ITEM 304 AGGREGATE BASE

304.01 Description. This work consists of furnishing, placing, and compacting one or more courses of aggregate on a prepared surface, including furnishing and incorporating all water required for compaction.

304.02 Materials. Furnish materials conforming to 703.17.

304.03 Before Spreading. The Engineer will sample the Contractor's stockpile to determine the initial moisture content to be used for compaction. The Engineer will develop a moisture-density curve according to Supplemental Specification 1501 to determine the optimum moisture content.

Use material that has a reasonably uniform moisture content. Ensure the moisture content is not less than 2 percent below the optimum moisture content before spreading. Add water to the stockpile if necessary to meet this moisture requirement.

Handle the material in a manner to minimize segregation. If segregation occurs, thoroughly mix or regrade the stockpile.

304.04 Spreading. Spread the material on the prepared surface. Do not use frozen material and do not spread on frozen surfaces.

Do not exceed a compacted lift thickness of 8 inches (200 mm) when using vibratory rollers greater than 12 tons (11 metric tons). Do not exceed a compacted lift thickness of 6 inches (150 mm) when using 10 to 12-ton (9 to 11 metric tons) vibratory rollers. Do not exceed a maximum compacted lift thickness of 4 inches (100 mm) when these vibratory rollers are not used.

The Contractor may elect to use a lighter roller if the centrifugal force exceeds the minimum weight. In all cases, submit documentation proving the minimum weight requirements are met.

Place the material in two or more approximately equal lifts when the specified compacted thickness exceeds the maximum allowed.

Place the material with self-propelled spreading machines capable of placing the material true to line and grade. Spreading machines such as spreader boxes or pavers are allowed. Do not use graders or dozers without spreader boxes to spread the material except for areas described in the next paragraph. Spread the material such that it minimizes segregation and requires minimal blading or manipulation. The City may perform in-place gradation testing in areas that are visually segregated according to City Supplement 1090 as directed by the Engineer.

The Contractor may use hand-placing methods, dozers or graders when the total area of the material is 2000 square yards (1700 m^2) or less or in small areas where self-

propelled spreading machines are impractical. Small areas include lane widths less than 12 feet (3.7 m) or lengths less than 1000 feet (305 m). The City will not take in-place gradation tests in these small areas.

The City may test for in-place gradation after spreading but before compaction testing according to City Supplement 1090 as directed by the Engineer.

304.05 Compaction. The City will measure compaction according to Supplemental Specification 1501.

Add water or dry the material to bring it to within 2 percent of the optimum moisture content before compacting. Maintain the moisture content within this range during all compaction operations. The Engineer will determine the percentage of moisture to apply or to be dried from the material. Uniformly apply the water or dry the material throughout the lift and in a manner that does not soften or disturb the lower courses. Reduce the moisture content if the material becomes unstable during the compaction operation.

Compact each lift of material immediately after spreading. Use rollers that correspond with the lift thickness as described in 304.04. The Contractor may use light rollers or vibratory equipment in small areas as specified in 304.04 or when heavier rollers are not practical. Approved compaction equipment may consist of vibratory rollers, static rollers, or vibratory equipment.

At the beginning of the compaction operation, construct a test section. The Engineer will determine the density requirements according to Supplemental Specification 1501. Use a minimum compactive effort of eight passes to construct the test section. Use and adjust the vibration on the vibratory rollers to maximize the density and stability. Construct a new test section when the material changes or when the supporting materials change appreciably.

The Engineer will use 98 percent of the test section maximum dry density for acceptance of the production material. Use at least the same number of passes and compactive effort used to obtain the test section maximum dry density for the production material. At a minimum, use eight passes in the production area. The Engineer may reduce the minimum passes if the passes are detrimental to compaction

The Engineer may check the production material density before or after the finishing operations.

Maintain the surface of each lift during the compaction operations in such a manner that the surface texture is reasonably uniform and the material is firmly keyed.

Cover the aggregate base with the next layer of pavement before the end of the construction season. If the aggregate base is not covered up, then assume all liability for contamination of, damage to and instability of the base, subgrade and underdrains.

Provide drainage and maintain the material according to 203.04.A.

304.06 Finished Surface. Ensure that the finished surface does not vary more than 3/8 inch (10 mm) from a 10-foot (3 m) straightedge parallel to the centerline or more than 1/2 inch (13 mm) from a template conforming to the required cross-section. Furnish straightedges, templates, or other devices satisfactory to the Engineer, and check the surface for conformance with these requirements.

Do not construct the aggregate base at a consistent depth below the required minimum compacted depth thickness. When the depth is found to be less than the required depth, provide the Engineer with a written corrective action plan for approval.

304.07 Method of Measurement. The City will measure Aggregate Base by the number of cubic yards (cubic meters) computed from the profile grade and typical sections, compacted in place.

Where variable depth is specified, the City will measure the number of cubic yards (cubic meters) of aggregate base by converting from weight using the following conversion factors:

TABLE 304.07-1

Material	Conversion Factor	
Crushed stone	4000 lb/yd^3	2375 kg/m^3
Crushed gravel	4000 lb/yd^3	2375 kg/m^3
Crushed slag [1]		
less than 90 lb/ft^3 (1450 kg/m^3)	3600 lb/yd^3	2140 kg/m^3
90 to 100 lb/ft^3(1450 to 1600 kg/m^3)	4000 lb/yd^3	2375 kg/m^3
more than 100 lb/ft^3(1600 kg/m^3)	4500 lb/yd^3	2670 kg/m^3
Granulated slag	2800 lb/yd^3	1660 kg/m^3

[1] Based on average dry rodded weight of standard size of slag aggregates on record at the Laboratory. The conversion factors listed are the long gradation weights. These numbers are based on the dry rodded weights of No. 67, 57, or 8 gradation. The City will determine slag weights based on weights obtained from the original source.

The City may verify that the moisture content of the delivered material is less than 2 percent above saturated surface dry (SSD) as directed by the Engineer. If the moisture content is greater than 2 percent above SSD, then the City will calculate the number of cubic yards (cubic meters) based on the dry density and dry weight.

The City may determine the pounds per cubic yard (kilograms per cubic meter) for aggregate mixtures by using 100 percent of the test section maximum dry density obtained in 304.05 as directed by the Engineer.

304.08 Basis of Payment. The City will pay for accepted quantities at the contract price as follows:

Item	Unit	Description
304	Cubic Yard (Cubic Meter)	Aggregate Base