

~~shall monitor all drainage structures within the areas being pumped. When the pumping operation is forcing the slurry into a drainage structure, the contractor shall discontinue pumping operations and immediately clean the drainage structure of slurry mixture.~~

~~When directed, undersealed or slabjacked pavements shall be proof rolled with the specified roller; however, proof rolling shall not be conducted until at least 24 hours after completion of undersealing at no direct pay. When such proof rolling indicates that cavities exist beneath the slab, such cavities shall be filled as directed at no direct pay.~~

~~Pavement and shoulder surfaces shall be kept free of slurry mixture during undersealing operations.~~

~~Pumping operations shall be discontinued at least 1 hour before opening the pavement to traffic.~~

~~**(2) Undersealing:** Pumping of slurry into a hole shall continue until all voids beneath the pavement are filled. Lifting of the slab or slurry flowing out of an adjacent hole, through pavement joints or cracks, or out of the shoulder pavement joint shall be sufficient evidence that all cavities are filled within range of the hole being pumped. Pumping pressures over 200 psi (1400 kPa) will not be permitted. When pressures cause pavement lifting, a lower pumping pressure shall be used. Lifting of the slab as a result of pumping shall not exceed 1/8 inch (3 mm). The contractor shall monitor the slab lifting by approved methods at all times during undersealing. Any pumping operation that causes voids to form under the pavement in the immediate area shall be terminated. The sequence of pumping from hole to hole shall be as directed.~~

~~**(3) Slabjacking:** Pumping operations for slabjacking shall be conducted in an approved manner and sequence. The contractor shall monitor the slab lifting at all times during pumping operations. Pumping shall continue until pavement slabs have been raised to the required grade within a tolerance of $\pm 1/8$ inch (± 3 mm).~~

602.15 DOWEL BAR RETROFIT. This work consists of installing plastic coated 1 1/2 inch (38 mm) diameter by 18 inch (450 mm) long plain round dowel bars into slots cut across and through existing concrete pavement transverse joints. The existing portland cement concrete pavement shall be removed from the slots and the dowel bars shall be retrofitted across the pavement joints. The voids surrounding the dowel bars shall be filled with a concrete patching material. The transverse joints shall be sawed and sealed as required in the plans. All work shall conform to the plan details, and the following requirements.

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The use of patented processes or devices for simultaneous cutting of slots for dowel bar retrofitting shall conform to Subsection 107.03.

(a) Materials: Dowel bars shall be in accordance with Subsection 1009.04.

The dowel bars shall have tight fitting nonmetallic end caps that allow for 1/4-inch (6 mm) bar movement at each end of the bar. The contractor shall submit an end cap sample to the project engineer for approval prior to installation.

Nonmetallic chair devices shall be used to support and hold the dowel bars in place. The chairs shall be in contact with the bottom and sides of the slot in order to maintain horizontal and vertical dowel bar alignments. The contractor shall submit a chair sample to the project engineer for approval prior to installation.

The foam core board filler material shall be 1/4-inch (6 mm) thick, constructed of closed cell foam and faced with poster board material on each side.

The caulk for sealing the existing transverse joint at the bottom and sides of the slot shall be a commercial grade of silicone caulk containing a minimum of 50 percent silicone.

A low shrinkage cementitious concrete patching material used to backfill the slots shall be selected from QPL 24 under Rapid Setting Patching Materials for Concrete and shall meet the following requirements when tested at the water content used at the project site.

(1) Compressive strength 3 hr., minimum 3,000 psi (20.7 MPa) - ASTM C 109

(2) Compressive strength 24 hr., minimum 5,000 psi (34.5 MPa) - ASTM C 109

(3) Shrinkage 4 days, 0.13 percent maximum - ASTM C 157

The contractor shall obtain and provide the manufacturer's technical specifications for approval of the patching product including all additives required to meet the minimum compressive strengths.

Curing compounds recommended by the patching material manufacturer shall be in accordance with Section 1011.

(b) Construction Requirements: The dowel bars shall be installed as follows:

Saw cut slots in the pavement shall be parallel to the centerline of the roadway and to a depth sufficient to place the center of the dowel bar at mid-depth in the pavement. Multiple saw cuts parallel to the centerline may be required to properly remove the material from the slot. The saw cuts for the slots at each transverse joint shall be made such that the dowel bars can be

positioned parallel to the roadway centerline and surface in accordance with plan details.

Jack hammers used to break loose concrete shall not be larger than the 30-pound (15 kg) class. If the 30-pound (15 kg) jack hammer damages the pavement, the project engineer will require the contractor to use a lighter weight hammer.

All exposed surfaces and cracks in the slot shall be sand blasted and cleaned prior to bar installation. Air compressors shall be equipped with approved oil and moisture traps.

The transverse contraction joint on the bottom and the sides of the slot shall be filled with silicone caulk. Caulking material at the bottom and sides of the slot that will result in breaking of the bond with the patching material shall be cleaned prior to patching.

The dowel bars shall be lightly oiled or greased prior to placement. The bar chairs shall provide a minimum of 1/2-inch (13 mm) clearance between the bottom of the dowel bar and the bottom of the slot. The dowel bars shall be centered over the transverse joint, placed in the middle of the slot to the depth shown on the plans, and shall be parallel to the roadway centerline and the roadway surface. The chairs shall hold the dowel bar securely in place during placement of the patching mix.

A 1/4-inch (6 mm) thick foam core board shall be placed at the middle of the dowel bar to maintain the transverse contraction joint. The existing joint sealant may need to be cut or removed to accommodate the foam core board. The foam core board shall fit tightly around the dowel bar and to the bottom and edges of the slot. The top of the foam core board shall be flush with the top surface of the concrete pavement. The foam core board shall remain in a vertical position and be tight to all edges during the placement of the patching material.

The contractor shall thoroughly moisten all surfaces on the sawed slot immediately prior to filling with patch compound unless the patching material manufacturer recommends the slot surface to be dry. Care shall be taken to prevent standing water in the slot. All excess water shall be removed with compressed air.

The contractor shall fill the slot (with the installed dowel bar, chairs, foam core board, and silicone in place) with an approved patching material. The patching material shall be mixed in accordance with the manufacturer's recommendations and with mixing equipment approved by the engineer. The patching material shall be vibrated with a small hand held vibrator capable of thoroughly consolidating the patching compound into the slot and around the dowel bar. The top surface of the filled slot shall be trowel finished and

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cured. The patched areas shall be cured as directed by the patching material manufacturer.

The contractor shall provide six 2-inch (50 mm) cube molds in accordance with ASTM C 192 for sampling and testing the patching material once for each 4 hours of production or a minimum of once per day. Test specimens shall be made in accordance with ASTM C 192. If the compressive strengths are not being met, production shall cease and the contractor shall take corrective measures to the satisfaction of the engineer.

The patching material shall be allowed to cure for a minimum of four hours before placing any vehicle loads on the repair or as directed.

The transverse joints shall be sawed, then sealed with a sealant complying with Subsection 1005.02(c) in accordance with plan details and the manufacturer's recommendations. Backer material shall be of the size shown on the plan details and shall be selected from QPL 42.

All dowel bars not functioning or damaged shall be repaired or replaced at no cost to the Department.

~~**602.16 MEASUREMENT.** Measurement of portland cement concrete pavement rehabilitation will be as follows:~~

~~(a) Cleaning and Filling Existing Longitudinal Pavement Joints will be measured by the linear foot (lin m).~~

~~(b) Cleaning and Resealing Existing Longitudinal and Transverse Pavement Joints will be measured by the linear foot (lin m).~~

~~(c) Cleaning and Sealing Cracks will be measured by the linear foot (lin m) along the centerline of the crack at the pavement surface.~~

~~(d) Full Depth Corner Patching of Jointed Concrete Pavement will be measured by the square yard (sq m).~~

~~(e) Full Depth Patching of Jointed Concrete Pavement will be measured by the square yard (sq m).~~

~~(f) Partial Depth Patching of Jointed Concrete Pavement will be measured by the square yard (sq m).~~

~~(g) Patching of Continuously Reinforced Concrete Pavement will be measured by the square yard (sq m).~~

~~(h) Grinding will be measured by the square yard (sq m). Additional passes of the grinder will be considered to be incidental. The quantity of pavement grinding to be paid for will be determined by multiplying the width of the ground area by the horizontal length ground. Only the final ground area will be measured for payment on pavement areas that require multiple grinding passes.~~