

SECTION 02324

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes trenching, bedding and jacking for utilities. All work shall conform to MDOT Standards and Specifications as modified by the Holland BPW. All non-itemized work shall be considered incidental.

1.2 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

1.3 SUBMITTALS

- A. Submit sheeting and bracing plans and construction details for jacking work.

1.4 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Bedding for Water Distribution and Sanitary Collection Utilities: Class I granular material conforming to MDOT Specifications.
- B. Bedding for other utilities: As indicated.
- C. Backfill: As indicated.

PART 3 - EXECUTION

3.1 LINES & GRADES

- A. Lines & Grades:
 - 1. Unless otherwise indicated, the Owner will provide all surveys, lines, and grades reasonably necessary for the control of the work.
 - 2. The Contractor shall be responsible for making accurate measurements and constructing all work to the lines and grades as indicated.
 - 3. Line and grade shall be maintained by use of a laser.

4. Batter boards may be used as an alternative means of establishing line and grade. The grade alignment of the pipe is maintained by the use of a string line parallel with the grade line and vertically above the centerline of the pipe. This line shall be established on level batter boards at intervals of not more than 25'. Batter boards shall span the trench and be rigidly anchored to substantial posts driven into the ground on each side of the trench. Three adjacent batter boards must be set before laying pipe to provide a check on the grades and line. Elevation and position of the string line shall be determined from the elevation and position of offset points or stakes located along the pipe route. Pipe shall not be laid using side lines for line or grade.
- B. Location of Pipelines:
1. The location and approximate depths of the proposed pipelines are shown on the Drawings.
 2. The Engineer reserves the right to make changes in lines, grades, and depths of pipelines and manholes when such changes are necessary.

3.2 EXCAVATION

- A. Excavate per **SECTION 02315**.
- B. Hand trim for bell and spigot pipe joints and remove loose matter.

3.3 TRENCHING

- A. Trench shall be opened to allow the pipe to be laid and jointed properly to the alignment and depth as indicated. The trench shall not be more than 2' wider at the bottom than the outside diameter of the pipe or structure. If adjacent facilities and soil permit, the Contractor, at his own expense, shall be permitted to slope the sidewalls of the trench starting at a point 2' above the top of pipe.
- B. Trench shall be opened to provide the pipe with uniform and continuous bearing and support on the bedding material at every point between joints, except where pipe slings or other lifting tackle are withdrawn. Hand trim as necessary.
- C. Trench shall not be opened for a distance of more than 200' at any one time, unless authorized by the Engineer. At no time will the Contractor be permitted to leave more than 50' of trench open at the end of a working day. Adequate protection of open trench shall be provided by the Contractor and approved by the Engineer.
- D. Where boulders, rocks or other such obstructions are encountered, they shall be removed to a depth of at least 6" below the bottom of the pipe and the trench bottom will be backfilled and compacted to material and density requirements for subsequent bedding or backfill material.
- E. Cut out soft, porous, wet, frozen or spongy areas of subgrade. Backfill and compact to material and density requirements for subsequent bedding or backfill material.
- F. Address over-excavation per **SECTION 02320**.

- G. The Contractor shall provide suitable pumping equipment and shall keep the trench dry during the progress of the work.
- H. Maintain 10' horizontal separation between all sewers and water main. Maintain 18" of vertical separation from other utilities. Both the horizontal and vertical separations are to be measured from outside to outside of pipe.
- I. Excavation within 24" of existing utilities shall be governed by specifications of the Owner of the respective utility. The Contractor shall obtain these specifications and follow the same at no extra cost.
- J. Sheeting and Bracing:
 - 1. Sheeting and bracing of all excavations shall conform to the latest statutes of the State of Michigan governing safety of workers in the construction industry. When necessary, in the opinion of the Engineer or Contractor, adequate sheeting and bracing shall be installed to prevent ground movement that may cause damage or settlement to adjacent structures, pipelines, utilities and pedestrian or vehicular traffic. Any damage due to settlement because of failure to use sheeting or because of inadequate bracing, or through negligence or fault of the Contractor in any other manner, shall be repaired at the Contractor's expense.
 - 2. Sides of trenches in unsuitable, loose or soft material, 5' or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect employees working within them.
 - 3. Where excavations are made with vertical sides which require supporting, the sheeting and bracing shall be of sufficient strength to sustain the sides of the excavations and to prevent movement which could in any way injure the Work, or adjacent structures, or diminish the working space sufficiently to delay the Work. Special precautions shall be taken where there is additional pressure due to the presence of other structures.
 - 4. It shall be the Contractor's responsibility to select sheeting and bracing of sufficient dimensions and strength to adequately support the sides of trenches and excavations. The Contractor shall submit details of the sheeting and bracing he proposes to use to the Engineer for review.
 - 5. Timber sheeting shall conform in quality to select structural Douglas Fir lumber and shall be sound, live timber, free from sap, large checks, shakes, loose or decayed knots, worm holes, and other imperfections which may impair its strength or durability.
 - 6. In wet excavation grooved sheeting shall be used to prevent passage of soil. Any voids between sheeting and face of excavation shall be filled with suitable material rammed in place.
 - 7. Sheeting and bracing shall be removed before the completion of the Work, unless otherwise directed in writing by the Engineer. Sheeting which is left in place shall be cut off 18" below the original ground surface or as directed by the Engineer. Untreated wood will not be allowed to be left in place.

3.4 BEDDING

- A. Request inspection prior to placing bedding material.
- B. Place bedding material at trench bottom and level in one continuous layer not exceeding 12" compacted depth.
- C. Place bedding material around sides and 12" over top of the pipe and tamp in place.
- D. Refer to Standard Detail **WM-2, "BEDDING AND CONDUCTIVITY"**.

3.5 FIELD QUALITY CONTROL

- A. Maintain optimum moisture content to attain required compaction density.
- B. Do not displace or damage pipe when compacting.
- C. Compaction testing will be performed in accordance with Controlled Density Method as specified in section 205 of the 2003 MDOT Standard Specifications for Construction and the MDOT Density Control Handbook. Compact to not less than 95% of the maximum unit weight.
- D. Perform 1 test for every 200' of 5' depth of trench. Frequency of test may be increased or decreased depending on contractor's methods at owner's option.
- E. If work does not meet specified requirements, remove, replace and retest.

3.6 JACKING

- A. Jacking shall extend a minimum of 10' outside of the edges of the pavement or as indicated.
- B. Casing pipe shall meet ASTM A53 Type E or S, Grade B with minimum wall thickness of 0.250" or as indicated. Inside diameter shall be equal to the outside diameter of the carrier pipe bell plus 8" or as indicated.
- C. Casing spacers for Ductile Iron Pipe shall be Standard or Centered Restrained CSC by CCI Pipeline Services, LLC installed per manufacturer's recommendations or Holland BPW approved equal.
- D. Casing spacers for PVC pipe shall be Standard or Centered Restrained CSP by CCI Pipeline Services, LLC installed per manufacturer's recommendations or Holland BPW approved equal.
- E. Pipe ends shall be closed with masonry bulkheads. Bulkhead and mortar work shall be completed within 24 hours of the installation of the carrier pipe.

3.7 BACKFILL

- A. Backfill per **SECTION 02320**.

END OF SECTION