SECTION 201 — STAKING

201.01 DESCRIPTION. When listed as a bid item, furnish all personnel, equipment, stakes, and hubs necessary to construct the roadway and appurtenant structures to the grade and alignment specified in the Contract. When no bid item is listed, the Department will perform staking.

201.02 MATERIALS AND EQUIPMENT. Reserved.

201.03 CONSTRUCTION.

201.03.01 Department Staking. The Department's Engineer will set all stakes necessary for the construction of the roadway and appurtenant structures to the proper grade and alignment in accordance with the contract.

201.03.02 Contractor Staking. Perform all necessary surveying under the general supervision of a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.

The Department's Engineer will perform the following:

1) Provide adequate control points to allow prompt re-establishment of the survey centerline, right-of-way, temporary easements, ramps, crossroads, frontage roads, and all other surveying needs during construction.
2) Take "check sections" to verify that construction is to grade and alignment as specified in the Contract.

The Contractor will perform the following:

1) Perform survey work using conventional methods or electronic methods capable of achieving the lines and grades the plans show for the work in question.
2) Re-establish the centerline and set such additional points as may be necessary for construction of the project. Verify the accuracy of the horizontal and vertical control as established by the Department's Engineer before beginning construction. Set permanent or temporary bench marks. Run a level loop through all control points and bench marks and provide copies of the supporting documentation to the Cabinet verifying the accuracy of each reference point prior to any work beginning on the project.
3) Establish clearing lines so that the project may be cleared without violating the limits of the right of way.
4) Protect and preserve known property and survey marks and land monuments.
5) Stake all structures (bridges, culverts, pipe, and other appurtenances) so that they can be built to the proper line and grade as shown on the plans and to perform the function for which they were designed.
6) Respond and provide accurate site measurements, construction checks, and layout stakes to the Engineer within 2 working days of the request.

201.03.03 Conventional Staking. Furnish, set, reference, and maintain stakes and markings necessary to establish the alignment, location, benchmarks, elevations, and continuous profile-grades for road and structure work as detailed in this section. Maintain neat, orderly, and complete survey notes, drawings, and computations used in establishing the lines and grades. Make the survey notes and computations available to the Engineer within 24 hours, upon request, as the work progresses. The following provisions apply:

1) Set slope stakes right and left of the survey centerline at 50-foot to 100-foot intervals to guide the contractor in constructing the cuts and fills. These stakes are generally set to shoulder grade for fills and ditch grade for cuts. The cut or fill information, slope, and distance from centerline should be on the front face

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Moved down [2]: <#>Set slope stakes right and left of the survey centerline at 50-foot to 100-foot intervals to guide the contractor in constructing the cuts and fills. These stakes are generally set to shoulder grade for fills and ditch grade for cuts. The cut or fill information, slope, and distance from centerline should be on the front face of the stake; the station number should be on the back of the stake. This stake should be guarded with a lath that has the station number written on the side facing the centerline.¶
Grade Stakes (Bluetops). Fine grade control will be set by the Contractor to establish sub-grade sections by setting hubs (referred to as blue tops) every 50 feet. These blue tops are set to the hundredth of a foot in elevation and are located left and right of pavement centerline, usually at the edge of metal. Bluetops will be set for the top of sub-grade and the top of aggregate base and/or drainage blanket material. Refer to Section 204.03.10 and Section 302.03.06 for construction tolerances of sub-grade and aggregate base or drainage blanket.¶

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of the stake; the station number should be on the back of the stake. This stake should be guarded with a lath that has the station number written on the side facing the centerline.

2) Grade Stakes (Bluetops). Fine grade control will be set by the Contractor to establish sub-grade sections by setting hubs (referred to as blue tops) every 50 feet. These blue tops are set to the hundredth of a foot in elevation and are located left and right of pavement centerline, usually at the edge of metal. Bluetops will be set for the top of sub-grade and the top of aggregate base and/or drainage blanket material. Refer to Section 204.03.10 and Section 302.03.06 for construction tolerances of sub-grade and aggregate base or drainage blanket.

201.03.04 Electronic Staking. The Department encourages the use of new and advanced technology in the construction of its roads and structures. The Department recognizes that there are various electronic survey instruments including robotic total stations, GPS, etc. Provide survey instruments and supporting equipment that can achieve the specified tolerances. Not all survey methods are suitable for all projects and construction activities. Projects with dense tree canopies, large vertical cuts, or limited survey control may prevent some equipment from meeting the minimum construction tolerances required. In these cases, the Engineer will determine if alternative surveying methods are necessary to meet the minimum construction tolerances. When the Engineer allows the use of electronic staking methods, the following provisions shall apply:

1) Tolerances are unchanged. Refer to Section 204.03.10 and Section 302.03.06.
2) The contractor will create a digital terrain model (DTM) based upon the plans provided by the Department.
3) The contractor will perform a site calibration using initial project control that was established by the Department and verified utilizing level loops by the Contractor.
4) The Contractor will submit his electronic data files, including the project DTM, to the Department's Engineer as they are developed so that the Engineer can reference the data for verification of the field work.
5) Check instruments against the control in the presence of Department personnel at least once per shift.
6) Check the work against the plan elevation on cross-sections located at stations evenly divisible by 50 at the selected construction milestones as detailed herein. Notify the Engineer immediately if a check exceeds the tolerances referenced in 201.03.03.1 above. Submit the results of these checks to the Engineer for approval prior to constructing the next phase.
   a) Check stations will be required at subgrade, top of aggregate base, and top of asphalt base at intersections and construction tie-ins.
   b) Check sections are to be done every 500 feet in tangent sections, every 250 feet in curves and every 50 feet within 250 feet of intersections and construction tie-ins. Define the check section locations by approved means which may be a hub and stake, paint marks, pin flags or other methods approved by the engineer. Check stations should be identified with centerline station, offset, if any, and elevation plainly marked. At the Engineer's discretion, electronic methods may be used to establish locations and verify vertical and horizontal grades for check stations at the same frequency and may be checked concurrently by contractor and Department personnel in lieu of setting the physical stakes.
   c) Check station submittals shall include Control Elevation, Control Tie-in Elevation, Station/Offset, Design Elevation, As-surveyed Elevation, and Coordinates
7) If at any point during construction there is doubt as to the accuracy of the electronic staking methods in relation to slopes, horizontal or vertical alignment, the Department may require conventional staking methods such as installation/reinstallation of slope stakes, bench marks, or temporary bench

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marks as needed for proper project reference points. Provide electronic field book reports that clearly define survey numbers with x, y, z coordinates, horizontal and vertical roadway alignments, templates, digital terrain models (DTMs) and any other digital background files used.

201.04 MEASUREMENT.

201.04.01 Contractor Staking. When listed as a bid item, the Department will measure staking as lump sum. The Department will not measure surveying required to correct any errors or inaccuracies resulting from construction operations for payment. Complete the general layout of the project under the supervision of a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.

201.04.02 Department Staking. The Department will not measure quantities for payment. When any stakes are disturbed due to unwarranted negligence of the Contractor, the Department will measure the work required to reset the stakes and deduct the cost from monies due the Contractor.

201.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02726	Staking	Lump Sum

The Department will consider payment as full compensation for all work required under this section.

SECTION 202 — CLEARING AND GRUBBING

202.01 DESCRIPTION. Clear, grub, remove, and dispose of all vegetation, buildings and foundations not removed by others, and debris within designated limits inside the right-of-way and easement areas. Do not remove objects designated to remain or to be removed according to other provisions of the Contract. Also, protect from injury or defacement all vegetation and objects designated to remain.

202.02 MATERIALS AND EQUIPMENT. Reserved.

202.03 CONSTRUCTION. Notify the Natural Resources and Environmental Protection Cabinet, Division of Air Quality in writing before demolishing any building located within the right-of-way.

When unexpected asbestos, underground storage tanks, or other hazardous materials are encountered, cease operations and notify the Engineer.

The Engineer will designate all trees, shrubs, plants, and other items to remain. For cut or scarred surfaces of trees or shrubs selected for retention, perform tree trimming surgery as the Engineer directs.

202.03.01 Clearing and Grubbing. Clear the entire area of the right-of-way of all weeds, brush, briers, bushes, trees, stumps, and other protruding obstructions, except within areas the Engineer designates to remain undisturbed. In addition, grub all bushes, trees, roots, and stumps within the line of slope stakes, except undisturbed stumps, roots, and nonperishable solid objects which will be a minimum of 3 feet below subgrade or slope of embankments. Remove stumps and nonperishable solid objects under embankments more than 6 inches above the groundline or low water level.

Perform all clearing and grubbing operations according to Sections 212 and 213.

Completely dispose of any materials resulting from clearing and grubbing by approved methods at approved locations. The Department will allow burning of perishable material when performed according to Regulation 401 KAR 63:005. When conditions or 401 KAR 63:005 prohibit burning, use an alternate approved method. When disposal is by burying, provide a cover of at least one foot, and grade and shape as the Engineer directs. Obtain written approval from the Engineer before placing any organic material within the right-of-way.

Do not place any material resulting from clearing and grubbing off the right-of-way without written permission from the property owner. Furnish a copy of the owner's written permission to the Engineer.

Do not place material resulting from clearing and grubbing on the right-of-way within view of any public road, without written approval. The Engineer may require the material placed within view of a public road to be covered with soil that will support vegetation. Seed and protect the soil as required by the Contract.

Take ownership of all merchantable timber in the clearing area that has not been removed from the right-of-way before starting construction.

Remove low hanging, unsound, and unsightly branches on trees and shrubs designated to remain, as directed. Trim branches of trees extending over the roadbed surface to provide a minimum clear height of 20 feet.

When specified in the Plans or required by the Engineer, construct brush barriers according to Subsection 212.03.01.

When utility relocation is still being performed, or is part of the work, schedule the clearing of the utility easements as a priority to expedite their relocation.

202.03.02 Removing Trees or Stumps. Remove and dispose of the tree, stump, and roots.

202.04 MEASUREMENT. The Department will not measure both Clearing and Grubbing and Removing Trees or Stumps on the same area. The Department will not measure necessary Clearing and Grubbing or Removal of Trees or Stumps when not listed as a separate bid item.

202.04.01 Clearing and Grubbing. The Department will specify in the Plans the quantities of the entire area of right-of-way, including all easements, in acres, but will measure by lump sum. The Department will not consider discrepancies in the plan quantity unless they are directly caused by approved plan changes.

202.04.02 Removing Trees or Stumps. The Department will measure the quantity by each individual unit when included as a bid item. The Department will include only trees or stumps one foot in diameter or larger, measured 2 feet above the ground or across the top of existing stumps less than 2 feet in height. The Department will not measure the removal of smaller trees or stumps for payment and will consider their removal incidental to this item of work.

202.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02545	Clearing and Grubbing	Lump Sum
02460	Remove Trees or Stumps	Each

For changes in payment for Clearing and Grubbing, due to approved plan changes, the Department will compute these changes at a unit price rate based on the lump sum price bid divided by the total estimated area of Clearing and Grubbing specified in the original Plans.

The Department will consider payment as full compensation for all work required under this section.

SECTION 203 — REMOVAL OF STRUCTURES AND OBSTRUCTIONS

203.01 DESCRIPTION. Remove, wholly or in part, and dispose of fences, structures, pavements, abandoned pipelines, and any other obstructions outside the typical section that are not designated or allowed to remain. Also, salvage designated materials, and backfill the resulting trenches, holes, and pits.

203.02 MATERIALS AND EQUIPMENT. Reserved.

203.03 CONSTRUCTION. Raze, remove, and dispose of all structures, fences, and other obstructions, any portions of which are on the right-of-way. Remove all designated salvable material without damage and store within the project limits, as the Engineer directs.

Fill basements or cavities left by structure removal to the level of the surrounding ground and, when within embankment limits, fill according to Section 206.

Clean all septic tanks within the permanent right-of-way according to Subsection 107.01, and fill them with granular material or remove them as the Engineer directs.

Except for removing structures or pipe, backfilling cavities left by structure removal, and removing or filling septic tanks, perform all work described in this section only in areas that are outside the typical section. Perform removal work within the typical section according to Sections 202, 204, 206, and 603.

203.03.01 Existing Bridges. Remove all existing structures, including foundations, conforming to the definition of a bridge.

Take ownership of existing structures, and dispose of them according to Subsection 202.03. Immediately remove any material entering the stream due to removing the existing structure from the waterway.

When specified in the Contract, remove the members of the superstructure, without damage, in transportable sections, and carefully store them on the right-of-way at an accessible location above high water. Before removing the superstructure, matchmark the parts with paint.

Remove all portions of abutments exposed in the finished work, all of the piers above the stream bed, and any parts of either abutments or piers that interfere with planned construction of the new work.

Excavate existing embankment approaches to structures removed, and lying outside the limits of the new construction, to a minimum slope of 2:1.

203.03.02 Masonry Structures other than Bridges. Completely remove existing structures, including their foundations, as specified in the Contract. Dispose of the resulting material, and fill any resulting holes or pits. Excavate all slopes that may result, such as stream sides, that lie outside the limits of new construction to a minimum slope of 2:1.

203.03.03 Partial Removal of Structures. When the Contract specifies using any parts of an existing structure as permanent parts of a new structure, remove only such portions specified in the Contract. Repair all damage caused to the portion remaining.

In removing manholes, catch basins, and inlets, connecting live sewers, rebuild and properly reconnect them. Maintain satisfactory by-pass service during such construction operations.

203.03.04 Removing Pipe. Conform to Section 701.

203.03.05 Removing Guardrail. Conform to Section 719.

203.03.06 Pavement, Sidewalks, Curbs, and Similar Items. Completely remove all cement concrete pavement or base, sidewalks, curbs, gutters, paved ditches, asphalt pavements, granular bases, and similar items.

When the Contract specifies leaving portions of the existing structures in place, remove the old structures to an existing joint, or cut them to a true line with a vertical face. Remove structures to provide for proper grades and connections in the new work.

203.04 MEASUREMENT. The Department will not measure for payment items removed from within the typical section, except for structures, guardrail, and septic tanks.

The Department will measure removing pipe according to Section 701 and removing guardrail according to Section 719.

When only removing a portion of an existing structure, the Department will measure the various items separately.

203.04.01 Removing Existing Structure. Unless a bid item is included in the proposal, the Department will not measure structures other than bridges and concrete box culverts for payment. When a bid item is included in the proposal, the Department will measure the quantity as the number of structures of the type specified actually removed.

The Department will not measure excavation for removing and shaping slopes for payment and will consider it incidental to this item of work.

203.04.02 Removing Concrete Masonry. The Department will not measure removing concrete masonry but will make final payment at the Contract unit price for the design quantity specified in the plans. When it can be shown actual quantities vary from the design quantity by more than 10 percent, the Department will measure the actual quantity in cubic yards.

203.04.03 Removing (Wet or Dry) Stone Masonry. The Department will measure the quantity in cubic yards.

203.04.04 Septic Tank Treatment. The Department will measure the quantity by each individual unit treatment, cleaning and filling, or removing.

203.04.05 Other Items as Listed in the Contract. The Department will measure these quantities in the units established in the Contract.

203.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02731	Remove Structure	Lump Sum
02403	Remove Concrete Masonry	Cubic Yard
02402	Remove Stone Masonry	Cubic Yard
02404	Septic Tank Treatment	Each
-----	Other items as listed in the Contract	As established in the Contact

The Department will consider payment as full compensation for all work required under this section.

SECTION 204 — ROADWAY AND DRAINAGE EXCAVATION

204.01 DESCRIPTION. Remove and dispose of all materials taken from within limits of the work contracted, meaning the calculated material lying between the original ground line and the excavation limits established or approved by the Engineer as shown on the final cross sections.

204.02 MATERIALS AND EQUIPMENT. Reserved.

204.03 CONSTRUCTION. Excavate for cuts and roadbeds, embankment foundation benches, embankment subgrades, under-cutting subgrades in cut sections, shoulders, slopes, ditches, waterways, intersections, approaches, balance excavation, inlet and outlet ditches, and channel changes, all as specified in the Contract.

Remove and dispose of miscellaneous structures from within the limits of the typical section according to Section 203.

Protect and preserve all existing culverts, pipelines, conduits, subdrains, or parts there of that may continue to be used without any change. Repair or replace any culvert, pipeline, conduit, or subdrain damaged from operations or negligence during the life of the Contract.

During construction, ensure that the roadway is well drained at all times.

204.03.01 Classification. Without regard to the materials encountered, all roadway and drainage excavation is unclassified and the Department will consider it Roadway Excavation. Any reference to rock, earth, or any other material on the Plans or cross sections, whether in numbers, words, letters, or lines, is solely for the Department's information and is not an indication of classified excavation or the quantity of either rock, earth, or any other material involved. The bidder must draw his own conclusions as to the conditions to be encountered. The Department does not give any guarantee as to the accuracy of the data and will not consider any claim for additional compensation when the materials encountered are not in accord with the classification shown.

204.03.02 Slopes. Do not remove or loosen any material outside of the required slopes. Leave all rock cut slopes with a uniform surface, and remove all loose or overhanging rock. Do not gouge or dig holes in back slopes or in embankment slopes.

The Engineer may vary the slopes in cuts during construction, depending upon the material encountered in excavation to secure sufficient material for the formation of embankment and shoulders, to prevent landslides, to improve sight distance, or for any other reasons widening or variations are deemed to be to the best advantage of the work. When making a cut on any section of the roadway in any material that may slide, excavate to the slope lines as specified in the Plans or as the Engineer directs. Do not form vertical slopes during the process of excavation of such cuts, except in stage construction when leaving material in cuts for future shoulder construction.

204.03.03 Serrated Slopes. When the Plans designate locations to construct serrated slopes and when soft rock or shale are encountered at the designated locations, excavate these materials by bulldozing or ripping, without drilling and blasting, in a manner that serrates the cut faces to a stepped pattern.

Round all soil overburden and talus material above the serrated slopes to blend with the original ground. Construct the top half step tread of a serrated slope just below the surface where the soil overburden contacts the soft rock or shale and continue the steps to the bottom of the cut slope, unless hard rock or hard shale formations are encountered which indicate that the lower limits of the rock disintegration zone have been reached. When hard rock or hard shale formations which must be blasted are encountered within the cuts being serrated, end the steps of the serrated slope by blending them into the hard rock or shale. Construct the step risers in the serrated slopes to the height specified in the Plans with the approximate width of the step treads being the height of the risers multiplied by the designated cut slope ratio. Make the midpoints of treads of the steps coincide approximately with the staked slope lines. Blend the first and last steps of a serrated slope into the staked slope line. Construct the first and last steps of a serrated slope to a width of approximately one-half the normal step tread width. Construct the step treads approximately level rather than parallel to the ditch line grades. When the steps extend throughout the length of a cut, round the ends of the steps and blend them into the adjacent ground.

The Engineer will not require thorough final dressing of the serrated slopes. However, remove large pieces of rock or other dangerous material which might fall from the steps and create safety hazards or maintenance problems. Seed and protect the serrated slopes according to the Plans and Section 212.

204.03.04 Presplitting. Presplit all rock and shale formations within the roadway excavation limits that are conducive to excavation by drilling and blasting at the designated slope lines. Perform the presplitting before blasting and excavating the interior portion of the specified cross section at any location.

Perform presplitting to obtain smooth faces in the rock and shale formations. Develop presplit faces that are free of all loose or crushed pieces and do not deviate more than 6 inches inwardly from the designated slope lines or offset drill holes, nor more than one foot outwardly, except where seams, broken formations, or earth pockets may cause unavoidable irregularities. The Engineer may stop the presplitting when he determines that materials have become unsuitable for presplitting. The Department will measure for payment material lying outside the typical section that must be removed due to seams, broken formations, or earth pockets, including any earth overburden removed with this material.

204.03.05 Landslides. When directed, remove and dispose of all landslides. The Department will measure landslides in place, by the cross-section method, before removal of material.

204.03.06 Ditches. Ditches include channel changes, inlet and outlet ditches, side ditches, surface ditches, wing ditches, and such other required ditches.

Construct side ditches draining from cuts toward embankments to avoid erosion damage to embankments by directing water coming from cuts away from fills.

Do not place material removed in cleaning or opening of ditches on cut slopes. Remove all debris from ditches before requesting formal acceptance.

204.03.07 Use of Excavated Materials. Use all suitable excavated material in the formation of embankments, subgrade, or shoulders; as backfill for structures; or for other purposes specified in the Contract.

Remove and dispose of all sod and soft or spongy material. Do not use such materials in the construction of the grade, except as provided in Subsection 206.03.

Take ownership and dispose of any coal excavated from the project within the typical section, or as directed. Do not use coal in embankments except in small quantities and then only when thoroughly mixed with other materials.

Do not dispose of excavated material without approval. Do not assume disposal sites for excess excavation are available within the right-of-way. When approved, dispose of excess material adjacent to the embankment or incorporate it in the normal embankment construction within the right-of-way limits. Do not perform irregular or partial widening of embankments. Do not place excess material between cut slopes and the right-of-way limits, except for the purpose of filling depressions, gullies, and other cavities; and, when so placed, shape the material to conform with the adjacent ground.

A) Channel Lining, Class IV. Prepare broken stone from formations consisting primarily of limestone, or if specified in the Plans, durable sandstone or durable shale (SDI equal to or greater than 95 according to KM 64-513) that are encountered in roadway excavation or obtained from borrow excavation.

Provide stone so that at least 80 percent, by volume, of individual stones range in size from 1/4 to 1 1/2 cubic foot. Use smaller sized stones for filling voids in the upper surface and dressing to the proper slope. The Engineer will accept the size and gradation of the material based on visual inspection. The Engineer may allow material not conforming to the specified size and gradation when it is acceptable for the intended use.

Shape ditches and channels as specified to receive the channel lining. Unless solid rock is encountered, begin the channel lining in a trench 2 feet below the natural ground or 2 feet below the channel flowline when the flowline is not lined. Where encountering solid rock, end the slope protection at the solid rock line.

Construct Channel Lining, Class IV to the minimum thickness specified in the Plans. Place the stone in a manner to produce a surface not varying more than 6 inches from a true plane.

B) Spreading Stockpiled Topsoil. If the Contract includes Spreading Stockpiled

Topsoil as a bid item, or when otherwise specified in the Contract, salvage topsoil from within the limits of the slope lines and store it in stockpiles. Before removing the topsoil, clear the areas of all weeds, brush, stumps, stones, and other debris. Remove the topsoil only from areas and to depths specified in the Plans or as the Engineer directs. Avoid mixing subsoil or other unsuitable material with the topsoil. Place sod removed from embankment areas according to Subsection 206.03 in the topsoil stockpiles. Place the stockpiles along the project at approved locations. Neatly dress each stockpile, when completed. Perform temporary or permanent seeding on the stockpiles.

When Spreading Stockpiled Topsoil is a bid item, the Department will allow the topsoil to be spread directly on the areas designated to receive the topsoil, without stockpiling, provided that seeding and protection operations are ready to begin.

204.03.08 Disposal of Excess Material. When excess material is encountered on a project, dispose of it according to section 205.02.

204.03.09 Roadbed. In addition to the limits of the roadbed as defined in Subsection 101.03, extend the roadway excavation to the ditch lines in cuts. Conduct roadway excavation operations to make available a sufficient quantity of selected materials to complete the roadbed.

Remove all rock between ditch lines to a depth below the required grade as specified in the Plans or as staked. Unless otherwise specified in the project plans or proposal all solid rock excavation in roadway cuts is to extend at least one (1) foot below top of subgrade elevation. Leave the final surface of the rock to provide complete drainage. Construct the refill over this surface with select material having no stone or spalls larger than 4 inches. Place all refill in lifts not exceeding one foot in depth, loose measurement, and compact according to Subsection 206.03. The Engineer will make no allowance for excavation and refill material to a greater depth below the required grade than as specified in the Plans or as staked.

When encountering unsuitable material at subgrade elevation, remove the material to the depths specified in the Plans or as directed. Dry and use material that is unstable due to excessive moisture but otherwise suitable. Dispose of the material or use the material as refill in embankments as the Engineer directs. Refill with suitable material.

A) Rock Roadbed. Conduct blasting and excavation operations to make available a sufficient quantity of rock to complete the roadbed.

Construct rock roadbed using limestone, durable sandstone, or durable shale (SDI equal to or greater than 95 according to KM 64-513) that is encountered in the roadway excavation or obtained from borrow excavation. Do not use rock fragments that exceed one foot.

Excavate all cuts to a minimum of 2 feet below the final subgrade elevation and refill with rock in 2 lifts, each approximately one foot thick. Leave the excavated surface to provide complete drainage. If excavation is deeper than 2 feet below subgrade, construct the top 2 feet in 2 lifts, each approximately one foot thick and the remaining in lifts not exceeding one foot using rock conforming to this section.

Construct rock roadbed from ditch line to ditch line in cuts, from shoulder to shoulder in fills, and throughout the entire project including mainline, ramps, and approach roads.

Perform all handling, stockpiling, or hauling manipulations, including overhauling, necessary to provide for the proper distribution of the broken stone.

In all instances, dump, spread, and smooth each one-foot lift, and compact each lift by vibratory rollers weighing at least 5 tons to minimize voids and bridging.

B) Chemically Stabilized Roadbed. Construct according to Section 208.

204.03.10 Construction Tolerances. Make every reasonable effort to construct the project uniformly within the following allowable tolerances and in a manner that will minimize the field measurements and computations required to determine if the work is satisfactory.

The Department will allow the following tolerances before making payment for any decreases in the quantity or before requiring the rework of the constructed item:

1) Do not deviate the distance from centerline to the ditch lines in cuts and the shoulder lines in fills more than one foot from the dimension specified in the Plans. Ensure that the total width of the roadbed is not deficient by more than one foot at any location.
2) Ensure that the sloped surfaces between the ditch lines or shoulder lines and the original ground are not inside the specified slope limits more than 6 inches or outside the specified slope limits more than one foot, both measured horizontally.
3) Excavate cut benches to within one foot above or below the bench elevation specified in the Plans or established by the Engineer.
4) The Department will not make payment for any earthwork performed outside the limits specified by the neat lines of the cross sections on the Plans or by the Engineer. Do not remove or place any extra material more than one foot outside of these limits without permission, except as provided in Subsections 204.03.04 and 206.03.
5) On grade and drain projects where surfacing is not included, complete the subgrade to within ± 0.1 foot of the designated grade at the time of final acceptance, except that when rock roadbed is specified, complete it to within ± 0.2 foot.
6) Ensure that all subgrades being prepared for base or surface courses, except traffic bound courses, are within ± 1/2 inch of the specified crown section, except that when rock roadbed is specified, complete it to within ± 2 inches. Uniformly construct these subgrades so the subsequent base and surface courses can be constructed within their specified tolerances.

204.04 MEASUREMENT.

204.04.01 Payment for Design Quantities. Unless the Contract provides for payment based on field measurements of material excavated, the Department will not measure Roadway Excavation but will make final payment at the Contract unit price for the design quantity specified within the neat lines of the cross sections on the Plans, increased or decreased by authorized adjustments.

The Department will determine the final quantity of Embankment-in-Place as the design quantity, increased or decreased by authorized adjustments.

The Department will not consider any quantity specified in the Plans for contingencies to be part of the design quantity. The Department will include only the portion of the contingency quantity actually used, as determined by the Engineer's measurements.

204.04.02 Authorized Adjustments. The Department will only make adjustments to the design quantities of Roadway Excavation or Embankment-in-Place authorized by the Engineer for the following reasons:

1) Changes in the quantity of work due to benching, undercutting, changing slopes or grades, removing slides, and any other required procedures.
2) Decreases in the quantity because of acceptable work not conforming to established tolerances.
3) Corrections of major errors on the Plans. Major errors are defined as individual mistakes of 3 percent or more in the quantity of earthwork between 2 consecutive cross sections, for omissions, duplications, or other errors in the survey or on the Plans, but not for minor discrepancies in the plotting of cross sections and in the resulting computation of the volume of earthwork. When errors in the lines or grades specified in the Plans cause major errors in earthwork quantities, the Department will correct the earthwork quantities throughout the entire span of the errors. The Department will not adjust earthwork quantities when errors in the lines or grades do not cause major errors in the earthwork quantities.
4) Arithmetical mistakes.
5) Any assumed errors or omissions in the original ground line must be brought to the attention of the Engineer before beginning earthwork with copies of the survey elevations. If the error is found after earthwork activities have began, inform the Engineer within 12 hours and allow the Engineer to check the elevations and orientation of the ground line. Failure to notify the Engineer or failure to allow the Engineer to check the ground line for errors absolves the Cabinet of any claims based on errors or omissions on the location of the ground line.

204.04.03 Serrated Slopes. The Department will not measure this work for payment and will consider it incidental to either Roadway Excavation or Embankment-in-Place, as applicable.

The Department will not measure for payment any breakage of the soft rock or other material outside the staked slope line.

204.04.04 Presplitting. The Department will not measure this work for payment and will consider it incidental to either Roadway Excavation or Embankment-in-Place, as applicable. However, if the Engineer directs in writing slope changes, then the Department will pay for the second presplitting operation as Extra Work.

The Department will not measure for payment any extra material excavated because of the drill holes being offset outside the designated slope lines.

The Department will not measure for payment any material including any earth overburden necessary to be removed due to the Contractor's faulty blasting practices.

204.04.05 Roadbed. The Department will measure the quantity in cubic yards as Roadway Excavation, Borrow Excavation, or Embankment-in-Place, as applicable. The Department will not measure any special work necessary to perform rock roadbed construction for payment and will consider it incidental to the earthwork bid item.

The Department will measure the removal of unsuitable material as Roadway Excavation. The Department will measure any additional material necessary for refill as Roadway Excavation or Borrow Excavation, at its origin. When the material is removed from the roadbed and disposed of without the Engineer's permission, the Department will not measure for payment any required refill material.

The Department will not measure for payment rock refill exceeding 2 feet.

204.04.06 Landslides. The Department will measure the quantity in cubic yards as Roadway Excavation or Embankment-in-Place, as applicable. The Department will not measure for payment the removal and disposal of any landslides resulting from faulty operations.

Whenever a landslide extends beyond the right-of-way in wooded areas, and the Engineer directs trees and stumps be removed, the Department will measure for payment clearing of the additional area under Clearing and Grubbing or Removing Trees and Stumps, as provided in the original Contract.

204.04.07 Ditches. When Ditching or Ditching and Shouldering are listed as a bid item, the Department will measure this according to Subsection 209.04. When Ditching or Ditching and Shouldering are not listed as a bid item, the Department will not measure this work for payment and will consider it incidental to either Roadway Excavation or Embankment-in-Place, as applicable.

204.04.08 Roadway Excavation. The Department will measure the quantity in cubic yards based on design quantities with authorized adjustments. The Department will base the measurement of the roadway excavation quantities at locations where serrated slopes are constructed on the areas and volumes defined by the staked slope lines. The Department will not measure for payment any excavated material used for any purpose other than that the Plans specify or the Engineer approves.

When the Contract provides for payment based on field measurements of the material excavated, the Department will measure the roadway excavation in its original position by taking cross sections before the work starts and after it is entirely completed. The Department will compute the volume by the average end-area method. The Department will include in its measurement all unavoidable slides and authorized excavation of any material below the subgrade.

Where material has been excavated beyond the slope line and disposed of, without being authorized, the Department will measure the disposed material and deduct it from the excavated quantities.

In determining the amount of excess material to be deducted as the result of excavation beyond the slope lines set by the Engineer, and disposed of, the Department will consider only that portion outside of one foot additional width of embankment on each side, widened uniformly. The Department will measure the volume and deduct it from the excavation quantities without regard to swell or shrinkage factors.

Where the amount of roadway excavation is not enough to construct the embankments

as shown on the plans, the Department will authorize adjustments to excavation quantities. The Department will consider excavated material used to complete embankments, refill or backfill and obtained from beyond the limits of the roadway section, but within the right-of-way, as balance excavation and will make payment for the material as Roadway Excavation. When the balance of the material is obtained from outside of the right-of-way, the Department will negotiate a cost for the material prior to the work beginning.

204.04.09 Excess Material. When an excess of material exists and is not due to authorized adjustments, the Department will consider the acquisition of an excess excavation storage site, the disposal of excess material, and the provision of erosion control for the site and haul roads incidental to either Roadway Excavation or Embankment-in-Place, as applicable. If the excess material is due to authorized adjustments, the Department will make provisions for an excess material storage site and measure erosion control work for payment according to Subsection 212.04.

204.04.10 Overhaul. The Department will measure the quantity only for excavation added due to authorized adjustments. For all other excavation quantities, the Department will not measure this work for payment and will consider it incidental to either Roadway Excavation or Embankment-in-Place, as applicable.

The Department will measure material removed from within Right of Way as additional Roadway Excavation or Embankment in place and pay for it as an adjustment to plan quantity. The Department will measure the quantity of material excavated from off of Right of Way by the Cubic Yard Station. A Cubic Yard Station is the product of the volume of material hauled in cubic yards and the distance that the material is hauled, in excess of the 2,000 feet of free haul, in stations of 100 feet, as determined by the Mass Diagram Method or by analytical methods, up to a total distance of 50 stations. If haul distance exceeds 50 stations (5000 feet) the cost of disposing of material will be by negotiated price adjustment. No work is to be performed until the price has been negotiated and approved by both parties. Notify the Engineer prior to the commencement of any overhaul work.

The Department will pay for Overhaul at 2 percent of the Contract unit price for Roadway Excavation or Embankment-In-Place for each Cubic Yard Station, up to a limit of 50 stations. The Department will negotiate a price for any overhaul exceeding the 50 station limit.

OVERHAUL [1]	
Haul Distance (feet)	Price Determination
0-2000	Free Haul
2001-7000	D = M * S * U * .02
7001+	Negotiate Price [2]

M = Cubic Yards of Material Excavated
S = Number of 100' Stations Between 2001' and 7000' Haul Distances
U = Unit Price of Excavation
D = Dollar Amount of Overhaul

*[1] Overhaul will not be paid unless the Engineer has been notified prior to the commencement of **any** overhaul work.*
[2] Negotiated price must be determined prior to any overhaul work commencing.

204.04.11 Channel Lining, Class IV. Channel Lining, Class IV, will be measured in cubic yards as Roadway Excavation, Borrow Excavation, or Embankment-in-Place, as applicable. Placing and grading Channel Lining, Class IV will be measured in cubic yards.

204.04.12 Water. The Department will not measure for payment water used to provide sufficient moisture for compaction of the roadbed in cut sections.

204.05 PAYMENT. The Department will make payment for the completed and accepted

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quantities under the following:

Code	Pay Item	Pay Unit
02200	Roadway Excavation	Cubic Yard
10300NX	Overhaul	Dollars
02488	Channel Lining, Class IV	Cubic Yard
05998	Spreading Stockpiled Topsoil	Cubic Yard

The Department will consider payment as full compensation for all work required under this section.

SECTION 205 — BORROW, EXCESS EXCAVATION, AND OFF RIGHT OF WAY SITES

205.01 DESCRIPTION. Locate and acquire areas on or off of the right of way to either dispose of excess material or obtain additional material needed to construct the project according to plans.

205.02 DISPOSAL OF EXCESS MATERIAL. Obtain approved sites for placing excess material on or off the right-of-way. When placing material, avoid any unsightly appearance. Place all excess material to avoid the obstruction of drainage. Seed and protect the excess material site and all temporary haul roads.

When encountering unanticipated excess material resulting from landslides or approved slope changes, place it within the right-of-way at sites designated by the Engineer, or dispose of it off the right-of-way at sites either acquired by or approved by the Department.

205.03 BORROW SITES. Use soil borrow materials with a minimum dry weight equal to or greater than the usable soils within the project limits as determined according to KM 64-511, and compact the materials to an in-place density according to Subsection 206.03.03. Furnish and place special borrow materials according to the Contract.

The Department will not allow excavation of borrow pits adjacent to the toe of any embankment. The Department will pay for the geotechnical investigation and analysis of the proposed excess material storage area when one is requested by the Engineer. Ensure all work is performed by a pre-qualified geotechnical consultant and according to the Department's Geotechnical Manual.

205.04 ENVIRONMENTAL AND PERMITTING REQUIREMENTS FOR OFF RIGHT OF WAY SITES. The Cabinet attempts to always provide adequate right-of-way to complete the construction of projects however, additional areas are sometimes required by the contractor to construct a project. These additional areas are often obtained by the contractor from private landowners through Consent and Release agreements or other arrangements. These areas are often used for waste or borrow sites, staging areas, material, equipment storage, and other ancillary activities. These additional areas are legally considered a part of the project's undertaking. Therefore, these areas must be environmentally cleared in order to be used by the contractor. If additional areas are required by the contractor, then the contractor shall first contact the Engineer to see if the area in question has already been environmentally cleared. If these additional areas have not already been environmentally cleared, the Contractor is responsible for obtaining any clearances from all applicable regulatory agencies prior to use. When approving the use of off right-of-way sites, the Cabinet will determine the level of clearance required.

If, at any point during the project, any archaeological materials are encountered, cease work in the immediate area and notify the Engineer. Provide a professional archaeologist to conduct the necessary investigations to determine the significance of the cultural resources. Avoid the area of discovery until the investigation is complete. Should the resources prove to be significant (eligible for the National Register of Historic Places), fulfill the requirements of Section 106 of the Historic Preservation Act before proceeding. When operations on the project are suspended due to the unanticipated finding of archaeological materials in a previously approved site, the Department may adjust the Contract time according to Subsection 108.07.

205.05 SUBMITTALS. Before using any area for proposed borrow or excess material storage, staging, material and equipment storage, etc., submit the following for approval:

1) A map of areas to be used; description of impacts; schedule of impacts.
2) Copies of a written agreement with the property owner, approval of the owner(s) of utilities of any nature existing within the proposed area.
3) Areas outside of the project's area of potential of effect, submit approved permits from all applicable regulatory agencies including but not limited to the Energy and Environment Cabinet - Division of Water, Kentucky State Historic Preservation Office, US Forest Service, US Coast Guard, US Fish and Wildlife Service, US Army Corps of Engineers, Planning and Zoning Commissions.

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Before using any site for borrow material, certify to the Department that a professional archaeologist has performed an archaeological reconnaissance survey on the site and has completed a report confirming the presence, on the site, of any known cultural resources affected that are eligible for, or on, the national register of historic places. Additionally, certify to the Department that the state historic preservation officer has reviewed the professional archaeologist's survey report of the site, and concurs with his findings. If any applicable cultural resources are present, mitigate according to Section 106 of the Historical Preservation act of 1966 and certify that the adverse effects upon the resources have been palliated before using the site for borrow material.¶
For borrow sites designated by the Department, the Department is responsible for assurances relative to cultural resources pursuant to the Historical Preservation Act of 1966.¶

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Submittals for proposed borrow or excess material storage areas shall include drawings showing the configuration of the original ground and the anticipated configuration of the area upon completion of the operations; any preparatory work such as benching; provisions for drainage of the area after completing borrow operations; and any other necessary information.

Furnish cross sections and hydraulic computations for excess material storage area sites situated in the flood plain of any stream. For these computations, define this flood plain as that area required to pass the 100-year flood. Indicate with the computations the effect that the excess material site will have on both the design flood and the 100-year flood.

Seed and protect all areas of the site except for noncommercial borrow pits, including haul roads, except areas of solid rock and areas to be under water in a pond, according to Section 212. The variety of seed may be altered upon written request from the property owner.

205.06 MEASUREMENT. The Department will consider excavated material used to complete embankments, refill, or backfill and obtained from beyond the limits of the roadway section, but within the right-of-way limits specified in the Plans, as balance excavation and will pay for it as Roadway Excavation.

The Department will consider obtaining the borrow or excess material sites and the professional archaeologist or any other work required for its historic preservation and conducting erosion control incidental to Embankment in place or Roadway Excavation.

The Department will not measure overhaul of borrow material within the right of way.

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SECTION 206 — EMBANKMENT

206.01 DESCRIPTION. Form embankments with materials from sources specified in the Plans or from other approved sources.

206.02 MATERIALS AND EQUIPMENT. Use water conforming to Section 803.

206.03 CONSTRUCTION.

206.03.01 Embankment Foundations. Remove sod from all embankment areas to a depth of approximately 3 inches. The Engineer will not require the removal of sod when constructing embankments over marshy areas.

Remove unsuitable material, including frozen material, encountered in embankment areas before placing any embankment material thereon.

When the height of the embankment, at subgrade elevation, is to be greater than 3 feet above existing concrete pavement, either break the pavement until no fragments have a dimension greater than 3 feet or remove the pavement. When the height of the embankment, at subgrade elevation, is to be 3 feet or less above existing concrete pavement, remove the pavement.

When placing embankment above existing asphalt pavement, break up to destroy all cleavage planes or remove as the Engineer directs.

Cut benches with horizontal and vertical faces into the original ground of embankment foundations as required. Unless otherwise directed, benches should be into rock. Compact the horizontal face. Provide subsurface drainage as specified in the Plans or as the Engineer directs.

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206.03.02 Embankment. Excavate special ditches and channel changes before constructing adjacent embankment areas. Complete all embankment for any roadway, including ramps, frontage roads within the tolerances specified in Subsection 204.03.10.

Use only acceptable materials from sources permitted in the Contract. Do not place frozen material, stumps, logs, roots, sod, or other perishable materials in any embankment. Do not place any stone or masonry fragment greater than 4 inches in any dimension within one foot of the finished subgrade elevation, unless rock roadbed is specified as provided in Subsection 204.03.10.

The Department may allow concrete rubble, without protruding reinforcement, to be placed in embankment provided that no fragment is larger than one foot in any dimension or is placed within 2 feet of the subgrade.

When crossing marshy or otherwise unstable areas, the Department may allow the first lift to exceed one-foot loose depth. Use rock or granular material in the first lift, when available, and construct by placing material behind the leading edge of the layer and blading into place to avoid unnecessary disturbance to the original ground.

Drain, clean out, and fill ponds lying within the staked construction limits.

Construct the upper one foot of the embankment with selected material placed in lifts not exceeding one foot loose thickness and compacted according to Subsection 206.03.03.

When rock roadbed is specified, construct the upper 2 feet of the embankment according to Subsection 204.03.09 A).

A) **Embankments of Earth, Friable Sandstone, Weathered Rock, Waste Crushed Aggregate, Bank Gravel, Creek Gravel, or Similar Materials.** Construct in lifts not exceeding one foot in thickness, loose depth, to the full width of the cross section, and compact the material. Shape the upper surface of the embankment to provide complete drainage of surface water at all times. Do not form ruts.

B) **Embankments Principally of Unweathered Limestone, Durable Shale (SDI equal to or greater than 95 according to KM 64-513), or Durable Sandstone.** Construct in lifts not exceeding 3 feet. Ensure that the maximum dimensions of boulders or large rocks placed in the embankment do not exceed 3 feet vertically and 4.5 feet horizontally. Place rocks having any dimension greater than 2 feet at least 2 feet below subgrade elevation. Do not dump rock into final position. Distribute the rock to minimize voids, pockets, and bridging. The Engineer will not require rolling in the construction of rock embankment. Do not construct the rock embankment to an elevation higher

than one foot below subgrade elevation.

C) **Embankment of Rock/Shale/Soil Combination.** Construct in lifts not exceeding one foot in thickness; however, when the thickness of the rock exceeds one foot, the Department may allow the thickness of the embankment lifts to increase, as necessary, due to the nature of the material, up to 2 feet. Apply a sufficient amount of water to induce slaking when mixtures contain 50 percent or more non-durable shale. Do not dump the mixture into final position. Distribute the mixture in a manner that minimizes voids, pockets, and bridging. Refer to KM 64-002 for the proper compaction testing for this material.

D) **Embankments Principally of Non-Durable Shale (SDI less than 95 according to KM 64-513).** Remove or break down rock fragments or limestone slabs having thickness greater than 4 inches or having any dimension greater than 1 1/2 feet before incorporating them into the lift. Construct in loose lifts not exceeding 8 inches in thickness. Apply water to accelerate slaking. Uniformly incorporate the water throughout the lift using a multiple gang disk with a minimum disk diameter of 2 feet or other suitable equipment the Engineer approves. Compact with 30-ton static tamping foot rollers in conjunction with vibratory tamping foot rollers that produce a minimum compactive effort of 27 tons and direct hauling equipment over the full width of the lift to aid in compaction. When questions arise regarding the durability of shale, use KM 64-514 to estimate the durability of the material in the field.

206.03.03 Compaction. Compact the embankment foundations and embankment to a density of at least 95 percent of maximum density as determined according to KM 64-511. The Engineer will check density according to KM 64-002.

During compaction, maintain the moisture content of embankment or subgrade material within ± 2 percent of the optimum moisture content as determined according to KM 64-511.

Compact each lift as required before depositing material for the next lift. Provide equipment that will satisfy the density requirements at all times. Run the hauling equipment, as much as possible, along the full width of the cross section.

206.03.04 Embankment Adjacent to Structures. Construct according to Subsection 603.03.04 for backfill.

206.03.05 Embankment-in-Place. When the Contract designates original material as unsuitable for the embankment foundation, the Department will designate areas of Special Excavation and/or treatment and will give instructions about the removal and disposal of unsuitable foundation material in the Plans.

When a bid item of special excavation has not been included in the Contract and the original ground is specified in the Plans as suitable to serve as the embankment foundation but the Engineer subsequently determines the material is unsuitable to remain in its original position, excavate and dispose of the unsuitable foundation material as directed. Incorporate the excavated material into embankments when manipulations such as spreading thin layers or drying the material make it acceptable for use as embankment-in-place. When excavated material cannot be used in embankments, dispose of the material.

206.04 MEASUREMENT. The Department will measure excavation of benches as Roadway Excavation or Embankment-in-Place, as applicable.

The Department will measure the removal of unsuitable materials from embankment areas as Roadway Excavation or Special Excavation.

The Department will consider removing sod 3 inches or less in depth; removing and/or scarifying of existing pavements in embankment areas; and the addition of water to aid compaction incidental to the earthwork bid items.

The Department will measure the quantity of unanticipated material resulting from landslides or authorized slope changes in place before excavation. The Department will include the quantity of unanticipated excess material under Embankment-in-Place. The Department will measure a second presplitting for payment according to Subsection 204.04.04.

206.04.01 Embankment-in-Place. The Department will measure the quantity in

cubic yards as the design quantity shown within the neat lines of the cross sections on the Plans, increased or decreased by authorized adjustments according to Subsection 204.04.02.

Regardless of whether the excavated material is used as Embankment-in-Place or is disposed of, the Department will measure and pay for the volume of the unsuitable foundation material that is excavated as Embankment-in-Place. When the Engineer directs that the excavated material be disposed of, then the Department will measure the material used to replace the excess material as the same as the excavated volume, and will pay for the material as Embankment-in-Place. When the excavated material is used in embankment, the Department will make no separate payment for the material necessary to replace the excavated material.

For embankment material obtained outside the right-of-way limits, conform to the requirements in Section 205.

The Department will not measure suitable excavation included in the original plans that is disposed of for payment and will consider it incidental to Embankment-in-Place.

The Department will not measure overhaul of material for payment and will consider it incidental to Embankment-in-Place.

When payment is made for Embankment-in-Place, the Department will make payment for all embankment constructed on the project, including roadway embankment, refill in cuts, and embankment placed in embankment benches. The Department will not measure materials from authorized Roadway and Drainage Excavation for payment and will consider them incidental to the construction of Embankment-in-Place. The Department will include under authorized Roadway and Drainage Excavation, mainline excavation, embankment benches, special ditches, channel changes, tail ditches, surface ditches, interceptor ditches, entrances, and undercuts in rock cuts. The Department will not measure borrow excavation used to construct the embankment for payment and will consider it incidental to the construction of Embankment-in-Place.

The Department will make adjustments to embankment-in-place projects when there is actually unanticipated excess material on the project. Excess material generated by the project phasing will not be considered for adjustment. The Department will make an adjustment for the actual costs incurred by the Contractor on the following items: excavation of material, clearing and grubbing, erosion control items and fuel adjustments.

206.04.02 Special Excavation. The Department will measure the quantity in cubic yards as the design quantity shown within the neat lines of the cross sections on the Plans, increased or decreased by authorized adjustments as specified in Subsections 204.04.01 and 204.04.02.

The Department will not measure overhaul of material and will consider it incidental to Special Excavation.

206.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02230	Embankment-in-Place	Cubic Yard
02204	Special Excavation	Cubic Yard
02200	Roadway Excavation	See Section 204.05

The Department will consider payment as full compensation for all work required under this section.

SECTION 207 — SUBGRADE

207.01 DESCRIPTION. Grade, shape, and compact the subgrade to the required density.

207.02 MATERIALS AND EQUIPMENT. Use water conforming to Section 803.

207.03 CONSTRUCTION. Prepare a smooth subgrade without indentations to the full width of the widest course of the pavement system plus one-foot additional width beyond each edge.

Shape the subgrade to conform to the lines, grades, and cross sections specified in the Contract or as directed. Remove all high areas of the roadbed and fill all low areas with approved material and compact.

Compact the subgrade to a uniform density throughout according to the density and moisture control requirements of Section 206.03.03. Should the subgrade subsequently lose its density due to exposure to severe weather conditions, after having been previously compacted to the required density during the construction of the grade, recompact it to the required density.

Excavate and backfill areas of yielding or unstable material with approved material as the Engineer directs.

When excess dust is present on the subgrade, either wet the material or completely remove and replace it with suitable material before any aggregate is placed thereon, at no additional expense to the Department.

Prepare all subgrades before the base course or pavement construction to allow the required testing and checking of the subgrade before placing any aggregate. Furnish templates and labor required for checking the subgrade.

207.03.01 Reshaping and Compacting. Scarify the existing road surface to a depth not exceeding 6 inches, and uniformly distribute the material so loosened over the surface of the road. Compact the subgrade according to Section 206.

207.03.02 Construction Tolerances. On grade and drain projects, complete the subgrade to the tolerance specified in Subsection 204.03.10.

When reshaping and compacting is not a bid item, the Engineer may allow minor adjustments in plan grades as he deems necessary.

Before placing base or surface courses on rock subgrade constructed with a 0.2-foot tolerance, level it to meet the specified 1/2 inch tolerance for base or surface course preparation with materials from the pavement quantities.

207.03.03 Protection and Maintenance. Complete all ditches and drains in order to drain the roadbed. Protect the subgrade. Repair all damage, and restore the subgrade to the required template.

When hauling materials over the completed subgrade, use equipment with pneumatic tires. Do not operate equipment of such weight as to cause rutting on the subgrade.

Do not allow the compaction equipment to cross any bridge deck within the limits of the project without permission of the Engineer.

Do not store or stockpile materials on a completed subgrade.

207.04 MEASUREMENT. The Department will not measure preparation of the subgrade when the construction of the grade is a part of the Contract.

The Department will not measure the repair of yielding or unstable areas for payment when construction of the base course or pavement is included in the same contract as construction of the grade. When the base and grade are in separate contracts, the Department will measure the removal and disposal of such material as Roadway Excavation and measure the backfill material as either Roadway Excavation or Borrow Excavation, as applicable. When the earthwork bid item is Embankment-in-Place, the Department will measure removal and replacement of yielding or unstable material in cut areas as Special Excavation.

The Department will not measure protection and repair of the subgrade for payment and will consider it incidental to the earthwork bid items.

The Department will not measure water used for maintaining moisture for subgrade compaction and water used for conditioning the subgrade immediately in advance of base

or pavement construction and will consider it incidental to the earthwork bid items.

207.04.01 Reshaping and Compacting. When included as a bid item, the Department will measure the quantity horizontally along the centerline of the roadway in linear feet, exclusive of ramps, road approaches, cross roads, and frontage roads. When the project is a multiple-lane, divided highway, the Department will measure the quantity along the centerline of each roadway. When moisture and density control requirements, as provided in Subsection 206.03.03, have been waived, the Department will measure only the portion, or portions, of the project on which the work is performed.

Where it is necessary to excavate to a depth of more than 6 inches in reshaping the existing road surface or where it is necessary to pick up the material so loosened and move it longitudinally, the Department will measure the entire work as roadway excavation.

207.04.02 Roadway Excavation. The Department will measure the quantity according to Subsection 204.04.

207.04.03 Borrow Excavation. The Department will measure the quantity according to Subsection 205.04.

207.04.04 Embankment-in-Place. The Department will measure the quantity according to Subsection 206.04.

207.04.05 Dense Grade Aggregate and Crushed Stone Base. The Department will measure quantities used to level rock subgrade constructed from a 0.2-foot tolerance to a 1/2 inch tolerance as pavement quantities according to Subsection 302.04.

207.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02241	Reshaping and Compacting	Linear Foot
02200	Roadway Excavation	See Subsection 204.05
02210	Borrow Excavation	See Subsection 205.05
02230	Embankment-in-Place	See Subsection 206.05
02204	Special Excavation	See Subsection 206.05
00001	DGA	See Subsection 302.05
00003	Crushed Stone Base	See Subsection 302.05

The Department will consider payment as full compensation for all work required under this section.

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SECTION 208 — CHEMICALLY STABILIZED ROADBED

208.01 DESCRIPTION. Construct roadbed stabilization by uniformly mixing the specified chemical stabilizer, cement or lime, with the roadbed material, and moistening and compacting the resulting mixture.

208.02 MATERIALS AND EQUIPMENT.

208.02.01 Cement. Select Type I or Type II cement conforming to Section 801. Use the same type cement throughout the work.

208.02.02 Lime. Select from the Department's List of Approved of Materials for Lime (Hydrated and Quicklime).

208.02.03 Asphalt Curing Seal. Use SS-1 or SS-1h conforming to Section 806.

208.02.04 Water. Conform to Subsection 803.

208.02.05 Sand. Use natural, crushed, or conglomerate conforming to Section 804.

208.03 CONSTRUCTION.

208.03.01 Temperature and Weather Limitations. Only apply stabilizer when the ambient air temperature is at least 40 °F in the shade and rising. Do not mix stabilizer with frozen soils or with soil containing frost.

208.03.02 Preparation of Existing Roadway. Before proceeding with other construction operations, grade and shape the roadway to 0.1 foot below the grades, lines, and cross-section required for the completed roadway. Remove any organic material, such as roots, and any rocks larger than 4 inches from the material to be stabilized. Ensure that the elevation of the subgrade before stabilization is according to Subsection 204.03.10. When using lime as slurry, scarify to the depth required for the stabilization before application. Carefully control the depth of stabilization so the surface of the roadbed below the scarified material remains undisturbed and conforms to the established cross section.

208.03.03 Application of Chemical. Apply the quantity of stabilizer and mix to the depth the Contract specifies or as the Engineer directs. The Department reserves the right to increase or decrease the quantity of stabilizer used and depth of treatment as deemed necessary by the Engineer.

The Department will not accept any stabilizer that has been exposed to the open air for a period of 4 hours or more for payment. Replace any quantity lost due to rain or wind.

Only allow traffic and equipment required for spreading, watering, or mixing on the spread stabilizer.

Prepare, transport, and distribute stabilizer on the roadbed, and mix it with the soil in a manner that will not cause injury, damage, discomfort, or inconvenience to individuals or property. Do not apply stabilizer when wind conditions, as determined by the Engineer, are such that blowing stabilizer becomes hazardous to traffic, workmen, adjacent property, or results in adverse impact upon the public. Do not apply dry chemicals pneumatically.

A) Cement. Spread the specified quantity of cement required for the full depth of treatment uniformly over the surface in one application.

Only apply cement to an area of such size that all operations, dry mixing through cutting final grade, are completed within 6 hours. Perform all operations in a continuous manner and complete all operations during daylight hours.

B) Lime. Only apply lime to an area of such size that all primary mixing operations are completed within the same day. Perform all primary mixing operations during daylight hours. Spread the lime by any of the following methods:

1) Slurry made with hydrated lime. Mix with water in agitating equipment and apply on the scarified area through distributing equipment. Use a distributor equipped to provide continuous agitation to ensure a uniform mixture from the mixing site until applied to the roadbed.

2) Slurry made by slaking quicklime at or near the project site. Gain approval of all equipment and procedures before beginning work.
3) Dry hydrated or quicklime when specified or when approved by the Engineer. Do not use in windy conditions. Use only when saturated soil conditions exist and the slurry method would worsen the situation or when weather conditions prohibit the use of slurry. Uniformly spread the lime without excessive loss. The Engineer will not require scarifying of the roadbed before placing dry hydrated or quicklime.

208.03.04 Mixing.

A) Cement.

1) Dry Mixing. Immediately after distributing, mix the cement with the soil for the full depth of treatment. Take care to avoid mixing cement below the specified depth. Continue mixing until the cement has been sufficiently blended with the soil to prevent forming cement balls when applying water.
2) Moist Mixing. Immediately after the soil and cement have been dry mixed, uniformly apply and incorporate water into the mixture. Apply the water uniformly using pressure-distributing equipment. The Department will allow application of water during dry mixing when introduced through the mixing machine.

Immediately after mixing, the Engineer will determine the moisture content of the soil cement mixture. When directed by the Engineer, uniformly apply additional water. Avoid concentration near the surface when incorporating water into the soil and cement mixture. After adding the last increment of water, continue mixing until 100 percent of the soil passes a one inch sieve and at least 80 percent of the soil passes a No. 4 sieve, exclusive of gravel or stone retained on these sieves.

After completing the water application and mixing, ensure that the moisture content of the mixture is not below the specified optimum moisture or more than 2 percent above the specified optimum moisture, and is less than the quantity that causes the roadbed to become unstable during compaction and finishing. Do not allow any mixture of soil and cement that has not been compacted and finished to remain undisturbed for more than 30 minutes. When the soil-cement mixture is wetted by rain to the extent that the moisture content exceeds the tolerance specified herein, reconstruct the entire section.

B) Lime. During the period after the application of lime until completion of preliminary curing, add water to maintain the moisture content of the material at or above its specified optimum at all times. Because water is needed to sustain chemical reactions occurring after applying the lime, a continual application of water during mixing may be necessary even when the material is at optimum moisture when mixing begins.

1) Primary Mixing. Immediately after spreading the specified quantity, thoroughly mix the lime into the soil for the full depth of treatment. Complete the primary mixing operation within 4 hours after applying lime. At this time, the result shall be a homogeneous, friable mixture of soil and lime, free from clods or lumps exceeding 2 inches in size.

After primary mixing, shape the lime treated layer to the approximate cross section and lightly compact to minimize evaporation loss. Crown the surface to provide surface drainage.
2) Preliminary Curing (mellowing). Following primary mixing, allow 48 hours for the roadbed to cure (mellow). The Department will allow remixing after 24 hours if the gradation requirement is obtained. The characteristics of the soil, temperature, and rainfall may influence the mellowing period necessary. During the mellowing period, keep the surface of the material moist to prevent drying and cracking.
3) Final Mixing and Pulverizing. Within 72 hours after the preliminary curing, completely mix and pulverize the roadbed to the full depth of stabilization. Continue final mixing until 100 percent of the soil, exclusive of rock particles, pass the one inch sieve and at least 50 percent pass a No. 4 sieve.

208.03.05 Compaction and Surface Finish. Compact the mixture uniformly for its full depth, to at least 95 percent of the maximum density determined according to KM 64-511. The Engineer will determine the density. Compact continuously until completing the final compacted surface.

After curing of the roadbed is completed, correct any stabilized roadbed that does not conform to the surface tolerances of Subsection 204.03.10 by leveling approved by the Engineer. Only remove material to level in small, isolated spots. Discard any material removed from the cured roadbed.

208.03.06 Curing and Protection. After finishing the roadbed, protect it against drying by applying an asphalt curing seal.

Apply the curing seal as soon as possible, but no later than 24 hours after completion of finishing operations. Keep the finished roadbed moist, by continuous sprinkling if necessary, until applying the curing seal. Only apply the asphalt material to a roadbed surface that is dense, free from loose extraneous material, and that contains sufficient moisture to prevent penetration of the asphalt material.

Provide a curing seal consisting of the asphalt material specified and uniformly apply the curing seal at the rate of approximately 2.0 pounds per square yard. The Engineer will determine the actual rate and application temperature of asphalt material. Apply the curing seal in sufficient quantity to provide a continuous membrane over the roadbed. To avoid excessive runoff, apply the seal in 2 or more applications when directed or allowed, making each application as soon as possible after the previous application.

Do not allow traffic or equipment on the finished surface until the stabilized subgrade has cured for a total of 7-days with an ambient air temperature above 40 degrees Fahrenheit. A curing day consists of a continuous 24-hour period in which the ambient air temperature does not fall below 40 degrees Fahrenheit. Curing days will not be calculated consecutively, but must total seven (7), 24-hour days with the ambient air temperature remaining at or above 40 degrees Fahrenheit before traffic or equipment will be allowed to traverse the stabilized subgrade. The Department may allow a shortened curing period when the Contractor requests. The Contractor shall give the Department at least 3 day notice of the request for a shortened curing period. The Department will require a minimum of 3 curing days after final compaction. The Contractor shall furnish cores to the treated depth of the roadbed at 500 feet intervals for each lane when a shortened curing time is requested. The Department will test cores using an unconfined compression test. Roadbed cores must achieve a minimum strength requirement of 80 psi.If any damage occurs before curing is complete, immediately reseal the damaged area.

If the asphalt material is tacky or sticky, apply a sand blotter material at a rate of approximately 5 pounds per square yard, when the Engineer directs, to avoid damage to the seal or to avoid tracking material onto other facilities.

After the curing period, protect any finished portion of the roadbed that equipment travels on from being marred or damaged.

At no expense to the Department, repair any damage to the subgrade caused by freezing.

Make every reasonable effort to completely cover the stabilized roadbed with the specified pavement courses before suspending work for the winter months. If the stabilized roadbed is not completely covered by the specified pavement courses, determine and perform any further work necessary to protect and maintain the uncompleted work during the winter months. Perform any work necessary to acceptably repair or restore the uncompleted work before the beginning of spring paving operations. The Department may require cores to be taken to verify that the stabilized roadbed was not unreasonably damaged from unprotected winter cycles. Perform all work necessary to protect, maintain, or repair the stabilized roadbed subject to the Engineer's approval.

208.03.07 Maintenance. Maintain the entire roadway within the limits of the Contract, for the duration of the Contract. Keep the roadway continuously intact by immediately repairing any defects that may occur either before or after completing the stabilized roadbed, at no expense to the Department. When making repairs, completely restore the uniformity of the surface and durability of the repaired portion.

208.04 MEASUREMENT. The Department will not measure extra materials, methods, or work for payment when used to protect, maintain, or repair uncompleted work.

208.04.01 Cement. The Department will measure the quantity in tons. The Department will not measure cement for payment when exposed to the open air for a period of 4 hours; lost due to rain or wind; or used for corrective or reconstructive work.

208.04.02 Lime. The Department will measure the quantity in tons. The Department will not measure lime for payment when exposed to the open air for a period of 4 hours; lost due to rain or wind; or used for corrective or reconstructive work.

When quicklime is furnished for slurry application, the Department will measure the quantity in tons at 1.25 times the actual quantity. When hydrated or quicklime is furnished for dry application, the Department will measure the actual quantity applied to the roadbed.

208.04.03 Cement Stabilized Roadbed. The Department will measure the quantity in square yards. The Department will not measure corrective or reconstructed work for payment. The Department will not measure hot-mixed asphalt for payment when used for corrective leveling. The Department will not measure water for payment and will consider it incidental to this item of work.

208.04.04 Lime Stabilized Roadbed. The Department will measure the quantity in square yards. The Department will not measure corrective or reconstructed work for payment. The Department will not measure hot-mixed asphalt for payment when used for corrective leveling. The Department will not measure water for payment and will consider it incidental to this item of work.

208.04.05 Asphalt Curing Seal. The Department will measure the quantity in tons. The Department will not measure corrective work for payment.

208.04.06 Concrete Sand for Blotter. The Department will measure the quantity in tons.

208.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02542	Cement	Ton
00014	Lime	Ton
00008	Cement Stabilized Roadbed[1]	Square Yard
00013	Lime Stabilized Roadbed[1]	Square Yard
00358	Asphalt Curing Seal	Ton
02702	Sand for Blotter	Ton

[1] *When the Engineer increases the depth of treatment, the Department will increase the quantity for that portion of the work as follows:*

4 inches additional, multiply by 1.33
8 inches additional, multiply by 1.50

The Department will consider payment as full compensation for all work required under this section.

SECTION 209 — DITCHING AND SHOULDERING

209.01 DESCRIPTION. For ditching, perform all work necessary to provide complete drainage of all side ditches, including those on road approaches within the limits of the right-of-way, and dispose of materials removed. Additionally, repair eroded areas on embankment slopes.

For shoulders, reshape existing or construct full depth earth shoulders, stabilized shoulders, or paved shoulders, and foundations for stabilized or paved shoulders, according to the Contract.

209.02 MATERIALS AND EQUIPMENT. Construct shoulders, or foundations for stabilized or paved shoulders, using materials conforming to Section 206 or 302 as specified in the Contract. When rock roadbed construction is specified, conform to Subsection 204.03.09 A) for shoulders.

209.03 CONSTRUCTION REQUIREMENTS.

209.03.01 Ditching. Remove all vegetation, including bushes and trees less than one foot in diameter, and all debris from within the limits of ditching and shouldering operations. Dispose of the materials removed by clearing in a manner approved by the Engineer. Shape the ditches to the approximate dimensions of the typical section specified in the Contract or as the Engineer directs. When the width of an existing roadbed exceeds that in the typical section, the Engineer will not require reduction of that width. In the absence of a specified typical section, use a section typical of the existing roadway. When no specific typical section is called for, use a minimum vertical depth of side ditches of one to 2 feet below the finished shoulder elevation. Do not excavate below the elevation of the solid rock. Where the roadway width allows, shape all ditches to have a slope no steeper than 3:1 from the edge of the shoulder to the bottom of the ditch. Do not perform work beyond the ditch lines except where the back slopes are disturbed by the ditching operations. Shape the disturbed areas of the back slopes to conform to the adjoining areas. Where machine operations are limited by obstructions, provide all handwork necessary to provide satisfactory drainage.

Use or dispose of the material removed from the ditches as approved by the Engineer. Submit written permission from the property owner to the Engineer before wasting material outside the right-of-way on private property.

Reshape the ends of metal entrance pipe that may be deformed to original form. Remove deposits of soil and other debris from all existing entrance pipe.

When proper drainage of an entrance pipe cannot be accomplished, the Engineer will consider cleaning complete when all soil and debris have been removed to an elevation at or below the grade of the finished ditch.

When entrance pipe has so deteriorated as to become unsuitable for further service, as determined by the Engineer, remove and replace according to Section 701 with a pipe of similar size, material, and strength.

A) Protection. Grade existing floater material on traffic-bound surfaces to the center or to the opposite side of the road before beginning ditching operations to prevent mixing floater material with material removed from the ditches, unless otherwise directed by the Engineer. Do not allow excess material to drift across the surfaced roadbed. Do not loosen or damage any portion of an existing surfaced area. Preserve delineators, mailboxes, mileposts, and similar installations. When their removal is necessary for the proper execution of the work, remove and replace them.

Do not disturb private and public entrances except when it is necessary to remove an existing entrance pipe. Repair or replace any entrance pipe damaged during the work.

When ditching and shouldering or ditching is included in a surfacing or resurfacing contract, complete ditching operations and as much of the shoulder operations as is practical before beginning surfacing operations.

Preserve mailboxes as specified in Subsection 107.12.02.

B) Cleaning Cross Drainage Structures. When the proposal includes either the bid item of ditching and shouldering or ditching, clean all drainage structures, except box culverts and structures defined as bridges, of all sediment, drift, and other debris.

209.03.02 Shouldering. On projects constructed as grade and drain only, or as grade and drain and traffic bound surface, construct the shoulders to the same requirements as specified for the subgrade. When shoulder material is of earth, compact a portion of the adjacent shoulder with each course of granular base. Before compaction of each course of granular base, place shoulder material against the base course to a minimum width of 18 inches and in sufficient quantity so that, after compaction, the height of the partial shoulder conforms to the height of the compacted base course.

Compact earth shoulders and foundations for paved or stabilized shoulders according to Subsection 206.03.03.

Construct stabilized, aggregate, and paved shoulders as specified in the Contract.

When reshaping existing shoulders, uniformly shape to a slope at least one inch per foot away from the edge of the existing surface. On projects not subject to the requirements of a typical section, shape the shoulder to at least 2 feet of width or a reduced width when deemed necessary by the Engineer. Furnish material from approved sources on or off the right-of-way at no additional expense to the Department.

A) Drainage. Before construction of permanent lateral drains, provide drainage for the subgrade as directed. Construct permanent lateral drains through the full width of the earth shoulders at the locations as directed for shoulders greater than 2 feet in width. On tangents, construct the drains on each side of the road at intervals not exceeding 100 feet, and stagger these drains on alternate sides of the roadway to provide a drain at intervals of approximately 50 feet. The Engineer may require the drains at shorter intervals, provided the increase in the number of drains does not exceed 10 percent. Cut the trenches to a width of 18 inches and to a depth of 2 inches below subgrade, and slope the trenches away from the subgrade. In cut sections, the Engineer will not require lateral drains in areas where the flowline of the ditch is at or above the subgrade elevation. Skew the lateral drains downgrade a maximum of 45 degrees. Backfill the trenches to a depth of 6 inches or more with aggregate conforming to Subsection 704.02. When coarse aggregate is used for backfilling lateral drains, completely wrap the coarse aggregate in geotextile fabric conforming to the Department's current requirements for fabric for subsurface drainage. Do not obstruct drainage through the lateral drains during final dressing or other operations. Do not construct any permanent lateral drains until completing all of the earthwork portion of the shoulder construction.

B) Mailbox Turnouts. Protect the edge of the mainline pavement according to Standard Drawing RPM-110-05 when quantities are included in the Contract.

C) Shoulder Completion. Due to the safety and protection of the traveling public, complete the shoulders on the project at the earliest practical time. When shoulder construction is part of this Contract and the pavement is open to public traffic, conform to signing requirements for low shoulders according to Section 112 until the shoulders are completed.

209.04 MEASUREMENT.

209.04.01 Aggregate for Shoulders, Entrances, and Mailbox Turnouts. When listed as a bid item, the Department will measure the quantity in tons weighed according to Section 109.

209.04.02 Entrance Pipe. The Department will measure the quantity according to Subsection 701.04.

209.04.03 Granular Base. When the pavement design includes granular base material, the Department will measure granular material used in backfilling lateral drains in the same manner as the specified granular base material. The Department will not measure excavation for lateral drains, disposal of surplus materials, or furnishing and placing geotextile fabric for payment and will consider this work incidental to the granular base. However, when the pavement design does not include granular base material, the Department will consider furnishing aggregate, furnishing geotextile fabric, and constructing lateral drains incidental to shoulder construction.

209.04.04 Ditching. The Department will measure the quantity horizontally as the gross length of the ditches cleaned in linear feet along the edge of the shoulder adjacent to

the front slope of the ditch. The Department will not measure disposal of the materials removed by clearing and ditching for payment and will consider it incidental to Ditching.

The Department will not measure cleaning out pipe structures 36 inches or less in diameter; reshaping any deformed ends on metal entrance pipe; and disposing of unsuitable entrance pipe for payment and will consider them incidental to Ditching.

209.04.05 Shouldering. The Department will measure the quantity in linear feet along the centerline of the roadway, which measurement will include the shoulder construction on both sides of the roadway. The Department will not measure disposal of the materials removed by clearing and will consider it incidental to Shouldering.

209.04.06 Ditching and Shouldering. The Department will measure the quantity as the gross length of the project measured in linear feet along the centerline of the roadway. The Department will include in the quantity all work required on the road approaches within the limits of the right-of-way.

The Department will not measure cleaning pipe structures 36 inches or less in diameter; reshaping any deformed ends on metal entrance pipe; and disposing of unsuitable entrance pipe and will consider them incidental to Ditching and Shouldering.

The Department will not measure disposal of the materials removed by clearing and ditching and will consider it incidental to Ditching and Shouldering.

209.04.07 Shoulder Surfacing. The Department will measure according to the applicable surfacing section. The Department will not measure the final roadway surface course for payment until the shoulders are completed. The Department will make partial payments for the final surface course for the portions of the project that the shoulders are substantially completed.

209.04.08 Clean Pipe Structure. When cross drains and entrance pipe that exceed 36 inches in diameter require cleaning, the Department will measure the quantity by each individual unit.

209.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02237	Ditching	Linear Foot
02714	Shouldering	Linear Foot
02575	Ditching and Shouldering	Linear Foot
00067	Aggregate for Shoulders	Ton
00068	Aggregate for Entrances	Ton
00077	Aggregate for Mailbox Turnouts	Ton
00003	Crushed Stone Base	See Subsection 302.05
00439-00454	Entrance Pipe, Size	See Subsection 701.05
03262	Clean Pipe Structure	Each

The Department will consider payment as full compensation for all work required under this section.

SECTION 210 — EMBANKMENT DRAINAGE BLANKETS

210.01 DESCRIPTION. Construct embankment drainage blankets for embankment stabilization.

210.02 MATERIALS.

210.02.01 Coarse Aggregate (Rock Drainage Blanket). Conform to Section 805.

210.02.02 Natural Sand (Sand Drainage Blanket). Conform to Section 804.

210.03 CONSTRUCTION. Construct either a rock drainage blanket or sand drainage blanket according to the Plans or as the Engineer directs. When geotextile fabric is required, construct the drainage blanket according to Subsection 214.03.06.

210.04 MEASUREMENT. The Department will measure the quantity in cubic yards based on the design quantity.

210.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
00021	Drainage Blanket, Embankment	Cubic Yard

The Department will consider payment as full compensation for all work required under this section.

SECTION 211 — FINAL DRESSING

211.01 DESCRIPTION. Perform Final Dressing, Class A on all grade and drain projects and grade, drain, and surface projects. Perform Final Dressing, Class B on surfacing projects and resurfacing projects when listed in the proposal as a separate Contract item.

211.02 MATERIALS AND EQUIPMENT. Reserved.

211.03 CONSTRUCTION. Perform final dressing to produce a uniform finish to all parts of the roadway.

Do not disturb slopes having satisfactory vegetative covering without the Engineer's approval.

211.03.01 Final Dressing, Class A. Perform the following:

1) Clear the right-of-way of all weeds, briers, bushes, and trees, except those trees designated by the Engineer to remain, when clearing and grubbing is a Contract item.
2) Remove all sediment, drift, and other debris from all entrance structures and cross drainage structures.
3) Dispose of the materials so removed.
4) Shape areas designated by the Engineer to receive seeding and protection.
5) Shape and dress shoulders, ditches, and slopes to the lines, grades, and cross sections specified in the Contract.
6) Shape the slopes of ditches, channels, and borrow pits.
7) Fill with suitable material, all holes and depressions resulting from the removal of structures, grubbing operations, or other construction operations.

211.03.02 Final Dressing, Class B. Perform according to Final Dressing, Class A, except perform work from ditch line to ditch line.

When solid rock is encountered in ditches, the Engineer will not require excavation below the elevation of the solid rock.

211.04 MEASUREMENT.

211.04.01 Final Dressing, Class A. The Department will not measure Final Dressing, Class A for payment and will consider it incidental to the earthwork items bid.

211.04.02 Final Dressing, Class B. The Department will measure Final Dressing, Class B as the net length of surfacing or resurfacing in linear feet. When the project is a multi-lane, divided highway and a portion is constructed as separate roadways, the Department will measure the actual length of the section or sections so constructed as the actual length of the right hand roadway as defined by the direction of the stationing. The Department will measure the quantity in feet along the centerline of the roadway. The Department will include in the quantity all final dressing within the lateral limits defined for Final Dressing, Class B, as specified in the Contract, and all necessary final dressing of borrow pits, waterways, ramps, cross roads, service roads, frontage roads, multi-level roadways, and approaches, and other areas falling outside the limits of the right-of-way but being appurtenant to the Contract.

When the material removed as directed exceeds 12 inches in average depth, measured perpendicularly to the existing cross section lines, the Department will measure the additional material as Roadway Excavation.

211.04.03 Roadway Excavation. The Department will measure the quantity according to Subsection 204.04.

211.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02601	Final Dressing, Class B	Linear Foot
02200	Roadway Excavation	See Subsection 204.0

The Department will consider payment as full compensation for all work required under this section.

SECTION 212 — EROSION CONTROL

212.01 DESCRIPTION. Construct brush barriers, prepare the soil for seeding, apply materials, and mulch areas seeded or sodded.

212.02 MATERIALS. Conform to Section 827.

212.03 CONSTRUCTION. Progressively incorporate erosion control measures with the grading operations throughout the duration of the project according to Section 213.

212.03.01 Brush Barriers. Construct barriers that are dense, 2 to 5 feet in height and 4 to 10 feet wide. Do not locate barriers where diverted drainage will create erosion problems.

Do not use brush barriers at sites where the adjacent private property has been residentially or commercially developed. Do not construct the barriers at sites easily and routinely seen that will detract from the appearance of either the adjacent property or the completed highway.

212.03.02 Topsoil. When included in the Contract as a bid item, either furnish and place topsoil or place stockpiled topsoil.

A) Furnish and Place Topsoil. When the bid item is furnish and place topsoil, obtain topsoil conforming to Section 827 from source outside the right-of-way limits. Avoid injury to existing planted growths, structures, and paved surfaces during topsoil operations.

Provide equipment and methods of operation that prevent the loading of subsoil or other unsuitable material with the topsoil. During hauling operations, keep pavement surfaces clean. Promptly and completely remove any topsoil or other substances dropped on the surfaces before it is compacted by traffic.

Prepare areas designated to receive topsoil. Then place and spread topsoil to a sufficient loose depth so that after natural settlement and rolling, the completed work conforms to the required line, grades, and elevations. Compact the topsoil and prepare the area for seeding according to Subsection 212.03.03.

B) Spreading Stockpiled Topsoil. When the bid item is spreading stockpiled topsoil, obtain the material from existing stockpile on or near the project.

Do not spread topsoil until grading and shaping of the area to receive the topsoil has been completed and seeding and protection operations are ready to begin. Spread and lightly compact the topsoil to a uniform depth of approximately 6 inches over areas specified in the Plans or as the Engineer directs. Do not place topsoil on slopes steeper than 3:1.

Prepare the area for seeding according to Subsection 212.03.03.

212.03.03 Permanent Seeding and Protection. Grade exposed earth and any other erodible areas to a uniform cross section or slope as soon as practical in the judgment of the Engineer and then perform permanent seeding and protection at the earliest practical time.

Prepare all areas within the construction limits and right of way limits that can be expected to sustain plant growth and are not covered by satisfactory vegetation for permanent seeding. The Engineer will designate areas to be seeded.

A) Seed Mixtures for Permanent Seeding.

For all projects within urban areas the seed mix will be modified to only include Fescue.

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Seed Mix Type I: 90% Kentucky 31 Tall Fescue (Festuca arundinacea)
10% White Dutch Clover (Trifolium repens)

Seed Mix Type II: 90% Kentucky 31 Tall Fescue (Festuca arundinacea)
10% Partridge Pea (Cassia fasciculate)

Seed Mix Type III: 70% Kentucky 31 Tall Fescue (Festuca arundinacea)
30% Partridge Pea (Cassia fasciculate)

Seed Mix Type IV: 95% Turf Type Tall Fescue Blend
5% White Dutch Clover (Trifolium repens)

Pollinator Seed Mix: See Special Note if applicable.

1) Permanent Seeding on Slopes 3:1 or Less. Apply seed mix Type I at a minimum application rate of 100 pounds per acre.
2) Permanent Seeding on Slopes Greater than 3:1 in Highway Districts 4, 5, 6, and 7. Apply seed mix Type II at a minimum application rate of 100 pounds per acre.
3) Permanent Seeding on Slopes Greater than 3:1 in Highway Districts 1, 2, 3, 8, 9, 10, 11, and 12. Apply seed mix Type III at a minimum application rate of 100 pounds per acre. If adjacent to crop land or golf course, replace the Partridge Pea with Kentucky 31 Fescue.
4) Permanent seeding in residential and urban areas use Seed Mix Type IV at a rate of 275 pounds per acre.
5) When Pollinator Seed Mix is specified in the contract, apply as per the Special Note at the rate and location as directed.

B) Procedures for Permanent Seeding. Include a seeding plan in the Best Management Practices Plan (BMP) according to Section 213. For areas at final grade, prepare a seedbed and apply Initial Fertilizer at a minimum of 500 pounds per acre of 19-19-19. When required, place agricultural limestone at a rate of 3 tons per acre. Do not apply dry agricultural Limestone when it may generate a traffic hazard. Remove all rock and dirt clods over 4 inches in diameter from the surface of the seedbed. Unless the Engineer directs otherwise, track all slopes 3:1 or greater. Ensure that tracking is performed up and down and not across. Native Grass seed should be calculated figuring seed on a pure live seed basis (PLS), using the least amount of inert matter available. Seed and mulch to produce a uniform vegetation cover using the seeding rates as indicated to each application. Mulch with clean, weed free straw. Place straw to an approximate 2-inch loose depth (2 tons per acre) and anchor it into the soil by mechanically crimping it into the soil surface or applying tackifier to provide a protective cover. For the periods of March 1 through May 15 and from September 1 through November 1, the Department may allow the option of using hydromulch at minimum rate of 1,500 pounds per acre in place of straw with tackifier. Regardless of materials used, ensure the protective cover holds until seeding is acceptably established according to part G) of this subsection.

C) Crown Vetch. When Seed Mix Type II is specified, sow crown vetch seed on all areas having a slope 3:1 or steeper and consisting of soil or mixtures of broken rock and soil. Also, sow crown vetch on soil seams and crevices within or adjacent to rock cuts and flat areas of benched slopes. Sow crown vetch seed uniformly at a rate that will provide 9 live seedlings per square yard and at a rate of no less than 30 pounds per acre. If adjacent to a golf course replace the crown vetch with Kentucky 31 Tall Fescue.

D) Fertilizer. Apply Initial Fertilizer to all areas prior to the seeding or sodding operation at the application rate specified in 212.03.03 B). When directed by the engineer, apply 19-19-19 Maintenance Fertilizer to the areas after vegetation has been established at a rate of 300 pounds per acre. Obtain approval from the Engineer prior to the Maintenance fertilizer application. Use fertilizer delivered

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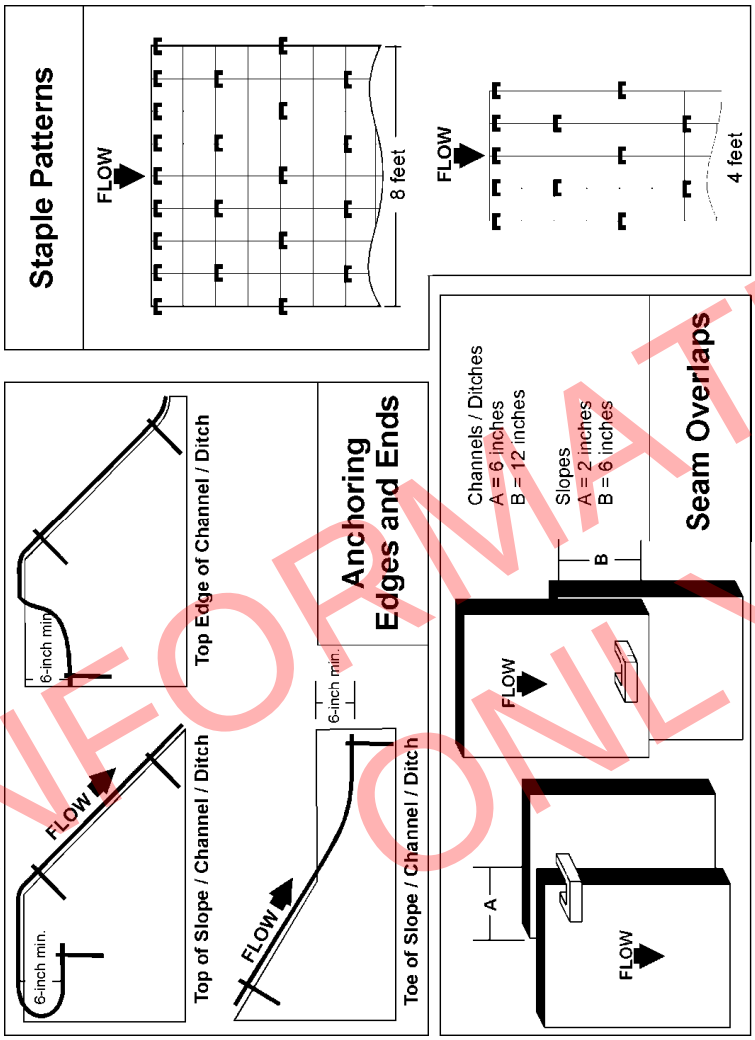
to the project in bags or bulk.

Reapply fertilizer to any area that has a streaked appearance. The reapplication shall be at no additional cost to the Department. Re-establish any vegetation severely damaged or destroyed because of an excessive application of fertilizer at no cost to the Department.

E) Erosion Control Blanket. Install erosion control blankets in ditches, except those to be paved or rock lined, to a flow depth of 1.5 feet. Install erosion control blankets on final soil-like slopes having a slope steeper than 3H:1V and consisting of soil or mixtures of broken rock and soil or as the Engineer directs. Prepare the bed by loosening the soil to a depth of 2 to 3 inches. Apply fertilizer, limestone, and seed at the permanent seeding rate. Cover with the erosion control blanket. Roll out the blanket in the direction of the anticipated run-off flow. Anchor the blanket at the top and toe of slopes and at the top, toe, and edges of channels and ditches as the "Anchoring Edges and Ends" figure shows, including burying the blanket. Secure the blanket by stapling as the "Stapling Pattern" figure shows. At seams, overlap the blanket as the "Seam Overlaps" figure shows. Rework areas that become unstable or do not establish vegetation.

Deleted: as designated on the Erosion Control Plan and as the Engineer directs



F) Maintenance of Seeded Areas. From the time seeding and protection work begins until the date the project is declared complete, keep all seeded areas in good condition at all times. Promptly repair any damage to seeded areas or to mulch materials as directed. Mow when the Engineer directs.

G) Acceptance of Seeding. The Engineer will make an inspection to determine the acceptability of the seeding between 3 and 6 months after completion of the project. The Engineer may delay the inspection when conditions are such that the acceptability of the seeding cannot be determined at the end of the 6-month period.

Ensure the seeded areas have a soil pH level of 6.0 or greater. Ensure that at least 90 percent of each seeded area has a minimum of 1,350 live seedlings per square yard at the time of inspection, representative of the specified seed mixture with no vacant areas larger than 25 square yards. Also, ensure that all applicable areas have a minimum of 9 live area seedlings per square yard of crown vetch. Conform to this requirement for all permanent seeding performed in conjunction with the project regardless of the type of protection used or the season in which the seeding is performed.

When seeding does not conform to the live seedling requirements at the time of inspection, submit a corrective work plan to the Engineer for approval and perform the additional work necessary to conform to the original requirements. The Department reserves the right to specify application rates for agricultural lime, fertilizer, seed, and mulch for corrective seeding.

212.03.04 Sodding. At locations specified in the Contract or by the Engineer, prepare the sod bed, incorporate fertilizer and agricultural limestone as needed and place sod flush with any adjacent seeded or turfed area, pavement, curb, or other structures.

The Engineer will make an inspection to determine the acceptability of the sod between 3 and 6 months after completion of the project. Ensure that at least 90 percent is alive with no area of dead sod larger than one square yard.

212.04 MEASUREMENT.

212.04.01 Brush Barriers. The Department will not measure the quantity of brush barriers for payment and will consider construction of brush barriers incidental to Clearing and Grubbing.

212.04.02 Topsoil Furnished and Placed. The Department will measure the quantity in cubic yards in the vehicle at the point of delivery.

212.04.03 Spreading Stockpiled Topsoil. The Department will measure the quantity in cubic yards by taking cross sections of stockpiles immediately before spreading operations, and taking final cross sections of the stockpile area after spreading has been completed and the area neatly dressed.

When electing to place the topsoil directly without stockpiling, according to Subsection 204.03.07 B), then the Engineer will not separately measure the topsoil not stockpiled.

212.04.04 Agricultural Limestone. The Department will measure the quantity of agricultural limestone in tons.

212.04.05 Fertilizer. The Department will measure fertilizer for payment based on the quantity in tons. Fertilizer is not considered incidental to any other item, and any authorized use will be compensated according to the measured quantity in tons.

Deleted: The Department will measure fertilizer used in the seeding or sodding operations for payment. The Department will measure the quantity by tons.

212.04.06 Seeding and Protection. The Department will measure the quantity in square yards as the design quantity specified in the Plans, increased or decreased by authorized adjustments. When it can be shown actual quantities vary from the design quantity by more than 10 percent, the Department will measure the actual quantity in square yards.

The Department will include in the authorized adjustments any seeding and protection necessary due to catastrophic events that are beyond the control of the Contractor.

The Department will not measure any corrective work required to conform to Subsection 212.03.03 F).

The Department will not measure seeding and protection of areas unnecessarily disturbed or disturbed areas outside the limits of construction.

212.04.07 Erosion Control Blanket. The Department will measure the quantity of Erosion Control Blanket by the square yard of surface covered. The Department will not measure seeding for payment and will consider it incidental to the Erosion Control Blanket. The Department will not measure any reworking of slopes, channels, or ditches for payment as it is considered corrective work and incidental to the Erosion Control Blanket.

212.04.08 Sodding. The Department will measure the quantity in square yards. The Department will not measure any additional sod necessary to restore areas that fail to conform to the original requirements.

212.04.09 Crown Vetch. The Department will measure the quantity in square yards.

212.04.10 Mowing. When mowing is required, the Department will measure and pay for the quantities under a supplemental agreement.

212.05 PAYMENT. The Department will pay for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
05997	Topsoil Furnished and Placed	Cubic Yard
05998	Spreading Stockpiled Topsoil	Cubic Yard
05985	Seeding and Protection	Square Yard
05950	Erosion Control Blanket	Square Yard
05989	Special Seeding Crown Vetch	Square Yard
05990	Sodding	Square Yard
05963	Initial Fertilizer	Ton
05964	Maintenance Fertilizer	Ton
05992	Agricultural Limestone	Ton

The Department will consider payment as full compensation for all work required under this section.

SECTION 213 — WATER POLLUTION CONTROL

213.01 DESCRIPTION. Control water pollution through use of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. Coordinate these measures with the permanent erosion control features specified in Section 212 and the Contract to the extent practical to ensure effective and continuous erosion control throughout the construction and post construction period.

213.02 MATERIALS AND PERSONNEL.

213.02.01 Materials. Conform to Section 827.

213.02.02 Personnel. Provide a qualified erosion and sediment control inspector. The Department will require the erosion and sediment control inspector to have successfully completed the KEPSC-RI Qualification Training and Testing Course. Personnel that have not successfully completed the course will not be considered qualified.

213.03 CONSTRUCTION. Conform to the applicable provisions of KRS Chapters 220 and 224 of the State Water Pollution Control Laws and other applicable statutes relating to the prevention or abatement of water pollution. Conform to the requirements of all Federal and State agencies having jurisdictional control over the land the project is constructed through. Secure all permits and clearance letters from the appropriate agencies for impacts to streams and for borrow and excess material sites, when these areas have not been assessed or permitted by the Department.

Exercise every reasonable precaution to prevent the pollution of streams, lakes, and reservoirs. Construct all permanent drainage structures, ditch checks, and paved ditches as soon as practical. Conduct and schedule operations to avoid the muddying or siltation of streams, lakes, and reservoirs and to avoid damage to fish habitats. While work on an item is suspended, do not leave the partially completed item in a manner that will contribute to erosion.

Construct water pollution controls in stream channels only in areas where channel changes or channel clearings are specified in the Plans or where necessary for temporary or permanent structures. Do not divert water through channel changes until the specified channel lining has been constructed or placed, unless there is no alternative in the judgment of the Engineer.

Do not place material removed from the roadway or channel changes in streams, stream channels, other areas subject to flooding, or other locations where it may be washed away by high stream flows or fast runoff. Do not place harmful materials where they may be carried into a stream or into underground water at any time.

Provide temporary bridges or structures for hauling materials across streams. Do not operate mechanized equipment in streams except as required for the construction of structures and channel changes, or for clearing channels.

Keep clearing of stream side trees to the absolute minimum necessary for the construction of the project.

When materials known to produce pollutants are encountered, excavate, place, cover, or otherwise deter the material as a potential pollutant according to the Contract and as the Engineer directs.

Do not disturb lands and waters outside the limits of the construction. Before final acceptance of the work, reshape all such disturbed areas, including abandoned haul roads, storage areas, and plant sites, to conform to the adjacent ground.

213.03.01 Best Management Practices (BMP). Before any disturbance is made, sign the BMP Plan from the proposal, perform an initial site inspection with the Engineer, record what areas are to be disturbed to begin the project, designate on this report what BMPs will be used, design BMPs according to good engineering practices, and install the designated BMPs. Before opening or affecting any new areas, repeat this process and ensure all BMPs are installed before starting. The Department will apply a penalty equal to the liquidated damages when any disturbance is made without adequate BMPs in place. The penalty will be assessed each day until adequate BMPs are installed. Include erosion control for all off right of way work performed under a Department acquired permit.

Ensure that the BMP is available for public inspection throughout the life of the project.

213.03.02 Progress Requirements. Coordinate the progress of both permanent and temporary erosion control measures with the clearing, grubbing, and grading operations throughout the duration of the project, and according to the BMP.

The Engineer will limit the area of excavation, borrow, and embankment operations commensurate with the Contractor's capability of maintaining the finish grading, seeding, and other such permanent pollution control measures according to the accepted schedule. For areas greater than 750,000 square feet submit a written request for approval to the Engineer. Keep the duration of the exposure of the uncompleted construction as short as practical.

Permanent stabilization practices on those portions of the project where construction activities have permanently ceased shall be completed within fourteen (14) days of the date of activity cessation. Temporary stabilization practices on those portions of the project where construction activities have temporarily ceased shall be completed within fourteen (14) days of the date of activity cessation.

The Engineer will suspend grading operations for instances where the Contractor fails to sustain erosion control measures to effectively control erosion and to prevent water pollution in accordance with the KPDES Permit. In addition, the Engineer will withhold monies due on current estimates until corrective work has been initiated and is continuously progressing to remediate noted deficiencies. Additionally, should noted deficiencies not be adequately addressed to the satisfaction of the Engineer within 7 calendar days of receipt of written notification of deficiencies, the Department will apply a penalty equal to the daily liquidated damages rate until all aspects of the work have been completed.

In case of repeated failures to control erosion, pollution, or siltation, the Engineer reserves the right to employ outside assistance or use Department forces to provide the necessary corrective measures. The Department will charge such incurred direct costs plus project engineering costs to the Contractor and make appropriate deductions from the pay estimate.

213.03.03 Inspection and Maintenance. Ensure a qualified erosion and sediment control inspector inspects all erosion control devices weekly and after each 0.5-inch rainfall event. Remove all accumulated silt when the devices are one-third full.

The Engineer will monitor the in-place erosion control for the project once every 7 calendar days and within 24 hours following a 0.5-inch or greater rainfall. The Engineer will furnish the documentation of this monitoring and any proposed changes due to this monitoring to the Contractor. This documentation and any proposed changes are to be included with the BMP Plan. Initiate corrective action within 24 hours of any noted deficiency and complete the work within 7 calendar days of receipt of the report. The Contractor shall make a concentrated effort to complete any corrective action required prior to the next predicted rainfall event.

When the Contractor is required to obtain the KPDES permit, it is their responsibility to ensure compliance with the inspection and maintenance requirements of the permit. The Engineer will perform verification inspections a minimum of once per month and within 7 days of a ½ inch or greater rainfall event. The Engineer will document these inspections using Form TC 63-61 A. The Engineer will provide copies of the inspection only when improvements to the BMP's are required. Verification inspections performed by the Engineer do not relieve the Contractor of any responsibility for compliance with the KPDES permit. Initiate corrective action within 24 hours of any noted deficiency and complete the work within 7calendar days of receipt of the report. The Contractor shall make a concentrated effort to complete any corrective action required prior to the next predicted rainfall event.

When projects do not meet the KYR10 minimum disturbance requirement, BMPs will be installed as needed or directed by the Engineer.

213.03.04 Construction Activities Affecting Streams. When in-stream work is unavoidable, perform it in a manner and duration to minimize re-suspension of sediments and disturbance to substrates and bank or riparian vegetation. To the maximum extent practical, perform all work during low flow conditions. Take appropriate measures to maintain normal downstream flows and minimize flooding to the maximum extent practicable. Investigate for water in-takes or other activities immediately downstream affected by increased turbidity resulting from the work. Before beginning any work in the stream, give sufficient notice to allow the downstream water users to prepare for any temporary change in water quality.

Use non-erodible fill or riprap that will not adversely affect the biological, chemical or physical properties of the receiving waters or cause violations of water quality standards. When riprap or channel lining is installed, use a weight and size that will not create bank stress or slump conditions.

On channel slopes not riprapped or otherwise stabilized, re-vegetate stream banks and riparian zones concurrently with Project progression to restore beneficial wildlife habitat. When specified in the Contract, randomly place, in offset rows, trees and shrubs as specified in the Plans; on either one side or both sides of the channel bank; and upstream and downstream of a proposed bridge within the disturbed area as specified in the Plans. Limit each species to 20 percent of the total. The Contract will specify the seeds, shrubs, and trees and include a quantity to be selected from each category. The Plans will include the rate of seeding. The Department may allow an adjustment in the plant species and quantities based on field conditions.

Do not dump spoil materials from the watercourse or on-shore operations, including sludge deposits, into the watercourse according to Section 404 guidelines of the Clean Water Act. Provide areas of deposit of dredged materials with temporary dikes or bulkheads for separation and retention of settleable solids.

When specified in the Plans, place soil excavated from an existing channel at designated locations along the new channel. This, and any stockpiling or double handling necessary is considered incidental to the earthwork bid items on the project.

Carry out the fill created by the discharge and any disposition of dredged or excavated materials on-shore, and all earthwork operations to control and minimize sediment run off and soil erosion to the watercourse.

Place all permanent structures in the stream to allow fish movement through the site. When specified in the Plans, construct artificial riffle structures, flow deflectors, boulders, or other types of structures to replace in stream aquatic habitat.

213.03.05 Temporary Control Measures. Provide and maintain immediate permanent or temporary pollution control measures to prevent contamination of adjacent property, watercourses, lakes, ponds, or other areas of water impoundment.

Incorporate all permanent erosion control features into the project at the earliest practical time as outlined in the accepted schedule. Provide inlet and outlet protection at existing drainage structures. Install temporary controls as needed through the duration of the project. Coordinate the temporary pollution control measures with the permanent erosion control features to the extent deemed practical by the Engineer to ensure effective and continuous erosion control throughout the construction and post-construction periods.

Temporary pollution controls may include construction work outside the right-of-way where such work is necessary as a result of roadway construction such as borrow pit operations, haul roads, and equipment storage sites.

A) Sedimentation Basins. As the first grading operation in the drainage area, construct an earth, or rock and earth, dam with designated spillways according to the Plans. When a sedimentation basin is to be used and plans are not included in the Contract, submit plans designed according to Chapter 10 of the Department's Drainage Guidance Manual to the Engineer for approval before construction.

Either clean out and dress or remove the sedimentation basin, as the Engineer directs, upon completion of the project.

B) Silt Traps. Use one of the following types:

1) Type A. Construct silt traps by excavating basins in natural or excavated channels. Traps may consist of a pit, a berm, or both. Excavate pits, from 2 to 4 feet deep, 20 to 30 feet in length, and 5 to 10 feet in width. Do not construct berms greater than 3 feet in height without the Engineer's approval.
2) Type B. Construct silt traps in roadway ditches or excavated channels. Use clean No. 2 aggregate or shot rock of similar size, quality, and gradation approved by the Engineer; and crushed aggregate. Construct according to the Plans and Standard Drawings.
3) Type C. Place interlocking layers of bagged aggregate around curb inlets, drop box inlets, and culvert inlets according to the Standard Drawings.

Remove sediment deposited in silt traps when they are greater than half full. When no longer needed, remove the silt traps and dispose of surplus materials according to Subsection 204.03.08. Seed and protect, or sod, the entire area

disturbed, as the Engineer directs. Do not leave silt traps in place after completion of the project unless allowed by the Engineer or specified in the Plans.

C) Temporary Silt Fence. Furnish, install according to the Standard Drawings, maintain, and remove temporary silt fence. The temporary silt fence works as a water permeable filter to remove suspended particles from the water passing through it.

Construct as shown in the Contract continuous and transverse to the flow. Limit the equivalent runoff area to 1,000 square feet per 10 feet of temporary silt fence. Leave gaps and install Type A Silt Traps in low areas or drainways.

Maintain the temporary silt fence after installation. Remove silt accumulations by tapping the dry fabric from the downstream side and dispose of it as excavated materials. Replace the geotextile fabric when clogging, damage, or deterioration prevents it from functioning properly.

When no longer needed, remove and dispose of the fence off the right-of-way. Dispose of the accumulated silt or dress in place, and seed and protect the area.

D) Temporary Ditch. As erodible areas are exposed, construct temporary ditches where needed to divert runoff from erosive soil areas to the silt traps or checks or silt ditches. Construct interceptor ditches or silt fences at the top of cut slopes when beginning excavation. Construct ditches adjacent and parallel to the right-of-way in relatively rolling areas where, in the judgment of the Engineer, adjacent property may be damaged from sheet-type soil erosion. Construct silt checks within the ditch or at the outlet. Construct surface ditches, roadside ditches, and flumes to carry runoff from the roadway at the earliest possible time during the grading work. Construct the ditches according to the Plans and Standard Drawings at the locations designated by the Engineer.

When needed, use pipe as liners for these temporary ditches. The Engineer will approve the type and location of the ditches as well as the need for a liner. Install the pipe liner according to the Plans and Standard Drawings. Use pipe of any substantial type or material for overflow pipe in the construction of temporary silt basins and for flumes.

When fill slopes have been constructed to such a stage that protection of the face of the slope from roadway runoff is necessary, construct a temporary earth mound ditch or silt fence at the outer edge of the shoulder along the top of the embankment as directed by the Engineer. Construct the ditch to form an earth mound on the embankment side of the ditch and carry runoff from the roadway along the shoulder to the flumes and roadside ditches. Use temporary berm ditches at the top of fill slopes after completing the permanent seeding and protection work and until beginning the surfacing operations. Stabilize the ditch and mound by spraying with asphaltic material when deemed necessary.

E) Temporary Seeding and Protection. Apply an Annual Rye seed mix at a rate of 100 pounds per acre during the months of March through August. During the months of September through February, apply Winter Wheat or Rye Grain at a rate of 100 pounds per acre. Obtain the Engineer's approval prior to the application of the seed mixture.

Promptly perform the work of temporary seeding and protection to prevent visible erosion. Protect all seeded areas with a mulch that precludes siltation.

Perform temporary seeding and protection under the following conditions:

1) When it is impractical to bring an area to final line, grade, and finish so that permanent seeding and protection work can be performed without subsequent serious disturbance by additional grading.
2) When soil erosion occurs, or is considered to be a potential problem, on areas where construction operations are temporarily suspended.
3) When an immediate cover would be desirable to minimize erosion, siltation, or pollution.
4) On temporary roadways that are expected to remain in place for longer than 30 days and that are constructed of erodible materials.

F) Temporary Mulch. Obtain the Engineer's approval for the mulch before use.

When Temporary Seeding and Protection would be required, but the time of exposure is 30 days or less, perform the work of temporary mulching to prevent

visible erosion. Place temporary mulch to an approximate 2-inch loose depth (2 tons per acre) and anchor it into the soil by mechanically crimping it into the soil surface or applying tackifier to provide a protective cover. Regardless of the anchoring method used, ensure the protective cover holds until disturbance is required or permanent controls are in installed.

213.04 MEASUREMENT. The Department will consider the various materials and labor used to construct, maintain, and, when no longer needed, remove the erosion control devices incidental to the initial construction.

The Department will not measure maintenance or corrective work for payment when it is due to a failure in following the BMP.

213.04.01 Roadway Excavation. The Department will measure the quantity according to Subsection 204.04.

213.04.02 Embankment-in-Place. The Department will measure the quantity according to Subsection 206.04.

213.04.03 Temporary Seeding and Protection. The Department will measure the quantity in square yards. The Department will not measure temporary erosion and pollution control measures required due to negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled. When construction of a temporary roadway is required by the Contract, the Department will measure the associated temporary seeding and protection. The Department will not measure temporary seeding and protection of temporary roadways constructed for the convenience of the Contractor.

213.04.04 Temporary Mulch. The Department will measure the quantity in square yards. The Department will not measure temporary erosion and pollution control measures required due to negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled. When construction of a temporary roadway is required by the Contract, the Department will measure the associated temporary mulch. The Department will not measure temporary mulch for temporary roadways constructed for the convenience of the Contractor.

213.04.05 Pipe for Flumes. The Department will measure the quantity in linear feet.

213.04.06 Sedimentation Basin. The Department will measure the quantity in cubic yards. The Department will not measure filter pipe, drain pipe, and spillway paving on sedimentation basins for payment and will consider them incidental to this item of work.

213.04.07 Clean Sedimentation Basin. The Department will measure the quantity of sediment removed in cubic yards.

213.04.08 Silt Trap, Type. The Department will measure the quantity by each individual unit.

213.04.09 Clean Silt Trap, Type. The Department will measure the quantity by each individual unit.

213.04.10 Temporary Silt Fence. The Department will measure the quantity in linear feet from end post to end post of each installation.

213.04.11 Clean Temporary Silt Fence. The Department will measure quantity in linear feet along the fence.

213.04.12 Temporary Ditch. The Department will measure the quantity in linear feet. The Department will measure pipe used in temporary ditches according to Subsection 213.04.06. The Department will not measure materials used to construct silt checks within the temporary ditch and will consider them incidental to this item of work.

213.04.13 Channel Lining, Classes IA, II, III, and IV. The Department will measure the quantity according to Subsection 703.04.

213.04.14 Plants, Trees, Vines, and Shrubs. The Department will measure the quantity by each individual unit.

213.04.15 Deflector, Gabion. The Department will measure the quantity by each individual unit.

213.04.16 Deflector, Dumped Stone. The Department will measure the quantity by each individual unit.

213.04.17 Riffle Structure, Dumped Stone. The Department will measure the quantity by each individual unit.

213.04.18 Riffle Structure, Gabion. The Department will measure the quantity by each individual unit.

213.04.19 Boulder. The Department will measure the quantity by each individual unit.

213.04.20 Clean Temporary Ditch. The Department will measure the quantity in linear feet along the ditch line.

213.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
05985	Seeding and Protection	See Subsection 212.05
02200	Roadway Excavation	See Subsection 204.05
02210	Borrow Excavation	See Subsection 205.05
02230	Embankment-in-Place	See Subsection 206.05
05953	Temporary Seeding and Protection	Square Yard
05952	Temporary Mulch	Square Yard
-----	Pipe for Flumes	Linear Foot
02711	Sedimentation Basin	Cubic Yard
02712	Clean Sedimentation Basin	Cubic Yard
02703, 02704, 02705	Silt Trap, Type	Each
02706, 02707, 02708	Clean Silt Trap, Type	Each
02701	Temporary Silt Fence	Linear Foot
02709	Clean Temporary Silt Fence	Linear Foot
02482-02484, 02488	Channel Lining, Classes IA, II, III, and IV	See Subsection 703.05
-----	Plants, Vines, and Shrubs	See Subsection 724.05
-----	Trees	See Subsection 724.05
02618	Deflector, Gabion	Each
02617	Deflector, Dumped Stone	Each
02738	Riffle Structure, Dumped Stone	Each
02622	Riffle Structure, Gabion	Each
02713	Boulder	Each
02159	Temporary Ditch	Linear Foot
02160	Clean Temporary Ditch	Linear Foot

The Department will consider payment as full compensation for all work required under this section.

SECTION 214 — GEOTEXTILE CONSTRUCTION

214.01 DESCRIPTION. Install geotextile fabric, when required in the Contract, for slope protection and channel lining, underdrains and drainage blankets, and subgrade or embankment foundation stabilization.

214.02 MATERIALS.

214.02.01 Geotextile Fabric. Conform to Section 843.

214.02.02 Steel Pins. Conform to Section 843.

214.03 CONSTRUCTION. The Engineer will reject the fabric if it has defects, rips, holes, flaws, deterioration, or damage.

Prepare the surface to receive the fabric to a smooth condition, free of obstructions, debris, or sharp objects that may puncture the fabric. Place the fabric smooth and free of tension, stress, folds, wrinkles, or creases. Do not operate equipment directly on the fabric. Protect the fabric at all times from contamination. Remove and replace any contaminated fabric with uncontaminated fabric.

Repair or replace any fabric damaged. Repair individual isolated cuts, tears, or punctures by placing a patch of geotextile fabric that extends at least 3 feet beyond the damage in all directions or by field splicing the patch.

Cover the fabric with a layer of the specified material within 14 calendar days. Remove and replace fabric not covered within the 14 days.

Demonstrate to the Engineer that the placement technique prevents damage to the fabric.

214.03.01 Laps. When more than one strip is necessary, place an overlap of at least 18 inches. Place transverse laps so the upstream strip laps over the downstream strip. Place horizontal laps so the upper strip laps over the lower strip.

Install fastener pins through both strips of overlapped fabric at no less than 5-foot intervals along a line through the midpoint of the overlap, and at any other locations as necessary to prevent any slippage of the fabric.

The Department will allow field splices in place of laps.

214.03.02 Field Splices. Sew the full length of the boundary between adjacent sheets of fabric. Ensure that the seam strength conforms to the requirements of Section 843.

214.03.03 Slope Protection and Channel Lining. Place geotextile fabric for slope protection / geotextile fabric for channel lining with the long dimension parallel to the channel or toe of slope.

Protect the fabric from damage due to the placement of the slope protection or channel lining either by limiting the height of drop of the material to no greater than 3 feet or by placing a cushioning layer of sand on top of the fabric before dumping the material. Demonstrate to the Engineer that the placement technique prevents damage to the fabric. Begin placement of material at the toe and proceed up the slope.

214.03.04 Underdrains. Place and shape geotextile fabric for subsurface drainage to the sides and bottom of the trench without stretching the fabric. Place filter aggregate so as not to damage, displace, or dislodge the fabric according to Subsection 704.03. Fold the fabric over the backfilled trench and secured it with steel pins at intervals of 5 feet to produce a double thickness of fabric over the top of the trench.

214.03.05 Subgrade Stabilization / Rock Roadbed. Place geotextile fabric for stabilization, unless otherwise noted. Install with the long dimension parallel to the long dimension of the area to be covered.

During back dumping and spreading, do not allow the wheels of trucks, dozer blades, and other equipment to come into direct contact with the fabric. Spread the material in the direction of the fabric overlap. If large fabric wrinkles develop during spreading operations, fold and flatten the wrinkles in the direction of spreading. Avoid large folds which reduce the fabric overlap width.

Place, spread, and compact rock or backfill in such a manner that minimizes the

development of wrinkles and movement in the fabric. In curves and intersections, cut the fabric and overlay appropriately. Keep the turning of tracked vehicles to a minimum to prevent displacement of the fill and damage to the fabric. Repair any damage caused during placement or by vehicles.

214.03.06 Drainage Blankets. Place geotextile fabric for subsurface drainage with the long dimension parallel to the long dimension of the area to be covered.

Place the drainage blanket material to present a reasonably even surface free from mounds or depressions. After the material is placed, fold the fabric over the ends and sides of the material, and place additional fabric over the material so that the material is completely encased within the fabric. Install additional pins, regardless of the location, as necessary to prevent any slippage of the fabric. Place the fabric so that laps do not occur at the edges or ends of the drainage blanket. Place embankment in a manner to avoid damage or displacement of the completed drainage blanket.

214.03.07 Embankment Foundation Working Platform. To facilitate embankment construction over soft ground, place geotextile fabric for separation unless otherwise specified. Place as directed in the plans or by the Engineer. Install with the long dimension parallel to the long dimension of the area to be covered. Leave surface vegetation in place.

During back dumping and spreading, do not allow the wheels of trucks, dozer blades, and other equipment to come into direct contact with the fabric. Spread the material in the direction of the fabric overlap. To avoid damage to the geotextile fabric, dump rock fill behind the leading edge of the rock layer, then blade into place. Repair any damage caused during placement or by vehicles. If large fabric wrinkles develop during spreading operations, fold and flatten the wrinkles in the direction of spreading. Avoid large folds which reduce the fabric overlap width.

214.04 MEASUREMENT. The Department will measure the quantity in square yards. The Department will not measure fabric when the Contract indicates the fabric is incidental to the work or when the specification for another item requires incidental installation of geotextile fabric.

The Department will not measure material in laps or seams.

When fabric is used for underdrains, either to wrap perforated pipe or to wrap aggregate, the Department will measure the quantity according to Subsection 704.04.

When the fabric is used to completely enclose an aggregate drainage blanket, the Department will measure the quantity as the sum of (1) the area of the lower surface of the aggregate layer, (2) the area of the upper surface of the aggregate layer, and (3) the area of the sides and ends of the aggregate layer; using the dimensions specified in the Plans.

The Department will not measure for payment the repair or replacement of damaged fabric or replacement of fabric not covered within 14 days.

214.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02602	Fabric-Geotextile Class 1	Square Yard
02603	Fabric-Geotextile Class 2	Square Yard
02608	Fabric-Geotextile Class 4A	Square Yard

Deleted:

The Department will consider payment as full compensation for all work required under this section.

SECTION 215 — TREATMENT OF OPEN SINKHOLES

215.01 DESCRIPTION. Clean and fill open sinkholes and cap open sinkholes not used for drainage. Protect sinkholes not being filled and capped.

215.02 MATERIALS.

215.02.01 Geotextile Fabric. Conform to Section 843.

215.02.02 Concrete. Use Class B concrete conforming to Subsection 601.02 and 601.03.

215.02.03 Steel Reinforcement. Conform to Section 811.

215.03 CONSTRUCTION. Locate and flag all open sinkholes before starting clearing and grubbing operations. Clear the sinkhole area according to Section 202. Remove the soil overburden, organic material, and debris from the sinkhole as specified in the Plans or as directed by the Engineer.

Place geotextile fabric between any soil and the Granular Embankment Refill. Refill the sinkhole with Granular Embankment, and compact it as the Engineer directs. Furnish Granular Embankment refill conforming to the following requirements:

A) **Roadway Excavation.** When obtaining granular embankment from roadway excavation, the Engineer will accept it by visual inspection. Use granular embankment that is free of shale or other deleterious materials.

A) **Off-Site Materials.** Use granular embankment having no more than 10 percent passing the No. 200 sieve when tested according to KM 64-606. The Engineer will inspect the quality of all granular embankments. The Engineer will accept the processed material by visual inspection when the material includes a significant amount of fragments greater than 1 1/2 inches. Do not use natural sand and other fine aggregates. The Engineer will approve the size and type of refill.

A) **Clay.** For clay soil cap, use an impervious clay the Engineer approves. Compact according to Section 206.03.03.

A) **Concrete.** Use a cap of reinforced concrete, precast or cast-in-place, with a minimum thickness of one foot as specified in the Contract or as the Engineer directs. Use Class B concrete according to Subsection 601.03. Furnish precast concrete according to Section 605. Reinforce the concrete with No. 8 bars placed on one-foot centers in both directions, and located 3 inches from the bottom surface of the concrete. Interlock the concrete cap with bedrock.

Protect sinkholes not to be filled and capped when runoff may reach its location. Place a protective ring using geotextile fabric for subsurface drainage and separation; clean No. 2 aggregate or shot rock of similar size, quality, and gradation approved by the Engineer; and crushed aggregate.

215.04 MEASUREMENT.

215.04.01 Granular Embankment. When the material is available within the right-of-way, the Department will consider granular embankment used for refill incidental to roadway excavation or embankment-in-place. When material within the right-of-way is unacceptable for refill, the Department will measure the quantity in cubic yards as Granular Embankment.

215.04.02 Clay Soil Cap. The Department will not measure the clay soil cap as a separate item of work and will consider it incidental to roadway excavation or embankment-in place.

215.04.03 Geotextile Fabric. The Department will measure the quantity according to Subsection 214.04.

215.04.04 Concrete, Class B. The Department will measure the quantity according to Subsection 601.04.

215.04.05 Clean Sinkhole. The Department will measure the quantity by each individual unit cleaned. This bid item includes all necessary work to prepare a sinkhole for treatment as directed by the Engineer. The scope encompasses clearing, grubbing, excavation, and disposal of all removed material.

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215.04.06 Steel Reinforcement. The Department will measure the quantity according to Subsection 602.04.

215.04.07 Crushed Aggregate. The Department will measure the quantity in tons according to Section 109.

215.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02223	Granular Embankment	Cubic Yard
02602	Fabric-Geotextile Class 1	Square Yard
02603	Fabric-Geotextile Class 2	Square Yard
02555	Concrete, Class B	See Subsection 601.05
02469	Clean Sinkhole	Each
08150	Steel Reinforcement	See Section 602.05
-----	Crushed Aggregate, Size	Ton

The Department will consider payment as full compensation for all work required under this section.

SECTION 216 — SETTLEMENT PLATFORMS

216.01 DESCRIPTION. Furnish all materials, construction, installation, and maintenance of settlement platforms as the Engineer directs.

216.02 MATERIALS.

216.02.01 Miscellaneous Metals. Conform to Section 813.

216.02.02 Fine Aggregate. Conform to Section 804.

216.02.03 Steel Pipe. The Engineer will visually inspect for acceptance.

216.03 CONSTRUCTION. Fabricate from the materials and to the dimensions specified in the Plans or Standard Drawing for settlement platforms.

Level the ground surface to an elevation 2 inches below the desired elevation of the base plate of the settlement platform. Level over a sufficient area to accommodate the bottom plate and at the location shown or directed. Place, lightly tamp, and level a 2-inch layer of fine aggregate at the proposed location of the bottom plate. Set and level the bottom plate on the fine aggregate. Place loose soil to an elevation corresponding to that of the top plate of the settlement platform. Ensure that the loose soil does not disturb the platform and that it extends laterally from the perimeter of the top plate to a slope of 1:1 or flatter. After placing and leveling the top plate, complete the embankment as specified for the project, and ensure that the settlement platform is not damaged or disturbed.

The Engineer will measure and record settlement, to the nearest 0.01 foot, and elevation of the embankment at weekly intervals or more frequently in order that no more than 10 percent of the expected settlement occurs between readings. The Engineer will submit the data to the Division of Materials weekly.

Stop work at any location where settlement platforms are disturbed or damaged, and make necessary repairs or replacement. As the embankment is constructed, add sections of 2 1/2-inch and 4-inch pipe to the assembly (tighten each new section of 2 1/2-inch pipe with a pipe wrench before taking a reading to ensure that the next added section does not affect future readings). Keep the top of the outer pipe closed as work progresses with a 4-inch standard cap. When work is complete, secure the cap to the final outer pipe section.

216.04 MEASUREMENT.

216.04.01 Settlement Platforms. The Department will measure the quantity by each individual unit.

216.04.02 Steel Pipe. The Department will measure each size in linear feet.

216.05 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02692	Settlement Platform	Each
03340	Steel Pipe, 2 1/2-inch	Linear Foot
03343	Steel Pipe, 4-inch	Linear Foot

The Department will consider payment as full compensation for all work required under this section.