

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
SECTION 02330 EMBANKMENT

PART 1 – SCOPE

1.01 This work consists of building controlled embankments; disposal of unsuitable material from beneath embankment areas; construction and removal of temporary detours ordered by the Owner and the sloping, shaping and dressing of all slopes.

1.02 Embankment work shall consist of constructing roadway or street embankments including preparation of the areas upon which they are to be constructed by the placing and compacting of material in holes, pits, and other depressions within the embankment area, all in conformity with the lines, grades, and typical cross-sections shown on the Plans. Only approved materials shall be used in the construction of embankments.

PART 2 – EQUIPMENT

2.01 All equipment for the satisfactory performance of embankment construction shall be on the project and approved by the Owner before the work will be permitted to begin. Compaction shall be accomplished by any type of compacting equipment that will produce the required result.

PART 3 – CONSTRUCTION REQUIREMENTS

3.01 GENERAL

A. Prior to beginning embankment operations all necessary Clearing and Grubbing and Removal of Structures and Obstructions shall have been completed in the area in accordance with Sections 02220 and 02230 of these Specifications. The removal of unsuitable material and/or undercutting ordered by the Owner will not be considered contract items and these two operations will be included in either excavation (unclassified) or embankment (unclassified) respectively. If there is insufficient suitable material from excavation on the project, it shall be the Contractor's responsibility to obtain the additional material off the project to complete embankments according to the lines, grades, and cross-sections on the Plans.

B. When ordered by the Owner, water used for dust control will be paid for as a contract item.

C. The Contractor shall provide for proper drainage of the project area to protect from ponding and erosion.

3.02 EMBANKMENTS

A. This work shall consist of constructing roadway or street embankments including the preparation of the area upon which they are to be constructed, the placing and compacting of approved materials where unsuitable material has been removed, and the placing and compaction of embankment material in holes, pits, and other depressions not filled in accordance with Sections 02220 and 02230. All work shall be in accordance with these Specifications and in conformity with the lines, grades, and cross-sections shown on the Plans. Only approved materials shall be used in the construction of embankments, which material shall come from excavation on the Project or from approved sources furnished by the Contractor.

B. Any area upon which an embankment is to be constructed shall be plowed or scarified, all cleavage planes destroyed, and the area rolled thoroughly with a sheeps-foot roller before embankment construction is begun in the area. An area upon which an embankment is to be constructed having a slope steeper than 3 to 1 shall be benched with steps of not less than eight (8) inches rise before any embankment materials are placed thereon. Benching shall be of sufficient width to permit the operation of placing and compacting equipment. Each successive benching cut shall begin at the intersection of the original ground line and the vertical side of the previous cut. Material thus cut out shall be recompacted along with new material at the Contractor's expense.

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C. Embankment construction will not be permitted within fifty (50) feet of any structure or proposed structure until such structure is cured sufficiently to permit embankment formation against it. This requirement will be waived when an embankment or portion thereof is to form the foundation of a structure or part thereof. Embankment to be placed on both sides of a concrete wall, manhole, or box type structure shall be so constructed that the embankment is always approximately the same elevation on both sides of the structure. Embankments on only one side of abutments, wingwalls, or piers shall not be constructed until the superstructure is in place or final concrete design strength has been obtained.

D. Where embankment is to be constructed across ground that will not support earth moving equipment, the fill shall be started with a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. In the construction of such a lift the density requirement will be waived but the moisture content of the material used shall not exceed the optimum moisture content for that material. Maximum thickness and minimum density requirements will apply to all succeeding layers of embankment construction. Each succeeding layer of embankment is to be constructed with a compacted thickness not to exceed six (6) inches and shall be approved before material for the next succeeding layer is placed.

E. Embankments shall be so constructed that adequate surface drainage will be provided at all times. Roadway embankment materials shall be placed in horizontal layers not to exceed a depth which will produce a six (6) inch compacted layer. Each layer shall be compacted for the entire embankment width to a density no less than ninety-five (95) percent of maximum density as determined in accordance with the standard specification of compaction and density of soils, AASHTO T 99. The moisture content of the embankment material shall be controlled in such a way that the material will be compacted with a moisture content ranging from two (2) percent below to two (2) percent above the optimum moisture content as determined from the above mentioned test and approved by the Owner. If the moisture content of the material in the embankment prior to compaction is greater than two (2) percent above the optimum moisture content, the material shall be aerated by disking, harrowing, plowing, or other means approved by the Owner, who shall be the sole judge as to when the required density has been obtained. For each layer of embankment material, the Contractor shall disk sufficiently to break down oversize clods, thoroughly mix any different materials, secure correct moisture content, ensure uniform density, and obtain proper compaction. Rolling with compacting equipment shall start longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half of the width of the tamping roller. Tamping equipment shall be operated at a speed of no more than three (3) miles per hour.

F. The Contractor shall be responsible until final acceptance for the stability of all embankments and shall replace at this own expense any portion which in the opinion of the Owner has become displaced or damaged due to carelessness, negligence, or by rainfall and weathering.

G. The slopes of all embankments, ditches, channels, and such other appurtenances as may be indicated on the Plans shall be shaped and trimmed to the lines, grades, and cross-sections shown or as directed by the Owner. This work shall also include the satisfactory shaping of spoil banks, waste deposits, and any other areas deemed necessary by the Owner to prepare the project for final inspection and acceptance.

H. Water for dust control when ordered by the Owner, whether to comply with local air pollution ordinances, safety, or good construction practices, shall be readily available along with adequate distribution equipment.

PART 4 – MEASUREMENT

4.01 A. Embankment (Unclassified) Embankment construction will be computed by the cubic yard in place, compacted and ready for acceptance. Measurements for computations will be made by

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cross-sections and the average-end-area method. Original cross-sections and final cross-sections will be taken from sections shown on the Plans

B. Water. Water for dust control will be measured by the 1,000 gallon unit. No payment will be made for any other water used on the project to maintain moisture control in embankment compaction or for stabilization.

C. General. It is the intent of these Specifications to pay only for quantities of Embankment as shown on the Plans or Proposal, and it shall be the Contractor's responsibility to ensure that excavation materials are suitable for embankment construction. Plan changes in grade or project limits may alter payment to the limits allowed in the General Conditions of Division 0.

PART 5 – PAYMENT

5.01 Embankment (Unclassified)

A. Payment will be made at the contract unit price per cubic yard in its final position, in place, compacted, and accepted by the Owner, which price shall be full compensation for the preparation of the area, furnishing, depositing and compacting the material, and the shaping and trimming of the embankments to the lines, grads, and cross-sections shown on the Plans.

5.02 Water

A. Water for dust control will be paid for at the contract unit price per 1,000 gallons (M.G.), which price will be full compensation for furnishing and distributing the water as directed by the Owner.

5.03 General

A. It is the Contractor's responsibility to ensure that adequate acceptable material is available to complete the project, and variations in shrinkage factors, undercut quantities, or unsuitable material quantities will not relieve him from that responsibility.

5.04 Payment will be made under:

<u>Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02330-01	Embankment (Unclassified)	Cubic Yard
02330-02	Water	M.G.

END OF SECTION 02330