SECTION 301
GENERAL REQUIREMENTS FOR BASES

301.01. DESCRIPTION.

This Section covers requirements common to all types of base construction, unless otherwise designated.

301.02. MATERIALS.

(a) **General.** Unless otherwise shown on the Plans, furnish all materials meeting the requirements of Section 300 Bases. Make any necessary preliminary investigations to locate the proposed source of acceptable material.

NOTE: Information obtained by the Department in its preliminary investigations will be available to prospective bidders at the Materials Laboratory.

(b) **Density.** Standard density and field density of soils and aggregates shall be determined in accordance with Subsection 202.02(b)(2), Earth Embankment, unless otherwise specified.

301.03. EQUIPMENT.

(a) **General.** All equipment necessary for base construction shall meet the requirements of Subsection 108.06. The general requirements for equipment for base construction shall be those accepted by the industry which produce the quality of work specified.

(b) **Mixing Equipment.**

(1) Traveling Plants. Traveling plants may be approved types of either the single- or multiple-pass type; they must thoroughly pulverize and mix the materials of the job-mix formula to the required size and uniformity for each type of material, as described in this Section and in Section 700. The plant shall be mounted on wheels or tread equipment of such type that when loaded to capacity will not rut or damage the subgrade.

The plant shall have provisions for introducing water or other liquids at the time of mixing through a metering device or other approved methods. Leakage of liquids from the equipment shall be corrected immediately. The single-pass machine shall be designed to pick up the material to be mixed from a windrow or blanket and shall be equipped so that during at least 50 percent of the mixing cycle all the material is picked up and mixed while separated from the mixing table.

(2) Stationary Plants. Stationary plants shall be either

- The batch type using revolving blade or rotary drum mixers

or

- Continuous type mixing.

The aggregates and other ingredients of the job-mix formula may be proportioned either by weight or by volume. You must provide means by which the Engineer can readily verify the proportions in each batch or the rate of flow for continuous mixing. The charge and mixing time in a batch mixer or the rate of feed to a continuous mixer shall be sufficient to obtain complete mixing of all the material. Correct any dead areas in the mixer in which the material does not move or is not sufficiently agitated and ensure that the plant delivers a uniform mixture, meeting all specification requirements.

(c) **Compactors.**

(1) Nonvibratory Steel-Wheeled Roller. Unless otherwise provided, non-vibratory steel-wheel rollers shall be of the tandem or 3-wheel self-propelled type or steel-wheel trailer type weighing not less than 5 tons (4.5 metric tons). When drive rolls or trailer type rolls produce a compressive force of not less than 200 pounds per linear inch (3.6 kg/mm) of contact area, you may use a roller weighing less than 5 tons (4.5 metric tons). When the weight of the roller is specified in tons, do not weight the roller above the manufacturer's maximum rating. Operate the roller within the manufacturer's speed range.

(2) Vibratory Compactors. Vibratory compactors may be of the roller or pan type. The compactor shall be equipped with amplitude and frequency controls and specifically designed for the compaction of the material on which it is to be used.

(3) Pneumatic-Tired Roller. This shall be an approved type with pneumatic tired wheels mounted on two or more axles and spaced so that all tires have uniform load and contact with the surface; in addition, the rear group of tires will cover the gap between adjacent tires of the forward group. The roller shall be of the self-propelled or trailer type so constructed as to provide for the addition of weights. It shall weigh, under operating conditions, not less than 5 tons (4.5 metric tons) for a rolling width of 5 feet (1.5 m). The pressure of the tires shall be such that the tire is riding square on the tread. The roller shall be operated at a speed not less than 3 mph (5 km/h) nor more than 8 mph (13 km/h) per hour.

(4) Tamping-Type Roller. The tamping type roller, under working conditions, shall have a minimum weight of 90 pounds per linear inch (1.6 kg/mm) of length of drum and a minimum load on each sheeps-foot of 100 pounds per square inch (0.07 kg per mm^2) of cross sectional area of the sheeps-foot in contact with the ground. Maximum area of the face of each sheeps-foot shall not be more than 12 square inches (7742 mm^2) . The feet on the sheeps-foot roller shall project not less than 7 inches (178 mm) from the face of the drum, and the roller shall be equipped with teeth-cleaning devices. The feet in adjacent rows shall be spaced so that the distance from center to center of adjacent parallel rows is not less than 6 inches (150 mm) nor more than 11 inches (279 mm). Individual drums of the roller shall not exceed 5 feet (1.5 m) in width and shall oscillate independently. Roller and tractor for pulling shall travel at a speed of approximately 3 mph (5 km/h) to 6 mph (10 km/h) per hour.

(d) **Sprinklers** Sprinklers shall be equipped with positive and rapidly working cut off valves and approved spray bars which will insure uniform and continuous discharge for their full length.

(e) **Distributors and Supply Tanks.** Distributors and supply tanks shall meet the requirements of Subsection 401.03.

301.04. CONSTRUCTION METHODS.

(a) **General.** In order to provide the required subgrade, subbase and pavement structure of acceptable smoothness and thickness, maintain reasonably accurate control in the compaction of the subgrade, smoothness of the subgrade, and smoothness and thickness of the component parts of the pavement structure.

Use equipment adequate for providing acceptable construction within the prescribed tolerances, using construction methods and equipment that meet the requirements of Subsection

108.06. Unless otherwise provided, tolerances for finished subgrade, subbase, and various bases and surfaces of bases are as follows:

BASES	SECTION	TOLERANCES	
		SURFACE	THICKNESS
Subgrade	310	1/2 inch (13 mm) in 10 feet (3 m)	
Subbase	306	1/2 inch (13 mm) in 10 feet (3 m)	Job average within 1/4 inch (6mm) of Plans. Not more than 1/2 inch (13 mm) deficient at any point except as provided in Subsection 301.04(b)
Aggregate Base	303	1/2 inch (13 mm) in 10 feet (3 m)	Same as above
Caliche Base	305	1/2 inch (13 mm) in 10 feet (3 m)	Same as above
Fly AshModified Subgrade	317	1/2 inch (13 mm) in 10 feet (3 m)	Same as above
Econocrete Base	318	1/4 inch (6 mm) in 10 feet (3 m)	Same as above
Open Graded Bituminous Base	319	1/4 inch (6 mm) in 10 feet (3 m)	Same as above
Open Graded Portland Cement Concrete Base	320	1/4 inch (6 mm) in 10 feet (3 m)	Same as above
Lime Treated Subgrade	307	1/2 inch (13 mm) in 10 feet (3 m)	Same as above

(b) **Checking for Compliance with Tolerances.**

(1) Surface. At selected locations, the Engineer—using a 10 feet (3 m) straightedge or other approved device—will test for compliance with specified surface tolerances. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall at no point exceed the specified tolerance. Correct any/all humps or depressions exceeding the specified tolerance in an acceptable manner as approved by the Engineer.

(2) Width and Thickness. Width and thickness tolerances for bases and subbases paid for on the compacted volume in place (the theoretical cross section shown on the Plans or established by the Engineer, multiplied by the length) will be determined as follows: The minimum width shall be in reasonably close conformity with the dimensions shown on the Plans or established by the Engineer. The completed thickness of the base or subbase shall be the nominal thickness shown on the Plans, and shall be measured at intervals of not more than 500 feet (150 m) for each dual lane width. Where the measured thickness of the base or subbase is more than 1/2 inch (13 mm) deficient in the thickness, correct the deficiency in an acceptable manner—with no additional compensation.

Where the measured thickness of the base or subbase is more than 1/2 inch (13 mm) thicker than shown on the Plans, it shall be considered as conforming with the specified

thickness plus 1/2 inch (13 mm). In determining the average job thickness, not more than 1/2 inch (13 mm) in excess of the Plan thickness will be considered. The average job thickness shall be the average of the job measurements determined as specified above, but shall be within 1/4 inch (6 mm) of the typical section thickness shown on the Plans. In the event you construct the base in excess of the required width and thickness, including tolerances, the additional material and labor required for the additional thickness will be at your expense.

SECTION 303
AGGREGATE BASE

303.01. DESCRIPTION.

This work shall consist of furnishing and placing one or more courses of aggregates and any specified additives on a prepared subgrade or subbase in accordance with these Specifications and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer. Aggregate base may be mixed off the roadbed and may be blended by plant mixing or other approved methods. Aggregate base may be mixed on the roadbed with approved methods that will produce a uniformly blended material.

NOTE: Aggregate base shall not be mixed on any completed base or surface course.

303.02. MATERIALS.

Materials shall conform to the requirements specified in the following Subsection of Section 700 - Materials, for the type gradation specified.

Aggregate Base 703.01

The gradation may be Type A, Type B, or Type C, unless otherwise specified on the Plans or in the Proposal, except as follows:

For base courses over 6 inches (150 mm) in specified thickness, the top 3 inches (75 mm) shall be Type A or Type C.

For base courses in which the specified thickness is 6 inches (150mm) or less, the total thickness shall be Type A or Type C.

After work starts, the same gradation type and source as specified or selected shall be used throughout the project unless otherwise permitted in writing by the Engineer.

303.04. CONSTRUCTION METHODS

(a) **Preparation of Subgrade.** Prior to placing any new base material or subbase and base course material on the roadbed, complete the subgrade according to the requirements of method B of Section 310, Subgrade, of these Specifications, or according to the method specified on the Plans or in the Proposal.

If there is an existing aggregate course in place, prepare it in accordance with the requirements of the method of Section 311, Processing Existing Base and Surface, of these Specifications or as indicated on the Plans and in the Proposal.