2017 ISSA Presidents Award Nominee

City of Lubbock 2017 Micro-Surfacing Solicitation RFP 17-13315-TF
Submitted by: Nathan Niemann
Intermountain Slurry Seal
701 E Main St.
Lewisville, TX 75057
Nate.Niemann@gcinc.com
City of Lubbock Owner Information

• Owner Representatives
  • Dwain Mitchell, SR Project Manager
  • (806)-775-3680  DMitchell@mail.ci.lubbock.tx.us

• Tim Merritt, Street Maintenance Supervisor
  • (806) 775-2606  Tmerritt@mail.ci.Lubbock.tx.us
Project Eligibility

• Intermountain Slurry Seal Inc. is in good standing with the ISSA
• Bid Date: 3/23/2017
• Construction Start Date: 5/18/2017
• Completion date: 8/15/2017
• Actual Completion Date: 8/1/2017
• Bid Amount: $3,624,138.00
• Actual Amount: $3,879,952.00 (Owner added area to the Project) the City of Lubbock had a $4M budget for the project.
• All Scrub Seal and Micro-surfacing performed by Intermountain Slurry Seal.
• No accidents or injuries with third party or employees.
• No environmental issues or cleanup.
Project information

- 1,042,000 SY of Micro-surfacing.
- 291,000 SY of Scrub Seal (Cape Seal).
- Multiple locations throughout the City of Lubbock.
- Major roads done at night requiring a scratch coarse and overlay.
- Residential done during the day only.
- Scrub Seal had a 2 week cure period prior to Micro-surfacing.
Red Areas are Micro-surfacing
Blue area is Cape Seal
Roadway Description

The roadways varied drastically from area to area. We had to constantly adjust to accommodate the needs of the road. Generally the boulevards were 5 to 10 years old and showed cracking and minor rutting. These roads were treated with 2 lifts of Micro-surfacing.

Most of the areas had been patched and crack sealed by the city prior to our work.

The areas requiring Cape Seal had not had any treatment for 15 to 20 years. The road had significant cracking and there was no major deformation.
35th Street Ave G to Ave A

As you can see in the lane treated with only the emulsion, you can see the extent of the cracking. For this reason the scrub seal was selected to treat the roads and crack seal would be impractical.

After the cover material was placed you can see how well the cracks were sealed with the scrub seal technique.
Same section of road the following morning with the completed scrub seal.
Ave P 50th street to 34th Street

The use of a drag broom was required to insure the cracks were filled with adequate amounts of emulsion.
It is important to keep “wave of emulsion” in front of the brooms to allow for filling the cracks and voids.
38th Street and Ave E Intersection

The look of the roadway following the application of the Micro-surfacing over the Scrub Seal.
38th STREET 4 Months after application of Cape seal
Cape Seal after 4 months
Special Specification 3005

Scrub Seal Treatment

1. DESCRIPTION

Construct a surface treatment consisting of 1 or more applications of a single layer of asphalt emulsion that is surcharged with a broom and covered with a single layer of aggregate.

2. MATERIALS

Furnish materials of the type and grade shown on the plans in accordance with the following:

- Polymer modified emulsion that meets the requirements of Item 300, "Asphalts, Oils, and Emulsions" Table 1 (CMG 29).
- Item 302, "Aggregate for Surface Treatments," furnish aggregate of the type and grade shown on the plans and listed in Table 2. Ensure the aggregate gradation meets the requirements in Table 2 for the specified grade when tested in accordance with Tex 2050F, Part 1. Furnish aggregates that meet the quality requirements shown in Table 3, unless otherwise shown on the plans.

For firm surfaces, unless otherwise shown on the plans, furnish aggregate with a surface aggregate classification of "B" or better. Provide aggregates from sources listed in the Department's Bituminous Road (Source Quality Catalog [BRQG]). Use materials not listed or not meeting the requirements of the BRQG only when tested by the Engineer and approved in writing. Allow 30 calendar days for testing of material from such sources.

3. EQUIPMENT

3.1. Distributor. Furnish a distributor that will apply the emulsion uniformly at the specified rate or as directed.

3.1.1. Calibration. Furnish a volumetric calibration and speed disk for the distributor tank in accordance with Tex 922-K, Part 1. Provide documentation of distributor calibration performed not more than 5 yr. before the date first used on the project. The Engineer may verify calibration accuracy in accordance with Tex 922-K, Part 1.

3.1.2. Computerized Distributor. When paying for emulsion by weight, the Engineer may allow use of the computerized distributor displayed to verify application rates. Verify application rates accuracy at a frequency acceptable to the Engineer.

3.2. Aggregate Spreader. Use a continuous feed, self-propelled spreader to apply aggregate uniformly at the specified rate or as directed.

3.3. Rollers. Unless otherwise shown on the plans, furnish light pneumatic tire rollers in accordance with Item 210, "Rolling." (Relevant text)

3.4. Scrub Broom. Furnish a scrub broom assembly of similar design to Exhibit A or B, as approved by the engineer, and having the following characteristics:

- Rigid frame construction,
- Attached to, and pulled by, the distributor,
- Of such weight that it does not depress the emulsion off the roadway surface,
- Leading and trailing broom heads angled at 10 to 15 degrees off the centerline of the supporting members,
- Stir brooms with a minimum height of 6 inches, and
- Herrin [sic] weave assemblies or other means of adjusting the broom width.

4. CONSTRUCTION

4.1. General. Application season will be as shown on the plans. Emulsion and aggregate sizes shown on the plans are for estimating purposes only. The Engineer will adjust the rates for the existing conditions.

4.2. Temporary Aggregate Stockpiles. The Engineer will approve the location of temporary aggregate stockpiles on the right-of-way before delivery. Place stockpiles in a manner that will not:

- Decorate traffic or sight distance,
- Interfere with the access from adjoining property, or
- Interfere with roadway drainage.

Locate stockpiles a minimum of 30 ft. from roadway whenever possible. Sign and barricade as shown on the plans.

4.3. Aggregate Furnished by the Department. When shown on the plans, the Department will furnish aggregate to the Contractor without cost. Stockpile locations are shown on the plans.

4.4. Adverse Weather Conditions. Do not place surface treatments when, in the Engineer’s opinion, general weather conditions are unsuitable. Meet the requirements for air and surface temperatures shown below.

4.4.1. Standard Temperature Limitations. Apply spoil seal when air temperature is above 60°F and raining. Do not apply surface treatment when air temperature is above 60°F and in the case, do not apply surface treatment when surface temperature is below 60°F.

4.4.2. Cool Weather Night Air Temperature. The Engineer reserves the right to reserve the National Oceanic and Atmospheric Administration (NOAA) weather forecast and determine if the night air temperature is suitable for placement to prevent aggregate loss.

4.4.3. Cold Weather Application. When application is allowed outside of the above temperature restrictions, the Engineer will approve the emulsion grade and the air and surface temperatures for application. Apply spoil seal at air and surface temperatures as directed.

4.5. Surface Preparation. Remove existing raised pavement markers. Repair any damage incurred by removal as directed. Remove dirt, dust, or other harmful material before sealing. Check the pavement must be cleaned of debris using compressed air. When shown on the plans, remove vegetation and loose pavement edges.

4.6. Rock Land and Shot.

4.6.1. Definitions.
4.6.2 Setting Lengths. Calculate the lengths of both rock land and shot. Adjust shot length to be an even multiple of the rock land. Verify that the distribution has enough emulsion to complete the entire shot length. Mark shot length before applying emulsion. When directed, mark length of each rock land to verify the aggregate ratio.

4.7. Emulsion Placement.

4.7.1. General. Adjust the shot and rock land so that the operations do not occur on traffic or interfere with the traffic control plan, as directed. Use paper or other approved material at the beginning and one part of each shot to construct a straight transverse part of the lane. The Engineer may require a strip line if necessary to keep joints straight with no overlapping. Use sufficient pressure to force the emulsion fully. Select an application temperature, as approved, in accordance with item 3.05. Uniformly apply the emulsion on the rock land within 15 minutes of the approved temperature and not above the maximum allowable temperature.

4.7.2. Scouring. Mechanically scour the rocky roadbed emulsion by dragging the scrub broom behind the distributor, so that the emulsion is evenly spread over the road surface and fills existing surface cracks.

4.7.3. Limitations. Do not apply emulsion to the roadway until:

- Traffic control methods and devices are in place as shown on the plans or as directed.
- The loaded aggregate material is in position and ready to begin.
- Medians are loaded with enough aggregate to cover the cut area, and
- Medians are in place behind the spreader box.

4.7.4. Non-uniform Application. Spot application if it is not uniform due to街头ing, mowing, puddling, or flushing the roadway surface, or not filling the cracks. Verify equipment condition, operating procedures, application temperature, and materials properties. Determine and correct the cause of non-uniform application. If the cause is high or low emulsion viscosity, replace emulsion with material that corrects the problem.

4.7.5. Test Strips. The Engineer may stop application and require construction of test strips at the Contractor’s expense if any of the following occurs:

- Non-uniformity of application continues after corrective action.
- On 3 consecutive shots, application rate differs by more than 0.05 gal per square yard from the rate directed, and
- Any shot differs by more than 0.05 gal per square yard from the rate directed.

The Engineer will approve the test strip location. The Engineer may require additional test strips until surface treatment application meets specification requirements.

4.8. Aggregate Placement. As soon as possible, apply aggregate uniformly at the rate directed without causing the rocks to roll over.

4.9. Rollin. Start rolling operation on each shot as soon as aggregate applied. Use sufficient rollers to cover the surface with materials in 1 pass, i.e., 1 direction. Roll in a staggered pattern. Unless otherwise shown on the plans, make a minimum of 5 passes. Rollers are similar to keep with the speeder broom, drop application until rollers have caught up, or furnish additional rollers. Keep roller tires asphalt-free.

4.10. Patching. Before rolling, repair spots where coverage is incomplete. Repair can be made by hand spotting or other approved method. When necessary, apply additional emulsion to embed aggregate.

4.11. Finishing Touches. After rolling, inspect as soon as aggregate has sufficiently locked to remove excess.

5. MEASUREMENT

5.1. Emulsion. Unless otherwise shown on the plans, emulsion will be measured by one of the following methods:

5.1.1. Volume. Emulsion will be measured at the applied temperature by stopping the tank before and after application and determining the net volume in gallons from the distributor’s calibrated tank dip stick. The quantity to be measured for payment will be the number of gallons used, as directed, in the accepted surface treatment.

5.1.2. Weight. Emulsion will be measured in tons using certified scales meeting the requirements of item 5.22, Weighing and Measuring Equipment, unless otherwise approved. The transporting tank must have a scale attached to the driving device and other paperwork. The Engineer may require random checking on public scales at the Contractor’s expense to verify weight accuracy. Upon work completion or temporary suspension, any remaining emulsion will be weighed by a certified public weigher, or measured by volume in a calibrated distributor or tank and the quantity converted to tons at the measured temperature. The quantity to be measured will be the number of tons received minus the number of tons remaining after all directed work is complete and minus the amount used for other items.

5.2. Aggregate. Aggregate will be measured by the cubic yard in the trucks as applied on the road. The Engineer may require loaded aggregate to be knocked off for accurate measurement.

5.3. Loading, Hauling, and Distributing Aggregate. When the Department furnishes the aggregate, the hauling, loading, and distributing will be measured by the cubic yard in the trucks as applied on the road.

6. PAYMENT

The work performed and materials furnished in accordance with this item and measured as provided under “Measurement” will be paid for at the unit prices bid for “Emulsion,” “Aggregate,” and “Loading, Hauling, and Distributing Aggregate” of the schedules specified. These prices are net compensation for surface preparation, surfacing, preparing, hauling, and placing materials; removing existing pavement markings and excess aggregate; rolling, cleaning up, stockpiles, test equipment, labor, tools, and accidents.
Exhibit A

PASS Scrub Broom
Exhibit "A"
(Not for fabrication - Use as schematic only)
8.10 Micro-Surfacing

8.10.01 Micro-surfacing materials and construction shall conform to TxDOT Specification Item # 350. There shall be no deviation from these specifications unless so directed by the Street Superintendent.

8.10.02 It shall be the responsibility of the Contractor to produce, transport, and place the micro-surfacing pavement and to ensure that the finished surface has a uniform texture and the micro-surfacing mat is fully adhered to the existing roadway surface.

8.10.03 Materials of Construction

A. All materials that are to be stockpiled shall be protected from dust and other contamination.
B. Mineral filler shall be stored in a manner that will keep it dry and free from contamination.
C. All asphalt materials shall be kept free from contamination.
D. Cationic Polymer-Modified Asphalt Emulsion
   i. Provide CSS-1P in accordance with TxDOT Item # 300.2.12 “Emulsified Asphalt”.
E. Aggregate
   i. Aggregate shall consist of clean, washed, tough, durable fragments of crushed stone of uniform quality and from a single source.
   ii. Aggregate shall meet TxDOT Class “4” surfacing classification.
   iii. Contractor shall include the amount of mineral filler added to the mix determining the total minus No. 200 sieve aggregate fraction.

8.10.04 Methods of Construction

A. Equipment
   i. Equipment shall be kept in good working condition with no leaks.
   ii. Any equipment that shows signs of leaks shall be fixed immediately and shall not be used until such leaks are fixed.
   iii. The mixing machine shall be a self-propelled micro-surfacing mixing machine with self-loading devices to promote continuous laying operations.
   iv. Mixing machine shall have sufficient storage capacity for mixture materials with individual volume or weight controls that will proportion each material to be added to the mixture.
   v. Mixing machine shall have a water pressure system and nozzle-type spray bar immediately ahead of spreader box capable of spraying the roadway for the width of the spreader box.
   vi. Scales used for weighing materials and emulsion must be calibrated and meet the requirements of TxDOT Item # 520.
B. Electronic Monitoring System
   a. The micro-surfacing machine shall be equipped with an electronic monitoring system that consists of pulse sensors measuring material delivery rates, a radar gun to monitor distance traveled, and programmable micro-controller, and operators display/input board and an on-board printer.
   b. System shall be capable of monitoring and displaying application rates and use of aggregate, emulsion, fines, water and additives.
   c. System shall be capable of calculating and displaying ratios of emulsion to aggregate, fines to aggregate, additive to aggregate, water to aggregate, and application rate in pounds per square yard.

Design Standards and Specifications

Streets and Drainage Check List

iv. Aggregate shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Standard Crushed Rock Aggregate</th>
<th>Cumulative Percent Retained by (weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained on 1/2&quot; Sieve</td>
<td>0</td>
</tr>
<tr>
<td>Retained on 3/8&quot; Sieve</td>
<td>0-1</td>
</tr>
<tr>
<td>Retained on No. 4 Sieve</td>
<td>6-14</td>
</tr>
<tr>
<td>Retained on No. 8 Sieve</td>
<td>10-55</td>
</tr>
<tr>
<td>Retained on No. 16 Screen</td>
<td>54-75</td>
</tr>
<tr>
<td>Retained on No. 30 Screen</td>
<td>65-85</td>
</tr>
<tr>
<td>Retained on No. 50 Screen</td>
<td>75-90</td>
</tr>
<tr>
<td>Retained on No. 100 Screen</td>
<td>82-93</td>
</tr>
<tr>
<td>Retained on No. 200 Screen</td>
<td>85-95</td>
</tr>
</tbody>
</table>

v. Maximum Magnesium Sulfate Soundness shall be 20% (5 cycles) based upon TxDOT Test Method Tex-411-A

vi. Minimum Sand Equivalent shall be 70% based upon TxDOT Test Method Tex-203-F

F. Mineral Filler shall be free of lumps and foreign matter consisting of Type S Lime.
G. Contractor shall adjust the mix design to alleviate the usage of Lime.
H. Water shall be potable and free of harmful soluble salts.
I. Use only approved additives as recommended by the emulsion manufacturer in the emulsion mix or any of the component materials when necessary to adjust mix time in field.
City of Lubbock
Design Standards and Specifications

Sections and Drainage Check List

D. Rutting on Major Throughfares and Collector Streets
   1. Shallow ruts that are less than ¼ inch in depth may be covered with a full width scratch box utilizing a steel primary strike-off plate.
   2. Ruts that are between ¼ inch and ½ inch in depth shall be filled independently with a fixed width spreader box no more than 6 feet wide. The rut filling box shall have a steel primary strike-off plate that is the same width as the spreader box.
   3. Ruts that are in excess of ½ inch in depth shall be filled with a 5-foot wide rut filling spreader box specifically designed to fill wheel path ruts. This operation will require multiple placement passes to restore the pavement to its original cross section. Special care shall be used by the Contractor to ensure that the material has proper time to dry between applications to promote bonding between the original pavement and the micro-surfacing pavement.
   4. Maximum micro-surfacing thickness applied as rut filling shall not exceed 1 inch for each pass required to restore pavement to the original profile.

E. Asphalt Milling at Concrete Intersections
   1. All throughfares and collector streets which have concrete intersections or where concrete valley gutters intersect the street shall have the asphalt surface milled to such a depth as to allow a smooth transition between concrete and the completed micro-surfacing pavement.

F. Scratch Course
   1. All “Scratch Course” applications shall be performed utilizing a steel primary strike-off plate.
   2. This will allow the bottom, or “scratch course”, to mitigate any irregularities and have a more uniform profile for the micro-surfacing pavement to be applied to.

G. Finished Surface
   1. Micro-surfacing pavement finished grade shall be uniform in texture and free from excessive scratch marks, blemishes, and other surface irregularities.
   2. All such irregularities shall be repaved by the Contractor at their own expense.
   3. Longitudinal joints shall be placed on lane lines unless otherwise directed by the Engineer.
   4. Joints shall be uniform in appearance when placed adjacent to existing joints.
   5. Joints and edges shall be uniform and neat in appearance.
   6. All ruts, utility cuts, and depressions in the surface shall be filled in a separate pass from the final pass.

8.10.05 Hours of Operation
A. Operating hours will be Monday through Saturday as outlined in Section 8.16 of these Specifications, unless otherwise directed by the Engineer.
B. Hours of operation shall be:
   1. Major Throughfares: 7:00am to 7:00pm (Night)
   2. Residential Areas: 7:00am to 7:00pm (Day)
C. On major thoroughfares the micro-surfacing pavement shall be traffic ready by 7:00am, including all traffic control devices and barriers being removed from the roadway.
As requested, Garco Testing Laboratories prepared a job mix formula according to ISSA accepted testing procedures using Grad 2 aggregate from Capitol, Marble Falls and the following emulsion CSS-1HLM from Ergon.

The aggregate and emulsion received were tested together as a mix to determine the job mix formula. Certificates of compliance for the aggregate and emulsion can be obtained from the suppliers.

The job mix formula based on the data from the laboratory tests is reported as follows. All values are based on dry aggregate weight:

| Emulsion       | Content | 1-Hour Loss | 6-Day Mod Soft | 6-Day Spec.
|----------------|---------|-------------|----------------|-------------
| CSS-1HLM       | 11.5 ± 0.5% | 19.6 | 75.0 |
| Water          | 4.0 - 8.0%   | 11.9 | 75.0 |
| Cement         | 0.5 - 1.0%   | 11.6 | 75.0 |
| Residual Content of Emulsion | 84.1% | 7.3 | 75.0 |
| Residual AC Content | 7.4 ± 0.3% | 7.3 | 75.0 |

Test results summarized in this report represent laboratory conditions only. The laboratory tests laboratory and field conditions vary significantly due to fluctuations such as temperature and moisture. Care should be taken to adjust material percentages to compensate for any changes.

Sincerely,

George Peterson, P.E.
Materials, Suppliers and Crews

• Micro-surfacing
  • Capitol Aggregates, Marble Falls Quarry, TXDOT Grade 2, SAC “A”
  • Ergon Emulsions, CSS-1HLM (CSS-1P), emulsified asphalt.
  • Work done by superintendent JD Tompkins and the Texas Micro-surfacing Crew

• Scrub Seal
  • Vulcan Materials, Brownwood Quarry, TXDOT Grade 6, SAC “B”, Cover material.
  • Ergon Emulsions, CMS-2P, emulsified asphalt.
  • Work done by superintendent Weston Albrecht and the Utah Chip Seal Crew.
Project Narrative

Intermountain Slurry Seal has done this project for the city of Lubbock a number of times. It is always challenging working with large equipment in tight city environment. Safety of our people and the public are a top priority for months within the city and having no accidents or injuries is commendable.

Logistics of the project are tough. In the Lubbock area there no aggregate sources everything is imported by train. This requires weeks of preparation to insure materials are on site to proceed with work and meet deadlines.

Scheduling and phasing are important to all stakeholders. We have to do what we say we will do every day. Notifying hundreds of resident in order to have cars moved and streets ready to be resurfaces is a top priority. Not finishing our daily schedule was not acceptable. We took into account many factors prior to notifying. Weather forecast, distance from our stockpile, difficulty level of the road way to be treated, etc. To insure we did not over commit and under deliver. Working with a cape seal we had to look ahead a number of weeks to allow for a two week cure time between applications.

For about 2 weeks of the project we were working 24 hours a day placing micro-surfacing at night on the boulevards and Scrub seal during the day in Residential areas. We coordinated with the city to have inspection people for both shifts.

Quality of work this begins with the materials and mix design. However, it includes many facets to produce a consistent level of quality. We started with materials, we choose the best available materials for the project. We keep our equipment in top notch working order, through scheduled maintenance daily inspection and cleaning of our mixing and placing boxes. Anything that could impact the look or constancy of the Micro-surfacing is repaired “we will not place material if it is not right.” A well trained placing crew is with an eye for detail is the most important factor to getting good quality. We have spent much time training and teaching our crew the proper techniques and we have given each of them ownership. If they see a problem they know they can stop and make it right. “Do it right the first time”. Traffic Control, keeping cars where we want them. Cars in the work zone is our number one reason for having to do punch list work. Having good hard working people and a well thought-out plan not only protects our people it protects our work. All of these factors came together to give the city of Lubbock an excellent project.

The City of Lubbock has had varied results with Chip seal related products in the past. ISS while working for TXDOT in the Lubbock district we were able to invite city representatives to our project to demonstrate the effectiveness of the scrub sealing. ISS also provided input for the selection of materials and application rates. By using our expertise with the scrub seal process we were able to expand the tools available to the city for maintaining their roadways. It was a great partnering opportunity which had a very direct impact on the success and quality of the project.
Placing scratch coarse on 98th street from Quaker Ave to Slide Rd
The City of Lubbock project has become a staple in the Texas market. Over time the city has seen the positive effects of a well executed pavement maintenance program. While it is the regular day in day out type of work, this project exemplifies all of the key factors of a successful project. It is easy to have a safe job if it only lasts for a week. A project lasting for 2 months the probability of safety issues increases significantly. It is easy to pave nice edges and straight seams on a road that goes on for miles. Paving cul-de-sacs and dead end roads with curb and gutter takes patients and focus to end up with a nice clean end product.

Having expertise in multiple pavement maintenance products, allows us to better serve our customers and give them the right product, on the right road, at the right time.

Partnering and sharing information was paramount in the success of this project. Our relationship with the city has been cultivated over years, the level of mutual respect and trust are a valuable commodity that must be earned.

A quality crew with strong leadership, what more can be said, it is the guys on the ground taking ownership and pride in their work that make projects like this go smoothly.

Organization and communication with suppliers, having materials on site might seem obvious. Often problems arise, and not being on top of your needs will cause delays and missed opportunities to “fix it before it happens”.

ISS implemented all of our best practices, exceeded industry standards and focused on our customer expectations. We did ALL of the fundamentals which lead to success and we enjoyed doing it!