

SECTION 02270
CLASS "D" SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section includes: All material, labor and equipment necessary for the placement of riprap required for the protection of and to prevent soil erosion on designated slopes where shown on the drawings and as specified herein. Also included are material, labor and equipment necessary for soil and slope preparation as shown on the drawings not included elsewhere.
- B. Related Sections:
 - 1. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.
- C. Method of measurement: All slope protection and erosion control will be delivered in tons. Weigh on accurate scales designed for weighing loaded trucks. Load vehicles to insure against loss of material between the scales and the point of delivery. No deduction will be made for the weight of moisture naturally occurring in the material. Material will not be deposited nor spread until the scale ticket is delivered to the DNR Construction Inspector and the weight of the material verified.
 - 1. The soil preparation not otherwise included elsewhere will be inclusive.
- D. Basis for payment:
 - 1. Unit Price: If the work of this section is so designated to be paid, the Contractor will be paid the Contract Unit Price for the calculated number of tons for each class of material provided as shown on the Drawings and as specified herein.
 - a. Additional payments for increased quantities, labor or equipment usage will only be allowed if a change order is warranted due to a change in project scope or for unforeseen conditions, as determined by the Project Engineer, in accordance with the provisions of the General Conditions of the Contract.

1.02 REFERENCES:

- A. Standards of materials and construction shall conform with the Standard Specifications for Highway and Bridge Construction, 2001 Series of the Iowa Department of Transportation.
 - 1. Section 4130 - Revetment Stone
- B. Where conflicts arise between the Drawings and Code Requirements, the latter shall prevail, unless Drawings are more stringent. Bring all conflicts to the attention of the Project Engineer and the DNR Construction Inspector.

1.03 SUBMITTALS:

- A. Samples: Submit, for verification purposes, samples of each type of material to be used in the work of this section, as requested by the DNR Construction Inspector.
- B. Weight tickets: Provide weight tickets for each truckload.
 - 1. Include the Contractor's name, date of delivery designation of mixture, load identification number, net weight of load and any other data which would aid in the identification of the load.
 - 2. Only weight tickets issued by a state licensed scale will be accepted.

1.04 QUALITY ASSURANCE:

- A. Qualification of Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper performance of the work of this section.

1.05 MATERIAL HANDLING:

- A. Class "D" Revetment Stone: Use a loading method which assures reasonable compliance with specified requirements and is acceptable to the DNR Construction Inspector. The DNR Construction Inspector will visually inspect material prior to loading and may reject material too fine or too coarse and require Contractor to load from another area.

1.06 PROJECT/SITE CONDITIONS:

- A. Existing Conditions: Survey job conditions prior to commencing work. Bring any discrepancies between existing conditions and the Drawings and Specifications to the attention of the Project Engineer/DNR Construction Inspector.
 - 1. Interface with existing conditions in accordance with the obvious intent of Drawings and Specifications. Claims for extra payments as a result of failure to examine existing conditions at the site will not be allowed.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Revetment Stone: Provide Revetment Stone (Riprap), where indicated on the drawings, meeting the requirements of IDOT Standard Specification Section 4130 for gradation shown and which when subjected to the freezing and thawing test of the IDOT Laboratory, Method 211, Method C, shall not lose more than 10% for stones crushed to 1-1/2" to 3/4"(nominal) for Class "D" revetment. In addition the percentage of abrasion loss when tested in accordance to AASHTO T96 shall not exceed 50. Do not use material which split in layers less than 4-inches thick, when exposed to natural weathering regardless of the above tests results.
 - 1. Class "D" revetment stone shall be taken from blasted rock or broken concrete. Class "D" material shall not require additional processing. After visual inspection and prior to

loading, the engineer may designate material as too fine or too coarse and may require material to be loaded from another area. Class "E" material shall be processed to the extent that most of the material 3 in. and less shall be removed.

Revetment shall be well-graded material with a nominal top size of 250 lb.* and meeting the following additional size limitations.

<u>Stone Weight</u>	<u>Minimum % Larger Than Stone Weight</u>
90 lb	50
5 lb	90

*Note: The Engineer may approve using riprap containing material larger than 250 lb.

- B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Project Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION:

- A. Surface Preparation: Begin with trench excavations to the elevations shown on the Drawings. Shape and dress the slope to be protected so that the revetment surface will be in compliance with the lines and grades shown on the Drawings.
 - 1. To control placement provide a grid system designating those areas shown on the Drawings to receive stone protection.
 - 2. The DNR Inspector will inspect the prepared base directly prior to placement of revetment.

3.03 APPLICATION:

- A. Special Techniques: Spot loads and distribute over the surface marked in grid. Do not place any material until prepared base has been accepted by the DNR Construction Inspector.
- B. Place stone riprap to produce a reasonably well-graded mass of stone with the minimum practicable percentage of voids and in full course thickness in one operation.
 - 1. Distribute the largest stones so that the entire mass conforms approximately to the gradation specified.

2. Where necessary, allow some roughness in surface to break up wave action and decrease the velocity of the mass while keeping the mass fairly compact with all sizes of material in proper proportions.
 3. Hand place or rearrange individual stones with mechanical equipment as necessary to secure results as specified.
- C. Tolerances: Control distribution based on the assumed density of 100 lbs per cubic foot and the actual weights delivered.

END OF SECTION 02270

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: The work covered by this section consists of furnishing all materials, labor, and equipment necessary or required to do the grading, placing, and compacting of fill materials and surfacing parking area and walk paving as shown on the Drawings and as specified herein.

B. Related Sections: Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not limited to, the following:

Section 03100 - Concrete Form Work
Section 03200 - Concrete Reinforcement
Section 03300 - Cast-In-Place Concrete

C. Measurement: Measure the quantity of material installed, to the nearest ton.

D. Method of Payment:

1. Contract Unit Price: When payment for the work of this section is so designated, the contractor will be paid the Contract Unit price per ton.

a. In the event that the estimated quantity is larger than the quantity provided, pay the Owner a deduct for the difference in cost for both quantity and labor.

b. Additional payments for increased quantities or labor will only be allowed if a change order is warranted due to a change in project scope or for unforeseen conditions, as determined by the Project Engineer, in accordance with the provisions of the General Conditions of the Contract.

3. The Owner will make no additional payments for additional material or labor to correct deficiencies, shortages, or mistakes by the Contractor.

1.02 REFERENCES:

A. Standards of materials and construction shall conform with the Standard Specifications for Highway and Bridge Construction, Series of 2001, of the Iowa Department of Transportation.

1.03 DELIVERY, STORAGE, AND HANDLING:

- A. General: Use only materials as specified for this section as tested and approved for use by the DNR Construction Inspector in accordance with the applicable portions of 2001 Series, I.D.O.T. Section 1106.
- B. Samples and Tests: Submit samples of materials to be used to the DNR Construction Inspector in advance of anticipated use to avoid construction delays. Submit samples and tests in accordance with 2001 Series, I.D.O.T. Section 1106.02.
- C. Field Testing: Testing of materials and workmanship will continue throughout the project as conducted by the DNR Construction Inspector. Cooperate in these tests in any way needed to obtain the required data and samples.
- D. Unacceptable Materials: Unacceptable materials will be rejected in accordance with 2001 Series, I.D.O.T. Section 1106.04.

1.04 PROJECT/SITE CONDITIONS:

- A. Environmental Requirements: Observe weather conditions. Attempt no work in frozen conditions without written approval from the DNR Construction Inspector.
- B. Existing Conditions: Review job conditions prior to commencing work. Bring any discrepancies of existing work with the Drawings and Specifications to the attention of the DNR Construction Inspector.
- C. If paving work cannot be completed because of weather conditions, then place base course and delay wearing course to be placed when directed by the DNR Construction Inspector. Fill any ruts, depressions, washouts, etc. in the base course and bring to grade prior to placing wearing course as directed by the DNR Construction Inspector.

PART 2 - PRODUCTS

2.01 ASPHALTIC CONCRETE PAVING MATERIAL:

- A. Provide materials in accordance with 2001 Series, I.D.O.T. Section 2203 and Section 2303.

2.02 CONCRETE WALK AND SLAB MATERIALS:

- A. Provide materials in accordance with Section 03300.

2.03 REINFORCING STEEL:

- A. Provide reinforcing steel in accordance with Section 03200.

2.04 EXPANSION JOINT FILLER:

- A. Provide expansion joint filler in accordance with Section 03300.

2.05 EXPANSION JOINT SEALER:

- A. Provide expansion joint sealer in accordance with Section 03300.

2.06 CONCRETE MIX DESIGN:

- A. Air entrained, 3,500 PSI, compressive strength as specified in Section 03300 with slump of two inches to four inches.

2.07 WHEEL STOPS:

- A. Provide precast concrete wheel stops or curb, 3500 psi, fully reinforced complete with suitable anchorage device as required for positive and permanent attachments to parking surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Preparation of Subgrade: Conform to 2001 Series, I.D.O.T. Section 2109. If unsuitable subgrade materials are encountered, remove this material to a depth as indicated by the DNR Construction Inspector and replace with suitable ballast material.
- B. Concrete Forms: Forms for concrete surfacing: wood or metal, staked so they are firmly held to line and grade. Make upper edge of form level with finish grades. Do not use twisted, warped, or broken forms. Coat forms before placing concrete. Lap reinforcing mesh six inches. Leave forms in place 12 hours minimum unless directed otherwise.
- C. Asphaltic Concrete and Paving:
 - 1. General: Plant mix asphaltic concrete in accordance with the material and placing method requirements of 2001 Series, IDOT Section 2303 for Type A and/or Type B Asphalt Cement Concrete.
 - 2. Asphaltic Concrete Paving: Use asphaltic concrete paving on all roadway, service and parking areas except those specifically designated as walkways.
 - 3. Design Mixes: Type "A" asphaltic concrete mixture size shall be 1/2", and Type "B" asphaltic concrete mixture size shall be 3/4". Contractor to submit asphalt

mix design to Project Engineer for approval prior to commencing work on the project.

- D. Installation of Wheel Barrier: Construct wheel barriers where shown on the Drawings. Units shall be set in one-half inch nominal cement grout. If modular units are used, install with open joints between blocks.
- E. Concrete Curbing: Place curbing where shown on the Drawings. Construct in accordance with I.D.O.T. Section 2512 Portland Cement Concrete Curb and Gutter. Coordinate efforts with those installing catch basins and curb inlets as shown on the Drawings.
- F. Concrete Walks and Aprons:
 - 1. Concrete Surfacing: Construct exterior concrete walks and aprons where shown on the Drawings. Construct in accordance with the applicable portions of the I.D.O.T. Portland Cement Concrete Sidewalks, Section 2511. Install expansion joints at transitions of walks and aprons in addition to those locations specified in I.D.O.T. Section 2511. Dowell drivable apron slabs into interior slabs as shown on the Drawings.
 - 2. Concrete Placement: Do not place concrete over frozen subbase, or ice-coated forms. Tamp and spade or vibrate concrete enough to compact firmly during placement.
 - 3. Concrete: Ambient air temperature shall be between 40 and 70 degrees Fahrenheit when placed. In cold weather, heat materials to obtain required temperature. In hot weather, a water-reducing retarder may be used, if approved by the Project Engineer. Erect tight and plumb bulkheads, when stopping placement and when forming construction joints. Brush on new cement when pouring against hardened concrete.
 - 4. Concrete Apron: 6" thick minimum.
 - 5. Expansion Joints: Install specified one-half inch (1/2") thick pre-molded expansion filler at abutting or intersecting construction and in expansion joints. Set top of joint filler within one inch (1") of slab surface. Hot pour joints to within one-fourth inch (1/4") of surface with specified joint sealer. Expansion joints shall be full slab depth.

6. Control Joints: Score concrete with 1/4" x 1-1/4" deep control joints. Use straightedge guide when scoring joints. Where required depth of control joint cannot be made by scoring, cut joints with carborundum saw.
 7. Finishing: Finish apron with fiber broom after leveling and floating. Tool expansion and control joint edges to one-fourth inch (1/4") radius.
 8. Do not overwork concrete. Do not allow coarse aggregate to be visible in the final finish.
 9. Protecting and Curing: Protect concrete surfaces from rapid drying or wash by rain. Cure and seal immediately after finishing by applying two spray coats of membrane curing compound, in accordance with manufacturer's instructions, at the rate of 500 square feet, or less, per gallon, per coat. Unless otherwise directed by DNR Construction Inspector, do not open surfaced areas to traffic for seven (7) days after concrete placement. In cold weather, avoid opening surfaces where there is danger of de-icing salts from vehicles damaging concrete surface.
- K. Parking Stall Lines: Paint parking stall and directional lines on roadway and parking areas on the paving surface with traffic signal and striping paint. Conform with manufacturer's specification and recommendations for surface cleaning and paint application. Color of pavement markings to be as shown on the Plans

3.02 FIELD QUALITY CONTROL:

- A. Slump and Control Tests: Meet requirements of Section 03300 and I.D.O.T. Take one set of control test cylinders for every 50 cubic yards and minimum of one set of three cylinders for each day's pour.

3.03 CLEANING:

- A. Upon completion of construction, remove all excess materials and construction debris, and restore any damage done to existing buildings or landscape.

END OF SECTION 02510

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes: Seedbed preparation and application of seed mixtures and fertilizer to all areas designated on the Drawings or all areas within the boundaries of this project having been disturbed by works of this project and not receiving finished surfacing, as determined by the DNR Construction Inspector and as specified herein.
- B. Related Sections: Drawings and General Provisions of the Contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not necessarily limited to, the following:

Section 02510 – Walk, Road and Parking Paving

1.02 REFERENCES:

- A. Standards of materials and construction shall conform with the Standard Specifications for Highway and Bridge Construction, 2001 Series of the Iowa Department of Transportation.

1.03 QUALITY ASSURANCE:

- A. Codes and Standards: Perform all work of this section in accordance with the requirements of the "Standard Specifications" 2001 I.D.O.T. Section 2601.

1.04 PROJECT/SITE CONDITIONS:

- A. Environmental Requirement:
 - 1. Weather conditions shall be observed. Seeding shall be performed only during normal application periods, optimum temperature, moisture and climatic condition to promote germination and plan growth. Normal application periods are between March 1 and May 31 and between August 10 and September 30.
- B. Existing Conditions: Survey job conditions prior to commencing work. Bring any discrepancies between existing work and the Drawings and Specifications to the attention of the Project Engineer/DNR Construction Inspector.

1.05 SEQUENCING AND SCHEDULING:

- A. Properly coordinate the work of this section with all other trades.
- B. Do not start the work of this section until the work of all other trades has been completed unless otherwise approved by the DNR Construction Inspector.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. All topsoil used for seedbed shall be in accordance with Section 02200.
- B. All seeds shall be "redtag" quality or better supplied from the latest available crop, free of noxious weed seed and supplied in the following varieties and percentages of weight.
- C. Provide mixture of types and quantities as specified herein for seeding of areas designated by the Project Engineer, the DNR Construction Inspector as indicated on the Drawings, and as specified herein.

- 1. Class "A" Mixture: For areas to remain in semi-natural state where mowing is required only as a temporary control measure.

Fescue, Kentucky 31	25 lbs. per acre
Switchgrass (Blackwell)	8 lbs. per acre
Alfalfa (Northern Grown)	5 lbs. per acre
Birdfoot Trefoil (Empire)	4 lbs. per acre
Alsike Clover	4 lbs. per acre

- 2. Class "B" Mixture: For same situation as where Class "A" mixture is used but where a lighter mix is preferable.

Fescue, Kentucky 31	20 lbs. per acre
Switchgrass (Blackwell)	3 lbs. per acre
Alfalfa (Northern Grown)	4 lbs. per acre
Birdfoot Trefoil (Empire)	4 lbs. per acre
Alsike Clover	4 lbs. per acre

- 3. Class "C" Mixture: For area designated as fine seeded, lawns or other mowed grass areas.

Bluegrass, Kentucky	70%
Ryegrass, Perennial, Fineleaf	10%
Fescue Creeping Red	20%

4. Class "D" Mixture: For all areas, unless otherwise specified, where a prairie grass in natural state is required.

Big Bluestem	30 lbs. per acre
Switchgrass (Blackwell)	5 lbs. per acre
Sideoats Grama	5 lbs. per acre
Little Bluestem	5 lbs. per acre

- D. Seed is to be delivered on site in separate packaging for each individual type of seed within each mixture and mixed in the presence of the DNR Construction Inspector if required. Commercial mixture in the quantities as specified will be acceptable at the discretion of the DNR Construction Inspector, if these quantities are verifiable.
- E. Seed mixture for this project to be Class "A" mixture.

2.02 FUNGICIDE:

- A. All seeds for permanent seeding shall be treated with a non-mercurial fungicide (75% concentration or equivalent) at the rate of 5-1/2 ounces per 100 pounds of seed.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 SEEDBED PREPARATION:

- A. The area to be seeded shall be raked or graded to fill washes or gullies. Pick up and dispose of all debris, including stones, boulders, logs, stumps, or other foreign material that will interfere with the seeding operation.

3.03 FERTILIZER APPLICATION:

- A. Spread fertilizer over the area at the rate of 750 pounds per acre of 15-15-15 (or equivalent).
- B. Unless otherwise indicated, spread all fertilizer with a mechanical spreader, which will secure a uniform rate of application.
- C. Spread fertilizer after the preliminary preparation of seedbed and prior to the sowing of any seeds.

- D. Disk the fertilizer and roll the area prior to seeding.
- E. On area inaccessible to field machinery, spread fertilizer after preparation of the seedbed and thoroughly rake into the soil.
- F. Application of fertilizer in combination with seeding by hydraulic seeder as specified in I.D.O.T. Section 2601.04H will be acceptable at the discretion of the DNR Construction Inspector.

3.04 SEED APPLICATION:

- A. Preparation: Mix all seeds specified for this project thoroughly at the project site prior to placing in spreading equipment.
- B. On all areas accessible to field machinery, all grass seeds may be sown with a gravity, cyclone or hydraulic seeder as specified herein. On areas inaccessible to field machinery, the use of hand-cyclone seeder will be permitted.
- C. Apply seed mixture at a rate of four pounds per 1,000 square feet, unless otherwise indicated, during fair, calm weather. One half of the seed mixture shall be sown in one direction and the remainder at right angles to the first sowing.

3.05 SEED APPLICATION IN MAINTAINED LAWNS:

- A. For maintained lawns to be seeded as part of this project, apply fertilizer prior to preparation of the seedbed.
- B. A rotary tiller will be required for preparation of the seedbed. The seedbed after tilling will be raked firm, smooth and free of clods, rocks and other debris.
- C. Roll the seedbed shall both before and after the application of seeds. Apply seeds over damp soil by broadcast seeding.
- D. Roll, seed, and fertilize by hand or with hand operated equipment in areas inaccessible to field equipment.

3.06 SPRING OVERSEEDING:

- A. Seedbed preparation will not be required provided the overseeding is applied when the ground is free from frost action after March 1 and before April 1 or as directed by the DNR Construction Inspector.

3.07 MOWING:

- A. When requested by the DNR Construction Inspector, mowing may be required prior to permanent seeding or anytime during the growing season.

3.08 MULCHING:

- A. All seeded areas are to be mulched unless otherwise designated in the contract documents.
- B. All areas requiring mulch are to be mulched as soon as seed is sown and final rolling is completed.
- C. Mulch is to be evenly and uniformly distributed and anchored into the soil. The application rate for reasonably dry material shall be approximately 1-1/2 tons of dry cereal straw, 2 tons of wood excelsior, or 2 tons of prairie hay per acre, or other approved material, depending on the type of material furnished.
 - 1. All accessible mulched areas are to have mulch consolidated into the soil with a mulch stabilizer, and slope areas are to be tugged on the contour.
 - 2. Crawler type or dual wheel tractors are to be used for the mulching operation. Equipment is to be operated in a manner to minimize displacement of the soil and disturbances of the design cross section.

END OF SECTION 02930