INDEX FOR SPECIFICATIONS FOR GRADING

SPECIFICATIONS FOR GRADING

500. 1 SCOPE

These Specifications govern all operations for and pertaining to the placing of materials for the construction of a highway embankment, slopes, drainage works and connections thereto, and excavation of materials classified herein; to the required alignment, grade and cross section.

1.1 Dimensions

The locations and dimensions of the embankments and excavations shall generally be in accordance with the plans accompanying the tender, but the dimensions of any or all embankments and excavations may be increased or decreased by the Engineer as conditions and circumstances determine.

1.2 Pre-Construction Meeting

The Contractor shall attend a pre-construction meeting with the Regional Construction Engineer and Departmental staff, at a mutually agreed upon date, to discuss the project. The meeting shall be initiated by the Contractor and be held in advance of commencing his field operations. Topics to be discussed will include the type and quantity of equipment to be used, sequence of work, traffic control and other pertinent topics.

1.3 Inspection of Equipment

Equipment required for the work will be subject to approval, shall be in satisfactory working condition and so maintained for the duration of the work. The Engineer shall have access to the equipment at all times for purposes pertaining to the work.

1.5 Work Around Structures

The Engineer may request the Contractor to do some work at structures within the limits of the project. The work may be at the site of existing or proposed structures. The Contractor shall, if so requested, undertake excavation work, preparatory work for the base of structures, backfilling, mechanical tamping and normal compaction operations. If work is required of the Contractor when his equipment is not in the vicinity of the structure, the work will be paid for either as Extra Work, or at the discretion of the Engineer, at the applicable unit prices with equipment moving costs paid for as Extra Work.

Special equipment such as mechanical tampers, requiring the use of hand labor, will be paid for as Extra Work.

1.6 Protection of Structures and Drains

The Contractor shall protect and preserve drainage structures which may be affected by his operations. Where grading operations are performed across or adjacent to drainage channels, the Contractor shall ensure that the drainage channels are clear of any debris which might restrict the flow of water.

1.7 Culverts

The Contractor shall receive, store and install culverts in accordance with the Specifications for Removing Culverts and Placing Culverts.

1.8 Underground Utilities

"Underground Utilities" includes buried cable, oil and gas pipelines, and water and sewer pipes. The Contractor shall determine and conspicuously mark the exact location of underground utilities and shall notify the utility company well in advance of commencing construction operations in the area. No compensation will be payable to the Contractor for any

costs that may arise as a result of waiting for underground utilities to be moved. Working days will not be assessed during such waiting periods.

1.9 Earth Islands to Support Poles and Towers

The sequence of moving pole lines or tower lines may require the Contractor to leave trimmed earth islands, the dimensions of which shall be sufficient to give adequate support to the existing pole or tower. No direct payment will be made to the Contractor for temporarily leaving and subsequently levelling islands; this work will be considered as incidental to the contract as a whole.

When trimming has been completed on any portion of the road prior to poles or towers being moved or reset within that portion, and the Contractor is later directed to level the earth islands, the cost involved in moving equipment and levelling the islands will be paid for as Extra Work.

1.10 Crossings and Intersecting Roads

Some work will be required on each crossing and at each intersecting road. Work done on crossings and intersections for which a unit price is provided in the Contract will be paid for at the applicable unit price. Work for which no unit prices are provided will be done by the Contractor on the basis of Extra Work. The time at which work shall be done will be as permitted or directed by the Engineer.

500. 2 HIGHWAY EMBANKMENT

2.1 Description

The construction of the highway embankment shall consist of placing, compacting and trimming earth, rock, stone, gravel or other approved material to the design cross section as staked on the ground by the Engineer.

2.7 Construction Methods

2.7.1 Preparing Existing Ground Surface

Areas on which preparation is to be performed will be as designated by the Engineer.

Where clearing, grubbing, removing peat, topsoil and other unsuitable material is required, it shall be performed in accordance with the applicable specifications prior to the placement thereon of embankment material.

A subcut is an excavation below existing ground level, into which material is backfilled to form the required embankment. Subcuts shall be excavated to the depth staked by the Engineer which shall, in general, be 600 mm below the design grade line. Where unsuitable material is encountered it shall be excavated below the subcut level and disposed of as directed by the Engineer. Except as otherwise permitted in section 2.7.5.1. the Contractor shall ensure that the base of the subcut is sufficiently stable to accommodate compaction of the first lift of fill thereon to a minimum of 95% AASHTO standard dry density. Approved material used to backfill subcuts shall be placed in accordance with the requirements for Placing Embankment Material.

Material removed from or below the design subcut, if suitable, shall be used for construction of the embankment and will be classified as "Common Excavation". Unsuitable material will be classified as "Waste Excavation".

Subcut excavation volumes will be determined using the design or revised subcut elevation against construction cross sections taken after stripping. Payment for material excavated from below staked cross sections will not be made unless the Engineer has directed the removal.

Where the proposed embankment crosses an existing road, drainage channel or other unevenness, the Contractor shall perform operations such as waste excavation, benching and subcutting in order to prevent differential settlements and to attain uniform compaction.

2.7.2 Compaction Equipment

The Contractor shall supply at least one appropriate compaction unit and one motor grader in each work area where embankment is being placed. The compaction equipment shall be appropriate for the type and quantity of material being compacted and capable of achieving the specified density.

The size and number of motor graders shall be sufficient to complement the compaction and earth moving equipment. The equipment shall be on site and in good operating condition before placement of embankment in any work area will be permitted. Hauling equipment will not be accepted as a substitute for compaction equipment on other than Rock Embankments.

2.7.3 Water

The Contractor shall supply and spray water on the highway embankment when additional moisture is required to achieve the specified density, and when requested by the Engineer, for other purposes.

Water shall be supplied in motor propelled units equipped with a spray bar at least 1.8 m long, capable of spraying at a uniform rate. The on-off valve on the spray bar shall be controllable from the operator's position. The number and capacity of watering units shall be sufficient to ensure the required moisture content of the embankment is attained at the time of compaction.

2.7.4 Widening Existing Embankments

Wherever practical, embankment widening operations shall be restricted to one side of the highway and limited to a construction area of the shortest possible length.

The Contractor shall take precautions to preserve the existing shoulder gravel so that it is not removed from its original position nor contaminated with non-granular material.

Prior to commencing grade widening the Contractor shall strip the sod from the existing slopes and windrow it outside of the proposed grade slopes. The sod shall be spread over the slopes upon completion of the widening or disposed of within the right-of-way as directed by the Engineer.

Where materials are hauled across existing highway pavements or base courses, earth bridges shall be constructed as permitted or directed by the Engineer. The earth bridge shall be constructed of stable material, at right angles to the centerline of the existing road, at least 300 mm in depth, 5 m in width and having traffic ramps flatter than 6:1. The earth bridge shall be maintained so that it remains stable and retains its original constructed shape while in use. Each earth bridge shall be protected by warning signs and two flagmen as long as it is in existence.

Earth bridges will be permitted only during daylight hours. They shall be removed, and the highway surface cleaned, before sunset. No direct payment will be made for placing and removing material or controlling traffic for the earth bridges, as this work will be considered as being included in other Contract items.

2.7.4.1 Bench Cuts

Bench cuts shall consist of excavating horizontal cuts into the slopes of the existing highway embankment prior to placing widening material thereon. Bench cuts shall be made at vertical intervals of 1.0 m, with the base of the initial bench cut being approximately 0.5 m above the toe of the existing slope. The base of each bench cut shall extend into the existing slope a minimum of 2 m. Suitable material resulting

from the bench cut shall be incorporated and compacted into the new embankment. Unsuitable material shall be disposed of as directed by the Engineer.

The Contractor shall not have more than 800m of bench cuts open where the pavement edge drop off is greater than 100mm, and no more than 800m of bench cuts where the pavement edge drop off is 100mm or less.

Except as otherwise permitted in section 2.7.5.1. the Contractor shall ensure that the base of the bench cut is sufficiently stable to accommodate compaction of the first lift of fill thereon to a minimum of 95% AASHTO standard dry density.

2.7.5 Embankment Material

The embankment shall be constructed from approved excavation material classified as Common, Borrow, Composite or Solid Rock Excavation.

2.7.5.1 Placing Common, Borrow or Composite Excavation Material

In general, embankment material shall be placed in uniform full width layers to a maximum depth of 200 mm prior to compaction. Material having less than 20% passing the 75 um sieve may, when approved by the Engineer, be placed in uniform layers up to 500 mm in depth prior to compaction. Non-uniform material shall be blended in each layer by manipulating the material with a motor grader or other approved equipment. Each layer shall be bladed smooth with a motor grader and crowned to permit drainage prior to compaction.

Each layer shall be compacted until the density has reached a minimum of 95% AASHTO standard dry density.

The compaction of silty material shall be performed when its moisture content is at or less than optimum. For the purposes of this Specification, silty material will be considered as that material which has a plasticity index of 20 or less, with more than 20% of the soil particles passing the 75 um sieve.

The compaction of other than silty material shall be performed when its moisture content is in the optimum range.

The specified moisture shall be achieved by discing or scarifying wet material to reduce the moisture content, or, applying water to dry material to increase the moisture content.

Stones and boulders may be used in the embankment, provided they are well distributed and evenly mixed with sufficient other materials so as to produce a compact embankment, subject to the following restrictions:

(a) Stones over 100 mm in diameter will not be permitted in the construction of the upper 300 mm of the embankment.

(b) Below the upper 300 mm of the embankment, stones and boulders shall not have a vertical dimension exceeding one-third the height of the embankment remaining to be constructed.

(c) Stones and boulders shall not project beyond the design slope line.

(d) Subject to (a) above, shale shall be reduced to a maximum dimension of 150 mm prior to placing it in the highway embankment.

When constructing an embankment through a wet unstable area, the Engineer may waive the requirement for layer construction until the height of the embankment is sufficient to bear the weight of the construction equipment. The embankment shall be constructed in such a manner that unstable material is not incorporated into the embankment.

2.7.5.2 In Situ Moisture

In the event that the in situ moisture at a depth *measured* 150 mm below the surface of excavation areas used for embankment material or at the base of subcuts exceeds the:

1) Optimum moisture by more than 5% in the case of silty materials (Section 2.7.5.1) or;

2) Optimum moisture range by more than 2% for excavation materials having a plasticity index ranging from 21 - 40; or

3) Optimum moisture range by more than 4% for excavation materials having a plasticity index greater than 40,

The material to be excavated will be considered to be excessively wet and the Engineer may approve one of the following options:

a) Classify the material as Waste Excavation.

b) Department will supply lime as a drying agent. Incorporation of the lime into the embankment material will be the responsibility of the Contractor and the costs associated with spreading and mixing the bulk lime with the embankment material will be considered incidental to the unit price of the type of excavation being performed.

c) (i) Pay the bid price for the type of excavation being performed plus,

(ii) Unless otherwise stated in the Special Provisions, pay for additional costs in excavating material that cannot be handled by a pull-type scraper. Additional costs would be those works that involve excavating and loading the material only or side casting the material to another location for handling.

(iii) Pay extra work for additional equipment (i.e. disks and additional motor grader) required to reduce the moisture. Extra work will cease once compaction (i.e. sheepsfoot packers) begins.

d) Other methods as may be mutually agreed upon.

2.7.5.3 Placing Solid Rock Excavation Material

When Solid Rock Excavation material is placed, the requirement for layer construction may be waived by the Engineer. The embankment shall be constructed by end-dumping, which shall consist of dumping material near the end of the grade and pushing the material forward over the end of the embankment with a bulldozer or similar equipment. This procedure shall be performed in such a manner that larger rocks are well distributed and the intervening spaces are filled with smaller sizes and fines to form a stable embankment and provide a dense surface.

The maximum vertical dimension of rock which may be placed in the embankment shall not exceed one-third the height of the fill remaining to be placed. The embankment shall be constructed to full width and true to cross-section as work progresses. No dumping over the sides of the embankment will be permitted. Rock embankments shall be compacted by routing the loaded construction equipment over the entire width of the embankment.

Rock embankments placed on an unstable base shall be constructed so that the centre of the advancing end of the embankment fill is out in advance of the shoulders. Slopes shall be constructed to the natural angle of repose.

2.7.6 Trimming

Trimming within the right-of-way prior to final cross sectioning and after placing topsoil shall commence immediately after embankment construction, and completed trimming shall not be more than 3 km behind the constructed embankment.

Areas within the right-of-way which have been newly constructed, or which have been disturbed due to construction, shall be trimmed to a smooth surface and maintained to the specified elevation and cross-section until final acceptance of the work. As a final trimming operation the areas shall be harrowed. Stumps and foreign debris collected during trimming shall be removed and disposed of by the Contractor.

Stones collected during trimming shall be disposed of in accordance with the requirements for Loose Rock Disposal. Disposing of the stones will be paid for in accordance with the provisions outlined in Loose Rock Disposal.

2.7.7 Acceptance of the Work

Portions of the work may be accepted when completed and trimmed to the satisfaction of the Engineer. The acceptance will be based, in general, on no less than 3 km portions; which shall be continuous, commencing at one end of the project. Final acceptance of portions to be used by construction equipment will not be given.

When the whole of the work or a portion thereof is accepted by the Engineer, the Department shall henceforth assume the maintenance of the accepted work.

2.9 Method of Measurement

2.9.1 Water

Water will be measured by volume in units of 5 kL. The capacity of the water tanks used will be computed and rounded off to the nearest one-tenth unit below the full volume of the tank.

2.9.2 Bench Cuts

Bench Cuts will be measured in 100 m stations along the centerline of the highway. One bench cut, or multiple bench cuts, on one or both slopes will be considered as a single bench cut for purposes of measurement.

2.9.3 Trimming

Trimming within the right-of-way will be measured in 100 m stations along the centerline of the highway. Where multi-lane construction is involved, the measurement for each station will include all trimming within that station, whether single lane, multi-lane or any combination thereof. When trimming is required on connecting roads outside the right-of-way it will not be for paid directly when the distance is 50 m or less, or

Trimming within the right-of-way will be measured by the hectare. The measurement will be by the plan view of the area to be trimmed, excluding the surface area of the roadways constructed and including the surface areas of all connecting roads. Plan view measurement of the area to be trimmed on connecting roads outside the right-of-way will not be paid for directly when the distance is 50 m or less.

2.9.4 Stripping Slopes

Stripping the sod from slopes when grade widening will be measured in 100 m stations along the centerline of the highway. One slope or multiple slopes will be considered as a single slope for purposes of measurement.

2.11 Basis of Payment

2.11.1 Water

Water will be paid for at the unit price for "Water", measured as specified herein, which price shall be payment in full for supplying, loading, hauling and spraying the water on the highway embankment, and all operations incidental thereto.

Where water is required to achieve compaction, and there is no Contract item for Water, payment will be made on the basis of “Extra Work”

2.11.2 Bench Cuts

Bench Cuts will be paid for at the unit price for "Bench Cuts", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

Where it is deemed necessary to construct bench cuts, and there is no contract item for Bench Cuts, the excavation will be measured and paid for at the unit price for "Common Excavation".

Embankments and compaction will not be paid for directly but will be considered as included in the payment of other Contract items.

2.11.3 Trimming

Trimming within the right-of-way will be paid for at the unit price for "Trimming", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

Where there is no Contract item for Trimming, no direct payment will be made for trimming, it being considered as included in other Contract items.

2.11.4 Stripping Slopes

Stripping the sod from slopes when grade widening will be paid for at the unit price for “Stripping Slopes”, measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

500. 3 TOPSOIL EXCAVATION

3.1 Description

Topsoil Excavation shall consist of excavating, hauling and stockpiling surface material obtained from within the right-of-way limits which is unsuitable for construction of the highway embankment and is not classified as Waste Excavation or Grubbing, and subsequently disposing of or placing the material in accordance with these Specifications.

3.7 Construction Methods

Where clearing and grubbing is required, it shall be performed in advance of topsoil excavation.

The Contractor shall not commence topsoil excavation in an area until the Engineer has indicated that the necessary measurements have been taken.

Topsoil shall be removed from designated excavation and embankment areas, and shall be excavated not more than two kilometers in advance of the highway embankment being constructed.

Topsoil shall be stockpiled where it will not interfere with highway construction or drainage. Where no area is available within the right-of-way, the Contractor shall, at his own expense, provide suitable areas for stockpiling on adjacent land.

When the ditch bottoms and slopes have been trimmed, and the Engineer has completed final cross sections for the Common Excavation quantity, the Contractor shall load, haul and uniformly place the lesser of all or a minimum depth of 75 mm of topsoil over the slopes and ditch bottoms to the satisfaction of the Engineer.

3.9 Method of Measurement

Topsoil Excavation will be measured, and the volume computed from cross sections taken before the topsoil excavation has started and again after it has been completed.

3.11 Basis of Payment

Topsoil Excavation will be paid for at the unit price for "Topsoil Excavation", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

Where no separate Contract item is provided, Topsoil Excavation will be paid for at the unit price for "Common Excavation".

Where separate Contract items are provided for both Waste Excavation and Topsoil Excavation, the Engineer's decision as to which unit price is applicable shall be final.

500. 4 COMMON EXCAVATION

4.1 Description

Common Excavation shall consist of excavating approved material other than Solid Rock, from within the right-of-way limits, and hauling and placing the material in the highway embankment in accordance with these Specifications.

4.7 Construction Methods

Where clearing, grubbing, Waste Excavation and Topsoil Excavation is required, it shall be performed in advance of Common Excavation.

The Contractor shall not commence Common Excavation in an area until the Engineer has indicated that the necessary measurements have been taken.

Ditches shall be excavated to the grades shown on the plans and as staked by the Engineer and shall be maintained to ensure good drainage.

The Contractor shall not excavate beyond the staked backslopes or below the established grade unless so directed by the Engineer. Unauthorized excavations below grade shall be backfilled with suitable material and compacted. No payment will be made for loading, hauling, placing and compacting such backfill material.

Surplus material shall be used to widen embankments, flatten slopes, or disposed of as directed or permitted by the Engineer.

Stones and boulders shall, where possible, be used in the construction of the embankment in accordance with the requirements for Highway Embankment. Where this is not possible, they shall be disposed of in accordance with the requirements for Loose Rock Disposal.

4.8 Ditch Borrows (Unscheduled)

In the event additional material is required to construct the embankment, the Contractor may be requested to excavate trenches in ditches at specified locations.

Material excavated from trenches below the final ditch cross section will be measured and paid for as Common Excavation. Additional compensation, equivalent to 20% of the unit price for Common Excavation, will be paid for each cubic metre of material excavated from trenches where the width, length or depth of the trench will not allow the earth moving equipment to enter and/or exit the excavation in a normal manner.

Trenches, in general, shall be backfilled with topsoil or waste excavation. Work involved in backfilling trenches will be paid as Extra Work only if it is not covered in the basis of payment

for the type of backfill being used. Compaction of topsoil or waste material used for backfilling will be paid as Extra Work.

4.9 Method of Measurement

Common Excavation will be measured, and the volume computed from cross-sections taken before the Common Excavation has started and again after it has been completed.

4.11 Basis of Payment

Common Excavation will be paid for at the unit price for "Common Excavation", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

500. 5 BORROW EXCAVATION

5.1 Description

Borrow Excavation shall consist of excavating approved material, other than Solid Rock, from areas provided by the Department outside the right-of-way limits, and hauling and placing the material in the highway embankment in accordance with these Specifications.

5.7 Construction Methods

Where clearing, grubbing or stripping is required, it shall be performed prior to commencing Borrow Excavation.

Cross sections will be taken on the borrow area upon completion of the clearing and grubbing operation and before stripping commences.

Borrow stripping will consist of excavating designated material, from the borrow area, which is unsuitable for construction of the highway embankment. The Engineer will specify whether the stripped material shall be spread uniformly over adjacent land or stockpiled adjacent to the borrow pit. The Contractor shall give the Engineer at least one working day advance notice prior to starting Borrow Excavation, and shall not commence excavation until the Engineer has indicated that the necessary measurements have been taken. No payment will be made for Borrow Excavation removed before the measurements have been taken.

Haul roads to borrow pits shall be constructed by the Contractor on a location and to a standard approved by the Engineer. Excavated material used to construct haul roads will be paid for at the unit price for Borrow Excavation. No direct payment will be made for maintenance of haul roads. When the Borrow Excavation has been completed, the Contractor shall remove the haul road, and trim and clean the haul road area. Haul road material used to construct the highway embankment at the Engineers direction will be measured and paid for at the unit price for Borrow Excavation. Material not so utilized shall be disposed of in the borrow pit after final measurements have been taken of the pit area.

No direct payment will be made for disposing of haul road material in the borrow pit; the work will be considered incidental to the unit price for Borrow Excavation.

The borrow pit shall be excavated as uniformly as possible to the depths and within the limits as staked by the Engineer. Side slopes shall be maintained at a slope of 4:l, unless otherwise permitted or directed. The Contractor shall level and trim the borrow pit when the excavation has been completed.

Stones and boulders not approved for placement in the highway embankment shall be stockpiled in the borrow pit and subsequently buried after final cross sections have been taken.

Stripping which has been stockpiled adjacent to the borrow pit shall be uniformly placed over the slopes and bottom of the borrow pit after the final cross-sections have been taken.

In the event that livestock is enclosed in an area from which borrow excavation is to be removed, the Contractor shall be responsible for ensuring that the livestock does not leave the enclosure via his entrance to the borrow area during the period of time that he is hauling

material. The Contractor shall re-erect gates or fences in a good and workmanlike manner during each period of time that he ceases hauling operations.

5.9 Method of Measurement

Borrow Stripping will be measured, and the volume computed from cross sections taken before the stripping of the borrow pit has started and again after it has been completed.

Borrow Excavation will be measured, and the volume computed from cross sections taken before the Borrow Excavation has started and again after it has been completed.

Surplus stones and boulders will not be measured separately but will be considered as part of the borrow quantity.

5.11 Basis of Payment

Borrow Stripping will be paid for at the unit price for "Borrow Stripping", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

Where no separate Contract item is provided, borrow stripping will be paid for at the unit price for "Borrow Excavation".

Borrow Excavation will be paid for at the unit price for "Borrow Excavation", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

Where no separate Contract price is provided, Borrow Excavation will be paid for at the unit price for "Common Excavation".

500. 6 COMPOSITE EXCAVATION

6.1 Description

Composite Excavation shall consist of excavating approved material, other than Solid Rock, from:

(a) within the right-of-way limits; and

(b) from borrow areas supplied by the Contractor outside the limits of the highway right-of-way,

and hauling and placing the material in the highway embankment in accordance with these Specifications.

6.7 Construction Methods

(a) Within the Right-of-Way Limits

The construction methods used to remove Composite Excavation from within the right-of-way limits, shall conform to the Construction Methods specified in Section 4 dealing with Common Excavation, except as follows

- References to Common Excavation shall be read as Composite Excavation.
- The Engineer may approve requests from the Contractor to lower the designed ditch grade and excavate outside the design limits, however no direct payment will be made for clearing, grubbing, and removing overburden on areas outside the design limits.

(b) Borrow Areas Supplied by the Contractor

The construction methods used to remove Composite Excavation from outside the right-of-way limits shall conform to the Construction Methods specified in Section 5 dealing with Borrow Excavation, except as follows:

- References to Borrow Excavation shall be read as Composite Excavation.
- The Contractor shall thoroughly sample the proposed borrow for suitability of materials, either by pits or by borings. Approval shall be obtained from the Engineer as to the suitability of material before commencing further operations on the borrow area. Acceptance by the Engineer will be deemed provisional only; any or all of the borrow pit may be rejected if subsequent excavated materials prove unsatisfactory for use.
- The Contractor shall make all arrangements for borrow areas and haul roads. The borrow areas shall be located at least 30 m back from the limits of the highway right-of-way or as permitted by the Engineer. Any growth in this buffer zone shall remain undisturbed except that a maximum of two access roads may be constructed to the pit.
- Cross sections will be taken on the borrow area upon completion of the clearing, grubbing and stripping operations. Excavated material used to construct haul roads will be paid for at the unit price for Composite Excavation. No direct payment will be made for clearing, grubbing or stripping as the work will be considered incidental to Composite Excavation.

6.9 Method of Measurement

Composite Excavation will be measured, and the volume computed from cross sections taken before the excavation has started and again after it has been completed.

6.11 Basis of Payment

Composite Excavation will be paid for at the unit price for "Composite Excavation", measured as specified herein, which shall be payment in full for performing those operations described herein and those incidental to the work.

500. 7 SOLID ROCK EXCAVATION

7.1 Description

Solid Rock Excavation shall consist of excavating rock occurring in solid masses or layers, which prior to its removal, has to be drilled and blasted or ripped; obtained from locations both inside and outside the right-of-way limits, and hauling and placing the rock in the highway embankment in accordance with these Specifications.

Boulders located within the limits of the right-of-way, having a volume in excess of one cubic metre will be classified as Solid Rock.

The Engineer's decision as to what shall be classified as Solid Rock Excavation shall be final.

7.7 Construction Methods

Where clearing, grubbing and removing overburden is required, it shall be performed prior to commencing rock excavation.

Overburden used in the construction of the highway embankment will be measured and paid for as Common Excavation if it is excavated from inside the right-of-way limits, or as Borrow Excavation if it is excavated from areas outside the right-of-way, or as Composite Excavation, when applicable.

Overburden deposited and trimmed on the edge of the right-of-way or placed in disposal areas provided by and at the expense of the Contractor will be measured and paid for as Waste Excavation.

The Contractor shall not commence rock excavation in an area until the Engineer has indicated that the necessary measurements have been taken.

All excavated rock shall be placed in the embankment unless otherwise directed by the Engineer. Methods employed in drilling, blasting and excavating rock shall be such as to

produce the required cut as well as suitable embankment material. Changing the type of explosive or modification of the drilling and blasting procedure may be required if there is excessive overbreak, if the blasted rock is too large or if other requirements of the Specifications are not being met.

Excavation of the rock rubble within the proposed embankment area through the rock cut will be optional. The solid rock within this area must be drilled and fractured to ditch bottom elevation.

If rock fractured below the staked grade line has been excavated, and pockets result, they shall be backfilled with rock spalls having maximum dimension of 150 mm. Pockets formed below the subgrade shall be drained if the embankment is other than rock. No payment will be made for providing drainage for pockets or for rock excavated from below the gradelines staked by the Engineer.

When the Contractor chooses not to excavate the embankment area through the rock cut, the ditches and grade slopes will be excavated and trimmed to the design grade line elevation staked by the Engineer.

Drilling shall not be performed outside of or extend beyond the design cut. No payment will be made for over break in excess of ten percent of the excavation as staked by the Engineer.

Side walls of rock cuts shall be vertical and excavated to the width staked by the Engineer, with no rock projections remaining inside the design wall. All loose rock or other material on or near the wall shall be removed to the satisfaction of the Engineer.

Boulders classified as Solid Rock Excavation shall be buried, or used in the embankment, or disposed of, as directed by the Engineer.

500. 7.9 Method of Measurement

Solid Rock Excavation will be measured, and the volume computed from cross sections taken prior to the commencement of drilling or ripping operations and again after the rock has been excavated. The bottom of the rock cut will be determined by the final cross-section elevation or the grade line whichever is higher. If the rock rubble has not been excavated within the proposed embankment through the rock cut, the bottom (pay line) of the rock cut will be determined by adjoining the ditches with a theoretical straight line and using that line, or the design cut line for the bottom of the rock cut, whichever is higher.

Boulders classified as Solid Rock Excavation will be measured by the Engineer prior to their reduction or disposal.

7.11 Basis of Payment

Solid Rock Excavation will be paid for at the unit price for "Solid Rock Excavation", measured as specified herein, which price shall be payment in full for performing those operations described herein and those incidental to the work.

Where no separate contract item is provided in the Contract for Solid Rock Excavation the work, when directed by the Engineer shall be performed by the Contractor on the basis of Extra Work.

500. 8 LOOSE ROCK DISPOSAL

8.1 Description

Loose rock disposal shall consist of loading;

(a) stones and boulders which exist in piles or windrows,

(b) surface boulders from designated areas,

(c) surplus stones and boulders brought to the surface during excavation operations,

which are not classified as Solid Rock, and hauling and disposing of the loose rock in accordance with these Specifications.

8.7 Construction Methods

Stones and boulders in piles or windrows, and surface boulders, shall be disposed of in advance of excavation operations.

Loose rock shall be disposed of at locations permitted by the Engineer,

(a) Inside the Right-of-Way

When directed by the Engineer the Contractor shall load, haul and uniformly distribute the loose rock as a base for the embankment; otherwise loose rock shall be buried in trenches, preferably not below the proposed ditch bottom nor in areas which will interfere with future highway widening. The Engineer will not direct the Contractor to haul loose rock further than one kilometre beyond its original position.

(b) In Borrow Pits

Loose rock shall be buried in trenches, windrowed in neat uniform piles or covered with topsoil.

(c) In Disposal Areas Provided by the Contractor

When there is no practical site available for burying loose rock within the right-of-way, the Contractor shall make provision for disposing of loose rock on adjacent property, at least 30 m beyond the limits of the highway right-of-way. The loose rock shall be buried unless otherwise permitted by the Engineer.

Permission to bury loose rock shall be obtained, in writing from the owner of the property. The Contractor shall provide the Engineer with a copy of the written permission.

The Engineer will allow the Contractor to haul loose rock a distance greater than one kilometre providing the disposal area is approved. No compensation other than the unit bid price for loose rock disposal will be paid for hauling loose rock.

Material excavated from trenches, which is used in the construction of the highway embankment, will be measured and the volume paid for at the applicable unit price for either Common, Borrow or Composite Excavation. Material excavated from trenches which is not used in the highway embankment will not be paid for directly, as it will be considered as incidental to the unit price for "Loose Rock Disposal".

Stones and boulders brought to the surface during excavation operations which can satisfactorily be incorporated into the highway embankment during normal grading operations will not be classified as Loose Rock Disposal, but will be paid for at the unit price for the type of excavation from which they were obtained.

Surplus stones and boulders, which cannot be satisfactorily incorporated into the highway embankment will be classified as Loose Rock Disposal, which will include the removal of stones from slopes and ditch bottoms during trimming operations.

Surface boulders on excavation areas, and on areas designated by the Engineer, shall be placed in stockpiles or in trenches to facilitate their measurement.

8.9 Method of Measurement

Loose rock will be measured by determining the length, width and depth of piles or groups of rocks either immediately before their disposition or in their final position, and the volume

computed in cubic metres. The time and place of measuring loose rock, will be as determined by the Engineer.

The volume of loose rock buried in trenches will be computed by measuring the trench before the stones and boulders have been dumped and again after the stones have been levelled off.

Material classified as Loose Rock Disposal, which is brought to the surface during excavation operations, will not reduce the quantity of Common, Borrow, Composite, or Waste Excavation revealed by final cross sections.

8.11 Basis of Payment

Loose rock disposal will be paid for at the unit price for "Loose Rock Disposal", measured as specified herein, which price shall be payment in full for performing those operations described herein, and those incidental to the work.

Where surplus stones and boulders are encountered, and no contract item is provided for Loose Rock Disposal, the disposal when directed by the Engineer shall be done by the Contractor on the basis of Extra Work.

Where no contract item is provided for disposing of boulders, which exceed one cubic metre, the boulders shall be reduced on the basis of Extra Work, or by others, and the disposal of the broken rock will be paid for at the unit price for "Loose Rock Disposal".

500. 9 WASTE EXCAVATION

9.1 Description

Waste excavation shall consist of excavating and disposing of peat, silt soils and other material unsuitable for construction of the highway embankment, which is excavated within the limits of the highway right-of-way and not classified as "Topsoil Excavation".

9.7 Construction Methods

Waste shall be removed from excavation and embankment areas in advance of constructing the highway embankment.

Waste removed from outside the staked limits shall be disposed of in accordance with these specifications, however the additional waste will be excluded from final quantities.

When constructing the highway embankment through the waste section, the Contractor shall have equipment available to remove unsuitable material, which may accumulate or be pushed in front of the embankment as work progresses. The equipment shall be capable of moving the unsuitable material from the waste cut to the spoil banks without trapping any unsuitable material in the highway embankment. The removal and disposal of this unsuitable material will be considered as incidental to the unit price for "Waste Excavation".

The excavated waste material shall be piled or windrowed on designated areas within the right-of-way. Stones and boulders excavated from waste areas shall be disposed of in the waste piles. Openings shall be left in the waste piles for all natural drainage, or as directed by the Engineer, but in no case shall drainage openings be farther than 150 m apart.

The waste piles shall be levelled, with sides sloped at approximately 3:l, so that the final result is a reasonably smooth pile which blends in well with the surrounding terrain.

9.9 Method of Measurement

Waste Excavation will be measured, and the volume computed from cross sections taken before the Waste Excavation has started and again after it has been completed.

Where it is impractical to cross section waste areas, the volume excavated will be computed from the measured depth, and from the width and length indicated by the Engineer's stakes.

The Engineer's decision as to which method of measurement will be used will be final.

9.11 Basis of Payment

Waste Excavation will be paid at the unit price for "Waste Excavation", measured as specified herein, which price shall be payment in full for those operations described herein and those incidental to the work.

Where no separate Contract item is provided, Waste Excavation will be paid for at the unit price for "Common Excavation".

The Specification for "Haul" (500.11) will also apply to this material.

500. 10 OFFTAKE EXCAVATION

10.1 Description

Offtake excavation shall consist of excavating and disposing of the specified material obtained when improving or constructing drainage ditches outside the right-of-way limits, or interceptor ditches within the right-of-way limits, in accordance with these Specifications.

10.7 Construction Methods

Where clearing is required it shall be performed prior to commencing offtake excavation.

The Contractor shall not commence Offtake Excavation in an area until the Engineer has indicated that the necessary measurements have been taken.

Offtake Excavation shall include the removal of roots, stumps, stones and other objectionable material in the slopes or bottoms of the offtake ditch. Excavated material shall be spread adjacent to the offtake ditch to the depth and width as directed by the Engineer.

Where backfill is required to obtain the necessary grade or cross-section, only material approved by the Engineer shall be used.

10.9 Method of Measurement

Where the unit bid item for Offtake Excavation is in cubic meters, the volume will be computed from cross-sections taken before the work is started and again after it has been completed.

Where the unit bid item for Offtake Excavation is on the basis of a linear measurement, the distance will be measured along the centerline of the offtake ditch.

10.11 Basis of Payment

Offtake Excavation will be paid for at the unit price for "Offtake Excavation", measured as specified herein, which price will be payment in full for performing those operations described herein and those incidental to the work.

When material to be excavated is Solid Rock or permafrost, the Engineer may direct the Contractor to perform the necessary excavation, and payment will be made at the contract unit price for "Solid Rock Excavation" or as Extra Work.

Where no unit price is provided in the Contract for the excavation of offtake ditches, the work shall be performed on the basis of “Extra Work”.

500. 11 HAUL

11.1 Description

Haul shall consist of hauling Common or Borrow Excavation in accordance with these Specifications.

11.9 Method of Measurement

Field Measurements

Movement of material excavated within the right-of-way, will always be considered as having been hauled along the centerline of the highway being constructed.

Material excavated from a borrow pit will be considered as having been hauled along the shortest practical route from the center of mass of the borrow to the centerline of the highway, thence along the centerline of the highway being constructed.

Office Measurement

The final mass diagram will be plotted using balance points established during the actual construction. The actual excavation quantities moved between these balance points will determine the haul. The quantity of haul will be the product of the hauled material in cubic metres and the haul distance in 100 m stations.

11.11 Basis of Payment

Haul will be paid for at the unit price for "Haul", measured as specified herein, which price shall be payment in full for transporting excavated material.

Where no separate price is provided in the Contract for the payment of haul, the movement of excavated material will be considered as incidental to the unit prices of the Excavation items.