19-13
13943



NOTES:

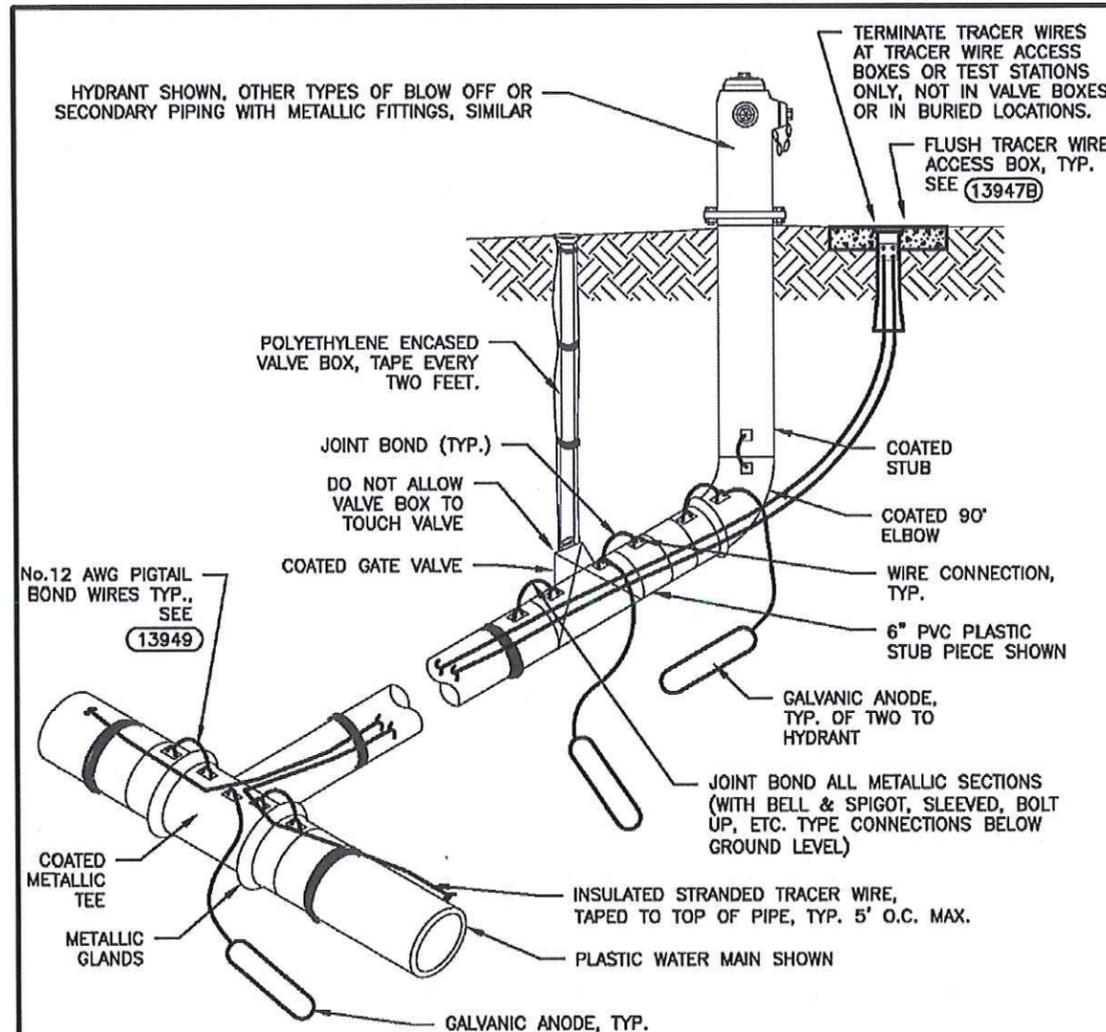
1. BOND PLASTIC PIPE METALLIC GLANDS OR MECHANICAL RESTRAINING RINGS TO METALLIC VALVE OR FITTING BODY, SEE (13940) AND (13949)
2. PROVIDE TYPE, NUMBER & SIZE OF ANODES AS SPECIFIED, MINIMUM SHALL BE ONE ANODE PER FITTING

NTS



CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
CORROSION PROTECTION FOR METALLIC VALVES OR FITTINGS ON PLASTIC PIPE
 DATE: 2-19-13
13943DIP

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	27	40
CATHODIC PROTECTION			



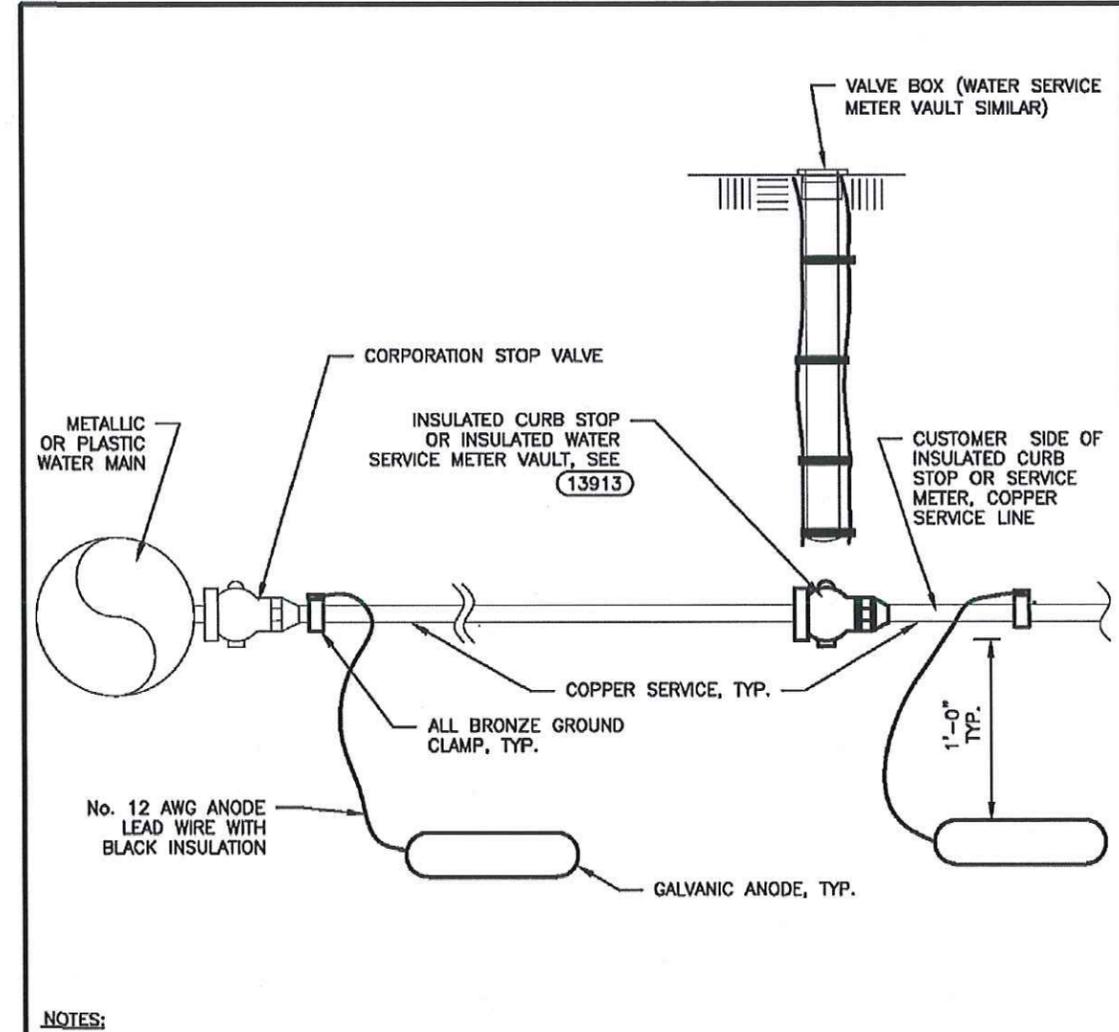
NOTES:

1. INSTALL GALVANIC ANODE MINIMUM 3'-0" FROM AND 1'-0" BELOW PIPELINE, FITTING, OR VALVE INVERT ELEVATION.
2. INSTALL MINIMUM NUMBER, TYPE, & SIZE OF GALVANIC ANODES SPECIFIED, MINIMUM OF TWO ANODES TO FIRE HYDRANT ASSEMBLY AND ONE OR MORE ANODE(S) PER EACH METALLIC FITTING. NUMBER AND SIZE OF ANODES ON METALLIC TEE WILL DEPEND ON MAINLINE DIAMETER.



NTS

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
GALVANIC ANODE INSTALLATION AT HYDRANT ASSEMBLIES W/ PLASTIC STUB	
	DATE: 2-19-13
13944T	



NOTES:

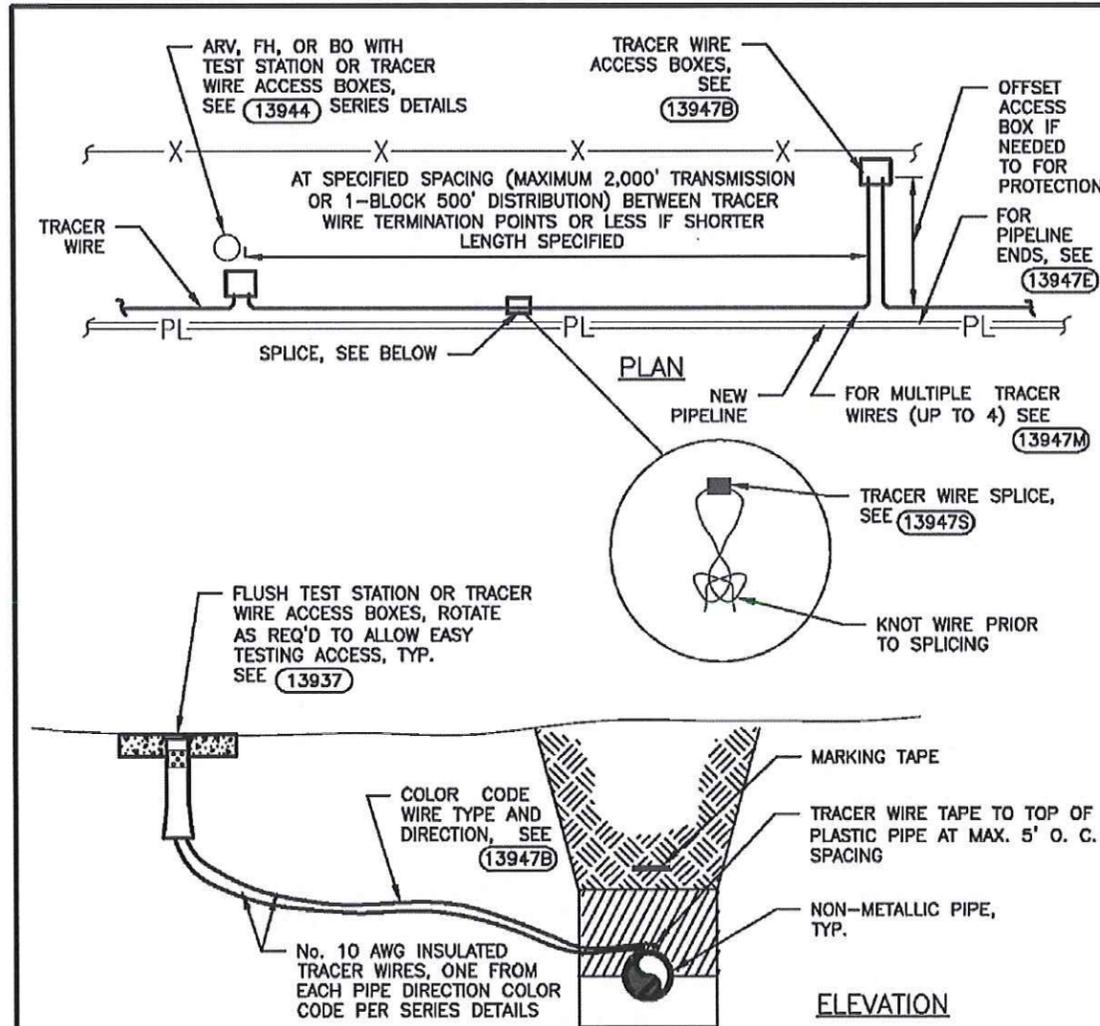
1. INSTALL ELECTRICAL INSULATORS AT CONNECTION TO METALLIC WATER MAIN AND AT CUSTOMER SERVICE CURB STOP OR WATER METER VAULT LOCATION, IF COPPER TYPE SERVICE ON CUSTOMER SIDE.
2. INSTALL GALVANIC ANODES TO COPPER SERVICE LINE ON BOTH SIDES OF INSULATED CORPORATION STOP OR SERVICE METER. MINIMUM ONE ANODE ON WATER MAIN SIDE AND ONE ANODE ON CUSTOMER SIDE COPPER SERVICE. MAINTAIN ELECTRICAL ISOLATION BETWEEN WATER MAIN AND CUSTOMER COPPER SERVICE LINES.



NTS

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
PLASTIC MAIN WITH CUSTOMER COPPER SERVICE LINE INSULATORS AND ANODES	
	DATE: 2-19-13
13946P	

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	28	40
CATHODIC PROTECTION			



NOTES:

1. TERMINATE TRACER WIRE AT TEST STATIONS OR TRACER WIRE ACCESS BOXES LOCATED AT SPECIFIED DISTANCES, STRUCTURES AND END OF EACH PIPE RUN. TEST TRACER WIRE ELECTRICAL CONTINUITY AS SPECIFIED PRIOR TO PLACEMENT OF CURB AND GUTTER OR PAVING. DO NOT CONNECT TRACER WIRE DIRECTLY TO EXSITING OR NEW METALLIC PIPE OR FITTING. USE TRACER BOX OR TEST STATIONS.
2. LOCATE TRACER WIRE ACCESS BOXES OR TEST STATIONS IN PROTECTED LOCATIONS DIRECTLY OVER PIPE UNLESS OFFSET REQUIRED BY SPECS. OR FIELD CONDITIONS (IN ROAD, FIELD, ETC.). OFFSET TO BACK OF CURB AND GUTTER OR HYDRANT, IF NO PROTECTED LOCATION AVAILABLE OVER PIPELINE. COORDINATE LOCATIONS WITH ENGINEER.



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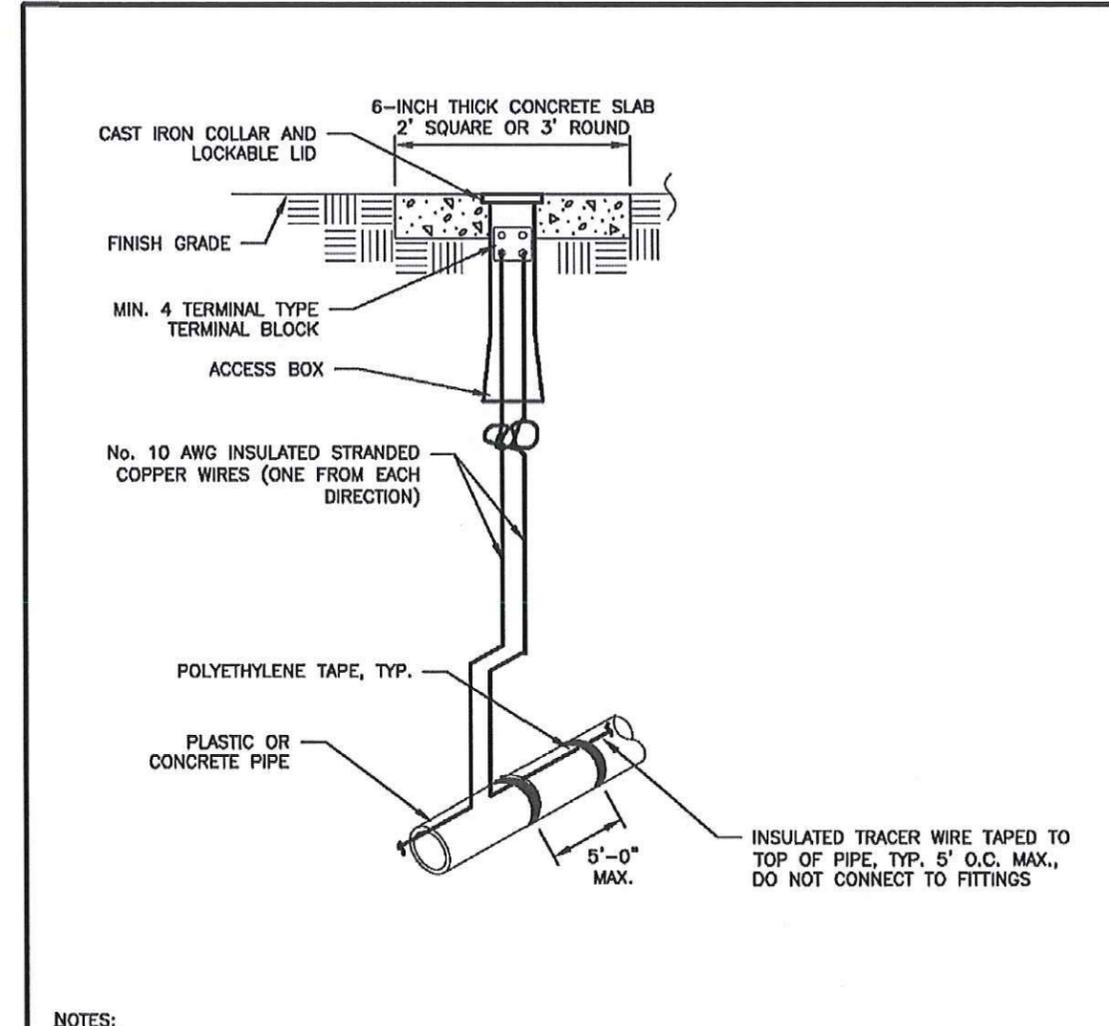
CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

TRACER WIRE DETAIL

(13947)



NOTES:

1. IF USING FLUSH TYPE BOXES PROVIDE SUFFICIENT SLACK IN WIRES TO ALLOW TERMINAL BLOCK TO EXTEND MIN. 18" OUT OF BOX. COIL WIRES IN ACCESS BOX.
2. INSTALL MIN. 4 TERMINAL TRACER WIRE ACCESS BOX WHERE THERE ARE NO TEST STATIONS AVAILABLE FOR TERMINATION, SO AS TO ALLOW NO TRACER WIRE SPAN LENGTHS LONGER THAN SPECIFIED. INSTALL PIPE MARKING SIGNS NEXT TO BOXES AS SPECIFIED.



NTS

CITY OF RAPID CITY

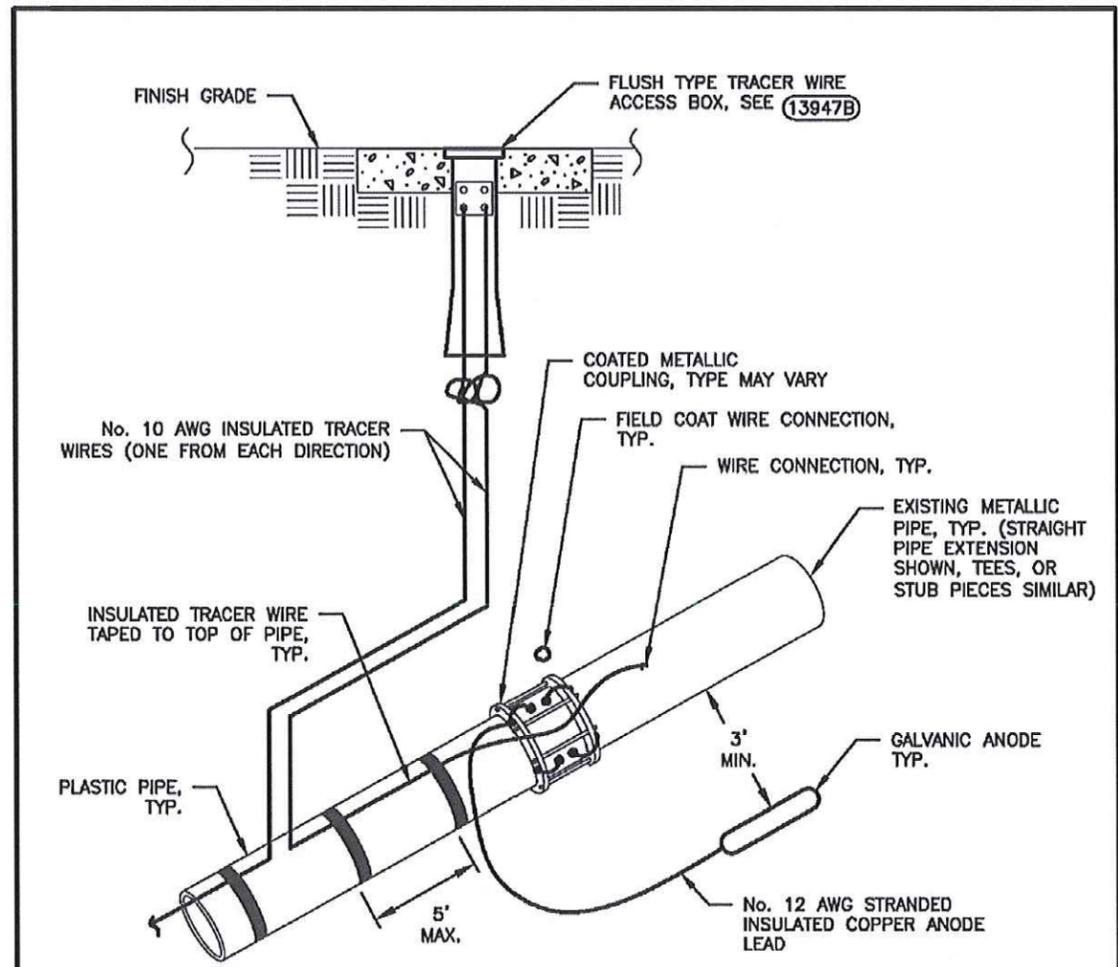
PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

**TRACER WIRE ACCESS BOXES
IN UNPROTECTED LOCATION**

(13947B)

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	29	40
CATHODIC PROTECTION			



NOTES:

1. INSTALL GALVANIC ANODE TO METALLIC FITTING AT CONNECTION TO EXISTING METALLIC PIPELINE (IF METALLIC PIPE NOT ALREADY CATHODIC PROTECTED WITH AN IMPRESSED CURRENT TYPE CATHODIC PROTECTION SYSTEM).
2. IF TRACER WIRE CONNECTED TO EXISTING METALLIC PIPELINE, LOOP TRACER WIRES ABOVEGRADE AND TERMINATE IN TRACER WIRE OR TEST STATION BOX. SEE (13947) SERIES DETAILS.



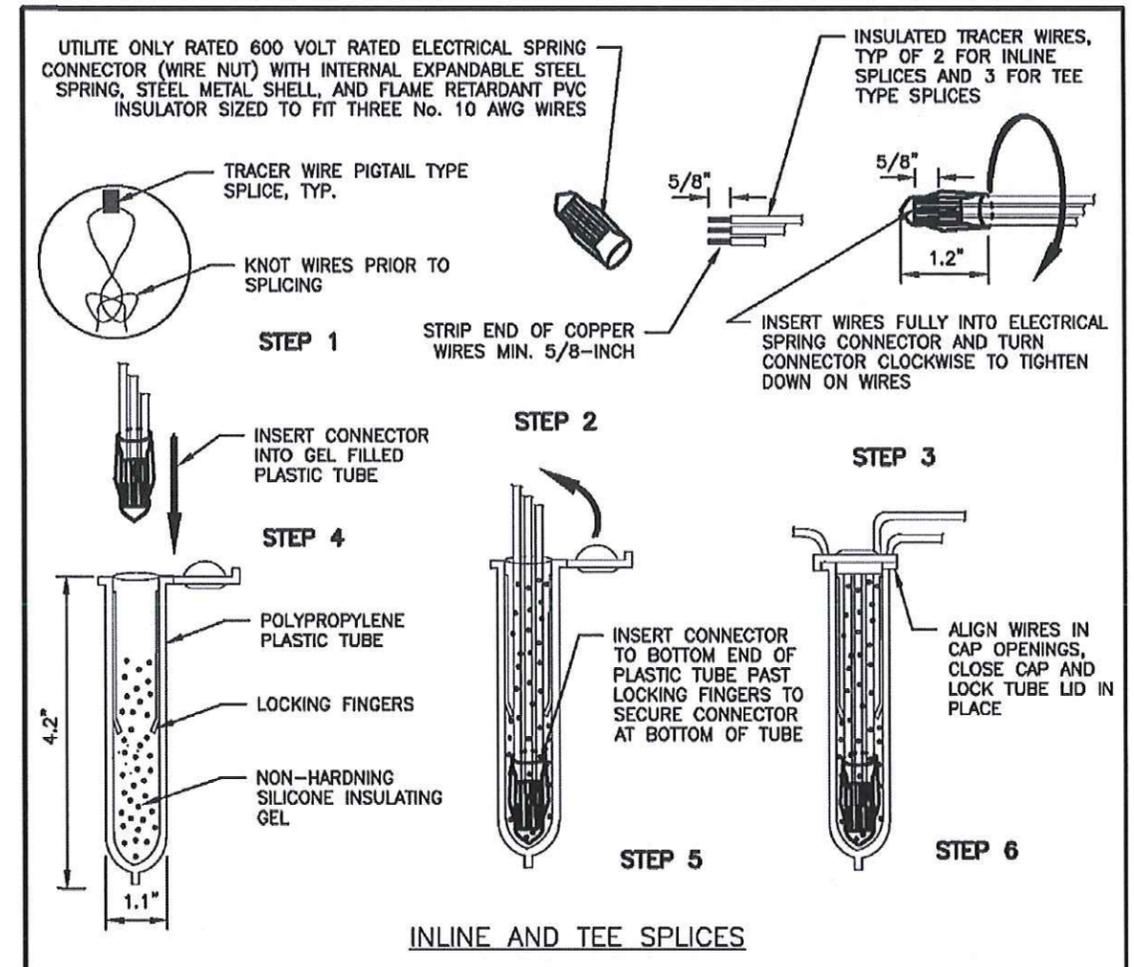
NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

TRACER WIRE ACCESS BOXES AT CONNECTION TO EXISTING

(13947F)



NOTES:

1. ALLOWED FOR TRACER WIRE TYPE SPLICES ONLY. TRACER WIRE ONLY REQUIRED FOR NON-METALLIC PIPE TYPE INSTALLATIONS. KNOT WIRES PRIOR TO MAKING SPLICE TO MINIMIZE STRESS ON SPLICE.
2. FOR COPPER WIRE SPLICES ONLY. STRIP WIRES AND MAKE WIRE SPLICE CONNECTION WITH ELECTRICAL SPRING (WIRE NUT) TYPE CONNECTORS. INSERT THE CONNECTOR INTO THE GEL FILLED TUBE TO THE END PAST THE LOCKING FINGERS TO HOLD THE CONNECTOR SECURELY IN PLACE, ALIGN WIRES AND THEN SHUT AND LOCK THE INSULATOR TUBE TOP LID COVER INTO PLACE. COMPLETE SPLICES AND INSULATE IN ACCORDANCE WITH CONNECTOR MANUFACTURER'S RECOMMENDATIONS.
3. COMPLETE ALL SPLICES ONLY IN THE PRESENCE OF THE ENGINEER.



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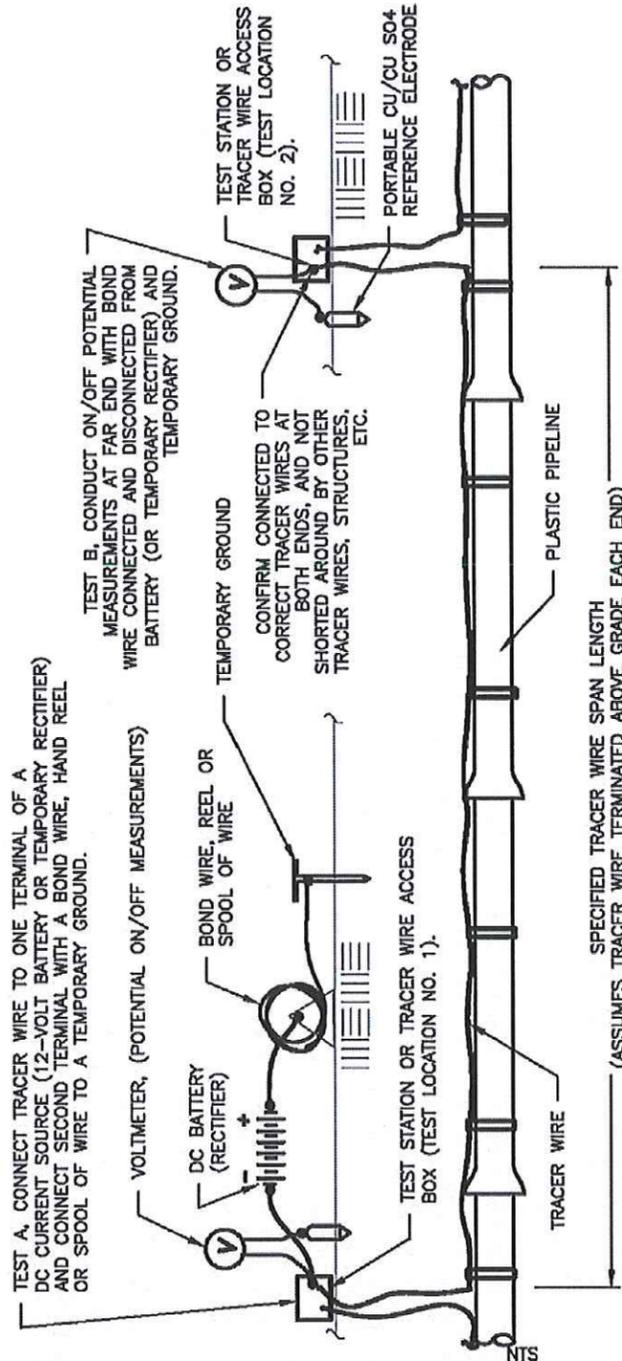
CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

TRACER WIRE SPLICES

(13947S)

 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	30	40
CATHODIC PROTECTION			

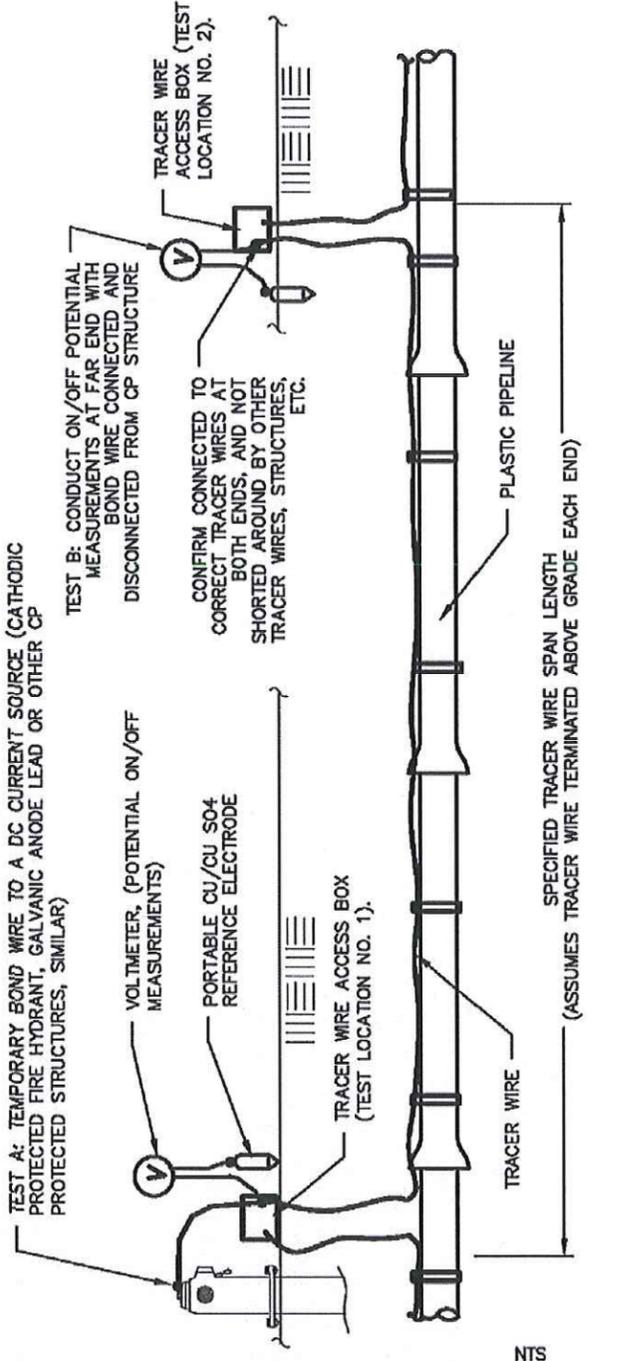


TRACER WIRE CONTINUITY VERIFICATION WITH POTENTIAL SHIFT TEST PROCEDURE:

1. CONDUCT ON AND OFF POTENTIAL MEASUREMENTS AT TEST LOCATION NO. 1 WITH TEMPORARY GROUND AND CONNECTION TO A BATTERY OR TEMPORARY RECTIFIER AT SAME END. THEN CONDUCT AN ON AND OFF POTENTIAL TEST MEASUREMENT AT FAR END (TEST BOX LOCATION NO. 2). TEST IS SIMILAR TO TESTING WITH GALVANIC ANODE BUT PROVIDES A LARGER VOLTAGE DIFFERENCE.
2. THE MEASURED POTENTIALS SHOULD CHANGE NEAR TO THE SAME AS THE VOLTAGE OF THE BATTERY (APPROXIMATELY 12 TO 13 VOLTS) OR TEMPORARY RECTIFIER DC VOLTAGE OUTPUT AT BOTH TEST LOCATIONS 1 AND 2.
3. IF BOTH TEST POINT MEASURED VOLTAGES ARE THE SAME, THIS INDICATES THE TRACER WIRE FOR THE SPAN TESTED IS CONTINUOUS.
4. IF THERE IS NO POTENTIAL CHANGE (OFF TO ON) AT THE TEST LOCATION NO. 2, (TEST B) END, BUT THERE IS AT THE TEMPORARY GROUND END (TEST LOCATION 1, TEST A), THIS INDICATES THAT THE TRACER WIRE MAY EITHER NOT BE ELECTRICALLY CONTINUOUS WITH ONE OR MORE BREAKS OR ELECTRICALLY SHORTED TO ANOTHER STRUCTURE.
5. IF NO POTENTIAL CHANGE, VERIFY BY TESTING FROM OPPOSITE DIRECTION. UTILIZE OTHER TEST METHODS TO CONFIRM.

NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
 TRACER WIRE CONTINUITY TEST PROCEDURES BATTERY OR RECTIFIER POTENTIAL SHIFT METHOD
 DATE: 2-19-13
 13947T1



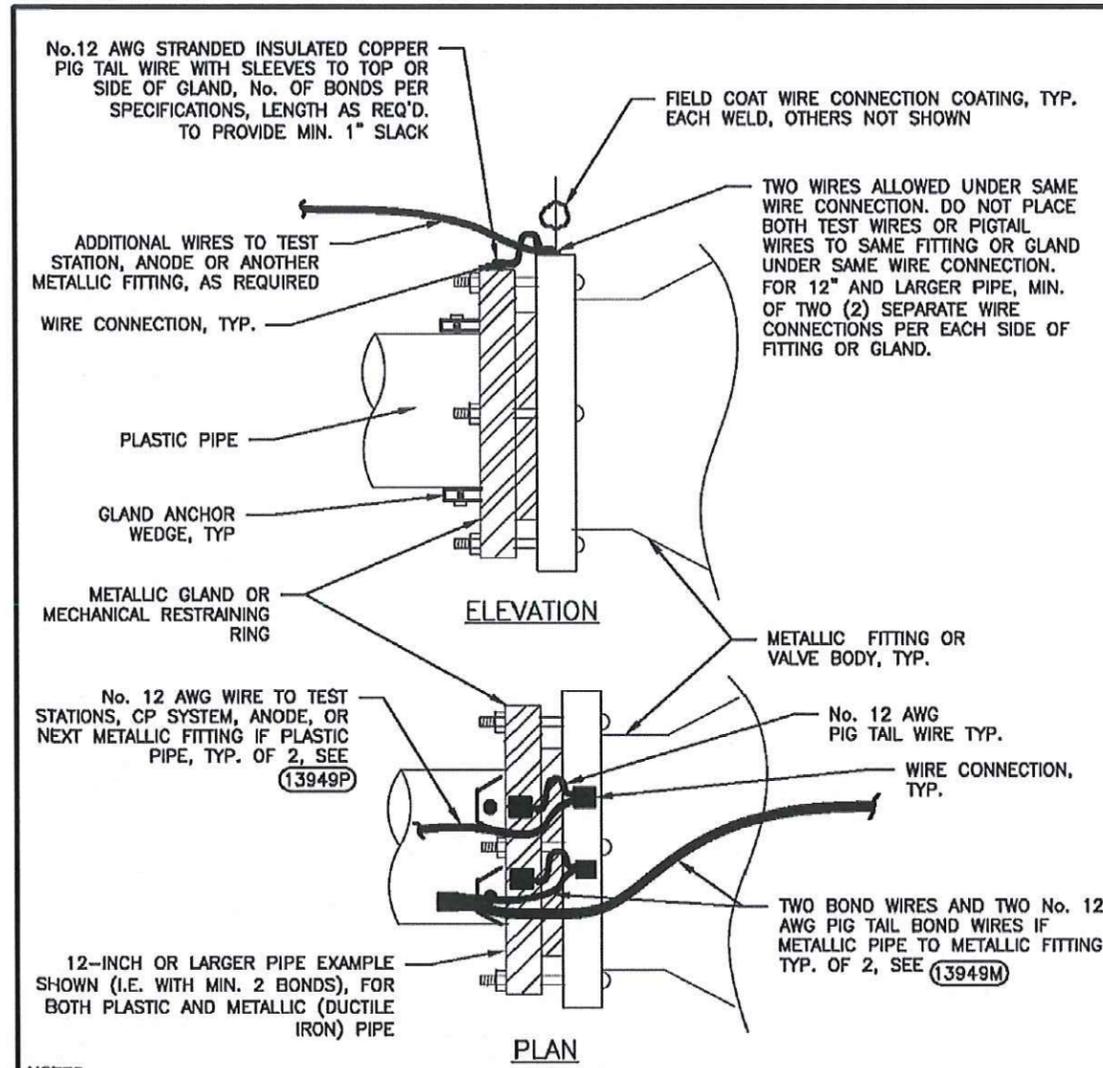
TRACER WIRE CONTINUITY VERIFICATION WITH GALVANIC ANODE POTENTIAL SHIFT TEST PROCEDURE:

1. CONDUCT ON AND OFF POTENTIAL MEASUREMENTS AT TRACER WIRE ACCESS BOX NO. 1 WITH BOND WIRE TO CATHODIC PROTECTION SOURCE AT SAME END. THEN CONDUCT ON AND OFF POTENTIAL TESTS AT FAR END (TRACER BOX LOCATION NO. 2). POTENTIAL SHOULD SHIFT THE SAME AMOUNT AT FAR END (LOCATION NO. 2), WHEN TEMPORARILY CONNECTED AND DISCONNECTED FROM CATHODIC PROTECTION SOURCE AT TRACER WIRE BOX LOCATION NO. 1, IF TRACER WIRE IS CONTINUOUS AND NOT SHORTED TO OTHER STRUCTURES.
2. FOR EXAMPLE: IF THE OFF POTENTIAL OF THE TRACER WIRE IS -0.24 VOLTS AND THE ANODE OR CATHODICALLY PROTECTED FIRE HYDRANT POTENTIAL IS -1.1 VOLT, THEN WHEN THE TRACER WIRE IS TEMPORARILY CONNECTED TO THE CATHODICALLY PROTECTED STRUCTURE, THE TRACER WIRE POTENTIAL CHANGES TO -1.0 VOLTS AT TRACER WIRE ACCESS BOX LOCATION NO. 1 AND -0.95 AT TRACER WIRE ACCESS BOX LOCATION NO. 2. THAT INDICATES THAT THE TRACER WIRE BETWEEN LOCATIONS NO. 1 AND NO. 2 IS CONTINUOUS. IF THE POTENTIAL AT TEST LOCATION NO. 2 DOES NOT CHANGE IT INDICATES THE TRACER WIRE MAY NOT BE ELECTRICALLY CONTINUOUS WITH ONE OR MORE BREAKS. IF THERE IS ONLY A SLIGHT CHANGE, SAY FROM -0.200 TO -0.233 VOLTS, THAT INDICATES THAT EITHER THE TRACER WIRE MAY BE BROKE OR ELECTRICALLY SHORTED TO ANOTHER STRUCTURE. IF INSIGNIFICANT POTENTIAL CHANGE, VERIFY BY TESTING FROM OPPOSITE DIRECTION. UTILIZE OTHER TEST METHODS TO CONFIRM.

NTS

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
 TRACER WIRE CONTINUITY TEST PROCEDURES GALVANIC ANODE POTENTIAL SHIFT METHOD
 DATE: 2-19-13
 13947T2

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	31	40
CATHODIC PROTECTION			

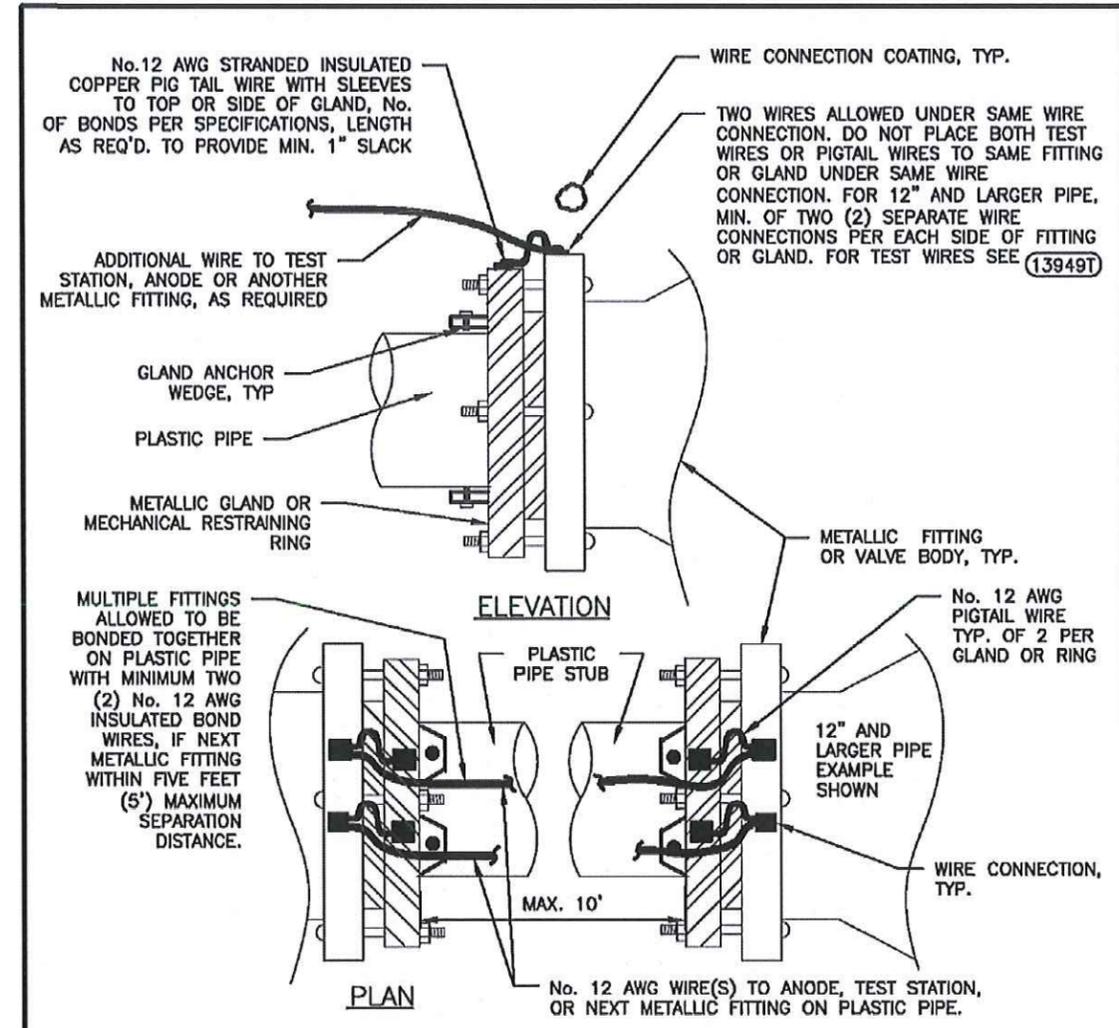


NOTES:

1. BOND METALLIC OR PLASTIC PIPE METALLIC GLANDS TO METALLIC FITTING BODY. COMPLETE PIGTAIL WIRE CONNECTIONS TO GLANDS BEFORE ASSEMBLY.
2. BOND METALLIC MECHANICAL RESTRAINT RINGS TO METALLIC FITTING BODY
3. MIN. TWO (2) BONDS EACH FOR 12" AND LARGER PIPE, MIN. ONE (1) FOR SMALLER PIPE. MINIMUM 2 NO. 12 AWG PIGTAIL WIRES EACH SIDE OF FITTING.



CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
METALLIC FITTING GLANDS AND MECHANICAL RESTRAINT RINGS BONDING	
DATE: 2-19-13	(13949)



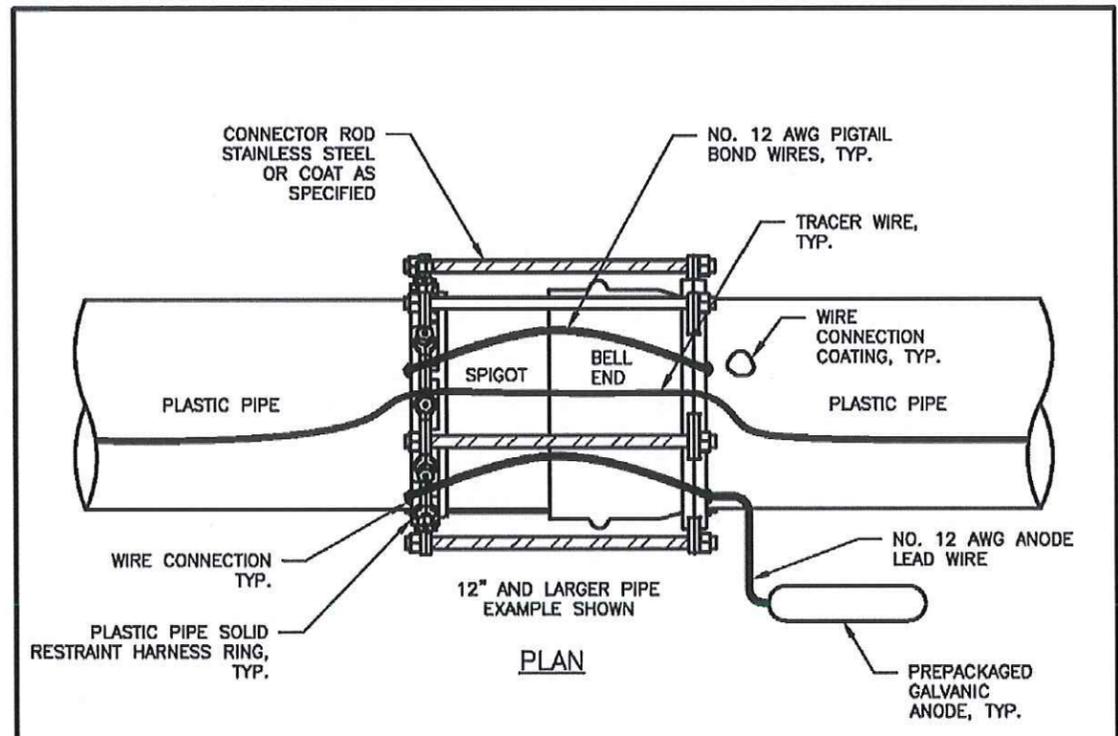
NOTES:

1. BOND PLASTIC PIPE METALLIC GLANDS TO METALLIC FITTING BODY. COMPLETE PIGTAIL WIRE CONNECTIONS TO GLANDS BEFORE ASSEMBLY.
2. MINIMUM NO. 12 AWG PIGTAIL WIRES EACH SIDE OF FITTING, MIN. 2 PIGTAIL BONDS EACH FOR 12" & LARGER PIPE, MIN. 1 FOR SMALLER PIPE.
3. NUMBER, SIZE AND TYPE OF GALVANIC ANODES REQUIRED FOR SINGLE OR MULTIPLE FITTINGS PER SPECIFICATIONS.



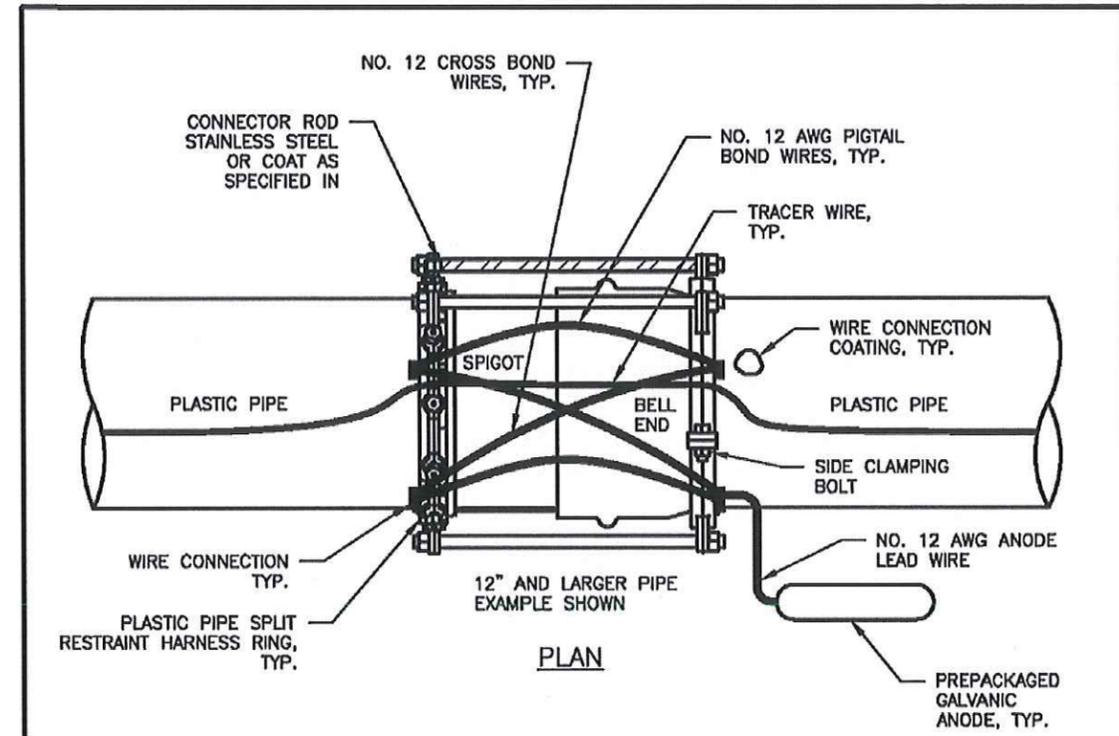
CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
PLASTIC PIPE METALLIC FITTING GLANDS AND MECHANICAL RESTRAINT RINGS BONDING	
DATE: 2-19-13	(13949P)

	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	32	40
CATHODIC PROTECTION			



NOTES:

1. SOLID RING TYPE RESTRAINTS SHOWN WITH MINIMUM OF 2 PIGTAIL BOND WIRES FOR 12 INCH AND LARGER PIPE. SINGLE PIGTAIL BOND WIRE ALLOWED FOR PIPE 10 INCH AND SMALLER. SPLIT RING RESTRAINTS MAY ONLY BE USED IF APPROVED BY ENGINEER AND WILL REQUIRE ADDITIONAL PIGTAIL BOND WIRES, SEE (13949S)
2. NUMBER, SIZE AND TYPE OF GALVANIC ANODES REQUIRED FOR SINGLE FITTING PER SPECIFICATIONS. MINIMUM OF ONE 17 POUND GALVANIC ANODE PER FITTING.
3. PRIOR TO ASSEMBLY, LOCATE WIRE CONNECTION FOR NO. 12 AWG BOND WIRES TO FLAT AREA ON SIDE OF COUPLING BOLT PATTERN RESTRAINT HARNESS RING.



NOTES:

1. SPLIT RING TYPE RESTRAINTS SHOWN WITH MINIMUM OF FOUR (TWO PIGTAIL AND TWO CROSS BOND WIRES FOR 12-INCH AND LARGER PIPE. TWO PIGTAIL CROSS BOND PIGTAIL WIRES ALLOWED FOR 10-INCH AND SMALLER PIPE). SPLIT RING RESTRAINTS MAY ONLY BE USED IF APPROVED BY ENGINEER. FOR SOLID RING PIGTAIL BOND WIRES, SEE (13949R)
2. NUMBER, SIZE AND TYPE OF GALVANIC ANODES REQUIRED FOR SINGLE FITTING PER SPECIFICATIONS. MINIMUM OF ONE 17 POUND GALVANIC ANODE PER FITTING.
3. PRIOR TO ASSEMBLY, LOCATE THERMITE WELD OR PIN BRAZED TYPE WIRE CONNECTION FOR NO. 12 AWG BOND WIRES TO FLAT AREA ON SIDE OF COUPLING BOLT PATTERN RESTRAINT HARNESS RING.

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CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

PLASTIC PIPE BELL SOLID RING RESTRAINT HARNESS JOINT BONDING

(13949R)

NTS

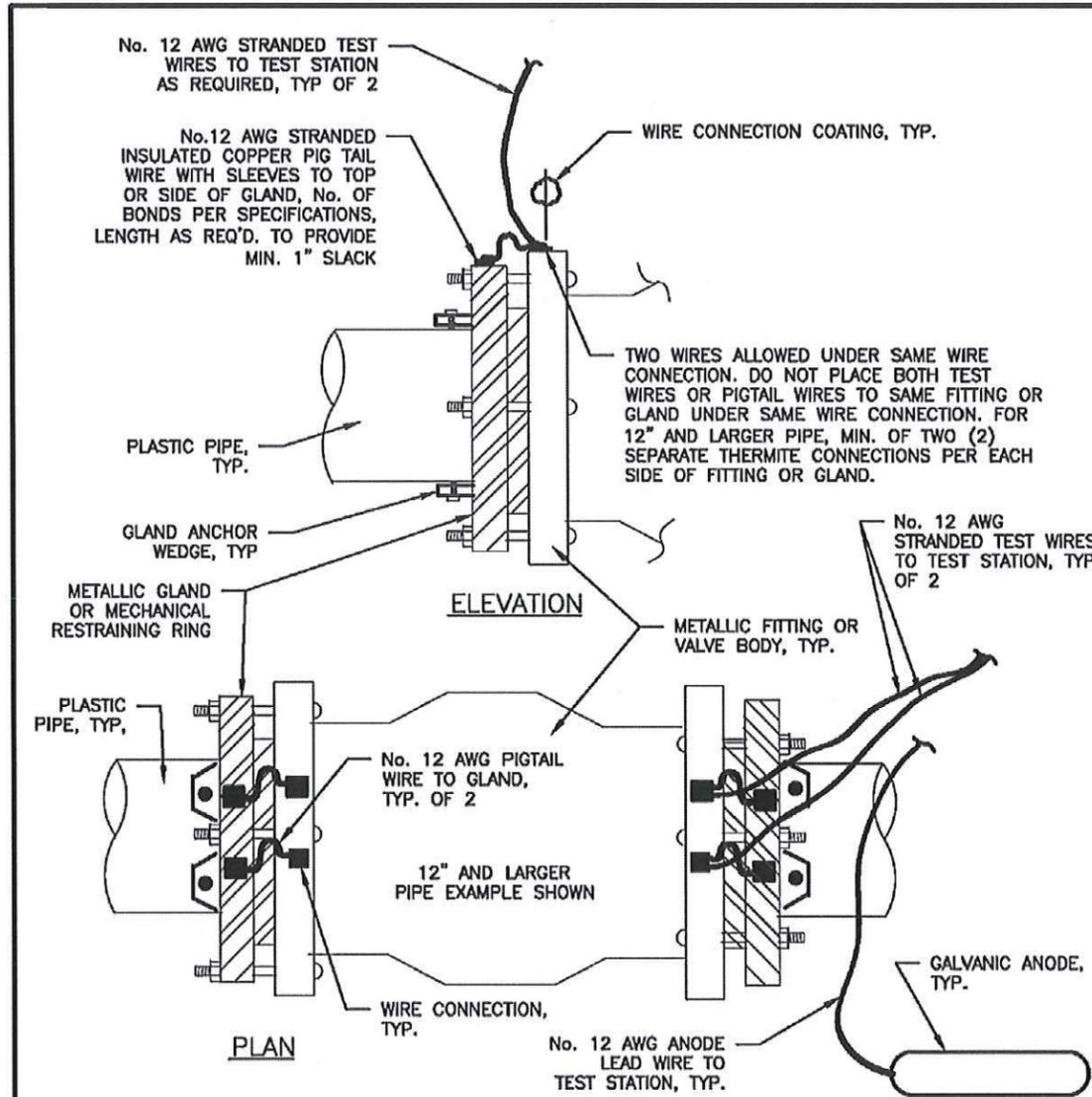
CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 2-19-13

PLASTIC PIPE BELL SPLIT RING RESTRAINT HARNESS JOINT BONDING

(13949S)

 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	33	40
CATHODIC PROTECTION			

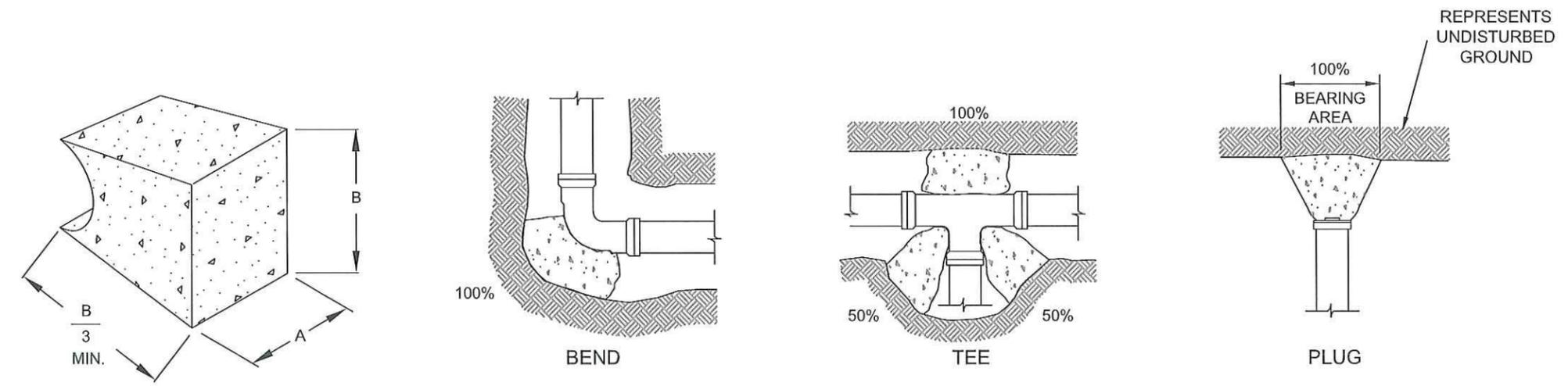


- NOTES:**
1. BOND METALLIC MECHANICAL RESTRAINT RINGS TO METALLIC FITTING BODY. COMPLETE PIGTAIL WIRE CONNECTIONS TO GLANDS BEFORE ASSEMBLY.
 2. MINIMUM NO. 12 AWG SIZED PIGTAIL BOND WIRES EACH SIDE OF FITTING, MIN. 2 PIGTAIL BONDS EACH FOR 12" & LARGER PIPE, MIN. 1 EACH SIDE FOR SMALLER PIPE.



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CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
DATE: 2-19-13	
PLASTIC PIPE METALLIC GLANDS/RESTRAINT RINGS BONDING, ANODE AND TEST LEADS	
(13949T)	



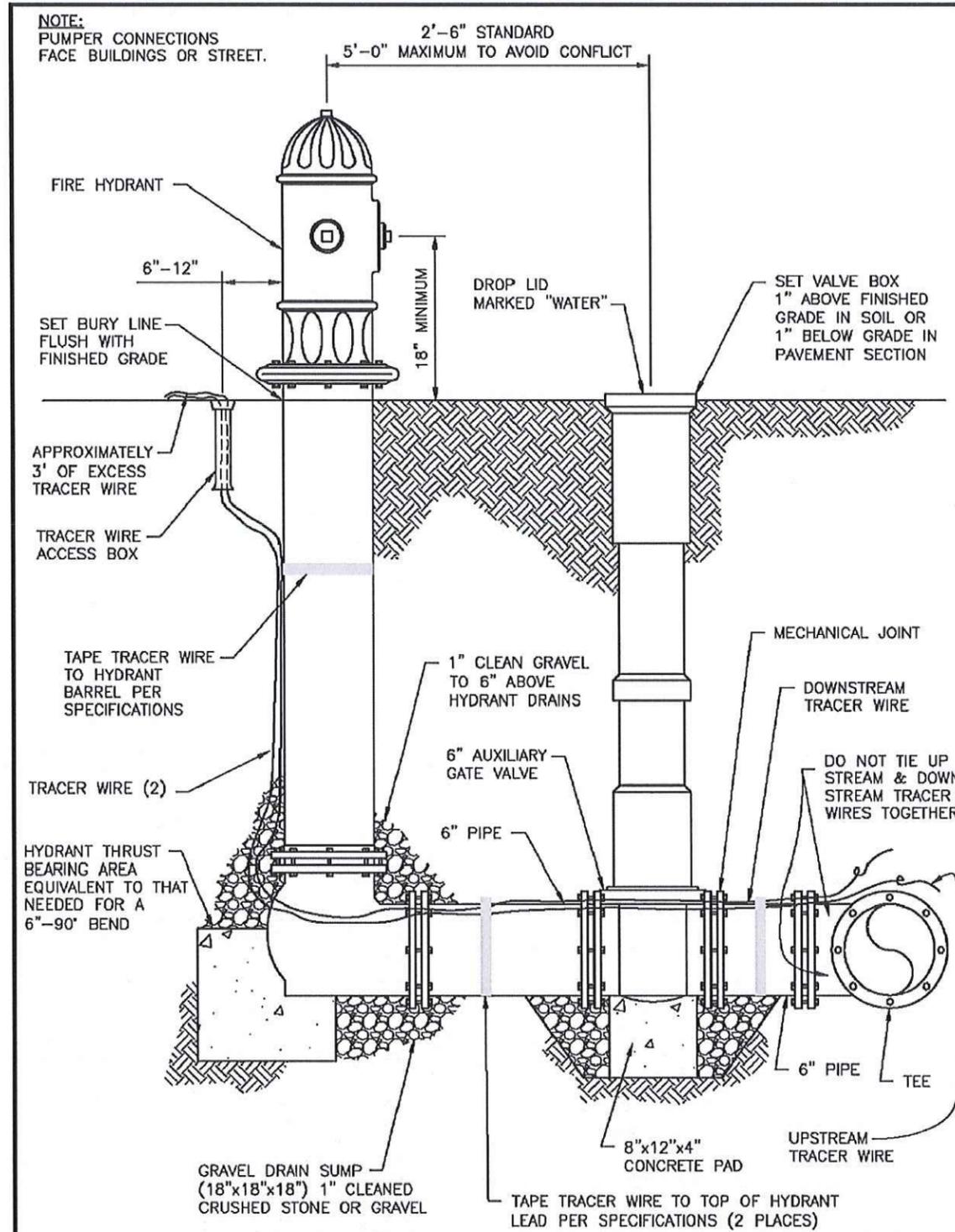
STANDARD MINIMUM DIMENSIONS FOR THRUST BLOCKING															
FITTING SIZES	PLUGS			TEES			90° BEND			45° BEND			22 1/2° BEND		
	A	B	MIN. CY	A	B	MIN. CY	A	B	MIN. CY	A	B	MIN. CY	A	B	MIN. CY
4"	1'-7"	1'-2"	0.18	1'-7"	1'-2"	0.36	1'-9"	1'-6"	0.10	1'-8"	0'-10"	0.10	1'-7"	0'-6"	0.10
6"	2'-0"	1'-11"	0.20	2'-0"	1'-11"	0.40	2'-5"	2'-2"	0.30	1'-10"	1'-7"	0.10	1'-9"	0'-10"	0.10
8"	2'-8"	2'-6"	0.70	2'-8"	2'-6"	1.40	3'-2"	3'-0"	0.70	2'-5"	2'-1"	0.30	1'-9"	1'-6"	0.10
10"	3'-4"	3'-3"	1.50	3'-4"	3'-3"	3.00	4'-0"	3'-10"	1.50	3'-0"	2'-9"	0.60	2'-2"	1'-11"	0.30
12"	4'-0"	3'-10"	2.50	4'-0"	3'-10"	5.00	4'-8"	4'-8"	2.50	3'-8"	3'-3"	1.00	2'-7"	2'-3"	0.35

NOTES:

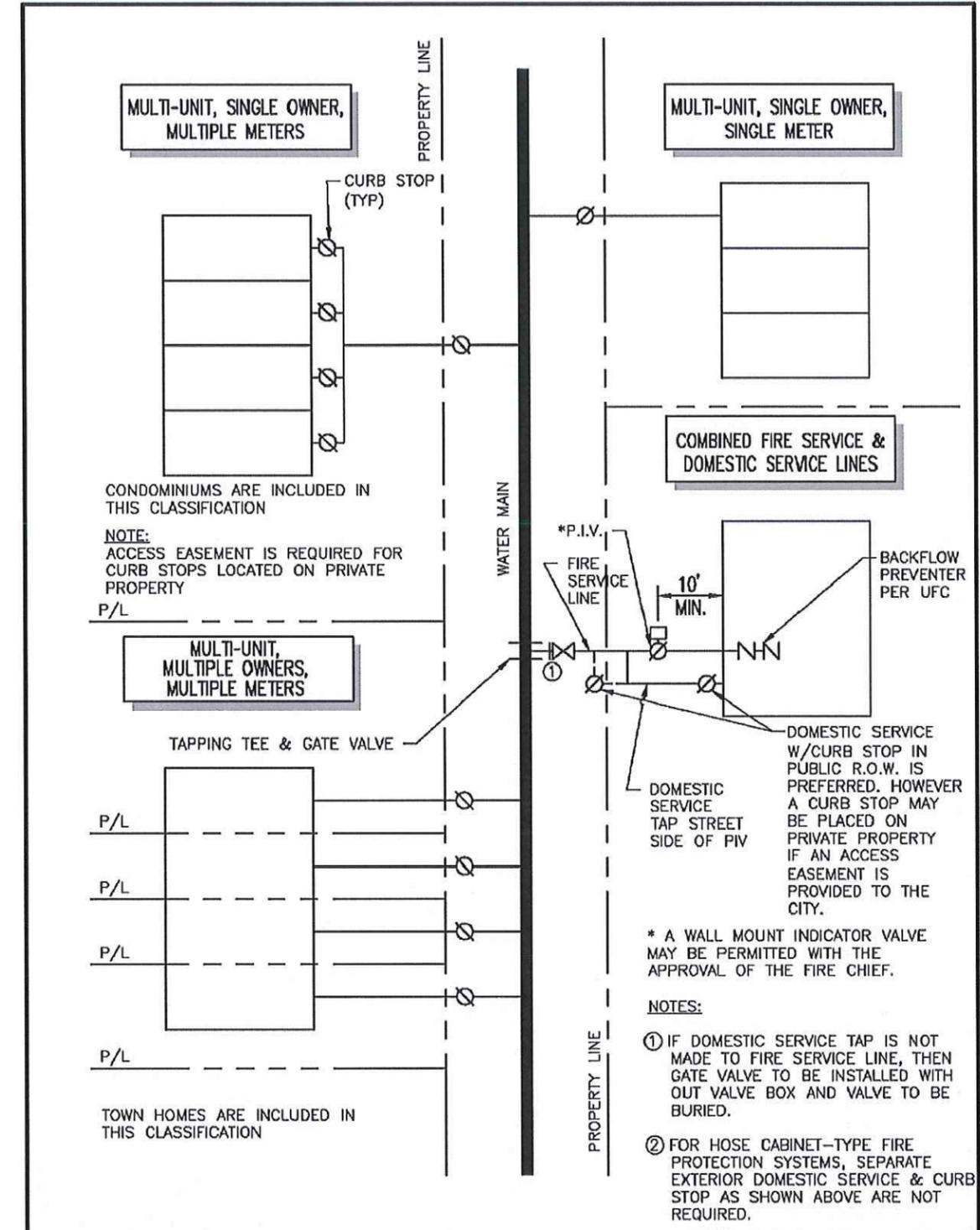
1. THIS TABLE IS BASED ON 150 PSI MAIN PRESSURE AND 2000 PSF SOIL BEARING PRESSURE.
2. WRAP ALL FITTINGS WITH POLYETHYLENE.

THRUST BLOCKING FOR WATER MAIN FITTINGS
NOT TO SCALE

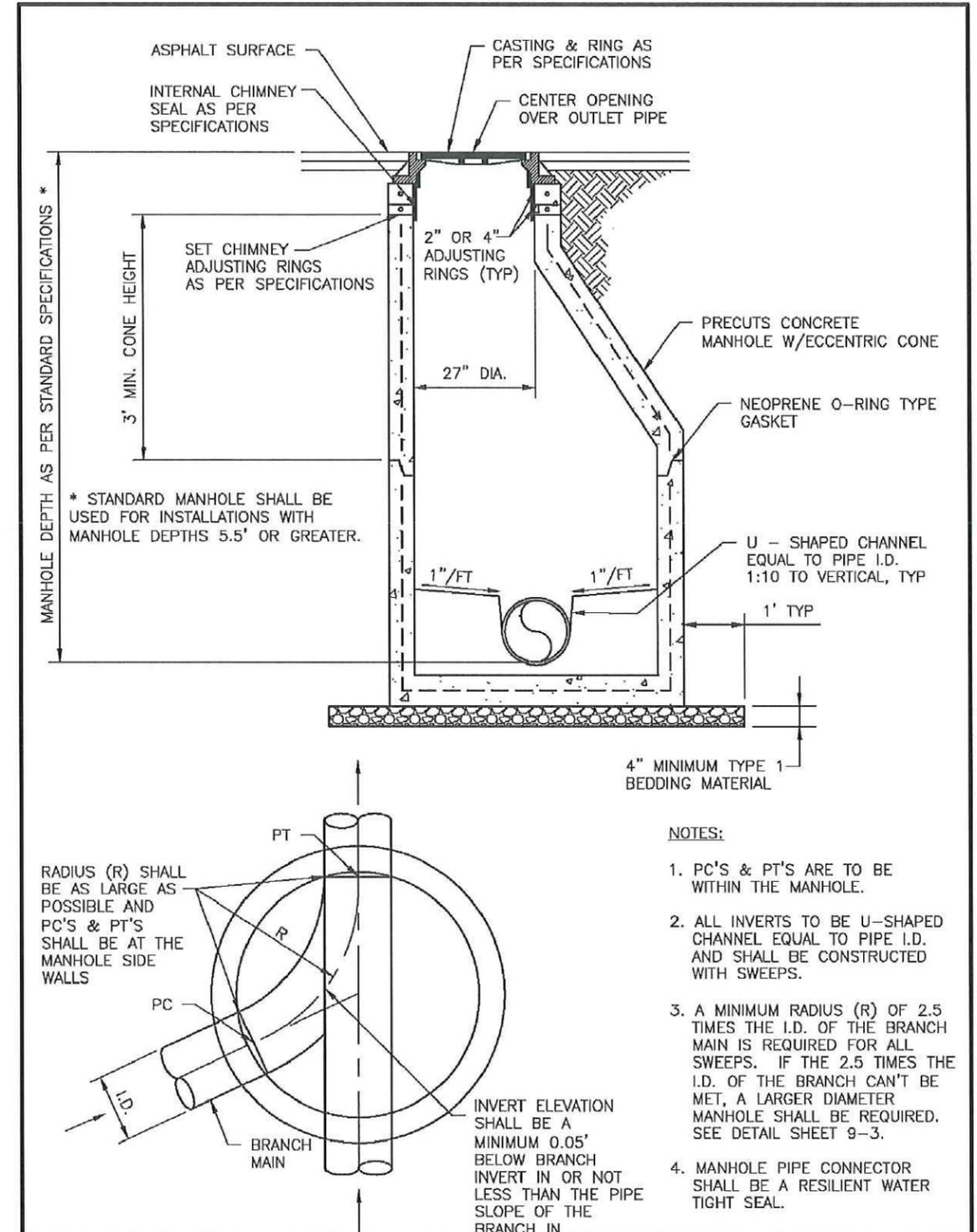




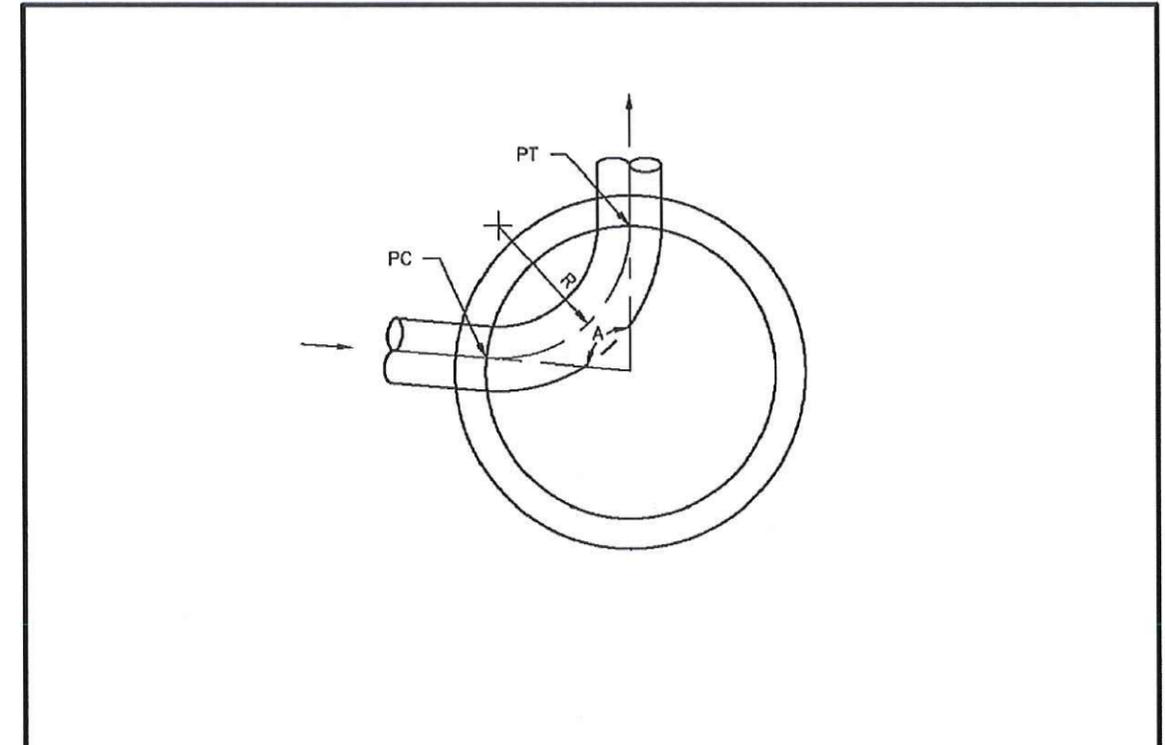
CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
DATE: 5-1-07	
SEC. 8-1	SHT. 1



CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
DATE: 5-1-07	
SEC. 8-5	SHT. 5



CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
STANDARD MANHOLE DETAIL WITH MONOLITHIC BASE (48" & 60")
 DATE: 5-1-07
 SEC. SHT. 9-1



OUTLET PIPE DIA. INCHES	INLET PIPE DIA. INCHES	MIN. ANGLE "A" IN DEGREES				
		48" DIA.	60" DIA.	72" DIA.	84" DIA.	96" DIA.
8	8	80	75	75	75	75
10	8	81	75	75	75	75
10	10	94	80	75	75	75
12	8	81	75	75	75	75
12	10	94	81	75	75	75
12	12	104	91	80	75	75
15	8	83	75	75	75	75
15	10	95	81	75	75	75
15	12	106	92	81	75	75
15	15	117	104	94	84	77

 ANGLES LESS THAN 90°

NOTE:
 "A" ANGLES LESS THAN 90° REQUIRE THE DESIGN ENGINEER TO SUBMIT A WRITTEN REQUEST AND JUSTIFICATION FOR A DESIGN EXCEPTION, AND OBTAIN CITY APPROVAL. IN NO CASE SHALL THE "A" ANGLE BE LESS THAN 75°.

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT
MINIMUM INVERT ANGLES FOR SANITARY MANHOLES
 DATE: 5-1-07
 SEC. SHT. 9-3

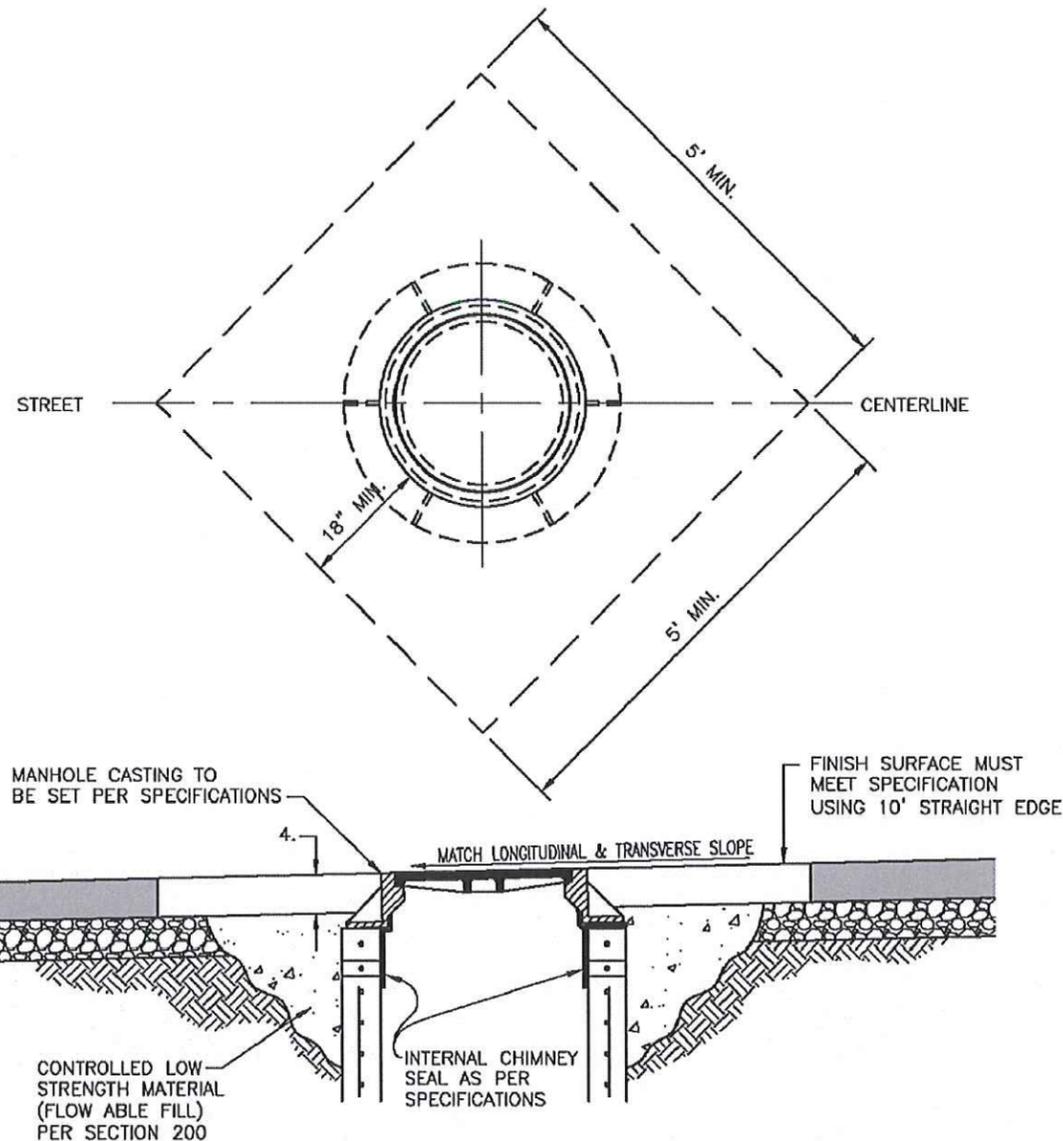
	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	37	40
CITY STANDARD DETAILS			

NOTES:

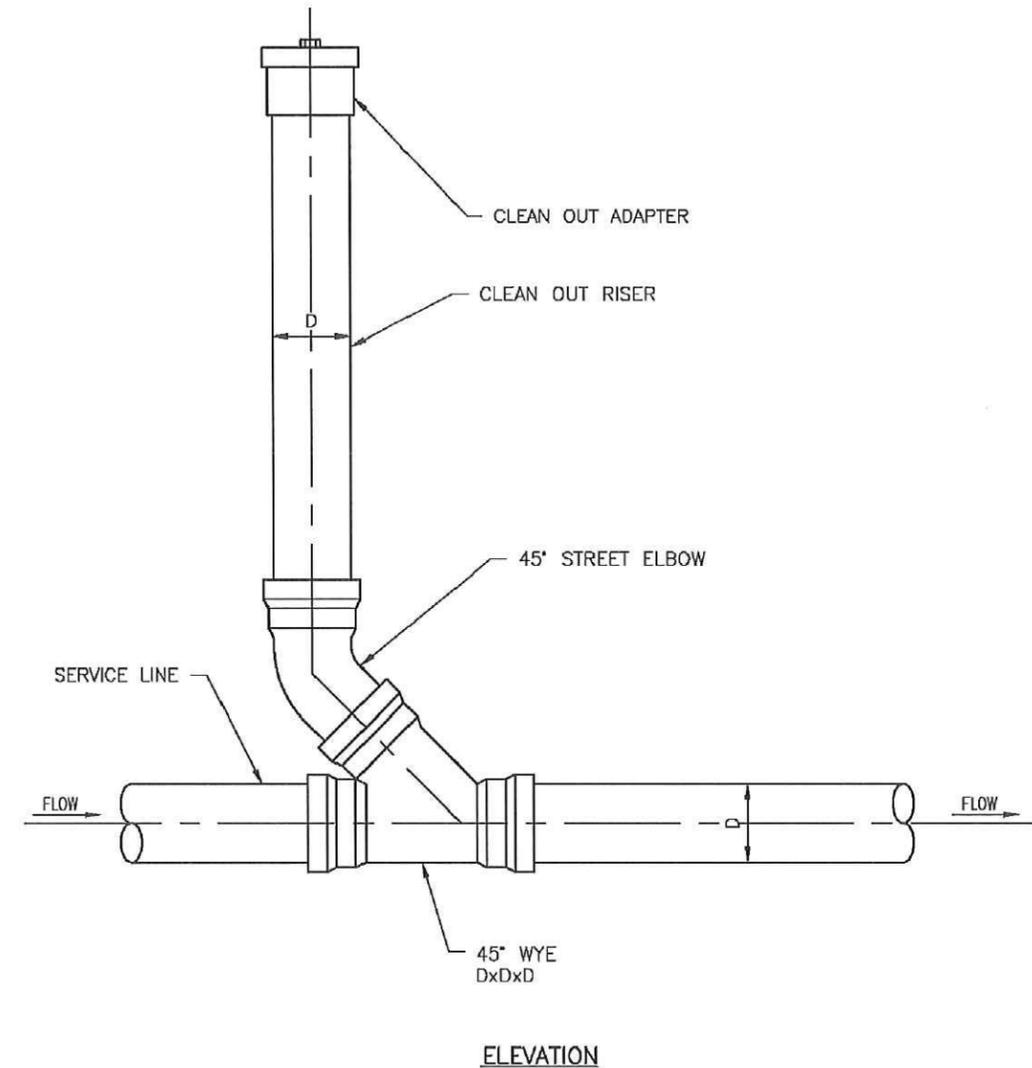
1. DEPENDING ON LOCATION, CROSS-SLOPE OF STREET, HEIGHT ADJUSTMENT REQUIREMENTS, ETC.. THE INSPECTOR/ENGINEER RESERVES THE RIGHT TO REQUIRE A LARGER CUT TO ASSURE THAT ALL TRANSITIONS AND TOLERANCES AS CALLED FOR IN CITY SPECIFICATIONS WILL STILL BE MET.
2. BLOCKS FOR SHIMMING PER SPECIFICATIONS.
3. 0.25 INCH MAX.. SURFACE DEVIATION IN 10 FEET.

4. PATCH MATERIAL - PATCH MATERIAL SHALL MATCH THE EXISTING PAVEMENT MATERIAL. (i.e. PCC PAVEMENT SHALL BE PATCHED WITH PCC AND EXISTING ASPHALT PAVEMENT WITH ASPHALT).

MINIMUM PATCH DEPTHS SHALL BE:
 *PCC-6" PCC PAVEMENT OR MATCH MINIMUM EXISTING PAVEMENT DEPTH WHICHEVER IS GREATER.
 *ASPHALT-5" MINIMUM. (2 LIFTS COMPACTED OR MATCH EXISTING PAVEMENT DEPTH WHICHEVER IS GREATER).



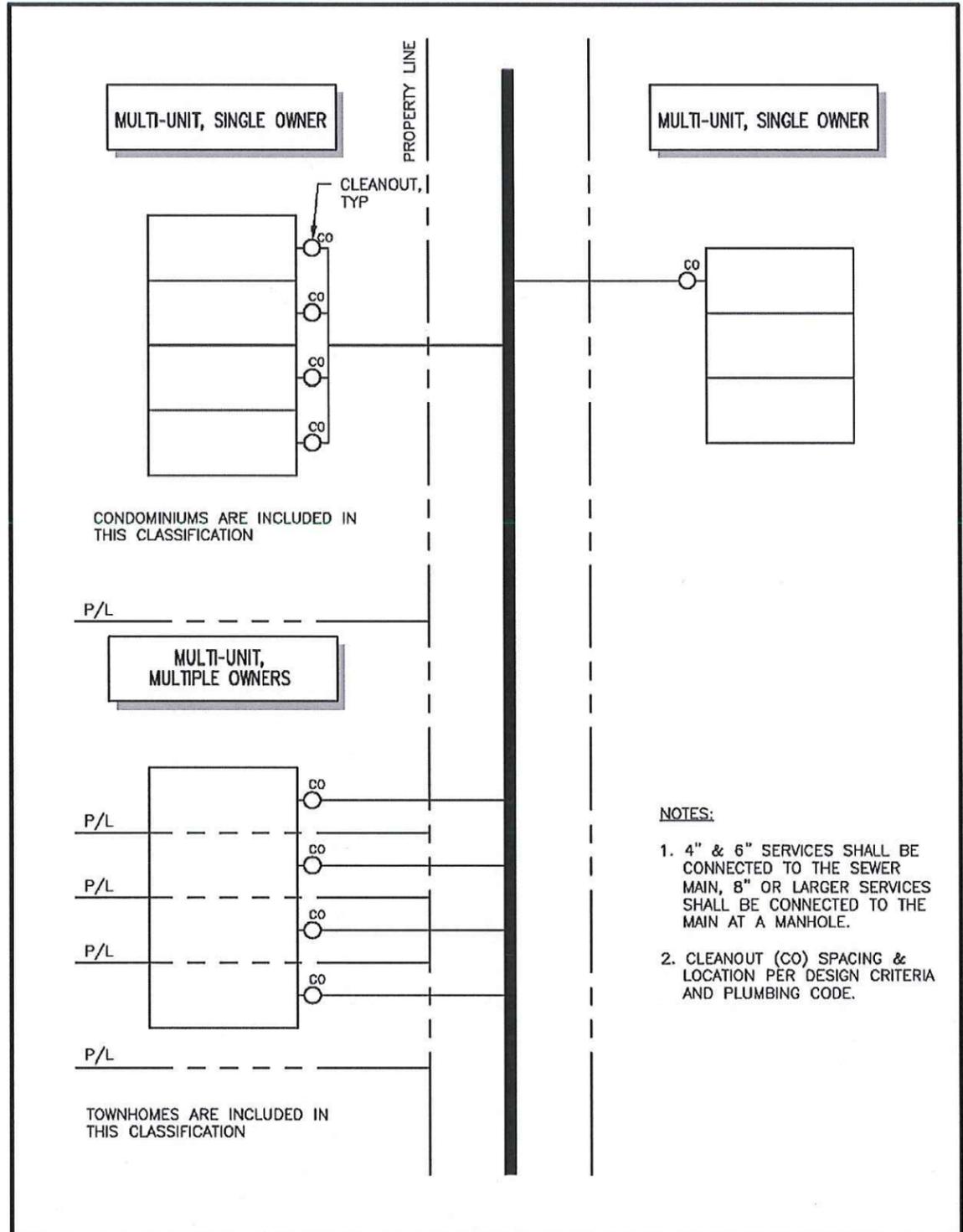
CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
MANHOLE ADJUSTMENT AND PATCH DETAIL	
DATE: 5-1-07	
SEC. 9-7	SHT. 7



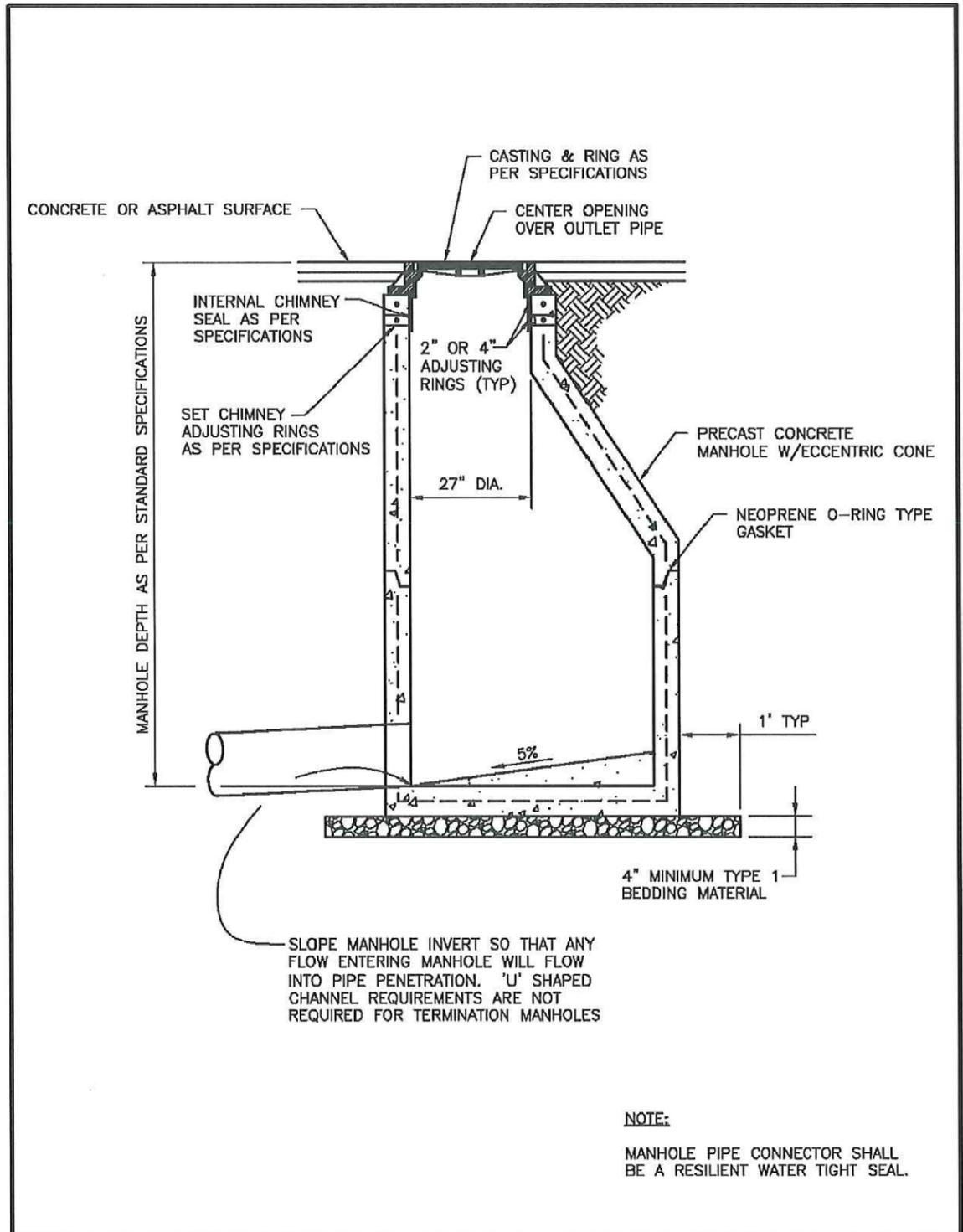
NOTES:

1. ALL FITTINGS SHALL BE GASKETED.
2. CLEAN OUTS TO BE SAME DIAMETER (D) AS SERVICE LINE.

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
SANITARY SEWER SERVICE CLEAN OUT DETAIL	
DATE: 5-1-07	
SEC. 9-10	SHT. 10

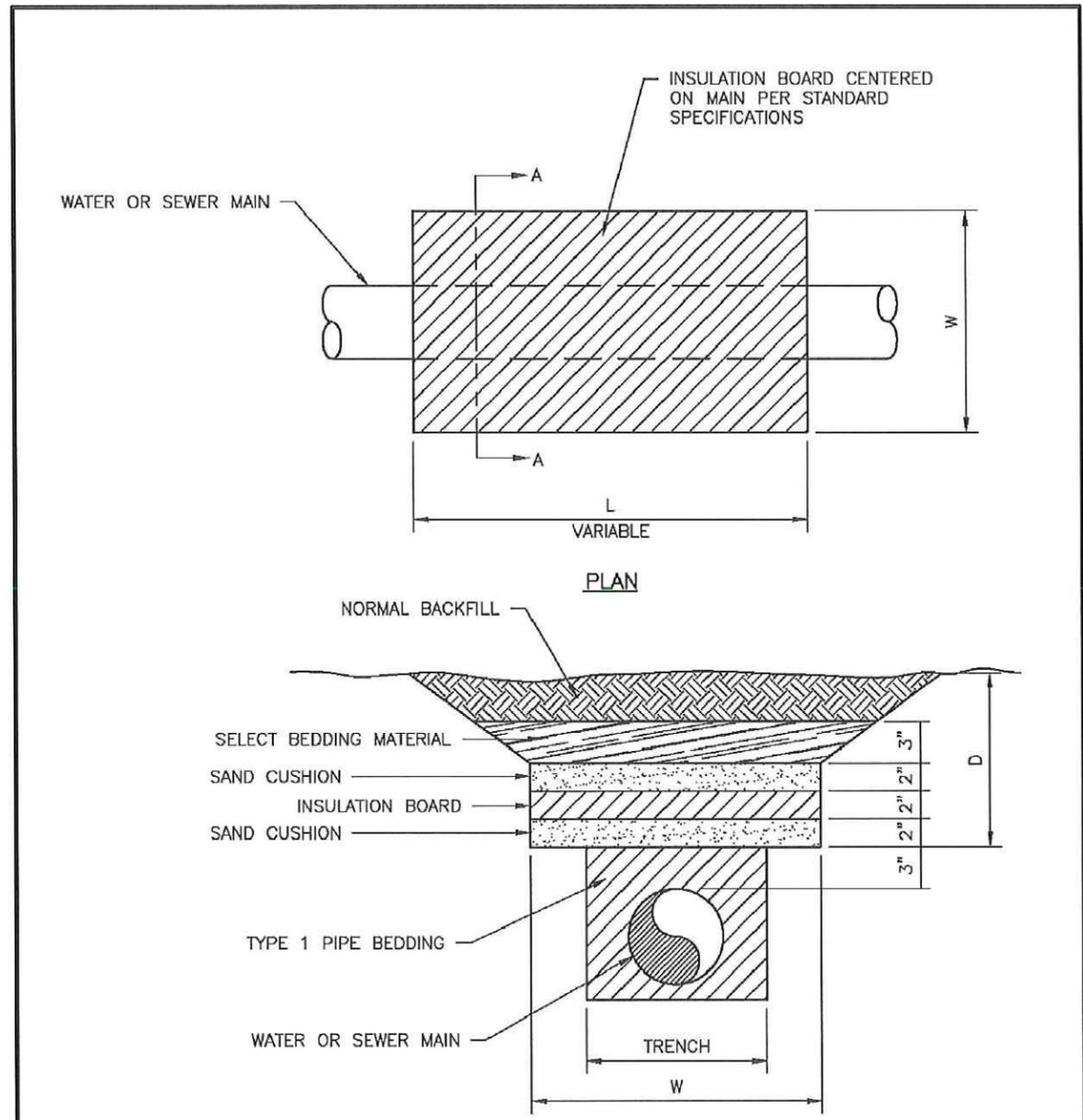


- NOTES:**
1. 4" & 6" SERVICES SHALL BE CONNECTED TO THE SEWER MAIN, 8" OR LARGER SERVICES SHALL BE CONNECTED TO THE MAIN AT A MANHOLE.
 2. CLEANOUT (CO) SPACING & LOCATION PER DESIGN CRITERIA AND PLUMBING CODE.



SLOPE MANHOLE INVERT SO THAT ANY FLOW ENTERING MANHOLE WILL FLOW INTO PIPE PENETRATION. 'U' SHAPED CHANNEL REQUIREMENTS ARE NOT REQUIRED FOR TERMINATION MANHOLES

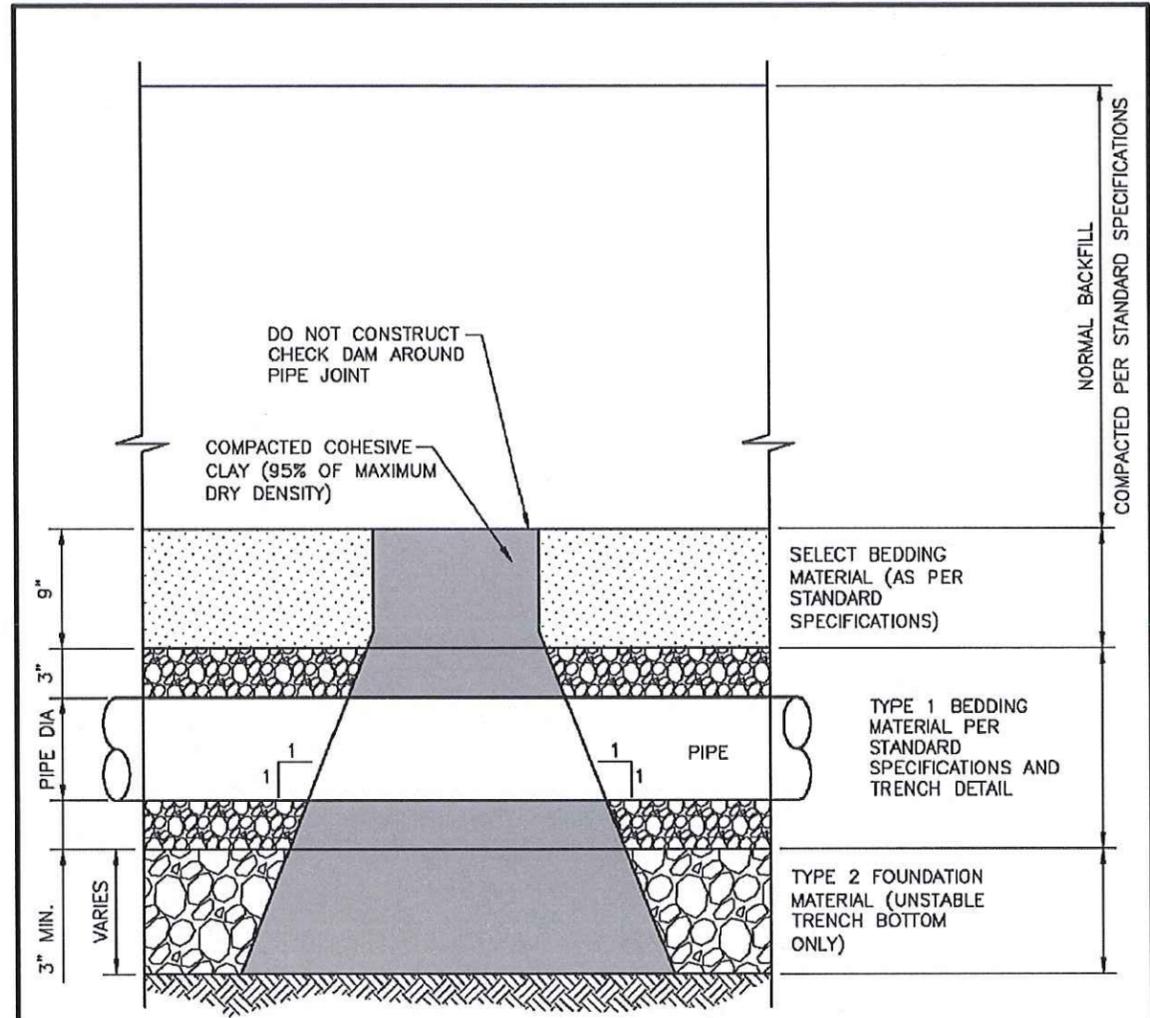
NOTE:
MANHOLE PIPE CONNECTOR SHALL BE A RESILIENT WATER TIGHT SEAL.



INSULATION WIDTH VS. PIPE DEPTH

WATER		SEWER	
D (FEET)	W (FEET)	D (FEET)	W (FEET)
3	8	2.5	8
4	6	3	6
5	4	3.5	4

* THE USE OF INSULATION REQUIRES PRIOR APPROVAL BY THE ENGINEER.



NOTE:

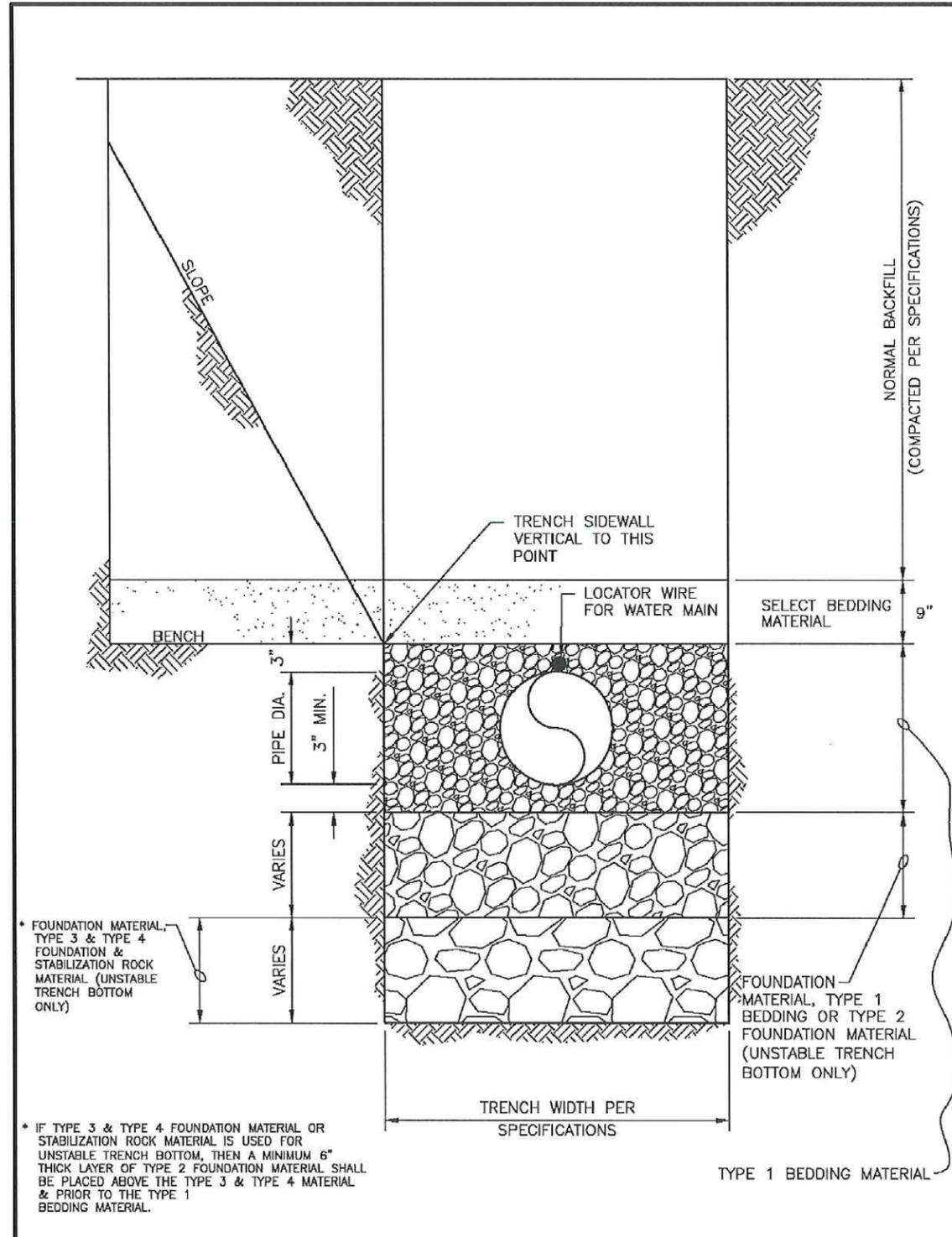
CHECK DAM INSTALLATION LOCATIONS SHALL BE AS INDICATED ON THE PLANS. HOWEVER DURING CONSTRUCTION, CHECK DAM INSTALLATION LOCATIONS MAY BE MOVED DUE TO FIELD CONDITIONS.

THE CHECK DAM SHALL EXTEND FROM THE BOTTOM OF THE EXCAVATION THROUGH THE BEDDING MATERIAL TO THE "NORMAL BACKFILL" AND SHALL EXTEND COMPLETELY TO EACH TRENCH SIDEWALL. CHECK DAM MATERIAL SHALL BE COMPACTED COHESIVE CLAY THAT CONTAINS A MINIMUM OF 25% MINUS NO. 200 SIEVE MATERIAL, WITH 70% PASSING A 3/4 INCH SIEVE. IF THE NORMAL EXCAVATED MATERIAL IS NOT SUITABLE FOR CONSTRUCTION OF THE CHECK DAM, THEN THE CONTRACTOR SHALL OBTAIN MATERIAL FROM OUTSIDE SOURCES. CHECK DAM INSTALLATION AND MATERIAL SHALL BE CONSIDERED AS INCIDENTAL TO THE PIPE INSTALLATION.

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
<h2 style="margin: 0;">WATER & SEWER MAIN INSULATION DETIAL</h2>	DATE: 5-1-07
	SEC. SHT.
	11-1

CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
<h2 style="margin: 0;">TYPICAL TRENCH CHECK DAM DETAIL FOR WATER & SEWER MAINS</h2>	DATE: 5-1-07
	SEC. SHT.
	11-2

 	PROJECT NO.	SHEET NUMBER	TOTAL SHEETS
	13-2125	40	40
CITY STANDARD DETAILS			



CITY OF RAPID CITY	PUBLIC WORKS DEPARTMENT
TRENCH DETAIL FOR WATER & SEWER MAIN	
DATE: 5-1-07	
SEC.	SHT.
11	-3