SECTION 200 EARTHWORK

Section 201 - Clearing & Grubbing

DESCRIPTION

201.01
Work

This work shall consist of clearing, grubbing, trimming, removing, and disposing of or treatment of timber, construction slash, and debris. This work shall also include preservation of vegetation and objects DESIGNATED to remain from injury or defacement.

CONSTRUCTION

201.02
Clearing & Grubbing

All debris, trees, stumps, roots, and other protruding vegetative material within the clearing limits, not DESIGNATED to remain, shall be cleared, grubbed, removed, and disposed of, except the following:

(a) Undisturbed stumps outside the roadway or in embankment areas, provided they do not extend more than 12 inches above the original ground (measured from the uphill side) nor closer than 2 feet to the finished subgrade or 1 foot to any slope surface or as otherwise SHOWN ON THE DRAWINGS and they do not interfere with the placement or compaction of embankments.

(b) Grubbing of pits, channel changes, rock sections, and ditches, below the depth of the proposed excavation.

All roots over 3 inches in diameter within the roadbed area shall be grubbed to a minimum depth of 6 inches below subgrade. Roots over 3 inches in diameter protruding from the excavated slope shall be cut flush with the excavated slope surface.

Unless shown otherwise in the SPECIAL PROJECT SPECIFICATIONS, trees shall be felled into the area being cleared when ground conditions, tree lean, and shape of clearing permit. Controlled felling shall be used that will ensure the direction of fall when necessary to prevent damage to property, structures, trees DESIGNATED to remain, or traffic.

Fire-dangerous dead trees or unstable live trees, DESIGNATED by the Engineer within 200 feet slope distance of the centerline of roads shall be cut off not more than 12 inches above the uphill ground line and treated in accordance with Subsections 201.03 and 201.05.

Branches on remaining trees or shrubs shall be trimmed to give a clear height of 14 feet above the roadbed unless otherwise SHOWN ON THE DRAWINGS. Tree limbs shall be trimmed as near flush with the trunk as practicable.

201.03
Utilization of Timber

Merchantable timber is timber that meets utilization standards in the SPECIAL PROJECT SPECIFICATIONS. Logging methods and utilization shall conform to the following:

(a) Felling and Bucking. Felling shall be done to minimize damage to merchantable timber and damage to remaining trees outside of clearing limits. Felling shall be done with saws or shears unless shown otherwise in the SPECIAL PROJECT SPECIFICATIONS.

Bucking shall be done to permit removal of all minimum pieces set forth in SPECIAL PROJECT SPECIFICATIONS.

(b) Utilization and Removal of Timber. Trees that equal or exceed the diameters and minimum lengths listed in the SPECIAL PROJECT SPECIFICATIONS and contain one minimum piece shall be removed or disposed of by one of the following methods as shown in the SCHEDULE OF ITEMS.

(1) The disposal of merchantable timber designated for removal shall be done in accordance with the B(BT) provisions of the Timber Sale Contract.

(2) Logs meeting utilization standards shall be limbed and decked at locations SHOWN ON THE DRAWINGS or at locations approved by the Engineer. Decking shall be done in such a manner that logs are piled parallel one to the other, can reasonably be removed by standard log loading equipment, will not damage standing trees, and will not roll. Decks shall be free of brush and soil.

(3) Removal from Government Land. Merchantable timber, designated for removal, shall become the property of the contractor without charge and removed from Government land. This timber shall not be exported from the United States nor used as substitution (as defined in 23 CFR 223.10) for timber from private lands exported by the contractor or an affiliate directly or indirectly.

(4) Disposal as Unmerchantable Timber. Timber on this project is not considered merchantable and shall be disposed of in accordance with Subsection 201.05 for the treatment methods SHOWN ON THE DRAWINGS and in the SCHEDULE OF ITEMS.

201.04 Pioneer Roads

The construction of pioneer roads shall be confined to inside the roadway unless otherwise approved by the Engineer.

201.05 Slash Treatment

Treatment of construction slash larger than 3 inches in diameter and 3 feet in length shall be accomplished by one or more of the following methods as shown in the SCHEDULE OF ITEMS:

(1) Windrowing Construction Slash

(2) Windrowing of Large Material

(3) Windrowing and Covering

(4) Scattering

(5) Burying

(6) Chipping

(7) Piling and Burning

(8) Decking Unmerchantable Material

(9) Disposal in Cutting Units

(10) Removal

(11) Piling

(12) Placing Slash on Embankment Slopes

Pieces of wood less than 3 inches in diameter and 3 feet in length may be scattered within the clearing limits.

(a) All Methods. No construction slash shall be deposited in lakes, meadows, streams, or streambeds. Construction slash that interferes with drainage structures shall be removed immediately.

Trees adjacent to the clearing limits scorched or damaged beyond recovery shall be felled and disposed of in accordance with Subsection 201.03 or treated as construction slash.

(b) Specific Methods

(1) Windrowing Construction Slash. Unless specified otherwise in the SPECIAL PROJECT SPECIFICATIONS, the contractor

shall meet the following requirements. Areas used to windrow construction slash shall be cleared to accommodate the windrow. Construction slash shall be placed outside the roadway in neat, compacted windrows laid approximately parallel with and along the toe-line of embankment slopes. The top of windrows shall not extend above the subgrade. All material in the windrow shall be matted down with construction equipment to form a compact and uniform pile. Windrows shall have 16-foot minimum length breaks at least every 200 feet. Windrows shall not be placed against trees. A pioneer road may be constructed to provide an area for placement of windrows provided the excavated material is kept within the clearing limits and does not adversely affect the road construction.

(2) Windrowing of Large Material. Construction slash 10 inches or more in diameter at the small end and 6 feet or more in length shall be windrowed as in (1) above. Smaller material shall be treated by one or more of the other included methods for slash treatment.

(3) Windrowing and Covering. Contruction slash shall be placed and compacted as in (1) above and shall be covered with at least 6 inches of rock and soil to form a smooth and uniform windrow.

(4) Scattering. Unless specified otherwise in the SPECIAL PROJECT SPECIFICATIONS, the contractor shall meet the following requirements. Construction slash shall be scattered outside the clearing limits without damaging trees. All logs shall be limbed. Logs and stumps shall be placed away from trees, positioned so they will not roll, and not be placed on top of one another. Other construction slash shall be limbed and scattered to reduce slash concentrations.

(5) Burying. Construction slash shall be buried at the locations SHOWN ON THE DRAWINGS and DESIGNATED on the ground. Construction slash shall be matted down in layers and covered with at least 2 feet of rock and soil. The final surface shall be smoothed and sloped to drain.

(6) Chipping. Construction slash up to at least 4 inches in diameter and longer than 3 feet shall be processed through a chipping machine. Chips shall be deposited on embankment slopes or outside the roadway to a loose depth not exceeding 6 inches. Minor amounts of chips may be permitted within the roadway if they are thoroughly mixed with soil and do not form a layer.

(7) Piling and Burning. Construction slash shall be deposited in areas SHOWN ON THE DRAWINGS and DESIGNATED on the ground. Piles shall be constructed so that burning does not damage standing trees. If burning is incomplete, the slash remaining shall be repiled and burned until pieces are reduced to less than 3 inches in diameter and 3 feet in length. These pieces shall then be scattered.

(8) Decking Unmerchantable Material. Logs not meeting utilization standards in Subsection 201.03 and other material that exceeds the diameter and length shown in the SPECIAL PROJECT SPECIFICATIONS shall be decked in areas SHOWN ON THE DRAWINGS. Other locations may be approved by the Engineer.

Material shall be cut into lengths not to exceed 32 feet and all limbs removed. Decks shall be stable and free of brush and soil. Other material shall be treated according to slash treatment methods SHOWN ON THE DRAWINGS and in the SCHEDULE OF ITEMS.

(9) Disposal in Cutting Units. Construction slash from within cutting units and 200 feet adjacent thereto shall be disposed of with logging slash. Such construction slash shall be deposited at least 50 feet inside the cutting unit boundary in

such a manner that it will not inhibit logging of the unit and that it may be treated by the prescribed logging slash treatment method.

(10) Removal. Construction slash shall be removed or hauled to locations SHOWN ON THE DRAWINGS and DESIGNATED on the ground.

(11) Piling. Construction slash shall be piled in areas SHOWN ON THE DRAWINGS and DESIGNATED on the ground for later burning or disposal by others. Piles shall be placed and constructed so burning will not damage remaining trees. All stumps shall be reasonably free of dirt. Unmerchantable logs shall be cut into lengths less than 20 feet prior to placement in the pile.

(12) Placing Slash on Embankment Slopes. Construction slash shall be placed on completed embankment slopes to reduce soil erosion where SHOWN ON THE DRAWINGS. Construction slash shall be placed as flat as practicable on the completed slope. Slash shall be placed from the toe of the embankment to a point at least 2 feet below subgrade elevation. Priority for the use of available slash shall be given to (1) through fills, (2) inside of curves, and (3) ditch relief outlets.

MEASUREMENT

201.06 Method

The method of measurement, described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

Linear measurements will be horizontal along the road centerline.

Quantities will be number of acres and fractions thereof within the clearing limits, regardless of the amount of work required.

The quantity for individual removal of trees will be the number of trees of the various size-designations removed. Tree diameters will be measured at a height of 12 inches above the ground. Trees less than 6 inches in diameter will not be counted.

Size of Least Diameter At Height of 12 Inches	Pay Item Designation
Over 6 inches to 24 inches	Small
Over 24 inches to 40 inches	Medium
Over 40 inches	Large

When an item for "Individual Removal of Trees, Miscellaneous" is shown in the SCHEDULE OF ITEMS, measurement will be the number of trees designated to be removed regardless of size.

PAYMENT

201.07 Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
201(01)	Clearing and Grubbing, Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, Logs _____ _____, and Stumps _____ _____ _____, Utilization of Timber _____	ACRE
201(02)	Clearing and Grubbing, Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, Logs _____ _____, and Stumps _____ _____ _____, Utilization of Timber _____	STA.

201(03) Clearing and Grubbing, Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, Logs _____ _____ _____, and Stumps _____ _____ _____, Utilization of Timber _____ . . . . . MI.

201(04) Clearing and Grubbing, Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, Logs _____ _____ _____, and Stumps _____ _____ _____, Utilization of Timber _____ . . . . . L.S.

201(05) Individual Removal of Trees, Small; Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, and Logs _____ _____ _____ _____, Utilization of Timber _____ . . . . . EA.

201(06) Individual Removal of Trees, Medium; Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, and Logs _____ _____ _____ _____, Utilization of Timber _____ . . . . . EA.

201(07) Individual Removal of Trees, Large; Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, and Logs _____ _____ _____ _____, Utilization of Timber _____ . . . . . EA.

201(08) Individual Removal of Trees, Miscellaneous; Slash Treatment Methods for Tops and Limbs _____ _____ _____ _____, and Logs _____ _____ _____ _____, Utilization of Timber _____ . . . . . EA.

201(09) Individual Removal of Stumps, Slash Treatment Methods _____ . . . . . EA.

Section 202 - Removal of Structures & Obstructions

DESCRIPTION

202.01 Work

This work shall consist of the removal and disposal, wholly or in part, of all buildings, structures, fences, old pavement, and all other obstructions within the clearing limits that are not DESIGNATED or permitted to remain, except for obstructions to be removed and disposed of under other contract items. It shall also include the salvaging of DESIGNATED materials and backfilling the resulting trenches, holes, and pits.

CONSTRUCTION

202.02 Performance

The contractor shall perform the work described in Subsection 202.01 as SHOWN ON THE DRAWINGS. All DESIGNATED salvageable material shall be removed without unnecessary damage, in sections or pieces that may be readily transported, and shall be stored at locations SHOWN ON THE DRAWINGS. All other material not DESIGNATED for salvage shall be removed from the project or disposed of, as described in the SPECIAL PROJECT SPECIFICATIONS. The source, type, and method of placement of material to fill the cavities left by the removed structure shall be as SHOWN ON THE DRAWINGS.

202.03 Removal of Bridges, Culverts, & Other Structures

The removal of existing culverts within embankment areas will be required only as necessary for the installation of new structures. No portion of any existing abandoned culvert shall be left within a distance equal to its diameter or 2 feet, whichever is greater, from the subgrade or the embankment slope. Culvert ends shall be crushed. All removed culvert sections that are not DESIGNATED for salvage or to be relaid shall be disposed of as described in the SPECIAL PROJECT SPECIFICATIONS.

The substructures of existing structures shall be removed down to the natural stream bottom, and those parts outside of a stream shall be removed down to at least 1 foot below natural ground surface or finished ground line, whichever is lower. Where portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed to accommodate the construction of the proposed structure.

Bridges to be salvaged shall be dismantled without unnecessary damage. Steel members shall be matchmarked unless matchmarking is waived by the Engineer and a drawing prepared showing matchmarking with the structural location of each member. All salvaged material shall be stored at locations SHOWN ON THE DRAWINGS.

Structures not DESIGNATED for salvage shall be disposed of as described in the SPECIAL PROJECT SPECIFICATIONS.

202.04 Removal of Pipe, Other than Culverts

Pipe shall be carefully removed and precautions taken to avoid damaging the pipe. Pipes to be relaid shall be stored when necessary to prevent loss or damage before relaying. The contractor shall replace without additional compensation all sections lost from storage or damaged by the use of improper methods.

MEASUREMENT

202.05 Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

PAYMENT

202.06 Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
202(01)	Removal of Structures and Obstructions	L.S.
202(02)	Removal of _____	EA.
202(03)	Removal of _____	L.F.
202(04)	Removal of _____	S.Y.
202(05)	Removal of _____	L.S.

Section 203 - Excavation & Embankment

DESCRIPTION

203.01 Work

This work shall consist of excavation and shaping of roadway, borrow excavation, drainage excavation, removal of slide material, excavation of unsuitable material, embankment construction, and disposal of all excavated material necessary for the completion of construction including roadway ditches, channel changes, furrows, slope rounding, benches, berms, dips, approaches, and subsidiary work.

203.02 Excavation

Excavation shall consist of the excavation and disposal of all excavated material, regardless of its nature, that is not included under other pay items listed in the SCHEDULE OF ITEMS.

203.03 Borrow Excavation

Borrow excavation shall consist of the excavation and utilization of material from sources SHOWN ON THE DRAWINGS or described in the SPECIAL PROJECT SPECIFICATIONS. Additional sources of borrow excavation will be subject to approval in advance by the Engineer. Development of sources shall be in accordance with Section 611.

CONSTRUCTION

203.04 Clearing & Grubbing

Clearing and grubbing shall be accomplished in accordance with Section 201 before work under Section 203 begins, except pioneer roads and slash disposal, and grubbing of stumps when approved by the Engineer may proceed concurrently with excavation, and the burning of slash may be delayed until weather permits. Excavation and placement operations shall be conducted so material to be treated under Section 201 will not be incorporated in the roadway.

203.05 Pioneering

Pioneering operations for the top of excavation slopes, toe of embankments, or pioneer road construction shall prevent undercutting of the final excavation slope, depositing of materials outside of the roadway limits, and any restriction of drainage.

203.06 Utilization of Excavated Materials

All suitable, excavated material shall be used in the construction of embankments, subgrades, shoulders, slopes, bedding, and backfill for structures and for other purposes as SHOWN ON THE DRAWINGS.

(a) Excess Excavation. Designed excess excavation shall be disposed of as SHOWN ON THE DRAWINGS.

(b) Rock for Slope Protection. Excavated rock suitable for protection of embankments may be conserved and used in lieu of a DESIGNATED materials source.

(c) Conserving Material. Material encountered in the excavation, suitable for cushion, road finishing, or other purposes, may be conserved and utilized instead of materials from DESIGNATED sources. Excessively wet material that is otherwise suitable for embankment shall be field drained and dried before placement.

(d) Excavation of Unsuitable Material. Unsuitable material shall be excavated. Disposal will be as SHOWN ON THE DRAWINGS. Excavated areas shall be backfilled with suitable material when necessary to complete the work. Frozen material shall not be placed in embankments. Rocks that are too large to be incorporated into the embankment shall be broken for incorporation into the embankment, maneuvered to the face of the embankment and embedded so that they will not roll or obstruct the use and maintenance of the roadbed, or moved to locations approved by the Engineer.

(e) Conservation of Topsoil. When SHOWN ON THE DRAWINGS, suitable topsoil shall be removed, transported, and deposited in the DESIGNATED stockpile areas.

(f) Abandoned Structures and Obstructions. Abandoned structures and obstructions shall be treated in accordance with Section 202.

203.07 Drainage Excavation

Drainage excavation shall include construction of side ditches, minor channel changes, inlet and outlet ditches, furrow ditches, ditches constructed along the road but beyond the roadway limits, and other minor earth drainage structures as SHOWN ON THE DRAWINGS. Excavated material shall be utilized in accordance with Subsection 203.06.

203.08 Finishing Roadbed

For roads receiving aggregate base or surface course, only rocks that do not protrude above the subgrade more than one-third of the depth of the base or surface course, or 3 inches, whichever is less, may remain in place.

For unsurfaced roads, unless otherwise SHOWN ON THE DRAWINGS, the top 4 inches below the finished road surface shall not contain rocks larger than 4 inches in greatest dimension. Oversize material shall be removed, reduced to acceptable size, or covered by importing suitable material approved by the Engineer.

The subgrade shall be visibly moist during shaping and dressing. Low sections, holes, cracks, or depressions shall be brought to grade with suitable material approved by the Engineer. Final compaction of the subgrade shall meet the requirements of the embankment placing method specified.

203.09 Snow Removal

Snow or ice shall not be incorporated in the embankment. Snow shall be removed in advance of the work and deposited beyond the roadway limits in a manner that will not cause resource damage nor waste material.

203.10 Finishing Slopes

Finished slopes shall conform reasonably to the lines STAKED ON THE GROUND or SHOWN ON THE DRAWINGS. The finished slope shall be left in a roughened condition to facilitate the establishment of vegetative growth. The finish associated with template and stringline or handraking methods will not be allowed. Loose rock, loose debris, and other loose material, each of which is larger than 6 inches in diameter, shall be removed from the slope unless otherwise SHOWN ON THE DRAWINGS.

The tops of excavations, excluding areas of solid rock, shall be blended with the adjacent terrain by rounding where SHOWN ON THE DRAWINGS. Decomposed rock that may be cut without blasting or ripping shall be rounded. Earth overlying rock shall be rounded above the rock.

All rock excavations that require blasting shall be formed with controlled blasting techniques unless otherwise SHOWN ON THE DRAWINGS. Controlled blasting is defined as the controlled usage of explosives and blasting accessories in appropriately aligned and spaced drill holes for the purpose of producing a free surface or shear plane in the rock excavation slopes and of minimizing landscape damage, adjacent ground vibration, and overbreak. Presplitting is not intended unless SHOWN ON THE DRAWINGS and described in the SPECIAL PROJECT SPECIFICATIONS.

Unless directed otherwise by the Engineer, the contractor shall drill, blast, and excavate short test sections (not to yield in excess of 1,000 cubic yards) to determine the controlled blasting method, hole spacing, and charge best suited to the material encountered.

203.11 Overbuilding & Landscape & Stream Protection

Unless otherwise agreed to by the Engineer, excavation or embankment material shall be confined within the roadway limits to avoid overbuilding and to protect the landscape and streams.

203.12 Subgrade Treatments

Subgrade treatment shall consist of soil modification by admixing aggregates, placing geotextiles, fiber mat, wood corduroy, rock blanket, or other similar materials over areas of unsuitable embankment foundation material that are SHOWN ON THE DRAWINGS. The construction and material requirements for the type of subgrade treatment will be specified in the SPECIAL PROJECT SPECIFICATIONS or SHOWN ON THE DRAWINGS.

203.13 Earth Berms

Permanent earth berms shall be constructed along the shoulder of the traveled way at locations SHOWN ON THE DRAWINGS. Material used in the construction of berms shall be well graded with no rocks having a dimension greater than one-fourth the height of the berm.

Acceptable material for the berm may be windrowed as the roadbed is constructed. When the local material is not acceptable, material shall be imported from approved sources. Material used for berm construction shall contain no frozen material, roots, sod, or other deleterious material. Material shall not be wasted over the embankment slope.

Compaction shall be accomplished by operating the spreading equipment over the full section of the berm.

203.14 Water

Water development, hauling, and application shall be in accordance with Section 207.

203.15 Embankment Placing Methods

(a) All Methods. When an embankment is to be placed across swampy ground and removal of unsuitable material or subgrade treatment is not required, the lower part of the embankment shall be constructed in a single layer to the minimum depth necessary to support construction equipment.

(b) Specific Methods. All embankments shall be placed by one or more of the following methods as SHOWN ON THE DRAWINGS and listed in the SCHEDULE OF ITEMS:

Method 1. Side Casting and End Dumping. Embankment may be placed by side casting and end dumping. Where material containing a large amount of rock is used to construct embankments, a solid embankment shall be provided by working smaller rocks and fines in with the larger rocks and fines to fill the voids.

Method 2. Layer Placement. Surfaces steeper than a ratio of 3 horizontal to 1 vertical (3:1) upon which embankment is to be placed, shall be roughened or stepped when SHOWN ON THE DRAWINGS to provide permanent bonding of new and old materials.

Embankment shall be layer placed, except over rock surfaces, in which case material may be placed by end dumping to the minimum depth needed for operation of spreading equipment. Each embankment layer shall be leveled and smoothed before placement of subsequent layers. Hauling and spreading equipment shall be operated uniformly over the full width of each layer.

Suitable material shall be placed in layers no more than 12 inches thick, except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. No layer shall exceed 24 inches before compaction.

Placing individual rocks or boulders greater than 24 inches will be permitted provided the embankment will accommodate them. Such rocks and boulders shall be at least 6 inches below subgrade. They shall be carefully distributed and the voids filled with finer material to form a dense and compacted mass.

Where material containing large amounts of rock is used to construct embankments, the layers may be of sufficient thickness to accommodate the material involved. A solid embankment with

adequate compaction shall be constructed by working smaller rock and fines in with the larger rocks to fill the voids and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.

Material shall be at a moisture content suitable to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Excessively wet material shall be handled in accordance with Subsection 203.06(c).

Method 3. Layer Placement (Roller Compaction). Embankments shall be placed as specified in Method 2. Placement shall be in horizontal layers not exceeding 12 inches prior to compaction except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. Compaction shall be obtained by equipment in compliance with the requirements of Subsection 212.02(a), (b), (c), or (d). Compaction equipment shall be operated over the full width of each layer until visible deformation of the layer ceases or in the case of the sheepfoot roller, the roller "walks out" of the layer. At least three complete passes shall be made.

Method 4. Controlled Compaction. Embankments shall be placed as specified in Method 2, except earth embankments shall be placed in horizontal layers not exceeding 12 inches (loose measure) and compacted. Material shall be at a moisture content suitable for attaining the required compaction. Embankments and the top 1 foot of excavation sections shall be compacted to at least 95 percent of the maximum density as determined by AASHTO T 99, Method C or D.

The density of the embankment material will be determined during the progress of the work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239, or T 255; and T 224.

Density requirements will not apply to portions of rock embankments that cannot be tested in accordance with approved methods. When this condition exists, compaction shall be provided by working smaller rocks and fines in with the larger rocks to fill the voids and by operating equipment over the embankment materials.

Method 5. Controlled Compaction Using Density Control Strips. The embankment placement requirements for Method 4 shall apply for this method except that compaction shall be performed in accordance with Section 212. Where portions of rock embankment are constructed that cannot be tested in accordance with approved methods, each layer shall be rolled full width with the same number of passes as the adjacent embankment containing material represented by a control strip.

Method 6. Special Project Controlled Compaction. Embankments shall be placed and compacted to at least 90 percent of the maximum density determined by AASHTO T 180, Method C or D, except that compaction of not less than 95 percent of AASHTO T 180, Method C or D, shall be obtained for a minimum depth of 1 foot below subgrade for the width of the roadbed in both excavation and embankment sections.

The density will be determined during the work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239 or T 255; and T 224.

203.16 Construction Tolerances

The tolerance class shall be as SHOWN ON THE DRAWINGS. Roadway ditches shall be constructed to flow in the direction SHOWN ON THE DRAWINGS.

Deviations shall be uniform in the direction of change for a distance of 200 feet or more along the project centerline.

Item	Tolerance Class[a]									
	A	B	C	D	E	F	G	H	I	J
Roadbed Width (Feet)	+0.5	+0.5	+1	+1	+1	+1	+1	+1.5	+1	+2
Subgrade Elevation (Feet)	±0.1	±0.2	±0.2	±0.5	±0.5	±1	±1	±1.5	±2	±3
Centerline Alignment (Feet)	0.2	0.2	0.5	0.5	1	1	1	1.5	2	3
Slopes, Excavation and Embankment (Percent Slope)[b]	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10

[a]Maximum allowable deviation from construction stakes and drawings.
[b]Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

203.17
(Reserved)

MEASUREMENT

203.18
Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

Quantities of excavation will include:

(a) Roadway excavation.

(b) Rock and unsuitable material below the required grade and unsuitable material beneath embankment areas.

(c) Furrow ditches outside the roadway, except when furrow ditches are included in the SCHEDULE OF ITEMS.

(d) Topsoil and other material removed and stockpiled as directed.

(e) Borrow material used in the work, except when borrow is included in the SCHEDULE OF ITEMS.

(f) The volume of conserved materials taken from stockpiles and used in the work, except topsoil included under other pay items.

(g) Slide material not attributable to negligence of the contractor.

Quantities of excavation will not include the following:

(a) Material used for other than approved purposes.

(b) Unauthorized excavation or borrow.

(c) Quantity of material excavated from slope rounding.

(d) Overbreakage from the backslope in rock excavation requiring blasting.

(e) Material scarified in place to receive the first layer of embankment.

(f) Benching or stepping existing ground for embankment foundation.

(g) Stepping or scaling cut slopes.

(h) Oversize material removed when finishing unsurfaced roads.

When designed quantities are DESIGNATED in the SCHEDULE OF ITEMS as the method of measurement, the quantities are estimated from design data based on undisturbed ground surface elevations.

When staked quantities are shown in the SCHEDULE OF ITEMS, excavation quantities will be determined by the average end area method using slope stake information taken prior to construction.

When actual quantities are DESIGNATED in the SCHEDULE OF ITEMS as the method of measurement, preliminary cross sections or comparable measurements will be taken of the undisturbed ground surface and quantities finally measured in accordance with the following:

(a) When excavation is DESIGNATED as a pay item in the SCHEDULE OF ITEMS, final cross sections or comparable measurements will be taken of the completed and accepted work.

(b) When embankment is DESIGNATED as a pay item in the SCHEDULE OF ITEMS, measurement will be in the final position.

(c) When borrow is DESIGNATED as a pay item by the cubic yard in the SCHEDULE OF ITEMS, measurement will be in the original position.

PAYMENT

203.19
Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
203(01)	Excavation, Placement Method 1	C.Y.
203(02)	Excavation, Placement Method 2	C.Y.
203(03)	Excavation, Placement Method 3	C.Y.
203(04)	Excavation, Placement Method 4	C.Y.
203(05)	Excavation, Placement Method 5	C.Y.
203(06)	Excavation, Placement Method 6	C.Y.
203(07)	Excavation, Placement Method _____ . . .	STA.
203(08)	Excavation, Placement Method _____ . . .	MI.
203(09)	Excavation, Placement Method _____ . . .	L.S.
203(10)	Borrow Excavation, Placement Method _____	C.Y.
203(11)	Borrow Excavation, Placement Method _____	TON
203(12)	Unsuitable Excavation	C.Y.
203(13)	Embankment, Placement Method _____	C.Y.
203(14)	Embankment, Placement Method _____	STA.
203(15)	Embankment, Placement Method _____	MI.

203(16)	Subgrade Treatment, Type _____	S.Y.
203(17)	Rounding Cut Slopes	L.F.
203(18)	Drainage Excavation, Type _____	C.Y.
203(19)	Drainage Excavation, Type _____	L.F.
203(20)	Drainage Excavation, Type _____	EA.
203(21)	Furrow Ditches	L.F.
203(22)	Topsoil (Stockpiled)	C.Y.
203(23)	Earth Berms	L.F.

Section 204 - Soil Erosion & Water Pollution Control

DESCRIPTION

204.01
Work

This work consists of temporary measures as SHOWN ON THE DRAWINGS or specified in the SPECIAL PROJECT SPECIFICATIONS to control soil erosion and water pollution, through the use of berms, dikes, dams, sediment basins, silt fences, brush barriers, fiber mats, netting, gravel, mulches, grasses, slope drains, and other devices or methods.

The control provisions shall be coordinated with the permanent erosion control features in the contract to ensure economical, effective, and continuous protection throughout the construction period.

MATERIALS

204.02
Requirements

Materials shall meet the requirements of the following sections or subsections:

Emulsified Asphalt	702.03
Agricultural Limestone	713.02
Fertilizer	713.03
Seed	713.04
Mulch	713.05
Net Material	713.07
Geotextiles	720

All other materials shall be as SHOWN ON THE DRAWINGS or specified in SPECIAL PROJECT SPECIFICATIONS.

CONSTRUCTION

204.03
Performance

Prior to the start of construction, the contractor shall submit to the Engineer for approval a schedule for temporary and permanent control work for each phase of work (clearing and grubbing, grading, structures, borrow pits, and so forth). No work shall begin until the necessary controls for that particular phase of work have been installed as required.

All permanent erosion control features shall be incorporated into the project at the earliest practicable time as outlined in the approved schedule to minimize the need for temporary erosion control.

When required by the SPECIAL PROJECT SPECIFICATIONS, clearing and grubbing shall be scheduled and performed so that grading operations and permanent erosion control measures can follow without interference.

Temporary erosion and pollution control measures required due to the contractor's negligence, carelessness, or failure to install permanent controls as scheduled shall be performed by the contractor at his own expense.

Erosion control features shall be maintained by the contractor during the contract. Temporary controls shall be dismantled and disposed of as specified in SPECIAL PROJECT SPECIFICATIONS or as SHOWN ON THE DRAWINGS.

MEASUREMENT

204.04
Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

PAYMENT

204.05
Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment shall be made under:

Pay Item		Pay Unit
204(01)	Temporary Seeding and Fertilizing	ACRE
204(02)	Mulching	TON
204(03)	Asphaltic Material	GAL.
204(04)	Temporary Netting	S.Y.
204(05)	Straw/Hay Bales	EA.
204(06)	Gravel Blanket	C.Y.
204(07)	Silt Fence	L.F.
204(08)	Brush Barrier	L.F.
204(09)	Sediment Basin	EA.
204(10)	Berm	L.F.
204(11)	Dike	L.F.
204(12)	Dam	EA.
204(13)	Temporary Water Bars	EA.
204(14)	_____ for Soil Erosion and Pollution Control	EA.
204(15)	_____ for Soil Erosion and Pollution Control	L.F.
204(16)	_____ for Soil Erosion and Pollution Control	S.Y.
204(17)	_____ for Soil Erosion and Pollution Control	ACRE
204(18)	_____ for Soil Erosion and Pollution Control	M.S.F.
204(19)	_____ for Soil Erosion and Pollution Control	C.Y.
204(20)	Soil Erosion & Pollution Control	L.S.

Section 205 - Overhaul

DESCRIPTION

205.01
Work

This work shall consist of authorized hauling of excavated material from its original location to its final location. It does not include hauling the DESIGNATED free-haul distance.

MEASUREMENT

205.02
Method

The method of measurement, as described in Section 106, will be designated in the SCHEDULE OF ITEMS. For a volume basis, the quantity of material hauled shall be based on the original in-place volume of material hauled. Overhaul will be measured as if excavated materials were deposited in embankment after having been hauled the shortest feasible distance minus the free haul distance.

The overhaul distance will be computed between the center of mass of the excavated material and the center of mass of the embanked material, minus the free haul distance. Overhaul may be computed by either mass diagram or analytical methods as determined by the Engineer.

Overhaul within the roadway limits will be measured along the centerline of roadway. Where material originates or is deposited outside the roadway, overhaul will include the distance by the most direct and feasible route from the roadway centerline to the point of origin or deposition.

PAYMENT

205.03
Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will not be made for overhaul of borrow, foundation embankment, bedding material, or material removed in the rounding of cut slopes.

Payment will be made under:

Pay Item		Pay Unit
205(01)	Overhaul (1,000 ft. free-haul)	STA. YD.
205(02)	Overhaul (2,000 ft. free-haul)	STA. YD.
205(03)	Overhaul (2,000 ft. free-haul)	C.Y.MI.
205(04)	Overhaul (4,000 ft. free-haul)	C.Y.MI.
205(06)	Overhaul (_____ ft. free-haul)	C.Y.MI.
205(07)	Overhaul (_____ ft. free-haul)	T.M.

Section 205A - Haul

DESCRIPTION

205A.01
Work

This work shall consist of the authorized hauling of excavated material from its original location to its final location in the work.

MEASUREMENT

205A.02
Method

The method of measurement, as described in Section 106, will be designated in the SCHEDULE OF ITEMS. The quantity of material hauled shall be based on the original in-place volume of material hauled. Haul will be measured as if excavated materials were deposited in embankment after having been hauled the shortest feasible distance.

The haul distance will be computed between the center of mass of the excavated material and the center of mass of the embanked material. Haul may be computed by either mass diagram or analytical methods as determined by the Engineer.

Haul within the roadway limits will be measured along the centerline of roadway.

Where material originates or is deposited outside the roadway, haul will include the distance by the most direct and feasible route from the roadway centerline to the point of origin or deposition. No haul allowance will be made for material designed to move directly across the roadway within a station.

PAYMENT

205A.03
Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
205A(01)	Haul	STA. YD.
205A(02)	Haul	C.Y.MI.
205A(03)	Haul	T.M.

Section 206 - Structure Excavation

DESCRIPTION

206.01
Work

This work shall consist of the necessary excavation and backfill or disposal of all materials required for the construction of bridges and other major structures.

This work shall include the necessary diversion of live streams, bailing, pumping, draining, sheeting, bracing, construction of cribs and cofferdams, and the subsequent removal of cribs and cofferdams.

This work shall also include the furnishing and placing of approved foundation material to replace unsuitable material encountered below the foundation elevation of structures.

CONSTRUCTION

206.02
Clearing & Grubbing

All necessary clearing and grubbing in any area shall be completed in accordance with Section 201 before starting excavation in that area, except slash disposal as approved by the Engineer.

206.03
All Structures

The contractor shall notify the Engineer sufficiently in advance of the beginning of any clearing, grubbing, or excavation so cross sectional measurements may be taken of the undisturbed ground. The natural ground adjacent to the structure shall not be disturbed until authorized by the Engineer.

Excavations for structures or structure footings shall be to the lines and grades or elevations SHOWN ON THE DRAWINGS. They shall be of sufficient size to permit the construction of structures or structure footings. The elevations of the bottoms of footings, as SHOWN ON THE DRAWINGS, shall be considered as approximate.

Boulders, logs, and any other unsuitable material encountered in the excavation shall be removed and disposed of at locations SHOWN ON THE DRAWINGS.

The contractor shall notify the Engineer when each excavation is completed. No footing shall be placed until the Engineer has approved the depth of excavation and the foundation material in writing.

Excavation shall conform to OSHA Standard 1926.652 or OSHA-approved State Plan Requirements.

All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface that is level, stepped, or serrated as approved by the Engineer. All loose and disintegrated rock and thin strata shall be removed. When the footing is to rest on material other than rock, excavation to final grade shall not be completed until just before the footing is to be placed. When the foundation material is soft or otherwise unsuitable, the unsuitable material shall be removed and the area shall be backfilled with approved granular material. This foundation backfill material shall be placed and compacted in 6-inch layers up to the foundation elevation. Each layer shall be compacted in accordance with subsection 203.15(b), Method 4.

When foundation piles are used, the excavation shall be completed before the piles are driven. Foundation backfill shall be placed after the piles are driven. After the driving is completed, all loose and displaced material shall be removed, leaving a smooth, solid bed to receive the footing.

206.04
Utilization of Excavated Materials

All suitable excavated material shall be utilized as backfill or embankment. All surplus material shall be disposed of as SHOWN ON THE DRAWINGS. Excavated material shall be deposited in a manner that will not endanger the partly finished structure.

Unauthorized placement of excavated material in live streams will not be permitted. Any excavated material temporarily stored near a stream shall be removed before rising waters reach the stockpiled materials.

206.05
Cofferdams

Suitable and practically watertight cofferdams or cribs shall be used whenever a pay item for cofferdams is included. For this purpose, a cofferdam or crib is defined as an enclosed single- or double-wall braced structure with walls sheeted with timber, concrete or steel, and which shall extend well below the bottom of the excavation when practical. Earthen or rockfill dikes, dams, or embankments are not considered cribs or cofferdams for this purpose.

The design and construction of supporting systems, if used, shall be the responsibility of the contractor in accordance with the following provisions. The contractor shall submit four sets of drawings showing the proposed method of cofferdam or crib construction and four copies of the design calculations, fully annotated and referenced. The design calculations and drawings submitted shall bear the signature and seal of a registered professional engineer.

Supporting systems shall be designed to withstand the expected loads and pressures, including surcharge, water, and earth, which may occur during the period for which they are used. Surcharge, earth, and water pressure diagrams, and the method of supporting system analysis and design, shall meet accepted engineering practice. For new materials, the allowable working stresses of the materials shall be as recommended by the manufacturer for the construction conditions encountered. For used materials or when manufacturer's recommendations are not available or applicable, the allowable working stresses shall be as specified in AASHTO's "Standard Specifications for Highway Bridges."

In general, the interior dimensions of cofferdams shall be sufficient to give clearance for the construction of forms and the inspection of their exteriors and to permit pumping outside of the forms. Cofferdams or cribs that are tilted or moved internally during the process of sinking shall be righted or enlarged to provide the necessary clearance.

When conditions make it impracticable to dewater the foundation before placing the footing, a concrete foundation seal with dimensions as necessary to resist uplift pressures shall be constructed. The concrete for the seal shall be placed as SHOWN ON THE DRAWINGS. The foundation shall then be dewatered and the footing placed. When weighted cribs are employed and the weight is utilized to partially overcome the hydrostatic pressure acting against the bottom of the foundation seal, special anchorage such as dowels or keys shall be provided to transfer the entire weight of the crib to the foundation seal. When a foundation seal is placed under water, the cofferdam shall be vented or ported at low water level or as otherwise authorized by the Engineer.

Cofferdams shall be constructed to protect recently placed concrete against damage from sudden rising of the stream and to prevent damage to the foundation by erosion. Timber or bracing that extends into substructure masonry shall not be left in cofferdams or cribs.

Pumping from the interior of any foundation enclosure shall be done in a manner that will not carry concrete materials away. All pumping required during the placing of concrete, or for a period of at least 24 hours thereafter, shall utilize a suitable sump located outside the concrete forms. Pumping to dewater a sealed cofferdam shall not start until the seal has set sufficiently to withstand the hydrostatic pressure.

Cofferdams and cribs, and all sheeting and bracing, shall be removed after completion of the substructure. Removal shall not disturb or mar finished structure.

206.06
Preservation of Channel

No excavation shall be made outside of caissons, cribs, cofferdams, or sheet piling. The natural stream bed adjacent to the structure shall not be disturbed without approval of the Engineer. After the foundation base is in place, all excavation or dredging made at the site of the structure before caissons, cribs, or cofferdams were sunk in place shall be backfilled to the original ground surface or streambed with suitable material. Material deposited within the stream area from foundation or other excavation or from the filling of cofferdams shall be removed and the stream area freed from obstructions. Water pumped from foundation excavation shall not be discharged directly into live streams but shall be pumped to settling areas SHOWN ON THE DRAWINGS or approved by the Engineer.

206.07
Backfill & Embankments for Structures

All backfilling and embankment construction within 20 feet of abutments shall be in accordance with this Subsection.

Excavated areas around structures shall be backfilled with approved material placed in horizontal layers, not over 6 inches (loose measure) in depth, to the level of the original ground surface. Each layer shall be compacted in accordance with Subsection 203.15(b), Method 4.

Backfill or embankment material shall be placed simultaneously, when possible, to approximately the same elevation on both sides of abutments, piers, or walls. If conditions require placing backfill or embankment appreciably higher on one side than on the opposite side, the additional material on the higher side shall not be placed until the masonry has been in place 14 days or until laboratory tests establish that the masonry has attained sufficient strength to withstand without damage the pressure created by the methods used and the materials placed.

Backfill or embankment shall not be placed behind the walls of concrete culverts or abutments of rigid frame structures until the top slab has been placed and cured. Backfill and embankment behind abutments held at the top by the superstructure and behind the sidewalls of culverts shall be carried up simultaneously behind opposite abutments or sidewalls.

All embankments adjacent to structures shall be constructed in horizontal layers and compacted in accordance with Subsection 203.15(b). Method 4, except that mechanical tampers may be used for the required compaction. Special care shall be taken to prevent wedging action against the structure. All slopes bounding or within the areas to be backfilled shall be benched or serrated to prevent wedging action. The placing of embankment and the benching of slopes shall maintain a horizontal berm of thoroughly compacted material for a distance at least equal to the height of the abutment or wall to be backfilled against, except when undisturbed material obtrudes upon the area.

Material for backfilling structures shall be free of excess moisture, muck, frozen material, roots, sod, or other unsuitable material.

Rock having its largest dimension greater than 6 inches shall not be placed within any backfill or embankment that is within 3 feet of the abutments.

206.08
(Reserved)

MEASUREMENT

206.09
Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

The volume of excavation will include only the number of cubic yards of material excavated from within the limits hereinafter defined, regardless of whether the excavation is made within a cofferdam enclosure or in an open trench or pit.

The horizontal limits will be the sides of the trench or pit, except that structure excavation will not include material removed outside of vertical planes 18 inches outside of and parallel to the neat lines of the footings. The bottom limits of the excavation shall be the bottom elevation of the footing as SHOWN ON THE DRAWINGS. The upper limit shall be the top surface of the ground or the bed of the stream as it existed prior to the start of construction operations.

PAYMENT

206.10 Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS, except that:

(a) Any excavation and related work for footing ordered to extend work more than 5 feet below the footing elevation SHOWN ON THE DRAWINGS will be covered by design change or change order.

(b) Shoring, cribbing, and related work for excavation ordered more than 5 feet below footing design elevation will be paid for as provided in (a) above.

Payment shall be made under:

Pay Item		Pay Unit
206(01)	Excavation for _____ Structures . . .	C.Y.
206(02)	Excavation for _____ Structures . . .	L.S.
206(03)	Shoring, Cribbing, Cofferdams, and Related Work	L.S.

Section 206A - Excavation for Culverts & Minor Structures

DESCRIPTION

206A.01
Work

This work shall consist of all excavation for foundations of culverts and minor structures, backfilling of completed structures, and disposal of excavated material. The footing for a bottomless arch culvert shall be considered a minor structure.

This work shall include all excavation below the designed slope or subgrade line as SHOWN ON THE DRAWINGS, excavation of unsuitable foundation material, and furnishing and placing approved foundation material.

This work shall also include necessary diverting of live streams, pumping, bailing, draining, sheeting, bracing, and miscellaneous items required for execution of the work.

CONSTRUCTION

206A.02
Clearing & Grubbing

Before starting excavation in any area, all necessary clearing and grubbing in that area shall have been completed in accordance with Section 201.

206A.03
Excavation

Excavation for culverts and foundation pits for minor structures shall be excavated to the lines and grades or elevations SHOWN ON THE DRAWINGS or as DESIGNATED on the ground. Excavations shall be of sufficient size to permit the placing and backfilling of culverts, minor structures, or minor structure footings. Boulders, logs, and any other unsuitable materials encountered shall be removed and disposed of in areas SHOWN ON THE DRAWINGS.

(a) Minor Structures. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface that is level, stepped, or serrated. All loose and disintegrated rock and thin strata shall be removed. When the footing is to rest on material other than rock, excavation to final grade shall not be completed until just before the footing is to be placed. When the foundation material is soft or otherwise unsuitable, it shall be removed and replaced with approved granular material. The contractor shall notify the Engineer when each excavation is completed and will receive written approval of the excavation and the foundation material prior to placing footings.

(b) Culverts. The width of trenches in natural ground shall permit satisfactory joining and thorough tamping of the bedding material under and around the culvert, and shall be at least as wide as the culvert diameter plus 2 feet.

Where culverts are to be placed in trenches excavated in embankments, then the excavation shall be at least as wide as one diameter plus one diameter on each side.

Unsuitable foundation material shall be excavated below the invert of the culvert to an approximate depth of 2 feet and a width of at least the culvert diameter plus 4 feet. Unsuitable material shall be replaced with selected granular foundation material and compacted to obtain a uniform foundation.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 1 foot. The width of the excavation shall be at least 2 feet greater than the outside width of the culvert. This excavated material shall be replaced with selected mineral soil meeting the requirements for backfill in Subsection 603.08 and compacted in accordance with Subsection 603.08.

206A.04 Utilization of Excavated Materials

All suitable excavated material shall be utilized as backfill or embankment. No excavated material shall be placed in live streams. All surplus material shall be disposed of as SHOWN ON THE DRAWINGS. No excavated material shall be deposited in a manner that will endanger the partly finished structure.

206A.05 Backfill & Embankments for Minor Structures Other Than Pipe Culverts

Excavated areas around minor structures shall be backfilled with selected material placed in horizontal layers, not over 6 inches (loose measure) in depth, to the level of the original ground surface. Backfill shall be readily compactible material free of frozen lumps, chunks of highly plastic clay, or other objectionable material. Rocks larger than 3 inches in diameter shall not be used within 1 foot of the structure. Each layer shall be compacted in accordance with Subsection 203.15(b), Method 4.

206A.06 Bedding, Backfill, & Embankment for Pipe Culverts

Bedding, backfill, and embankment for pipe culverts shall be in accordance with Section 603.

206A.07 (Reserved)

MEASUREMENT

206A.08 Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

Quantities of excavation will include:

(a) For box culverts, headwalls, minor concrete and stone masonry structures, and minor drainage structures other than pipe culverts, measurement will be between vertical planes 18 inches outside the base of the masonry sections SHOWN ON THE DRAWINGS or as DESIGNATED, and between the foundation grade and the natural ground surface.

(b) For pipe culverts, measurement shall be between the original ground surface, and the bottom excavations and to the minimum width required under 206A.03(b) paragraph 1, 2, 3, or 4 as applicable.

PAYMENT

206A.09 Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
206A(01)	Minor Structure Excavation	C.Y.
206A(02)	Pipe Culvert Excavation	C.Y.
206A(03)	Bedding Material	C.Y.
206A(04)	Bedding Material	TON
206A(05)	Foundation Material	C.Y.

Section 207 - Developing Water Supply & Watering

DESCRIPTION

207.01 Work

This work shall consist of furnishing, hauling, and applying water.

MATERIALS

207.02 Requirements

Water used in the planting or care of vegetation shall be free of substances injurious to plant life.

Water sources are SHOWN ON THE DRAWINGS. If the contractor elects to obtain water from other sources, the contractor shall be responsible for obtaining the right to use the water, including any royalty costs.

CONSTRUCTION

207.03 Development of Supply & Access

Developing water supplies and access shall be as SHOWN ON THE DRAWINGS.

207.04 Equipment

Mobile watering equipment shall have watertight tanks of known capacity. Equipment used for dust control and finishing operations of subgrade and surfaces shall provide uniform and controlled application of water without ponding or washing. Positive control of water from the driver's position is required at all times.

MEASUREMENT

207.05 Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

The contractor shall furnish calibrated tanks, distributors, or accurate water meters when directed by the Engineer for measurement.

When the SCHEDULE OF ITEMS calls for "Developing Water Supply and Water," the cost of developing the supply shall be included in the unit price for the quantity of water delivered.

"Hauling of Water" will be measured along the shortest feasible route to the nearest water supply, and does not include the cost of developing the supply.

PAYMENT

207.06 Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
207(01)	Developing Water Supply	L.S.
207(02)	Water	M. GALS.
207(03)	Water	L.S.
207(04)	Developing Water Supply and Water	M. GALS.
207(05)	Developing Water Supply and Water	L.S.
207(06)	Hauling Water	M. GALS. MI.

Section 209 - Sheathing

DESCRIPTION

209.01
Work

This work shall consist of placing free-draining material adjacent to structures and other locations including the installation of geotextile materials.

MATERIALS

209.02
Requirements

Sheathing material may be either gravel, slag, crushed stone, or sand meeting the requirements of the SPECIAL PROJECT SPECIFICATIONS.

Geotextiles shall be the type SHOWN ON THE DRAWINGS and shall meet the requirements in Section 720.

CONSTRUCTION

209.03
Performance

The sheathing shall form a continuous covering over the areas SHOWN ON THE DRAWINGS. Sheathing material shall be placed in accordance with Subsection 206.07. It shall be placed so that mixing with the embankment will be prevented.

Geotextile shall be placed as SHOWN ON THE DRAWINGS and in accordance with the manufacturer's recommendations.

When waterproofing is protected by roofing felt, a 4-inch layer of sand shall be placed between the coarse graded sheathing and the felt.

MEASUREMENT

209.04
Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

Cross sectional measurements will not exceed the dimensions SHOWN ON THE DRAWINGS.

PAYMENT

209.05
Basis

The accepted quantities will be paid for at the contract unit price for each item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
209(01)	Sheathing Material	C.Y.
209(02)	Geotextile, Function _____, Type _____	S.Y.
209(03)	Sheathing Material	TON

Section 210 - Obliteration of Abandoned Roadways

DESCRIPTION

210.01
Work

This work shall consist of the obliteration of roadways and construction of water bars.

CONSTRUCTION

210.02
Performance

Sections of the abandoned roadway shall be obliterated where SHOWN ON THE DRAWINGS. The natural drainage pattern shall be restored or maintained or both. The roadbed shall be ripped, plowed, or scarified to promote the establishment of vegetation, and the slopes shall be rounded to approximate the original contour.

Water bars for drainage and barricade berms to prevent vehicle access shall be constructed where SHOWN ON THE DRAWINGS.

Structures shall be dismantled, buried, or removed as SHOWN ON THE DRAWINGS.

Where SHOWN ON THE DRAWINGS, material required for the new roadway shall be taken from the abandoned roadway, and excess or unsuitable material or both taken from the new roadway shall be used in obliterating the abandoned roadway.

MEASUREMENT

210.03
Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

The number of miles will be to the nearest 0.1 mile of roadway measured along the centerline.

Only those units and fractions thereof that are outside the limits of the new roadway will be measured. Areas of less than 200 square feet will not be measured.

PAYMENT

210.04
Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS. Materials obtained from the abandoned roadway and used in the construction of the new roadway and materials obtained from the new roadway and used for obliteration of the abandoned roadway will be paid for under Section 203.

Payment will be made under:

Pay Item		Pay Unit
210(01)	Obliteration of Abandoned Roadways	M.S.F.
210(02)	Obliteration of Abandoned Roadways	MI.
210(03)	Obliteration of Abandoned Roadways	L.S.
210(04)	Obliteration of_____.	EA.

Section 211 - Roadside Cleanup

DESCRIPTION

211.01
Work

This work shall consist of cleaning up roadside areas outside the clearing limits where SHOWN ON THE DRAWINGS.

CONSTRUCTION

211.02
Performance

Cleanup shall consist of clearing the DESIGNATED area of down timber, dead brush, logs, and debris; the felling of dead and dangerous trees and disposing of slash not included in Section 201.

The neatness of cleanup shall be in character with the surroundings. Hand raking or any similar exaggerated degree of treatment will not be required.

The intensity of cleanup shall be gradually diminished from the clearing limits outward to the cleanup limits to effect a gradual transition in treatment from the artificial to the natural.

The first 20-foot width nearest the roadway shall have all small sticks and other loose materials removed, except those of approximately an inch or less in thickness or diameter; the second 20-foot width shall be cleaned of all sticks and loose material exceeding 2 inches in thickness and diameter; and the third 20-foot width shall be cleared of all sticks and loose material exceeding 3 inches in thickness or diameter.

Existing stumps and live or dead trees DESIGNATED for removal shall be cut as near flush with the ground as possible, but shall not extend more than 6 inches above the ground.

Debris from cleanup operations shall be disposed of as provided under Section 201.

MEASUREMENT

211.03
Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITMES.

Measurement will be to the nearest 0.1 pay unit.

PAYMENT

211.04
Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OT ITEMS.

Payment shall be made under:

Pay Item		Pay Unit
211(01)	Roadside Cleanup	ACRE
211(02)	Roadside Cleanup	L.S.

Section 212 - Compaction Equipment, Density Control Strips, & Nuclear Testing Devices

DESCRIPTION

212.01
Work

This procedure shall be used to determine density requirements of selected embankments, subgrade, bases, and bituminous concrete. The procedure shall consist of control strip construction to establish target densities and approved roller patterns for the specified course and the use of portable nuclear moisture/density testing equipment to determine in-place densities obtained during the construction process.

CONSTRUCTION

212.02
Compaction Equipment

Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compacting units may be of any type, provided they are capable of compacting each lift of material as specified and meet the minimum requirements contained herein. Minimum requirements for rollers are as follows:

(a) Sheepsfoot, tamping, or grid rollers shall be capable of exerting a force of 250 pounds per inch of width of roller drum.

(b) Steel-wheel rollers, other than vibratory, shall be capable of exerting a force of not less than 250 pounds per inch of width of the compression roll or rolls.

(c) Vibratory steel-wheel rollers shall have a minimum weight of 6 tons. The compactor shall be equipped with amplitude and frequency controls and specifically designed to compact the material on which it is used.

(d) Pneumatic-tire rollers shall have smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi.

(e) Heavier compacting units may be required to achieve the specified density of the embankment.

212.03
Construction of Control Strips & Determination of Target Density

To determine target density, a control strip shall be constructed at the beginning of work on each type of material to be compacted. Each control strip, constructed to acceptable density and surface tolerances, shall remain in place and become a section of the completed roadway. Unacceptable control strips shall be corrected or removed and replaced at the contractor's expense. A control strip shall have an area of approximately 400 square yards and shall be of the same depth specified for the construction of the course that it represents.

The materials used in the construction of the control strip shall meet the specification requirements. They shall be furnished from the same source and shall be of the same type and moisture content used in the remainder of the course represented by the control strip.

The base upon which a control strip is to be constructed will be approved by the Engineer before placing control strip material.

The equipment used in the construction of the control strip will be approved by the Engineer and shall be of the same type and weight as that to be used on the remainder of the course represented by the control strip.

Compaction of control strips shall commence immediately after the course has been placed to the specified thickness and shall be continuous and uniform over the entire surface. Compaction of the

control strip shall be continued until no discernable increase in density can be obtained by additional compactive effort.

Upon completion of the compaction, the mean density of the control strip will be determined by averaging the results of 10 nuclear density tests taken at randomly selected sites within the control strip. The mean density of the control strip shall be the target density for the remainder of the course that it represents.

If the mean density of the control strip is less than 95 percent of the maximum density as determined in the laboratory compacted specimens, the Engineer may request the construction of another control strip. The test procedure used to establish the maximum density will be SHOWN ON THE DRAWINGS.

A new control strip may also be requested by the Engineer or by the contractor when:

(a) A change in the material or job mix formula is made.

(b) Ten days of production have been accepted without construction of a new control strip.

(c) There is reason to believe that a control strip density is not representative of the material being placed.

212.04 Control of Compaction

The specified course shall be compacted to at least 95 percent of the target density. Density will be tested by a portable nuclear moisture-density test device in accordance with AASHTO T 238 and T 239.

MEASUREMENT

212.05 Method

No separate measurement will be made for this item.

PAYMENT

212.06 Basis

The cost of construction control strips will be included in the payment of other items of work.

Section 299 - Composite Road Construction

DESCRIPTION

299.01
Work

This work shall consist of clearing and grubbing, excavation and embankment, and erosion control. Clearing and grubbing shall include treatment of merchantable timber, and disposal of construction slash, including all designated trees. Excavation and embankment shall include borrow, drainage excavation, shaping the roadway, including approaches, turnarounds, ditches and drainage dips, and disposal of all excavated material, regardless of its nature. Erosion control, when specified, consists of furnishing and placing required seed, fertilizer, mulch and tackifier. Construction of the roadway shall be in conformance with the dimensions SHOWN ON THE DRAWINGS and DESIGNATED on the ground.

MATERIALS

299.02
Requirement

Materials shall meet the following requirements:

(a) Seed shall meet the requirements of Federal Specification JJJ-S-181 and shall have been tested within the past 6 months.

Seed shall be certified to meet state requirements for containment of noxious or undesirable plant seeds.

(b) Mulch shall be grass, hay, or grain straw in an air dry condition or wood cellulose fiber. Mulch shall be free of noxious weeds, mold, or materials injurious to plant growth.

(c) Fertilizer shall be a standard commercial grade furnished in sealed containers with name, weight, and contents clearly marked.

(d) Tackifier shall be emulsified asphalt Grade SS-1, SS-1h, CSS-1, or CSS-1h or as SHOWN ON THE DRAWINGS.

CONSTRUCTION

299.03
Clearing & Disposal

All trees, snags, downed timber, brush, and stumps within the clearing limits shall be removed and disposed of by:

(a) Decking or removing timber meeting utilization standards as SHOWN ON THE DRAWINGS.

(b) Decking unmerchantable timber as SHOWN ON THE DRAWINGS.

(c) Treating the construction slash larger than 3 inches in diameter and 3 feet in length by one or more of the following methods as SHOWN ON DRAWINGS:

Method A. Incorporating construction slash in the embankment.

Method B. Windrowing construction slash outside the clearing limits. When slash is windrowed, it shall be placed approximately parallel to the roadway outside the toe of the fill slope.

Method C. Scattering construction slash outside the clearing limits.

Method D. Piling for future disposal.

(d) Construction slash less than 3 inches in diameter and 3 feet in length may be incorporated into embankments so long as the material is distributed so that it does not result in concentrations or matting.

Slash shall not be deposited in stream courses.

Fire-dangerous dead trees or unstable live trees, DESIGNATED by the Engineer within 200 feet slope distance of the centerline of roads shall be felled and disposed of in accordance with (a), (b), or (c) unless there is agreement that removal would cause unnecessary damage to residual timber or roads.

299.04 Pioneering

Pioneering operations shall not undercut the final back slope, deposit material outside the roadway limits, or restrict drainage.

299.05 Grubbing

Grubbing limits shall be as SHOWN ON THE DRAWINGS. Stumps outside the grubbing limits may remain, but shall be cut no higher than 12 inches above the original ground measured on the uphill side unless otherwise SHOWN ON THE DRAWINGS.

299.06 Excavation & Embankment

The roadway shall be constructed to conform to the typical sections SHOWN ON THE DRAWINGS. Embankment may be placed by side casting and end dumping.

The location and requirements for use of borrow material and any requirements for the removal and disposition of unsuitable or excess material will be as SHOWN ON THE DRAWINGS.

Rocks too large to be incorporated in the embankment shall be placed outside the traveled way on the downhill side, so that they will not roll, obstruct drainage, or hinder the use and the maintenance of the roadbed.

To facilitate seeding, slopes shall be left in a roughened condition.

Unless otherwise SHOWN ON THE DRAWINGS, the roadbed shall be shaped and finished to that ordinarily accomplished by a crawler tractor with dozer blade to provide drainage of surface water. Individual rocks, within the roadbed, shall not protrude over 4 inches above the subgrade. A motor grader finish is not required.

Unless otherwise SHOWN ON THE DRAWINGS, the traveled way width shall not exceed the specified dimension by more than 2 feet.

299.07 Erosion Control

Seasonal limitations for seeding are SHOWN ON THE DRAWINGS. The seeding shall not be accomplished during windy weather, nor when the ground is excessively wet, nor when the ground is frozen. The methods and rates of application, and types of seed, fertilizer, mulch, and tackifier shall be as SHOWN ON THE DRAWINGS. Materials shall be applied uniformly to the areas to be treated.

MEASUREMENT

299.08 Method

The method of measurement, as described in Section 106, will be DESIGNATED in the SCHEDULE OF ITEMS.

PAYMENT

299.09 Basis

The accepted quantities will be paid for at the contract unit price for each pay item shown in the SCHEDULE OF ITEMS.

Payment will be made under:

Pay Item		Pay Unit
299(01)	Composite Road Construction	STA.
299(02)	Composite Road Construction	MI.
299(03)	Composite Road Construction	L.S.