

Project Specific Provisions

The following clarifies certain inclusions, exclusions, and other information. This list is not inclusive of all work and is not limiting in any manner. The Bid Package (Fullerton College – Parking Lot Condition Assessment and Renovation Project for Student Parking Lots 4, 7, & 8) shall include all items listed herein despite possible duplications with other parts of the Contract Documents. This Exhibit shall supersede all other conditions in this Contract and the Contract Documents in the event of specific conflicts between any of the Documents. The scope of this Contract includes all items shown or those that can be reasonably inferred as necessary to fully complete work included herein.

I. General Requirements: The following general requirements apply to all work included in this Contract:

1. This Contract specifically includes full compliance and scope coverage of the following Specification Sections and documents.

024119	Selective Demolition
101426	Post and Panel/Pylon Signage
312000	Earth Moving
321216	Asphalt Paving
321313	Concrete Paving
321723	Pavement Markings
320113	Slurry Sealing
Exhibit A	Cement Stabilization Specification with Micro-Cracking

2. The ways and means of performing the work belong to the Contractor and any additional work required by the Contractor to supplement the installation of his work is the responsibility of that Contractor. Paths of travel, room to work, protection of existing utilities, and site furnishings, demolition of existing elements of the project, access openings, utility relocation, replacement of removed items, etc. necessary to complete the work belong to the Contractor. The Contractor must make arrangements and include the cost of these items in his base bids.
3. Contractor parking is not allowed anywhere on Campus. Contractors' vehicles must be parked off site. Costs for parking and transportation of workers to/from the site are the responsibility of the Contractor.
4. Comply with all City/State requirements and prepare haul route plans, obtain permits/approvals, etc. as required.
5. Coordinate all Fire Control and Prevention requirements with the local jurisdiction and include those costs in the base price of this Contract. Examples of these requirements include, but are not limited to, fire extinguishers, fire blankets, fire watches, fire alarm monitoring, unobstructed emergency access for fire department equipment/personnel, District/College Safety and Security personnel, construction personnel, etc.
6. Obtain and comply with all AQMD and CAUOSHA permits and safety requirements.

7. All work to be removed adjacent to areas that remain shall be removed cleanly and neatly by core-drilling, saw-cutting, or the like. All saw cutting shall be square and true. Intersections of saw cuts shall be core-drilled as required to prevent over-sawing.
8. Include all necessary precautions (including utility investigation potholing and/or exposing of each utility in the work zone) to prevent disturbing known or unknown existing underground utilities and/or structures that are not to be removed in this scope of work.
9. The Contractor is responsible for collateral damages done to areas or finishes that result from their work operations.
10. Provide flagmen and traffic control as required to guarantee the safety of the general public in and around the project and work areas including that of all students, faculty, District/College personnel, visitors, etc.
11. Obtain and pay for Performance and Payment Bonds to cover all work included in the base contract. The cost of these Bonds is to be included in the base contract amount. The District must receive all Bonds in accordance with the Special Conditions. The terms of the Bonds must be acceptable to the District. Payment of all change order bond premiums shall be the responsibility of the Contractor and be included in scope change responses.
12. Provide OSHA-approved fall protection for all workers as required by the work.
13. Properly staff the Project at all levels (from Office Management to Field Labor) to maintain the Master Construction Schedule and put work in place as required by the Construction Manager.
14. Attend all meetings as required.
15. Include all provisions as required to maintain the Master Construction Schedule in inclement weather conditions. The Contractor is to be responsible to protect their own equipment and materials from damage or loss due to inclement weather.
16. If there is a conflict within any of the Contract Documents, then the more stringent shall apply to the advantage of the District.
17. If an item or system is not clearly defined on the Drawings or in the Specifications, then an item that is considered "reasonable" and "standard" for the product or system shall be provided and installed at no additional cost to the District.
18. Contractor is to comply with all Cal/OSHA, and California Code of Regulations, Title 8, Section 5157-5159 (General Industry Safety Orders Section 8CCR5157-5159) confined spaces requirements including:
19. The Contractor is responsible for Specification Sections that pertain to its scope of work, whether specifically designated in this Exhibit or not.
20. The Campus Representative's phone and fax shall not be used by Contractors. The Contractor must provide their personnel with their own means of telephone communication via cellular phones, calling cards to be used at public phones, etc. The project site will NOT have a pay phone installed.
21. The Contractor is to provide sufficient labor, material, and equipment to provide **DAILY** specific clean-up for their trade scope of work. In particular, this shall consist of scrapping all excess

material to dumpsters, properly storing and organizing materials and equipment in work areas, relocating stored materials as required allowing other trades to work, protecting and cleaning adjacent surfaces and structures.

22. The Contractor must review Contract Documents for compatibility with their products prior to bidding. The Owner will not pay for changes to structural, mechanical, electrical, or other systems required to accommodate bidder's equipment.

II. INCLUSION: The following items are specifically included in this scope of this contract:

1. The intent of this contract is to provide all work required for Parking Lots 4, 7, and 8 as required by the Contract Documents.
2. Contractor shall take digital photographs and videos documenting the existing condition prior to starting work. Provide one (1) copy of each media to the Campus Representative prior to starting work.
3. Provide 100% of the survey work required to do this work. Survey work will be provided by a licensed surveyor.
4. General Requirements & Demolition:
 - i. Demolish and Remove all elements shown on the Contract Documents.
 - ii. Include all saw cutting, grinding, haul-off of debris off-site, and dump fees. Demolition debris shall be removed daily.
 - iii. Power for all demolition equipment shall be provided by the Contractor. Temporary power (110/220 volt) for lighting and small hand tools will be provided by the District.
 - iv. Clean all on-site and off-site roadways during the demolition operations. Provide continuous clean up of the streets and sidewalks during the trucking phases of the work. The Contractor shall have street cleaning equipment on site each day prior to starting any haul-off operations or whenever there is an opportunity for demolition work to contaminate the surrounding roadways. Hauling operations will not be permitted to start until the proper equipment is on site. All spills and debris must be cleaned up immediately to the satisfaction of the Campus Representative. Dispose of all collected debris in a proper manner off site.
 - v. Provide ventilation, dust and water control for demolition operations. The site is to be sufficiently wetted at the end of each shift to prevent the need for off-hours dust control. Existing and adjacent structures shall be protected from water (and all other) damages that result from dust control operations.
 - vi. The Contractor shall furnish and install a water meter for his own use and shall pay for all water used to perform his scope of work. The water meter assembly and devices shall comply with the requirements and standards of the local authority having jurisdiction.
 - vii. Remove all hardscape and landscape areas located onsite within the construction limits. This includes but is not limited to asphalt, walkways, curbs, stairs, landings, light pole bases, bollards, retaining walls, landscape walls, lootings, plants, etc.

- viii. Saw cut and remove sections of asphalt, sidewalks, and curbs as required for new construction. Coordinate the limits and extent of work with the Contract Documents. At removal of existing asphalt/sidewalk, demolition to include trench plates and re-routing of pedestrian and vehicle traffic.
 - ix. Demolition includes the protection of all catch basins, pull boxes, tunnel crossings, landscaping, storm drain trenches, etc. shown to remain or as shown but not scheduled to be demolished.
 - x. Contractor shall leave the site clean of all demolition debris when complete.
5. Parking Lot 4 or any areas receiving Slurry Seal - Contractor shall:
- i. Clean And Fill All Cracks
 - 1. For asphalt cracks that are 1/2 inch or smaller, clean by brushing, treat with weed killer and apply Slurry Seal, Type I. Fill flush with surface of existing pavement and remove excess.
 - 2. Large cracks 1/2" and larger that have broken asphalt and or areas that have broken asphalt, all loose asphalt shall be removed, treated with week killer, and patched using Type "E" asphalt pavement.
 - 3. Fill in all areas of pavement depressions. Contractor shall skim patch asphalt with Type "E" asphalt pavement, minimum depth of 1/2". Estimate 10% of parking area.
 - ii. Prepare Oil And Grease Residue
 - 1. Slurry Seal will not adhere to surfaces with excessive oil and grease.
 - 2. Clean all oil and grease deposits with a degreasing solution using a stiff bristle broom or a power operated broom.
 - 3. Areas that are completely saturated shall be identified prior to bid and be removed and replaced with new asphalt.
 - 4. Apply guard top oil (or approved equal) seal to all oil and grease stained surfaces insuring full coverage over the stain.
 - iii. Final Surface Cleaning
 - 1. After all pavement repairs have been completed, the surface should be clean and free of all dirt, debris and existing pavement loose graveled particles.
 - 2. Clean all surfaces using a power broom, power blower or flush the surface with high pressure water.

- iv. Mist
 - 1. Surface shall be sprayed with a mist of water in an amount that will leave the surface damp and free of standing water or puddles.
 - 2. Misting is critical when the ambient temperature is hot and on bright sunny days or when the pavement is excessively aged and porous.
- v. Priming Excessively Weathered Surfaces
 - 1. For excessively weathered surfaces, a primer or fog seal shall be applied to the surface.
 - 2. The primer should consist of a 50/50 mixture of SS1-H and water.
 - 3. Apply the mixture to the surface and let dry.
 - 4. Apply Slurry Seal, Type I to the surface (follow manufacturer application process & rates for rough, aged surface)

6. Parking Lot 4 - Contractor shall:

- i. Contractor shall field verify all signs, sign posts, bollards, wheel stops, and etc. within Parking Lot 4 that can be salvaged. Once identified, an itemized list shall be generated and verified by Civil Engineer.
- ii. Contractor shall remove all signage including post and concrete base, bollards, concrete wheel stops, etc. within the existing asphalt areas of Parking Lot 4 and remove off –site. Salvaged items shall be stored until future installation.
- iii. All utilities including the Parking Permit Machine shall be identified, marked appropriately, and protected in place prior slurry seal.
- iv. Contractor shall update all ADA signs and stripe parking lot per the guidelines below.
- v. Apply slurry seal per the attached specifications.
- vi. Install wheel stops as shown on the contract documents.



7. Parking Lots 7 and 8 - Contractor shall:

- i. Contractor shall field verify all signs, sign posts, bollards, wheel stops, and etc. within Parking Lots 7 and 8 that can be salvaged. Once identified, an itemized list shall be generated and verified by Civil Engineer.
- ii. Contractor shall remove all signage including post and concrete base, bollards, concrete wheel stops, etc. within the existing asphalt areas of Parking Lots 7 and 8 and remove off –site. Salvaged items shall be stored until future installation.
- iii. All utilities including the Parking Permit Machine shall be identified, marked appropriately, and protected in place prior to the removal of the existing asphalt.
- iv. All existing asphalt shall be removed to the base course and hauled off-site.
- v. Contractor shall cement treat the top 12 inches of the existing base course and subgrade per Exhibit “A” of the attached specifications.

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- vi. Contractor shall place a 4” section of new asphalt per the attached specifications and contract drawings (2 lifts, 1” minimum surface course) and per the approved geotechnical report. Apply tack coat to all vertical surfaces as well as cement treated base/subgrade.
 - vii. Contractor shall apply seal coat. Do not apply seal coat until thirty (30) days after placing of asphaltic concrete paving. Refer to attached asphalt specifications.
 - viii. Contractor shall update all ADA signs and stripe parking lot per the guidelines below.
 - ix. Install wheel stops as shown on the contract documents.
 - x. Contractor shall update all ADA signs in front of Building 1400 and stripe parking lot per the guidelines below.
8. Parking Lots 7 and 8 (Bid Alternate 1): includes, but not limited to, full depth asphalt removal, removal of the first 12” existing base, and new asphalt:
- i. Contractor shall field verify all signs, sign posts, bollards, wheel stops, and etc. within Parking Lots 7 and 8 that can be salvaged. Once identified, an itemized list shall be generated and verified by Civil Engineer.
 - ii. Contractor shall remove all signage including post and concrete base, bollards, concrete wheel stops, etc. within the existing asphalt area of Parking Lots 7 and 8 and remove off –site. Salvaged items shall be stored until future installation.

- iii. All utilities including the Parking Permit Machine shall be identified, marked appropriately, and protected in place prior to the removal of the existing asphalt.
 - iv. All existing asphalt shall be removed to the base course and hauled off-site.
 - v. The top 12” of existing base course shall be removed and hauled off-site.
 - vi. Contractor shall place a 4” section of new asphalt per the attached specifications and contract drawings (2 lifts, 1” minimum surface course) over 15” crushed aggregate base compacted per approved soils report.
 - vii. Contractor shall update all ADA signs and stripe parking lot per the guidelines below.
9. Signage & Striping (All Areas)
- i. Contractor shall update all existing signs for ADA Parking in Parking Lots 4, 7, and 8 if necessary to the latest standard of the American with Disabilities Act and California Title 24, Accessibility Regulations including but not limited to the sign height, wording, and sign dimensions. Contractor shall include the replacement of the sign, sign pole, concrete base, and miscellaneous hardware.
 - ii. Contractor shall update all striping for ADA Parking in Parking Lots 4, 7, and 8, to the latest standard of the American with Disabilities Act and California Title 24, Accessibilities Regulations.
10. Relocate all site items and furnishings scheduled to be salvaged and returned to the Owner as required by the contract documents. The salvaged/relocated items will be stored at a location on Campus designated by the Campus Representative. All items are to be accompanied with an itemized letter of transmittal for each part, piece, etc.
11. The Contractor agrees and understands that the Project is phased and that multiple areas may be under construction simultaneously requiring multiple crews. Several separate installation sequences/move-ins, working on weekends, may be required of the Contractor to complete its work as directed by the Campus Representative. Associated costs for all move-ins, mobilizations, demobilizations, and phasing shall be included as required by the Master Construction Schedule.
12. Protect all existing utilities from damage caused by demolition operations.
13. All testing and inspections will be provided by the District, unless such inspections are caused by Contractor's failure to meet testing and inspection criteria. Additional inspection costs due to such failures shall be paid by the Contractor.
14. Comply with the Master Construction Schedule requirements for demolition work so as not to impair the progress of the Schedule.
15. The Soils Report is not a part of the contract documents and is provided for information only. It is the Contractor's responsibility to review the site to determine and obtain any additional information required to provide a complete bid for the work.
16. Relocate all site items and furnishings scheduled to be salvaged and returned to the Owner as required by the contract documents. The salvaged/relocated items may be stored at a location on

Campus designated by the Campus Representative, if Permission is granted. All items are to be accompanied with an itemized letter of transmittal for each part, piece, etc.

17. Protect all storm drains within the project limits to prevent run off or debris from entering, maintain protection until all work is complete. Certify that the storm drain system is clean and free of all debris and dirt prior to completing the project and turn-over to maintenance.
18. If an open valve (live line) is encountered DO NOT TURN IT OFF UNTIL NOTIFICATION HAS BEEN MADE TO THE CAMPUS REPRESENTATIVE. Direction will be provided and the utility disengaged before work will be allowed to continue.
19. Furnish and maintain portable toilets onsite as required per OSHA requirements.
20. An allowance of \$50,000 for the costs of all necessary labor, materials, and equipment for miscellaneous repairs, underground obstacles and unforeseen conditions not included in the original scope of work will be added to the Base Bid and any Alternate amounts in the Bid Proposal for the final contract amount to be awarded. Bidders are not to include this allowance in their price for the Base Bid or any Alternate. The Campus Representative must agree to the type and extent of work before work is started. Field tickets must be signed by the Campus Representative on a daily basis to account for the time, material, and equipment used from this allowance. All time, material, and equipment used from this allowance will be billed against this allowance and any portion of the original allowance amount not used will be credited to the Owner at the end of this Contract's scope of work at the prevailing wage rate plus fringe benefits and 15% overhead/fee established in these Contract Documents. This Article is separate and exclusive from all other Work required by the Contract.

024119 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. Section Includes: Furnishing labor, materials and equipment necessary for demolition, dismantling, cutting and alterations as indicated, specified, or required for completion of the Work. Includes items such as the following:
 - 1. Protection of existing improvements to remain.
 - 2. Cleaning existing improvements to remain.
 - 3. Disconnecting and capping utilities.
 - 4. Removing debris, waste materials, and equipment.
 - 5. Removal of items for performance of the Work.
 - 6. Salvageable items to be retained by the Client.

1.2 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawing for Traffic Control and Alternative Path of Travel for Student Traffic (if required). Coordinate all Access & Construction Entrances with Fullerton Campus Personnel.
- B. Submit Shop Drawing indicating the items to be salvaged, such as, wheel stops. Note: Contractor shall have the number of salvaged items verified with Civil Engineer or Fullerton College Personnel.

1.3 QUALITY ASSURANCE

- A. Prior to commencement of Work, schedule a walkthrough with the Civil Engineer & Fullerton College Personnel, to confirm District property items have been removed from scheduled Work areas. Identify and mark remaining property items and schedule their removal.
- B. Coordinate demolition for the correct sequence, limits, and methods. Schedule demolition Work to create least possible inconvenience to the public and facility operations.
- C. Related Standard: American National Standard A10.6-1983.

1.4 PROJECT CONDITIONS

- A. Drawings may not indicate in detail all demolition Work to be performed. Examine existing conditions to determine the full extent of required demolition.
- B. Repair damage to existing improvements or damage due to excessive demolition.
- C. Provide all measures to avoid excessive damage from inadequate or improper means and methods, improper shoring, bracing or support.
- D. If conditions are encountered that varies from those indicated, promptly notify the Architect for clarification before proceeding.

PART 2 - PRODUCTS

2.1 HANDLING OF MATERIALS

- A. Items Scheduled for salvage by the District shall be delivered to a location designated by the Architect. Items shall be cleaned, packaged and labeled for storage.
- B. Items scheduled for reuse shall be stored on the Project site and protected from damage, theft and other deleterious conditions.

PART 3 - EXECUTION

3.1 GENERAL

- A. Protection:
 - 1. Do not commence demolition until safety partitions, barricades, warning signs and other forms of protection are installed.
 - 2. Provide all safeguards, including warning signs, lights and barricades, for protection of workers, occupants, and the public.
- B. If, at any time, safety of existing construction appears to be endangered, take immediate measures to correct such conditions; cease operations and immediately notify the Civil Engineer.
- C. Implement measures to control dust during demolition.

3.2 DEMOLITION

- A. Do not throw or drop materials.
- B. Remove existing construction only to extent necessary for proper installation of Work and interfacing with existing construction. Cut back finished surfaces to straight, plumb or level lines as required for a smooth transition.
- C. Where openings are cut oversize or in improper locations, replace or repair to required condition.

3.3 CUTTING EXISTING CONCRETE

- A. Cutting of existing concrete shall be performed by skilled workers familiar with the requirements and space necessary for placing concrete. Perform concrete cutting with concrete cutting wheels and hand chisels. Do not damage concrete intended to remain.
- B. Prior to cutting or coring concrete, determine locations of hidden utilities or other existing improvements and provide necessary measures to protect them from damage.

3.4 REMOVAL OF OTHER MATERIALS

- A. Remove existing improvements not specifically indicated or required but necessary to perform Work. Cut to clean lines, allowing for installation of Work.

3.5 PATCHING

- A. Patch and/or repair materials to remain when damaged by the performance of the Work of this section. Finish material and appearance of patch and/or repair Work shall match existing.

3.6 CLEANING

- A. Clean existing materials to remain with appropriate tools and equipment.
- B. Protect existing improvements during cleaning operations.
- C. Debris shall be dampened by fog water spray prior to transporting by truck.
- D. Debris pick-up area shall be kept broom-clean and shall be washed daily with clean water.
- E. Remove waste and debris, other than items to be salvaged. Turn over salvaged items to District, or store and protect for reuse where required. Continuously clean up and remove items as demolition Work progresses.
- F. Remove rubbish, debris, and waste materials and legally dispose of off the Project site

END OF SECTION 024119

SECTION 101426 – Post and Panel Signage

PART 1 – General

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
 - 1. Section 03300 “Cast-in-Place Concrete.”
 - 2. Section 10431 “Signage.”

1.2 Performance Requirements

- A. Provide post and panel signs of withstanding the effects of gravity loads and wind loads indicated on drawings.

1.3 Submittals

- A. Product Data: For each type of product indicated.
- B. Sign Schedule: Use same designations indicated on Drawings.

1.4 Quality Assurance

- A. Obtain each sign type indicated from one source from a single manufacturer.
- B. Comply with the current edition of the “Americans with Disabilities Act (ADA) and California Title 24 Accessibility Regulations.

1.5 Project Conditions

- A. Proceed with installation only when existing and forecasted weather conditions permit installation of signs to be performed according to manufacturers’ written instructions and warranty requirements.

1.6 Coordination

- A. Coordinate installation of anchorages and furnish setting drawings, templates, and directions for installing anchorages and other items that are to be embedded in concrete.

PART 2 – Products

2.1 Materials

- A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32. Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner. Provide 0.125 inch thick panel with predrilled holes for mounting sign to post.

- B. Reflectorized Sign Film: 3M DG reflective sheeting Series 4000 or approved equal.
- C. Fabricate posts to lengths indicated. Provide reverse sleeve method with galvanized inserts recommended by manufacturer, sized for close fit inside posts. Size inserts for direct embedment in concrete foundations and to attach sign posts securely and prevent sign from overturning when subjected to normal loading conditions prevailing at Project site. Drill posts and inserts through bolts for fastening them together. Provide non-corrosive bolts for fastening posts to inserts. Fabricate sign posts from 0.120-inch thick, square galvanized steel tubing. Include post caps and related accessories required for complete installation. Hot-dip galvanize post assemblies after fabrication to comply with ASTM A 123.

2.2 Accessories

- A. Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance.

PART 3 – Execution

3.1 Execution

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

- A. Excavate for sign foundation to elevations and dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, rain, accumulated water, or construction activities by excavating a further 12 inches, backfilling with satisfactory soil, and compacting to original subgrade elevation.
- B. Set reverse sleeves required for installation of signs. Protect portion of sleeve above ground from concrete splatter.
- C. Locate signs and accessories where indicated. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance. Use non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to post.

3.3 Cleaning and Protection

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

End of SECTION 101426

SECTION 312000 – Earth Moving

PART 1 - General

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 Definitions

- A. Backfill: Soil material approved by Geotechnical Engineer of Record used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and asphalt concrete paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe or conduit.
- D. Borrow or Import Soil: Soil approved by Geotechnical Engineer of Record imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water and also provides a break in horizontal hydrostatic pressure at vertical wall applications.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
- G. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- H. Fill: Soil material approved by Geotechnical Engineer of Record used to raise existing grades.
- I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

1.3 Project Conditions

- A. A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
- B. Per geotechnical report, the on-site soils are moderately corrosive to ferrous metals and copper.

- C. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided.
 - 1. Provide a minimum 48 hours' notice to the Project Civil Engineer and utility owners and receive written notice to proceed before interrupting any utility.
- D. Noise and Dust Abatement: Exercise all reasonable and necessary means to abate dust, dirt rising and undue noise. Perform necessary sprinkling and wetting of construction site to allay dust as required by applicable codes and ordinances.

PART 2 - Products

2.1 Soil Materials

- A. General: All soils materials to be used throughout the site shall be approved for use by the geotechnical testing engineer. Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.

No earthwork analysis has been completed with respect to the volumes of soils to be excavated, placed, or imported in order to provide the finished grades shown on the plans. The Contractor is solely responsible for verifying the earthwork quantities necessary to complete the project.

Furthermore, there has been no analysis to determine footing spoils and/or bulking or shrinkage during earthwork operations.

- B. Provide soils materials approved by Geotechnical Engineer of Record, free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Base Course: Rock Base shall be crushed aggregate meeting the requirements of 200-1.1 and 200-1.2 to be compacted to 95 percent of Hveem laboratory test.
- D. Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Imported Soil: Shall consist of clean, granular, non-expansive soil, free of vegetation and other debris with an Expansion Index of 20 or less. No soil or aggregate base shall be imported to the site without prior approval of the Geotechnical Engineer.

PART 3 - Execution

3.1 Preparation

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect and maintain required erosion and sedimentation controls during earthwork operations.
- C. Provide dewatering as required to keep tranches, excavation for footings and sub-slats areas free of water.
- D. Prior to grading, all construction debris shall be removed and hauled away from the site (at contractor's expense).

- E. Any site grading shall be performed under observation by a geotechnical engineer or his representative.
- F. Contractor shall have a full-time field superintendent with authority to make decisions on the project and shall cooperate fully with the Geotechnical Engineer in carrying out the work.
- G. A Pre-Grading meeting is required prior to grading, in the presence of the Owner, Architect, Geotechnical Engineer, Contractor, and DSA Inspector to review the project schedule and construction sequencing.

3.2 Excavation for Asphalt Parking Lot, Sidewalks, and New Fire Lane Entry

- A. Site Grading consists of removing the existing asphalt pavement (est. 3.5”) and 1.5” of the existing base layer, cement treating the top 12” of base & subgrade combined, and earthwork for removal and re-compaction as required for all sidewalks and new fire lane entry.
- B. No excavation shall be performed and no fill should be placed, spread, or rolled during unfavorable weather. If work is interrupted by rain, operations should not be resumed until the Geotechnical Engineer indicates that conditions will permit satisfactory results.
- C. Excavate to required subgrade elevations and as recommended by geotechnical engineer regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for solid rock excavation and removal, boulder removal or removal of obstructions.

3.3 Excavation for Sidewalk and New Fire Lane Entry.

- A. The top 12-inches of subgrade soil shall be excavated; moisture conditioned, and re-compacted to 90% of the ASTM D-1557 laboratory standard for all the areas within walkways, parking lots, and driveways prior to placing the rock base and concrete. The horizontal limits of over-excavation shall extend to a minimum horizontal distance of 2-feet beyond the perimeter of the proposed flatwork improvements unless specifically shown different on the plans.
- B. Prior to compacting subgrade soil, exposed bottom surfaces shall be observed and approved by the Geotechnical of Record and then to be scarified to a depth of at least 6-inches, watered or air dried as necessary to achieve near optimum moisture conditions, and then compacted to a minimum relative compaction of 90 or 95 percent where applicable. The laboratory maximum dry density and optimum moisture content for each change in soil type should be determined in accordance with Test Method ASTM D-1557.
- C. If bottom of excavation is too wet and in yielding condition; subgrade soil shall be aerated by waiting and disking or stabilizing providing at least 12-inches of aggregate base subject to inspection and approval of Geotechnical Engineer of Record.
- D. Any new fill including imported soil shall be brought to near optimum moisture, placed in layers not exceeding 6-inches thick, and compacted to at least 90 or 95 percent where applicable for subgrade per current ASTM D-1557 standards.
- E. No jetting or water tamping of fill soils shall be permitted.

- F. Excavate to required subgrade elevations and as recommended by geotechnical engineer regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for solid rock excavation and removal, boulder removal or removal of obstructions.

3.4 Subgrade Inspection

- A. Proof-roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Geotechnical Engineer of Record, without additional compensation.

3.5 Soil Moisture Control

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.6 Subbase and Base Courses

- A. Place subbase and base course as required by Geotechnical Engineer of Record on subgrades free of mud, frost, snow, or ice.

3.7 Field Quality Control

- A. Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction required by Geotechnical Engineer of Record, scarify and moisten or aerate, or remove and replace soil to depth required by Geotechnical Engineer of Record; re-compact and retest until required compaction is obtained.
- E. Geotechnical Engineer of Record will certify to Owner and governing authorities that earthwork and compaction densities conform to Project requirements.

3.8 Protection

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing, to meet required finish grades. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.9 Disposal of Surplus and Waste Materials

- A. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose off Owner's property.

END OF SECTION 312000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Weed Killer
 - 2. Cold milling of existing hot-mix asphalt pavement.
 - 3. Hot-mix asphalt patching.
 - 4. Hot-mix asphalt paving.
 - 5. Hot-mix asphalt paving overlay.
 - 6. Asphalt surface treatments.
 - 7. Pavement-marking paint.
- B. **Related Sections:**
 - 1. Division 02 Section "Selective Structure Demolition" for demolition, removal, and recycling of existing asphalt pavements, and for geotextiles that are not embedded within courses of asphalt paving.
 - 2. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.
 - 3. Division 32 Sections for other paving installed as part of crosswalks in asphalt pavement areas.
 - 4. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants and fillers at paving terminations.

1.3 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - 1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

- C. Material Certificates: For each paving material, from manufacturer.

1.5 QUALITY ASSURANCE

- A. Requirements: Comply with materials, workmanship, and other applicable requirements of Standard Specifications for Public Works Construction for asphalt paving work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
1. Prime Coat: Minimum surface temperature of 60 deg F.
 2. Tack Coat: Minimum surface temperature of 60 deg F.
 3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
 4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 HERBICIDE

- A. Herbicide shall be Dry, free-flowing, dust free chemical compound, non-flammable, not creating a fire hazard when applied in accordance with the manufacturer's recommendations, soluble in water, and capable of being spread dry or in solution.
- B. Weed Killer Products
1. Oust XP Herbicide; Dupont
 2. Casoron; UAP CA

2.2 AGGREGATES

NOTE: The existing base layer and subgrade shall be cement treated for Parking Lots 4, 7, and 8 per Exhibit “A”. The following will be used in areas that the cement treatment cannot be used or does not apply, such as, sidewalks.

- A. Provide aggregates consisting of crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.
- B. Granular Base Aggregate: In accordance with Section 200-2.2 of Standard Specifications of Public Works Construction.
 - 1. Base Courses over Six (6) inches Thick: 1 1/2 inches
 - 2. Other Base Courses: 3/4 inches
- C. Aggregate for Asphaltic Concrete Paving: In accordance with Section 203.6.3.2 of Standard Specifications for Public Works Construction, 3/8” maximum aggregate.
- D. Mineral Filler: In accordance with Section 203-6.3.3 of Standard Specifications for Public Works Construction.
 - 1. Mineral Filler shall consist of Portland cement or mechanically reduced rock.
 - 2. Mechanically reduced rock shall conform to the grading in Table 203-6.3.3 (A) when tested in accordance with ASTM D 422.

2.3 ASPHALT MATERIALS

- A. Asphalt Cement: In Accordance with Standard Specifications, Subsection 203-6, PG 64-10, 3/8” maximum aggregate size and compacted to 95 percent of Hveem laboratory test.
- B. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- C. Water: Potable.

2.4 AUXILIARY MATERIALS

- A. Joint Sealant: ASTM D 6690, Type I, hot-applied, single-component, polymer-modified bituminous sealant.
- B. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than three minutes.
 - 1. Color: White unless otherwise specified.
- C. Wheel Stops: Precast, air-entrained concrete, 3500-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners, drainage slots on underside, and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length (2-required per wheel stop).

2.5 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:
 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 2. Provide mixes complying with composition, grading, and tolerance requirements in ASTM D 3515.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall be responsible for laying out and installing all pavements in the correct locations and to the proper cross sections and in accordance with the lines and grades as specified herein and the on the Drawings and/or in accordance with the directions of the Site/Civil Engineer. Pavements which are not constructed to the proper section, grade and/or alignment shall be corrected by repair or replacement by the Contractor in accordance with the directions of the Site/Civil Engineer and at no additional cost to the Owner.
- B. Contractor shall remove existing concrete wheel stops, verify count with Civil Engineer or Fullerton College Personnel, and store for future reuse. Dowels will be discarded.

3.2 EXAMINATION

- A. Verify that subgrade/base is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.
- D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.3 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
 - 1. Full Depth Mill per Plan (Estimated 3.5” Thick)
 - 2. Repair or replace curbs, manholes, and other construction damaged during cold milling.
 - 3. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
 - 4. Keep milled pavement surface free of loose material and dust.

3.4 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd..
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.5 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
 - 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.
 - 1. Small Cracks 1/2” or smaller: Clean cracks by brushing, treat with weed killer, and apply slurry seal, type II. Fill flush with surface of existing pavement and remove excess.
 - 2. Large Cracks 1/2” or larger: Cracks with broken asphalt or areas that have broken asphalt; all loose asphalt shall be removed, treated with weed killer, and patched using Type “E” Asphalt Pavement.

3.6 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted- aggregate base before applying paving materials.
 - 1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.
- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings.
Remove spillages and clean affected surfaces.

3.7 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
 - 2. Place hot-mix asphalt surface course in single lift.
 - 3. Spread mix at minimum temperature of 250 deg F.
 - 4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.

4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.9 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927, but not less than 94 percent nor greater than 100 percent.
 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.10 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 1/8 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
- C. Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch of height indicated above pavement surface. Apply Tack Coat prior to placement.

3.11 SURFACE TREATMENTS

- A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.
- B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D 3910 and allow to cure.
 - 1. Use of Squeegee on slurry seal to remove ridges and provide a uniform, smooth surface.

3.12 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect and/or Civil Engineer. All Striping is white except as indicated on Plan.
- B. Allow paving to age for 14 days before starting pavement marking.

- C. Sweep and clean surface to eliminate loose material & dust and thoroughly clean surface prior to painting. Provide Surface that is clean, dry, and satisfactory to paint manufacturer and to satisfy warranty requirements.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils. Apply marking paint in two coats minimum to obtain coverage. Apply additional coats as required to create an opaque marking.
- E. Provide guide lines and templates as necessary to control paint application. Special precautions shall be taken in marking numbers, letters, and symbols. Edges of markings shall be sharply outlined. Lines shall be straight or curved as applicable, to within ¼" in 15 feet. Greater deviations shall be removed and lines reapplied. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement or discoloration by tires of traffic. If there is a deficiency in drying of the markings, painting operations shall be discontinued until cause of the slow drying is determined and corrected.
- F. Provide directional arrow, numbering, and lettering in similar manner and with same paint in color indicated. Paint directional arrows and letters with stencils. Stokes of letters to be as indicated. Islands and "no Parking" areas shall have 4" stripes as indicated on drawings.

3.13 WHEEL STOPS

- A. Install wheel stops using dowels.
- B. Securely attach wheel stops to pavement with not less than two galvanized-steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. In-Place Density: Testing agency will take samples of un-compacted paving mixtures and compacted pavement according to ASTM D 979.
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.

- b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- E. Replace and compact hot-mix asphalt where core tests were taken.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
- G. Remove all paint droppings, overspray, and repair all injured or stained surfaces to satisfaction of Engineer or Owner.

3.15 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow milled materials to accumulate on-site.

END OF SECTION 321216

SECTION 321313 - PORTLAND CEMENT CONCRETE WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 DESCRIPTION

- A. Provide exterior concrete work, including curbs, ramps, gutters, driveway aprons, swales, walks and pavement, as indicated, specified, and required.

1.3 SUBMITTALS

- A. Layout Drawings: Provide a layout drawing showing locations of each type of pavement and construction, and dimensioned locations of all expansion and control joints.
- B. Product Data: Submit for expansion and control joint material.
- C. Site Samples
 - 1. Prepare following samples at the site, cast in the directed locations and orientations. Prepare as many samples of each type of concrete as are required for approval. Remove samples from the site when no longer needed and removal is approved. Approved samples may be part of permanent construction if meeting all other requirements shown and specified and are so approved.

1.4 QUALITY ASSURANCE

- A. Contractor shall be responsible to secure all areas of construction. Graffiti damage on freshly placed concrete shall be replaced at no cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete:
 - 1. Portland cement: ASTM C150, Type II, low alkali. Use Type V where concrete is in contact with earth.
 - 2. Aggregates: ASTM C33, from approved source to insure uniform quality and grading. Deliver so that moisture content variations will not decrease production of reasonably uniform concrete. Do not use aggregates that are reactive with alkalis.
 - 3. Water: Clean, fresh and potable.

- B. Strength: Minimum ultimate compressive strength of 4,000 psi (minimum per geotechnical engineer's recommendation). Refer to Division 1 for testing requirements.
- C. Reinforcing:
 - 1. Bars: ASTM A615, grade 60.
 - 2. Wire: ASTM A82.
 - 3. Wire mesh: ASTM A185.
- D. Expansion and Control Joints:
 - 1. Expansion joints for slabs: Conform to Standard Specifications for Public Works Construction, Latest Edition. Subsection 201-3.
 - 2. Expansion joints for curbs and gutters: Asphalt impregnated fiber filler material, 1/2 inch thick.
 - 3. Control Joints: "Zip Strip" as distributed by S.C.A. Construction Supply, Santa Fe Springs, Calif., or equal.
- E. Curing Compound: Conform to Standard Specifications for Public Works Construction, Latest Edition Subsection 201-4.
- F. Polyethylene Film: Clear, 10 mil thick, "Visqueen", or equal. Provide compatible tape for sealing joints.

PART 3 - EXECUTION

3.1 ON-SITE CONCRETE WORK

- A. Construct all site concrete of 4,000 psi concrete (minimum per geotechnical engineer's recommendation) unless otherwise indicated or specified. Provide reinforcing bars or mesh where indicated. Form accurately to profiles shown, using wood, metal or plastic forms as approved. Place and handle concrete in manner that will avoid segregation of ingredients.

3.2 SUBGRADE PREPARATION: Refer to Section 312000 Earth Moving.

- A. General: Conform to Standard Specifications for Public Works Construction, Latest Edition Subsections 301-1.2 through 301 - 1.4, inclusive, performed under the supervision of the Soils Engineer.
- B. Maintenance of subgrade: The subgrade shall be maintained in a smooth, compacted condition, in conformity with the required section and established grade until the concrete is placed.

3.3 CONCRETE SLABS, PADS, WALKS, DRIVEWAY APRONS, CURBS, GUTTERS AND OTHER EXTERIOR CONCRETE FLATWORK

- A. Form Setting: Conform to Standard Specifications for Public Works Construction, Latest Edition Subsection 303-5.2.1. Concrete surfaces, where left exposed, shall be formed on all sides with plywood with taped joints to give a smooth, uniform straight finish.
- B. Reinforcing steel shall be securely tied in place. Do not use bars with kinks or bends not shown on drawings. Reinforcing steel shall be clean, free from rust, oil, scale, or any foreign material. Place all reinforcing as detailed and comply with typical detail for bends, splices, clearance, etc., and with requirements of the Uniform Building Code.
- C. Placing Concrete: Conform to Standard Specifications for Public Works Construction, Latest Edition Subsection 303-5.3.
- D. Expansion Joints:
 - 1. Concrete Curbs: Provide 1/2" thick expansion joints at beginning and at end of curves, intersections, and 20-foot intervals between, set plumb, square, and to same profile as the curbs. Edge curb tops to 1/2" radius and vertical joints to 1/4" radius.
 - 2. Concrete Gutters: Provide 1/2" thick expansion joints as above for curbs.
 - 3. Concrete Walks: Provide 1/2" expansion joints as specified for curbs and where walks abut rigid structures, aligned with joints in curbs where adjoining. Provide expansion joints at 6 foot intervals in concrete walks.
 - 4. Exterior Slabs: Provide 1/2" thick expansion joints at 6 foot intervals or less.
- E. Control Joints shall be formed joints. Tops of joints shall be installed flush with the concrete surface. Depth of joint shall be a minimum of 1/4 the thickness of slab. Use control joints on all curbs, curbs and gutters, and cross gutters at maximum intervals of 20 feet on center. Sawed joints may be used in lieu of the above, providing they are at least one inch deep.
- F. Concrete Ramps: Construct pedestrian and disabled ramps of profile indicated. Excavate below bottoms of ramps to allow for full thickness of concrete throughout. Do not feather the concrete unless specifically indicated. Reinforce with No. 4 bars or mesh. Provide smooth transitions between ramps and adjoining surfaces. Provide uniform slopes throughout. Provide grooved pavement as detailed.

3.4 FINISHES

- A. Walks and Pavement: Medium broom finish perpendicular to longitudinal direction of the walk. Score walks in direction and pattern indicated or directed.
- B. Gutters: Light broom finish with 3 inch wide steel trowel finish at flowlines.
- C. Curbs: Steel trowel finish, followed by fine hair brush finish.
- D. Ramps: Heavy broom finish where slope is 6 percent or greater; medium broom finish where slope is less than 6 percent.
- E. Paving: Medium broom finish, unless otherwise directed.
- F. Driveway Aprons: Medium broom finish, unless otherwise directed.

- G. See Landscape Drawings for any additional architectural finishes.

3.5 CURING

- A. Concrete work shall be properly cured and protected against injury and defacement of any nature during construction operations. If weather is hot or surface has dried out, spray surface with fine mist of water, starting not later than 2 hours after final troweling. Surface of finish shall be kept continuously wet for at least 10 days. Wetting is considered emergency work and shall be performed on weekends and holidays if necessary.
- B. In lieu of water curing, within 24 hours after finishing, the concrete which is not to receive special finishes, may be cured with an approved clear liquid curing compound, applied in accordance with the manufacturer's recommendations.

3.6 BACKFILLING

- A. After curing, debris shall be removed and the area adjoining the work shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

3.7 PROTECTION

- A. Completed work shall be protected from damage until accepted. The Contractor shall remove damaged concrete and clean concrete discolored during construction. Work that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints at no expense to the owner. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

3.8 REMOVAL OF FORMS

- A. Do not remove forms until the concrete has attained adequate strength to prevent damage. Take extreme care in stripping to avoid breaking off corners, marking concrete or defacing the finish surface in any way. Minimum stripping time at walls shall be 3 days.

3.9 CLEANING AND PATCHING

- A. After stripping forms, clean all exposed concrete surfaces and all adjoining work stained by leakage of concrete. Remove all fins, burrs, and projections by grinding. Patch all voids, rock pockets, holes, cracks, etc., by chipping loose concrete and exposing clean sound aggregate. After inspection, dampen prepared recesses for 2 hours minimum and fill with drypack to within 1/4" of surface. Keep drypack damp for 2 days minimum. Apply mortar to final surface and keep patch damp for 5 days minimum. Entire surface of concrete to be sacked with neat cement and water after surface is cleaned and patched.

3.10 FLOOD TEST

- A. All concrete gutters and concrete pavement shall be given a flood test. All concrete work where water ponds and does not run off in a reasonable amount of time, shall be removed to the nearest score or joint line and replaced to provide proper drainage.

3.11 DEFECTIVE CONCRETE

- A. If concrete tests indicate that the strengths do not meet those specified, or if concrete has excessive pockets, or if reinforcing steel is exposed, or if concrete does not comply with the drawings and specifications, the defective concrete shall be removed and replaced as directed.
- B. Concrete paving that shows evidence of cracking prior to completion of the project or during the 60-day maintenance period shall be replaced at no cost to the Owner. Such replacement shall include the entire panel of concrete in which the cracking occurs, to the nearest expansion or control joints, as approved.

3.12 OFFSITE CONCRETE WORK

- A. Replace existing items are damaged by Contractor's operations. Secure and pay for required permits, inspections, engineering, and surveying. Offsite concrete work shall comply with rules and regulations of local authorities.

END OF SECTION 321313

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Pavement striping and markings.
 - 2. Signs.
 - 3. Pavement markers.
 - 4. Parking bumpers.
- C. Related Sections:
 - 1. Division 01 Section "General Requirements."
 - 2. Division 01 Section "Special Procedures."
 - 3. Division 32 Section "Asphalt Paving".
 - 4. Division 32 Section "Concrete Paving".

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
State of California, Department of Transportation (CALTRANS)
- B. State of California - California Department of Transportation (CALTRANS):
 - 1. Standard Specifications:
 - a. Sec 56. Signs
 - b. Sec 85. Pavement Markers
 - c. Sec 94. Asphaltic Emulsions

PART 2 - PRODUCTS

2.1 PAINT

- A. White Traffic Paint: DuPont #LF32M30P, Hawkins-Hawkins Co. #V10-31, or equal.
- B. Yellow Traffic Paint: DuPont #112-8049, Hawkins-Hawkins Co. #V10-32, or equal.
- C. Blue Paint (Handicapped Areas): DuPont "Precaution Blue" #326Y23665, Hawkins-Hawkins Co. #V10C-1865, or equal.

- D. Red Curb Paint: DuPont #LC64M30P, Hawkins-Hawkins Co. V10C-23, or equal.

2.2 SIGNS

- A. Signs:
 - 1. **<Insert product name here>**, or equal.
 - 2. International Handicap Sign and Symbol: **<Insert product name here>**.
- B. Substitutions: Under provisions of Division 01 Section "General Requirements."

2.3 PAVEMENT MARKERS

- A. Amber Bi-Directional Pavement Markers: Reflective type; Hawkins-Hawkins Co. #V16C-D, Westway, or equal.
- B. Amber Mono-Directional Pavement Markers: Reflective type; Hawkins-Hawkins Co. #V16C-H, Zumar model 88B type H, or equal.
- C. Clear Pavement Markers: Center-mount plastic reflectors, 3-1/4 inch diameter, type GM-75; Safeway Sign Co., Western Highway Products, or equal.

2.4 PARKING BUMPERS

- A. Three-foot (0.9 m) sections bumper block; Christy Concrete Products No. M20W6BB, Bertelson Concrete Products, or equal.
 - 1. Type: As indicated on the drawings, with steel reinforcement throughout.

PART 3 - EXECUTION

3.1 STRIPING AND MARKINGS

- A. Mark and stripe uniformly in design, position, and application.
- B. Do not apply paint to the paved surface within 24 hours after paving.
- C. Apply two coats of paint in accordance with manufacturer's directions. Protect adjacent surfaces against splatter or stains.

3.2 SIGNS AND GUIDE MARKERS

- A. Install signs and guide markers at locations indicated on the Drawings in accordance with CALTRANS Section 56.

3.3 PAVEMENT MARKERS

- A. Install pavement markers at locations indicated on the Drawings in accordance with CALTRANS Section 85.

3.4 PARKING BUMPERS

- A. Set and level bumpers on pavement with an adhesive consisting of asphaltic emulsion, and anchor to the pavement with two No. 5 by 2-foot (0.6 m) deformed bars. Apply the asphaltic emulsion in accordance with CALTRANS Section 94-1.02.

END OF SECTION 321723

SLURRY SEALING

SECTION 32 01 13

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide slurry sealing over existing asphalt paving areas as indicated on drawings.
- B. Provide striping for parking, roadway, fire lanes and handicapped markings as indicated on drawings.

1.2 SUBMITTALS

- A. None required.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Standards: Comply with the provisions of the following specifications and standards, except as noted or specified, or as accepted or directed by the Architect.
 - 1. ASTM C 131-89, "Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine".
 - 2. ASTM D 242-85, "Specifications for Mineral Filler for Bituminous Paving Mixtures".
 - 3. ASTM D 977-86, "Specifications for Emulsified Asphalt".
 - 4. ASTM D 2397-85, "Specifications for Cationic Emulsified Asphalt".
 - 5. Paint handicap spaces to conform to ADA, ANSI A117.1 and local code requirements.

1.4 PROJECT CONDITIONS

- A. Weather limitations:
 - 1. Apply slurry sealant when ambient temperature is above 50° F, and when temperature has not been below 35° F for 12 hours immediately prior to application. Do not apply when existing paving is wet or contains an excess of moisture.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Design Requirements
 - 1. This specification shall meet requirements of International Slurry Seal Association, Type I.
- B. Asphalt Emulsion
 - 1. Conform to requirements of ASTM D 977 or ASTM 2397.
 - 2. Minimum percent of emulsion to aggregate shall be 18 percent.
- C. Aggregate
 - 1. Mineral aggregate consisting of natural or manufactured sand, slag, or combination thereof.
 - a. Smooth textured sand of less than 1.25% water absorption shall not exceed 50% of total combined aggregate.
 - b. Material shall be clean and free from organic matter and other deleterious substances and show loss of not more than 35 when tested in accordance with ASTM C 131.
 - c. Mineral fillers shall meet requirements of ASTM D 242, and following gradation requirements:

1).	<u>Sieve Size</u>	<u>% Passing by Weight</u>
(a).	#4	100
(b).	#8	90 to 100
(c).	16	65 to 90

(d).	30	40 to 60
(e).	50	25 to 42
(f).	100	15 to 30
(g).	200	10 to 20

- D. Water – Potable and free from harmful soluble salts.
- E. Lane and Parking Area Marking Paint: Colors as indicated on drawings. Alkyd-resin type, ready-mixed, AASHTO M 248, Type I.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Immediately prior to applying slurry, clean surface of loose material, silt spots, vegetation, oil spots, and other objectionable material. Power brooms, power blowers, air compressors, water flushing equipment, and hand brooms shall be suitable for cleaning existing pavement.
- B. Apply tack coat of one-part emulsion, 3 parts water at rate of 0.05 to 0.10 gallons per sq. yd.

3.2 APPLICATION

- A. Equipment, tools, and machines used in performance of work of this Section shall be maintained in satisfactory working order during performance of work of this Section.
 - 1. Slurry mixing machine shall be continuous flow mixing unit capable of delivering accurately predetermined proportion of aggregate, water, and asphalt emulsion to mixing chamber and to discharge thoroughly mixed production on continuous basis.
 - 2. Attach to mixer mechanical type squeegee distributor equipped with flexible material in contact with surface to prevent loss of slurry from distributor.
- B. Surface may be pre-wetted by fogging ahead of slurry box providing no water is accumulated in front of slurry box.
- C. Maintain adequate amounts of slurry in spreader to insure complete coverage. No lumping, balling, unmixed aggregate, or streaking due to oversize aggregate shall be permitted.
- D. Use approved squeegees to spread slurry in areas not accessible to slurry mixer.
- E. Apply at rate of 6 to 10 lbs. per sq. yd. based on dry aggregate weight.
- F. Roll with 6 to 8 ton pneumatic tired roller with minimum contact pressure of 40 psi after emulsion has broken.
- G. No unsightly joints or other visual imperfections are permitted on finished product.
- H. Traffic and Lane Markings:
 - 1. Cleaning: Sweep and clean surface to eliminate loose material and dust.
 - 2. Striping: Use lane-marking paint, factory-mixed, quick-drying, and non-bleeding; yellow, blue, red, or white color as indicated on drawings or selected by Architect.
- 3. Site Tolerances:
 - a. General: Make lines parallel, evenly spaced, and with sharply defined edges.
 - b. Line Widths:
 - 1). Plus or minus ¼-inch variance on straight segments.
 - 2). Plus or minus ½-inch variance on curved alignments.
- 4. Do not apply traffic and lane marking paint until layout and placement has been verified by Architect.
- 5. Do not apply until slurry sealant has cured 72 hours minimum.
- 6. Apply paint with mechanical equipment to produce uniform 4" wide straight edges. Apply in 2 coats at manufacturer's recommended rates. Colors as indicated on drawings.

3.3 PROTECTION & CLEANING

- A. Allow treated areas to cure 24 hours minimum before opening to traffic.
- B. Remove drips, overspray, improper markings, and paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Architect prior to performance.

END OF SECTION

EXHIBIT “A”
CEMENT STABILIZATION SPECIFICATION 05-31-2016

1-1 DESCRIPTION.

This item shall consist of constructing a mixture of soil, cement, and water in accordance with this specification, and in conformity with the lines, grades, thickness, and typical cross sections shown on the plans.

Cement-treated subgrade shall be constructed in a series of parallel lanes such that longitudinal and transverse joints are minimized.

1-2 SUBMITTALS.

A. At the time of bid, the Contractor shall furnish the following information regarding the subgrade cement treatment to the Civil Engineer. Approval of the cement source and the Contractor (or Subcontractor) performing the subgrade cement treatment is at the discretion of the Civil Engineer.

1. The proposed source and supplier of cement with supplier’s certificate of compliance, test data, and samples of the proposed cement.
2. Description and specifications of the proposed construction equipment, construction methods, expected production rates, and planned sequence of subgrade treatment.
3. Proof of California Contractor’s License for a period of no less than five (5) years of the Contractor (or Subcontractor) performing the subgrade cement treatment. Prior soil-cement project experience of the Contractor (or Subcontractor) performing the subgrade cement treatment.
4. Quality Control Plan detailing testing and inspection procedures on the cement treatment that will ensure compliance with the project specifications.

B. During the cement treatment work, the Contractor shall furnish the following information to the City Inspector on a daily basis:

1. Certified weight tickets of cement delivered to the site and spread and mixed into the subgrade.
2. A summary of the quantity of cement used each day, areas treated and compacted, and areas with curing completed.

2-1 MATERIALS.

2-1.1 PORTLAND CEMENT.

Portland cement shall be Type II Modified conforming to the requirements of Section 201-1.2.2 “Portland Cement” of the Caltrans Standard Specifications. Supplementary materials shall not be substituted for any portion of the required Portland cement.

2-1.2 WATER.

Water used for mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product. Water shall be tested in accordance with and shall meet the suggested requirements of AASHTO T 26. Water known to be of potable quality may be used without testing.

2-1.3 SOIL.

The soil for this work shall consist of materials on the site or imported and shall be free of roots, sod, weeds, wood, construction debris, and stones larger than 2-1/2 inches (60 mm).

3-1 CONSTRUCTION METHODS.

3-1.1 GENERAL.

Prior to beginning any cement treatment, the existing subgrade shall be shaped to conform to the typical sections, lines, and grades as shown on the plans.

3-1.2 WEATHER LIMITATIONS.

The cement shall not be spread while the atmospheric temperature is below 40 F or when conditions indicate that temperatures may fall below 40 F within 24 hours, when it's raining, or when the soil or subgrade is frozen.

3-1.3 APPLICATION.

Cement shall be applied at a rate of not less than 5 percent based on the in-place dry unit weight of soil and for the depth of subgrade treatment shown on the plans. For estimating purposes, an in-place dry unit weight of soil of 125 pcf should be used. The required 7-day unconfined compressive strength shall be no less than 400 psi.

The cement content shall vary no more than 0.5 percent under and not more than 1.0 percent over the specified cement content (example: tolerance on spread rate of 6.0% is 5.5% to 7.0%). However, the moving average of the rate of cement content tests/inspections shall not be less than the specified cement content. The Engineer reserves the right to increase the rate of application of cement from the specified rates during the progress of construction as necessary to maintain the desired characteristic of the stabilized subgrade. Additional cement and work required above and beyond the specified amount will be paid for by the owner on a per ton and unit price basis, respectively.

Cement shall be distributed with a non-pressurized mechanical vane-feed spreader with on-board scales and controls capable of spreading the cement at a prescribed weight per unit area. Spreader truck shall be equipped with an on-board vacuum system capable of minimizing fugitive cement dust during the spreading process. The amount of cement spread shall be the amount required for mixing to the specified depth which will result in the specified rate of cement application. Cement shall not be spread upon the prepared material more than 2 hours prior to the mixing operation. No traffic other than the mixing equipment shall be allowed to pass over the spread cement until the mixing operation is completed.

3-1.4 MIXING.

Mixing of the soil, cement, and water shall be done with a four wheel drive rotary mixer capable of down and up cutting the soil with a minimum engine gross horsepower of 500 hp (CMI RS-500B or equivalent). The mixing machine shall have equipment provisions for introducing water at the time of mixing through a metering device.

The full depth of the treated subgrade shall be mixed a minimum of two times with the approved mixing machine. At least one of the two mixes shall be done while introducing water into the soil through the metering device on the mixer. Water shall be added to the subgrade during mixing to provide a moisture content not less than 2 percentage points below nor more than one percentage point above (-1 to +2 of OMC) the optimum moisture of the soil-cement mixture to ensure chemical action of the cement and soil.

3-1.5 COMPACTION.

The mixture shall be compacted in one layer. The Contractor shall regulate the sequencing of the cement treatment operations, such that the final compaction of the soil-cement mixture to the specified density will be completed within 2 1/2 hours after the initial application of water during the mixing operation.

Compaction shall be by means of steel drum, pad foot and/or segmented wheel rollers of sufficient capacity to compact the full depth. Areas inaccessible to rollers shall be compacted to the required density by other means satisfactory to the Engineer. The field dry density of the compacted mixture shall be at least 95% percent of the maximum dry density as determined in accordance with ASTM D 1557. Should the cement treated subgrade yield under the weight of the compaction equipment, compaction effort will cease in an effort not to compromise the section; in this case, the maximum achievable field density will be accepted or an alternate remedial plan will be proposed by the Engineer.

3-1.6 FINISHING AND CURING.

After the final layer of course of cement treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical section. The completed section shall then be finished by rolling with a pneumatic or other suitable roller approved by the Engineer.

The subgrade shall be protected against drying for a period of 2 days by the application of bituminous material or moist curing methods, unless otherwise directed by the Engineer. The curing method shall be as soon as possible, but no later than 2 hours after the completion of finishing operations. The finished subgrade shall be kept moist continuously until the curing material is placed. If completed surface is to be microcracked, moist curing shall be the only method of curing prior to microcracking. After microcracking is complete additional moist curing or emulsion sealing may be used.

A curing seal consisting of SS or CSS grade asphaltic emulsion shall be furnished and applied to the surface of the top layer of the cement stabilized material. Curing seal shall be applied at a rate of 0.20 gallons per square yard of surface. Damage to the curing seal shall be promptly repaired by the Contractor at his/her expense, as directed by the Engineer.

3-1.7 MICROCRACKING (RECOMMENDED IF NEW ASPHALT IS TO BE PLACED DIRECTLY ON TOP OF CEMENT TREATED SURFACE IN A SINGLE LIFT OF 2”- 4”)

After the initial 24-48 hours of the moist curing period, microcracking of the CTB shall be accomplished by using a 12-ton steel-wheel (smooth drum)vibratory roller, traveling at a speed of approximately 2 mph and vibrating at maximum amplitude (or as directed by the Project Engineer). The section shall have 100% coverage exclusive of the outside 1 foot so as to induce minute cracks in the CTB. A minimum of three passes are required of the vibratory roller to reduce the stiffness of the cement treated section and minimize the potential for reflective cracking to occur.

After completion of microcracking, the section shall be cured in accordance with Section 3-1.6 for a period of at least 48-72 hours, or until deemed firm and unyielding by the project Engineer.

3-1.8 MAINTENANCE.

The Contractor shall maintain, at his/her own expense, the entire cement treated subgrade in good condition from the start of work until all the work has been completed, cured, and accepted by the Engineer.

END OF SECTION