CUPERTINO

PUBLIC WORKS DEPARTMENT
Timm Borden, Director

CITY HALL
10300 TORRE AVENUE ~ CUPERTINO, CA 95014-3266
(408) 777-3354 ~ FAX (408) 777-3333

ADDENDUM NO. 1
2015 PAVEMENT MAINTENANCE PHASE 2
PROJECT NO. 2015-24
BID OPENING: JUNE 2, 2015
2:00 P.M.

ISSUED DATE: MAY 27, 2015

The following revisions are hereby made to the above referenced project.

1. Replace existing Document 00400 Bid Form with revised Document 00400 Bid Form attached to this addendum. Bid items have been added.

2. Replace existing Document 00850 Technical Specifications with revised Document 00850 Technical Specifications attached to this addendum. Section 6b has changed. Scope is modified to included Preformed Thermoplastic Green Bike Lanes.

3. Replace existing Document 00864 Estimated Quantities with revised Document 00864 attached to this addendum. Quantities have changed. Alves Dr and Anton Way have been removed from project.

All questions regarding this project must be transmitted in writing to Roger Lee, Assistant Director of Public Works. Fax number is 408-777-3333 and email address is RogerL@cupertino.org.

Please indicate receipt of this addendum on the last page of the Proposal. Failure to do so may cause rejection of your bid.

APPROVED BY:

Roger A. Lee

Timm Borden
Director of Public Works

DOCUMENT 00400

BID FORM

To be submitted as part of Envelope "A" by the time and date specified in Document 00200 (Instructions to Bidders).

TO THE HONORABLE CITY COUNCIL OF THE CITY OF CUPERTINO

THIS BID IS SUBMITTED BY:

_____
(Firm/Company Name)

Re: PROJECT NUMBER 2015-24
2015 PAVEMENT MAINTENANCE PHASE 2

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a contract with the City of Cupertino ("City") in the form included in the Contract Documents, Document 00520 (Contract), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents. All portions of this Bid Form must be completed and signed before the bid is submitted. Failure to do so will result in the bid being rejected as non-responsive.

2. Bidder accepts all of the terms and conditions of the Contract Documents, Document 00100 (Advertisement for Bids), and Document 00200 (Instructions to Bidders), including, without limitation, those dealing with the disposition of Bid Security. **This Bid will remain subject to acceptance for 90 Days after the day of Bid opening.**

3. Bidder has visited the Site and performed all tasks, research, investigation, reviews, examinations, and analysis and given notices, regarding the Project and the Site, as set forth in Document 00520 (Contract), Article 5.

4. Bidder has given City prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents and as-built drawings and actual conditions and the written resolution thereof through Addenda issued by City is acceptable to Contractor.

5. Subcontractors for work included in all Bid items, in accordance with the criteria in the Public Contract Code, are listed on the attached Document 00430 (Subcontractors List).

6. The undersigned Bidder understands that City reserves the right to reject this Bid.

7. If written notice of the acceptance of this Bid, hereinafter referred to as Notice of Award, is mailed or delivered to the undersigned Bidder within the time described in paragraph 2 of this Document 00400 or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver the documents required by Document 00200 (Instructions to Bidders) within the times specified therein. These documents include, but are not limited to, Document 00520 (Contract), Document 00610 (Construction Performance Bond), and Document 00620 (Construction Labor and Material Payment Bond).

8. Notice of Award or request for additional information may be addressed to the undersigned Bidder at the address set forth below on the signature page.

10. The undersigned Bidder herewith encloses cash, a cashier's check, or certified check of or on a responsible bank in the United States, or a corporate surety bond furnished by a surety authorized to do a surety business in

the State of California, in form specified in Document 00200 (Instructions to Bidders), in the amount of ten percent (10%) of the total of Base Bid and made payable to the "City of Cupertino".

11. The undersigned Bidder agrees to commence Work under the Contract Documents on the date established in Document 00700 (General Conditions) and to complete all work within the time specified in Document 00520 (Contract). The undersigned Bidder acknowledges that City has reserved the right to delay or modify the commencement date. The undersigned Bidder further acknowledges City has reserved the right to perform independent work at the Site, the extent of such work may not be determined until after the opening of the Bids, and that the undersigned Bidder will be required to cooperate with such other work in accordance with the requirements of the Contract Documents.

12. The undersigned Bidder agrees that, in accordance with Document 00700 (General Conditions), liquidated damages for failure to complete all Work in the Contract within the time specified in Document 00520 (Contract) shall be as set forth in Document 00520 (Contract).

NOTICE

Required Contractor and Subcontractor Registration *[Applies if Bid is submitted on or after March 1, 2015 or if Contract is awarded on or after April 1, 2015]*

1. **Owner shall accept Bids only from Bidders that (along with all Subcontractors listed in Document 00430, Subcontractors List) are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5.**
2. **Subject to Labor Code Sections 1771.1(c) and (d), any Bid not complying with paragraph, above, shall be returned and not considered; provided that if Bidder is a joint venture (Business & Professions Code Section 7029.1) or if federal funds are involved in the Contract (Labor Code Section 1771.1(a)), Owner may accept a non-complying Bid provided that Bidder and all listed Subcontractors are registered at the time of Contract award.**

SCHEDULE OF BID PRICES

All Bid items, including lump sums and unit prices, must be filled in completely. Allowances and Alternative Bid items are described in Document 00800 (Special Conditions). Quote in figures only, unless words are specifically requested. **Please Note that time extensions will NOT be permitted with the acceptance of any or all of the Alternative Bid Items listed below.**

ITEM	DESCRIPTION	UNIT	EST QTY	UNIT PRICE	TOTAL
1	Traffic Control	LS	1		
2	Rubberized Chip Seal	SY	47042		
3	Double Chip Seal-Conventional Type 3	SY	11160		
4	Micro Surfacing	SY	47042		
5	Conventional Type 2 Slurry	SY	51199		
6	Install Blue RPM's @ Fire Hydrant	EA	40		
7	4" White (Thermo)	LF	1750		
8	8" White (Thermo	LF	476		
9	12" White Crosswalk/Limit Line (Thermo)	LF	2255		
10	24" White (Thermo)	LF	120		
11	Striping Detail # 10 (Markers)	LF	2300		
12	Striping Detail # 22 (Thermo & Markers)	LF	120		
13	Striping Detail # 23 (Markers)	LF	692		
14	Striping Detail #24	LF	1690		
15	Striping Detail #25	LF	404		
16	Striping Detail #32	LF	250		
17	Striping Detail # 38 (Thermo & Markers)	LF	1100		
18	Striping Detail #38A	LF	850		
19	Striping Detail #38C	LF	1580		
20	Striping Detail # 39 (Preformed Thermo)	LF	3040		
21	Striping Detail # 39A (Preformed Thermo)	LF	2687		
22	Striping Detail # 40A (Markers)	LF	5536		
23	Arrow Type IV (Preformed Thermo)	EA	28		
24	Arrow Type VII (Preformed Thermo)	EA	4		
25	Arrow Type VI (Preformed Thermo) Right Lane Drop	EA	2		
26	"25" Legend (Thermo)	EA	6		
27	"30" Legend (Preformed Thermo)	EA	2		
28	"35" Legend (Preformed Thermo)	EA	14		
29	"AHEAD" Legend (Preformed Thermo)	EA	4		
30	"Bike Rider with person" Symbol - Left facing(Preformed Thermo)	EA	16		
31	Bike Lane Arrow (Preformed Thermo)	EA	14		

ITEM	DESCRIPTION	UNIT	EST QTY	UNIT PRICE	TOTAL
32	"Bike Detector" Symbol	EA	3		
33	"SIGNAL" legend (Preformed Thermo)	EA	2		
34	"STOP" Legend (Preformed Thermo)	EA	16		
36	"PED" Legend (Preformed Thermo)	EA	2		
37	"WAIT" legend (Preformed Thermo)	EA	2		
38	"HERE" legend (Preformed Thermo)	EA	2		
39	"XING" Legend (Preformed Thermo)	EA	2		
40	"YIELD" Legend (Preformed Thermo)	EA	3		
41	YIELD line (Preformed Thermo)	EA	3		
42	Sharrows - Left Facing (Preformed Thermo)	EA	48		
43	Green Bike Lanes	SF	1774		
44	Green Bike Rider Panel Pre Preformed Factory Assembled (4x20)	EA	2		
45	Bike Rider Symbol on Green PreMark (Preformed Factory Assembled) (4x7)	EA	2		
			TOTAL		

TOTAL BASE BID (WORDS) _____

Unit Legend

LS = Lump Sum
EA = Each
SY = Square Yards
LF = Linear Feet

ACKNOWLEDGEMENT OF RECEIPT OF ADDENDUMS
Bidder herby acknowledges receipt and examination of all Contract Documents and the following Addenda:

Addendum No.	Addendum Date

Bidder proposes and agrees to fully perform the Work within the time stated and in strict accordance with the Contract Documents for the sums of money listed in this Bid Form.

NAME OF BIDDER: _____

licensed in accordance with an act for the registration of Contractors, and with license number: _____
Expiration Date: _____.

_____ _____
Where incorporated, if applicable

_____

_____
Principals

I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

_____
Signature of Bidder

NOTE: If Bidder is a corporation, set forth the legal name of the corporation, state where incorporated, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If Bidder is a partnership, set forth the name of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

Business Address: _____
_____
_____

Officers authorized to sign contracts: _____
_____
_____
Typed Full Name:

Telephone Number(s): _____

Fax Number(s): _____

E-Mail Address: _____

END OF DOCUMENT

DOCUMENT 00850

TECHNICAL SPECIFICATIONS

1. TRAFFIC CONTROL (Bid Item Number 1)

a. Item Requirement

Contractor shall furnish all necessary supervision, labor, materials, construction tools and equipment, supplies to complete traffic control at each location during the times immediately prior, during and after work.

b. Scope

Construction area signs shall be furnished, installed, and removed when no longer required. The Contractor's attention is directed to Section 7-1.08, "Public Convenience", Section 7-1.09, "Public Safety", and Section 12, "Construction Area Traffic Control Devices", of the Caltrans Standard Specifications and Section 00820 Traffic Control Requirements of these specifications.

All traffic control devices shall conform to the latest "Manual of Traffic Control for Construction and Maintenance Work Zones" issued by Caltrans.

(a) Advance construction warning signs shall be placed on all streets leading into the construction area before any construction is started.

(b) Speed limit advisories may be placed along the main traffic lanes.

(c) When detours or changes in traffic lanes are required, directional signs shall be placed at each end and along the roads.

(d) Warning signs, caution signs, and end construction signs, shall be placed at each end of the work and along the route when conditions warrant their use.

The Contractor shall submit a detailed traffic control plan for all work that requires lane closures at least 5 days prior to the lane closure. No lane closure will be allowed without prior approved traffic control plan specific to that location.

The Contractor is responsible for proper placement and maintenance of all signs and barricades. Any additional signs, barricades, lights, etc., that may be required by the Engineer to ensure public safety shall be installed and maintained by the Contractor.

Note: Traffic Controls – Qualified Individual: Traffic controls through the construction zone shall be designed and maintained by a designated individual qualified in this responsibility. **The Contractor shall submit the traffic control**

plan and have an approved traffic control plan prior to commencing work. Traffic control shall be planned for each individual lane closure with detail layouts of all signage locations.

If required in the traffic control plan, and always during one way traffic control, flagmen will be required to direct traffic during construction. The number and location of flagmen shall be sufficient to allow safe control and passage of traffic through the work zone. During the paving of intersections, two flagmen shall be posted at each intersection for the entire time between tack coat and finish rolling.

If a cross street needs to be temporarily closed when work is in progress through the intersection and the anticipated delay is more than five minutes, a detour sign shall be installed on the cross street and shall include the installation of advance signing displaying the anticipated delay time. The signing shall be reviewed by the Traffic Engineer.

When required by the Engineer, the Contractor shall supply **two (2)** message boards per arterial / collector street, to be placed at designated locations for advanced warning signs. The message shall be preapproved by the engineer prior to programming. Message boards shall be set up at least two weeks prior.

The term "Construction Area Signs" shall include all temporary signs required for the direction of public traffic through or around the work during construction. Such signs are shown in or referred to in the current MANUAL OF TRAFFIC CONTROLS – Warning signs, Lights and Devices for Use in Performance of Work Upon Highways, published by the State of California, Department of Transportation, hereinafter referred to as MANUAL OF TRAFFIC CONTROLS.

Restrictions on Closure of Traffic Lanes

The streets shall be open for use by public traffic on Saturday, Sunday, and any day designated by the City as a legal holiday; before 8 a.m. and after 5 p.m., Monday thru Friday, or any day preceding a designated legal holiday; and when construction operations are not actively in progress on working days. During daily construction operations, there may be certain peak traffic hours that would require the Contractor to alter the construction schedule in order to minimize the impact of the work on the public's convenience.

The following provisions shall apply on the listed street segments:

Street	**Special Traffic Control Provision**
Arterials:	One lane in each direction of traffic shall be maintained at all times. The roadway shall be open for two-way traffic at all times.
Collectros:	On four lane streets, one lane in each direction shall

	be maintained at all times. On two lane streets, flagmen shall be used to maintain traffic flow.
Residential:	Traffic may be limited to only local traffic during the period between 8 a.m. and 4:30 p.m. Flagman shall be used to control traffic.

Refer to "Attachment A" – Work Hour Restrictions for working hour requirements for each street or street category.

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, Public Safety," and 12, "Construction Area Traffic Control Devices," of the State Standards and to the Section entitled "Public Safety" and flagging for traffic control systems elsewhere in these technical specifications. Nothing in these technical specifications shall be construed as relieving the Contractor from his responsibility as provided in said Section 7-1.09.

Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control for Lane Closure."

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic.

The Contractor shall notify local authorities of his intent to begin work at least 7 calendar days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles.

Whenever vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. A minimum of 9 cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by Engineer.

In order to minimize the impact on local merchants, and residents, driveways shall not be blocked for any long periods of time. The Contractor shall maintain access to all driveways before and after road material is placed. The Contractor shall limit the time between the prep time placing and curing time of the asphalt material and cleanup so that vehicles may return the roadway to use.

The full width of the traveled way shall be open for use by public traffic on weekends, designated legal holidays, and when construction operations are not actively in progress.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if in the opinions of the Engineer public traffic will be better served and the work expedited. Such deviations shall not be adopted until the Engineer has indicated his written approval. All other modifications will be made by contract change orders.

A traffic control system shall consist of closing traffic lanes in accordance with the provisions of Section 12, "Construction Area Traffic Control Devices," of the State Standards, the provisions under "Maintaining Traffic" elsewhere in these technical specifications.

The provisions in this section will not relieve the Contractor from his responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the State Standards.

If any component in the traffic control system is damaged, displaced, or ceases to operate or function as specified, from any cause, during the progress of work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

Lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along the traveled way, shall be removed from the traveled way, shoulder and auxiliary lanes.

c. Measurement & Payment

The contract lump sum price paid for Traffic Control shall include full compensation for furnishing all labor including flagging costs, materials (including signs), tools, equipment and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system and preparing required traffic control plans, as specified in the State Standards and these technical specifications, and as directed by the Engineer.

2. RUBBERIZED CHIP SEAL (Bid Item Number 2)

a. Item Requirement

The following sections of this specification describe the preparation, materials application and finishing requirements for the asphalt rubber seal coat (asphalt rubber chip seal).

Asphalt rubber seal coat shall consist of an application of asphalt-rubber binder and screenings pre-coated with paving asphalt. Asphalt-rubber seal coat shall conform to the provisions specified for seal coats in Section 37-1, "Seal Coats" of the Standard Specifications and to these Special Provisions.

b. Scope

Materials – The Contractor shall furnish a Certificate of Compliance to the Engineer for each material used in the asphalt-rubber binder mixture. It shall certify that the material conforms to the requirements in the Special Provisions. When requested by the Engineer, the Contractor shall also submit samples with the Certificate of Compliance. The Contractor shall provide the Engineer a Material Safety Data Sheet (MSDS) for each of the constituent components of the asphalt-rubber binder and for the completed mixture of the asphalt-rubber binder.

The Contractor shall provide a Certificate of Compliance for each truck load of crumb rubber modifier (CRM), paving asphalt, and asphalt modifier delivered to the project. The Quality Control Program used by the manufacturer of each ingredient shall include a sampling and testing frequency as shown below:

A. CRM shall be tested except for the grading requirement, at least once for every 250 tons with a minimum of once per project. CRM shall be tested for grading for every truck load delivered to the project.
B. Paving Asphalt shall be tested at least once for every 200 tons of production with a minimum of once per project.
C. Asphalt modifier shall be tested at least once for every 25 tons of production with a minimum of once per project.
D. A copy of the laboratory test results for the test parameters specified in these special provisions for CRM, paving asphalt, and asphalt modifier shall be submitted to the Engineer with the Certificate of Compliance for each truck load of individual material delivered to the project.

Certified volume or weight slips shall be delivered to the Engineer for materials supplied.

Paving Asphalt – Paving asphalt to be used in the asphalt-rubber binder shall be Grade PG 64-16 and shall conform to the provisions in Section 92, "Asphalts" of the 2006 Standard Specifications reflecting the use of 'Performance Grade (PG)' asphalt binders. This reference to the 2006 Standard Specifications is for asphalt only and not for any other work.

The paving asphalt for use in asphalt-rubber binder shall be modified with an asphalt modifier.

The CRM material shall be made from 100% recycled California Waste Tires. Contractor shall submit a Rubberized Pavement Certification that states under penalty of perjury, the material provided on the project was manufactured from 100% California-generated waste tires.

Asphalt Modifier – The asphalt modifier shall be a resinous, high flash point, aromatic hydrocarbon compound and shall conform to the following requirements:

ASPHALT MODIFIER

Test Parameter	ASTM Designation	Requirement
Viscosity, m^2/s (10^{-6}) at 100°C	D 445	X ±3*
Flash Point, CL.O.C. °C	D 92	405 min.
Molecular Analysis		
Asphaltenes, percent by mass	D 2007	0.1 max.
Aromatics, percent by mass	D 2007	55 min.

* The symbol "X" is the viscosity of the asphalt modifier the Contractor proposes to furnish. The value "X" which the Contractor proposes shall be between the limits 19 and 36 and shall be submitted in writing to the Engineer. Any proposed change, requested by the Contractor, in the value "X" shall require a new asphalt-rubber binder design.

The asphalt modifier shall be proportionately added to the paving asphalt at the production site where the asphalt-rubber binder is blended and reacted. Asphalt modifier shall be added at an amount of 2.5 percent to 6.0 percent by weight of the paving asphalt based on the recommendation of the asphalt-rubber binder supplier. The paving asphalt shall be at a temperature of not less than 375°F nor more than 440°F when the asphalt modifier is added. If the asphalt modifier is combined with the paving asphalt, before being blended with the CRM, the combined paving asphalt and asphalt modifier shall be mixed by circulation for a period of not less than 20 minutes. This premixing of asphalt modifier and paving asphalt will not be required when all ingredients of the asphalt-rubber binder are proportioning with the meters conforming to the provisions in Section 5-1.33, “Equipment” of the Standard Specifications.

Crumb Rubber Modifier (CRM) – Crumb rubber modifier (CRM) shall consist of a combination of scrap tire CRM and high natural CRM. The scrap tire CRM shall consist of ground or granulated rubber derived from any combination of automobile tires, truck tries or tire bufferings. The high natural CRM shall consist of ground or granulated rubber derived from materials that utilize high natural rubber sources.

Steel and fiber separation shall be accomplished by any method. Cryogenic separation, if utilized, shall be performed separately from and prior to grinding or granulating.

CRM shall be ground or granulated at ambient temperature. Cryogenically produced CRM particles that pass through the grinder or granulator without being ground or granulated, respectively, shall not be used.

CRM shall not contain more than 0.01-percent wire (by weight of CRM) and shall be free of other contaminants, except fabric. Fabric shall not exceed 0.05-percent by weight of CRM. A certificate of compliance certifying these percentages shall be furnished to the Engineer in conformance with the provisions in Section 8 of these Special Provisions and of Section 6-1.07, "Certificates of Compliance" of the Standard Specifications.

The length of an individual CRM particle shall not exceed 3/16 inch.

The CRM shall be sufficiently dry so that the CRM will be free flowing and will not produce foaming when combined with the blended paving asphalt and asphalt modifier mixture. Calcium carbonate or talc may be added at a maximum amount of 3 percent by weight of CRM to prevent CRM particles from sticking together. The CRM shall have a specific gravity of between 1.1 and 1.2 as determined by California Test 208. Scrap tire CRM and high natural CRM shall be delivered to the production site in separate bags and shall be sampled and tested separately.

CRM Material shall conform to the following requirements as determined by ASTM Designation: D297:

	SCRAP TIRE CRM Percent		HIGH NATURAL CRM Percent	
Test Parameter	Minimum	Maximum	Minimum	Maximum
Acetone Extract	6.0	16.0	4.0	16.0
Rubber Hydrocarbon	42.0	65.0	50.0	—

Natural Rubber content	22.0	39.0	40.0	48.0
Carbon Black Content	28.0	38.0	—	—
Ash Content	—	8.0	—	—

The CRM for asphalt-rubber binder shall conform to the gradations specified below when tested in conformance with the requirements in ASTM C 136, except as follows:

A. Split or quarter 100 g +/- 5 g from the CRM sample and dry to a constant mass at a temperature of not less than 57°C nor more than 63°C and record the dry sample mass. Place the CRM sample and 5 g of talc in a 0.5-L jar. Seal the jar then shake the jar by hand for a minimum of one minute to mix the CRM and the talc. Continue shaking or open the jar and stir until particle agglomerates and clumps are broken and the talc is uniformly mixed.

B. Place one rubber ball on each sieve. Each ball shall have a mass of 8.5 g +/- 0.5 g, have a diameter of 24.5 mm +/- 0.5 mm, and shall have a Shore Durometer "A" hardness of 50 +/- 5 in conformance with the requirements in ASTM D 2240. After sieving the combined material for 10 minutes +/- 1 minute, disassemble the sieves. Material adhering to the bottom of a sieve shall be brushed into the next finer sieve. Weigh and record the mass of the material retained on the 2.36-mm sieve and leave this material (do not discard) on the scale or balance. Observed fabric balls shall remain on the scale or balance and shall be placed together on the side of the scale or balance to prevent the fabric balls from being covered or disturbed when placing the material from finer sieves onto the scale or balance. The material retained on the next finer sieve (2.00-mm sieve) shall be added to the scale or balance. Weigh and record that mass as the accumulative mass retained on that sieve (2.00-mm sieve). Continue weighing and recording the accumulated masses retained on the remaining sieves until the accumulated mass retained in the pan has been determined. Prior to discarding the CRM sample, separately weigh and record the total mass of fabric balls in the sample.

C. Determine the mass of material passing the 75-µm sieve (or mass retained in the pan) by subtracting the accumulated mass retained on the 75-µm sieve from the accumulated mass retained in the pan. If the material passing the 75-µm sieve (or mass retained in the pan) has a mass of 5 g or less, cross out the recorded number for the accumulated mass retained in the pan and copy the number recorded for the accumulated mass retained on the 75-µm sieve and record that number (next to the crossed out number) as the accumulated mass retained in the pan. If the material passing the 75-µm sieve (or mass retained in the pan) has a mass greater than 5 g, cross out the recorded number for the

accumulated mass retained in the pan, subtract 5 g from that number and record the difference next to the crossed out number. The adjustment to the accumulated mass retained in the pan is made to account for the 5 g of talc added to the sample. For calculation purposes, the adjusted total sample mass is the same as the adjusted accumulated mass retained in the pan. Determine the percent passing based on the adjusted total sample mass and record to the nearest 0.1 percent:

CRM GRADATIONS

Sieve Sizes	**SCRAP TIRE CRM Percent Passing**	**HIGH NATURAL CRM Percent Passing**
No. 8	100	100
No. 10	98 - 100	100
No. 16	45 - 75	95 - 100
No. 30	2 - 20	35 - 85
No. 50	0 - 6	10 - 30
No. 100	0 - 2	0 - 4
No. 200	0	0 - 1

Asphalt Rubber Binder – Asphalt-rubber binder shall consist of a mixture of paving asphalt, asphalt modifier, and crumb rubber modifier.

At least 2 weeks before its intended use, the Contractor shall furnish the Engineer four one-quart cans filled with the asphalt-rubber binder proposed for use on the project. The Contractor shall supply the Engineer, for approval, a binder formulation, design profile and samples of all materials to be used in the asphalt-rubber binder, at least 2 weeks before construction is scheduled to begin. The binder formulations shall consist of the following information:

A. Paving Asphalt and Modifiers:

1. Source and grade of paving asphalt.
2. Source and identification (or type) of modifiers used.
3. Percentage of asphalt modifier by weight of paving asphalt.
4. Percentage of the combined blend of paving asphalt and asphalt modifier by total weight of asphalt-rubber binder to be used.
5. Laboratory test results for test parameters shown in these special provisions.

B. Crumb Rubber Modifier (CRM):

1. Source and identification (or type) of scrap tire and high natural CRM.
2. Percentage of scrap tire and high natural CRM by total weight of the asphalt rubber blend.
3 If CRM from more than one source is used, the above information will be required for each CRM source used.
4. Laboratory test results for test parameters shown in these special provisions.
5. The State of the source of the Waste tires

C. Asphalt-Rubber Binder:

1. Laboratory test results of the proposed blend for test parameters shown in these special provisions.
2. The minimum reaction time and temperature.

The method and equipment for combining the paving asphalt, asphalt modifier, and CRM shall be so designated and accessible that the Engineer can readily determine the percentages by weight for each material being incorporated into the mixture.

The proportions of the materials, by total weight of asphalt-rubber binder, shall be 80 percent combined paving asphalt and asphalt modifier and 20 percent CRM. Lower values shall not be rounded up. The CRM shall be combined at the production site and shall contain 75 percent scrap tire CRM and 25 percent high natural CRM, by weight.

The paving asphalt and asphalt modifier shall be combined into a blended mixture that is chemically compatible with the crumb rubber modifier to be used. The blended mixture shall be considered to be chemically compatible when the mixture meets the requirements for asphalt-rubber binder (after reacting) found in these special provisions.

The blended paving asphalt and asphalt modifier mixture and the CRM shall be combined and mixed together at the production site in a blender unit to produce a homogeneous mixture.

The temperature of the blended paving asphalt and asphalt modifier mixture shall not be less that 375° F nor more than 440° F when the CRM is added. The combined materials shall be reacted for a minimum of 45 minutes after incorporation of the CRM at a temperature of not less than 375° F nor more than 425° F. The temperature shall not be higher than 10° F below the actual flash point of the asphalt-rubber binder.

After reacting, the blended asphalt-rubber binder shall conform to the following requirements:

BLENDED ASPHALT-RUBBER BINDER

Test Parameter	ASTM Test Method	Requirement	
		Minimum	Maximum
Cone Penetration @ 25°C, 1/10 mm	D 217	25	60
Resilience @ 25°C, Percent rebound	D 5329	25	--
Field Softening Point, °C	D 36	55	88
Viscosity @190°C, Pa • s ($x10^{-3}$)	See Note	1500	3500

NOTE:

The viscosity test shall be conducted using a hand held Haake Viscometer Model VT-02 with Rotor 1, 24 mm depth x 53 mm height, or equivalent, as determined by the Engineer. The accuracy of the viscometer shall be verified by comparing the viscosity results obtained with the hand held viscometer to 3 separate calibration fluids of known viscosities ranging from 1000 to 5000 Pa • s ($x10^{-3}$). The viscometer will be considered accurate if the values obtained are within 300 Pa • s ($x10^{-3}$) of the known viscosity. The known viscosity value shall be based on the fluid manufacturer's standard test temperature or the test temperature versus viscosity correlation table provided by the fluid manufacturer. All viscometers used on the project shall be verified to be accurate. The test method for determining the viscosity of asphalt-rubber binder using a hand held viscometer is available at the Transportation Laboratory, Office of Pavement Consulting Services, Sacramento, California, Telephone (916) 227-7300. The accuracy verification results shall be provided to the Engineer and shall be certified by a Certificate of Compliance. The Certificate of Compliance shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

The Contractor shall provide a Haake Viscometer, or equivalent, at the production site during the combining of asphalt-rubber binder materials. The Contractor shall take viscosity readings of asphalt-rubber binder from samples taken from the distributor truck a minimum of 45 minutes after incorporation of the CRM. Readings shall be taken at least every hour with no less than one reading for each batch of asphalt-rubber binder. The Contractor shall log these results, including time and asphalt-rubber temperature. A copy of the log shall be submitted to the Engineer on a daily basis. As determined by the Engineer, the Contractor shall either notify the Engineer at least 15 minutes prior to each test or provide the Engineer a schedule of testing times.

The reacted asphalt-rubber binder shall be maintained at a temperature of not less than 375° F nor more than 425° F.

If any of the material in a batch of asphalt-rubber binder is not used within 4 hours after the 45 minute reaction period, heating of the material shall be discontinued. If the asphalt-rubber binder cools below 375° F and is then reheated, it shall be considered a reheat cycle. The total number of reheat cycles shall not exceed 2. The material shall be uniformly reheated to a temperature of not less than 375° F nor more than 425° F prior to use. Additional scrap tire CRM may be added to the reheated binder and reacted for a minimum of 45 minutes. The cumulative amount of additional scrap tire CRM shall not exceed 10 percent of the total binder weight. Reheated asphalt-rubber binder shall conform to the requirements for blended asphalt-rubber binder.

Screenings – Screenings shall conform to the provisions in these Special Provisions and in Section 37-2.01B, “Materials”, Section 37-2.04A(1)(d) “Quality Control” and Section 37-2.04 B(4) “Payment” of the Standard Specifications,

Stockpiling of screenings after preheating and pre-coating with paving asphalt will not be permitted.

Canvas or similar covers that completely cover each load of pre-coated screenings shall be used during hauling to minimize temperature drop of the pre-coated screenings.

Screenings shall conform to the following grading requirements prior to pre-coating with paving asphalt:

SCREENINGS GRADING REQUIREMENTS 1/2-inch Course Maximum	
Sieve Sizes	Percentage Passing
¾"	100
½"	95-100
3/8"	70-85
No. 4	0 – 15
No. 8	0 - 5
No. 200	0 - 1

Screenings shall conform to the following quality requirements immediately prior to preheating:

SCREENINGS QUALITY REQUIREMENTS

Test Parameters	California Test	Requirements
Los Angeles Rattler Loss (100 Revolutions)	211	10 Max.
Los Angeles Rattler Loss (500 Revolutions)	211	40 Max.
Film Stripping	302	25 Max.
Cleanness Value	227	80 Min.
Durability	229	52 Min.

Screenings for asphalt-rubber seal coat shall be preheated to between 260° F and 325° F and uniformly coated at a rate of 0.7 percent to 1 percent by weight of dry aggregate with Grade PG-64-10 asphalt, conforming to the provisions in Section 92, "Asphalts" of the 2006 Standard Specifications reflecting the use of 'Performance Grade (PG)' asphalt binders. This reference to the 2006 Standard Specifications is for Asphalt only and not for any other work.

Screenings shall be coated at a central mixing asphalt concrete plant that has been approved in conformance with the requirements in California Test 109. The exact rate will be determined by the Engineer upon a visual inspection of the first initial load delivered and thereafter as deemed necessary.

Equipment – The Contractor shall utilize the following equipment for asphalt-rubber seal coat operations:

A. Self-propelled power brooms that clean the existing pavement and remove loose screenings without dislodging screenings set in the asphalt-rubber binder. Gutter brooms or steel-tinned brooms shall not be used.

B. Pneumatic tired rollers conforming to the provisions in Section 39-5.02, "Compacting Equipment" of the Standard Specifications, except that the rollers shall have an air pressure of 100 pounds per square inch and maintained so that the air pressure will not vary more than +/- 5 pounds per square inch in each tire. A sufficient number of rollers shall be used so that one complete coverage will be provided in one pass.

C. Steel rollers conforming to the provisions in Section 39-5.02, "Compacting Equipment" of the Standard Specifications, except the weight of roller shall be appropriate to no cause excessive crushing of aggregates.

D. A self-propelled screenings spreader, equipped with a screenings hopper in the rear, belt conveyors to carry the screenings to the front, and a spreading hopper equipped with full width distribution auger and spread roll. The screenings spreader shall be capable of providing a uniform screening spread rate over the entire width of the traffic lane in one application.

E. An asphalt heating tank equipped to heat and maintain the blended paving asphalt and asphalt modifier mixture at the necessary temperature before blending with the CRM. This unit shall be equipped with a thermostatic heat control device and a temperature reading device and shall be accurate to within +/- 5° F and shall be of the recording type.

F. A mechanical mixer for the complete, homogeneous blending of paving asphalt, asphalt modifier, and CRM. Paving asphalt and asphalt modifier shall be introduced into the mixer through meters conforming to the provisions in Section 5-1.33, "Equipment" of the Standard Specifications The blending system shall vary the rate of delivery of paving asphalt and asphalt modifier proportionate with the delivery of CRM. During the proportioning and blending of the liquid ingredients, the temperature of paving asphalt and the asphalt modifier shall not vary more than +/- 25° F. The paving asphalt feed, the asphalt modifier feed, and the CRM feed shall be equipped with devices by which the rate of feed can be determined during the proportioning operation. Meters used for proportioning individual ingredients shall be equipped with rate-of-flow indicators to show the rates of delivery and resettable totalizers so that the total amounts of liquid ingredients introduced into the mixture can be determined. The liquid and dry ingredients shall be fed directly into the mixer at a uniform and controlled rate. The rate of feed to the mixer shall not exceed that which will permit complete mixing of the materials. Dead areas in the mixer, in which the material does not move or is not sufficiently agitated, shall be corrected by a reduction in the volume of material or by other adjustments. Mixing shall continue until a homogeneous mixture of uniformly distributed and properly blended asphalt-rubber binder of unchanging appearance and consistency is produced. The Contractor shall provide a safe sampling device that delivers a representative sample of the completed asphalt-rubber binder of sufficient size to permit the required tests.

G. An asphalt-rubber binder storage tank equipped with a heating system to maintain the proper temperature of the asphalt-rubber binder and an internal mixing unity that maintains a homogeneous mixture of blended paving asphalt, asphalt modifier, and CRM.

H. A self-propelled truck or trailer mounted distributor, equipped with an internal mixing unit that maintains a homogeneous mixture of blended paving asphalt, asphalt modifier and CRM. The distributor shall have a pump or pumps that sprays asphalt-rubber binder within +/-0.05 gallons per square yard of the specified rate. The

distributor shall have a fully circulating spray bar that applies the asphalt-rubber binder without a streaked or otherwise irregular pattern. The distributor shall be equipped with a tachometer, pressure gages, volume measuring devices and thermometer. The distributor shall have a platform on the rear of the vehicle and an observer shall accompany the distributor. The observer shall ride in such a position that all spray nozzles are in full view and readily accessible for unplugging plugged nozzles, should plugging occur.

I. Tailgate discharge trucks for hauling screenings shall be equipped with a device to lock onto the hitch at the rear of the screenings spreader. Haul trucks shall be compatible with the screenings spreader so that the dump bed will not push down on the spreader when fully raised or have too short a bed which results in screenings spilling while dumping into the receiving hopper.

All equipment shall be approved by the Engineer prior to use.

Preparation –The Contractor shall be responsible for preparation of the pavement to receive seal coat required under Section 37-1.04 of the Standard Specifications and Section 1.06 of Document 860 "Protection and Restoration of Existing Facilities". All existing thermoplastic markings, paint markings and messages are to be ground out. Prior to placing seal coat, the streets shall be cleaned by sweeping with self-propelled vacuum or regenerative air sweepers with water spray bars to reduce dust. Sidewinder sweepers or brooms that wind row material and do not remove it shall not be used. Completion of sweeping shall be evidenced by the absence of all loose particles of paving, all dirt and all other extraneous material. If needed, all areas shall be swept a second time or more if necessary in the same manner as the first sweeping or as directed by the Engineer. All areas shall be completely dry prior to chip seal applications.

Applying Asphalt Rubber-Binder – Asphalt-rubber binder shall be applied in conformance with these Special Provisions and with the provisions for applying asphaltic emulsion in Section 37-1.05, "Applying Asphaltic Emulsion" of the Standard Specifications, except that the second, third, fourth, fifth, ninth, and twelfth paragraphs of Section 37-1.05 shall not apply.

Asphalt rubber binder for asphalt-rubber seal coat shall be applied at a rate of 0.55-gallon to 0.65 gallon per square yard. Asphalt-rubber binder shall be placed upon a clean, dry surface. The pavement surface temperature shall be a minimum of 50° F and rising where asphalt-rubber binder is to be applied. The atmospheric temperature shall be a minimum of 55° F and a maximum of 109° F.

Distributor bar height, distribution speed, and shielding materials shall be utilized to reduce the effects of wind upon spray distribution as directed by the Engineer. The Engineer will delay or reschedule work when high, gusting or dusty winds prevent or adversely affect binder or screening application operations. Necessary equipment shall be in position and ready to commence placement operations before starting.

The Contractor shall comply with Federal, State, and Local environmental laws, rules, regulations, and ordinances including, but not limited to, air quality requirements.

The asphalt-rubber binder shall be applied to the roadway immediately following mixing and reacting and shall be applied at a temperature not less than 385° F nor more than 415° F. Asphalt-rubber binder application shall not be in excess of that which can be covered with screenings within two (2) minutes.

When placing asphalt-rubber seal coat at intersections, left turn lanes, gore points, and other irregular areas, asphalt-rubber application shall not be in excess of that which can be covered with screenings within fifteen (15) minutes.

When joining edges against areas with screenings, the joint shall be swept clean of excess screenings prior to the adjacent application of asphalt-rubber binder. Transverse joints of this type shall be constructed by placing roofing paper across and over the end of the previous asphalt-rubber seal coat applications. Once the spraying has progressed beyond the paper, the paper shall be removed immediately.

The longitudinal joint between adjacent applications of screenings shall coincide with the line between designated traffic lanes. Longitudinal joints shall be overlapped for complete overage. The overlap shall not exceed 4 inches.

At longitudinal joints with screenings, the edge shall be broomed back and blended to eliminate differences in elevation. The joints shall be free from ridges and depressions and shall have a uniform appearance consistent with the adjacent sealed surface. Defects shall be corrected at the Contractor's expense.

Joints between areas of asphalt-rubber binder without screenings shall be made by overlapping asphalt-rubber binder distributions. The excess material shall be properly dispersed by spreading with a squeegee or rake over a larger area of freshly applied asphalt-rubber binder.

The application of asphalt-rubber binder to areas not accessible with the distributor bar on the distributor torch shall be accomplished by using pressurized hand wands or other means approved by the Engineer.

Spreading Screenings – Screenings for asphalt-rubber seal coat shall be spread in conformance with the provisions specified for spreading screenings on asphaltic emulsion in these Special Provisions and in Section 37-1.06, "Spreading Screenings" of the Standard Specifications, except that the first, fifth, sixth, and seventh paragraphs of Section 37-1.06 shall not apply.

Following the application of the asphalt-rubber binder, screenings shall be placed over areas receiving asphalt-rubber binder.

Screenings for asphalt-rubber seal coat shall be applied at a temperature not less than 225° F and not more than 325° F after applying asphalt-rubber binder.

The Contractor shall prevent any vehicle, including construction equipment, from driving on the asphalt-rubber binder prior to application of the screenings.

Screenings shall be applied at a rate of 28 pounds to 40 pounds per square yard. The completed spread rate shall be within 10 percent of the rate determined by the Engineer. The completed surface shall be free of gaps, ridges, depressions or other irregularities caused by the application of the asphalt-rubber seal coat.

Finishing – Asphalt-rubber seal coat shall be finished in conformance with the provisions for finishing screenings spread on asphaltic emulsion in these Special Provisions and in Section 37-1.07, "Finishing" of the Standard Specifications, except that the second, third, seventh, eighth, and ninth paragraphs of Section 37-1.07 shall not apply.

Initial rolling of the asphalt-rubber seal coat shall consist of a minimum of one complete coverage with one or more pneumatic-tired rollers and shall begin within 90 seconds following the placement of the screenings. Chip spreading will not be allowed with less than two (2) operating rollers on the job.

The distance between the rollers and the screenings spreader shall not exceed 200 feet at any time during the spreading of the screenings operations.

A minimum of 3 complete coverages as defined in Section 39-6.03, "Compacting" of the Standard Specifications with pneumatic-tired rollers, after the initial coverage, shall be made on the asphalt-rubber seal coat. The final roller coverage shall be made with one steel wheel roller at a weight sufficient to set but not crush the aggregates. The steel roller shall be operated in the static mode only.

The Contractor shall immediately remove any excess asphalt-rubber from the gutters. The Contractor shall not continue to the next street until all excess asphalt-rubber is removed to the satisfaction of the Engineer. No extension of time will be granted due to delay caused by non-compliance with this provision.

Sweeping Sweeping shall be a multi-step operation following final rolling of the screenings. Loose screenings shall be removed from the roadway surface and abutting adjacent areas. Loose screenings shall be disposed of at least 150 feet from the nearest waterway.

Initial sweeping shall be completed before controlled traffic is permitted on the asphalt-rubber seal coat. Removal of excess screenings shall be completed before uncontrolled traffic is permitted on the completed asphalt-rubber seal coat. Final sweeping shall be done and loose screenings shall be removed without dislodging the screenings set in the asphalt-rubber binder prior to acceptance.

Sidewinder sweepers or brooms that wind row material and do not remove it shall not be used. A minimum of two (2) sweepers shall be used at all times. All areas shall be swept a second time or more if necessary in the same manner as the first sweeping or as directed by the Engineer. Completion of sweeping shall be evidenced by the

absence of loose chips in gutters, driveways and surrounding improvements. Special attention shall be required in sweeping driveways clear of loose chips. The Contractor shall also be responsible for removal of all chips from the sidewalks and other affected areas. Streets in hill areas shall be swept as often as necessary to remove loose chips from the roadway. The Contractor shall provide a sufficient number of sweepers (minimum two) to sweep all streets within 24 hours after spreading screenings (chips).

The use of any sweeper that causes damage to the chip seal coat shall be discontinued. The Contractor shall patch the chip seal where any voids exist prior to application of the fog, slurry, or micro seal. Any void caused by automobile tires, poor adhesion of chips to emulsion, or any other cause shall be the contractor's responsibility to patch prior to application of the fog or slurry seal.

Final Sweeping – A minimum of three (3) self propelled power brooms shall be used that are capable of cleaning the existing pavement and removing loose screenings without dislodging screenings set in the asphalt-rubber mixture. Gutter brooms or steel-tined brooms shall not be used.

Sweeping of the chip seal shall commence one hour after completion of the rolling operation or as directed by the Engineer. Sweeping shall be completed prior to allowing uncontrolled traffic on the road surface. Three (3) additional sweepings shall be performed one day, two days, and either four or five days after placement of the chip seal to remove all loose screenings. The Contractor shall spray water on these subsequent sweepings for dust removal. Excess screenings shall be salvaged and stockpiled at a designated location or removed from the job site by the Contractor.

On the day of the actual chip seal operations, three power sweepers shall be used on those streets being chip sealed that day. Two sweepers shall be used to remove excess screenings from the road surface, and one sweeper shall directly follow the chip seal operations and be used to clean the surrounding streets and road surfaces outside of the project area to avoid tracking loose material. During sweeping the day of the chip seal, water shall not be used in the removal of loose material.

3. CONVENTIONAL CHIP SEAL (Bid Item Number 3)

a. Item Requirement

Work to be performed under this Section covers all labor, materials, tools, equipment, transportation, and incidentals necessary to construct chip seal.
All such work shall conform to the applicable provisions of the State of California, Department of Transportation, Standard Specifications (Caltrans) dated 2010; 2010 Revised Standard Specification, these Technical Provisions; and the plans and typical sections.

b. Scope

Materials

Submit a 1/2-gallon sample of asphaltic emulsion in a plastic container. Take the sample from the distributor truck spray bar at mid load.
At least 10 days before starting asphaltic emulsion seal coat application, submit the name of an authorized laboratory that will be performing asphaltic emulsion QC testing.
Submit a sample of asphaltic emulsion to the authorized laboratory and the Engineer. Each sample must be submitted in an insulated shipping container within 24 hours of sampling.
Within 7 days after taking samples, submit the authorized laboratory's test results for asphaltic emulsion.

Asphalt Emulsion

Polymer asphaltic emulsion must include elastomeric polymer.

Polymer asphaltic emulsion must comply with the section 94, of the Standard Specifications under the test on residue from evaporation test for Grades PMCRS-2h- following:

1. The penetration at 39.2 degrees F (200g for 60 seconds) determined under AASHTO T 49 must be at least 6.
2. Test elastic recovery under AASHTO T 301.
3. Polymer content in percent by weight does not apply.
4. The minimum ring and ball softening point temperature determined under AASHTO T 53 for Test on Residue from Evaporation Test must comply with the following:

4.1. 126 degrees F for a geographical ambient temperature from 32 to 104 degrees F
4.2. 129 degrees F for a geographical ambient temperature from 18 to 104 degrees F
4.3. 135 degrees F for a geographical ambient temperature from 18 to greater than 104 degrees F

Polymer asphaltic emulsion must be applied within the application rate ranges shown in the following table:

Asphaltic Emulsion Application Rates

Screenings	Application rate range(gallons per square yard)
Medium	0.25-0.40
Coarse	0.30–0.40

The Engineer determines the exact application rate.

Screenings

Screenings must be broken stone, crushed gravel, or both. At least 90 percent of screenings by weight must be crushed particles as determined under California Test 205. Screenings for seal coats must have the properties specified in the following table:

Seal Coat Screenings

Properties	Test method	Specification
Los Angeles Rattler, %, max Loss at 100 revolutions. Loss at 500 revolutions.	California Test 211	 10 40
Film stripping, %, max	California Test 302	25

Screenings for seal coat must have the gradation as determined under California Test 202 in the following table.

'Polymer Asphaltic Emulsion Seal Coat Screening Gradation
Percentage Passing

Sieve sizes	Bottom Layer Coarse 1/2" max	Top Layer Medium 3/8 Max
1/2"	85-100	100
3/8"	0-30	85-100
No. 4	0-5	0-15
No. 8	--	0-5
No. 16	--	--
No. 30	--	--
No. 200	0–2	0–2

The cleanness value determined under California Test 227 must be 86.

Equipment

Equipment for seal coats must include and comply with the following:

1. Screenings haul trucks. Haul trucks must have:
1.1. Tailgates that discharge screenings
1.2. Devices to lock onto the rear screenings spreader hitch
1.3. Dump beds that will not push down on the spreader when fully raised
1.4. Dump beds that will not spill screenings on the roadway when transferred to the spreader hopper
1.5. Tarpaulins to cover precoated screenings when haul distance exceeds 30 minutes or ambient temperature is less than 65 degrees F
2. Self-propelled screenings spreader. The spreader must have:
2.1. Screenings hopper in the rear
2.2. Belt conveyors that carry the screenings to the front
2.3. Spreading hopper capable of providing a uniform screening spread rate over the entire width of the traffic lane in 1 application.

3. Self-propelled power brooms that clean the existing pavement and remove loose screenings without dislodging screenings set in the asphalt-rubber binder. Gutter brooms or steel-tinned brooms shall not be used.

4. Pneumatic-tired rollers. Pneumatic-tired rollers must be an oscillating type at least 4 feet wide. Each roller must be self-propelled and reversible. Pneumatic tires must be of equal size, diameter, type, and ply. The roller must carry at least 3,000 lb of load on each wheel and each tire must have an air pressure of 100 ± 5 psi.
5. Steel tired rollers must be of sufficient weight to assist in setting the aggregates, but not cause excessive crushing of the aggregates.

Surface Preparation

The Contractor shall be responsible for preparation of the pavement to receive seal coat required under Section 37-1.04 of the Standard Specifications and Section 1.06 of Document 860 "Protection and Restoration of Existing Facilities" of the Project Specifications. All existing thermoplastic markings, paint markings and messages are to be ground out. Prior to placing chip seal coat, the streets shall be cleaned by sweeping with self-propelled vacuum or regenerative air sweepers with water spray bars to reduce dust. Sidewinder sweepers or brooms that wind row material and do not remove it shall not be used. Completion of sweeping shall be evidenced by the absence of all loose particles of paving, all dirt and all other extraneous material from road surface and surrounding improvements. If needed, all areas shall be swept a second time or more if necessary in the same manner as the first sweeping or as directed by the Engineer. All areas shall be completely dry prior to chip seal application.

Applying Emulsion

Asphaltic Emulsion shall be applied at a rate of 0.30 to 0.40 gallons per square yd.

At the time of application, the temperature of polymer asphaltic emulsion must be from 130 to 180 degrees F.

Apply polymer asphaltic emulsion when the ambient air temperature is from 55 to 105 degrees F and the pavement surface temperature is at least 50 degrees F.
Do not apply polymer asphaltic emulsion when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.
When tested under California Test 339, the application rate for polymer asphaltic emulsion must not vary from the average by more than:

1. 15 percent in the transverse direction
2. 10 percent in the longitudinal direction

Prevent spray on existing pavement not intended for seal coat or on previously applied seal coat using a material such as building paper. Remove the excess material after use. Align longitudinal joints between seal coat applications with designated traffic lanes. For emulsion, overlap longitudinal joints by not more than 4 inches. You may overlap longitudinal joints up to 8 inches if authorized.

For areas not accessible to a truck distributor bar, apply the emulsion with a squeegee or other authorized means. You may overlap the emulsion applications before the application of screenings at longitudinal joints.

Do not apply the emulsion unless there are sufficient screenings at the job site to cover the emulsion.

Discontinue application of emulsion early enough to comply with lane closure specifications and darkness. Apply to 1 lane at a time and cover the lane entirely in one operation.

Spreading

Prevent vehicles from driving on asphaltic emulsion or asphalt binder before spreading screenings.

Spread screenings at a uniform rate over the full lane width in one application.

Broom excess screenings at joints before spreading adjacent screenings.

Operate the spreader at speeds slow enough to prevent screenings from rolling over after discharge.

If the spreader is not moving, screenings must not drop. If spreading stops and screenings continue to drop, remove the excess screenings before resuming any activities.

Stockpiling screenings is allowed provided no contamination occurs. Screenings must have damp surfaces at spreading. If water visibly separates from the screenings, do not spread. You may redampen them in the delivery vehicle.

Spread screenings before the asphaltic emulsion sets or breaks.

Spread screenings within 10 percent of the rate determined by the Engineer. Screenings must have a spread rate within the ranges shown in the following table:

Screening Spread Rates

Seal coat type	Range (lb/sq yd)
Medium	20-30
Coarse	23–30

Do not spread screenings more than 2,500 feet ahead of the initial rolling.

Finishing

Remove piles, ridges, or unevenly distributed screenings. Repair permanent ridges, bumps, or depressions in the finished surface. Spread additional screenings and roll if screenings are picked up by rollers or vehicles.

Seal coat joints between adjacent applications of seal coat must be smooth, straight, uniform, and completely covered. Longitudinal joints must be at lane lines and not overlap by more than 4 inches. Blend the adjacent applications by brooming.

A coverage is the number of passes a roller needs to cover the width. A pass is 1 roller movement parallel to the seal coat application in either direction. Overlapping passes are part of the coverage being made and are not part of a subsequent coverage. Do not start a coverage until completing the previous coverage.

Before opening to traffic, finish seal coat in the following sequence:

1. Perform initial rolling consisting of 1 coverage with a pneumatic-tired roller
2. Perform final rolling consisting of 3 coverages with a pneumatic-tired roller
3. Broom excess screenings from the roadway and adjacent abutting areas
4. Apply flush coat if specified

The Engineer may order salvaging of excess screenings.
Properly dispose of excess screenings the Engineer determines are not salvageable.

Salvaging and stockpiling excess screenings is change order work.

Seal Coat Maintenance

Sweeping shall be a multi-step operation following final rolling of the screenings. Loose screenings shall be removed from the roadway surface and abutting adjacent areas. Loose screenings shall be disposed of at least 150 feet from the nearest waterway.

Initial sweeping shall be completed before controlled traffic is permitted on the asphalt-rubber seal coat. Removal of excess screenings shall be completed before uncontrolled traffic is permitted on the completed asphalt-rubber seal coat. Final sweeping shall be done and loose screenings shall be removed without dislodging the screenings set in the asphalt-rubber binder prior to acceptance.

Sidewinder sweepers or brooms that wind row material and do not remove it shall not be used. A minimum of two (2) sweepers shall be used at all times. All areas shall be swept a second time or more if necessary in the same manner as the first sweeping or as directed by the Engineer. Completion of sweeping shall be evidenced by the absence of loose chips in gutters, driveways and surrounding improvements. Special attention shall be required in sweeping driveways clear of loose chips. The Contractor shall also be responsible for removal of all chips from the sidewalks and other affected areas. Streets in hill areas shall be swept as often as necessary to remove loose chips from the roadway. The Contractor shall provide a sufficient number of sweepers (minimum two) to sweep all streets within 24 hours after spreading screenings (chips).

The use of any sweeper that causes damage to the chip seal coat shall be discontinued. The Contractor shall patch the chip seal where any voids exist prior to application of the fog, slurry, or micro seal. Any void caused by automobile tires, poor adhesion of chips to emulsion, or any other cause shall be the contractor's responsibility to patch prior to application of the fog or slurry seal.

Final Sweeping – A minimum of three (3) self propelled power brooms shall be used that are capable of cleaning the existing pavement and removing loose screenings without dislodging screenings set in the asphalt-rubber mixture. Gutter brooms or steel-tined brooms shall not be used.

Sweeping of the chip seal shall commence two to four hours after completion of the rolling operation or as directed by the Engineer. Sweeping shall be completed prior to allowing uncontrolled traffic on the road surface. Three (3) additional sweepings shall be performed one day, two days, and either four or five days after placement of the chip seal to remove all loose screenings. The Contractor shall spray water on these subsequent sweepings for dust removal. Excess screenings shall be salvaged and stockpiled at a designated location or removed from the job site by the Contractor.

On the day of the actual chip seal operations, three power sweepers shall be used on those streets being chip sealed that day. Two sweepers shall be used to remove excess screenings from the road surface, and one sweeper shall directly follow the chip seal operations and be used to clean the surrounding streets and road surfaces outside of the project area to avoid tracking loose material. During sweeping the day of the chip seal, water shall not be used in the removal of loose material.

Quality Control and Assurance

Samples for the screenings grading and cleanness value must be taken from the spreader conveyor belt.
Within 3 business days of sampling, the authorized laboratory must test asphaltic emulsion for:

1. Viscosity under AASHTO T 59
2. Sieve test under AASHTO T 59
3. Demulsibility under AASHTO T 59
4. Torsional recovery under California Test 332 for polymer asphaltic emulsion

The authorized laboratory must test screening for retention under the Vialit test method for aggregates in chip seals. The Vialit test results are not used for acceptance. The Vialit test is available at the METS Web site.

Circulate polymer asphaltic emulsion in the distributor truck before sampling. Take samples from the distributor truck at mid load or from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon. Take two 1/2-gallon samples in the presence of the Engineer.

If the test results for polymer asphaltic emulsion do not comply with the specifications, the Engineer assesses a pay factor value for the following properties and increments:

Polymer Asphaltic Emulsion Pay Factor Table

Test method and property	Increment	Pay factor
Test on polymer asphaltic emulsion		
AASHTO T 59 (Viscosity, sec Saybolt Furol, at 50 °C)	Each 10 seconds above max or below min	1
AASHTO T 59 (settlement, 5 days, percent)	Each 1.5 percent above max	1
AASHTO T 59 (sieve test, percent max)	Each 0.2 percent above max	1
AASHTO T 59 (demulsibility percent)	Each 2 percent below min	1
Test on residue from evaporation test		
AASHTO T 49 (penetration, 25 °C)	Each 2 dm above max or below min	1
ASTM D 36 (field softening point °C)	2 °C below min	1
California Test 332 (torsional recovery [a])	For each 1 increment below the min value of 18	1
	For each 2 increments below the min value of 18	3
	For each 3 or more increments below the min value of 18	10

[a] The highest pay factor applies

The Engineer assesses a pay factor of 1 for sampling not performed in compliance with the specifications, including shipping and sampling containers.

For polymer asphaltic emulsion seal coat, if a test result for the screenings cleanness value is from 75 to 86, you may request that the asphaltic emulsion seal coat represented by the test remain in place. A payment deduction is made as specified in section 37-2.04C(4). If the screenings cleanness value is less than 75, remove the asphaltic emulsion seal coat.

c. Payment

Payment for conventional chip seal shall be per square yard.

4. MICRO SURFACE (Bid Item Number 4)

The Micro-Surface shall be placed over Rubber Chip Seal (bid item No. 2) no sooner than seven days after the completion of Rubber Chip unless otherwise approved by the Engineer. The emulsified asphalt shall be a quick-set latex modified cationic type CQS-1H emulsion and shall conform to the requirements specified in AASHTO M208 and ASTM 2397. It shall pass all applicable storage and settlement tests. The latex shall be milled into the emulsion. The cement mixing test shall be waived for this emulsion.

Distillation of residue will be at a temperature of 350 degrees F for 20 minutes. Softening point of the residue shall be 140 degrees F minimum. Viscosity, absolute at 140 degrees F, shall be 8,000 poise minimum.

The mineral aggregate used shall be of the type and grade specified for micro-surfacing. The aggregate shall be manufactured crushed stone such as granite, slag, limestone, chat, or other high quality aggregate or combination thereof.

The aggregate including natural fines when tested by AASHTO methods T11 or T27 or ASTM C117 or C136, should met the referenced gradation requirements.

To limit the permissible amount of clay like fines in an aggregate, a sand equivalent value of 65 or higher is required when tested by ASTM 2419.

The aggregate shall have a weighted loss of not more than 15% when the sodium sulfate test is used or 20% when the magnesium sulfate test is used.

The aggregate wear, from resistance to abrasion, shall be a maximum of 35% when using AASHTO T96 or ASTM C131 test methods after 500 revolutions .

The water shall be potable and shall be free of harmful soluble salts.

Special quick-setting emulsifier agents shall be milled into the asphalt emulsion. The emulsified asphalt shall be so formulated that when the paving mixture is applied at thickness of one inch width the relative humidity at not more than 50% and the ambient air temperature of at least 75 degrees F, the material will cure sufficiently so that rolling traffic can be allowed in one hour with no damage to the surface, as verified by the Engineer.

A mineral additive shall be introduced to the mineral aggregate and may be any recognized brand of non-air entrained Portland cement or hydrated lime that is free of lumps, or other approved mineral additive. The amount of mineral additive needed shall be determined by the laboratory mix design and will be considered as part of the material gradation requirement. A liquid field control additive is introduced and blended with water to provide effective control of the required quick-set properties. This additive shall be made available by the chemical supplier or emulsion manufacturer and certifiable as being compatible with the mixture.

The qualified laboratory shall develop the job mix design and present certified test results for the contractors approval. Compatibility of the aggregate and emulsion shall be verified by the mix design. The job mix formula shall provide a minimum Marshall stability of 1800 pounds and a flow of 6 to 16 units when tested according to the ASTM 1559 or AASHTO 245

procedure as modified. All component material used in the mix design shall be representative of the material proposed by the contractor for use on the project.

The Engineer shall approve the design mix and all micro surfacing materials and methods prior to use. The component materials shall be within the following limits.

Residual Asphalt	5% to 9% by dry weight of aggregate
Mineral Additive	0.5% to 3% by dry weight of aggregate
Latex Modifier	As required to provide specified properties
Field Control Additive	As required to provide the specified properties
Water	As required to produce consistency

Aggregate-Recommended Gradations:

Screen Size	Type II % Passing	Type III % Passing
3/8”	100	100
#4	94-100	70-90
#8	65-90	45-70
#16	40-70	28-50
#30	25-50	19-34
#50	15-30	12-25
#100	10-21	7-18
#200	5-15	5-15

Application Rate shall be 18-22 lbs per sq. yd. The aggregate for Micro-Surface shall be Type II.

Before work commences, the contractor shall submit a signed mix design covering the specific material to be used on the project. This design shall be performed by a qualified laboratory. The Contractor shall construct a test strip for evaluation by the Engineer. The test strip shall be 300 feet to 500 feet long and shall consist of the application courses specified. The test strip shall be constructed at the same time of day or night that the full production of microsurfacing will be placed. The Engineer will evaluate the completed test strip after 12 hours of traffic on the completed test strip to determine if the mix design and placement procedure are acceptable. If the mix design or the placement procedure is determined by the Engineer to be unacceptable, the test strip will be rejected, the Contractor shall make modifications, and a new test strip shall be constructed and evaluated by the Engineer. The cost of materials and placement of the test strips, which have been rejected, shall be borne by the Contractor and will not be considered as part of the contract work. If ordered by the Engineer, rejected test strips shall be removed at the Contractors expense. If approve by the Engineer, the Contractor may continue with production work after placement of the test strip at his own risk. If the test strip is rejected, all production work shall be stopped and evaluated by the Engineer. The production work will be evaluated in the same manner as the placement of the test strip and shall conform to the same requirements for the test strip material.

Once the materials are approved, no substitution will be permitted unless first tested and approved by the laboratory preparing the mix design.

All equipment, tools, and machines used in the performance of this work shall be maintained in satisfactory working condition at all times to ensure a high quality of product.

The material shall be mixed by a self-propelled microsurfacing mixing machine which shall be a continuous flow mixing unit able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral and field control additives, and water to a revolving multi-blade twin shafted mixer and discharge the mixed product on a continuous flow basis. The machine shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral and field control additives, and water to maintain an adequate supply to the proportioning controls. The machine may be equipped with self-loading devices which provide for the loading of materials while continuing to lay micro-surfacing, thereby minimizing construction joints.

Individual volume or weight controls for proportioning each material to be added to the mix, i.e., aggregate, emulsified asphalt, mineral and field control additives, and water shall be provided and properly marked. These proportioning devices are usually revolution counters or similar devices and are used in material calibration and determining the materials output at any time.

The emulsion pump shall be a heated positive displacement type.

The surfacing mixture shall be spread uniformly by means of a mechanical type spreader box attached to the mixer, equipped with paddles to agitate and spread the materials throughout the box. A front seal shall be provided to insure no loss of mixture at the road contact point. The rear seal shall act as final strike off and shall be adjustable. The mixture shall be spread to fill cracks and minor surface irregularities and leave a uniform skid resistant application of material on the surface. The spreader box and rear strike off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike off. The longitudinal joint where two passes join shall be neat appearing, uniform and lapped. All excess material shall be removed from the job site prior to opening the road. The spreader box shall have suitable means provided to side shift the box to compensate for variations in pavement width and longitudinal alignment. A rut box shall be available to prefill wheel ruts when necessary prior to overlay to eliminate puddles or runoff interruption. The box shall be readily adjustable from 4’-6’ width hydraulically adjusted strike off screeds to attain maximum grade and profile.

Suitable surface cleaning equipment, traffic control equipment, hand tools and any support equipment shall be provided as necessary to perform the work.

The material shall be spread only when the road surface and atmospheric temperatures are at least 55 degrees F and rising and the weather is not rainy and there is no forecast of temperatures below 32 degrees F within 48 hours from the time of placement of the mixture.

Suitable methods shall be used by the contractor to protect the micro-surface from traffic until the new surface will support traffic without damage.

The Contractor shall be responsible for preparation of the pavement to receive seal coat required under Section 37-1.04 of the Standard Specifications and Section 1.06 of Document 860 “Protection and Restoration of Existing Facilities” of these Project Specifications. Prior to placing micro seal, the streets shall be cleaned by sweeping with self-propelled vacuum or regenerative air sweepers with water spray bars to

reduce dust. Sidewinder sweepers or brooms that wind row material and do not remove it shall not be used. Completion of sweeping shall be evidenced by the absence of all loose particles of paving, all dirt and all other extraneous material from roadway and surrounding improvements.. If needed, all areas shall be swept a second time or more if necessary in the same manner as the first sweeping or as directed by the Engineer**.**

The surface should be pre-wetted by fogging ahead of the spreader box when required by local conditions. The rate of application of the fog spray shall be adjusted during the day to suit temperatures, surface texture, humidity, and dryness of the pavement surface.

The micro-surfacing mixture shall be of the desired consistency upon leaving the mixer and no additional materials should be added. A sufficient amount of material shall be carried in all parts of the spreader at all times so that a complete coverage is obtained. Overloading of the spreader shall be avoided. No lumping, balling, or unmixed aggregate shall be permitted.

No streaks, such as those caused by oversized aggregate, will be left in the finished surface. If excessive oversize develops, the job will be stopped until the contractor proves to the Engineer that the situation has been corrected.

No excessive buildup, uncovered areas or unsightly appearances 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. Half passes and odd widths passes will be used only in minimum amounts. If half passes are used, they shall not be the last pass of any paved areas.

The micro-surfacing mixture shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogenous during and following mixing and spreading. It shall be free of excess water or emulsion and free of segregation of the emulsion and aggregate fines from the coarser aggregate.

Areas which cannot be reached with the mixing machine shall be surfaced using hand squeegees to provide complete and uniform coverage. The area to be handworked shall be lightly dampened prior to mix placement. Care shall be execerised to leave no unsightly appearance from handwork.

The same type finish as applied by the spreader box shall be required. Handwork shall be completed at the time of the machine applying process.

Care shall be taken to insure straight lines along curbs and shoulders. No runoff on these areas will be permitted. Lines at intersections will be kept straight to provide a good appearance.

Measurement and Payment: “MICROSURFACE” shall be paid for at the contract price per square yard and shall be full compensation for furnishing all labor, materials, tools, equipment, traffic control and incidentals for doing all the work involved.

5. SLURRY SEAL (Bid Item No. 5)

a. Item Requirement

The work shall consist of furnishing all necessary labor, materials and equipment for the transporting, mixing of asphaltic emulsion, aggregate and water and spreading the mixture of pavement areas to conform to the Provisions of Section 37-3, "Slurry Seal," of the Caltrans 2010 Standard Specifications, Revised Standard Specifications, the Project Plans, and these Special Provisions.

b. Scope

Immediately prior to the slurry sealing operations, the Contractor shall sweep the entire surface with vacuum assisted power brooms.

Contractor shall provide delineators for traffic safety until paving at each respective location is complete. Slurry seal shall be placed at a rate of not less than fifteen (15) pounds per square yard.

Slurry seal shall be placed only when the atmospheric temperature is at least fifty-five (55) degrees Fahrenheit and rising. Slurry seal shall not be placed on the surface of a street after 4:00 p.m. of the work day, unless otherwise authorized by the Engineer.

At least four (4) days prior to the beginning of slurry seal operations, the Contractor shall notify all affected property owners, residents, businesses and agencies by an approved, written notice detailing streets and limits of work to be done and the hours of work. The Contractor shall, prior to the beginning of slurry seal operations, post all streets that are to be worked upon with approved "No Parking – Tow Away" signs at one hundred (100) feet intervals. These shall also state the day of the week and hours of no parking. These signs shall be in English and Spanish and shall be supplied and paid for by the Contractor. The Contractor shall adhere diligently to said written schedule in the prosecution of the work.

Materials

The aggregate for slurry seal shall be Type II. Asphaltic emulsion shall be quick-setting Type PMCQS-1h asphaltic emulsion and shall conform to the following required specifications.

SPECIFICATIONS FOR ASPHALT EMULSION PMCQS-1h

TESTS ON EMULSION	TEST METHOD	TYPICAL RESULTS	SPECS. MIN.	SPECS. MAX
Viscosity 77°F, SFS	ASTM D244	22	15	100
Sieve test w%	ASTM D244	0.01		0.1
Residue from distlln	ASTM D244	61.5	57.0	
Particle Charge Test	ASTM D244		Positive	
TESTS ON RESIDUE FROM DISTILLATION				
Penetration 77°F, dmm	ASTM D5	52	40	90

Ductility 77°F, dmm	ASTM D113	100+	40
Solubility in TCE, w%	ASTM D2042	99+	97.5

Torsional recovery at 18%

Aggregate-Recommended Gradations:

Screen Size	Type II % Passing
3/8"	100
#4	94-100
#8	65-90
#16	40-70
#30	25-50
#200	10-20

The bidder must supply a notarized certification from the polymer supplier showing compliance with above.

Construction

Slurry seal shall be mixed in continuous pug mill mixers. Concrete transit mixer trucks shall not be used.

The Contractor shall be responsible for preparation of the pavement to receive seal coat required under Section 37-1.04 of the Standard Specifications and Section 1.06 of Document 860 "Protection and Restoration of Existing Facilities" of these Project Specifications. All existing thermoplastic markings, paint markings and messages are to be ground out. Prior to placing slurry seal, the streets shall be cleaned by sweeping with self-propelled vacuum or regenerative air sweepers with water spray bars to reduce dust. Sidewinder sweepers or brooms that wind row material and do not remove it shall not be used. Completion of sweeping shall be evidenced by the absence of all loose particles of paving, all dirt and all other extraneous material from street surface and surrounding improvements. If needed, all areas shall be swept a second time or more if necessary in the same manner as the first sweeping or as directed by the Engineer**.** Contractor shall replace all contaminated pavement markers at his/her expense.

All incidental work such as surfacing of driveway aprons and returns shall be done concurrently with the surfacing of the street proper. The joint between the edge of the pavement and the concrete gutter shall be sealed; slurry seals shall overlap the concrete gutter edge and concrete gutter approximately one (1) to two (2) inches. The edges of the limits of the slurry seal application on both sides of the street shall be maintained in a neat and uniform line. Slurry seal may be applied over concrete gutters upon the authorization of the Engineer. The Contractor shall furnish and maintain in good operating condition all tools and equipment necessary to do the work with a personnel to operate efficiently and skillfully.

The Contractor shall refrain from using diesel fuel, gasoline or solvents of any kind for cleaning tools and equipment in such a manner as to permit spillage of the diesel fuel or solvent on new or existing pavement, curbs and gutters, parkways or other improved areas.

The Contractor shall not use sand on the fresh slurry seal for vehicle crossings at intersections and at driveways.

Basis for rejection of improperly placing slurry seal includes, but is not limited to, striation of surface, "balling" of material due to quick-set and tracks of unauthorized vehicles, bicycles and pedestrians.

Contractor shall install temporary pavement markers once the slurry seal is cured until the roadway surface is ready for permanent raised pavement markers.

6. ASPHALT STRIPING / MESSAGES & MARKERS (Bid Item Numbers 6-45)

a. Item Requirement

The Contractor shall furnish and apply traffic stripes, characters, arrows, pavement markers, and other delineations and markings. These shall be reapplied in the original pattern on all roads except as directed by the Traffic Engineer. Contractor shall install traffic striping and markers in accordance with Sections 84 and 85, 'Traffic Stripes and Pavement Markings' and 'Pavement Markers' and the most recent version of the California MUTCD. Contractor is required to document existing striping and message types, complete with dimensions, for each street receiving seal coat treatment. Contractor is to submit this to the Engineer for review and approval a minimum of five working days prior to removal of existing striping and/or markings.

All pavement legends and traffic striping shall be applied in thermoplastic unless otherwise noted.

Temporary pavement marking materials must be on hand prior to the covering or demolition of existing pavement markings.

b. Scope

<u>MATERIALS</u>

<u>Pavement Delineation- Thermoplastic</u>

Thermoplastic material shall be extruded thermoplastic meeting the requirements of Section 84-2 and specifically Section 84-2.03B Extruded Thermoplastic or City approved equivalent. Placement shall be performed as directed by the manufacturer.

<u>Legend, Shields and Arrows</u>

Legends and arrows shall be preformed, thermoplastic pavement markings and shall be Premark 20/20 Flex Plus or a City approved equivalent. Placement shall

be performed as directed by the manufacturer. Legends and symbols for preformed green bike lanes shall be factory assembled.

Preformed Thermoplstic Green Bike Lane including bike symbols, legends and arrows.

Green bike lanes shall be preformed thermoplastic pavement markings and shall be Premark Skid/Slip Resistant (90 mil) or a City approved equivalent. Bike symbols, legends, and arrows within green bike lanes and 6" white stripe at 2' segments on dashed bike lanes shall be Premark ViziGrip (90 mil) or a City approved equivalent. Placement shall be performed as required by the manufacturer's specifications.

Bike symbols, legends, and arrows in green bike lanes must be factory assembled with the green marking sheet and interconnected so that in the field it is unnecessary to assemble the individual pieces within a material segment.

A sealer specified by the manufacturer must be applied to the substrate asphalt and concrete to ensure proper adhesion.

Preformed green marking sheets shall be installed first before the 6" white liquid thermoplastic bicycle lane line.

Pre-formed sheets shall be laid out and applied so that edges of adjacent sheets fit snugly together, the pattern of the marking aligns properly from sheet to sheet, and to prevent overlap of adjacent sheets.

First time applicators shall contact the pre-formed thermoplastic pavement marking supplier for product support and on-site training.

Pavement Delineation- Pavement Markers

Raised and reflective pavement markers shall comply with Section 85 of the Standard Specifications. The specific type to be used shall be consistent with the type generally in use within the local jurisdiction unless directed otherwise by the Engineer.

CONSTRUCTION

All construction shall conform to the respective provisions of the Standard Specifications, manufacturer's installation requirements, and these Technical Specifications.

Existing Striping and Markings

In areas adjacent to the reconstructed surfacing where existing striping must be changed to conform to a revised striping pattern, conflicting striping shall be removed by sand blasting, grinding, or other methods as specified in the Standard Specifications or by the Engineer.

The Contractor shall replace all striping which has been damaged or obliterated by or during the work. This may include striping replacement completely across the street even in the event that the Contractor's work may not extend that far. All lines of each crosswalk shall be completely replaced with thermoplastic even if only a portion of a line has been obliterated.

Layout for Temporary and Permanent Striping

The alignment and layout of traffic stripes shall conform to the Standard Specifications.

The Contractor shall perform all tie downs, layout, alignment, and spotting. The Contractor shall submit a plan documenting locations, dimensions, and Caltrans Standard Detail reference number or other applicable detail for all existing pavement striping, markings, markers and legends. The plan shall contain sufficient detail for installation of new thermoplastic and markers. The plans shall be submitted five working days prior to any removal of existing striping/markings, and shall be approved by the Engineer prior to any removal activities. The Engineer or his/her designee shall review and approve striping layout prior to final striping.

The Contractor shall physically tie down the location of the beginning and ending of each paint or thermoplastic marking type in the adjacent curb top. The marking location shall not exceed fifty square inches each. Any locations exceeding this limit shall be removed by the Contractor prior to acceptance of the work. The Contractor shall contact the City Traffic Division for review of tie downs.

The Contractor shall be responsible for accurately referencing out and replacing the lines and positions of all traffic lines, directional lines, arrows, and other markings in accordance with either prior existing striping/message layout or by revised striping plans provided by the Engineer by cat tracking with painted marks. This shall occur no later than two hours after the final surface course paving operation.

Cat tracking shall consist of stretching a rope on a straight line between control points on tangent alignment and on a true arc through control points on curved alignment and placing spots of paint along the rope. Temporary tab markers shall be placed not more than twelve feet apart on curves nor more than twenty-four feet apart on straight segments.

Temporary tab markers shall be the same color as the traffic stripe that they are replacing, shall measure two inches tall by 3-1/2 inches wide, and have a reflective lens across the width of the marker.

Application of cat tracking and/or placement of temporary markers are to occur immediately upon completion of final compaction rolling and prior to opening asphalt areas to traffic. All crosswalks, stop bars and directional arrows, both yellow and white in color, shall be placed immediately upon completion of final compaction rolling and prior to opening asphalt areas to traffic. Failure to comply with these requirements shall result in a liquidated damage of $5000 per day for each street that has not received temporary installation of the tab markers, traffic striping, and other markings. All liquidated damages in this Contract are cumulative.

Prior to application of permanent striping and markers, the Contractor shall call for review and approval of the proposed striping by the Engineer or his/her designee. The City shall have the right to make changes in the location and alignment of line stripes. Striping and traffic markings shall not be applied until approval is granted by the Engineer or his/her designee. The Contractor shall allow a minimum of seven working days for review of the layout by the City.

Crosswalks

In some instances, portions of new crosswalks will extend beyond limit of pavement rehabilitation work. In these instances, the existing 12 inch wide lines outside the paving limit shall be removed by grinding or sandblasting prior to placing new crosswalk striping.

At various locations in the project, crosswalks shall consist of a series of ten (10) foot width by two (2) foot length bars, with no perpendicular lines at the crosswalk sides, as shown in the 'Miscellaneous Details & City Standard Details' of the Contract Documents.

Schedule

Raised pavement markers (RPM's) shall be placed to replace existing RPM's or as designated by City provided striping plans. When utilizing hot melt bituminous adhesive, RPM's shall be placed after the surface has been open to traffic for at least seven days. When utilizing epoxy adhesive, RPM's shall be placed after the surface has been open to traffic for at least fourteen days. Regardless of which adhesive is utilized, the RPM's shall not be placed more than twenty-one days after paving or surfacing.

Thermoplastic materials shall be placed to replace existing thermoplastic materials or as designated by City provided striping plans. Where green bike lanes are to be installed, the pre-formed green lanes shall be installed prior to the installation of the 6" white stripe. Permanent traffic striping and markings including legends and

arrows shall be placed between eight (8) and twelve (12) days after paving or surfacing, unless otherwise directed by the Engineer. All permanent striping shall be complete in place by the 13th day after completion of resurfacing work.

Failure to comply with these requirements shall result in a liquidated damage of $150 per day for each street that has not been cat tracked or has not received permanent installation of the required raised pavement markers, traffic striping, and markings. All liquidated damages in this Contract are cumulative.

Reflective and Raised Pavement Markers

Installation of both reflective and raised pavement markers shall conform to the provisions of Section 85 of the Standard Specifications. Pavement markers shall be placed in the same pattern and locations as they were previously, except as specified by the Engineer.

Reflective Pavement Markers at fire hydrants shall consist of placing a single blue marker on the new pavement surface. Location of the new marker shall be six (6) inches off of the lane striping nearest to and in line with the existing fire hydrant.

Pavement Delineation- Thermoplastic

Pavement temperature shall be measured at the beginning of the shift on each working day and this information shall be provided to the Traffic Engineer.

No primer or thermoplastic shall be installed within forty-eight hours from the last measurable rain report as provided by the City.

Thermoplastic traffic striping, legends, and arrows shall conform to the provisions of Section 84-of the Standard Specifications and these Technical Provisions.

c. Measurement & Payment

Payment for traffic striping layout and placement of temporary lane markers will be included in the unit price bid for each striping detail as identified in the Bid Schedule and no additional compensation will be allowed therefore.

Measurement and payment for pavement striping, characters, arrows, pavement markers, raised pavement markers, and reflective pavement markers shall be paid on a unit cost basis as identified in the Bid Schedule.

Payment for any striping removal as identified herein shall be included in the unit price for the related striping item and no additional compensation will be allowed therefore.

The above contract unit costs shall be considered full compensation for furnishing all labor, materials, tools, equipment, transportation, and incidentals; and for performing all of the work involved as detailed in the Standard Specifications, these Technical Specifications, and the plans and typical sections. No additional compensation will be allowed therefore.

2015 Pavement Maintenance Project - Phase 2

Estimated Quantities

Engineer's Estimate - $800,000

BID ITEM NO.	BID ITEM	UNIT	Rubber Chip	Rubber Chip	Double Chip	Double Chip	Double Chip	Type II Slurry	Type II Slurry	Type II Slurry	Type II Slurry
			Miller Ave	S Stelling Rd	Canyon View Cir	Lindy Ln	Mercedes Rd	Berland Ct	Charsan Ln	Columbus Ave	Cristo Rey Drive
			Stevens Creek Blvd to Calle De Barcelona	Stevens Creek Blvd to SR 85	Lindy Ln to End	Lindy Pl to End	Cordova Rd to End	Stelling Rd to End	Rainbow Dr to End	Bubb Rd to Vai Ave	Roundabout to Forum
		Area (SF)	139550	283832	19075	46175	35186	14610	17773	37,443	55,047
1	Traffic Control	LS	-	-	-	-	-	-	-	-	-
2	Rubberized Chip Seal	SY	15506	31537	0	0	0	0	0	0	0
3	Double Chip Seal-Conventional Type 3	SY	0	0	2119	5131	3910	0	0	0	0
4	Micro Surfacing	SY	15506	31537	0		0	0	0	0	0
5	Conventional Type 2 Slurry	SY	0	0	0		0	1623	1975	4160	6116
6	Install Blue RPM's @ Fire Hydrant	EA	0	4	0	0	0	0	0	0	5
7	4" White (Thermo)	LF	0	1690	0	0	0	0	0	0	0
8	8" White (Thermo	LF	0	476	0	0	0	0	0	0	0
9	12" White Crosswalk/Limit Line (Thermo)	LF	550	1300	0	0	0	30	30	30	0
10	24" White (Thermo)	LF	0	0	0	0	0	0	0	0	0
11	Striping Detail # 10 (Markers)	LF	2300	0	0	0	0	0	0	0	0
12	Striping Detail # 22 (Thermo & Markers)	LF	0	0	0	120	0	0	0	0	0
13	Striping Detail # 23 (Markers)	LF	212	480	0	0	0	0	0	0	0
14	Striping Detail #24	LF	1690	0	0	0	0	0	0	0	0
15	Striping Detail #25	LF	0	404	0	0	0	0	0	0	0
16	Striping Detail #32	LF	250	0	0	0	0	0	0	0	0
17	Striping Detail # 38 (Thermo & Markers)	LF	600	500	0	0	0	0	0	0	0
18	Striping Detail #38A	LF	0	850	0	0	0	0	0	0	0
19	Striping Detail #38C	LF	0	1580	0	0	0	0	0	0	0
20	Striping Detail # 39 (Preformed Thermo)	LF	0	3040	0	0	0	0	0	0	0
21	Striping Detail # 39A (Preformed Thermo)	LF	0	2687	0	0	0	0	0	0	0
22	Striping Detail # 40A (Markers)	LF	0	5536	0	0	0	0	0	0	0
23	Arrow Type IV (Preformed Thermo)	EA	12	16	0	0	0	0	0	0	0
24	Arrow Type VII (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
25	Arrow Type VI (Preformed Thermo) Right Lane Drop	EA	0	2	0	0	0	0	0	0	0
26	"25" Legend (Thermo)	EA	0	0	0	0	0	0	0	0	0
27	"30" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	2
28	"35" Legend (Preformed Thermo)	EA	4	10	0	0	0	0	0	0	0
29	"AHEAD" Legend (Preformed Thermo)	EA	2	2	0	0	0	0	0	0	0
30	"Bike Rider with person" Symbol - Left facing(Preformed Thermo)	EA	0	16	0	0	0	0	0	0	0
31	Bike Lane Arrow (Preformed Thermo)	EA	0	14	0	0	0	0	0	0	0
32	"Bike Detector" Symbol	EA	0	3	0	0	0	0	0	0	0
33	"SIGNAL" legend (Preformed Thermo)	EA	2	0	0	0	0	0	0	0	0
34	"STOP" Legend (Preformed Thermo)	EA	0	6	0	0	0	1	1	1	0
36	"PED" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
37	"WAIT" legend (Preformed Thermo)	EA	0	2	0	0	0	0	0	0	0
38	"HERE" legend (Preformed Thermo)	EA	0	2	0	0	0	0	0	0	0
39	"XING" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
40	"YIELD" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	1
41	YIELD line (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	1
42	Sharrows - Left Facing (Preformed Thermo)	EA	23	2	0	0	0	0	0	0	0
43	Green Bike Lanes	SF	0	1774	0	0	0	0	0	0	0
44	Green Bike Rider Panel Factory Assembled (4x20)	EA	0	2	0	0	0	0	0	0	0
45	Bike Rider Symbol Pre-formed (Factory Assembled) (4x7)	EA	0	2	0	0	0	0	0	0	0

2015 Pavement Maintenance Project - Phase 2

Estimated Quantities

Engineer's Estimate - $800,000

BID ITEM NO.	BID ITEM	UNIT	Type II Slurry Echo Hill Ct Stelling Rd to End	Type II Slurry Elderwood Ct Tuscany Pl to End	Type II Slurry Gates of Heaven Round About to Entrance Gate	Type II Slurry Hammond Way Cristo Rey to End	Type II Slurry Imperial Ave Stevens Creek to Conform	Type II Slurry Orange Ave McClellan to Cul De Sac	Type II Slurry Pasadena Ave Stevens Creek to Granada	Type II Slurry Riviera Rd Scenic Circle to End	Type II Slurry Scenic Blvd Palm to Scenic Circle
		Area (SF)	10201	18042	4638	29219	53,028	59,960	10,666	2212	13953
1	Traffic Control	LS	-	-	-	-	-	-	-	-	-
2	Rubberized Chip Seal	SY	0	0	0	0	0	0	0	0	0
3	Double Chip Seal-Conventional Type 3	SY	0	0	0	0	0	0	0	0	0
4	Micro Surfacing	SY	0	0	0	0	0	0	0	0	0
5	Conventional Type 2 Slurry	SY	1133	2005	515	3247	5892	6662	1185	246	1550
6	Install Blue RPM's @ Fire Hydrant	EA	0	0	0	0	0	0	0	0	0
7	4" White (Thermo)	LF	0	0	0	0	60	0	0	0	0
8	8" White (Thermo	LF	0	0	0	0	0	0	0	0	0
9	12" White Crosswalk/Limit Line (Thermo)	LF	30	0	0		30	75	60	0	0
10	24" White (Thermo)	LF	0	0	70	50	0	0	0	0	0
11	Striping Detail # 10 (Markers)	LF	0	0	0	0	0	0	0	0	0
12	Striping Detail # 22 (Thermo & Markers)	LF	0	0	0	0	0	0	0	0	0
13	Striping Detail # 23 (Markers)	LF	0	0	0	0	0	0	0	0	0
14	Striping Detail #24	LF	0	0	0	0	0	0	0	0	0
15	Striping Detail #25	LF	0	0	0	0	0	0	0	0	0
16	Striping Detail #32	LF	0	0	0	0	0	0	0	0	0
17	Striping Detail # 38 (Thermo & Markers)	LF	0	0	0	0	0	0	0	0	0
18	Striping Detail #38A	LF	0	0	0	0	0	0	0	0	0
19	Striping Detail #38C	LF	0	0	0	0	0	0	0	0	0
20	Striping Detail # 39 (Preformed Thermo)	LF	0	0	0	0	0	0	0	0	0
21	Striping Detail # 39A (Preformed Thermo)	LF	0	0	0	0	0	0	0	0	0
22	Striping Detail # 40A (Markers)	LF	0	0	0	0	0	0	0	0	0
23	Arrow Type IV (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
24	Arrow Type VII (Preformed Thermo)	EA	0	0	0	0	2	0	2	0	0
25	Arrow Type VI (Preformed Thermo) Right Lane Drop	EA	0	0	0	0	0	0	0	0	0
26	"25" Legend (Thermo)	EA	0	0	0	0	0	4	2	0	0
27	"30" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
28	"35" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
29	"AHEAD" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
30	"Bike Rider with person" Symbol - Left facing(Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
31	Bike Lane Arrow (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
32	"Bike Detector" Symbol	EA	0	0	0	0	0	0	0	0	0
33	"SIGNAL" legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
34	"STOP" Legend (Preformed Thermo)	EA	1	0	0	0	0	3	2	0	0
36	"PED" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
37	"WAIT" legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
38	"HERE" legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
39	"XING" Legend (Preformed Thermo)	EA	0	0	0	0	0	0	0	0	0
40	"YIELD" Legend (Preformed Thermo)	EA	0	0	1	1	0	0	0	0	0
41	YIELD line (Preformed Thermo)	EA	0	0	1	1	0	0	0	0	0
42	Sharrows - Left Facing (Preformed Thermo)	EA	0	0	0	0	0	23	0	0	0
43	Green Bike Lanes	SF	0	0	0	0	0	0	0	0	0
44	Green Bike Rider Panel Factory Assembled (4x20)	EA	0	0	0	0	0	0	0	0	0
45	Bike Rider Symbol Pre-formed (Factory Assembled) (4x7)	EA	0	0	0	0	0	0	0	0	0

2015 Pavement Maintenance Project - Phase 2

Estimated Quantities

Engineer's Estimate - $800,000

BID ITEM NO.	BID ITEM	UNIT	Scenic Circle Scenic Blvd to Scenic Blvd	Scenic Ct Scenic Cir to End	Tuscany Pl Heatherwood Dr to End	Vai Ave Bubb Rd to Columbus Rd	TOTAL ESTIMATED QUANTITY
			Type II Slurry	Type II Slurry	Type II Slurry	Type II Slurry	
		Area (SF)	55916	8903	30896	38,284	
1	Traffic Control	LS	-	-	-	-	1
2	Rubberized Chip Seal	SY	0	0	0	0	47042
3	Double Chip Seal-Conventional Type 3	SY	0	0	0	0	11160
4	Micro Surfacing	SY	0	0	0	0	47042
5	Conventional Type 2 Slurry	SY	6213	989	3433	4254	51199
6	Install Blue RPM's @ Fire Hydrant	EA	0	0	0	0	40
7	4" White (Thermo)	LF	0	0	0	0	1750
8	8" White (Thermo	LF	0	0	0	0	476
9	12" White Crosswalk/Limit Line (Thermo)	LF	90	0	0	30	2255
10	24" White (Thermo)	LF	0	0	0	0	120
11	Striping Detail # 10 (Markers)	LF	0	0	0	0	2300
12	Striping Detail # 22 (Thermo & Markers)	LF	0	0	0	0	120
13	Striping Detail # 23 (Markers)	LF	0	0	0	0	692
14	Striping Detail #24	LF	0	0	0	0	1690
15	Striping Detail #25	LF	0	0	0	0	404
16	Striping Detail #32	LF	0	0	0	0	250
17	Striping Detail # 38 (Thermo & Markers)	LF	0	0	0	0	1100
18	Striping Detail #38A	LF	0	0	0	0	850
19	Striping Detail #38C	LF	0	0	0	0	1580
20	Striping Detail # 39 (Preformed Thermo)	LF	0	0	0	0	3040
21	Striping Detail # 39A (Preformed Thermo)	LF	0	0	0	0	2687
22	Striping Detail # 40A (Markers)	LF	0	0	0	0	5536
23	Arrow Type IV (Preformed Thermo)	EA	0	0	0	0	28
24	Arrow Type VII (Preformed Thermo)	EA	0	0	0	0	4
25	Arrow Type VI (Preformed Thermo) Right Lane Drop	EA	0	0	0	0	2
26	"25" Legend (Thermo)	EA	0	0	0	0	6
27	"30" Legend (Preformed Thermo)	EA	0	0	0	0	2
28	"35" Legend (Preformed Thermo)	EA	0	0	0	0	14
29	"AHEAD" Legend (Preformed Thermo)	EA	0	0	0	0	4
30	"Bike Rider with person" Symbol - Left facing(Preformed Thermo)	EA	0	0	0	0	16
31	Bike Lane Arrow (Preformed Thermo)	EA	0	0	0	0	14
32	"Bike Detector" Symbol	EA	0	0	0	0	3
33	"SIGNAL" legend (Preformed Thermo)	EA	0	0	0	0	2
34	"STOP" Legend (Preformed Thermo)	EA	0	0	0	1	16
36	"PED" Legend (Preformed Thermo)	EA	2	0	0	0	2
37	"WAIT" legend (Preformed Thermo)	EA	0	0	0	0	2
38	"HERE" legend (Preformed Thermo)	EA	0	0	0	0	2
39	"XING" Legend (Preformed Thermo)	EA	2	0	0	0	2
40	"YIELD" Legend (Preformed Thermo)	EA	0	0	0	0	3
41	YIELD line (Preformed Thermo)	EA	0	0	0	0	3
42	Sharrows - Left Facing (Preformed Thermo)	EA	0	0	0	0	48
43	Green Bike Lanes	SF	0	0	0	0	1774
44	Green Bike Rider Panel Factory Assembled (4x20)	EA	0	0	0	0	2
45	Bike Rider Symbol Pre-formed (Factory Assembled) (4x7)	EA	0	0	0	0	2