CONSTRUCTION OF

PROJECT NAME

PROJECT NO. ##-####

SPECIAL PROVISIONS

SECTION R - ROADWAY

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction 2021 Edition (Greenbook). These Special Provisions have been arranged into a format that parallels the Greenbook.

Bidders with pre-bid inquiries regarding the Work covered in this Section should be directed to Purchasing at (951) ###-####.

Prepared By:

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Date

Reviewed:

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Date

(UPDATED: 07-28)

SECTION R – ROADWAY PROVISIONS

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PART 1 – GENERAL PROVISIONS

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

5-7.8 STEEL PLATE COVERS.

5-7.8.2 Thickness

Steel plate covers shall conform to Table 206-7.1 (A) and to City of Corona Standard Plan No. 151.

TABLE 206-7.1 (A).0

Trench Width[1]	Minimum Plate Thickness
10 inches (25 cm)	½ inch (13 mm)
1 foot-11 inches (58 cm)	¾ inch (19 mm)
2 foot-7 inches (80 cm)	7/8 inch (22 mm)
3 foot-5 inches (104 cm)	1 inch (25 mm)
5 foot-3 inches (160 cm)	1 ¼ inch (32 mm)

1. For spans greater than 5 feet - 3 inches (160 cm), a structural design by a Registered Structural or Civil Engineer shall be submitted and approved in accordance with 2-5.3. The steel plate covers shall be designed to withstand an HS20-44 AASHTO Bridge Loading or as specified on the Plans.

Steel plates shall have a surface that is roughened, taped, coated or otherwise modified to provide the non-skid surface shown on the Plans or specified in the Special Provisions.

5-7.8.3 Installation

1. Whenever openings, trenches and excavations cannot be completely backfilled or resurfaced within the workday, they shall be bridged with steel plate covers to permit an unobstructed flow of traffic, bicyclists, and pedestrians. The Contractor shall provide and install the steel plate covers. The steel plate covers shall be approved by the Agency and conform to 5-7.8, the Plans and Be secured against movement using holding devices such as adjustable cleats, angles, bolts, tack welding or other devices.
2. Be installed to operate with a minimum of noise.
3. Extend 1-foot minimum beyond the edges of the trench.

The steel plate covers shall provide complete coverage to prevent any pedestrian, bicyclist or motor vehicle from being endangered due to movement of the steel plate covers causing separations or gaps.

The trench shall be adequately shored to support the steel plate covers, traffic and pedestrians. Temporary paving materials in conformance with 306-13.1 shall be used to feather the edges of the steel plates to minimize wheel impacts and comply with ADA.

Steel plate covers shall be installed using either Method 1 or 2.

Method 1. For posted speeds more than 45 MPH the pavement shall be cold milled to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate.

Method 2. For posted speeds less than 45 MPH the approach to the plate(s) and ending of the plate (in longitudinal placement) shall be attached to the Roadway by a minimum of 2 dowels per- plate drilled into the corners of the plate and drilled 2 inches into the pavement. Subsequent plates may be butted next to each

other. When the steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of asphalt concrete mix, concrete slurry or an equivalent. The Contractor has the option of installing the steel plates covers using Method 1 for speeds less than 45 MPH.

When steel plate covers are installed in conformance with Method 2, temporary asphalt paving material conforming to an "E" gradation shall be placed in:

1. Roadways shall be placed with a 4-inch run for each 1-inch thickness of steel plate cover.
2. Bike paths or routes shall be placed with an 8-inch run for each 1-inch thickness of steel plate cover.
3. Pedestrian ways, including cross walks, shall be placed with a 12-inch run for each 1-inch thickness of steel plate to comply with ADA.

Contractor shall be responsible for maintenance of the steel plate covers and asphalt concrete ramps.

Advance traffic warning signs are required when steel plate covers are installed. The signs shall comply with the California MUTCD, be as specified in these Special Provisions or as shown on the TCP.

When steel plate covers are removed, any damaged pavement shall be repaired with either asphalt concrete mix conforming to a "D2" gradation asphaltic cold mix or concrete slurry as specified in these Special Provisions.

5-7.8.4 Payment.

Full compensation for furnishing and installing steel plate covers shall be considered as included in the prices in the Bid for the various items that required the steel plate covers.

Add the entire section as follows:

PART 2 - CONSTRUCTION MATERIALS

All as provided in Part 2 of the Standard Specifications for Public Works Construction except as otherwise provided hereinafter.

SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE

201-1.1.1 General.

Insert the following as the second paragraph:

Contractor shall furnish the Engineer a copy of the mix design to be used and with legible certified weight-master's certificate for each load of PCC delivered to the work site. Portland Cement concrete delivered to the site having a water content and/or slump greater than that specified in the mix design shall be rejected and removed from the Work site.

201-1.4.4 Hand Mixing.

Insert the following after the first sentence:

Hand mixing concrete shall not be allowed except by prior permission from the Engineer. Prepackaged unmixed concrete shall not be allowed except by prior permission from the Engineer.

(UPDATED: 01-19)

201-2 REINFORCEMENT FOR CONCRETE.

201-2.2 Steel Reinforcement.

201-2.2.1 Reinforcing Steel.

Replace the first sentence in the first paragraph with the following:

Unless otherwise specified, reinforcing steel, except longitudinal steel shall be Grade 60 billet steel conforming to ASTM A615.

201-4 CONCRETE CURING MATERIALS.

201-4.1.1 General.

Replace the first sentence in the fourth paragraph with the following:

Unless otherwise shown on the Plans, Type 2, white pigmented curing compound shall be applied to all finish concrete work immediately after the finishing work has been completed.

SECTION 214 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

214-4 PAINT FOR STRIPING AND MARKINGS.

214-4.1 General.

Insert the following after the last paragraph:

All striping and pavement marking shall be thermoplastic ALKYD BINDER unless specified otherwise on the Plans. Paint, when approved in lieu of thermoplastic material, for traffic striping and pavement markings shall be manufactured by Bauer Coatings Chemicals Division or approved equal. Colors shall be white (1039 A9), yellow (1040 A9), or black (11 A9), as required and shall be approved by the Engineer prior to application.

214-6 PAVEMENT MARKERS.

214-6.4 Retroreflective Pavement Markers.

214-6.4.1 General.

Replace the last sentence of the first paragraph with the following:

The exterior surface of the shell shall be smooth and contain 1 or 2 methyl methacrylate prismatic faces of the color shown on the Plans or to match existing.

214-7 ADHESIVES FOR PAVEMENT MARKERS.

214-7.1 General.

Replace the last sentence of the first paragraph with the following:

The type of adhesive to be applied shall be as specified in the Special Provisions.

214-7.2 Epoxy Adhesives.

214-7.2.1 General.

Replace the first sentence with the following:

Epoxy adhesive- shall be rapid-set.

Add the entire following Section:

PART 3 – CONSTRUCTION METHODS

All as provided in Part 3 of the Standard Specifications for Public Works Construction except as otherwise provided hereinafter.

SECTION 300 – EARTHWORK

300-1 CLEARING AND GRUBBING.

300-1.1 General.

Insert the following after the second paragraph:

Clearing and Grubbing shall also include but not be limited to:

Removing any existing plant material (including roots), rocks, concrete, boulders, asphalt, and any other trash or debris to a depth of 12 inches below top of curb elevations.

Protection of all existing improvements within the Project area, including all materials, temporary fencing, and labor required to protect existing improvements.

Removal shall be disposed of in a legally acceptable manner outside of right-of-way. All green waste material shall be disposed of at a recycling center. Contractor shall provide weight tickets as evidence of disposal of all green waste.

300-1.4 Payment.

Replace the first sentence with the following:

Payment for "CLEARING AND GRUBBING" shall be at the lump sum Bid price and shall include full compensation for subgrade preparation, material, placement, removal, labor, tools, equipment, and incidental necessary to do the work involved thereof, complete, in place and accepted.

SECTION 301 – SUBGRADE PREPARATION, TREATED MATERIALS, AND PLACEMENT OF BASE MATERIALS

301-1.6 Adjustment of Manhole Frame and Cover Sets to Grade.

Replace the first three sentences of the first paragraph with the following:

Adjustment of manhole frame and cover including utility vault frame and cover to grade shall be in accordance with Standard Plan 152. Adjustment of water valve slip can and/or sleeve shall be in accordance with Standard Plan 422. Contractor shall be responsible to provide all slip cans and/or sleeves needed to adjust the water valve covers. Existing manholes and utility vaults shall be ramped with minimum 10 feet round with temporary asphalt. Temporary asphalt ramps shall be completely removed prior to asphalt overlay. The area around each manhole or utility vault must be compacted prior to paving.

It is the Contractor's responsibility to coordinate with other agencies to adjust to grade manhole, valve, and utility vault frame and cover of any facility owned/maintained by each agency. Prior to beginning of work, Contractor will submit to the Engineer a copy of all correspondences with each utility company.

Add the following subsections:

301-1.6.1 Protect Existing Manhole from Debris.

Contractor shall exercise care so that surface materials such as rocks, dirt, and debris do not enter the pipeline. In order to prevent contamination, Contractor shall be required to provide a ¾-inch thick plywood platform to be placed on the concrete shelf at the bottom of the manhole

prior to any cold milling pavement work. The shape of this platform shall conform to the circumference of the inside wall at the shelf elevation. After the manhole has been adjusted, the material accumulated on the plywood shelf along with the plywood shelf shall be removed from the manhole and disposed of in accordance with 401-1. Payment for all preparatory work, material, equipment, and labor for installation and removal of the false manhole bottom shall be included in the various items of work involved and no additional compensation shall be allowed therefor.

301-1.6.2 Protect and Clean Water Valve.

Contractor shall exercise care so that surface material such as rocks, dirt, and debris do not enter a water valve. Contractor shall uncover water valves at the end of construction for final inspection. Any debris found inside a valve shall be removed by use of vacuum truck. Payment for protecting, inspecting, and cleaning water valves shall be made at the Contract Unit price Bid for "Protect and Clean Water Valve" as shown on the Bid Schedule. The Contract Unit price Bid shall include, but is not limited to all preparatory work, material, equipment, and labor required to perform the work.

301-1.7 Payment.

Replace the third and fourth paragraph with the following:

Payment for adjusting manhole frame and cover, utility vault frame and cover, and water valve shall be made at the Contract Unit price Bid and not additional compensation will be allowed. The Contract Unit price Bid shall include the cost of double adjustment to lower the manhole frame and cover, utility frame and cover, or water valve to subgrade elevation and to restore the manhole frame and cover, utility vault frame and cover, or water valve to the final elevation and shall be paid 50% for each adjustment.

301-2 UNTREATED BASE.

301-2.3 Compacting.

Insert the following as the first paragraph.

It shall be the Contractor's responsibility to provide adequate equipment and methods to accomplish the Work in accordance with these provisions. The grading shall be done to the elevations provided in the Plans. Any field conditions that prevent the Contractor from matching design elevations shall be immediately notified to the Engineer.

Replace the first sentence of the third paragraph with the following:

Relative compaction of not less than 95% shall be obtained for a minimum depth of 1.0 foot below the grading plane.

SECTION 302 – ROADWAY SURFACING

302-4 SLURRY SEAL SURFACING.

302-4.4 Rubberized Emulsion Aggregate Slurry (REAS).

302-4.4.2 Mixing.

Replace the subsection with the following:

REAS shall be mixed at a central mixing plant conforming to 203-5.3

302-4.8.2.1 Application Temperature.

Replace the first paragraph with the following:

REAS shall not be applied when the atmospheric temperature is less than 60°F or when the atmospheric temperature at 7 a.m. is 75°F or over, and rising to a forecast high of 100°F. REAS shall only be applied between April 15th and October 15th unless approved by the Engineer.

302-4.10.3 Rubberized Emulsion-Aggregate Slurry Seal Surfacing.
Replace the entire subsection with the following:

REAS will be measured per square foot [Greenbook stipulates measurement by each ton (Tonne) therefore if Bid per ton, 302-4.10.3 and 302-4.11.3 okay per Greenbook].

302-4.11.3 Rubberized Emulsion-Aggregate Slurry Seal Surfacing.
Replace the entire subsection with the following

REAS will be paid at the Contract Unit Price per square foot [Greenbook stipulates measurement by each ton (Tonne)]. The Contract Unit Price paid per square foot shall include full compensation for furnishing emulsion, accelerator or retardant, and water for constructing REAS in place. No separate payment will be made for calibration, scheduling, public convenience, or traffic control unless otherwise specified in these Special Provisions.

302-5 ASPHALT CONCRETE PAVEMENT.

302-5.4 Tack Coat.
Replace the first sentence of the first paragraph with the following:

Tack Coat shall be grade SS-1h emulsified asphalt, where required, and shall be uniformly applied at a rate no less than 0.07 gallons per square yard. Payment for this item shall be included in the unit price for asphalt overlay and no additional compensation will be allowed.

302-5.5 Distribution and Spreading.
Insert the following as item (f) under the seventh paragraph:

(f) Longitudinal joints in the top layer must match lane lines. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the lane line. Other longitudinal joint placement patterns are allowed if authorized by the Engineer.

302-6 PORTLAND CEMENT CONCRETE PAVEMENT.

302-6.1 General.
Insert the following after the first sentence:

Formwork shall be approved by the Engineer before placing concrete. The work shall include, but not be limited to the saw cutting, removal and disposal of AC and sub-base, sub-grade preparation, base material, compaction, placement, materials, rebar, all labor, tools, equipment and incidentals necessary to do all of the work as specified on the Plans or as directed by the Engineer.

Insert the following subsection(s):

302-15 POLYMER EMULSION – RECLAIMED ASPHALT PAVEMENT SLURRY SEAL (RAPSS)

302-15.1 General.

Polymer Emulsion – Reclaimed Asphalt Pavement Slurry Seal (RAPSS) shall consist of a

stable mixture of polymer modified asphalt emulsion (PMAE), reclaimed asphalt pavement (RAP), water and when warranted retarding or accelerating additives proportioned, mixed and uniformly spread over a properly prepared surface or pavement where shown on the Plans, as specified in this Specification, and as directed by the Engineer.

302-15.2 Materials.

The materials for slurry seal immediately prior to mixing shall conform to the following requirements.

302-15.2.1 Polymer Modified Asphalt Emulsion (PMAE).

Polymer modified asphalt emulsion shall be a quick-setting Type PMCQS-1h asphalt emulsion. The emulsion shall be homogeneous in color throughout and show no separation after thorough mixing. It shall break and set on the aggregate within 5 minutes and shall be ready for vehicular traffic in 60 minutes. The PMAE shall meet the requirements shown in Table 302-14.2.1 (A).

TABLE 302-14.2.1 (A)

Tests On Emulsion	**ASTM Test Method**	**Typical Results**	**Specs. Min.**	**Max.**
Viscosity 77°F, SFS	D244	22	15	100
Sieve test w%	D244	0.01	0.1 Max.	
Residue from distillation	D244	61.5	57.0 Min.	
Particle Charge Test	D244		Positive	
Tests On Residue From Distillation				
Penetration 77°F, dmm	D5	52	40	90
Ductility 77°F, dmm	D113	100+	40 Min.	
Solubility in TCE, w%	D2042	99+	97.5 Min.	
Torsional Recovery, %, min.	CA332	22	18	

The polymer shall be Butonal®NX1120 manufactured by BASF Corporation.

The polymer shall be added to the water/soap phase by injection prior to the mill manufacture of the asphalt emulsion. The amount of polymer solids shall be 3 percent of the asphalt residual content and shall be certified by the emulsion producer on each load of emulsion delivered to the job site. Samples of polymer may be required and shall conform to the requirements shown in Table 302-14.2.1 (B).

TABLE 302-14.2.1 (B)

Test	**Requirement**
Total Solids, min %	60
Bound Styrene %	24 - 60
pH at 25 Degrees C	4.2 - 5.2
Brookfield Viscosity RVT	1000 - 4000
Residual Monomer %	0.08 max.

302-15.2.2 RAP Aggregate.

RAP Aggregate shall consist of sound, durable, milled and/or crushed Reclaimed Asphalt Pavement. The material shall be free from vegetable matter, loop wires, paving fabric, crushed concrete, brick and other deleterious substances. When tested in accordance with ASTM C136

and ASTM C117 the percentage composition by weight of the RAP shall conform to the grading requirements shown in Table 302-14.2.2 (A).

TABLE 302-14.2.2 (A)

Sieve Size	Percent Passing1	Percent Passing2
3/8" (9.5 mm)	100	100
No. 4 (4.75mm)	95-100	95-100
No. 8 (2.36 mm)	65-85	70-79
No. 16 (1.18 mm)	35-60	50-75
No. 30 (600 um)	18-38	35-55
No. 50 (330 um)	8-25	22-40
No. 100 (150 um)	5-20	13-38
No. 200 (75 um)	2-12	10-20
Residual Asphalt Content		6.5%[3] Min. (based on dry weight of aggregate)

1. On unextracted RAA.
2. On extracted RAA.
3. To be determined by Ignition

The RAP shall conform to the quality requirements shown in Table 302-14.2.2 (B).

TABLE 302-14.2.2 (B)

Test	Test Method	Requirement
Sand Equivalent	ASTM D2419	60 Min.
Durability Index		55 Min.
Soundness	ASTM C88	15% Max. Using NA_2SO_4 *
Abrasion Resistance	ASTM C131	35% Max. After 500 Revolutions. *

* On RAP Source Retained on Number 4 Sieve.

302-15.2.3 Water.

Water shall be potable, free of harmful soluble salts and shall be of such quality that the asphalt will not separate from the emulsion before the slurry seal is in place.

302-15.2.4 Additives.

Additives may be used, as approved by the Engineer to accelerate or retard the break-set of the slurry seal or to improve the resulting surface.

302-15.3 Mix Design.

At least 7 working days before slurry seal placement commences, a certified job mix design shall be submitted by the Contractor for approval by the Engineer that conforms to the specification limits, and that is suitable for the traffic, climate conditions, curing conditions and final use. The report shall clearly show the proportions of Recycled Asphalt Aggregate, water (min. and max.), additive(s) (usage) and asphalt emulsion based on the dry weight of the Recycled Asphalt Aggregate. A laboratory capable of performing the applicable International Slurry Seal Association (ISSA) tests shall perform the tests and mix design. All components used in the mix design shall be representative of the materials proposed by the Contractor to be used on the project. The proposed slurry seal mixture shall conform to the requirements specified when tested in accordance with the tests shown in Table 302-14.3 (A).

TABLE 302-14.3 (A)

Test	ISSA Test Method	Requirement
Wet Track Abrasion Loss (g/m^2)	TB100	650 max. (60)
Slurry Seal Consistency (mm)	TB106	30 max.
Wet Stripping	TB114	Pass (90% min.)
Mix time	TB113	Controllable to 180 seconds min. at the maximum expected air temperature at the site during application.
Wet Cohesion Test (kg-mm)	TB139	120 at 30 minutes minimum

The component materials shall be within the limits shown in Table 302-14.3 (B).

TABLE 302-14.3 (B)

Component	Amount
Emulsion	10.0% - 14.0%
Residual Asphalt	12.5% min.
Additives	As needed.
Water	As needed to achieve proper mix consistency.

Water, and retarder if used, shall be added to ensure proper workability and permit uncontrolled traffic on the slurry seal within 1 hour after placement without the occurrence of bleeding, raveling, separation or other distress.

302-15.4 Mixing and Spreading Equipment.

The slurry seal shall be mixed in a self-propelled mixing machine equipped with sufficient storage capacity for the recycled asphalt aggregate, polymer modified asphalt emulsion, additives and water. The mixing machine shall be equipped with individual volume or weight controls for automatically proportioning and accurately delivering in proper sequence the material to a continuous flow pug mill for mixing. Each material control device shall be calibrated, properly marked, preset and lockable at the direction of the Engineer. Calibrated flow meters shall be provided to measure both the addition of water and asphalt emulsion to the pug mill. Concrete transit mixer trucks shall not be used.

The slurry mixture shall be uniformly spread by means of a controlled spreader box. The spreader shall be capable of spreading a traffic lane width and shall have strips of flexible rubber belting or similar material on each side of the spreader box and in contact with the pavement to prevent loss of slurry from the box. The box shall have baffles, or other suitable devices, to insure uniform application on super-elevated sections and shoulder slopes. The rear flexible strike-off blade shall make close contact with the pavement and shall be capable of being adjusted to the various crown shapes so as to apply a uniform slurry seal. The spreader box shall be maintained in such a manner as to prevent chatter (wash boarding) or other surface defects that will affect the aesthetic value of the finished slurry seal mat. The mixing machine shall be equipped with a water pressure system and nozzle type spray bars to provide a water spray immediately ahead of the spreader box.

302-15.5 Placing.

Slurry shall be applied only when the atmospheric temperature is at least 50°F (10 °C) and rising. The mixture shall not be applied if high relative humidity prolongs the curing beyond a

reasonable time.

The application of slurry shall not commence prior to the start of the workday and shall be sufficiently cured to be open to traffic by the end of the workday, unless authorized by the Engineer. The streets to be sealed shall be closed from the time the application begins until the Engineer determines the mixture has achieved sufficient set to be opened to traffic.

The slurry seal shall be placed at an application rate of 12 to 15 pounds per square yard.

Areas, which cannot be reached by the spreader box, shall be surfaced with hand squeegees to provide complete and uniform coverage. The area to be hand worked shall be lightly dampened prior to mix placement. The same type of finish as applied /the spreader box shall be required.

Prior to the slurry sealing operations, the Contractor shall remove all existing striping, legends and raised pavement markers within the slurry seal limits per 314-2 and 314-3. When removing the raised pavement markers the Contractor shall remove any adhesive left on pavement caused from the removal of raised pavement markers. If any pavement damage (potholes) caused by removing raised pavement markers it shall be filled with a bituminous adhesive approved by the Engineer. Contractor shall install temporary pavement markers once the slurry seal is cured until the roadway surface is ready for permanent raised pavement markers.

Immediately prior to the slurry placement, the Contractor shall sweep the entire surface to be sealed with street sweeping equipment conforming to 7-8.1.

Before slurry seal operations, all manholes covers, flush inlet covers, monument covers and all other utility covers to remain shall be protected by covering the surface with an appropriate paper or plastic sheeting, cut to fit or by other methods approved by the Engineer. All traces of the cover and slurry seal shall be removed by the end of the same workday. 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 by the slurry seal by overlapping the concrete gutter edge and concrete gutter 1 to 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. 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.

Slurry shall be applied in such a manner that no ridges shall remain. The mixture shall be uniform and homogeneous after spreading on the existing surface and shall not show separation of the emulsion and aggregate after setting.

The Contractor shall prevent slurry from being deposited on other than asphalt concrete surfaces and shall remove slurry from surfaces not designated to be sealed. The method of slurry removal shall be approved by the Engineer.

At the direction of the Engineer, the Contractor shall repair and reseal all areas of the streets which have not been sealed properly or completely. Where the completed slurry is not uniform in color, the street shall be treated to eliminate the color variation. The method of treatment shall be approved by the Engineer.

Adequate means shall be provided to protect the slurry seal from damage from traffic until

such time that the mixture has cured sufficiently so that the slurry seal will not adhere to and be picked up by the tires of the vehicles. Basis for rejection of improperly placing slurry seal includes, but is not limited to, striation of surface, solidification of the asphalt, balling or lumping of the aggregates due to quick-set, tracks of unauthorized vehicles, bicycles and pedestrians, or the presence of uncoated aggregate will be cause for rejection of the slurry.

302-15.6 Compacting.

Rolling of the slurry shall commence as soon as the material has set sufficiently to adhere to the roadway without lifting or sticking to the tires. The slurry shall be rolled with a minimum of three passes with a double-axle, multiple pneumatic-tired rollers prior to opening to traffic. Rollers shall be self-propelled or drawn by tracks or tractors having rubber-tired wheels and shall be operated at a minimum tire pressure of 60 psi. Rolling shall continue until the surface is evenly rolled.

302-15.7 Public Convenience and Traffic Control.

Traffic control and scheduling for the spreading and compacting of PERAASS shall conform to 7-10.2.2.1. The Contractor shall notify all affected property owners, residents, businesses and agencies per 7-10.2.2.1.1.

Contractor shall be responsible for adequate barricading of the work area and controlling of traffic in the vicinity of the Work as specified in 7-10.2, or as directed by the Engineer.

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

302-15.8 Measurement and Payment.

[Specify whether item will be measured by the ton or by the square yard.]Slurry seal will be measured and paid for by the ton. The quantity of slurry seal to be paid for will be the combined mass of the Recycled Asphalt Aggregate and Polymer Modified Asphalt Emulsion. The mass of the water and additives used in the mixture will not be included in the mass of the slurry seal to be paid for. The contract price paid per square yard for slurry seal shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in the furnishing and placing of the slurry seal complete in place, including cleaning the surface and protecting the slurry seal until it has set, all as shown on the Plans, as specified in these Specifications and as directed by the Engineer.

SECTION 303 – CONCRETE AND MASONRY CONSTRUCTION

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS AND DRIVEWAYS.

303-5.1.1 General.

Replace the second paragraph with the following:

PCC curbs and gutters shall be constructed in accordance with Standard Plan 135, 136, 137, and/or 138, in place with the exception that expansion joints shall not be at more than 20-foot intervals and weakened plane joints shall be at 10-foot intervals. PCC curbs and gutters, sidewalks, cross gutters, driveways and access ramp work shall satisfy the following as applicable:

Formwork shall be approved by the Engineer before placing PCC.

Expansion joint material shall be pre-molded asphalt expansion joint filler and shall penetrate and be continuously one piece through the curb and gutter.

Shapes and sizes of PCC curbs and gutters shall be as indicated on the drawings and the concrete shall be placed in such a manner as to prevent distortion of the forms and shall be vibrated as required to ensure an acceptable product.

As soon as the concrete will allow, Contractor shall strip the forms and trowel smooth the curb face and top. Contractor shall tool the edges of expansion joints with an approved ½-inch-edging tool.

The completed curb and gutter shall be protected from damage until accepted.

Where any curb and gutter requires repair before acceptance, the repair shall be made by removing and replacing the entire curb and gutter between joints and not by refinishing the damaged portion.

303-5.5.3 Walk.
Insert the following before the first paragraph:

Sidewalks shall be constructed in conformance with the Standard Plan 142.

Exterior walkways and flatwork shall be directly supported on 90% compacted, on-site silty sandy soil. Subgrade soils underlying in slab areas shall be maintained in a moist condition until just prior to the placing of concrete slabs.

The sidewalk surface shall not vary more than 0.02 feet from a 10-foot straightedge except at grade changes. The finished surface shall be free of humps, sags, blemishes, or other irregularities. All sidewalks shall be a minimum of 4 inches thick except at the driveways where the sidewalks shall be a minimum of 6 inches thick for single family residential areas and 8 inches thick for all other areas.

303-5.5.4 Gutter.
Insert the following as the first sentence of the first paragraph:

Cross gutters and spandrels shall be constructed in accordance with the Standard Plan 145. Prior to acceptance of the valley gutter constructed by the Contractor, a flow test shall be conducted by the Contractor in the presence of the Engineer. Any new work found to be defective shall be repaired or replaced by the Contractor in accordance with 303-5.7.

303-5.5.5 Alley Intersections, Access Ramps, and Driveways.
Delete "access ramps" from the first paragraph and add the following as the second paragraph:

Curb ramp shall be constructed per design drawings and shall also conform to Standard Plan 146 or 147. Curb face depressions shall conform to the details of the Plans, ADA and Title 24, these Specifications or whichever is the most stringent or as directed by the Engineer. Measurement for this item shall be from the beginning of the curb return to the end of curb return.

303-5.9 Measurement and Payment.
Insert the following as the first sentence:

Payment for concrete curb and gutter, retaining curb, sidewalk, driveways, pedestrian access ramps (including detectable warning surface, curbs, and retaining curbs), detectable warning surface installed on existing access ramps, cold milling existing gutter lips shall be at

the Contract Unit Price shown on the Bid and shall include full compensation for subgrade preparation, base material, placement, materials, all labor, tools, equipment and incidentals necessary to do all of the work involved thereof, complete in place and accepted.

SECTION 313 – TEMPORARY TRAFFIC CONTROL

313-1 GENERAL.

313-1.1 General.

Contractor shall install and maintain all required traffic control devices, provide flaggers throughout the Work area as shown in the WATCH, TCP, or as specified in the plans or these Special Provisions and promptly remove the traffic control devices when they are no longer required. The Work area shall include the Work site and the areas required for advance signing and transitions to and from the traffic control zone. Unless otherwise provided in these Special Provisions, traffic shall be permitted to pass through the Work area in conformance with the WATCH, or TCP. Unless otherwise specified in the WATCH, TCP, or these Special Provisions, the Work shall be performed in half the roadway at one time. One half shall be kept open and unobstructed until the opposite side is ready for use. If one-half a street is being improved, the other half shall be conditioned and maintained as a detour.

Contractor engaged in setting up or removal of traffic control zones shall be properly licensed. All personnel engaged in setting up or removal of traffic control zones, including flaggers shall be properly trained.

Traffic control activities and milestones shall be shown as activities on the Contractor's construction schedule in conformance with 6-1.

Whenever the term "hours of darkness" is used in the Specifications, it shall be deemed to mean the hours of darkness as defined in Division 1, Section 280, of the California Vehicle Code.

Contractor shall patrol and monitor the Work site to ensure that all traffic control devices are in place and operating at all times. Any traffic control devices that are displaced or not in an upright position shall be replaced or restored to their original location in an upright position by the Contractor. The Contractor shall ensure that all traffic control devices are repaired, replaced, and cleaned as necessary to preserve their appearance and visibility. Traffic control devices that are damaged from any cause during the progress of the Work shall be repaired, including painting if necessary, or replaced by the Contractor at the Contractor's expense.

Any action on the part of the Engineer in directing the Contractor's attention to any inadequacy of the required devices and services or any action of the Agency to alleviate the Contractor's inadequacies shall not relieve the Contractor from its responsibility for public safety or abrogate its obligation to provide and maintain the traffic control devices and services. If the Contractor fails to provide and maintain these devices and services and the Agency is required to alleviate said condition, the total charges of labor, equipment and materials including overhead and transportation, accrued by the Agency for such work will be deducted from any monies due or that may become due to the Contractor.

313-1.2 Vehicular Traffic.

Grading operations, pavement milling, roadway excavation and fill construction shall be conducted by the Contractor in a manner to provide a reasonably satisfactory surface for traffic. When rough grading is completed, the roadbed surface shall be brought to a smooth, even condition satisfactory for traffic.

Pavement disruptions 1½ inch or greater shall have a beveled edge of 4 horizontal to 1 vertical.

313-1.3 Pedestrian Traffic.

Safe and adequate pedestrian zones and public transportation stops, as well as pedestrian crossings of the Work site at intervals not exceeding 300 feet shall be maintained unless otherwise approved by the Engineer. When sidewalks are closed an alternate walkway shall be provided. Pedestrians shall not be directed into direct conflict with vehicles operating within the Work site or other traffic. Where it is necessary to divert pedestrians into the parking lane or a street, barricading or temporary barriers conforming to 601-3.6.4 or 601-3.6.5 as specified in these Special Provisions shall be provided to separate the pedestrian walkway from the adjacent traffic lane.

If required by the Work, the Contractor shall close only one crosswalk at a time at intersections having 4 crosswalks. If the Work requires closure of 2 or more crosswalks at an intersection, the Contractor shall obtain approval from the Agency before implementation of the closure. Agency approval shall be obtained before closing any crosswalks at intersections having fewer than four crosswalks. The request for approval to close cross walks shall be submitted to the Engineer per 3-8. Pavement surface disruptions in areas subject to pedestrian traffic of ½-inch or greater shall have a beveled edge of 12 horizontal to 1 vertical in conformance with ADA.

All traffic control devices and zones shall conform to ADA requirements. Walkways in Work sites shall be maintained at least 4 feet in width. Obstructions within walkways shall be illuminated during hours of darkness. Minimum vertical clearance to any obstruction within the walkway shall be 7 feet.

313-1.4 Bicycle Traffic.

When performing Work in any street or sidewalk attention shall be directed to the probability of encountering bicycle traffic. Roadways adjacent to Work sites particularly shoulders, parking or bike lanes, or routes shall be kept free of obstructions or other hazards to bicyclists.

When performing Work on a street with a designated bike lane or route special attention needs to be given to bicyclists. Pavement surface disruptions in marked bike lanes or routes of 1/2 inch or more shall have a beveled edge of 8 horizontal to 1 vertical. In addition signs indicating the condition of the surface of the pavement shall be posted in accordance with the TCP or WATCH. If the pavement surface disruptions are not beveled and signs posted, the bicycle lane or route shall be closed.

When a bicycle lane or route is closed, signing shall be installed to terminate the bike lane or route and advise motorist and bicyclists that the previously separated bicycle traffic will be in the vehicular traveled way. Barricades used at the terminus or the closure shall be closely spaced to prevent physical passage by bicyclists into the closed bicycle lane or route. Warning tape may be used to close the gap between barricades to keep bicyclists out of the closed bicycle lane or route.

313-1.5 Work in the Vicinity of Railroads.

When a street-rail grade crossing exists within or in the vicinity of the Work site, work area traffic control shall be as shown on the TCP or WATCH and as specified in these Special Provisions. In no case shall lane restrictions, flagging or other operations be performed in a manner that would cause traffic to stop on the railroad tracks. Whenever the Work causes traffic to backup across an active railroad track, a flagger shall be provided.

(UPDATED: 01-19)

313-1.6 Safety in Traffic.

Contractor's attention is directed to the importance of safety when working in proximity to traffic. The Contractor shall take all precautions and establish such traffic control as is necessary to properly provide for the safety of all personnel and equipment on the Work site. Contractor shall comply with all the requirements of OSHA and CAL/OSHA.

Unusual conditions may arise on the Work which will require that immediate and unusual provisions be made to protect the public from danger or loss or damage to life and property, due directly or indirectly to the prosecution of the Work, and it is part of the service required of the Contractor to make such provisions and to furnish such protection.

Contractor shall use such foresight and shall take such steps and precautions as his operations make necessary to protect the public from danger or damage, or loss of life or property, which would result from the interruption or contamination of public water supply, irrigation, or other public service or from the failure of partly completed work.

Whenever, in the opinion of the Engineer, an emergency exists against which the Contractor has not taken sufficient precaution for the safety of the public or the protection of utilities or of adjacent structures or property which may be injured by process of construction on account of such neglect; and whenever, in the opinion of the Engineer, immediate action shall be considered necessary in order to protect public or private personnel or property interests, or prevent likely loss of human life or damage on account of the operations under the Contract, then and in that event the City may provide suitable protection to said interest by causing such work to be done and material to be furnished as, in the opinion of the Engineer, may seem reasonable and necessary.

The cost and expense of said labor and material together with the cost and expense of such repairs as may be deemed necessary shall be borne by the Contractor, and if the Contractor does not pay said cost and expense upon presentation of bills therefor, duly certified by the Engineer, then said cost and expense will be paid by the City and shall thereafter be deducted from any amounts due, or which may become due to said Contractor. Failure of the City, however, to take such precautionary measure shall not relieve the Contractor of full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the City.

313-2 TRAFFIC LANES AND CLEARANCES.

313-2.1 General.

Traffic lanes and clearances shall be as shown on the TCP, WATCH, or as specified in these Special Provisions. However, the Contractor shall provide and maintain minimum traffic lanes as specified in 214. Unless otherwise approved by the Engineer, when only one lane is provided in each direction, wider lanes shall be provided to separate opposing traffic and to accommodate turning movements. A minimum 18-foot lane shall be provided if parking is allowed.

Clearances to obstructions shall be as follows:

2 feet from vertical obstructions such as curbs, guardrails or temporary barriers.

10 feet from the edge of the traveled way to fixed objects, (utility poles, streetlights, traffic signals poles, trees, large sign supports, etc.) unprotected by barriers. When the minimum clearance to fixed objects cannot be provided, temporary barriers shall be placed to protect

the fixed object. On low-speed local streets, and at the Contractor's option, temporary AC curb may be used in lieu of temporary barriers.

5 feet from any excavation or drop off of 2 inches or greater to allow placement of temporary barriers to keep traffic out of the Work site and minimize traffic surcharge on the excavation. When the 5-foot clearance to an excavation or drop off cannot be maintained, temporary barriers shall be placed to separate vehicles and bicycles from the excavation or drop off.

Bicycle Lanes shall have a clear width of not less than 5 feet. Any Bicycle Lane less than 5 feet wide shall be closed. If the Work site is in a Bike Path and requires the Bike Path be closed, a detour Bike Path, Lane or Route, with appropriate signage, shall be provided.

If the Engineer determines that it is necessary to decrease the minimum distances specified herein to allow for the prosecution of the Work, the Contractor shall provide all protective devices required by the Engineer to adequately protect the public and/or its workers.

601-4 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS.

Temporary striping/markings shall be as shown per WATCH or on TCP and as specified in these Special Provisions. Removal shall conform to 314-2 and these Special Provisions. Immediately following the removal of temporary striping and pavement markings, the Contractor shall remove all residue from the pavement surface by power sweeping and thoroughly cleaning the area. Removal and cleaning shall be completed before relocation of new striping is started.

601-4.5 Payment.

Full compensation for the installation and removal of temporary traffic striping and pavement markings, shall be considered as included in the Contract Unit price Bid for the appropriate item(s) bid for "Traffic Control".

601-7 FLAGGERS.

601-7.1 General.

The flagger's sole duties shall consist of directing the movement of public traffic through or around the Work site. Personnel selected to be flaggers shall be trained in the fundamental of flagging traffic before they are assigned to that responsibility. Flaggers shall also be properly equipped with an 18-inch x 18-inch Stop/Slow sign paddle. When used at night, the sign paddle shall be retroreflective. Under emergency conditions the flagger may use a flashlight and hand signals to direct traffic.

A W20-1 sign and a symbol sign of a flagger (W20-7a) shall be placed as far ahead of the flagger as practical. For high-speed situations a "Prepare to Stop" (W3-4) sign should also be used. Flaggers shall be located such that approaching traffic will have sufficient distance to stop at the intended stopping point. From sunset to sunrise flagger stations shall be illuminated such that the flagger will be clearly visible to approaching traffic.

Flaggers shall be provided with high visibility clothing. Flaggers shall wear fluorescent orange or fluorescent strong yellow-green colored warning garments such as vests, jackets, or shirts. Rainwear, when worn, shall be orange, strong yellow-green, or yellow. During hours of darkness, flaggers shall be outfitted with garments of retroreflective material that shall be visible at a minimum distance of 1,000 feet.

Retroreflective material added to the clothing shall have a minimum of one horizontal stripe around the torso. White outer garments with retroreflective material may be worn during the hours of darkness in lieu of colored vest, jackets and/or shirts.

(UPDATED: 01-19)

601-7.2 Payment.

The cost of furnishing flaggers, including transporting flaggers to provide for passage of traffic through the Work site shall be considered as included in the lump sum Bid and no additional compensation shall be allowed therefor. Payment will be prorated on a monthly basis over the duration of the Contract or until all flagging operations are complete.

601-3.5 SIGNS AND SIGNAGE.

601-3.5.1 General.

Signs shall include all temporary signs required for the direction of traffic through or around the Work site. Signs shall be as shown in the California MUTCD or WATCH. Signs shall be placed as specified in the TCP, WATCH or these Special Provisions.

Temporary "No Parking" and "No Stopping" signs shall be installed and removed as specified in the 601-4.

Whenever the pavement surface has been disrupted by cold milling, temporary trench resurfacing, steel plating, placement of hoses, etc. warning signs describing the pavement surface shall be installed.

Whenever an excavation 2 inches or more deep is made or exists within 2 feet of the traveled way the Contractor shall place "LOW SHOULDER" or "OPEN TRENCH" signs to warn drivers and/or bicyclists of the excavation. In addition, edge-line channelizer delineation shall be placed every 50 feet to 100 feet for the length of the excavation. If required, additional warning signs shall be placed beyond every intersecting street.

601-3.5.2 Payment

The cost of furnishing, installing and maintaining signs specified in this subsection, complete and in place, shall be considered as included in the prices Bid for the various items of Work.

601-6 COVERING OR REMOVAL OF EXISTING TRAFFIC SIGNS AND SIGNAL FACES.

601-6.1 General.

When the TCP or temporary traffic signal modification Plans show or the Special Provisions specify the temporary covering of traffic signs or signal indications, they shall be covered with material conforming to 215. No holes shall be drilled in any indications to attach the covers. Adhesive tape shall not be used to attach covers. Cardboard, wood, plastic sheets, bags or other field fabricated temporary covers shall not be used.

601-6.3.2 Vehicle Heads.

The Contractor shall cover all the non-functioning vehicle heads utilizing signal head covers complying with 215. The entire signal indication or portions of the indications shall be covered. A minimum of two vehicle heads for each phase shall be in operation while Work is being performed at an intersection except for approved shutdowns.

601-6.3.3 Pedestrian Indications.

Pedestrian indications shall be covered with a cover conforming to 215. If audible pedestrian signals are in place, the audible warning device shall be temporarily disabled for the crossing taken out of service.

601-6.3.3 Pedestrian Push Button.

Pedestrian push buttons message signs shall be removed, reversed and remounted on the

pedestrian push button assembly. Pedestrian push button assembly covers may be used instead of reversing and remounting pedestrian push button message signs.

601-6.3.5 Audible Pedestrian Signals.

Audible pedestrian signals shall be disabled by temporarily removing the load switches for the pedestrian indications within the traffic signal controller cabinet. The pedestrian indications shall be covered as specified herein.

601-6.4 Signs.

Sign covers shall be securely fastened to the sign to prevent movement or removal by the wind in conformance to 601-6.

601-6.5 Payment.

Payment for covering existing traffic signs and signal faces shall be considered as included in the prices Bid for the various items of Work.

313-7 TRAFFIC SIGN ENHANCEMENT DEVICES.

313-7.1 General.

Traffic sign enhancement devices consist of flags and "High Level Warning Devices", warning lights, portable changeable message signs, flashing arrow boards and flashing arrow bars. High level warning devices or arrow boards shall be used at approaches to locations where work is being performed within or immediately adjacent to a traffic lane.

313-7.2 Flags.

Flags shall be placed as shown on the TCP or WATCH. Torn or dirty flags shall be replaced immediately.

313-7.3 High Level Warning Device.

High level warning devices shall provide advance warning of the Work site by being visible to drivers even when the Work site is obstructed from view by vehicles or other equipment. High level warning devices shall be placed as shown on the TCP or WATCH. The Contractor may use sandbags to add weight to the base or legs of high-level warning devices.

313-7.4 Warning Lights.

Warning lights shall only be used outside of the Work area to provide advance warning as specified in these Special Provisions. Warning lights used for advance warning must be clearly distinguishable from the primary delineation and shall be positioned above the normal reflectorized barricades. Warning lights shall be mounted at a minimum height of 3 feet measured from the bottom of the lens to the underlying surface.

The warning lights may be used in either a steady burn or flashing mode at the Contractor's option. Visors shall not be required during the hours of darkness. Torches and flares shall be used only in patrolled emergency situations.

313-7.5 Portable Changeable Message Signs.

Portable changeable message signs shall be furnished, placed, operated, and maintained at locations shown of the TCP and as specified in these Special Provisions. Portable changeable message signs may be placed in advance of or within the Work area. After initial placement portable changeable message signs shall be moved from location to location as directed by the Engineer.

(UPDATED: 01-19)

Portable changeable message signs shall not be used for advertising or as a supplement for temporary traffic control signs and devices.

313-7.6 Flashing Arrow Boards.

Flashing arrow boards shall be furnished, placed, operated and maintained at locations shown on the TCP and as specified in these Special Provisions. Flashing arrow boards shall be mounted to provide a minimum of 6 feet, 10-11/16 inches clearance between the bottom of the sign and the roadway surface. The type of arrow board shall be as specified in the TCP and these Special Provisions.

313-7.7 Flashing Arrow Bar.

Flashing arrow bars shall be mounted on vehicles. Flashing arrow bars shall be used to provide traffic control for lane closures as specified in the TCP and these Special Provisions. Additional warning devices such as delineators, signs and/or guidance devices may also be specified in these Special Provisions.

313-7.8 Payment.

The cost of furnishing, installing and maintaining traffic sign enhancement devices specified in this subsection, complete and in place, shall be the price Bid for the Contract Unit Price or lump sum bid. If no Bid item is provided, the cost shall be considered as included in the prices Bid for the various items of Work.

313-8 CHANNELIZING DEVICES.

313-8.1 General.

Channelizing devices include, but are not limited to cones, tubular markers (delineators), drums, barricades, temporary barriers. Channelizing devices shall be placed as shown on the Plans, TCP, or WATCH.

On arterial streets, opposing traffic shall be separated by tubular markers, traffic striping or raised pavement markers. When traffic is diverted into a painted median to the left of an existing double yellow centerline or into a left turn lane, tubular markers shall be placed beyond the Work site to return traffic to its normal lanes.

313-8.2 Cones, Tubular Markers and Channelizers.

Cones, tubular markers or channelizers shall be used on short-duration, and short-term stationary temporary traffic control zones as defined in the WATCH. Tubular markers or channelizers shall be used on intermediate-term stationary temporary traffic control zones as defined in the WATCH and when more visibility and stability are required.

313-8.3 Drums.

Drums shall be used in lieu of cones or tubular markers for long-term stationary temporary traffic control zones as defined in WATCH.

313-8.4 Barricades.

Barricades shall be specified by type. Barricades shall be placed as shown on the TCP, WATCH or as specified in these Special Provisions. Barricades shall not be placed in a merging lane of traffic without advance warning. Advance warning shall consist of a high-level warning device, arrow panel and other appropriate delineation specified in these Special Provisions or shown on the TCP or WATCH.

Type 1 and 2 barricades shall be used on local streets and sidewalks. However, Type 1 barricades should not be used where they may be encountered by the visually impaired unless horizontal tie bars are provided not more than 6 inches from the bottom of the barricade. Type 2 barricades shall be used in major, secondary and collector streets. Type III barricades shall be used for closing streets to through traffic and for other major operations where the barricades must remain in place for extended periods. Barricades shall be placed so there is no gap large enough for a vehicle to pass, except where necessary to provide access for local traffic or emergency vehicles.

Ballasting of barricades shall be by means of sand filled bags placed on the lower parts of the barricade frame or stays. Ballasting shall not be placed on top of the barricades or over any retroreflectorized barricade rail face facing traffic.

If barricades are displaced or are not in an upright position, from any cause, the barricades shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

313-8.5 Temporary Traffic Barriers.

Temporary traffic barriers shall be placed as shown on the TCP, WATCH or as specified in these Special Provisions. End treatment shall be as shown on the TCP or as specified in these Special Provisions. Water filled plastic barriers shall be used within sidewalks and bike paths. Concrete barriers shall be used within the vehicular way and bike lanes and routes.

Temporary barriers shall be placed on a firm, stable foundation. The foundation shall be paved or graded to provide a uniform bearing throughout the entire length of the barrier.

Abutting ends of adjoining segments shall be placed and maintained in alignment without offset to each other. Segments shall be positioned straight on tangent alignment and on a true arc on curved alignment.

If it is necessary to leave a gap between barrier segments due to equipment or special drainage features, the gap shall be closed at all times when the Work is not actively in progress at the location of the gap.

At locations shown on the Plans, threaded rods or dowels shall be bonded in holes drilled in the existing Portland cement concrete pavement. Drilling of holes shall be as shown on the Plans and specified in these Special Provision. Epoxy grout bonding material shall be used to bond the threaded rods or dowels.. This will be deleted almost every time except for long term situations.

Water used to fill/ballast water filled plastic barriers shall be disposed of in a sanitary sewer system.

313-8.6 Payment.

The cost of furnishing, installing and maintaining channelizing devices specified in this subsection, complete and in place, shall be the price Bid for the Contract Unit Price or lump sum bid. If no Bid item is provided, the cost shall be considered as included in the prices Bid for the various items of Work.

313-9 FLOOD LIGHTING.

313-9.1 General.

When nighttime Work is being performed flood lights shall be used to illuminate the work site, flagger stations, equipment crossings and other hazardous areas. The flood lighting shall

provide enough light to illuminate flagger stations, equipment crossings and other hazardous areas so they are visible for a distance of ½ mile. Care shall be exercised to ensure that the flood lights do not shine into the eyes of oncoming traffic.

313-9.2 Payment.

The cost of furnishing, installing and maintaining flood lighting shall be considered as included in the prices Bid for the various items of Work.

SECTION 314 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

314-1 GENERAL.

Add the following after the first sentence in the first paragraph:

Striping and pavement markings which are damaged or darkened as a result of construction, including wheel markings by public traffic or equipment, shall be repainted or replaced at the Contractor's expense.

314-2 REMOVAL OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS.

314-2.1 General

Replace the first and second paragraphs with the following:

Existing traffic stripes and pavement markings to be removed will be shown on the Plans or designated by the Engineer. Traffic stripes and pavement markings shall be removed to the fullest extent possible from the pavement by wet sandblasting or grinding. Alternative methods of removal require prior approval of the Engineer. These other methods must not materially damage the surface or texture of the pavement or surfacing. Sand or other material deposited on the pavement as a result of removing traffic stripes and markings shall be removed as the Work progresses.

Where blast cleaning is used for the removal of traffic stripes and pavement markings or for removal of objectionable material, and such removal operation is being performed within 10 feet of a lane occupied by public traffic, the residue, including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation. Accumulations of sand or other material, which might interfere with drainage or might constitute a hazard to traffic, will not be permitted. Obliteration of traffic striping with black paint or light emulsion oil shall be done only with approval of the Engineer. Grinding shall be permitted when shown on Plans or approved by the Engineer. Grinding machines shall utilize new, sharp blades to prevent deep scarification and damage to the pavement. When necessary to protect the street, the Engineer will direct the Contractor to replace the blades at no additional cost to the City.

Where existing double yellow or two-way left turn lane lines are to be repainted, black lines shall be painted per 314-4, "Application of Traffic Striping and Curb and Pavement Markings." Where blast cleaning is used for the removal of traffic stripes and pavement markings or for removal of objectionable material, and such removal operation is being performed within ten (10) feet of a lane occupied by public traffic, the residue, including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.

The Contractor will not be required to use a vacuum attachment under the following conditions:

a) When approved by Engineer.

b) When the blasting sand will be confined by mechanical means to small area.

c) When a vacuum type sweeper immediately follows the blasting operation or when traffic can be safely routed around the sand until it is swept up.

314-2.2 Measurement.
Replace the subsection in its entirety with the following:

Removal of traffic striping and markings will be measured as a lump sum item.

314-2.3 Payment.
Replace the subsection in its entirety with the following:

Payment for removal of traffic striping and curb markings shall be considered as included in the Contract Lump Sum Price bid for "Remove Traffic Striping and Pavement Markings", and no additional compensation shall be allowed therefor.

314-3 REMOVAL OF PAVEMENT MARKERS.

314-3.1 General.

314-3.2 Measurement.
Replace the subsection in its entirety with the following:

Removal of pavement markers will be measured as a lump sum item.

314-3.3 Payment.
Replace the subsection in its entirety with the following:

Payment for removal of pavement markers shall be considered as included in the Contract Lump Sum Price bid for Remove "Traffic Striping and Pavement Markings", and no additional compensation shall be allowed therefor.

314-4 APPLICATION OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS.

314-4.1 General.
Add the following after the first sentence in the first paragraph:

Striping and pavement markings, other than those called for on the Plans, which are damaged or darkened as a result of construction, including wheel markings by public traffic or equipment, shall be repainted or replaced by the Contractor at his expense.

Paint shall be installed according to Standard Plan 710, unless otherwise approved by the Engineer.

314-4.2 Control of Alignment and Layout.

314-4.2.1 General.
Replace the first paragraph with the following:

The Contractor shall perform all layout, alignment and spotting for traffic stripes and markings. No section of street shall be without the proper striping overnight. Cat tracks may be used to delineate traffic lanes overnight, for one night only, until permanent striping is applied. If permanent striping will not be applied within one night, the Contractor shall install temporary

reflective pavement markers at 5-foot intervals around curves, intersections and other areas with limited sight distance. Temporary reflective pavement markers shall be spaced at 25-foot intervals when sight distance is 100-feet or greater. The 'spot' shall not be more than 3 inches in width. Paint for cat tracks shall be the same color as the item for which it is placed.

The Contractor shall not commence painting of pavement markings or striping until the Engineer has checked and approved cat-tracking and spotting and authorized the Contractor to proceed.

314-4.3 Painted Traffic Striping and Curb and Pavement Markings.
Add the following as the sixth bullet:

f) the relative humidity is below 75%.

314-4.3.4.2 Striping Machines.
Add the following to the second set of bullets:

s) laser guidance equipment capable of maintaining the alignment of traffic stripes with an accuracy equivalent to or better than that obtainable through use of cat tracking, as determined by the Engineer. Dribble line cat tracking will not be permitted.

314-4.3.5 Application.
Add the following to the first paragraph:

Except for black paint, each coat of traffic paint shall have reflective glass beads uniformly incorporated to a minimum depth of one-half the diameter of the bead immediately after application of the paint. Beads shall be applied at the rate of 5 pounds per gallon in the first coat and 8 pounds per gallon in the second and third coats. Newly paved and resurfaced streets or portions thereof shall be striped within 24 hours after completion of said work and shall not be opened to public traffic without striping or other delineation approved in advance by the Engineer.

314-4.3.7 Payment.
Replace the first and second paragraphs with the following:

Payment for permanent and temporary painted traffic stripes, curb markings, and pavement markings, including furnishing all labor, materials, tools, equipment and incidentals necessary for doing the work shall be considered as included in the Contract Lump Sum Price bid for Signing and Striping, and no additional compensation shall be allowed therefor.

314-4.4 Thermoplastic Traffic Striping and Pavement Markings.

314-4.4.6 Payment.
Replace the first and second paragraphs with the following:

Payment for thermoplastic traffic stripes and pavement markings, including furnishing all labor, materials, tools, equipment and incidentals necessary for doing the work shall be considered as included in the Contract Lump Sum Price bid for Signing and Striping, and no additional compensation shall be allowed therefor.

314-4.6 Protection from Damage.
Add the following:

Striping and pavement markings, other than those called for on the Plans, which are

damaged or darkened as a result of construction, including wheel markings by public traffic or equipment shall be repainted or replaced by the Contractor at his/her expense.

Precautions in the handling and application of paints and/or thermoplastics shall be in accordance with all applicable occupational safety and health standards, rules, regulations and orders established by the State of California.

314-5 PAVEMENT MARKERS.

314-5.1 General.

Add the following to the end of the paragraph:

Blue Dot pavement marker shall be installed per Standard Plan 531.

314-5.7 Payment.

Replace the entire section with the following:

Payment for reflective and non-reflective markers, including furnishing all labor, materials, tools, equipment and incidentals necessary for doing the work shall be considered as included in the Contract Lump Sum Price bid for Signing and Striping, and no additional compensation shall be allowed therefor.

Add the following section:

PART 4 -EXISTING IMPROVEMENTS

SECTION 403 – MANHOLE ADJUSTMENT AND RECONSTRUCTION

403-3 Manholes (and Other Structures) IN ASPHALT CONCRETE PAVEMENT

Insert the following as the first paragraph:

Manhole frames and covers shall be adjusted to grade in accordance with Standard Plan 152. Manhole frames and covers within the area to be paved or graded shall be set to finished grade by the Contractor as required by the Plans and Specifications.

SECTION 404 – COLD MILLING

404-1 General.

Add the following after the last paragraph:

Contractor shall furnish one or more planning machines operated by experienced workmen. The surface produced shall have a tolerance so that a 10-foot straight edge laid laterally will indicate variance of less than 3/16-inch. Removal shall consist of: (1) planning and cutting the pavement to form a keyway header cut; and (2) removing the loosened material. Loosened material shall be stored on the property of the Contractor and shall be disposed of off-site at the end of each workday.

Directly following the cold plane operation, all asphalt pavement joints within travel lanes that have vertical separation of more than 0.5-inch shall be ramped with temporary asphalt concrete. Ramps shall be no less than 10 feet in length from the joint and shall extend across all travel lanes. Temporary asphalt ramps shall be completely removed and disposed of off the job site prior to overlay application.

After cold milling and at least 24 hours prior to overlay, all cracks shall be sealed in accordance with 302-1.7.1.

(UPDATED: 01-19)

404-7 Work Site Maintenance.

Replace the second sentence with the following:

Street sweeping equipment shall conform to 3-12.1. Contractor shall provide a minimum of two sweepers at all times during cold milling at no additional cost to the City. One motorized street sweeper shall follow within 50 feet of the cold milling machine unless otherwise approved by the Engineer. Cold milled areas shall be swept at least once daily until the area is paved.

Add the following subsection:

404-7.1 Crack Sealing.

In areas where an overlay of asphalt concrete is to be made on existing paving, all cracks 1/8th-inch wide or wider shall be sealed prior to the construction of an asphalt concrete overlay. The Engineer will make the sole determination as to which cracks shall be sealed.

Contractor shall spray weeds in cracks with commercial grade weed killer or approved equal method prior to applying sealant. All cracks 1/8 inch to 1 ½ inches wide shall be sealed with a hot applied rubberized asphalt sealant. The sealant shall be Crafco Polyflex Sealant, Type 2 or 3, or an approved equal. The Sealant shall be applied in accordance with the manufacturer's instructions.

Cracks greater than ¼ inch wide but less than ½ inch wide shall be cleaned full depth by routing and blowing operations prior to applying the sealant. Cracks ½ inch wide but less than 1 ½ inches wide shall be cleaned full depth by blowing operations prior to applying the sealant.

All cracks 1 ½ inches or wider shall be cleaned full depth, a tack coat applied to the edges and filled with a fine asphalt concrete hot mix.

Care shall be taken to avoid excess sealant being applied to the existing asphalt concrete surface. A squeegee shall be used to spread out excess sealant on small cracks. There shall be a ½ inch deep cup-shaped groove between the existing asphalt concrete surface and the top crack sealant placed in cracks ½ inch wide or wider. Excess sealant, as solely determined by the Engineer, shall be removed at the Contractor's expense. Contractor shall keep traffic off of areas receiving crack seal until it has cured to the point where it will not be removed from cracks by vehicle tires. Cracks shall be sealed a minimum of seven days prior to placing asphalt concrete overlay.

Payment for crack sealing shall be considered as included in the bid prices paid for asphalt concrete overlay and no additional compensation will be allowed.

404-9 Traffic Signal Loop Detectors.

Add the following after the last sentence:

Contractor shall notify the Engineer a minimum of 3 Working Days prior to the start of cold milling asphalt concrete pavement on any street containing traffic signal loop detectors.

SECTION 405 – MICRO-MILLING

405-1 General

Micro-milling shall consist of the cold milling of existing asphalt concrete pavement with a milling machine equipped with a cutting drum specifically designed and constructed for micro-milling. The resulting pavement surface shall be suitable for use as a temporary pavement driving surface in advance of a FOG seal or other surface treatment. Micro-milling to be

performed in accordance with these Specifications and Plan details.

405-2 Milling Machines.

Milling machines shall conform to 404-2.1 and as follows:

Be equipped with a micro-milling drum with tungsten-carbide-tipped cutting teeth spaced no greater than 1/4 inch apart on center. The configuration of the teeth shall be such that the deviation in elevation between any 2 teeth does not exceed 1/16 inch.

Be capable of removing asphalt concrete pavement to a tolerance of ± 1/8 inch.

Be equipped with an automatic grade control system operating in "profile" mode. The system shall be either:

1) A 30-foot long paving machine ski with spring-loaded feet attached to the bottom on not more than 1.5-foot increments such that the feet rise and fall over small irregularities on the pavement surface. The upper part of the ski shall be one piece and of such construction that it will not flex or bend by more than 1/8 inch at either end when supported off the grade by a fixture located at its center of gravity. The grade control system shall be referenced off the center of the ski, with skis mounted on each side of the milling machine such that the ski's longitudinal center is even with the center of the milling machine's cutting drum. Or,

2) A sonic averaging system with automated controls. Each corner of the milling machine shall be equipped with sonic grade averaging and slope sensors. The system shall feature plug-in connections, internal cable routing, 2 dual control boxes for ground personnel each capable of controlling each side of the milling machine, and a separate control box for the operator. Whichever system is used, the milling will conform to the line and grade tolerances of this specification.

The milling machine shall be equipped with a tier III (minimum) and must be compliant with all California Air Resource Board regulatory requirements.

The milling equipment shall have a minimum size cutter head of 72" such as a Wirtgen W200 or equivalent.

405-3 Milling Operations.

Each successive pass of the milling machine shall meet the line and grade of the previous pass. The speed of the milling machine shall be maintained at a rate which results in a uniform pavement texture.

Micro-milling shall result in a grid-patterned textured pavement surface with longitudinal ridges approximately the same distance apart as the cutting teeth. The ridges shall be consistent in depth, width, and profile. The distance between the top of each ridge and adjacent valleys shall not exceed 1/8 inch. The resulting profile and cross slope of the milled pavement surface shall be such that a 12-foot long straightedge laid perpendicular or parallel to the centerline will not allow a shim with a width of 1 inch and a thickness of 3/16 inch to pass under the straightedge at any point except planned grade breaks. However, many streets may have crowns or parabolic curves. *The intent of the micro milling will need to be established prior to specifying out the project: to smooth the road, or establish a straight grade profile, or both*.

Milled pavement surfaces which do not conform to the requirements above shall be corrected by the Contractor. The Contractor shall prepare and submit to the Engineer for approval a correction plan prior to initiating corrective action.

During milling operations, the cutter teeth shall be regularly checked and replaced as necessary to maintain the tolerances specified by the manufacture.

405-4 Work Site Maintenance.

Work site maintenance shall conform to 404-7. A self-loading motorized street sweeper equipped with both brooms and a vacuum system, and a functional water spray system shall immediately follow the milling machine. Sweeping shall continue until loose millings have been completely removed and as requested by the Engineer. The Contractor will continue to maintain the milled surface until a surfacing treatment is applied or until accepted by the Engineer. A surface treatment must be applied within 7 Days, but It is recommended for areas in travel lanes, that a fog-seal as a minimum or other surface treatment be applied within 48-hours. Any raveled sections of the pavement will be repaired as directed by the Engineer and paid as Extra Work in conformance to 2-8.

405-5 Disposal of Millings.

Millings shall be considered the property of the Contractor and shall be disposed of by the Contractor at a bona fide recycling center or facility. The Contractor shall notify the Engineer a minimum of 2 Working Days prior to the start of milling operations of the recycle disposal location.

405-6 Measurement.

Micro-milling will be measured by the square foot.

405-7 Payment.

Payment for micro milling will be made at the Contract Unit Price per square foot for "MICRO-MILLING."

PART 6 – TEMPORARY TRAFFIC CONTROL

SECTION 600 – ACCESS

600-1 GENERAL

Add the following after the first sentence:

The Contractor shall provide continuous, unobstructed access for all existing access roads, paved or unpaved, within and through the Work site unless otherwise specified by the Engineer. Existing access roads may be rerouted to avoid construction activities, where needed, upon approval of the Engineer.

600-2 VEHICULAR ACCESS

Add the following after the first paragraph:

Adequate traffic control devices shall be placed to direct traffic entering or exiting driveways to the correct travel lanes.

The Contractor shall cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules for these

services. If necessary, the Contractor may move residential trash cans to locations accessible for collection and then return the trash cans to the original place of residence to be picked by the resident. Residents shall be responsible for marking trash cans with their home address.

Roadway excavation and fill construction shall be conducted by the Contractor in a manner to provide a reasonable satisfactory surface for traffic. Unless otherwise authorized, work shall be performed in only-half the roadway at one time. One half shall be kept open and unobstructed until the opposite side is ready for use. If only one-half a street is being improved, the other half shall be conditioned and maintained as a detour.

Whenever the Contractor's operations temporarily require one-way traffic or create a condition not accepted by the Engineer, the Contractor shall provide and station competent flaggers whose sole duties shall consist of directing the movement of traffic through or around the Work.

Insert the following subsections:

600-2.1 Informational Project Sign.

The Contractor shall furnish and install Informational Project Signs per Bid schedule constructed on 4-foot by 8-foot plywood or metal and posted within the parkway adjacent to the street. Signs shall be mounted on two posts at least 7 feet above the pedestrian travel way. Signs and signposts shall be located within the public right-of-way and may not hinder or obstruct driver's line of sight. Placement shall not violate or compromise current ADA access requirements. The wording and size of the letters shall be approved by the Engineer prior to fabrication. Placement shall be approved by the Engineer prior to installation. Refer to Standard Plan 522.

Informational Project Signs shall be posted at least 3 Days prior to start of construction and remain posted until the final job walk is completed. The signs shall then be removed and properly disposed. Contractor shall be responsible for the maintenance of these signs until removed. Full compensation for the informational project signs, including construction, deployment, maintenance, removal, and furnishing of all necessary labor, equipment, materials, and all other related costs shall be considered as included in the Lump Sum Bid Price for "Informational Project Sign." Payment for the Informational Project Signs shall be paid under the Contract Lump Sum Price at 90% for the completed installation of the signs and 10% for the removal and disposal of the signs upon completion of the Work.

600-2.2 Public Notification.

The Contractor shall prepare public notification fliers in English and Spanish per Bid schedule. Fliers shall notify residents and businesses of the Work and include information describing the Work, how it may affect them and contact information of City and Contractor personnel responsible for the Work. The Engineer will provide the contact information for the City to be included on the flier at the pre-construction meeting. Contractor shall submit draft versions of the flier in English and Spanish to the Engineer for review and approval prior to starting the Work. Contractor shall distribute fliers as appropriate to provide advance notification of the Work to residents and businesses adjacent to or affected by the Work. Refer to sample provided in Appendix B.

Full compensation for the public notification shall include all necessary labor, equipment, materials, and all other related costs for preparation, copying, and distribution shall be considered as included in the Lump Sum Price Bid for "Public Notification."

600-3 PEDESTRIAN ACCESS

Add the following before the first paragraph:

Alternative routes for the pedestrians and bicyclists along the Project site shall be clearly marked and safety of those that utilize the path shall be considered at all times. This includes the use of proper lighting (where appropriate), fencing/shielding, proper storage of equipment and construction supplies, covering loose piles of soil, silt, clay, sand debris, or other earthen material so as to eliminate any discharge onto the existing pathway or temporary pathway, and immediately hosing down/cleaning such areas of the existing pathway or temporary pathway that have been affected by construction debris or sedimentation from the Project.

SECTION 601- TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES

601-1 GENERAL

601-2 TRAFFIC CONTROL PLAN (TCP) ****ADD THE FOLLOWING IF TCP IS REQUIRED***

Add the following after the last paragraph:

The Contractor shall provide traffic control and shall submit a traffic control plan and schedule for approval by the City when required by the scope of construction. Key traffic control schedule activities and milestones shall be included in the Contractor's construction schedule as specified in 6-1.

In general, when re-striping or when construction affecting an existing roadway is necessary, a traffic control plan is required. A traffic control plan will also be required under the following conditions:

a) Work within the roadways of ***SPECIFY ROADWAY****.

b) When traffic is to be diverted to the left of a double yellow centerline for overnight construction, unless otherwise directed by the Engineer.

c) When the Work area is an intersection or adjacent thereto and requires a transition through the intersection.

d) When a traffic lane is obstructed for more than three consecutive nights, unless otherwise approved by the Engineer.

e) When traffic volumes dictate that the minimum number of traffic lanes cannot be maintained with the existing channelization.

f) In other unusual situations where traffic and physical conditions such as speed, restricted visibility, grade, or alignment require special treatment.

g) When directed by the Agency or required by the Special Provisions.

The requirements set forth in the current CA MUTCD Part 6 Temporary Traffic Controls shall govern the design of the proposed traffic control. Traffic control plans shall be prepared and stamped by a Civil or Traffic Engineer registered by the State of California.

The traffic control plan shall be drawn to a 1" = 40' scale on common size sheets, either 8 ½" x 11", 8 ½" x 14", 11" x 17", or standard 24" x 36'' plan sheets as dictated by the length of the Project. The total length of the Project shall be shown including the advance signing and striping transitions in advance of the Work area; and existing striping, signing and raised medians, if any. The sheets shall display the Project name; phase identification; name of firm preparing the

plan; plan; name and stamp of the Civil or Traffic Engineer; approval block for the Agency or Agencies involved; north arrow; sheet number; and number of sheets comprising the traffic control plans. General notes and symbol definitions shall be included when required. Adequate dimensioning shall be provided to allow for Agency checking and proper field installation.

Simple daytime lane closures may be installed in accordance with the CA MUTCD Part 6 Temporary Traffic Controls without a plan submittal when approved by the City. However, a traffic control sketch may be required by the City for more complex temporary daytime installations. The traffic control sketch shall display the phase identification and the name of the designer, firm, and the Project.

In no case shall traffic be diverted from the existing traveled way without prior approval of the Engineer. Detour striping will not be permitted on any finish course of asphalt concrete pavement constructed on the Project. Temporary striping shall be detour grade traffic tape in this case.

In order to facilitate the flow of traffic during the Contract duration, the City reserves the right to extend the limits of the Project to include any areas where removal of striping or marking, construction of detour pavement, or signing and delineating is deemed necessary by the Engineer.

The Contractor will be responsible for obtaining an Encroachment Permit and Street Closure Permit prior to the start of any work. This Street Closure Permit will identify all sign requirements, work hours and other conditions as may be necessary to minimize inconvenience to motorists and businesses. Personal vehicles of the Contractor's employees shall not be parked on the traveled way at any time.

A detailed TCP, approved by the Engineer, will be required for all construction work within any public right-of-way. No reduction of the traveled way width shall be permitted on any City street **before 8:30 AM or after 5:00 PM** during weekdays, or anytime on weekends or holidays, or when active work is not being done, unless prior authorization to do so is granted by the Engineer.

The Contractor shall notify the Police, Fire, Traffic, and Public Works Departments of the City of Corona at least 48 hours in advance of closing, or partially closing, or of reopening, any street, alley or other public thoroughfare, and shall comply with their requirements. If the telephone numbers herein below are changed, the Contractor is not relieved of the responsibility of notifying said departments.

The following telephone numbers are listed to assist the Contractors in compliance with these requirements:

Fire Department ..... (951) 736-2220
Police Department ..... (951) 736-2333
Public Works Department (Traffic & Engineering) ..... (951) 736-2266

All traffic control and safety devices, equipment and materials, including but not limited to cones, delineators, flashing warning lights, barricades, high level warning devices (flag trees), flags, signs, markers, portable barriers, flashing arrow signs, markings and flagging equipment, shall be provided and maintained in "like new" condition.

The Contractor shall furnish and properly install, construct, erect, use and continuously inspect and maintain, 24 hours per day, 7 days per week, all said devices, equipment and materials, and all temporary and permanent pedestrian and driving surfaces as necessary to provide for the safety and convenience of and to properly warn, guide, control, regulate and

channelize Project workers and the public beyond said limits as necessary to include areas affecting or affected by the Work, from the start of Work to the completion of the Work.

High level warning devices (flag trees) are required at all times for any work being performed within the roadway, unless otherwise specifically authorized by the Engineer. Flashing arrow boards will be required on all streets with 4 or more lanes (2 in each direction) or as deemed necessary by the Engineer.

All barricades shall be equipped with flashing warning lights when installed during hours of darkness and all traffic cones shall be no less than 28 inches in height except that shorter cones, 12 inches high or higher, may be used during striping maintenance operation where the only function of the cones is to protect the wet paint from traffic.

Except as otherwise authorized by the Engineer, 2-way vehicular traffic shall be maintained at all times within two 11-foot wide lanes or 13-foot wide lane when adjacent to the curb.

Properly trained and experienced flaggers shall be provided to direct traffic when said traffic is to be interrupted for short periods of time, when 2-way traffic is to be reduced to one-way traffic at such time as is necessary to safely pass the traffic through or around the Work area, and when so directed by the Engineer.

Any traffic control and safety devices and equipment being used which becomes damaged, destroyed, faded, soiled, misplaced, vandalized, worn out, inoperative, lost or stolen shall be promptly repaired, refurbished and/or replaced, and any traffic control and safety devices and equipment being used which are displaced or not in an upright position from any cause, shall be promptly returned or restored to their proper position.

An unobstructed view of all signs and warning devices including, but not limited to, stop signs, stop ahead signs, street name signs and other regulatory, warning and construction signs, markers and warning devices shall be maintained at all times. No trucks or other equipment or materials shall be stopped, parked or otherwise placed from the view of vehicular and/or pedestrian traffic to which it applies.

When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded, shall yield to said public traffic at all times, except where the traffic is being controlled by Police officers, Fire officers, or at traffic signalized intersections.

Stockpiling and/or storage of materials on any public right-of-way or parking areas will not be allowed without specific permission of the Engineer. Materials spilled along or on said right of way or parking area shall be removed completely and promptly. All stockpile and/or storage areas shall be kept in a safe, neat, clean and orderly fashion, and shall be restored to equal or better than original condition upon completion of the Work.

Work involving the closure of, or partial closure of existing streets, and where vehicular access to the abutting property must be restricted, shall be so selected, arranged and scheduled that the persons requiring access to said abutting property and/or residents along said streets affected will be able to park within a reasonable distance of not more than 500 feet from their homes and/or destination; and in addition, no two adjoining streets shall be closed at the same time, except as otherwise authorized by the Engineer.

When work has been completed on a particular street or has been suspended or rescheduled and said street is to be opened to vehicular traffic, all equipment, "NO PARKING" signs, other obstructions and unnecessary traffic control devices and equipment shall be promptly removed from the street, except as otherwise authorized or directed by the Engineer. This will include the placement of temporary asphalt paving in vehicular travel lanes and/or

pedestrian walkways, as appropriate. Temporary traffic striping, when applicable, shall be applied prior to opening any newly paved area to traffic. This includes lane and centerlines. The Contractor shall also remove all utility markings identifying utility locations specifically marked for the Work when work has been completed on a particular street.

Should the Contractor be neglectful, negligent or refuse, fail or otherwise be unavailable to promptly, satisfactorily and fully comply with the provisions specified and referred to hereinabove, the City reserves the right to correct and/or mitigate any situation, which in the sole opinion of the Engineer constitutes a serious deficiency and/or serious case or non-compliance, by any means at its disposal at the Contractor expense, and in the case of a contract City project, to deduct the cost therefor from the Contractor's progress and/or final payments. Such corrective actions taken by the City shall not reduce or abrogate the Contractor's legal obligations and liability for proper traffic control and safety measures and shall not serve to transfer said obligations and liability from the Contractor to the City or the City's agent.

Violations of any of the above provisions and/or provisions of the referenced publications, unless promptly and completely corrected to the satisfaction of the Engineer, shall, at the sole discretion of the City, be grounds for termination of the Contract or shut down or partial shut-down of the Work without compensation to the Contractor, or liability to the City, all as prescribed by contractual obligations or State law, whichever is applicable.

Should the Engineer point out the inadequacy of warning devices or should the Engineer approve the location of warning devices, such action shall not relieve the Contractor of responsibility for public safety, nor abrogate the Contractor's obligation to furnish and pay for these devices. Should it be determined, during hours other than work hours and the Contractor is unavailable, that the warning devices are inadequate; the City may furnish and erect such additional devices as may be necessary.

601-2.2 PAYMENT

Replace the first sentence with the following:

All costs incurred for preparing the TCP, furnishing labor, materials, tools, equipment and incidentals; maintaining, servicing, and removing work area control required for the Work shall be included in the Lump Sum Bid item for "Traffic Control" and no additional compensation shall be allowed therefor.

Add the following subsections:

601-4 Notification and No Parking Signs.

The Contractor shall contact and notify, with printed notices, all residents, businesses and public agencies fronting on, or along, or affected by the proposed work, a minimum of 2 full Days prior to performing any work which will close or partially close the street or which will disallow street parking.

The printed notices shall contain a general description of the work to be done, the location and limits of the work, the day(s) and date(s) that the work is to be done, a statement that the street is to be closed or partially closed to vehicular traffic during construction, and a statement that on-street parking will be prohibited between the hours of 6:00 AM and 5:00 PM on the day(s) of the work as called for on the 'NO PARKING' signs.

The Contractor shall post 'NO PARKING' signs at 50-foot maximum spacing on 1-inch x 2-inch wood stakes along sides of the street, 2 Days in advance of the Work and shall maintain

said signs throughout the period of time that will disallow parking.

The 'NO PARKING' sign shall be approximately 14 inches x 22 inches, printed in red letters on a white background, and shall contain information and be laid out as follows:

NO PARKING
TOW-AWAY ZONE
6:00 AM - 5:00 PM
FROM

DAY	DATE

TO

DAY	DATE

FOR
CONSTRUCTION OF SIDEWALKS
OR CURB OR BOTH
Violators will be Cited and Vehicles Towed
Away at Owners Expense
per
CVC22651L & CVC22654D

Posting of 'NO PARKING' signs on trees, utility poles, fire hydrants or other streetscape features will not be allowed. The signs shall be immediately removed upon completion of the work that disallows parking.

The Contractor shall document the day, date and time that the signs are installed because the No Parking restriction will not be enforced until the signs have been in place 48 hours.

The above-described printed notices and signs shall be submitted to the Engineer for review and approval prior to the pre-construction meeting and at least 7 Days before the start of any work.

The Contractor shall make every reasonable effort to arrange with the owners of illegally parking vehicles to remove their vehicles from the street before summoning the police to tow away vehicles.

In addition to the above requirements, the Contractor shall notify the Post Office, Police Department, Fire Department, Water Utility, ambulance service, Dial-a-Ride, school district transportation manager, street sweeping service, trash collection service, and affected utilities, hospitals, schools and governmental agencies a minimum of 2 full calendar days prior to the start of work.

Full compensation for conforming to 601-4 shall be considered as included in the various items of work involved and no additional compensation shall be allowed therefor.

600-5 Remove Roadside Signs.

Existing roadside signs and posts, at locations shown on the Plans, shall be removed, relocated, disposed of, or salvaged as shown on the Plans or as directed by the Engineer.

Existing roadside or mast arm signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless

otherwise authorized by the Engineer.

Selected sign panels and/or posts as determined by the Engineer shall be salvaged and delivered to the City of Corona Service Yard during regular working hours. The Contractor shall notify the Engineer at least 24 hours prior to delivery. Signs, panels and or posts that are not salvaged by the City shall become the property of the Contractor and be disposed of outside the public right-of-way.

600-6 Roadside Signs.

Sign code numbers on the Plans refer to designations in the State of California, Department of Transportation, 2014 California Manual on Uniform Traffic Control Devices (CA MUTCD) and approved sign specification sheets. All signs shall conform to the latest revisions of these specification sheets.

New signs shall be reflectorized Diamond Grade Material (3M) with anti-graffiti coating or equal and shall be certified as meeting all applicable requirements.

SECTION 601-3 – TEMPORARY TRAFFIC CONTROL (TTC) ZONE DEVICES

601-3.1 GENERAL.

The following sets forth the specifications for traffic control devices used in temporary traffic control zones. Retroreflective sheeting shall conform to ASTM D 4956.

601-6 COVERING FOR EXISTING TRAFFIC SIGNS AND SIGNAL FACES.

602-2.1 General.

When the traffic control or temporary traffic signal modification plans show, or the Special Provision specify the temporary covering of traffic signs or signal indications they shall be covered as specified in601-6.

Covers shall be made from outdoor grade, weather resistant cloth, plastic, or metallic material and shall be of the color specified herein. The cover shall be designed to be easily installed by hand without the use of tools. The covers shall be secured in place with bolt snaps attached to elastic straps. The straps shall be permanently attached to the cover.

602-2.2 Covers for Vehicular Indications.

Contractor shall cover all the non-functioning vehicle heads utilizing signal head covers that are specially fabricated for this purpose. Signal head covers shall be a matte tan color or a contrasting color to the signal head. The size of the cover shall closely fit and encapsulate the signal head.

602-2.3 Covers for Pedestrian Indications.

The entire pedestrian indication shall be covered with a cover manufactured for that purpose. The covers shall be a matte black color. The size of the cover shall closely fit and encapsulate the pedestrian indication.

602-2.4 Covers for Signs.

When signs in temporary traffic control zones are covered, they shall be covered with a cover manufactured for that purpose. The cover material shall be weather resistant cloth, plastic or metallic material and shall be of sufficient density to block out the sign face or message so that they are not visible to the driver.

602-3 SIGNS.

602-3.1 General.

The signs shall be as shown in the WATCH or the California MUTCD. Each sign shall consist of a base, standard or framework and a sign panel. The units shall be capable of being delivered to the Work site and placed in immediate operation. The Contractor shall provide and maintain graffiti free construction signs during construction.

New signposts shall be installed in accordance with the City of Corona Standard Plan No. 519. New signs shall be reflectorized Diamond Grade Material (3M) with anti-graffiti coating or equal and shall be certified as meeting all applicable requirements.

602-4 SIGN ENHANCEMENT DEVICES.

602-4.1 General.

Sign enhancement devices consist of Flags, High Level Warning Devices, Warning Lights, Portable Changeable Message Signs, Flashing Arrow Signs, and Flashing Arrow Bars.

602-4.2 Warning Lights.

602-4.2.1 General.

Warning lights shall be portable, lens directed, enclosed lights with a yellow lens. They shall consist of a lighting unit, a flasher unit, a visor, a backplate, a standard, a battery power source and a base. The units shall be assembled to form a complete self-contained flashing warning light that can be delivered to the Work site and placed in immediate operation.

602-4.2.2 Standard and Base.

The standard shall be adjustable to provide a variable mounting height between 3 feet to 9 feet 10-1/8 inches measured from the bottom of the base to the bottom of the lens. Provisions shall be made for securing the standard at the height specified in 313. The standard shall be securely attached to the base and a sufficient length of multi-conductor, neoprene jacketed cable as required for full vertical height shall be provided.

The base shall be large enough to accommodate a minimum of two 12 V automotive type storage batteries, and shall be of such shape and mass that the warning light will not roll in the event it is struck by a vehicle or pushed over.

Standards and bases shall be finished with 2 applications of commercial quality orange enamel conforming to color No. 12473 of Federal Standard 595B.

602-4.2.3 Warning Light Assembly.

Warning lights assembly shall be weatherproof and shall be capable of operating a minimum of 150 hours between battery recharge or other routine maintenance. Lamps shall be rated at 25 W for operation with a 12V battery current. The color of the light emitted shall be yellow. Portable flashing beacons shall be capable of use in either a steady burn or flashing mode. Portable beacons shall conform to the requirements of ANSI D.10.1 and Table 602-4.2.3(A).

TABLE NO. 602-4.2.3(A)

	Type A Low Intensity	Type B High Intensity	Type C and D Steady Burn And 360° Steady Burn
Lens Size	7” Dia. ½” Border	12” Dia.	----

(UPDATED: 01-19)

	Type A Low Intensity	Type B High Intensity	Type C and D Steady Burn And 360° Steady Burn
Lens Directional Face	1 or 2	1	1 or 2
Flash Rate per Minute	55 to 75	55 to 75	Constant
Flash Duration[1]	10%	8%	Constant
Minimum Effective Intensity[2]	40 Candles	35 Candles	----
Minimum Beam Candle Power[2]	----	----	2 Candles
Visible on a Clear Day	3000 ft	----	3000 ft
Visible on a Sunny Day	----	1000 ft	----
Hours of Operation	Dusk to Dawn	24 hrs/day	Dusk to Dawn

1. Length of time that instantaneous intensity is equal to or greater than effective intensity.
2. These values must be maintained within an elliptical pattern 9 in. on each side of the vertical axis and 5 in each side of the horizontal axis.

602-4.2.4 Visor and Backplate.

Warning light units shall be equipped with a 7 - 7/8-inch minimum length visor and a backplate. The interior of the visor and the front face of the backplate shall be finished with 2 applications of commercial quality flat black enamel conforming to 210.

602-5 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS.

Paint for temporary traffic striping and pavement markings shall conform to 214-4.

PART 9 - MODIFIED ASPHALTS, PAVEMENTS AND PROCESSES

SECTION 900 – MODIFIED ASPHALTS, PAVEMENTS AND PROCESSES

900-1 TIRE RUBBER MODIFIED SLURRY SEAL.

900-1.1 General.

Tire rubber modified asphalt slurry seal shall be a stable mixture of emulsified asphalt, mineral aggregate, water, and retardant and is herein referred to as slurry.

900-1.2 Materials.

Tire Rubber Modified Slurry Seal (TRMSS) shall consist of cationic quick-set type CQS-1h TR and contain 3% latex by weight of the emulsified asphalt.

The additives for quick and slow-setting emulsion and the asphalt modifier shall be a type approved by the Engineer. The Amount of additive and asphalt modifier to be included in the quickset slurry shall be the amount necessary to ensure that the applied slurry can support vehicular traffic within 60 minutes after the last application.

Water shall be potable and compatible with the other ingredients of the slurry. Contractor shall provide an aggregate stockpile 24 hours prior to starting the work.

Aggregate shall be rock dust or other mineral aggregates approved by the Engineer and shall conform to the requirements of Section 200. The aggregate without any additive shall conform to the requirements in Table 900-1.2 (A).

TABLE NO. 900-1.2 (A)

Tests	ASTM Test Method	Requirements

(UPDATED: 01-19)

Tests	ASTM Test Method	Requirements
Percentage Wear 500 Revolutions[1]	C 131	40% Maximum
Sand Equivalent	C 2419	55% Minimum
Soundness (5 Cycles)[1]	C 88	15% Maximum

1. ASTM C 131 to be run on plus four graded material before final crushing.

900-1.3 Test Reports and Certification.

The quick-set type shall be cationic and shall conform to the requirements of CQS-1h of 203-1.3 and to the specifications included in Table 900-1.3 (A), when tested according to appropriate ASTM Methods:

TABLE NO. 900-1.3 (A) – QUICK SET EMULSION [1] [2]

Tests	ASTM Test Method	Requirements Min.	Max.
Furol Viscosity at 77°F (25°C), sec.	D244	15	100
Residue from distillation, % by weight	D244	60 Min.	
Sieve Test (% retained on No. 20 [850 µm])	D244	0.10 Max.	
Particle Charge Test (Cationic)	D244	Positive	
Particle Charge Test (Anionic)	D244	Negative	
Storage Stability; 1-Day Settlement	D244	1% Max.	
Residue			
Penetration 0.1 mm	D 5	45	80
Solubility in TCE, %	D 2042	97.5 Min.	
Ductility, 25°C (77°F), mm	D 113	400 Min.	

1. Table does not apply to latex or polymer modified emulsion.
2. The base asphalt shall contain a minimum of 10% recycled tire rubber. The finished asphalt binder composition shall be smooth and homogeneous. The tire rubber material shall be totally incorporated into the asphalt cement yielding a finished product of singular composition.

900-1.4 Composition and Grading.

The grading of the combined aggregate and the percentage of emulsified asphalt shall conform to the requirements indicated in Table 900-1.4 (A).

TABLE NO. 900-1.4 (A)

Class	Percentage Passing Sieves					
	Type I		Type II		Type III	
Sieve Size	Min.	Max.	Min.	Max.	Min.	Max.
3/8 in (9.5 mm)	100	---	100	---	100	---
No. 4 (4.74 mm)	100	---	90	100	70	90
No. 8 (2.36 mm)	90	100	65	90	45	70
No. 16 (1.18 mm)	65	90	45	70	28	50
No. 30 (600 µm)	40	60	30	50	19	34
No. 50 (300 µm)	25	42	18	36	12	25
No. 100 (150 µm)	15	30	10	24	7	18
No. 200 (75 µm)	10	20	5	15	5	15
Residual Asphalt % of Dry Aggregate Weight	10 min		7.5 min		6.5 min	
Emulsified Asphalt % of Dry Aggregate Weight must meet Residual Asphalt requirement)						

(UPDATED: 01-19)

900-1.5 Mix Design.

The Contractor, at its expense, shall submit for Engineer approval laboratory reports of mix designs performed in accordance with ASTM D 3910 procedures, utilizing the specific materials to be used. ASTM D 3910 procedures shall be modified to include the retained No. 4 (4.75 mm) aggregate if present in the mix design. The Engineer will approve the mix proportions that are best suited for use on the project, based upon the emulsion content and water needed to produce a slurry with a maximum loss of 540 grams per square meter (50 grams per square foot) by the modified Wet Track Abrasion Test. For mix designs containing more than 4% aggregate retained on the No. 4 (4.75 mm) sieve, the maximum loss will be 60 grams per square foot (650 grams per square meter).

Contractor, at its expense, shall calibrate each slurry mixer to be used in the work according to the approved slurry mix design. The Contractor shall allow 2 days prior to the start of work for calibration and testing at a location to be approved by the Engineer. The Engineer will obtain field samples at the time of calibration for Extraction Test (ASTM D 2172, California Test 382). Consistency Test, and Wet Track Abrasion Test (Modified ASTM D 3910). When in the judgment of the Engineer, the field samples meet the requirements stipulated in these specifications, the Engineer will notify the Contractor to start the work.

900-1.6 Mixing.

900-1.6.1 General.

Mixing shall be performed by a continuous-flow mixer. All aggregate particles will be uniformly saturated and coated with asphalt.

900-1.6.2 Continuous Flow Mixers.

The slurry mixer shall be a multi-blade or spiral continuous-flow in good working condition capable of accurately delivering a predetermined proportion of aggregate, water, emulsion, additives and asphalt modifier to the mixer and of discharging the thoroughly mixed slurry on a continuous basis. Each mixer shall have a metering device to measure the quantity of water in gallons (liters) used for each load of slurry and a separate metering device or equivalent which meets the approval of the Engineer to measure the quantity of emulsified asphalt used in each load of slurry.

The spreader box shall be equipped with flexible material in contact with the pavement and shall be maintained so as to prevent loss of slurry. It shall be adjustable to ensure a uniform controlled spread and be equipped with a mechanical or hydraulic type horizontal shifting device.

900-1.7 Application.

The work shall consist of mixing asphaltic emulsion, aggregate, additive, and water and spreading the mixture on the pavement where shown on the Plans. Slurry shall be applied at the application rate shown in Table 900-1.7 (A).

TABLE NO. 900-1.7 (A)

	Application Rate		Area Covered	
Slurry Seal	**Minimum**	**Maximum**	**Minimum**	**Maximum**
Type I	8lbs/yd²	10 lbs/yd²	1800 ft²/ELT	2250 ft²/ELT
	(4.3 kg/m²)	(5.4 kg/m²)	(167 m² /ELT)	(209 m²/ELT)
Type II	12 lbs/yd²	15 lbs/yd²	1200 ft²/ELT	1500 ft²/ELT

(UPDATED: 01-19)

	Application Rate		Area Covered	
Slurry Seal	**Minimum**	**Maximum**	**Minimum**	**Maximum**
	(6.5 kg/m²)	(8.1 kg/m²)	(112 m²/ELT)	(139 m²/ELT)
Type III	16lbs/yd²	20 lbs/yd²	900 ft²/ELT	1125 ft²/ELT
	(8.7 kg/m²)	(10.8 kg/m²	(93 m²/ELT)	(116 m²/ELT)

An ELT of slurry is made up of 2000 pounds (907 kg) of dry aggregate plus emulsified asphalt, accelerator or retardant, and water. Quantities and application rate shall be approved by the Engineer. When the Engineer determines that the application rate does not conform to the requirements, the Contractor shall take immediate corrective action. When the rate is less than the minimum amount required, the Contractor shall reapply additional slurry seal to the nonconforming area to meet the requirements. When the rates exceed the maximum specified Table 900-1.7 (A), the Engineer should refer to 4-1.1.

The sites for stockpiling and batching materials shall be clean and free from objectionable materials. Arrangements for these sites shall be the responsibility of the Contractor.

Hand squeegees and other hand equipment shall be provided to remove spillage and spread slurry in areas inaccessible to the spreader box.

Contractor shall have two fully operational mixers for use at the Work site at all times. These mixers shall be available for inspection by the Agency at least 48 hours prior to commencing work.

900-1.8 Spreading.

Slurry shall be applied only when the atmospheric temperature is at least 50°F (10 °C) and rising. The maximum speed of the slurry machine shall not exceed 270 feet per minute.

The application of slurry shall not commence prior to the start of the workday and shall be sufficiently cured to be open to traffic by the end of the workday, unless authorized by the Engineer. The streets to be sealed shall be closed from the time the application begins until the Engineer determines the mixture has achieved sufficient set to be opened to traffic.

Prior to the slurry sealing operations, the Contractor shall remove all existing striping, legends and raised pavement markers within the slurry seal limits per 314-2 and 314-3. When removing the raised pavement markers the Contractor shall remove any adhesive left on pavement caused from the removal of raised pavement markers. If any pavement damage (potholes) caused by removing raised pavement markers it shall be filled with a bituminous adhesive approved by the Engineer. Contractor shall install temporary pavement markers once the slurry seal is cured until the roadway surface is ready for permanent raised pavement markers.

Immediately prior to the slurry placement, the Contractor shall sweep the entire surface to be sealed with street sweeping equipment conforming to 7-8.1. Ahead of the mixer, the pavement shall be pre-wetted by a pressure water distribution system equipped with a fog-type spray bar which will completely fog the surface of the pavement. The need for application and the rate of application will be determined by the Engineer.

Before slurry seal operations, all manholes covers, flush inlet covers, monument covers and all other utility covers to remain shall be protected by covering the surface with an appropriate paper or plastic sheeting, cut to fit or by other methods approved by the Engineer. All traces of the cover and slurry seal shall be removed by the end of the same workday. 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 by the slurry seal by overlapping the concrete gutter edge and concrete gutter 1 to 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. 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.

Slurry shall be applied in such a manner that no ridges shall remain. The mixture shall be uniform and homogeneous after spreading on the existing surface and shall not show separation of the emulsion and aggregate after setting.

The Contractor shall prevent slurry from being deposited on other than asphalt concrete surfaces and shall remove slurry from surfaces not designated to be sealed. The method of slurry removal shall be approved by the Engineer.

At the direction of the Engineer, the Contractor shall repair and reseal all areas of the streets which have not been sealed properly or completely.

Where the completed slurry is not uniform in color, the street shall be treated to eliminate the color variation. The method of treatment shall be approved by the Engineer.

Adequate means shall be provided to protect the slurry seal from damage from traffic until such time that the mixture has cured sufficiently so that the slurry seal will not adhere to and be picked up by the tires of the vehicles. Basis for rejection of improperly placing slurry seal includes, but is not limited to, striation of surface, solidification of the asphalt, balling or lumping of the aggregates due to quick-set, tracks of unauthorized vehicles, bicycles and pedestrians, or the presence of uncoated aggregate will be cause for rejection of the slurry.

900-1.9 Compacting.

Rolling of the slurry shall commence as soon as the material has set sufficiently to adhere to the roadway without lifting or sticking to the tires. The slurry shall be rolled with a minimum of three passes with a double-axle, multiple pneumatic-tired rollers prior to opening to traffic. Rollers shall be self-propelled or drawn by tracks or tractors having rubber-tired wheels and shall be operated at a minimum tire pressure of 60 psi. Rolling shall continue until the surface is evenly rolled.

900-1.10 Public Convenience and Traffic Control.

Traffic control and scheduling for the spreading and compacting of TRMSS shall conform to 7-10.2.2.1. The Contractor shall notify all affected property owners, residents, businesses, and agencies per 7-10.2.2.1.1.

Contractor shall be responsible for adequate barricading of the work area and controlling of traffic in the vicinity of the Work as specified in 7-10.2, or as directed by the Engineer.

When necessary to provide vehicular or pedestrian crossings over the fresh slurry, the Engineer shall direct the Contractor to spread sufficient sand or rock dust on the affected area to eliminate tracking or damage to the slurry. Sand or rock dust used for this purpose shall be at the Contractor's expense.

900-1.11 Measurement and Payment.

Slurry will be paid at the Contract Unit Price per square foot. [ELT. The payment quantity

will be determined by the weight of dry aggregate used in the slurry.] The Contract Unit Price paid per square foot shall include full compensation for furnishing emulsion, accelerator or retardant, and water for constructing TRMSS in place.

900-2 RUBBER POLYMER MODIFIED SLURRY (RPMS).

900-2.1 General.

Rubber polymer modified slurry (RPMS) is a crumb rubber asphalt slurry-seal surface treatment and shall be a stable mixture of asphaltic emulsion, mineral aggregate, set-control additives, specially produced and graded crumb rubber, polymer, mineral fillers, carbon black, and water. The materials for RPMS shall conform to 203-5 and these specifications. Mixing and spreading of RPMS shall be as described in 302-4 and 302-14.

900-2.2 Materials.

The ingredients of 0052PMS immediately prior to the mixing shall conform to the following:

Asphaltic emulsion shall be a quick-set type and shall conform to the requirements of CQS-1h and to the following requirements in accordance with the specified test methods:

Quality Tests	Emulsion Test	Requirements
AASHTO T 59	Residue after Distillation ASTM D 244	60% min.

Quality Tests	Residue	Requirements
AASHTO T 49	Penetration at 77°F (25°C) ASTM D 2397	40% - 90%.

In addition, quick setting Type CQS-1h Asphaltic Emulsion shall test Positive for Particle Charge when tested in accordance with ASTM Designation. If the Particle Charge Test result is inconclusive, the Asphaltic Emulsion shall meet a pH requirement of 6.7 maximum.

Water shall be potable and of such quality that the asphalt will not separate from the emulsion before the slurry seal is in place in the work.

If necessary for workability, a set-control agent that will not adversely affect the RPMS material may be added.

Polymer additive shall be SBR Latex or approved equal, which is added at a minimum of 2.0 percent by weight of the asphaltic emulsion.

Crumb rubber shall be ambient granulated or ground from whole passenger and/or truck tires only, in conformance with requirements indicated in Tables 900-2.2(A), 900-2.2(B), and 900-2.2(C). Uncuring or devulcanized rubber is not acceptable and may not be used. Rubber tire buffing from either recapping or manufacturing processes may not be used as a supplement to the crumb rubber mixture.

In order to remove steel and fabric, an initial separation stage which subjects the rubber to freezing temperatures may be used. The crumb rubber shall not be elongated or hair-like in shape and individual particles shall not be greater than 1/20 of an inch in length. The crumb rubber shall be free of contaminants including fiber, metal and mineral matter within the following tolerances: the fiber content shall be less than 0.30% by weight; the crumb rubber shall be free of metal particles--metal imbedded in rubber particles will not be allowed; the amount of mineral contaminants allowed shall not exceed 0.10% by weight; and the crumb rubber shall be dry with a moisture content of less than 0.75%.

(UPDATED: 01-19)

TABLE NO. 900-2.2(A)

CRUMB RUBBER CHEMICAL PROPERTIES SPECIFICATION

Property	Specification Limits
Specific Gravity	1.15+/-.05
Percent of Carbon Black	35.0 Maximum
Percent of Rubber Hydrocarbon	55.0 Maximum
Percent Ash	6.0 Maximum
Percent of Acetone Extract	10.0 Maximum
Percent of Chloroform Extract	3.0 Maximum
Percent Natural Rubber	40 Minimum

TABLE NO. 900-2.2(B)

CRUMB RUBBER GRADATION REQUIREMENTS

Sieve Size	Percent Passing
No.30	100
No.40	90-100
No.50	75-85
No.100	25-35
No.200	0-10

TABLE NO. 900-2.2(C)

TESTING METHODS FOR CRUMB RUBBER ANALYSIS

Property	Test Method
Specific Gravity	ASTM D 1817
Carbon Black	ASTM D 297
Ash	ASTM D 297
Chloroform Extract	ASTM D 297
Natural/Synthetic Rubber	ASTM D 297
Sieve Analysis	ASTM C 136

Carbon black solution shall be non-ionic in charge and liquid in form. The carbon black must be compatible with the emulsion system, polymers, and additives being used and conform to the requirements indicated in Table 900-2.2(D) and ASTM D 1511.

TABLE NO. 900-2.2(D)

Specification	Tolerances
Total Solids	40-44
% Black by Weight	35-37
Type Black	Medium Furnace Color
Type Dispersing	Non-ionic

Additives may be used to accelerate or retard the break-set of the RPMS. The use of additives shall be in quantities specified in the mix design.

Mineral filler such as Portland Cement, hydrated lime, limestone dust, fly ash or other approved filler meeting the requirements of ASTM D 242 shall be used if required by the mix

design and may be used to facilitate set times as needed. Any cement used shall be considered as part of the dry aggregate weight for mix design purposes.

The mineral aggregate used shall be the type and grade specified for the particular Type of RPMS. The aggregate shall be manufactured crushed stone such as granite, slang, limestone, chat, or other high quality aggregate, or combination thereof. Aggregate shall consist of rock dust except that 100 percent of any aggregate of combination of aggregates, larger than the No. 50 sieve size, used in the mix shall be obtained by crushing rock. The material shall be free from vegetable matter and other deleterious substances. All aggregate shall be free of caked lumps and oversized particles. The aggregate shall also conform to the following requirements in Table 600-2.2(E).

TABLE NO. 900-2.2(E)

Test	California Test	Requirements
Sand Equivalent	217	45 min.
Durability Index	229	55 min.

900-2.3 Composition and Grading.

The percentage composition by weight of the aggregate shall conform to the requirements indicated in Table 900-2.3(A) when determined by California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.20 or more between blends of different aggregates.

TABLE NO. 900-2.3(A)

TYPE I SLURRY SEAL GRADATION

Sieve Size	Percentage Passing	Stockpile Tolerance
No.4	100	+/-5%
No.8	90-100	+/-5%
No.16	65-90	+/-5%
No.30	40-60	+/-5%
No.50	25-42	+/-4%
No.200	10-20	+/-2%

TYPE II SLURRY SEAL GRADATION

Sieve Size	Percentage Passing	Stockpile Tolerance
No.3/8	100	+/-5%
No.4	90-100	+/-5%
No.8	65-90	+/-5%
No.16	45-70	+/-5%
No.30	30-50	+/-5%
No.50	18-36	+/-4%
No.100	10-24	+/-3%
No.200	5-15	+/-2%

TYPE III SLURRY SEAL GRADATION

Sieve Size	Percentage Passing	Stockpile Tolerance
No.3/8	100	+/-5%

(UPDATED: 01-19)

No.4	70-90	+/-5%
No.8	45-70	+/-5%
No.16	28-50	+/-5%
No.30	19-34	+/-5%
No.50	12-25	+/-4%
No.100	7-18	+/-3%
No.200	5-15	+/-2%

The job mix (target) gradation shall be within the gradation band for the desired type. After the target gradation has been submitted, the percent passing each sieve shall not vary by more than the stockpile tolerance.

The aggregate will be accepted at the job location or stockpile. The stockpile shall be accepted based on five gradation tests according to California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between blends of different aggregates. If the average of the five tests is within the gradation tolerances, then the material will be accepted. If the test shows the material to be out, the contractor will be given the choice to either remove the material or blend other aggregates with the stockpile material to bring it into specifications. Materials used in blending must meet the quality test before blending and must be blended in a manner to produce a consistent gradation.

When the results of either the Aggregate Grading or the Sand Equivalent test do not conform to the requirements specified, the aggregate shall be removed. However, if requested in writing by the Contractor and approved by the Engineer, the aggregate may be used and the Contractor shall pay to the agency $1.75 per ton for such aggregate left in place. No single aggregate grading or sand equivalent tests shall represent more than 300 tons or one day's production, whichever is smaller.

900-2.4 Mix Design.

Before work begins, the Contractor, at its expense, shall submit for Engineer approval laboratory reports of mix design performed in accordance with the tests identified in Table 900-2.4(A), utilizing the specific materials to be used on the project. The design will be prepared by a laboratory experienced in designing rubber asphalt slurry-seal surface treatments. After the mix design is approved, no substitution will be permitted unless approved by the Engineer. The proposed rubber asphalt slurry-seal surface treatment mix design shall verify compatibility of the aggregate, emulsion, mineral filler, set-control additive and rubber blend.

TABLE NO. 900-2.4(A)

Test	Description	Specification
ISSA T-106	Slurry Seal Consistency	Pass
ISSA TB-109	Excess Asphalt	50 grams/square foot max.
ISSA TB-100 (Type I)	Wet Track Abrasion	50 grams/square foot max.
ISSA TB-100 (Type II)	Wet Track Abrasion	60 grams/square foot max.
ISSA TB-100 (Type III)	Wet Track Abrasion	60 grams/square foot max.
ISSA TB-113	Mixing Time	Controllable to 150 seconds min.
ISSA TB-114	Wet Stripping	Pass

The Mixing Time test should be done at the highest temperatures expected during construction. The original lab report shall be signed by the laboratory that performed the mix design and shall show the results of tests on individual materials. The report shall clearly show

the proportions of aggregate, mineral filler (min. and max.), water (min. and max.), additive (s) (usage), asphalt emulsion and asphalt rubber blend based on the dry weight of the aggregate.

All of the component materials used in the mix design shall be representative of the materials proposed by the contractor to be used on the project. The percentage of each individual material required shall be shown in the laboratory report. Adjustments may be required during the construction, based on field conditions.

The component materials shall be within the following limits:

Residual Asphalt Type I	10%-16% Based on dry weight of aggregate.
Residual Asphalt Type II	7.5%-13.5% Based on dry weight of aggregate.
Residual Asphalt Type III	6.5%-12% Based on dry weight of aggregate.
Crumb Rubber	The crumb rubber will be added to the Rubberized Slurry mix at a rate of 5% by volume to the asphalt cement.
Polymer	Polymer Additive shall be added at 2% of finished emulsion.
Carbon Black	Carbon Black shall be added at 1.3 to 2% of the finished emulsion.
Mineral Filler	0.5%-2.0% (if required by mix design) Based on dry weight of aggregate.
Additives	As needed.
Water	As needed to achieve proper mix consistency. (Total mix liquids, should not exceed the loose aggregate voids)

900-2.5 Mixing.

900-2.5.1 General.

Proportioning equipment of equal capacity to that described herein will be considered by the City prior to time of award.

The rubberized asphalt slurry surfacing shall be mixed in a continuous, twin shaft, multi-paddle pugmill mixer. The pugmill shall be equipped with a hydraulically controlled steel pugmill gate for positive discharge operations. No dripping slurry will be allowed.

Each Rubberized Slurry surfacing unit shall be equipped with independent storage capabilities for the aggregate, emulsion, crumb rubber, polymer, set-control additives and the carbon black.

Each Rubberized Slurry surfacing unit shall be equipped with a unit designed to store and deliver the various required materials to a twin-shafted, multi-paddle pugmill with a computer controlled automatic sequencing system that initiates each material delivery at the precise moment necessary to insure proper proportioning.

Aggregates, asphaltic emulsion, water, polymers, additives, including set-control agent, if used, and crumb rubber shall be proportioned by volume utilizing the mix design approved by the Engineer. If more than one kind of aggregate is used, the correct amount of each kind of aggregate to produce the required grading shall be proportioned separately, prior to the other materials of the mixture, in a manner that will result in a uniform and homogenous blend.

Asphaltic emulsion shall be added at a rate within the ranges identified in Table 900-2.5.1(A) of percent by weight of the dry aggregate. The exact weight will be determined by the mix design and the asphalt solids content of the asphaltic emulsion furnished.

TABLE NO. 900-2.5.1(A)

Type of Aggregate	Range

(UPDATED: 01-19)

Type I	17-20%
Type II	14-17%
Type III	11-14%

The Aggregate shall be proportioned by a belt feeder operated with an adjustable cutoff gate. The height of the gate opening shall be readily determinable. The emulsion shall be introduced into the mixer by a positive displacement pump. Water shall be introduced into the mixer through an adjustable multi-spray pugmill bar, water volume shall be displayed by an electric digital meter registering in gallons delivered.

The aggregate belt feeder shall deliver aggregate to the pugmill mixed with such volumetric consistency that the deviation for any individual aggregate delivery rate check-run shall be within 2.0 percent of the mathematical average of 3 runs of at least 300 gallons each in duration.

The bitumen ratio (pounds of asphalt per 100 pounds of dry aggregates) shall not vary more than 1.5- pound of asphalt above or 0.6-pound asphalt below the amount designated by the mix design and approved by the Engineer.

The polymer additive and the carbon black shall be delivered to the mixer in the relative proportions required by means of a common shaft, dual pump system. The polymer additive and the carbon black flow rates shall be independently adjustable by means of diaphragm valves and shall be sequenced through the computer controlled auto-sequencing system. The polymer additive and the carbon black shall be blended and mixed prior to their introduction into the pugmill. Introduction into the twin-shafted pugmill shall be done through an injection system, which delivers the blended material to the apex of each mixing shaft immediately prior to the introduction of the asphalt emulsion. The polymer additive and the carbon black delivery system shall each be equipped with digital electronic flow metering devices that can read in gallons per minute.

The crumb rubber delivery system shall be equipped with an air suspension unit designed to prevent clumping or bridging of the rubber material. The air discharges shall be sequenced to avoid over-suspension of the rubber. The rubber shall be delivered to the pugmill by a hydraulically driven auger and shall be initiated through the computer controlled auto-sequencing system.

The emulsion shall be introduced into the mixer by a positive displacement pump. The emulsion storage shall be equipped with a device which will automatically shut down the power to the emulsion pump and aggregate belt feeder when the level of stored emulsion is lowered to within two inches of the suction line.

A temperature-indicating device shall be installed in the emulsion storage tank at the pump suction level.

The aggregate shall be proportioned using a belt feeder operated with an adjustable cutoff gate. The height of the gate opening shall be readily determinable.

The aggregate feeder shall be directly connected to the drive on the emulsion pump. The drive shaft of the aggregate feeder shall be equipped with an electronic digital belt. The belt delivering the aggregate to the pugmill shall be equipped with a device to monitor the depth of the aggregate being delivered to the pugmill. The device for monitoring depth of aggregate shall automatically shut down the power to the aggregate belt feeder whenever the depth of aggregate is less than 70 percent of the target depth of flow. An additional device shall monitor

movement of the aggregate belt by detecting revolutions of the belt feeder. The devices for monitoring no flow or belt movement, as the case may be, shall automatically shut down the power to the aggregate belt when the aggregate belt movement is interrupted. To avoid shutdown caused by normal fluctuations in delivery rates, a delay of three seconds between sensing less than desirable storage levels of aggregate or emulsion shall be permitted.

Water delivery shall be adjusted through a diaphragm valve. Water flow rate shall be electronically displayed through a digital meter.

Set control additive flow rate shall be electronically displayed through a digital meter.

The mixer unit shall not be operated unless all electronic display and revolution counters are in good working condition and functioning and all metal guards are in place. All indicators required by these specifications shall be operational at all times.

For each working crew, the Contractor shall have two fully-operational mixers and one standby mixer for use at the project site at all times.

900-2.6 Application.

900-2.6.1 General.

The work shall consist of mixing asphaltic emulsions, aggregate, set-control additives, specially produced and graded crumb rubber, and water and spreading the mixture on the pavement where shown marked out in the field, as specified in these special provisions, and as directed by the Engineer. Type II RPMS shall be applied to all streets unless otherwise specified in the proposed work Appendix of this Contract or as directed by the Engineer.

Application rates shall be as follows:

The **Type I** RPMS shall be placed at **9** pounds per square yard based on dry aggregate weight.

The **Type II** RPMS shall be placed at **13.33** pounds per square yard based on dry aggregate weight.

The **Type III** RPMS shall be placed at **15-22** pounds per square yard based on dry aggregate weight.

900-2.6.2 Spreading.

Pre-wetting of streets will not be required unless streets are subject to high temperatures and/or dust.

The complete mixture, after addition of water and any set-control agent used, shall be such that the mixture has proper workability and (a) will permit a traffic flow, without pilot-car-assisted traffic on the slurry seal within one hour after placement (at 78ºF.) without the occurrence of bleeding separation or other distress, and (b) will prevent development of bleeding, excessive raveling, separation or other distress within 7 days after placing the rubberized asphalt surfacing.

The Rubberized Asphalt Slurry mixture shall be spread by means of a controlled spreader box. The spreader box shall be capable of spreading traffic lane width and shall have strips of flexible rubber belting or similar material on each side of the spreader box and in contact with the pavement to positively prevent loss of slurry from the ends of the box. All spreader boxes shall be equipped with reversible motor-driven augers when placing Rubberized Asphalt Slurry. Rear flexible strike-off blades shall make close contact with the pavement, and shall be capable

of being adjusted to the various crown shapes so as to apply a uniform surfacing coat. Flexible drags, to be attached to the rear of the spreader box, shall be provided as directed by the Engineer. All drags and strike-off blades (rubbers) shall be cleaned daily if problems with cleanliness and longitudinal scouring occur. The spreader box shall be clean, free of all slurry and emulsion, at the start of each work shift.

900-2.7 Compacting.

Rolling of the slurry shall commence as soon as the material has set sufficiently to adhere to the roadway without lifting or sticking to the tires. The slurry shall be rolled with a minimum of three passes with a double-axle, multiple pneumatic-tired rollers prior to opening to traffic. Rollers shall be self-propelled or drawn by tracks or tractors having rubber-tired wheels and shall be operated at a minimum tire pressure of 60 psi. Rolling shall continue until the surface is evenly rolled.

900-2.8 Public Convenience and Traffic Control.

Traffic control and scheduling for the spreading and compacting of RPMS shall conform to 7-10.2.2.1. The Contractor shall notify all affected property owners, residents, businesses, and agencies per 7-10.2.2.1.1.

Contractor shall be responsible for adequate barricading of the work area and controlling of traffic in the vicinity of the Work as specified in 7-10.2, or as directed by the Engineer.

When necessary to provide vehicular or pedestrian crossings over the fresh slurry, the Engineer shall direct the Contractor to spread sufficient sand or rock dust on the affected area to eliminate tracking or damage to the slurry. Sand or rock dust used for this purpose shall be at the Contractor's expense.

900-2.9 Measurement and Payment.

RPMS shall be paid based on the square footage of RPMS applied. The measurement of RPMS applied shall be calculated by dividing the weight obtained from Certified Weighmaster Certificates by the spread rate for the Type specified. The Contractor shall also present Weighmaster Certificates for the amount of such material remaining unused at the completion of the work at no cost to the Agency. Payment will be determined by deducting the amount of the unused material from the total amount of material delivered.

The pay quantity for RPMS shall be the total square footage used on the project calculated using the aforementioned procedure. Such price shall include full compensation for specified surface preparation not included in other bid items, removals, sweeping, aggregate required in the mix design, and for constructing the RPMS in place.