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SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Parking Lot "N" Pavement Repair for Cabrillo Community College District.

1. Project Location: Cabrillo College's Aptos Campus
2. Owner: Cabrillo Community College District
3. Civil Engineer: Bowman and Williams
1011 Cedar Street
Santa Cruz, CA 95060

1.02 DESCRIPTION

A. Project Scope: Repair of the failed pavement in Parking Lot "N", including an asphalt overlay and restriping of the parking stalls. Plans prepared by Bowman & Williams Job Number 25042.

1.03 USE OF PREMISES

- A. General:
- B. Restricted Areas:
- C. Accessible Route:

1.03 SPECIFICATION FORMATS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 2004 CSI/CSC's "MasterFormat" numbering system.

END OF SECTION 01 10 00

SECTION 01 55 26 – TRAFFIC CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Description: This work shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Caltrans Standard Specifications and the provisions under "Maintaining Traffic" elsewhere in the special provisions, and shall consist of installing traffic and pedestrian signing, delineators, fencing, barricades, temporary base rock or plywood walkways, temporary driveways and flaggers as necessary to maintain safe passage, and these special provisions, and as directed by the College's Representative.

1.02 REFERENCES

- A. State of California, Department of Transportation's "Standard Specification's" (CSS) latest edition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. Vehicular and pedestrian access to private property shall be maintained at all times unless the closing of such access is approved by the District's Representative. The Contractor shall request in writing permission from the District's Representative in advance of making such closing.
- B. Detours and all lights, signs, barricades, flag persons or other devices necessary to provide for safety and convenience shall be furnished, installed and maintained by the Contractor. Lighted or flashing barricades shall be used during hours of darkness.
- C. Existing traffic signs shall be protected in place by the Contractor during the construction period.
- D. The Contractor shall place, remove, store, maintain, relocate, replace, and dispose construction area traffic control devices and traffic control and construction area signs.
- E. Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to the public traffic.
- F. The Contractor shall notify local public safety authorities of this intent to begin work at least 5 working days before work is begun. The Contractor shall cooperate with local public safety authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles.
- G. The full width of the traveled way shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 p.m. on Fridays and the day preceding designated legal holidays, and when construction operations are not actively in progress.

- H. Designated legal holidays are: January 1, the third Monday in February, the last Monday in May, July 4, the first Monday in September, November 11, Thanksgiving Day, and December 25. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11 falls on a Saturday, the preceding Friday shall be a designated legal holiday.
- I. Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if in the opinion of the District Representative public traffic will be better served and the work expedited. Such deviations shall not be implemented until the District Representative has indicated his written approval. All other modifications will be made by Contract Change Order.

3.02 CONSTRUCTION AREAS SIGN

- A. Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Caltrans Standard Specifications. Construction area signs shall be installed 7 calendar days prior to starting work.

END OF SECTION 01 55 26

SECTION 01 71 13 –MOBILIZATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Organization and mobilization of the Contractor's forces.
- B. Transporting construction plant and equipment to the jobsite and setting up of staging area.
- C. Transporting various tools, materials, and equipments to the jobsite.
- D. Erection of temporary buildings and facilities as required for field offices, staging, storage, and construction operations.

1.02 DESCRIPTION

- A. This work shall conform to the requirements of Section 11, "Mobilization," of the Caltrans Standard Specifications and shall consist of preparatory work and operations, including but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for the establishment of all offices, buildings and other facilities necessary for work on the project; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various contract items on the project site.
- B. Mobilization shall also include assembly and delivery to the job site, equipment, tools, materials, and supplies necessary for the prosecution of work which are not intended to be incorporated in the Work.

1.03 SUBMITTALS

- A. The Contractor shall submit a plan of the proposed layout of the construction site, including fences, roads, parking, buildings, staging, and storage areas, within 7 days after the effective date of Notice to Proceed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE

- A. The Contractor shall submit a detailed construction schedule to the College Representative for review and approval prior to the pre-construction meeting for the project.
- B. The contractor shall implement necessary traffic control during mobilization to maintain roadway vehicular access per Section 11 55 26.

END OF SECTION 01 71 13

SECTION 01 71 23- FIELD ENGINEERING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provide and pay for field engineering services required for the project.
 - 1. Civil or other professional engineering services specified, or required to execute Contractor's construction methods.
 - 2. Coordination with testing laboratory and soils engineer.
 - 3. Contractor furnished assistance.
 - 4. Verification of conditions.
- B. Related Requirements in Other Parts of the Project Manual:
 - 1. Conditions of the contract.

1.02 SUBMITTALS

- A. Submit name and address of professional engineer to District, including changes as they may occur.
- B. On request of District, submit documentation to verify accuracy of field engineering work.
- C. Record Drawings:
 - 1. At project completion, obtain and pay for reproducible transparencies of the project plans. Clearly indicate all differences between original drawings and completed work within specified tolerances.
 - 2. Completed record drawing transparencies shall be dated, signed and certified as correct by the Civil Engineer.

1.3 QUALITY ASSURANCE

- A. Qualifications of Engineer: Engage a registered Civil Engineer acceptable to both Contractor and Owner and who is qualified to perform land surveying. Furnish to Owner prior to start of work, the name and license (or registration number) issued by the State of California, Board of Registration for Professional Engineers and Land Surveyors. Provide notice to Owner during course of construction should identification of individual responsible for this work change, and obtain approval of Owner for the replacement.
- B. All field engineering services furnished during the course of this project shall be under the direct supervision and control of the named individual Civil Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 RECORDS

- A. Maintain a complete, accurate surveyor's log of all control and survey work as it progresses. Make this log available for reference.

END OF SECTION 01 71 23

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing bars.
 - 2. Welded wire fabric.
 - 3. Reinforcement accessories.

- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.

- C. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
 - 3. ACI 530.1 - Specifications for Masonry Structures.
 - 4. ACI SP-66 - ACI Detailing Manual.

- D. ASTM International:
 - 1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
 - 3. A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 4. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 5. ASTM A497/A497M - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - 6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 7. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
 - 8. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 9. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 10. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 11. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
 - 12. ASTM A934/A934M - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
 - 13. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

- E. American Welding Society:
 - 1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- F. Concrete Reinforcing Steel Institute:
 - 1. CRSI - Manual of Standard Practice.
 - 2. CRSI - Placing Reinforcing Bars.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules and supporting and spacing devices.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI - Manual of Standard Practice, ACI 301, ACI 318.
- B. Prepare shop drawings in accordance with ACI SP-66.
- C. Perform Work in accordance with Caltrans Standards.

1.4 QUALIFICATIONS

- A. Welders: AWS qualified within previous 12 months.

1.5 COORDINATION

- A. Section 01 30 00 - Administrative Requirements Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, #4 bars 40 ksi yield grade, deformed billet bars, uncoated.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions

2.3 FABRICATION

- A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice, ACI 318.

- B. Form standard hooks for 180 degree bends, 90 degree bend, stirrup and tie hooks and seismic hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

2.4 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements : Testing, inspection and analysis requirements.
- B. Make completed reinforcement available for inspection at manufacturer’s factory prior to packaging for shipment. Notify Architect/Engineer at least seven days before inspection is allowed.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly except as permitted by Architect/Engineer.
- B. Do not displace or damage vapor retarder.
- C. Accommodate placement of formed openings.
- D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
 - 1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches
Supported Slabs, Walls, and Joists	No. 14 bars and larger	1-1/2 inches
	No. 11 bars and smaller	3/4 inches
Beams and Columns		1-1/2 inches
Shell and Folded	No. 6 bars and larger	3/4 inches

Plate Members	No. 5 bars and smaller	1/2 inches
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3.2 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements : Tolerances.
- B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

- C. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed by Owner’s testing laboratory in accordance with ACI 318.

END OF SECTION

SECTION 03 30 00

CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provisions for Constructing:

- a. Concrete Matt Slab under pavement in areas where tree roots are damaging the existing pavement.

B. Related Sections

- 1. Section 31 23 13 - Subgrade Preparation
- 2. Section 03 20 00 - Concrete Reinforcing

1.2 REFERENCES

A. Standards listed below, after their abbreviated designation, apply where the designation is cited in this Section. Refer to the latest edition unless otherwise noted.

B. Local Agency Specifications

1. When applying the cited standards, the following shall be understood.

- a. Terms such as Commission, Department or Agency shall mean the Cabrillo Community College District (District).
- b. Terms such as Director, Executive Officer, or Engineer shall mean the District's Representative.
- c. In case of discrepancies between the cited standards and this Section, this Section governs.
- d. All references to statistical testing are deleted.
- e. All references to measurement and payment are deleted.

2. Standards cited:

- a. State of California, Department of Transportation's (Caltrans) "Standard Specifications", (CSS) May 2006.

1.3 SUBMITTALS

- A. Product Data: Catalog cuts for each specified or indicated manufactured product.
- B. Quality Control Submittals
 - 1. Certificate of compliance with specified industry standards.

1.4 SITE CONDITIONS

- A. Do not place concrete when base surface temperature is less than 40 degrees Fahrenheit, or surface is frozen.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE AND SUBBASE

- A. See Section 31 23 13 – Subgrade Preparation and Section 32 11 23 – Aggregate Base Course.

2.2 CONCRETE MATERIALS

- A. Concrete mixes by minimum 28-day strength unconfined compressive strength for concrete of at least 2500 psi to be used for the Matt Slab.

28 - day <u>Strength</u> 2500 psi	Max. size of <u>Aggregate</u> 1"	Max. <u>Slump</u> 4"
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- B. Use only one brand type of cement for each type of concrete finish; uniform color is required.

2.4 REINFORCEMENT:

- A. Deformed steel bars shall conform to CSS Section 52, ASTM A615, Grade 40 or better and shall be of U.S.A. domestic manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify grading has brought subgrade to proper elevation.
- B. Report any discrepancies in Drawings, conditions at the site, or prior work done by others which would prevent positive drainage or would produce unsatisfactory concrete work.
- C. Ensure all underground work and embedded items are in place.

3.2 AGGREGATE BASE

- A. Place, spread, moisture condition, and compact in accordance with Section 02300.

3.3 CONCRETE, GENERAL

- A. Notify the District's Representative at least 48 hours prior to placing concrete.
- B. Place Concrete in accordance with this section.
- C. All concrete work shall be true to line and grade as indicated on the drawings. Follow the intent of drainage patterns indicated; any surface which does not drain properly will be rejected.
- D. Finished paving surfaces shall not vary more than 1/8" from a 10' metal straightedge, except at grade changes. No "birdbaths" or other surface irregularities will be permitted. Correct irregularities to the satisfaction of the University's Representative at no additional cost to the University.
- E. Tooled weakened plane joints shall be set at 20 foot intervals with a depth of 1/3 the slab thickness.
- F. Concrete walkways with gradients less than 5% (1:20) shall have a light broom finish.
- G. Concrete ramps with gradients between 5% (1:20) and 8.33% (1:12) shall have a medium broom finish.

3.4 PROTECTION

- A. Conform to applicable requirements of CSS Section 90-8.
- B. Protect all concrete work against injury and defacement during subsequent construction operations until Final Acceptance.

3.5 CURING

- A. All concrete shall be allowed to cure a minimum of 7 days prior to any loading.

3.6 FIELD QUALITY CONTROL

- A. The District's Geotechnical Engineer will inspect subgrade and any required bases prior to placement of concrete.
- B. The District's Testing Agency will take samples for testing during the course of the work in accordance with the Contract Documents or as considered necessary.

END OF SECTION 02751

SECTION 31 23 13 – SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Description: Performing operations necessary to construct sub grade to the required grade and compaction as shown on plans or specified herein.
- B. Related Sections
 - 1. Section 32 11 23 – Aggregate Base Course
 - 2. Section 32 12 16 – Asphalt Paving

1.02 REFERENCES

- A. State of California, Department of Transportation's "Standard Specification's" (CSS) latest edition.
- B. California Testing Method No. 216; or as directed by the College's Soil Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. After initial 2" deep Cold Mill of existing AC pavement, Cold Mill an additional 4" deep.
- B. At sub grade level, keep sub grade free of water, debris, and foreign matter.
- C. Compact sub grade to 95% relative compaction per California Testing Method No. 216.
- D. As required, provide additional engineered fill material where needed to keep grade. Additional engineered fill material shall also be compacted to 95% relative compaction prior to asphalt paving.
- E. At the direction of the College's Soil Engineer, water may be added to sub grade soil to achieve compaction requirements.

3.02 RECORDS

- A. Maintain a complete, accurate log of all soils compaction testing work as it progresses. Make this log available for reference.

END OF SECTION 31 23 13

SECTION 32 01 13.61 – SLURRY SEAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Emulsified Asphalt Slurry Seal
- B. Related Sections
 - 1. Section 32 12 16 – Asphalt Paving

1.02 REFERENCES

- A. Standards listed below, with their designation in parenthesis, apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.
- B. State of California, Department of Transportation's "Standard Specification's" Latest Edition (CSS).
 - 1. Interpretation of Standard Specifications:
 - a. Wherever the term Commission of Department occurs, it shall mean the College. Whenever the term Director or Executive Officer occurs, it shall mean the College's Representative.
 - b. Whenever a discrepancy occurs between the Standard Specifications and this specification, this specification governs.

1.03 SUBMITTALS

- A. Submit the following:
 - 1. Certificates of compliance with specified standards for natural materials and manufactured items.
 - 2. For manufactured items, the manufacturer's technical data of physical properties.
 - 3. Slurry mix design. Include recommended aggregate grading, asphalt content, and supporting test results
 - 4. Samples as requested by the College's Testing Laboratory.

1.4 SITE CONDITIONS

- A. Comply with all requirements of Cabrillo Community College District.
- B. Do not place Slurry Seal unless atmospheric temperature is at least 50 degrees Fahrenheit and rising.
- C. Slurry shall not be placed when rain is predicted or on a surface and shall not be applied during night conditions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asphalt Emulsion: Asphalt Emulsion shall be a cationic quick-setting type conforming to the requirements of CQS1h grade under Caltrans Standard Specifications, Section 94, Table 4: Requirements for Quick-Setting Asphalt Emulsion.
- B. Water: Water shall be potable, free of harmful salts and shall be of such quality that asphalt will not separate from emulsion before the slurry seal is in place.
- C. Aggregate: Aggregate for slurry seal shall conform to the provisions in Section 37-2.02C, "Aggregate (Slurry Seal)" of the Caltrans Standard Specifications for Type II Aggregate with the following exceptions:
 - 1. The percentage of aggregate passing the No. 4 sieve shall be 100%.
 - 2. The aggregate shall have a minimum Sand Equivalent of seventy-two (72) when tested with California Test Method 217.
 - 3. The aggregate shall have a minimum Durability Index result of seventy-five (75) when tested in accordance with the California Test Method 229.
 - 4. Aggregate shall be 100% crushed into no ground particles, volcanic in origin and black in color. The used of gray or light colored aggregate shall not be allowed.
- D. Storage of Materials: Storage location shall be approved by the College. Stockpiled materials shall be placed on flat, graded surfaces. The Contractor shall be responsible for the complete cleanup and removal of all material at stockpile and/or storage locations.

2.02 MIXES

- A. Mix Design shall conform to Section 37.203 "Mix Design" of Caltrans Standard Specifications except as modified herein.
 - 1. The "Wet Stripping" Test shown in the table following the 2nd paragraph of CALTRANS Standard Specifications Section 37-2.03, Mix Design shall be modified to include the requirement of "Pass (90% minimum)".

2.03 PROPORTIONING

- A. Proportioning shall conform to Section 37-2.04, "Proportioning of the Caltrans Standard Specifications except as modified herein."
 - 1. The components of the slurry seal mix shall be proportioned in accordance with the requirements of these Standard Specifications and the approved mix design which is suitable for the current climate, curing, and traffic conditions. The mix design shall include the recommended application rate considering these factors.

2. Volume or weight controls for proportioning each individual material to be added to the slurry seal mix (i.e. aggregate, mineral filler, emulsified asphalt and additive) shall be provided, properly marked and calibrated.
3. The completed slurry seal mixture after addition of water and any control agent used, shall be such that the slurry seal mixture has proper workability and (a) break, set, and be ready for traffic no later than 4:00 pm of the day of application unless otherwise allowed by the Inspector. There shall be no bleeding, raveling, separation or other distress within seven (7) days after placing the slurry seal.

2.04 EQUIPMENT

- A. The slurry mixing machine continuous flow mixing unit, capable of delivering a predetermined proportion of aggregate, water, and asphalt emulsion to the mixing chamber and discharging the thoroughly mixed product on a continuous basis. The equipment shall be capable of prewetting the aggregate immediately prior to mixing with the emulsion. The mixing unit shall be capable of thoroughly blending all materials together.
- B. Whenever mineral filler is required for the mixture, the mixing machine shall be equipped with an approved fines feeder that includes an accurate metering device or method to introduce a predetermined proportion of mineral filler into the mixer. The mineral filler shall be fed into the mixer at the same time and location as the aggregate.
- C. The slurry mixing machine shall be equipped with a water pressure system and fog type spray bar, adequate for complete fogging of the surface receiving slurry treatment.
- D. A mechanical type squeegee distributor with flexible material in contact with the surface of the pavement to prevent loss of slurry from the distributor shall be connected to the mixing machine. It shall be maintained so as to prevent loss of slurry on varying grades and crown. There shall be a steering device and flexible strike off. The spreader box shall have an adjustable width and shall be capable of placing the slurry mixture to the width specified in the contract documents.
- E. Cleaning equipment in the form of power brooms, power blowers, air compressors, water flushing equipment, and hand tools shall be provided to clean the surface and cracks as required prior to slurry sealing operations.

PART 3 - EXECUTION

3.01 CLEANING AND PREPARATION OF THE SURFACE

- A. Prior to applying the slurry, clean the surface of all loose material, mud spots, vegetation, and other objectionable material.
- B. Standard cleaning methods used to clean pavement shall be power brooms, compressed air, high-pressure water, and hand tools. Water flushing shall not be permitted in areas where considerable cracks are present in pavement surface.
- C. The surface preparation shall be inspected and approved by the College's Representative prior to slurry treatment.

3.02 APPLICATION OF THE SLURRY MATERIAL

- A. Pavement surface and asphalt berms to be slurry sealed shall be lightly pre-dampened with a fog spray of water.
- B. Water fog shall be applied at such a rate that the entire surface is damp with no apparent flowing water in front of the slurry box.
- C. A sufficient amount of slurry shall be carried in all parts of the spreader at all times to obtain complete coverage.
- D. No lumping, balling, or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate shall be permitted. If the coarse aggregate settles to the bottom of the mix, the slurry shall be removed from the pavement.
- E. All lines of termination of slurry sealing shall be neat and straight.
- F. Joint between the edge of pavement and concrete gutter shall be filled with slurry, but not overlapped.
- G. Slurry applied to asphalt berms may be brush or roller applied. All cracks in the asphalt berms shall be thoroughly coated and filled with the slurry seal.

3.03 PROTECTION

- A. Slurry treatment area shall be allowed to cure until it may be opened to traffic without pickup or raveling of the slurry mixture. Any damage caused to the slurry surface by premature opening to traffic shall be repaired or replaced at the Contractor's expense.

END OF SECTION 32 01 13.61

SECTION 32 01 16.71 – COLDING MILLING ASPHALT PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Cold milling asphalt pavements is the process of removing existing pavement from the roadway to lines and dimensions shown on the plans or as directed by the College.

1.02 REFERENCES

- A. Standards listed below, with their designation in parenthesis, apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.
- B. State of California, Department of Transportation's "Standard Specifications" Latest Edition (CSS).
 - 1. Interpretation of Standard Specifications:
 - a. Wherever the term Commission of Department occurs, it shall mean the College. Whenever the term Director or Executive Officer occurs, it shall mean the College's Representative.
 - b. Whenever a discrepancy occurs between the Standard Specifications and this specification, this specification governs.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EQUIPMENT

- A. The Contractor shall use equipment with automatic grade and slope controls, capable of cold milling existing asphalt pavement to an accurate depth of cut, profile and cross slope and shall be capable of loading the milled material directly into trucks.
- B. The cold planing machine shall be equipped with a cutting head not less than 72 inches in width and shall be operated so as not to produce fumes or smoke. The cold planing machine shall be capable of planing the pavement without requiring the use of a heating device to soften the pavement during or prior to the planing operation.

3.02 GENERAL

- A. Planing asphalt concrete pavement shall be performed by the cold planing method. Use of the heater planing method will not be allowed.
- B. The depth and width of the cut shall be as indicated on the plans or as directed by the Engineer. All conform locations on the plan are approximate and should be verified in the field with the Engineer. The outside lines of the planed area shall be neat and uniform. Planing asphalt concrete pavement operations shall be performed without damage to the surfacing to remain in place.

- C. The Contractor shall be responsible for all damage to cold mill planing machine caused by hitting any hidden objects during the planing operation. In addition, the Contractor shall be responsible for the cost of repairing any facility that is damaged by the cold mill-planing machine.
- D. Planed widths of pavement shall be continuous except for intersections at cross street where the planing shall be carried around the corners and through the conform lines. Following planing operations, a drop-off of more than 2 inches will not be allowed at any time between adjacent lanes open to public traffic.
- E. The planed material from the roadway surface shall be removed from the project and disposed of.
- A. The excess material planed from the roadway surface and remnants or slivers of old asphalt concrete lift, including material deposited in existing gutters, driveways, around structures, or on the adjacent traveled way, shall be removed and disposed of outside the right of way in accordance with the provisions in Section 7-1.13 of the Caltrans Standard Specifications. Removal of this material shall be considered as included under this item of work and no additional compensation will be allowed. Removal operations of cold-planed material shall be concurrent with planing operations and follow within 50 feet of the planer, unless otherwise directed by the College's Representative.
- B. The Contractor shall furnish and operate a self-loading motor sweeper with spray nozzles for final clean up work and shall keep the milled area cleaned and maintained at all times until the street has been resurfaced.
- C. The Contractor is notified that existing pavement fabric may be encountered in the areas to be ground. If pavement fabric substantially hinders the progress of grinding as determined by the District Representative the Contractor will be given additional contract days to accomplish grinding operations. No additional compensation for cold mill planing will be made to the Contractor based on the presence of fabric in the sections to be ground. If the Contractor's operation exposes existing pavement fabric, the Contractor shall continue grinding until the fabric is removed. This shall be considered as included in the bid item cost for cold mill planing and no further compensation will be allowed.
- D. Temporary asphalt tapers must be provided where transverse joints are planed in the pavement at conform lines no drop-off shall remain between the existing pavement and the planed area when the pavement is opened to public traffic. Asphalt concrete for temporary tapers shall be placed to the level of the existing pavement and tapered on a slope of 1:60 (Vertical: Horizontal) or flatter to the level of the planed area.
- E. Asphalt concrete for temporary tapers shall be of commercial quality and may be spread and compacted by any method that will produce a smooth riding surface. Temporary asphalt concrete tapers shall be completely removed, including the removal of all loose material from the underlying surface, before placing the permanent surfacing. The removed material shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Caltrans Standard Specifications. Operations shall be scheduled so that not more than 10 days shall elapse between the time when transverse joints are planed in the pavement at the conform lines and the permanent surfacing is placed at the conform lines.

END OF SECTION 32 01 16.71

SECTION 32 01 17.64 – FULL DEPTH AC PAVEMENT REPAIR

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Cold mill and remove existing asphalt concrete pavement.
 - 2. Construct new asphalt concrete pavement.
- B. Related Sections
 - 1. Section 32 11 23 – Aggregate Base Course
 - 2. Section 32 12 16 – Asphalt Paving

1.02 REFERENCES

- A. Standards listed below, with their designation in parenthesis, apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.
- B. State of California, Department of Transportation's "Standard Specification's" Latest Edition (CSS).
 - 1. Interpretation of Standard Specifications:
 - a. Wherever the term Commission of Department occurs, it shall mean the College. Whenever the term Director or Executive Officer occurs, it shall mean the College's Representative.
 - b. Whenever a discrepancy occurs between the Standard Specifications and this specification, this specification governs.
- C. State of California, Department of Transportation's "Testing Manual", "Method of Preparation of Bituminous Mixtures for Testing" (California Test 304).
- D. American Society for Testing and Materials (ASTM).

1.03 SITE CONDITIONS

- A. Comply with all requirements of Cabrillo Community College District.
- B. Do not place Asphalt Concrete unless atmospheric temperature is at least 50 degrees Fahrenheit and rising.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Aggregates: See Section 32 11 23
- B. Asphalt Paving: See Section 32 12 16

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive full depth asphalt concrete paving repair and verify the following:
 - 1. Pavement conditions and sub-base conditions after initial 2" cold mill.
 - 2. Limits and locations as shown on plans.

3.02 PREPARATION

- A. Damaged asphalt and areas shall be removed as shown on plan.
- B. All weeds or other vegetation growing through the asphaltic concrete shall be removed.

3.03 FULL DEPTH ASPHALT REPAIR

- A. After the initial overall 2 inch deep cold mill, areas designated by the Engineer shall be dug out to an additional depth of 2 inches (4 inches total) at locations shown on plan, (milling is recommended and preferred) removed and replaced with a full-depth section of 4 inches of asphaltic concrete placed in two 2 inch lifts, unless otherwise directed on the contract plans.
- B. The material remaining in place, after removing surfacing and base to the required depth, shall be graded to a plane, watered, and compacted to 95 percent relative compaction for 6" of depth. After compaction and prior to the placing of asphalt concrete, the vertical edges of the existing pavement shall receive a tack coat. The finished surface of the remaining material shall not extend above the grade established by the District Representative.
- C. The asphaltic concrete shall be placed in two lifts with the uppermost lift of not less than 0.15 feet or more than 0.20 feet and shall be Type B 1/2-inch Maximum, Medium grade. Removed materials shall be disposed of legally. The minimum width of any repair shall be 42 inches as field marked.
- D. The Contractor shall make all arrangements for disposal of excavated materials. All edges shall be cold milled or saw-cut unless otherwise approved by the District Representative. Asphalt concrete in repair sections shall be placed in lifts in accordance with Caltrans Section 39-6.01 "Spreading and Compacting", and shall be Type B, 1/2inch Maximum, Medium gradation per Section 39-2, "Materials" of the CSS. Removed materials shall be disposed of legally.

3.04 FIELD QUALITY CONTROL

- A. The College's Testing Laboratory will:
 - 1. Inspect and test base and paving in accordance with CSS, including but not limited to:
 - a. Compaction and thickness of base.
 - b. Compaction and thickness of asphaltic concrete.
 - c. Temperature of asphalt concrete just prior to paving.
 - 2. Check thickness of surfacing by coring when directed by the College's Representative.

B. Contractor will:

1. Repair areas cored for testing.
2. As directed by the College's Representative, remove and replace or repair all paving not meeting Contract Document requirements.

END OF SECTION 32 01 17.64

SECTION 32 11 23 - AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Aggregate base course for new and reconstructed pavements.

B. Related Sections

1. Section 32 01 17.64 – Full Depth AC Pavement Repair
2. Section 32 12 16 – Asphalt Paving

1.02 REFERENCES

A. Standards listed below, with their designation in parenthesis, apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.

B. State of California, Department of Transportation's "Standard Specification's" (CSS) latest edition.

1. Interpretation of Standard Specifications:

- a. Wherever the term Commission of Department occurs, it shall mean the College. Whenever the term Director or Executive Officer occurs, it shall mean the College's Representative.
- b. All references to statistical testing are deleted.
- c. Whenever a discrepancy occurs between the Standard Specifications and this specification, this specification governs.

C. State of California, Department of Transportation's "Testing Manual", "Method of Preparation of Bituminous Mixtures for Testing" (California Test 304).

D. American Society for Testing and Materials (ASTM).

1.03 SUBMITTALS

A. Submit the following:

1. Certificates of compliance with specified standards for natural materials and manufactured items.
 1. For manufactured items, the manufacturer's technical data of physical properties.
 3. Samples as requested by the University's Testing Laboratory.

1.04 SITE CONDITIONS

A. Comply with all requirements of the Monterey Bay Unified Air Pollution Control District.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aggregate Base (AB): Class 2, R-value 78 minimum, 3/4 inch maximum size, meeting the requirements of CSS Section 26.
- B. Aggregate Subbase: Class 2, R-value 50 minimum, CSS Section 25.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive aggregate base and verify the following:
 - 1. That abutting improvements have been set at proper elevations.
 - 2. That gradients and elevations of pavement subgrade are correct.
 - 3. That wet receiving surfaces or other conditions that adversely affect execution of this Work are absent.
- B. Do not start Work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. If after initial preparation, the pavement subgrade is allowed to stand or is used by construction equipment, or is otherwise damaged, repair in accordance with CSS 26-1.03 at no additional cost to the College.
- B. Proof-roll the pavement subgrade for pumping as defined in Section 02300. Where moisture appears on the pavement subgrade surface after rolling, repair as directed by the College, at no additional cost to the University.
- C. Protect existing Work from damage. Protect concrete Work from staining with asphalt materials. Shield from overspray.
- D. Sawcut 12" from the edge of existing pavement to obtain a clean vertical edge. Where an existing patch occurs within 24" of pavement edge, sawcut to the edge of pavement.
- E. Damaged asphalt and areas completely saturated by oil and grease should be removed and replaced as required.

3.03 AGGREGATE BASE

- A. Spread and compact in accordance with CSS Section 26, to thickness, lines and grades noted, with a maximum deviation of plus 0.0 and minus 0.05 feet from plan grade.
- B. Do not incorporate into the completed section any base material used for construction traffic.
- C. Moisture Treat the compacted base in accordance with CSS Section 17.

3.04 FIELD QUALITY CONTROL

- A. Inspection and testing will be performed under the supervision of the College's Soil Engineer.

- B. The College's Testing Laboratory will:
 - 1. Inspect and test base and paving in accordance with CSS, including but not limited to
 - a. Compaction and thickness of base.
 - b. Compaction and thickness of asphaltic concrete.
 - c. Temperature of asphalt concrete just prior to paving.
 - 2. Check thickness of surfacing by coring when directed by Strategic Construction Management.

- C. Contractor will:
 - 1. Repair areas cored for testing.
 - 2. As directed by the College, remove and replace or repair all paving not meeting Contract Document requirements.

END OF SECTION 32 11 23

SECTION 32 12 16 – ASPHALT PAVING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Sawcut and remove existing asphalt concrete pavement.
 - 2. Construct new asphalt concrete pavement.
 - 3. Pavement Reinforcing Fabric (Add Alternate 1)

- B. Related Sections
 - 1. Section 32 11 23 – Aggregate Base Course
 - 2. Section 31 23 13 – Subgrade Preparation
 - 3. Section 32 01 16.71 – Cold Milling Asphalt Paving
 - 4. Section 32 01 17.64 – Full Depth Pavement Repair

1.02 REFERENCES

- A. Standards listed below, with their designation in parenthesis, apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.

- B. State of California, Department of Transportation's "Standard Specification's" Latest Edition (CSS).
 - 1. Interpretation of Standard Specifications:
 - a. Wherever the term Commission of Department occurs, it shall mean the College. Whenever the term Director or Executive Officer occurs, it shall mean the College's Representative.
 - b. Whenever a discrepancy occurs between the Standard Specifications and this specification, this specification governs.

- C. State of California, Department of Transportation's "Testing Manual", "Method of Preparation of Bituminous Mixtures for Testing" (California Test 304).

- D. American Society for Testing and Materials (ASTM).

1.03 SUBMITTALS

- A. Submit the following:
 - 1. Certificates of compliance with specified standards for natural materials and manufactured items.
 - 2. For manufactured items, the manufacturer's technical data of physical properties.
 - 3. Slurry mix design. Include recommended aggregate grading, asphalt content, and supporting stabilimeter test results conforming to California Test 304. Do not schedule seal coat work until submittal has been reviewed.
 - 4. Samples as requested by the College's Testing Laboratory.

1.4 DEFINITIONS

- A. (Pavement) Subgrade: The material in excavation or embankments underlying the lowest layer of subbase, base, pavement surfacing or other specified layer which is to be placed. (The surface upon which embankment is to be placed is sometimes called "subgrade" in other sections, not to be confused with pavement subgrade).
- B. Structural Section: The planned traffic support layers of specified materials, normally consisting of subbase, base, and pavement placed over the pavement subgrade. The structural section is also commonly called the pavement structural section.
- C. Subbase: A layer of aggregate of designed thickness and specified quality placed on the pavement subgrade as the foundation for a base.
- D. Surface Course: The top layer of AC pavement. The top layer of AC pavement is sometimes called the "wearing course".
- E. Pavement Reinforcing Fabric: Pavement reinforcing fabric as part of the AC overlay.
- F. Leveling Course: A layer of A.C. pavement placed over uneven surfaces and extensive cracking prior to placing pavement fabric or reinforcing mesh.

1.05 SITE CONDITIONS

- A. Comply with all requirements of Cabrillo Community College District.
- B. Do not place Slurry Seal or Asphalt Concrete unless atmospheric temperature is at least 50 degrees Fahrenheit and rising.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aggregates:
 - 1. Asphalt Concrete (AC): Type B, 1/2 inch maximum size, medium grading, CSS Section 39.
- B. Asphalt Binder: Steam-refined paving asphalt, grade AR-8000, CSS Section 92.
- C. Prime Coat: Liquid asphalt, Grade MC-70, CSS Section 93.
- D. Paint Binder or Tack Coat: Type SS1h of SS1 asphaltic emulsion, CSS Section 94.
- E. Sand : The sand shall be 30 mesh sand blast sand composed of clean hard durable particles, free from lumps of clay or organic material.
 - I. Water: The water used in all mixtures shall be fresh and potable.
- F. Pavement Reinforcing Fabric: Reinforcing fabric shall conform to requirements of "TruPave" by Owens Corning or approved Equal.

2.02 MIXES

- A. Asphalt Concrete (AC):
 - 1. CSS Section 39, Type B asphalt concrete, 1/2" maximum gradation.
 - 2. Determine the amount of asphalt binder in accordance with the mix design.
- B. Bituminous Seals
 - 1. CSS Slurry Seal or OverKote Asphalt Paving Coating or its Equivalent.
- D. Do not change sources from those used in mix designs without prior written approval by the College's Representative.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive asphalt concrete paving or slurry seal and verify the following:
 - 1. That abutting improvements have been set at proper elevations.
 - 2. That gradients and elevations of pavement subgrade are correct.
 - 3. That wet receiving surfaces or other conditions that adversely affect execution of this Work are absent.
- B. Do not start Work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Damaged asphalt and areas completely saturated by oil and grease should be removed and replaced as required.
- B. All weeds or other vegetation growing through the asphaltic concrete shall be removed and sprayed with a suitable sterilant.
- C. All areas to receive slurry shall be power broomed to remove dirt debris and other materials prior to placing the seal coat.

3.03 BASE PRIME COAT

- A. After Base has been accepted by the College's Representative, place asphalt concrete paving on new aggregate base while base is still tight and damp.
- B. If base has been allowed to dry before placing asphalt concrete, apply prime coat in amount of 0.25 gallons per square yard of surface area to base in accordance with CSS Section 39, at no additional cost to College. Allow at least 24 hours for prime coat to set; remove any puddles; and spread sand over damp spots before placing asphalt concrete.

3.04 PAINT BINDER

- A. Prior to placing asphalt concrete surfacing, apply a coat of asphaltic emulsion paint binder to all vertical contact surfaces in accordance with CSS Section 39 at an approximate rate of 0.10 gallons per square yard of surface covered.

3.05 PAVEMENT REINFORCING FABRIC/PAVING MAT (ADD ALTERNATE 1)

- A. Installation of Paving Mat shall conform to the requirements of "TruPave" by Tencate Mirafi or approved equal.
- B. The paving mat must be installed over a hot asphalt tack coat Tack shall be AC-20, 64-22 or 80-100 penetration grade of asphalt applied at a rate of 0.21 to 0.25 gallons per square yard (g/sy). If atmospheric temperatures are above 100°F then AC-30, 64-22, or 80-100 should be used.
- C. The temperature of the tack coat should not drop below 280°F with a maximum temperature of 400°F.

3.06 ASPHALT CONCRETE

- A. After prime coats have been approved by the Colleges Representative, spread and compact asphalt concrete paving to compacted thickness shown on Drawings in accordance with CSS Section 39, including all requirements for mix temperatures, and thickness of layers.
- B. Provide surface which is dense, smooth, tight, free from pores, loose material of segregation, within tolerances specified, and free of bird baths.
- C. Finished surface shall be no more than 0.01 feet below the bottom of a 12-foot straightedge laid on the surface in any direction.
- D. Place asphalt concrete so that finished surface will be 0" to 1/8" above edge of adjacent concrete gutters designed to collect water runoff, or 0" to 1/8" below edge of adjacent concrete designed to deposit runoff onto paved surface.
- E. Carefully roll with proper heat at edges alongside curbs, walks and driveways to match balance of rolled work. Hand tamping will be permitted only where inaccessible to heavy equipment.

3.07 FIELD QUALITY CONTROL

- A. The College's Testing Laboratory will:
 - 1. Inspect and test base and paving in accordance with CSS, including but not limited to:
 - a. Compaction and thickness of base.
 - b. Compaction and thickness of asphaltic concrete.
 - c. Temperature of asphalt concrete just prior to paving.
 - 2. Check thickness of surfacing by coring when directed by the College's Representative.
- B. Contractor will:
 - 1. Repair areas cored for testing.

2. As directed by the College's Representative, remove and replace or repair all paving not meeting Contract Document requirements.

3.08 PROTECTION

- A. Permit no surface traffic until surface has cooled sufficiently to resist damage.

END OF SECTION 32 12 16

SECTION 32 17 23 – PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Traffic lines, parking striping, and markings.
 - 2. Paint.
 - 3. Glass beads.
- B. Related Sections:
 - 1. Section 32 12 16 – Asphalt Paving

1.02 REFERENCES

- A. Standards listed below, with their designation in parenthesis, apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.
- B. State of California, Department of Transportation's "Standard Specifications", (CSS) January latest edition, and "Traffic Manual," latest edition. When applying the cited standards, the following should be understood.
 - 1. Terms such as Commission, Department or Agency shall mean the College.
 - 2. Terms such as Director, Executive Office, or Engineer shall mean the College's Representative.
 - 3. In case of discrepancies between the cited standards and this Section, this Section governs.

1.03 PERFORMANCE REQUIREMENTS

- A. Paint Adhesion: Adhere to road surface forming smooth continuous film one minute after application.
- B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within two minutes after application.

1.04 SUBMITTALS

- A. Product Data: Submit paint formulation for each type of paint to be used.
- B. Samples: As requested by the College's Representative.

- C. Manufacturer's Installation Instructions: Submit instructions for application temperatures, eradication requirements, application rate, line thickness, type of glass beads, bead embedment and bead application rate, and any other data on proper installation.
- D. Manufacturer's Certificate: As requested by the College's Representative.

1.05 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: State and local code requirements shall apply to all work in this section.
- B. Striping shall be performed with no less than four (4) working day's notification.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Material and Equipment: Requirements for transporting, handling, storing, and protecting products shall be done per manufacturer's recommendations.
- B. Invert containers several days prior to use when paint has been stored more than 2 months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.
- C. Glass Beads. Store glass beads in cool, dry place. Protect from contamination by foreign substances.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Protect material and equipment from environmental conditions affecting products on site per manufacturer's recommendations.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Do not apply paint when temperatures are expected to fall below 50 degrees F for 24 hours after application.
- E. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

PART 2 PRODUCTS

2.01 PAINTED PAVEMENT MARKINGS

- A. Stripe and Pavement Marking Material. Paint and glass spheres for traffic stripes and pavement markings will be furnished by the contractor including paint for cat tracks and

dribble lines. White and yellow paint will be either the Fast Dry or Rapid Dry type at the option of the contractor. Black paint will be the Fast Dry type.

- B. If more than 120 days have elapsed from the date of manufacture of the paint furnished, the paint shall be mixed in containers other than the spray equipment containers until a smooth, uniform product of proper consistency is obtained. All necessary mixing shall be at the contractor's expense.
- C. Crosswalk markings shall be Thermoplastic with a non skid surface and shall match existing University Crosswalk markings.
- D. Reflective Pavement Markers.
- E. Glass Beads: AASHTO M247, Type 1, coated to enhance embedment and adherence with paint.

2.02 SOURCE QUALITY CONTROL

- A. The paint and glass spheres to be furnished will conform to the Caltrans current specification for such materials. Copies of said specifications are available for inspection at Caltrans Transportation Laboratory, Sacramento, California.
- B. Painting traffic stripes and markings and placing reflective pavement markings, at the existing locations or designated by the University's Representative shall be in conformance with Section 84, "Traffic Stripes and Pavement Markings" and Section 85, "Pavement Markers", of the Caltrans Standard Specifications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify of existing conditions before starting work.
- B. Do not apply paint to concrete surfaces until concrete has cured for 28 days.

3.02 PREPARATION

- A. Maintenance and Protection of Traffic:
 - 1. Provide short term traffic control in accordance with Section 11 55 26.
 - 2. Prevent interference with marking operations and to prevent traffic on newly applied markings before markings dry.
 - 3. Maintain access to existing buildings and other areas requiring access.
- B. Surface Preparation.

1. Clean and dry paved surface prior to painting.
2. Blow or sweep surface free of dirt, debris, oil, grease or gasoline.
3. Spot location of final pavement markings as specified and as indicated on Drawings by applying pavement spots 25 feet on center.

3.03 EXISTING WORK

- A. Remove existing markings in an acceptable manner. Do not remove existing pavement markings by painting over with blank paint. Remove by methods that will cause least damage to pavement structure or pavement surface. Satisfactorily repair any pavement or surface damage caused by removal methods.
- B. Clean and repair existing remaining or reinstalled lines and legends.

3.04 APPLICATION

- A. Mechanical means shall be used to paint traffic stripes and pavement markings and to apply the glass spheres for traffic stripes. Rapid Dry type paint shall be applied with only airless type equipment.
- B. Cat tracking shall consist of stretching a rope on a straight line between control points on tangent alignment and on a true arc through control points on curved alignment and placing spots of paint on the rope. The spots shall be not more than three inches (3") in width and not more than five feet (5') apart on curves nor eight feet (8') apart on tangents.
- C. Dribble lines shall consist of marking the pavement with a thin line of paint using a striping machine or other suitable device. Dribble lines shall be on a straight line between control points on tangent alignment and on a true arc through control points on curved alignment.
- D. Paint for cat tracks and dribble lines shall be the same color as the traffic stripe for which they are placed.
- E. Laser guidance equipment, when used, shall be capable of maintaining the alignment of traffic stripes with an accuracy equivalent to or better than that obtained through use of cat tracking or dribble lines, as determined by the University's Representative.
- F. Traffic stripes and pavement markings shall be applied only on dry surfaces and only during periods of favorable weather. Painting shall not be performed when the atmospheric temperature is below 40 degrees F.; when freshly painted surfaces may become damaged by rain, fog, or condensation; nor when it can be anticipated that the atmospheric temperature will drop below 40 degrees F. during the drying period.
- G. All crosswalks, stop bars, and stenciled items will be thermoplastic.
- H. Stencils shall be used to paint pavement markings words.
- I. Paint shall not be heated to a temperature greater than 160 degrees F.

- J. Traffic stripes shall be applied in two coats. The first coat of paint shall be dry and set for a minimum of 72 hours before application of the second coat.
- K. Unless otherwise directed by the University's Representative, glass spheres shall be uniformly incorporated in all coats of paint immediately after application of the paint, except that glass spheres shall not be applied to black paint. Spheres shall be embedded in the coat of traffic paint, being applied to a depth of at least one-half their diameter.
- L. A double stripe shall consist of two 4-inch wide yellow stripes separated by a 3-inch wide black stripe.
- M. Completed traffic stripes shall have clean and well-defined edges, shall be uniform, shall be straight on tangent alignment, and shall be on a true arc on curved alignment. The widths of completed traffic stripes shall not deviate more than 1/4-inch on tangent nor more than 1/2-inch on curves from the widths shown on the plans. Broken traffic stripes shall also conform to the following requirements:
- N. The lengths of the gaps and individual stripes that form broken traffic stripes shall not deviate more than two inches from the lengths shown on the plans.
- O. The lengths of the gaps and individual stripes shall be of such uniformity throughout the entire length of each broken traffic stripe that a normal striping machine will be able to repeat the pattern and superimpose additional coats of paint upon the traffic stripe being painted.
- P. The completed pavement markings shall have clean and well-defined edges and shall conform to the dimensions shown on the plans.
- Q. Drips, overspray, improper markings, and paint tracked by traffic shall be immediately removed from the pavement surface by last cleaning or other methods approved by the University's Representative. All such removal work shall be at the contractor's expense.
- R. Application Rates. Paint for traffic stripes and pavement markings shall be applied at a rate between one gallon per 60 square feet and one gallon per 250 square feet. The exact rate will be determined by the University's Representative.
- S. Glass spheres shall be applied to all coats at an approximate rate of 8 pounds per gallon of paint. The exact rate will be determined by the University's Representative.
- T. The volume of paint applied shall be measured by stabbing the paint tank with a calibrated rod. At the option of the University's Representative, if the striping machine is provided with air atomized spray units (not airless) and is equipped with paint gauges, the volume of paint may be determined by using such gauges.
- U. The amount of glass spheres applied shall be measured by stabbing the glass sphere tank with a calibrated rod.
- V. Equipment and Operation. All equipment used in the application of traffic stripes and pavement markings shall produce stripes and pavement markings of uniform quality that conform to the specified requirements.

- W. The striping machine shall be capable of accurately superimposing succeeding coats of traffic paint upon the first coat and upon existing stripes at a speed of at least five miles per hours.
- X. Each coat of paint for any traffic stripe, including glass spheres where required, shall be applied in one pass of the striping machine, regardless of the number, widths, and types of individual stripes involved.
- Y. The striping machine shall consist of a rubber-tired vehicle that is maneuverable to the extent that straight lines can be followed and normal curves can be made in true arcs. It shall be capable of applying traffic paints and glass spheres at the rates specified above. The striping machine shall be equipped with the following:
 - 1. A pointer or sighting device not less than five feet (5') long and extending from the front of the machine;
 - 2. A pointer or sighting device extending from the side of the machine to gauge the distance from the centerline for painting shoulder stripes;
 - 3. A positive acting cutoff device to prevent depositing paint in gaps of broken strips;
 - 4. Shields or an adjustable air curtain for line control;
 - 5. Pressure regulators and gauges (if pneumatically operated) that are in full view of the operator;
 - 6. A paint strainer in the paint supply line;
 - 7. A paint storage tank with a mechanical agitator that operates continuously during painting operations;
 - 8. A glass sphere dispenser located behind the paint applicator nozzle and which is controlled simultaneously with the paint applicator nozzle; and
 - 9. Calibrated rods for measuring the volume of paint and glass spheres in the paint and glass sphere tanks.
- Z. All spray equipment shall be of a proper type and of adequate capacity for the work. Air atomized spray equipment shall be equipped with oil and water extractors and pressure regulators and shall have adequate air volume and compressors recovery capacity. Spray gun type needle assemblies and orifices shall be of the proper size.

3.05 FIELD QUALITY CONTROL

- A. Inspect for incorrect location, insufficient thickness, line width, coverage, retention, uncured or discolored material, and insufficient bonding.
- B. Repair lines and markings, which after application and curing do not meet following criteria:
 - 1. Incorrect Location: Remove and replace incorrectly placed patterns.

2. Insufficient Thickness, Line Width, Paint Coverage, Glass Bead Coverage or Retention: Prepare defective material by acceptably grinding or blast cleaning to remove substantial amount of beads and to roughen marking surface. Remove loose particles and debris. Apply new markings on cleaned surface in accordance with this Section.
3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings in accordance with this Section and clean pavement surface one foot beyond affected area. Apply new markings on cleaned surface in accordance with this Section.
- C. Prepare list of defective areas and areas requiring additional inspection and evaluation to decide where material may need replaced. Provide traffic control as necessary if markings require more detailed evaluation.
- D. Replace failed or defective markings in entire section of defective markings within 30 days after notification when any of the following exists during warranty period:
 1. Marking is discolored or exhibits pigment loss, and is determined to be unacceptable by three member team based on visual comparison with beaded color plates.
 2. More than 15 percent of area of continuous line, or more than 15 percent of combined area of skip lines, within any 100 foot section of roadway is missing.
- E. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus 1 inch on all sides. Prevent damage to transverse and longitudinal joint sealers, and repair any damage according to requirements in Section 02514 or Section 02740.
- F. Maintain daily log showing work completed, results of above inspections or tests, pavement and air temperatures, relative humidity, presence of any moisture on pavement, and any material or equipment problems. Make legible entries in log in ink, sign and submit by end of each work day. Enter environmental data into log prior to starting work each day and at two additional times during day.

3.06 PROTECTION OF FINISHED WORK

- A. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow manufacturer's recommendations or use minimum of 30 minutes. Consider barrier cones as satisfactory protection for materials requiring more than 2 minutes dry time.

END OF SECTION 32 17 23