

SECTION 31 20 00.00**EARTH MOVING (SITE EXCAVATION AND PLACEMENT OF FILL MATERIAL)****PART 1 GENERAL****1.1 DESCRIPTION**

- A. The work of this section includes, but is not limited to:
- B. Excavation
- C. Blasting
- D. Placement and compaction of fill material
- E. Related Work Specified Elsewhere:
 - 1. Earth Moving (Roadway, Excavation, Fill and Compaction): Section 31 20 00.01
 - 2. Earth Moving (Trenching, Backfilling and Compacting): Section 31 20 00.02
 - 3. Erosion and Sedimentation Controls: Section 31 25 00
- F. Definitions: NONE
- G. Applicable Standard Details: NONE

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Pennsylvania Department of Transportation (PennDOT), latest revision:
 - Publication 408, Specifications
 - Publication 213, Temporary Traffic Control Guidelines
 - Publication 19, Field Test Manual
 - PTM No. 106 Moisture-Density Relations of Soils (using 5.5 lb Rammer and 12 inch drop)
 - PTM No. 402 Determine In-Place Density and Moisture Content of Construction Materials by Use of Nuclear Gauges
 - 2. American Society for Testing and Materials (ASTM):
 - D698 Test Method of Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbf./ft³)
 - D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.-lbf./ft³)
 - D2922 Test Method for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
 - 3. American Association of State Highway and Transportation Officials (AASHTO):
 - T89 Determining Liquid Limit of Soils
 - T90 Determining Plastic Limit and Plasticity Index of Soils
 - 4. Pennsylvania Code
 - Title 67, Transportation, Chapter 459, Occupancy of Highway by Utilities
- B. Testing Agency:
 - 1. Compaction testing shall be performed by a Soils Testing Laboratory engaged and paid for by the CONTRACTOR and approved by the ENGINEER.

- C. Compaction Testing:
 - 1. Determine compaction by the testing procedure contained in ASTM D698 or ASTM D1557 at the locations and frequencies specified on Contract Drawings.

1.3 SUBMITTALS

- A. Certificates:
 - 1. Submit certified compaction testing results from the Soils Testing Laboratory.

1.4 JOB CONDITIONS

- A. Classification of Excavation:
 - 1. All site excavation work performed under this contract is UNCLASSIFIED, and includes excavation and removal of all soil, shale, rock, boulders, fill, and all other materials encountered of whatever nature.
- B. Control of Traffic:
 - 1. Employ traffic control measures in accordance with Publication 213, "Temporary Traffic Control Guidelines".
- C. Protection of Existing Utilities and Structures:
 - 1. Take all precautions and utilize all facilities required to protect existing utilities and structures in compliance with Pennsylvania Act 187. Request cooperative steps of the Utility and suggestions for procedures to avoid damage to its lines.
 - 2. Allow free access to Utility personnel at all times for purposes of maintenance, repair and inspection.

PART 2 PRODUCTS

2.1 ACCEPTABLE MATERIALS

For purposes of construction control, the following materials may be deemed acceptable for use in placement of fills:

- A. Soil. Soil shall include all inorganic material having a maximum size that can be readily placed and compacted in loose 8 inch layers and of which more than 35 percent shall pass the No. 200 sieve. Soil shall have a minimum dry weight density of 98 pounds per cubic foot as determined in accordance with PTM No. 106, Method B and a maximum liquid limit of 65 as determined in accordance with AASHTO Designation T89. The plasticity index, as determined by AASHTO Designation T90 for soils having liquid limits of 41 to 65 inclusive, shall be not less than that determined by the formula: Plasticity Index = Liquid Limit - 30.
- B. Granular Material. Granular material shall include all natural or synthetic mineral aggregates having a maximum size that can be readily placed and compacted in loose 8 inch layers and of which 35 percent or less shall pass the No. 200 sieve.
- C. Shale. Shale shall include all rock-like materials formed by the natural consolidation of mud, clay, silt and fine sand and usually thinly laminated, comparatively soft and easily split, having a maximum size that can be readily placed and compacted in loose 8 inch layers.
- D. Rock. Rock shall include all igneous, metamorphic and sedimentary rock having a maximum size that can be readily placed and compacted in loose 8 inch layers and which generally has sufficient fines to normally fill all the voids in each layer.

- E. Random Materials. Random material shall include any combination of the above classifications and may include old concrete, brick, etc., from demolition having a maximum size that can be readily placed and compacted in loose 8 inch layers, and which has been approved by the ENGINEER.
- F. Flowable Fill. As defined in Section 31 20 00.02 and approved in advance by the ENGINEER.

PART 3 EXECUTION

3.1 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate the work to ensure the least inconvenience to traffic and maintain traffic on one or more unobstructed lanes unless closing of the roadway is authorized.
- B. Maintain access to all streets and private drives and for emergency vehicles.
- C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform with construction operations and to keep traffic flowing with minimum restrictions.
- D. Comply with State and local codes, permits and regulations.

3.2 PLACEMENT OF FILL MATERIAL

- A. After removal of topsoil, areas to receive fill shall be thoroughly rolled, and any soft spots disclosed by rolling shall be excavated and the unsuitable material removed and disposed of in a waste area. The excavated area shall be filled with suitable fill material approved by the ENGINEER and recompacted. Suitable fill material shall be spread in layers of not more than 8 inches (loose) over the full area of the fill, and compacted to the required density by the use of compaction equipment. All fill material shall be compacted to not less than 95% of its maximum dry weight density at its optimum moisture content, plus or minus 2%, as determined by ASTM D698, under roadways, shoulders, driveways, curbs, sidewalks, gravel and sand parking areas and not less than 90% in yards, fields and sand areas. When the material is too coarse to satisfactorily use these methods, compaction will be determined by the ENGINEER based on non-movement of the material under the equipment.
- B. Fill material placed in areas inaccessible to the compaction equipment shall be placed in uniform loose layers not exceeding 4 inches in depth and compacted by means of approved mechanical tampers to the density requirements herein specified.
- C. When a previously constructed fill requires additional material to bring it to required elevation, the top of the fill shall be thoroughly scarified before the required additional material is placed.
- D. Material containing moisture in excess of that percentage which will ensure satisfactory compaction shall not be placed in the fill and fill material shall not be placed on material that has become unstable due to excessive moisture.
- E. Frozen fill material shall not be placed in fills, and fill material shall not be placed on frozen material. If during construction the top of the fill freezes, all frozen material shall be removed before additional material is placed.
- F. Wet or frozen materials which would be suitable when dried or when thawed and dried, may be wasted by the CONTRACTOR for his convenience only with the written permission of the ENGINEER, and subject to replacement in equivalent volume, at the expense of the CONTRACTOR. However, in no case shall waste material be disposed of in the flood channel or floodway area of any stream.
- G. Shale and random material containing an excessive quantity of large fragments shall be so placed that the coarser material is in areas where no building foundations or utility trenches are to be located. The

large pieces shall then be broken down by the use of approved equipment until all voids are filled. Mixtures of shale and rock shall be placed in accordance with the requirements for placing shale.

- H. Where fill is to be constructed on a slope, the slope shall be benched to the width and depth shown on the drawings or as approved by the ENGINEER.

3.3 EXCAVATION

- A. Perform excavation of borrow material in a manner satisfactory to the ENGINEER. Strip borrow pits of brush, trees, roots, grass and other vegetation prior to removal of material for use in fill. During the excavation operation, grade the borrow area to ensure free drainage of water from the area. Place and maintain erosion control devices after completion of the excavation, grade the excavated area, including side slopes, to drain and present a uniformly trim appearance merging into the surrounding terrain. After borrowing operations are complete, re-grade area, if necessary, to prevent erosion.

3.4 BLASTING

- A. Blasting is prohibited.

3.5 CONTROL OF EXCAVATED MATERIAL

- A. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.
- B. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural water courses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of the work.
- C. Comply with requirements of Section 31 25 00- Soil Erosion and Sedimentation Control.

3.6 DEWATERING

- A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work.
- B. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.
- C. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.7 DISPOSAL OF EXCAVATED MATERIAL

- A. Excavated material remaining after completion of placement of fills shall remain the property of the CONTRACTOR, removed from the construction area, and properly disposed of.

3.8 FOREIGN BORROW MATERIAL

- A. Foreign borrow consists of excavation, placement and compaction in fill areas of approved material obtained from sources outside the project limits.
- B. The CONTRACTOR shall make his own arrangements for obtaining all foreign borrow material and pay all costs involved.

END OF SECTION