

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION CONTROL MANUAL

SECTION 1 STABILIZATION

Version	Version Date	Notes
1	9/12/2023	

TABLE OF CONTENTS

- SECTION 1 STABILIZATION..... 4**
- Temporary Seeding4
- Permanent Seeding6
- Erosion Control Blankets 10
- Hydraulic Erosion Control Products 11
- Aggregate Ditch Lining..... 12
- Rock Slope Protection 14
- Dust Control 15
- Preserving Natural Vegetation..... 17

SECTION 1 STABILIZATION

TEMPORARY SEEDING

Purpose and Operation

Temporary stabilization measures for disturbed soils are necessary while conducting construction activities. Temporary seeding is by far the most efficient and cost-effective method for controlling onsite erosion. The key to controlling erosion with temporary seeding is the timeliness of the application. Temporary seeding should be initiated immediately whenever any clearing, grading, excavating, or other soil disturbing activities have temporarily or permanently ceased on any portion of the site and will not resume for a period exceeding 7 calendar days. Onsite erosion and offsite sedimentation will continue to occur as long as a section of exposed earth remains open.

To view KDOTs Standard Drawings for the temporary seeding, select the following link to the standard drawing with relevant detailed design information: [Landscape Standard LA 852A](#). This file can also be found on KDOTs Authentication and Resource Tracking (KART) webpage with a free account.

Design

Material Specification

- Use approved seed mixtures as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2103 – Seeds](#) and [Section 904 – Seeding](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).
- Current temporary seed mixes for use in design are available for download from the KDOT KART website (<https://kart.ksdot.gov/>). Mixes are identified for rural areas in each district as well as a statewide mix for use in urban areas.
- Seed and seed mixtures should comply with the seed and noxious weed laws of the State of Kansas and applicable Kansas Department of Agriculture Rules and Regulations.
- Use approved fertilizers as referenced in the Contract Documents and KDOTs Standard Specifications [Section 903 – Fertilizer, Agricultural Limestone and Peat Moss](#), [Section 2107 – Agricultural Limestone](#), [Section 2108 – Fertilizers](#), and [Section 2109 – Peat Moss](#).
- Use approved mulching as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2110 – Mulch](#) and [Section 905 – Mulching](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).

Installation

Seedbed Preparation

- Unless shown otherwise in the Contract Documents, prepare the seedbed and seed all disturbed or cultivated areas within the right-of-way and construction easements.
- Seed and mulch the area within 24 hours of seedbed preparation.
- Repair eroded areas before the seedbed is prepared.
- In urban areas, use a landscape box to level the seedbed. Grade seedbeds to the elevations of abutting sidewalks. Remove rocks and other debris detrimental to lawn maintenance equipment.
- Before seeding, use tillage equipment that penetrates 2 to 3 inches to prepare a firm, friable and weed-free seedbed. If the use of disks and harrows is impracticable, prepare the seedbed using hand methods.

- Prepare seedbeds in developed urban and residential areas using rotary tillers or similar equipment. Tractor mounted equipment is permitted if the area is large enough to facilitate the use of such equipment.
- Do not injure trees while preparing the seedbed. If the Engineer or Designer designates areas of desirable perennial native grasses to remain, do not till such areas. If areas of annual grasses such as cheat, crabgrass or triple-awn are encountered, destroy such grasses by thorough disking.
- Do not till areas if temporary or existing grasses provide stable slopes with no erosion.

Fertilizer

- Apply any fertilizers or soil amendments to the prepared seedbed at the rates designated in the Contract Documents.
- Use an agricultural type broadcast spreader or a fertilizer attachment on the seed drill to apply the fertilizer.
- Spread the fertilizer uniformly by hand methods in areas where it is impracticable to use a seed drill.

Seed installation

- Seed can be implemented using a seed drill, broadcaster seeder, or a hydro-seeder and should be applied at rates specified in the Contract Documents.
- In rural areas, use seed drills. If it is impracticable to operate a seed drill, broadcast the seed with a standard manufacture grass seeder. A hydro-seeder may be used in place of the broadcast seeder, when approved by the Engineer or Designer.
- In urban areas, apply the seed with equipment suitable for the size of the area. Use manually operated drop-seeders, cyclone spreaders or other similar equipment when appropriate. After the seeding, but before mulching, hand rake the seeded lawn areas.

Mulching

- After an area is fertilized and seeded, uniformly spread mulch over the area or apply hydromulch.
- Mulch or hydromulch should be applied at the rates shown in the Contract Documents. The rates shown in the Contract Documents are a guide. The Engineer or Designer will determine if the applied mulch is sufficient to protect the seeded area.
- Do not allow the mulching operations to lag behind the fertilizing and seed operations more than 24 hours.
- If rain is in the forecast, make every effort to mulch areas the same day as they are seeded.

Inspection and Maintenance

Seeded areas should be inspected at least once within every 7-day inspection monitoring period to verify that a uniform vegetative cover is achieved. The following is a general list of questions that should be addressed during each inspection:

- Do the seeded areas show signs of erosion or washout?

Areas with erosion and where seed has been washed out should be repaired and reseeded.

- Are seeded areas still bare or lack appropriate vegetative cover?

Areas that fail to establish vegetative cover should be reseeded.

- Does the vegetation appear yellow/brown or stunted.

Additional fertilizer applications or scheduled watering can promote vegetative growth. Seasonal watering should be performed as necessary.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

PERMANENT SEEDING

Purpose and Operation

Permanent stabilization measures for disturbed soils are necessary while conducting construction activities. Permanent seeding consists of the establishment of perennial vegetation. Permanent seeding is typically installed as long-term erosion control for areas that will be inactive for prolonged periods of time or in areas that have reached final grade. Permanent seeding is an efficient and cost-effective method for controlling onsite erosion. The key to controlling erosion with Permanent seeding is the timeliness of the application and use of designated regional seed mixes. Permanent seeding should be initiated immediately whenever any clearing, grading, excavating, or other soil disturbing activities have temporarily or permanently ceased on any portion of the site and will not resume for a period exceeding 7 calendar days. Onsite erosion and offsite sedimentation will continue to occur as long as a section of exposed earth remains open.

To view KDOTs Standard Drawings for the permanent seeding, select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 850](#). This file can also be found on KDOTs KART webpage with a free account.

Design

Material Specification

- Use approved seed mixtures as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2103 – Seeds](#) and [Section 904 – Seeding](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).
- Current permanent seed mixes for use in design are available for download from the KDOT KART website (<https://kart.ksdot.gov/>). Permanent seed mixes are identified for both rural and urban areas by District. Rural seed mixes are also identified by soil type and include wildflower mixes. Urban seed mixes also include warm season and cool season lawn mixes.
- Seed and seed mixtures should comply with the seed and noxious weed laws of the State of Kansas and applicable Kansas Department of Agriculture Rules and Regulations.
- Use approved fertilizers as referenced in the Contract Documents and KDOTs Standard Specifications [Section 903 – Fertilizer, Agricultural Limestone and Peat Moss](#), [Section 2107 – Agricultural Limestone](#), [Section 2108 – Fertilizers](#), and [Section 2109 – Peat Moss](#).
- Use approved mulching as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2110 – Mulch](#) and [Section 905 – Mulching](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).
- For mowing specifications refer to KDOTs Standard Specifications [Section 909 – Mowing](#).

Installation

Seedbed Preparation

- Unless shown otherwise in the Contract Documents, prepare the seedbed and seed all disturbed or cultivated areas within the right-of-way and construction easements.
- Seed and mulch the area within 24 hours of seedbed preparation.
- Repair eroded areas before the seedbed is prepared.
- In urban areas, use a landscape box to level the seedbed. Grade seedbeds to the elevations of abutting sidewalks. Remove rocks and other debris detrimental to lawn maintenance equipment.
- Before seeding, use tillage equipment that penetrates 2 to 3 inches to prepare a firm, friable and weed-free seedbed. If the use of disks and harrows is impracticable, prepare the seedbed using hand methods.
- Prepare seedbeds in developed urban and residential areas using rotary tillers or similar equipment. Tractor mounted equipment is permitted if the area is large enough to facilitate the use of such equipment.
- Do not injure trees while preparing the seedbed. If the Engineer or Designer designates areas of desirable perennial native grasses to remain, do not till such areas. If areas of annual grasses such as cheat, crabgrass or triple-awn are encountered, destroy such grasses by thorough disking.
- Do not till areas if temporary or existing grasses provide stable slopes with no erosion. Seed the permanent grasses into the existing cover using a no-till drill.

Fertilizer

- Apply any fertilizers or soil amendments to the prepared seedbed at the rates designated in the Contract Documents.
- Use an agricultural type broadcast spreader or a fertilizer attachment on the seed drill to apply the fertilizer.
- Spread the fertilizer uniformly by hand methods in areas where it is impracticable to use a seed drill.

Seed installation

- Seed can be implemented using a seed drill, broadcaster seeder, or a hydro-seeder and should be applied at rates specified in the Contract Documents.
- In rural areas, use seed drills. If it is impracticable to operate a seed drill, broadcast the seed with a standard manufacture grass seeder. A hydro-seeder may be used in place of the broadcast seeder, when approved by the Engineer or Designer.
- In urban areas, apply the seed with equipment suitable for the size of the area. Use manually operated drop-seeders, cyclone spreaders or other similar equipment when appropriate. After the seeding, but before mulching, hand rake the seeded lawn areas.

Mulching

- After an area is fertilized and seeded, uniformly spread mulch over the area or apply hydromulch.
- Mulch or hydromulch should be applied at the rates shown in the Contract Documents. The rates shown in the Contract Documents are a guide. The Engineer or Designer will determine if the applied mulch is sufficient to protect the seeded area.
- Do not allow the mulching operations to lag behind the fertilizing and seed operations more than 24 hours.
- If rain is in the forecast, make every effort to mulch areas the same day as they are seeded.

- Hydraulic mulching slurry can be applied on top of punched mulch to provide additional erosion protection if in windy or high traffic areas.

Mulch Tacking Slurry

- When the mulching is applied with a straw blower, if required, remove the cutting knives to prevent cutting the mulch too short.
- Apply the mulch at the rates shown in the Contract Documents. The rates shown in the Contract Documents are a guide, the Engineer or Designer will determine if the applied mulch is sufficient to protect the seeded area.
- After the mulch is applied to an area, punch the mulching material (except wood chips and excelsior material) approximately 2" into the ground.
- Perform the punching operation longitudinally, using a mulch puncher.
 - When needed, use weights on the mulch puncher to punch the mulching material into the soil.
 - When the slope is too steep to use a mulch puncher, "pat" the mulch with forks as it is placed on the slope.
- Apply mulching tacking slurry or cover with a light application of soil or sand to reduce wind loss.
- On lawns and small areas in urban areas, apply the mulch material using hand methods, unless otherwise approved by the Engineer or Designer.
- As the mulch is placed, "pat" the mulch with a fork. Apply mulching tacking slurry or cover with a light application of soil or sand to reduce wind loss.
- Immediately after the designated areas are mulched and punched, use hydraulic slurry equipment to apply the mulching tacking slurry.
- Unless shown otherwise in the Contract Documents, apply the mulching tacking slurry at the rate of 900 pounds per acre.
- Distribute the mulching tacking slurry uniformly over the mulch, leaving no bare spots.
- Arrange work so the mulching tacking slurry can be placed within 24 hours after each area has been mulched.

Sodding

- Sod the project during the proper sodding season to protect the finished grading. This may require sodding different parts of the project at different times or seasons.
- Prepare the soil by repairing any eroded areas and remove all weeds and surface stones greater than 1" diameter.
 - Undercut the soil below the adjacent areas so that the top of the new sod is flush with the adjacent seedbeds or turfed areas, and 1" below sidewalks and tops of curbs.
 - Cultivate or pulverize the soil to a minimum depth of 1". Smooth the soil, maintaining the grades established by the Grading Contractor.
- Before sodding, place fertilizer as specified in the Contract Documents.
- Place and fit sod strips as close together as possible. Stagger the joints between horizontal rows. Fill gaps between sod strips with sod pieces cut to the shape and size of the gaps.
- Lay sod strips horizontally on slopes, starting at the bottom and working upwards, unless directed otherwise by the Engineer or Designer.

- If the sod is placed on slopes of 2½:1 or steeper, or in ditch bottoms, secure the sod with 6 stakes per square yard or per roll of sod. If the sod is placed on slopes steeper than 20:1 and flatter than 2½:1, secure the sod with 2 to 4 stakes per square yard or per roll of sod. Use wooden lath (approximately 6" long) or similar wooden materials or ungalvanized wire staples (1/8" wire diameter approximately 6" long) to stake the sod. Drive the stakes and staples flush with the sod surface.
- After the sod is placed and secured, firm the sod using a small roller, tamper or other method approved by the Engineer or Designer.
- Immediately after placing the sod, thoroughly water to a depth of 3". Continue watering the sod every other day for 20 days after the sod is placed.

Mowing

- Mowing can be implemented in areas that require vegetation management.
- Properly timed mowing can suppress unwanted weedy vegetation while favoring desired perennial plant species.
- Mowing can reduce competitiveness of temporary vegetative cover or unwanted weedy vegetation by opening the canopy to allow more sunlight to reach permanent seedlings that are beginning to establish.
- Mowing activities should avoid saturated ground conditions to minimize compaction and rutting of the right-of-way.
- If mowing produces enough clippings and debris to impede the growth of grass, remove and dispose of the clippings and debris.

Inspection and Maintenance

Seeded areas should be inspected at least once within every 7-day inspection monitoring period to verify that a uniform vegetative cover is achieved. The following is a general list of questions that should be addressed during each inspection:

- Do the seeded areas show signs of erosion or washout?

Areas with erosion and where seed has been washed out should be repaired and reseeded.

- Are seeded areas still bare or lack appropriate vegetative cover?

Areas that fail to establish vegetative cover should be reseeded.

- Does the vegetation appear yellow/brown or stunted.

Additional fertilizer applications or scheduled watering can promote vegetative growth. Seasonal watering should be performed as necessary.

- Do seeded areas contain weedy or unwanted vegetative growth?

Weedy and unwanted vegetation can be managed through mowing.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

EROSION CONTROL BLANKETS

Purpose and Operation

Erosion control blankets are used to help limit erosion and establish vegetation on slopes and in ditches where conventional seeding and/or structural methods would be inadequate. By reducing the negative effects of rainfall impact and runoff, erosion control blankets help to minimize erosion and provide slopes and ditches with a stable environment for seed to germinate.

Erosion control blankets are constructed of a variety of materials. These include straw, wood excelsior, coconut, or some combination thereof. These materials are then usually stitched or glued to some type of natural fiber netting. This netting is biodegradable.

Erosion control blankets can be used in a variety of locations:

- Slopes and disturbed soils where mulch would have to be anchored and other methods such as crimping or tackifying are not feasible and/or adequate.
- Steep slopes (generally 3:1 or steeper) or slopes where concentrated flows exist, or highly erodible soils are present.
- Locations where seeding is likely to be too slow in providing adequate protective cover.
- Critical slopes adjacent to sensitive areas, such as streams, wetlands, shorelines, and existing development.
- Areas prone to sloughing of topsoil.

To view KDOTs Standard Drawings for erosion control blankets select the following links which show the detailed drawings with relevant design information: [Landscape Standard LA 855](#) and [Landscape Standard LA 856](#). These files can also be downloaded from KDOTs KART webpage with a free account.

Design

Material Specification

- Use approved erosion control materials as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2113 – Erosion Control Materials](#) and [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

Installation

Prior to the installation of erosion control blankets the site should be shaped and graded to the appropriate grade. Installation areas shall be free of erosion rills, rocks, clods, or other debris that may cause “tenting” or otherwise inhibit uniform contact. Appropriate soil preparation and the application of soil amendments, fertilizers, and seeding should be done so prior to the installation of the erosion control blankets.

Erosion control blankets shall be laid loosely in the direction of the slope, beginning at the bottom of the slope. For the blanket to be in contact with the soil, lay blanket loosely, avoiding stretching.

- Anchor slots: The top of the blanket should be “slotted in” at the top of the slope and anchored in place with anchors 6” apart. The slots should be 6” wide x 6” deep with the blanket anchored in the bottom of the slot, then backfilled, tamped, and seeded.

- Longitudinal Seams: The edges of the blanket should overlap each other a minimum of 6", with anchors catching the edges of both blankets.
- Splice Seam: When splices are necessary, overlap end a minimum of 8" in direction of water flow. Stagger splice seams.
- Terminal Fold: The bottom edge of blanket shall be turned under a minimum of 4", then anchored in place with anchors 9" apart.
- Typical Anchors: Anchor design shall be as recommended by manufacturer.
- Staple Check: Establish Staples in 2 rows 4' on center apart. Staple Checks shall be 30' apart.

Other anchoring methods such as wooden stakes, bio-degradable plastic staples, live willows, or steel pins that provide proper embedment and support may also be used per the manufacturer's recommendations.

Inspection and Maintenance

Erosion control blankets should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does the erosion control blanket exhibit signs of "tenting" or is stormwater flowing under the blanket?

Verify that there is uniform contact with the soil surface (tenting is unacceptable), all seams and splices are secure, and all anchors are driven flush with the soil surface.

- Are there signs of erosion or washout under or adjacent to the erosion control blanket?

If erosion, washouts, or undermining are visible under the blankets, blankets should be reinstalled after damage to the soil surface is repaired. Consider implementing additional BMPs upslope to reduce stormwater velocities and minimize erosion and washout.

- Is the erosion control blanket dislodged, ripped, torn, or damaged?

Any dislodging or failure of the erosion control blankets should be repaired as per the manufacturer recommendations.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

HYDRAULIC EROSION CONTROL PRODUCTS

Purpose and Operation

Hydraulic Erosion Control Products (HECPs) consists of mulches and adhesive polymers that are mixed with water and then sprayed onto the soil surface. HECPs can provide temporary erosion protection and assist with the establishment of vegetative cover. HECPs can be applied to disturbed areas to provide protection from wind and soil erosion.

Design

Material Specification

- Use approved HECPs referenced in the Contract Documents and KDOTs Standard Specifications [Section 905 – Mulching](#), [Section 2110 – Mulch](#), and [Section 2111 – Mulch Tacking Slurry](#). and. See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#) and [Division 2100](#)).

- Do not use mulching material containing noxious weeds identified by the Kansas Department of Agriculture in the [“Kansas Noxious Weed List”](#).

Installation

Hydraulic Erosion Control Products (HECPs)

- Apply the hydromulch by means of a standard hydraulic slurry seeding machine.
- Demonstrate, to the Engineer’s or Designer’s satisfaction, that the equipment and methods will result in a uniform application of the hydromulch.
- Mix and apply the hydromulch at the rate according to KDOT specifications or as recommended by the manufacturer.
- Obtain complete coverage from a consistent angle of approach while applying hydromulch.
- Achieve no more than 65% coverage from the primary angle of application, and 35% coverage from the secondary angle of coverage.
 - Maintain secondary angles of coverage of between 175° and 185° from the primary angle.
- Mixing proportions, application methods and rates may be adjusted based on the manufacturer’s recommendations.

Inspection and Maintenance

HECPs should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Do areas where HECPs have been applied show signs of erosion or washout?

Areas where HECPs have eroded, washed out, or breakage occurs, repair damage or erosion to the area and reapply HECPs. Once the surface is broken, the matrix material must be reapplied.

- Do areas where HECPs have been applied lack appropriate coverage?

HECPs should be applied from two different angles to obtain appropriate coverage of disturbed soils.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

AGGREGATE DITCH LINING

Purpose and Operation

Aggregate lined ditches operate by removing stormwater from the road and carrying it along and across the right-of-way. Aggregate ditch lining helps to reduce stormwater velocities, minimize erosion potential, and provide bank stabilization. These linings can often be less expensive than concrete lined ditches, however, grass and weedy vegetative growth can present additional maintenance problems if left unmaintained. Aggregate ditch lining is most common in areas where right-of-way restrictions require steeper ditch side slopes and in areas where there are rapid changes in ditch geomorphology.

To view KDOTs Standard Drawing for the aggregate ditch lining, select the following link which shows the detailed drawing with relevant design information: [Road Standard RD 502](#). This file can also be found on KDOTs KART webpage with a free account.

Design

Design criteria for temporary erosion protection is documented in the most current edition of the KDOT Design Manual Volume I (Part C) Bureau of Road Design, Elements of Drainage and Culvert Design (Drainage Design Manual). Permanent aggregate ditch lining should be placed as soon as possible following final grading of the ditches to manage erosion throughout construction. Aggregate ditch lining design is based on Section 12.7 Design of Road Ditches with Aggregate Linings found in the Drainage Design Manual.

Material Specification

- Use approved aggregate referenced in the Contract Documents and KDOTs Standard Specifications [Section 1114 – Stone for Riprap, Ditch Lining, and Other Miscellaneous Uses](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1100](#)).

Installation

Proper Installation Method

- Construct the ditch to the lines and grades shown in the Contract Documents before placing the ditch lining.
- Prepare for the ditch lining by undercutting the finished ditch to the depth required for the ditch lining.
- When required, compact the excavated area.
- The subgrade shall be well compacted prior to placing ditch lining.
- After the ditch lining is completed, backfill and compact around the structures.
- Dumped aggregate shall be spread in reasonable conformity with the ditch section as shown in the Contract Documents and as directed by the Engineer or Designer.

Placement

- Construct the aggregate ditch lining and aggregate backslope ditch lining according to the Contract Documents.

Inspection and Maintenance

Aggregate ditch liners should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow around the aggregate ditch lining?

This is usually caused by insufficient depth/undercutting of the ditch line or incorrect grade/slope of the ditch and/or the ditch side slopes. If this occurs, ditches and aggregate ditch lining should be returned to appropriate grade/slope as specified in the Contract Documents or as directed by the Engineer or Designer. Aggregate should also be spread in reasonable conformity with the ditch section to promote positive drainage.

- Have high-velocity flows displaced any aggregate from the ditch lining?

Sometimes high-velocity flows can carry away portions of the aggregate ditch lining. After a large rainstorm, inspect the ditch lining for any displaced aggregate, undermining of aggregate, and erosion within or adjacent to the ditch. If a large portion of aggregate has been washed away, fill in void with new aggregate. In areas where erosion and undermining are present the lining should be maintained as specified to complete the work.

- Does sediment or debris need to be removed from the aggregate ditch lining?

Sediment accumulation within the aggregate ditch lining can impact the ditches' ability to reduce stormwater velocities resulting in higher erosion potential. In addition, accumulated sediments can provide a suitable environment for unwanted vegetation. Removal of accumulated debris should also be performed to promote positive drainage.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

ROCK SLOPE PROTECTION

Purpose and Operation

Rock slope protection can be used to minimize erosion on steep slopes or slopes with highly erodible soils. Rock slope protection can help reduce stormwater velocities, minimize erosion potential, and provide stabilization.

To view KDOTs Standard Drawings for rock slope protection, select the following links which shows the detailed drawings, [Bridge Standard BR 131](#), [Bridge Standard BR 132A](#), and [Bridge Standard BR 132B](#). These files can also be found on KDOTs KART webpage with a free account.

Design

Material Specification

- Use approved aggregate referenced in the Contract Documents and KDOTs Standard Specifications [Section 1114 – Stone for Riprap, Ditch Lining, and Other Miscellaneous Uses](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1100](#)).
- Use approved geotextiles referenced in the Contract Documents and KDOTs Standard Specifications [Section 1710 – Geosynthetics](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1700](#)).

Installation

Proper Installation Method

- Construct the bridge berms, fill slopes and channels to the lines and grades shown in the Contract Documents.
- Prepare for the slope protection by undercutting the finished berms, slopes, and channels to the depth necessary for the slope protection.
- After the slope protection is completed, backfill and compact around the structure.
- Construct the slope protection to the lines and grades shown in the Contract Documents. A tolerance of +6" from the slope lines and grades is allowed.
- Underlay the slope protection with geotextile fabric at the locations designated in the Contract Documents. Provide the Engineer or Designer with a copy of the manufacturer's recommendation.
- Install and secure the geotextile fabric as recommended by the manufacturer. Replace any geotextile fabric damaged or displaced during construction.
- Place the bedding for the slope protection at the locations designated in the Contract Documents.
 - Place the bedding in its full course thickness in one operation, using methods of placement that will not segregate the material.
 - The finished surface of the bedding shall be uniform. Compaction of the bedding is not required.

- Place the slope protection the full course thickness in one operation.
- Place the slope protection to produce a reasonably well-graded mass of rocks with a minimum number of voids.
- The finished slope protection shall be free of pockets of small rocks and clusters of larger rocks.
- Rearrange individual rocks (by hand or mechanical equipment) to the extent necessary to obtain a reasonably well-graded distribution of rock sizes.

List of common placement/installation mistakes to avoid

- Do not use methods of placing the rocks that will segregate the various sizes of rocks.
- Do not use heavy equipment (working on the slope protection) to spread the rocks.
- Do not place oversized rocks on the slopes.

Inspection and Maintenance

Rock slope protection should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow around the rock slope protection?

This is usually caused by incorrect excavation or grading of slope protection. If this occurs, slopes should be returned to the appropriate grade as specified in the Contract Documents or as directed by the Engineer or Designer. Rock should be spread in reasonable conformity to promote positive drainage and reduce concentrated flows.

- Have areas of rock slope protection been displaced or washed out?

Sometimes stormwater flows can cause erosion that undermines sections of rock slope protection. After a large rainstorm, inspect the slope protection for any displaced rock, undermining of rock aggregate, and erosion of the slope. If a large portion of aggregate has been displaced, fill in the void with additional rock. Repair geotextile fabric as needed.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

DUST CONTROL

Purpose and Operation

The purpose of dust control is to minimize the spread of surface dust via air movements as it originates from unstabilized, fugitive, and/or tracked out soils that occur during construction. It also helps reduce the spread of hazardous airborne particles that can pose problems to pedestrians and construction staff on the site. Dust control can be achieved with many different options.

Design

Material Specification

- Control Measure Options
 - Vegetative Cover: Review the [Temporary Seeding Section](#) for options of vegetative cover.
 - Mulch: Review KDOTs Standard Specifications [Section 2110 – Mulch](#) and [Section 905 – Mulching](#) for mulch. See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).

- HECs: Review the [HECs Section](#) for application options.
- Tillage: No outside material needed.
- Irrigation: Water from water trucks or other connections.
- Sweeping: Use of streetsweepers or sweeper attachments to collect and remove soils from paved surfaces.
- Aggregate: Standard base coarse aggregate.
- Geotextiles: Review the [Geotextiles Section](#) for options.
- Barriers: Can consist of board fence, wind fence, sediment fence or other barrier to limit the spread of dust. Engineer or Designer to specify if needed.
- Permanent Vegetation: Review the [Permanent Seeding Section](#) for options of permanent vegetation.

Placement

- Placement of device/control measure depends on the site and area of construction.
- Vegetation is best placed on steep slopes or in areas of little traffic to avoid killing plants.
- If being used, aggregate shall be placed on dirt roads or areas on a site where construction traffic is common.
- Barriers shall be placed perpendicular to the air currents on a site if they are used.
- If using tillage as a control measure, till the side of the site that faces the wind.

Installation

Proper Installation Method

- Installation method and implementation shall be decided by the designer or contractor on site. Not all components are required to be used for dust control, as each site varies in needs for control.
- The control measures shall be installed or implemented in areas where movement of dust in the air is likely to occur.

List of common placement/installation mistakes to avoid

- Do not place vegetation or mulch in areas where trucks commonly drive on construction sites, or it will result in loss of plants.
- Do not place barriers parallel to the air currents on the site or they will prove to be ineffective.
- Only use measures in areas where dust is commonly a problem.

Inspection and Maintenance

If structures for dust control are implemented, they should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Is dust a problem on the site?

If yes, verify that the current devices/control measures are in place and in working order. Work with the Engineer or Designer or contractor to implement new methods of dust control or repair existing methods to minimize the amount of dust generated onsite.

- Is the vegetation used for dust control not growing?

This is usually a result of vehicles or other equipment driving over seeded areas. In some cases, lack of vegetative growth can be a result of improper seedbed preparation or lack of scheduled watering

during dry periods. Check to confirm that seeding was placed in areas where construction traffic is not common. Educate crews and equipment operators to avoid seeded areas to minimize potential impacts and unnecessary re-work. Appropriate measures should be implemented during seeding (i.e., seedbed preparation, fertilizing, mulching, watering, etc.) to encourage favorable growing conditions for vegetative establishment.

- If a barrier is being used, is it damaged?

This can be caused by high winds or interference with equipment onsite. Verify the barriers are in places that are not obstructing traffic and repair if needed.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

PRESERVING NATURAL VEGETATION

Purpose and Operation

Preserving natural vegetation protects existing stands of established vegetation which helps to reduce compaction of topsoil, minimize the overall area of disturbance, and reduce erosion. The existing vegetation can absorb stormwater, reduce runoff, and improve the water quality of runoff through natural filtration. It is best used in areas that already have healthy existing vegetation, especially around perimeter areas of the construction site, onsite overland flow paths, channels, streams, creeks, lakes, ponds, wetlands, steep slopes, or areas where constructed stabilization may be hard to put into place. Preservation of natural vegetation should be considered for all projects involving ground disturbance.

Design

Material Specification

- Existing natural vegetation.
- Barrier or fence of some type to surround and designate the area being preserved.

Placement

- Preserve the natural vegetation in areas where there is not going to be development (no grading, no construction traffic). This is often beneficial around onsite channels, streams, creeks, lakes, ponds, wetlands, steep slopes, or areas where constructed measures would be complicated to construct. The placement is site dependent.

Preservation

Proper Preservation Method

- Effectively mark the preservation area with spray paint, flags, or other devices before construction.
- Install barriers around the preservation area so that vehicles or people do not disturb the natural vegetation.
- If vegetation is being preserved for conservation reasons and is destroyed during construction, engage a landscape architect to design a replacement and establishment plan.

List of common placement/preservation mistakes to avoid

- Do not designate areas for preservation where grading or traffic will be occurring.
- Do not remove existing vegetation in areas that are under local, state, or federal regulations.

- Do not remove existing vegetation where native wildlife live, nest, or obtain food from.

Inspection and Maintenance

Preserved natural vegetation should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Have markings and/or boundaries been removed from the preserved area?

Inspect to confirm these devices for the boundary have not been removed and if so repair and replace these to keep a set boundary around the preserved area.

- Is the natural vegetation damaged because of grading or construction traffic?

This damage could be caused by the preservation area being within the construction traffic area or within the grading limits. Reevaluate the preservation area so it does not result in this problem. Reiterate to crews and equipment operators the location of the preserved areas to avoid/protect before and during construction.

- Is the natural vegetation damaged?

Damaged natural vegetation could be a result of construction activities accidentally impacting the preserved area or from stormwater runoff and sediment discharging from the site. Repair or replace the vegetation to preconstruction conditions and/or until the reestablished vegetation has achieved a density of at least 70 percent of the native background vegetative cover. Consider installing additional temporary BMP devices to control runoff prior to discharging from site. If fertilizer is being used while reestablishing vegetation, confirm that the amount of fertilizer used is kept to a minimum to avoid water quality issues.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.