

SPECIAL PROVISION

NOTE: This special provision is generally written in the imperative mood. The subject, "the Contractor" is implied. Also implied in this language are "shall", "shall be", or similar words and phrases. The word "will" generally pertains to decisions or actions of Sedgwick County Public Works.

AGGREGATE BASE (SPECIAL)

1. DESCRIPTION

Construct a geogrid reinforced crushed aggregate base on prepared subgrade as shown in the Contract Documents. Materials to be used for the geogrid reinforced base construction shall consist of virgin crushed stone and/or recycled Portland Cement Concrete with the option of blending in Reclaimed Asphalt Pavement (RAP).

BID ITEMS

Aggregate Base (Special) (*)

*Thickness

UNITS

Square Yard

2. MATERIALS

Provide materials that comply with the applicable requirements in the Kansas Department of Transportation Standard Specifications for State Road and Bridge Construction (2015).

Water for Aggregate Base and Aggregate Shoulder.....**DIVISION 2400**

**a. Stone/Concrete Aggregate.
Gradation**

Sieve Size	% Retained (by dry weight)
2½"	0
¾"	20-60
#4	50-80
#30	78-96
#200	90-98

Quality

(1) Crushed stone¹.

- Soundness², minimum (KTMR-21) 0.85
- Wear³, maximum (KTMR-25) 50%
- Absorption, maximum 4.0%

(2) Reclaimed crushed PCCP.

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- Soundness, minimum (KTMR-21) 0.85
- Wear, maximum (KTMR-25) 60%

¹Crushed aggregates with less than 10% material retained on the No. 4 sieve (excluding mineral filler supplements)

must be produced from a source complying with the official quality requirements of this Section prior to crushing.

²The above requirements for soundness do not apply for aggregates having less than 10% material retained on the No. 4 sieve.

³The above requirements for wear do not apply to aggregates having less than 10% material retained on the No. 8 sieve.

- b. Recycled Asphalt Pavement.** Recycled Asphalt Pavement (RAP) may be mixed in with the crushed stone/concrete aggregate at a rate not to exceed 50 percent of the total aggregate volume. The RAP shall be free of detrimental quantities of organic, non-granular soils and deleterious materials.

The maximum size of the RAP particles shall be 1½ times the maximum aggregate size in the RAP material.

- c. Geosynthetic.** The stabilization/reinforcement geosynthetic may be either a geotextile or geogrid meeting the following characteristics:

- All geosynthetics shall be composed of at least 85% by weight polyolefins or polyesters.
- All geosynthetics shall be resistant to chemical and biological degradation and creep.
- When seams are required for geotextiles, use "Butterfly" seams that have a Federal Standard designation of Type SSD-1. Place the stitching approximately 1 inch from the fold. Make sure the two fabric edges are even and have been completely penetrated by the seam. Use polyester, polypropylene or Kevlar thread with durability equal to or great than the material used in the fabric. Seam strength requirements shall be as specified in the Contract Documents.
- A single-layer geogrid or woven geotextile that complies with the properties in Table 1 for reinforcement of an aggregate sub-base.

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TABLE 1: REINFORCEMENT GEOSYNTHETIC MINIMUM AVERAGE ROLL VALUES			
Property	Test Method	Requirements¹	
Tensile Strength (at 5% strain)	ASTM D4595	580 lb/ft MD	900 lb/ft CD
Tensile Strength (at 2% strain)	ASTM D4595	280 lb/ft MD	450 lb/ft CD
Coefficient of Soil Interaction	GRI-GT6/GG5	0.8	
Junction Strength (geogrid)	GRI:GG2	25 lbs	
Aperture Size ² (geogrid)		0.8 to 1.3 inches, MD	1.0 to 1.6 inches, CD
Permittivity (geotextile)	ASTM D4491	0.40 sec ⁻¹	
Apparent Opening Size ³ (geotextile)	ASTM D4751	30 U.S. Sieve	

¹ MD= Machine Direction, CD= Cross-Machine Direction.

² Inside dimensions are calipered

³ ASTM D 4751: AOS is a Maximum Opening Diameter Value

On very soft ground where subgrade stabilization is needed, the Contractor will substitute the geogrid for a woven geotextile that complies with the properties below in Table 2.

TABLE 2: SUBGRADE STABILIZATION GEOSYNTHETIC MINIMUM AVERAGE ROLL VALUES			
Property	Test Method	Requirements¹	
Tensile Strength (at 5% strain)	ASTM D4595	810 lb/ft MD	1340 lb/ft CD
Tensile Strength (at 2% strain)	ASTM D4595	410 lb/ft MD	620 lb/ft CD
Coefficient of Soil Interaction	GRI-GT6/GG5	0.8	
Junction Strength (geogrid)	GRI:GG2	25 lbs	
Aperture Size ² (geogrid)	Inside Dimension Calipered	0.8 to 1.3 inches, MD	1.0 to 1.6 inches, CD
Permittivity (geotextile)	ASTM D4491	0.40 sec ⁻¹	
Apparent Opening Size ³ (geotextile)	ASTM D4751	30 U.S. Sieve	

¹ MD= Machine Direction, CD= Cross-Machine Direction.

² Inside dimensions are calipered

³ ASTM D 4751: AOS is a Maximum Opening Diameter Value

The geosynthetic materials shall be tested according to the ASTM test methods cited in subsection 1710.2 of the KDOT Standard Specifications. The Engineer will accept the geosynthetic based upon receipt and approval of a Type D Certification per Section 2600.

3. CONSTRUCTION REQUIREMENTS

- a. **Subgrade Preparation.** Unless other subgrade preparation is included in the Contract Documents, water, scarify, blade and compact the roadway and shoulder subgrade to obtain the lines and grades shown in the Contract Documents. Remove all vegetation before shaping and rolling. Remove and dispose of any excess material. If additional

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embankment material is needed, obtain the material from locations shown in the Contract Documents or as directed by the Engineer.

Excavate the subgrade as shown in the Contract Documents. If existing pavements or bridges are encountered, excavate the subgrade at all control points to a depth that will allow placement of the required thickness, flush with the existing surface. Use a transition (from normal to special section) of sufficient length to prevent an abrupt or noticeable change in grade. Remove and dispose of the excavated subgrade. Compact the excavated areas to a depth of 6 inches, according to the Contract Documents. When subgrade compaction is not specified in the Contract Documents, compact the excavated areas to a depth of 6 inches, according to Type B, MR- 90, Section 205 of the KDOT Standard Specifications.

- b. Geosynthetic.** Store and handle the geosynthetic according to the manufacturer's recommendations. Do not expose the geosynthetic to direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust, and debris.

Place geosynthetics in position and roll out over the prepared subgrade. Geosynthetic should be cut to conform to manhole covers or other protrusions. Geosynthetic should be cut and overlapped as necessary to accommodate curves. Pin overlaps to secure against separation and to provide anchorage. If two rolls are to be placed side by side, or end to end, overlap them as noted in Table 3.

Table 3: Recommended Overlaps

Soil Type*	Grid Overlap
Firm	1 ft.
Soft Ground	2 ft.
Very Soft Ground	3 ft.

*As determined by the Engineer in the field.

Overlap geosynthetics in the direction fill will be spread. Over very soft ground, wire, plastic ties or hog rings can be used on five to twenty-foot spacings as necessary to secure the overlaps.

Limit placement of geosynthetics to that which can be covered with base material within 72 hours.

When placing the base lift over the geosynthetic, do not allow construction traffic directly on the geosynthetic.

- c. Tensioning and Pinning.** Pin beginning of roll to the ground with securing pins that are nominally ¼ inch in diameter, 18 inches long, pointed at one end and fitted with a 1½ inch outside diameter steel washer at the other end. Pin at edges, overlaps, and center of roll width. Over soft ground it may only be necessary to secure the end with stakes, rocks, or fill.

Pull geosynthetics tight by hand to take up all slack.

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- a) **Firm Ground.** Anchor geosynthetic to the ground at edges, including overlaps, and in center of roll on thirty foot (30') intervals along the roll length.
- b) **Soft Ground.** Anchor only the roll ends. The geosynthetics will conform to the ground surface as the fill material is dumped.

Anchor the terminal ends of the roll. If the overlap is required for advancing rolls, overlap as noted previously and anchor at the overlap.

- d. **Mixing.** The mixing method shall be the Central Plant Method. Use a stationary mechanical mixing plant to uniformly mix the water and aggregate. Blend the stone/concrete aggregate with Recycled Asphalt Pavement (RAP) meeting the requirements of Section 2.b. to a uniform mixture at the plant.
Mix the aggregate with sufficient water, if necessary, to allow compaction of the mixture to the specified density.

- e. **Dumping and Spreading.** Use an aggregate spreader to place the mixture immediately after mixing the aggregate and water. Do not place the mixed material on the prepared subgrade when conditions are such that the hauling and placing will damage the prepared subgrade. Do not dump or mix the aggregate on any paved surface.
Back Dump or End Dump and Spread. Thin lifts of aggregate base over very soft subgrades may not be sufficient to support loads of fill and heavy equipment. Low ground pressure tractors and low tire pressures (less than 4 psi) are recommended for hauling and spreading fill over these conditions. Do not operate equipment directly on the geosynthetic. Ensure at least four inches (4") of fill is between the geosynthetic and vehicle.

Back dump the aggregate base onto the geosynthetic where subgrade is most stable. Spread the fill material over the geosynthetic out toward the softer subgrade. Avoid spreading the fill linearly from one edge to the other as this may produce a "wave" in the geosynthetic.

Grade the aggregate base to the specified thickness. Raise the blade gradually as the fill is pushed out over the geosynthetic. This causes much of the fill to roll out onto the geosynthetic and reduce stresses on the subgrade.

Back dump subsequent loads of aggregate base onto the leveled fill and advance forward by spreading with a dozer.

Crown the aggregate base during the grading process to assure rainfall runoff and prevent fill saturation.

- f. **Compacting and Finishing.** The maximum compacted thickness of any layer of aggregate base or shoulder is 6 inches. If the thickness is greater than 6 inches, spread and compact the aggregate base in multiple lifts of equal thickness with a maximum lift thickness of 6 inches. On aggregate course projects without shoulders, construct all lifts, regardless of thickness, with an edge slope of 1:1 or flatter. If the aggregate base or shoulder is constructed in more than 1 layer, allow sufficient time for the initial layer to

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cure to prevent any rutting or surface distortion from equipment being used to place the succeeding layers.

NOTE: Do not use vibratory compacting equipment to compact the aggregate base. It may cause a "quick" condition resulting in rapid subgrade strength loss.

Spread and compact the aggregate base as specified in the Contract Documents. Compact the aggregate base to a minimum uniform density of 95% of the standard density. Compact the aggregate shoulders until no further consolidation is gained by additional blading and rolling. The Engineer will visually verify compaction of the aggregate shoulders.

After compacting the aggregate base, trim the surface to the specified lines and grades. The Contractor shall use automatic grade controlled equipment to trim the compacted aggregate base. In irregular areas, trim the aggregate base by wetting, blading and rolling. Compact the trimmed surface of the aggregate base with a smooth-wheel or a pneumatic-tire roller. When necessary, lightly scarify and blade the surface to eliminate equipment imprints while performing final rolling.

- e. **Curing and Maintenance of Aggregate Base.** Allow the aggregate base to cure before any heavy equipment is allowed on the aggregate base. The Engineer will perform testing to determine when the cure of the aggregate base is complete. The Engineer may require that the surface of the aggregate base be kept moist during the curing period to prevent loss of surface material.

Do not apply surfacing until the aggregate base is cured. Maintain the base until the surfacing is applied.

- f. **Repairs.** Should the geosynthetic be damaged during or after installation, repair by patching.

Remove the aggregate base from the surface of the geosynthetic at the damaged area and three (3) feet around in all directions.

Place a geosynthetic patch of appropriate dimensions to cover damaged area and extending three feet beyond in all directions.

Replace aggregate base fill and compact.

4. MEASUREMENT AND PAYMENT

The Engineer will measure Aggregate Base (Special) by the square yard.

The Engineer will not measure the water used in the mixture and used on the finished surface during the curing period. The Engineer will not measure water used for dust control or water wasted through the Contractor's negligence.

Payment for "Aggregate Base (Special)" at the contract unit price is full compensation for all water, materials, labor, equipment and incidentals necessary to complete the specified work.

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The contract unit price shall govern for "Aggregate Base (Special)" regardless of the amount of overruns or underruns.

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