

## SECTION 02206 – AGGREGATE TURF ROADS

### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

#### 1.2 SUMMARY OF WORK

This Section includes the requirements for furnishing and installing aggregate turf for airfield vehicle service roads on a prepared subgrade.

#### 1.3 REFERENCES

- A. Section 02152, Excavation, Subgrade, and Embankment

#### 1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

- A. Certified test reports for aggregates.
- B. Samples of aggregates.
- C. Quality control plan and testing procedures in accordance herein.

### PART 2 PRODUCTS

#### 2.1 AGGREGATES

Provide aggregates consisting of clean, sound, durable particles of natural gravel, crushed gravel, crushed stone, sand, slag, soil, or other approved materials processed and blended or naturally combined. Provide aggregates free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign materials. The Contractor is responsible for obtaining materials that meet the specification and can be used to meet the grade and smoothness requirements specified herein after all compaction and proof rolling operations have been completed.

- A. Coarse Aggregates

The material retained on the No. 4 sieve is known as coarse aggregate. Use only

coarse aggregates that are reasonably uniform in density and quality. Use only coarse aggregate having a percentage of wear not exceeding 50 percent after 500 revolutions as determined by ASTM C131. The amount of flat and/or elongated particles must not exceed 20 percent. A flat particle is one having a ratio of width to thickness greater than three; an elongated particle is one having a ratio of length to width greater than three. When the coarse aggregate is supplied from more than one source, aggregate from each source must meet the requirements set forth herein.

#### B. Fine Aggregates

The material passing the No. 4 sieve is known as fine aggregate. Fine aggregate consists of screenings, sand, soil, or other finely divided mineral matter that is processed or naturally combined with the coarse aggregate.

#### C. Gradation Requirements

Gradation requirements specified in TABLE I apply to the completed aggregate surface. It is the responsibility of the Contractor to obtain materials that will meet the gradation requirements after mixing, placing, compacting, and other operations. TABLE I shows permissible gradings for granular material used in aggregate surface roads. Use sieves conforming to ASTM E11.

TABLE I. GRADATION FOR AGGREGATE SURFACE COURSES Percentage by Weight Passing Square-Mesh Sieve	
Sieve Designation (mm)	Gradation
1 inch	100
3/8 inch	50-85
No. 4	35-65
No. 10	25-50
No. 40	15-30
No. 200	8-15

## 2.2 LIQUID LIMIT AND PLASTICITY INDEX

The portion of the completed aggregate surface course passing the 0.425 mm No. 40 sieve must have a maximum liquid limit of 35 and a plasticity index of 4 to 9.

## 2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

- A. Sampling
- B. Take samples for laboratory testing in conformance with ASTM D75/D75M. When deemed necessary, the sampling will be observed by the Engineer.

## 2.4 TESTING

- A. Sieve Analysis

Perform sieve analysis in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11.

- B. Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

- C. Field Density Tests

Measure field density in accordance with ASTM D1556, ASTM D2167 or ASTM D6938. For the method presented in ASTM D1556 use the base plate as shown in the drawing. For the method presented in ASTM D6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in paragraph Calibration, of the ASTM publication. Tests performed in accordance with ASTM D6938 result in a wet unit weight of soil and ASTM D6938 will be used to determine the moisture content of the soil. Also check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in paragraph Calibration of ASTM D6938, on each different type of material being tested at the beginning of a job and at intervals as directed. Submit calibration curves and related test results prior to using the device or equipment being calibrated.

- D. Wear Test

Perform wear tests on aggregate surface course material in conformance with ASTM C131.

## 2.5 GEOGRID

- A. Geogrid shall be biaxial BX1200 as manufacturer by Tensar, or approved equal.

## PART 3 EXECUTION

### 3.1 PREPARATION OF UNDERLYING SUBGRADE

Clean the subgrade of all foreign substances. Do not construct the surface course on subgrade that is frozen material. Correct ruts or soft yielding spots in the subgrade, areas having inadequate compaction and deviations of the surface from the requirements set forth herein by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade and recompacting to density requirements specified in Section 02152 Excavation, Subgrade, and Embankments. Do not allow traffic or other operations to disturb the completed subgrade and maintain in a satisfactory condition until the surface course is placed.

### 3.2 GRADE CONTROL

During construction, maintain the lines and grades including crown and cross slope indicated for the aggregate surface course by means of line and grade stakes placed by the Contractor.

### 3.3 MIXING AND PLACING MATERIALS

Mix and place the materials to obtain uniformity of the material and a uniform optimum water content for compaction. Make adjustments in mixing, placing procedures, or in equipment to obtain the true grades, to minimize segregation and degradation, to obtain the desired water content, and to ensure a satisfactory surface course.

### 3.4 LAYER THICKNESS

Place the aggregate material on the subgrade in layers of uniform thickness. Compact the completed aggregate surface course to the thickness indicated. No individual layer may be thicker than 6 inches nor be thinner than 3 inches in compacted thickness. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course will be considered as conforming to the specified thickness requirements. The average job thickness will be the average of all thickness measurements taken for the job and must be within 1/4 inch of the thickness indicated. Measure the total thickness of the aggregate surface course at intervals of one measurement for each square yards of surface course. Measure total thickness using 3-inch diameter test holes penetrating the aggregate surface course.

### 3.5 COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D1557 abbreviated herein as percent laboratory maximum density. Compact each layer of the aggregate surface course with approved compaction equipment, as required in the following paragraphs. Maintain the water content during the compaction procedure at optimum or at the

percentage specified by the Engineer. Compact the mixture with mechanical tampers in locations not accessible to rollers. Continue compaction until each layer through the full depth is compacted to at least 100 percent of laboratory maximum density. Remove any materials that are found to be unsatisfactory and replace them with satisfactory material or rework them to produce a satisfactory material.

### 3.6 SMOOTHNESS TEST

Construct each layer so that the surface shows no deviations in excess of 1/2 inch when tested with a 12-foot straightedge applied both parallel with and at right angles to the centerline of the area to be paved. Correct deviations exceeding this amount by removing material, replacing with new material, or reworking existing material and compacting, as directed.

### 3.7 FIELD QUALITY CONTROL

- A. In-Place Tests. Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Perform each of the following tests on samples taken from the placed and compacted aggregate surface course. Take samples and test at the rates indicated.

1. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 800 square yards, or portion thereof, of completed area. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached.
2. Perform sieve analysis on every lift of material placed and at a frequency of one sieve analysis for every 1,600 square yards, or portion thereof, of material placed.
3. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.
4. Measure the thickness of the aggregate surface course at intervals providing at least one measurement for each 800 square yards or part thereof. Measure the thickness using test holes, at least 3 inch in diameter through the aggregate surface course. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, material where depth tests have been taken.

### 3.8 MAINTENANCE

Maintain the aggregate surface course in a condition that will meet all specification requirements until accepted.

### 3.9 PLACEMENT OF GEOGRID

- A. Geogrid shall be laid smooth without wrinkles or folds on the prepared subgrade in the direction of construction traffic. If required, the geogrid may be anchored or pinned in place. Adjacent rolls shall be overlapped, sewn, or joined as required in the plans. Overlaps shall be a minimum of 12-inches.
- B. Prior to covering, the geogrid shall be inspected to ensure that it has not been damaged (i.e., holes, tears, rips) during installation by the Engineer. Damaged, as identified by the Engineer, shall be repaired immediately. Cover the damaged area with a patch as recommended by the manufacturer that extends an amount equal to the required overlap beyond the damaged area.
- C. The aggregate base shall be placed by end dumping onto the geotextile from the edge of the geotextile, or over previously placed subbase aggregate. If permitted by the manufacturer, construction vehicles may be allowed directly on the geogrid as slow speeds.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 METHOD OF MEASUREMENT

- A. All work under this section will not be measured for payment.

### 4.2 BASIS OF PAYMENT

- A. Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
02206.1A	Aggregate Turf Roads (Phases 0 through 3)	Lump Sum
02206.1B	Aggregate Turf Roads (Phase 4)	Lump Sum

END OF SECTION 02206