

## ITEM 712 MISCELLANEOUS

**712.01 Expansion Shield Anchors.** Provide anchors conforming to the dimension requirements of the project plans and the following:

**A. Type A.** Federal Specification A-A-1923A, and A-A-55614.

**B. Type B.** Federal Specification A-A-1924A.

The supplier or producer of the anchors will provide a certification showing certified test results of the proof load required in the Federal Specification.

Provide materials in accordance with the City's QPL.

**712.02 Calcium Chloride.** Provide calcium chloride in accordance with ASTM D 98.

Provide materials in accordance with the City's QPL.

**712.03 Sodium Chloride.** Provide sodium chloride in accordance with ASTM D 632, Type I, Grade 1, with the following modification:

4 Total Chlorides (NaCl, CaCl<sub>2</sub>, and MgCl<sub>2</sub> as NaCl based on dry weight) not less than 97 percent.

**712.04 Lime and Lime Kiln Dust.**

A. Provide hydrated lime for masonry purposes in accordance with ASTM C 207, Type S.

B. Provide quick lime for soil stabilization certified in accordance with ODOT Supplement 1087, as listed on the City's QPL and in accordance with ASTM C 977, with the following modification:

4.2.1 *Particle size of Quick Lime* – Quick lime shall all pass the No. 4 (4.75 mm) sieve.

C. Provide lime kiln dust, a by-product of making lime for soil stabilization certified in accordance with ODOT Supplement 1087. Provide lime kiln dust meeting the following requirements. Perform chemical analysis of the lime kiln dust in accordance with ASTM C 25.

Combined total calcium and magnesium oxide	50 % minimum
Available calcium hydroxide (rapid sugar test, ASTM C25), Plus calculate total MgO content equivalent Ca(OH) <sub>2</sub>	30 % minimum 40 % maximum
Loss on ignition (carbon dioxide plus moisture, combined and free on as-received basis)	
Free water (as-received basis)	4% maximum
Sulfur as SO <sub>3</sub>	10% maximum

Sieve analysis.

Sieve Size	Minimum Percent Passing
No. 4 (4.75 mm)	95
No. 30 (600 μm)	90
No. 100 (150 μm)	75

**712.06**

Submit test results for the above requirements for every 100 tons (90 metric tons) of lime kiln dust supplied to the City. For multiple tests, include the average and standard deviation with the results.

**712.06 Preservative Treatment for Structural Timber, Lumber, Piling, Posts, Braces, and Blocks.**

**A. General.** Provide structural timber, lumber, and pilings in accordance with 711.26, and posts, braces, and blocks in accordance with 710.14 that the City will allow moisture removal from the untreated lumber at the time of preservative treatment. Provide structural timber, lumber, piling, posts, and braces conforming to the current AWPA standards and this subsection. The City will allow a minimum retention for blocks of 0.40 pounds per cubic foot (6.4 kg/m<sup>3</sup>).

**B. Materials.** Provide timber preservatives in accordance with AASHTO M 133.

**C. Preparation for Treatment.** Sort the material into one kind or designated group of kinds of wood and into pieces of approximately equal size and moisture and sapwood content. Separate material to ensure contact between treating medium and all surfaces.

**D. Framing.** Conduct all adzing, boring, chamfering, framing, graining, mortising, and surfacing before treatment.

**E. Incising.** Incise lumber 3 inches (75 mm) or more thick on all four sides. Incise lumber less than 3 inches (75 mm) thick on the wide faces only, except as shown on the plans.

Incise Douglas fir with a minimum dimension of 2 inches (50 mm) using a suitable power-driven machine before treatment. Do not incise Douglas fir rails and rail posts.

Use the spacing and shape of the cutting teeth and the method of incising necessary to produce a uniform penetration. Meet the minimum required depths of the incisions as follows:

Size <sup>[1]</sup>	Minimum depth of incision, inch (mm)
2 × 12 (50×300)	3/8 (9)
3 × 12 (75×300)	7/16 (11)
4 × 12 (100×300)	1/2 (13)
8 × 10 (200×250)	9/16 (14)
10 × 12 (250×300)	5/8 (16)
12 × 12 (300×300)	3/4 (19)

[1] Intermediate size in proportion.

**F. Amount of Preservative.** The Engineer will require net retention in any charge no less than 90 percent of the quantity of preservative specified. The Engineer will require the average retention by the material treated under any contract or order and the average retention of any five consecutive charges to be at least 100 percent of the quantity specified. Ensure that the minimum amounts of preservative retained conform to AASHTO M 133 and the requirements set forth in the referenced AWPA Standard. Treat all species of structural timber, lumber, piling, posts, and blocks in accordance with the current AWPA standards.

**G.Acceptance.** Accept only structural timber, lumber, piling, posts, braces, and blocks in accordance with ODOT Supplement 1072.

**712.09 Geotextile Fabrics.** Provide fabric composed of strong rot-proof polymeric fibers formed into a woven or non-woven fabric. The City will determine acceptance of Type A, B, C and D fabric in accordance with test data obtained in the most current report from the National Transportation Product Evaluation Program (NTPEP) – Laboratory Results of Evaluations on Geotextiles and Geosynthetics.

<b>Type A: Underdrains and Slope Drains</b>	
Minimum Tensile Strength <sup>[ASTM D4632]</sup>	80 lb (355 N)
Minimum Puncture Strength <sup>[ASTM D4833]</sup>	25 lb (110 N)
Or Minimum Puncture Strength <sup>[ASTM D6241]</sup>	140 lb (625 N)
Minimum Tear Strength <sup>[ASTM D4533]</sup>	25 lb (110 N)
Apparent Opening Size <sup>[ASTM D4751]</sup>	
Soil Type-1: Soils with 50% or less passing No. 200 (75 µm) sieve	AOS ≤ 0.6 mm
Soil Type-2: Soils with 50 to 85% passing No. 200 (75 µm) sieve	AOS ≤ 0.3 mm
Minimum Permittivity <sup>[ASTM D4491]</sup>	0.5 sec <sup>-1</sup>
<b>Type B: Filter Blankets for Rock Channel Protection</b>	
Minimum Tensile Strength <sup>[ASTM D4632]</sup>	200 lb (890 N)
Minimum Puncture Strength <sup>[ASTM D4833]</sup>	80 lb (355 N)
Or Minimum Puncture Strength <sup>[ASTM D6241]</sup>	440 lb (1955 N)
Minimum Tear Strength <sup>[ASTM D4533]</sup>	50 lb (220 N)
Minimum Elongation <sup>[ASTM D4632]</sup>	15%
Apparent Opening Size <sup>[ASTM D4751]</sup>	AOS ≤ 0.6 mm
Minimum Permittivity <sup>[ASTM D4491]</sup>	0.2 sec <sup>-1</sup>
<b>Type C: Sediment Fences</b>	
Minimum Tensile Strength <sup>[ASTM D4632]</sup>	120 lb (535 N)
Maximum Elongation <sup>[ASTM D4632]</sup>	50%
Minimum Puncture Strength <sup>[ASTM D4833]</sup>	50 lb (220 N)
Or Minimum Puncture Strength <sup>[ASTM D6241]</sup>	275 lb (1225 N)
Minimum Tear Strength <sup>[ASTM D4533]</sup>	40 lb (180 N)
Apparent Opening Size <sup>[ASTM D4751]</sup>	AOS ≤ 0.84 mm.
Minimum Permittivity <sup>[ASTM D4491]</sup>	0.01 sec <sup>-1</sup>
*Ultraviolet Exposure Strength Retention <sup>[ASTM D4355]</sup>	70%
<b>Type D: Subgrade-Base Separation or Stabilization</b>	
Minimum Tensile Strength <sup>[ASTM D4632]</sup>	180 lb (800 N)
Maximum Elongation <sup>[ASTM D4632]</sup>	50%
Minimum Puncture Strength <sup>[ASTM D4833]</sup>	70 lb (310 N)
Or Minimum Puncture Strength <sup>[ASTM D6241]</sup>	385 lb (1715 N)
Minimum Tear Strength <sup>[ASTM D4533]</sup>	70 lb (310 N)
Apparent Opening Size <sup>[ASTM D4751]</sup>	Same as Type A
Permittivity <sup>[ASTM D4491]</sup>	0.05 sec <sup>-1</sup>

## 712.10

- [1] ASTM D6241 - now the standard puncture resistance test required by AASHTO and NTPEP. NTPEP will continue to publish product data, tested under ASTM D4833, until retesting the product under ASTM D6241.
- [2] Provide certified test data to the City. Include strength retention data at 0, 150, 300, and 500 hours

For Type E material, supply fabric conforming to the requirements of AASHTO M288, Section 10, Table 8. The City will accept Type E material based on certified test data.

All minimum strengths shown represent average roll minimum values in the weakest principal direction.

Provide fabric free of any treatment that might significantly alter its physical properties.

During shipment and storage, wrap the fabric in a heavy-duty protective covering to protect it from UV deterioration, direct sunlight, dirt, dust, and other debris.

Provide materials in accordance with the City's QPL.

**712.10 Prefabricated Edge Underdrain.** Provide prefabricated edge underdrain consisting of a polymeric core with a minimum thickness of 1 inch (25 mm) wrapped in fabric in accordance with 712.09, Type A. Provide a flexible underdrain, rectangular in shape, and of hollow construction. Use core material resistant to petroleum-based chemicals, naturally occurring soil chemicals, and road de-icing agents. Provide core material having sufficient flexibility to withstand bending and handling during installation without damage. Provide a core with a minimum of 100 square inches (0.064 m<sup>2</sup>) unobstructed (one side only) drainage area per 1 foot (0.3 m) of width. Provide side walls of the core having at least 5 percent open area to permit unobstructed flow through the filter and wall to the core. The Engineer will require prefabricated edge drain with 6000 pounds per square foot (290 kPa) with a maximum 20 percent compression in a parallel plate compression test (ASTM D 695) minimum compressive strength. Provide a minimum (single side) core flow capacity of 10 gallons per minute per foot of width for a 0.1 gradient at 10 pounds per square inch bladder load in accordance with ASTM D 4716. Provide the manufacturer's certified test results as specified 101.03.

**712.11 Temporary Erosion Control Mats Materials.** Unless specifically itemized, provide any of the type mats listed below. Provide certified test data for each shipment of material.

**A. Type A Temporary Erosion Control Mat.** Provide a Type A temporary erosion control mat conforming to the following:

1. A machine-produced mat consisting of 100 percent agricultural straw covered on the top with a polypropylene netting having an approximate 1/4 × 1/4 inch to 1/2 × 1/2 inch (6 × 6 mm to 13 × 13 mm) mesh, and sewn together with biodegradable or photodegradable thread.
2. A consistent thickness with the straw evenly distributed over the entire area of the mat.
3. A minimum mat width of 6.5 feet (2 m).

4. An average mat weight of 0.5 pound per square yard ( $270 \text{ g/m}^2$ )  $\pm$  10 percent.
5. A netting weight of approximately 1 pound per 1000 square feet ( $5 \text{ kg}/1000 \text{ m}^2$ ).

**B. Type B Temporary Erosion Control Mat.** Provide a Type B temporary erosion control mat conforming to the following:

1. A machine-produced mat consisting of 100 percent agricultural straw covered on the top with a photodegradable polypropylene netting having an approximate  $1/2 \times 1/2$  inch to  $5/8 \times 5/8$  inch ( $13 \times 13 \text{ mm}$  to  $16 \times 16 \text{ mm}$ ) mesh and on the bottom with a photodegradable polypropylene netting having an approximate  $1/4 \times 1/4$  inch to  $1/2 \times 1/2$  inch ( $6 \times 6 \text{ mm}$  to  $13 \times 13 \text{ mm}$ ) mesh, sewn together with biodegradable or photodegradable thread.
2. A consistent thickness with the straw evenly distributed over the entire area of the mat.
3. A minimum mat width of 6.5 feet (2 m).
4. An average mat weight of 0.5 pound per square yard ( $270 \text{ g/m}^2$ )  $\pm$  10 percent.
5. A top netting weight of approximately 3 pounds per 1000 square feet ( $15 \text{ kg}/1000 \text{ m}^2$ ) and a bottom netting weight of approximately 1 pound per 1000 square feet ( $5 \text{ kg}/1000 \text{ m}^2$ ).

**C. Type C Temporary Erosion Control Mat.** Provide a Type C temporary erosion control mat conforming to the following:

1. A machine-produced mat consisting of 70 percent agricultural straw and 30 percent coconut fiber covered on the top with a photodegradable polypropylene netting having an approximate  $5/8 \times 5/8$  inch ( $16 \times 16 \text{ mm}$ ) mesh and on the bottom with a photodegradable polypropylene netting having an approximate  $1/4 \times 1/4$  inch ( $6 \times 6 \text{ mm}$ ) mesh, sewn together with cotton thread.
2. A consistent thickness with the straw and coconut fiber evenly distributed over the entire area of the mat.
3. A minimum mat width of 6.5 feet (2 m).
4. An average mat weight of 0.5 pound per square yard ( $270 \text{ g/m}^2$ )  $\pm$  10 percent.
5. A top netting weight of approximately 3 pounds per 1000 square feet ( $15 \text{ kg}/1000 \text{ m}^2$ ) and a bottom netting weight of approximately 1 pound per 1000 square feet ( $5 \text{ kg}/1000 \text{ m}^2$ ).

**E. Type E Temporary Erosion Control Mat.** Provide a Type E temporary control mat conforming to the following:

1. A machine-produced mat consisting of 100 percent coconut fiber covered on the top and bottom with an ultraviolet stabilized polypropylene netting having an approximate  $5/8 \times 5/8$  inch ( $16 \times 16 \text{ mm}$ ) mesh, and sewn together with polyester thread.

## 712.11

2. A consistent thickness with the coconut fiber evenly distributed over the entire area of the mat.
3. A minimum mat width of 6.5 feet (2 m).
4. An average mat weight of 0.5 pound per square yard ( $270 \text{ g/m}^2$ )  $\pm$  10 percent.
5. An ultraviolet stabilized polypropylene netting with a weight of approximately 3 pounds per 1000 square feet ( $15 \text{ kg}/1000 \text{ m}^2$ ).

**F. Type F Temporary Erosion Control Mat.** Provide a Type F temporary erosion control mat conforming to the following:

1. A uniform open plain weave of undyed and unbleached single jute yarn.
2. Loosely twisted yarn not varying in thickness by more than one-half its normal diameter.
3. Provide mats in rolled strips with:
  - a. A minimum length of 50 yards (46 m).
  - b. A width of 48 inches  $\pm$  1 inch ( $1.2 \text{ m} \pm 25 \text{ mm}$ ).
  - c. Warp ends width  $81 \pm 3$ .
  - d. Weft ends per yard (meter)  $41 \pm 3$  ( $49 \pm 3$ ).
  - e. An average weight of 1.22 pounds per linear yard ( $0.6 \text{ kg/m}$ )  $\pm$  10 percent.

**G. Type G Temporary Erosion Control Mat.** Provide a Type G temporary erosion control mat conforming to the following:

1. A machine-produced mat consisting of wood excelsior, with 80 percent at least 8 inches (200 mm) in length.
2. Excelsior cut from properly cured wood to achieve adequately curled and barbed fibers.
3. A consistent thickness with the fiber evenly distributed over the entire area of the mat.
4. For use in ditches or channels, cover the top and bottom of the excelsior with lightweight netting entwined with the excelsior for maximum strength and ease of handling, or cover the top only with heavyweight netting machine sewn on maximum 2 to 4-inch (51 to 102 mm) centers along the longitudinal axis of the material. For all other applications, cover the top with lightweight netting entwined with the excelsior for maximum strength and ease of handling.
5. Regardless of application, lightweight netting consists of either netting having a maximum  $3 \times 1$  inch ( $75 \times 25 \text{ mm}$ ) weave, twisted craft [check spelling] paper yarn having a high web strength or biodegradable plastic.
6. Mat widths of 24, 36, 48, or 78 inches (0.6, 0.9, 1.2, or 2 m) or greater,  $\pm 1$  inch ( $\pm 25 \text{ mm}$ ).

7. Mat rolls of more than 90 feet (27.5 m) in length.
8. A mat weight of not less than 0.72 pound per square yard (390 g/m<sup>2</sup>) constant weight, air dry.

**I. Type I Temporary Erosion Control Mat.** Provide a Type I temporary control mat conforming to the following:

1. Extruded polymeric plastic net having a mesh opening of approximately 3/4 × 3/4 inch (20 × 20 mm).
2. A netting with an average weight of 3 pounds per 1000 square feet (15 kg/1000 m<sup>2</sup>) ± 10 percent and a minimum tensile strength of 15 pounds over a 3-inch width (67 N over a 77 mm width) in the weakest principal direction.