SPECIAL SPECIFICATION

ITEM 5160

TIRES FOR USE IN EMBANKMENT

1. Description. This work shall consist of placing and compacting tire chip and/or shred fill in accordance with this specification and Item 132, "Embankment" in reasonably close conformity with the lines, grades, thicknesses and typical cross sections, as shown on the plans. Instrumentation to monitor the performance of the tire chip fills will be installed by the Departments designated representative in conjunction with this work. The Contractor shall anticipate delays due to instrumentation installation and cooperate with the Engineer as necessary to allow time for the instrumentation to be successfully installed and tested.

2. Materials.

(1) General. The material shall be made from scrap tires which shall be shredded into the Type(s) designated on the plans. The material shall be produced by a shearing or cutting process. Tire particles produced by a hammer mill will not be allowed. The tire particles shall be free on any contaminates such as oil, gasoline, diesel, grease, etc. That could leach into the ground water. In no case shall the tire particles contain the remains of tires that have been subjected to a fire. Type A tire particles will be mixed with soil and Type B tire particles will be a cell enclosed in geotextile.

Tire particles which become contaminated and/or otherwise deemed unacceptable by the Engineer as a result of the activities of this contract shall be removed or processed as directed by the Engineer at no additional cost.

(2) Tire Particles. The gradation shall be measured in accordance with Test Method Tex-401-A, except that the sample size shall be as shown and sample preparation shall be by drying in the 60 C (140 F) oven to a constant weight. Any tire particle shall contain no more than one (1) side wall. Free loose metal not encased in rubber shall not exceed one (1) percent by mass.

Type A		Type B	
Master Grading (% passing)		Master Grading (% passing)	
100 mm(4")	100 min.	300 mm (12")	100 min.
75 mm(3")	95 min.	200 mm (8")	75 min.
50 mm(2")	50 min.	37.5 mm(1.5")	25 max.
4.75 mm(No.4)	15 max.	4.75 mm(No.4)	1 max.
Sample size= 4.5 kg (10lb) min.		Sample size= 11.4 kg (25lb) min.	

(3) Material Storage. Tire particles shall be stored in an area acceptable to the Engineer.

3. Equipment.

The machinery, tools and equipment necessary for proper prosecution of the work shall be on the project and approved by the Engineer prior to the beginning of construction operations for this Item. All machinery, tools and equipment used shall be maintained in a satisfactory working condition.

4. Construction Methods.

(1) General. It is the primary requirement of this specification to secure an embankment with tire particles as noted on the plans. It shall be the responsibility of the Contractor to regulate the sequence of his work, to provide the depths as shown on the plans, maintain the work and rework the courses as necessary to meet these requirements.

(2) Subgrade Preparation. The subgrade that will underlie the tire particle course shall meet the grade tolerance, compaction and other requirements set forth in Item 132, "Embankment".

(3) Geotextiles. The tire particle cell shall be enclosed in a layer of geotextile as shown on the plans. The geotextile shall meet the requirements of D-9-6200, Type I, and shall be installed with a minimum 450 mm (18 inch) overlap. Holes or tears in geotextile shall be repaired or replaced as directed by the Engineer. Payment for geotextile shall be considered incidental to construction of the tire particle cell.

(4) Placing.

(a) Tire Particle Cell. The compacted thickness of any tire particle layer shall be as directed by the Engineer and not exceed 300 mm (12 inches). Each layer of tire particles shall be placed over the full width of the section to the dimensions as shown on the plans. The tire particles shall be spread with track mounted bulldozers, rubber tired motor graders, backhoes, or other equipment as needed to obtain a uniform layer thickness. The tire particles shall be well mixed, with no pockets of either fine or coarse tire particles. Segregation of large or fine particles will not be allowed. Security against vandalism will be required for tire particle stockpiles and tire cells until the stockpiles are depleted and the cell is covered with embankment. Tire particle courses will not be placed on frozen ground.

(b) Tire Particles Mixed with Embankment. A layer of uncompacted tire particles shall be placed in a uniform layer (300 mm/12 inches max.) as directed by the Engineer. A layer of embankment soil of equal uncompacted thickness shall be placed in a uniform layer on top of the tire particles. The two layers shall be mixed by scarifier, ripper teeth or methods and equipment as approved by the Engineer. The tire particles shall be well mixed with soil in a uniform layer as directed by the Engineer. Each layer of mixed tire particles and soil will be sampled for uniformity.

Embankment and tire particles shall be mixed off site when directed by the Engineer.

(5) Shaping and Compacting.

(a) Tire Particle Cell. Each lift of a tire particle cell be compacted with six passes of a vibratory smooth drum roller with a minimum static weight of approximately 9000 kilograms (20,000 pounds), unless otherwise directed by the Engineer. If the top of any tire particle layer becomes contaminated by the addition of foreign materials, the contaminated material shall be processed or removed as directed by the Engineer.

The surface of each layer shall be maintained during compaction operations in such a manner that a uniform texture is produced and the tire particles are firmly keyed together.

The completed side slopes and surface of the tire particle course shall be brought to a condition of uniform stability and compaction. To compensate for settlement of the tire particles caused by the weight of the overlying soil, the top surface of the tire particle fill shall be overbuilt as shown on the plans. The side slopes of the tire particle fill shall be overbuilt by the amount shown on the plans at the top of the slope tapering uniformly to zero at the toe of the slope. A tolerance of 75 mm (3 inches) above or 75 mm (3 inches) below the required grade and cross section will be allowed.

After the embankment has been completed and final subgrade elevations have been achieved, a minimum of 30 days shall have lapsed for tire consolidation before final paving is allowed within 61 meters (200 ft.) Of the bridge abutment unless otherwise approved by the Engineer.

(b) Tire Particles Mixed With Embankment. Tire particles mixed with embankment shall be shaped as approved by the Engineer. Tire particles mixed with embankment shall be compacted by the "Ordinary Compaction" method as stated in Item 132, "Embankment". The embankment soil to be mixed with tire particles shall be a granular material with 100 % passing the 9.5 mm (3/8 inch) sieve according to Test Method Tex-401-A and a Bar Linear Shrinkage not to exceed two (2) when tested according to Test Method Tex-107-E.

(c) General. Tire particle compaction within one (1) meter (3 ft.) Of instrumentation and fill over conduits shall be accomplished with a walk behind vibratory smooth drum, vibratory tamping foot or vibratory pad-foot roller, with a minimum static weight of 680 kilogram (1,500 lbs.). Vibratory plate compactors are ineffective for compacting tire particles and will not be allowed. Wheeled vehicles shall not be allowed to drive over conduit placed within the tire particle fill, unless there is a minimum of 0.6 meter (2 ft.) Fill over the conduit.

The Contractor shall take all necessary precautions to prevent damage, disturbance or movement of any monitoring device, once installed. The Contractor shall immediately

notify the Engineer of any instrumentation damage, disturbance or movement.

5. Measurement. The tire particle course placed in accordance with the widths and thicknesses shown on the plans and compacted as specified will be measured by the cubic meter in vehicles as delivered on the road.

6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Tires for Use in Embankment", of the type specified. This price shall be full compensation for furnishing and installing geotextile; for hauling tires; placing, compacting, reworking, removal and reprocessing if needed; recompacting if needed; and for all labor, tools, equipment and incidentals necessary to complete the work.