

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. PAVEMENT MARKINGS consists of furnishing transportation, labor, materials, and equipment to layout and install markings, striping, lettering, and informational and directional markings on pavement and curbs; and installing pavement markers, including hydrant markers. Work further consists of covering or removing existing markings on pavements prior to installing new markings.

1.2 RELATED WORK

- A. BASIC SITE MATERIALS AND METHODS Section 02 00 01
- B. TEMPORARY FACILITIES AND CONTROLS Section 01 51 00
- C. POLYMER MODIFIED ASPHALT PAVING Section 32 12 16.29

1.3 MEASUREMENT AND PAYMENT

- A. Install Yellow Centerline, Caltrans Detail 1, Thermoplastic
Payment for the installation of traffic stripe, Caltrans Detail 1, will be payable under "Install Yellow Centerline, Caltrans Detail 1, Thermoplastic" unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed without deductions for gaps in broken traffic stripes in accordance with Caltrans Standard Plans A20A Detail 1, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- B. Install White Laneline, Caltrans Detail 8, Thermoplastic
Payment for the installation of traffic stripe, Caltrans Detail 8, will be payable under "Install White Laneline, Caltrans Detail 8, Thermoplastic" unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed without deductions for gaps in broken traffic stripes in accordance with Caltrans Standard Plans A20A Detail 8, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.

- C. Install White Laneline with Raised Markers, Caltrans Detail 9, Thermoplastic
Payment for the installation of traffic strip with raised markers, Caltrans Detail 9, will be payable under “Install White Laneline with Raised Markers, Caltrans Detail 9, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed without deductions for gaps in broken traffic stripes in accordance with Caltrans Standard Plans A20A Detail 8, including reflective raised pavement markers establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- D. Install Double Yellow Line Caltrans Detail 21, Thermoplastic
Payment for the installation of double yellow line, Caltrans Detail 21, will be payable under “Install Double Yellow Line Caltrans Detail 21, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of double thermoplastic pavement stripe installed in accordance with Caltrans Standard Plans A20A Detail 21, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. Double traffic stripe will be measured as a single traffic stripe. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- E. Install Double Yellow Line Caltrans Detail 22, Thermoplastic
Payment for the installation of double yellow line, Caltrans Detail 22, will be payable under “Install Double Yellow Line Caltrans Detail 22, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of double thermoplastic pavement stripe installed in accordance with Caltrans Standard Plans A20A Detail 22, including reflective pavement markers and establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. Double traffic stripe with markers will be measured as a single traffic stripe. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- F. Install Double Markerline, Caltrans A20A Detail 23
Payment for the installation of double markerline, Caltrans Detail 23, will be payable under “Install Double Markerline Caltrans Detail 23” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of double raised pavement markers installed in accordance with Caltrans Standard Plans A20A Detail 23, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. Double markerline will be measured as a single traffic stripe. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.

- G. Install Yellow Left Edgeline with Markers, Caltrans Detail 25, Thermoplastic
Payment for the installation of yellow left edgeline with raised markers, Caltrans Detail 25, will be payable under “Install Yellow Edgeline with Markers Caltrans Detail 25, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed in accordance with Caltrans Standard Plans A20B Detail 25, including reflective pavement markers and establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- H. Install White Right Edgeline, Caltrans Detail 27B, Thermoplastic
Payment for the installation of white right edgeline, Caltrans Detail 27B, will be payable under “Install White Right Edgeline Caltrans Detail 27B, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed in accordance with Caltrans Standard Plans A20B Detail 27B, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- I. Install White Channelizing Line with Raised Markers, Caltrans Detail 38, Thermoplastic
Payment for the installation of white channelizing line with raised markers, Caltrans Detail 38, will be payable under “Install White Channelizing Line with Raised Markers Caltrans Detail 38, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed in accordance with Caltrans Standard Plans A20D Detail 38, including reflective pavement markers and establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- J. Install White Bike Lane Line, Caltrans Detail 39, Thermoplastic
Payment for the installation of white bike lane line, Caltrans Detail 39, will be payable under “Install White Bike Lane Line Caltrans Detail 39, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic pavement stripe installed in accordance with Caltrans Standard Plans A20D Detail 39, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.

- K. Install Pavement Markings – Words, Numbers, Arrows
Payment for the installation of pavement words, numbers, and arrows will be payable under “Install Pavement Marking – Words, Numbers, Arrows” unit price bid item. Payment shall be measured and paid for at contract price per square foot for the actual area of thermoplastic pavement markings. Contract price and payment includes, but not limited to, establishment of cat-tracks and layout work, and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- L. Install 4” White Line, Thermoplastic
Payment for the installation of 4-inch white line will be payable under “Install 4” White Line, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of thermoplastic line. Contract price and payment includes, but not limited to, establishment of cat-tracks and layout work, and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- M. Install 12” White Line and Crosswalk, Thermoplastic
Payment for the installation of 12-inch white line will be payable under “Install 12” White Line and Crosswalk, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of white thermoplastic line and thermoplastic crosswalk line installed (10 feet apart) in accordance with Caltrans Standard Plans A24E. Contract price and payment includes, but not limited to, establishment of cat-tracks and layout work, and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- N. Install 12” Yellow Line and Crosswalk, Thermoplastic
Payment for the installation of 12-inch yellow line will be payable under “Install 12” Yellow Line and Crosswalk, Thermoplastic” unit price bid item. Payment shall be measured and paid for at contract price per linear foot of yellow thermoplastic line and thermoplastic crosswalk line installed (10 feet apart) in accordance with Caltrans Standard Plans A24E. Contract price and payment includes, but not limited to, establishment of cat-tracks and layout work, and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, permits, and as directed by the Engineer.
- O. Install 24-Inch White Diagonal Stripe, Thermoplastic
Payment for the installation of 24-inch diagonal white striping will be payable under “Install 24-Inch White Diagonal Stripe, Thermoplastic” unit price bid item. Payment shall be measured and paid by linear foot of 24-inch-wide

thermoplastic diagonal line a 45-degree angle to the traverse crosswalk and within traverse crosswalk lines installed, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, and permits.

- P. Install 24-Inch Yellow Diagonal Stripe, Thermoplastic
Payment for the installation of 24-inch diagonal yellow striping will be payable under "Install 24-Inch Yellow Diagonal Stripe, Thermoplastic" unit price bid item. Payment shall be measured and paid by linear foot of 24-inch-wide thermoplastic diagonal line a 45-degree angle to the traverse crosswalk and within traverse crosswalk lines installed, including establishment of cat-tracks; and shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidental costs. All work be completed and in place as accordance with project plans, specifications, and permits.
- Q. Hydrant Pavement Markers
Compensation for providing and re-placing pavement markers identifying fire hydrant shall be included in the applicable contract unit price and no additional payment will be made.

1.4 REFERENCES

A. State of California Department of Transportation Standard Specifications (SS):

Section 15	Existing Facilities
Subsection 15-2-2.02C(1)	Remove Traffic Stripes and Pavement Markings
Subsection 15- 2-2.0D	Remove Pavement Markers
Section 37	Bituminous Seals
Section 84	Traffic Stripes and Pavement Markings
Subsection 84-2	Thermoplastic Traffic Stripes And Pavement Markings
Section 85	Pavement Markers
Subsection 85-1.02C	Reflective Pavement Markers

B. Standard Specifications for Public Works Construction (RS):

Section 214	Pavement Markers
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C. California Department of Transportation (Caltrans) Standard Details:

A20A – 20D	Pavement Markers and Traffic Lines Typical Details
A24A – 20B	Pavement Markings Arrows

A24C	Pavement Markings Symbols and Numerals
A24D	Pavement Markings Words
A24E	Pavement Markings Words and Crosswalks
A88A	Curb Ramp Details (Crosswalk installation layout details)

1.5 TRAFFIC AND PEDESTRIAN CONTROL PLAN

- A. Perform Traffic Control in conformance with TEMPORARY FACILITIES AND CONTROLS Section

1.6 SUBMITTALS

- A. Submit the following prior to purchasing material:
 - 1. Equipment to be used for pavement markings
 - 2. Complete list of materials to be used including reflective media
 - 3. Materials test reports and certifications in conformance with SS Subsection 84-2
 - 4. For marker quantity less than 10,000, Contractor may submit manufacturer's certification that markers and adhesive conform to RS Section 214
 - 5. Submit method to remove existing striping and thermoplastic striping material (thermoplastic paint). Include method to recover grindings, paint residue, blast media, and wastewater

PART 2 PRODUCTS

2.1 MATERIALS

- A. Thermoplastic Paint:
 - 1. Conform to SS Subsection 84-2.02
- B. Reflective Pavement Markers:
 - 1. Conform to SS Subsection 85-1.02C
- C. Blue Reflective Hydrant Pavement Markers
 - 1. Conform to RS Subsection 214

PART 3 EXECUTION

3.1 LAYOUT OF MARKINGS

- A. Perform and establish cat-tracks and dribble lines on the pavement to be approved by the City prior to placing the stripes and markings. No thermoplastic stripes and pavement markings shall be installed until the surface and the striping layout has been approved by the Engineer.
- B. Layout the markings at the locations and to the dimensions indicated on Drawings.
- C. Apply letters, numerals, and symbols using stencils and templates
- D. Layout crosswalk at one-ramp corner in conformance with Caltrans Standard Plans A88A, Curb Ramp Details

3.2 PREPARATION

- A. Surfaces which are to receive thermoplastic traffic stripes or pavement markings shall be thoroughly clean, free from loose materials and dry; and such areas shall be thus prepared by the Contractor to the satisfactions of and with methods approved by the Engineer.
- B. Removal of existing traffic striping, pavement markings, and pavement markers:
 - 1. Removal of existing traffic striping, pavement markings, and pavement markers in conformance with the provisions in SS Section 15, Existing Facilities
 - 2. Conflicting striping and pavement markings shall be removed before the installation of new striping and pavement markings. All traffic striping and pavement markings shall be removed in a rectangular shape.
 - 3. Remove existing thermoplastic paint in areas of new striping and prior to applying slurry seal in areas where slurry seal is required on Drawings
 - a. Remove thermoplastic paint by a method that minimizes damage to existing pavement
 - 4. If grinding or sand-blasting is used for the removal of existing traffic striping and pavement markings, 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 grinding or sand-blasting material and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the grinding or sand-

blasting operation. After the removal of existing traffic striping and pavement markings on the asphalt concrete pavement, a fog seal shall be applied to the surface of grinding or sand-sand-blasting areas in accordance with the provisions in SS Section 37, Bituminous Seals.

5. New striping and pavement markings shall be installed within 24 hours of removal of existing striping and pavement markings
 6. Existing pavement markers to be removed, shall be done so in a manner as to leave the existing asphalt concrete pavement undamaged. Damage to the asphalt concrete resulting from the removal of pavement markers shall be considered as any depression more than one-fourth inch (1/4") deep and shall be patched using type A, No. 4 maximum asphalt concrete.
 7. Recover and dispose of grindings, paint residue, blast media, and waste water from areas undergoing marking removals
- B. The Engineer will inspect surfaces to be painted after Contractor has laid out pavement markings, and prior to application of paint materials. Correct deficiencies in layout and surface preparation prior to application of paint.
 - C. Thermoplastic traffic stripes and pavement markings shall be placed in accordance with SS Subsection 84-2
 - D. Protect existing, adjacent facilities from overspray and spillage
 - E. Permanent striping and markings shall be installed no sooner than ten (10) calendar days and no later than fifteen (15) calendar days after final lift of overlay or slurry seal is placed. Temporary markings shall be installed the same day that the original markings are removed or destroyed and shall be maintained until permanent striping is placed
 - F. Thermoplastic and paint shall be placed as close as possible to existing utility structures and frames and covers without covering them
 - G. Contractor shall protect the newly installed pavement markers, pavement markings, traffic lines and signs from damage until the materials have cured. Any markers, markings, stripes or signs broken, misaligned or otherwise disturbed shall be repaired by Contractor prior to opening the roadway to traffic
 - H. Any damage to the new stripes or markings due to the failure of the Contractor to protect his work shall be repaired by him at no additional cost.
 - I. Walk-behind striping machine is not allowed
 - J. Any overlap, dripping or tracking of thermoplastic or paint onto adjacent surfacing shall be removed to the satisfaction of the Engineer

3.3 WEATHER LIMITATION

- A. Thermoplastic material shall be applied only to dry pavement surfaces and only when the pavement surface temperature is above 50° F and when the weather is not excessively windy, dusty, foggy, or humid. Verify suitability of the weather with the Engineer in the field.

3.4 APPLICATION

- A. Apply thermoplastic paint in conformance with SS Subsection 84-2.03
- B. Install pavement markers in conformance with SS Section 85-1.03

3.5 TOLERANCES

- A. Width of stripes shall not vary more than 1/4 inch, plus or minus, from the width shown on Drawings. The alignment and straightness of stripes shall not deviate more than 1/2 inch in 50 feet. Deviations in excess of the tolerances specified shall be erased by wet sandblasting, and the painting reapplied.

3.6 CLEANUP

- A. Remove paint overspray, drips, and spills from adjacent surfaces by means, which will not damage the surfaces.

-END OF SECTION-