

**ITEM 0103801**

**EARTHWORK & FORMATION OF EMBANKMENT**

**DESCRIPTION**

Earthwork and Formation of Embankment will consist of the removal and satisfactory disposal, in the manner herein required, of all material taken from within the limits of the work contracted for, the removal of which is necessary for the construction of the roadbed, sub-grade, shoulders, slopes, entrances, retaining walls, gutters, channels and other miscellaneous construction to the dimensions and limits shown on the plans or as ordered and shall include the necessary excavation for pervious structural backfill outside of structure excavation limits. It shall also include the formation of embankments, the disposal of surplus or unsuitable material concrete or masonry walls, crib walls, bin walls, stone wall fences or farm wall fences and filling of cellar or other holes and in the absence of such items in the contract, the clearing and grubbing and the shaping and cleaning of slopes and of shoulders.

**REFERENCED ITEMS**

Item 0103001

**REQUIRED SUBMITTALS**

None

**MATERIALS**

Shall include all materials removed as indicated or directed except water and "Rock" Shall include rock in definite ledge formation and boulders, or the portion of boulders, one (1) cubic yard, or more, in volume.

**CONSTRUCTION METHODS**

Excavation shall be made in conformity with the requirements of the plans and as ordered by the City. The Contractor shall, when necessary in excavation areas, provide and maintain ditches that are adequate to prevent free water from becoming incorporated in material to be used to form embankments, such ditching to be at the sole expense of the Contractor.

Sod and other unsuitable material shall be disposed of off site. Frozen material, otherwise suitable for formation of embankments shall be placed on embankment slopes or disposed of as directed by the City. The City may direct the removal of

any portion of an accepted layer that has become frozen after placement and compaction. This removal of frozen material shall be at the sole expense of the Contractor.

**1. EXCAVATION OF ROCK**

When bedrock is encountered, it shall be excavated to the slope lines and depths indicated on the plans. Rock excavation will be paid for, and be in conformance with Item 0103001-Rock Excavation.

**2. PLACEMENT OF EXCAVATED MATERIAL**

All suitable excavated material shall be used in the formation of embankments, except as provided elsewhere herein or as ordered by the City surplus or unsuitable material shall be removed from the site.

Overhaul will not be allowed; but excavated material shall be transported where directed, provided the designated point of deposit is not more than 100 yards beyond the limits of the work contracted for, unless stated otherwise in the special provisions or plans.

When embankments are to be constructed on slopes steeper than 1 vertical to 3 horizontal, the slope of the existing ground on which the embankment is to be placed shall be plowed deeply or cut into steps before the filling is begun.

Embankments shall be constructed of earth, rock, or a mixture of earth and rock. The embankment shall be constructed by depositing successive layers of fill for the full width of the embankment, unless a partial width is permitted by the contract documents or by the City. No embankment layer shall be deposited on surfaces of snow or ice, nor shall it be placed on frozen or unstable surfaces except under the conditions permitted elsewhere herein. If the Contractor is permitted to continue work, he shall remove, at no cost to the City, any frozen embankment material unless otherwise directed by the City.

The depth of each layer, before compaction, shall not exceed 12 inches except as permitted hereinafter by these specifications, or with the permission of the City.

The embankment shall be crowned or pitched to provide drainage at the close of each day's operations.

When excavated material consists predominantly of rock fragments of such size that material cannot be placed in horizontal layers of the thickness specified above without crushing or further breaking down the pieces resulting from the excavation methods, such material may be placed in the embankments in horizontal layers not exceeding 3 feet in thickness. Large stones shall not be placed in nests but shall be distributed over the area; and the interstices shall be filled with spalls, finer fragments or earth to form a solid, compact mass.

The entire area of each layer shall be leveled off by suitable grading equipment and shall be compacted as hereinafter specified.

In portions of roadway embankments where piles are to be driven, the Contractor shall not place any material that might interfere with pile driving operations. The correction of any condition that interferes with the pile driving operations in embankments constructed under the contract shall be made by the Contractor at no cost to the City.

No rock fill shall be placed above an elevation that is 2 feet below the top of the embankment.

No stone over 5 inches in its greatest dimension shall be placed within 12 inches of the elevation of the top of the prepared sub-base unless otherwise specifically authorized.

Prior to the formation of any embankment, the Contractor may submit a plan in a form acceptable to the City for grading operations detailing the location of embankment material sources and points of deposit for the entire project in order to qualify for payment for overhaul as hereinafter provided. Failure to submit such a plan will be construed as a waiver of any and all rights to payment for overhaul.

### 3. **COMPACTION**

The entire area of each layer shall be uniformly compacted to at least the required minimum density by use of compaction equipment consisting of rollers, compactors or a combination thereof. Earth-moving and other equipment not specifically manufactured for compaction purposes shall not be considered as compaction equipment.

The dry density after compaction shall be not less than 95 percent of the dry density for that soil when tested in accordance with ASTM D-1557-02,

Method C in areas of paving, structures and footings. The same compaction requirements shall apply to cut areas under paving structures and footings.

In planted areas, the compaction shall be not less than 90 percent of that obtained by ASTM D-1557-02, Method C.

If necessary to obtain the required compaction, water shall be added to acquire optimum moisture content.

**4. STABILITY**

If after full-compliance with the requirements of these specifications with regard to excavation, placement and compaction density requirements, a stable embankment, or sub-grade has not been obtained, the Contractor shall proceed to perform such corrective work as is necessary to produce a stable embankment or sub-grade. This work may include, but not necessarily be limited to control of moisture to within limits suitable for obtaining the required stability; blending with rock or granular material from roadway excavation or borrow, or free draining material or any combination thereof; removal and replacement with acceptability compacted material or a combination of methods approved by the City. Any of the foregoing methods may be supplemented by suspending embankment operations and allowing the material to dry.

When embankments are constructed of material from earthwork and formation of embankments, and the City determines that the material properly compacted is not sufficiently stabilized, the cost of corrective measures directed by the Engineer shall be paid at applicable contract unit prices, or in the absence thereof, as extra work.

When embankments are constructed of borrow, they shall be stable. In this case, however, the methods and materials used to obtain such stability shall be determined by the Engineer and performed at the expense of the Contractor.

**5. SURPLUS EXCAVATED MATERIAL**

All surplus excavated material shall be used where directed by the City to uniformly widen embankments, to flatten slopes, to fill places in the right-of-way, or for such other purpose as the Engineer may direct, provided that area designated for deposit does not conflict with Sub-Article 4.

Any surplus or unsuitable material not required, will not be permitted to be used for such purposes, and shall be disposed of in accordance with Sub-article 7 below.

6. **FENCES**

The Contractor shall erect either permanent or temporary fence to the satisfaction of the Engineer, at all points where the land is used for pasturing, and where the existing fences are affected by the grading operations. Permanent or temporary fences shall be erected prior to the removal or destruction of the existing fence, and any temporary fence erected shall be removed when no longer required. There will be no direct payment for any temporary fence erected, but the cost thereof shall be considered as included in the cost of this item.

7. **DISPOSAL OF UNSUITABLE MATERIAL**

When the Engineer has not directed otherwise, the Contractor shall dispose of trees, stumps, logs, woody vegetation and unsuitable excavated excess material by removing it from the site and properly disposing of it.

8. **SLOPES**

Earth slopes with a degree of slope from 2:1 to 5:1 shall be tracked unless the Engineer directs otherwise. Tracking shall consist of traversing the slopes with cleated tracks so that the cleat indentations are horizontal. Where topsoil is to be placed on slopes, that tracking shall be done prior to the installation of the topsoil.

Tracking is not to be construed as use for slope compaction. Its sole purpose is to provide indentations in the slope to help reduce soil erosion. Other methods of achieving the desired results may be used with the permission of the Engineer.

**METHOD OF MEASUREMENT**

Earthwork will be measured for on a lump-sum basis for performing all work, supplying all materials, supervision, equipment, and labor necessary to achieve proposed grades. There will be no additional payment for clearing and grubbing, excavation, grading, furnishing or installing borrow for sub-grade, transporting, and reusing suitable fill or removing excess material from the site, digging test pits,

stripping or stockpiling topsoil, compacting, or de-watering, but the cost of this work is to be included in the price for earthwork.

When rock is encountered, and its removal is to be paid for as ROCK EXCAVATION, the Contractor shall strip or expose the rock to such an extent that in the Engineer's opinion the necessary measurements can be taken. The Contractor shall notify the City at least 2 days prior to disturbing any of the rock to allow ample time to obtain the necessary measurements. If the Contractor fails to give such notice, or removes any rock prior to the taking of the measurements, the City shall presume that measurements take at the time the Contractor first sees the material in will give a true quantity of excavation.

**BASIS FOR PAYMENT**

“EARTHWORK AND FORMATION of EMBANKMENTS” will be paid for at the contract lump sum price. Work shall be in accordance with the specifications given herein and subject to the method of measurement described above. The price shall include all equipment, tools, and labor incidental to the completion of the excavation, the formation and compaction on embankments, and the disposal of surplus or unsuitable material in accordance with the provisions of the plans and of these specifications.

<b><u>PAY ITEM</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>PAY UNIT</u></b>
0103801	Earthwork & Formation of Embankment	LS