207-R-669 SUBGRADE

(Adopted 09-21-17)

The Standard Specifications are revised as follows:

SECTION 207, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 207 – SUBGRADE

207.01 Description

This work shall consist of the construction of the subgrade in accordance with 105.03.

MATERIALS

207.02 Materials

Materials shall be in accordance with the following~~.~~:

Chemical Modifiers.....*215.02*
~~Fly Ash.....901.02~~
~~Lime.....913.04(b)~~
~~Portland Cement, Type I.....901.01(b)~~
Coarse Aggregate, Class D or Higher,
Size No. ~~11, 12,~~*5, 8, 43,* 53, or 73.....904
Geogrid, Type IB.....918.05~~(a)~~
Geocell Confining System.....*214*
Water.....913.01

Soils containing greater than 3% by dry weight organic material, or with a maximum dry density of less than 100 pcf, or with liquid limit of greater than 50, or with a soluble sulfate content greater than 1,000 ppm, will not be allowed within the specified thickness of the subgrade treatment in cut sections and will not be allowed within 24 in. of the finished subgrade elevation in fill sections. Density will be determined in accordance with AASHTO T 99 or ITM 512 and organic content will be determined in accordance with AASHTO T 267. Liquid limits will be determined in accordance with AASHTO T 89. Sulfate content will be determined in accordance with ITM 510.

CONSTRUCTION REQUIREMENTS

207.03 ~~General~~*Construction* Requirements

(a) Subgrade Construction Methods

The subgrade shall be constructed uniformly transversely across the width of the pavement including shoulders or curbs unless shown otherwise on the plans, by one of the following methods:

(a) chemical modification in accordance with 215;

(b) aggregate No. 53 in accordance with 301;

(c) geogrid in accordance with 214 placed under aggregate No. 53 in accordance with 301, or

(d) soil compaction to 100% of maximum dry density.

Longitudinally, the treatment may vary depending on the method of construction.

~~Soils containing greater than 3% by dry weight organic material, or with a maximum dry density of less than 100 pcf, or with liquid limit of greater than 50, or with a soluble sulfate content greater than 1,000 ppm, will not be allowed within the specified thickness of the subgrade treatment in cut sections and will not be allowed within 24 in. of the finished subgrade elevation in fill sections. Density will be determined in accordance with AASHTO T 99 or ITM 512 and loss on ignition will be determined in accordance with AASHTO T 267. Liquid limits will be determined in accordance with AASHTO T 89. Sulfate content will be determined in accordance with ITM 510.~~

(b) General Requirements

~~Coal within the specified thickness of the subgrade shall be excavated if directed, and disposed of in accordance with 202.05. Coal or coal blossoms that are allowed to remain shall be mixed thoroughly with subgrade soils and compacted in accordance with 207.04.~~

All rock greater than ~~6~~*3* in. shall be removed or broken off *and placed* at least 6 in. below the specified subgrade ~~surface~~. Holes or depressions resulting from the removal of unsuitable material shall be filled with ~~an acceptable material and compacted to conform with the surrounding subgrade~~*soils in accordance with 207.02 or B borrow and compacted in accordance with 203.23*.

Coal within the specified thickness of the subgrade shall be excavated if directed, and disposed of in accordance with 202.02.

During subgrade preparation, adequate drainage shall be provided at all times to prevent water from standing on the subgrade. *The grade and cross section of the subgrade shall be finished within a tolerance of 1/2 in. from the subgrade elevation specified on the plans.*

Even though the subgrade has been previously accepted, the condition of the subgrade shall be in accordance with 105.03 and 207.04 at the time paving material is placed. ~~Just prior to placing the base course on the subgrade, proofrolling in accordance with 203.26 shall be completed. Undue distortion of the subgrade shall be avoided. If limits of the work make mechanical preparation of the subgrade impractical, appropriate hand methods may be used.~~

~~The grade and cross section of the subgrade shall be finished within a tolerance of 1/2 in. from the true subgrade.~~ Finishing within this tolerance by blading or other mechanical means without the use of side forms will be allowed. If these methods do not finish within this tolerance, side forms shall be used.

207.04 Subgrade Treatments *Types*

The subgrade treatment type shall be as specified on the contract plans. If required, the subgrade foundation shall be corrected as directed by the Engineer prior to subgrade treatment.

~~Type I 24 in. of soil compacted to density and moisture requirements.~~

~~Type IA [blank]~~

~~Type IB 14 in. chemical soil modification.~~

~~Type IC 12 in. of the subgrade excavated and replaced with coarse aggregate No. 53.~~

~~Type II 6 in. of the subgrade excavated and replaced with coarse aggregate No. 53.~~

~~Type IIA 8 in. chemical soil modification.~~

~~Type III 6 in. of soil compacted to the density and moisture requirements.~~

~~Type IV 12 in. of the subgrade excavated and replaced with coarse aggregate No. 53 on type IB geogrid.~~

~~Type V 3 in. of subgrade excavated and replaced with 3 in. coarse aggregate No. 53.~~

SUBGRADE TREATMENT TYPES	
Type	*Subgrade Description*
I	*24 in. of soil compacted in accordance with 203.23*
IA	*[Blank]*
IB	*14 in. chemical soil modification*
IC	*12 in. coarse aggregate No. 53 in accordance with 301*
II	*6 in. coarse aggregate No. 53 in accordance with 301*
IIA	*8 in. chemical soil modification*
III	*In place compaction in accordance with 203.23*
IV	*12 in. coarse aggregate No. 53 with Type IB geogrid in accordance with 214*
IVA	*12 in. coarse aggregate with Geocell confining system in accordance with 214*
V	*3 in. of subgrade excavated and replaced with 3 in. coarse aggregate No. 53.*

In areas where shallow utilities are encountered or chemical modification is not allowed, the Contractor may submit a request to the Engineer to substitute Type IC for Type IB.

Where the *strength or* density and moisture control option is used, compaction of embankment areas shall be in accordance with 203.23. In cut and transition areas, the top lifts shall be removed, and the bottom 6 in. compacted in-place ~~to comply with the specified density and moisture requirements~~*in accordance with 203.23*. The excavated material shall then be replaced and compacted in 6 in. lifts ~~to comply~~*in accordance* with *203.23* ~~the specified density and moisture requirements~~. Removal of the lifts may be waived and only the upper 6 in. ~~treated~~*compacted* in accordance with ~~207.03~~*203.23* when it is determined, through testing in accordance with 203.24, that the lower lifts comply with ~~the specified density and moisture requirements~~*203.23*.

In sections where *rock*, shale, *sandstone* or ~~shale and rock~~*its* mixtures are encountered, these materials shall be undercut ~~12~~*24* in. below the subgrade elevation and replaced with coarse aggregate No. 53 or No. 73 and compacted in accordance with 301.06. *Geotextiles used shall be in accordance with 918.02*. All irregularities and holes shall be graded ~~to provide positive drainage~~*with either coarse aggregate No. 53 or No. 73*. ~~Where necessary, finishing to subgrade elevation shall be accomplished using No. 11 or No. 12 crushed stone.~~ *If an aggregate base is part of the HMA pavement structure, the 24 in. excavation depth shall be reduced by the thickness of the aggregate base.*

~~The existing railroad ballast and railroad bed material shall be excavated to the depth specified for subgrade treatment, Type V and graded as shown on the plans, or as directed by the Engineer, in order to provide the subgrade width required for the proposed pavement section, including side slopes. Excavation and grading of the ballast and bed material shall include any cuts and fills necessary to account for erosion or degradation of the ballast in localized areas. Cuts and fills shall be balanced within sections approximately 300 ft in length along the profile of the pavement. The graded ballast and bed material shall be compacted in accordance with the applicable provisions of 203 prior to placement of the coarse aggregate No. 53.~~ The 3 in. compacted aggregate as part of the subgrade treatment Type V shall be compacted to 100% prior to the placement of the pavement.

When conditions are encountered below the specified subgrade treatment depth that prevent achieving the specified subgrade compaction, such conditions shall be corrected *in accordance with 203.09 or* as directed.

Proof rolling shall be performed in accordance with 203.26. The proof rolling shall cover the entire subgrade surface. The maximum allowable deflection or rutting in subgrade shall not be greater than 1/2 in.

207.05 Method of Measurement

Subgrade treatment will be measured in both cut and fill areas by the square yard per type. Chemicals for modification, excavation, aggregates, and geogrid materials will not be measured.

The undercutting of rock, where encountered, will be measured in accordance with 203.27(b).

207.06 Basis of Payment

The accepted quantities of subgrade treatment will be paid for at the contract unit price per square yard per type, complete in place. In areas where shallow utilities are encountered or the Contractor elects to use Type IC for Type IB, payment will be made at the price of Type IB.

The undercutting of rock, where encountered, will be ~~measured~~*paid for* in accordance with 203.2~~7~~*8*.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Subgrade Treatment, Type _____	SYS

The cost of subgrade treatments including testing, sampling, aggregates ~~for cut or at grade areas~~, chemicals for modification, geogrid, *geotextile* and *geocell confining system, coarse aggregate for subgrade Type IC, Type II, Type IV, Type IVA and Type V*, water, and the excavation required ~~for the methods chosen by the Contractor~~ shall be included in the cost of the pay item for subgrade treatment, type.

The cost of excavation and grading of existing railroad ballast and railroad bed material shall be included in the cost of subgrade treatment, Type V.

Where conditions exist below the specified subgrade compaction depth that prevent achieving the specified compaction, payment for correcting such conditions will be made based on the directed method of treatment.