

ITEM 361

FULL DEPTH REPAIR OF CONCRETE PAVEMENT

- 361.1 Description. This Item shall govern for repairing deteriorated areas of concrete pavement as herein specified, in conformity with the existing roadway section and as directed by the Engineer.
- 361.2 Materials. The Contractor shall furnish from a source approved by the Engineer, all concrete, and hot poured rubber joint sealing material. Rubber joint sealing material shall conform to ASTM D6690 "Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements".

Concrete for Pavement Repair:

- A. High Early Strength Concrete Mix shall contain 7 sacks of Portland cement per cubic yard using a Type I, Type II, or Type III cement, which shall conform to ASTM C150 and in accordance with Item 360 "Concrete Pavement".
- B. Rapid Setting High Early Strength Concrete Mix shall contain 7 sacks of Portland cement per cubic yard, with other chemical admixtures and its applications are designed for early opening of the concrete road pavement to traffic 24 hours or less after completing the pour and finish.

An accelerating agent (Type C), conforming to ASTM C494 "Specification for Chemical Admixtures for Concrete" may be used. All chemical admixtures shall be used in accordance with the manufacturer's recommendations.

Proposed concrete curbs shall be poured separately, using 5-1/2 sacks of Type I Portland cement per cubic yard.

The Contractor shall furnish all reinforcing steel for replacement purposes, when the Engineer deems the existing steel is not salvageable. All reinforcing steel shall meet ASTM A615, minimum Grade 40 with minimum No. 4 rebar for 7 inch thick concrete, to replace existing concrete pavement that is 7 inch thick or less. Thence minimum Grade 40 with minimum No. 5 rebar for 9 inch thick concrete to replace existing concrete pavement 8 inch thick to 10 inch thick. Reinforcing steel shall be in accordance with Item 440 "Reinforcing Steel".

The Contractor shall furnish all curing compound. Curing compound shall be in accordance with Item 526 "Membrane Curing".

- 361.3 Construction Methods. When the areas to be repaired are located in an area that is patched, cracked, repaired or overlain with asphaltic concrete, the asphaltic concrete shall be removed over an area greater than that to be repaired, as directed by the Engineer. Where reinforcement is

present, the following procedures shall apply. A groove approximately 2 inches minimum depth shall be sawed along a line approximately 18 inches beyond the distressed area unless otherwise indicated on the drawings, except along the longitudinal construction joint if it is a pavement repair boundary. The slab and 6" of underlying base shall be removed. The concrete in the area inside the perimeter of the sawcut slab shall be carefully broken and removed leaving a clean vertical face, taking care to work around the reinforcing steel so as not to break the bond in the steel in the adjacent concrete pavement. At the perimeter, the breaking of the existing concrete will be accomplished by only the use of hand tools or lightweight jack hammers as approved by the Engineer. Concrete adjacent to the repair area shall not be spalled or fractured by the removal procedure. Base material shall be removed and replaced with a commercial grade cement stabilized sand base, as per Item 433 "Cement Stabilized Sand Bedding and Backfill Material", and compacted to provide firm, even support to the concrete pavement.

Reinforcing bars that are removed shall be replaced with new bars as per the drawings. The protruding reinforcing steel shall be inspected for damage and carefully straightened. New reinforcing bars shall be placed and firmly supported by approved bar chairs.

Longitudinal Reinforcement. The new bars shall be spliced to the existing protruding bars by lapping a minimum of 18 inches or lapping and welding as directed by the Engineer.

If three or more adjacent bars are seriously damaged or broken, they shall be replaced by drilling and grouting 30 inch long reinforcing bars (minimum #5 bars for 7 inch thick concrete; and #6 bars for concrete 9 inches or greater in thickness), using an epoxy adhesive. The 30 inch reinforcing bars shall be embedded a minimum of 10 inches horizontally into the existing concrete pavement at a spacing of 18 inches on center. If less than three adjacent bars are damaged or broken, splicing to broken bars will not be required. The accepted epoxy adhesive shall be in accordance with ASTM C881, Type I, II, IV, and/or V; Grade 3; and depending on the air temperature either Class A & B, or Class C.

In non-reinforced concrete pavement areas, reinforcing shall be placed as per the drawings with a 3 inch space between end of new bars and face of existing concrete pavement.

For all concrete repair work, the following procedures shall apply. The removed concrete and excavated base shall be disposed of by the Contractor, as directed by the Engineer. Replacement of transverse joints will be required where the failed area necessitates the removal of existing joints. Concrete, used for repair, shall be High Early Strength in accordance with Item 360 "Concrete Pavement" or Rapid Setting High Early Strength.

Immediately prior to placing the concrete, the base and each face of existing concrete shall be wetted. Approved hand-operated mechanical

vibrators shall be used to insure the proper consolidation of the concrete. The concrete shall be screeded off to the elevation of the adjacent concrete pavement and checked with a straight edge to insure that the riding surface will be satisfactorily repaired. Areas shall also be checked to insure there is adequate slope to provide for free drainage. The concrete shall be finished with a broom finish, as directed by the Engineer. Membrane curing shall be used until the pavement is opened to traffic. Membrane curing shall be in accordance with Item 526 "Membrane Curing".

Part of the concrete repair work adjacent to existing concrete curb shall include replacement of grass sod and any backfill material needed behind the concrete curb, and these repairs shall be incidental to the bid item for concrete pavement repair. The Contractor shall locate any existing improvements (waterlines, sprinklers, or landscape appurtenances) to mitigate damages. The Contractor shall be responsible for protecting these appurtenances, in the original condition, and if damaged by his operations, the Contractor shall replace them to the original condition or better, at no expense to Harris County.

High Early Strength Concrete:

The repaired area may be opened to traffic after 72 hours, when the concrete has attained a minimum average flexural strength of 500 psi, or a minimum average compressive strength of 2500 psi. All test specimens (tested in accordance with ASTM C78 or ASTM C39) representing tests for opening to traffic, shall be cured using the same methods and under the same conditions as the concrete represented.

Rapid Setting High Early Strength Concrete:

The repaired area may be opened to traffic after 24 hours, when the concrete has attained a minimum average flexural strength of 400 psi, or a minimum average compressive strength of 2600 psi. All test specimens (tested in accordance with ASTM C78 or ASTM C39) representing tests for opening to traffic, shall be cured using the same methods and under the same conditions as the concrete represented.

If the time frame designated for opening traffic is less than 24 hours after concrete placement, concrete must be designed to attain a minimum average flexural strength of 255 psi or a minimum average compressive strength of 1,800 psi within the designated time frame as shown in the contract documents.

361.4

Measurement. Deteriorated areas repaired as prescribed for in this Item shall be measured by the square yard of surface area of the repaired section, regardless of the depth or type of pavement. Calculation for each patch shall be rounded off to the nearest one-hundredth square yard.

All 6 inch reinforced concrete curb shall be measured by the linear foot of curb, as replaced, complete in place.

Dowelling, when required as described in this Item, shall be measured per each dowel placed.

361.5 Payment. The work performed as prescribed by this Item and measured in accordance with the provisions of Measurement above, will be paid for at the unit price bid for "Full Depth Repair of Concrete Pavement", which price shall be full compensation for sawcutting, and breaking the existing steel reinforced pavement structure and curb, and excavation of the 6 inch thick base, and for removal, loading, hauling and disposal of the broken concrete and base; for furnishing and installing all material including reinforcing steel and joints; for all curing; for placing hot-poured rubber as required in joints; for cement stabilized sand base; for the replacement of grass sod with required backfill; and for all manipulations, labor, equipment, appliances, tools and incidentals necessary to complete the work.

All dowelling performed as prescribed by this Item and measured in accordance with the provisions of Measurement above, will be paid for at the unit price bid for "Dowelling", which price shall be full compensation for drilling and grouting, including epoxy adhesive, for furnishing and installing all materials necessary, and for all manipulations, labor, equipment, appliances, tools, and incidentals necessary to complete the work.

Proposed concrete curb will be paid for at the unit price bid for 6" reinforced concrete curb, which shall include the removal and disposal of the existing curb as needed. The concrete curb is not considered a part of the area measured and paid for as repairing existing concrete pavement.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires drawings that shall be incorporated into the contract documents.

NOTE: This Item requires other Standard Specifications

Item 205 "Subgrade"  
Item 440 "Reinforcing Steel"  
Item 433 "Cement Stabilized Sand Bedding and Backfill Material"  
Item 526 "Membrane Curing"

END OF ITEM 361