

# Section 200

## EARTHWORK

### SECTION 201 - CLEARING AND GRUBBING

#### 201-1 DESCRIPTION

**201-1.01 General.** This work shall consist of clearing, grubbing, removing and disposing of all trees, brush, stumps, fences, debris, and miscellaneous structures not covered under other contract items within the construction area and such other areas as specified or directed. The Contractor shall clear such additional areas within the limits of the right-of-way and easement lines as specified or directed.

**201-1.02 No Burning Requirement.** Materials generated by the work, including construction and demolition debris, shall not be disposed of by burning on or off the site. Off site burning in a permitted solid waste incinerator or in another lawful manner as refuse derived fuel will be permitted.

**201-2 MATERIALS** (Not specified)

#### 201-3 CONSTRUCTION DETAILS

**201-3.01 Limits of Work Areas.** The Engineer will establish the limits of areas to be cleared and grubbed, to be cleared but not grubbed, or areas, objects or features that are designated to remain undisturbed. In general, the work areas shall include the road section, stream channels, ditches, temporary approaches to bridges, detours and other areas as shown in the contract documents or directed by the Engineer. The Engineer will designate fences, structures, debris, trees and brush to be cleared where grubbing is not required. Clearing beyond the areas of construction shall be done only where specified or directed.

**201-3.02 Clearing and Grubbing.** During the life of the contract the Engineer may order the clearing of any trees within the R.O.W. that the Engineer determines to be hazardous or dead and unsightly.

The Contractor shall carefully prune all branches of trees less than five (5) meters above any part of the roadway and all branches which have been broken or injured during construction. The work shall be done as specified under §614-3.01A Equipment and B. Pruning.

Whenever trees are felled or trimmed on/or adjacent to highways, all wood shall be immediately removed from the roadway or any area that would present a hazard to traffic. Grubbed stumps shall be moved immediately at least ten (10) meters from the edge of pavement. No trees, tree trunks, stumps or other debris shall be felled, sidecast or placed outside the limits of the road section. No grubbing will be required beneath the embankment where the finished grade will be two (2) meters or more above the original ground surface unless otherwise specified in the contract documents. Where trees or existing stumps are cleared and grubbing is not required, the tree trunk or existing stump shall be cut off not more than 150 mm above the original ground surface unless otherwise approved. Exposed stumps not required to be removed but which are within ten (10) meters of the edge of the pavement or are in a built-up area shall be chipped out to a depth of not less than 150 mm below the finished grade and the holes backfilled if directed by the Engineer. This work shall be completed within one week after start of work on the tree.

#### 201-3.03 Disposal

**A. General.** All wood including grubbed stumps shall be removed from the contract site or otherwise disposed of.

**B. Methods of Disposal of Wood and Brush.**

**1. Disposal (No Burning).** All wood and brush shall be disposed of within fifteen (15) days after cutting or felling unless otherwise approved. No burning of land clearing materials that result from the clearing and grubbing operations, except in a permitted solid waste incinerator or as refuse derived fuel, will be permitted. The Contractor will have the following options or combination of options for disposal of this material:

a. The Contractor shall make every effort to salvage marketable timber as specified in paragraph B4 of this subsection.

b. When permitted by a note in the contract documents, disposable material may be placed at locations approved by the Engineer within the right-of-way but outside of the embankment area.

When permitted by a note in the contract documents, disposable material may be placed in the embankment side slope area. The contract documents will define the embankment side slope area and the procedures for the concurrent construction of the embankment and disposal section.

This type of disposal will require certain preparatory work. Preparation for direct burial of woody materials shall consist of cutting main trunks and limbs and chipping smaller limbs, branches, foliage and brush. Under conditions when disposal space and earth cover are limited in size and quantity, stumps will have to be ranked in size and placed in layers so as to make best use of the space available and the quantity of materials to be buried.

c. The Contractor may bury disposable material off the right-of-way at locations obtained by the Contractor at no expense to the State. Such locations are to be approved in writing by the Engineer. The disposal work will require the same preparatory work as stated in option b. above except that the Engineer may waive such requirements for miscellaneous work which may be accommodated in a satisfactory manner by other methods. The disposal area is to be covered with earth as hereinafter specified.

d. The Contractor may reduce all woody materials to chips and dispose of the chips as specified in paragraph B2 of this subsection.

e. The material may be sent to a refuse derived fuel processing facility or to other processing facility for eventual beneficial re-use as fuel or for other lawful re-use.

Under no circumstances is disposal to be made in swamp or wet lands. When the disposal area is within the embankment section or is formed by flattening the embankment slopes, the elevation of the normal embankment construction shall always equal or exceed that of the disposal area. There is to be absolutely no end dumping of disposable material over the sides of the embankment. All disposal areas are to be finally covered with a minimum of 600 mm of earth and graded to drain properly.

**2. Chipping.** Wood may be reduced to chips by the use of an approved chipping machine or stump grinder. Chips shall be 15 mm maximum thickness or of other approved thicknesses. Chips resulting therefrom may be disposed of by being stockpiled and used as mulch for planting, by distribution on the ground surface in wooded areas within the right-of-way as approved by the Engineer, or by disposal at a location off the contract site satisfactory to the Engineer.

**3. Burying.** No tree trunks, stumps or other debris shall be buried inside the right-of-way limits without the written approval of the Engineer. Disposal areas outside the right-of-way limits shall be approved in writing by the Engineer and shall be acquired by the Contractor at no expense to the State.

**4. Salvage of Marketable Timber.** In the interest of conservation, the Contractor shall make every effort possible to salvage marketable timber produced as a result of clearing operations, provided the amount of timber is great enough to make the hauling practical. In general, marketable timber is construed to mean logs 2.5 to 5 m in length, plus appropriate trimming allowance, having a diameter inside the bark, at the small end, of approximately 250 mm. In the event that the Contractor is not successful in salvaging marketable timber, the Contractor shall advise the Engineer, in writing, of the efforts to salvage and indicate the reason why the timber could not be salvaged.

Any wood that is cut up in firewood lengths or other marketable lengths may be neatly piled adjacent to the right-of-way in an area provided by the Contractor for periods in excess of one week but shall be removed prior to completion of the contract.

**201-4 METHOD OF MEASUREMENT**

**201-4.01 Per Hectare.** Payment for Clearing and Grubbing will be made at the unit price bid per hectare computed to the nearest one hundredth hectare.

**201-4.02 Per Lump Sum.** Payment for Clearing and Grubbing will be made on a lump sum basis for work satisfactorily completed. Monthly payments will be made in proportion to the amount of work done as determined by the Engineer.

**201-4.03 Borrow Areas.** Borrow pits or other pit areas from which material is secured shall not be included for measurement of clearing and grubbing.

**201-5 BASIS OF PAYMENT.**

**201-5.01 Clearing and Grubbing.** Payment will be made at the contract price to furnish all materials, labor and equipment necessary to satisfactorily complete the work as specified. No separate payment will be made for any excavation, backfill or earth cover necessary to complete the work of disposal outside the embankment area nor for the work in handling, storing, rehandling and hauling of disposable material within or outside the right-of-way.

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>PayUnit</b>
201.06	Clearing and Grubbing	Lump Sum
201.07	Clearing and Grubbing	Hectare

**SECTION 202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

**202-1 DESCRIPTION.** This work shall consist of the removal and disposal, wholly or in part, of all buildings, structures, pavements, obsolete utility lines and tanks which are released to the Contractor in accordance with the provisions of these specifications. The work includes the demolition of existing superstructures, substructures, supporting bents and columns, surrounding material, and the removal of old bituminous concrete overlay and bituminous patches, within the right-of-way, listed in the itemized proposal, or directed by the Engineer. It also includes salvaging and storing designated materials, relocating designated buildings and backfilling resulting trenches, holes, pits, and cellars.

**202-2 MATERIALS** (Not specified)

**202-3 CONSTRUCTION DETAILS**

**202-3.01 General and Safety Requirements.** The Contractor shall conduct all demolition operations in a safe, legal, and responsible manner and shall ensure that any equipment, material, or method used shall be safe for the workers and the public. All laws, rules, regulations, and local building codes shall be followed. Local building code shall mean, outside of New York City, a code enacted or adopted by competent local officials or bodies at least as stringent in its requirements as the “New York State Fire Prevention and Building Code” and its associated reference standards. In New York City, Local Building Code shall mean the New York City Building Code.

Prior to demolition operations, an engineering survey shall be made by a competent person of the building, bridge, or other structure to determine its condition and the possibility of collapse of any portion, as outlined in 29 CFR 1926, Subpart T. As defined in 29 CFR 1926, Subpart C “Competent Person” means someone who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are or will be unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. For purposes

of this contract a competent person for bridge structures longer than twenty feet shall mean a registered professional engineer experienced in the design, construction or demolition of such structures unless waived in the contract documents. For buildings, other than ordinary wood frame construction, shall mean a registered professional architect or registered professional engineer experienced in building design, construction, or demolition.

Adjacent buildings or structures, within 30 meters of the building or structure, shall also be included in the survey if directed by the Engineer. The findings and recommendations of this survey shall constitute a "removal plan." Removal plans that are required to be prepared by a registered professional engineer or architect shall be submitted to the Engineer thirty (30) days prior to the commencement of demolition. Other removal plans shall be submitted fifteen (15) days prior to demolition. The removal plan shall include a description of the type, size, weight, and location of all equipment to be used and a sequence of removal activities. The removal plan shall be filed with the Project Safety and Health Plan.

The Engineer may return the removal plan and require additional engineering surveys and studies to be conducted if the removal plans do not adequately identify and address obvious safety and other identified conditions. However, the Engineer's failure to return any removal plan for additional studies and recommendations shall not relieve the Contractor from the obligation of preparing an adequate removal plan and conducting adequate engineering surveys that safeguard the workers and public.

The competent person shall frequently and on a continuing basis perform monitoring to reassess the structural condition of the surveyed buildings and structures. This shall be accomplished by observing them for the presence of excessive vibrations; measuring and recording the width, extent, and progression of cracks; by measuring and recording the plumbness and integrity of structural elements and bracing; and by making other observations as necessary. Should the results of these assessments indicate that potential for collapse of a structure or building to be demolished exists, the competent person shall recommend and cause measures to be taken to ensure safety. Should the results of these assessments indicate that the work is causing damage to or diminution of structural condition of a structure or building that is to remain either wholly or in part or one that is to be relocated, the competent person shall recommend and cause to be undertaken measures to prevent additional damage or diminution of structural condition from occurring and, if directed by the State, shall recommend and cause to be undertaken measures necessary to reverse the diminution or repair the damage. The findings and recommendations of these monitoring assessments shall be made part of the removal plan prepared for the work and shall be provided to the Engineer promptly.

Before any structure or building served with or having utilities thereon is demolished or relocated all telephone, cable, electric, gas, water, steam, or any other service shall be shut off at the street and capped, or otherwise made safe and controlled, outside the building or off the structure before the general demolition work is started. Remediation work of asbestos or other hazardous material however may proceed before services are cut, except that all electric circuitry in any work area that is humid, wet, or will become wet or humid during the work shall be shut down and locked out. If power is required in such places, temporary power and light circuits may be brought into the work area provided such circuits have ground fault interrupters at their sources. In each case, the utility companies involved shall be notified, in writing, at least five (5) working days, or longer if indicated elsewhere in the contract documents, in advance of the work. The Contractor will be held fully responsible for any claim arising from failure to do so.

All severed sewer lines or drains emanating from the building or structure shall be capped or otherwise tightly sealed to prevent the entry of foreign materials into the main sewer or drain.

The Contractor shall protect power, water, or other utility lines during demolition. If such lines cannot be protected in place they shall be temporarily relocated, as necessary, and protected prior to undertaking any demolition work that might affect them. Unless indicated otherwise, all utility relocation work will be performed by, and at the expense of, its respective owners upon adequate notice.

During the periods that personnel are required to work on, in, or around a building or structure to be demolished or relocated which is in a damaged or deteriorated condition by fire, flood, explosion, weather, or other cause, its elements shall be adequately braced to prevent collapse. Details of the bracing shall be provided in the removal plan previously mentioned in connection with the engineering survey and shall be included with the Project Safety and Health Plan for the project.

All asbestos materials or other hazardous materials shall be removed from or otherwise remediated on each structure or building before the general demolition work on that building or structure begins. The requirements and payment for this work will be as indicated elsewhere in the contract documents and as

outlined in the asbestos or hazardous material remediation plan prepared by the State or others for the project.

Where a falling hazard exists to personnel, the openings shall be protected to a height of approximately one meter. All floor or deck openings not used as material drops shall be covered over with materials substantial enough to support the weight of any loads which may be imposed upon them. Such materials shall be properly secured to prevent accidental movement.

When excavation is required, the Contractor shall provide excavation protection for workers and the public in accordance with §107-05K. Open Excavations and Trenches.

The Contractor shall repair or replace in kind, at no cost to the State and in a manner as approved by the Engineer, sidewalks, curbs, roadway and other materials designated to remain in place which are damaged by or as a result of the work.

**202-3.02 Disposal Of Buildings.** Any building designated for disposal and released to the Contractor thirty (30) days or earlier before the contract completion date, shall become the property of the Contractor and shall be promptly demolished at its site. Any proposal to allow such building or any portion thereof to remain standing at the site, or to be relocated to another site, shall be referred to the Director of the Real Estate Division for approval and shall be accomplished under terms and conditions established by the State. An appropriate extension of time may be allowed for work resulting from demolition of buildings released to the Contractor after the date indicated above. All abandoned equipment, material other than those of a hazardous nature, and fixtures of any kind remaining on the property after it is released to the Contractor shall become the Contractor's property and shall be removed as part of the building disposal. Materials of a hazardous nature shall be removed or remediated as indicated below. All the requirements of §202-3.01 General and Safety Requirements shall apply together with the following:

**A. Unauthorized Entry.** The Contractor shall immediately inspect all buildings released for demolition and shall prevent unauthorized entry to these buildings by boarding up or otherwise blocking potential entrances. If material blocking entrances is removed, the Contractor shall, after determining the building to be vacant, replace the removed material in such a manner as to keep the buildings from being re-entered.

**B. Hazardous Material.** Asbestos, hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous materials in the building or on the property shall be removed and disposed of or otherwise remediated in accordance with all applicable rules, regulations and laws concerning the handling and disposal of Hazardous Materials or Hazardous Wastes. Payment and requirements for such disposals and/or remediations shall be as indicated elsewhere in the contract documents. Petroleum products in storage tanks shall be removed in accordance with and paid for under the pay item for Disposal of Petroleum Storage Tanks.

**C. Rodent, Insect, and Wildlife Control.** The Contractor shall exterminate rodents and insects in each building so infested, as determined by the Engineer, City, County or District Office of the State Department of Health. The Contractor or Subcontractor performing the exterminating work shall, upon request, show at least five (5) years experience at extermination of the kind required. If the building or structure to be demolished is inhabited by wildlife, the Regional Office of the Department of Environmental Conservation or the local animal control officer shall be contacted and given the opportunity to remove such wildlife before extermination or demolition operations are commenced. If inhabited by domesticated animals, the local animal control officer shall be given the opportunity to arrange for their removal.

The work of extermination shall be performed in accordance with the requirements of the City, County or District Office of the State Department of Health.

Bait shall be placed at least thirteen (13) calendar days but not more than thirty (30) calendar days before actual demolition is started, or at such other times as required by the City or County Health Department. Insects shall be controlled by spraying or fumigating. If it is necessary to seal the building for the treatment to be effective or to prevent migration of insect, pest, or vermin, the Contractor shall seal the building.

If extermination is being conducted because it was ordered by the City, the County, or the State Department of Health, then the Contractor shall notify that office that the extermination has been completed and shall obtain their written concurrence that the extermination work was satisfactorily completed. Demolition work shall not proceed until the Engineer receives a copy of the written concurrence of the City, County or District Office of the State Health Department stating the extermination has been satisfactorily performed.

**D. Glass.** Glass that will create a hazard if fragmented shall be removed.

**E. Demolition of Party Wall Structures.** In the event that the demolition of one or more units of a group of party wall structures leaves a wall or walls exposed, the Contractor shall comply with the following requirements:

1. Furring, plaster, chimneys which are directed to be removed, projecting parts, and the like shall be removed.
2. The walls shall be made self-supporting, safe and weatherproof with construction similar to or consistent with the remaining building. The supports and bracing details necessary to accomplish this shall be included as a recommendation contained in the removal plan.

The walls shall be left in a presentable and sound weatherproof condition compatible in appearance with the remaining building and in conformance with local building codes, as determined by the Engineer.

3. The roof shall be properly flashed, repaired, or otherwise treated to prevent leaks.
4. The Contractor shall provide and place on solid foundation any shoring necessary to prevent damage to adjacent property. Necessary details of the foundation and shoring shall be included in the Removal Plan. The Contractor shall be held responsible for any claim arising out of failure to prevent damage to adjacent properties.
5. All work shall be in conformance with local building codes.

**F. Demolition of Buildings.** Unless mechanically demolished, the demolition of multi-story buildings herein defined as consisting of more than 2 ½ stories shall be accomplished story by story without accumulating rubble on the floors of the partially demolished structure.

If mechanical demolition is used, during actual operations no worker shall be permitted at any location onto which debris may fall or which may become unstable or collapse as a result of the demolition operations. Only the minimum number of workers actually necessary for the performance of the work shall be permitted in those locations at other times until such time as the operations are complete and the debris has been removed.

If debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with substantial barricades nominally one meter high, or higher if directed, and placed not less than two (2) meters back from the projected edge of the opening above. If the hole is to be used by machines as a material drop, substantial timber or other curbing shall be securely anchored around the hole. The barricades, but not the curbing, may be moved aside temporarily during periods that the machines are actually using the hole. Barricades shall be promptly restored to their proper locations when the machines have ceased actually using the hole.

Signs warning of the hazard and of falling materials shall be posted at each level.

Demolition and removal activities shall not be permitted in lower areas until debris handling ceases above.

The locations and details of any signs, barricades, curbings, and decking used to cover over holes in the flooring shall be indicated in the removal plan prepared for the building.

**G. Partial Demolition of Buildings.** If the work involved consists of demolishing only a portion of a building, the Contractor shall cooperate with the owner(s) of the remaining portion so that annoyance and inconvenience is minimized.

The competent person shall survey the site of the partial demolition and shall recommend any measures necessary to prevent the work from affecting adjacent property. Any measures recommended shall be included in the Removal Plan.

The Contractor shall close the open ends of the buildings being partially demolished with construction similar to the remainder of the building and shall furnish and install supporting members, framing, and foundations to support the remaining structure. All construction necessary to close the openings shall be of a strength and type to meet the local building codes. Structural supports shall be of the same materials as the existing supporting members to which they frame or with which they share load or shall be compatible with them. The Contractor may use salvaged lumber for sheathing provided that such lumber is sound and suitable, as determined by the Engineer. New kiln dried timber and lumber shall be used for all other purposes. The supporting members, framing and foundation etc, necessary to accomplish this shall be submitted as a recommendation of the previously mentioned engineering survey and included with the Removal Plan for the building.

**H. Demolition of Foundation.** Unless indicated otherwise or their removal would endanger adjacent improvements, the Contractor shall remove the foundation walls to the depth of the lowest cellar floor and shall break up any cellar floor, backfill the hole and grade the site to the satisfaction of the Engineer immediately after demolition of the structure.

**I. Dust Control.** Provisions shall be made at every demolition site to control the quantity of dust resulting from demolition operations by wetting the debris and the immediate work area with water or other appropriate spraying agents or by means acceptable to the Engineer. Dust control measures shall be included in the Removal Plan.

**J. Maintenance and Protection of Traffic, Including Pedestrians.** The Contractor shall, for the duration of the contract, maintain and keep safely passable and free from debris, snow and ice, all public walkways adjacent to the properties on which buildings to be demolished are located.

Active entrances to two or more story buildings being demolished shall be completely protected by sidewalk sheds, canopies or other means detailed in the Removal Plan and approved by the Engineer. Protection shall be provided a minimum distance of 2.5 meters from the face of the building. All such protection shall extend a minimum of 0.3 meters beyond each side of the building entrances or openings and shall be capable of sustaining a load of 7.2 kilopascals.

All sidewalks or other walkways subject to falling objects as determined by the Engineer or within 2.5 meters of a two story or taller building, or greater distance if indicated in the contract documents, upon which traffic is to be maintained shall be protected by sidewalk shed or canopy designed by a professional engineer registered to practice in the State of New York to withstand the loading as required above. For single story buildings, these requirements may be waived if in the opinion of the Engineer the work may be satisfactorily and safely completed without these protective devices. No canopy or shed shall contain design features that will deflect falling material into an area where they could cause harm or injury to person or property.

**K. Disposal of Materials.** Disposal of all materials shall be in accordance with all federal, state, and local laws, rules, and regulations, any provision found elsewhere in the contract documents, and most specifically in §107-16 A “Construction and Demolition Debris”, if included in the contract, and shall be subject to the approval of the Engineer.

**L. Removal of Salvaged Materials.** All salvaged materials shall be removed from the site of the work prior to the final acceptance of the project. The Contractor shall not hold any sales, public or private, of salvaged equipment, material, or articles on State owned land. The State does not guarantee the number of fixtures, quantity or quality of equipment or any other material of value existing in the building to be present after its release to the Contractor. The Contractor waives all claims against the State because the salvage value of any building has decreased at the time of disposal.

**M. Use of Non-State Owned Land.** If any material is to be placed upon non-state owned lands, written permission from the owner thereof shall be furnished to the Engineer prior to the use of such lands.

**N. Removal of Buildings by Others.** The State reserves the right to clear the Right of Way of any building by permitting the owner thereof to remove it from the site. Should any building be removed or demolished by its owner, the Contractor shall demolish the foundation and grade the site as indicated in §202-3.02H Demolition of Foundation.

**O. Deletion of Buildings from Contract.** The State reserves the right to delete any building demolition work from the Contract. There will be no compensation for claims of lost profits.

**P. Explosives.** Unless specifically authorized in the contract documents, demolition shall be accomplished without the use of explosives.

**Q. Domestic Sewage Facilities.** Septic tanks, leaching basins, cesspools and other similar facilities associated with buildings being demolished or those that will be abandoned shall be pumped free of septage or sewage, removed, and the resulting hole shall be backfilled in lifts of compacted suitable material. If permitted by the Engineer, the facilities may be collapsed in place after pumping instead of removal. Septage recovered from the pumping operation shall be handled, transported, and disposed of in accordance with 6 NYCRR Part 364.

**202-3.03 Relocating Buildings.** The Contractor shall, if directed by the Engineer, relocate specified buildings to sites designated by the owner and approved by the Department. The Contractor shall do all work in accordance with applicable State and local requirements and shall obtain necessary permits.

All the applicable requirements of §202-3.01 General and Safety Requirements, §202-3.02 Disposal of Buildings and the following shall apply:

**A. Preparation of Site.** The Contractor shall construct all necessary foundations and cellar floors for the relocated building to meet applicable local building codes but not less than equivalent in construction to the existing features. The Contractor shall also grade the new site, and construct necessary driveways and sidewalks, topsoil and/or seed the area and perform other incidentally required items of work to prepare the site as indicated in the contract documents or by the Engineer.

**B. Moving Buildings.** The Contractor shall move the building safely and in a manner so as to cause the least possible damage to the building and the least possible interference with or inconvenience to its occupant(s). The Contractor shall also arrange for any temporary rerouting of overhead lines or relocating guide wires and for the clearance of other obstructions. The Contractor shall be responsible for the repair of any damage that may occur to the building, pavement and other features within and around the area of the move as a result of the move.

**C. Service Connections.** At the building's final location, the Contractor shall reconnect or arrange for the reconnection of necessary plumbing, gas, heating, electrical, sanitary, water supply and other services at least equivalent in construction to those existing. The work shall be accomplished in such a manner as to cause the least possible disruption to the properties affected. All work shall be in conformance with the requirements of the various utilities and local building codes. Payment and requirements for such work shall be as indicated elsewhere in the contract documents.

**D. Restoration Work.** The Contractor shall restore all portions of the building, including steps, porches, railings, lean-tos, and other appurtenances, to as good and serviceable condition, in accordance with local building codes, as existed prior to its relocation as determined by the Engineer. Any property damaged or destroyed during the execution of the work shall be repaired or replaced, as determined by the Engineer at the Contractor's expense to the satisfaction of the Engineer.

**E. Demolition of Old Foundations.** The Contractor shall remove old foundation walls in compliance with the provisions of §202-3.02H Demolition of Foundation.

**F. Expenses and Liabilities.** The Contractor shall save the State and the owner harmless as to all costs, expenses, and liabilities in connection with carrying out the work, and shall not hold the State

liable for any claim on account of any delay or interferences with any part of the work due to relocating buildings.

**G. Furnishing Sites.** Sites to which the buildings are to be moved will be furnished without cost to the Contractor.

**H. Removal of Building by Others.** The State reserves the right to clear the Right of Way of any building by permitting the owner thereof to remove it from the site.

Should the building be removed or demolished by its owner, the Contractor shall demolish the foundation and grade the site as indicated in §202-3.02H Demolition of Foundation.

**202-3.04 Disposal of Petroleum Storage Tanks.** Subsection 202-3.01 General and Safety Requirements and the following shall apply to this work.

All tanks containing petroleum liquids shall be removed in accordance with the requirements of the local fire and police officials, and those of the New York State Department of Environmental Conservation in general and 6 NYCRR Part 613 in particular. In addition, the following requirements shall apply:

**A. Explosion Meter.** The Contractor shall supply an explosion meter to monitor the tank atmosphere.

**B. Emptying Tanks Before Removal.** Before the removal of any tank is commenced, it shall first be pumped completely dry. All water obtained from this operation shall be transported and disposed of in accordance with applicable laws. All product obtained shall be either disposed of according to applicable laws or used or recycled at the Contractor's option. During the emptying operation the following restrictions shall apply:

1. Smoking shall be banned in the area.
2. All open-flame and spark producing equipment within the area shall be shut down.
3. All electrical and internal combustion equipment, unless it is designed to be "explosive proof", shall be removed from the area.
4. Only "non-sparking" tools shall be used.
5. Static electricity shall be controlled.
6. The work area shall be secured.

**C. Additional Safety Precautions.** After the excavation work of underground tanks has been completed, but before removal of the tank, the Contractor shall distribute a minimum of one kg of crushed dry ice for 500 liters capacity (approximately one pound crushed dry ice for 60 gallons capacity) in the tank. Removal work shall not start until the readings from the explosion meter indicate that a safe and non-explosive tank atmosphere has been achieved as evidenced by readings less than ten percent (10%) of the lower explosive or flammable level at all elevations within the tank. Removal work shall be progressed diligently and expeditiously without interruption until its completion. The explosion meter shall be used to take subsequent readings periodically or continuously as directed by the Engineer as work is progressing. If any reading indicates a dangerous level is approaching, work shall cease, the workers shall exit the tank, and additional carbon dioxide shall be introduced into the tank until safe conditions are restored to all levels within the tank.

The Contractor shall permit only trained and properly equipped personnel to enter the tank. Tanks shall not be entered unless personnel have and use proper self contained breathing apparatus and standby personnel similarly equipped are present at the site to safeguard and protect those working in the tank. Workers in the tank shall also have and use appropriate harnesses and lifelines connected to personnel retrieval equipment fully rigged, and ready for use.

**D. Removal of Contaminated Soil.** Contaminated soil shall be removed and paid for in accordance with provisions found elsewhere in the contract documents.

**E. Backfilling.** The Contractor shall backfill any resulting holes and trenches with suitable material placed and compacted as indicated in §202-3.02H Demolition of Foundation and regrade the area to drain as directed by the Engineer.

**F. Removal of Supporting Structures.** Tank supports shall be removed and disposed of in a manner approved by the Engineer.

**G. Cleaning of Tanks.** All tanks shall be cleaned prior to disposal, either on-site or off, of all residue and product clinging to their surfaces. All product, cleaning solvents, and water generated by the operation, shall be transported by a transporter permitted under 6 NYCRR 364 and, if disposed of in New York State, disposed of at a site regulated by the New York State Department of Environmental Conservation.

**H. Transportation of Tanks.** Unless cleaned, tanks shall be transported only by transporters permitted under 6 NYCRR 364. Prior to transporting an uncleaned tank, all holes shall be plugged and the tank shall be placarded. The tank shall be vented by means of a three millimeter hole in one of the plugs. The tank shall be securely fastened to the transporting vehicle oriented so that the plug with the hole in it is uppermost on the tank. Cleaned tanks need not be transported by permitted transporters nor is it necessary to placard a cleaned tank.

**I. Disposal of Tanks.** All tanks shall be cleaned prior to disposal. All non-metal tanks shall be disposed of (or recycled) at facilities permitted by the New York State Department of Environmental Conservation. Metal tanks shall be disposed of only by recycling.

**202-3.05 Demolition of Structures.** General. §202-3.01 General and Safety Requirements shall apply to this work and in addition the following also apply:

Except as noted below, any structure designated for demolition and released to the Contractor shall be demolished at its site. Any proposal to allow such structure or any portion thereof to remain standing on the site or to be relocated to another site, shall be referred to the Deputy Chief Engineer, Structures for approval and accomplished under terms and conditions established by the State.

Colored tapes, barricades, marking paint, and signs shall be used to mark all areas that could become subject to collapse or that could become unstable as a result of demolition activity. Such areas are to be designated as non-access areas, and are to be identified by the previously mentioned Engineering Survey. Personnel and equipment with operators on board shall remain outside these designated non-access areas at all times during demolition operations or at any time the area is subject to collapse.

During the course of demolition work, the Contractor shall cause the structure to continue to be monitored by a competent person, as defined in §202-3.01, and the designated non-access areas or any additional non-access areas identified during the course of the work shall be appropriately marked and signed.

In accordance with state policy, steel and other metals other than those embedded in concrete or otherwise inseparable from articles being discarded shall be disposed of in a manner that ensures their salvage or beneficial re-use.

For steel structures coated with lead-based paint, the contractor shall comply with the provisions of 29 CFR 1926.62 and all other applicable worker Health and Safety Regulations. In addition, the contractor shall comply with all applicable regulations controlling the release of lead-based paint into the environment. Prior to the beginning of any steel removal operations, the paint shall be removed for a minimum distance of four inches on each side of the centerline of cut, bolt row, or weld as applicable. The paint removal work shall be done in accordance with the requirements of Section 741. In cases where the contractor can clearly demonstrate through exposure monitoring that other work practices and engineering controls, under the oversight of a certified industrial hygienist, can effectively maintain actual worker exposure below the permissible exposure level, exception to this requirement may be granted by the Engineer

**202-3.06 Dismantling and Storing of Existing Superstructures.** In accordance with §202-3.01 General and Safety Requirements, §202-3.05 Demolition of Structures-General and the following, all concrete and paving material and other materials as directed shall be carefully removed from the structure

in a manner so as to not damage materials to be stored. If not incorporated into the work the removed materials shall be disposed of by the Contractor in a manner approved by the Engineer and as outlined in §202-3.02K Disposal of Waste Materials. The parts of superstructure designated to be stored shall be dismantled, protected, and stored on site or at the locations designated without damage. All stored steel members and other stored members as directed shall be adequately match-marked in order to permit reassembly.

Any parts of the structure designated for storage which are damaged during the course of the operation or during storage shall be repaired or replaced at the direction of the Engineer at the Contractor's expense.

**202-3.07 Removing Existing Superstructures.** In accordance with §202-3.01 General and Safety Requirements, §202-3.05 Demolition of Structures-General and the following, all concrete and paving material shall be removed from the structure and if not incorporated into the work shall be disposed of by the Contractor in a manner in accordance with laws, rules or regulations and as approved by the Engineer and as outlined in §202-3.02K Disposal of Waste Materials.

The rest of the material removed under this work will become the property of the Contractor and, except for materials incorporated into the work, shall be removed from the site of the work and disposed of in a manner approved by the Engineer.

**202-3.08 Removing Old Bituminous Concrete Overlay.** The Contractor shall remove the old bituminous concrete overlay and bituminous patches indicated in the Contract Documents in a manner approved by the Engineer. If the Contract Documents indicate that the overlay or patch to be removed contains asbestos, but not more than one percent by volume, the material shall be softened by radiant heat and removed while still hot, or in a thoroughly wet condition by means other than cold milling, or in accordance with the blanket variance for the removal of bituminous pavement containing asbestos.

Should the percentage asbestos be greater than one percent (1%) by volume, the material is defined as Asbestos Containing Material by Industrial Code Rule 56 and shall be removed and paid for as indicated elsewhere in the Contract Documents.

**202-3.09 Removal of Substructures.** The appropriate construction details specified for Section 203, Excavation and Embankment, as stated in §203-3.01 General through and including §203-3.08 Disposal of Surplus Excavated Material shall apply. The excavation shall be dewatered and kept free from water, snow and ice when necessary.

Sheeting or piling shown on the Contract Plans which is integral with the substructure and is designated to remain in place shall be cut off at the elevations shown on the plans. If indicated in the Contract Documents, existing sheeting or piling shall be extracted.

The Contractor may, with the permission of the Engineer, extract sheeting or piling not shown to be extracted or designated to remain in place rather than cutting it off at the elevations shown on the plans at no additional cost to the State.

If excavation protection is required solely to ensure the safety of workers and the public, the Contractor shall provide excavation protection. If excavation protection is necessary also to protect structures or other improvements, or if the alternatives of laying back slopes or benching are not available, the support system shall be as indicated in the contract documents.

If directed, the resulting hole shall be backfilled with suitable material placed in lifts and compacted as indicated in §202-3.02H Demolition of Foundation to the satisfaction of the Engineer and the area shall then be regraded as directed, topsoiled, and/or seeded.

## **202-4 METHOD OF MEASUREMENT**

**202-4.01 Relocating or Disposal of Buildings.** The work will be measured on a lump sum basis for the relocation or disposal of the given building in accordance with the provisions of these specifications. Monthly estimates of the percentage completion will be made in proportion to the amount of work satisfactorily completed.

If a property owner, upon agreement with the Department, removes the building, the Contractor shall demolish the existing foundation, cellar floors, walks and other facilities to properly complete the work, and will be paid 20% of the bid price.

**202-4.02 Disposal of Buildings (Credit Item).** The bidder may provide a credit bid price for this work in the event that the estimated salvage value of the building materials exceeds the cost of demolition. When a credit bid price is intended for this work, it shall be identified by the bidder as follows:

- A. Where the unit bid price is written in words in the proposal the words “a credit to New York State of” shall be written by the bidder preceding the bid price in words.
- B. The bidder shall insert the word “credit” where the unit bid price and amount bid are written in numbers.

**202-4.03 Disposal of Petroleum Storage Tanks.** This work will be measured as the number of tanks within the indicated size range removed and disposed of in accordance with the provisions of these specifications.

However, if the tank owner, upon agreement with the Department, removes the tank or tanks, the Contractor shall remove any supporting structures and backfill the resulting hole and/or trenches with suitable material, placed and compacted in accordance with §202-3.02H Demolition of Foundation, and will be paid 20% of the bid price in compensation for backfilling any resulting hole or for removing and disposing of the tank supporting structure.

**202-4.04 Dismantling and Storing Existing Superstructures.** The work will be measured on a lump sum basis for “Dismantling and Storing Existing Superstructures.” Monthly estimates of the percentage completion will be made for this work in proportion to the amount of work satisfactorily completed.

**202-4.05 Removing Existing Superstructures.** The Contractor will be paid the lump sum price bid for “Removing Existing Superstructures.” Monthly estimates of the percentage completion shall be made for this work in proportion to the amount of work satisfactorily completed.

**202-4.06 Removing Old Bituminous Concrete Overlay.** The quantity to be measured will be the number of square meters of bituminous concrete overlay removed in accordance with the plans or as approved by the Engineer.

**202-4.07 Removal of Substructures.** The quantity of material removed and disposed of shall be the number of cubic meters of material computed from the payment lines shown on the Contract Plans irrespective of the excavation protection method chosen by the Contractor under 202-3.09.

## **202-5 BASIS OF PAYMENT**

**202-5.01 Disposal of Buildings.** Except as indicated in the following the lump sum bid for Disposal of Buildings shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work. Unless indicated otherwise, asbestos and hazardous waste removal or remediation work shall be paid for under separate pay items. Suitable or select material obtained from other than the demolition site used to fill cellars will be paid for separately. Water used for dust control or compaction shall also be paid for separately if a pay item for water is included in the contract.

The cost of extermination work shall be included in the price bid if the contract documents indicate that extermination work is required for the given building; otherwise the work of extermination will be paid for as extra work.

**202-5.02 Disposal of Buildings (Credit Item).** When a credit price is bid for this work, the total or gross sum bid for the contract shall be the sum of all the bid amounts for the various items, not including those credit bids, reduced by the total bid amount involving credit bid prices.

**202-5.03 Relocating Buildings.** Except as indicated in the following the lump sum price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work including the cost of any excavation necessary at the old or the new building site, and any incidentals.

Suitable or select material obtained off-site to backfill the original cellar hole will be paid for separately. Water used for dust control or for compaction shall be paid for separately only if an item for water exists in the contract. Sidewalks, driveways, topsoil, and turf reestablishment will also be separately paid. The cost of extermination work shall be included in the price bid if the contract documents indicate that extermination work is required for the given building; otherwise the work of extermination will be paid for as extra work.

Unless indicated otherwise, the work of reconnecting and providing services for the relocated building at its new site shall be performed and paid for under separate pay items.

**202-5.04 Disposal of Petroleum Storage Tanks.** The unit bid price for the removal and disposal of Tanks within the indicated size range shall include the cost of all labor, materials, and equipment necessary to satisfactorily perform the work except that suitable or select material obtained from other than the tank site used to fill the resulting hole will be paid separately. Removing and disposing of contaminated soil, except that contaminated during the tank removal operations, will be separately paid.

**202-5.05 Dismantling and Storing Existing Superstructures and Removing Existing Superstructures.** The lump sum bid shall include the cost of all labor, materials, and equipment necessary to complete the work. The lump sum bid shall also include the cost of repair or replacement of any element designated to be stored that is damaged during the operation and any protective system(s) required to ensure the safety of the workers or the public unless indicated on the plans. Support or protection systems when indicated on the plans, the extraction of existing sheeting designated to be extracted, topsoiling, and seeding will be paid for separately under their respective items. Water used for compaction or to control dust will also be paid for separately if a pay item for water is included in the Contract. Backfilling with select material or with suitable materials that must be obtained off-site will be separately paid.

**202-5.06 Removal of Substructures.** Except as indicated below, the unit price bid per cubic meter for this work shall include the cost of furnishing all labor, materials, and equipment necessary to complete the work, including the cost of cutting existing sheeting or piling the protective system(s) required to ensure the safety of the workers and the public, unless indicated on the plans, and keeping the site dewatered and free of water, ice and snow when necessary. Support or protection systems when indicated on the plans, Topsoiling, and/or Seeding will be paid for separately under their respective items. Backfilling with select materials or with suitable materials which must be obtained off-site will be separately paid. Water will be paid for separately only if the pay item for Applying Water is in the contract. If the Contract Plans indicate that the sheeting or piling is to be extracted, payment for the extraction shall be made separately.

**202-5.07 Removing Old Bituminous Concrete Overlay.** The unit price bid per square meter shall include the cost of furnishing all labor, materials and equipment necessary to complete the work, except the cost of removing Asbestos Containing Material shall be paid for separately.

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
202.01nnnn	Disposal of Buildings	Lump Sum
202.02nnnn	Disposal of Buildings (Credit Item)	Lump Sum
202.03nnnn	Relocating Buildings	Lump Sum
202.05xx	Disposal of Petroleum Storage Tanks (various size ranges)	Each
202.11nnnn	Dismantling and Storing Existing Superstructures	Lump Sum
202.12nnnn	Removing Existing Superstructures	Lump Sum
202.19	Removal of Substructures	Cubic Meter
202.20	Removing Old Bituminous Concrete Overlay	Square Meter

**NOTE:** nnnn denotes serialized pay item for each building or structure; see §101-02 Definitions of Terms under "Specifications".

xx -see Catalog of Standard Pay Items or Proposal for complete description.

**SECTION 203 - EXCAVATION AND EMBANKMENT**

**203-1 DESCRIPTION.** This work shall consist of excavation, disposal, placement and compaction of all materials that are not provided for under another section of these Specifications, and shall be executed in conformance with payment lines, grades, thicknesses and typical sections specified in the contract documents.

**203-1.01 Unclassified Excavation.** Unclassified excavation shall consist of the excavation and disposal of all materials, of any description, encountered in the course of construction, unless otherwise specified in the contract. Estimated limits and descriptions of subsurface deposits and formations which may be shown in the contract documents are supplied as a part of Base Line Data.

**203-1.02 Embankment.** The embankment is the portion of a fill section situated between the embankment foundation and the subgrade surface, excluding any material placed under another section of these specifications.

**203-1.03 Embankment Foundation.** The embankment foundation is the surface upon which an embankment is constructed after all work required under §203-3.09 has been completed.

**203-1.04 Subgrade Surface.** The subgrade surface is the surface of the road section upon which the select materials and/or subbase are placed.

**203-1.05 Subgrade Area.** The subgrade area is that portion of an embankment situated above either of the following, but excluding any material placed under another section of these specifications.

- A. A line located 0.6 m below the subgrade surface and extended to the intersection with the embankment side slopes, or
- B. The embankment foundation, whichever is higher.

The material and compaction requirements for the subgrade area in embankments are found in §203-2.02 and §203-3.12, respectively.

In cut sections, the subgrade area is not defined except where undercut and backfill with a select material item is specified or ordered: in such cases, the payment lines for undercut work shall define the subgrade area.

**203-1.06 Embankment Side Slope Area.** The embankment side slope areas are those cross-sectional areas of an embankment situated outside of lines projected downward and outward on a one on one slope from the edges of the subgrade surface to their intersection with the embankment foundation, but excluding any portion lying within a subgrade area.

**203-1.07 Topsoil.** See Section 613, Topsoil.

**203-1.08 Suitable Material.** A material whose composition is satisfactory for use in embankment construction is a suitable material. The moisture content of the material has no bearing upon such designation. In general, any mineral (inorganic) soil, blasted or broken rock and similar materials of natural or man made (i.e. recycled) origin, including mixtures thereof, are considered suitable materials. Determinations of whether a specific natural material is a suitable material shall be made by the Engineer on the above basis.

Recycled materials that the Department has evaluated and approved for general use shall be considered to be suitable material for embankment construction subject to the conditions for use as determined by the Department. The Regional Geotechnical Engineer and Geotechnical Engineering Bureau are available to provide guidance on the use of such materials. In general, the use of recycled materials must be also sanctioned by the Department of Environmental Conservation, usually in the form of a Beneficial Use Determination (BUD). Glass from recycling facilities shall be considered suitable material for embankment construction.

Reclaimed Asphalt Pavement (RAP), and Recycled Portland Cement Concrete Aggregate (RCA) shall be considered suitable materials for embankment construction, subject to the following conditions for use:

RAP - The Contractor shall provide and place RAP conforming to the requirements of Section 304.

RCA-The Contractor shall provide and place RCA conforming to the requirements of Section 304.

Pieces of broken up concrete pavement from on-site pavement removal or in-place recycling (i.e. rubblizing, crack and seat, break and seat, etc.) may be used in embankment construction. Refer to §203-3.09 and §203-3.10.

**203-1.09 Unsuitable Materials.** Any material containing vegetable or organic matter, such as muck, peat, organic silt, topsoil or sod, that is not satisfactory for use in embankment construction under §203-1.08 is designated as an unsuitable material. Certain man made deposits of industrial waste, toxic or contaminated materials, sludge, landfill or other material may also be determined to be unsuitable materials, based on an evaluation by the Department's Geotechnical Engineering Bureau and Environmental Analysis Bureau, and the Department of Environmental Conservation.

**203-1.10 Borrow.** Borrow is material required for earthwork construction in excess of the quantity of suitable material available from the required grading, cuts and excavations. Borrow may be necessary even though not shown on the plans.

**203-1.11 Embankment Construction Control Devices.** This work shall consist of furnishing, installing and maintaining devices such as settlement gages, settlement rods, piezometers and other equipment used specifically for controlling earthwork construction.

**203-1.12 Proof Rolling.** Proof rolling consists of applying test loads over the subgrade surface by means of a heavy pneumatic-tired roller of specified design, to locate and permit timely correction of deficiencies likely to adversely affect performance of the pavement structure.

**203-1.13 Graded Surfaces.** The Contractor shall form and trim all graded surfaces to the lines and grades shown on the plans or as modified by the Engineer.

**203-1.14 Select Granular Fill - Slope Protection.** This work shall consist of excavating for, furnishing, and installing granular fill slope protection in accordance with these specifications, the standard sheets, conforming to the lines and grades shown on the plans, or where directed by the Engineer.

**203-1.15 Applying Water.** Under this work, the Contractor shall furnish and apply water for dust control, for compaction purposes and for such other purposes (not provided for in other Sections) as called for on the plans, in the itemized proposal or as directed by the Engineer. Water shall not be applied in inclement weather or when the temperature is below 0°C.

**203-1.16 Modifying Cut Slopes and Other Means of Obtaining Borrow.** The Regional Director may approve the modification of cut slopes and other means of obtaining material, which is not part of the contract, so long as provisions are made to prevent unsafe conditions, damage, and nuisances to property, wildlife areas, and haul routes within and outside the contract limits. Such approval may be granted only after review of a written proposal by the Contractor showing the final deposition of the material, the haul route, hauling hours, and provisions necessary to comply with the above. Should unanticipated conditions arise resulting in any unsatisfactory situation, the Engineer shall immediately rescind the approval pending satisfactory correction.

The following procedure shall apply to areas within the R.O.W. limits which are not designated as available sources of borrow by a Special Note in the contract proposal where the Contractor requests and is granted permission to modify slopes to obtain material for use on State contract work only. The Contractor will be required to reimburse the State with a rebate for the material obtained in these areas. Permission will not be granted to excavate material beyond the design slopes if it is to be used on other than State contract work.

The rebate to be obtained from the Contractor for this material is comprised of 1) A royalty based on the actual value of the excavated material, and 2) A credit for the difference in the contractor's handling costs if these handling costs have been reduced. The royalty which is to be obtained for the excavated material shall be appropriate for the item for which it is to be utilized and shall be comparable to the current price being paid to purchase similar material in the area.

If the Contractor's handling costs associated with obtaining material from within the R.O.W. limits are greater than those for obtaining material from other acceptable sources, these additional handling costs must be borne by the Contractor. The royalty shall not be reduced to offset any increased handling costs incurred by the Contractor.

If the Contractor's handling costs associated with obtaining materials from within the R.O.W. limits are less than those for obtaining material from other acceptable sources, the differences shall be reimbursed to the State as a credit in addition to the royalty.

The difference in the Contractor's handling cost shall be determined by an analysis based on a comparison of haul lengths, hauling equipment, hauling operation, use of haul roads or public highways, preparation and restoration of the borrow areas, and any other variables involved.

Prior to modifying rock cut slopes, the Geotechnical Engineering Bureau must be consulted. If rock cut slopes are flattened sufficiently to eliminate the need for presplitting, an additional rebate will be necessary.

All special requirements to be fulfilled by the Contractor, at the Contractor's own expense, shall be clearly stated in the agreement. The foregoing requirement of receiving a rebate from the Contractor for material obtained by modification of slopes shall apply only to locations not designated in the Contract Documents.

**203-1.17 Cleaning Culverts, Closed Drainage Systems, Drainage Structures and Manholes.** This work shall consist of cleaning and keeping clean, existing culverts, closed drainage systems and drainage structures indicated in the contract documents or where directed by the Engineer, for the duration of the contract.

**203-2 MATERIALS**

**203-2.01 Tests and Control Methods.** Materials tests and control methods pertaining to the item requirements and work of this Section will be performed in conformance with the procedures contained in the appropriate Departmental publication in effect on the date of the advertisement for bids. These publications are available upon request to the Regional Director or the Director, Geotechnical Engineering Bureau.

**203-2.02 Select Materials and Subgrade Area Material Requirements.** The requirements for select materials and subgrade area materials are described below. All processing operations including washing, removal of oversize material, blending, or crushing shall be completed at the source of the material. The procedure for acceptance or rejection of these materials shall be as described in the appropriate Geotechnical Control Procedure (GCP) manual.

**A. Subgrade Area Material.** Subgrade area material shall consist of any suitable material having no particles greater than 150 mm in maximum dimension, unless Select Granular Subgrade with the well graded rock option is used. In that case, refer to 203-2.02 E. 1. A. If concrete is used, any exposed mesh or rebar shall not exceed 25 mm in length.

**B. Select Borrow and Select Fill**

**1. Gradation.** Material furnished for these items shall be suitable material having no particles greater than 1 m in maximum dimension. Of the portion passing the 100 mm square sieve, the material shall have the following gradation:

Sieve Size	Percent Passing by Weight	Sieve Size	Percent Passing by Weight
425 µm	0 to 70	75 µm	0 to 15

**2. Soundness.** The material shall be sound and durable. A material with a Magnesium Sulfate Soundness Loss exceeding 35 percent will be rejected.

**3. Composition.** RAP shall not be used.

**C. Select Granular Fill and Select Structural Fill.** Materials furnished under these items shall be suitable, well graded, and conform to the following requirements:

**1. Gradation.** Except when used as backfill material for aluminum pipe with Type IR corrugations (Spiral Rib Pipe), the material shall have the following gradation:

Sieve Size	Percent Passing by Weight
100 mm	100
425 µm	0 to 70
75 µm	0 to 15

When used as backfill for Corrugated Aluminum Pipe, Type 1R (Spiral Rib Pipe ) 100% of the material shall also pass the 50 mm sieve.

**2. Soundness.** The materials shall be substantially free of shale and soft, poor durability particles. A material with Magnesium Sulfate Soundness Loss exceeding 30% will be rejected.

**3. Composition.** RAP shall not be used.

When used as backfill for aluminum pipe, the material shall be free of Portland cement or Portland cement concrete.

**4. pH.** Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected.

**D. Select Granular Fill Slope Protection.** Material furnished for use under this item shall consist of rock, stone, slag, cobbles, or gravel, substantially free of shale or other soft, poor durability particles.

**1. Gradation**

a. Broken or blasted unweathered rock used for this item shall be well graded, having no particles greater than 600 mm in maximum dimension, and substantially free from particles greater than 300 mm in maximum dimension, containing little or no material passing the 2 mm mesh sieve.

b. All materials, other than broken or blasted unweathered rock, shall meet the following gradation requirements:

Material Size	Percent Passing by Weight
600 mm maximum dimension	100
150 mm maximum dimension	90 to 100
50 mm square sieve	0 to 30
6.3 mm sieve	0 to 10

**2. Soundness.** Where the State elects to test for this requirement, a material with a Magnesium Sulfate Soundness Loss exceeding 35 percent will be rejected.

**E. Select Granular Subgrade.**

**1. Gradation**

- a. Well graded rock may be used for this item. Particles shall not exceed 300mm in greatest dimension nor 2/3 of the loose lift thickness, whichever is less.
- b. All materials, other than well graded rock, furnished under this item shall have no particles greater than 150 mm in maximum dimension. Of the portion passing the 100 mm square sieve, the material shall have the following gradation:

Sieve Size	Percent Passing by Weight
6.3 mm	30 to 100
425 µm	0 to 50
75 µm	0 to 10

**2. Soundness.** A material with a Magnesium Sulfate Soundness Loss exceeding 35 percent will be rejected.

**3. Composition.** RAP shall not be used.

**F. Glass**

- 1. Gradation.** Glass shall be crushed to a maximum particle size of 10 mm.
- 2. Characteristics.** Glass may contain up to a maximum of 5 percent by volume of china, ceramics, plate glass products, paper, plastics or other deleterious materials. The material shall be subject to visual inspection by the Regional Geotechnical Engineer and may be rejected based on this inspection. In case of rejection, the inspection must be documented in writing to the Engineer-In-Charge indicating the basis of rejection.

**G. RAP**

- 1. Gradation.** RAP shall have a maximum top size of 50 mm at the time of placement.
- 2. Characteristics.** RAP shall meet the requirements stated in Section 304.

**H. RCA**

- 1. Gradation.** RCA shall meet the gradation requirements for the appropriate item of use.
- 2. Characteristics.** RCA shall meet the requirements stated in Section 304, and the applicable parts of Section 203 herein.

**I. Sand Backfill.** Materials furnished under these items shall be suitable and conform to the following requirements:

**1. Gradation.** The material shall have the following gradation:

Sieve Size	Percent Passing by Weight
12.5 mm	100
6.3 mm	90 to 100
75 µm	0 to 5

**2. Soundness.** The materials shall be substantially free of shale and soft, poor durability particles.

**3. pH.** Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected.”

**J.** Necessary fill material for cleaning, grading and shaping the existing roadside section shall conform to the requirements of Subsection 203-2.02A, Subgrade Area Material.

**203-2.03 Water.** Water used for dust control or compaction purposes may be obtained from any source. When used for watering seeded or sodded areas, or surfaces to be seeded or sodded, water shall meet the requirements of §712-01.

**203-2.04 Embankment Construction Control Devices.** The materials details for embankment control devices shall be as specified in the current publication issued by the Department covering construction, installation, maintenance and abandonment of these devices.

### **203-3 CONSTRUCTION DETAILS**

**203-3.01 General.** The Contractor shall remove all soil, rock, and other material, and utilize or dispose of these materials as required by the plans and specifications. All excavation and embankment work shall be executed to payment lines shown in the contract documents.

All graded earth surfaces outside the roadway limits shall be smoothed and trimmed in reasonably close conformity (plus or minus 150 mm) of true grade. After trimming, the area shall be left in a compact and satisfactory condition, free of large stones or other objectionable materials, as determined by the Engineer.

Earthwork construction operations requiring compaction shall not be performed from November 1 thru April 1 except with written permission of, and under such special conditions and restrictions as may be imposed by the Regional Director, after discussion with the Regional Geotechnical Engineer or the Director, Geotechnical Engineering Bureau. Under no conditions will the contractor be permitted to place material that is frozen, or place fill material on frozen ground.

**203-3.02 Archaeological Salvage.** Whenever, during the course of construction, historical or prehistoric objects or human remains are encountered, such objects shall not be destroyed or moved. Work shall be stopped and rescheduled to avoid disturbing such areas and the Engineer-in-Charge of the project shall be notified immediately.

The Engineer will, through proper channels, notify the Director of the Construction Division who will notify the DOT Environmental Analysis Bureau and the Regional Cultural Resources Coordinator who will arrange to have an immediate inspection of the site.

In the event that the objects are to be removed or salvaged, agreements between the Commissioner and the Contractor will be made to cover the cost of any extra work. Such work will be limited to that performed within the right-of-way, and at any location under direct control of the Contractor used as a source of approved borrow material.

**203-3.03 Scheduling of Work to Minimize Soil Erosion and Water Pollution.** The Contractor shall ensure effective and continuous soil erosion and sediment control throughout the construction period. The Contractor shall prepare and submit for approval, plans and schedules for all excavation, stripping, embankment, fill and grading operations. Such plans and schedules shall include but are not limited to temporary and permanent erosion control measures specified in Section 209, Soil Erosion and Sediment Control, Section 610, Turf and Wildflower Establishment and Section 612, Sodding.

**203-3.04 Drainage and Grading.** The Contractor shall provide and maintain slopes, crowns and ditches on all excavation and embankments to ensure satisfactory surface drainage at all times. Ditches and other drainage facilities necessary to remove ponded water shall be constructed as soon as practical to have the work area dry during the progression of work. All existing culverts and drainage systems shall be maintained in satisfactory operating condition throughout the course of the work. If it is necessary to interrupt existing surface drainage, sewers or under-drainage, then temporary drainage facilities shall be provided until the permanent drainage work is complete. Top-of-slope interceptor ditches, where shown

on the plans, shall be completed before adjacent excavation operations are begun. In earth cuts, the Contractor shall progress excavation operations in such a manner that the portion of the cut immediately adjacent to the design slope is at least 1.5 m lower than the general level of the cut at all times until the lower payment line is reached.

The construction of these temporary drainage facilities shall be considered as incidental to the construction of the project and no additional payment will be allowed.

Any portion of an embankment or subgrade which has, in the opinion of the Engineer, been damaged by the Contractor's equipment during the course of construction, shall be repaired and recompacted by the Contractor to the satisfaction of the Engineer, and no extra payment will be made therefore.

Where seepage causes instability of slopes, excavation and backfill or other corrective measures shall be performed as ordered by the Engineer and paid for under the appropriate item. Excavation for the installation of slope protection may be necessary at any time and location throughout the duration of the contract and may not necessarily coincide with the Contractor's performance of the general excavation work.

**203-3.05 Rock Excavation.** Presplitting is required where the design rock slope is one vertical on one horizontal or steeper and if the vertical height of the exposed rock slope exceeds 1.5 m. Ripping will not be allowed within 3 m of a slope that requires presplitting. Test sections will be required at the outset of presplit drilling and blasting operations for the evaluation of the presplit rock slopes by a Departmental Engineering Geologist. The Contractor will be required to completely expose the presplit rock face in the test section for evaluation prior to any further presplit drilling.

All rock slopes shall be thoroughly scaled and cleaned to the satisfaction of the Engineer. For rock excavations involving multiple lifts, scaling of upper lifts shall be completed prior to drilling and fragmenting of lower lifts. Scaled rock slopes shall be stable and free from possible hazards of falling rocks or rock slides that endanger public safety. If, after scaling, such conditions still exist, a determination of the cause will be made by a Departmental Engineering Geologist and if it is determined that the conditions are the result of poor quality work or improper methods employed by the Contractor, the Contractor shall provide approved remedial treatment, at no expense to the State. Such treatment may include, but is not necessarily limited to, laying back the slope, rock bolting, or shotcreting. In no case shall the subgrade be trimmed prior to the completion of the scaling operation at any location.

**A. Presplitting.** Prior to drilling presplitting holes, the overburden shall be completely removed to expose the rock surface along the presplitting line. The methods of collaring the holes to achieve required inclination and alignment shall be approved by the Engineer.

The presplitting holes shall be a maximum of 100 mm in diameter, spaced not more than 1 m center to center along the slope, and drilled at the designed slope inclination for a maximum slope distance of 20 m. When excavation operations are conducted in multiple lifts, the presplitting holes for successive lifts may be offset a distance of not more than 1 m for a design slope of one vertical on one horizontal and not more than 0.3 m for slopes of steeper design; however, a presplitting hole shall not be started inside the payment line. If presplitting is conducted in lifts, each lift shall be of approximately equal depth. All presplitting holes shall be checked and cleared of obstructions immediately prior to loading any holes in a round. All presplitting holes shall be loaded with a continuous column charge manufactured especially for presplitting which contains not more than 0.5 kg of explosive per meter. The top of the charge shall be located not more than 1 m below the top of rock. A bottom charge of not more than 1.5 kg of packaged explosive may be used; however, no portion of any bottom charge shall be placed against a proposed finished slope. Each presplitting hole shall be filled with No. 1A crushed stone stemming meeting the gradation requirements of §703-02, Coarse Aggregates. The presplitting charges shall be fired with detonating cord extending the full depth of each hole and attached to a trunk line at the surface. Detonation of the trunk line shall be with blasting cap(s) and shall precede the detonation of fragmentation charges within the section by a minimum of 25 milliseconds. Presplitting shall extend for a minimum distance equal to the burden plus 1m beyond the limits of fragmentation blasting within the section.

**B. Fragmentation Blasting.** Fragmentation holes, or portions thereof, shall not be drilled closer than 1.2 m to the proposed finished slope. Where presplitting is required, fragmentation holes adjacent to the presplitting holes shall be drilled parallel to the presplitting holes for the full depth of

the production lift at a spacing not exceeding the spacing of the production pattern. Only packaged explosives shall be used 3 m or less from a design slope which requires presplitting regardless of the construction sequence.

Fragmentation charges shall be detonated by properly sequenced millisecond delay blasting caps.

**C. Explosive Loading Limits.** In the absence of more stringent requirements, the maximum quantity of explosives allowed per delay period shall be based on a maximum particle velocity of 50 mm/s at the nearest structure to be protected. In the absence of seismic monitoring equipment, the following explosive loading limits shall apply:

**DISTANCE EQUAL TO OR LESS THAN 65 m FROM THE NEAREST STRUCTURE**

1. When the distance from the proposed blasting area to the nearest structure to be protected is 2 m or less, no blasting shall be allowed.
2. When the distance between the blasting area and the nearest structure to be protected is greater than 2 m and equal to or less than 4.5 m, a maximum of 0.1 kg of explosives per delay period (minimum of twenty-five (25) milliseconds) blasting cap shall be allowed.
3. When the distance between the blasting area and the nearest structure to be protected is greater than 4.5 m and equal to or less than 65 m, a Scaled Distance of 9 m shall be utilized to determine the maximum amount of explosive allowed per delay period (minimum of twenty-five (25) milliseconds) blasting cap. The Scaled Distance Formula is as described below:

$$SD = \frac{D}{1.5 \sqrt{E_{max}}} \quad \text{where : } SD = \text{Scaled Distance}$$

D = Distance from blasting area to nearest structure to be protected in meters

AND

$$E_{max} = \frac{D^2}{(SD)^2} \quad (.45) \quad E_{max} = \text{Maximum kilograms of explosive per delay period (minimum of twenty-five milliseconds) blasting cap}$$

**DISTANCE GREATER THAN 65 m FROM THE NEAREST STRUCTURE**

1. When the blaster elects to utilize more than 25 kg of explosive per delay period (minimum of twenty-five (25) milliseconds) blasting cap, a seismograph shall be employed to monitor the blasting vibrations generated. The initial loading shall be computed using a Scaled Distance of 9 m. The resulting particle velocity measured by the seismograph shall be evaluated by a Department Engineering Geologist. The Geologist's evaluation shall be the basis for adjusting the Scaled Distance.

No separate payment shall be made for this work. The cost shall be included in the appropriate excavation item. The above requirements shall in no way relieve the Contractor of liability for any damage incurred as a result of the blasting operations.

**203-3.06 Suitable Materials.** Moisture content has no bearing on the suitability of material to be used for embankment construction, however, the moisture content of a material may be such that its use will require manipulation. It is the Contractor's responsibility to determine the economics of using, or disposing and replacing, such materials. Material determined by the Contractor to be un-economical for use may be disposed of as specified under §203-3.08 and replaced with other material at no additional cost to the State.

When a contract includes the item "Unclassified Excavation and Disposal", all excavated suitable materials, including the excavation performed under "Structure Excavation" and "Trench and Culvert Excavation," shall become the Contractor's property for disposal or use under another item of these specifications.

**203-3.07 Unsuitable Materials.** All excavated unsuitable materials shall be the Contractor's property for disposal as surplus materials under the provisions of §203-3.08.

**203-3.08 Disposal of Surplus Excavated Materials.** Only unsuitable materials, or that portion of suitable material excavated in excess of the quantity required to construct all embankments on the project, shall be considered as surplus. Where disposal of surplus materials cannot be accommodated within the right of way, the excess shall become the Contractor's property for disposal. Surplus material disposed of within the right-of-way shall be placed in accordance with §107-10 *Managing Surplus Material And Waste*.

**203-3.09 Embankment Foundation.** After completion of the work required under Section 201, Clearing and Grubbing, and Section 202, Removal of Structures and Obstructions, the embankment foundation shall be prepared. Sod and topsoil shall be removed where the final pavement grade is 2 m or less above the existing ground surface and in other areas designated in the plans or by the Engineer. Prior to embankment construction and subbase course placement, the surface on which the embankment and/or subbase is to be placed shall be thoroughly compacted to the satisfaction of the Engineer. Unsuitable materials other than sod and topsoil shall be removed to the depths shown in the plans or as directed by the Engineer. Underwater areas shall be filled with "Select Borrow or Select Fill," §203-2.02B, to 0.6 m above the water surface at the time of placement, and paid for under its appropriate item.

Where embankments are to be constructed over ground that will not adequately support embankment construction equipment, an initial layer of fill may be allowed to form a working platform. The need, manner of construction, and thickness of such a layer shall be subject to approval of the Engineer, and the layer will be permitted only where the lack of support is, as determined by the Engineer, not due to deficient ditching, grading or drainage practices or where the embankment could be constructed in the approved manner by the use of different equipment or procedures. Thicknesses of up to 1 m may be permitted for such a layer. Concrete slabs may be used at the bottom of such a layer, provided they are placed horizontally.

In locations where embankments are to be constructed on hillsides or against existing embankments with slopes steeper than 1 (vertical) on 3 (horizontal), the slopes shall be benched. Required benches shall be constructed as shown on the Standard Sheet, "Earthwork Transition and Benching Details."

Where old pavement is encountered within 0.6 m of the top of the subbase course, it shall be broken up or scarified.

**203-3.10 Embankments.** The embankment shall be constructed of suitable material as defined by §203-1.08, Suitable Material. Embankment material shall not be placed on frozen earth, nor shall frozen soils be placed in any embankments. Embankment material shall be placed and spread in lifts (layers) of uniform thickness, then uniformly compacted as specified under applicable portions of §203-3.12, Compaction. During embankment construction operations, earth moving equipment shall be routed so as to prevent damage to any compacted lift. Damage to any compacted lift at any time during the course of construction, such as rutting under the loads imposed by earth moving equipment, shall be fully repaired by the Contractor at his/her own expense prior to placement of any overlying materials. At the close of each day's work, the working surface shall be crowned, shaped and rolled with smooth steel wheel or pneumatic tired rollers, for positive drainage.

Particles with a dimension in excess of two-thirds of the loose lift thickness are designated as oversized particles. Oversized particles shall be removed prior to compaction of the lift and may be placed in the Embankment Side Slope Area, Subsection 203-1.06.

Pieces of concrete may be used provided that the voids between the pieces are completely filled, and the greatest dimension of any piece does not exceed 2/3 the loose lift thickness. Exposed mesh or rebar shall not exceed 25 mm in length.

Embankments constructed using rock products or pieces of concrete shall be spread by bladed equipment on each lift to minimize the formation of large voids as the work progresses. The top lift of a rock or concrete fill shall be chinked.

When permitted by a note in the plans or proposal, stumps, logs, and other materials may be placed in the Embankment Side Slope Area, §203-1.06, provided that: 1) such matter is deposited and compacted

concurrent with the adjacent embankment, and; 2) any stumps or woody material are covered by not less than 0.6 m of soil beneath the exposed side slope surface.

Glass shall not be placed in contact with synthetic liners, geogrids, geotextiles or other geosynthetics. Glass incorporated into embankments shall be thoroughly mixed with other suitable material so that Glass constitutes no more than 30 percent by volume anywhere in the embankment as visually determined by the Engineer-In-Charge.

**203-3.11 Subgrade Area.** Where a subgrade area is defined in an embankment by §203-1.05, Subgrade Area, the material placed shall conform to §203-2.02A, Subgrade Area Material, placed and compacted in conformance with §203-3.10 and §203-3.12. Where longitudinal and transverse changes from cut to fill are encountered in the work, a subgrade transition section shall be provided in conformance with Standard Sheet "Earthwork Transition and Benching Details." Where a subgrade area becomes defined by §203-1.05 in a cut section, the materials placed and other details shall be as specified under §203-3.14C, unless otherwise required by the contract documents. Prior to subbase course placement, the surface on which the subbase is to be placed shall be thoroughly compacted to the satisfaction of the Engineer.

### 203-3.12 Compaction

**A. General Requirements.** It shall be the Contractor's responsibility to properly place and compact all materials in the road section and other locations specified in the contract documents, and to correct any deficiencies resulting from insufficient or improper compaction of such materials throughout the contract period. The Contractor shall determine the type, size and weight of compactor best suited to the work at hand, select and control the lift (layer) thickness, exert control over the moisture content of the material, and other details necessary to obtain satisfactory results. During the progression of the work, the Department will inspect the Contractor's operations and will permit the work to continue where:

1. Lift thickness is controlled and does not exceed the maximum allowed according to the equipment classifications in subparagraph B of this subsection, and the equipment meets all specified class criteria. Thinner lifts and lighter equipment than the maximum allowed may be necessary for satisfactory results on some materials.
2. The compactive effort (number of passes and travel speed) is uniformly applied and not less than that specified for the given equipment class and lift thickness. Higher efforts than the minimum allowed may be necessary for satisfactory results on some materials.
3. The Engineer concludes from a visual observation that adequate compaction has been attained, with the exception of backfill at structures, culverts, pipes, conduits, and direct burial cables. However, the State reserves the right to perform density tests at any time. When tests are performed, the results shall indicate that not less than 90 percent of Standard Proctor Maximum Density is attained in any portion of an embankment, or 95 percent in a subgrade area, or as specified for other items with a percent maximum density requirement.
4. Significant rutting under the action of the compactor is not observed on the final passes on a lift.

Whenever the Contractor's operations do not conform to the above criteria, or requirements contained in other subparagraphs of this subsection, the Engineer will prohibit placement of an overlying lift until the Contractor takes effective corrective action.

When the Engineer determines that density tests are necessary, the Contractor shall provide any assistance requested to facilitate such tests. Such assistance shall include but will not be limited to excavation and backfill of test pits and holes. This work shall be considered to be incidental construction.

Damage to any compacted lift at any time during the course of construction such as rutting under the loads imposed by earth moving equipment, shall be fully repaired by the Contractor at his/her own expense prior to placement of any overlying materials.

**B. Compaction Equipment.** The selection of compaction equipment is the Contractor's responsibility, but shall be subject to meeting the requirements of this subparagraph and approval by

the Engineer with respect to its provisions. All compaction equipment shall be marked by a permanently attached manufacturer's identification plate designating the name of the manufacturer, model number and serial number of the machine as minimum identification. This plate shall be installed in a readily visible location. Compaction equipment lacking such an original manufacturer's identification plate, or with altered or illegible plates, will not be recognized as acceptable compaction equipment. Any equipment not principally manufactured for compaction purposes and equipment which is not in proper working order in all respects shall not be approved or used. The Engineer will also withhold approval of any compactor for which the Contractor cannot furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment and necessary to determine its classification.

The term, "pass," for any type of compactor, shall denote one direct vertical application of compactor effort over all elemental areas of a lift surface. Terms in common parlance, such as "coverage," "trips," etc., have no significance, equivalence, or application under these specifications.

PNEUMATIC COMPACTOR CLASS	TIRE REQUIREMENTS			RANGE OF BALLASTED WHEEL LOADS (KILONEWTONS PER WHEEL)
	TIRE SIZE	NO. PLYS	INFL. PRESS. (kPa)	
A	7.50 x 15	4	240	9 - 14
B	7.50 x 15	6	415*	9 - 18
C	7.50 x 15	{10	620*	9 - 18
D	7.50 x 15	14	900*	9 - 18
E	9.00 x 20	10	520*	18 - 27
		{12	620*	
E	11.00 x 20	12	620*	27 - 36
		{18 }		
F	13.00 x 24	18	690*	36 - 45

\* Inflation pressure for not less than the last two passes on each lift. May be reduced during earlier passes and gradually increased to this level.

**1. Pneumatic-Tired Compactors.** This type of compactor shall be classified for use according to the requirements of Figure 203-1. For the lift thickness selected by the Contractor, the minimum class and wheel load which will be allowed on that lift thickness, shall be as shown in Figure 203-2.

The minimum effort for all pneumatic compactors shall be 6 passes, at speeds up to 3.6 m/s on no more than the first 2 passes, and all subsequent passes at speeds of 1.8 m/s or less.

**2. Smooth Drum Vibratory Compactors.** This type of compactor is defined as a machine which primarily develops its compactive effort from the vibrations created and is classified for use according to the developed compactive force rating (CFR) per linear meter of drum width.

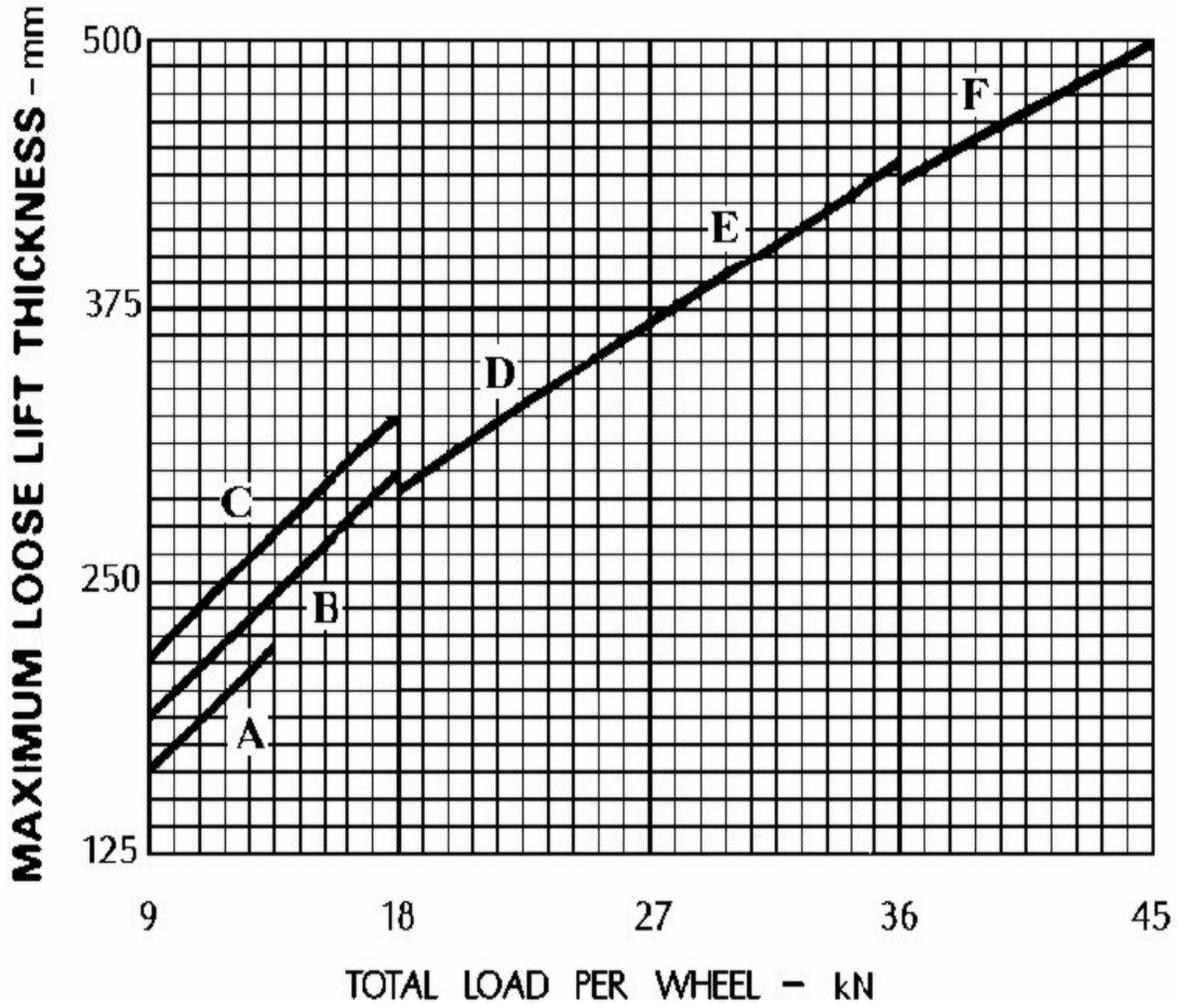
The CFR is defined as follows:

$$CFR = \frac{\text{Unsprung Drum Weight (kN)} + \text{Dynamic Force (kN)}}{\text{Drum Width (m)}}$$

The unsprung drum weight is the static weight of the drum and appurtenances without any reaction transmitted to the drum from the main chassis of the compactor. The dynamic force produced is dependent on the frequency of vibration, and therefore, CFR ratings shall be determined for the actual operating frequency of the compactor. Approval for vibratory compactors shall be confined, however, to equipment operating at not less than 18 Hz, nor more than 25 Hz, and those where the actual dynamic force at the actual operating frequency is at least 2.5 times the unsprung drum weight.

FIGURE 203-2 PNEUMATIC-TIRED COMPACTORS

FOR LETTER CLASS DATA SEE FIG. 203-1



Conversion of manufacturer's published ratings, at a given frequency, shall be made with the following equation:

$$F_2 = \frac{F_1(V_2)^2}{(V_1)^2}$$

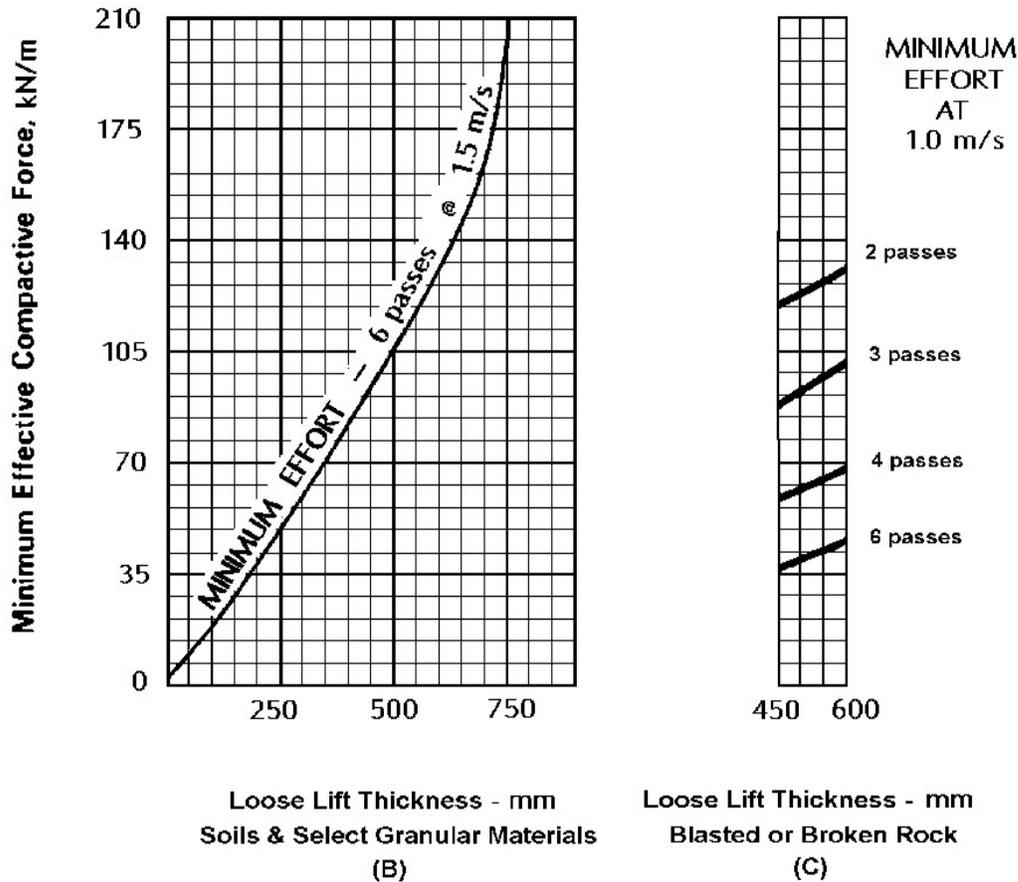
where:  $F_1$  = Dynamic Force at Rated Frequency  
 $F_2$  = Dynamic Force at Operating Frequency  
 $V_1$  = Rated Frequency  
 $V_2$  = Operating Frequency

For the lift thickness selected by the Contractor, the minimum CFR rating and minimum effort on such a lift, shall be as shown in Figures 203-3B&C, respectively. Non-Centrifugal (Vertical force only) types of vibratory compactors shall be approved as above, less 30 kN/m before using Figures 203-3 B&C as a minimum number of passes at a single specified speed. An equivalent effort, relating varying numbers of passes to other speeds is given by the equation:

$$\text{Speed X} = \frac{(\text{Specified Speed}) (\text{Min. Passes at Speed X})}{(\text{Specified Min. Passes})}$$

The Contractor may choose to alter the specified minimum pass requirement, provided that speed is adjusted to the value given by this equation and does not exceed 1.8 m/s.

**FIGURE 203-3 VIBRATORY COMPACTORS**



Where vibratory compactors are used on a project, the Contractor shall furnish for the exclusive use of the Engineer, one vibrating reed tachometer per project, plus one additional tachometer for each group of two vibratory compactors in excess of two per project. Tachometers shall have a frequency range adequate to cover operating frequencies of all vibratory compactors used on the project and shall have scale divisions of 1 Hz or less. Tachometers may be placed on the ground surface near the compactor when making readings, or with suitable damping materials interposed, placed directly on the compactor drum frame.

The dispensations permitted under this specification for vibratory compactors are contingent upon proper operation of the equipment at all times during compaction operations. In any instance where the Engineer encounters any problems with operators rolling without vibration, for any reason, and immediate and effective corrective action is not taken by the Contractor, the Engineer will halt the work until the problem is resolved. If continuing problems of this nature occur, the Engineer may suspend all provisions of this subparagraph and consider the vibratory compactors as smooth steel wheel rollers classified according to their gross weight.

**3. Sheepfoot Rollers.** This type of compactor shall be defined as a machine which is primarily designed to compact a lift from the bottom to the top.

The maximum loose layer thickness of the material to be compacted shall be equal to the length of the feet plus fifteen (15) percent. The end area size and configuration of the feet shall be selected by the Contractor to suit the characteristics of soil being compacted.

Where sheepfoot rollers are used, with or without vibration, the number of passes required for job control shall be determined by a jobsite test in which the feet penetrate into the loose lifts

and, with further passes, eventually and substantially “walk out” of the layer. This job control shall then be established for that machine, lift thickness and material, provided that adequate moisture control is continuously maintained per §203-3.12C. Sheepsfoot rollers shall be operated at speeds not exceeding 2 m/s, when towed and 5 m/s when self-propelled.

**4. Smooth Steel Wheel Rollers.** Smooth steel wheel rollers shall be considered as primary compactors on layers whose maximum thickness, after compaction, is 200 mm. When so used, the roller shall have a nominal gross weight of not less than nine metric tons, exert a minimum force of not less than 50 kN/m of width on the compression roll faces, and a minimum of 8 passes shall be applied over each lift with the roller operating at a speed not exceeding 2 m/s.

When the Contractor employs smooth steel wheel rollers exclusively for surface compaction, leveling or finishing operations on lifts previously compacted by other types of primary compactors, the above restrictions shall not apply.

This section applies to non-vibratory rollers or vibratory rollers operated in the static mode only.

**5. Other Type of Compactors.** Compactor types other than those classified above, may be employed by the Contractor, subject to approval by the Engineer of the proposed minimum applied effort (minimum number of passes and travel speed) and maximum lift thickness. Such approval by the Engineer will be based upon the results of appropriate on-site field tests.

**6. Compaction Equipment for Confined Areas.** In areas inaccessible to conventional compactors, or where maneuvering space is limited, impactor rammers, plate or small drum vibrators, or pneumatic buttonhead compaction equipment may be used with layer thickness not exceeding 150 mm before compaction. However, materials placed for subbase course construction shall have a maximum compacted thickness of 150 mm. Hand tampers shall not be permitted. The Engineer may approve or reject any of the above described mechanical devices based upon the results of appropriate on-site field tests.

**C. Moisture Control.** All fill or backfill material to be compacted, shall be at a moisture content for adequate compaction of that material using the compactor selected by the Contractor to perform the work. The Contractor shall be responsible for determining the appropriate moisture content, and for controlling it within the proper limits as the work is progressed. When water must be added to a material, it may be added on the lift or in the excavation or borrow pit. Water added on the lift, however, shall be applied by use of an approved pressure distributor. Distributors must be approved and documented by the Engineer. Documentation by the Engineer shall be adequate evidence of approval. Water added shall be thoroughly incorporated into the soil, and manipulation shall be provided whenever necessary to attain uniformity of moisture distribution in the soil. When the moisture content of a lift about to be compacted exceeds the required amount, compaction shall be deferred until the layer has dried back to the required amount. Natural drying may be accelerated by blending in a dry material or manipulation alone, to increase the rate of evaporation. Increased loose lift thickness caused by blending in a dry material, however, may necessitate a change in compaction equipment to meet the minimum provisions of subparagraph B of this subsection.

**203-3.13 Proof Rolling in Embankment Sections.** Immediately prior to final trimming of the subgrade surface and placement of subbase materials in embankment sections, all areas of the subgrade surface within roadway limits shall be proof rolled according to the requirements of this subsection. This work, and any delays due to this work, shall be considered incidental to the embankment item.

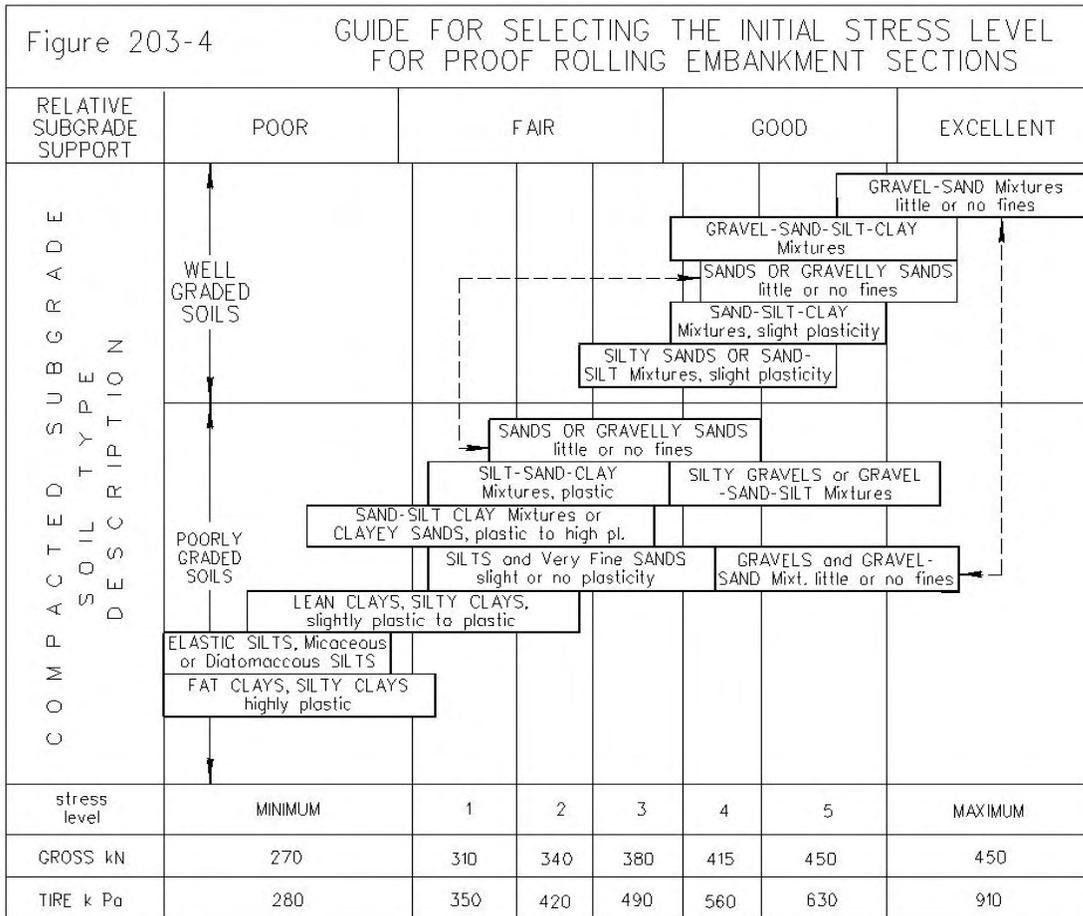
**A. (Vacant).**

**B. Equipment.** The proof roller shall consist of a chariot type rigid steel frame with a box body suitable for ballast loading up to forty-five metric tons gross weight, and mounted on four (4) pneumatic tired wheels acting in a single line across the width of the roller on its transverse load center line. The wheels shall be equipped with 18.00 x 24 or 18.00 x 25, 24 ply tires, and shall be

suspended on articulated axles such that all wheels carry approximately equal loads when operating over uneven surfaces.

**C. Determination of Roller Stress.** Initially, the gross ballasted weight and tire inflation pressure of the proof roller shall be adjusted to the highest stress level shown in Figure 203-4 based on:

1. The Engineer's general description of the subgrade soils.



2. The Engineer's estimation of the relative subgrade support within the subgrade soil description range. The initial roller stress for embankments constructed of rock shall be the maximum level listed in Figure 203-4 (Gross Metric Tons 45, Tire kPa 910).

The roller shall be operated briefly to establish the acceptability of the initial stress level. Proof rolling of the embankment shall be performed at the next lower stress level whenever operation of the roller at a higher stress level is accompanied by consistent lateral displacement of soil out of the wheel paths.

**D. Procedure.** After an acceptable stress level is established, two complete passes of the roller shall be applied over all elements of the area to be proof rolled. Any deficiencies disclosed during the proof rolling operation shall be corrected. Subsidence depressions shall be filled with material similar to the subgrade soil and then compacted in a normal manner. After compaction, these areas shall be proof rolled again. Corrective work shall be judged complete and accepted by the Engineer when all elements of the subgrade surface over a given embankment show a satisfactory uniform response to the proof roller.

**E. Exceptions.** Proof rolling of the subgrade surface in embankment sections will not be required in any area where:

1. Due to restrictions in available access and/or maneuvering space, use of the proof roller may damage adjacent work;
2. The proof roller will approach a culvert, pipe or other conduit closer than 1.5 m in any direction.

**203-3.14 Proof Rolling in Cut Sections.** Immediately prior to final trimming of the subgrade surface and placement of subbase materials in cut sections, all areas of the subgrade surface within roadway limits shall be proof rolled according to the requirements of this subsection. This work, and any delays due to this work, shall be considered incidental to the excavation item.

**A. Purpose.** In cut sections, the purpose of proof rolling is to determine the location and extent of areas below the subgrade surface that require corrective undercutting and are not so specified in the contract plans.

**B. Equipment.** The proof roller used in embankment sections, as specified in §203-3.13B, shall be employed for proof rolling in cut sections except that the roller shall be loaded to achieve a single stress level in operation, using a gross ballasted weight of twenty-seven metric tons and all tires inflated to 275 kPa.

**C. Procedure.** Two complete passes shall be applied over all elements of the area to be proof rolled. Where any portion of the cut subgrade surface other than that which has been damaged by the Contractor's operations fails to provide a satisfactory support for the proof rolling operation, the Engineer may order corrective undercut and backfill work performed. Backfill of undercuts shown on the plans or ordered by the Engineer shall meet the requirements of Select Granular Subgrade, §203-2.202E, placed and compacted as approved by the Engineer. Where natural soil below this course will not support the weight of the construction equipment, and when ordered by the Engineer, the course shall be placed in one lift. No additional proof rolling shall follow corrective work.

**D. Exceptions.** Proof rolling of the subgrade surface in cut sections will not be required in any area where the subgrade surface is in a rock cut, or where undercut and backfill has been previously performed. The Engineer may order undercutting and backfill without proof rolling of any cut where the need for corrective work, as determined by the Engineer, is obvious without actual proof rolling. The Engineer may also delete proof rolling in any cut section where, based upon a written evaluation by a Departmental Geotechnical Engineer, proof rolling would be detrimental to the work.

**203-3.15 Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables.** The type of material to be used in bedding, filling and backfill at structures, culverts, pipes, conduit and direct burial cable and payment lines therefore shall be in conformance with the details shown on the appropriate Standard Sheet or as noted on the plans or as ordered by the Engineer. Do not use RAP. Do not use slabs or pieces of either concrete or asphalt .

Fill or backfill material at structures, culverts and pipes shall be deposited in horizontal layers not exceeding 150 mm in thickness prior to compaction. Compaction of each layer shall be as specified under §203-3.12, Compaction. A minimum of 95 percent of Standard Proctor Maximum Density will be required. When placing fill or backfill around culverts and pipes, layers shall be deposited to progressively bury the pipe or culvert to equal depths on both sides. When filling behind abutments and similar structures, all material shall be placed and compacted in front of the walls prior to placing fill behind the walls to a higher elevation. The limits to which this subsection will apply shall be in accordance with the Standard Sheets or as modified on the plans.

Fill or backfill for conduit or cable placed in a trench shall be carefully placed in a horizontal layer to a depth of 150 mm over the top of the conduit or cable. This layer of material shall not be compacted, however, the remaining portion of the trench shall be backfilled in accordance with the preceding paragraph. Where cables or conduits are placed and backfilled by a machine in one operation, the above requirements for backfilling do not apply.

Where sheeting has been used for the excavation, and incremental removal of sheeting is not specified in the plans or proposal, sheeting shall be pulled when the trench has been backfilled to the maximum unsupported trench depth allowed by 29 CFR 1926.

**203-3.16 Borrow.** The management of a borrow source and the acceptability of all borrow material shall be subject to the approval of the Engineer at all times. The Contractor shall notify the Engineer at least ten (10) work days in advance of opening any borrow area, and request approval of the source under the pay item involved. Test pits required by the Engineer to evaluate the acceptability and limits of the source, shall be provided by the Contractor at the Contractor's own expense. Concurrent removal of material for more than one pay item from a single source or pit shall be prohibited except with the written permission of, and under such conditions and restrictions as may be imposed by the Engineer. All borrow pits shall be stripped of sod, topsoil and vegetable matter well in advance of any working face. The minimum distance by which stripping shall lead excavation for a given source shall be established by the Engineer to suit local conditions. Where a borrow source is not under direct control of the Contractor or where special conditions exist, the Engineer may waive any of the above requirements and establish alternative provisions for the control and acceptability of borrow.

Ordinary borrow will be accepted for use where the material qualifies under the definition of Suitable Material, §203-1.08. The borrow of select granular materials enumerated in §203-2.02 shall be accepted subject to meeting the additional provisions contained, therein. All borrow, whether ordinary borrow or select borrow placed within the limits of Embankment or the Subgrade Area shall be placed in conformance with §203-3.10 or §203-3.11 respectively, as appropriate, or where used for fill or backfill at structures, culverts and pipes, in conformance with §203-3.15.

**203-3.17 Select Granular Fill, Slope Protection.** The Contractor shall perform the excavation in accordance with the requirements for "Unclassified Excavation and Disposal" as described elsewhere in these specifications. The Contractor shall then spread material conforming to the requirements given in §203-2.02D, in one layer to its full thickness by a method approved by the Engineer. The work shall be performed where shown on the plans or where directed by the Engineer in accordance with the standard sheets, and details shown on the plans. Compaction of the slope protection is not required. Slope Protection shall be either of two types, as described below:

**A. Select Granular Fill, Slope Protection - Type A.** Under this type, the Contractor shall furnish and install the slope protection where shown on the plans in accordance with the details shown on the Standard Sheets.

**B. Select Granular Fill, Slope Protection - Type B.** Under this type, the Contractor shall furnish and install the slope protection where directed by the Engineer in accordance with the details shown on the Standard Sheets.

### **203-3.18 Embankment Construction Control Devices**

**A. Settlement Gages and Settlement Rods.** Settlement gages and rods shall be constructed, installed, and maintained where shown on the plans and in accordance with the details contained in the current publication issued by the Department covering construction, installation, maintenance, and abandonment of these devices.

Where settlement gages are called for, it will be the Contractor's option to install pipe gages or manometer gages, unless a definite type is specified on the plans or in the proposal. Settlement gages and settlement rods will be accepted for conformance with the specification requirements on the basis of an inspection of the installation by the Departmental Geotechnical Engineer.

**B. Piezometers.** Piezometers shall be constructed, installed, and maintained at the locations shown on the plans and in accordance with the detailed drawings and specifications included in the proposal.

**203-3.19 Cleaning Culverts and Closed Drainage Systems.** Culverts, closed drainage systems, drainage structures and manholes shall be thoroughly cleaned and maintained clean as determined by the

Engineer for the duration of the contract. Materials removed shall be disposed of in accordance with §203-3.08 "Disposal of Surplus Excavated Materials."

**203-3.20 Subgrade Surface Tolerance.** After compaction, the subgrade surface shall not be above design elevation at any location.

**203-3.21 Clean, Grade and Shape Existing Roadside Section.** The Contractor shall remove earth, turf, brush and debris, or provide necessary fill material to restore adequate roadside drainage. Ditches shall be shaped as shown on the plans. Material removed shall be disposed of in conformance with the provisions of Subsection 203-3.08, Disposal of Surplus Excavated Materials.

The Contractor shall protect all fences, markers, culverts, underground structures, utilities and other appurtenances adjacent to the work area. Any damaged facilities and/or disturbed areas shall be replaced in kind at no additional cost to the state.

## 203-4 METHOD OF MEASUREMENT

**203-4.01 General.** Quantities for all items of work with payment units in cubic meters encompassed by this Section, shall be computed from payment lines shown on the plans or standard sheets except where revised payment lines are established by the Engineer prior to performing the work. Work performed beyond any designated payment line, including any offset required for the construction of presplit rock slopes in lifts, shall not be included in the computation of quantities for the item involved.

For any item paid for in its final position, no additional quantity shall be measured for payment to make up losses due to foundation settlement, compaction, erosion or any other cause.

Cross sectioning, for the exclusive purpose of determining quantities for payment, shall be employed only where payment lines are not shown on the Plans or Standard Sheets, and cannot be reasonably established by the Engineer.

Quantities for benching shall be computed for payment from the details and instructions shown on the Standard Sheet, "Earthwork Transition and Benching Details."

The excavation of unsuitable materials designated as topsoil under Section 613, shall be included in the quantity measured for the appropriate unclassified excavation item, without distinction. Separate payment for placing topsoil, however, is made under Section 613.

### 203-4.02 (Vacant).

**203-4.03 Unclassified Excavation and Disposal.** Quantities shall be in cubic meters, computed in the original position for all excavation within right-of-way limits. No deduction shall be made for any pipes, culverts, structures, or other obstructions, unless these are measured for payment under another contract item. Excavation for borrow of suitable materials for embankment construction, shall not be included in the computation for this work.

**203-4.04 Embankment in Place.** Quantities shall be in cubic meters, computed in the final compacted position. Any additional quantity of material required to compensate for embankment settlement shall not be included in the measurement of this item. The quantities of embankment shall exclude the total volume of pipes, culverts, other roadway items, and granular backfill within the payment lines for such granular backfill.

**203-4.05 Ordinary Borrow.** Where the item, "Embankment in Place," is designated for the project by the proposal, all borrow of ordinary suitable materials shall be incidental to the work of that item.

**203-4.06 Select Borrow.** Quantities shall be in cubic meters, computed in the original position.

**203-4.07 Select Fill and Select Granular Subgrade.** Quantities for each of these items shall be in cubic meters, computed in the final compacted position.

**203-4.08 Select Granular Fill, Select Structure Fill, and Sand Backfill.** Quantities for this work shall be computed in cubic meters in the final compacted position. A deduction shall be made for

pipes (based on nominal diameters) and other payment items when the combined cross-sectional area exceeds 0.1 m<sup>2</sup> unless otherwise shown on plans. No deduction will be made for the cross-sectional area of an existing facility.

**203-4.09 Select Granular Fill, Slope Protection.** Quantities shall be in cubic meters, computed in the final position.

**203-4.10 (Vacant).**

**203-4.11 Embankment Construction Control Devices.** Quantities shall be per each device satisfactorily installed and maintained under their respective items “Surface Settlement Gages,” “Subsurface Settlement Gages,” “Settlement Rods,” or “Piezometers.”

**203-4.12 Cleaning Culverts and Closed Drainage Systems.** This work will be measured by the number of meters of culvert and or pipe of the size range indicated in the Contract Documents.

Measurement will be the total length end to end along the invert of culvert or closed drainage system cleaned. Multiple barrel culverts will be measured along each individual barrel. The length of closed drainage systems will be determined by measuring from the inside wall surface to the inside wall surface of the adjacent manhole or other drainage structure. The spans of culverts will be determined as the greatest internal horizontal width of the culvert measured perpendicular to the axis of the structure.

**203-4.13 Cleaning Drainage Structures and Manholes.** This work will be measured as the number of drainage structures or manholes cleaned and maintained within the inside walls of the structure, excluding existing structures being altered under Section 604.

**203-4.14 Applying Water.** The unit of measurement shall be one operating pressure distributor per calendar day, denoted hereafter as one p.d.d. Where the Contractor works in more than one separate and distinct shift per calendar day, each shift shall be considered as one p.d.d. A single shift plus overtime work, however, shall be considered as one p.d.d. The quantity thus determined shall be applied directly as the quantity to be paid for where the distributors used have a capacity of 11 000 L or less.

Provided that the Engineer determines that the total operating distributor capacity (number and sizes of all distributors) employed is reasonably commensurate with the needs for water application, additional payment will be allowed for distributors exceeding 11 000 L in capacity as follows:

Where the distributor capacity exceeds 11 000 L but is less than 19 000 L the p.d.d.'s shall be multiplied by 1.5 and where the capacity is 19 000 L or more, multiplied by 2.0 to determine the quantity for payment.

**203-4.15 Clean, Grade and Shape Existing Roadside Section.** This work will be measured as the number of meters along the edge of the adjacent roadway.

## 203-5 BASIS OF PAYMENT

**203-5.01 General-All Items.** The unit price bid for all pay items of work encompassed by this Section, shall include the costs of furnishing all equipment, labor and materials as necessary to complete the work of the item, except where specific costs are designated or included in another pay item of work.

All incidental costs, such as acquisition of borrow pits or material outside of the right-of-way, rock drilling and blasting, compaction and special test requirements, stockpiling and rehandling of materials, precautionary measures to protect private property and utilities, to form and trim graded surfaces, proof rolling, re-proof rolling, corrective work disclosed by proof rolling and any delays caused by this corrective work, shall all be included in the unit price of the pay item where such costs are incurred.

Except that, corrective work ordered in cut sections based on an evaluation of proof rolling will be paid for under the appropriate excavation and backfill items. When there is no pay item for Applying Water in the itemized proposal, the work shall be performed in accordance with the specifications for the appropriate items but the costs thereof shall be included in those pay items that require the application of water. When there is no pay item for Clearing and Grubbing in the itemized proposal, this work shall be

performed in accordance with the specifications for the appropriate item but the cost thereof shall be included in those pay items that require clearing and grubbing.

Cleaning culverts, removing and resetting guiderail and establishing turf and sodding will be paid under their respective specification items.

Items with additional provisions to these are listed in subsections sequentially numbered following this subsection. Items with no additional provisions to these above are:

- Embankment In Place
- Select Borrow
- Select Fill
- Select Granular Fill
- Select Granular Fill, Slope Protection (Type A & B)
- Select Granular Subgrade
- Select Structure Fill
- Applying Water
- Sand Backfill

#### **203-5.02 (Vacant).**

**203-5.03 Unclassified Excavation and Disposal.** The unit price bid shall cover all costs of required excavation within the right of way limits, and all costs of disposal if the excavated materials are not used under another pay item.

#### **203-5.04 (Vacant).**

**203-5.05 Embankment Construction Control Devices.** The unit price bid shall cover all costs of providing, installing and maintaining each device, including excavation, trenching and backfill during the course of the work. No payment will be made under any other item of the contract for any work associated with these items.

**A. Settlement Gages and Settlement Rods.** When each installation is completed, 75 percent of the item unit price will be paid. The remaining 25 percent will be paid when each device has been properly maintained and is abandoned according to the procedures of §203-3.18A. Unless otherwise specified in the proposal, the unit price shall also include the costs of removal.

**B. Piezometer.** When each installation is completed and the device placed in satisfactory operation, 75 percent of the unit price will be paid. The remaining 25 percent will be paid when all earthmoving and slope work is completed in the vicinity of each installation. Any installation rendered inoperative due to damage by construction equipment after partial or full payment, shall be immediately repaired or the full amount of such payment shall be deducted from other monies due the Contractor under the contract.

**203-5.06 Cleaning Culverts and Closed Drainage Systems.** The unit price bid per linear meter shall include the cost of all labor, materials, and equipment necessary to satisfactorily perform the work.

Payment, for cleaning culverts and/or closed drainage systems will be made only for those facilities designated on the plans or by the Engineer. Only one payment for each facility will be made regardless of the number of times it is cleaned. The cleaning of drainage structures and manholes shall be paid for under their respective item.

**203-5.07 Cleaning Drainage Structures and Manholes.** The unit price bid for each shall include the cost of all labor, materials and equipment necessary to satisfactorily perform the work. Payment for cleaning drainage structures and manholes will be made only for those facilities designated on the plans or by the Engineer. Only one payment for each facility will be made regardless of the number of times it is cleaned.

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
203.02	Unclassified Excavation and Disposal	Cubic Meter
203.03	Embankment In Place	Cubic Meter
203.05	Select Borrow	Cubic Meter
203.06	Select Fill	Cubic Meter
203.07	Select Granular Fill	Cubic Meter
203.0801	Select Granular Fill, Slope Protection - Type A	Cubic Meter
203.0802	Select Granular Fill, Slope Protection - Type B	Cubic Meter
203.10	Surface Settlement Gages	Each
203.11	Subsurface Settlement Gages	Each
203.12	Settlement Rods	Each
203.13	Piezometers	Each
203.1601	Applying Water	P.D.D.
203.1770	Cleaning Culverts with Span of 1300 Millimeters or Less	Meter
203.1780	Cleaning Culverts with Span of More Than 1300 Millimeters	Meter
203.18	Cleaning Closed Drainage Systems	Meter
203.19	Cleaning Drainage Structures and Manholes	Each
203.20	Select Granular Subgrade	Cubic Meter
203.21	Select Structure Fill	Cubic Meter
203.25	Sand Backfill	Cubic Meter
203.51	Clean, Grade and Shape Existing Roadside Section	Meter

**SECTION 204 - CONTROLLED LOW STRENGTH MATERIAL (CLSM)**

**204-1 DESCRIPTION.** The work consists of mixing and placing Controlled Low Strength Material (CLSM) or Controlled Low Strength Material (CLSM, No Fly Ash) at the locations shown on the plans or where ordered by the Engineer.

**204-2 MATERIALS**

**204-2.01 Tests and Control Methods.** Provide CLSM containing cement and water. At the Contractor’s option, it may also contain fly ash (unless the No Fly Ash item is specified), aggregate, or chemical admixtures in any proportions such that the final product meets the strength and flow consistency requirements included in this specification.

Provide materials meeting the requirements of the following subsections:

- Portland Cement, Type 1 or Type 2: § 701-01
- Water: § 712-01

If used, provide materials meeting the following requirements:

- Aggregates: Gradation: 100% passing the 2.0 mm sieve and a maximum of 20% passing the 75 µm sieve.
- Fly Ash: Provide fly ash that complies with the requirements of § 711-10. Waive the loss on ignition requirement.
- Chemical Admixtures: Provide admixtures that comply with § 711-08. The mix may include high air generators manufactured for CLSM.

Certify that the CLSM will have a 28 day compressive strength between 275 kPa and 1030 kPa, and provide this certification to the Engineer.

Design the CLSM mix so that it sets within the time stated in the contract documents. If no set time is required by the Department, design the set time to conform with the Maintenance and Protection of Traffic scheme and requirements of the project.

Prior to placement, the CLSM will have a minimum diameter spread of 200 mm as determined from the following procedure performed by the Engineer:

- Fill a hollow plastic or metal cylinder 150 mm in length and 75 mm inside diameter with the CLSM and strike off the surface.
- Raise the flow cylinder 150 mm in a continuous motion without rotation.
- Immediately measure the spread of the CLSM along two diameters which are perpendicular to each other.

Cast three (3) specimens (cylinders) for each batch in accordance with Materials Method 9.2. and deliver them to the Geotechnical Engineering Bureau within seven days of the pour date for evaluation.

### 204-3 CONSTRUCTION DETAILS

**204-3.01 General.** Provide all equipment for this work subject to approval of the Engineer.

Mix the materials at a stationary mixing plant which is either a continuous or a batch type plant, designed to accurately proportion either by volume or by weight, so that when the materials are incorporated in the mix, a thorough and uniform mix will result.

The mix may be transported in open haul units provided the material is placed within 30 minutes of the end of mixing. Use a rotating drum unit capable of 2 - 6 rpm to transport material which cannot be placed within 30 minutes after the end of mixing.

In work involving quantities of CLSM less than 2 cubic meters, the Engineer may permit the Contractor to use a small construction mixer. Provide a mixer capable of mixing CLSM that has the specified compressive strength and flow consistency. Mix all components so as to produce a uniform product.

Narrower trench widths can be employed when using CLSM due to the self-compacting properties of the material. Construction personnel and equipment are not required to be in the trench for compaction operations. Refer to the current Standard Sheet for Controlled Low Strength Material (CLSM) Installation Details for Circular and Elliptical Metal Pipes, Structural Plate Pipes and Pipe Arches, and Reinforced Concrete and Other Rigid Pipes. For installations that require that construction personnel temporarily occupy the trench follow all OSHA requirements.

#### 204-3.02 Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables.

Place the CLSM using a method approved by the Engineer, in accordance with the appropriate Standard Sheet for additional guidance on the use of CLSM as backfill material.

When placing CLSM for pipe backfill, discharge the material onto the top of the pipe at the center.

Do not place CLSM in contact with aluminum pipe, including connections, fixtures, etc., unless the aluminum has been coated with an approved primer.

Do not place CLSM containing fly ash in contact with cast iron or ductile iron pipes, fittings or appurtenances.

CLSM should be kept encapsulated with soil, as it is highly erodible and disintegrates when left exposed to the environment

In situations where CLSM is used as backfill around lightweight pipe, take precautions to counteract the pipe's buoyancy.

### 204-4 METHOD OF MEASUREMENT

**204-4.01 General.** Payment for CLSM will be made for the number of cubic meters of satisfactorily placed CLSM computed between the payment lines shown on the contract documents or from payment lines established in writing by the Engineer.

A deduction shall be made for pipes (based on nominal diameters) and other payment items when the combined cross-sectional area exceeds 0.1 m<sup>2</sup> unless otherwise shown. No deduction will be made for the cross-sectional area of an existing facility.

No additional quantity shall be measured for payment to make up losses due to foundation settlement, compaction, erosion or any other cause.

Cross sectioning, for the purpose of determining quantities for payment, shall be employed only where payment lines are not shown on the contract documents or Standard Sheets, and cannot be reasonably established by the Engineer.

**204-5 BASIS OF PAYMENT**

**204-5.01 General.** The unit price bid shall include the costs of furnishing all equipment, labor and materials necessary to complete the work, except where specific costs are designated or included in another pay item of work.

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
204.01	Controlled Low Strength Material (CLSM)	Cubic Meter
204.02	Controlled Low strength Material (CLSM) (No Fly Ash)	Cubic Meter

**SECTION 205 (VACANT)**

**SECTION 206 - TRENCH, CULVERT AND STRUCTURE EXCAVATION**

**206-1 DESCRIPTION**

**206-1.01 General.** This work shall consist of the excavation of all materials and backfill or disposal of excavated material required for trenches, culverts, structures, conduit and direct burial cable not otherwise provided for in other sections of these specifications. All such excavation shall be unclassified excavation as defined in §203-1.01. The work shall also consist of all required protection necessary to ensure the safety of the workers and the public.

**206-1.02 Trench and Culvert Excavation and Trench and Culvert Excavation - Original Grade (O.G.)** The work specified under these items shall include the excavation for and backfill of all culverts, pipe lines, and other minor structures including but not limited to leaching basins, catch basins, field inlets, manholes and drop inlets.

**206-1.03 Structure Excavation.** The work specified under this item shall include the excavation for all bridge foundations, walls and other major structures and backfill of suitable excavated material if another item is not specified.

**206-1.04 Conduit Excavation and Backfill including Surface Restoration.** The work specified under this item shall include the excavation, necessary backfill and surface restoration required for conduits and direct burial cables.

**206-1.05 Test Pits.** The work specified under this item shall include the excavation and backfill of test pits at locations shown in the contract documents, or as directed by the Engineer. Excavation and backfill methods, limits and equipment used shall be approved by the Engineer. This work will not relieve the contractor of the responsibility to locate underground facilities as required under 16 NYCRR 753.

**206-2 MATERIALS.** (Not Specified).

**206-3 CONSTRUCTION DETAILS**

**206-3.01 General.** The appropriate construction details specified for “Excavation and Embankment” in §203-3.01 through and including §203-3.12, and §203-3.15 shall apply to the work specified in this section.

The excavation shall be dewatered and kept free from water, snow and ice when necessary.

Special care shall be taken not to disturb the bottom of the excavation, and not to remove the material at final grade until just before the structure is placed.

The Contractor shall carry out all excavation operations in a safe and prudent manner so that the workers, the public, and adjacent public and private property will be protected from unreasonable hazard in accordance with §107-05K. *Open Excavations and Trenches.*

If no support or protective system is shown in the plans or proposal, the Contractor may open the excavation with the sides sloped to a stable slope not steeper than that allowed by 29 CFR 1926 Subpart P. Taking this option, however, does not relieve the Contractor of responsibilities as stated in this subsection. When the Contractor chooses this option, the materials used and method of construction outside the payment lines shall be in accordance with the requirements of this Section.

When excavation is required for the installation of conduit or direct burial cable, the Contractor shall notify the Engineer upon completion of the excavation. No conduit or cable shall be placed in the excavation until the Engineer has approved the depth and cross-section.

**206-3.02 Replacement of Pavement Structure Courses.** When the Contractor, in placing conduits, direct burial cable or utilities, excavates into the pavement, subgrade, subbase, or shoulder courses, such courses must be replaced in kind, character and condition, to maintain a uniform road section.

**206-3.03 Disposal of Excavated Material.** The provisions of §203-3.06 and/or §203-3.07 shall apply to all material excavated under this section which is not used as backfill.

**206-3.04 Test Pits.** The Contractor shall excavate and backfill test pits in order to determine existing underground utility type, size and/or condition where new utility connections to existing facilities are proposed. The Contractor shall excavate and backfill test pits in a manner approved by the Engineer that prevents damage to wrappings, coatings or other protective coverings, such as by hand digging, vacuum excavation or similar non-destructive locating equipment. The limits of the excavation shall be those sufficient to determine existing utility type, size and/or condition.

## **206-4 METHOD OF MEASUREMENT**

**206-4.01 General.** The quantity of excavation shall be the number of cubic meters of material computed from payment lines shown on the plans or the appropriate standard sheets, except where revised payment lines are established by the Engineer prior to performing the work. Work performed beyond any designated payment line will not be included in the computation of quantities for the item involved.

**206-4.02 Trench and Culvert Excavation.** Unless otherwise shown or indicated on the contract plans, payment lines for excavation of pipe and culvert lines, and minor structures will be determined as follows:

**A. Bottom Payment Line.** The elevation of the bottom payment line shall be the invert elevation of the pipe, conduit, or culvert. For pipes, conduits, or culverts of nominal horizontal dimensions of 300 to 3700 mm, the width of the excavations at the bottom payment line shall be the nominal inside horizontal dimension of the pipe, conduit, or culvert plus 1.2 m, or three (3) times the nominal inside horizontal dimension, whichever is less; for pipes with a nominal horizontal dimension greater than 3700 mm the width will be as shown on the appropriate standard sheets or in the contract documents. For concrete and smooth interior corrugated polyethylene pipe, twice the minimum wall thickness shall be added to the preceding. For concrete pipe, the bottom payment line is the Bedding Control Line shown on the applicable standard sheet.

**B. Top Payment Line.** Except when otherwise provided in the contract, the payment line in a cut section shall be the surface at the centerline of the pipe, culvert or conduit after completion of the general excavation and prior to excavation to place material paid for under another item of the contract; except that, when an undercut is made for unstable conditions, the payment line will be at the top of the undercut backfill. The payment line in a fill section shall be the ground surface prior to commencing work on the contract.

**C. Side Payment Lines.** The side payment lines of the excavation shall be vertical to the bottom of payment line, regardless of whether sheeting is or is not required or used.

For utility lines, exclusive of conduit and cable lines, of less than 300 mm diameter, the excavation width shall be the actual bottom width necessary, as determined by the Engineer, to properly perform the installation work required, or 1 m, whichever is less.

**D. Payment Lines for Minor Structures.** Payment lines for minor structures shall be vertical from the bottom of the footing and shall extend out 0.6 m from the perimeter of the structure footing. The top payment line shall be the same as for (B) above.

**206-4.03 Conduit Excavation and Backfill including Surface Restoration.** The quantity of conduit and/or cable excavation and backfill including surface restoration for payment shall be the number of linear meters measured along the center of the conduit and/or cable placed, in accordance with the methods stated below.

Wherever a pair or group of conduits and/or cables are physically connected together, they shall be considered as a single conduit and/or cable.

A. Wherever conduit and/or cable in the same trench are physically separated laterally by 150 mm or more between centerlines, as shown on the plans or as directed by the Engineer, the linear meter measurement shall be made along the center of each conduit and/or cable.

B. Wherever a pair or group of conduits and/or cable in the same trench are physically separated laterally by less than 150 mm between centerlines of adjacent conduit and/or cable, as shown on the plans or as directed by the Engineer, the linear meter measurement for those conduits and/or cable shall be made along the center of that pair or group of conduit and/or cables.

**206-4.04 Trench and Culvert Excavation - O.G.** The provisions of §206-4.02 Trench and Culvert Excavation shall apply, except the top payment line shall be the existing ground surface at the centerline of the pipe, culvert or conduit prior to commencing work on the contract.

**206-4.05 Test Pits.** The quantity to be measured for payment will be the number of test holes excavated and backfilled in accordance with the contract documents.

## 206-5 BASIS OF PAYMENT

**206-5.01 Trench, Culvert and Structure Excavation.** The unit price bid for this work shall include the cost of labor, materials and equipment required to satisfactorily complete the work, including the costs of excavation, backfill (except select backfill paid for separately), disposal of excavated material, presplitting rock excavations where required, and keeping the site dewatered and free from earth, water, ice and snow when necessary.

The cost for necessary guarding and protection required to protect the public from open trenches and that required for the protection to ensure the safety of the workers shall be included in the bid price for Trench, Culvert and Structure Excavation. Progress payments will be made after the excavation has been completed, and prior to the completion of other work included under this item, including but not limited to pumping, fencing and backfilling. Payment will be made, at the unit price bid, for 75% of the quantity excavated within the prescribed payment lines. The balance of the quantity excavated will be paid for upon proper completion of backfill placement.

If the Contractor chooses the slope layback option to satisfy OSHA, no extra payment will be made for the cost of any labor, equipment or material necessary to restore the area outside the payment lines shown on the plans.

**206-5.02 Sheeting, Cofferdams or Temporary Water Diversion Structures.** Payment for Sheeting, Cofferdams or Temporary Water Diversion Structures required by the plans, specifications, or ordered by the Engineer in writing will be made in accordance with the appropriate item.

Where cofferdams are specified for structure excavation, the work required to keep the site free from earth, water, ice and snow shall be included in the item for cofferdams when necessary.

**206-5.03 Replacement of Pavement Structure Courses.** With exception of the Conduit Excavation and Backfill including Surface Restoration item, the work of replacing pavement, subcourses and shoulder courses shall be paid for and performed under the provisions of their respective items and subsections.

**206-5.04 Conduit Excavation and Backfill including Surface Restoration.** The unit price bid per linear meter for this work shall include the cost of furnishing all labor, materials and equipment necessary to excavate and backfill the trench and to replace any pavement, shoulder, and sidewalk courses, subcourses, curbs, drives, lawns and other top surfaces as required to complete the work.

**206-5.05 Test Pits.** The unit price bid for this work shall include the cost of furnishing all labor, materials and equipment necessary to excavate and backfill the test pit and replace any pavement, shoulder and sidewalk courses, subcourses, curbs, drives, lawns and other top surfaces required to complete the work.

*Payment will be made under:*

Item No.	Item	Pay Unit
206.01	Structure Excavation	Cubic Meter
206.02	Trench and Culvert Excavation	Cubic Meter
206.03	Conduit Excavation and Backfill including Surface Restoration	Meter
206.04	Trench and Culvert Excavation - O.G.	Cubic Meter
206.05	Test Pit Excavation	Each

**SECTION 207 - GEOTEXTILES AND PREFABRICATED COMPOSITE DRAINS FOR STRUCTURES**

**207-1 DESCRIPTION**

**207-1.01 Geotextiles.** The work shall consist of furnishing and installing approved Geotextile of the Class and Type indicated, at the locations, and in the manner shown on the plans or as directed by the Engineer, in writing, prior to performing the work.

**207-1.02 Prefabricated Composite Drains for Structures.** The work shall consist of furnishing and installing an approved Prefabricated Composite Structural Drain (PCSD) or Prefabricated Composite Integral Abutment Drain (PCIAD) as specified at the location (s) shown on the contract documents or as directed by the Engineer, in writing, prior to performing the work.

Prior to installation, the Contractor shall furnish the Engineer with copies of the manufacturer’s literature with details and installation requirements for the PCSD or PCIAD. If not included in the manufacturer’s literature, a letter identifying the geotextile wrap shall also be provided to the Engineer.

**207-2 MATERIALS**

**207-2.01 General.** The Geotextile and Prefabricated Composite Drain for Structures shall be the type appropriate for the intended use as shown on the plans and be listed in the Appropriate Approved List issued by Department's Materials Bureau. Evaluation of a Geotextile or Prefabricated Composite Drain for Structures not on the Approved List will be made in accordance with procedural directives of the Geotechnical Engineering Bureau. Evaluation will require a minimum of four months.

The Contractor shall provide PCSD or PCIAD that is a flexible product consisting of a geotextile bonded to an internal supporting core.

The Contractor shall provide PCSD or PCIAD that is resistant to deterioration from salts, road oils, fuels and other deleterious substances encountered in this type of application.

Only approved structural drains with an impermeable core will be permitted for use in installations where fresh concrete is to be placed against the drain.

**207-2.02 Basis of Acceptance**

**A. Geotextiles.** The Geotextiles which are on the Approved List issued by the Department's Materials Bureau will be accepted on the basis of the brand name labeled on the Geotextile or the Geotextile container and verification of the Geotextile by a Departmental Geotechnical Engineer.

**B. Prefabricated Composite Drains for Structures.** The Prefabricated Composite Drain for Structures which are on the Approved List issued by the Department's Materials Bureau will be accepted on the basis of the brand name labeled on the drain's packaging and verification by the Engineer of the geotextile wrap being on the approved list for a drainage application.

**207-2.03 Quality Assurance**

**A. Geotextiles.** When the State elects to sample, one ten square meter sample will be obtained for quality assurance testing. The results of this testing will only affect a product's standing on the Approved List. Payment for this sample will be made at the unit bid price.

**B. Prefabricated Composite Drains for Structures.** When the State elects to sample, a 1 meter long by roll width sample will be obtained for quality assurance testing. The results of this testing will only affect a product's standing on the Approved List. No payment will be made for this sample.

**207-3 CONSTRUCTION DETAILS****207-3.01 Geotextiles**

**A. General.** The Geotextiles shall be protected from exposure to sunlight during transport and storage. After placement, the Geotextile shall not be left uncovered for more than two (2) weeks.

Traffic or construction equipment will not be permitted directly on the Geotextile. Geotextiles may be joined by either sewing or overlapping. Sewn seams shall be lapped a minimum of 100 mm and double sewn. The thread used to sew the seam shall be nylon or polypropylene. Overlapped seams shall have a minimum overlap of 500 mm except when placed under water where the overlap shall be a minimum of 1 m. All seams shall be subject to the approval of the Engineer. Geotextile which becomes torn or damaged due to the Contractor's operations shall be replaced or patched at no cost to the State. The patch shall extend 1 m beyond the perimeter of the tear or damage.

**B. Bedding and Slope Protection.** The Geotextile shall be placed and anchored on a prepared surface approved by the Engineer. The Geotextile shall be laid loosely but in intimate contact with the soil so that placement of the overlying materials will not stretch or tear the Geotextile. Where Geotextile is placed above water, the backfill placement shall begin at the toe and proceed up the slope.

Where Geotextile is placed under water, the long dimension shall be placed parallel to the direction of flow. Successive Geotextile sheets shall be overlapped so that the upstream sheet is placed over the downstream sheet. As the Geotextile is placed under water, the backfill material shall be placed on it to the required thickness. The Geotextile placement shall not progress more than 15 m ahead of the backfill placement.

Rip-rap, stone filling (Heavy) or stone filling (Medium) shall not be dropped onto the Geotextile from a height greater than 0.3 m. Slope protection and smaller sizes of stone filling shall not be dropped onto the Geotextile from a height exceeding 1 m.

**C. Separation and Stabilization.** The Geotextile shall be placed as directed by the Engineer. The Geotextile shall be laid loosely but in intimate contact with the soil so that placement of the overlying material will not stretch or tear the Geotextile.

**D. Drainage.** The Geotextile shall be placed to conform loosely to the shape of the trench.

After placing the filter material, the Geotextile shall be folded over the top of the filter material to produce a minimum overlap of 300 mm. The Geotextile shall then be covered with the subsequent course.

**207-3.02 Prefabricated Composite Drains for Structures.** The Contractor shall install the drain in conformance with the manufacturer’s installation procedures. The drain shall be installed so that the backfill, when placed, will be in contact with the geotextile and forms a continuous drainage layer without interruption within the drain’s plane. At all locations, a positive outlet for the water in the drain shall be provided. This may involve making a hole in the core at the weep hole locations for approved drains with an impermeable core. Do not puncture the geotextile. Any damaged geotextile shall be repaired.

Adhesive shall be applied to the wall surface, and not directly to the drain.

During all periods of shipment and storage, the drain shall be wrapped and protected from direct exposure to sunlight, mud, dirt and debris.

Care shall be exercised while backfilling to prevent damage to the drain. Repairs or replacements of drain damaged by construction operations shall be performed, as directed by the Engineer, at no cost to the State.

**207-4 METHOD OF MEASUREMENT**

**207-4.01 Geotextiles**

**A. General.** The quantity of Geotextile will be the number of square meters computed from the payment lines shown on the plans or from payment lines established in writing by the Engineer. Measurement will not be made for Geotextile used for repairs, seams, or overlaps. If taken, the amount of quality assurance samples will be added to this quantity.

**B. Drainage.** The number of square meters shall be computed by multiplying the length of the trench where Geotextile is used by the theoretical perimeter (determined from the typical section).

**207-4.02 Prefabricated Composite Drains for Structures.** The quantity of PCSD or PCIAD is the number of square meters satisfactorily installed computed from the payment lines indicated in the contract documents or from payment lines established, in writing, by the Engineer.

**207-5 BASIS OF PAYMENT**

**207-5.01 Geotextiles.** The unit price bid per square meter for these items shall include the cost of furnishing all labor, equipment, and materials necessary to complete the work, including the cost of preparing the surface upon which the Geotextile is placed. No payment will be made for replacement or repairs.

**207-5.02 Prefabricated Composite Drains for Structures.** The unit price per square meter for this item includes the cost of furnishing all labor, equipment, and material necessary to complete the work. No payment will be made for repairs or replacement.

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
207.10	Geotextile Bedding	Square Meter
207.11	Geotextile Separation	Square Meter
207.12	Geotextile Drainage	Square Meter
207.13	Geotextile Slope Protection	Square Meter
207.14	Geotextile Stabilization	Square Meter
207.15	Prefabricated Composite Structural Drain	Square Meter
207.16	Prefabricated Composite Integral Abutment Drain	Square Meter

**SECTION 208 (VACANT)**

**SECTION 209 - SOIL EROSION AND SEDIMENT CONTROL**

**209-1 DESCRIPTION.** This work shall consist of furnishing, installing, inspecting, maintaining, and removing soil erosion and sediment control measures as shown on the contract documents or as ordered by the Engineer during the life of the contract to provide soil erosion and sediment control. This work shall be coordinated with the soil erosion and sediment control features specified elsewhere in the contract documents to the extent practical to assure effective and continuous soil erosion and sediment control throughout the construction and post construction period.

**209-1.01 Erosion Control.** See §101-02 Definitions of Terms, Erosion Control, for the definition of Erosion Control. The following items of work are provided in this section to address soil erosion control - mulch, straw/wood fiber mulch, seed and mulch, seed and straw/wood fiber mulch, all classes and types of rolled erosion control products, and soil stabilizers. Other items may be provided in the contract documents to provide soil erosion control (e.g., turf establishment, bank and channel protection, etc.).

**209-1.02 Sediment Control.** Sediment control is any action taken or item used as part of a project or as a separate action to minimize suspended solid material transport by water. The following items of work are provided in this section to address sediment control - haybale/strawbale, strawbale, sediment trap, turbidity curtain, silt fence.

**209-2 MATERIALS.** Unless otherwise stated elsewhere in the contract documents, materials shall be as stated herein.

**209-2.01 Mulch.** Mulch shall be §713-18 Hay, §713-19 Straw, or §713-11 Wood Fiber Mulch. Straw/Wood Fiber Mulch shall be §713-19 Straw or §713-11 Wood Fiber Mulch.

**209-2.02 Seed.** Seed shall be ryegrasses (annual or perennial) or cereal grasses suitable to the area and as a temporary cover which will not compete with the grasses sown later for permanent cover.

**209-2.03 Stone Filling.** Stone filling shall meet the requirements of §620-2.02 Stone Filling, light.

**209-2.04 Haybale/Strawbale.** Haybale/Strawbale shall meet the requirements of §713-18 Hay or §713-19 Straw. Strawbale shall be §713-19 Straw.

All bales shall be tightly bound; loose or broken bales will not be accepted. Hardwood stakes shall be at least 32 mm x 32 mm and a minimum of 0.6 m long.

**209-2.05 Geotextile.** Geotextiles shall meet the requirements of §207-2 Materials. UV sensitive geotextiles shall be protected from exposure to sunlight during transport and storage.

**209-2.06 Prefabricated Check Dams and Drainage Structure Inlet Protection.** The materials used for prefabricated check dams and drainage structure inlet protection shall be triangular-shaped in cross section, and have a height of at least 200 mm - 250 mm in the center with two equal sides and a 450 mm - 600 mm base. The triangular-shaped inner material shall be urethane foam. The outer cover shall be a woven bedding type geotextile placed around the inner triangle and extend 600 mm - 920 mm beyond each side of the triangle base.

Other materials may be proposed by the Contractor who shall be solely responsible for their performance.

**209-2.07 Vacant.**

**209-2.08 Silt Fence.** Silt fence shall be listed in the Approved List. A silt fence assembly shall consist of silt fence geotextile, posts, and fasteners and may include mesh support consistent with the Approved List.

**A. Posts.** Posts shall meet the following requirements:

1. Either wood, metal, or synthetic posts may be used. Softwood post shall be 38 mm x 89 mm, hardwood post shall be at least 32 mm x 32 mm, steel post shall be "T" or "L" shaped in cross section, with a minimum weight of 2 kg/m.
2. Posts shall be a minimum of 1.2 m long and shall be spaced consistent with the material selected and as indicated in the Approved List.

**B. Mesh Support.** For those silt fence assemblies on the Approved List that require a mesh support, the support shall consist of 14 gauge (min) welded wire mesh with a maximum 150 mm x 150 mm opening or polymeric mesh. All mesh support shall be a minimum of 750 mm in height.

**C. Fasteners.** Fasteners shall be heavy duty staples, hog rings, tie wires, or any other fastener compatible with the post material.

**209-2.09 Gravel Bag.** Bags shall be fabricated from reinforced woven geotextile and shall include ties. No burlap bags shall be allowed. Coarse aggregate shall meet the gradation requirements of size designation #1 or #2 of Table 703-4 and shall be used as the fill material. Each gravel bag shall be individually tied and double bagged. The bag with fill material shall be inversely inserted into the second bag in order to prevent leakage.

**209-2.10 Sand Bag.** Sand bags shall meet the requirements of §209-2.09 Gravel Bag except that sand meeting the gradation requirements of §703-06 Cushion Sand shall be used as the fill material.

**209-2.11 Pipe Slope Drain.** Pipe slope drain materials may consist of new or used material in satisfactory condition and suitable for the intended use. The Engineer will reject used materials determined to be unsatisfactory. Pipe couplings shall be appropriate for the pipe and as recommended by the Manufacturer. End sections may be steel, aluminum, or polyethylene.

**209-2.12 Rolled Erosion Control Products and Soil Stabilizers.** These materials shall meet the requirements of §713-07 Jute Mesh Or Other Approved Erosion Control Materials and shall be of the Type and Class specified in the contract documents.

**209-2.13 Stabilized Construction Entrance.** Construction entrances shall consist of a geotextile, crushed stone or gravel and, if necessary, a drainage pipe to maintain ditch flow.

**A. Geotextile.** Geotextile shall meet the requirements of §207-2 Materials, Geotextile Stabilization, Strength Class 1.

**B. Crushed Stone or Gravel.** Crushed stone or gravel shall be 150 mm of coarse aggregate material meeting the gradation requirements of size designation #3 on Table 703-4.

**C. Drainage Pipe.** The Contractor shall provide a drainage pipe sized with sufficient capacity to carry ditch flow. The pipe dimension shall be consistent with the modified soil erosion and sediment control plan approved by the Engineer. The drainage pipe may consist of new or used material in satisfactory condition and suitable for the intended use. The Engineer will reject any materials determined to be unsatisfactory.

**209-2.14 Temporary Pipe Inlet/Outlet Protection.** The materials used shall be as indicated on the standard sheets.

**209-2.15 Temporary Sediment Trap.** The materials used shall be as indicated on the standard sheets.

**A. Impervious Embankment In Place.**

1. The impervious embankment material shall have the following gradation:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
150 mm	90 - 100
19.0 mm	50 -100
4.75 mm	40 - 90
425 µm	30 - 85
75 µm	25 - 75

### 209-3 CONSTRUCTION DETAILS.

**209-3.01 General.** In the event of conflict between these specification requirements and pollution control laws, rules, regulations or permit conditions by other federal or state or local government agencies, the more restrictive laws, rules or regulations shall apply.

All work done under this section shall be performed consistent with §107-12 Water Quality Protection and included as part of the construction schedule submitted by the Contractor under §108-01 Start and Progress of Work. The Contractor's schedules and methods shall be consistent with the soil erosion and sediment control plan included in the contract documents or the modified plan approved by the Engineer. The Contractor shall begin earthwork only after receiving written approval from the Engineer for the scheduling of earthwork and work covered under this section.

The Contractor shall designate to the Engineer an erosion and sediment control supervisor with adequate training, experience, and authority to implement and maintain all erosion and sediment control measures.

Perimeter sediment controls shall be installed prior to performing grubbing, excavation, and borrow or fill operations. The Contractor shall limit the area of clearing and grubbing, excavation, borrow and embankment operations in progress, commensurate with their capability and progress in keeping the finish grading, mulching, seeding and other temporary and/or permanent control measures current in accordance with the approved schedule. Under no condition shall earth material exposed by grubbing, excavation, borrow or fill or other work be left without application of temporary or permanent erosion controls for a period of greater than 7 days. The Engineer may determine that a potential for erosion or sediment transport exists and order the Contractor to install temporary erosion controls earlier. When permanent soil erosion and sediment control measures can not be installed due to seasonal or other limitations, temporary soil erosion and sediment control measures shall be installed. Prior to removing or disturbing any erosion or sediment control measure that may be required to be reestablished due to continual grading operations, the Contractor shall verify the proposed progression of operations and the reestablishment of control measures with the Engineer to ensure the continuity of erosion and sediment control.

Sediment control measures shall not be removed without the Engineer's approval.

**209-3.02 Inspection and Maintenance.** Soil erosion and sediment control measures shall be inspected and maintained by the Contractor during the life of the project, including winter shutdown, etc. Such inspection and maintenance shall continue until after the permanent stabilization measures are in place and the temporary control measures are ordered to be removed by the Engineer. The remaining disturbed area shall be permanently stabilized as indicated in the contract documents.

All temporary controls shall be inspected by the Contractor every seven calendar days, after each rainfall of 12 mm or more within a 12 hour period, or daily during prolonged rainfall to determine if the measure is functioning as intended. All inspections shall be completed within one calendar day.

Within 3 calendar days from completion of the inspection, the Contractor shall:

- Repair or rebuild the control measure to function as originally intended.
- Remove sediment deposition which reaches one half the height of the control measure. All sediment deposits shall be considered unsuitable material and disposed of in accordance with §203-3.08, Disposal of Surplus Excavated Materials. Material shall be disposed of away from wetlands, water courses or other bodies of water.

Torn or punctured silt fence fabric may be repaired by the placement of a patch, on the upstream side, consisting of an additional layer of fabric over the damaged area, or replacement of the damaged section.

Where erosion control materials have been used on final grade that have been permanently seeded, the Contractor shall care for the areas until acceptance of the Contract or acceptance of the turf, whichever is later. Where necessary, such care may include, but is not limited to providing warning signs or barricades for protection against traffic. Any surfaces that have settled, become gullied, or otherwise damaged due to the Contractor's operations shall be repaired at no additional expense to the state to re-establish the grade and soil conditions that existed prior to placing erosion control materials.

**209-3.03 Temporary Mulch.** The Contractor shall have the capability to mulch any disturbed areas on any given day (e.g., those areas where earthwork operations are ongoing, etc.). The Contractor shall apply mulch on disturbed areas consistent with the approved project schedule.

Mulch shall be spread uniformly in a continuous blanket at an approximate rate of 4 t/ha. Mulch may be spread by hand, mechanical spreaders, or blowers.

**209-3.04 Temporary Seed and Mulch.** The Contractor shall apply seed and mulch on disturbed areas consistent with the approved project schedule.

Prior to the application of seed, all areas where compaction has occurred shall be scarified. The seed bed shall be loose and friable for positive seed retention.

Ryegrasses shall be spread at a rate of 3.5 g/m<sup>2</sup> to uniformly cover the ground. Cereal grasses shall be spread at a rate of 11.2 g/m<sup>2</sup> to uniformly cover the ground. Seeds shall be evenly distributed by any method of sowing that does not injure the seeds in the process of spreading.

Mulch shall be spread immediately following application of seed. Mulch shall be spread uniformly in a continuous blanket at an approximate rate of 4 t/ha. Mulch may be spread by hand, mechanical spreaders, or blowers. Mulch and seed shall not be placed simultaneously, except in the case of hydroseeding.

**209-3.05 Temporary Check Dam.** Check dams shall be constructed where shown in the contract documents and in accordance with the standard sheets. A bedding type geotextile or stone scour protection shall be placed as indicated in the contract documents.

**A. Prefabricated Check Dam.** The length of each prefabricated check dam shall be as indicated in the contract documents. The dam shall be attached to the ground with wire staples. The staples shall be No. 11 gauge wire and be 150 mm - 210 mm long. Staples shall be placed as indicated in the contract documents.

The geotextile filter material shall be attached to the triangular frame by using wire ties or staples. The ties shall be placed evenly 0.3 m on center.

**209-3.06 Temporary Haybale/Strawbale.** Bales shall be placed with the cut ends vertical as shown in the contract documents. Each bale shall be embedded into the soil a minimum of 100 mm, and be securely anchored. Hardwood stakes shall be installed a minimum of 300 mm into the ground below the bale. The first stake in each bale shall be driven at an angle toward the previously laid bale to force the bales together.

**209-3.07 Temporary Silt Fence.** Unless otherwise detailed in the contract documents, silt fence shall be installed as follows:

1. Posts shall be driven into the ground.
2. Geotextile and any mesh support (if applicable) shall be placed on the upstream side of the posts.
3. The geotextile shall be fastened to each post in no less than 4 locations with approved fasteners.
4. The mesh support shall be fastened to each post at the top, bottom, and two additional evenly spaced locations, or by a continuous corded attachment along the top of the assembly.
5. Any geotextile or mesh splices necessary for fence erection shall be continuous between two post sections.
6. Geotextile at the bottom of the fence shall be buried in a trench to a depth of 150 mm. The trench shall be back filled with the excavated soil and the soil compacted by tamping.

**209-3.08 Temporary Sediment Trap.** Sediment traps shall be constructed where shown in the contract documents and in accordance with the standard sheets.

**A. Sand Bag Berm and Earth Berm.**

1. The area under which the sand bag berm or earth berm will be constructed shall be cleared, grubbed and stripped of any vegetation and root mat. The pool area shall be cleared. All work shall be performed consistent with the requirements of §201-3 Construction Details.
2. The earth berm embankment shall be constructed consistent with the requirements of §203-Excavation & Embankment, except as herein modified. Immediately prior to placement of the impervious embankment material, the entire earth surface on or against which fill is to be placed, shall be thoroughly scarified to a depth of 150 mm and compacted to not less than 95 percent of Standard Proctor Maximum Density. Impervious embankment material shall then be deposited in horizontal layers not exceeding 200 mm in thickness prior to compaction. Each layer shall be compacted to not less than 95 percent of Standard Proctor Maximum Density. The moisture content of all impervious embankment material shall not be greater than 2 percent above Optimum Moisture Content as determined by A.A.S.H.T.O Designation: T-99, Method C at the time of compaction.  
Sand bag and ditch dam sediment traps shall be constructed as shown on the Standard Sheets.
3. All fill slopes shall be 2:1 or flatter. Cut slopes shall be 1:1 or flatter.
4. Temporary mulch and rolled erosion control product shall be applied to earth berm side slopes.
5. Excavate and install light stone at emergency spillway.

**B. Riser and Outlet Pipe.** The section of the riser above the embedment shall be perforated with 25 mm diameter holes or slits spaced 150 mm vertically and horizontally and placed in the concave portion of the riser pipe. No holes shall be made within 150 mm of the outlet pipe.

The riser shall be wrapped with 6 mm to 12 mm hardware cloth wire then wrapped with Class A Geotextile Drainage Fabric. The geotextile shall extend 150 mm above the highest hole and 150 mm below the lowest hole. Where ends of geotextile come together, they shall be overlapped, folded and stapled to prevent bypass.

Straps or connecting bands shall be used to hold the geotextile and wire fabric in place. They shall be placed at the top and bottom of the cloth.

The riser shall be anchored with a steel plate base to prevent floatation. A 7 mm minimum thickness steel plate shall be attached and sealed to the riser by a continuous weld around the bottom to form a watertight connection. 600 mm of suitable material shall be placed on the plate and tamped.

Fill material around the outlet pipe shall be hand compacted in four 100 mm layers. A minimum of 600 mm of hand compacted backfill shall be placed over the outlet pipe before crossing it with construction equipment.

All outlet pipe connections shall be watertight.

**C. Sediment Removal.** Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to ½ the design depth of the trap.

**209-3.09** Vacant.

**209-3.10 Temporary Pipe Slope Drain.** Pipe slope drain shall be placed where shown in the contract documents and constructed in accordance with the standard sheets.

**209-3.11 Drainage Structure Inlet Protection.** Drainage structure inlet protection shall be placed where shown in the contract documents and constructed in accordance with the standard sheets.

**209-3.12 Rolled Erosion Control Products and Soil Stabilizers.** The time and method of placement shall be as specified in the contract documents and/or according to Manufacturer's recommendations.

For areas at final grade, all loose stones, clods, sticks, or other undesirable material shall be removed in accordance with the manufacturer's recommendations or as specified elsewhere in the contract

documents. In addition, those areas at final grade shall be scarified to a minimum depth of 25 mm immediately prior to installation, unless topsoil is being placed and the erosion control material will be installed within 2 workdays of topsoil placement.

**A. Rolled Erosion Control Products.**

1. Class II, Type A, Jute Mesh. Jute mesh shall be placed without stretching on the freshly prepared surface so that it lays loosely on the soil and in contact with the soil at all points; and then it shall be rolled or tamped firmly into the soil surface. The upper end of each roll shall be turned down and buried to a depth of 150 mm with the soil firmly tamped against it. Unless otherwise specified in the contract documents, check slots shall be constructed at 15 m intervals down the slope. The construction procedure shall consist of placing a fold of material 150 mm vertically into the ground and tamping soil firmly against it. Jute mesh shall be placed so that all edges shall have a minimum overlap of 150 mm. The ends of rolls shall be placed with the upgrade section on top. Jute mesh shall be held tightly to the soil by anchors driven firmly into the ground. Anchors shall be spaced not more than 1 m apart on the sides and along the centerline of all drainage ways. Jute mesh ends and check slots shall have anchors spaced at 300 mm intervals.
2. Class I, Other Class II, and Class III Rolled Erosion Control Products. These products shall be placed and firmly anchored as stated in the manufacturer's instructions.

**B. Class IV Soil Stabilizers.** These materials shall be applied as recommended by the Manufacturer. Type A & B are intended to be applied with hydroseeding equipment. Type B may also be placed through dry spreading. When dry spreading method is used, the Contractor shall apply the material uniformly. Where applied, Type A shall be minimum of 6 mm thick. When Type A is used in conjunction with turf establishment, seeds must be sown separately and prior to the application of the soil stabilizer.

**209-3.13 Construction Entrances.** Construction entrances shall be placed where shown in the contract documents and constructed in accordance with the standard sheets.

The Contractor shall grade, including excavating or placing fill, to prepare the original ground surface for the placement of a stabilized pad of 150 mm of coarse aggregate material, underlain by a geotextile. If necessary, a drainage pipe shall be installed to maintain the capacity of the ditch. The pipe dimension shall be consistent with the modified soil erosion and sediment control plan approved by the Engineer. All areas cut or filled and not stabilized by the construction entrance material shall be covered with an erosion control treatment (temporary mulch, temporary seed and mulch, etc.) and shall be included in this pay item.

When washing is performed, the washing area within the construction entrance shall be located in an area which will drain into an approved sediment control measure(s).

The construction entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto the right-of-way. All sediment spilled, dropped, washed or tracked onto the right-of-way shall be removed immediately. In the event the entrance is no longer performing properly (i.e. the entrance aggregate becomes clogged with sediment), the Contractor shall top-dress the entrance with additional coarse aggregate material.

**209-3.14 Temporary Pipe Inlet/Outlet Protection, Silt Fence.** Temporary pipe inlet/outlet protection, silt fence, shall be placed where shown in the contract documents and constructed in accordance with the standard sheets.

**209-4 METHOD OF MEASUREMENT.** Measurement will be made for installation or reinstallation of temporary soil erosion and sediment controls shown in the contract documents.

**209-4.01 Temporary Mulch.** Measurement will only be made for work directed or approved by the Engineer. This work will be measured as the number of square meters of mulch to the nearest square meter.

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**209-4.02 Temporary Seed and Mulch.** Measurement will only be made for work directed or approved by the Engineer. This work will be measured as the number of square meters to the nearest square meter.

**209-4.03 Temporary Check Dams.** Stone, gravel, and sand bag check dams will be measured by the number of check dams. All other check dams will be measured by the number of meters to the nearest meter.

**209-4.04 Temporary Haybale/Strawbale.** Bales will be measured by the number of meters to the nearest meter.

**209-4.05 Temporary Silt Fence.** Silt fence will be measured by the number of meters of silt fence to the nearest meter. No measurement will be made for seams or overlaps.

**209-4.06 Temporary Sediment Trap.** Sediment traps will be measured by the number of traps.

**209-4.07** Vacant.

**209-4.08 Temporary Pipe Slope Drain.** Pipe slope drain will be measured by the number of drains.

**209-4.09 Drainage Structure Inlet Protection.** Silt fence geotextile, and prefabricated drainage structure inlet protection measures will be measured by the number of meters to the nearest meter. Gravel bag measures will be measured by the number of cubic meters to the nearest cubic meter.

**209-4.10 Rolled Erosion Control Products and Soil Stabilizers.** Rolled erosion control products and soil stabilizers will be measured as the number of square meters to the nearest square meter.

**209-4.11 Construction Entrances.** Construction entrances shown in the contract documents will be measured by the number of square meters to the nearest square meter. Measurement will not be made for construction entrances associated with the contractor's operations (e.g., staging areas, storage yards, borrow sites, etc.).

**209-4.12 Temporary Pipe Inlet/Outlet Protection, Silt Fence.** Temporary pipe inlet/outlet protection, silt fence, will be measured by the number of meters to the nearest meter.

### **209-5 BASIS OF PAYMENT.**

**209-5.01 General.** The unit price bid for all work items shall include the cost of furnishing all labor, equipment, and materials necessary to satisfactorily complete the work as shown in the contract documents, including the cost of excavation associated with the removal of accumulated sediment and the installation of erosion and sediment control measures covered by this Section.

Progress payments will be made for check dams, turbidity curtain, silt fence, pipe slope drain, and sediment traps. Fifty percent of the price bid will be paid after installation. The remaining percentage will be paid when the temporary control measure is removed and the remaining area is permanently stabilized.

Payment will not be made for work which is attributed to the Contractor's negligence, carelessness or failure to install temporary or permanent controls in accordance with the contract documents.

**209-5.02 Mulch.** Mulching will only be paid for when directed or approved by the Engineer.

**209-5.03 Seed and Mulch.** Seed and mulch will only be paid for when directed or approved by the Engineer. In addition to the provisions of §209-5.01, the unit price bid for this item shall include water.

**209-5.04 Sediment Trap - Temporary.** In addition to the provisions of §209-5.01, the unit price bid for this item shall include bags, excavation, impervious embankment material, outlet pipe, riser assembly,

light stone filling, and geotextile. Temporary mulch and rolled erosion control product will be paid for under their respective items.

**209-5.05 Pipe Slope Drain - Temporary.** In addition to the provisions of §209-5.01, the unit price bid for this item shall include bales, pipe, pipe end sections, stone, and geotextile.

**209-5.06 Construction Entrances.** In addition to the provisions of §209-5.01, the unit price bid for this item shall include any erosion control treatments (temporary mulch, temporary seed and mulch, etc.) required to stabilize an erodible surface produced by the installation of the construction entrance, periodic top-dressing with additional coarse aggregate material, and washing station provisions.

Additional sediment control measures (silt fence, haybale/strawbale, sediment trap, etc.) required to control a washing area will be paid for under their respective item(s).

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
209.1001	Mulch - Temporary	Square Meter
209.1002	Straw/Wood Fiber Mulch - Temporary	Square Meter
209.1003	Seed and Mulch - Temporary	Square Meter
209.1004	Seed and Straw/Wood Fiber Mulch - Temporary	Square Meter
209.110101	Check Dam (Ditch Bottom Width 0.0 to 1.0 m), Stone - Temporary	Each
209.110102	Check Dam (Ditch Bottom Width >1.0 to 2.0 m), Stone - Temporary	Each
209.110103	Check Dam (Ditch Bottom Width >2.0 to 3.0 m), Stone - Temporary	Each
209.110104	Check Dam (Ditch Bottom Width >3.0 m), Stone - Temporary	Each
209.110201	Check Dam (Ditch Bottom Width 0.0 to 1.0 m), Gravel Bag - Temporary	Each
209.110202	Check Dam (Ditch Bottom Width >1.0 to 2.0 m), Gravel Bag - Temporary	Each
209.110203	Check Dam (Ditch Bottom Width >2.0 to 3.0 m), Gravel Bag - Temporary	Each
209.110204	Check Dam (Ditch Bottom Width >3.0 m), Gravel Bag - Temporary	Each
209.110301	Check Dam (Ditch Bottom Width 0.0 to 1.0 m), Sand Bag - Temporary	Each
209.110302	Check Dam (Ditch Bottom Width >1.0 to 2.0 m), Sand Bag - Temporary	Each
209.110303	Check Dam (Ditch Bottom Width >2.0 to 3.0 m), Sand Bag - Temporary	Each
209.110304	Check Dam (Ditch Bottom Width >3.0 m), Sand Bag - Temporary	Each
209.1104	Check Dam, Silt Fence - Temporary	Meter
209.1105	Check Dam, Prefabricated - Temporary	Meter
209.1201	Haybale/Strawbale - Temporary	Meter
209.1202	Strawbale - Temporary	Meter
209.13	Silt Fence - Temporary	Meter
209.1401nn	Sediment Trap, Earth Berm - Temporary	Each
209.1402nn	Sediment Trap, Sand Bag - Temporary	Each
209.1403nn	Sediment Trap, Ditch Dam - Temporary	Each
209.15	Turbidity Curtain - Temporary	Square Meter
209.160101	Pipe Slope Drain, 150 mm - Temporary	Each
209.160102	Pipe Slope Drain, 200 mm - Temporary	Each
209.160103	Pipe Slope Drain, 300 mm - Temporary	Each
209.160104	Pipe Slope Drain, 375 mm - Temporary	Each
209.160105	Pipe Slope Drain, 450 mm - Temporary	Each
209.160106	Pipe Slope Drain, 600 mm - Temporary	Each
209.160107	Pipe Slope Drain, 750 mm - Temporary	Each
209.1701	Drainage Structure Inlet Protection, Silt Fence - Temporary	Meter
209.1702	Drainage Structure Inlet Protection, Gravel Bag - Temporary	Cubic Meter
209.1703	Drainage Structure Inlet Protection, Prefabricated - Temporary	Meter
209.1801	Rolled Erosion Control Product, Class I Type A, Short Term	Square Meter
209.1802	Rolled Erosion Control Product, Class I Type B, Short Term	Square Meter
209.1803	Rolled Erosion Control Product, Class I Type C, Short Term	Square Meter
209.1901	Rolled Erosion Control Product, Class II Type A, Intermediate	Square Meter
209.1902	Rolled Erosion Control Product, Class II Type B, Intermediate	Square Meter
209.1903	Rolled Erosion Control Product, Class II Type C, Intermediate	Square Meter

209.2001	Rolled Erosion Control Product, Class III Type A, Permanent	Square Meter
209.2002	Rolled Erosion Control Product, Class III Type B, Permanent	Square Meter
209.2003	Rolled Erosion Control Product, Class III Type C, Permanent	Square Meter
209.2004	Rolled Erosion Control Product, Class III Type D, Permanent	Square Meter
209.2101	Soil Stabilizers, Class IV Type A	Square Meter
209.2102	Soil Stabilizers, Class IV Type B	Square Meter
209.22	Construction Entrance	Square Meter
209.23	Pipe Inlet/Outlet Protection, Silt Fence - Temporary	Meter

**NOTE:** nn denotes serialized pay item, see §101-02 Definition of Terms under “Specifications”. These items will be paid for by the each within established size groups.

**SECTION 210 - REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL (BUILDINGS, BRIDGES AND HIGHWAYS)**

**210-1 DESCRIPTION.** Under this specification, the Contractor shall remove and dispose of asbestos containing material from all locations of building(s), bridge(s) and/or highway(s) designated in the Contract Documents and/or where directed by the Engineer in accordance with: 12 NYCRR 56 or, if indicated, an approved variance thereof promulgated by the New York State Department of Labor (NYSDOL); the National Emission Standards for Hazardous Air Pollutants (NESHAP), promulgated by the United States Environmental Protection Agency (USEPA); and the Occupational Safety and Health Administration (OSHA).

Additional project specific requirements may be found on the plans or in the proposal in a note entitled "Asbestos Remediation Supplemental Requirements".

**210-2 MATERIALS.** All materials used in the performance of the work shall comply with all applicable regulatory standards. Respirators and filters shall comply with NIOSH and MSHA standards. HEPA filtration systems shall comply with ANSI Z9.2-79.

**210-3 CONSTRUCTION DETAILS.** Prior to beginning any work under this item, the Contractor shall supply the Engineer with proof that the firm performing the work has a valid asbestos handling license; that its insurance coverage whether provided by the Contractor or the Asbestos Subcontractor, is consistent with §107-06 Insurance and includes an asbestos specific occurrence type policy with no deductible or sunset clause; that its project supervisor is a NYSDOL certified asbestos project supervisor; that all employees engaged in the work are properly certified and have current physical examinations and respirator fit tests; and that the proper notification of work beginning on the asbestos project has been given to NYSDOL and USEPA. Also, after the work is completed, the Contractor shall provide the Engineer with a written certification ("Waste Shipment Record") that the material was disposed of in an approved waste disposal site. The certification shall include the name and address of the waste disposal site or sites used.

Unless indicated otherwise, the Contractor shall arrange and pay for all air quality monitoring required for regulatory compliance. The firm and persons engaged shall be: properly licensed and certified; independent of the Contractor or the Asbestos Contractor performing the asbestos work; properly insured; and approved in accordance with §108-05 Subletting or Assigning the Contract.

Asbestos containing material shall be disposed of in accordance with 40 CFR Part 61 and all other requirements and laws, rules, and regulations of Federal, State or local agencies. Disposal sites which accept asbestos containing materials for disposal shall be permitted by the New York State Department of Environmental Conservation (NYSDEC) to accept such material for disposal. If disposed of out-of-state, the rules, regulations, and laws of that state shall apply.

In the event of a conflict between these specification requirements and laws, rules and regulations of Federal, State or local agencies, the more restrictive of the specification or the laws, rules or regulations shall apply.

Two copies of Daily logs, Visitor Logs, OSHA Air Monitoring record, and New York State Department of Labor compliance air monitoring records shall be provided to the Engineer.

**210-4 METHOD OF MEASUREMENT.** The quantity of asbestos containing material to be measured for payment will be determined by one of the following methods, as indicated:

**210-4.01 Square Meter.** The quantity to be measured will be the area, measured to the nearest one tenth square meter, of asbestos containing material removed and disposed of in accordance with the contract documents and 12 NYCRR 56, or with the contract documents and an approved variance thereof.

**210-4.02 Meter.** The quantity to be measured will be the length, measured to the nearest one tenth meter, of asbestos containing material removed and disposed of in accordance with the contract documents and 12 NYCRR 56, or with the contract documents and an approved variance thereof.

**210-4.03 Lump Sum.** The quantity will be measured for payment on a lump sum basis. No actual measurements will be taken.

**210-4.04 Fixed Price Lump Sum.** The lump sum of money shown in the itemized proposal for this work will be considered the price bid even though payment will be made only for the work performed. Payments on contract will be based on one or both of the following:

**A. Agreed Price.** The Agreed Price will be based on a cost analysis submitted by the Contractor and agreed to by the State prior to performing the work. The submittal shall include a detailed estimate from the licensed asbestos removal contractor for the estimated cost of the removal and disposal.

**B. Force Account.** A separate Force Account will be maintained of the total asbestos removal work performed on each building, structure or highway to be worked on.

**210-5 BASIS OF PAYMENT.** Payment for the work, under this specification, shall include the cost of air quality monitoring, unless indicated elsewhere in the Contract Documents. Payment shall include all labor, materials, equipment, and asbestos related fees and insurances necessary to complete the asbestos removal and disposal work in accordance with the plans, specifications, and applicable Federal, State, and Local laws, rules, and regulations.

Payment shall not include "Jersey Barriers", "Shadow Vehicles" and other Maintenance and Protection of Traffic devices outside the regulated asbestos work area required by specific Applicable Variances (AV) and/or Blanket Variances (BV) shall be paid under their respective Item(s), as specified in the Contract Documents.

**210-5.01 Square Meter, Meter, or Lump Sum Bid Items.** Payment for 75% of the completed quantity will be made upon the Project Monitor's written concurrence with the Contractor's certification as to the following: that the building, structure and/or highway is visually free of asbestos; that the removal of the asbestos containing material was performed as required; that the final clearance air monitoring results meet the acceptable level specified in 12 NYCRR 56; and, that the building(s), bridge(s) and/or highway(s) are certified by the Asbestos contractor to be available for normal demolition. If there is no Project Monitor on the project, the Engineer's concurrence with the Certification will be necessary before any payments can be made.

The remainder of the payment for completed work will be made upon receipt by the Engineer of a certified statement from the disposal facility, signed by an official thereof, that the asbestos containing material has been accepted and disposed of in accordance with all applicable laws, codes, rules, and regulations.

**210-5.02 Fixed Price Lump Sum.** The fixed price lump sum published in the proposal is an amount estimated by the State to be adequate to complete the work. The Contractor will not be obligated to complete the work within the amount published nor will the State by publishing the price be obligated to pay over to the Contractor the whole or any of the amount published. Payments under this work will be made by Force Account or by Agreed Price, or by a combination thereof, as agreed to by the State and the Contractor in writing prior to undertaking the work. Payments may total less than the lump sum amount

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published in the proposal or, with an order-on-contract, may total more than the fixed price lump sum amount published in the proposal.

Payment for 75% of the Agreed Price or Force Account charges will be made upon the Project Monitor's written concurrence with the Contractor's certification as to the following: that the building, structure and/or highway is visually free of asbestos; the removal of the asbestos containing material was performed as required; that the final clearance air monitoring results meet the acceptable level specified in 12 NYCRR 56; and, that the building(s), bridge(s) and/or highway(s) are certified by the Asbestos contractor to be available for subsequent demolition and/or construction. If there is no Project Monitor on the project, the Engineer's concurrence with the Certification will be necessary before any payments can be released.

The remainder of the payment for completed work will be made upon receipt by the Engineer of a certified statement from the disposal facility, signed by an official thereof, that the asbestos containing material has been accepted and disposed of in accordance with all applicable laws, codes, rules, and regulations.

Asbestos specific insurance premiums will be reimbursed as the actual and identifiable cost of the portion of the premium attributable to the work performed under the Fixed Price Lump Sum Item. No overhead or profit will be allowed on asbestos specific insurance premiums.

### *Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
<b>Roofing (Buildings)</b>		
210.0102	Removal and Disposal of Asbestos-Containing Roofing Material	Square Meters
210.0103	Removal and Disposal of Asbestos-Containing Roofing Material	Lump Sum
210.0104	Removal and Disposal of Asbestos-Containing Roofing Material	Fixed Price Lump Sum
210.0112	Removal and Disposal of Asbestos-Containing Roofing Material (BV 11)	Square Meters
210.0113	Removal and Disposal of Asbestos-Containing Roofing Material (BV 11)	Lump Sum
210.0114	Removal and Disposal of Asbestos-Containing Roofing Material (BV 11)	Fixed Price Lump Sum
210.0122	Removal and Disposal of Asbestos-Containing Roofing Material (AV 119)	Square Meters
210.0123	Removal and Disposal of Asbestos-Containing Roofing Material (AV 119)	Lump Sum
210.0124	Removal and Disposal of Asbestos-Containing Roofing Material (AV 119)	Fixed Price Lump Sum
<b>Siding (Buildings)</b>		
210.0202	Removal and Disposal of Asbestos-Containing Siding Material	Square Meters
210.0203	Removal and Disposal of Asbestos-Containing Siding Material	Lump Sum
210.0204	Removal and Disposal of Asbestos-Containing Siding Material	Fixed Price Lump Sum
210.0212	Removal and Disposal of Asbestos-Containing Siding Material (BV 11)	Square Meters
210.0213	Removal and Disposal of Asbestos-Containing Siding Material (BV 11)	Lump Sum
210.0214	Removal and Disposal of Asbestos-Containing Siding Material (BV 11)	Fixed Price Lump Sum

210.0222	Removal and Disposal of Asbestos-Containing Siding Material (AV 89)	Square Meters
210.0223	Removal and Disposal of Asbestos-Containing Siding Material (AV 89)	Lump Sum
210.0224	Removal and Disposal of Asbestos-Containing Siding Material (AV 89)	Fixed Price Lump Sum

**Window Caulking and/or Glazing (Buildings)**

210.0301	Removal and Disposal of Asbestos-Containing Window Caulking and/or Glazing	Meter
210.0303	Removal and Disposal of Asbestos-Containing Window Caulking and/or Glazing	Lump Sum
210.0304	Removal and Disposal of Asbestos-Containing Window Caulking and/or Glazing	Fixed Price Lump Sum
210.0311	Removal and Disposal of Asbestos-Containing Window Caulking and/or Glazing (BV 11)	Meter
210.0313	Removal and Disposal of Asbestos-Containing Window Caulking and/or Glazing (BV 11)	Lump Sum
210.0314	Removal and Disposal of Asbestos-Containing Window Caulking and/or Glazing (BV 11)	Fixed Price Lump Sum

**Flooring (Buildings)**

210.0402	Removal and Disposal of Asbestos-Containing Flooring and/or Mastic	Square Meter
210.0403	Removal and Disposal of Asbestos-Containing Flooring and/or Mastic	Lump Sum
210.0404	Removal and Disposal of Asbestos-Containing Flooring and/or Mastic	Fixed Price Lump Sum
210.0412	Removal and Disposal of Asbestos-Containing Flooring and/or Mastic (AV 120)	Square Meter
210.0413	Removal and Disposal of Asbestos-Containing Flooring and/or Mastic (AV 120)	Lump Sum
210.0414	Removal and Disposal of Asbestos-Containing Flooring and/or Mastic (AV 120)	Fixed Price Lump Sum

**Ceilings (Buildings)**

210.0502	Removal and Disposal of Asbestos-Containing Ceilings	Square Meters
210.0503	Removal and Disposal of Asbestos-Containing Ceilings	Lump Sum
210.0504	Removal and Disposal of Asbestos-Containing Ceilings	Fixed Price Lump Sum
210.0512	Removal and Disposal of Asbestos-Containing Ceilings (AV86)	Square Meters
210.0513	Removal and Disposal of Asbestos-Containing Ceilings (AV 86)	Lump Sum
210.0514	Removal and Disposal of Asbestos-Containing Ceilings (AV 86)	Fixed Price Lump Sum

**Thermal System Insulation (Buildings)**

210.0601	Removal and Disposal of Asbestos-Containing Thermal System Insulation	Meters
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210.0602	Removal and Disposal of Asbestos-Containing Thermal System Insulation	Square Meters
210.0603	Removal and Disposal of Asbestos-Containing Thermal System Insulation	Lump Sum
210.0604	Removal and Disposal of Asbestos-Containing Thermal System Insulation	Fixed Price Lump Sum
210.0611	Removal and Disposal of Asbestos-Containing Thermal System Insulation (AV 87)	Meters
210.0613	Removal and Disposal of Asbestos-Containing Thermal System Insulation (AV 87)	Lump Sum
210.0614	Removal and Disposal of Asbestos-Containing Thermal System Insulation (AV 87)	Fixed Price Lump Sum
210.0621	Removal and Disposal of Asbestos-Containing Thermal System Insulation (AV 108)	Meters
210.0623	Removal and Disposal of Asbestos-Containing Thermal System Insulation (AV 108)	Lump Sum
210.0624	Removal and Disposal of Asbestos-Containing Thermal System Insulation (AV 108)	Fixed Price Lump Sum

**Miscellaneous (Buildings)**

210.4901	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Meters
210.4902	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Square Meters
210.4903	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Lump Sum
210.4904	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Fixed Price Lump Sum
210.4911	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 11)	Meters
210.4912	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 11)	Square Meters
210.4913	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 11)	Lump Sum
210.4914	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 11)	Fixed Price Lump Sum
210.4923	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (AV 106)	Lump Sum
210.4924	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (AV 106)	Fixed Price Lump Sum

**Concrete Encased Pipe (Bridges & Highways)**

210.5001	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe	Meter
210.5003	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe	Lump Sum
210.5004	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe	Fixed Price Lump Sum
210.5011	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe (BV 1)	Meter
210.5013	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe (BV 1)	Lump Sum
210.5014	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe (BV 1)	Fixed Price Lump Sum

210.5021	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe (BV 12)	Meter
210.5023	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe (BV 12)	Lump Sum
210.5024	Removal and Disposal of Concrete Encased Asbestos-Containing Pipe (BV 12)	Fixed Price Lump Sum

**Underground Pipe (Bridges & Highways)**

210.5101	Removal and Disposal of Underground Asbestos-Containing Pipe	Meters
210.5103	Removal and Disposal of Underground Asbestos-Containing Pipe	Lump Sum
210.5104	Removal and Disposal of Underground Asbestos-Containing Pipe	Fixed Price Lump Sum
210.5111	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 2)	Meters
210.5113	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 2)	Lump Sum
210.5114	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 2)	Fixed Price Lump Sum
210.5121	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 6R1)	Meters
210.5123	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 6R1)	Lump Sum
210.5124	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 6R1)	Fixed Price Lump Sum
210.5131	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 12)	Meters
210.5133	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 12)	Lump Sum
210.5134	Removal and Disposal of Underground Asbestos-Containing Pipe (BV 12)	Fixed Price Lump Sum
210.5141	Removal and Disposal of Underground Asbestos-Containing Pipe (AV 108)	Meters
210.5143	Removal and Disposal of Underground Asbestos-Containing Pipe (AV 108)	Lump Sum
210.5144	Removal and Disposal of Underground Asbestos-Containing Pipe (AV 108)	Fixed Price Lump Sum

**Suspended Pipe (Bridges & Highways)**

210.5201	Removal and Disposal of Suspended Asbestos-Containing Pipe	Meters
210.5203 M	Removal and Disposal of Suspended Asbestos-Containing Pipe	Lump Sum
210.5204	Removal and Disposal of Suspended Asbestos-Containing Pipe	Fixed Price Lump Sum
210.5211	Removal and Disposal of Suspended Asbestos-Containing Pipe (BV 3R1)	Meters
210.5213	Removal and Disposal of Suspended Asbestos-Containing Pipe (BV 3R1)	Lump Sum
210.5214	Removal and Disposal of Suspended Asbestos-Containing Pipe (BV 3R1)	Fixed Price Lump Sum
210.5221	Removal and Disposal of Suspended Asbestos-Containing Pipe (BV 12)	Meters

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210.5223	Removal and Disposal of Suspended Asbestos-Containing Pipe (BV 12)	Lump Sum
210.5224	Removal and Disposal of Suspended Asbestos-Containing Pipe (BV 12)	Fixed Price Lump Sum
210.5231	Removal and Disposal of Suspended Asbestos-Containing Pipe (AV 108)	Meters
210.5233	Removal and Disposal of Suspended Asbestos-Containing Pipe (AV 108)	Lump Sum
210.5234	Removal and Disposal of Suspended Asbestos-Containing Pipe (AV 108)	Fixed Price Lump Sum

**Bond Breakers and/or Joint Fillers (Bridges & Highways)**

210.5302	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers	Square Meters
210.5303	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers	Lump Sum
210.5304	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers	Fixed Price Lump Sum
210.5312	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 5)	Square Meters
210.5313	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 5)	Lump Sum
210.5314	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 5)	Fixed Price Lump Sum
210.5322	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 9)	Square Meters
210.5323	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 9)	Lump Sum
210.5324	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 9)	Fixed Price Lump Sum
210.5332	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 12)	Square Meters
210.5333	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 12)	Lump Sum
210.5334	Removal and Disposal of Asbestos-Containing Bond Breakers and/or Joint Fillers (BV 12)	Fixed Price Lump Sum

**Caulking (Bridges & Highways)**

210.5401	Removal and Disposal of Asbestos-Containing Caulking	Meter
210.5403	Removal and Disposal of Asbestos-Containing Caulking	Lump Sum
210.5404	Removal and Disposal of Asbestos-Containing Caulking	Fixed Price Lump Sum
210.5411	Removal and Disposal of Asbestos-Containing Caulking (BV 4)	Meter
210.5413	Removal and Disposal of Asbestos-Containing Caulking (BV 4)	Lump Sum
210.5414	Removal and Disposal of Asbestos-Containing Caulking (BV 4)	Fixed Price Lump Sum
210.5421	Removal and Disposal of Asbestos-Containing Caulking (BV 10)	Meter
210.5423	Removal and Disposal of Asbestos-Containing Caulking (BV 10)	Lump Sum

210.5424	Removal and Disposal of Asbestos-Containing Caulking (BV 10)	Fixed Price Lump Sum
210.5431	Removal and Disposal of Asbestos-Containing Caulking (BV 12)	Meter
210.5433	Removal and Disposal of Asbestos-Containing Caulking (BV 12)	Lump Sum
210.5434	Removal and Disposal of Asbestos-Containing Caulking (BV 12)	Fixed Price Lump Sum

**Asphalt (Bridges & Highways)**

210.5502	Removal and Disposal of Asbestos-Containing Asphalt	Square Meters
210.5503	Removal and Disposal of Asbestos-Containing Asphalt	Lump Sum
210.5504	Removal and Disposal of Asbestos-Containing Asphalt	Fixed Price Lump Sum
210.5512	Removal and Disposal of Asbestos-Containing Asphalt (BV 8)	Square Meters
210.5513	Removal and Disposal of Asbestos-Containing Asphalt (BV 8)	Lump Sum
210.5514	Removal and Disposal of Asbestos-Containing Asphalt (BV 8)	Fixed Price Lump Sum

**Miscellaneous (Bridges & Highways)**

210.9901	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Meters
210.9902	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Square Meters
210.9903	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Lump Sum
210.9904	Removal and Disposal of Miscellaneous Asbestos-Containing Materials	Fixed Price Lump Sum
210.9911	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 12)	Meters
210.9912	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 12)	Square Meters
210.9913	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 12)	Lump Sum
210.9914	Removal and Disposal of Miscellaneous Asbestos-Containing Materials (BV 12)	Fixed Price Lump Sum

**Item Number Codes**

210.xxyz

xx *Category*

01-49 *Buildings, 49 Miscellaneous (Buildings)*

50-99 *Bridges and Highways, 99 Miscellaneous (Bridges and Highways)*

y *BV or AV*

1-9 *In order of listing within the category, 0 No BV or AV*

z *Payment Method*

1 *Meters, 2 Square Meters, 3 Lump Sum, 4 Fixed Price Lump Sum*

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