

## DIVISION 200 - EARTHWORK

### SECTION 201 - CLEARING RIGHT-OF-WAY

201.01 **Description** - This work shall consist of clear cutting, selective clearing and thinning, tree trimming, removing single trees, including dead, blown down or uprooted trees, removing and disposing of all stumps and debris within the limits of the right-of-way and easement areas except such objects as are designated to remain or are to be removed in accordance with other sections of these specifications. This work shall also include the preservation from injury to or defacement of all vegetation and objects designated to remain and the treatment of stumps with herbicides.

- a. Clearing shall consist of cutting and disposing of all trees, down timber, brush, bushes, and debris within designated limits.
- b. Tree trimming shall consist of removing any designated branches and other tree portions for preservation purposes.
- c. Selective Clearing and Thinning shall consist of cutting and disposing of designated trees, down timber, stubs, brush, bushes, and debris within designated limits. This work also includes application of approved herbicides on hardwood stumps.
- d. Removing trees shall consist of cutting and disposing of single trees, stumps and roots, located outside the limits of clearing or selective clearing and thinning limits, as indicated on the plans or as authorized.
  1. A single tree is defined as any tree or remains of a tree, still standing, 12" or more in its average diameter measured, as specified in Subsection 201.09 - Method of Measurement, and taller than 5 ft measured from the ground at the base of the tree.
  2. A stump is defined as the remains of a single tree 12" or more at its average diameter from which the toppings have been removed and which is less than 5 ft in height measured from the ground at the base of the stump.

201.02 **Materials** - Materials shall conform to the requirements specified in the following Subsection of Section 717.07 – Herbicide.

201.03 **General** - The Resident will verify clearing and selective clearing limit lines and designated items that are to be preserved and to remain.

Unsound or unsightly branches of trees and shrubs, designated to remain and not specified to be removed under another item, shall be removed as directed. Branches of trees extending over the roadbed shall be trimmed to provide a clear height of 20 ft above the road and shoulder surface. Trimming shall be done by skilled workers and in accordance with good tree surgery practices.

Alignment stakes, grade stakes, witness stakes, boundary markers, bench marks and tie points shall be preserved until permission is given for their destruction.

201.04 **Clearing** - In areas indicated on the plans, all trees, down timber, brush, bushes, shrubs, plants and debris not designated to remain shall be removed and disposed of.

In areas where the proposed embankment is not designated to be grubbed, as provided in Subsection 203.09 - Preparation of the Embankment Area, all stumps shall be cut off as close to the ground as is practicable. When stumps are to remain in the backslope rounding of cut sections, they shall be cut flush with the final slope line.

All wood in the clearing area, except trees designated to remain, shall become the property of the Contractor, unless otherwise provided.

The Contractor shall take special care to completely dispose of all elm trees removed.

All live hardwood stumps, 1" or more in diameter located between the lines of improvement and the outermost clearing or selective clearing lines shall be treated with an approved herbicides, unless specifically exempted.

In areas where stumps and shrubs are to remain, the surface of the ground shall not be unduly disturbed or compacted. Existing ground cover shall be preserved insofar as possible and the area shall be left neat and clean and in a condition that is reasonably consistent with the surroundings.

201.05 **Selective Clearing and Thinning** - In order that trees may be properly marked, the Contractor shall give the Resident at least 2 weeks notice before starting work. Only those trees or bushes designated to be removed shall be cut. In no event shall selective clearing and thinning operations begin until approval is given.

All dead or diseased trees or shrubs, junk, trash, litter or foreign matter of any kind shall be removed from the areas to be enhanced. This shall include uprooted stumps and all branches, tops, trunks and dead wood, resulting from woodcutting operations or from any other causes.

Trees and shrubs to be preserved shall be carefully pruned to remove all dead, diseased and injured wood. In addition, in certain areas, the Resident may require the branches of designated trees to be removed to a height above ground as directed. Complete clearing may be required in certain areas. Such clearing shall be included under this Subsection. Storing logs and pulpwood in thinned areas shall be avoided.

The Contractor shall avoid disturbing or compacting the existing ground surfaces as well as avoiding damage to plant growth. The use of heavy equipment, operating anywhere within the area to be selectively thinned, will not be allowed unless authorized.

Any injury to trees and shrubs that are to be preserved shall be carefully repaired. Disturbed ground surface shall be restored as nearly as possible to natural conditions.

Pruning and repairs to live trees and shrubs shall be done by skilled workers or tree surgeons according to approved arboricultural practice. All stumps, new or old, shall be cut off as close to the ground as is practicable.

Trees falling outside the specified limits of the thinning areas shall be removed and disposed of in a satisfactory manner. Undesirable trees leaning or falling over the highway right-of-way from outside shall be cut at the property line.

201.06 **Herbicides** - All herbicides shall be approved by the Department of Transportation Landscape Architect. The herbicides shall be applied by Certified Pesticide Applicators in accordance with State Pesticides Control Board Regulations. With the exception of coniferous (softwood) trees, stumps over 1" in diameter resulting from cutting live hardwood trees and shrubs shall be treated with approved herbicide spray mixture. The spray mixture may be applied at any time until regrowth from the stumps has reached a height of approximately 24" except that it shall not be applied when the stumps are wet or frozen. The herbicide spray mixture shall be sprayed on all exposed surfaces of stumps and the stems of regrowth, until there is complete saturation and run-off. Particular attention to coverage shall be given to the bark and all exposed roots.

All stumps shall receive at least one treatment with the herbicide spray mixture. At the time of final acceptance, live regrowth of hardwood tree seedlings shall have been substantially eliminated. Any remaining regrowth will require another treatment before final acceptance.

Particular care must be taken that the herbicide mix does not come in contact with or too near live trees and shrubs that are to be preserved. Unless otherwise directed the spray mixture shall not be applied closer than 2 ft from the trunk of a tree that is to remain.

When directed, live stumps in specified areas shall be exempted from spraying with herbicides.

The Contractor shall be responsible for maintaining the treated area until final acceptance of the work. All damage or dieback shall be repaired at the Contractor's expense as directed. At the time of final acceptance the area shall be free of all dead, dying or damaged trees and shrubs and litter of any kind as well as free from regrowth.

201.07 **Disposal** - All brush, timber, logs and other woody debris shall be disposed of by approved methods. The Contractor shall make every effort to provide useful disposition of woody material that may be marketable. If the Contractor can demonstrate that a reasonably suitable market for the material is not available, other disposal methods may be approved.

Acceptable methods of disposal may include chipping, grinding, and burying. Burning will not be allowed.

- a. **Chipping** - Wood chippers shall reduce woody material to chips, not over ¼" thick by not over 8" long, and the chips shall be spread uniformly over the ground or as directed.
- b. **Burying** - Brush and logs may be disposed of by burying in approved waste dumps or by placing in the portion of the embankments outside a slope 1½ horizontal to 1 vertical extending from the edge of the shoulder to the existing ground and covering with a minimum of 2 ft of earth. Excavation or borrow used to cover the brush and logs in the slopes may be placed in layers at least 2 ft thick and compacted only to the extent that the stability of the slope is assured. For a related provision, see Department of Environmental Protection Code of Maine Regulations 401 Section 7.
- c. **Burning** - Burning is not allowed.

201.08 **Removing Single Trees and Stumps** - When called for on the plans or otherwise designated, complete removal and disposal of single trees and stumps shall be required and shall include the backfilling of stump holes.

Trees, which have been uprooted, shall be removed by cutting the tree and removing the stump from the ground or, where approved, the stumps may be placed back in the hole to present a natural appearance. The area shall be graded to conform to the surrounding terrain.

201.09 **Method of Measurement** - Clearing and selective clearing and thinning will be measured by the acre, determined from horizontal dimensions, acceptably and actually cleared or thinned within the limits shown on the plans or additional areas flagged by the Resident. Areas not shown on the plans or not flagged for clearing or thinning will not be measured for payment.

As an alternative to field measurements, the Contractor and the Resident may agree in writing that the acreage acceptably cleared for payment will be that shown in the Schedule of Items. If such an agreement is reached, no further measuring and computing of quantities will be required and the quantity referred to herein will be final.

Single trees and stumps will be measured by each unit. The size of the tree shall be the average diameter determined by circumferential measurement at a height of 4½ ft above the ground. When trees are removed under this Contract and the removal of the stump is required, the stump size shall be the same size as that determined for the tree. The size of all other stumps shall be the greatest horizontal cross sectional dimension determined at the top of the stump. Trees or stumps, which have multiple trunks protruding from a single base trunk, shall be measured for payment as a single tree or stump.

Individual trunks of multiple trunk trees or stumps having a diameter of less than 12" will not be included to determine the size of a tree or stump.

201.10 **Basis of Payment** - The accepted quantities of clearing, selective clearing and thinning will be paid for at the Contract unit price per acre.

The accepted quantity of single trees and stumps removed will be paid for at the Contract unit price each. Payment for trees shall include removal and disposal of the entire tree except stumps.

All stumps, as defined in Subsection 201.01 d.2 and designated to be removed, will be paid for at the Contract unit price each. Payment shall include removal and disposal of the stumps and roots.

When the Schedule of Items does not contain an estimated quantity for clearing, and it is not noted on the plans as incidental, the work, when authorized, will be paid for under the provisions of Section 109.3 - Extra Work.

When the use of herbicide or tree paint is required to complete the work included under this section, it will not be paid for directly, but will be considered as included in the other Contract Pay Items.

Grubbing, when required, will be measured and paid for as provided in Section 203 - Excavation and Embankment.

Payment for removal of trees and stumps, not defined as Contract Pay Items under Section 201.01d, shall be considered incidental to the Contract and no separate payment will be made.

Removal of unsound and unsightly branches and trimming branches of trees, as specified in Subsection 201.03 - General, will be paid for under the provisions of Sections 109.03 - Extra Work or 631 - Equipment Rental.

Payment will be made under:

Pay Item		Pay Unit
201.11	Clearing	Acre
201.12	Selective Clearing and Thinning	Acre
201.23	Removing Single Tree Top Only	Each

## SECTION 202 - REMOVING STRUCTURES AND OBSTRUCTIONS

202.01 **Description** - This work shall consist of removing wholly or in part, and satisfactory disposing of all designated buildings, structures, bituminous pavement, concrete pavement, manholes, catch basins, and other obstructions which are required to be removed, except for the obstructions to be removed and disposed of under other Contract items. It shall also include salvaging designated materials.

202.02 **Removing Buildings** - The Contractor shall remove and dispose of all buildings and foundations indicated in the Contract Documents.

Cavities remaining as a result of foundation or Structure removal shall be filled to the level of the surrounding ground and, if within the limits of embankment or below the subgrade in excavation areas, shall be compacted in accordance with applicable embankment construction requirements.

Details of the ownership of the buildings and all the equipment, fixtures and materials therein, except equipment belonging to a Utility or equipment or fixtures specifically excepted and details relative to the date of availability of the property, will be stated elsewhere in the Contract Documents.

Written notice will be given the Contractor when any building becomes available before the date specified in the Contract Documents. On the above-specified date, or upon notice of availability, ownership of the buildings shall transfer from the State to the Contractor who then shall proceed with the work required under this section. The buildings shall not be used or occupied for any purpose while in the right-of-way and the buildings shall be removed as soon as possible after the date available, unless otherwise allowed.

All debris and unusable materials shall be removed to an approved dump or waste area and buried or removed to an approved landfill. No material shall be disposed of by burning. For a related provision, see Department of Environmental Protection Maine Solid Waste Management Rules, 06-096 CMR Ch. 401, Landfill Siting, Design and Operation.

202.03 ***Removing Existing Superstructure, Structural Concrete, Curbs, Sidewalks, Railings, and Bridges*** - Removing existing superstructures shall consist of removing and disposing of existing superstructure including fill, pavement, railing, and all other material on or over the superstructure unless otherwise specified. Removing existing structural concrete shall be to the limits designated in the Contract Documents and shall be accomplished without damage to the portion of the Structure to remain.

Removing existing bridge shall be to the limits shown in the Contract Documents.

Existing concrete curbs, granite curbs, and concrete sidewalks shall be removed to the limits shown in the Contract Documents using equipment such as chipping hammers or pavement breakers of a size approved by the Resident or any other method approved by the Resident which will not damage the structural integrity of the concrete deck to remain.

Before removal of existing concrete curbs or sidewalks as indicated in the Contract Documents, the fascia removal line, shall be saw cut to a depth of 1" minimum. Care shall be taken not to damage any reinforcing steel that is to remain in the Structure.

When any materials from an existing Structure are to be retained by the Department, the Contractor shall carefully dismantle them, and all materials, except those that may be specified to be reused in the new Structure, shall be loaded on trucks supplied Contractor, transported to the MaineDOT facility

identified elsewhere in the Contract Documents, or as directed by the Resident, and unloaded by the Department, unless otherwise specified in the Contract Documents. The use of any portion of the salvaged material in connection with new or temporary construction shall not be anticipated by the Contractor. The dismantling of metal Structures or railings shall, when explicitly provided, include the removal of all bolts and fasteners necessary to disconnect the members and the matchmarking of these members for future reassembling.

When the material from an existing Structure are designated to become the property of the Contractor, they shall be entirely removed and disposed of out of sight of the highway and beyond the limits of the right-of-way. Such materials shall not be deposited in rivers, streams, or other bodies of water. If the material is to be wasted then it shall be disposed of at an approved location.

When practical, any suitable material removed shall be used in backfilling or for the formation of embankments and no additional allowances for payment will be made. Unsuitable or surplus material shall be disposed of in an approved waste area.

Blasting or other operations necessary for the removal of an existing Structure or obstruction, which might damage new construction, shall be completed before installing the new work. If this is not feasible, the work shall be done only when approved and entirely at the Contractor's risk.

If damage to the structure to remain occurs, repair structural steel in accordance with Section 504.55 - Field Welding and Repairs.

202.031 ***Removing Existing Bituminous Pavement and Concrete Wearing Surface from Bridges*** - The full depth of existing bituminous pavement, or concrete wearing surface shall be removed from curb to curb for the entire length of the bridge. Membrane waterproofing, if present, shall also be removed in a manner approved by the Resident.

Extreme care shall be taken to avoid damaging the top of the concrete deck to remain. All existing deck concrete that is not otherwise specified to be removed or repaired, that is damaged by the Contractor, shall be repaired at the expense of the Contractor.

When repair of the top of the deck is called for in the Contract Documents, the work shall be done in accordance with Standard Specification Section 518 - Structural Concrete Repair.

202.32 ***Removing Concrete Pavement*** - All concrete pavement and concrete base course designated for removal shall be broken into pieces suitable for use in construction of embankment or disposed of as directed by the Resident. When used in construction of embankments, the maximum size of any fragment shall not exceed the thickness of the layer being placed. The Contractor may, at their option and with approval of the Resident, dispose of material in approved waste areas

and replace with an equivalent volume of granular borrow at no cost to the Department.

202.04 **Removing Manholes or Catch Basins** - Where the manhole or catch basin is under a Roadway or embankment, the sides shall be removed to a depth of at least 2 ft below subgrade. When the Contract Documents do not provide for the complete removal of pipe(s) connecting to the catch basin or manhole, said pipe:

- (1) if to be connected to new pipe, shall not be disturbed, or
- (2) if no connection is called for, the pipe shall be tightly plugged with mortared masonry.

Floors of the Structures shall be broken up or removed to permit drainage. The open cavity shall be filled with earth and thoroughly compacted.

202.05 **Removing Bituminous Pavement** - This work involves removing bituminous pavement from Roadways, down to gravel. The equipment for removing the bituminous pavement shall be capable of removing and loading the bituminous pavement without including any gravel, except that adhering to the pavement. The remaining gravel shall be graded to drain as approved by the Resident.

202.051 **Removing Pavement Surface** - The equipment for removing the bituminous surface shall be a power operated milling machine or grinder capable of removing bituminous concrete pavement to the required depth, transverse cross slope, and profile grade using an automated grade and slope control system. The controls shall automatically increase or decrease the pavement removal depth as required, and readily maintain desired cross slope, to compensate for surface irregularities in the existing pavement course. The equipment shall be capable of accurately establishing profile grades by referencing from a fixed reference such as a 30 ft minimum contact ski (floating beam), 24 ft non-contact ski (floating beam) with 3 or more sensors; or 3 non-contact sensors directly affixed at the fore, mid, and aft points of the milling machine. Systems designed to incorporate a contact sensor located at the mid-point of the milling machine in lieu of the non-contact sensor will be permitted. Grade control sensors shall all be located on the same side. A single sensor, contact or otherwise, shall not be permitted unless otherwise approved by the Department.

The rotary drum shall be a minimum of 7 ft in width and utilize carbide tip tools at a minimum triple wrap configuration. The difference in height from the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ¼". The forward speed of the milling machine shall be adjusted to produce a milled surface meeting the groove spacing, groove depth, and surface tolerance requirements of this specification. The tools on the revolving cutting drum must be

continually maintained and shall be replaced as warranted to provide a uniform pavement texture. The Department may evaluate the texture of the milled surface for information purposes by performing the Sand Patch test according to ASTM E965.

The Contractor shall locate and remove all objects in the pavement through the work area that would be detrimental to the milling or grinding machine. Any structures or obstructions left within the travel lane or shoulders shall have tapers installed according to Standard Detail 202(01). The finished milled surface will be inspected before being accepted, and any deviations in the profile exceeding 1/2 inch under a 16 ft string line or straightedge placed parallel to the centerline will be corrected. Any deviations in the cross-slope that exceed 3/8" under a 10 ft string line or straightedge placed transversely to centerline will be corrected. All corrections will be made with approved methods and materials. Any areas that require corrective measures will be subject to the same acceptance tolerances. Excess material that becomes bonded to the milled surface will be removed to the satisfaction of the Resident before the area is accepted.

On roadways with adjoining lanes carrying traffic, the Contractor shall remove the pavement surface in each lane per the conditions in Table 1, unless otherwise noted in Special Provisions.

**TABLE 1: MILLING CONDITIONS FOR ADJOINING LANES**

<b>Depth (At Centerline)</b>	<b>Milling Conditions</b>
<b>Vertical Longitudinal Joint</b>	
2" and less	The Contractor may remove the pavement on a single travel lane width for each production Day and will be required to mill the adjacent section of travel lane before the end of the following Calendar Day.
Greater than 2"	The Contractor shall remove the pavement over the full width of the traveled way section being paved that Day.
<b>12:1 Tapered Centerline Joint</b>	
1 1/2" to 2"	The Contractor may remove the pavement on a single travel lane width for each production Day and will be required to mill the adjacent section of travel lane before weekend or holiday suspension. A maximum unmatched centerline joint length of 0.5 miles will be permitted over the weekend.
Greater than 2"	The Contractor shall remove the pavement on a single travel lane width for each production Day and will be required to mill the adjacent section of travel lane before the end of the following Calendar Day.

The Contractor will be required to remove the pavement over the full width of the mainline traveled way, regardless of highway type, cut depth, or longitudinal joint type prior to Memorial Day, July 4<sup>th</sup>, Labor Day, suspensions exceeding 3 Days, or other dates as specified by Special Provision.

The Contractor will also be responsible for installing additional warning signage that clearly defines the centerline elevation differential hazard. Unless otherwise addressed in the Contract, the Contractor shall install additional centerline delineation such as a double RPM application, or temporary painted line. The Traffic Control Plan shall be amended to include this option and the additional requirements. All signs and traffic control devices will conform to Section 719.01, and Section 652, and will be installed prior to the work, at a maximum spacing of 0.50 mile for the entire length of effected roadway section. If this option is utilized, all additional signing, labor, traffic control devices, or incidentals will not be paid for directly, will be considered incidental to the appropriate 652 items.

On roadways with immediately adjacent shoulders, the Contractor shall remove the pavement surface in each lane per the conditions in Table 2, unless otherwise noted in Special Provisions.

**TABLE 2: MILLING CONDITIONS FOR THE EDGE OF TRAVELED WAY**

Depth (At Edge of Traveled Way)	Conditions
2" and less	The Contractor may leave a vertical edge joint exposed for up to <b>21 Days</b> after milling is performed. The Contractor shall treat vertical edge joints exposed beyond 21 Days per the criteria below.
Greater than 2"	The Contractor shall treat vertical edge joints exposed per the criteria below.

When required by Table 2, the Contractor shall treat vertical edge joints through one of the options below:

1. The vertical edge shall be tapered to a zero edge by means of milling a 12:1 transition from the edge of traveled way onto the shoulder before opening the lane to traffic. Tapers shall be removed to form a vertical edge prior to the placement of the new pavement course. No additional payment will be made for tapers, or taper removal.
2. An additional 2 ft of pavement shall be removed from the shoulder to eliminate the vertical edge at the edge of travel way before opening the lane to traffic. Unless otherwise

authorized by the Department, no additional payment will be made for the additional milling.

3. A pavement layer shall be placed to reduce the vertical edge to 1" or less before opening the lane to traffic.

As a minimum, the use of temporary painted line, or RPMs placed along the edge of traveled way at 200 ft intervals is required for all elevation differentials. When pavement milling is extended into the shoulder (including milled tapers), appropriate channelization devices shall be placed 2 ft outside the edge of the vertical face at intervals not exceeding 600 ft, and RPMs shall be placed on the remaining pavement surface along the vertical edge at 200 ft intervals. Uneven pavement signs shall be placed at a maximum spacing of ½ mile when any pavement milling operations leaves an exposed uneven pavement surface.

Weepers shall be ground across the full width sections adjacent shoulders or remaining pavement surface matching the milled travel way or shoulder milled depth to minimize water ponding in any lanes carrying traffic. Weepers shall typically be 18-24" in width, installed along each lane, at a frequency of approximately one per half mile at locations as directed by the Resident or in areas that will provide drainage for the milled areas. Installation of weepers will not be paid for directly but will be considered incidental to the pavement removal item. The replacement of mix in the weeper locations shall be performed concurrently within the pavement placement operation closure using the appropriate HMA item produced for the Contract or a MaineDOT approved 9.5mm HMA. There will be no separate payment for repaving the weeper locations as they are considered incidental to the square yard price of the pavement removal item.

The milled surface shall be cleaned of all material resulting from the pavement removal operation. Loaders, skid steers, motorized side cast brooms, sweeper pick up brooms, vacuum pick up machines and hand labor may be used in any number or sequence as determined by the Contractor in order to clean the milled surfaces to the satisfaction of the Department before acceptance and opening the area up to traffic. The use of compressed air may be required to loosen any bonded materials from the surface to aid in cleaning.

Any areas of concern, such as delamination or potholing shall be identified on a continuous basis as milling progresses. Proper corrective action will be determined by the Resident and paid for under the appropriate Contract items, and if required, completed prior to opening lane to traffic. Any issues that arise up to 7 Calendar Days

after being milled will be the responsibility of the Department, unless otherwise noted in Special Provision.

202.052 **Pavement Butt Joints** - The equipment for removing the bituminous surface shall be a cold milling machine or a power-operated planer capable of removing the existing pavement to the required depth, width, grade, and slope.

The milled surface shall have a uniform texture and provide acceptable rideability for vehicles. Should resurfacing be delayed, or the resulting milled surface is unsatisfactory for any reason, a bituminous leveling course or temporary pavement may be required. The Contractor shall clean the milled surface and surrounding area of all loose material prior to use by traffic.

202.06 **Method of Measurement** - Removing buildings, removing existing superstructures, and removing existing bridges will each be measured by the lump sum.

Removing concrete pavement, removing bituminous pavement, pavement butt joints, and removing pavement surface will be measured by the square yard with no deductions made for areas occupied by existing catch basins and manholes.

Removing existing structural concrete will be measured either by the cubic yard in place before work starts on the particular portion of the Structure to be removed or by the lump sum as specified.

Removing existing railings will be measured by the linear foot in place along the grade and line of the railing from outside to outside of end posts or rail Projections, whichever is greater.

Removing of existing bituminous pavement, removing existing concrete wearing surface, and removing of existing concrete curbs and sidewalks from bridges, will each be measured for payment as one lump sum unit, complete, and accepted.

Removing of existing manholes and catch basins will be measured by each unit removed.

202.07 **Basis of Payment** - The accepted quantity of removing building, removing existing superstructure, and removing existing bridge will be paid for at the Contract lump sum price, which price shall be full compensation for removing and disposing of the obstructions and building foundations down to an elevation matching the surrounding ground, as indicated elsewhere in the Contract Documents or as directed by the Resident.

Removing concrete pavement will be paid for at the Contract unit price per square yard which price will be full compensation for removing and disposing of pavement and pavement reinforcement.

Material for backfilling holes resulting from removal of obstructions will be measured and paid for as provided in Section 203 - Excavation and Embankments.

The quantity of structural concrete removed will be paid for, either at the Contract unit price per cubic yard or at the Contract lump sum price which price shall include disposal of the concrete.

The quantity of railing removed will be paid for at the respective Contract unit price per linear foot of railing removed and disposed of, whether it is retained by the Department or becomes the property of the Contractor.

Removing existing concrete wearing surface and removing of existing bituminous pavement from bridges will be paid for at the Contract lump sum price for the respective Contract Pay Item involved. Payment for removing membrane waterproofing, if present on the existing deck, shall be considered incidental to the removing of bituminous pavement.

Removing existing manholes and catch basins will be paid for at the Contract unit bid price each, which price shall include all work, materials, labor, and equipment. New pipe as required by the Contract Documents will be paid for separately under the appropriate Pay Item. Where new pipe is to be connected to existing pipe, the Contractor shall furnish and install, at their expense, pipe necessary to replace any existing pipe damaged beyond the limits of pipe removal shown in the Contract Documents.

Removing bituminous pavement will be paid for at the Contract unit price for the number of square yards removed as required by the Contract Documents or as ordered by the Resident, which price will be full compensation for removing and disposing of the bituminous pavement and re-grading of the remaining material.

The accepted quantity of pavement butt joints will be paid for at the Contract unit price per square yard which price will be full compensation for removing and salvaging the bituminous material. Any bituminous leveling material or temporary pavement required will not be measured for payment directly, but will be considered incidental to the related Contract Pay Items.

The accepted quantity of removing pavement surface will be paid for at the Contract unit price per square yard or at the Contract hourly rental price and will be full compensation for mobilizing to the site, de-mobilizing from the site, labor, supervision, cleaning of the milled surface, and all other incidentals required to complete the work. Hauling and stockpiling of the material will not be paid for directly but will be considered incidental to the milling items.

Trimming to create a vertical face along curb line, guardrail, or around structures will be considered incidental to the milling items. Additional trimming beyond the incidental work described will be paid under the appropriate rental items as listed in the Contract.

**Square Yard** - Payment will be made at the Contract unit price for the number of square yards removed.

**Hourly** - Payment will be made at the Contract unit price for the number of hours of operation removing pavement surface as directed by the Resident. The equipment used for pavement removal shall be operated at the minimum speed of 50 fpm, unless the Resident directs otherwise for milled surface quality reasons, or traffic control limitations impact pavement removal operations, or site conditions make operations at the prescribed rate unreasonable.

When the Pay Item calls for material to be retained by the Department, payment shall include the salvage of these materials, custody, preservation, loading and delivery as provided herein.

When the Contract does not include Pay Items for removal of Structures and obstructions as provided in this Section, such work shall be incidental to the various Contract Pay Items and no direct payment will be made except that removal of foundations and concrete pavement will be paid as provided in Section 203 - Excavation and Embankment.

The containment and disposal of pollutants during the removal of materials from any Structure, Roadway or obstruction will not be paid for directly but shall be incidental to the related Contract Pay Item.

The payment for each Contract Pay Item will be full compensation for furnishing all materials, labor, equipment and for all other incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
202.08	Removing Building No. ____	Lump Sum
202.09	Removing Existing Superstructure: Retained by Department	Lump Sum
202.10	Removing Existing Superstructure: Property of Contractor	Lump Sum
202.11	Removing Concrete Pavement	Square Yard
202.12	Removing Existing Structural Concrete	Cubic Yard
202.121	Removing Existing Structural Concrete ____	Lump Sum
202.127	Removing of Existing Bituminous Pavement from Bridges	Lump Sum
202.128	Removing Existing Curbs & Sidewalks from Bridges	Lump Sum
202.13	Removing Existing Railings: Retained by Department	Linear Foot
202.14	Removing Existing Railings: Property of Contractor	Linear Foot
202.15	Removing Existing Manhole or Catch Basin	Each
202.19	Removing Existing Bridge	Lump Sum
202.20	Removing Bituminous Pavement	Square Yard
202.202	Removing Pavement Surface	Square Yard
202.20201	Removing Pavement Surface (Hourly)	Hour
202.203	Pavement Butt Joints	Square Yard
202.30	Removing Existing Concrete Wearing Surface from Bridges	Lump Sum

## SECTION 203 - EXCAVATION AND EMBANKMENT

203.01 **Description** - This work shall consist of excavating, removing, hauling, backfilling and compacting or disposing, as required, of all material not being removed under some other item, encountered for the construction of the Project in accordance with these specifications and in reasonably close conformity with the lines, grades, thickness and typical cross sections shown in the Contract Documents or established by the Department. Excavation under this section will be classified as Common Excavation, Rock Excavation and Unclassified Excavation, as hereinafter defined. Material not classified as excavation that is required to construct embankments and backfill trenches and holes shall be classified as borrow or crushed stone. This work shall also consist of constructing foundation pads of Culvert Bedding Stone in accordance with these specifications and in reasonably close conformity with the width, length, grade and thickness as shown in the Contract Documents or established by the Department.

The following definitions shall apply to this section:

- **Common Excavation** - shall consist of excavation and removal of all material encountered in grading within the Project Limits, which is not otherwise classified and paid for. Common excavation shall include the removal and disposal of boulders, solid mortared stone masonry and concrete masonry when each is less than 2 cy in volume and all soft and disintegrated bedrock which can be removed with ordinary excavating machinery. It shall include grubbing, which consists of the removing and disposing of all stumps, roots, bushes, grass, turf or other objectionable material and it shall include excavation for channels, berm ditches and cut slope downspouts.
- Common Excavation shall include muck removal, which shall consist of excavating and disposing of saturated or unsaturated mixtures of soils and organic matter not suitable for embankment foundation material regardless of moisture content.
- Common Excavation shall also include removing and disposing of all earth material encountered in excavating for permanent stream channel diversion and channel widening or straightening, when designated in the Contract Documents, outside the limits of structural excavation or other classifications.
- **Rock Excavation** - shall consist of removing: Hard igneous, metamorphic and sedimentary bedrock which cannot be excavated with ordinary excavating machinery and cannot be excavated without employing means such as, but not limited to, drilling and blasting, drilling and splitting or hoe-ramming; and all boulders, solid mortared stone masonry and concrete masonry, each having a volume of 2 cy or more.

- **Unclassified Excavation** - shall consist of Common Excavation and Rock Excavation as classified above and not measured separately.
  - When identical unit prices are bid for Common Excavation and for Rock Excavation, such bids shall be considered as a bid for Unclassified Excavation of the combined items and shall be so classified.

203.02 **Materials** - Borrow shall consist of approved material required for the construction of embankments or for other portions of the work as designated by the Department. . Unless otherwise designated in the Contract, the Contractor shall make their own arrangements for obtaining borrow and shall pay all costs involved.

Material shall meet the requirements of the following Subsections of Division 700 - Materials:

Crushed Stone ¾"	703.13
Common Borrow	703.18
Granular Borrow	703.19
Gravel Borrow	703.20
Rock Borrow	703.21

Slope blanket backfill material shall meet the requirements of aggregate for base and subbase, Type D specified in Subsection 703.06 - Aggregate for Base and Subbase, as directed.

Culvert Bedding Stone shall meet the requirements of Type C material, specified in Subsection 703.22 - Underdrain Backfill Material.

203.03 **Unauthorized Use of Materials** - No Common Excavation, Rock Excavation, Unclassified Excavation or Borrow which is designated for use in embankments or backfill may be diverted for the Contractor's own use. Any unauthorized use of such material will be adjusted by deducting quantities, measured by the most appropriate method, as determined by the Department, and 115% of the quantity deducted from the total amount.

203.04 **General** - Prior to beginning excavating, grading, and embankment operations in any area, all necessary clearing in that area shall have been performed in accordance with Section 201 - Clearing Right-of-Way.

Unsuitable material shall be disposed of as directed and no material shall be wasted without the Department's permission.

The Resident may designate as unsuitable those soils which cannot be properly compacted in embankments and all such unsuitable material shall be disposed of in approved waste storage areas or acceptable waste areas as directed.

Suitable material taken from excavation shall be used in the construction of embankment, subgrade, and for backfilling as indicated in the Contract

Documents, or as directed, and no additional payment will be made. Unsuitable or surplus material shall be used as directed or wasted.

The Contractor shall give the Resident sufficient time before beginning excavation to take necessary survey measurements. The Contractor shall not excavate beyond the dimensions, slopes and elevations established, and no material shall be removed prior to surveying the site. Unless otherwise authorized, borrow shall not be placed until after all suitable excavation has been placed in the embankment unless the use of Granular Borrow is called for in the Contract Documents, for use under embankments, in conjunction with the use of excavated material or for the maintenance of traffic. If the Contractor places more borrow than is required and thereby causes a waste of suitable excavation material, the amount of such waste will be measured by the method deemed most appropriate and 100% of the amount deducted from the borrow volume.

When different unit prices are bid for Common Excavation and Rock Excavation, the Contractor will be required to strip earth from the bedrock to provide an opportunity for the Resident to take the necessary measurements. When identical prices are bid for Common Excavation and Rock Excavation, the Contractor will not be required to strip the earth from the bedrock.

When it is necessary to temporarily remove fencing designated to remain, the fencing shall be replaced by the Contractor at their expense in as good a condition as it was originally. The Contractor shall be responsible for the confinement of livestock when a portion of the fence is removed. When new fencing for confinement of livestock is required, it shall be erected before existing fencing is disturbed. Where new fencing cannot be erected in its final location, temporary fencing shall be installed at the Contractor's expense.

The degree of finish for grading ditches and slopes, both fill slopes and cut slopes, shall be that obtainable from machine operations. Ditches shall be constructed to within 6" above or below the grade called for in the Contract Documents, or as otherwise modified, but, in no case, shall the ditch be finished in a condition that will not allow the flow of water. Ditches shall be graded to the extent that puddles will not form.

Unstable slopes subject to sliding and slumping shall be excavated to the lines and grades indicated in the Contract Documents or as directed. Immediately after each location is excavated, approved slope blanket backfill material shall be placed and shaped to match the adjacent slopes.

Rock slopes shall be scaled (cleaned of all loose material) immediately as the excavation proceeds. The rock slope shall then be examined by the Contractor to determine if the slope is stable. If the slope is not deemed stable upon this examination, then immediate steps shall be taken by the Contractor to insure the stability of the slope during construction. There will be no additional payment for any temporary protection required for the construction of the Project.

Culvert Bedding Stone shall be placed and graded as shown in the Contract Documents or as directed by the Resident and shall be compacted as required to ensure that all voids in the stone are filled, as approved by the Resident.

203.041 **Salvage of Existing Hot Mix Asphalt (HMA) Pavement** - All existing HMA pavement designated to be removed under this Contract must be salvaged for utilization. Existing HMA pavement material shall not be deposited in any waste area or be placed below subgrade in any embankment.

Methods of utilization of HMA pavement may be any of the following:

1. Used as a replacement for untreated aggregate surface course on entrances provided the material contains no particles greater than 2" in any dimension. Payment will be made under Pay Item 411.09 - Untreated Aggregate Surface Course or 411.10 - Untreated Aggregate Surface Course, Truck Measure. Material shall be placed, shaped, compacted and stabilized as directed by the Resident.
2. Used as the top 3" of gravel. Recycled Asphalt Pavement (RAP) shall be processed such that the material contains no particles greater than 1½" in any dimension. When this method is utilized, a surcharge will not be required.
3. Stockpiled at commercial facilities or at approved sites for commercial or Department use.
4. Other methods proposed by the Contractor and approved by the Department.

The cost of salvaging HMA material will be incidental to applicable Contract pay items, with no additional allowances made, which will be full compensation for removing, temporarily stockpiling, and rehandling, if necessary, and utilizing the material as listed above.

203.042 **Rock Excavation and Blasting**

1. **General Requirements**
  - a. All blasting operations, including the storage and handling of explosives and blasting agents, shall be performed in accordance with this specification and Standard Specification Section 105.2.7 - Use of Explosives, and other specifications referenced therein.
  - b. In case of conflict between regulations or between regulations and this Specification, the Contractor shall comply with the strictest applicable codes, regulations, or Specifications.

- c. The overburden shall be removed or trenches shall be excavated through the overburden at the intervals directed by the Resident, normally 25 ft, but, in no case, closer than 10 ft apart to permit surveying of the bedrock in its original position. Bedrock removed prior to surveying will be considered Common Excavation.
  - d. The delay elements in blasting caps are known to deteriorate with age. For this reason, it is required that all blasting caps used on the Project be less than 1 year of age. No blasting products will be allowed on the job site if the date codes are missing.
  - e. When, in the opinion of the Resident, any blasting product is either of excessive age or in what appears to be a deteriorated condition, all work will cease until the product's age or quality can be determined.
  - f. No explosives, caps, detonators or fuses shall be stored on the Project site during non-working hours.
  - g. The use of explosives containing perchlorate compounds shall not be allowed.
2. **Controlled Blasting Methods** - Controlled Blasting is defined as a blasting method which utilizes a line of closely spaced, lightly loaded blastholes that are fired either before or after the main production blast to define a break line on the perimeter of the excavation.

The purpose of Controlled Blasting is to create a stable rock face with a fall zone to protect the traveling public from rockfall hazard, and to protect existing structures, adjacent and nearby properties, and the public from damage or injury. Controlled Blasting shall be required on all critical rock slopes.

- a. Production blasting refers to the main fragmentation blasting resulting from widely spaced production holes drilled throughout the main excavation area adjacent to the presplit line. Production holes shall be detonated in a controlled delay sequence.
- b. Presplitting is defined as the establishment of a free surface of a shear plane in bedrock by the controlled usage of explosives and blasting accessories in appropriately aligned and spaced drill holes so that the resulting split bedrock is not affected by subsequent blasting and excavation operations. The purpose of

presplitting is to minimize damage to the rock backslope and to help ensure long term stability. When presplitting, the detonation of the presplit line shall be before the detonation of any production holes.

- i. Prior to drilling, all overburden and all loose and disintegrated rock shall be removed down to solid bedrock in the vicinity of the presplit lines. Potentially dangerous boulders beyond the excavation limits shall also be removed as directed by the Resident.
- ii. Presplitting shall extend a minimum of 30 ft ahead of the limits of production blasting within the section or to the end of the cut, as applicable.
- iii. All drilling equipment used to drill the presplit holes shall have electromechanical or electronic devices affixed to that equipment to accurately determine the angle at which the drill steel enters the bedrock. Presplit hole drilling will not be permitted if these devices are missing or inoperative.
- iv. The length of the presplit holes shall not exceed 30 ft in depth unless approved by the Resident. Bedrock deeper than 30 ft shall usually be presplit in lifts, but no lift shall be less than 10 ft in depth. When the cut height will require more than one lift, a maximum 2 ft offset between lifts shall be permitted to allow for equipment clearance. No payment will be made for additional excavated quantity caused by offsetting of presplit lines for less than 20 ft lifts. Drilling 2 ft below ditch bottom will be allowed to facilitate removal of the toe berm.
- v. Before placing charges, the Contractor shall determine that the hole is free of obstructions for its entire depth. All necessary precautions shall be exercised so that placing the charges will not cause caving of material from the walls of the holes.
- vi. The diameter of the explosives used in presplit holes shall not be greater than  $\frac{1}{2}$  the diameter of the hole.
- vii. Continuous column cartridge explosives manufactured especially for presplitting shall be used for all presplitting. The bottom charge of a presplit hole may be larger than the line charges, but shall not be large enough to cause overbreak.

The top charge of the presplitting hole shall be placed far enough below the collar, and reduced sufficiently, to avoid over breaking and heaving. The upper portion of all presplit holes, from the top charge to the hole collar, shall be stemmed.

viii. The presplit slope face shall not deviate more than 1 ft from a plane passing through adjacent drillholes, except where the character of the bedrock is such that, as determined by the Resident, irregularities are unavoidable. The 1 ft plane shall be measured perpendicular to the plane of the slope. In no case shall any portion of the slope encroach on the roadbed.

c. **Cushion blasting** - Where the horizontal distance from the existing rock face to the cut face is less than 15 ft, or if rock conditions warrant this approach, the Contractor may use cushion blasting in lieu of presplitting. Cushion blasting is similar to presplitting except that the detonation along the cut face occurs after the detonation of all production holes. With the exception of the above criteria, requirements previously given for presplitting shall also apply to cushion blasting.

d. **Sliver Cuts** - For sliver cuts, pioneering the top of cuts and preparing a working platform to begin the controlled blasting may require unusual work methods and use of equipment. The Contractor may use angle drilled holes during the initial pioneering operations to obtain the desired rock face. Hole spacing shall not exceed 30".

### 3. **Submittals**

a. Not less than 2 weeks prior to commencing drilling and blasting operations, or at any time the Contractor proposes to change drilling and blasting methods, the Contractor shall submit a Blasting Plan to the Resident for review. The Blasting Plan shall contain full details of the drilling and blasting patterns and controls the Contractor proposes to use for both the controlled and production blasting. Review of the Blasting Plan by the Department shall not relieve the Contractor of its responsibility for the safety, accuracy and adequacy of

implementing the Plan. The Blasting Plan shall contain the following information:

- i. Station limits of proposed shots.
  - ii. Plan and section views of the proposed drill pattern, including free face, burden, blasthole spacing, blasthole diameters, blasthole angles, lift height, and subdrill depth.
  - iii. Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming.
  - iv. Initiators sequence of blastholes including delay times and delay system.
  - v. Manufacturers' data sheets for all explosives, primers and initiators to be used.
  - vi. Details of the audible advance signal system to be employed at the job site.
  - vii. Precautions to protect nearby structures and cultural features.
- b. **Daily Blasting Logs** - The Contractor shall provide the Resident with a daily log of blasting operations, submitted on a weekly basis. The log shall be updated at the close of each Working Day. The log shall include the number of blasts, times and dates of blasts, the blasting locations and patterns and all information shown below:
- i. Station limits of the shot.
  - ii. Plan and section views of drill pattern, including free face, burden blasthole spacing, blasthole diameters, lift height, and subdrill depth.
  - iii. Loading diagram showing type and amount of explosive, primers and initiators and location and depth of stemming.
  - iv. Initiators sequence of blastholes including delay times and delay system in each blasthole.
  - v. Mats or other protection used.
  - vi. Signature of the Blaster in charge.
  - vii. The Contractor shall report to the Resident in writing all blasting complaints received by the Contractor within 24 hours of receipt. Each blast complaint

report shall include the name and address of the complainant, time received, date and time of blast complained about and a description of the circumstances which led to the complaint.

4. **Blast Vibration Control and Monitoring**

- a. The Contractor shall be required to monitor blasting vibrations (both ground and air concussions) and shall provide a copy of the Pre-Blast Condition survey of all structures and cultural features that may be affected to the Resident, prior to any blasting activities.
- b. When nearby structures, utilities or adjacent slopes may be subject to damage from blast-induced ground vibrations, the ground vibrations shall be controlled using properly designed delay sequences and appropriate charge weights per delay.
- c. When vibration damage to adjacent structures or cultural features is possible, the Contractor shall monitor each blast with an approved seismograph located between the blast area and the closest structure subject to blast damage, as approved by the Department. The seismograph used shall be capable of recording particle velocity for three mutually perpendicular components of vibration in the range generally found with controlled blasting.

5. **Flyrock Control** - Before the firing of any blast in areas where flying rock or debris may result in personal injury or damage to property, the rock to be blasted shall be covered with approved blasting mats, soil, or other equally serviceable material to prevent flyrock. The method of flyrock control shall be subject to approval by the Resident.

203.05 **Roadway Excavation** - Roadway excavation shall be maintained in such condition that the excavation surface will be well drained. Temporary drains, drainage ditches and culverts shall be constructed to intercept and divert water that may adversely affect the condition of the excavation and the prosecution of the Work.

Excavation in general, shall proceed in an upgrade direction. Subgrades shall be promptly graded and rolled to minimize absorption of water. Adjacent ditches shall be graded to the extent that puddles will not form. Grubbing areas which cannot be drained shall be promptly filled with approved excavation or borrow to such an elevation that surface drainage will be effective. If, due to unusual circumstances, drainage by gravity cannot be accomplished, the Resident may require the Contractor to provide adequate means of pumping the area. Pumping

may be required on a 24 hour a Day continuous basis, at no additional cost to the Department.

When muck is encountered, either unexpectedly or as indicated in the Contract Documents, it shall be removed in such a manner as to insure its complete removal with no areas remaining or trapped below the embankment. Excavated muck shall be deposited in designated waste storage areas as indicated in the Contract Documents, deposited in waste areas beyond the Project Limits or disposed of as otherwise directed.

Excavation adjacent to roots of trees or shrubs, which are to remain, shall be removed by hand.

When excavating results in a subgrade of unsuitable soil, the Resident may require the Contractor to remove the unsuitable material and backfill the area with approved material. The Contractor shall conduct their operations in such a way that the Resident can take the necessary measurements before the backfill is placed.

Material classified as rock, whether paid for as Rock Excavation or Unclassified Excavation, shall be excavated to the required depth, as shown in the Contract Documents. Care shall be taken that undrained pockets will not be left in the surface of the rock remaining.

The space between the rock remaining and the normal subgrade as indicated in the Contract Documents shall be backfilled with the designated aggregate subbase or aggregate base, pulverized rock or other approved material. The Contractor shall conduct their excavating and hauling work in a manner that will cause as little contamination as possible. Fine grading at the normal subgrade line will be required unless aggregate subbase or aggregate base material is used.

Ditches in bedrock cuts shall be constructed with no protrusions of rock above the designated rock cut pay lines. The space between the rock remaining and the finished surface of the ditch shall be backfilled with broken rock.

For earth and rock backslopes designated to be constructed on a 2 horizontal to 1 vertical slope or flatter, the slope shall be uniformly finished to within 6" above or 6" below the lines designated, but, in no case, shall Projections of rock extend over 6" above the actual finished surface of the slope as constructed. Rock backslopes designated to be constructed on a ¼ horizontal to 1 vertical slope shall be excavated at least to a vertical plane.

Buried structures and other materials , as specified in Section 104.3.13 - Materials and Items Found on the Project, located within the Project Limits, shall be removed as part of the applicable excavation item for type of work being performed. Buried structures and other materials located below or outside the required excavation, whose removal is ordered, shall be removed and such

removal paid for as Common Excavation, Rock Excavation or Unclassified Excavation, whichever is applicable.

203.051 **Drilling and Blasting of Solid Rock Subgrade** - Subgrade areas shall be shattered to the dimensions as indicated in the Contract Documents or as directed by the Resident.

The area of blasted rock subgrade shall extend sufficiently beyond the beginning and end of cut areas to ensure the shattering of all rock to a depth of 4 ft below subgrade elevation to eliminate water pockets.

After detonation, any rock that protrudes above the subgrade elevation after subgrade has been proof rolled, shall be removed. When directed by the Resident, the Contractor shall excavate a trench across the blasted rock to determine if the rock is broken and disarranged to a depth of 4 ft below subgrade to ensure that the rock is not simply fractured. Afterwards, the trench shall be backfilled with the rock removed.

203.06 **Waste Areas** - It shall be the responsibility of the Contractor to obtain necessary permits and approvals from all pertinent State and Federal agencies and from the local municipality before the establishment of waste areas off the Project, or to verify that the landowner has obtained these permits and approvals. In addition, written permission of the property owners shall be obtained by the Contractor, including permission to dispose of waste in the area. Copies of all agreements between the waste area property owner and the Contractor, on the Contractor's letterhead, shall be given to the Resident.

Provisions shall be made for temporary and permanent erosion controls at waste areas, which shall include, but not necessarily be limited to, grading the surface to drain, covering the surface with loam or other earthy material that will support growth and seeding and mulching.

Entrances to waste areas located within wooded areas shall be in accordance with Subsection 203.07 - Haul Roads.

All trees that are damaged, uprooted or otherwise moved because of the waste material, and trees that have had waste material placed around them to the extent that they may die, shall be cut and removed at the expense of the Contractor.

Designated waste areas may be established by the Department. When such waste areas are established, the location and other conditions relating to them will be described in the Contract Documents.

203.07 **Haul Roads** - In wooded areas, haul roads shall be kept to a minimum width and placed at approximately right angles to the road or angled away from view of oncoming traffic.

203.08 **Borrow** - Refer to Section 105.8.6 - Pit or Quarry Requirements.

The Contractor shall notify the Resident sufficiently in advance of opening any borrow areas so that survey measurements of the ground surface after stripping may be taken. The Contractor shall submit borrow material test results to the Department prior to being used. Existing pits shall, when directed, be graded and shaped by the Contractor before being surveyed for initial measurements.

203.09 **Preparation of the Embankment Area** - When the depth of the embankment, measured vertically below subgrade, does not exceed 5 ft, the area on which the embankment is to be placed shall be grubbed as defined in Subsection 203.01 a. When the embankment is more than 5 ft deep, as measured above, all vegetation in the embankment area shall be cut as specified in Section 201 - Clearing Right-of-Way.

When fill material is placed against existing slopes or previously placed fill, the interface shall be continuously benched by excavating steps of sufficient width to permit operations of placing and compacting the additional material. Material removed shall be placed and compacted along with the new embankment material.

203.10 **Embankment Construction - General** - Layers of material for embankments shall start at the deepest portion of the fill and as placement progresses, layers shall be constructed approximately horizontal. Roadway embankment of earth material shall be placed in layers not exceeding 8", loose measure, unless otherwise approved, and the material compacted as specified before the next layer is placed; however, when placing layers of specified thickness is not feasible, such as filling in water, over swampy ground or over cleared areas, the initial layer of embankment may be constructed in one layer to an elevation where bridging will be accomplished. In embankment areas where no grubbing is required, the material placed in the first layer shall be of sufficient depth to cover all stumps.

When the excavation or borrow consists predominantly of fragments of such size that the material cannot be placed in embankments in layers of specified thickness without breaking down the pieces, such material may be placed in layers in thickness not exceeding the approximate average size of the larger rocks but, in no case, shall layers exceed 2 ft. Rocks exceeding this thickness shall be separated and collectively placed in accordance with the requirements for rock embankments. Each layer shall be leveled and smoothed by even distribution of rock spalls and finer rock fragments or earth. The Resident may test any or all layers by moisture and density control as specified in Section 203.12 - Construction of Earth Embankment with Moisture and Density Control, which are constructed in depths exceeding 8". The layers so constructed shall not be placed above an elevation that is 2 ft below the finished subgrade. The remainder of the embankment shall be composed of suitable material smoothed

and placed in layers not exceeding 8", loose thickness, and compacted as specified for earth embankments.

When it is impractical to construct layers over the full width of the cross section, partial width layers may be authorized.

The Contractor shall spread, grade and compact each layer to obtain uniform thickness and produce an embankment surface free from low spots and ridges to provide direct drainage of water. Water shall be added to, or removed from, the material as necessary to obtain required compaction. Construction equipment shall be routed uniformly over the entire surface of each layer.

Embankments within 50 ft of a bridge abutment, structural plate or box culvert type structure shall be compacted by the moisture and density control method as specified in Section 203.12 - Construction of Earth Embankment with Moisture and Density Control, except that rock embankments may be constructed over culverts as specified in Section 203.15 - Construction of Rock Embankments.

Where guardrail is to be installed, rock shall not be placed in the embankment under the location of the guardrail to an elevation 5.5 ft below the finished grade of the shoulder. Rocks, broken concrete and other solid materials shall not be placed in any portions of embankments where piling is to be placed or driven or where Utility facilities are to be placed.

Excess or unsuitable excavated material, including rock and boulders, which cannot be used in embankments, shall be placed in acceptable waste areas.

Excavation that is unsuitable for use due to excessive moisture content may be rendered satisfactory by combining it with Granular Borrow or granular excavation when, and as, approved by the Resident.

If the embankment is required to be deposited on only one side of abutments, wing walls, piers or culvert headwalls, care shall be taken that the area immediately adjacent to the structure is not compacted excessively to the extent that it will cause overturning of, or excessive pressure against, the structure. When embankment is to be placed on both sides of a concrete wall, structural plate or box type structure, operations shall be so conducted that the embankment is always at approximately the same elevation on both sides of the structure.

At the close of each Day's work, the embankment surface shall be graded, crowned, smoothed and rolled to minimize infiltration of water.

The portion of the embankment and subbase outside a 1 vertical to 1½ horizontal slope extending from the edge of the finished shoulder to the existing ground, as shown on the Standard Detail 203(01) - Muck Excavation And Waste Disposal, will be required to be compacted only to the extent that stability of the slope is assured. As construction of the embankment progresses, material placed in the portion of the embankment outside the 1 vertical to 1½ horizontal slope shall not

be placed above the elevation of the surface of the main embankment unless provisions are made to allow drainage of surface water from the embankment. The surface of the slopes shall be finished to present a uniform neat appearance.

The portion of the embankment inside the aforementioned 1 vertical to 1½ horizontal slope lines shall be compacted in accordance with the designated embankment compaction requirements specified for the Project.

- 203.11 **Construction of Earth Embankment-Layer Method** - The layer method will be required unless otherwise specified. Unless otherwise approved, the material shall be deposited and spread upon compacted material in full width layers not more than 8" in depth, loose measure. Clay or loam soils shall be compacted by use of sheepsfoot or tamping type roller having a minimum weight on each tamper, under working conditions, of 250 psi of cross sectional bearing area. Sand or gravel soils shall be compacted by vibratory type compaction equipment or by pneumatic tired equipment and, if necessary, by the addition of water. A combination of the above or other methods capable of producing equivalent results may be used. The compacting operations shall be continued until each layer is compacted to its full depth and width.

With approval, the Contractor may place layers in excess of 8" and less than 24", loose measure, providing the Contractor demonstrates that the compaction requirements as specified in Section 203.13 are obtained and the Contractor agrees to make necessary test excavations for testing to determine that the in-place density requirements are met.

- 203.12 **Construction of Earth Embankment with Moisture and Density Control** - The Contract Documents and/or Section 203.10 will designate the areas to be constructed with moisture and density control and the distance below subgrade to which such methods shall be applied. The moisture content at the time of compaction shall be suitable to obtain the required density. The maximum density and required density shall be determined in accordance with Section 203.13.

- 203.13 **Compaction Testing and Requirements** - Where compaction testing is required by this specification or by Special Provision, and unless otherwise specified, the following shall apply:

All field density tests will be performed by the Department in accordance with AASHTO T 310.

The maximum density and compaction requirements shall be determined by one of the following:

- For material where the percent retained on the ¾" sieve is 40%, or less: The maximum density shall be determined in accordance with AASHTO T 180, Method C or D, correcting for oversize particles as provided in Annex A, except that the material may have a maximum retained on the ¾" sieve

of 40%, or less; each layer placed shall be compacted to not less than 90% of the maximum density determined in this manner.

- For material that exceeds 40% retained on the ¾" sieve: A 300 ft section at the start of the operation will be designated as the control section, unless a shorter section is approved by the Resident; the Contractor shall add or remove water to the control section as directed until the Department determines that optimum moisture has been obtained; the control section shall then be rolled as directed using the specified compaction equipment until the Department determines that four consecutive passes do not increase the dry density by more than 1 lb/ft<sup>3</sup>; the compaction process shall be repeated for each roller; once the compaction process is complete, the Department will perform several additional density tests; the average of these tests shall be used to determine the maximum density of the control section; each layer placed shall be compacted until a density of not less than 98% of the maximum density has been achieved, as determined in this manner.

203.14 **Removed**

203.15 **Construction of Rock Embankments** - The material for rock embankment shall be placed in compacted layers not exceeding 3 ft in depth. Depositing the rock directly over the end of the fill from the hauling equipment will not be permitted; rather, it shall be deposited on the fill and pushed into place. The top of the rock embankment shall be so choked that there will be no infiltration of the earth embankment placed on the top of the rock embankment.

This method shall be used only in fills in excess of 4 ft in depth. In no case shall the rock embankment be placed within 1 ft of subgrade (5.5 ft in guardrail areas).

When structures are located under rock embankment, they shall be covered with not less than 2 ft of earth excavation or borrow before the rock embankment is placed over the structures.

203.16 **Winter Construction of Embankments** - Frozen material shall not be used in the construction of embankments. The construction of embankments may continue during freezing weather only when all frozen material in the top of the embankments, successive layers of the embankments, or the existing ground under the embankments is removed prior placing additional material. When this procedure results in additional borrow quantity, the additional borrow will not be paid for directly. If allowed by the Resident, the excavated frozen material removed may be placed outside of the limits of an assumed 1.5:1 (horizontal to vertical) slope from the break in the shoulder and inside the design slope line, provided the design slope is flatter than 2:1 (horizontal to vertical).

Excavated frozen material which will be suitable when dry shall be allowed to thaw and then be placed in the embankment. No additional payment will be made for the storing and rehandling of these materials.

Compaction shall be in accordance with the specified method of embankment construction. When the prevailing temperatures are below 30°F, all material used in embankment construction shall have a moisture content, at the time of compaction, equal to or less than the optimum moisture content.

203.17 **Preparation and Protection of the Subgrade** - Unless otherwise provided, the subgrade shall be brought to a condition of uniform stability and compacted for the full width of the roadway by grading and rolling operations and shall be maintained to no tolerance above, or 3" below, the required grade and cross section. The surface shall be compacted to uniform density and stability and graded to the extent that puddles of water will not form. Additional material required because of low subgrade shall be furnished and placed at the expense of the Contractor.

The required compaction shall be the same as specified for embankments. When the subgrade occurs in cuts, the required compaction shall apply to a depth of 6" below subgrade, unless otherwise specified.

The Contractor shall protect the subgrade from damage. Ditches and drains along the roadway shall be maintained to effectively drain the subgrade. In no case shall vehicles be allowed to travel in a single track and form ruts. No material shall be deposited on a subgrade until the subgrade has been approved.

203.18 **Method of Measurement** - Except as otherwise provided, excavation and borrow will be measured by the number of cubic yards measured in place by survey measurements. Measurements will include slides in Common Excavation and Unclassified Excavation, not attributable to carelessness of the Contractor, and authorized excavation of earth, bedrock, shale, muck or other unsuitable material. Volumes will be computed by the average end area method or by other methods generally recognized as conforming to good engineering practice.

When Granular Borrow or Gravel Borrow is placed for backfill behind bridge abutments and around structural plate pipes, pipe arches, and plate arches to the lines, grades, and dimensions shown in the Contract Documents, the quantity measured for payment will be that portion of the number of cubic yards shown in the Schedule of Items that is estimated for the structure.

This quantity is considered final, and no adjustments will be made except under the following conditions:

- a. When the structure is founded on bedrock, the quantity measured will be what is actually placed to maximum allowable horizontal dimensions indicated in the Contract Documents.
- b. When changes to the Contract Documents are made by the Resident.

**Muck excavation** - to be measured for payment as Common Excavation, will be the number of cubic yards of material acceptably excavated from areas shown in the Contract Documents or as authorized by the Department. Muck excavation shall be measured in its original position by survey elevations and the volume

computed by the average end area method or by other methods generally recognized as conforming to good engineering practice. If muck is stored in excess of the maximum slope requirements of any waste storage area, the amount requiring reloading, hauling and disposing of in other waste storage areas or acceptable waste areas will not again be measured for payment.

When it is impractical to measure small quantities of borrow in place, a quantity not exceeding 2,500 cy per item for a single Project may be measured in vehicles at the point of delivery. If a dedicated borrow pit is available for the Project, the entire quantity may be measured pit quantity. When measured in vehicles, the quantity for payment shall be 80% of the quantity determined for earth and 100% of the quantity determined for rock, as shown on delivery slips. When pit measured, the amount for payment shall be 90% of the quantity so measured for earth material and 130% of the quantity so measured for rock.

Unless otherwise authorized, measurement for excavation in earth cuts will be made to the designated slopes. Field changes made by the Resident will be measured by cross-sections or by other acceptable methods. Elevations for final cross-sections shall be determined at the surface of the finished ground with no additional allowance for thickness of loam, sod, riprap, hay mulch, or other type of ground cover, except that excavation for slope blanket backfill will be measured by the cubic yard.

Unless otherwise authorized, measurement for excavation in rock slopes designated to be constructed on a 1 vertical to 2 horizontal slope, or flatter, will be made to the designated slope line providing the finished slope is within tolerances described in Subsection 203.05 - Roadway Excavation. If the finished slope line is not within the tolerances described, payment will be made to the designated cut slope line or to the finished slope line, whichever yields the lesser quantity.

Unless otherwise authorized, measurement for excavation in rock slopes designated to be constructed on a 1 vertical to ¼ horizontal slope will be made to the designated slope providing the rock is excavated beyond a vertical plane. There will be no payment for material removed beyond the designated slope line.

Unless authorized, material placed in embankments outside a surface parallel to and 6" beyond the neat line of embankment slope, or 12" beyond the neat line of the waste storage area in which waste has been placed, will not be included in the quantity for payment and will be deducted from the borrow at 100% of the material so measured in place.

Measurements will be made for unsuitable materials actually excavated and removed to obtain proper compaction in cut sections and in foundations for fill sections.

The quantity of Drilling and Blasting of Solid Rock Subgrade to be measured for payment will be the number of square yards of subgrade plan area drilled and detonated in accordance with this Section, measured at subgrade level. The

number of cubic yards of excavation required by the Resident to inspect the depth of shattered and rearranged rock, computed at a maximum width of 30" will be measured for payment as Structural Earth Excavation – Drainage and Minor Structures Below Grade.

**When Structural Rock Excavation** - Drainage and Minor Structures, and Drilling and Blasting of Solid Rock Subgrade occur at the same location, measurement and payment for Structural Rock Excavation - Drainage and Minor Structures will be made for the required trench. This area will not be included in the measurement and payment for Drilling and Blasting of Solid Rock Subgrade.

**Controlled Blasting** - shall be paid by the linear foot of presplitting holes and extra drilled holes without explosives, measured from the top of the drill hole at the bedrock surface to the bottom of the hole or to the elevation of the required subgrade (whichever is higher) or to an established bench elevation. Portions of holes not meeting the requirements of Section 203.042 - Rock Excavation and Blasting, Item No. 2, Controlled Blasting Methods, will not be measured. Production holes will not be measured. Presplitting holes and extra drilled holes without explosives drilled where presplitting is not required by this specification will not be measured. Where presplitting is required, excavated rock will be paid for only to the slope and depth lines shown or described in the Contract Documents or as ordered by the Resident. Where the Resident determines that the removal of additional bedrock is necessary due to conditions clearly not attributable to the Contractor's methods of operations, the payment lines will be adjusted to the limits ordered, to include only bedrock actually removed within such limits.

**Culvert Bedding Stone** will be measured by the cubic yard, complete and in place.

203.19 **Basis of Payment** - The accepted quantity of excavation and borrow will be paid for at the Contract unit price per cubic yard for each of the pay items included in the Schedule of Items. Payment shall be full compensation for obtaining borrow when required and for excavating, loading, rehandling, hauling, placing, grading and compacting all material necessary for the formation of embankments. It shall also include full compensation for disposing of unsuitable and surplus material when necessary. It shall also include excavation in embankments for determining compaction density. No payment will be made for unauthorized work done beyond authorized pay limits.

Payment for removal of unstable material below subgrade in cuts will be paid at the Contract unit price per cubic yard for Common Excavation or Unclassified Excavation, whichever is appropriate.

Payment for placing and compacting backfill, except for special fill or backfill, specified under Special Provisions or other Standard Specifications, will not be paid for separately but will be included in the payment for any one of the related excavation items, provided however, there is suitable excavation material

available in its original position at the time of backfilling. When there is no suitable material available for backfilling, the material authorized will be paid for under the Contract item for the class of material used.

When bedrock is encountered and no item is included in the Contract for its removal, the excavation of the bedrock will be paid for at 6 times the Contract unit price for Common Excavation.

The furnishing and placing of backfill material between the bedrock remaining and the normal subgrade line of rock cuts and between the bedrock remaining and the finished surface of ditches in rock cuts will not be paid for directly, but shall be considered incidental to the Work. The quantity of Aggregate Subbase or Aggregate Base for payment in rock cuts shall include only the material placed above the normal subgrade lines.

Costs for furnishing and placing material necessary to backfill and to grade rock cut slopes designated to be constructed on a slope of 1 vertical to 2 horizontal or flatter, will be considered to be included under the payment for the material used, either excavation or borrow.

When muck is encountered, the excavation of the muck will be paid for at the Contract unit price bid for Common Excavation or Unclassified Excavation.

Excavation which requires more than one handling prior to final placement in the embankments, including material placed as backfill and loamy top soil to be stockpiled and reserved for later use on the slopes, will be paid for at the Contract unit price for Common Excavation, Unclassified Excavation or Rock Excavation, as applicable, for each handling approved by the Department. It may be paid for under another Contract item for the second handling when so authorized. Each handling shall be considered to include the operations of excavating, loading, transporting, unloading and disposing of earth or rock material.

Excavation for unstable slopes for slope blanket backfill, as specified in Subsection 203.04 - General, will be paid for at twice the Contract unit price bid for Common Excavation. Backfill material will be paid for as specified in Subsection 304.07 - Basis of Payment.

Excavation for benching to receive embankments will not be paid for directly but shall be incidental to the related Contract items.

Water added to embankment material to aid in compaction will not be paid for directly but shall be considered incidental to related Contract items.

Payment for compacting the soils in the abutment and pier areas, after the topsoil has been removed, will not be made directly but shall be considered incidental to related Contract items.

Removing Portland Cement concrete pavement and Portland Cement concrete base course, when not included in the Contract as a separate pay item, will be paid for under Pay Item 203.21 - Rock Excavation.

Payment for excavating or filling and compacting material in building or other foundation holes, whether existing or created by the removal of structures and obstructions, will be made under the appropriate pay item for excavation or borrow and no additional allowances will be made.

All work and materials required to grade, loam, seed and mulch waste areas and associated haul roads to allow the surfaces to drain and to control erosion will not be paid for directly but will be considered incidental to related Contract items.

Stripping pits to obtain necessary borrow will not be paid for separately but will be considered incidental to related Contract items.

When Common Excavation and Rock Excavation are reclassified as Unclassified Excavation, payment will be made for the reclassified items under Pay Item 203.22 - Unclassified Excavation, at the identical unit bid price.

The accepted quantities of Drilled and Blasted Solid Rock Subgrade will be paid for at the Contract unit price per square yard. Payment will be full compensation for performing the work specified including the removal of blasted bedrock that may swell above subgrade and its disposition on the Project as directed by the Resident. Excavation and backfill required to inspect the depth of broken rock below subgrade will be paid for at the Contract unit price per cubic yard for Structural Rock Excavation – Drainage and Minor Structures.

The accepted quantity of Presplitting Rock will be paid for at the Contract unit price per linear foot. All costs incurred by the Contractor in preparing an approved blasting plan, in maintaining a blasting log, and in adopting revised blasting methods necessary to produce an acceptable test shot shall be considered incidental to related Contract items.

The accepted quantity of Culvert Bedding Stone will be paid for at the Contract unit price per cubic yard, complete and in place.

Payment will be made under:

Pay Item		Pay Unit
203.20	Common Excavation	Cubic Yard
203.21	Rock Excavation	Cubic Yard
203.211	Presplitting Rock	Linear Foot
203.213	Drilling and Blasting of Solid Rock Subgrade	Square Yard
203.22	Unclassified Excavation	Cubic Yard
203.24	Common Borrow	Cubic Yard
203.25	Granular Borrow	Cubic Yard
203.26	Gravel Borrow	Cubic Yard
203.27	Rock Borrow	Cubic Yard
203.35	Crushed Stone ¾"	Cubic Yard
203.55	Culvert Bedding Stone	Cubic Yard

## SECTION 204 - SHOULDER REHABILITATION

204.01 **Description** - This work shall consist of rehabilitating existing shoulders by grading and compacting shoulders, and furnishing, placing, grading and compacting new shoulder aggregate to required grade.

204.02 **Aggregates** - New shoulder aggregate for shoulder rehabilitation shall be material meeting the requirements of Section 703.10 - Aggregate for Untreated Surface Course and Leveling Course or Section 703.06b. - Aggregate for Subbase, Type D.

New shoulder aggregate for add shoulder aggregate shall be material meeting the requirements of Section 703.11 - Aggregate for Shoulders or Section 703.06b. - Aggregate for Subbase, Type D.

New shoulder aggregate used for shoulder rehabilitation or add shoulder aggregate will not be required to pass the Washington State Degradation Test.

204.03 **Existing Shoulder** - The existing shoulder for rehabilitate shoulder shall be prepared by grading with power equipment to provide a surface on which to place an aggregate course. All sod, tar-penetrated strips and other unsuitable material shall be removed to the extent required by the Resident. Suitable excavated granular material may be used to fill low areas and to widen out to provide a uniform shoulder width as required. Where required by the Resident the edge of the existing traveled lane shall be cut to provide a uniform edge.

For proposed paved shoulders the surface of the existing shoulder shall be graded and compacted approximately parallel to the proposed finished paved shoulder surface.

Surplus material shall be incorporated into embankments or disposed of in an approved waste area.

Add new shoulder aggregate to existing shoulders shall be to the widths and grades that are required by the typical sections.

- 204.04 **New Aggregate** - After preparation of the existing shoulder and where the thickness of new shoulder aggregate for rehabilitated shoulders to be placed exceeds 4", material meeting the requirements of Aggregate for Subbase, Type D or Aggregate for Untreated Surface Course shall be placed to the required grade. Where the thickness of new shoulder aggregate to be placed is 4" or less, material meeting the requirements of Aggregate for Untreated Surface Course shall be used. The Contractor may, at their option, grade the existing shoulders to an elevation of 4" or more below the proposed finished gravel surface and place material meeting the requirements of Aggregate for Subbase, Type D, full depth.

Where the thickness of new shoulder aggregate for add shoulder aggregate shoulders to be placed exceeds 4", material meeting the requirements of Section 703.06(b) Aggregate for Subbase, Type D, or Section 703.11 - Aggregate for Shoulders shall be placed to the required grade. Where the thickness of new shoulder aggregate to be placed is 4" or less, material meeting the requirements of this provision shall be used. The Contractor may, at their option, grade the existing shoulders to an elevation of 4" or more below the proposed finished gravel surface and place material meeting the requirements of Section 703.06 - Aggregate for Subbase, Type D full depth.

- 204.05 **Surface Tolerance** - The completed surface of the rehabilitated shoulder shall be shaped and maintained to a tolerance, above or below the required cross sectional shape of  $\frac{3}{8}$ ".

The completed surface of the add shoulder aggregate shoulder shall be shaped and maintained to a uniform machine finish.

- 204.06 – 204.09 **Removed**

- 204.10 **Method of Measurement** - The quantity of rehabilitation of existing shoulders and add shoulder aggregate measured for payment will be the number of square yards shown in the Schedule of Items in the Contract.

This quantity will be considered final, and no adjustments will be made, except when the quantity shown in the Schedule of Items is added to or deducted from, when changes to the plans are made by the Resident.

- 204.11 **Basis of Payment** - The accepted quantity of rehabilitation of existing shoulder will be paid for at the Contract unit price per square yard. No adjustment will be made to the quantity for payment, except as described under Method of Measurement above. Payment will be full compensation for cutting the edge joint, removing pavement, curb and other unsuitable material, grading and compacting the existing shoulder, disposing of surplus and unsuitable material, and for furnishing, placing, grading, and compacting new aggregate to the required depth, suitable for paving at the time of paving.

The accepted quantity of Add Shoulder Aggregate to existing shoulder will be paid for at the Contract unit price per square yard. No adjustment will be made to the quantity for payment, except as described under Method of Measurement above. Payment will be full compensation for furnishing, placing, grading, and compacting new aggregate to the required depth.

Additional material required as a result of cross-slope variance of the pavement surface will not be paid for directly, but will be considered incidental to the Contract unit price per square yard of rehabilitation of existing shoulder.

Grading, furnishing and placing loam, seed and mulch in required waste areas will be considered incidental to the Contract and no separate payment will be made.

Payment will be made under:

Pay Item		Pay Unit
204.20	Add Shoulder Aggregate to Existing Shoulder, Plan Quantity	Square Yard
204.41	Rehabilitation of Existing Shoulder, Plan Quantity	Square Yard

## SECTION 205 - SHOULDER RECONSTRUCTION

205.01 **Description** - This work shall consist of reconstructing or widening existing shoulders by excavating, grading, furnishing, and compacting new shoulder aggregate and fill material if necessary, in accordance with the thickness and typical sections shown on the plans.

205.02 **Aggregates** - New shoulder aggregate shall be material meeting the requirements of Section 703.06a. - Aggregate for Base, Type B.

Fill material shall be existing excavation or common borrow from an outside source.

205.03 **Existing Shoulder** - The area shall be excavated to the depth shown on the typical section and graded to a tolerance, above or below the required cross sectional shape, of  $\frac{3}{4}$ ". Where required by the Resident, the edge of the existing travel lane pavement shall be cut to provide a uniform edge.

Excavated material shall be incorporated into embankments, used to flatten existing slopes as directed or disposed of in an approved waste area.

205.04 **New Aggregate** - After excavation, new shoulder aggregate shall be placed and compacted to the required grade.

205.05 **Surface Tolerance** - The completed surface of the shoulder shall be shaped and maintained to a tolerance, above or below the required cross section shape of  $\frac{3}{8}$ ".

205.051 **Compaction** - The aggregate shall be compacted to the requirements of Section 304.04.

205.06 **Method of Measurement** - The quantity of reconstruction of existing shoulders and widening of existing shoulders measured for payment will be the number of square yards shown in the Schedule of Items in the Contract.

This quantity will be considered final, and no adjustments will be made, except when the quantity shown in the Schedule of Items is added to or deducted from, when changes to the plans are made by the Resident.

205.07 – 205.10 **Removed**

205.11 **Basis of Payment** - The accepted quantity of reconstruct existing shoulder will be paid for at the Contract unit price per square yard. No adjustment will be made to the quantity for payment, except as described under Method of Measurement above. Payment will be full compensation for cutting the edge joint, removing pavement, curb and other unsuitable material, excavating, grading and compacting the existing shoulder, disposing of surplus and unsuitable material, and for furnishing, placing, grading, and compacting new aggregate to the required depth.

The accepted quantity of widening of existing shoulder will be paid for at the Contract unit price per square yard. Payment will be full compensation for excavating, removal of pavement, and other unsuitable material, and for the cutting of edge joints. Payment will also be full compensation for furnishing, grading, and compacting fill material; disposing of surplus and unsuitable material; and for furnishing, placing, grading, and compacting new aggregate.

Grading, furnishing and placing loam, seed and mulch in required waste areas will be considered incidental to the Contract and no separate payment will be made.

Payment will be made under:

Pay Item		Pay Unit
205.41	Reconstruction of Existing Shoulder, Plan Quantity	Square Yard
205.51	Widening of Existing Shoulder, Plan Quantity	Square Yard

## SECTION 206 - STRUCTURAL EXCAVATION

206.01 **Description** - This work shall consist of excavating, removing, hauling backfilling and compacting or disposing, as required, of all material encountered for the installation and construction of Drainage and Minor Structures and for Major Structures in accordance with these specifications and in reasonably close conformity with the lines, grades and typical cross sections shown in the Contract Documents or established by the Department.

Excavating for structures below designated excavation limits as specified or shown in the Contract Documents will be included under this section.

Material which is required to be excavated or paid for under another section shall not be included under this section.

Ditches at inlets and outlets of culverts, special ditches and outlet ditches, all as indicated in the Contract Documents, shall be constructed and paid for under Section 203 - Excavation and Embankment.

The following definitions shall apply to this section:

- **Drainage and Minor Structures** - shall include pipe culverts, pipe arches, underdrains, catch basins, manholes, structural plate units, box culverts, three-sided box culverts, culvert end walls and wingwalls, concrete steps and other minor structures.
- **Major Structures** - shall include abutments and piers for bridges, cast-in place rigid frame structures, and concrete and masonry retaining walls.
- **Special Backfill** - shall consist of obtaining, hauling, and placing selected material suitable for the location where it is to be used. Special Backfill as a Contract item will be called for in the Contract Documents.
- **Structural Earth Excavation** - shall consist of excavation and removal of all material encountered, except for Structural Rock Excavation. Structural Earth Excavation shall also include the removal of:
  - All boulders, solid mortared stone masonry and concrete masonry when each is less than 2 cy in volume; and
  - all soft and disintegrated rock which can be removed with ordinary excavating machinery.
- **Structural Rock Excavation** - shall consist of removing: Hard igneous, metamorphic and sedimentary bedrock which cannot be excavated with ordinary excavating machinery and cannot be excavated without employing means such as, but not limited to, drilling and blasting, drilling and splitting, or hoe-ramming; and all boulders, solid mortared stone masonry; and concrete masonry each having a volume of 2 cy or more.
- **Structural Earth Excavation, Below Grade** - shall consist of the removal of excavation required for unknown or unanticipated subsurface condition. See 206.04 – Method of Measurement for pay limits.

206.02 **Construction Methods** - The Contractor shall notify the Resident a sufficient length of time in advance of the beginning of Structural Excavation so that necessary elevations and measurements may be taken of the undisturbed ground. When solid bedrock is encountered which is to be removed, the Contractor shall uncover the rock and provide ample opportunity for the Resident to take the necessary survey measurements of the undisturbed rock.

When the foundation material is soft or otherwise unsatisfactory and must be removed below the elevation shown in the Contract Documents, the excavation

shall be carried to a depth designated by the Resident and the material shall be removed and replaced with approved granular material and thoroughly compacted; alternately, a lower elevation for the bottom of the structure may be established by, and at the discretion of, the Department.

Suitable material removed from the excavation area, including that material removed from beyond the specified excavation pay limits, shall be used for backfilling or for the formation of embankments and no additional payment will be made. Unsuitable or surplus material shall be disposed of accordingly.

When the structure is to be placed on solid bedrock, the rock shall be excavated to a firm surface, either level, stepped or serrated. When solid or disintegrated rock or boulders are encountered, the rock shall be excavated to a designated depth below the bottom of the proposed structures, as shown in the Contract Documents or as directed by the Resident. Except for installations of underdrain, the material so removed shall be replaced with selected fine compressible material such as sand and uniformly compacted and shaped in accordance with Section 603.04 - Bedding.

When the structure is to rest on an excavated surface other than bedrock, particular care shall be taken not to disturb the bottom of the excavation. If the surface upon which the structure is to rest is disturbed, it shall be regraded and recompacted as directed by the Resident and no additional payment shall be made.

After each excavation is completed, the Contractor shall notify the Resident and no culverts or masonry shall be placed, foundation piles driven or other installations made, until the depth of the excavation and the character of the foundation material has been approved.

Before drainage or underdrain pipe is installed in cut areas where common excavation, unclassified excavation or muck excavation is removed below the subgrade elevation shown on the plans, the undercut roadbed shall be filled with approved granular material to a depth sufficient to support construction equipment. All fill material shall be compacted as required.

- 206.03 **Backfilling** - Backfilling shall consist of placing suitable material in all spaces excavated and not occupied by Drainage and Minor Structures, Major Structures and other permanent structures up to the elevation of the existing ground or other elevations shown in the Contract Documents. Except for underdrain backfill and for structural plate pipe units, backfill material for Drainage and Minor Structures shall be fine readily compressible soil or granular material, at, or near, optimum moisture content, and shall not contain stones larger than 3", frozen lumps, chunks of clay, mineral matter or any other objectionable material. When Granular Borrow is called for in the Contract Documents to be placed around Drainage and Minor Structures, Granular Borrow, Material for Underwater Backfill, shall be used. Backfill material for Major Structures shall be Granular Borrow, Material for Underwater Backfill, or other material indicated in the

Contract Documents and shall be at, or near, optimum moisture content and shall not contain frozen lumps, chunks of clay, mineral matter or any other objectionable matter.

Backfill shall not be placed against gravity sections of any structure, including those comprised of masonry and/or concrete, until the structure has been in place for at least 7 Days or until mortar and/or concrete cubes/cylinders cured with the structure establish that design strength has been reached. For structures other than gravity structures that require reinforcing designed to resist applied dead and live loads, backfill shall not be placed against the structure until the concrete has been in place for at least 14 Days or until concrete cylinders cured with the structure establish that the design strength has been reached. Backfilling around pipes, catch basins and manholes that include joints with cement-based mortar shall not commence until the mortar has been in place at least 12 hours unless methods approved by the Resident are used to protect the mortar from being disturbed.

Except for structural plate units, backfill material shall be uniformly distributed in layers of not more than 8" in depth, loose measure, and each layer thoroughly compacted by use of approved compactors before successive layers are placed. When backfill is being placed around a pipe or structure, operations shall be conducted so that the fill is always at approximately the same elevation on both sides. Water shall be added when necessary to increase the moisture content of the backfill material to obtain compaction. Puddling or jetting of backfill will not be allowed unless specified in the Contract Documents. Structural plate units shall be backfilled in accordance with Section 509 - Structural Plate Pipes, Pipe Arches, Arches, and Metal Box Culverts.

Unless otherwise indicated in the Contract Documents or directed, all sheeting and bracing used during Structural Excavation shall be removed by the Contractor following the completion of the work, and all voids resulting from use of the sheeting and bracing backfilled where necessary, at no additional cost to the Department.

- 206.04 **Method of Measurement** - Structural Excavation will be measured by the number of cubic yards of material removed, measured in its original position, and acceptably excavated in conformity with the Contract Documents or as directed.

When structures are to be installed where roadway excavation is to be removed, only the excavation beyond and below the roadway excavation limits will be classified as Structural Excavation.

**Drainage and Minor Structures** - For these structures there will be no measurement for Structural Earth Excavation, except for Structural Earth Excavation, Below Grade. When measured for payment, the quantity of Structural Earth Excavation, Below Grade, will be the amount actually excavated, provided the maximum allowable in accordance with the following limits:

- **Vertical pay limits** - Below a plane parallel with and 12" below the bottom of the drainage or minor structure or below the excavation limits shown in the Bid Documents; whichever is greater.
- **Horizontal pay limits** – The maximum allowable horizontal dimensions shall not exceed those bounded by vertical surfaces 18" outside the base, or extreme limits of, the structure, and to the vertical neat lines of underdrain trenches, as shown in the Contract Documents.

When bedrock is required to be excavated for installation of these structures, the depth for measurement will be the actual depth required in accordance with the Contract Documents or as otherwise designated, except:

- For culvert pipe and underdrain, the depth for measurement will be a maximum of 1 ft below the bottom of the invert; and
- for catch basins and manholes, the depth of measurement will be a maximum of 1 ft below the bottom of the base.
- Any removal of solid rock for leveling, stepping or serrating, as shown in the Contract Documents, or as determined, shall be measured within the aforementioned limits. The quantity of rock will be the number of cubic yards actually removed provided the maximum allowable horizontal dimensions do not exceed those bounded by vertical surfaces specified in the preceding paragraph.

**Major Structures** - For Major Structures, the quantity measured for payment will be the number of cubic yards shown on the Schedule of Items in the Contract Documents. This quantity is considered final and no adjustments will be made, except under the following conditions:

- When the structure is founded on bedrock, the quantity measured will be what is actually excavated to the top of the bedrock and to maximum allowable horizontal dimensions bounded by vertical surfaces 18" outside the neat lines of the base as indicated in the Contract Documents.
- When changes to the Contract Documents are made by the Resident.
- When the outermost limit of French drains exceeds the vertical planes stated above, the limit to be measured for payment will be extended upward from the bottom of the French drain on a vertical plane bounded by the outermost limit of the French drains.
- When bedrock is required to be excavated for the construction of Major Structures to definite elevations as indicated in the Contract Documents, or elevations designated by the Resident after the rock has been exposed, the maximum depth of measurement for payment will be to a horizontal plane or planes located 12" below the elevation shown or designated.

- Removal of solid bedrock, for leveling, stepping or serrating, as indicated in the Contract Documents or determined, shall be measured within the aforementioned limits and paid for as Structural Rock Excavation. When earth is required to be removed to uncover existing rock, it will mean to excavate to undisturbed solid bedrock and will be so measured for payment.

**Special Backfill** - The quantity measured for payment will be the number of cubic yards of material acceptably placed and measured in place.

206.05 **Basis of Payment** - The accepted quantities of Structural Excavation, when specified to be paid for separately, will be paid for at the Contract unit price per cubic yard. The work, whether paid for separately or incidental to the structure, shall include the placing and compacting of backfill, the formation of any embankments made with material from Structural Excavation and the disposal of all surplus or unsuitable material, unless otherwise specified.

Earth excavation for installation of Drainage and Minor Structures, except that which is defined as “Below Grade”, will not be paid for and all costs for such excavation and disposal of materials will be considered incidental to the Contract unit price per item for the structure being installed or constructed. Rock excavation for the installation of these structures will be paid for at the Contract unit price for Pay Item 206.07 - Structural Rock Excavation - Drainage and Minor Structures.

The accepted quantity of Structural Earth Excavation - Drainage and Minor Structures, Below Grade and of Structural Rock Excavation - Drainage and Minor Structures, will be paid for at the Contract unit price per cubic yard.

When bedrock is encountered and no Structural Rock Excavation - Drainage and Minor Structures item is included in the Contract, the excavation of the rock will be paid for at 16 times the Contract unit price per cubic yard for Common Excavation.

When bedrock is encountered and no Structural Rock Excavation - Major Structures is included in the Contract Documents, the excavation of the rock will be paid for at 6 times the Contract unit price for Structural Earth Excavation.

When it is necessary to excavate below the elevation indicated in the Contract Documents for Major Structures, payment for such excavation will be made at 1½ times the Contract unit price for the item classification applying where the extra depth is required.

Protective systems and/or additional excavation for backsloping required for Structural Excavation will not be measured for payment, but will be considered incidental to related Contract item(s).

When no bid item appears in the Contract for work such as, but not limited to, clearing drainage ways, maintenance of traffic, special detours or cofferdams, payment for such work shall not be made directly, but will be considered

incidental to related Contract pay items. Unless otherwise specified, payment for all pumping, bailing, drainage, sheeting, bracing and incidentals required for proper execution of the work shall be considered incidental to related Contract pay items.

Backfill or bedding materials, except for material used to backfill underdrain, whose source is other than Structural Excavation, will be paid for under the class of material used. Material used to backfill underdrain will not be paid for but shall be considered incidental to the cost of the underdrain.

**Special Backfill** - will be paid for at the Contract unit price per cubic yard, in place and accepted, but will not include replacement of material excavated beyond the specified pay limits for Structural Excavation.

Payment will be made under:

Pay Item		Pay Unit
206.061	Structural Earth Excavation – Drainage & Minor Structures Below Grade	Cubic Yard
206.07	Structural Rock Excavation – Drainage & Minor Structures	Cubic Yard
206.082	Structural Earth Excavation – Major Structures, Plan Quantity	Cubic Yard
206.092	Structural Rock Excavation – Major Structures	Cubic Yard
206.14	Special Backfill	Cubic Yard

**SECTION 207 - BRUSH MATTING - Reserved**

**SECTION 208 - SAND DRAINS - Reserved**

**SECTION 209 - WICK DRAINS - Reserved**

**SECTION 210 – Removed**

**SECTION 211 - DITCH AND INSLOPE EXCAVATION**

211.01 **Description** - This work shall consist of removing winter sand build-up and other earth material from existing inslopes and ditches. New ditch areas consist of removing all material encountered including backslopes as needed.

211.02 **Inslope Excavation** - From the edge of shoulder to the subgrade break, the inslope will be graded to the original template, or as directed by the typicals or construction notes. From the subgrade break to a location on the slope that does

not create a hinge point, the inslope shall be machine graded and finished to a smooth condition so that the flow of water is unimpeded.

- 211.03 **Inslope Excavation - Guardrail** - Winter sand and other earth materials shall be removed from all paved areas. From the edge of shoulder to the subgrade break, the inslope will be graded to the original template, or as directed by the typical or construction notes. From the subgrade break to a location on the slope that does not create a hinge point, the inslope shall be machine graded and finished to a smooth condition so that the flow of water is unimpeded.
- 211.04 **Inslope Rehabilitation** - Material shall be excavated from or placed on inslopes. All inslopes shall be built, from the edge of shoulder to the toe of slope, to provide a 3 horizontal to 1 vertical minimum slope (1¾ horizontal to 1 vertical in guardrail sections), or as directed by the typical or construction notes. Added material shall be capable of attaining a growth of grass and shall be approved by the Resident
- 211.05 **Ditch Excavation** - Ditches and adjacent slopes will be graded to the original template from the edge of shoulder to the top of the backslope, or as directed by the typical or construction notes.
- 211.06 **New Ditch Excavation** - Ditches and adjacent slopes will be graded from the edge of shoulder to the top of the backslope as directed by the typical or construction notes.
- 211.07 **Method of Measurement** - The quantity of work done will be measured by the linear foot. Measurements will be made along the ground parallel to the roadway centerline. Payment for inslope rehabilitation will include excavation and fill areas.
- 211.08 **Basis of Payment** - Payment will be full compensation for excavating, removing brush, trees and stumps, placing waste material in designated areas, disposing excess materials, rehabilitating waste areas including seed and mulch, and for grading and finishing the work.

In inslope rehabilitation areas, any borrow material needed to complete the rehabilitation of the inslopes will not be paid for separately, but will be considered incidental to this item.

When rock is encountered in new ditch excavation areas and new ditch excavation rock is not included in the Contract, the excavation of the rock will be paid for at 6 times the Contract unit price for new ditch excavation.

The work will not be accepted for payment until inspected and approved by the Resident or authorized personnel. Conditions of approval will include, but are not limited to, grade and smoothness, flow of runoff, proper functioning of the drainage system, and cleanup of all disturbed areas including waste disposal areas. Seed, mulch, and erosion control blanket applied on the Project will be paid for under appropriate Contract items.

Payment will be made under:

<b>Pay Item</b>		<b>Pay Unit</b>
211.20	Inslope Excavation	Linear Foot
211.21	Inslope Rehabilitation	Linear Foot
211.22	Inslope Excavation - Guardrail	Linear Foot
211.221	Inslope Excavation - Guardrail Plan Quantity	Linear Foot
211.30	Ditch Excavation	Linear Foot
211.40	New Ditch Excavation	Linear Foot
211.41	New Ditch Excavation - Ledge	Linear Foot