

**Springville City
MICRO SURFACING PROJECT
RFB 2017-005**

ADDENDUM #01

July 12, 2017

To all Plan Holders:

You are hereby notified that the following changes, clarifications, and/or corrections have been made to the Contract Documents and Specifications, and /or Drawings for the above referenced project.

The following ADDENDUM consisting of 1 page(s) shall be made part of the contract documents, and all provisions of the Contract shall apply thereto.

Bidders shall acknowledge receipt of this addendum in the space provided in the BID FORM.

CONTRACT DOCUMENTS AND SPECIFICATIONS

1. **REPLACE** Document 00500 - 1 “Agreement” with the revised Document 00500 - 1 “Agreement – ADDENDUM 01.” **Under Section 1.01A the square yards has been updated to 164,659.**
2. **REPLACE** page 10 of the “Recommended Performance Guideline for Micro Surfacing” with the revised page 10 of the “Recommended Performance Guideline for Micro Surfacing - ADDENDUM 01.” **Under Section 11.2 Rate of Application, the suggested application rate has been updated to 14 lb/yd. per Springville City requirements.**

- END OF ADDENDUM -

DOCUMENT 00500 – ADDENDUM #1

AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ July in the year 2017
by and between _____ Springville City Corporation (hereinafter called OWNER)
and _____ (hereinafter called CONTRACTOR).

Project Name: **SPRINGVILLE CITY MICRO SURFACING TYPE II - 2017**

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

1 WORK

1.01 The CONTRACTOR shall complete all Work as specified or indicated in the Contract Document. The Work is generally described as follows:

- A. Furnish and apply approximately **164,659** square yards of Micro Surfacing Type II to multiple roadways throughout the City. The Micro Surfacing shall be a full-width roadway application (lip-of-gutter to lip-of-gutter); The roadways shall be prepared in accordance with the approved specifications and all existing manholes and water valves protected prior to placement of material.
- B. The work to be performed shall include furnishing all necessary materials, equipment, facilities, services and appurtenances thereto needed for the complete construction of the project.

The above explanation is intended to give a general understanding of the scope of the work under these specifications, and shall not be construed to be an itemized listing of each element of work required. CONTRACTOR shall be responsible for construction of complete facilities conforming in all respects to the details and requirements of the specifications, drawings, and other contract documents.

2 CONTRACT TIME AND LIQUIDATED DAMAGES

2.01 Time of the Essence

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

2.02 Dates for Substantial Completion and Final Payment

A. The Work will be substantially completed by _____, 2017, within approximately 90 working days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions by _____, 2017, within approximately 95 working days after the date when the Contract Times commence to run.

2.03 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 2.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER FIVE HUNDRED DOLLARS (\$ 500.00) for each day that expires after the time specified in paragraph 2.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER FIVE HUNDRED DOLLARS (\$ 500.00) for each day that expires after the time specified in paragraph 2.02 above for completion and readiness for final payment.

3 CONTRACT PRICE

3.01 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds and at the prices shown in CONTRACTOR's Bid Schedule attached hereto as an exhibit.

3.02 As provided in paragraph 11.03 of the General Conditions estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by OWNER as provided in paragraph 9.08 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.

4 PAYMENT PROCEDURES

4.01 Submittal and Processing of Payments

A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by OWNER as provided in the General Conditions, as modified by the Supplementary Conditions.

4.02 Progress Payments; Retainage.

- A. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment, on or about the 1st day of each month during construction. All such payments will be measured by the schedule of values established in paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.
1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but in each case, less the aggregate of payments previously made and less such amounts as OWNER shall determine, or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions.
 - a. 95% of Work completed (with the balance being retainage). If Work has been 50% completed as determined by OWNER, and if the character and progress of the Work have been satisfactory to OWNER, OWNER may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage on account of Work completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed.
 - b. 95% (with the balance being retainage) of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided in paragraph 14.02.B.5 of the General Conditions).
 2. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR 97.5% of the Work completed (with the balance being retainage), less such amounts as OWNER shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less 100% of OWNER's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

4.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as provided in said paragraph 14.07.

5 INTEREST

- 5.01 All moneys held in retainage as provided in Article 4.02.A of this Agreement shall be placed in an interest bearing account. Accrued interest shall be to the benefit of the CONTRACTOR.
- 5.02 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear a maximum annual interest rate of 4 percent.

6 CONTRACTOR'S REPRESENTATIONS

- 6.01 In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:
- A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 - B. CONTRACTOR has visited the site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance or furnishing of the Work.
 - C. CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work.
 - D. CONTRACTOR has carefully studied available reports, explorations, drilling logs and tests (including those listed in the Instruction to Bidders as provided in paragraph 4.02 of the General Conditions) and has performed all necessary explorations and tests necessary to become familiar with subsurface conditions at or contiguous to the site.
 - E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto.
 - F. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance

and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

- G. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the site that relates to the Work as indicated in the Contract Documents.
- H. CONTRACTOR has become familiar with all physical conditions relating to existing surface and subsurface conditions (including utilities) which are at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.02 of the General Conditions.
- I. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
- J. CONTRACTOR has given OWNER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by OWNER is acceptable to CONTRACTOR.
- K. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

7 CONTRACT DOCUMENTS

7.01 Contents

- A. The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work consist of the following:
 - 1. This Agreement (pages 1 to 7, inclusive);
 - 2. Performance Bond (pages 1 to 2, inclusive);
 - 3. Payment Bond (pages 1 to 2, inclusive);

4. General Conditions (pages 1 to 42, inclusive);
 5. Supplementary Conditions (pages 1 to 6, inclusive);
 6. Technical Specifications as listed in the table of contents of the Project Manual;
 7. Drawings consisting of a Cover Sheet and sheets listed thereon, with each sheet bearing the following general title: **SPRINGVILLE CITY MICRO SURFACING TYPE II - 2017**;
 8. Addenda (Numbers _____ to _____ inclusive);
 9. Exhibits to this Agreement (enumerated as follows):
 - a. Exhibit A Notice of Award;
 - b. Exhibit B Notice to Proceed;
 - c. Exhibit C CONTRACTOR's Bid (with documentation accompanying Bid);
 - d. Exhibit D Insurance Forms;
 10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Written Amendments;
 - b. Work Change Directives;
 - c. Change Order(s).
- B. The documents listed in paragraph 7.01.A are attached to this Agreement except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.05 of the General Conditions.

8 MISCELLANEOUS

8.01 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

8.02 Assignment of contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.03 Successors and Assigns

- A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

8.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR. All portions of the Contract Documents have been signed, initialed or identified by OWNER and CONTRACTOR.

This Agreement will be effective on _____, 2017.

OWNER Springville City Corporation CONTRACTOR _____

By _____ By _____

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(SEAL)
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Attest _____

Attest _____

Address for giving notices:

Addresses for giving notices:

License No. _____

Agent for service of process

(If CONTRACTOR is a corporation, attach evidence of authority to sign.)

- END OF DOCUMENT -

Recommended Performance Guideline For Micro Surfacing

ADDENDUM #1

A143
(Revised February 2010)



International Slurry Surfacing Association
#3 Church Circle, PMB 250
Annapolis, MD 21401
(410) 267-0023
www.slurry.org

RECOMMENDED PERFORMANCE GUIDELINE FOR MICRO SURFACING

1. SCOPE

The intent of this guideline is to aid in the design, testing, quality control, measurement and payment procedures for the application of micro surfacing.

2. DESCRIPTION

Micro surfacing shall consist of a mixture of polymer-modified emulsified asphalt, mineral aggregate, water, and additives, proportioned, mixed and uniformly spread over a properly prepared surface as directed by the **OWNER**. Micro surfacing should be capable of performing in variable thickness cross-sections such as ruts, scratch courses and milled surfaces. After curing and initial traffic consolidation, it should resist further compaction. The micro surfacing shall be applied as a homogeneous mat, adhere firmly to the prepared surface, and have a skid-resistant texture throughout its service life.

Micro surfacing is a quick-traffic system that allows traffic to return shortly after placement. Normally, these systems are required to accept straight, rolling traffic on a 0.5 in (12.7 mm) thick surface within one hour after placement in specific application conditions. Stopping and starting traffic may require additional curing time.

3. SPECIFICATIONS

It is normally not required to specify all tests for every project. A compilation of the results from the listed tests should be indicative of system performance. Failure to meet requirements for an individual test does not necessarily disqualify the system. If, for example, the system to be used on the project has a record of good performance, an individual test result may be waived. Agency and testing methods are listed in the appendix (see Appendix A) and form a part of this guideline.

4. MATERIALS

4.1 **EMULSIFIED ASPHALT**

4.1.1 **GENERAL**

The emulsified asphalt shall be polymer modified. The polymer material shall be milled or blended into the asphalt or emulsifier solution prior to the emulsification process. In general, a three percent (3%) polymer solids, based on asphalt weight, is considered minimum.

4.1.2 QUALITY TESTS

The emulsified asphalt, and emulsified asphalt residue, shall meet the requirements of AASHTO M 208 or ASTM D 2397 for CQS-1h, with the following exceptions:

| TEST | TEST METHOD | | SPECIFICATION |
|---|-------------|--------|----------------------|
| | AASHTO | ASTM | |
| Settlement and Storage Stability of Emulsified Asphalts, 24-h | T 59 | D 6930 | 1% Maximum |
| Distillation of Emulsified Asphalt ¹ | T 59 | D 6997 | 62% Minimum |
| Tests on Emulsified Asphalt Residue | | | |
| Softening Point of Bitumen (Ring-and-Ball Apparatus) | T 53 | D 36 | 135°F (57°C) Minimum |
| Penetration of Bituminous Materials at 77°F (25°C) | T 49 | D 5 | 40-90 ² |

¹ The temperature for this test should be held at 350°F (177°C) for 20 minutes.

² The climatic conditions should be considered when establishing this range.

The solubility test, if required, should be evaluated on the base asphalt.

Each load of emulsified asphalt shall be accompanied with a Certificate of Analysis/Compliance to indicate that the emulsion meets specification.

4.2 AGGREGATE

4.2.1 GENERAL

The mineral aggregate used shall be the type specified for the particular application requirements of the micro surfacing. The aggregate shall be a crushed stone such as granite, slag, limestone, chat, or other high-quality aggregate, or combination thereof. To assure the material is 100 percent crushed, the parent aggregate will be larger than the largest stone in the gradation used.

4.2.2 QUALITY TESTS

The aggregate should meet agency specified polishing values and these minimum requirements:

| TEST | TEST METHOD | | SPECIFICATION |
|---|-------------|--------|--|
| | AASHTO | ASTM | |
| Sand Equivalent Value of Soils and Fine Aggregate | T 176 | D 2419 | 65 Minimum |
| Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate | T 104 | C 88 | 15% Maximum w/Na ₂ SO ₄ 25% Maximum w/MgSO ₄ |
| Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine ¹ | T 96 | C 131 | 30% Maximum |

¹The abrasion test is run on the parent aggregate.

4.2.3 GRADATION

When tested in accordance with AASHTO T 27 (ASTM C 136) and AASHTO T 11 (ASTM C 117), the mix design aggregate gradation shall be within one of the following bands (or one recognized by the local paving authority).

| SIEVE SIZE | TYPE II PERCENT PASSING | TYPE III PERCENT PASSING | STOCKPILE TOLERANCE |
|----------------|-------------------------|--------------------------|---------------------|
| 3/8 (9.5 mm) | 100 | 100 | |
| # 4 (4.75 mm) | 90 - 100 | 70 - 90 | ± 5% |
| # 8 (2.36 mm) | 65 - 90 | 45 - 70 | ± 5% |
| # 16 (1.18 mm) | 45 - 70 | 28 - 50 | ± 5% |
| # 30 (600 um) | 30 - 50 | 19 - 34 | ± 5% |
| # 50 (330 um) | 18 - 30 | 12 - 25 | ± 4% |
| #100 (150 um) | 10 - 21 | 7 - 18 | ± 3% |
| #200 (75 um) | 5 - 15 | 5 - 15 | ± 2% |

The gradation of the aggregate stockpile shall not vary by more than the stockpile tolerance from the mix design gradation (indicated in the table above) while also remaining within the specification gradation band. The percentage of aggregate passing any two successive sieves shall not change from one end of the specified range to the other end.

The aggregate will be accepted at the job location or stockpile based on five gradation tests sampled according to AASHTO T 2 (ASTM D 75). If the average of the five tests is within the stockpile tolerance from the mix design gradation, the material will be accepted. If the average of those test results is out of specification or tolerance, the contractor will be given the choice to either remove the material or blend additional aggregate with the stockpile material to bring it into compliance. Materials used in blending must meet the required aggregate quality test specifications in Section 4.2.2 before blending and must be blended in a manner to produce a consistent gradation. Aggregate blending may require a new mix design.

Screening shall be required at the stockpile if there are any problems created by oversized materials in the mix.

Type II. This aggregate gradation is used to fill surface voids, address surface distresses, seal, and provide a durable wearing surface.

Type III. This aggregate gradation provides maximum skid resistance and an improved wearing surface. This type of micro surfacing surface is appropriate for heavily traveled pavements, rut filling, or for placement on highly textured surfaces requiring larger size aggregate to fill voids.

4.3 MINERAL FILLER

Mineral filler may be used to improve mixture consistency and to adjust mixture breaking and curing properties. Portland cement, hydrated lime, limestone dust, fly ash, or other approved filler meeting the requirements of ASTM D 242 shall be used if required by the mix design. Typical use levels are normally 0.0 - 3.0 percent and may be considered part of the aggregate gradation.

4.4 WATER

The water shall be free of harmful salts and contaminants. If the quality of the water is in question, it should be submitted to the laboratory with the other raw materials for the mix design.

4.5 ADDITIVES

Additives may be used to accelerate or retard the break/set of the micro surfacing. Appropriate additives, and their applicable use range, should be approved by the laboratory as part of the mix design.

5. LABORATORY EVALUATION

5.1 GENERAL

Before the work begins, the contractor shall submit a signed mix design covering the specific materials to be used on the project. This design will be performed by a laboratory which has experience in designing micro surfacing. After the mix design has been approved, no material substitution will be permitted unless approved by the **OWNER**

ISSA can provide a list of laboratories experienced in micro surfacing design.

5.2 MIX DESIGN

Compatibility of the aggregate, polymer-modified emulsified asphalt, water, mineral filler, and other additives shall be evaluated in the mix design. The mix design shall be completed using materials consistent with those supplied by the contractor for the project. Recommended tests and values are as follows:

| TEST | ISSA TB NO. | SPECIFICATION |
|---|-------------|--|
| Mix Time @ 77 F (25 C) | TB 113 | Controllable to 120 Seconds Minimum |
| Wet Cohesion @ 30 Minutes Minimum (Set) @ 60 Minutes Minimum (Traffic) | TB 139 | 12 kg-cm Minimum 20 kg-cm or Near Spin Minimum |
| Wet Stripping | TB 114 | Pass (90% Minimum) |
| Wet-Track Abrasion Loss One-hour Soak Six-day Soak | TB 100 | 50 g/ft ² (538 g/m ²) Maximum 75 g/ft ² (807 g/m ²) Maximum |
| Lateral Displacement Specific Gravity after 1,000 Cycles of 125 lb (56.71 kg) | TB 147 | 5% Maximum 2.10 Maximum |
| Excess Asphalt by LWT Sand Adhesion | TB 109 | 50 g/ft ² (538 g/m ²) Maximum |
| Classification Compatibility | TB 144 | 11 Grade Points Minimum (AAA, BAA) |

The Wet Track Abrasion Test is performed under laboratory conditions as a component of the mix design process. The purpose of this test is to determine the minimum asphalt content required in a micro surfacing system. The Wet Track Abrasion Test is not recommended as a field quality control or acceptance test. ISSA TB 136 describes potential causes for inconsistent results of the Wet Track Abrasion Test.

The mixing test is used to predict the length of time the material can be mixed before it begins to break. It can be a good reference check to verify consistent sources of material. The laboratory should verify that mix and set times are appropriate for the climatic conditions expected during the project.

The laboratory shall also report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect) according to AASHTO T19 (ASTM C29).

The percentage of each individual material required shall be shown in the laboratory report. Based on field conditions, adjustments within the specific ranges of the mix design may be required.

The component materials shall be designed within the following limits:

| COMPONENT MATERIALS | SUGGESTED LIMITS |
|---------------------|--|
| Residual Asphalt | 5.5 - 10.5% by dry weight of aggregate |
| Mineral Filler | 0.0 - 3.0% by dry weight of aggregate |
| Polymer Content | Minimum of 3.0% solids based on bitumen weight content |
| Additives | As needed |
| Water | As required to produce proper mix consistency |

6. EQUIPMENT

6.1 GENERAL

All equipment, tools, and machines used in the application of micro surfacing shall be maintained in satisfactory working condition at all times.

6.2 MIXING EQUIPMENT

The machine shall be specifically designed and manufactured to apply micro surfacing. The material shall be mixed by an automatic-sequenced, self-propelled micro surfacing mixing machine. It shall be a continuous-flow mixing unit that accurately delivers and proportions the mix components through a revolving multi-blade, double-shafted mixer. Sufficient storage capacity for all mix components is required to maintain an adequate supply to the proportioning controls.

When specifying continuous machinery to minimize transverse joints, the specified machine must be capable of loading materials while continuing to apply micro surfacing. The continuous-run machine shall be equipped to provide the operator with full control of the forward and reverse speeds during application. It shall be equipped with opposite-side driver stations to assist in alignment. The self-loading device, opposite-side driver stations, and forward and reverse speed controls shall be of original-equipment-manufacturer design.

6.3 PROPORTIONING DEVICES

Individual volume or weight controls for proportioning mix components shall be provided and properly labeled. These proportioning devices are used in material calibration to determine the material output at any time.

6.4 SPREADING EQUIPMENT

The mixture shall be agitated and spread uniformly in the surfacing box by means of twin-shafted paddles or spiral augers fixed in the spreader box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved and a free flow of material is provided to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.

6.4.1 SECONDARY STRIKE-OFF

A secondary strike-off shall be provided to improve surface texture. The secondary strike-off shall be adjustable to match the width of the spreader box and allow for varying pressures to control the surface texture.

6.4.2 RUT-FILLING EQUIPMENT

When project plans require, Micro Surfacing material may be used to fill ruts, utility cuts, depressions in the existing surface, etc. Ruts of 0.5 in (12.7 mm), or greater in depth, shall be filled independently with a rut-filling box, either 5 ft (1.5 m) or 6 ft (1.8 m) in width. Ruts that are in excess of 1.5 in (38.1 mm) in depth may require multiple applications with the rut-filling box to restore the cross-section. When rutting or deformation is less than 0.5 in (12.7mm), a full width scratch course may be applied with the spreader box using a metal or stiff rubber strike-off. Apply at a sufficient rate to level the pavement surface. The leveling course may, or may not, meet the suggested application rate in the table in Section 11.2. All rut-filling and level-up material should cure under traffic for at least twenty-four (24) hours before additional material is placed.

6.5 AUXILIARY EQUIPMENT

Suitable surface preparation equipment, traffic control equipment, hand tools, and other support and safety equipment necessary to perform the work shall be provided by the contractor.

7. CALIBRATION

Each mixing unit to be used in the performance of the work shall be calibrated in the presence of the **OWNER** prior to the start of the project. Previous calibration documentation covering the exact materials to be used may be acceptable, provided that no more than 60 days have lapsed. The documentation shall include an individual calibration of each material at various settings that can be related to the machine metering devices. Any component replacement affecting material proportioning requires that the machine be recalibrated. No machine will be allowed to work on the project until the calibration has been completed and/or accepted. ISSA Inspector's Manual describes a method of machine calibration. ISSA contractors and/or machine manufacturers may also provide methods of machine calibration.

8. WEATHER LIMITATIONS

Micro surfacing shall not be applied if either the pavement or air temperature is below 50°F (10°C) and falling, but may be applied when both pavement and air temperatures are above 45°F (7°C) and rising. No micro surfacing shall be applied when there is the possibility of freezing temperatures at the project location within 24 hours after application. The micro surfacing shall not be applied when weather conditions prolong opening to traffic beyond a reasonable time.

9. NOTIFICATION AND TRAFFIC CONTROL

9.1 NOTIFICATION

Homeowners and businesses affected by the construction shall be notified at least one day in advance of the surfacing. Should work not occur on the specified day, a new notification will be distributed. The notification shall be in the form of a written posting, stating the time and date that the surfacing will take place. If necessary, signage alerting traffic to the intended project should be posted.

9.2 TRAFFIC CONTROL

Traffic control devices shall be in accordance with agency requirements and, if necessary, conform to the requirements of the Manual on Uniform Traffic Control Devices. Opening to traffic does not constitute acceptance of the work

10. SURFACE PREPARATION

10.1 GENERAL

Immediately prior to applying the micro surfacing, the surface shall be cleared of all loose material, silt spots, vegetation, and other objectionable material. Any standard cleaning method will be acceptable. If water is used, cracks shall be allowed to dry thoroughly before applying micro surfacing. Manholes, valve boxes, drop inlets and other service entrances shall be protected from the micro surfacing by a suitable method. The **OWNER** shall approve the surface preparation prior to surfacing.

10.2 TACK COAT

Normally, tack coat is not required unless the surface to be covered is extremely dry and raveled or is concrete or brick. If required, the emulsified asphalt should be SS, CSS, or the micro surfacing emulsion. Consult with the micro surfacing emulsion supplier to determine dilution stability. The tack coat may consist of one part emulsified asphalt/three parts water and should be applied with a standard distributor. The distributor shall be capable of applying the dilution evenly at a rate of 0.05-0.15 gal/yd² (0.23-0.68 l/m²). The tack coat shall be allowed to cure sufficiently before the application of micro surfacing. If a tack coat is to be required, it must be noted in the project plans.

10.3 CRACKS

It is recommended to treat cracks wider than 0.25" (0.64cm) in the pavement surface with an approved crack sealer prior to application of the slurry seal.

11. APPLICATION

11.1 GENERAL

If required, a test strip should be placed in conditions similar to those expected to be encountered during the project.

When local conditions warrant, the surface shall be fogged with water ahead of the spreader box. The rate of application of the fog spray may be adjusted as the temperature, surface texture, humidity, and dryness of the pavement change.

The micro surfacing shall be of the appropriate consistency upon leaving the mixer. A sufficient amount of material shall be carried in all parts of the spreader at all times so that complete coverage is obtained. Overloading of the spreader box shall be avoided. No lumps or unmixed aggregate shall be permitted. No dry aggregate either spilled from the lay-down machine or existing on the road, will be permitted.

No streaks, such as those caused by oversized aggregate or broken mix, shall be left in the finished surface. If excessive streaking develops, the job will be stopped until the contractor proves to the B.A.R. that the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than 0.5 in (12.7 mm) wide and 4.0 in (101 mm) long, or 1.0 in (25.4 mm) wide and 3.0 in (76.2 mm) long, in any 29.9 yd² (25 m²) area. No transverse ripples or longitudinal streaks of 0.25 in (6.4 mm) in depth will be permitted, when measured by placing a 10 ft (3 m) straight edge over the surface.

11.2 RATE OF APPLICATION

The micro surfacing mixture shall be of the proper consistency at all times so as to provide the application rate required by the surface condition. The application rate shall be in accordance with the table below.

| AGGREGATE TYPE | LOCATION | SUGGESTED APPLICATION RATE |
|----------------|--|--|
| Type II | Urban and Residential Streets Airport Runways Scratch or Leveling Course | 10 - 20 lb/yd ² (5.4 - 10.8 kg/m ²) As Required |
| Type III | Primary and Interstate Routes Wheel Ruts Scratch or Leveling Course | 15 - 30 lb/yd ² (8.1 - 16.3 kg/m ²) As Required (See Appendix B) As Required |

Springville City requires 14 lb/yd

Suggested application rates are based upon the weight of dry aggregate in the mixture. Application rates are affected by the unit weight and gradation of the aggregate and the demand of the surface to which the micro surfacing is being applied.

11.3 JOINTS

No excess buildup, uncovered areas, or unsightly appearance shall be permitted on longitudinal or transverse joints. The contractor shall provide suitable width spreading equipment to produce a minimum number of longitudinal joints throughout the project. When possible, longitudinal joints shall be placed on lane lines. Partial width passes will only be used when necessary and shall not be the last pass of any paved area. A maximum of 3.0 in (76.2 mm) shall be allowed for overlap of longitudinal joints. Also, the joint shall have no more than a 0.25 in (6.4 mm) difference in elevation when measured by placing a 10 ft (3 m) straight edge over the joint and measuring the elevation difference.

11.4 MIXTURE

The micro surfacing shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess liquids which create segregation of the aggregate. Spraying of additional water into the spreader box will not be permitted.

11.5 HANDWORK

Areas which cannot be accessed by the mixing machine shall be surfaced using hand squeegees to provide complete and uniform coverage. If necessary, the area to be hand worked shall be lightly dampened prior to mix placement. As much as possible, handwork shall exhibit the same finish as that applied by the spreader box. All handwork shall be completed prior to final surfacing.

11.6 LINES

Lines at intersections, curbs, and shoulders will be kept straight to provide a good appearance. If necessary, a suitable material will be used to mask off the end of streets to provide straight lines. Longitudinal edge lines shall not vary by more than ± 2 in (± 51 mm) horizontal variance in any 96 ft (29 m) of length.

11.7 ROLLING

Rolling is usually not necessary for micro surfacing on roadways. Airports and parking areas should be rolled by a self-propelled, 10-ton (maximum) pneumatic tire roller equipped with a water spray system. All tires should be inflated per manufacturer's specifications. Rolling shall not start until the micro surfacing has cured sufficiently to avoid damage by the roller. Areas which require rolling shall receive a minimum of two (2) full coverage passes.

11.8 CLEAN UP

All utility access areas, gutters and intersections, shall have the micro surfacing removed as specified by the **OWNER**. The contractor shall remove any debris associated with the performance of the work on a daily basis.

12. QUALITY CONTROL

12.1 INSPECTION

Inspectors assigned to projects must be familiar with the materials, equipment and application of micro surfacing. Local conditions and specific project requirements should be considered when determining the parameters of field inspection.

Proper mix consistency should be one of the major areas of inspector concern. If mixes are too dry, streaking, lumping and roughness will be present in the mat surface. Mixes applied too wet will flow excessively and not hold straight lane lines. Excessive liquids may also cause an asphalt-rich surface with segregation.

12.2 MATERIALS

To account for aggregate bulking, it is the responsibility of the contractor to check stockpile moisture content and to set the machine accordingly. At the **OWNER** discretion, material tests may be run on representative samples of the aggregate and emulsion. **Tests will be run at the expense of the CONTRACTOR. The CONTRACTOR must notify the OWNER immediately if any test fails to meet the specifications.**

12.3 MICRO SURFACING

If required, representative samples of the micro surfacing may be taken directly from the micro surfacing machine. Residual asphalt content (ASTM D2172) tests may be run on the **samples at the expense of the CONTRACTOR. The CONTRACTOR must notify the OWNER immediately if any test fails to meet specs. Data obtained from the proportioning devices on the** micro surfacing machine may be used to determine individual material quantities and application rate.

12.4 NON-COMPLIANCE

If any two successive tests fail on the stockpile aggregate, the job shall be stopped. If any two successive tests on the mix from the same machine fail, the use of the machine shall be suspended. It will be the responsibility of the contractor, at his expense, to prove to the B.A.R. that the problems have been corrected.

13. METHOD OF MEASUREMENT

13.1 AREA

On smaller projects, the method of measurement and payment is usually based on the area covered, measured in square feet, square yards, or square meters.

14. PAYMENT

The micro surfacing shall be paid for by the unit area accepted by the **OWNER**. Payment shall be full compensation for all preparation, mixing and application of materials, and for all labor, equipment, tools, testing, cleaning, and incidentals necessary to complete the job as specified herein.

APPENDIX A

AGENCIES

AGENCIES

AASHTO: American Association of State Highway and Transportation Officials
ASTM: American Society for Testing and Materials
ISSA: International Slurry Surfacing Association

TEST METHODS

EMULSIFIED ASPHALT

| AASHTO TEST NO. | ASTM TEST NO. | TEST |
|------------------------|----------------------|--|
| M 208 | D 2397 | Specification for Cationic Emulsified Asphalt |
| T 59 | D 6930 | Settlement and Storage Stability of Emulsified Asphalts |
| T 59 | D 6997 | Distillation of Emulsified Asphalt (This test method may have to be modified by using lower temperatures.) |
| T 40 | D 140 | Sampling Bituminous Materials |
| T 59 | D 244 | Test Methods and Practices for Emulsified Asphalts |

RESIDUE FROM EMULSIFIED ASPHALT

| AASHTO TEST NO. | ASTM TEST NO. | TEST |
|------------------------|----------------------|--|
| T 53 | D 36 | Softening Point of Bitumen (Ring-and-Ball Apparatus) |
| T 49 | D 5 | Penetration of Bituminous Materials |

APPENDIX A

TEST METHODS (CONTINUED)

AGGREGATE AND MINERAL FILLER

| AASHTO TEST NO. | ASTM TEST NO. | TEST |
|-----------------|---------------|--|
| T 176 | D 2419 | Sand Equivalent Value of Soils and Fine Aggregate |
| T 104 | C 88 | Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate |
| T 96 | C 131 | Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (This test should be performed on the parent rock that is used for crushing the finer gradation Micro Surfacing material.) |
| T 27 | C 136 | Sieve Analysis of Fine and Coarse Aggregates |
| T 11 | C 117 | Test Method for Materials Finer than 75µm (No. 200) Sieve in Mineral Aggregates by Washing |
| T 2 | D 75 | Sampling Aggregates |
| | D 242 | Mineral Filler for Bituminous Paving Mixtures |
| T 19 | C 29 | Bulk Density ("Unit Weight") and Voids in Aggregate |

MIX DESIGN

| ISSA TEST NO. | TEST |
|---------------|--|
| A143 | Standard Design, Testing and Construction of Micro Surfacing |
| TB 100 | Wet Track Abrasion of Slurry Seals |
| TB 109 | Excess Asphalt by LWT Sand Adhesion |
| TB 113 | Mix Time |
| TB 114 | Wet Stripping Test for Cured Slurry Seal Mixes |
| TB 136 | Causes of Inconsistency of Wet Track Abrasion Test (WTAT) Results |
| TB 144 | Classification Compatibility by Use of the Schulze-Breuer and Ruck Procedure |

NOTES:

ASTM D 6372, Standard Practice for Design, Testing, and Construction of Micro Surfacing, is a combined reference of the ISSA Test Bulletins listed above.

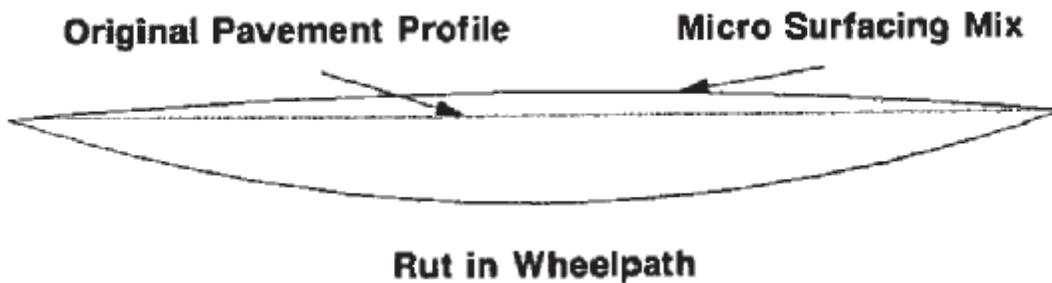
ASTM D 2172, Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures, is referenced in Section 12.3.

APPENDIX B

REPROFILING RUTTED WHEELPATHS WITH MICRO SURFACING

Rule of Thumb

For every inch (mm) of micro surfacing mix, add 0.125 in (3.2 mm) to 0.25 in (6.4 mm) as a crown to allow for compaction under traffic.



| Rut Depth | | Micro Surfacing Quantity Needed | |
|--------------|-------------------|---------------------------------|----------------------------------|
| 0.5 - 0.75" | (12.7 - 19.1 mm) | 20 - 30 lb/yd ² | (10.8 - 16.3 kg/m ²) |
| 0.75 - 1.00" | (19.1 - 25.4 mm) | 25 - 35 lb/yd ² | (13.6 - 19.0 kg/m ²) |
| 1.00 - 1.25" | (25.4 - 31.75 mm) | 28 - 38 lb/yd ² | (15.2 - 20.6 kg/m ²) |
| 1.25 - 1.50" | (31.75 - 38.1 mm) | 32 - 40 lb/yd ² | (17.4 - 21.7 kg/m ²) |