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CHAPTER 2

EARTHWORK

2.00 GENERAL

Earthwork shall include all necessary clearing, grubbing, stripping and excavation within the limits of the Work. Earthwork shall include but not be limited to removal of obstructions, removal and disposal of unsuitable materials and debris, borrow, excavation, construction of fills and embankments, park spacing, ditch excavation and any other item of Work necessary to conform to these Standard Specifications, and to conform to the line, grade and cross section shown on the plans, or as directed by the City’s Project Manager.

2.01 GENERAL CLEARING AND GRUBBING

A. GENERAL

The necessary removal of all trees and stumps less than 12” in diameter, brush, roots, shrubs, trash, etc. within the limits of the project shall be as directed by the City’s Project Manager. The debris removed shall be disposed of at an appropriate, off-site location. No burning will be allowed at the site of the Work.

Roots 2” in diameter or greater shall be removed to a depth of at least 12” below natural ground, subgrade, or finish grade elevation as directed by the City’s Project Manager.

B. BASIS OF PAYMENT

General clearing and grubbing shall not be measured and paid for directly. The cost of this Work shall be considered subsidiary to other items of Work for which direct payment is made.

When called for in the proposal, clearing and grubbing shall not be measured, but shall be paid for at the contract unit price bid as a lump sum for GENERAL CLEARING AND GRUBBING. Such payment shall be full compensation for all tree and stump removal, removal of brush, roots, shrubs, trash, fencing which is not to be replaced, and for all materials, equipment, tools, labor and incidentals necessary to complete the Work in conformance with these Standard Specifications and accepted by the City’s Project Manager.

2.02 TREE REMOVAL

A. GENERAL

Trees 12” in diameter or greater measured 24” above the ground shall be removed from the site of the Work together with their stumps and roots 2” in diameter or greater. Existing stumps and stumps resulting from tree removal, together with roots 2” in diameter or greater shall be removed to a depth of at least 12” below natural ground, subgrade or finished grade. The resultant organic material shall be removed from the job site and the remaining hole shall be filled and compacted in conformance with these Standard Specifications.
2.02 TREE REMOVAL (Continued)

B. BASIS OF PAYMENT

Trees 12” in diameter and larger and their stumps, removed in conformance with these Standard Specifications and accepted by the City’s Project Manager, shall be measured and paid for at the contract unit price bid per each for TREE REMOVAL _____” to _____” for the various sizes called for.

Such payment shall be full compensation for the removal of the tree and its stump, backfilling, disposal of organic matter, materials, equipment, tools, labor, and incidentals necessary to complete the Work.

Existing stumps 12” in diameter and larger, removed in conformance with these Standard Specifications and accepted by the City’s Project Manager, shall be measured and paid for at the contract unit price bid per each for STUMP REMOVAL _____” to _____” for the various sizes called for. Such payment shall be full compensation for removal of the stump, backfilling, disposal of organic matter, materials, equipment, tools, labor and incidentals necessary to complete the Work.

2.03 TRANSPLANT TREE (SAPLINGS TO 6”)

A. GENERAL

Trees to be transplanted, as shown on the plans, shall be moved to their new locations using truck or tractor-mounted equipment designed to perform such Work. The equipment to be used and method shall be approved by the City’s Project Manager prior to performing such Work. When the new location is not shown on the plans, the tree shall be transplanted to a location on the job site as designated by the City’s Project Manager.

Transplanted trees shall be staked and wired to provide support and maintain the tree in a vertical position for a minimum of one full growing season.

B. BASIS OF PAYMENT

Trees which are transplanted in conformance with these Standard Specifications and accepted by the City’s Project Manager shall be counted and paid for at the contract unit price bid each for TRANSPLANT TREE (SAPLINGS TO 6”). Such payment shall be full compensation for transplanting the tree, backfilling, supporting the tree, materials, tools, labor and incidentals necessary to complete the Work.

2.04 REMOVE & RESET FENCE

A. GENERAL

Where indicated on the plans or in the Special Provisions, fences to be removed and reset shall be removed by the Contractor, stockpiled during construction, and reconstructed in their original location or at locations indicated. The Contractor shall use all salvageable materials for resetting the fence whenever possible. When the material is not reusable, the Contractor shall supply new materials in order to restore the fence to at least its original condition.
2.04 REMOVE & RESET FENCE (Continued)

B. BASIS OF PAYMENT

Fence removed and reset using new or salvaged material, constructed in conformance with these Standard Specifications and accepted by the City’s Project Manager, shall be measured and paid for at the contract unit price bid per linear foot for REMOVE AND RESET FENCE. Such payment shall be full compensation for all removal, excavation, stockpiling, reconstruction, new materials when required, equipment, tools, labor and incidentals necessary to remove and replace the fence.

2.05 EXCAVATION

A. GENERAL

All suitable material obtained from excavating the existing embankments shall be used as far as practicable in the formation of fills or embankments and at such other places on the Work as may be necessary. Excess excavated material shall be disposed of in appropriate areas selected by the Contractor.

When unsuitable material is encountered in the subgrade beyond the limits of the typical section, it shall be excavated as directed by the City’s Project Manager. The limits of such over-excavation shall be approved by the City’s Project Manager and the material removed from the subgrade, shall be hauled and deposited at an appropriate location. Additional suitable material shall be obtained by the Contractor and incorporated into the fill according to the compaction requirements specified in Chapter 2.

When over-excavation of material in a cross section is identified on the plans to establish uniform density, the excavated materials may be used in the finished section, provided that the compaction and moisture requirements in Chapter 2 are satisfied.

When the amount of suitable excavated material within the limits of the Work is not sufficient or accessible in time to complete the fills or embankments, the City’s Project Manager shall be notified by the Contractor of proposed borrow location(s) at least one week in advance of construction. The use of the proposed borrow shall not be authorized until sampling and testing of the proposed borrow material(s) has been completed and suitability based on compliance with all project requirements has been determined to the satisfaction of the City’s Project Manager.

When so designated on the plans, borrow shall be taken from the designated areas in conformance with lines and grades furnished by the City’s Project Manager. When completed, all areas shall be left in a neat condition with no sharp breaks in contour, and shall be sloped to drain without causing damage to adjacent properties.

During progress of the Work, the excavation shall be maintained comparatively smooth and in such condition that it shall adequately drain at all times.
2.05 EXCAVATION (Continued)

B. BASIS OF PAYMENT

Final measurement of the various specified quantities of excavation shall not be made. The quantity shown on the plans shall be an established quantity and shall be the basis of payment at the contract unit price per cubic yard bid for EXCAVATION, OVER-EXCAVATION, OR EXCAVATION BORROW. EXCAVATION when called for on the plans is the quantity of material to be removed and subsequently used to construct embankments in order to complete the required section. OVER-EXCAVATION when called for on the plans shall be the quantity of material to be removed and re-compacted prior to completing the required section. EXCAVATION BORROW when called for on the plans shall be the quantity of material that must be obtained off site in order to complete the required section. All such payments shall be full compensation for all stripping of vegetation, conservation of top soil, excavation, over-excavation, compaction, incorporation of water when required, materials, equipment, tools, labor and incidentals necessary to complete the Work.

When authorized by the City’s Project Manager, removal of unsuitable material shall be measured and added to the established quantities as an EXTRA WORK item.

All the aforementioned quantities are established by average end areas of the cross-sections with no balance factor used. These quantities do not include material excavated for pipe trenches, inlets, retaining wall, bridge abutments or any other appurtenances installed in the completed section. Those excavated materials shall be subsidiary to other items of Work for which direct payment is made.

2.06 DISPOSAL OF SURPLUS MATERIALS

A. GENERAL

All excavated material not required or suitable for fills or other designated purposes shall be removed from within the limits of the Work and deposited at an appropriate, off-site location. Surplus materials shall, in general, be removed and disposed of before the subgrade has been completed and before any construction materials are placed.

Surplus materials, if left on the project site and placed on public or private property, shall be dumped, spread and finished to grades as designated.

B. BASIS OF PAYMENT

Final measurement of the specified quantity of surplus material shall not be made. EXCAVATION DISPOSAL, when called for on the plans, shall be the quantity of excess material measured in cubic yards which must be removed from the site and disposed of at an appropriate, off-site location. All such payments shall be full compensation for equipment, tools, labor and incidentals necessary to complete the Work.

2.07 CONSERVATION OF TOP SOIL

Topsoil shall be carefully removed and deposited in storage piles at the job site or as directed by the City’s Project Manager for the purpose of parking space finishing. Topsoil shall be kept separate from other excavated materials and shall be piled free from roots, stones and other undesirable material.

No direct payment will be made for conservation of topsoil. Topsoil conservation shall be considered subsidiary to other items of Work for which direct payment is made.
2.08 EMBANKMENT

A. GENERAL

EMBANKMENT shall be defined as the raised soil structure of the roadway and all other fill areas associated with the construction of the project.

Areas to be filled shall be stripped of all vegetation and other debris. The stripped material shall be disposed of as hereinafter specified.

Fills and embankments shall be constructed of approved material and shall not contain any large logs, stumps, brush, sod, roots, weeds, debris or other perishable matter. Thoroughly pulverized sod mixed with earth may be deposited in the fill only when authorized by the City’s Project Manager.

No stones or rocks larger than 3” in diameter will be allowed in the top 2’ of the constructed embankment. No stones or rocks larger than 8” in diameter will be allowed below the top 2’ of the constructed embankment.

When widening existing embankments, the side of the existing embankment shall be plowed or stepped and all stripped material may be placed at the toe of the slope before the placing of additional material. All fills shall be placed in horizontal layers which shall not exceed 6” in depth after rolling. Before rolling, each successive layer shall be leveled with appropriate equipment. Only approved earth which can be suitably compacted shall be used.

Each successive layer of material placed as described shall be compacted by rolling to a density of not less than 96% of the maximum density as determined by AASHTO Standard Method T99. The moisture content of the earth in each layer shall be such that the specified density can be obtained and shall be adjusted if necessary so that it will be between 2% below and 4% above the Optimum Moisture Content, as determined by the standard test specified above.

When the moisture content of the material is too low, sufficient water shall be added to the material before it is excavated or to each layer before compaction. If excessive moisture is present, the material shall not be used or the material may be aerated until such excess moisture has dissipated. If, in the opinion of the City’s Project Manager, the fill has been damaged due to precipitation, retesting shall be required. If the retesting indicates excessive moisture, the material shall be reworked or replaced.

The material shall not be compacted before it is thoroughly mixed and uniform in moisture content as above specified. The compaction shall be accomplished with equipment approved by the City’s Project Manager.
2.08 EMBANKMENT (Continued)

B. BASIS OF PAYMENT

Final measurement of embankment shall not be made. The quantity shown on the plans shall be an established quantity and shall be the basis of payment at the contract unit price per cubic yard bid for EARTHWORK MEASURED IN EMBANKMENT. EARTHWORK MEASURED IN EMBANKMENT is the amount of material to be placed and compacted to complete the required section. Quantities are established by average end areas of the cross-sections with no balance factor used. Such payment shall be full compensation for all loading, hauling, spreading, compacting and other materials, equipment, tools, labor and incidentals necessary to complete the Work in conformance with these Standard Specifications and accepted by the City’s Project Manager.

2.09 PARKING SPACE FINISH

A. GENERAL

The parking space is hereby defined as that part of the street right-of-way within the limits of the Work, exclusive of paved roadway and exclusive of space actually occupied by sidewalks or driveways. The parking space finish shall begin after the completion of all paving, driveway and sidewalk.

The above specified areas shall be fine graded to the exact lines and elevations indicated on the plans or as directed by the City’s Project Manager. In general, they shall be covered with a seed bed, 2” in thickness, of selected topsoil reserved for this purpose at the time grading operations were performed. In the event that the reserved material is unsuitable, the Contractor will be required to provide a suitable material. The layer of topsoil shall be hand raked and shall be free from sod, stones, roots, clods and other objectionable foreign materials. All objectionable material shall be removed and disposed of as hereinbefore provided under "Disposal of Surplus Materials".

B. BASIS OF PAYMENT

PARKING SPACE FINISH performed in conformance with the Standard Specifications and accepted by the City’s Project Manager shall be measured and paid for at the contract unit price bid per square yard. Such payment shall be full compensation for all materials, equipment, tools, labor and incidentals necessary to complete the Work.

2.10 SUBGRADE

A. GENERAL

The subgrade is hereby defined as that portion of the street or alley, within the limits of the Work, which forms the foundation for the pavement or the curb or curb and gutter, and which is within the first 12” of soil below the pavement. After all earthwork has been substantially completed as herein specified, the subgrade shall be cut or trimmed to the exact lines, grade and cross-section shown on the plans or as directed by the City’s Project Manager.

The subgrade for Portland Cement Concrete Pavement and Portland Cement Concrete Base shall be constructed to a uniform density of not less than 96% of the maximum density (as determined by AASHTO Standard Method T-99) throughout its entire width. The subgrade for full depth Asphaltic Concrete Pavement shall be constructed to a uniform density of not less than 100% of the maximum density (as determined by AASHTO Standard Method T-99) throughout its entire width.
2.10 SUBGRADE (Continued)

A. GENERAL (Continued)

The moisture content of the earth in each layer shall be such that the specified density can be obtained and the moisture adjusted, if necessary, so that it will be between two percent below -2% and above +4% the optimum moisture content (as determined by AASHTO Standard Method T-99). All soft or yielding material and other portions of the subgrade which will not compact readily shall be removed as directed, and any loose rock or boulders found shall be removed or broken off at a depth of not less than 6” below the surface of the subgrade. All holes or depressions made by the removal of material, as described above, shall be filled with approved material and compacted.

B. SUBGRADE PREPARATION

Immediately prior to paving, the entire subgrade for concrete pavement must be thoroughly manipulated and recompacted with the methods described above.

The elevation of the subgrade shall be carefully checked by the Contractor using a template or by such other methods as shall be approved by the City’s Project Manager. No subgrade shall be accepted until it has been brought to the exact lines, grade and elevations indicated on the plans or as directed by the City’s Project Manager. No pavement or foundation material shall be placed on any subgrade before the same is accepted by the City’s Project Manager.

The Contractor shall maintain the subgrade to the specified section free from ruts, waves and undulations and in case any such objectionable irregularities occur for any reason, the subgrade shall be reshaped and re-rolled as necessary.

The Contractor shall protect the subgrade from damage due to precipitation and no water shall be allowed to remain on the subgrade.

If, in the opinion of the City’s Project Manager, the subgrade has been damaged due to precipitation, retesting shall be required. If the testing indicates excessive moisture, the subgrade shall be reworked or replaced.

C. SUBGRADE STABILIZATION

If called for in the plans or contract documents or as directed by the City’s Project Manager, sandy areas of the subgrade shall be stabilized with the addition of cohesive soil.

This work shall include obtaining and thoroughly mixing the cohesive soil with the sandy subgrade to the satisfaction of the City’s Project Manager, adjusting the moisture and compacting the subgrade to the specifications as noted above.

It shall also include adjusting the grade lines to conform to the plans and disposal of surplus, excavated or profiled material.

If called for in the plans or contract documents or as directed by the City’s Project Manager, wet areas of the subgrade shall either be stabilized with the addition of fly ash or hydrated lime or replaced with crushed limestone or crushed concrete.
2.10 **SUBGRADE (Continued)**

C. **SUBGRADE STABILIZATION (Continued)**

This work shall include providing and thoroughly mixing fly ash or hydrated lime with the wet subgrade material to the satisfaction of the City’s Project Manager and compacting by a Contractor established rolling pattern to the satisfaction of the City’s Project Manager or coring out the subgrade to the depth as shown in the plans or contract documents or as directed by the City’s Project Manager, and replacing with crushed limestone or crushed concrete. The crushed limestone or crushed concrete shall be provided by the Contractor and placed in the cored out area in 6” lifts and compacted by a Contractor established rolling pattern to the satisfaction of the City’s Project Manager. It shall also include adjusting the grade lines to conform to the plans and disposal of surplus, excavated or profiled material.

D. **BASIS OF PAYMENT**

No direct payment will be made for the preparation and compaction of the subgrade. It shall be considered subsidiary to other items of Work for which direct payment is made.

SUBGRADE STABILIZATION performed in conformance with the Standard Specifications and accepted by the City’s Project Manager shall be measured and paid for at the contract unit price bid per square yard. Such payment shall be full compensation for all materials, equipment, tools, labor and incidentals necessary to complete the Work.

2.11 **COLD WEATHER CONSTRUCTION**

Fills and embankments shall be laid only upon a surface that is free from frost. The material being used for fill and embankment shall not contain any frozen material and shall be placed only when proper spreading, compacting and bonding with the existing surface can be obtained.

General clearing and grubbing and tree removal or stump removal shall have no winter time restrictions; these operations may be carried on at any time of the year. Consideration should be given to inconveniencing the public as little as possible.

2.12 **SUBSTANTIAL COMPLETION**

All projects involving items of paving shall be considered substantially complete when all items of Work shown on the proposal or called for in any other area of the Contract documents are completed to the satisfaction of the City’s Project Manager. Such items shall include but will not be limited to: curb and gutter, Asphaltic Concrete pavement/Portland Cement Concrete (PCC) pavement, driveways, sidewalks, alley returns, adjustment of manholes, valve boxes, water stop boxes, backfilling, park spacing, joint sealing, and pavement markings.

Liquidated damages shall continue to accrue until such time as the Work is deemed to be substantially completed by the City’s Project Manager. However, the Contractor may submit a written request to the City’s Project Manager for approval to suspend such liquidated damages to allow additional time for completion of minor items of the work, such as seeding, sodding, and survey monuments. Granting the request for additional time by the City’s Project Manager shall not relieve the Contractor of the Contractor’s responsibilities for completion of those items for which the suspension is requested.