

Subsection 4.02 Earthwork

I. Scope: This item includes the required excavation within the project limits, placement and compaction of approved earth materials for embankment, the removal and disposal of all excavated materials not required, and the shaping and finishing of all subgrade and in conformity with the required lines, grades, and cross sections.

II. Materials

A. Soil: Excavated materials shall be used where possible within project limits. Imported soil and excavated soil shall meet the requirements below.

B. Water: Water usage shall conform to Subsection 3.04 "Requirements for Water Usage."

III. Equipment

A. General: Unless otherwise provided, the Contractor shall furnish all machinery, tools, equipment, and qualified equipment operators for the proper prosecution and completion of the work. All equipment shall be maintained in good repair and operating condition and shall be approved by the Engineer prior to use.

Suitable and sufficient compacting equipment shall be provided to obtain the required densities and stabilities complete compaction of embankment and subgrade. Compaction equipment shall obtain the required densities and stabilities. Rollers will meet requirements of Subsection 4.27 "Rolling."

Where the existing ground elevation is higher than the top of curb elevation, the embankment shall be cut back on the slopes shown on the plans.

Where the existing ground elevation is lower than the top of curb elevation, the space behind the curb shall be backfilled on a maximum slope of six to one from the top of curb unless otherwise shown on the plans.

IV. Construction Methods

A. Excavation: The Contractor shall excavate to the lines and grades as shown on the plans.

1. The contractor will accept ownership of unsuitable or excess material and dispose of material in accordance with local, state and federal regulations at locations outside of the right of way. All rock, flexible paving, bushes, shrubs, trees, and other material not designated by a bid item in the project proposal shall be removed by the Contractor at the unit price bid for earthwork or other similar bid item. Excavation will be unclassified. The Contractor is expected to satisfy himself as to the nature of the excavation expected including the need for

rock cuts as listed below. The Contractor shall not dispose of any material in any "Flood Hazard Area" within the City limits or its extraterritorial jurisdiction. The Contractor shall be familiar with "Flood Hazard Areas" limits.

2. Rock Cuts: Excavate to finish grade. Manipulate and compact subgrade in accordance with Section 4.02.V.B Embankment unless excavation is to clean homogenous rock at finish subgrade elevation. If excavation extends below finish subgrade, use approved embankment material compacted in accordance with Section 4.02.V.B Embankment to replace undercut material at no additional cost.

3. Earth Cuts: Excavate to finish subgrade. In areas where base or pavement structure will be placed on subgrade, scarify subgrade to a uniform depth at least 6 inches below finish subgrade elevation. Manipulate and compact subgrade in accordance with Section 4.02.V.B Embankment.

If unsuitable material is encountered below subgrade elevations, take corrective measures as directed. Drying required deeper than 1 foot below subgrade elevation will be paid for in accordance with pertinent Subsections of Article 10.1.1, "Change Orders" in the Uniform General Conditions for City of Amarillo Construction Contracts.

B. Embankment: Furnish, place and compact materials for construction of Streets, Alleys and other embankments shown on the plans.

1. Furnish the ODR with a submittal for a proctor for material to be used on the project whether existing material or imported material. Submittal must be approved before embankment work begins. The material must meet requirements of Table 1.

Table 1
Testing Requirements

Property	Test Method	Specification Limit
Liquid limit	Tex-104-E	≤45
Plasticity index (PI)	Tex-106-E	≤15

2. Backfill holes and excavations with approved material and compact. Restore the ground surface, including any material disked loose or washed out, to its original grade. Compact the ground surface by sprinkling in accordance with Subsection 4.32 "Sprinkling," and by rolling using equipment complying with Subsection 4.27 "Rolling," when directed by ODR.
3. Where embankment is to be placed adjacent to or over existing subgrade, the existing subgrade shall be scarified and recompacted with the next layer of the new embankment. The total depth of the scarified and added material shall not exceed the permissible layer depth. Apply water to achieve the uniform moisture content specified for compaction. Construct embankments to the grade shown on the plans after completion of the earthwork portion, it shall be continuously maintained to its finished section and grade until the project is accepted.
4. Scarify and loosen the unpaved surface areas, except rock to a depth of at least 6 in. unless otherwise shown on the plans. Do not place objectionable material in fill areas. Recompact material the loosened material.

V. Compaction Methods: Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least 1/2 the width of the roller. Compact embankments and subgrade in accordance with the method shown on the plans. Prior to compaction, the layers shall not exceed 6 inches in depth where pneumatic tire rolling is to be used and shall not exceed 8 inches in depth for rolling with other types of rollers.

A. Ordinary Compaction: Use approved rolling equipment complying with Subsection 4.27 "Rolling," to compact each layer. The ODR may require specific equipment. Determine layer thickness based on the ability to meet required density, but cannot exceed thickness shown above. Before and during rolling operations, bring each layer to moisture content directed by the ODR. Compact each layer until there is no evidence of further consolidation. Maintain a level layer to ensure uniform compaction. If the required stability or finish is lost for any reason, recompact and refinish the layer at no additional expense to the City.

B. Density Control: Compact each layer to the required density using equipment that complies with Subsection 4.27 "Rolling." Determine layer thickness based on the ability to meet required density, but cannot exceed thickness shown above. Each layer is subject to testing by the ODR for density and moisture content. Where layers of unlike materials abut each other, each layer shall be featheredged for at least 50 feet or the material shall be so mixed as to prevent abrupt changes in the compacted soil. During compaction, the moisture content should not exceed 2% over the value shown on the proctor. Each layer of embankment shall be uniform as to material and moisture content before beginning compaction. Subgrade is required to meet 95% of dry density shown on the proctor and the moisture content must be within +/- 2%. Proof roll in accordance with Subsection 4.31 "Proof Rolling," when shown on the plans or directed by the ODR. Correct soft spots as directed.

C. Maintenance of Moisture and Reworking: Maintain the density and moisture content once layer once it has been tested, maintain layer until next lift is

ready to be placed or a surface is applied. Rework the material to obtain the specified compaction when the material loses required density or moisture.

D. Grade Tolerances: Grade to within 1/2 inch of the cross-section and 1/2 inch in 16 feet measured longitudinally.

VI. Measurement: Earthwork will be defined on the plans. The payment types are as follows:

A. Square yard: Square yard will be measured in its final position.

B. Cubic Yard: Cubic yard will be measured in its final position using average end area method. The volume is computed between the original ground surface or the surface upon which the embankment or excavation is to be constructed. Shrinkage or swell factors will not be considered in determining the calculated quantities.

C. Cubic yard by Topographical Survey: The contractor shall perform survey before excavation or embankment begins. The contractor shall produce a survey for each monthly estimate, or the ODR shall estimate quantities and a final survey will be done at the end of the project to determine final quantity.

VII. Payment: In the square yard measurement method, the unit price shall be full compensation for excavating, hauling, compacting, shaping, fine grading, wetting, rolling, removal of trees, shrubs and existing pavement, and all other work required in the excavation and embankment operation.

In the cubic yard measurement method, the appropriate excavation and embankment items will be in the proposal.

The work performed and material furnished shall be paid for at the unit price bid for the appropriate bid item. This unit price shall be full compensation for securing and furnishing all materials involved; for all processing required; for loading, hauling, delivering, placing, and spreading for blading, shaping, and compacting to the specified grade; and for all manipulation, labor, tools, and incidentals necessary to complete the work.

LAST PAGE OF THIS SUBSECTION