

DIVISION 33 – UTILITIES

GENERAL

Prior to the start of any utility installation work, a pre-installation conference shall be held with the Project Manager, A/E firm, representatives of Facilities Management, and the Contractor performing the utility installation.

All utilities which are installed via open cut method are to have a metallic warning tape placed a minimum of 24” above the pipe which identifies the type of utility buried below the tape. All non-metallic utilities which are installed via open cut method are to have a #12 AWG tracer wire with a minimum 30 mil. HDPE insulation thickness installed directly above the pipe which extends to the surface in an at grade double-terminal access box with a 1.5lb drive-in magnesium ground rod at each termination point of the installed pipe if the pipe/conduit will not carry a metallic facility which can be traced. All tracer wire splices are to be completed utilizing water-proof gel splice kits.

Underground utilities are to be installed at the following depths on campus:

Type of Utility	Minimum Bury Depth	Maximum Bury Depth
Communications	24”	36”
Chilled Water	60”	84”
Domestic Water	60”	84”
Electric	24”	36”
Irrigation	12”	24”

Depth of bury for storm and sanitary sewers will be dependent on downstream connection inverts as approved by the Project Manager.

When utilities are installed under parking lots the minimum bury depth is to be 48” below grade.

Once MISSDIG tickets have cleared, Contractors are to expose all existing utilities by the use of hydroexcavation to confirm the horizontal and vertical location of the utility crossings within the minimum and maximum utility bury depth as noted in the above table.

33 0507.13 DIRECTIONAL DRILLING

- A. The following pipe/conduit identification color scheme shall be utilized when installing facilities via directional drilling. The pipe/conduit shall be marked or contain the following colors:
 - a. Electric power lines, cables, conduits, and lighting – RED
 - b. Gas, oil, steam, petroleum, or gaseous material – YELLOW
 - c. Communication, alarm, or signal lines, and cables – ORANGE
 - d. Potable water and chilled water – BLUE
 - e. Sewers and drain lines – GREEN
 - f. Reclaimed water, irrigation, and slurry lines – PURPLE

- B. All directionally drilled pipe/conduit shall be installed with a #12 AWG tracer wire with a minimum 45 mil. HDPE insulation thickness if the pipe/conduit will not carry a metallic facility which can be traced. The tracer wire shall extend to the surface in an at grade double-terminal access box with a 1.5lb drive-in magnesium ground rod at each end of the installed pipe/conduit.

33 1000 WATER UTILITIES

33 1100 Water Utility Distribution Piping

- A. All domestic water distribution piping and appurtenances shall be designed and constructed in accordance with the City Of Mt. Pleasant Standard Specifications which can be located at www.mt-pleasant.org

33 1700 Chilled Water Distribution Piping

- A. Chilled water tie-ins to the campus chilled water system shall be completed between November 1st and April 1st. Procedure to be approved by Owner.
- B. Chilled water piping shall be C900 class water main or HDPE class PVC piping.
- C. Chilled water piping shall not be routed in the campus tunnels.
- D. Hot tapping of the chilled water lines is permitted per the following protocol:
 - a. The chilled water flow in the tapped pipe is stopped by shutting off all associated pumps. Pressure is to remain inside the pipe.
 - b. The cutting head to be used is one that is specifically made to tap HDPE/PVC mains.
 - c. The tap will be made in the vertical position under main pipe pressure.
 - d. After the tap is completed, the valve will be flushed to expel any remaining cuttings.
- E. Chilled water lines shall be pressure tested in the same manner as domestic water pressure testing. Refer to the City of Mt. Pleasant Standard Specifications as it related to pressure testing water main.
- F. Refer to Division 23 Heating, Ventilating, and Air-Conditioning (HVAC) for additional Chilled water design requirements.
- G. CMU's consultant for Chilled Water is Fishbeck Thompson Car & Huber, FTCH. All projects that add new or increase existing chilled water load shall be submitted to FTCH prior to the conclusion of design development for a design review and to be included the campus chilled water model.

33 3000 SANITARY SEWERAGE UTILITIES

33 3100 Sanitary Utility Sewerage Piping

- A. All sanitary sewer piping systems shall be designed and constructed in accordance with the City of Mt. Pleasant Standard Specifications which can be located at www.mt-pleasant.org
- B. Jet and flush all Sanitary Sewer pipes between each structure prior to requesting final inspection.

33 3100 Sanitary Utility Sewerage Structures

- A. Vacuum all Sanitary Sewer Structures within the project limits and one structure beyond the project limits prior to requesting final inspection.

- B. All structures shall be pre-cast concrete. At each joint section, the contractor shall apply waterproof mastic and wrap with filter fabric. The contractor shall apply waterproof mastic at the pre-case adjusting rings and wrap with filter fabric.
- C. Sanitary structure covers are to conform with the current version of the Michigan Department of Transportation's Standard Specifications for Construction, Standard Details, and Special Details. CMU's University Engineering and Planning Department shall be consulted and approve the type, size, and dimensions of the sanitary sewer structure covers used on each project.

33 4000 STORM DRAINAGE UTILITIES

33 4001 Storm Water Management

- A. Refer to CMU's Storm Water Management Design and Performance Standards.

33 4100 Storm Drainage Piping

- A. Jet and flush all Storm Drainage pipes between each structure prior to requesting final inspection.

33 4241 Gratings and Frames for Stormwater Drainage Inlets

- A. Drainage structure covers are to conform with the current version of the Michigan Department of Transportation's Standard Specifications for Construction, Standard Details, and Special Details. CMU's University Engineering and Planning Department shall be consulted and approve the type, size, and dimensions of the drainage structure covers used on each project.

33 4900 Storm Drainage Structures

- A. Vacuum all Storm Drainage Structures within the project limits and one structure beyond the project limits prior to requesting final inspection.
- B. All structures shall be pre-cast concrete. At each joint section, the contractor shall apply waterproof mastic and wrap with filter fabric. The contractor shall apply waterproof mastic at the pre-case adjusting rings and wrap with filter fabric.

33 6000 HYDRONIC AND STEAM ENERGY UTILITIES

33 6001 TUNNEL DESIGN REQUIREMENTS

- A. CMU's consultant for Steam Piping design is Fishbeck Thompson Car & Huber (FTCH). The Architect shall work closely with FTCH regarding the layout of the steam piping, so the tunnel design supports the steam and condensate system. All new steam piping in the campus tunnels, up to and including the pressure reducing valves must be submitted to FTCH prior to the conclusion of design development for a design review and be included the campus steam model. This also includes the condensate system from the flash tank and condensate receiver back to the campus tunnels. The AE shall allot 4 weeks from time of notifying FTCH and CMU Mechanical Project Manager, to complete the review and provide a written report. Any design corrections must be included in the 50% Construction Documents. The following design elements must be included with this review:
 - a. Size of all steam and condensate piping including insulation.
 - b. All piping stanchion designs including supports, hangers, rollers, guides, slides etc.

- c. All anchoring details of steam and condensate piping
 - d. All expansion loops, slip joints etc. or other means of addressing pipe expansion
 - e. Pressure Reducing Valve and configuration
 - f. Condensate Receiver and Pump selection
 - g. All drip legs and trap selection and configuration
 - h. All isolation valves
- B. Tunnel design at a minimum shall meet AASHTO H-20 (HS-20) loading.
- C. Refer to CMU Standard detail sheet "S-001 Tunnel Details" for typical tunnel size, reinforcement, water proofing, drainage, pipe rack, lighting, power, and access requirements.
- D. The consultant shall use the details referenced as the basis to begin their design. The consultant is required to provide a complete design detailing of the tunnel, to include waterproofing, pipe supports and pipe anchoring.
- a. Do not use metal decking as a form for pouring of the tunnel roof. This provides a path for water to get into the tunnel and rust the metal decking.
 - b. Tunnel shall be sloped to provide drainage
- E. Provide pipe chutes in tunnel to allow for easy access to place larger sections of pipe into the tunnel. Refer to Detail 5 on sheet S-001 Tunnel Details for basic design.
- F. Provide secured access hatch/vent to tunnel. Refer to Detail 4 on Sheet S-001 Tunnel Details for basic design.
- G. Refer to Division 23 Heating, Ventilating, and Air-Conditioning (HVAC) for complete Hydronic design requirements.

33 6300 Steam Energy Distribution

33 6305 Tunnels

- A. Hard hats and flashlights shall be considered minimum required PPE for entry.
- B. Individuals shall not enter the tunnel alone – use the buddy system. Notify CMU Project Manager or PEP administrative team when entering the tunnels and immediately after exiting the tunnels.
- C. All penetrations to the wall of the tunnels require prior approval from the Director of Plant Engineering and Planning and the Director of Energy and Utilities.
- D. All tunnel penetrations shall be in the middle one third of the side wall of the tunnel and properly sealed. Any exceptions to this requirement shall require structural analysis by a professional engineer.
- E. All abandoned holes to the tunnels shall be plugged and sealed to eliminate water penetration.
- F. The tunnels are to support the installation and maintenance of steam, condensate, air, IT and telecom systems. Gas, water, power, storm and sanitary lines shall not be installed in the tunnels unless approved in writing by the Director of Energy and Utilities.

- G. It is recommended that any team planning to add, modify, rearrange or demolish utilities in the tunnel contact the Director of Energy and Utilities during the planning stage to assure the concept is supported and avoid unnecessary rework.
- H. Any team planning to add, modify, rearrange or demolish utilities in the tunnel shall complete a **Utility Tunnel Work Form** and obtain the necessary signatures. The exception to this requirement is like for like replacement of system components such as valves.

33 6306 Abandoned Utilities in the Tunnels

- A. All abandoned utilities shall be removed from the tunnel when the new / replacement system is installed.
- a. Exceptions must be approved in writing by the Director of Energy and Utilities. To assure utilities that have been abandoned in place are easily identifiable the following requirement shall be met.
- i. The utility shall be disconnected at each end to support future efforts to trace and/or remove the utility.
- ii. The utility shall be labeled every 20 feet as follows:
- Utility:
 - Date Abandoned:
 - Project Contact:

For Example

Utility: 4" Steam Line
Date Abandoned: May 3, 2009
Project Contact: Andy Reihl

33 7000 ELECTRICAL UTILITIES

337119 Electrical Underground Ducts, Ductbanks, and Manholes

- A. Electrical utility vault covers are to be East Jordan Iron Works, Heavy Duty, 1475C cover with 1475 frame. The cover is to read "ELECTRICAL". CMU's University Engineering and Planning Department shall be consulted and approve the type, size, and dimensions of the structure covers used on each project.

34 8000 COMMUNICATIONS UTILITIES

348129 Communications Vaults, Pedestals, and Enclosures

- A. Communications utility vault covers are to be East Jordan Iron Works, Heavy Duty, 1106ZPT 1106A2PT assembly. The cover is to read "COMMUNICATIONS". CMU's University Engineering and Planning Department shall be consulted and approve the type, size, and dimensions of the structure covers used on each project.

END OF SECTION

DOCUMENT CONTROL PAGE:

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10/19/20	Added pipe/conduit color identification and tracer wire requirements for directional drill installations. Added warning tape and tracer wire requirements for open-cut installations. Added minimum and maximum bury ranges for utilities. Added requirement for hydroexcavation of existing utilities.	Andy Reihl
10/5/21	Added storm sewer, sanitary sewer, electrical, and communications structure cover requirements	Andy Reihl