608 - BITUMINOUS SURFACE TREATMENT

608.1 DESCRIPTION

This work shall consist of applying an emulsified asphalt followed by an application of a cover aggregate, on a previously cleaned and prepared surface with additional requirements as indicated herein and as directed by the Engineer.

(1) Pavement markings shall be applied to streets as part of the chip seal process.

(2) Chip Seal will be scheduled to begin no sooner than June 1, but no later than July 15 and shall be completed by August 31 in the following sequence:

(a) North to south.

(3) Once chip seal begins, the Contractor shall work each day until all work is completed.

608.2 MATERIALS FOR BITUMINOUS SEALING

Bituminous sealing shall be done using the following materials in the proportions specified.

a. Aggregate

The aggregate to be used as cover material for bituminous sealing of streets shall be crushed rock, as set forth below:

Collector/Thoroughfare/Residential Aggregate

Cumulative Percent Retained on Square Mesh Sieves

l/2"	3/8"	#4	#8	#30	Pan
0	0-3	60-100	90-100	98-100	99.5-100

Type: Crushed granite (Granite Mountain Quarries) or trap rock (Iron Mountain Quarries, Trap Rock & Granite Quarries), no asphalt pre-coat required.

Cul-de-sac Bulb Aggregate

Cumulative Percent Retained on Square Mesh Sieves

l/2"	3/8"	#4	#8	#30	Pan
0	0	0-35	35-100	95-100	99-100

Type: Crushed granite (Granite Mountain Quarries) or trap rock (Iron Mountain Quarries, Trap Rock & Granite Quarries), no asphalt pre-coat required.

Aggregate color shall be similar to a light brownish gray (Munsell 5YR 4/1) or darker.

In the event of excessive bleeding/flushing, manufactured sand (crushed granite or trap rock) shall be applied the day it is observed. This work shall be subsidiary to the "Chip Seal Aggregate".

(1) Aggregate Testing

The Contractor shall furnish the Project Engineer test results as specified under Section 1108 of the Kansas Department of Transportation, Standard Specifications, the latest special provisions issued by KDOT. Aggregate must have a minimum soundness of .90 and a maximum wear of 30% as defined in 1108.2b, and should not exceed the allowance for deleterious substances as defined in 1108.2c.

The contractor will also furnish the Project Engineer the results of ASTM-D6928-08 modified as follows:

Aggregate for the test sample shall be an oven-dried sample of 1500 g ± 5 g as follows:

Passing	Retained	Mass
4.75-mm	2.38-mm	1500 g

Perform procedure 9.3 by running the machine for 95 minutes.

Maximum permitted loss for the finer gradations specified when testing using ASTM-D6298-08 as modified above is 15%.

The contractor shall furnish the Project Engineer the results of FLH T 508 (Mn/DOT Modified). The average allowable flakiness index based on this test is 32.

Tests shall be performed from representative samples of the first 500 tons produced, second 1,000 tons produced, and 1,000 tons produced thereafter; at the supplier's expense. The contractor shall have at all times a minimum one day supply of aggregate.

b. Bituminous Material

A copy of the test report on the emulsified asphalt from the oil refinery shall be submitted to the Project Engineer a minimum of 15 days prior to any operations and thereafter a new series of tests shall be provided for every 5,000 gallons of emulsion used. The modified asphalt emulsion shall conform to Special Provision 07-12001-R01 when tested in accordance with the specified test method.

The asphalt emulsion used on Residential/Collector/Thoroughfares shall be polymer modified as noted and shall be pre-approved or certified CRS-1HP. The asphalt emulsion used on cul-de-sac bulbs shall be polymer modified certified CRS-1HP with the following modifications:

Penetration range of 45-75 dmms at 77°F.
Softening point of 140°F minimum.
Original Dynamic Shear Rheometer (ODSR) @ 64°C of 3.0 kPa minimum

608.3 CONSTRUCTION REQUIREMENTS

a. Selection of the Initial Asphalt and Cover Material Application Rate

Prior to the start of construction, the Contractor shall determine the initial rate of application of bituminous material and cover material using Asphalt Institute/McLeod/Hanson method described in the AASHTO "Manual for Emulsion-Based Chip Seals for Pavement Preservation", 2012, Appendix J. The Project Engineer has example calculations for all preapproved aggregate sources available upon request. This design, as modified in the test strip, will determine aggregate rate, and will determine the basic emulsion rate that may be adjusted for varying road conditions during construction.

The sealing design and materials test reports for the seal components shall be submitted to the Project Engineer a minimum of 15 days prior to the start of sealing operations for approval.

b. Test Strip

The Contractor shall construct a continuous 500 foot long by lane width test strip for each aggregate gradation and material type. This shall determine the initial optimum bituminous application rate, and aggregate application rate. The Project Engineer will review the test strip. If the review shows the test strip meets the requirements in Section l, then notice to proceed will be issued. Should deficiencies be noted, the Project Engineer may require another test strip. This item will be considered complete and eligible for payment at the conclusion of the final successful test strip, regardless of the number of unsuccessful test strips. The Project Engineer will approve the location of the test strip.

c. Testing During Construction

During construction, testing of the bituminous application rate and aggregate application may be performed as requested by the engineer. Testing will be performed by a material testing laboratory hired by the City. The test will be performed to ensure compliance with the optimum bituminous and aggregate application rates determined by the test strip. Should deficiencies be encountered, additional tests will be performed until the optimum application rates are achieved.

d. Temporary Lane Markings

(1) Removal of existing markings, cleaning/sweeping of all foreign material/dust, and placement of temporary markings shall be completed as a continuous process.

(2) Existing pavement markings shall be removed in preparation for application of bituminous material. The method of pavement marking removal shall be waterblasting jets with vacuum suction (or approved equivalent). Pavement marking materials shall be thoroughly removed without structurally damaging the pavement or removing crack seal material and shall minimize pavement scarring. Waterborne or urethane acrylate pavement markings do not need to be removed.

(3) Temporary pavement markings, for longitudinal lines, crosswalks, and stop bars, shall be immediately painted after permanent pavement markings are removed (and the surface swept). White legends ("ARROW" and "ONLY" markings) are to be marked using temporary tape and are only required for right and/or left trap lane situations.

(4) Prior to placing of emulsion and after the surface to be treated has been cleaned/swept of all foreign material/dust, the contractor is to place Temporary Raised Pavement Markers (TRPM) along and at a 4" offset of the longitudinal lines. TRPMs spacing shall be as specified in the latest adopted revision of the Manual of Uniform Traffic Control Devices (MUTCD) according to "Long Term Stationary" work.

(5) After placement of emulsion the contractor shall remove the plastic cover and ensure both sides of the TRPMs are clearly visible and retroreflective meeting the color requirements of the MUTCD.

(6) The Contractor shall be required to maintain the appropriate number of TRPM throughout the duration of the project.

(7) Immediately preceding the application of the final pavement markings the contractor shall remove the TRPMs by cutting flush with the surface of the chip seal.

(8) By direction of the Project Engineer and at locations treated after August 1, crosswalks and stop bars shall be remarked within 24 hours of rolling the placed aggregate. A paint at wet film thickness of 5 mils is to be used for these temporary markings. At the approval of the Project Engineer, permanent pavement markings may be used.

e. Preparation of Road Surfaces

Prior to application of bituminous material, the surface to be treated shall be cleaned and swept of all foreign material and dust. Dispersion of dust and debris into the air and surrounding environment shall not be allowed. All transverse header joints shall be constructed using construction paper.

f. Protection of Utilities

Utility covers, manholes, grated inlets, curb inlets, and traffic device covers located in the roadway shall be protected from coverage and referenced for prompt location and cleaning following application. The Contractor shall be responsible for covering, locating, removing and cleaning following application. The methods used to protect, reference, locate and clean shall be submitted by the Contractor and shall be subject to approval by the Project Engineer. All such materials shall be removed and properly disposed of by the Contractor at the end of each workday.

g. Maintenance of Traffic

All construction operations shall be coordinated to result in the least practical delay of traffic. One way traffic shall be maintained at all times. The Contractor shall provide traffic control as necessary to conform to the latest adopted revision of the Manual of Uniform Traffic Control Devices (MUTCD) and the City of Overland Park "Traffic Control Handbook for Maintenance and Construction Operations" latest editions. The work shall be coordinated so that traffic will be permitted upon the sealed surface within 15 minutes after pneumatic rolling is completed.

h. Weather Limitations

Bituminous sealing shall be done only during the contract period specified. Ambient air temperatures must be a minimum of 60 degrees Fahrenheit and rising. Pavement temperature must be a minimum of 70 degrees Fahrenheit. Chip seal operations shall not be performed if any of the following conditions exist:

(1) Impending weather conditions do not allow for curing or if temperatures are forecasted below 50 degrees Fahrenheit within 24 hours from the time of work.

(2) The existing pavement temperature is 130 degrees Fahrenheit or above.

(3) If pavement has standing surface water and/or pavement surface is saturated.

i. Application of Chip Seal on Cul-de-sac Bulbs

The Contractor shall coordinate the application of the specified aggregate and bituminous material with the Project Inspector. The specified aggregate and bituminous material for cul-de-sacs shall be placed over the entire surface of the cul-de-sac bulb. The construction joint shall be located where the street is of

typical width. The Contractor and the Project Inspector shall determine where the construction joint shall be in the stem to the cul-de-sac. The construction joint shall be constructed using construction paper.

j. Application of Modified Bituminous Material

Material shall be applied at the design rate expressed as asphalt residual in gallons per square yard. Application temperatures shall be between 150 degrees Fahrenheit and 185 degrees Fahrenheit. If the design application rate is not the optimum application rate due to gradation of the aggregate, the absorption of the aggregate, surface temperature, or due to existing surface conditions of the pavement, immediately notify the Project Inspector and document the starting point of the new rate. Prior to application, ensure sufficient cover aggregate is available for immediate application. The Contractor shall ensure even application volume and profile at start and stop points. All non-machine chip seal applications shall be performed prior to moving to a new subdivision.

The spread length of bituminous material shall not exceed that which can be covered immediately. Under no circumstance shall the bituminous material remain uncovered long enough to impair retention of the cover material.

All distributors shall be calibrated prior to application of emulsion.

k. Application of Aggregate

Immediately following the application of the bituminous material, apply cover aggregate uniformly without ridges or laps at the design rate per square yard, adjusted as directed by the Project Engineer to produce a minimum of excess loose particles.

Apply cover aggregate at a rate necessary to provide full coverage of the bituminous material and to avoid tracking. If the target application rate is not the optimum application rate due to gradation of the aggregate or due to existing surface conditions of the pavement, immediately notify the Project Engineer and document the starting point of the new rate.

All chip spreaders shall be calibrated prior to application of aggregate.

At no time shall tires of the dump trucks or aggregate spreader come in contact with the fresh bituminous material.

Prior to rolling, correct deficiencies in application of cover aggregate in a manner satisfactory to the Project Inspector.

At the time of delivery to the roadway, the moisture content of the cover material shall not exceed 3% by mass (dry unit weight) of the aggregate. In no case shall free moisture be draining from the truck.

After rolling, protect the surface from traffic damage during the period required for the bituminous material to cure sufficiently to prevent dislodging of aggregate particles by normal traffic. During this period correct deficiencies of cover aggregate by spreading additional aggregate or by light brooming.

l. Manipulation

Immediately following the application of the aggregate, to include corrections of deficiencies, the aggregate shall be embedded by pneumatic tired rollers.

Initial rolling of the chip seal shall consist of a minimum of 1 complete coverage and shall begin within 90 seconds after placement of aggregate.

The distance between the rollers and the chip spreader shall at no time exceed 200 feet. A minimum of 3 complete coverages with pneumatic tired rollers shall be made on the chip seal within 10 minutes after application of the cover material. Rollers shall be ballasted to a minimum weight of 10 tons. A minimum of 3 rollers shall be used with each chip spreader. The maximum allowable speed for all rollers is 3 MPH while manipulating the aggregate. When rolling cul-de-sacs or other irregularly shaped areas, turns shall be minimized by using a “tiled” rolling pattern.

m. Sweeping

All streets shall be swept four times following the chip seal application. The forward movement of the street sweeping equipment shall not exceed 3 MPH. All street sweeping equipment shall have a water system to control dust. The contractor shall remove all loose aggregate with each sweeping, including but not limited to driveways, sidewalks, curb and side streets by whatever means necessary. All loose aggregate shall be removed from the surface of the street as soon as the bituminous material has cured enough to prevent damage

by sweeping within a period not to exceed 24 hours after chip seal is completed. Streets shall be swept again 72 hours or less after the initial sweeping, approximately one month following the chip seal application, and approximately two months following the chip seal application, or as approved by the Project Engineer. The Project Engineer may require additional sweepings for specific neighborhoods after the fourth sweeping until October 31. Sweeping shall be conducted on Saturdays, if necessary, to meet these requirements. All swept material is the property of the contractor who is responsible for its proper disposal.

All deficiencies shall be corrected after the first sweeping and prior to the second sweeping. Any deficiencies found and corrected after the second sweeping shall be swept with a street sweeper within 24 hours. The second sweeping will not be accepted until deficiencies are corrected and all loose aggregate is removed on driveways, sidewalks, curb and side streets. If any second sweeping is not accepted within 7 days after the chip seal was applied, all chip seal notifications shall stop.

n. Permanent Pavement Marking

The first sweeping and second sweeping shall be completed prior to permanent pavement marking installation and all permanent pavement markings shall be installed within 7 to 30 calendar days after the chip seal was applied. If any permanent pavement markings are not completed within 30 calendar days after the chip seal was applied, at the discretion of the Project Engineer, all chip seal notifications shall stop.

o. Acceptance

During application of chip seal, the work will be inspected for deficiencies resulting from poor workmanship, flushing, tracking from equipment, surface patterns, loss of aggregate, sweeping, unsealed areas, minimum overlap on longitudinal joints, and minimum overlap on construction joints.

The following shall be verified daily:

(1) Finished surface has no more than 4 tears or untreated areas greater than 1 inch wide and 4 inches long in any 120 square yard area or unsightly buildup.

(2) Joints appear neat and uniform without buildup, uncovered areas, or unsightly appearance.

(3) Longitudinal joints have less than a 2 inch overlap on adjacent passes.

(4) Transverse joints have no more than ¼ inch difference in elevation across the joint as measured with a 6 foot straightedge.

(5) Chip seal edge is neat and uniform along the curb lines.

(6) Chip seal edge has no more than a 2 inch variance in any 100 feet along the curb line.

All deficiencies shall be corrected prior to proceeding to the next mile section.

For project acceptance the Contractor and the Project Engineer will review completed work prior to final completion. The finished work must meet the following requirements:

DEFECT*	SEVERITY
Surface Patterns	Alternate lean and heavy lines (Ridges or streaking over the surface.)
Bleeding / Flushing	Distinctive Appearance (Excess bituminous material on surface.)
Loss of Cover Aggregate	Patches or lines of aggregate lost from surface.

*Defect does not exceed the extent of any surface defect by more than 20% of any 120 square yard area. The beginning of any 120 square yard area will be the start of any individual defect.

608.4 MEASUREMENT AND PAYMENT

The Engineer will measure "Chip Seal Emulsion" by the gallon of delivered emulsion, "Chip Seal Aggregate", "Chip Seal Manipulation", "First Sweeping", "Second Sweeping", "Third Sweeping", "Fourth Sweeping" by the square yard of completed and accepted work.

Quantity measurements will be totaled for each mile section.

Payment for “Chip Seal Aggregate” and “Chip Seal Manipulation” based on plan quantities at the contract unit price bid is full compensation for furnishing all materials except emulsion, for all labor, tools, equipment and incidentals necessary to complete the work. This amount will not be adjusted up or down if the actual aggregate area varies from the bid quantity.

Payment for “Chip Seal Emulsion” at the contract unit price is full compensation for furnishing all materials necessary to complete the work. Aggregate rates will be determined after the Project Engineer has approved the mix design and the test strip. The Contractor shall submit emulsion and aggregate tickets to the Project Inspector.

Payment for “First Sweeping,” “Second Sweeping”, "Third Sweeping" and “Fourth Sweeping” at the contract unit price bid is full compensation for furnishing all materials, for all labor, tools, equipment and incidentals necessary to complete the work. Additional sweepings for specific neighborhoods after the fourth sweeping will be paid at the contract unit price bid for "Fourth Sweeping".

Payment for “Test Strip” at the contract lump sum price is full compensation for furnishing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made upon completion of each mile section.