DIVISION 33 – UTILITIES

33 0500 - COMMON WORK RESULTS FOR UTILITIES

A. Piped Utility Demolition: Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.

B. Drawing plans indicate location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, pump sizing, and other design considerations.

C. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

D. Plastic Non-pressure Piping Gasketed Joints: Join according to ASTM D 3212.

E. Connect plastic pipe to manholes using fabricated rubber boot in-beds with stainless steel band.

33 0513 – STEAM MANHOLES AND STRUCTURES

A. Bomb bay doors shall be installed for each manhole to allow easy access for maintenance and to have adequate airflow to cool the manhole. Depending on the size of the manhole, two sets of bomb bay doors may be necessary, unless otherwise approved by UND Facilities Management.

B. The vault needs to have enough clearance for maintenance staff to safely access equipment and perform maintenance on it. Per UND Plumbing, a minimum of 3’ clearance is needed to work around equipment, 5’ is required.

C. Preference is to have two electric sump pumps shall be used for reliability/redundancy. Zoeller is an acceptable brand. The sump pumps will need to be rated for the plumbing high temperature water, up to 200°F. Install a warning light above the manhole that turns on if a sump pump fails. The acceptable brand is SJE Rhombus, preferred model is the Model TD. The audio alarm shall be disabled.

D. Preference is to have an outlet and light available in the manhole, and to have it high enough in the manhole to prevent it from getting wet (above ground but still in the manhole) and to put it close to the ladder/access area so it is easily accessible by maintenance staff to change the light bulb or plug something in.

E. Proper supports for piping are needed within the vault. Take actions to prevent crushing of Link-Seal. Also, specify backfill requirements to prevent the pipes from settling outside the manholes.
F. Application appropriate Pittsburgh Corning Foamglass water proof insulation layer wrapped in a metal jacket shall be used in the steam vault; never fiberglass.

G. All steam valves including control valves, expansion joints and strainers shall be covered with a custom fabricated insulation jacket secured around the fitting. Insulation Systems will be custom designed and engineered for each individual item which is not a standard product based on type of application, operating temperature, and environment. A close contour fit is essential for proper thermal performance and neat appearance.

   a. Insulation Jacket shall be constructed of Teflon Impregnated Fiberglass Cloth with a minimum temperature rating to 500°F and Dark Grey in color. Insulation shall be a minimum of one (1") Inch Thick.

   b. Insulation jacket shall be secured to the fitting with stainless steel buckle and strap assembly, Grey color, Maximum Temperature Resistance 250°. Insulation Seams which do not tightly butt one another are Not Acceptable.

   c. All reusable insulation blanket assemblies shall be labeled with laser label. The tagging systems will facilitate installation and reinstallation of all blankets and enable the manufacturer to provide replacements upon request by number assigned as imprinted on the label.

H. The steam and condensate lines shall be Hydro tested according to Perma-Pipe’s specifications. An air test will only be acceptable where a hydro test is not possible (such as when testing would be up against a fully pressurized steam line valve/fitting). An air test would have to be approved by the manufacturer. The Perma-Pipe representative will need to sign off on it once it meets manufacturer recommended standards prior to activation and acceptance of the steam distribution system.

I. Once the steam line is installed and passes the air test, the interior of the conduit shall be dried out by the contractor using Perma-Pipe’s company approved procedures. The process needs to be witnessed by UND Facilities Management’s Plumbing Department and the local Perma-Pipe representative. The Perma-Pipe representative will need to sign off on it once it meets manufacturer recommended standards prior to activation and acceptance of the steam distribution system.

J. All steam and condensate lines shall be flushed out and pressure tested. Steam line conduits need to be dried out per manufacturer’s (Perma Pipe) recommendation. Each of these processes needs to be approved by UND Facilities Management Plumbing Supervisor or Lead prior to making connections to an active system.

K. UND Facilities Management has a numbering system for the manholes on campus. A list of manhole numbers will be provided upon request. The numbering of manholes needs to follow the UND standard.

L. Sump pump discharge shall be connected to the storm sewer or a safe location.
M. Velan, Gestra, Armstrong, or Hoffman are acceptable steam trap brands to use in campus buildings and manholes.

N. Velan, Crane or approved equal gate valves shall be used in the steam manholes. Valves that are selected for the steam distribution system need to be of a good quality for the safety of employees and to ensure proper valve operation (this includes both seating of the valve to prevent leakage and that it can still easily open and close once it sits for years).

O. Acceptable manufacturer for valves (PRV) and pilot positioners for pressure reducing stations (PRS) include Spence, Boylston and Leslie. Include a removable waterproof jacket as described in section G.

P. The design shall prevent venting of steam from the manhole and the steam distribution process. New installations shall be sparge tanks. Flash tanks shall be reviewed for the addition of sparge tanks.

Q. High pressure steam valves shall be Class 150 cast steel and stamped for high-pressure steam application.

33 1110 – SITE STEAM AND CONDENSATE UTILITY DISTRIBUTION

A. Underground Tunnels, Vault Steam, and Condensate Distribution:

1. Tunnels and direct buried lines are to be covered with sufficient soil to prevent damage to vegetation above them.

2. Tunnels shall be of minimum size four (4) feet wide by six (6) feet high interior dimensions.

3. Waterproof tunnel and vaults with bituthane membrane. Water stop is required where a vertical wall connects with a horizontal slab.

4. Each vault shall have drain tile with a sump pit that is piped into the storm sewer system with steel pipe (no plastic will be allowed). Drain tile shall be installed to properly drain around/under the manhole and keep the manhole floor dry. Grade the floor to the sump pit.

5. For 30 feet in each direction along the steam and condensate lines outside of the steam vault as well as around the manhole, drain tile shall be run.

B. Trench backfill shall comply with jurisdictional authority requirements when installed outside of University of North Dakota property.

C. For new installations, install warning tape 12 inches to 18 inches above piping during backfilling for future reference.

D. Direct buried steam and condensate systems
1. Direct buried systems shall be supplied by Perma-Pipe to match existing piping.
2. All steam pipe connections shall be installed per manufacturer’s expectation.
3. All welding shall be done by a certified welder according to the requirements put forth by the American Welding Society.

E. All piping and appurtenances shall be installed according to the alignment and grade as staked by the engineer of record. Wood shall not be used to align or set grade for any conduit or appurtenance.

F. Cathodic protection shall be installed where necessary to protect the steam distribution system from corrosion.

G. Contractor shall verify and assure the quality of all steam pipe welds by performing x-ray or hydro testing of all welded connections. The Perma-Pipe representative will need to sign off on it once it meets manufacturer recommended standards prior to activation and acceptance of the steam distribution system.

H. Provide clear access, a minimum of 3 to 5 feet, to shut-off valves.

I. Install Spence Type "E" or Boylston pressure regulators with bypasses at mechanical entrances of high pressure distribution lines. Use cascading or step pressure operated parallel pressure reducing stations where large fluctuations in steam use if anticipated.

J. The acceptable model number for the steam driven condensate pump is Gestra FPS14. Condensate pumps shall be non-electric positive displacement pressure-powered pumps for larger applications. Provide removable insulating jacket for the pump tank and valves.

K. Install drip legs and traps before all thermostatic temperature regulating valves and pressure reducing valves, and at line's end.

33 1116 – SITE WATER UTILITY DISTRIBUTION PIPING

A. Trench backfill shall comply with jurisdictional authority requirements when installed outside of University of North Dakota property.

B. For new installations, install warning tape 12 inches to 18 inches above piping during backfilling for future reference.

C. Underground piping systems shall have a #12 AWG copper wire attached to the pipe for tracing. Wire shall be labeled and terminated in an accessible location. No splices in wire allowed. When work is done around existing lines, the contractor is responsible to protect tracing wires and ensure they will continue to work.

D. Operation of all valves, both new and existing, shall be by the UND.
E. All piping and appurtenances shall be installed according to the alignment and grade as staked by the engineer of record. Wood shall not be used to align or set grade for any conduit or appurtenance.

F. The materials shall be handled in such a manner as will prevent damage to the materials. Accidental damage to the materials shall be repaired to the satisfaction of UND Facilities Management or be removed from the job and methods of handling shall be corrected to prevent further damage.

G. Dirt of other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and re-laid. When pipe laying is not in progress, the open end(s) of the pipe shall be plugged. The temporary plug shall be the same size and type used to make a permanent closure to insure a watertight plug and absolute cleanliness inside the pipe.

H. Water mains shall not be left open and unattended, whether in repair or new construction, and shall be plugged.

I. No valve or other control on the existing water system shall be operated for any purpose by the Contractor without approval by the UND Plumbing shop, and all consumer affected shall be notified.

J. All tees and bends shall be provided with reaction backing as shown on drawing 67.02 of the City of Grand Forks Engineering Department (Reaction Backing at Bends and Tees), found at the end of section 33 1116.

K. Setting Hydrants as shown on drawings 67.01 and 67.01A of the City of Grand Forks Engineering Department (Standard Hydrant Setting Using Standard Tee, Standard Hydrant Setting Using Tapping Sleeve), found at the end of section 33 1116:
   1. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to curb with the pumper nozzle pointing normal to the curb. They shall conform to the established grade, with the nozzles at least thirty-two (32) inches above the ground.
   2. The trench for the hydrant branch shall be excavated to a width or at least thirty (30) inches and four (4) inches below the bottom of the pipe for a distance of six (6) feet from the hydrant bowl. After the hydrant has been unlocked into place, the trench space around the hydrant bowl and along the hydrant brace for a distance of five (5) feet shall be backfilled with ¾ to 1 ½” size rock, to a level six (6) inches above the waste opening. No hydrant drainage shall be connected to a sewer.
   3. The bowl of each hydrant shall be well braced against unexcavated earth at the end of the trench. Hydrants shall be thoroughly cleaned inside of all dirt or foreign matter before setting.

L. Hydrostatic Test:
   1. A hydrostatic test of the completed line shall be performed under a static head of 150 psi. The duration of this test shall be at least one (1) hour.
2. The test pump, pipe taps, and connecting piping and all necessary apparatus shall be furnished by the Contractor.

3. All exposed pipe, fittings, valves, and joints will be carefully examined during the test. Any visible leaks shall be stopped by repair or replacement of the deficient joint or pipes.

4. The Contractor may, at his option, test against the existing line or plug and block the ends of the new project and test prior to connecting to the existing line.

5. The Contractor may backfill the entire trench before he tests the line if he so desires, but he shall open up the trench at his own expense to repair any leaks.

M. When water meters are required outdoors for irrigation, reference drawing 67.09 of the City of Grand Forks Engineering Department (Shallow Meter Box) located at the end of section 33 1116.
OWNER REQUIRED TO INSTALL METER BOX ON PRIVATE PROPERTY. AT OWNERS OPTION GUARD POSTS MAY BE INSTALLED - METER BOX COVERS ARE NOT TRAFFIC GRADE.

METER BOX BY RAINBIRD OR APPROVED EQUAL. JUMBO MODEL VB-JMB FOR SYSTEMS UP TO 1.5" USE 2 VB-JMB BOXES. FOR SYSTEMS OVER 1.5".

INSTALL CONCRETE BLOCK SUPPORT @ EACH CORNER & 12" DEEP LAYER 3/4" ROCK UNDER BLOCK. OF WATER METER, READ-O-MAT & CORD SHALL BE PURCHASED FROM THE CITY WATER DEPARTMENT MOUNT TO SIDE OF METER BOX. CONTRACTOR SHALL MAKE THE ENTIRE INSTALLATION EXCEPT THE METER. ALL PIPING, VALVES, ETC. SHALL MEET THE REQUIREMENTS OF THE N.D. STATE PLUMBING CODE. CURB BOX SHALL BE WITHOUT WEEP HOLES. ALL HOLES CUT FOR PLUMBING AND WIRING SHALL BE SEALED.

COPPER PIPE SHALL BE USED FROM CORP. TO DRAINAGE CURB BOX POLY MAY BE USED FROM DRAINAGE CURB BOX TO METER. DRAINAGE PIPE SHALL BE 3/4" COPPER WITH PIPE BENT DOWN TO DRAIN.

ELEVATION VIEW

PLAN VIEW

SHALLOW METER BOX

CITY ENGINEER
ALLEN GRASSER

DRAWN BY:
MPV

SCALE:
NTS

STD. PLATE
67.09
DEPTH OF BACKING, RATIO OF PIPE DIAM.

<table>
<thead>
<tr>
<th>FITTING</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEE OR PLUG</td>
<td>3D</td>
</tr>
<tr>
<td>1/4 BEND-90 DEG.</td>
<td>3D</td>
</tr>
<tr>
<td>1/8 BEND-45 DEG.</td>
<td>3D</td>
</tr>
<tr>
<td>1/16 BEND-22 1/2 DEG.</td>
<td>2D</td>
</tr>
</tbody>
</table>

NOTES:
1. FOR FITTINGS OTHER THAN SHOWN OR UNUSUAL SOIL CONDITIONS, COMPUTE SIZE & PLACEMENT OF REQD. BACKING.
2. PRECAST BLOCKING SHALL BE ALLOWED ON PIPE SIZES UNDER 12".
3. ALL FITTINGS TO BE WRAPPED WITH 2 LAYERS OF 8 MIL. (MIN.) POLY.
KEY:

1. TEE
2. 3/4" - 1 1/2" ROCK
3. HYDRANT LEAD
4. CONCRETE BLOCK
5. GATE VALVE
6. HYDRANT WASTE OPENING
7. HYDRANT
8. GATE VALVE ADAPTOR

NOTES:

1. 3/4" - 1 1/2" SIZE ROCK SHALL BE TO A LEVEL 6" ABOVE WASTE OPENING OR GREATER, WITH A MINIMUM 30" WIDE & ALL ALONG HYD. LEAD (MIN. QUANTITY 3/4 CU. YD.)

2. ALL HYDRANT LEADS SHALL BE 6" PVC C-600 AND EACH SECTION SHALL HAVE A MINIMUM OVERALL LENGTH OF 18".

3. WRAP SADDLE, VALVE, & HYDRANTS UP TO GROUND LINE WITH 2 LAYERS OF 6 MIL (MIN.) POLY TAPE ENDS & SEAMS - DO NOT ALLOW POLY OR CONCRETE TO COVER WASTE OPENING.
NOTES:

1. 3/4" - 1 1/2" SIZE ROCK SHALL BE TO A LEVEL 0' ABOVE WASTE OPENING OR GREATER, WITH A MINIMUM 36" WIDE & ALL ALONG HYD. LEAD (MIN. QUANTITY 3/4 C.U. YD.)

2. ALL HYDRANT LEADS SHALL BE 6" PVC C-900 AND EACH SECTION SHALL HAVE A MINIMUM OVERALL LENGTH OF 18".

3. WRAP SADLE, VALVE, & HYDRANTS UP TO GROUND LINE WITH 2 LAYERS OF 6 MIL (MIN.) POLY TAPE ENDS & SEAMS - DO NOT ALLOW POLY OR CONCRETE TO COVER WASTE OPENING.

KEY:

1. STAINLESS STEEL TAPPING SLEEVE
2. 3/4" - 1 1/2" ROCK
3. HYDRANT LEAD
4. CONCRETE BLOCK
5. GATE VALVE
6. HYDRANT WASTE OPENING
7. HYDRANT
8. GATE VALVE ADAPTOR
33 1300 – DISINFECTING OF WATER UTILITY

A. After the new main and valve extensions have been tested and approved by UND Facilities Management, they shall be flushed until all foreign material has been removed. Chlorination applications shall then be made under the supervision of the UND Plumbing Shop.

B. Liquid Chlorine conforming to the requirements of military specification MIL-C-12460 or hypochlorite conforming to the Federal Specification 0-C-114, Type II-B, shall be put into a water solution. The chlorine solution shall be fed into the new line amounts to produce at least 50 ppm retained for 24 hours or 200 ppm retained for 3 hours. When repairing existing lines, the chlorine residual shall be at least 200 ppm and retained for three hours. The valves shall be sterilized by opening and closing them at least once during the holding period.

C. After the contact time, the system shall be flushed with clean water until the chlorine residual is lowered to approximately 1.0 ppm. No chlorination water will be permitted to be discharged in the water main’s trench.

D. The contractor shall furnish all tools, equipment, and material to chlorinate the system.

33 3111 – SITE SANITARY UTILITY SEWERAGE PIPING

A. Trench backfill shall comply with jurisdictional authority requirements when installed outside of University of North Dakota property.

B. For new installations, install warning tape 12 inches to 18 inches above piping during backfilling for future reference.

C. The minimum building service line size shall be a minimum of 6 inches.

D. The minimum sewer line shall be a minimum of 8 inches.

E. Lid extension ring height shall not exceed 12 inches.

F. The sewer shall be installed according to the lines and grades established by the engineer of record. No deviation shall be made without the written consent of the engineer of record.

G. All piping and appurtenances shall be installed according to the alignment and grade as staked by the engineer of record. Wood shall not be used to align or set grade for any conduit or appurtenance.

H. To prevent accidental flooding of the sanitary sewer system and any properties connected thereto, the Contractor shall furnish and install a watertight plug in the existing sewer prior to commencing work on any project which involves the
extension of an existing sanitary sewer. The plug shall be installed at the point where new work begins, or as directed by the engineer of record, and shall be capable of withstanding ahead of 50 feet of water without leakage or failure.

I. After completion of all new construction, including manholes and service leads, and removal of all accumulation of water in the completed sewer system extension, the plug shall be removed.

J. Pipe joints shall be installed according to the manufacturer’s recommendations. All VCP joints shall be a pre-molded, factory fabricated, gasket type that conforms to the requirements of ASTM Designation C425, except that a separate O-ring or gasket will not be permitted, or, in the case of plain-end pipe, a compression sleeve conforming to ASTM Designation C594, Type II. All concrete pipe shall have flexible rubber gasket joints conforming to AASHO M198 unless otherwise provided by special provision or permitted, in writing, by the UND Facilities Management.

K. The drawing 65.03A of the Grand Forks city Code, located at the end of section 33 3111, illustrates how sanitary sewer manholes should be modeled.
NOTES:
1. PLASTIC RINGS SHALL BE REQUIRED.
2. MANHOLE CASTINGS: NEEHAN FOUNDRY NO. R-1733-0979 (LETTERED SANITARY SEWER) OR EAST JORDAN IRON WORKS 1205. FRAME FLANGES SHALL HAVE 5/8" DRILLED HOLE.
3. SANITARY SEWER LIDS SHALL BE SELF-SEALING LIDS WITH CONCEALED LIFT NOTCHES.
4. BACKFILL UNDER ALL PIPES WITH 4 BAG CONCRETE MIX UNTIL NORMAL BEDDING IS OBTAINED; SIDES MAY BE FORMED (MINIMUM WIDTH: 12 INCHES).
5. RUN MAIN LINE PIPE THROUGH MANHOLE. FORM CONCRETE AROUND BOTTOM HALF OF PIPE. CUT OUT TOP HALF OF PIPE.
6. INSTALL CONCRETE IN THE AREA BETWEEN THE PIPE INVERT & TOP OF BASE AS NECESSARY TO MEET THE TWO RING REQUIREMENT.
7. STEPS SHALL BE M. A. INDUSTRIES PS1-D1 OR APPROVED EQUAL.
8. MONOLITHIC BASES MAY BE USED, HOWEVER A 72" BASE IS REQUIRED.
9. INSTALL 2 WRAPS OF 5 MIL POLY ON NH CONE. ADJ. RINGS & CASTING FLANGE (TAPE IN PLACE) ON ALL MANHOLES IN ERM AREAS.
10. FOR MANHOLES IN PAVED AREAS SEE DETAIL 65.06 OR 65.06A.
11. WHEN TYPING INTO EXISTING STRUCTURE, MANHOLE IS TO BE CORE DRILLED AND INSTALLATION OF EXPANDING RUBBER BOOT IS REQUIRED.

STANDARD SANITARY SEWER MANHOLE

CITY ENGINEER
ALLEN GRASSER
DRAFTED BY:
MPV

DATE: 1/1/2016
SCALE: NTS
STD. PLATE 65.03A

UNIVERSITY OF NORTH DAKOTA – DESIGN STANDARDS
REVISED SEPTEMBER 5, 2017
DIVISION 31 – EARTHWORK 33-UTILITIES
A. Trench backfill shall comply with jurisdictional authority requirements when installed outside of University of North Dakota property.

B. For new installations, install warning tape 12 inches to 18 inches above piping during backfilling for future reference.

C. Do not interrupt service to facilities occupied by UND or others unless permitted and then only after arranging to provide temporary service according to requirements indicated:


E. PVC Water-Service Piping: All water service lines 1 inch to 2 inches shall be Copper Type K to curb stop, then DR-18 to building and services 4” and larger shall be C900 PVC.

F. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall B.

G. All piping and appurtenances shall be installed according to the alignment and grade as staked by the engineer of record. Wood shall not be used to align or set grade for any conduit or appurtenance.

H. Designed Precast Concrete Manholes and Catch Basins: Refer to drawings 65.03 (Standard Storm and Sewer Manhole), 65.01 (Standards Catch Basin), and 65.10 (Standard Area Drain) of the City of Grand Forks Engineering Department, found at the end of section 33 4111.

1. ASTM C 913; designed according to Industry Standards.
2. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
3. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
4. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals.
5. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Use a minimum of 3 each per structures.

I. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER", ASTM A 48/A, Class 35 gray iron.
J. Manhole Channels and Benches: Concrete channels must be formed to ensure proper flow.

K. Catch Basin Frames and Grates: ASTM A 48, Class 35 cast iron. Include flat grate with small square or short-slotted drainage openings.
   1. Size: 24 by 24 inches minimum unless otherwise indicated.
   2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

L. Install PVC profile gravity sewer piping and water – service piping according to ASTM D 2321 and ASTM F 1668.

M. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

N. Join force-main pressure piping according to the following:
   1. Join ductile-iron special fittings according to AWWA C600 or AWWA M41 for push-on joints.
   2. Join PVC pressure piping according to AWWA M23 for gasketed joints.
   3. Join PVC water-service piping according to ASTM D 2855 for solvent-cemented joints.
   4. Join dissimilar pipe materials with pressure-type couplings.

O. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Install piping so cleanouts open in direction of flow in sewer pipe.

P. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place, close open ends of piping with at least 8-inch- thick, concrete bulkheads.

Q. Clean interior of piping of dirt and superfluous materials. Flush with water. Inspect interior of piping to determine whether line displacement or other damage has occurred, a minimum of 30 days after completion of backfill operations.
NOTES:

1. PLASTIC RINGS SHALL BE REQUIRED.

2. MANHOLE CASTINGS: NEENAH FOUNDRY NO. R-1733-0087 (LETTERED STORM SEWER) OR EAST JORDAN IRON WORKS 1205. FRAME FLANGES SHALL HAVE 5/8" DRILLED HOLE.

3. STORM SEWER LIDS SHALL HAVE OPEN PICK HOLES. INSTALL R-1955-1 CASTING IN LIEU OF 1733 WHEN SPECIFIED.

4. BACKFILL UNDER ALL PIPES WITH 4 BAG CONCRETE MIX UNTIL NORMAL BEDDING IS OBTAINED. SIDES MAY BE FORMED (MINIMUM WIDTH - 12 INCHES).

5. INSTALL CONCRETE IN THE AREA BETWEEN THE PIPE INVERT & TOP OF BASE AS NECESSARY TO MEET THE TWO RING REQUIREMENT.

6. STEPS SHALL BE M.A. INDUSTRIES PS1-DI OR APPROVED EQUAL.

7. INSTALL 2 WRAPS OF 6 MIL POLY ON MH CONE, ADJ. RINGS & CASTING FLANGE (TAPE IN PLACE) FOR MH NOT IN PAVED AREAS.

8. FOR MANHOLES IN PAVED SEE DETAIL 65.08 AND 65.08A.
NOTES:
1. CB BARREL & CHIMNEY SEAL SHALL BE DOUBLE WRAPPED WITH 6 MIL POLY.
2. FILL INVERT TO DESIGN GRADE WITH 4 BAG CONCRETE MIX.
3. USE INLET CASTING: NEENAH-398S WITH TYPE DR GRATE, OR EAST JORDAN IRON WORKS-7010 WITH MS DIAG. BAR GRATE.
4. PLASTIC RINGS SHALL BE REQD.
5. IF MORE THAN ONE PIPE IS TO BE INSTALLED IN CB, PROVIDE SMOOTH INVERT W/ MIN 1" DROP BETWEEN PIPES.

STANDARD CATCH BASIN
NOTES:
1. AREA DRAIN BARREL, ADJUSTING RINGS & CASTING SHALL BE DOUBLE WRAPPED WITH 6-MIL POLY.
2. FILL INVERT TO DESIGN GRADE WITH 4 BAG CONCRETE MIX.
3. USE NEWAH R-1733 CASTING (OR APPROVED EQUAL) WITH GRATE AS INDICATED ON PLANS.
4. PLASTIC RINGS SHALL BE REQUIRED.

SIDE VIEW

BACKFILL UNDER ALL PIPES WITH 4 BAG CONCRETE MIX UNTIL NORMAL BEDDING IS OBTAINED - SIDES MAY BE FORMED (MINIMUM WIDTH 12’)

INSTALL 4’ STYROFOAM HI BRAND INSULATION

4" GRAVEL BEDDING

45’ X 3’ PRE-CAST CONC BASE

30’ PRE-CAST CONC CATCH BASIN BARREL

RCP

MORTAR

3 1/2’

3’ MAX

PAY LENGTH

INV. ELEV.

3/28/15

STANDARD AREA DRAIN

UNIVERSITY OF NORTH DAKOTA – DESIGN STANDARDS
REVISED SEPTEMBER 5, 2017
DIVISION 31 – EARTHWORK 33-UTILITIES
33 5111 – SITE NATURAL GAS DISTRIBUTION

A. The majority of gas mains on UND campus are property of Excel Energy. All work must be coordinated with both UND Facilities Management and Excel energy.

B. Gas mains and services shall have a minimum of 24 inches of cover.

C. A shutoff valve shall be installed immediately downstream of the utility meter. This valve is in addition to the shutoff valve installed upstream of the meter.

D. Piping downstream of meter shall be above-grade.

33 6111 - SITE CHILLED WATER DISTRIBUTION

A. Trench backfill shall comply with jurisdictional authority requirements when limited outside of University of North Dakota property.

B. For new installations, install warning tape 12 inches to 18 inches above piping during backfilling for future reference.

C. Operation of all valves, both new and existing, shall be by UND.

D. Wall and floor penetrations shall be sealed with Link-Seal.

33 4600 – SUBDRAINAGE

A. The University of North Dakota normally doesn’t utilize these. If needed, it must be viewed and approved by Academic Maintenance, within Facilities Management.

33 7119 - ELECTRICAL UNDERGROUND DUCTS, MANHOLES, AND SWITCH BASEMENTS

1.1 Precast Concrete Manholes

A. Duct Entry Size: 5 inch.

B. Cable Rack Inserts: Minimum load rating of 800 pounds (365 kg). Locate at 2 feet (0.6 m) on center.

C. Cable Rack Mounting Channel: 1 x 4 inch non-metallic channel, 36 inch length minimum. Underground Devices Inc. Model CRXX-B Heavy Duty Nonmetallic Cable Rack or approved equal.

D. Cable Racks: Underground Devices Inc. Model RAXX or equal nonmetallic, 4 inch wide, 14 inch long, compatible with mounting channel, include Underground Devices Inc. HDL Arm Lock. Minimum two per wall in switch basements and four (two high, two low) in manholes.

1.2 Cast-In-Place Manhole Installation

A. Duct Entry: Cast duct openings in walls for 5 inch pipe.
33 7900 - SITE GROUNDING

A. “Reference Division 26”.