

**Specifications for Full Depth Pavement Reclamation and Surface Improvements of  
Upper Valley Pike in Salem Township in Champaign County, Ohio.**

General Conditions

Scope: It is the intent of these specifications to describe the materials and methods required to resurface Upper Valley Pike from State Route 296 to Lippincott Road. The extent of the project will correspond with the limits as provided with the plan schematic included with this project.

The work consists of, and the contractor will be paid for: planing pavement at intersecting roadways including butt joints, applying cement as required per the specifications, full depth pavement reclamation, providing profile adjustments per the plan notes, applying a cure coat, applying an asphaltic concrete surface course as directed by the County, placing stabilized crushed aggregate berm, paint striping, and traffic control.

Supervision: Work shall be performed under the supervision of the County Engineer or his designated representative. Determination of the methods to be used to obtain the specified results, direction of the contractor's employees and operation of equipment shall rest with the contractor.

Safety: The contractor shall operate in a safe manner at all times. Equipment shall be in good operating condition with all guards and protective devices in place and in working condition. Items such as steps, walkways and railings shall be in good condition. Personal safety equipment shall be furnished and issued by the contractor as required. He shall further see to it that this equipment is used and that his employees work in a safe manner. The Champaign County Engineer's Safety Policy Manual shall apply to this project. The Contractor will be required to sign the provided Acknowledgment/agreement form.

Liability: The Contractor shall carry Workman's Compensation, public liability, personal liability, and property damage insurance. The Contractor shall furnish satisfactory evidence of insurance coverage to the maximum extent of \$5,500,000.00 bodily injury and \$5,100,000.00 property damage to insure adequate payment for any damage caused by their operations.

Tax payment: The Contractor shall furnish a statement regarding personal property tax, on the provided form, in accordance with section 5719.042 O.R.C.

Bid and Performance Bonds: Bids shall be accompanied by a bid guaranty bond in the amount of 100% of the bid or a certified check, cashier's check, or letter of credit in the amount of 10% of the bid in accordance with section 153.54 O.R.C. If a certified check, cashier's check or letter of credit is submitted with the bid, then the successful bidder will be required to provide a performance bond in the amount of 100% of the bid at the time the contract is signed. The address and telephone number of the bonding company and agent must be included with all bid guaranty bonds and performance bonds.

Wages: This job is subject to Ohio prevailing wage rates which are part of these specifications. Wage rates can be viewed at the State of Ohio Department of Commerce web site.

Contractor Qualifications: Bids are solicited only from contractors qualified to perform this type of work and who have successfully complete similar work. The successful bidder shall furnish evidence of his ability to perform this type of work. The contractor awarded the contract will have to submit an approved ODOT job mix formula for the specified asphalt.

Materials Testing: All materials used in this work are subject to testing for compliance with the specifications. Tests will be performed at the County's option and expense. The contractor will cooperate to the extent necessary in supplying the requested samples or making the material available.

Asphalt Binder Price Adjustment: Section 401.20 will not apply to these specifications. No placing index factor will be applied to adjust the price for asphalt binders.

Sub-contracting: The contractor shall not sub-contract more than 40% of the dollar value of the project. If the contractor intends to use sub-contractors, they shall be named on the bid along with the work it is intended for them to perform. They shall be subject to the same qualification requirements as the contractor. The contractor shall be responsible for all actions and performance by his sub-contractors including the payment of prevailing wages and the submission of payrolls.

Work Dates: Work shall be completed and the road opened to traffic by **November 3, 2017**. In accordance with Sections 108.06, 108.07, 108.08, 108.09 and 108.10 liquidated damages in the amount of \$500.00 per day will be assessed for each calendar day the project is not completed. However, all asphalt must be placed in conformance with weather limitations of 401.05.

Termination of Contract: The County Engineer may terminate the contract for the convenience of the County at any time. The Engineer may, by written instruction to the contractor, decrease or increase the quantity of any item or portions of a contract, and the Engineer shall authorize payment to the contractor for the reasonable cost incurred, in connection with such item or portions, prior to the date of such decrease or cancellation made by order of the Engineer.

Finding for Recovery: An award will not be made to any bidder, including the lowest and best bidder or the lowest responsive and responsible bidder against whom a finding for recovery has been issued by the Ohio Auditor of State, if the finding for recovery is unresolved, as provided in Section 9.24 of the Ohio Revised Code, whether or not it is clear that any funds used in this project could be deemed to be “state funds”. A bidder with an unresolved finding for recovery shall be deemed not a best bid or not a responsible bid.

Affidavit of Compliance with O.R.C. 3517.13: Ohio Revised Code Section 3517.13(I)(3) and (J)(3) requires that no agency or department of this state or any political subdivision shall enter into any contract for the purchase of goods costing more than five hundred dollars or services costing more than five hundred dollars with a corporation, individual, partnership or other association organized under Chapter 1785 of the Revised Code, estate, or trust unless the contract includes a certification that the individuals named in Revised Code Sections 3517.13(I)(1) and (J)(1) are in compliance with the aforementioned provisions. The offeror is required to complete the attached AFFIDAVIT OF COMPLIANCE WITH OHIO REVISED CODE SECTION 3517.13. Failure to submit the required affidavit with the proposal/bid pack will deem the offeror’s response to be non-responsive and disqualified from receiving further consideration.

### Specifications

Item numbers refer to ODOT Construction and Material Specifications dated January 1, 2013. These specifications will cover the work unless otherwise noted.

1. ITEM 202 - WEARING COURSE REMOVED, ASPHALT CONCRETE: Consists of planing existing asphalt to a depth of approximately 1" to match existing pavement for butt joints per the schematic details included with the plans. All planed cuttings shall become the property of the county and shall be removed from the limits of the project delivered to County stockpile location at Westville Oh. This item also includes required tack coat at .09 gal per sq yd prior to paving of surface course. Payment will be for square yard of pavement planed. Limits for pavement planning are included per the plan details and quantities.
2. ITEM 206 - CEMENT: Consists of applying cement per the special provision for full depth pavement reclamation. For bidding purposes, 5% cement has been included with the calculations. Payment will be per ton of cement applied.
3. ITEM 411 – STABILIZED CRUSHED AGGREGATE, AS PER PLAN - This item shall consist of stabilized crushed aggregate placed 18" wide and 2 1/2" deep adjacent to the finished pavement elevation. Material shall be placed and compacted along the edge of pavement, including any transitions required at driveways/approaches. Payment shall be made per cubic yard.

Totals include additional quantities for 2' driveway flare, mailbox approaches, and a 50' intersections radius

4. ITEM 441 - ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (441), PG64-22, AS PER PLAN: Consists of placing and compacting 1" of asphaltic concrete on Upper Valley Pike as shown within these specifications. The job mix formula shall be in accordance with **table 441.02-1 (PG 64-22) Type 1 Surface Course for medium traffic**. The provisions of 401.20 Asphalt Binder Price Adjustment will not be applied to these specifications.

Asphalt samples from each 1000 ton batch shall be taken throughout the application of the project. The Contractor will supply the necessary size plates (to be laid on the surface of the highway and paved over) for the samples and the Contractor will be responsible to take the sample and coordinate the collection of the samples with the County. All cost of testing shall be the responsibility of the County. All batch slips from the plant shall show the percent of AC asphalt contained in said load with all weight to be in "English" units (tons).

All butt joints will be required to be sealed with AC20. Only County and State roadways shall be utilized as haul roads unless otherwise approved by the Engineer in writing.

The average asphalt bitumen content shall be at least 6.2 % of the total mix per road. Test will be performed for every 500 tons laid. If an individual asphalt bitumen content test is below 6.0 % or above 8.0% the material shall be removed and replaced at the cost of the contractor.

Payment shall be based upon unit quantities applied as detailed in these specifications. The Contractor shall be paid 100% of all work performed, after test results of the asphalt samples have been determined to be in conformance.

5. ITEM 441 - ASPHALT CONCRETE INTERMEDEATE COURSE, TYPE 2, (441), PG64-22, AS PER PLAN: Consists of placing and compacting 1 1/2" of asphaltic concrete on Upper Valley Pike as shown within these specifications. The job mix formula shall be in accordance with **table 441.02-1 (PG 64-22) Type 2 Intermediate Course for Heavy traffic**. The provisions of 401.20 Asphalt Binder Price Adjustment will not be applied to these specifications.

Asphalt samples from each 1000 ton batch shall be taken throughout the application of the project. The Contractor will supply the necessary size plates (to be laid on the surface of the highway and paved over) for the samples and the Contractor will be responsible to take the sample and coordinate the collection of the samples with the County. All cost of testing shall be the responsibility of the County. All batch slips from the plant shall show the percent of AC asphalt contained in said load with all weight to be in "English" units (tons).

The average asphalt bitumen content shall be at least 6.2 % of the total mix per road. Test will be performed for every 500 tons laid. If an individual asphalt bitumen content test is below 6.0 % or above 8.0% the material shall be removed and replaced at the cost of the contractor.

Payment shall be based upon unit quantities applied as detailed in these specifications. The Contractor shall be paid 100% of all work performed, after test results of the asphalt samples have been determined to be in conformance.

6. ITEM 642 – CENTER LINE: Consists of water based traffic paint in accordance with ITEM 642. County will furnish logs and no passing zone surveys from previous work. Pre-marking, layout, and any no passing zone surveys necessary shall be included in this item. Payment will be per mile of line, regardless of type.
7. ITEM 642 – EDGE LINE: Consists of water based traffic paint in accordance with ITEM 642. Payment will be per mile of line.
8. ITEM 614 MAINTAINING TRAFFIC, AS PER PLAN: Consists of furnishing and placing necessary signs at all intersecting roads and furnishing necessary flag men, signs or other traffic control devices to handle traffic in the work zone. DO NOT PASS signs and pavement markings shall be in place in accordance with 614.04 Temporary markings shall be installed as per 614.11 the same day of paving. Local traffic will be maintained throughout the entire project at all times. Payment will be for lump sum bid.

9. ITEM SPECIAL - CHEMICALLY STABILIZED SUBGRADE, MISC.: FULL DEPTH RECLAIMED BASE COURSE, 12 INCHES DEEP: Consists of full depth pavement reclamation per the special provision included with this contract. Payment will be per square yard of reclaimed pavement completed. Limits of full depth reclamation are provided per the attached schematic plan and details included with the project. Other associated work items included with this pay item are provided in the plan notes where applicable.
10. Supplement item - FIBER REINFORCED ASPHALT CONCRETE: Consists of adding Fiber reinforced fibers to item 4 and 5. Specification and mixing shall be in accordance with per the supplementary specifications. Similar alternative material may be used if approved by the engineer.

## **REINFORCING FIBERS FOR ASPHALT**

### Material and Mixing Specifications

#### A. DEFINITIONS

1. Reinforcing Fibers: High tensile strength aramid fiber blend specially formulated to reinforce hot mix asphalt.
2. Fiber reinforced asphalt concrete (FRAC): A mixture of hot or warm mix asphalt and reinforcing fibers that has greater resistance to rutting, thermal cracking, fatigue cracking, and reflective cracking as compared to conventional non-fiber asphalt mixes.
3. Aramid Dispersion State Ratio (ADSR): The mass of aramid in the individual state compared to the total mass of extracted aramid fibers, expressed as a percentage.

#### B. REFERENCES

1. ASTM D2172, Standard Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
2. ASTM D6931, Standard Test Method for Indirect Tensile (IDT) Strength of Bituminous Mixtures.
3. AASHTO T322, Determining the Creep Compliance and Strength of Hot-Mix Asphalt (HMA) Using the Indirect Tensile Test Device.
4. Zeiada, W., Underwood, S., Stempihar, J., "Extraction of Aramid Fibers from Fiber Reinforced Asphalt Concrete – Special Test Method", Arizona State University, May 11, 2016.

#### C. SUBMITTALS

1. Submit the following as part of the bid package:

- a. Representative fiber product sample.
  - b. Fiber product data sheet and certification from the Manufacturer that the fiber product supplied meets the requirements of this specification.
  - c. Manufacturer's instructions and general recommendations.
  - d. Performance test results of IDT testing from a minimum of three separate laboratory trials.
  - e. Performance test results of ADSR testing from a minimum of two tests.
2. Submit a minimum of two unique project examples and references where the reinforcing fiber product was used within 500 miles of the project location.

**D. MATERIALS**

1. Reinforcing fiber properties
  - a. Provide a reinforcing fiber blend of virgin polyolefins and virgin aramids that meets the requirements in Table 1 and Table 2 below.

Table 1

<b>Reinforcing Fiber Material Properties</b>			
<b>Property</b>	<b>Test Method</b>	<b>Polyolefin</b>	<b>Aramid</b>
Form	Manufacturer Certification	Serrated	Monofilament
Nominal Specific Gravity	ASTM D276	0.91	1.44
Tensile Strength (psi)	ASTM D7269	NA <sup>1</sup>	400,000
Length (in)	Manufacturer Certification	0.75	0.75

1. Polyolefin fibers will melt or become plastically deformed during production

Table 2

<b>Reinforcing Fiber Performance Properties</b>		
<b>Performance Test</b>	<b>Test Method</b>	<b>Requirement</b>
Indirect Tensile Strength (IDT)	AASHTO T322 or ASTM D6931	≥ 20% increase
Aramid Dispersion State Ratio (ADSR)	Modified ASTM D2172	≥ 85%

- b. Forta-Fi<sup>®</sup>, provided by the Forta Corporation, is an acceptable product and meets the performance and material properties outlined in this section.
- c. ACE Fiber, fiber type C, is an acceptable product for this project approved by the engineer.

- d. If a different aramid-based fiber blend is proposed, performance test results complying with Section D-2 below must be submitted at least two weeks prior to bid date for approval by engineer.
- e. Non-aramid fiber blends will not be considered as acceptable alternatives to this specification.

## 2. Performance testing requirements

Testing shall be from previously completed laboratory trials performed on plant mixed FRAC. Testing is not required on samples from the job mix.

Performance testing must be from laboratory trials at a fiber dosage rate equal to the rate proposed for the project. Tests must be performed by an AASHTO accredited laboratory or nationally recognized university testing lab and must be reviewed and approved by the project engineer.

- a. Indirect Tensile (IDT) Strength Tests from a minimum of three (3) separate laboratory trials.
  - 1. Perform indirect tensile tests using the protocol from AASHTO T322 or ASTM D6931
  - 2. Tests results shall include a control and a fiber reinforced mix. FRAC mix shall be identical to control mix except for the inclusion of fibers added at the same dosage as proposed on the project.
  - 3. Indirect tensile test results from fiber specimens shall show an average tensile strength increase of 20 percent over control specimen with no less than 15 percent increase of average tensile strength.
- b. Aramid Dispersion State Ratio (ADSR) Tests from a minimum of two (2) separate laboratory trials.
  - 1. Perform ADSR test based on modified ASTM D2172 procedures as provided in the document entitled "Extraction of Aramid Fibers from Fiber Reinforced Asphalt Concrete – Special Test Method". A copy of the modified extraction methodology can be obtained by making an inquiry to the Pavement and Materials Laboratory at Arizona State University at NCE@asu.edu.
  - 2. To validate ADSR results, average extracted aramid fiber quantity must equal 0.007 percent by total sample weight with no individual result less than 0.005 percent of the total sample weight.
  - 3. All tested fiber mixes must achieve a minimum ADSR of 85%.

## E. DELIVERY, STORAGE, AND HANDLING



1. Deliver fiber-reinforcement in sealed, undamaged containers with labels intact and legible, indicating material name and lot number.
2. Deliver fiber-reinforcement to location where it will be added to each batch or loaded into the mixer.
3. Store materials covered and off the ground. Keep sand and dust out of boxes and do not allow boxes to become wet.

## F. MIXING AND PRODUCTION

1. Add aramid and polyolefin reinforcing fiber blends at a dosage rate of one (1) pound fiber per one (1) ton of asphalt.
2. Add alternative aramid fiber blends at a rate proposed by the manufacturer that achieves the IDT and ADSR results required by Section D.
3. Have a fiber manufacturer's representative on site during mixing and production. This requirement can be waived if fiber manufacturer and asphalt producer can supply evidence of manufacturer's brand of fiber being successfully produced a minimum of three times at the asphalt plant to be used for the project.
4. Batch Plant. When a batch plant is used, add fiber to the aggregate in the weigh hopper and increase both dry and wet mixing times. Ensure that the fiber is uniformly distributed before the injection of asphalt cement into the mixture.
5. Drum Plant:
  - a. Inject fibers through the RAP collar by placing fibers on the RAP belt for by feeding them with a blower tube system. Rate the feeding of fibers with the rate the plant is producing asphalt mix. If there is any evidence of fiber balls at the discharge chute, increase the mixing time and/or temperature or change the angle of the fiber feeder line to increase dry mixing time.
  - b. For manual feeding, place fibers on the RAP belt at intervals based on the plant production rate.
  - c. When using a blower tube system, add fibers continuously and in a steady uniform manner. Provide automated proportioning devices and control delivery within  $\pm 10\%$  of the mass of the fibers required. Perform an equipment calibration to the satisfaction of the fiber manufacturer's representative to show that the fiber is being accurately metered and uniformly distributed into the mix.

Include the following with the blower tube system:

- Low level indicators
- No-flow indicators
- A printout of feed rate status in pounds/minute

- A section of transparent pipe in the fiber supply line for observing consistency of flow or feed.
- Manufacturer's representative's approval of fiber addition system

#### G. PLACEMENT

1. Follow manufacturer's and engineer's recommendations for placement of FRAC.
2. Visually observe FRAC mix in the back of first three trucks and every tenth truck thereafter to confirm adequate blending of the fiber.
3. Remove any observed fiber balls from placed mixture and adjust operations per the manufacturer's recommendation to eliminate future fiber ball development.

#### H. PAYMENT

Payment shall be based on tons of asphalt concrete treated.

#### NOTES:

**EXISTING SURVEY MONUMENTS:** The contractor may remove existing survey monuments during the full depth reclamation process.

**EXISTING DRIVEWAYS:** The contractor shall transition the finished pavement elevation to best fit existing driveways. All concrete drive approaches shall be graded to not disturb the apron. Any damage to concrete approaches will be at the contractor's expense.

**PAVEMENT MARKINGS:** The County will provide pavement striping logs to the contractor at the preconstruction meeting. The striping logs provided by the County shall govern final pavement marking placement.

**UTILITY COORDINATION:** At the time of plan preparation, OUPS markings or record plans were not available. Based on the scope of work for this project, utility interference or disruption is not anticipated. Prior to construction, the contractor shall contact OUPS and have all existing utilities marked in the field.

**Bid Form**  
**2017 Upper Valley Pike Pavement Reclamation**  
**Champaign County, Ohio**

Item	Quantity	Unit	Description	Unit Price	Extension
1	280	Sq. Yd	Item 202- Wearing Course Removed		
2	1,064	Tons	Item 206 - Cement		
3	318	Cu. Yd.	Item 411 - Stabilized Crushed Aggregate		
4	916	Cu. Yd.	Item 441 - Asphalt Concrete Surface 1" of Type 1 PG64-22		
5	1380	Cu. Yd.	Item 441 - Asphalt Concrete Intermediate 1.5" of Type 2, PG 64-22		
6	2.50	Mile	Item 642 - Center Line		
7	5.00	Mile	Item 642 - Edge Line		
8	1	L.S.	Item 614 - Maintaining Traffic		
9	35,677	Sq. Yd.	Item Special - Chemically Stabilized Subgrade		
10	4592	Tons	Asphalt Treated with Fiber		
				Total	

I certify that I have inspected the job and have read and understand the plans and specifications, including the required completion date. Any questions or concerns about any quantities should be directed to the office of the Champaign County Engineer prior to submitting any bid.

By: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

## Operating Conditions

A Pre-Construction meeting shall be scheduled prior to start of work. The contractor shall notify the Engineer (937/653-4848) 48 hours prior to the initial start of work.

There will be no work performed from 6 P.M. on Saturday until 6 A.M. on Monday without the approval of the Engineer.

Work shall be conducted in such a manner as to cause minimum inconvenience to the public and the residents along the project.

Once the contractor commences work, it shall be carried out in a continuous manner and in accordance with the job schedule until completion. If the work is interrupted, the contractor shall notify the Engineer of the cause. If the Engineer agrees that the cause is valid, he will give the Contractor written permission to restart the work. The Contractor shall notify the Engineer the day prior to restarting.

The contractor will have a qualified representative, capable of making decisions on the contractor's behalf at all times the contractor or sub-contractor is working.

A copy of the plans and specifications shall be at the job site while any work is being completed.

Any changes in quantities or work must be authorized by written change orders, signed by the Contractor and the Engineer on the provided form. A change order must be secured before any additional work or additional quantities are used. Approved changes in work or quantities shall be paid at the bid unit price. A change order issued for an item for which there is no unit bid price will be paid according to the average bid price for that item as established in the latest available edition of the Ohio Department of Transportation Summary of Contracts Awarded. In the event that either of the above methods is not applicable, the approved change order will be paid in accordance with ORC Section 153.62

**AFFIDAVIT**  
**OF COMPLIANCE WITH OHIO REVISED CODE SECTION 3517.13**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_ SS:

I \_\_\_\_\_, being duly sworn, depose and state as follows:  
(Name)

1. I am duly authorized to make the statements contained herein on behalf of  
\_\_\_\_\_ ("The Contracting Party").

2. The Contracting Party is a/an (select one):

- Individual, partnership, or other unincorporated business association (including, without limitation, a professional association organized under Ohio Revised Code Chapter 1785), estate, or trust.
- Corporation organized and existing under the laws of the State of \_\_\_\_\_.
- Labor organization

3. I hereby affirm that the Contracting Party and each of the individuals specified in **R.C. 3517.13(I)(3)** (with respect to non-corporate entities and labor organizations) or **R.C. 3517.13(J)(3)** (with respect to corporations) are in full compliance with the political contribution limitations set forth in R.C. 3517.13(I) and (J), as applicable.

4. I understand that a false representation on this certification constitutes a felony of the fifth degree pursuant to R.C. 3517.13(AA) and 3517.992(R)(3).

Affiant further sayeth naught.

By \_\_\_\_\_  
(Signature)

Title \_\_\_\_\_

SWORN TO BEFORE ME and subscribed in my presence this \_\_\_\_\_ day of  
\_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

SEAL

My Commission Expires \_\_\_\_\_

AFFIDAVIT OF CONTRACTOR OR SUPPLIER OF NON-DELINQUENCY  
OF  
PERSONAL PROPERTY TAXES

O.R.C. 5719.042

STATE OF OHIO  
COUNTY OF \_\_\_\_\_ ss:

TO: CHAMPAIGN COUNTY

The undersigned, being first duly sworn, having been awarded a contract by you for the 2017 Township Paving Project, Champaign County, Ohio, hereby states that we were not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which you as a taxing district have territory and that we were not charged with delinquent personal property taxes on any such tax list.

In consideration of the award of the above contract, the above statement is incorporated in said contract as a covenant of the undersigned.

\_\_\_\_\_  
Affiant

Sworn to before me and subscribed in my presence this \_\_\_\_ day of \_\_\_\_\_,  
2017.

\_\_\_\_\_  
Notary Public

## LEGAL NOTICE

Bids will be received by the Champaign County Commissioners at their office located at 1512 South US 68, Suite A-100, Urbana, Ohio 43078 until 9:00 A.M., August 15, 2017 for the full depth reclamation and installation of an asphalt overlay and related materials on Upper Valley Pike between SR 296 and Lippincott road in Salem Township, Champaign County, Ohio. Bids shall be accompanied by a bid guaranty bond in the amount of 100% of the bid or a certified check, cashier's check or letter of credit in the amount of 10% of the bid in accordance with ORC 153.54. Bids shall be submitted in sealed envelopes marked "Upper Valley Pike Reconstruction". Specifications are on file at the office of the Champaign County Engineer, 428 Beech Street, Urbana, Ohio 43078 and on the engineer's website at <http://engineer.co.champaign.oh.us/>

The Champaign County Board of Commissioners reserves the right to reject any or all bids.

Board of Commissioners  
Champaign County

By: Stephen McCall, PE, PS  
County Engineer

**STATE OF OHIO  
DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION  
FULL DEPTH RECLAMATION (FDR) CHEMICAL STABILIZATION**

**April 23, 2010**

- 01. Description**
- 02. Materials**
- 03. Submittals**
- 04. Equipment**
- 05. Construction**
- 06. Mixture Design for Full Depth Reclamation**
- 07. Method of Measurement**
- 08. Basis of Payment**

**01. Description.** Full depth reclamation (FDR) consists of constructing a stabilized, reclaimed base course by pulverizing the existing asphalt pavement and existing aggregate material, and then mixing it with the subgrade soil and either cement, lime, or lime kiln dust.

**02. Materials.** Furnish materials conforming to:

Portland cement .....	701.04
Lime (quick lime) .....	712.04.B
Lime kiln dust .....	712.04.C
Aggregate.....	703.17

Furnish water conforming to 499.02.

For the curing coat, furnish rapid setting emulsified asphalt conforming to 702.04 or the curing materials specified in 451.02.

**03. Submittals.** Prepare and submit the report for mixture design for full depth reclamation as required in Supplement 1120 and modified in this special provision.

Submit, for the Engineer's acceptance, a report that lists the type of equipment to be used, speed of the intended equipment usage, rate of application of the chemical, and calculations that demonstrate how the required percentage of chemical will be applied. Submit the report to the Engineer for acceptance at least 2 workdays before the stabilization work begins.

**04. Mixture Design for Full Depth Reclamation.** Perform a mixture design according to Supplement 1120 with the following modifications.

Collect samples of the existing asphalt pavement, existing aggregate material, and subgrade soil to the specified depth. Collect one sample for every 5000 square yards (4000 m<sup>2</sup>) of reclaimed base course, but not less than a total of four samples for a project. Record the location of all samples, and the thickness of existing pavement and aggregate layers.

Process and prepare samples to closely simulate field conditions. When performing tests on untreated samples, only determine the liquid limit and plastic limit if the subgrade soil comprises more than 20 percent of the specified depth of reclamation.



Do not perform the moisture conditioning or the expansion testing.

Determine the minimum percentage of chemical that results in an average 7-day unconfined compressive strength that meets the minimum strengths shown in the following table. Interpolate the minimum percentage between points on the graph. If the average strength for the mixture with the greatest percentage of stabilization chemical does not meet the minimum strengths, contact the Department.

**TABLE 04-1 MINIMUM UNCONFINED COMPRESSIVE STRENGTH**

Thickness of proposed asphalt pavement overlay	UCS after 7 days
Less than 3 inches (75 mm)	300 psi (2.1 MPa)
At least 3 inches (75 mm)	200 psi (1.4 MPa)

**05. Equipment.** Provide equipment that meets the following requirements:

A. Use equipment capable of automatically metering liquids with a variation of not more than two percent by weight of liquids. Calibrate before use.

B. Reclaimer. Use a self-propelled, traveling rotary reclaimer or equivalent machine capable of cutting through existing roadway material to depths of up to 16 inches (405 mm) with one pass. Provide equipment capable of pulverizing the existing pavement, aggregate base and subgrade soil in place, to a minimum width of 8 feet (2.4 meters), and mixing any added materials to the specified depth. The rotation speed of the cutting drum must be adjustable independent of the machine's forward speed.

Use a machine equipped with a computer controlled liquid proportioning system capable of regulating and monitoring the water application rate relative to depth of cut, width of cut, and speed. Connect the water pump on the machine by a hose to the supply truck, and mechanically or electronically interlock the pump with the forward movement of the machine. Mount the spray bar so that water is injected directly into the mixing chamber. Provide equipment capable of mixing water, chemicals, and the pulverized pavement materials into a homogenous mixture. Maintain the cutting drum in good condition during the work.

Do not use equipment such as road planers or cold-milling machines designed to mill or plane the existing roadway materials rather than crush or fracture them.

C. Compaction. Provide a vibratory padfoot roller with at least 52,000 pounds (23,500 kg) of centrifugal force for breakdown compaction. Provide a single or tandem smooth drum vibratory roller having a minimum effective weight of 12 tons (11 metric tons) for finish rolling.

**06. Construction.** Perform full depth reclamation work when the air temperature is 40 °F (5 °C) or above and when the soil is not frozen. Do not perform this work during wet or unsuitable weather.

**A. Pulverizing and Shaping.** Before spreading any stabilizing chemicals or aggregate, pulverize the existing roadway materials to the specified depth. Pulverize until 95 percent of the material passes through the 2 inch (50 mm) sieve. Shape to within 3/4 inch (18 mm) of the proposed grade and compact until no further densification is achieved. Add water to the pulverized material to bring it to at least optimum moisture content but not more than 3 percent above optimum moisture content.

**B. Spreading.** After pulverizing, spread the specified chemical uniformly on the surface using a mechanical spreader at the approved rate and at a constant slow rate of speed. Use a distribution bar with a maximum height of 3 feet (1 meter) above the subgrade. Use a canvas shroud that surrounds the distribution bar and extends to the surface.

Minimize dusting when spreading the chemical. Control dust according to 107.19. Do not spread the chemical when wind conditions create blowing dust that exceeds the limits in 107.19.

Do not spread the chemical on standing water.

If specified, spread aggregate at the approved rate using an auger or vane type distributor for dry materials.

Provide a one square yard (square meter) canvas sheet and scale to check the spreading rate of the chemical and aggregate.

**C. Mixing.** Mix according to 206.05.B. Mix cement or lime kiln dust according to 206.05.B.1. Mix lime according to 206.05.B.2. Check the depth of the mixture according to 206.05.B.3.

**D. Compacting.** Start compaction no more than 30 minutes after the final mixing. Begin rolling at the low side of the reclaimed base course. Initially, do not compact within 3 to 6 inches (80 to 150 mm) of an unsupported edge to prevent distortion.

Compact the reclaimed base course to the requirements in 204.03, except the Engineer will use 98 percent of the maximum dry density for acceptance. The Engineer will determine the maximum dry density for acceptance using the test section method.

Use the moisture controls according to 203.07.A, except ensure that the moisture content at time of compaction is at or above optimum but not greater than 3 percent above optimum moisture content.

Perform the final rolling using a steel-wheeled roller. Do not use vibration during the final rolling.

The Contractor may either shape and fine grade the reclaimed base course before the curing period, or shape the reclaimed base course before the curing period and fine grade after the curing period. If fine grading before the curing period, fine grade the same day as mixing, compacting, and shaping. If fine grading after the curing period, shape the reclaimed base course approximately 1/2 inch (13 mm) above the profile grade and typical sections. In either case, fine grade the reclaimed base course to the profile grade and typical sections within the tolerances in 203.08.

**E. Curing.** Immediately after the compaction and shaping of the reclaimed base course, cover the surface with curing coat for curing the reclaimed base course. Use a rate of 1 gallon per 30 square feet (1.36 liters per square meter) for emulsions or a rate of 1 gallon per 150 square feet (0.27 liters per square meter) when the curing materials in 451.02 are used.

Apply the curing coat prior to the surface drying out. If the curing coat is delayed or the surface starts to dry out apply water for temporary curing until the curing coat can be applied. Do not apply the curing coat unless the curing coat can set up before it rains. When the application of curing coat must be delayed, keep the reclaimed base course wet by using water until the curing coat can be applied.

Cure the reclaimed base course for at least five days before placement of the overlying course.

**F. Proof Rolling.** After the cure period, proof roll the reclaimed base course according to Item 204.

**G. Protection.** Protect any finished portion of the reclaimed base course upon which any construction equipment is required to travel to prevent marring, distortion or damage of any kind. Immediately and satisfactorily correct any such damage.

Drain and maintain the work according to 203.04.A. Do not operate any equipment on the reclaimed base course during the curing period. Do not allow the reclaimed base course to freeze during the cure period. Cover the completed reclaimed base course with asphalt concrete pavement within 14 calendar days.

**07. Method of Measurement.** The Department will measure Full Depth Reclaimed Base Course by the number of square yards (square meters) computed from the profile grade and typical sections accepted in place.

The Department will measure cement, lime, and lime kiln dust by the number of tons (metric tons) incorporated in the complete and accepted work.

The Department will measure aggregate by the number of tons (metric tons) incorporated in the complete and accepted work.

The Department will measure Curing Coat by the number of square yards (square meters) computed from the profile grade and typical sections accepted in place.

**08. Basis of Payment.** The Department will pay lump sum for all work, labor, and equipment described in 04. Mixture Design for Full Depth Reclamation. The Department will pay one-half of the lump sum amount when the soil sampling and testing is complete and the report is accepted by the Department. The Department will pay one-half of the lump sum amount bid when the reclaimed base course is completed and accepted by the Department.

The Department will pay for accepted quantities at the contract prices as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
Special	Square Yard	Chemically Stabilized Subgrade, Misc.: Full Depth Reclaimed Base Course, 12 inches deep
206	Ton	Cement
Special	Ton	Chemically Stabilized Subgrade, Misc.: Aggregate for FDR Base
Special	Each	Chemically Stabilized Subgrade,