July 10, 2023

MILITARY DEPARTMENT
STATE of NEBRASKA
LINCOLN, NEBRASKA

NEBRASKA ARMY NATIONAL GUARD
CATS Non-Potable Waterlines Construction

at the

Camp Ashland Training Site
220 County Rd A,
Ashland, NE 68003

for the

MILITARY DEPARTMENT
STATE of NEBRASKA
Lincoln, Nebraska

PROJECT NO. 31090658

A D D E N D U M N O. 2

The original specifications and drawings on the STATE OF NEBRASKA REQUEST for PROPOSAL FORM for the project noted above are amended as noted in this Addendum No. 2.

Receipt of this Addendum shall be acknowledged by inserting its number and date in the space provided on the Bid Form.

ADDENDUM NO. 2

NOTE TO ALL PLANHOLDERS: Please insert this Addendum into your copy of the Contract Documents for the above named project.

The following changes to the Contract Documents are issued by the CFMO-CMB and shall have the same force and affect as though a part of the original issue.

ITEM NO.:

ADD 2-1: Replace Note I on Sheets C1.2 and C1.3 with "Install Curb Stop."

ADD 2-2: Once inside the utility chase, the piping shall transition from 1.5" PE pipe to 1.5" copper pipe. A copy of the original building plumbing piping specification is attached as a reference for work inside the utility chase.

THIS ADDENDUM SHALL BE ATTACHED TO AND MADE A PART OF THE DRAWINGS AND SPECIFICATIONS AND SHALL BE ACKNOWLEDGED WITH THE BIDDER'S PROPOSAL.

BRIAN SCHUELE, PE
Olsson, Inc.

CRAIG W. STRONG
Major General, The Adjutant General

ATTACHMENTS:

1. Pre-Bid Meeting Attendees
2. Plumbing Piping Specification from original building project.

End of Addendum No. 2

PRE-BID CONFERENCE
CATS Non-Potable Waterline Construction PN# 31090658
220 County Rd A, Ashland, NE 68003

1400 Hrs. 6 July 2023

INTRODUCTORY REMARKS

The purpose of this conference is to answer any Administrative or Technical questions you may have and to provide you with an opportunity to look at the Project Site. Please make sure to sign in before you leave if you haven't already.

Mr. James Rasmussen	Business Manager	402-309-8457	james.t.rasmussen3.civ@army.mil
MAJ Justin Portenier	Design Manager	402-309-8458	justin.r.portenier.mil@army.mil
Mr. Jack Hodges	Project Manager	402-309-8480	john.p.hodges6.nfg@army.mil
Brian Schuele, PE	A&E, Olsson, Inc	402-458-5817	bschuele@olsson.com
LT Kristen Gordon	CATS POC	402-309-7250	
Mr. Don Rosenboom	CATS Maint. POC	402-309-7253	

ADDENDUM

Everyone receiving Plans and Specs and or attending the Pre-Bid Meeting will receive an addendum. Deadline for clarification of Plans & Specifications that may require an Addendum needs to be submitted to the **A&E** by 1200 on 10 July 2023. **Addendums** will be posted on the A&D Technical Supply Plan room website (Lincoln Office) and in-turn at the other Plan houses.

BID FORM

On completing the Bid Proposal Form contained in the Bid Packet (Section P1 of 4):

1. Please fill out Bid Form completely for all applicable items.
2. Sign the Bid Form in **BLUE INK**. Bids received without original signature or signed in pencil will not be accepted.
3. Return all (4) pages of the Bid Form, Pages P1-P4.
4. Include Bid Security of 5% of the total Bid Amount on the project.
5. On the Bid Form, there is a Total Base Bid Amount and (0) Alternative Bid Items (ABIs) and (0) Unit Bid Items (UBIs).
6. Be sure to enter your Bid Proposal amounts correctly in both word and figure as required on the Bid Proposal Form.
7. In case of an irregularity between the numeric amount and the written amount, the amount written shall govern.

BID SECURITY

The bid proposal MUST be accompanied by a Bid Bond in the amount of 5% to be considered (in order of preference):

1. Bonding Company (AIA Document A310 American Institute of Architects)
2. Cashier's Check
3. Money Order

BIDS DUE
The Bids are due **NO LATER THAN 1330 hours on 25 July 2023** at the front desk of the Construction & Facilities Management Office, 3rd Floor in the Joint Forces Headquarters Building, Lincoln Air National Guard Base.

Mailing Address: Construction and Facilities Management Office
(**CATS Non-Potable Waterline Construction PN# 31090658**)
2433 Northwest 24th Street
Lincoln, NE 68524

Overnight Service – Ensure that delivery will be made no later than 1:30 p.m. of the Bid Date.

All vehicles entering the Base will be stopped at the Front Gate and asked to show a Driver's License Photo ID and asked the reason or business for entry. Identify the Construction Company you are representing and are there to deliver a Construction Bid for the CATS Non-Potable Waterline at JFHQ. In advance of the Bid Opening, we will notify Base Security of the Bid Opening and provide them with a copy of today's Sign-In Sheet to expedite this process. Please note: Security may, at random, inspect your vehicle; therefore, please allow sufficient time.

Hand-carried bids must be delivered no later than 1:30 p.m. to the Contracting Branch or CFMO Administrative Assistant. CFMO is located on the 3rd floor of the building. There is guest parking available in front of the Joint Forces Headquarters Building. If you are having difficulty getting onto the Air Guard Base, please call 402-309-8464 or 402-309-8473. The Bids will be publicly opened at 2:00 p.m. and recorded. You are encouraged to stay and attend the Bid Opening. If you hand carry your bid, call by noon to be put on the visitor access listing, and be sure to allow adequate time to clear through Security and find our Office.

DRUG POLICY
By signing the Invitation to Bid, the Bidder is committed to providing a drug free workplace environment. If requested by the Military Department, the Bidder must furnish evidence that they have a Drug Free Workplace Policy.

BID REVIEW COMMITTEE
The "Bid Review Committee" will meet within one week after the Public Bid Opening to review the bids for any irregularities and to award the contract for the Project.

LIQUIDATED DAMAGES
No liquidated damages will be assessed for this project.

DAVIS BACON ACT
DAVIS BACON does not apply to this Project under Nebraska State Contracting Procedures.

PERFORMANCE BONDS
Performance Bonds and Labor & Material Bonds are required on this Project upon awarding.

MANDATORY MEETINGS
PRE-CONSTRUCTION
PROGRESS REVIEW will be conducted every two weeks.

INVOICE PAYMENTS ON PROJECT (AIA Form G702 -G703 are required)
Payments will be made by **DIRECT DEPOSIT** on the project in accordance with State of Nebraska procedures. Payments will be made within **45 days** after the invoices are received at the CFMO Office. The Contractor must establish a direct deposit payment enrollment with the State Treasurer (ACH – Automated Clearing House). The enrollment form will be provided at the Pre-Construction Meeting. The Nebraska State Treasurer requires that payments more than $25,000 be made by direct deposit instead of State Warrants (checks).

USE OF SANITARY FACILITIES
Contractor will be required to supply and maintain chemical toilets during project execution.

EQUIPMENT STORAGE & MATERIAL STORAGE AT THE SITE
The Contractor is responsible for the security of their equipment and any materials left at the site. The Contractor is expected to keep the construction site clean and free of trash and debris during the project. Daily cleaning shall be completed.

CONTRACT TIME
The Contractor should ensure that the estimated completion timeline indicated on bid form (page P-2) is correct and realistic. The timeline should reflect the time required from issuance of "Notice to Proceed" **thru** Substantial Completion of the project. **IF**, The Bid form indicates a **"not to exceed date";** this is the maximum amount of time we have allotted for the project. Your number of days can be less but not more than indicated.

GENERAL CONDITIONS REVIEW
See General Conditions provided in the bid packet.

USE OF SITE
The Contractor is responsible for the security and safety of the site at all times. The contractor is responsible for repair of any damages to facilities and property.

SECURITY RESTRICTIONS
Taking photos of government vehicles and personnel is not authorized.

PROJECT MANAGER COMMENTS

- An Entry Access List (EAL) will be required of the awarded contractor so that the government can vet all workers on site (delivery personnel will be escorted from the gate to delivery and back to the gate by an EAL individual).

ARCHITECT COMMENTS

Nebraska Military Department

Construction and Facilties Management Office

JFHQ Building, 2433 NW 24th Street, Lincoln, Nebraska 68524-1801

(402) 309-8450 (main) (402) 309-7480 (fax)

CATS Non-Potable Waterline Construction Pre-Bid Meeting

PN# 31090658 6 July 2023, 1400 hrs

Name	Agency/Company	Phone Number	E-mail Address
Mr. James Rasmussen	CFMO Business Manager	402-309-8457	james.t.rasmussen3.civ@army.mil
MAJ Justin Portenier	CFMO Design and Project Mgr.	402-309-8458	justin.r.portenier.mil@army.mil
Jack Hodges	CFMO Project Manager	402-309-8799	john.p.hodges6.nfg@army.mil
Brian Schuele, PE	A&E, Olsson, Inc	402-458-5817	bschuele@olsson.com
LT Kristen Gordon	CATS POC	402-309-7250	
Mr. Don Rosenboom	CATS Maint. POC	402-309-7253	
Anthony Fitzgerald	Bauer Infrastructure	402-525-0631	afitzgerald@bauerinfrastructure.com
Gene Hellbusch	Neuvirth	402-455-2255	gene@neuvirth.com
VAL Wiley	Neuvirth	402 670 7526	[illegible]@neuvirth.com
Brian Schuele	Olsson	402-547-6327	bschuele@olsson.com
2LT Kristen Gordon	TSC	402-862-5779	~~Kristen~~ Kristen.a.gordon3.mil@army.mil
Curtis Smith	Maint	402 805 9648	HSKRLnd@Gmail.Com
Andy Hytrek	Maint	402 340 2596	
Joshua Kelsay	TSC	402-309-7275	
Raymond Phillips	TSC	402-309-8459	

SECTION 221005 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, pipe fittings, specialties, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Flanges, unions, and couplings.
   4. Pipe hangers and supports.
   5. Valves.
   6. Check.

1.2 RELATED REQUIREMENTS

A. Section 312316 - Excavation.

B. Section 312323 - Fill.

C. Section 312316.13 - Trenching.

D. Section 331300 - Disinfecting of Water Utility Distribution.

E. Section 099123 - Interior Painting.

F. Section 220516 - Expansion Fittings and Loops for Plumbing Piping.

G. Section 220548 - Vibration and Seismic Controls for Mechanical Piping and Equipment.

H. Section 220553 - Identification for Mechanical Piping and Equipment.

I. Section 220719 - Plumbing Piping Insulation.

J. Section 220516 - Expansion Fittings and Loops for Plumbing Piping.

K. Section 312316 - Excavation.

1.3 REFERENCE STANDARDS

A. ANSI Z223.1 - National Fuel Gas Code.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

E. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.

F. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.

G. ASME B31.1 - Power Piping.

H. ASME B31.9 - Building Services Piping.

I. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems.

J. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.

K. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

L. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.

M. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

N. ASTM B32 - Standard Specification for Solder Metal.

O. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.

P. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.

Q. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

R. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric).

S. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.

T. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.

U. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

V. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

W. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.

X. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

Y. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems.

Z. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

AA. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.

AB. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

AC. AWWA C606 - Grooved and Shouldered Joints.

AD. AWWA C651 - Disinfecting Water Mains.

AE. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.

AF. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

AG. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

AH. MSS SP-67 - Butterfly Valves.

AI. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

AJ. NSF 61 - Drinking Water System Components - Health Effects.

AK. NSF 372 - Drinking Water System Components - Lead Content.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes and local standards and requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

D. All grooved couplings and fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components. All castings used shall be date stamped for quality assurance and traceability.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight.

1. Fittings: Cast iron.

2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

2.3 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight.

1. Fittings: Cast iron.

2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. Fittings: Cast iron.

2. Joints: CISPI 310, neoprene gaskets and type MG stainless steel clamp-and-shield assemblies.

C. Copper Tube: ASTM B88 (ASTM B88M), Type K (A).

1. Fittings: ASME B16.29, wrought copper, or ASME B16.23, sovent.
2. Joints: ASTM B32, alloy Sn50 solder.

D. Brass Pipe: ASTM B43, chrome plated.

1. Fittings: ASME B16.23, cast bronze, chrome plated.
2. Joints: Mechanical compression.

E. PVC Pipe: ASTM D2665.

1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Pipe: ASTM B42, hard drawn.

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
2. Joints: ASTM B 32, alloy Sn95 solder.

B. Ductile Iron Pipe: AWWA C151/A21.51.

1. Fittings: Ductile or gray iron, standard thickness.
2. Joints: AWWA C111/A21.11, styrene butadiene rubber (SBR) or vulcanized SBR gasket with 3/4 inch diameter rods.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B32, alloy Sn95 solder. Piping 2" and larger shall be brazed.
3. Joints: Grooved mechanical couplings.

2.6 NATURAL GAS PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.

1. Fittings: ASTM A234/A234M, wrought steel welding type.
2. Joints: ASME B31.1, welded.
3. Jacket: AWWA C105/A21.5 polyethylene jacket or double layer, half-lapped 10 mil polyethylene tape.

2.7 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.

1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.

2. Joints: Welded to ASME B31.1.

2.8 **WELDING GAS AND SHIELD GAS PIPING, ABOVE GRADE**

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.

2. Joints: ASTM B32, alloy Sn95 solder. Piping 2" and larger shall be brazed.

2.9 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:

1. Ferrous pipe: Class 150 malleable iron threaded unions.

2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch:

1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.

1. Dimensions and Testing: In accordance with AWWA C606.

2. Housing Material: Provide ASTM A47/A47M malleable iron or ductile iron, galvanized.

3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.

4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.10 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.
5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.

B. Plumbing Piping - Drain, Waste, and Vent:
1. Conform to ASTM B31.9.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:
1. Conform to ASTM B31.9.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.
5. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
6. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
7. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
8. Vertical Support: Steel riser clamp.
9. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
10. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.11 GATE VALVES

A. Manufacturers:

1. Apollo Valve
2. Watts

2.12 BALL VALVES

A. Manufacturers:

1. Apollo Valve
2. Watts
3. Victaulic Company.

B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

2.13 BUTTERFLY VALVES

A. Manufacturers:

1. Grinnell Products; B302: www.grinnell.com/#sle.
2. Victaulic Company.

B. Construction 2-1/2 Inches and Larger: MSS SP-67, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM seat, wafer ends, extended neck, 10 position lever handle.

C. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

2.14 SWING CHECK VALVES

A. Manufacturers:

1. Apollo Valve
2. Watts

2.15 WATER PRESSURE REDUCING VALVES

A. Manufacturers:

1. Watts Regulator Company: www.wattsregulator.com.

B. Up to 2 Inches:

1. ASSE 1003, bronze body, stainless steel, and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded single union ends.

C. Over 2 Inches:

1. ASSE 1003, cast iron body with interior lining complying with AWWA C550, bronze fitted, elastomeric diaphragm and seat disc, flanged.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Provide all piping offsets and fittings as required for a quality installation.

F. Group piping whenever practical at common elevations.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 220516.

H. Provide access where valves and fittings are not exposed.

I. Establish elevations of buried piping outside the building to ensure not less than 4 ft of cover.

J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly; refer to roofing specification.

K. Locate plumbing vent terminations a mimimum of 20' away from air intakes.

L. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

M. Provide support for utility meters in accordance with requirements of utility companies.

N. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

O. Excavate in accordance with Section 312316.

P. Install bell and spigot pipe with bell end upstream.

Q. Install valves with stems upright or horizontal, not inverted. Refer to Section 220523.

R. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood. Locate vent terminations a mimimum of 20' away from air intakes or windows.

S. Install water piping to ASME B31.9.

T. Install fuel piping to ASME B31.1.

U. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

V. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

W. Sleeve pipes passing through partitions, walls and floors constructed of a minimum of 18 gauge sheetmetal. Provide schedule 40 pipe as sleeves with appropriate sealant at fire and/or smoke rated penetrations around pipe sleeve. Extend sleeves through floors a minimum of 2" above the floor. Wall sleeves shall be flush with the wall and chrome plated solid steel escutcheons shall be installed.

X. Inserts:

1. Provide inserts for placement in concrete formwork.
2. Where concrete slabs form finished ceiling, locate inserts with top of sleeve 1" above slab surface.

Y. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.
2. Support horizontal piping as indicated.

3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.

7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

8. Provide copper plated hangers and supports for copper piping. Use Hydra-Zorb type clamps when copper piping is supported by uni-strut hangers.

9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

10. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 220548.

11. Support cast iron drainage piping at every joint.

Z. Hydrostatically test water piping with 125 psi of water pressure for 24 hours.

AA. Hydrostatically test sanitary and storm drainage piping with 10 feet of water column for 30 minutes.

AB. Test all gas piping with 60 psi of air pressure for 24 hours. Test joints with a soapy water solution.

AC. Testing of plumbing piping systems shall be witnessed by the Engineer. Provide a minimum of 24 hours of notice prior to the testing.

AD. Install copper sanitary piping from sink and indirect fixture drains in commercial kitchen and cast iron piping in the kitchen and boiler rooms where high temperature water will be drained into the system.

AE. Provide chrome plated brass P-traps under lavatories and sinks. Provide chrome eschutcheons at wall pentration of waste piping.

AF. Provide chrome plated water supply pipes where exposed. Provide chrome eschutcheons at wall penetration behind water supply stop valve.

AG. Provide an isolation valve on each branch water pipe within 3' of the main.

AH. Provide extended bell and gaskets in vertical drainage piping exceeding 40' in height with additional pipe guides as required by pipe manufacturer for piping expansion.

3.4 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations. Grooved joints shall be installed in accordance with the manufacturer's latest published installation instructions. All installations shall be done by factory-trained field personnel. Contractor shall remove and replace any improperly installed products.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers. Install isolation valves on all branch piping within 3 feet of mains.

D. Provide spring loaded check valves on discharge of water pumps.

E. Provide flow controls in water recirculating systems where indicated.

F. Provide extended valve stems on valves where piping is being insulated to provide required clearance from insulation to operate valve.

3.5 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/8 inch per foot slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.7 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide new water service complete with approved double check backflow preventer and water meter with by-pass valves.

1. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

2. Provide 18 gage, 0.0478 inch galvanized sheet metal sleeve around service main to 6 inch above floor and 6 feet minimum below grade. Size for minimum of 2 inches of loose batt insulation stuffing.

3.8 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:
   a. Pipe Size: 1/2 inches to 1-1/4 inches:
      1) Maximum Hanger Spacing: 6.5 ft.
      2) Hanger Rod Diameter: 3/8 inches.
   b. Pipe Size: 1-1/2 inches to 2 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 3/8 inch.
   c. Pipe Size: 2-1/2 inches to 3 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 1/2 inch.
   d. Pipe Size: 4 inches to 6 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 5/8 inch.
   e. Pipe Size: 8 inches to 12 inches:
      1) Maximum hanger spacing: 14 ft.
      2) Hanger Rod Diameter: 7/8 inch.
   f. Pipe Size: 14 inches and Over:
      1) Maximum Hanger Spacing: 20 ft.
      2) Hanger Rod Diameter: 1 inch.
2. Plastic Piping:
   a. All Sizes:
      1) Maximum Hanger Spacing: 6 ft.
      2) Hanger Rod Diameter: 3/8 inch.

END OF SECTION 221005