

Each Bidder shall state in his/her Proposal whether the plant proposed to be used on the work has facilities for furnishing the meals and accommodations required.

The entire cost to the Contractor for furnishing, equipping and maintaining the foregoing accommodations, providing transportation ashore, and furnishing meals, shall be included in the price bid for dredging.

COMPENSATION

148.80 Method of Measurement.

The amount of material dredged and disposed of will be determined by preliminary and final cross sections taken by the Engineer in the dredging area. If this method is impracticable, the Engineer will determine the method of measurement.

If the alternate method of measurement is by measuring the dredging materials in the scows in which it is placed for disposal, such actual scow quantities as determined by the measurements shall be divided by 1.15 to compensate for bulking or swelling. The quotient for this division shall then be the quantity to be paid for.

The quantity of materials shown in the Proposal has been computed to the payment limits.

The Engineer may take additional soundings before the work is started, which soundings shall be the preliminary soundings for payment purposes.

Pay limits for material actually dredged and disposed will be as follows:

A. Bottom – Depth up to and including 8 meters below mean low water plus 300 millimeters below the required depths. Depths more than 8 meters below mean low water plus 600 millimeters below the required depths.

B. Side slopes shall be as shown on the plans.

Rocks. Removed from Dredged areas and Disposed will be determined by measurement made by the Engineer.

Ledge. Removed from Dredged Areas and Disposed will be determined by preliminary and final cross sections taken by the Engineer in the dredging area. The overlying material shall be removed prior to the Engineer taking preliminary cross sections. If this method of measurement is impracticable, the Engineer will determine the method of measurement.

Mobilization and Demobilization will be paid for at the contract lump sum price. The Contractor will be paid sixty percent of the lump sum price upon completion of his/her mobilization at the work site. The remaining forty percent will be included in the final payment for work under the Contract.

148.81 Basis of Payment.

All classes of dredged material will be paid for at the contract unit price per cubic meter for the particular type of material removed and disposed as defined hereinbefore.

148.82 Payment Items.

148	Dredging and Disposing of Material	Cubic Meter
148.1	Dredging and Disposing of Material (Hydraulic Method)	Cubic Meter
148.2	Removal and Disposal of Rock from Dredged Areas	Cubic Meter
148.3	Removal and Disposal of Ledge from Dredged Areas	Cubic Meter
148.4	Dredging, Mobilization and Demobilization	Lump Sum

SECTION 150

EMBANKMENT

DESCRIPTION

150.20 General.

Construction of all embankment fill shall be done in accordance with the relevant provisions of Sections 120, 150 and 170 and in accordance with the procedures described herein.

This work comprises the formation of embankments with suitable material obtained from excavation and borrow, thoroughly compacted to produce a stabilized embankment. The work shall be performed in accordance with the lines and grades shown on the plans as directed.

Material available from widened cuts outside the slopes as indicated on the plans or as ordered by the Engineer may be used in embankments or elsewhere upon written request by the Contractor and subsequent written approval by the Engineer. The Engineer shall determine the suitability of any excavation material for incorporation in the embankment.

If the Contractor desires to waste excavated material and provide borrow to replace it for his/her own convenience, he/she may do so only after obtaining the written approval of the Engineer and after satisfactory arrangements have been made for the measurements and disposal of the material.

When it is determined by the Engineer that there is not sufficient material available either from excavation within the Right-of-Way or the slope lines of the section under Contract for the formation of embankments, roadbeds in cut sections, foundations, shoulders, or backfill the Contractor shall obtain such additional material as may be necessary from outside the location, and this material will be borrow material.

150.21 Borrow Pit Restrictions.

With the exception of commercial borrow pits, the location, material removal operation and final shaping and finishing of borrow pits, regardless of location, must conform with all local and State regulations, and for the purpose of preventing water pollution shall be subject to approval by the Engineer prior to use, during the material removal operation and upon completion. Borrow pits shall be so graded and finished after material removal is completed that there can be no reasonable possibility of a safety hazard nor ponding of water nor water pollution caused by later erosion of the pit.

Borrow pits located adjacent to the Right-of-Way shall be finished by extending the slope of the cross section to a berm to be constructed or left within the Right-of-Way at the side line. The berm shall be a minimum of 1.5 meters high and 600 millimeters wide across the top with natural slopes in both directions, or as otherwise directed. The floor of the pit shall slope away from the location line at a minimum rate of 5% for at least 15 meters.

Portions of borrow pits (within 150 meters of the project or any other highway location line) which may be noticeable from a traveled way, residence or place of business, shall be neatly trimmed and left in a condition satisfactory to the Engineer. Particular attention shall be given to make the slopes harmonize with the general appearance of the adjacent landscape, provided however, that no slope shall be steep enough to constitute a public menace. No unsightly accumulation of material shall be permitted which may in any manner deface the finished landscape.

The cost for the final shaping and finishing of borrow pits shall be included in the contract unit price of the type of borrow furnished with no additional compensation.

MATERIALS

150.40 General.

All embankment materials, whether coming from excavation or borrow shall consist of solid, sound mineral aggregate. It shall be free from deleterious, organic, elastic or foreign matter and shall be adequately graded for satisfactory compaction into a stabilized soil structure.

These materials will be classified into particular groups according to AASHTO M 145, "The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes".

All borrow material to be furnished shall meet the requirements specified in the following Subsections of Division III, Materials:

Ordinary Borrow	M1.01.0
Gravel Borrow	M1.03.0
Sand Borrow	M1.04.0 Type b
Gravel Borrow for Bridge Foundation	M1.03.0 Type a
Special Borrow	M1.02.0
Impervious Soil Borrow	M1.08.0
Crushed Stone for Drainage, Revetment and Water Work Foundations	M2.01.1
Crushed Stone for Bridge Foundation	M2.01.1

Reclaimed Pavement Borrow Material For Base Course meeting Subsection M1.11.0 may be substituted for Ordinary Borrow under the pavement areas.

CONSTRUCTION METHODS

150.60 General.

Prior to starting work, the Contractor shall obtain approval for the compaction equipment to be used. Unless otherwise required in the Special Provisions, each layer of embankment material shall be thoroughly compacted with power rollers or tamping rollers. Other equipment or equivalent compactive capacity may be used subject to trial on the project and approval by the Engineer. Compacting equipment will not be used for any other purpose during compaction operations.

The use of tractors, trucks, scrapers or other equipment designed primarily for purposes other than compaction and being used for purposes other than solely compaction will not be considered as compaction equipment, but traffic of such vehicles shall be distributed over this fill in such a manner as to take advantage of the additional compaction afforded thereby.

Sufficient leveling and compacting equipment shall be provided to do the work of spreading and compacting the material promptly after it has been deposited. When, in the Engineer's judgment, such equipment is inadequate to spread and compact the material properly, the Contractor shall reduce the rate of excavation and placing of the fill to a rate not to exceed the capacity of the leveling and compacting equipment or employ additional equipment.

The Contractor shall plan his/her grading operation to use all rock possible from all excavation either as backfill in excavated muck areas or in areas of greatest depth.

Before placing of any fill, the areas under embankments shall be cleared, grubbed, and stripped as specified in Section 101 and 120.

Frozen material shall not be placed on embankments nor shall embankments be placed on material frozen to a depth of over 75 millimeters. If during the construction of an embankment, the top layer becomes frozen to a depth of over 75 millimeters, the frozen material shall be removed before a succeeding layer is placed on the embankment. This work shall be performed at no additional expense to the Department.

Frozen excavated material, if suitable when dry, shall be allowed to thaw and dry and then be placed in the embankment. No compensation will be allowed for the storing and rehandling of these materials.

Embankments shall be formed by placing successive layers of material uniformly distributed and compacted over the full width of the cross section unless otherwise directed. Stumps, rubbish, sod, frozen or other unsuitable materials shall not be incorporated in the embankment.

The Contractor shall prosecute his/her work so that no damage will occur to drainage pipe lines or masonry or brick structures (See Subsection 150.64).

150.61 Preparation of Foundation Areas.

The foundation areas shall be cleared, grubbed and stripped as required, and all soft, spongy or other material unsuitable for embankment foundation shall be removed. When, in the Engineer's judgment, there is reasonable doubt as

to the suitability of the existing material for embankment foundation, no further work shall be performed in the area in question until the material is tested and approved for use or remedial methods are ordered by the Engineer.

Embankment areas 1 meter or less in height from the subgrade to the existing ground shall be rough graded and compacted to not less than 95 percent of the maximum dry density of the material as determined by the AASHTO Standard Method of Test T 99, Method C at optimum moisture content, as determined by the Engineer, without additional compensation before placing any fill. If the material retained on the 4.75 millimeter sieve is 50% or more of the total sample this test shall not apply and the material shall be compacted to the satisfaction of the Engineer.

For embankments greater in height than 1 meter below the proposed subgrade to existing ground no additional embankment foundation area preparation will be required, provided the material within the area is suitable for the purpose.

Regardless of the height of fill, where embankment is to be placed against existing earth slopes steeper than 1 vertical to 3 horizontal, the slope shall be broken up into steps of random width as the fill is placed in order to provide a suitable bond between the existing ground and the new embankment. Both the material cut out and the bottom of the area cut into shall be compacted along with and to the same degree as the material being placed in the embankment without additional compensation for excavation, benching or compacting.

Where foundations for bridges, culverts (span 2.44 meters or more) and major wall structures are to be founded on the embankment, the embankment to the extent shown on the plans shall be constructed of Gravel Borrow for Bridge Foundations and/or Crushed Stone for Bridge Foundations.

At the sites of footings for abutments, piers or other structures having pile foundations, the material shall be placed in embankment prior to driving piles and shall be of a quality and grading that will not obstruct driving of the piles.

Where foundations for structures are to be supported on newly formed embankments and where flying wingwalls are to be constructed, the embankment shall be placed to an elevation of at least 600 millimeters above the bottom of the proposed foundation or flying wingwalls and thoroughly and satisfactorily compacted.

After the above work is completed the material within the area of the proposed foundation or flying wingwalls will be excavated to the grade of the bottom of the concrete. Excavation of this compacted fill will be paid for under the item of Bridge Excavation as stipulated in Subsection 140.21.

150.62 Embankment Construction With Materials Other Than Rock.

Embankment construction with materials other than rock shall not be placed from December 1 to April 1, except with written permission of and under such special conditions and restrictions as may be imposed by the Engineer.

Embankment 3 meters or more in height from the elevation of the subgrade to the original ground elevation shall be constructed to the elevation of the proposed subgrade and then allowed to settle for 60 days (or such other period as the Engineer shall direct in writing) before the pavement structure is constructed thereon. If the condition of the subgrade is suitable, not frozen or muddy and is shaped, compacted and fine graded within the tolerance provided in the Specification, the Contractor may apply and the Engineer may approve the placing but not the fine grading of the subbase prior to the termination of the 60 day waiting period.

Earth embankment shall be placed and compacted in uniform layers not exceeding 300 millimeters in depth, loose measurement; each layer of material shall be spread on the entire width of the embankment and leveled off by approved equipment.

The embankment materials shall be compacted to not less than 95 percent of the maximum dry density of the embankment material as determined by AASHTO Standard Method of Test T 99, Method C at optimum moisture content. If the material retained on the 4.75 millimeter sieve is 50 percent or more of the total sample, this test shall not apply and the material shall be compacted to the satisfaction of the Engineer. The Contractor shall, without additional compensation, employ whatever measures that may be necessary to adjust the natural water content of the suitable embankment material to permit the placement and compaction as hereinbefore specified. The Engineer, during the progress of the work, may make tests as required, determining the in-place density of the soil by one of the following Standard Methods of Test: Density of Soil and Soil Aggregate In-Place by Nuclear Methods (Shallow Depth), AASHTO T 238; Density of Soil In-Place by the Sand-Cone Method, AASHTO T 191; or Density of Soil In-Place by the Rubber-Balloon Method, T 205.

Each lift of compacted materials shall be visibly crowned to allow drainage of surface and rain waters off the surface of the embankment. No stones larger than 75 millimeters shall be used to fill where piles are to be driven. Embankment constructed in basement areas of demolished buildings and other areas restricting the use of power rollers, etc., shall be compacted by mechanical tamping with approved power tools.

If the natural-in-place moisture of the excavated material makes it impractical to compact the soil, the Contractor shall dry the soil by disking, harrowing, blading, rotary mixing or by other approved means, or compaction of the layer of wet material may be deferred until the layer has dried so that it can be properly compacted. If these above methods do not produce the desired results, or when in the judgment of the Engineer, excess moisture resulting from climactic conditions beyond the control of the Contractor is considered to have affected adversely the stability of the previously placed and satisfactorily compacted embankment materials, the Engineer may direct the placement of single layers of "Special Borrow" to act as stabilizing drainage layers. When so ordered by the Engineer, the Contractor shall place a layer of "Special Borrow" having a depth of not more than 300 millimeters in thickness, loose measure. Such materials shall be placed completely over the entire width between the limits designated by the Engineer, and shall be compacted as hereinafter specified before the succeeding layer of suitable embankment materials from the roadway excavation is placed.

The work may be ordered suspended if the weather and climactic conditions are such that the embankment and excavation cannot be performed in accordance with the specifications. No additional compensation will be allowed to the Contractor for such suspension of work. If the work is ordered suspended due to weather or other climactic conditions not under the control of the Contractor, an extension of time may be granted to the Contractor by the Engineer.

150.63 Rock in Embankment.

Where rock is used in embankments the materials shall be carefully spread so that all large stones shall be well distributed and the interstices of each layer shall be practically filled with smaller stones and suitable material from excavation or borrow to form a solid and dense layer of embankment. No rock in excess of 150 millimeters in its largest dimension shall be incorporated in the top 600 millimeter layer of embankment immediately below the subgrade. The maximum size of boulders or ledge fragments used in embankments shall be such that they can be incorporated into layers not exceeding 1 meter in depth. Any stones or fragmented material too large to be placed in 1 meter layers shall be broken down by blasting or other means to appropriate size.

Rock in fills shall not be placed adjacent to masonry or brick structures or to any pipe lines. At bridge abutments rock fill shall not be placed within 6 meters of the backwall of the abutment.

150.64 Backfilling for Structures and Pipes.

A. General.

All backfilling shall consist of suitable materials uniformly distributed and thoroughly compacted. When suitable backfilling materials cannot be obtained from excavation, the material shall consist of satisfactory borrow.

When directed, mechanical tampers shall be used in compacting backfill for trenches, and in hard to reach areas around masonry.

No backfill whatever shall be placed on or against structures, pipes, or other masonry, until permitted by the Engineer. It shall be formed of successive layers not more than 150 millimeters in depth, uniformly distributed and each layer thoroughly compacted.

B. Structures.

The backfill in back of abutments and wingwalls of bridges shall consist of gravel. The gravel shall meet the specifications of Subsection M1.03.0, Type b. Measurement of "Gravel Borrow" under this work will not include any filling made beyond a vertical plane 300 millimeters outside the footings except as directed.

Whenever backfill is placed in back of or over arches, culverts or rigid frames, the fill shall be first placed midway between the ends of the structure. The remainder of the fill shall then be placed to equal depths on both sides of the structure, working equally both ways from the center of the structure toward the ends. This procedure shall continue up to the bottom of the subbase of the roadway.

C. Pipes.

No load greater than 70 kilonewtons shall be moved over any pipe until a fully compacted backfill of at least 600

millimeters has been placed over the top of the pipe. This minimum will be increased to 1 meter for a 180 kiloNewton single wheel load and to 1.2 meters for a 270 kilonewton single wheel load. The required fully compacted backfill cover shall be placed a minimum of 15 meters on both sides of the pipe crossing. However, compliance with this requirement is not to be construed as relieving the Contractor of any responsibility concerning damage to the pipe.

Material used for backfilling to a point 600 millimeters over the pipe shall contain no stones larger than 75 millimeters in greatest dimension.

Backfill below the haunches shall be placed in 150 millimeter layers and compacted simultaneously on both sides of the pipe with railroad tampers or approved mechanical rammers which shall not come in contact with the pipe. Backfill above the haunches shall be placed in 150 millimeter layers and compacted as directed. Backfill material shall be moist prior to and during compaction.

If directed, backfill material shall consist of gravel borrow, type c.

Backfilling for structural plate pipe, pipe-arches and arches shall be placed evenly on both sides of the structure in layers not exceeding 150 millimeters in depth. Backfilling shall be placed uniformly on both sides of pipe. The fill material shall be thoroughly tamped around the pipe or pipe-arch, between the pipe or pipe-arch and the sides of the trench, or for a minimum distance each side of the pipe or pipe-arch equal to the diameter or span of the structure.

In all cases the filling material shall be thoroughly tamped. Puddling or jetting the backfill will not be permitted, except with written approval of the Engineer.

150.65 Backfilling Muck Excavation Areas.

Backfilling after muck is removed shall consist of rock fragments, boulders up to 1.5 cubic meters in size, if available, or selected clean granular material not more than 15% of which will pass through a 75 micrometer sieve as determined by AASHTO Test T 11. The backfill shall be obtained from suitable excavation on the project, or from Special Borrow under Item 150.1. When rock is used as backfill, granular material meeting the specifications described above shall also be provided and used with the rock backfill. The volume of the granular material shall be sufficient to fill all voids and interstices of the rock backfill.

Where directed, backfilling shall be placed immediately after the muck has been excavated in order that any remaining soft material may be pushed ahead of the backfill and readily removed.

The backfill shall be placed at least 600 millimeters above the top of the swamp area or at least 600 millimeters above the level of any water that is present whichever will give the highest elevation of backfill.

The surface of the embankment shall be kept free of unsuitable material. No muck or unsuitable material shall be entrapped by any successive deposits of fill.

150.66 Gravel Borrow for Bridge Foundations.

The gravel shall be placed on firm material free from standing water and thoroughly compacted in layers not exceeding 300 millimeters in depth, loose measurement, in accordance with the provisions of Subsection 150.62 to a minimum total depth of 600 millimeters, except the requirements of AASHTO T 180 shall apply.

In areas where it is not practicable to compact the gravel for bridge foundations by rollers or other rolling moving equipment the compaction shall be accomplished by means of mechanical or pneumatic tampers and the density of the compacted gravel as tested in the field shall not be less than 95% of the laboratory maximum density as determined by AASHTO Test T 180 Method D. If the material retained on the 4.75 millimeter sieve is 40% or more of the total sample this test shall not apply and the material shall be compacted to the satisfaction of the Engineer.

Compaction of the gravel and any adjoining embankment material shall be done simultaneously so that the respective materials will be confined substantially to the indicated lines.

150.67 Crushed Stone for Bridge Foundation.

Crushed stone shall be furnished and placed where shown on the plans and where directed by the Engineer.

In no case shall crushed stone be placed on other than firm material.

The crushed stone shall be placed to an elevation 300 millimeters above ground water level or lowered water level.

The entire mass of crushed stone shall be compacted into place by overlapping coverage by pneumatic tired earth rollers having 4 wheels abreast and loaded, vibratory plate type compactors, vibratory rollers or by other means that shall achieve equivalent compaction and are approved by the Engineer.

The compaction operation shall be continued until there is no moving stone directly ahead of the wheels of the moving machine.

150.68 Crushed Stone for Drainage, Retention, and/or Water Works Foundations.

When directed in writing by the Engineer to place crushed stone in the bottom of the excavation of retention, drainage and water system installation to stabilize the foundation, the work will be performed under this item.

The minimum total depth of crushed stone to be placed under this item of work shall be 150 millimeters. No compaction will be required for depth up to 300 millimeters. For any depth over 300 millimeters, the crushed stone shall be placed and compacted in layers not to exceed 150 millimeters. Compaction will be accomplished by means of mechanical or pneumatic tampers. Compaction effects shall continue until the stones are firmly interlocked and the surface is unyielding.

COMPENSATION

150.80 Method of Measurement.

All borrow with the exception of sand borrow and crushed stone will be measured in place. When this method of measurement is impracticable and the Engineer, prior to the start of construction, so directs and the Contractor agrees in writing, borrow, with the exception of sand borrow and crushed stone, will be measured in its original position in the pit after stripping by the cross-section method.

When ordinary borrow is paid for as measured in place, it shall be measured from existing or compacted old ground surface to the lines and grades applicable to embankment as shown on the plans or as directed.

The volume of ordinary and special borrow when in place measure is necessary, shall be determined as follows:

1. Measure the total volume of embankment in place;
2. Add 12.5 percent of this quantity (for compaction);
3. Deduct the total volume of all suitable materials available for embankments, including rock excavation; except that excavated under Section 140.60;
4. Deduct an additional 25 percent of the volume of rock excavation.

When not measured in its original position in the pit by the cross section method, gravel borrow used in subbase, gravel for base course, gravel for surfacing, gravel for bridge foundations and gravel for backfilling around structures and pipes, will be paid for as measured in place plus 15%.

When not measured in its original position in the pit by cross section method gravel borrow used in slope stabilization and other miscellaneous uses will be paid as measured in place plus 12.5%.

If material that is measured in place is taken from a cross sectioned pit, the amount of material to be deducted from the cross-section pit quantity shall be equal to the material measured in place plus any allowable percent added to the in place measurement.

Sand borrow will be measured by the cubic meter by load measurement. The quantity shall be the volume of the load, as measured, divided by 1.15.

If stone screenings are used the volume shall be obtained from its mass using 1600 kilograms as the mass of a cubic meter of stone screenings.

Crushed stone complete in place will be measured by the metric ton.

The weight slips shall be countersigned on delivery by the Engineer, and no weight slip not so countersigned shall be included for any payment under the Contract.

No overhaul allowance will be made for any kind of borrow.

150.81 Basis of Payment.

Payment for the formation of embankments as specified will be included in the items of excavation or borrow. Excavated material used with the permission of the Engineer for other than the formation of embankments will be paid for as specified in Subsection 120.81 and such payment shall include full compensation for the formation of the required embankments. The contact unit prices for the aforesaid items shall constitute full compensation for the satisfactory performance and completion of the entire work.

Borrow will be paid for at the contract unit price per cubic meter, complete in place, which shall include such test pits and borings necessary to procure samples to establish the suitability of the materials and all required stripping operations.

Crushed stone will be paid for at the contract unit price per metric ton, complete in place.

150.82 Payment Items.

150.	Ordinary Borrow	Cubic Meter
150.1	Special Borrow	Cubic Meter
151.	Gravel Borrow	Cubic Meter
151.01	Gravel Borrow - Type c	Cubic Meter
151.1	Gravel Borrow for Bridge Foundation	Cubic Meter
151.2	Gravel Borrow for Backfilling Structures and Pipes	Cubic Meter
154.	Sand Borrow	Cubic Meter
156.	Crushed Stone for Drainage, Retement, and/or Water Works Foundations	Metric Ton
156.1	Crushed Stone for Bridge Foundations	Metric Ton

SECTION 170

GRADING

DESCRIPTION

170.20 General.

The shaping, trimming, compacting and finishing of the surface of the subgrade, the grading and finishing of all unpaved shoulders and slopes, and the preparation of all areas for topsoil, loam, riprap or slope paving as shown on the plans or as directed, shall be constructed in accordance with these specifications and in close conforming with the lines, grades and typical cross sections shown on the plans or established by the Engineer.

CONSTRUCTION METHODS

170.60 General.

All soft or spongy material below the subgrade shall be removed to a depth to be determined by the Engineer and backfilled with satisfactory material.