Rev. 5/10

TECHNICAL SPECIFICATION 231
MILL EXISTING PAVEMENT

231.1 SCOPE OF WORK

This technical specification covers the furnishing of all labor, materials, testing, submittals, tools, and equipment necessary to perform the milling, removal and disposal of existing bituminous concrete pavement when milling a tapered "keyway" to transition the top course of a bituminous concrete overlay to an existing pavement surface.

Work under this item shall consist of milling and removal of material to the line, grade, and typical cross-section shown on the plans or as specified by the Engineer.

Unless otherwise specified, the milled material shall become the property of the Contractor.

231.2 EQUIPMENT

The equipment for milling the pavement surface shall be designed and built for milling flexible pavements and shall have a minimum 6 foot cutting width. It shall be self propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement to the line, grade, and typical cross-section shown on the plans.

The milling machine shall be equipped with a built in automatic grade control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, ski (30 feet minimum), mobile string line (30 foot minimum), or matching shoe. The transverse controls shall have an automatic system for controlling cross-slope at a given rate.

The machine shall be capable of operating at a minimum speed of 10 feet per minute and be able to provide a 0 to 3 inch deep cut (minimum) in one pass. It shall be designed so that the operator can at all times observe the milling operation without leaving the control area of the machine.

The teeth on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively

limiting the amount of dust escaping from the milling and removal operation in accordance with local, State, and Federal air pollution control laws and regulations.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a smaller or lesser equipped milling machine may be permitted when approved by the Engineer.

A sweeper equipped with a water tank, spray assembly to control dust, a pick-up broom, a dual gutter broom, and a dirt hopper shall be provided by the Contractor. The sweeper shall be capable of removing millings and loose debris from the textured pavement. Other sweeping equipment may be provided in lieu of the sweeper when approved by the Engineer.

231.3 SUBMITTALS

Not applicable.

231.4 CONSTRUCTION METHODS

The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, excessive longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

Unless otherwise specified, milling shall be done to improve rideability and/or cross-slope. The existing pavement shall be removed to the average depth shown on the plans, in a manner that will restore the pavement surface to a uniform cross-section and longitudinal profile. The longitudinal profile of the milled surface shall be established by a stringline, mobile stringline, or mobile ski. The cross-slope of the milled surface shall be established by a second sensing device or by an automatic cross-slope control mechanism. The Contractor will be responsible for providing all grades necessary to remove the material to the proper line, grade, and typical cross-section shown on the plans. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm sewer system the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

At all permanent limits of milling, a clean vertical face shall be established prior to paving. No vertical faces, transverse or longitudinal, shall be left exposed to traffic. If any vertical face is formed in an area exposed to traffic a temporary paved transition shall be established. If a vertical face is not formed and the milling machine is used to temporarily transition the milled pavement surface to the existing pavement surface, the length of the temporary transition shall conform to the below requirements.

Transitions for Roadway Surface: Transitions shall be formed at any point on the roadway where the pavement surface deviates, vertically, from the uniform longitudinal profile as specified on the plans. Whether formed by milling or by bituminous concrete mixture, all transition lengths shall conform to the criteria below unless otherwise specified.

Permanent Transitions: A permanent transition is defined as any transition that remains as a permanent part of the work. All permanent transitions, leading and trailing ends shall meet the following length requirements:

a) Roadways greater than 35 MPH = 30 feet per inch of vertical change (thickness)
b) Roadways 35 MPH or less = 15 feet per inch of vertical change (thickness).
c) Bridge Overpass and underpass transition length will be 75 feet either
    (1) Before and after the bridge expansion joint, or
    (2) Before or after the parapet face of the overpass.

In areas where it is impractical to use the above described permanent transition lengths the use of a shorter permanent transition length may be permitted when approved by the Engineer.

Temporary Transitions: A temporary transition is defined as a transition that does not remain a permanent part of the work. All temporary transitions shall meet the following length requirements:

a) Roadways greater than 35 MPH
    (1) Leading Transitions = 15 feet per inch of vertical change (thickness)
    (2) Trailing Transitions = 6 feet per inch of vertical change (thickness)
b) Roadways 35 MPH or less
    (1) Leading and Trailing = 4 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in-place over the winter shutdown period, holidays, or during extended periods of inactivity (more than 7 calendar days) shall conform to the "Permanent Transition" requirements shown above.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper or other approved equipment to remove, to the greatest extent practicable, material which will become airborne under traffic. This operation shall be

conducted in a manner so as to minimize the potential for creation of a traffic hazard and to comply with local, State, and Federal air pollution control laws and regulations. Any damage done to traffic as a result of milled material becoming airborne is the responsibility of the Contractor and shall be repaired at the Contractor's expense.

The milled surface will be tested with a 10 foot straightedge furnished by the Contractor. The variation of the top of ridges from the testing edge of the straightedge, between any two ridge contact points. The variation of the top of any ridge from the bottom of the groove adjacent to that ridge shall not exceed one quarter (¼) of an inch in ten (10) feet in any direction in preparation for placing a final wearing surface, or three eighths (3/8) of an inch for an intermediate course. Any point in the surface not meeting these requirements shall be corrected as directed by the Engineer at the Contractor's expense.

The Contractor may be waived of the straightedge surface requirements stated in the preceding paragraph in areas where a surface lamination between bituminous concrete layers or a surface lamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur. This is subject to the approval of the Engineer.

The length of the milled tapered "keyway" transition shall conform to the requirements above.

231.5 MEASUREMENT

Measurement for this item will be based on the number of square yards of area from which the milling of asphalt has been completed and accepted to the limits shown on the plans and accepted by the Engineer.

231.6 PAYMENT

Payment for this item will be based on the contract unit price per Square Yard, completed and accepted, including all labor, materials, testing, submittals, tools, and equipment necessary to complete the work as specified.

PAY ITEM	**PAY UNIT**
Mill Existing Pavement	S.Y.