

# EARTHWORK AND RELATED OPERATIONS

## SECTION 120 EXCAVATION AND EMBANKMENT

### **120-1 Description.**

Excavate and construct embankments as required for the roadway, ditches, channel changes and borrow material. Prepare subgrades and foundations, construct embankments, and otherwise use or dispose of the materials excavated. Use suitable excavated materials or authorized borrow. Also compact and dress excavated areas and embankments. For excavation and backfilling of structures, refer to Section 125.

Excavate materials for clearing and grubbing under Section 110. Unclassified material displaced by the storm sewer or drainage structure system is not included in the earthwork quantities shown on the plans.

### **120-2 Classifications of Excavation.**

**120-2.1 General:** The Department may classify excavation specified under this Section for payment as any of the following: (1) Regular Excavation, (2) Subsoil Excavation, (3) Lateral Ditch Excavation, and (4) Channel Excavation.

If the proposal does not show Subsoil Excavation or Lateral Ditch Excavation as separate items of payment, include such excavation under the item of Regular Excavation.

If the proposal shows Lateral Ditch Excavation as a separate item of payment, but does not show Channel Excavation as a separate item of payment, include such excavation under the item of Lateral Ditch Excavation. Otherwise, include Channel Excavation under the item of Regular Excavation.

**120-2.2 Regular Excavation:** Regular Excavation includes roadway excavation and borrow excavation, as defined below for each.

**120-2.2.1 Roadway Excavation:** Roadway Excavation consists of the excavation and the utilization or disposal of all materials necessary for the construction of the roadway, ditches, channel changes, etc., except as may be specifically shown to be paid for separately and that portion of the lateral ditches within the limits of the roadway right-of-way as shown in the plans.

**120-2.2.2 Borrow Excavation:** Borrow Excavation consists of the excavation and utilization of material from authorized borrow pits, including only material that is suitable for the construction of roadway embankments or of other embankments covered by the Contract, and unsuitable material in borrow areas furnished by the Department that must be excavated as determined by the Engineer in order to obtain the suitable material.

A Value Engineering Change Proposal (VECP) submittal based on using borrow material from within the project limits will not be considered.

**120-2.3 Subsoil Excavation:** Subsoil Excavation consists of the excavation and disposal of muck, clay, rock, or any other material that is unsuitable in its original position and that is excavated below the finished grading template. For stabilized bases and sand bituminous road mixes, consider the finished grading template as the top of the finished base, shoulders and slopes. For all other bases and rigid pavement, consider the finished grading template as the finished shoulder and slope lines and bottom of completed base or rigid pavement. Subsoil Excavation also consists of the excavation of all suitable material within the above limits as necessary to excavate the unsuitable material. Consider the limits of Subsoil Excavation indicated on the plans as being particularly variable, in accordance with the field conditions actually encountered.

The quantity of material required to replace the excavated material and to raise the elevation of the roadway to the bottom of the template will be paid for separately.

**120-2.4 Lateral Ditch Excavation:** Lateral Ditch Excavation consists of all excavation of inlet and outlet ditches to structures and roadway, changes in channels of streams, and ditches parallel to the

roadway right-of-way. Dress lateral ditches to the grade and cross-section shown in the plans. The Department will classify all excavation in that portion of lateral ditches beyond the limits of the roadway right-of-way, including the sections where dressing is required as provided above, as Lateral Ditch Excavation.

**120-2.5 Channel Excavation:** Channel Excavation consists of the excavation and satisfactory disposal of all materials from the limits of the channel as shown in the plans.

### **120-3 Preliminary Soils Investigations.**

When the plans contain the results of a soil survey, do not assume such data is a guarantee of the depth, extent, or character of material present.

### **120-4 Removal of Unsuitable Materials and Existing Roads.**

**120-4.1 Subsoil Excavation:** Where muck, rock, clay, or other material within the limits of the roadway is unsuitable in its original position, excavate such material to the cross-sections shown in the plans or indicated by the Engineer, and backfill with suitable material. Shape backfill material to the required cross-sections. Where the removal of plastic soils below the finished earthwork grade is required, meet a construction tolerance, from the lines shown in the plans as the removal limits, of  $\pm 0.2$  feet [ $\pm 60$  mm] in depth and  $\pm 6$  inches [ $\pm 150$  mm] (each side) in width.

**120-4.2 Removal of Existing Old Road:** Where a new roadway is to be constructed over an old one, plow or scarify the old road, and break it up full width, regardless of height of fill. If the plans provide that paving materials may be incorporated into the fill, distribute such material in a manner so as not to create voids.

**120-4.3 Obliterating Old Road:** Where the plans call for obliteration of portions of an old road outside of the proposed new roadway, obliterate such sections of the old road by grading to fill ditches and to restore approximately the original contour of the ground or a contour which produces a pleasing appearance.

### **120-5 Disposal of Surplus and Unsuitable Material.**

**120-5.1 Ownership of Excavated Materials:** The Department will retain ownership of all suitable excavated materials until the final job requirements for fill or backfill materials have been fulfilled. Take ownership of remaining excavated materials not needed for job requirements, and dispose of them outside the right-of-way, to the satisfaction of the Engineer.

In urban or other areas where temporary storage of apparent excess suitable materials within the right-of-way may be impracticable, the Contractor may stockpile the materials outside the right-of-way in areas provided by him, until the Contractor needs such materials in the job or declares them as surplus. With the written approval of the Engineer, the Contractor may dispose of such apparent excess material with the stipulation that he shall replace any portion of the disposed material required to fulfill the actual job requirements, with equally suitable material, at his own expense.

**120-5.2 General Requirements for Disposal:** Dispose of excavated muck or other materials unsuitable for the roadway construction as shown in the plans or, if the plans do not indicate the disposal, take ownership of the materials and dispose of them outside the right-of-way.

**120-5.3 Disposal of Muck on Side Slopes:** As an exception to the provisions of 120-5.2, when approved by the Engineer, in rural undeveloped areas, the Contractor may place muck (A-8 material) on the slopes, or store it alongside the roadway, provided there is a clear distance of at least 6 feet [2 m] between the roadway grading limits and the muck, and the Contractor dresses the muck to present a reasonably neat appearance. In addition, the Contractor may also dispose of this material by placing it on the slopes in developed areas where, in the opinion of the Engineer, this will result in an aesthetically pleasing appearance and will have no detrimental effect on the adjacent developments. Where the Engineer allows the Contractor to dispose of muck or other unsuitable material inside the right-of-way limits, the Contractor shall not place such material in a manner which will impede the inflow or outfall of

any channel or of side ditches. The Engineer will determine the limits adjacent to channels within which the Contractor may place such materials.

**120-5.4 Disposal of Paving Materials:** Unless otherwise noted, take ownership of paving materials, such as paving brick, asphalt block, concrete slab, sidewalk, curb and gutter, etc., excavated in the removal of existing pavements, and dispose of them outside the right-of-way. If the materials are to remain the property of the Department, place them in neat piles as directed. Existing limerock base that is removed may be incorporated in the stabilized portion of the subgrade. If the construction sequence will allow, incorporate all existing limerock base into the project as allowed by the Contract Documents.

**120-5.5 Disposal Areas:** Where the Contract Documents require disposal of excavated materials outside the right-of-way, and the disposal area is not indicated in the Contract documents, furnish the disposal area without additional compensation.

Provide areas for disposal of removed paving materials out of sight of the project and at least 300 feet [90 m] from the nearest roadway right-of-way line of any State-maintained road. If the materials are buried, disregard the 300 foot [90 m] limitation.

## **120-6 Borrow.**

**120-6.1 Authorization for Use of Borrow:** Use borrow only when sufficient quantities of suitable material are not available, as herein prescribed, from roadway and drainage excavation, to properly construct the embankment, subgrade, and shoulders, and to complete the backfilling of structures. Do not use borrow material until so ordered by the Engineer, and then only use material from designated borrow pits. Do not open borrow pits until the Engineer has approved their location and, where measurement of payment quantities is to be in the original position, cross-sections have been taken of the original ground surface.

Do not provide borrow materials that are polluted as defined in Chapter 376 of the Florida Statutes (oil of any kind and in any form, gasoline, pesticides, ammonia, chlorine, and derivatives thereof, excluding liquefied petroleum gas) in concentrations above any local, State, or Federal standards.

Prior to placing any borrow material that is the product of soil incineration, provide the Engineer with a copy of the Certificate of Materials Recycling and Post Burn Analysis showing that the material is below all allowable pollutant concentrations.

**120-6.2 Furnishing of Borrow Areas:** Unless otherwise specified, furnish areas for borrow material. When the Department is to furnish upland borrow areas, it will secure the necessary rights, permits or waivers. When the Department is to furnish a dredging area, it will obtain any necessary property rights and will make the necessary application for the dredging permits, which permits will be subsequently issued to the Contractor in accordance with 7-2.

To obtain the Engineer's approval to use an off-site construction activity area that involves excavation such as a borrow pit or local aggregate pit, request in writing, a Cultural Resources Assessment. Send the request to the Division of Historical Resources, Department of State, State Historic Preservation Officer, Tallahassee, FL. As a minimum, include in the request the State Project Job Number, the County, a description of the property with Township, Range, Section, etc., the dimensions of the area to be affected, and a location map. Do not start any work at the off-site construction activity area until receiving a clearance letter from the Division of Archives and written clearance from the Engineer concerning compliance with the Federal Endangered Species Act as specified in 7-1.4.

For certain locations, the Division of Archives will require a Cultural Resources Field Survey before approval can be granted. When this is required, secure professional archaeological services to make the survey and prepare a report. Submit the report to the Division of Archives with a copy to the Department. The Engineer will base final approval or rejection of the use of the off-site construction activity area on the report.

The Department will adjust Contract Time in accordance with 8-7 for any suspension of operations required to comply with this Article. The Department will not accept any monetary claims due to delays or loss of off-site construction activity areas.

Except where the plans specifically call for the use of a particular borrow or dredging area, the Contractor may substitute borrow or dredging areas of his own choosing provided: (1) the Engineer determines the materials from such areas meet the Department's standards and other requirements for stability for use in the particular sections of the work in which it is to be placed, and (2) the Contractor absorbs any increase in hauling or other costs.

Before using any borrow material from any substitute areas, obtain the Engineer's approval, in writing, for the use of the particular areas, and, where applicable, ensure that the Engineer has cross-sectioned the surface. Upon such written approval by the Engineer, consider the substitute areas as designated borrow areas.

When furnishing the dredging or borrow areas, supply the Department with evidence that the necessary permits, rights, or waivers for the use of such areas have been secured.

Do not excavate any part of a Contractor furnished borrow area which is less than 300 feet [90 m] from the right-of-way of the project or any State Road until the Engineer has approved a plan for landscaping and restoring the disturbed area. Perform this landscaping and land restoration at no expense to the Department, prior to final acceptance of the project. Do not provide a borrow area closer than 25 feet [8 m] to the right-of-way of any state road. In Department furnished borrow pits, do not excavate material within 5 feet [1.5 m] of the adjacent property lines.

Upon completion of excavation, neatly shape, dress, grass, vegetate, landscape, and drain all exposed areas including haul roads, as necessary so as not to present an objectionable appearance.

Meet the requirements of Section 104 when furnishing borrow areas, regardless of location.

**120-6.3 Use of Overburden from Material Pits:** Use overburden from areas from which sand-clay or other selected material is to be obtained, which is suitable for use in the embankment as borrow, as directed by the Engineer.

**120-6.4 Borrow Material for Shoulder Build-up:** When so indicated in the plans, furnish borrow material with a specific minimum bearing value, for building up of existing shoulders. Blend materials as necessary to achieve this specified minimum bearing value prior to placing the materials on the shoulders. Take samples of this borrow material at the pit or blended stockpile. Include all costs of providing a material with the required bearing value in the Contract unit price for borrow material.

**120-6.5 Requirements for Excavating in Borrow Areas:** When borrow material is to be measured for payment, excavate the borrow pits neatly, and shape the bottoms and edges so that the Engineer can make accurate measurements of the excavated material. If the bottom of the pit is above the normal water table, shape it to a regular grade that will not permit the ponding of water. Do not maintain the bottom or edges after the final cross-sections have been taken, except for the correction of erosion along the pit perimeter. Where the plans show the depth and width of excavation, consider such depths and widths as approximations only and subject to variation.

**120-6.6 Drainage of Borrow Pits:** Where shown in the plans or ordered by the Engineer, construct ditches for draining the borrow pits. Classify the excavation of such pit drains as borrow, and use all suitable materials excavated from pit drains as borrow.

**120-6.7 Haul Routes for Borrow Pits:** Provide and maintain, at no expense to the Department, all necessary roads for hauling the borrow material. The Department will obtain any necessary property easements for haul roads from pits which it furnishes. Where borrow area haul roads or trails are used by others, do not cause such roads or trails to deteriorate in condition.

Arrange for the use of all non-public haul routes crossing the property of any railroad. Incur any expense for the use of such haul routes. Establish haul routes which will direct construction vehicles away from developed areas when feasible, and keep noise from hauling operations to a minimum. Advise the Engineer in writing of all proposed haul routes.

## **120-7 Materials for Embankment.**

**120-7.1 Use of Materials Excavated From the Roadway and Appurtenances:** Use all suitable materials resulting from roadway excavation as far as practicable for completion of the work. Where so shown in the plans, use suitable material excavated from lateral ditches in the construction of the roadway and appurtenances. Use overburden stripped from material pits in the construction of embankments.

**120-7.2 General Requirements for Embankment Materials:** Construct embankments of acceptable material including broken portland cement concrete pavement and portland cement concrete rubble, but containing no muck, stumps, roots, brush, vegetable matter, rubbish, reinforcement bar or other material that does not compact into a suitable and enduring roadbed. Remove and waste material designated as undesirable. Use material in embankment construction in accordance with plan details or as the Engineer directs.

Complete the embankment using maximum particle sizes as follows:

In top 12 inches [300 mm]: 3 1/2 inches [90 mm] (in any dimension).

12 to 24 inches [300 to 600 mm]: 6 inches [150 mm] (in any dimension).

In the depth below 24 inches [600 mm]: not to exceed 12 inches [300 mm] (in any dimension) or the compacted thickness of the layer being placed, whichever is less.

Spread all material so that the larger particles are separated from each other to minimize voids between them during compaction. Compact around these rocks in accordance with 120-9.2.

When and where approved by the Engineer, the Contractor may place larger rocks (not to exceed 18 inches [450 mm] in any dimension) outside the two to one slope and at least 4 feet [1.2 m] or more below the bottom of the base. Compact around these rocks to a firmness equal to that of the supporting soil. Compact grassed embankment areas in accordance with 120-9.2.6.

Where constructing embankments adjacent to bridge end bents or abutments, do not place rock larger than 3 1/2 inches [90 mm] in diameter within 3 feet [1.0 m] of the location of any end-bent piling.

**120-7.3 Selected Material for Plant Growth:** When material suitable for plant growth, as designated by the Engineer, is available from the excavation within the limits of the project, use such material for at least the top 8 inches [200 mm] of earth material in areas designated for subsequent landscape planting. Do not place material which is unsuitable for plant growth in such areas.

**120-7.4 Materials Used at Pipes, Culverts, etc.:** Construct embankments over and around pipes, culverts, and bridge foundations with selected materials.

## **120-8 Embankment Construction.**

**120-8.1 General:** Construct embankments in sections of not less than 300 feet [90 m] in length or for the full length of the embankment.

### **120-8.2 Dry Fill Method:**

**120-8.2.1 General:** Except as provided below for material placed on unstable ground and for materials used for flattening slopes, construct embankments in successive layers of not more than 8 inches [200 mm] in thickness, measured loose, for the full width of the embankment. However, the Contractor may construct embankments in successive layers of not more than 12 inches [300 mm] compacted thickness, if he can demonstrate with field tests that he has compacting equipment sufficient to achieve density required by 120-9.2 for the full depth of a thicker lift, and if the compactive effort is approved by the Engineer. Construct all layers approximately parallel to the centerline profile of the road.

The Engineer will base his approval on the results of a test section the Contractor constructed using his specified compactive effort. Construct the test section with a minimum length of 300 feet [90 m], full width, and a maximum length of 1,000 feet [300 m].

Once approved, if there is a change in soil classification of the embankment materials, construct a new test section. Do not change the compactive effort once a test section is approved.

The Engineer reserves the right to terminate the Contractor's use of thick lift construction and have him revert to the 8 inch [200 mm] loose lifts whenever it is determined that satisfactory results are not being achieved.

As far as practicable, distribute traffic over the work during the construction of embankments so as to cover the maximum area of the surface of each layer.

Construct embankment in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering.

**120-8.2.1.1 Equipment and Methods:** Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, sumps and siphons.

When normal dewatering does not adequately remove the water, the Engineer may require the embankment material to be placed in the water or in low swampy ground in accordance with 120-8.2.2

**120-8.2.2 Placing in Unstable Areas:** Where depositing the material in water, or in low swampy ground that will not support the weight of hauling equipment, construct the embankment by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. Once sufficient material has been placed so that the hauling equipment can be supported, construct the remaining portion of the embankment in layers in accordance with the applicable provisions of 120-8.2.1 and 120-8.2.3.

**120-8.2.3 Placing on Steep Slopes:** When constructing an embankment on a hillside sloping more than 20 degrees from the horizontal, before starting the fill, deeply plow or cut into steps the surface of the original ground on which the embankment is to be placed.

**120-8.2.4 Placing Outside Standard Minimum Slope:** Where material that is unsuitable for normal embankment construction is to be used in the embankment outside the standard minimum slope (approximately two to one), place such material in layers of not more than 18 inches [450 mm] in thickness, measured loose. The Contractor may also place material which is suitable for normal embankment, outside such standard minimum slope, in 18 inch [450 mm] layers.

### **120-8.3 Hydraulic Method:**

**120-8.3.1 Method of Placing:** When the hydraulic method is used, as far as practicable, place all dredged material in its final position in the embankment by such method. Place and compact any dredged material that is rehandled, or moved and placed in its final position by any other method, as specified in 120-8.2. The Contractor may use baffles or any form of construction he may select provided the slopes of the embankments are not steeper than indicated in the plans. Remove all timber used for temporary bulkheads or baffles from the embankment, and fill and thoroughly compact the holes thus formed. When placing fill on submerged land, construct dikes prior to beginning of dredging, and maintain the dikes throughout the dredging operation.

**120-8.3.2 Excess Material:** Do not use excess material placed outside the prescribed slopes, below the normal high-water level, to raise the fill. Remove only the portion of this material required for dressing the slopes.

**120-8.3.3 Protection of Openings in Embankment:** Leave openings in the embankments at the bridge sites. Remove any material which invades these openings or existing channels without additional compensation to provide the same depth of channel as existed before the construction of the embankment. Do not excavate or dredge any material within 200 feet [60 m] of the toe of the proposed embankment.

## **120-9 Compaction Requirements.**

**120-9.1 Moisture Content:** Compact the materials at a moisture content such that the specified density can be attained. If necessary to attain the specified density, add water to the material, or lower the moisture content by manipulating the material or allowing it to dry, as is appropriate.

## **120-9.2 Compaction of Embankments:**

**120-9.2.1 Density Requirements:** Except for embankment constructed by the hydraulic method as specified in 120-8.3 and for the material placed outside the standard minimum slope as specified in 120-8.2.4, and for other areas specifically excluded herein, compact each layer of the material used in the formation of embankments to a density of at least 100% of the maximum density as determined by AASHTO T 99, Method C. Uniformly compact each layer, using equipment that will achieve the required density, and as compaction operations progress, shape and manipulate each layer as necessary to ensure uniform density throughout the embankment.

**120-9.2.2 Compaction Over Unstable Foundations:** Where the embankment material is deposited in water or on low swampy ground, and in a layer thicker than 12 inches [300 mm] (as provided in 120-8.2.2), compact the top 6 inches [150 mm] (compacted thickness) of such layer to the density as specified in 120-9.2.1.

**120-9.2.3 Compaction Where Plastic Material Has Been Removed:** Where unsuitable material is removed and the remaining surface is of the A-4, A-5, A-6, or A-7 Soil Groups (see Florida Sampling and Testing Methods, M145), as determined by the Engineer, compact the surface of the excavated area by rolling with a sheepsfoot roller exerting a compression of at least 250 psi [1.7 MPa] on the tamper feet, for the full width of the roadbed (subgrade and shoulders). Perform rolling before beginning any backfill, and continue until the roller feet do not penetrate the surface more than 1 inch [25 mm]. Do not perform such rolling where the remaining surface is below the normal water table and covered with water. Vary the procedure and equipment required for this operation at the discretion of the Engineer.

### **120-9.2.4 Compaction of Material To Be Used In Base, Pavement, or Stabilized**

**Areas:** Do not compact embankment material which will be incorporated into a pavement, base course, or stabilized subgrade, to be constructed as a part of the same Contract.

**120-9.2.5 Compaction of Grassed Shoulder Areas:** For the upper 6 inches [150 mm] layer of all shoulders which are to be grassed, since no specific density is required, compact only to the extent directed.

**120-9.2.6 Compaction of Grassed Embankment Areas:** For the outer layer of all embankments where plant growth will be established, do not compact. Leave this layer in a loose condition to a minimum depth of 6 inches [150 mm] for the subsequent seeding or planting operations.

**120-9.3 Compaction for Pipes, Culverts, etc.:** Compact the backfill of trenches to the densities specified for embankment or subgrade, as applicable, and in accordance with the requirements of 125-8. Thoroughly compact embankments over and around pipes, culverts, and bridges in a manner which will not place undue stress on the structures, and in accordance with the requirements of 125-8.

**120-9.4 Compaction of Subgrade:** If the plans do not provide for stabilizing, compact the subgrade area (as defined in 1-3) in both cuts and fills to the density specified in 120-9.2.1. Do not apply density requirements where constructing narrow widening strips 4 feet [1.2 m] or less on undisturbed soil.

Where trenches for widening strips are not of sufficient width to permit the use of standard compaction equipment, perform compaction using vibratory rollers, trench rollers, or other type compaction equipment approved by the Engineer.

Maintain the required density until the base or pavement is placed on the subgrade.

## **120-10 Maintenance and Protection of Work.**

While construction is in progress, maintain adequate drainage for the roadbed at all times. Maintain a shoulder at least 3 feet [1 m] wide adjacent to all pavement or base construction in order to provide support for the edges.

Maintain all earthwork construction throughout the life of the Contract, and take all reasonable precautions to prevent loss of material from the roadway due to the action of wind or water. Repair, at no expense to the Department, except as otherwise provided herein, any slides, washouts, settlement,

subsidence, or other mishap which may occur prior to final acceptance of the work. Perform maintenance and protection of earthwork construction in accordance with Section 104.

Maintain all channels excavated as a part of the Contract work against natural shoaling or other encroachments to the lines, grades, and cross-sections shown in the plans, until final acceptance of the project.

## **120-11 Construction.**

**120-11.1 Construction Tolerances:** Shape the surface of the earthwork to conform to the lines, grades, and cross-sections shown in the plans. In final shaping of the surface of earthwork, maintain a tolerance of 0.3 foot [90 mm] above or below the plan cross-section with the following exceptions:

1. Shape the surface of shoulders to within 0.1 foot [30 mm] of the plan cross-section.
2. Shape the earthwork to match adjacent pavement, curb, sidewalk, structures, etc.
3. Shape the bottom of ditches so that the ditch impounds no water.
4. When the work does not include construction of base or pavement, shape the entire roadbed (shoulder point to shoulder point) to within 0.1 foot [30 mm] above or below the plan cross-section.

Ensure that the shoulder lines do not vary horizontally more than 0.3 foot [90 mm] from the true lines shown in the plans.

**120-11.2 Operations Adjacent to Pavement:** Carefully dress areas adjacent to pavement areas to avoid damage to such pavement. Complete grassing of shoulder areas prior to placing the final wearing course. Do not manipulate any embankment material on a pavement surface.

When shoulder dressing is underway adjacent to a pavement lane being used to maintain traffic, exercise extreme care to avoid interference with the safe movement of traffic.

## **120-12 Method of Measurement.**

**120-12.1 General:** When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards [cubic meters], calculated by the method of average end areas, unless the Engineer determines that another method of calculation will provide a more accurate result. The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer, unless otherwise specified under the provisions for individual items.

Where Subsoil Excavation extends outside the lines shown in the plans or authorized by the Engineer including allowable tolerances, and the space is backfilled with material obtained in additional authorized roadway or borrow excavation, the net fill, plus shrinkage allowance, will be deducted from the quantity of Roadway Excavation or Borrow Excavation to be paid for, as applicable.

The quantity of all material washed, blown, or placed beyond the authorized roadway cross-section will be determined by the Engineer and will be deducted from the quantity of Roadway Excavation or Borrow Excavation to be paid for, as applicable.

Subsoil Excavation that extends outside the lines shown in the plans or authorized by the Engineer including allowable tolerances will be deducted from the quantity to be paid for as Subsoil Excavation.

**120-12.2 Roadway Excavation:** The measurement will include only the net volume of material excavated between the original ground surface and the surface of the completed earthwork, except that the measurement will also include all unavoidable slides which may occur in connection with excavation classified as Roadway Excavation.

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4.

**120-12.3 Borrow Excavation:** The measurement will be in accordance with 120-12.1 except that in special cases, when so shown in the Contract Documents, measurement will be made on a loose volume basis, as measured in trucks or other hauling equipment at the point of dumping on the road. If measurement is made in vehicles, level the material to facilitate accurate measurement.

Measurement of borrow excavation in borrow areas furnished by the Department will include unsuitable material that is necessary to excavate, as determined by the Engineer, in order to obtain suitable borrow material. Such unsuitable material excavated from borrow pits where truck measurement is provided for and from any borrow pits furnished by the Contractor, will not be included in the quantity of excavation to be paid for.

For suitable material excavated from a borrow pit and not used for roadway fill within specification tolerances, as limited by 9-3.4, either the Contractor shall return the material to the pit before final cross-sections are taken or the Engineer will measure the material in place and deduct the quantity, plus an allowance for shrinkage, from the pay quantity of borrow excavation. In case borrow paid by truck measure is returned to the pit, the Contractor shall keep tabulation records of the material returned, and the Engineer will deduct an equivalent volume of borrow from the measured pay quantity. This provision applies but is not limited to materials used in construction of haul roads, flushed fill slopes, pit rim berms, and backfill of unauthorized Subsoil Excavation.

Except when used as borrow material for construction of the roadway embankment, or when otherwise shown in the plans, overburden stripped from pits from which selected base material is to be obtained will not be measured for payment, but the costs thereof will be included in the Contract unit price for the base.

**120-12.4 Lateral Ditch Excavation:** The measurement will include only material excavated within the lines and grades indicated in the plans or as directed by the Engineer. The measurement will include the full station-to-station length shown in the plans or directed by the Engineer and acceptably completed. Excavation included for payment under Section 125 will not be included in this measurement.

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4.

**120-12.5 Channel Excavation:** The measurement will include only material excavated within the lines and grades indicated in the plans or in accordance with authorized plan changes. The measurement will include the full station-to-station length shown in the plans including any authorized changes thereto.

If shoaling occurs subsequent to excavation of a channel and the Engineer authorized the shoaled material to remain in place, the volume of any such material remaining within the limits of channel excavation shown in the plans will be deducted from the measured quantity of Channel Excavation.

**120-12.6 Subsoil Excavation:** The measurement will include only material excavated within the lines and grades indicated in the plans (including the tolerance permitted therefor) or as directed by the Engineer.

When no item for Subsoil Excavation is shown in the proposal but Subsoil Excavation is subsequently determined to be necessary, such unanticipated Subsoil Excavation will be paid for as provided in 4-4. The cost of additional material required to replace the unanticipated Subsoil Excavation will be paid for as specified for the particular case shown below:

(a) No additional payment will be made for backfill material obtained from surplus material available from the normal excavation or grading operations.

(b) When the necessary material is not available from the normal excavation or grading operations and the Contract includes an item for borrow excavation, backfill material authorized to be obtained from designated borrow areas will be included in the volume of borrow excavation to be paid for.

(c) When the work of grading for the project is paid for under the item of regular excavation, any backfill material authorized to be obtained by increasing the volume of excavation within the roadway right-of-way will be measured and paid for as regular excavation subject to the provisions of 9-3.2.2.

(d) When authorization is given for obtaining the material from outside the Right-Of- Way and from other than designated borrow areas, such excavation will be paid for as provided in 4-4.

**120-12.7 Embankment:** The quantity will be at the plan quantity.

Where payment for embankment is not to be included in the payment for the excavation, and is to be paid for on a cubic yard [cubic meter] basis for the item of Embankment, the plan quantities to be paid for will be calculated by the method of average end areas unless the Engineer determines that another method of calculation will provide a more accurate result. The measurement will include only material actually placed above the original ground line, within the lines and grades indicated in the plans or directed by the Engineer. The length used in the computations will be the station-to-station length actually constructed. The original ground line used in the computations will be as determined prior to placing of embankment subject to the provisions of 9-3.2, and no allowance will be made for subsidence of material below the surface of the original ground.

If there are authorized changes in plan dimensions or if errors in plan quantities are detected, plan quantity will be adjusted as provided in 9-3.2.

Where the work includes excavation of unsuitable material below the finished grading template or original ground line, whichever is lower as defined in 120-2.3, the original ground line is defined as the surface prior to beginning excavation, except that this surface is not outside the permissible tolerance of lines and grades for Subsoil Excavation as indicated in the plans or as directed by the Engineer. Any overrun or underrun of plan quantity for Subsoil Excavation which results in a corresponding increase or decrease in embankment will be considered as an authorized plan change for adjustment purposes as defined in 9-3.2.2.

No payment will be made for embankment material used to replace unsuitable material excavated beyond the lines and grades shown in the plans or ordered by the Engineer.

In no case will payment be made for material allowed to run out of the embankment on a flatter slope than indicated on the cross-section. The Contractor shall make his own estimate on the volume of material actually required to obtain the pay section.

## **120-13 Basis of Payment.**

**120-13.1 General:** Prices and payments for the various work items included in this Section will be full compensation for all work described herein, including excavating, dredging, hauling, placing, and compacting; dressing the surface of the earthwork; maintaining and protecting the complete earthwork; and hauling.

The Department will not allow extra compensation for any rehandling involved under the provisions of 120-5.1.

The Department will compensate for the cost of grassing or other permanent erosion control measures directed by the Engineer as provided in the Contract for similar items of roadway work.

### **120-13.2 Excavation:**

**120-13.2.1 Items of Payment:** When no classification of material is indicated in the plans, and bids are taken only on Regular Excavation, the total quantity of all excavation specified under this Section will be paid for at the Contract unit price for Regular Excavation.

When separate classifications of excavation are shown in the proposal, the quantities of each of the various classes of materials so shown will be paid for at the Contract unit prices per cubic yard [cubic meter] for Regular Excavation, Lateral Ditch Excavation, Subsoil Excavation, and Channel Excavation, as applicable, and any of such classifications not so shown will be included under the item of Regular Excavation (except that if there is a classification for Lateral Ditch Excavation shown and there is no classification for Channel Excavation, any channel excavation will be included under the item of Lateral Ditch Excavation).

**120-13.2.2 Basic Work Included in Payments:** Prices and payments will be full compensation for all work described under this Section, except for any excavation, or embankment which is specified to be included for payment under other items. Such prices and payments will include hauling; any rehandling that may be necessary to accomplish final disposal as shown in the plans; the dressing of

shoulders, ditches and slopes; removal of trash, vegetation, etc., from the previously graded roadway where no item for clearing and grubbing is shown in the plans; and compacting as required.

**120-13.2.3 Additional Depth of Subsoil Excavation:** Where Subsoil Excavation is made to a depth of 0 to 5 feet [0 to 1.5 m] below the depth shown on the Contract plans, such excavation will be paid for at the unit price bid.

Where Subsoil Excavation is made to a depth greater than 5 feet [1.5 m], and up to 15 feet [4.5 m], deeper than the depth shown on the Contract plans, such excavation will be paid for at the unit price bid plus 25% of such unit price. Additional extra depth, more than 15 feet [4.5 m] below such plan depth, will be considered as a change in the character of the work and will be paid for as Unforeseeable Work.

Where no subsoil excavation is shown in a particular location on the original plans, payment for extra depth of subsoil will begin 5 feet [1.5 m] below the lowest elevation on the grading template.

**120-13.2.4 Borrow Excavation:** When the item of Borrow Excavation is included in the Contract, and the plans, price and payment will also include the cost of furnishing the borrow areas and any necessary clearing and grubbing thereof, the removal of unsuitable material that it is necessary to excavate in order to obtain suitable borrow material, and also the costs incurred in complying with the provisions of 120-6.4.

**120-13.2.5 Materials Excluded from Payment for the Excavation:** No payment as excavation will be made for any excavation covered for payment under the item of Embankment.

No payment will be made for the excavation of any materials which are used for purposes other than those shown in the plans or designated by the Engineer. No payment will be made for materials excavated outside the lines and grades given by the Engineer, unless specifically authorized by the Engineer; except that, in the operations of roadway excavation, all slides and falls of insecure masses of material beyond the regular slopes and not due to lack of precaution on the part of the Contractor will be paid for at the Contract unit price for the material involved. The removal of slides and falls of material classified as Lateral Ditch Excavation or as Subsoil Excavation will not be paid for separately, but will be included in the Contract unit price for the pay quantity of these materials, measured as provided in 120-12.

### **120-13.3 Embankment:**

**120-13.3.1 General:** Price and payment will be full compensation for all work specified in this Section, including all material for constructing the embankment; all excavating, dredging, pumping, placing and compacting of material for constructing the embankment complete; dressing of the surface of the roadway, maintenance and protection of the completed earthwork, and the removal of rubbish, vegetation, etc., from the roadway, where no clearing and grubbing of the area is specified in the plans. Also, such price and payment, in each case, will specifically include all costs of any roadway, lateral ditch, or channel excavation, unless such excavation is specifically shown to be paid for separately, regardless of whether the materials are utilized in the embankment.

**120-13.3.2 Excluded Material:** No payment will be made for the removal of muck or overburden from the dredging or borrow areas. No payment will be made for embankment material used to replace muck or other unsuitable material excavated beyond the lines and grades shown in the plans or ordered by the Engineer.

**120-13.3.3 Clearing and Grubbing:** No payment will be made for any clearing and grubbing of the borrow or dredging areas. Where no clearing and grubbing of such areas is specified in the plans, the cost of any necessary clearing and grubbing will be included in the Contract unit or lump sum price for Embankment.

**120-13.3.4 Cost of Permits, Rights, and Waivers:** Where the Contractor provides borrow or dredging areas of his own choosing, the cost of securing the necessary permits, rights or waivers will be included in the Contract price for Embankment.

**120-13.4 Payment Items:** Payment will be made under:

Item No. 120- 1-	Regular Excavation - per cubic yard.
Item No. 2120- 1-	Regular Excavation - per cubic meter.
Item No. 120- 2-	Borrow Excavation - per cubic yard.
Item No. 2120- 2-	Borrow Excavation - per cubic meter.
Item No. 120- 3-	Lateral Ditch Excavation - per cubic yard.
Item No. 2120- 3-	Lateral Ditch Excavation - per cubic meter.
Item No. 120- 4-	Subsoil Excavation - per cubic yard.
Item No. 2120- 4-	Subsoil Excavation - per cubic meter.
Item No. 120- 5-	Channel Excavation - per cubic yard.
Item No. 2120- 5-	Channel Excavation - per cubic meter.
Item No. 120- 6-	Embankment - per cubic yard.
Item No. 2120- 6-	Embankment - per cubic meter.