

SECTION 02225 - TRENCHING & BACKFILLING

1.0 GENERAL

- 1.1 Work included in this Section includes trenching and backfilling for underground pipelines and related structures only.
- 1.2 Reference Specifications are referred to by abbreviation as follows:
- A. American Society for Testing and Materials..... ASTM
 - B. American Association of State Highway and Transportation Officials AASHTO
 - C. Virginia Department of Transportation.....VDOT
- 1.3 The Contractor shall perform all construction operations in accordance with the U.S. "Occupational Safety and Health Act of 1970", the Standards of the U.S. Department of Labor, Occupational Safety and Health Administration and the latest amendments thereto.
- 1.4 The Contractor shall perform all construction operations in accordance with the "Rules and Regulations Governing the Safety and Health of Employees Engaged in Construction" as adopted by the Safety and Health Codes Commission of the Commonwealth of Virginia and all latest revisions thereto and issued by the Department of Labor and Industry.
- 1.5 Store and use explosives in accordance with Federal, State and Local regulations. The Contractor shall be responsible for and shall satisfactorily correct all damage resulting from use of explosives.
- 1.6 Within roadways, the Contractor shall provide compaction testing per VDOT standards. For construction within easements, the Contractor will provide compaction testing at Department's request at the Contractor's expense.
- 1.7 Locate existing utilities, culverts and structures, above and/or below ground, before any excavation starts. Coordinate work with utility companies through **MISS UTILITY**. Protect, maintain in service, and prevent damage to utilities not designated to be removed. When utilities are encountered and are not shown on Drawings or when locations differ from those shown on Drawings, notify the Department for instructions before proceeding.
- 1.8 All excavation is unclassified and no additional payment will be allowed regardless of materials encountered.

2.0 PRODUCTS

Pipe Bedding Fill

- A. Granular fill shall meet requirements for coarse aggregates, ASTM C3, Size No. 57.

2.1 Select Backfill

- A. Aggregate fill shall meet requirements for coarse aggregates, Section 203, VDOT Specification, size No. 57.
- B. Clean earth fill shall be an approved material free of debris, roots, frozen materials, organic matter, rock or gravel larger than 1" in any dimension or other harmful matter.

2.2 Rip-rap, where shown on the Drawings shall conform to VDOT Specification Sec. 414 "Dry Rip-rap - Class I."

3.0 EXECUTION

3.1 Strip existing topsoil, leaf mold and organic materials, meeting topsoil requirements of Section 02935 - Seeding. Deposit in storage piles separate from other excavated material.

3.2 Where the trench width exceeds the allowable width, the Contractor at his own expense shall provide for increased loads on pipe as directed by the Department.

3.3 Unauthorized excavation consists of the removal of material beyond indicated subgrade elevations or side dimensions without specific approval of the Department. Where unauthorized excavations occur, restore these areas to the elevations and dimensions shown on the Drawings with granular fill.

3.4 Where removal of unsatisfactory material is due to fault or negligence of the Contractor, by inadequate shoring or bracing, dewatering, material storage or other failure to meet specified requirements, any work deemed necessary by the Department to correct the faulty condition shall be performed at no additional cost to the County.

3.5 Trenches in public roadways. See Section 1, Volume 1 of these Standards for utility location.

- A. Refer to Virginia Department of Transportation's "Road and Bridge Specifications" for design and construction considerations.
- B. Adequate protection of sewer lines shall include the following:
 - (1) Minimum 5 feet of cover over PVC pipe.
 - (2) Minimum 3.5 feet of cover over ductile iron.
 - (3) Concrete caps shall be used where minimum covers cannot be attained.

3.6 Excavation.

- A. Open trenches only so far in advance of pipe laying as permitted by Department. In no case will more than 500 ft. of trench may be open at one time. Trenches shall be backfilled at the end of each working day except where otherwise permitted.
- B. The width of the trench at and below the top of the pipe shall not exceed the outside diameter of the pipe plus 18 inches except that for pipe 12 inches or less in diameter, the trench width shall not exceed 33 inches. Where this width is exceeded, Contractor shall provide for increased pipe loading as directed by the Department.
- C. The trench walls above the top of the pipe may be sloped or the trench, above the top of the pipe, may be widened as necessary for bracing, sheeting and shoring. Construction methods shall be subject to review and approval by the Department.
- D. Excavate trenches for gravity lines to elevations shown on Contract Drawings. Excavate trenches for pressure lines to elevations shown on Contract Drawings or to depths specified in other sections of this Division.
- E. The bottom of the trench for gravity lines shall be as specified herein under "Pipe Bedding".
- F. The bottom of the trench for pressure lines shall be shaped to fit the bottom of the pipe as specified herein under "Pipe Bedding".
 - (1) Excavate for bell holes at each joint.
 - (2) Where rock is encountered, excavate a minimum of 6 inches below the bottom of the pipe for bedding.
- G. Dewater excavation as necessary to provide proper protection. If deemed necessary, the Department may require continuous dewatering 24 hours per day by adequate pumpage or well-points until backfilling is completed. The method, and equipment used for dewatering shall be subject to the approval of the Department.
- H. Where unsuitable soil is encountered, excavate to depth determined by the Department and replace with select backfill thoroughly and uniformly compacted.
- I. Where underground streams or springs are found, provide temporary drainage and notify the Department.
- J. Remove from project site and dispose of material unsatisfactory for backfill, trash, and all excess material continuously with the progress of the work.
- K. Remove shoring and all form materials, unless ordered to remain.

- L. Where rock is encountered so that a manhole, vault, or other structure will bear entirely on rock, it shall be used to support the foundation. Where only a part of the foundation would bear on rock, excavate to an even depth of 8 inches below the entire structure and backfill with aggregate fill and thoroughly compact.
- M. Provide a minimum of 8 inches between rock excavation and sides of structures.

3.7 Sheeting

- A. Maintain trench walls in a safe condition at all times. Provide sheeting, shoring, and bracing as necessary to prevent cave-in of excavation or damage to existing structures on or adjoining the site.
- B. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
- C. Maintain sheeting, shoring and bracing in excavations regardless of time period excavations will be open. Carry down sheeting, shoring and bracing as excavation progresses in accordance with the proper Department requirements.
- D. Sheeting, shoring and bracing left in place shall be cut off to a depth of not less than 18 inches below grade.

3.8 Pipe Bedding

- A. Bed all sewer pipes in accordance with bedding details as shown in Section 00870 - Standard Details.
- B. Except where otherwise shown on the Drawings, all gravity lines using rigid pipe such as ductile iron, etc. shall be Class B bedding as a minimum.
- C. Except where otherwise shown on the Drawings, all gravity lines using flexible pipe such as PVC, etc. shall be Class B-2 bedding as a minimum.
- D. Except where otherwise shown on the Drawings, all pressure lines using rigid pipe such as ductile iron, etc. shall be Class C-1 bedding as a minimum.
- E. Except where otherwise shown on the Drawings, all pressure lines using flexible pipe such as PVC, etc. shall be Class C-1 bedding as a minimum.
- F. Compact pipe bedding by tamping or rodding to prevent settlement.

3.9 Backfill

- A. Backfill trench to a compacted depth of 1 foot over the pipe with select backfill in accordance with the details shown in Section 00870 - Standard Details. Backfill shall

be placed by hand, uniformly on each side of the pipe and compacted in layers not exceeding 5". Do not backfill on muddy or frozen soil, or with muddy or frozen soil.

- B. Backfill trench from 1 foot above the pipe to grade with clean earth fill free of stones not larger than 5" or 1/2 the layer thickness, whichever is smaller. Layers shall not exceed 12", except that under road shoulders and under existing or future paved areas, layers shall not exceed 8 inches. Backfill shall be compacted to the density specified for the areas in which it is located except that minimum compaction in any area shall be to the density of the adjacent soil.
- C. Excavation depressions caused by removal of stumps or other clearing operations to firm subgrade, fill with clean earth fill and compact as specified.
- D. Place backfill materials evenly adjacent to structures. Take care to prevent wedging action of the backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
- E. Compact soil materials using equipment suitable for materials to be compacted and work area locations. Use power-driven hand tampers for compacting materials adjacent to structures.
- F. Compact aggregate fill placed around manholes or other structures to required density.

3.10 Compaction

- A. Percentage of maximum density requirements.
 - (1) Compact each layer of fill or backfill to not less than the following percentages of the maximum density at optimum moisture content as determined by ASTM D 1557 (AASHTO T-180).
 - 95% beneath and within 25 ft. of buildings and structures, including those shown for future construction.
 - 90% beneath pavements, walks, and road shoulders, including those shown for future construction.
 - 85% in other unpaved areas.

3.11 Grading

- A. Uniformly grade all areas within the limits designated on the Contract Drawings, including adjacent transition areas. Finish surfaces within specified tolerances with uniform levels or slopes between points where elevations are shown and existing grades.

- B. Finish all surfaces free from irregular changes.
- C. Finish subgrade areas to receive topsoil to within 0.10 foot of required subgrade elevations.
- D. Shape subgrade under walks to line, grade, and cross-section to within 0.10 ft. of required subgrade elevations.
- E. Shape subgrade under pavement to line, grade, and cross-section to within 0.10 ft of required subgrade elevations.
- F. Protect newly graded areas from traffic and erosion. Repair and reestablish grade in settled, eroded, or rutted areas to the specified tolerances.
- G. Where compacted areas are disturbed by subsequent construction or adverse weather scarify the surface, reshape and compact to the required density. Use hand tamper for recompaction over underground utilities.

3.12 Utilities to be Abandoned or Removed

- A. When underground utilities are to be abandoned in place, plug, cap, or seal with concrete at the "construction limits" or at points shown.
- B. Remove underground utilities indicated on the Drawings to be removed and backfill resulting excavation with suitable material, compacted as specified. Plug, cap or seal utilities with concrete, at the construction limits or at points shown.

3.13 Erosion Control

- A. Comply with local erosion control ordinance and with the "Virginia Erosion and Sediment Control Handbook" by the Virginia Soil and Water Conservation Commission to control erosion and sedimentation.
- B. Submit erosion control plan to the County for review and approval prior to commencing any grading operations.
- C. Install all applicable erosion and siltation control measures in accordance with approved plan prior to grading.
- D. No more than 500 feet of trench shall be open at any one time.
- E. All utility lines, not in streets, shall be mulched with hay or straw and seeded within 15 days after backfill.
- F. Any disturbed area, not paved, sodded or built upon by November 15 is to be seeded

on that date with oats, abruzzi rye, or equivalent and mulched with hay or straw.

- G. Protect graded areas from the action of the elements. Settlement or other damage that occurs prior to acceptance of the work shall be repaired and grades satisfactorily reestablished.
- H. Repair after cleanup: Upon completion of construction work and after spoils and debris have been removed; regrade any areas disturbed by operations.

3.14 Clean Up

- A. Keep area of Work cleaned up at all times and promptly remove all materials and debris not intended for incorporation in the Work. Broom clean the surfaces of all paved areas immediately after backfilling operations.
- B. Maintain backfilled trenches from the nuisance of dust, mud or settling during the entire length of the Contract and for a period of one year following Final Acceptance of the Work.
- C. In the event the Contractor fails to satisfy these requirements to the satisfaction of the Department, or otherwise prosecute the Work in a reasonable or proper manner, and after a reasonable period of time has elapsed after notification by the Department of unsatisfactory conditions, the Department reserves the right to employ outside services to take such corrective action as deemed necessary by the Department. The cost incurred in taking corrective actions will be deducted from any monies due the Contractor by the Department or such other means of collection as may be available to the Department.

3.15 Preparation for Final Inspection

- A. Locate and adjust all manholes, valve boxes, etc. to final grade and flush out all gravity pipe lines as necessary prior to final inspection by the Department. The costs of this work shall be included in the applicable bid prices.

3.16 Existing Driveways, Fences, Culverts, etc.

The Contractor shall return all driveways, fences, culverts, lawn areas, paved areas, etc. to the same condition existing prior to construction. Any culverts damaged during construction shall be replaced with new culverts at no cost to the Department.

END OF SECTION