QUATTROCCHI KWOK
ARCHITECTS

Project Manual

for the

L i b e r t y H i g h S c h o o l

B a s e b a l l B a c k s t o p R e p l a c e m e n t

August 2, 2021

DSA File Number: 7-H4
DSA Application Number: 01-119543
PTN Number: 61721-81

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Architect's Project No.: 1923.00

DOCUMENT 00 0107

PROFESSIONAL SEALS AND DSA IDENTIFICATION STAMP

DIVISION OF THE STATE ARCHITECT IDENTIFICATION STAMP

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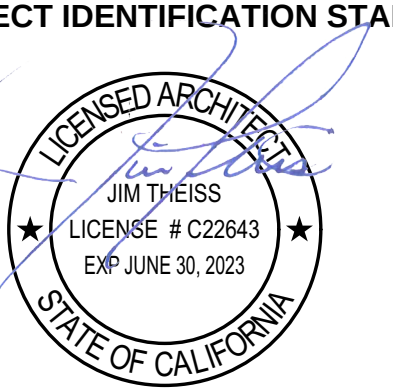

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IDENTIFICATION STAMP
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APP: 01-119543 INC:
REVIEWED FOR
SS ☐ FLS ☐ ACS ☑
DATE: 08/05/2021

END OF SECTION

DOCUMENT 00 0110

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COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Coordination and project conditions.

B. Related work.

C. Discrepancies.

D. Examination.

E. Pre-Contract meeting.

F. Pre-construction meeting.

G. Site mobilization meeting.

H. Progress meetings.

I. Pre-installation meetings.

J. Project coordination meetings.

1.02 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various portions of the Contract Documents to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate hours and days of Work with local ordinances and requirements.

C. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

H. Contractor shall coordinate Work with work to be performed by separate contractors.

1.03 RELATED WORK

A. Referencing specification sections in "Related Work" articles is for convenience only and shall not be construed as to limit the coordination of the Contract Documents to referenced sections.

B. Documents affecting the work of any section include, but are not limited to, General Conditions, Supplementary General Conditions, and Sections in Division 01 of these Specifications.

C. Work in any section may relate to other work in these documents. The Contractor is responsible to coordinate all work.

1.04 DISCREPANCIES

A. In the event of discrepancy in the Contract Documents or if uncovered conditions are not as anticipated, immediately notify the Architect and secure needed direction.

B. Do not proceed in areas of discrepancy until such discrepancies have been fully resolved.

C. Before starting work, verify governing dimensions at the premises, and examine adjoining work on which this work is dependent. No "Extra" or additional compensation will be allowed on account of differences between actual measurements and dimensions shown. Submit differences discovered during the work to Architect for interpretation before proceeding with the associated work.

D. Any time extension or any increase or decrease of cost resulting from such changes will be adjusted in the manner provided in the General Conditions.

1.05 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Examine and verify specific conditions described in individual specification sections.

C. Verify that utility services are available, of the correct characteristics, and in the correct location.

1.06 PRE CONTRACT MEETING

A. Construction Manager will schedule a meeting with District and apparent low bidder prior to award of Contract.

B. Attendance Required: Owner, Construction Manager, Architect, and Contractor.

C. Agenda: Execution of the Notice of Award, Review of documents required for Preconstruction Meeting.

1.07 PRECONSTRUCTION MEETING

A. Construction Manager will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Construction Manager, Architect and Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of schedule of values.
5. Designation of personnel representing the parties in Contract, and the Architect/Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Scheduling activities of DSA Inspector of Record.

D. Architect will record minutes and distribute copies within five days after meeting to participants, and those affected by decisions made.

1.08 SITE MOBILIZATION MEETING

A. Construction Manager will schedule a meeting at the Project site prior to Contractor occupancy.

B. Attendance Required: Owner, Construction Manager, Architect, Special Consultants, Contractor, Contractor's Superintendent and major Subcontractors.

C. Agenda:
1. Use of premises by Owner and Contractor.
2. Owner's requirements and partial occupancy.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Security and housekeeping procedures.
6. Schedules.
7. Application for payment procedures.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for start-up of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Architect will record minutes and distribute copies within five days after meeting to participants, and those affected by decisions made

1.09 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at bi-weekly intervals. Provide and discuss "two-week look ahead" schedule reports at these progress meetings. Coordinate progress payments and revised schedule, to monthly meeting attended by an officer of the construction company.

B. Make arrangements for meetings, prepare agenda with copies for participants and preside at meetings.

C. Attendance Required: Job Superintendent, major Subcontractors and suppliers, Owner, Construction Manager, Inspector of Record and Architect as appropriate to agenda topics for each meeting.

D. Architect will record minutes and distribute copies within five days after meeting to participants, including Owner, Contractor, and those affected by decisions made.

1.10 PREINSTALLATION MEETING

A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.

E. Architect will record minutes and distribute copies within five days after meeting to participants, with copies to Owner, Contractor and participants.

1.11 PROJECT COORDINATION MEETINGS

A. Contractor will schedule project coordination meetings to be held weekly.

B. Attendance Required: Contractor, job superintendent, Subcontractors, as required.

C. Contractor will prepare agenda and preside at meeting.

D. Contractor will record minutes and distribute copies within five days after meeting to participants, Construction Manager, Architect and those affected by decisions made.

E. Copies of the minutes to Construction Manager and Architect are required as part of submission of Application for Payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 4000

QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances.

C. References.

D. Mockup.

E. Inspecting and testing laboratories services.

F. Manufacturers' field services and reports.

G. Field engineering and staking.

1.02 RELATED SECTIONS

A. Section 01 4200- Reference Standards.

B. Section 01 4523 - Testing and Inspection Services.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Correct conditions or workmanship not in conformance with specified standards or quality.

C. Comply with manufacturers' instructions, including each step in sequence.

D. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

F. Perform Work by persons qualified to produce required and specified quality.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.04 TOLERANCES

A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.05 REFERENCES

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. The contractual relationships, duties, and responsibilities of the parties in Contract or those of the Architect/Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 MOCK-UP

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups are representative of the quality required for the Work.

D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.07 TESTING AND INSPECTION AGENCY SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent Testing and Inspection Agency to perform inspecting and testing. Inspections and Testing will be performed in accordance with Section 01 4523 - Testing and Inspection Services; and the General Conditions.

1.08 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship and to initiate instructions when necessary.

1.09 FIELD ENGINEERING AND STAKING

A. Each Contractor awarded Work for this Project shall provide all necessary surveying, layout, lines and grades required for the proper location of the Work.

B. Contractor agrees to provide any and all false-work, templates, batter-boards and other such structures or devices necessary to provide for the Contractor's layout, lines and grades. Work installed in an incorrect location or elevation shall be removed and re-installed at the expense of the Contractor.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 8113

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes general requirements and procedures for compliance with California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".
   1. Chapter 5- Non-Residential Mandatory Measures.

1.02 RELATED REQUIREMENTS

A. Pertinent sections specifying erosion control.

B. Section 01 6116 - Volatile Organic Compound (VOC) Restrictions.

C. Section 01 7419 - Construction Waste Management and Disposal.

D. Pertinent sections specifying landscape irrigation.

1.03 DEFINITIONS

A. CAL-Green Definitions: Certain terms are defined by CAL-Green in Chapter 5 of the Code. Words and terms used in this section shall have the meanings shown therein.

1.04 INFORMATIONAL SUBMITTALS

A. General: Submit CAL-GREEN submittals required by code and in other Specification Sections.

B. CAL-GREEN submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated CAL-GREEN requirements.

C. Acceptable verification submittals are specified in the related sections.

PART 2 PRODUCTS

2.01 REQUIREMENTS - GENERAL

A. Provide products and procedures necessary to confirm CAL-GREEN compliance required in this Section. Although other Sections may specify some CAL-GREEN requirements, the Contractor shall determine additional materials, techniques, means, methods and procedures necessary to comply with CAL-GREEN requirements.

2.02 STORM WATER POLLUTION PREVENTION PLAN

A. Section 5.106.1: Comply with requirements of this code section, local ordinances, General Conditions, Special Provisions, and related sections specifying erosion control.

2.03 OUTDOOR WATER USE

A. Section 5.304.3.1: Irrigation Controllers: Comply with requirements of this code section, local ordinances and Section 32 8000.

2.04 CONSTRUCTION WASTE REDUCTION

A. Section 5.408 Construction Waste Management, Diversion and Recycling: Comply with requirements of this code section, local ordinances and Section 01 7419.

2.05 POLLUTANT CONTROL

A. Section 5.504.4 Finish Material Pollutant Control: All Finish materials shall comply with requirements of this code section, local ordinances and Section 01 6116.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with Section 01 7419 - Construction Waste Management and Disposal.

B. Comply with execution requirements of related sections and applicable local codes and ordinances.

END OF SECTION

SECTION 01 4200

REFERENCE STANDARDS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF REQUIREMENTS

A. General: This section specifies procedural and administrative requirements for compliance with governing regulations and the codes and standards imposed upon the work. These requirements include the obtaining of permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes, and standards.
   1. "Regulations" is defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the work regardless of whether they are lawfully imposed by governing authority or not.

B. Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

1.03 DEFINITIONS

A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including the drawings. (Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated thereon.) Certain terms used in contract documents are defined in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to the extent they are not stated more explicitly in another element of contract documents.

B. General Requirements: The provisions or requirements of Division 01 sections apply to entire work of Contract and, where so indicated, to other elements which are included in project.

C. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Architect/Engineer," "requested by "Architect/Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's/Engineer's responsibility into the Contractor's area of construction supervision.

E. Approve: Where used in conjunction with Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Architect/Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.

F. Project Site: The term "project site" is defined as the space available to Contractor for performance of the work. The extent of project site is shown on the drawings, and may or may not be identical with the description of land upon which the project is to be built.

G. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

H. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

I. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

J. Installer: The term "installer" is defined as the entity (person or firm) engaged by Contractor, or its subcontractor or subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.

K. Testing Laboratory: The term "testing laboratory" is defined as an independent entity engaged to perform specific inspections or tests of the work, either at project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

L. Products: The term "products" includes materials, systems and equipment.

M. Approved Equal, Or Equal: means as approved and accepted by the Architect.

N. Shall: The term "shall" is mandatory.

O. As Required, As Necessary, etc.: Words of similar import mean as required by the Contract Documents or essential to the completion of the Work.

P. Concealed: The term "concealed" means as embedded in masonry or other construction, installed within furred spaces, within double partitions or above suspended ceilings, in trenches, in crawl spaces, or in enclosures.

Q. Exposed: The term "exposed" means not installed underground or "concealed" as defined above, including work and surfaces open in whole or in part to the exterior or weather.

R. Work: The term "work" shall include both labor and materials.

S. The Contract Documents:
The Contract Documents consist of the Contract, any addenda thereto, the completed Bid Form, the completed Bond and Insurance forms, the Notice Inviting Bids, the Instructions to Bidders, the General Conditions, the Supplementary General Conditions, the Labor Compliance Program, if any, the Technical Specifications, the Drawings and the Bidder's Questionnaire. All modification(s) amending or extending the work shall be as binding as if originally included in the Contract Documents. A Modification is a written amendment to the Contract signed by both parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Architect. The Contract Documents are complementary, and each obligation of the Contractor, Subcontractors, material or equipment suppliers in any one shall be binding as if specified in all.

T. The Contract:
The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the Owner and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

U. The Work:
The Work shall include the initial obligation of any Contractor or Subcontractor, who performs any portion of the Work, to visit the Site of the proposed Work, a continuing obligation after the commencement of the Work to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated bid documents. The "Site" refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

V. The Project:
The Project is the total construction of the Work performed in accordance with the Contract Documents in whole or in part and which may include construction by the Owner or by separate Contractors.

W. The Drawings:

The Drawings are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect.

X. The Specifications:
The Specifications are that portion of the Contact Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

Y. The Project Manual:
The Project Manual is the volume usually assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

1.04 FORMAT AND SPECIFICATION EXPLANATIONS

A. Format Explanation: The format of principal portions of these specifications can be described as in the following paragraphs. Although some portions of these specifications may not be in complete compliance with this format, no particular significance will be attached to such compliance or non-compliance.
   1. Sections and Divisions: For convenience, the basic unit of text is a "section." Each section is identified by a descriptive title (name) and the number. Individual sections are grouped together with other sections of similar or related work groupings known as "divisions." Divisions are recognized as the present industry consensus on uniform specification organization and sequence. The section title is not intended to limit meaning or content of a section, nor to be fully descriptive of the requirements specified therein, nor to be an integral part of the text.
      a. Each section of specifications has been subdivided into 3 "parts" for uniformity and convenience (Part 1-General, Part 2-Products, and Part 3 - Execution); some sections may not require the use of all three parts. These parts do not limit the meaning of and are not an integral part of text which specifies requirements.

B. Subordination of Text: Portions of specification text are subordinated to other portions in the following manner (lowest level to highest):
   1. Indented (from left margin) paragraphs and lines of text are subordinate to preceding text which is not indented, or which is indented by a lesser amount.
   2. Paragraphs and lines of text are subordinate to sub-article titles, which are printed in upper/lower-case lettering.
   3. Sub-articles are the subordinate to article titles, which are printed in uppercase lettering.
   4. Subordination (if any) of certain sections (or portions of sections) to other sections is described within those sections.
   5. <u>Underscoring</u> is used strictly to assist the reader of specification text in scanning text for key words (for quick recall). No emphasis on or relative importance of text is intended where underscoring is used.
   6. Imperative language is used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.

7. Section numbering is used to facilitate cross references in the contract documents. Sections are placed in Project Manual in numeric sequence; however, numbering sequence is not complete, and listing of sections at beginning of Project Manual must be consulted to determine numbers and names of specification sections in contract documents.
8. Page Numbering: Pages are numbered independently for each section and are recorded in the listing of sections (Index or Table of Contents) in Project Manual. The section number is shown together with the page number at the bottom of each page to facilitate the location of text in the Project Manual.
9. Project Identification: Project name (either complete or abbreviated) is recorded at top of each page of specifications to minimize possible misuse of specifications, or confusion with other project specifications.

C. Specification Content: Because of methods by which the project specification has been produced, certain general characteristics of content and conventions in use of language are explained as follows:

1. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text, and may include "prescriptive," "open generic-descriptive," "compliance with standards," "performance," "proprietary," or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
2. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed language written into the contract documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Architect/Engineer for a decision before proceeding.
3. Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified, for a particular unit of work, option is intended to be Contractor's regardless of whether or not it is specifically indicated as such.

D. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended to be the minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of the requirements. Refer instances of uncertainty to Architect/ Engineer for decision before proceeding.

E. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements should not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; they are also not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of entire set of contract requirements remains with the Contractor.

F. Trades: Except as otherwise indicated, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradespersons of that corresponding generic name.

G. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in the texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in section at first instance of use. Trade association names and titles of general standards are frequently abbreviated.
   1. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.05 DRAWING SYMBOLS

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards," published by John Wiley & Sons, Inc., seventh edition.

B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

1.06 INDUSTRY STANDARDS

A. General Applicability of Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effect (and are made a part of contract documents by reference) as if copied directly into the contract documents, or as if published copies were bound herewith. Refer to other contract documents for resolution of overlapping and conflicting requirements which result from the application of several different industry standards to the same unit of work. Refer to individual unit of work sections for indications of which specialized codes and standard the Contractor must keep at the project site, available for reference.
   1. Referenced standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work. See also Chapter 35 of the CBC.
   2. Non-referenced standards are hereby defined to have no particular applicability to the work, except as general requirements of whether the work complies with standards recognized in the construction industry.

B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

1. Updated Standards: At the request of the Architect/Engineer, Contractor or governing authority, submit a change order proposal where an applicable industry code or standard has been revised and reissued after the date of the contract documents and before the performance of the work affected. The Architect/Engineer will decide whether to issue the change order to proceed with the updated standard.

C. Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with recognized industry standards applicable to that part of the work. Copies of applicable standards are not bound with the contract documents.
   1. Where copies of standards are needed for proper performance of the work, the Contractor is required to obtain such copies directly from the publication source.
   2. Although certain copies of standards needed for enforcement of the requirements may be required submittals, the Architect/Engineer reserves the right to require the Contractor to submit additional copies of these standards as necessary for enforcement of the requirements.

D. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of date of contract documents:

AA	Aluminum Association 1525 Wilson Boulevard, Suite 600, Arlington, VA 22209 www.aluminum.org
AAMA	American Architectural Manufacturers Association 1827 Walden Office Square, Suite 550, Schaumberg, IL 60173-4268 www.aamanet.org; 847.303.5664
AAN	American Association of Nurserymen 1200 G St. Suite 800; Washington, DC 20005 www.anla.org; 202 789 2900
AASHTO	American Association of State Highway & Transportation Officials 444 N. Capitol St.; Washington, DC 20001 www.transportation.org; 202 624 5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215; Research Triangle Park, NC 27709-2215 www.aatcc.org; 919 549 8141
ACA	American Coatings Association 1500 Rhode Island Ave., NW; Washington, DC 20005 www.paint.org; 202-462-6272
ACI	American Concrete Institute

38800 Country Club Dr., Farmington Hills, MI 48331-3439
www.concrete.org; 313 532-2600

ACIL — American Council of Independent Laboratories
1725 K Street, NW; Washington, DC 20006
www.acil.org; 202 887-5872

ACPA — American Concrete Pipe Association
8445 Freeport Parkway, Suite 350, Irving TX 75063-2595
www.concrete-pipe.org 972 506 7216

AF&PA — American Forest & Paper Association
1111 19th St. NW, Suite 800, Washington, CD 20036
www.afandpa.org

AGA — American Gas Association
400 N. Capitol St. NW, Washington DC 20001
www.aga.org 202 824 7000

AHAM — Association of Home Appliance Manufacturers
1111 19th St. NW, Suite 402, Washington, DC 20036
www.aham.org 202 872 5955

AI — Asphalt Institute
2696 Research Park Drive, Lexington, KY 40511-8480;
www.asphaltinstitute.org 859 288 4960

AIA — American Institute of Architects
1735 New York Ave. NW; Washington, DC 20006-5292
www.aia.org 800 242 3837

A.I.A. — American Insurance Association
2101 L Street NW, Suite 400, Washington DC 20037
www.aiadc.org 202 828 7100

AISC — American Institute of Steel Construction
One East Wacker Drive, Suite 700, Chicago, IL, 60601-18021
www.aisc.org 312 670 2400

AISI — American Iron and Steel Institute
25 Massachusetts Ave NW Suite 800, Washington, DC 20001
www.steel.org 202 452 7100

AITC — American Institute of Timber Construction
www.aitc-glulam.org 503 639 0651

ALSC — American Lumber Standard Committee, Inc.
P.O. Box 210; Germantown, MD 20875-0210;
www.alsc.org 301 972 1700

ANSI	American National Standards Institute 25 West 43rd St. 4th Floor, New York, NY 10036 www.ansi.org 212 642 4900
APA	American Plywood Association 7011 South 19th, Tacoma, WA 98466; www.apawood.org 253 620 7400
ARI	Air Conditioning, Heating and Refrigeration Institute 2111 Wilson Blvd, Suite 500.; Arlington, VA 22201; www.ahrinet.org 703 524 8800
ASC	Adhesive and Sealant Council 7101 Wisconsin Ave, Ste 990, Bethesda, MD 20814; 301-986-9700 www.ascouncil.org
ASCE/SEI	American Society of Civil Engineers Structural Engineering Institute 1801 Alexander Bell Drive, Reston, VA 20191-4400 www.asce.org; 800 548 2723
ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineers 1719 Tullie Circle, NE; Atlanta, GA 30329; www.ashrae.org ; 404 636 8400
ASME	American Society of Mechanical Engineers Three Park Ave, New York, NY 10016-5990 www.asme.org; 800-843-2763
ASPE	American Society of Plumbing Engineers 2980 S. River Road; Des Plaines, IL 60018 www.aspe.org; 847-296-0002
ASSE	American Society of Sanitary Engineers-CA Chapter 1111 W. James Wood Blvd.; Los Angeles, CA 90015 www.asse-plumbing.org; 213-688-9090
ASTM	American Society for Testing and Materials 100 Barr Harbor Dr / PO Box C700, West Conshohocken, PA 19428 www.astm.org; 215 299-5400
AWI	Architectural Woodwork Institute 46179 Westlake Drive;, Ste 120; Potomac Falls, VA 20165 571-323-3636
AWS	American Welding Society 8669 Doral Boulevard, Suite 130, Doral FL 33166 www.aws.org; 800 443 9353

AWPA	American Wood Protection Association P.O. Box 361784; Birmingham AL 35236-1784 www.awpa.com
AWWA	American Water Works Association 6666 W. Quincy Ave., Denver, CO 80235 303-794-7711
BHMA	Builders' Hardware Manufacturers Association 355 Lexington Ave 17th Floor, New York, NY 10017; www.buildershardware.com; 212-297-2122
BIFMA	Business and Institutional Furniture Manufacturer's Association 678 Front Ave NW, Ste. 150; Grand Rapids, MI 49504-5368; 616-285-3963
CBMA	Certified Ballast Manufacturers 2122 Keith Bldg.; Cleveland, OH 44115; 216 241-0711
CDA	Copper Development Association 260 Madison Ave; New York, NY 10016; 212-251-7200
CISPI	Cast Iron Soil Pipe Institute 1064 Dleaware Ave. SW, Atlanta, GA 30316 www.cispi.org; 404 622 0073
CPA	Composite Panel Association 19465 Deerfield Ave. Suite 306, Leesburg, VA 20176 www.compositepanel.org
CPSC	Consumer Product Safety Commission 4330 East West Highway; Bethesda, MD 20814-4408; 301-504-7923
CRI	Carpet and Rug Institute Box 2048/730 College Dr.; Dalton, GA 30720; 706-278-3176
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Rd.; Schaumburg, IL 60173; 847-517-1200
CSA	Canadian Standards Association 5060 Spectrum Way, Mississauga, Ontario, Canada L4W 5N6
CSI	Construction Specifications Institute 110 South Union St., Ste. 100; Alexandria, VA 22314; 800-689-2900 www.csinet.org
CTI	Ceramic Tile Institute 310-574-7800
DHI	Door and Hardware Institute

	14150 Newbrook Drive, Ste. 200; Chantilly, VA 20151-2232 www.dhi.org; 703-222-2010
DLPA	Decorative Laminate Products Association (Formerly National Association of Plastic Fabricators) Hulman Building; 20th Floor; 120 West Second Street; Dayton, OH 45402; 513/228-1041
DOC	US Dept. of Commerce, National Institute of Standards and Technology 1401 Constitution Avenue NW, Washington DC 20230
DOJ	US Department of Justice 950 Pennsylvania Ave. NW Civil Rights Division, Disability Rights Section-NYA Washington DC 20530
DOTn	Department of Transportation 1200 New Jersey Ave, SE; Washington, DC 20402-9325 202 426 4000
EIA	Electronic Industries Association 2001 Eye St., NW: Washington, DC 20006; 202 457-4900
EPA	Environmental Protection Agency 2001 Eye St., NW; Washington DC 20006; www.epa.gov; 202 457 4900
FEMA	Federal Emergency Management Agency, Federal Center Plaza 500 C St. S.W., Washington DC 20472 www.fema.gov
FGMA	Flat Glass Marketing Association White Lakes Professional Bldg; 3310 Harrison; Topeka, KS 66611; 913 266-7013
FM	Factory Mutual Global Research, Standards Laboratory Dept.. 1301 Attwood Ave. POB 7500, Johnson, RI 02919; www.fmglobal.com
GA	Gypsum Association 810 First St. N.E. #510, Washington, DC 20002-4268 www.gypsum.org; 301 277 6886
HMMA	Hollow Metal Manufacturers Association See NAAMM below.

HPVA	Hardwood Plywood Veneer Association 1825 Michael Farraday Dr., Reston, VA 20190 www.hpva.org
HUD	US Dept. of Housing and Urban Development 451 7th St. SW, Washington, DC 20410
IBC	International Building Code 500 New Jersey Ave. NW 6th Floor, Washington, DC 20001 www.iccsafe.org
ICC	International Code Council 500 New Jersey Ave NW, 6th Floor, Washington DC 20001 www.iccsafe.org
IEEE	Institute of Electrical and Electronic Engineers, Inc. 3 Park Ave, 17th Floor; New York, NY 10016 212-419-7900
IES	Illuminating Engineering Society 120 Wall St., Floor 17, New York, NY 10005-4001 212-248-5000
IRI	Industrial Risk Insurers 85 Woodland St.; Hartford, CT 06102; 203/525-2601
ISO	International Organization for Standardization ISO Central Secretariat 1 ch. De la Voie-Creuse, Case Postale 56 CH-1211 Geneva 20, Switzerland www.iso.org
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr.; Rockville, MD 20850; 301-869-5800
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park St. NE; Vienna VA 22180-4602; 703-281-6613
NAAMM	National Association of Architectural Metal Mfrs. 800 Roosevelt Rd. Bldg C, Ste 312; Glen Ellyn, IL 60137 www.naamm.org; 630-942-6591
NBHA	National Builders Hardware Association (No Part of HDI) 711 Old Springhouse Rd.; McLean, VA 22101; 703 556-3990
NBS	National Bureau of Standards (U.S. Dept. of Commerce) Gaithersburg, MD 20234; 301 921-1000

NCMA	National Concrete Masonry Association 13750 Sunrise Valley, Herndon, VA 22071-4662
NECA	National Electrical Contractors Association 3 Bethesda Metro Center, Ste. 1100; Bethesda, MD 20814; 301 657 3110
NEII	National Elevator Industry, Inc. 1677 Country Route 64/PO Box 838; Salem, NY 12865-0838 518-854-3100
NEMA	National Electrical Manufacturers Association 1300 North 17th Street, Ste. 1752, Rosslyn, VA 22209; 703-841-3200
NFPA	National Fire Protection Association 1 Batterymarch Park, Quincy, MA 02169-7471 www.nfpa.org; 617 770 3000
NHLA	National Hardwood Lumber Association P.O. Box 34518; Memphis, TN 38104; 901 377-1818 www.nhla.com
NIST	National Institute of Standards and Technology (US Dept. of Commerce) 1401 Constitution Avenue NW, Washington DC 20230 www.nist.gov
NRCA	National Roofing Contractors Association 10255 W. Higgins Rd., Ste. 600, Rosemont, IL 60018-5607 www.nrca.net; 847-299-9070
NSF	National Sanitation Foundation P.O. Box 130140/789 N. Dixboro Road, Ann Arbor, MI 48113-0140 www.nsf.org 800-673-6275
OSHA	Occupational Safety & Health Administration (U.S. Dept. of Labor) 200 Constitution Ave; Washington, DC 20210 www.osha.gov 800-321-6742
PCI	Precast Prestressed Concrete Institute 209 W. Jackson Blvd., Suite 500, Chicaog, Il 60606-6938 www.pci.org
PDI	Plumbing and Drainage Institute 800 Turnpike Street, Ste. 300; North Andover, MA 01845 www.pdionline.org 978-557-0720
PTI	Post-Tensioning Institute 38800 Coutry Club Dr., Farmington Hills, MI 48331 www.post-tensioning.org

RFCI	Resilient Floor Covering Institute 115 Broad Street, Ste. 201; La Grange, GA 30240 www.rfci.com
RIS	Redwood Inspection Service (Grading Rules) 818 Grayson Rd., Ste. 201; Pleasant Hill, CA 94523 www.redwoodinspection.com 925-935-1499
SDI	Steel Deck Institute POB 25, Fox River Grove, IL 60021 ww.sdi.org
S.D.I.	Steel Door Institute 30200 Detroit Rd.; Westlake, OH 44145 www.steeldoor.org 440-899-0010
SFM	State of California, Dept. of Forestry and Fire Protection Office of the State Fire Marshal, POB 944246, Sacramento, CA 94246 osfm.fire.ca.gov
SGCC	Safety Glazing Certification Council 100 W. Main St. / PO Box 730; Sackets Harbor, NY 13685; 315-646-2234
SJI	Steel Joist Institute 1173B London Links Dr., Forest, VA 24551 steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors' National Association 4201 Lafayette Center Drive;, Chantilly, VA 20151-1219 www.smacna.org 703-803-2980
SPRI	Single-ply Roofing Institute 411 Waverly Oaks Rd., Suite 331B, Waltham, MA 02452 www.spri.org
SSPC	Steel Structure Painting Council (The Society for Protective Coatings) 40 24th Street, 6th Floor, Pittsburgh, PA, 15222-4656 www.sspc.org
TCNA	Tile Council of North America 100 Clemson Research Blvd., Anderson, SC 29625, www.tcnatile.com 864-646-8453
TIA	Telecommunications Industry Association 2500 Wilson Blvd., Ste 300; Arlington VA 22201 www.tiaonline.org 703-907-7700
TMS	The Masonry Society 3970 Broadway, Unit 201-D, Boulder, CO 80304-1135 www.masonrysociety.org

TPI	Truss Plate Institute 218 N. Lee St., Sutie 312, Alexandria, VA 22314 www.tpinst.org
UL	Underwriters Laboratories 333 Pfingsten Rd.; Northbrook, IL 60062-2096 www.ul.com 847 272 8800
ULC	Underwriters Laboratories of Canada 7 Underwriters Rd., Toronto, Ontario, Canada M1R3B4 www.ul.com/Canada/eng/pages/aboutus/
USC	United States Code, c/o Superintendent of Documents US Government Printing Office, Washington, DC 20402-9325
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules) P.O. Box 23145; Portland, OR 97281 www.wclib.org 503 639 0651
WDMA	Window and Door Manufacturers Association 1400 E. Touhy, #470, Des Plaines, IL 60018 www.wdma.com
WI (WIC)	Woodwork Institute PO Box 980247; West Sacramento, CA 95798 www.wicnet.org 916-372-9943
WRI	Wire Reinforcement Institute 942 Main Street; Hartford, CT 06103 www.wirereinforcementinstitute.org
WSC	Water Systems Council 1101 30th Street Northwest; Washington, DC 20007-3708 www.watersystemscouncil.org 888 395 1033
WWPA	Western Wood Products Association (Grading Rules) 522 SW Fifth Ave., Ste. 500; Portland, OR 97204-2122 www.wwpa.org 503 224-3930
W.W.P.A	Woven Wire Products Association www.wovenwire.org

1.07 GOVERNING REGULATIONS/AUTHORITIES

A. General: The procedure followed by Architect/Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing contract documents; recognizing that such information may or may not be of significance in relation to Contractor's responsibilities for performing the work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the work.

B. Trade Union Jurisdiction: It is a procedural requirement that the Contractor maintain and require prime subcontractors to maintain, complete current information on jurisdictional matters, regulations actions, and pending actions, as applicable to the work.
   1. Discuss new developments at appropriate project meetings at the earliest feasible dates.
   2. Record information of relevance along with the action agreed upon.
   3. The manner in which contract documents have been organized and subdivided is not intended to be an indication of jurisdictional or trade union agreements.
   4. Assign and subcontract the work, and employ tradesmen and laborers, in a manner which will not unduly risk jurisdictional disputes of a kind which could result in conflicts, delays, claims and losses in the performance of the work.

1.08 SUBMITTALS

A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgements, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Procedures for Owner-supplied products.

F. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

A. Section 01 4000 - Quality Control: Product quality monitoring.

1.03 DEFINITIONS

A. Request For Substitution: Requests for changes in products, materials, or equipment required by Contract Documents proposed by the Contractor prior to and after award of the Contract are considered requests for substitutions. The following are not considered substitutions;
   1. Revisions to Contract Documents requested by the Owner or Architect.
   2. Specified options of products, materials, and equipment included in Contract Documents.

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's colors, textures, and patterns.

E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances

PART 2 PRODUCTS

2.01 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

B. Provide interchangeable components of the same manufacture for components being replaced.

C. Products or equipment referenced with a manufacturer's name and/or model number shall be provided with all standard materials, components, compliance requirements and features normally furnished for that model or product. These items and requirements are inherent in the specification whether or not individually itemized.

D. Manufacturer's Requirements: Any deviation from design requirements shown or specified, resulting either from Contractor's or supplier's change of model, or manufacturer's recommendation, or from submitted alternates or accepted substitutions, shall be clearly indicated on the Contractor's submittals. Contractor shall provide all such manufacturer or supplier supplemental requirements at no additional cost.

E. Owner's Requirements:
   1. Pursuant to the requirements of California Public Contract Code 3400, the Owner may designate certain products as "District Standards" in order that a field test or experiment may be made to determine the product's suitability for future use, or in order to match other products in use on a particular public improvement, either completed or in the course of construction.
   2. A list of these designated products as may be applicable to the project is contained in the Notice Inviting Bids, as required by PCC 3400. These products shall be provided as specified and are not subject to substitution. All bids shall be deemed to include these listed items as specified without additional costs.
   3. In the event of a conflict between the Notice Inviting Bids and the technical specifications for a product's provision for substitutions, the Notice Inviting Bids shall govern.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming a Single Manufacturer with a Provision for Substitutions: Submit a request for substitution in accordance with specified procedures for products meeting specifications from any manufacturer not named. For such specifications, the Architect is aware of only one manufacturer providing products meeting the specification, pursuant to PCC 3400.

C. Products Specified by Naming Multiple Manufacturers with a Provision for Substitutions: Submit a request for substitution in accordance with specified procedures for products meeting specifications from any manufacturer not named.

D. Products Specified by Naming A Single Manufacturer or Multiple Manufacturers without Provision for Substitution: Use only a product of one of the manufacturers named and meeting specifications. No options or substitutions allowed.

E. Products Specified by Naming A Single Manufacturer or Multiple Manufacturers as listed in the Notice Inviting Bids: Use only a product of one of the manufacturers named and meeting specifications. No options or substitutions allowed

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.

B. Deliver to Project site, prior to final payment.
   1. Provide materials list for all items turned over to the Owner including quantities.
   2. Deliver items in presence of Owner designated representative to the location identified by the Owner.
   3. Obtain Owner designated representative sign-off of materials list attesting to receipt of items in triplicate. Retain one copy, provide one copy to Owner representative receiving items, and submit one copy to Architect.

PART 3 EXECUTION

3.01 LIMITATIONS ON SUBSTITUTIONS SUBMITTED PRIOR TO THE RECEIPT OF BIDS

A. The Bid shall be based upon the standards of quality established by those items of equipment and/or materials which are indicated in the Contract Documents, including those products designated as "District Standards".

B. Architect may consider requests for substitutions of specified equipment and/or materials only when requests are received by Architect within twenty-one (21) days prior to the date of bid, in conformance with Public Contract Code Section 3400. Do not request substitutions for products designated as "District Standards".

C. Architect will consider a substitution request only if request is made in strict conformance with provisions of this Section. Request shall be fully responsive to all product requirements of the specified product, including those requirements noted in this section in the article titled PRODUCTS.

D. Burden of proof of merit of requested substitution is the responsibility of the proposer requesting the substitution.

E. It is the sole responsibility of the proposer requesting the substitution to establish proper content of submittal for requests for substitutions. Incomplete submittals will be rejected.

F. When substitution is not accepted, provide specified product.

G. Substitute products shall not be included within the bid without written acceptance by Addendum.

3.02 LIMITATIONS ON SUBSTITUTIONS SUBMITTED AFTER THE AWARD OF THE CONTRACT

A. The Contract is based upon the standards of quality established by those items of equipment and/or materials which are indicated in the Contract Documents, including those products designated as "District Standards".

B. Architect will consider substitution requests received after the established date of the receipt of bids or contract award only when one or more of the following conditions are met and documented:
   1. Specified item fails to comply with regulatory requirement.
   2. Specified item is no longer manufactured.
   3. Specified item, through no fault of the Contractor, unavailable in the time frame required to meet project schedule.
   4. Specified item, through subsequent information disclosure, will not perform properly or fit in designated space.
   5. Manufacturer declares specified product to be unsuitable for use intended or refuses to warrant installation of product,
   6. Substitution would be, in the sole judgment of the Architect, a substantial benefit to the Owner in terms of cost, time, energy conservation, or other consideration of merit.

C. Notwithstanding other provisions of this section and the above, the Architect may consider a request for substitution after the date of the receipt of bids or contract award, if in the sole discretion of the Architect, there appears to be just cause for such a request. The acceptance of such a late request does not waive any other specified requirement.

D. Architect will consider a request for substitution after the date of the receipt of bids or contract award only if request is made in strict conformance with provisions of this section. Request shall be fully responsive to all product requirements of the specified product, including those requirements noted in this section in the article titled PRODUCTS.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
   1. Review of shop drawings does not constitute acceptance of substitutions indicated or implied on shop drawings.
   2. Substitutions will not be considered when requested or submitted directly by subcontractor or supplier.

F. Contractor's failure or inability to pursue the work promptly or coordinate activities properly shall not establish a cause for consideration of Substitutions.

G. Burden of proof of merit of requested substitution is the responsibility of the Contractor.

H. It is the sole responsibility of the Contractor to establish proper content of submittal for requests for substitutions. Incomplete submittals will be rejected.

I. When substitution is not accepted, provide specified product.

J. Substitute products shall not be provided without written acceptance by Change Order.

3.03 SUBSTITUTION PROCEDURES

A. Document each request on Architect's Request For Substitution (RFS) form with complete data substantiating compliance of proposed substitution with Contract Documents. All requests for substitution must be submitted on the specified form which may be obtained from the Architect. Requests received without the Request Form will be rejected.

B. A request for substitution constitutes a representation that the proposer:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty or bonds for the substitution as for the specified product.
   3. Will coordinate installation of an accepted substitution and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives all claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse the Owner for services provided by Owner and Architect for review or redesign services associated with re-approval by authorities.

C. Regulatory Requirements: Proposer requesting the substitution shall be responsible for obtaining all regulatory approvals required for proposed substitutions.
   1. All regulatory approval shall be obtained for proposed substitutions prior to submittal of substitution request to Architect, unless Architect participation is required by the regulating agency.
   2. All substitutions that affect structural safety, fire and life safety, access compliance or energy (as applicable) shall be submitted to Division of State Architect for review and approval.
   3. All costs incurred by the Owner in obtaining regulatory approvals for proposed substitutions, including the costs of the Architect and any authority having jurisdiction over the project shall be reimbursed to the Owner. Costs of these services shall be reimbursed regardless of final acceptance or rejection of substitution.

D. Substitution Submittal Procedure:
   1. Submit one original signature copy of only the Request For Substitution Form included in this Project Manual for consideration. Forms provided by proposer or other agencies or organizations are not acceptable. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence, including:
      a. Statement of cause for substitution request.
      b. Identify product by specification section and article number.
      c. manufacturer's name, address, and phone number.
      d. List of fabricators, suppliers, and installers as appropriate.
      e. List of similar Projects where proposed products have been used, date of installation and names of Architect and Owner.
      f. Confirmation of regulatory approvals
      g. Product data, including drawings and product samples.
      h. Fabrication and installation procedures.
      i. Comparison of the qualities of the proposed substitution with that specified.
      j. Cost data comparing the proposed substitution with the product specified.
      k. Any required license fees or royalties.
      l. Availability of maintenance service and source of replacement materials.

m. Coordination information, including a list of changes or modifications needed to other items of work that will be required to accommodate Proposed substitution.
n. Statement on the Substitution's effect on the Construction Schedule.
o. Written certification by the proposer that the Substitution is equal or better in every respect to that required by the contract Documents and that substitution will perform adequately in the application intended.
p. Written certification that the proposer will pay for all permits, fees, and costs required to implement the substitution, and including waiver of all claims for additional costs or time extension which may subsequently become apparent, and reimbursement of Owner and Architect for review or redesign services associated with re-approval by authorities.

3.04 ARCHITECT'S REVIEW OF SUBSTITUTIONS

A. The Architect will accept or reject proposed substitutions within fourteen (14) days of receipt of request.

B. If a decision on a substitution cannot be made within the time allocated, the product specified shall be used.

C. No extension of bid period or contract time will be made for substitution review.

D. Final acceptance of a substitution submitted prior to the date established for the receipt of bids will be in the form of an Addendum.

E. Final acceptance of a substitution submitted after the award of the contract will be in the form of a Change Order.

F. Architect/Engineer shall be the judge of the acceptability of the proposed substitution. Architect's decision on substitution requests is final and does not require documentation or justification.

G. Rejection Of Substitution Request: Any of the following reasons shall be cause for rejection, all as determined by the Architect;
   1. Vagueness or incompleteness of Substitution submittal,
   2. Insufficient data, failure to meet specified requirements, (including warranty).
   3. Qualification of the requirements of the Substitution Form, including modification of any of the requirements.

H. The Architect/Engineer will notify Contractor in writing of decision to accept, accept as noted, or not accept the request for substitution.

I. Substitute products shall not be ordered or installed without written acceptance.

J. Owner shall receive full benefit of any cost reduction as a result of any request for substitution.

K. Provide submittals for accepted substitutions in accordance with specified requirements of the respective section and provisions of Section 01 2500.
   1. An accepted substitution is not acceptable as a submittal under Section 01 2500. Provide separate submittals for each review.

3.05 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
   1. Arrange and pay for product delivery to site.
   2. On delivery, inspect products jointly with Contractor.
   3. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   4. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   2. Handle, store, install and finish products.
   3. Repair or replace items damaged after receipt.
   4. Coordinate installation with other trades.

3.06 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.07 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

I. Provide bonded off-site storage and protection only when site does not permit on-site storage or protection. Obtain Owner’s permission prior to initiating such off-site storage.

END OF SECTION

(REQUEST FOR SUBSTITUTION FORM FOLLOWS)

Request for Substitution

{Projects.Name}
Project Number: {Projects.Number}
DSA Application: {LegalDocInfo.NotaryStateOf}
DSA File: {LegalDocInfo.NotaryName}

Specification Title:_____ Product Description:_____

Specification Section:_____ Article/Paragraph:_____

Architect will consider substitution requests received after the date established as deadline for substitution request only when one or more of the following conditions are met and documented; indicate one or more conditions which apply:

- ☐ Specified item fails to comply with regulatory requirement.
- ☐ Specified item is no longer manufactured.
- ☐ Specified item, through no fault of the Contractor, unavailable in the time frame required to meet project schedule.
- ☐ Specified item, through subsequent information disclosure, will not perform properly or fit in designated space.
- ☐ Manufacturer declares specified product to be unsuitable for use intended or refuses to warrant installation of product.
- ☐ Substitution would be a substantial benefit to the Owner in terms of cost, time, energy conservation, or other consideration of merit.

Explain benefit (required): _____

Proposed Product Name (include specific model number):_____

Manufacturer:_____ Phone:_____

Address:_____

Installer:_____

Address:_____ Phone:_____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

Difference between proposed substitution and specified product:_____

☐ Attached comparative table. Include point-by-point comparison of each article number. **REQUIRED**

Similar Installation:

Project:_____ Architect:_____

Address:_____ Owner:_____

_____ Date Installed:_____

Proposed substitution affects other parts of Work? ☐ No ☐ Yes; Explain:_____

Savings to Owner for accepting substitution:_____ ($_____).

Proposed substitution changes Contract Time? ☐ No ☐ Yes; [Add] or [Deduct]_____ days.

Substitution Request

(Continued)

As outlined in Specification Section 01 6000, a request for substitution constitutes a representation that the proposer:

- ☐ Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
- ☐ Will provide the same warranty or bonds for the substitution as for the specified product.
- ☐ Will coordinate installation of an accepted substitution and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
- ☐ Waives all claims for additional costs or time extension which may subsequently become apparent.
- ☐ Will reimburse Owner for services provided by Owner and Architect associated with re-approval by authorities.

{Company.Name} Representative Printed Name:_____

{Company.Name} Representative Signature:_____

Date Submitted from {Company.Name} to Architect:_____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports

Additional comments:_____

_____

_____

_____

Architect's review and action:

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- ☐ Substitution approved as noted -Make submittals in accordance with Specification Section
- ☐ 01 3300. Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Reviewed by: _____ Date: _____

SECTION 01 6116

VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. VOC restrictions for product categories listed below under "DEFINITIONS."
   1. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

B. All products of each category that are installed in the project must comply; applicable laws and ordinances do not allow for partial compliance.

C. Listing of a product in these specifications shall not be construed as a solicitation or requirement to use any product or combination of products in violation of the requirements of South Coast Air Quality Management District Rule No.1168, as described in Rule 1168(g).
   1. If a listed product does not meet the requirements of this rule, request approval for use of an alternate product by the same or another manufacturer meeting the requirements of this rule.
   2. Do not use products which do not meet the requirements of this rule.

1.02 RELATED REQUIREMENTS

A. Divisions 01 through 33 contain related requirements specific to the work of each of these Sections. Requirements may or may not include reference to this section.

B. Section 01 8113 "Sustainable Design Requirements".

1.03 DEFINITIONS

A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site:
   1. Adhesives, sealants, and sealer coatings, regardless of specification section or division.
   2. Paints and coatings.
   3. Composite wood products; plywood, particleboard, wood fiberboard.

B. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

C. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.04 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

B. Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net.

C. CRI (GLCC) - Green Label Testing Program - Approved Product Categories for Carpet Cushion; Carpet and Rug Institute; Current Edition.

D. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; Carpet and Rug Institute; Current Edition.

E. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

F. GreenSeal GS-36 - Commercial Adhesives; Green Seal, Inc.

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

H. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com.

1.05 SUBMITTALS

A. See Section 01 3300 - Submittals Procedures.

B. Evidence of Compliance: Submit for each different product in each applicable category.
   1. Identify evidence submittals with the words "CAL-Green VOC Compliance Report".

C. Product Data: For each VOC-restricted product used in the project, submit product data showing compliance, except when another type of evidence of compliance is required.

D. Installer Certifications for Accessory Materials: Require each installer of any type of product, (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.
   1. Use the form following this section for installer certifications.

1.06 QUALITY ASSURANCE

A. A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168 and less where required by code.
   1. These products may be specified in multiple sections throughout these specifications.

B. Adhesives, including carpet: Comply with Title 24, Part 11, Table 5.504.4.1.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.
      c. Certification by manufacturer that product complies with requirements.

C. Joint Sealants: Comply with Title 24, Part 11, Table 5.504.4.2.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.
      c. Certification by manufacturer that product complies with requirements.

D. Aerosol Adhesives: Comply with Title 24, Part 11, Table 5.504.4.1. and California Code of Regulations Title 17, Section 94507.
   1. Evidence of Compliance: Acceptable types of evidence are:

a. Current GreenSeal Certification.
b. Report of laboratory testing performed in accordance with GreenSeal GS-36 requirements.
c. Published product data showing compliance with requirements.

E. Paints and Coatings: Comply with Title 24, Part 11, Table 5.504.4.3; California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008.
1. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
a. Evidence of Compliance: Acceptable types of evidence are:
1) Report of laboratory testing performed in accordance with requirements.
2) Published product data showing compliance with requirements.
3) Certification by manufacturer that product complies with requirements.
b. Provide coatings that comply with the most stringent requirements specified in the following:
1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
2) South Coast Air Quality Management District Rule No.1168.

H. Composite Wood Products: Comply with Title 24, Part 11, Table 5.504.4.5 formaldehyde limits for hardwood plywood, particleboard, and medium density fiberboard composite wood products.
1. Title 24, Part 11, Table 5.504.4.5 Composite Wood Products Maximum Formaldehyde Emissions in Parts per Million.

PRODUCT	CURRENT LIMIT (Effective July 1, 2012)
Hardwood Plywood veneer core	0.05
Hardwood Plywood composite core	0.05
Particleboard	0.09
Medium Density Fiberboard	0.11
Thin Medium Density Fiberboard	0.13

2. Evidence of Compliance: Acceptable types of evidence are:
a. Chain of custody certifications
b. Published product data showing compliance with requirements.
c. Certification by manufacturer that product complies with requirements.
d. Other method acceptable to enforcing agency.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. All additional costs to restore indoor air quality, including fines by authorities, due to installation of non-compliant products will be borne by Contractor.

3.02 RESTRICTED COMPONENTS

A. Restricted Components:
   1. Paints and coatings shall not contain any of the following:
      a. Acrolein.
      b. Acrylonitrile.
      c. Antimony.
      d. Benzene.
      e. Butyl benzyl phthalate.
      f. Cadmium.
      g. Di (2-ethylhexyl) phthalate.
      h. Di-n-butyl phthalate.
      i. Di-n-octyl phthalate.
      j. 1,2-dichlorobenzene.
      k. Diethyl phthalate.
      l. Dimethyl phthalate.
      m. Ethylbenzene.
      n. Formaldehyde.
      o. Hexavalent chromium.
      p. Isophorone.
      q. Lead.
      r. Mercury.
      s. Methyl ethyl ketone.
      t. Methyl isobutyl ketone.
      u. Methylene chloride.
      v. Naphthalene.
      w. Toluene (methylbenzene).
      x. 1,1,1-trichloroethane.
      y. Vinyl chloride.

B. The following tables are taken from South Coast Air Quality Management District Rule No.1168 and are believed accurate at the time of publication. All products used shall comply with the limits of Rule No. 1168. In the event of discrepancy between these values and those of Rule No. 1168, those of Rule No. 1168 shall prevail.

C. **Table 5.504.4.1 ADHESIVE VOC LIMIT**

Architectural Applications	Current VOC Limit
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesives	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100
Single Ply Roof Membrane Adhesives	250

D. Table 5.504.4.1 Continued

	VOC Limits and Effective Dates **	** The specified limits remain in effect unless revised limits are listed in subsequent columns.		
Specialty Applications	Current VOC Limit	1-1-05	7-1-05	1-1-07
PVC Welding	510			
CPVC Welding	490			
ABS Welding	400		325	
Plastic Cement Welding	350	250		
Adhesive Primer for Plastic	650		550	
Computer Diskette Manufacturing	350			
Contact Adhesive	80			
Special Purpose Contact Adhesive	250			
Tire Retread	100			
Adhesive Primer for Traffic Marking Tape	150			
Structural Wood Member Adhesive	140			
Sheet Applied Rubber Lining Operations	850			
Top and Trim Adhesive	540			250

E. Table 5.504.4.1 Continued

For adhesives, adhesive bonding primers, or any other primer not regulated by the above two tables and applied to the following substrates, the following limits shall apply	
Substrate Specific Applications	Current VOC Limit

Metal to Metal	30
Plastic Foams	50
Porous Material (Except Wood)	50
Wood	30
Fiberglass	80

F. Table 5.504.4.2 SEALANT VOC LIMIT

If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.	
Sealant	Current VOC Limit
Architectural	250
Marine Deck	760
Nonmembrane Roof	300
Roadway	250
Single Ply Roof Membrane	450
Other	420

Sealant Primers	Current VOC Limit
Architectural Porous Non-Porous	 250 775
Modified Bituminous	500
Marine Deck	760
Other	750
For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(32); for all other adhesives and sealants, VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as determined in paragraph (b)(31).	

G. Paints and Coatings: Architectural Paints and Coatings shall comply with VOC limits in Table 1 of ARB Architectural Coatings Suggested Control Measure, California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green" Table 5.504.4.3. All products used in this category shall comply with these limits, unless more stringent local and regional rules apply.

H. **Table 5.504.4.3 VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS (See Notes 2 & 3 below)**

Grams of VOC per Liter of Coating, less water and less exempt compounds.	
COATING CATEGORY	**Current VOC Limit 1/1/2012**
Flat Coatings	50

Nonflat Coatings	100
Nonflat High Gloss Coatings	150
Specialty Coatings	
Aluminum Roof Coatings	400
Basement Specialty Coatings	400
Bituminous Roof Coatings	50
Bituminous Roof Primers	350
Bond Breakers	350
Concrete Curing Compounds	350
Concrete / Masonry Sealers	100
Driveway Sealers	50
Dry Fog Coatings	150
Faux Finishing Coatings	350
Fire Resistive Coatings	350
Floor Coatings	100
Form-Release Compounds	250
Graphic Arts Coatings (Sign Paints)	500
High-Temperature Coatings	420
Industrial Maintenance Coatingss	250
Low Solids Coatings (See Note 1 above)	120
Magnesite Cement Coatings	450
Mastic Texture Coatings	100
Metallic Pigmented Coatings	500
Multicolor Coatings	250
Pretreatment Wash Primers	420
Primers, Sealers and Undercoaters	100
Reactive Penetrating Sealers	350
Recycled Coatings	250
Roof Coatings	50
Rust Preventative Coatings	250
Shellacs: Clear Opaque	 730 550
Specialty Primers, Sealers and Undercoaters	100
Stains	250

Stone Consolidants	450
Swimming Pool Coatings	340
Traffic Marking Coatings	100
Waterproofing Membranes	250
Wood Coatings	275
Wood Preservatives	350
Zinc Rich Primers	340

1. Note 1: Grams of VOC per liter of coating including water and including exempt compounds
2. Note 2: Not Applicable

3. Note 3: Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

END OF SECTION

SECTION 01 6116.01

ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM

1.01 FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Architect: _____

B. Use of This Form:
   1. Because installers are allowed and directed to choose accessory materials suitable for the applicable installation, there is a possibility that such accessory materials might contain VOC content in excess of that permitted, especially where such materials have not been explicitly specified.
   2. Contractor is required to obtain and submit this form from each installer of work on this project.
   3. For each product category listed, circle the correct words in brackets: either [HAS] or [HAS NOT].
   4. If any of these accessory materials has been used, attach to this form product data and MSDS sheet for each such product.

C. VOC content restrictions are specified in Section 01 6116.

2.01 PRODUCT CERTIFICATION

A. I certify that the installation work of my firm on this project:
   1. [HAS] [HAS NOT] required the use of any ADHESIVES.
   2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
   3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
   4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.

B. Product data and MSDS sheets are attached.

3.01 CERTIFIED BY: (Installer/Manufacturer/Supplier Firm)

A. Firm Name: _____

B. Print Name: _____

C. Signature: _____

D. Title: _____ (officer of company)

E. Date: _____

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of each prime Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY:

A. Contractor shall implement procedures to divert **75%** of construction waste. As many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

B. The Contractor shall develop a Waste Management Plan as defined in this Section and submit for review by the Owner, Construction Manager, and Architect.

1.03 DEFINITIONS

A. Waste Materials: construction materials that are excess to the contract requirements and which can not be effectively used in the Work.

B. Salvage Materials: waste materials or materials that exist on the site that can be reused, either on site or by another entity.

C. Recyclable Waste: waste materials that exist on site or are generated during the construction process that can be recycled/remanufactured into another material.

D. Categories of salvageable or recyclable waste include the following:
   1. Concrete, Masonry, and Other Inert Fill Material: concrete, brick, rock, broken up asphalt pavement, clay, and other inert (non-organic) materials.
   2. Metals: metal scrap including iron, steel, copper, brass, and aluminum; includes beverage containers, packaging materials (such as metal banding), fencing, reinforcing bar, wiring, plumbing, etc.
   3. Untreated Wood: unpainted, untreated dimensional lumber, wood edging, wood shipping pallets, etc. Does not include pressure treated or creosote treated wood.
   4. Engineered Wood Products: plywood, oriented strand board, "Masonite", particleboard, manufactured trusses and beams, and glue-laminated timbers.
   5. Gypsum Wallboard: excess drywall construction materials including cuttings, other scrap, and excess materials.
   6. Cardboard: clean, corrugated cardboard such as used for packaging, etc.
   7. Paper Goods:
   8. Office paper: includes any paper, such as manufacturer instruction, specification sheets, files, correspondence, packaging, stiffeners, etc.
   9. Newsprint: shredded or whole newspaper goods.

10. Plastic: beverage containers, packaging materials (such as polystyrene "peanuts" and expanded polystyrene), containers (other than those used for hazardous materials), vinyl products, etc.
11. Glass: includes glass beverage containers, and recyclable glass building materials.
12. Insulation: rigid foam, batt, and loose fill insulation materials.
13. Carpet: face fiber, backing, padding, and carpet cushion scrap.
14. Paints: unused portions of paints and coatings applied on-site.
15. Fabric: uncontaminated fabric scraps.
16. Rubber: uncontaminated rubber scraps, including but not limited to recycled-content rubber flooring, rubber edging, tires that are no longer serviceable, etc.
17. Other: any additional materials identified on-site to be valued for salvage, reuse, or recycling by the Contractor, Owner, Construction Manager, or Architect.

E. Non-Recyclable Waste: All waste materials that are not able to be recycled, due to contamination, lack of recycling facilities or salvage options, or high cost.

F. Source Separated: Materials that are separated on-site by category.

G. Co-Mingled: Several types of construction waste that are combined in a single container. Co-mingling of recycling waste must be approved by the identified recycling facility.

H. Hazardous Waste: Any substance whose handling and/or disposal is regulated as hazardous waste by local, state, or federal authorities.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all applicable federal, state, and local ordinance and regulation requirements for recycling and waste management.

B. Disposal Sites, Recyclers, and Waste Materials Processors: Use only facilities properly permitted by state and local authorities.

C. Preconstruction Waste Management Conference: Prior to beginning work at the site, schedule and conduct a conference to review the Construction Waste Management Plan and discuss procedures, schedules and specific requirements for waste materials recycling and disposal. Discuss coordination and interface between the Contractor and other construction activities. Identify and resolve problems with compliance with requirements. Record minutes of the meeting, identifying all conclusions reached and matters requiring further resolution.
   1. Plan Revision: Make any revisions to the Construction Waste Management Plan agreed upon during the meeting and incorporate resolutions agreed to be made subsequent to the meeting. Submit the revised plan to the Contracting Officer's Representative for approval.

D. Implementation:
   1. Designate an on-site party responsible for instructing workers and implementing the Construction Waste Management Plan.
   2. Distribute copies of the Construction Waste Management Plan to the job site foreman and each subcontractor.
   3. Include waste management and recycling in worker orientation.
   4. Provide on-site instruction on appropriate separation, handling, recycling, and salvaging methods to be used by all parties at the appropriate stages of the work at the site.

5. Prominently display Waste Management Plan and clearly mark all containers and areas on site dedicated to source separation.
6. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators.
7. Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.05 STORAGE AND HANDLING

A. Salvage Materials: Provide protective handling and storage as required for all items identified for salvage and reuse by the Owner, Construction Manager, or Architect.

B. Recyclable Waste: Remove all recyclable materials, as identified in the Waste Management Plan, from the work location to approved containers daily. Failure to remove waste materials will be considered cause for withholding payment and/or termination of Contract.

C. Provide separate collection containers as required by recycling haulers and to prevent contamination of materials, including protection from rain as applicable.

D. Replace loaded containers with empty ones as demand requires but not less than weekly.

E. Handling: Deposit all indicated recyclable materials in the containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

F. If contamination chemically combines with the material so that it cannot be cleaned, do not deposit into the recycle containers.

1.06 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Transport recyclable waste materials from the Work Area to the recycle containers and carefully deposit in the containers in a manner to minimize noise and dust. Close container covers immediately after materials are deposited. Do not place recyclable waste materials on the ground adjacent to a container.

B. Existing Conditions: Coordinate with "Instructions to Bidders" and "Supplementary Conditions".

1.07 SUBMITTALS

A. Construction Waste Management Plan: Contractor must submit complete Construction Waste Management Plan for review within 30 days from the Notice to Proceed.

PART 2 PRODUCTS

2. 01 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Construction Waste Management Plan: Contractor shall develop a construction waste management plan indicating proposed methods for collection, segregation, and removal of all construction wastes and debris produced by the work of this Contract, including all costs associated with this plan. Those waste materials produced during the course of this Contract that can be recycled cost-effectively, shall be. The Waste Management Plan shall include, at a minimum, the following:

1. Provide an analysis of jobsite waste to be generated, including types and quantities.
2. Provide strategies for salvage, reuse, or recycling for a minimum of all materials listed below. Include additional waste materials that are deemed cost-effective to salvage, reuse, or recycle. See "Definitions" above for material categories.
3. Provide documentation to justify decision not to recycle any items listed below.
4. Show compliance with applicable state and local ordinances and regulations.
5. Include a list of recycling facilities to which indicated recyclable materials will be distributed for disposal.
6. Identify materials that are not recyclable or otherwise conservable that must be disposed of in a landfill or other means acceptable under governing State and local regulations.
7. List permitted landfills and/or other disposal means to be employed.
8. Indicate any instances where compliance with requirements of this Section does not appear to be possible and request resolution from the Architect.

B. Waste Materials: The following materials shall be salvaged or recycled according to this specification. Strategies for salvage and recycling shall be identified in the Waste Management Plan as required above.
   1. Salvage Materials: Identify materials existing on site that are candidates for salvage and reuse, either on this Project or through sale or donation to local organizations.
   2. Recyclable Materials: The following materials, at a minimum, shall be salvaged or recycled. Applies to all such listed waste materials produced during the course of this Contract.
      a. Concrete, Masonry, and Other Inert Fill Material
      b. Metals
      c. Untreated Wood
      d. Gypsum Wallboard Scrap
      e. Cardboard
      f. Paper Goods
      g. Beverage Containers
      h. Plastic
      i. Glass
      j. Carpet

C. Delivery Receipts: Maintain copies of delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

D. Maintain working copy of Construction Waste Management Plan at site for review by Owner, Construction Manager, Architect, and all Trades involved in Project.

PART 3 EXECUTION

3. 01 WASTE MANAGEMENT

A. General: Implement waste management procedures in accordance with approved construction waste management plan. Maintain procedure throughout the life of this Contract.

B. Source Separation: Separate, store, protect, and handle at the project site all identified recyclable and salvageable waste products to prevent contamination of materials and maximize recyclability and salvageability of materials.

C. Collection: Arrange for timely pickups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent

contamination of recyclable materials. Maintain records accessible to the Contracting Officer's Representative for verification of construction waste materials recycling.

D. Delivery Receipts: Keep and maintain records of all deliveries to recycling facilities and all pickups of waste materials at the site by others as specified above.

E. Salvage and Reuse: Identify salvage and reuse options for all materials that are deemed to be reusable, but will not be reused on this Project.

F. Non-Recyclable Waste: Collect and segregate non-recyclable waste for delivery to a permitted landfill site.

G. Hazardous Waste: Control and dispose of hazardous waste in accordance with local, state, and federal regulations.

END OF SECTION

SECTION 01 4523

TESTING AND INSPECTION SERVICES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included:
   1. Selection and payment of Testing and Inspection Agency
   2. Testing and Inspection Agency submittals.
   3. Testing and Inspection Agency responsibilities.
   4. Testing and Inspection Agency reports.
   5. Limits on Testing and Inspection authority.
   6. Contractor's Responsibilities.
   7. Architect's Responsibilities.

1.02 RELATED SECTIONS

A. Related Sections:
   1. Drawings and Contract Documents, including General and Supplemental General Conditions.
   2. Section 01 4000 - Quality Control.
   3. Technical Specifications - Pertinent Sections requiring tests and inspections.

1.03 REFERENCES

A. ASTM C802 - Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.

B. ASTM C1021 - Practice for Laboratories Engaged in the Testing of Building Sealants.

C. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

D. ASTM C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.

E. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.

F. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

G. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.

H. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.

I. ASTM E543 - Practice for Determining the Qualification of Nondestructive Testing Agencies.

J. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.

K. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.04 SELECTION AND PAYMENT

A. An independent testing laboratory approved by DSA shall perform inspections, tests, and other services as specified by various specification sections.
   1. Owner will employ and pay for testing laboratory to provide initial testing indicated under specific specification sections and specifically noted to be paid by the Owner.
   2. Contractor shall be back-charged for testing costs when:
      a. Additional tests and inspections by Owner's testing agency where initial tests and inspections reveal failure to meet Contract requirements.
      b. Excessive inspection time by Owner's testing agency is required by Contractor's failure to provide sufficient workman or to properly pursue the progress of work.
      c. Test(s) deemed necessary by the Owner/Architect to evaluate any substitution proposed by the Contractor.
      d. Testing and inspection for the Contractor's convenience.
      e. Testing and inspection overtime necessitated by the Contractor's schedule.

B. Employment of inspection firm in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Employment of any testing laboratory by Contractor shall be subject to Owner approval; laboratory shall be under direct supervision of a registered Engineer and shall conform to ASTM 329. Laboratory of concrete producer shall not be acceptable for concrete mix designs.

D. Owner reserves the right to test any material or work of Project at any time, whether or not tests are indicated in Contract Documents.

1.05 QUALITY ASSURANCE

A. Conform to requirements of the referenced standards.

B. Laboratory: Authorized to operate in State in which Project is located.

C. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

A. Prior to start of Work, submit testing laboratory OR inspection firm's name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Each Contractor responsible for the construction of a main wind- or seismic-force resisting system, designated seismic or a wind- or seismic-resisting component list in the statement of special inspections shall submit a written statement of responsibility prior to commencement of work on the system or component. A copy of this written statement shall be maintained at the project site and made available upon request. The Contractor's statement of responsibility shall contain the following:
   1. Acknowledgment of awareness of the special requirements contained in the statement of special inspections;
   2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the building official;
   3. Procedures for exercising control within the Contractor's organization, the method and frequency of reporting and the distribution of the reports; and
   4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

C. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 AGENCY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

C. Perform specified sampling and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional tests required by Architect/Engineer.

G. Attend preconstruction meetings and progress meetings.

1.08 AGENCY AND INSPECTION REPORTS

A. After each test, observation or inspection, promptly submit copies of report to Architect, Engineer, DSA, Owner's Inspector, Owner, Contractor and as otherwise directed.

B. Include:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and specifications section.
   6. Location in the Project.
   7. Type of inspection or test.
   8. Date of test.

9. Results of tests.
10. Conformance with Contract Documents.

C. When requested by Architect/Engineer, provide interpretation of test or inspection results.

1.09 LIMITS ON TESTING and INSPECTION AUTHORITY

A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Agency or laboratory may not approve or accept any portion of the Work.

C. Agency or laboratory may not assume any duties of Contractor.

D. Agency or laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

A. Provide information regarding activities requiring special inspection and tests to District's inspection and testing laboratory upon request.

B. Provide agency or laboratory representative access to any chosen location and adequate samples of materials proposed to be used which require testing, along with proposed mix designs.

C. Cooperate with laboratory personnel, and provide access to the Work.

D. Provide incidental labor and facilities:
1. To provide access to Work to be tested.
2. To obtain and handle samples at the site or at source of Products to be tested.
3. To facilitate tests.
4. To provide storage and curing of test samples.

E. Notify agency or laboratory and Architect/Engineer forty-eight (48) hours prior to expected time for operations requiring testing services. Become familiar with time constraints of tests required. Schedule work to allow time for performance of required tests.

F. Employ services of an independent qualified testing laboratory and pay for additional samples and tests required by Contractor beyond specified requirements.

1.11 ARCHITECT RESPONSIBILITIES

A. Architect is not responsible for notification of the Testing Agency or scheduling its work.

B. Architect will not be responsible for the actions of the Testing Agency.

1.12 RE-TESTING

A. When initial tests indicate non-compliance with the Contract Documents, subsequent re-testing shall be performed by the same testing laboratory and the costs thereof shall be paid by the Owner and deducted from the Contract Sums owed to the Contractor.

1.13 SCHEDULE OF INSPECTIONS

A. Division of State Architect Form SSS-103 SCHEDULE OF TESTS AND INSPECTIONS is attached.

B. Individual Specification Sections: Other tests or inspections required; standards for testing.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION - NOT USED.

END OF SECTION

DIVISION OF STATE ARCHITECT FORM SSS-103 SCHEDULE OF TESTS AND INSPECTIONS FOLLOWS THIS SECTION

SECTION 01 8113

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes general requirements and procedures for compliance with California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".
   1. Chapter 5- Non-Residential Mandatory Measures.

1.02 RELATED REQUIREMENTS

A. Pertinent sections specifying erosion control.

B. Section 01 6116 - Volatile Organic Compound (VOC) Restrictions.

C. Section 01 7419 - Construction Waste Management and Disposal.

D. Pertinent sections specifying landscape irrigation.

1.03 DEFINITIONS

A. CAL-Green Definitions: Certain terms are defined by CAL-Green in Chapter 5 of the Code. Words and terms used in this section shall have the meanings shown therein.

1.04 INFORMATIONAL SUBMITTALS

A. General: Submit CAL-GREEN submittals required by code and in other Specification Sections.

B. CAL-GREEN submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated CAL-GREEN requirements.

C. Acceptable verification submittals are specified in the related sections.

PART 2 PRODUCTS

2.01 REQUIREMENTS - GENERAL

A. Provide products and procedures necessary to confirm CAL-GREEN compliance required in this Section. Although other Sections may specify some CAL-GREEN requirements, the Contractor shall determine additional materials, techniques, means, methods and procedures necessary to comply with CAL-GREEN requirements.

2.02 STORM WATER POLLUTION PREVENTION PLAN

A. Section 5.106.1: Comply with requirements of this code section, local ordinances, General Conditions, Special Provisions, and related sections specifying erosion control.

2.03 OUTDOOR WATER USE

A. Section 5.304.3.1: Irrigation Controllers: Comply with requirements of this code section, local ordinances and Section 32 8000.

2.04 CONSTRUCTION WASTE REDUCTION

A. Section 5.408 Construction Waste Management, Diversion and Recycling: Comply with requirements of this code section, local ordinances and Section 01 7419.

2.05 POLLUTANT CONTROL

A. Section 5.504.4 Finish Material Pollutant Control: All Finish materials shall comply with requirements of this code section, local ordinances and Section 01 6116.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with Section 01 7419 - Construction Waste Management and Disposal.

B. Comply with execution requirements of related sections and applicable local codes and ordinances.

END OF SECTION

SECTION 03 1000

CONCRETE FORMING AND ACCESSORIES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: All labor, materials and equipment and all operations required to complete all formwork as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:

1. Forms, shores, bracing, removal and other operations as necessary for all cast-in-place concrete placed.
2. Setting and securing anchor bolts and other metal items embedded in concrete into formwork, using materials and layouts furnished and delivered to jobsite as specified under other sections.

B. Related Sections:

1. Pertinent Sections of Division 03 specifying concrete construction.
2. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete foundations and formwork.

1.02 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19A Concrete.

B. American Concrete Institute (ACI) 347 "Recommended Practice for Concrete Formwork".

C. American Plywood Association (APA) “Concrete Forming Guide”.

D. West Coast Lumberman Inspection Bureau (WCLIB) “Standard Grading Rules for West Coast Lumber”.

E. ACI SP-066 “ACI Detailing Manual”.

F. ACI 301 “Specifications for Structural Concrete”.

G. Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice”.

1.03 DESIGN REQUIREMENTS

A. Design, engineer, and construct formwork, shoring and bracing to conform to design and code requirements, resist imposed loads; resultant concrete to conform to required shape, line, and dimension.

1.04 SUBMITTALS

A. Limitation of review: Structural Engineer's review will be required only where specifically requested for general architectural applications and features only. Contractor is responsible for structural stability, load-resisting characteristics, and sufficiency of form work design.

1.05 QUALITY ASSURANCE

A. General: All form materials shall be new at start of work. Produce high quality concrete construction. Minimize defects due to joints, deflection of forms, roughness of forms, nonconforming materials, concrete, or workmanship.

B. Reuse of Forms: Plywood forms may be reused, if thoroughly cleaned of all dirt, mortar, and foreign materials, and undamaged at edges and contact face. Reuse shall be subject to permission from the Architect without exception and issued in writing. Reuse of any panel which will produce a blemish on exposed concrete, will not be permitted.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Form Materials:

1. Non-Exposed Surface Formwork Facing: Forms for concrete which is not exposed to view, may be of plywood as specified for exposed surfaces, or square edge 1x nominal Douglas Fir, Construction Grade, S4S.
2. Exposed Surface Formwork Facing:
   a. Forms for all exterior and interior concrete flat surfaces unless otherwise specified as board formed shall be new Douglas Fir Plywood (APA) ply, 5/8-inch, B-B Plyform, Class 1, Exterior Type, oiled and edged and edge-sealed conforming to U.S. Product Standard PS 1 in large sheet sizes to achieve joint patterns shown.
   b. All exposed concrete edges shall be chamfered 3/4" minimum or as noted on the drawings.
3. Exposed Surface Formwork - Special Pattern Form Liner:
   a. Forms for all exterior and interior concrete flat surfaces indicated shall be as designated by Architect.

B. Earth Forms: Allowed, subject to soil standing in excavations without ravel or caving.

C. Form Release Agent: Spray-on compound, not affecting color, bond or subsequent treatment of concrete surfaces. Maximum VOC content shall comply with local requirements and California Green Building Code.

D. Accessories: Types recommended by manufacturers or referenced standards to suit conditions indicated;

1. Anchors, spacers, void in-fill materials: sized to resist imposed loads.
2. Form Ties: Prefabricated rod, flat band, or wire snap ties with 1" break-back or threaded internal disconnecting type with external holding devices of adequate bearing area. Ties shall permit tightening and spreading of forms and leave no metal closer than 1" to surface.

E. Corner Chamfers and Rustications: Filleted, wood strip or foam type; sizes and shapes as detailed, or 3/4 x 3/4 inch size minimum if not detailed; maximum possible lengths.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

G. Foam Block Formwork: For use only where specified on drawings to create void space under or within concrete. ASTM D6817. 1 pound per cubic foot maximum density. 10 pounds per square inch minimum compressive strength at 10% deformation. 3.5 pounds per square inch minimum compressive resistance at 1% deformation. 8 pounds per square inch minimum compressive resistance at 5% deformation. InsulFoam Geofoam EPS15, or equivalent.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Inspect the substrate and the conditions under which concrete formwork is to be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of substrates and conditions.

B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. If natural soil or compacted fill can be accurately cut and maintained, foundations and grade beams may be poured against earth without forming. Provide positive protection of trench top corners.

B. Maintain earth forms free of water and foreign materials.

3.03 ERECTION – FORMWORK

A. General: Construct formwork in accordance with calculations, and recommendations of Section 401 of ACI 347. Construct forms to the sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finished structure. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes.

1. Construct cambers specified in concrete members and slabs in the formwork.
2. Schedule the work and notify other trades in ample time so that provisions for their work in the formwork can be made without delaying progress of the project. Install all sleeves, pipes, etc. for building services systems, or other work. Secure information about and provide for all openings, offsets, recessed nailing blocks, channel chases, anchors, ties, inserts, etc. in the formwork before concrete placement.
3. Deflection: Formwork and concrete with excessive deflection after concrete placement will be rejected. Excessive deflection is that which will produce visible and noticeable waves in the finished concrete.

B. Formwork Construction: Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301. Uniform, substantial and sufficiently tight to prevent leakage of concrete paste, readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials. Tie, brace, shore, and support to insure stability against pressures from any source, without failure of any component part and without excessive deflection. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

C. Provide all openings, offsets, inserts, anchorages, blocking, and other features of the work as shown or required. See INSERTS, EMBEDDED PARTS, AND OPENINGS for detailed requirements.

D. Warped, checked, or scuffed forms will be rejected.

E. Maintain membranes, reinforcing and other work free of damage; protect with plywood runway boards or other positive, durable means.

F. Align joints and make watertight. Keep form joints to a minimum.

G. Provide fillet and chamfer strips on external corners of exposed locations and as indicated to form patterns in finished work. Extend patterns around corners and into alcoves, on backs of columns and similar locations not otherwise shown.

1. Produce beveled, smooth, solid, unbroken lines, except as otherwise indicated to conform to patterns.
2. Form corners and chamfers with 3/4 inch x 3/4 inch strips, unless otherwise indicated, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer at changes in direction.

H. Unexposed corners may be formed either square or chamfered.

I. Ties and Spreaders: Arrange in a pattern acceptable to the Architect when exposed. Snap-ties may be used except at joints between pours where threaded internal disconnecting type shall be used.

J. Coordinate this section with other sections of work that require attachment of components to formwork.

K. Reglets and Rebates: Accurately locate, size, and form all reglets and rebates required to receive work of other trades, including flashing, frames, and equipment.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcement or surfaces which will be bonded to fresh concrete.

D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork will be rejected.

E. Leave no residue or stain on the face of the concrete, nor affect bonding of subsequent finishes or work specified in other sections.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

1. Provide openings in concrete formwork to accommodate work of other sections including those under separate contracts (if any). Size and location of openings, recesses and chases shall be in accordance with the section requiring such items. Accurately place and securely support items to be built into forms.

B. Construction Joints: Construct and locate generally as indicated on Drawings and only at locations approved by Structural Engineer, so as not to impair the strength of the structure. Form keys in all cold joints shown or required.

C. Locate and set in place items that will be cast directly into concrete.

D. Rough Hardware and Miscellaneous Metal: Set inserts, sleeves, bolts, anchors, angles, and other items to be embedded in concrete. Set embedded bolts and sleeves for equipment to template and approved shop drawings prepared by trades supplying equipment.

E. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

F. Wood Inserts and Nailers: Provide approved preservative-treated lumber. Set all required nailing blocks, grounds, and other inserts as required to produce results shown. Wood plugs shall not be used.

G. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

H. Piping: Do not embed piping in structural concrete unless locations specifically approved by Structural Engineer.

I. Conduit: Place conduit below slabs-on-grade and only as specifically detailed on structural drawings. Minimum clear distance between conduits shall be 3 diameters. Location shall be subject to Engineer's written approval and shall not impair the strength of the structure.

J. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

1. Provide openings for the introduction of vibrators at intervals necessary for proper placement.
2. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

K. Install Form Liner inserts in accordance with manufacturer's recommendations, to produce patterns and textures indicated.

L. Install waterstops in accordance with manufacturer's recommendations to provide continuous waterproof barrier.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Remove all dirt, chips, sawdust, rubbish, water and foreign materials detrimental to concrete.
2. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.07 FOOTINGS

A. Verify elevations and provide final excavation required for footings prior to placing of concrete.

3.08 EQUIPMENT BASES

A. Form concrete bases for all mechanical and electrical equipment in accordance with approved shop details furnished by other sections.

B. Sizes and locations as indicated and as required to produce results shown.

C. Provide coved base for all equipment bases placed on concrete slabs.

3.09 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.10 FOAM BLOCK FORMWORK

A. Blocks shall be placed on prepared leveling course for level bearing. Place adjacent blocks in tight contact together. Where placed in multiple layers, orient long axis of upper layer at 90° to lower layer, and so forth for subsequent layers. Anchor blocks as required to prevent movement prior to and during concrete placement. Do not expose to hydrocarbons, solvents, or coal tar.

3.11 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

B. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

C. Clean and repair surfaces to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.

D. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.

3.12 FORM REMOVAL

A. Do not loosen or remove forms before minimum curing period has elapsed without employment of appropriate alternate curing methods, approved by the Architect in writing.

B. Remove forms without damage to the concrete using means to insure complete safety of the structure and without damage to exposed beams, columns, wall edges, chamfers and inserts. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Do not remove forms until the concrete has hardened sufficiently to permit safe removal and the concrete has attained sufficient strength to safely support imposed loads. The minimum elapsed time for removal of forms after concrete has been placed shall be as follows:

1. Columns and Walls: 7 days, provided members are not subjected to overhead loads.
2. Retaining Walls: 21 days minimum.
3. Footings: 7 days minimum. If backfilled immediately, side forms may be removed 24 hours after concrete is placed.
4. Beams, elevated slab, and similar overhead conditions: 28 days unless adequate shoring is provided.

D. Durations listed above are minimums and are subject to extension at the sole judgment of the Architect/Engineer.

E. Reshoring: Reshore members where and if required by Formwork Design Engineer.

F. Do not subject concrete to superimposed loads (structure or construction) until it has attained full specified design strength, nor for a period of at least 14 days after placing.

G. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

3.13 CLEANING

A. Remove excess material and debris associated with this work from the job site.

END OF SECTION

SECTION 03 2000

CONCRETE REINFORCING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Reinforcing steel work for all concrete work as indicated on the drawings and specified herein.
2. Coordinate this work with other work affected by these operations, such as forms, electrical work, mechanical work, structural steel, and concrete.

B. Related Sections:

1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
2. Pertinent Sections of Divisions 03 specifying concrete construction.
3. Pertinent Sections of Divisions 04 specifying masonry construction.
4. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete work.

1.02 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19A Concrete.

B. American Concrete Institute (ACI) 301 "Specifications for Structural Concrete for Buildings".

C. ACI 318 "Building Code Requirements for Reinforced Concrete and Commentary".

D. ACI SP-066 "ACI Detailing Manual".

E. American Society for Testing and Materials (ASTM) A1064 "Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete".

F. ASTM A615 "Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement".

G. ASTM A706 "Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement".

H. American Welding Society (AWS) D1.4 – "Structural Welding Code for Reinforcing Steel".

I. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".

1.03 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.

C. Shop Drawings: Show complete fabrication and placing details of all reinforcing steel. Comply with requirements of ACI SP-66. Include:

1. Bar sizes and schedules;
2. Shapes of bent bars, layout and spacing of bars, location of splices.
3. Stirrup spacing, arrangements and assemblies,
4. References to Contract Document detail numbers and designations.

D. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

E. Certificates: Submit all certifications of physical and chemical properties of steel for each heat number as manufactured, including location of material in structure as specified below in Article titled QUALITY ASSURANCE. All materials supplied shall be tagged with heat numbers matching submitted Mill Test Report analyses.

F. Samples: Provide to the Owner's Testing laboratory as specified in Article SOURCE QUALITY CONTROL.

1.04 QUALITY ASSURANCE

A. Perform work of this Section in accordance with CRSI DA4, CRSI P1, ACI 301, and ACI 318.

B. Requirements of Regulatory Agencies, refer to pertinent Sections of Division 01 and CBC.

C. Certification and Identification of Materials and Uses: Provide Owner's Testing Agency with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.

1. Provide manufacturer's Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.
2. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each grade of reinforcing and/or heat number in the project (i.e. foundations, walls, etc.).
3. Unidentified Material Tests: Where identification of materials by heat number to mill tests cannot be made, Owner's Testing Agency shall test unidentified materials as described below.

D. Testing and Inspection: Tests and Inspections required by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent Sections of Division 01.

1.05 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent requirements of Division 01.

B. Deliver reinforcement to project site in bundles marked with durable tags indicating heat number, mill, bar size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.

C. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

PART 2 PRODUCTS

2.01 MATERIALS

A. Reinforcing Steel: Deformed billet steel bars, ASTM A706 Grade 60 or ASTM A615 Grade 60.

1. Welded reinforcement shall be ASTM A706, or A615 meeting carbon requirements of AWS D1.4. Welding shall conform with AWS D1.4.
2. All reinforcement to be unfinished.

B. Welded Wire Reinforcement: ASTM A1064.

C. Tie Wire: No. 16 AWG or heavier, black annealed.

D. Concrete Blocks: On-grade conditions only, as required to support reinforcing bars in position.

E. Reinforcing Supports: Plastic or galvanized steel chairs, bolsters, bar supports, or spacers sized and shaped for adequate support of reinforcement and construction loads imposed during concrete placement, meeting ACI and CRSI standards.

1. For use over formwork: Galvanized wire bar type supports complying with CRSI recommendations. Provide plastic tips where exposed to view or weather after removal of formwork. Do not use wood, brick, or other unacceptable materials.

F. Reinforcement Splice Couplers: For use only where specified on drawings. Submit other locations proposed for use to Engineer for review. "L-Series Bar Lock" Coupler Systems for Splicing Reinforcement Bars, UES ER-0319, by Dayton-Superior Corporation.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4), unless specifically shown otherwise. Details not specifically shown or indicated shall conform to SP-066 and specified codes and standards.

1. Accurately shop-fabricate to shapes, bends, sizes, gauges and lengths indicated or otherwise required.
2. Bend bars once only. Discard bars improperly bent due to fabricating or other errors and provide new material; do not re-bend or straighten unless specifically indicated. Rebending of reinforcement in the field is not allowed.
3. Do not bend reinforcement in a manner that will injure or weaken the material or the embedding concrete.
4. Do not heat reinforcement for bending. Heat-bent materials will be rejected.

B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the work.

1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on Drawings or final shop drawings.
3. Bars with reduced cross-section due to rusting or other cause.

C. Tag reinforcement with durable identification to facilitate sorting and placing.

D. Shop Fusion Welded Stirrup/Tie/Spiral Cages

1. Shop fusion welding of stirrup/tie/spiral cages is permitted to aid in fabrication and handling. The following requirements shall be met.
2. All reinforcing bars receiving weld shall be ASTM A706.
3. Longitudinal holding wires shall be ASTM A1064.
4. Shop welding shall be performed by machines under a continuous, controlled process.
5. Quality control tests shall be performed on shop-welded specimens and the test results shall be available, upon request, to the Architect/Engineer.
6. Tack welding of reinforcing steel is not permitted.
7. Welding of any type shall not occur at 90°, 135°, or 180° bends. Circular ties and spirals may be shop fusion welded outside of areas with 90°, 135°, or 180° hook bends.
8. Longitudinal bars shall not be welded to stirrups/ties/spirals.

2.03 SOURCE QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following:

1. Sampling and Tests of Reinforcing Bars per CBC 1910A.2.
2. Material Testing:
   a. Identified Steel: When samples are taken from bundled steel identified by heat number, matched with accompanying mill analyses as delivered from the mill, Owner's Testing Agency will perform one tensile test and one bend test per each ten tons or fraction thereof for each required size of reinforcing steel.
   b. Unidentified Steel: When identification of materials by heat number matched to accompanying mill analyses cannot be made, perform one tensile test and one bend test per each two and one-half tons or fraction thereof for each required size of reinforcing steel. Tests of unidentified steel shall be performed by the Owner's Testing Agency and costs for these tests shall be paid by the Contractor by deductive change order.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect the conditions under which concrete reinforcement is to be placed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Coordinate with work of other sections to avoid conflicts or interference. Bring conflicts between reinforcement and other elements to Architect's attention. Resolve conflicts before concrete is placed.

C. Notify Architect, Structural Engineer, and Authority Having Jurisdiction for review of steel placement not less than 48 hours before placing concrete.

3.02 PLACEMENT

A. General: Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean bars free of substances which are detrimental to bonding. Maintain reinforcement clean until embedded in concrete.

C. Place reinforcement to obtain the minimum coverages for concrete protection. Do not deviate from required position. Maintain required distance, spacing and clearance between bars, forms, and ground.

D. Location and Support: Provide metal chairs, runners, bolsters, spacers and hangers, as required.

E. Provide additional steel reinforcement as necessary or as directed, to act as spreaders or separators to maintain proper positioning.

F. Tying and Attachment: Securely tie at all intersections and supports with wire. Prevent dislocation or movement during placement of concrete. Direct twisted ends of wire ties away from exposed concrete surfaces.

G. Separate reinforcing from pipes or conduits with approved non-metallic separators. Do not use wood or steel form stakes or reinforcement used as stakes as support for reinforcement.

H. Accommodate placement of formed openings required by other sections.

I. Obstructions:

1. Where obstructions, block-outs, or penetrations (conduits, raceways, ductwork) prevent continuous placement of reinforcement as indicated, provide additional reinforcing as detailed and as directed by the Structural Engineer to supplement the indicated reinforcement around the obstruction.
2. Place additional trim bars, ties, stirrups, or other elements as detailed and as directed at all opening, sleeves, pipes or other penetrations through structural elements.

J. Welded Wire Reinforcement: Reinforce slabs with 6"x 6"-W1.4 x W1.4 welded wire reinforcement reinforcing, unless otherwise noted on drawings.

1. Provide flat sheets only, no rolls. Straighten, cut to required size, and lay out flat in place.
2. Securely wire-tie reinforcement to other reinforcement at frequent intervals.
3. Extend reinforcement over supporting beams and walls, and to within 1 inch of edge of slabs, construction joints, and expansion joints.
4. Support reinforcement in mid-depth of slab.
5. Lift reinforcement at intervals as slab concrete is placed, ensure proper embedment

3.03 REINFORCING SPACING AND COVERAGE

A. Spacing: Do not space bars closer than four (4) diameters of the largest of two adjacent bars, except at bar laps, which shall be placed such that a minimum of 2 bar diameters is clear between bars.

B. Where reinforcing in members is placed in two layers, the distance between layers shall not be less than four bar diameters of the largest bar and the bars in the upper layers shall be placed directly above those in the bottom layer, unless otherwise detailed or dimensioned.

C. Coverage of bars (including stirrups and ties) shall be as follows, unless otherwise shown:

1. Footings: 3 inches to any soil face, 2 inches to top.
2. Slabs (on grade): 2 inches to grade face, 1-1/2 inches to top face.

3.04 DOWELS, SPLICES, OFFSETS AND BENDS

A. Provide standard reinforcement splices at splices, corners, and intersections by lapping ends, placing bars in contact, and tightly tying with wire at each end. Comply with details shown on structural drawings and requirements of ACI 318.

B. Provide minimum 1-1/2 inch clearance between sets of splices. Stagger splices in horizontal bars so that adjacent splices will be 4 feet apart.

C. Laps of welded wire reinforcement shall be at least two times the spacing of the members in the direction lapped but not less than twelve inches.

D. Splices of reinforcement shall not be made at points of maximum stress. Provide splice lengths as noted on the structural drawings, with sufficient lap to transfer the stress between bars by bond and shear.

E. Spacing:

1. Space bars minimum distance specified and all lapped bars 2 bar diameters (minimum) clear of the next bar.
2. Stagger splices of adjacent bars where possible and where required to maintain bar clearance.
3. Beam or slab top bars shall be spliced mid-span of column support and bottom bars spliced at column supports.

4. Request Architect/Engineer review prior to placement for all splices not shown on the drawings.

F. Reinforcement Couplers: Install at all locations indicated. Install couplers in accordance with manufacturer's recommendations.

3.05 WELDING

A. No reinforcing shall be welded unless specifically indicated. No reinforcing shall be welded without prior approval of the Structural Engineer and the Authority Having Jurisdiction.

B. Only when so approved for use as noted above, all welding shall conform to AWS D1.4, ACI 318 Section 26.6.4, and CBC 1903A.8 and the following:

1. All welding performed by certified welders.
2. All reinforcement requires preheat prior to welding. All preheat and welding shall be continuously inspected by the Testing Agency.

3.06 MISPLACED REINFORCEMENT

A. Notify Architect/Engineer immediately if reinforcing bars are known to be misplaced after concrete has been placed.

B. Perform no correction or cutting without specific direction. Do not bend or kink misplaced bars.

C. Correct misplaced reinforcing only as directed in writing by the Architect/Engineer. Bear all costs of redesign, new, or additional reinforcing required because of misplaced bars at Contractor's expense.

3.07 FIELD QUALITY CONTROL

A. The Testing Agency as specified in the Article QUALITY ASSURANCE, will inspect the work for conformance to contract documents before concrete placement.

1. Inspection: Provide inspection and verification of installed reinforcement. Confirm that the surface of the rebar is free of form release oil or other coatings.
2. Inspect all preheat and welding activities for steel reinforcement, when these occur.
3. Exception: Non-structural patios, driveways, and sidewalks do not require special inspection.

3.08 CLEANING

A. Remove excess material and debris associated with this work from the job site.

END OF SECTION

SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Provide all labor, materials, equipment, and services to complete all concrete work required, including, but not limited to, the following:

1. Foundations and exterior slabs-on-grade.
2. Installation of all bolts, inserts, sleeves, connections, etc. in the concrete.
3. Joint devices associated with concrete work.
4. Miscellaneous concrete elements, including, but not limited to: equipment pads, light pole bases, flagpole bases, thrust blocks, and manholes.
5. Concrete curing.
6. Coordination with other sections:
   a. Make all preparations and do all work necessary to receive or adjoin other work. Install all bolts and anchors, including those furnished by other sections, into formwork and provide all required blocking.
   b. Install all accessories embedded in the concrete and provide all holes, blockouts and similar provisions necessary for the work of other sections. Provide all patching or cutting made necessary by failure or delay in complying with this requirement at the Contractor's expense.
   c. Coordinate with other sections for the accurate location of embedded accessories.

B. Related Sections:

1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
2. Pertinent Sections of Division 03 specifying concrete construction.
3. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete.
4. Pertinent sections of other Divisions specifying floor finishes and sealants applied to concrete substrates.

1.02 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19A Concrete.

B. American Concrete Institute (ACI) 211.1 “Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete”; ACI 211.2 “Standard Practice for Selecting Proportions for Lightweight Concrete”.

C. ACI 301 “Specifications for Structural Concrete”.

D. ACI 302.1R “Guide for Concrete Floor and Slab Construction”.

E. ACI 304R "Guide for Measuring, Mixing, Transporting, and Placing Concrete".

F. ACI 305R "Hot Weather Concreting".

G. ACI 306R "Cold Weather Concreting".

H. ACI 308 "Standard Practice for Curing Concrete".

I. ACI 318 "Building Code Requirements for Reinforced Concrete and Commentary".

1.03 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review. Submit for review prior to fabrication.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturers' data on manufactured products and other concrete related materials such as bond breakers, cure/sealer, admixtures, etc. Demonstrate compliance with specified characteristics. Provide samples of items upon request. Submit material certificates for concrete aggregates and cementitious materials. Certificates shall show compliance to applicable ASTM's, the CBC, and additional requirements stated herein.

D. Mix Designs: Submit Mix Designs for each structural concrete type required for work per requirements of articles CONCRETE MIXES and QUALITY ASSURANCE. Resubmit revised designs for review if original designs are adjusted or changed for any reason. Non-Structural mixes need not be submitted for review by Structural Engineer.

E. Shop Drawings: Proposed location of construction and cold joints. Proposed location of all slab construction/dowel joints, control joints, and blockouts.

F. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.

G. Batch Plant Certificates: Include with delivery of each load of concrete. Provide Certificates to the Testing Agency and the Architect/Engineer as separate submittals. Concrete delivered to the site without such certificate shall be rejected and returned to the plant. Each certificate shall include all information specified in Article SOURCE QUALITY CONTROL below.

H. Engineering Analysis: Prepared by a California-licensed Civil or Structural Engineer, justifying construction-imposed loads on slabs, beams, and walls which exceed those allowed by CBC for the specified use.

1. 2000 lbs maximum allowable construction load without analysis.
2. 10,000 lbs maximum allowable construction load with analysis.

I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Concrete construction verification and inspection to conform to CBC 1705A.3.

C. Common Sourcing: Provide each of the following materials from consistent sources for entire project.

1. Cement.
2. Fly ash.
3. Aggregate.
4. Ground Granulated Blast Furnace Slag.

D. Follow recommendations of ACI 305R when concreting during hot weather. Follow recommendations of ACI 306R when concreting during cold weather.

E. Services by the Independent Testing Agency (includes "Special" Inspections) as specified in this Section and as follows:

1. Perform tests and inspections specified below in articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and reports to be in conformance with pertinent Sections of Division 01.

F. Contractor shall bear the entire cost of remediation, removal, and/or replacement of concrete determined defective or non-conforming, including Architect/Engineer fees for redesign.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Materials specified by brand name shall be delivered in unbroken packages bearing manufacturer's label and shall be brand specified or an approved equal.

B. Delivery, Handling and Storage of other materials shall conform to the applicable sections of the current editions of the various reference standards listed in this Section.

C. Protect materials from weather or other damage. Sort to prevent inclusion of foreign materials.

D. Specific Requirements:

1. Cement: Protect against dampness, contamination, and warehouse set. Store in weather tight enclosures.
2. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregates. Use only one supply source for each aggregate stock pile.
3. Admixtures:
   a. Store to prevent contamination, evaporation, or damage.
   b. Protect liquid admixtures from freezing and extreme temperature ranges.
   c. Agitate emulsions prior to use.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather (Freezing or near-freezing temperatures) per ACI 306R:

1. Heat concrete materials before mixing, as necessary to deposit concrete at a temperature of at least 50°F but not more than 90°F.
2. Do not place concrete during freezing, near-freezing weather, snow, rain or sleet unless protection from moisture and/or cold is provided.
3. Protect from freezing and maintain at a temperature of at least 50°F for not less than seven days after placing. Take special precautions to protect transit-mixed concrete.
4. No salts, chemical protection or admixture are permitted without written approval of Architect/Engineer.
5. Contractor shall maintain an air temperature log for the first 7 days after placement with entry intervals not to exceed 8 hours.

B. Hot Weather per ACI 305R:

1. Cool concrete materials before mixing, or add ice in lieu of mix water as necessary to deposit concrete at a temperature below 85°F.
2. Do not place concrete in hot/windy weather without Architect/ Engineer review of procedures.
3. Provide sunshades and/or wind breakers to protect concrete during finishing and immediate curing operations. Do not place concrete at air temperature exceeding 90°F.
4. Provide modified mix designs, adding retarders to improve initial set times and applying evaporation reducers during hot/windy weather for review by Independent Testing Agency prior to use.

1.07 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.

B. Provide schedule and sequence information to Testing Agency in writing upon request. Update information as work progresses.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 2000.

2.03 MATERIALS

A. General Requirements: All materials shall be new and best of their class or kind. All materials found defective, unsuitable, or not as specified, will be condemned and promptly removed from the premises.

B. Cementitious Materials:

1. Portland Cement: ASTM C150, Type II, low alkali.
2. Fly Ash (Pozzolan): ASTM C618, Class F.
3. Ground Granulated Blast Furnace Slag: ASTM C989, Grade 100 or 120.

C. Concrete Aggregates:

1. Coarse and Fine Aggregates: ASTM C33; Stone aggregate and sand. Specific source aggregate and/or sand or shrinkage characteristics as required for class of concrete specified.
2. Lightweight aggregate: ASTM C330 and C332.
3. Source shall remain constant throughout the duration of the job. The exact portions of the fine aggregates and coarse aggregates to be used in the mix shall be determined by the mix design.
4. Aggregates shall be tested for alkali reactivity per CBC section 1903A.5. Where test results exceed allowable limits, additional testing of mitigation procedures shall be provided, as outlined per CBC section 1903A.5.

D. Water: Potable, clean, from domestic source.

E. Admixtures: All admixtures shall be used in strict accordance with the manufacturer's recommendations. Admixtures containing calcium chlorides or other accelerators shall not be used without the approval of the Architect/Engineer and the Owner's Testing Laboratory.

1. Mid Range Water Reducing Admixtures: ASTM C494 Type A, "MasterPolyHeed" (formerly “PolyHeed”) series by Master Builders Solutions, "WRDA" series by W.R. Grace, or equal.
2. High Range Water-Reducing Admixtures: ASTM C494 Type F, "MasterRheoBuild 1000" (formerly “RheoBuild 1000”) or “MasterGlenium” (formerly “Glenium”) series by Master Builders Solutions or equal.
3. Water Reducing Admixture and Retarder: ASTM C494 Type B or D, "MasterPozzolith" (formerly “Pozzolith”) series or “MasterSet DELVO” (formerly “DELVO”) series by Master Builders Solutions, "Plastiflow-R" by Nox-crete, or equal.
4. Air Entraining Admixtures: ASTM C260, product suit condition by Master Builders Solutions or equal.
5. Viscocity Modifiers: ASTM C494 Type S.

F. Slurry: Same proportion of cement to fine aggregates used in the regular concrete mix (i.e. only coarse aggregate omitted); well mixed with water to produce a thick consistency.

G. High Strength Grout: See section 05 1100 for requirements.

H. Dry Pack: Dry pack (used only for cosmetic concrete repairs) shall consist of:

1. One part cement to 2-1/2 parts fine aggregate (screen out all materials retained on No.4 sieve), mixed with a minimum amount of water, added in small amounts.
2. Mix to consistency such that a ball of the mixture compressed in the hand will retain its shape, showing finger marks, but without showing any surface water.

2.04 ACCESSORIES

A. Bonding Agent: ASTM C881, Type II Grade 2 Class B or C. Do not allow epoxy to set before placing fresh concrete.

1. "MasterEmaco ADH 326" (formerly "Concresive Liquid LPL") by Master Builders Solutions;
2. "Rezi-Weld 1000" by W.R. Meadows.

B. Chemical Hardener: Fluorosilicate solution designed for densification of cured concrete slabs. "MasterKure HD 300 WB" (formerly "Lapidolith") by Master Builders Solutions, "LIQUI-HARD" W.R. Meadows Co, or equal.

C. Moisture-Retaining Cover: ASTM C171, type 1, one of the following;

1. Regular Curing Paper, Type I, reinforced waterproof: Fortifiber Corporation "Orange Label Sisalkraft", "Pabcotite" paper, or equal.
2. Polyethylene Film: ASTM D 2103, 4 mil thick, clear or white color.
3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd.

D. Liquid Curing Compound: ASTM C 309, Type 1, Class B, clear or translucent, 25% minimum solids, water base acrylic cure/sealer which will not discolor concrete and compatible with bonding of finishes specified in related sections. W.R. Meadows Co. "Vocomp 25" or equal. Maximum VOC content shall comply with local requirements and California Green Building Code.

E. Underslab Water Vapor Retarder: See Section 07 2500 "Weather Barriers".

F. Evaporation Reducer: "MasterKure ER 50" (formerly Confilm), by Master Builders Solutions.

G. Permeability Reducer: Use only where specifically referred to.

1. Admixture Type: Xypex Chemical Corporation "XYPEX Admix C-500". Dosage: 2-3% of cement content by weight; 15 lb/cu. yd. max. or Master Builders Solutions "MasterLife 300D" (formerly "Rheomac 300D"). Dosage: 2% of cement content by mass.
2. Surface-Applied Type: Xypex Chemical Corporation "XYPEX Concentrate. Brush application: 1.25-1.50lb/sq. yd., 5 parts powder to 2 parts water. Master Builders Solutions "MasterSeal 500" (formerly "Tegraproof"). Slurry coat: one part water to 2.25-2.5 parts powder by volume.
3. Approved equal.

2.05 JOINT DEVICES AND MATERIALS

A. Waterstops: Resilient type, meeting Corps of Engineers CRD-C 572. Consult manufacturer for appropriate product for specific use. Submit for review. Install per manufacturers

recommendation. Provide W. R. Meadows “Seal Tight” PVC waterstop, Sika “Greenstreak” PVC waterstop, or approved equal.

B. Expansion Joint Filler: ASTM D1751, Nonextruding, resilient asphalt impregnated fiberboard or felt, 3/8 inch thick and 4 inches deep; tongue and groove profile.

1. Products: "Servicised Products", W.R. Meadows, Inc., "National Expansion Joint Company", "Celotex Corporation", or equal.

C. Joint Filler: ASTM D944, Compressible asphalt mastic with felt facers, 1/4 inch thick and 4 inches deep.

D. Sealant and Primer: As specified in Section 07 9200.

E. Slab Joint Sealant: Compatible with floor finishes specified in related sections.

2.06 CONCRETE MIXES

A. General requirements for mix design and submittal of structural class concrete:

1. Provide Contractor submittals to Architect/Engineer not less than 15 days before placing concrete.
2. Contractor shall review mix designs and proposed placing requirements prior to submittal for compatibility to ensure that the concrete as designed can be placed in accordance with the drawings and specifications.
3. Changes or revisions require re-submittal: All variations to approved mix designs, including changing type and/or quantity of admixtures shall be resubmitted to the Architect/Engineer for review prior to use.
4. Mix design(s) for all structural classes of concrete to be prepared by qualified person experienced in mix design. Allow for time necessary to do trial batch testing when required.
5. Preparer to provide backup data and certify in writing that mix design meets:
   a. Requirements of the specifications for concrete durability and quality;
   b. Requirements of the California Building Code and ACI 318 Section 26.4, including break histories, trial batching test results, and/or a mix designed by a California Registered Civil Engineer per ACI 318 Section 26.4.3.1(b) and bearing the Engineer’s seal & signature.
6. Clearly note on mix designs with specified maximum WCR if design permits addition of water on site, or clearly identify in the mix design that no water is to be added on site.
7. Deviations: Clearly indicate proposed deviations, and provide written explanation explaining how the deviating mix design(s) will provide equivalent or better concrete product(s) than those specified.
8. Include adjustments to reviewed mix designs to account for weather conditions and similar factors.

B. Proportioning - General: The following provisions apply to all mix designs:

1. Proportion concrete mixes to produce concrete of required average strength (as defined by ACI 318 Section 19.2.1). Select slump, aggregate sizes, shrinkage, and consistency that will allow thorough compaction without excessive puddling, spading, or vibration, and without permitting the materials to segregate, or allow free water to collect on the surface.
2. Select aggregate size and type to produce dense, uniform concrete with low to moderate shrinkage, free from rock pockets, honeycomb and other irregularities.
3. Mix designs may include water reducing and retarding admixtures to meet or exceed minimum set times (time required to place and finish) and to minimize Water Cement Ratios (WCR). Minimum and maximum criteria presented in this section are guidelines and do not represent a specific mix design.
4. Cement Content: Minimum cement content indicates minimum sacks of cementitious material. Increasing cement content to increase early strengths or to achieve specified WCR while maintaining water content is discouraged in order to minimize effects of shrinkage.
    a. Substitution of fly ash for Portland cement on an equivalent weight basis up to 25% replacement is permitted, except at high early strength concrete. Replacement in excess of 25% is not permitted unless part of a specified mix design that has been submitted for review.
    b. Substitution of slag for Portland cement on an equivalent weight basis up to 45% replacement is permitted, except at high early strength concrete. Replacement in excess of 45% is not permitted unless part of a specified mix design that has been submitted for review.
    c. Such substitution requests may be denied by the Engineer.
5. Water Content: Mix designs with a specified maximum Water Cement Ratio (WCR) may be designed with a lower WCR than specified in order to allow addition of water at the site.
6. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301 and this section.
    a. For trial mixtures method, employ independent testing agency acceptable to Architect/Engineer for preparing and reporting proposed mix designs.
7. Placement Options: Mix designs may, at the Contractor's option, be designed for either pump or conventional placement with aggregate size, slumps, etc. to be maintained as specified in this section.

C. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations and this section.

D. Mix Design Minimum Requirements:

Concrete Class	Coarse Aggregate Size (Inches) & Fine Aggregate[3]	Maximum WCR or Maximum Nominal Slump & Tolerance (Inches)[1,2]	Minimum 28-Day Design Strength	Minimum Cement Sacks/per yd[4]
NON-STRUCTURAL				
1) Lean Concrete (use only where specified)	---	---	---	3.0
2) Slab on Grade Exterior (Walks & Patios)	1" x #4	WCR = .55	2,500	4.5
STRUCTURAL				
3) Drilled Pier	3/4" x #4	WCR = .53	3,000	5.0

1. The tolerance is the maximum deviation allowable without rejection. The mix design shall be based on the nominal value specified and is without water reducing mixtures. Slump to be measured at the end of the hose.
2. The maximum water cement ratio (WCR) is limited at time of placement as noted. No water is to be added on site such that the specified WCR or maximum slump is exceeded without approval of the testing laboratory and the Architect/Engineer. Workability is to be achieved utilizing an acceptable mid range to high range water reducing admixture.
3. Gradation of aggregate is per ACI 318 section 26.4.1.2 and ASTM C33.
4. Minimum cement content includes all cementitious materials.

2.07 MIXING CONCRETE

A. Batch final proportions in accordance with approved mix designs. All adjustments to approved proportions, for whatever reason, shall be reviewed by the Architect/Engineer prior to use.

B. Batch and mix concrete in accordance with ASTM C94, at an established plant. Site mixed concrete will be rejected.

C. Provide batch and transit equipment adequate for the work. Operate as necessary to provide concrete complying with specified requirements.

D. Place mixed concrete in forms within 1-1/2 hours from the time of introduction of cement and water into mixer or 300 revolutions of the drum whichever comes first. Use of, re-mixing, and/or tempering mixed concrete older than 1 hour will not be permitted.

E. Do not add water at the site to concrete mixes with a maximum specified WCR unless the water content at batch time provides for a WCR less than specified and this provision, including the quantity of water which may be added at the site, is specifically noted on the mix design and certification by the mix preparer. See ASTM C94 for additional requirements.

2.08 SOURCE QUALITY CONTROL

A. Services by independent Testing Agency:

1. Where aggregate alkali reactivity testing (and, when applicable, mitigation testing) per the MATERIALS section is not available, the Testing Agency shall perform this testing to verify materials conformance to CBC section 1903A.5.
2. Batch Plant inspection at automated plants to occur at commencement of concrete work each day (first truck). Batch Plant inspection at non-automated plants and when accuracy is questionable shall be continuous. Additionally, water cement ratio (WCR) is to be verified where a WCR is specified herein. The computed WCR is to be written on the Batch Plant Certificate to be taken to the job site prior to the truck leaving the plant. See requirements of CBC 1705A.3.3.
3. Batch Plant Certificates: Obtain the weighmaster's Batch Plant Certificate at arrival of truck at the site. If no batch plant certificate is provided, recommend to the General Contractor that the truckload of concrete be rejected. So note in daily log, along with the location of the load of concrete in the structure if the load is not rejected. See requirements of CBC 1705A.3.3.
    a. Laboratory's inspector shall obtain for each transit mixer Batch Plant Certificates to verify mix design quantities and condition upon delivery to the site.
    b. Certificates to include: Date, time, ingredient quantities, water added at plant and on job, total mixer revolutions at time of placement, and time of departure.
    c. Concrete with specified water cement ratio: Add no water on site unless mix design and batch records each show additional water may be added. See ASTM C94 for additional requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

B. Verify work of other sections is complete and tested as required before proceeding.

3.02 PREPARATION

A. Observation, Inspection and Testing:

1. Architect/Engineer: Notify not less than 2 working days before each concrete placement, for observation and review of reinforcing, forms, and other work prior to placement of concrete.
2. Testing Agency: Notify not less than 24 hours before each placement for inspection and testing.

B. Placement Records: Contractor shall maintain records of time, temperature and date of concrete placement including mix design and location in the structure. Retain records until completion of the contract. Make available for review by Testing Agency and Architect/Engineer.

C. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

D. Verify location, position, and inclusion of all embedded and concealed items.

E. Verify installation of vapor retarder under interior slabs on grade, as specified in related section, is complete.

F. Cleaning and Preparation:

1. Remove loose dirt, mud, standing water, and foreign matter from excavations and cavities.
2. Close cleanout and inspection ports securely.
3. Thoroughly clean reinforcement and other embedded items free from loose rust and foreign matter. Maintain reinforcing securely in place. Do not place concrete on hot reinforcing.
4. Dampen form materials and substrates on which concrete is to be placed at least 1 hour in advance of placing concrete; repeat wetting as necessary to keep surfaces damp. Do not saturate. Do not place concrete on saturated material.
   a. Thoroughly wet wood forms (except coated plywood), bottom and sides of trenches, adjacent concrete or masonry and reinforcement.
   b. Concrete slabs on base rock, dampen rock.
   c. Concrete slabs on vapor retarder, do not wet vapor retarder.
5. Verify that metal forms are clean and free of rust before applying release agent.
6. Thoroughly clean metal decking. Do not place concrete on wet deck surface.
7. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

G. Drill holes in existing concrete at locations where new concrete is doweled to existing work. Insert steel dowels and prepare connections as detailed.

H. Do not overcut at existing concrete work to remain. Contractor is responsible for repair/replacement of overcut concrete to the Owner's satisfaction.

3.03 PIPES AND CONDUITS IN CONCRETE

A. No pipes or conduit are permitted within drilled piers.

3.04 CONCRETE PLACEMENT

A. Transporting:

1. Provide clean, well-maintained equipment of sufficient quantity and capacity to execute the work and produce concrete of quality specified.
2. Handle and transport concrete from mixer to final deposit location as rapidly as practicable. Prevent separation or loss of ingredients.

B. Perform concrete placement by methods which will not puncture, damage, or disturb vapor retarder membrane. Repair all damage to vapor retarder membrane before covering.

C. Placement - General: Placement, once started, shall be carried on as a continuous operation until section of approved size and shape is completed. Provide construction joints as detailed on the drawings. Engineer's written approval required for all deviations.

1. Deposition:

a. Deposit concrete to maintain an approximately horizontal plastic surface until the completion of the unit placement.
b. Deposit as neatly as practicable in final position, minimize re-handling or flow.
c. Do not drop concrete freely where reinforcing bars, embeds, or obstructions occur that may cause segregation. Provide spouts, elephant trunks, or other means to prevent segregation during placement.

2. Depth: Layered placement in piers shall not exceed ten feet vertical depth.
   a. Place concrete in minimum 32 inch horizontal lifts.
   b. Schedule placement to ensure that concrete will not take initial set before placement of next lift.
   c. No horizontal cold joints are allowed in piers.
3. Progress Cleaning: Remove all concrete spilled on forms or reinforcing steel in portions of structure not immediately concreted. Remove completely before concrete sets.
4. Interruptions: Shut down placement operations and dispose of all remaining mixed concrete and concrete in hoppers or mixers following all interruption in placement longer than 60 minutes.
   a. If such interruption occurs, provide new or relocate existing construction joints as directed by Engineer.
   b. Cut concrete back to the designated line, cleaning forms and reinforcing as herein specified.
   c. Prepare for resumption of placement as for new unit when reason for interruption is resolved.

D. Consolidation:

1. Consolidate all concrete thoroughly during placement with high-speed mechanical vibrators and other suitable tools. Perform manual spading and tamping to work around reinforcement, embedded fixtures, and into corners of formwork as required to obtain thorough compaction.
   a. Provide vibrators with sufficient amplitude for adequate consolidation.
   b. Use mechanical vibrators at each point of concrete placement.
   c. Keep additional spare vibrators, in addition to those required for use, at the site for standby service in case of equipment failure.
2. Consolidate each layer of concrete as placed.
   a. Insert vibrators vertically at points 18 to 30 inches apart; work into top area of previously placed layer to reconsolidate, slowly withdraw vibrator to surface.
   b. Avoid contact of vibrator heads with formwork surfaces.
   c. Systematically double back and reconsolidate wherever possible. Consolidate as required to provide concrete of maximum density with minimized honeycomb.

E. Unacceptable Materials:

1. Do not place concrete that has started to set or stiffen. Dispose of these materials.
2. Do not add water on site to concrete except as specified in the approved mix design, see PART 2 above.

F. Protection of installed work:

1. Do not introduce any foreign material into any specified drainage, piping or duct systems.

2. Contractor shall bear all costs of work required to repair or clean affected work as a result of failure to comply with this requirement.

3.05 CONCRETE JOINTS

A. Structural Joints (Construction/Cold Joints):

1. Locate joints only where shown, or as approved.
2. Review Required: Joints not indicated on the plans shall be located to meet the minimum requirements below, shall not impair the strength of the structure and shall be submitted to Architect/Engineer for review prior to placement of concrete.
   a. Indicate proposed location(s) of construction/cold/expansion joints on shop drawing submittals for review prior to placing concrete.
3. Clean and roughen all surfaces of previously placed concrete at construction joints by washing and sandblasting to expose aggregate to 1/4 inch amplitude.
4. Slabs-On-Grade: Maximum Length of continuous placement shall not exceed 60 feet without special review by the Architect/Engineer. Alternate or stagger placement sections.

B. Expansion/Construction Joints (Dowel Joints and Control Joints):

1. Exterior Concrete Slabs on Grade (walkways, patios):
   a. Expansion/ construction joints: Provide a 2 inch deep troweled groove or asphalt impregnated joint material embedded 50 percent of the slab depth at 12 feet on center, maximum.
   b. Proportions: Place no section with a length larger than two times width. Additionally, place joints at all inside corners and at all intersections with other work.

C. Joint Types:

1. Dowel Joint: A keyed joint with smooth dowels passing through to allow unrestricted movement due to contraction and expansion. Joints are as specified on the drawings.
2. Control Joint(s): Shrinkage crack control joints may be of the following types when shown on the drawings. Install joints in a straight line between end points with edges finished appropriate to type. Depth shall be 25% of the slab thickness, unless noted otherwise. Fill joints with sealant as shown on the drawings or as required by related sections.
   a. 1/4 inch wide troweled joint.
   b. Keyed joint: Only at locations where concealed by other finishes.
   c. Masonite Strip, 1/8 inch: Only at locations where concealed by other finishes.
   d. Saw Cut, 1/8 inch: Must be performed within eight hours of completion of finishing. Do not make saw cuts if aggregate separates from cement paste during cutting operation. Prevent marring of surface finish. Fill with flexible sealant.

3.06 VAPOR RETARDER

A. Vapor Retarder Installation: Install as specified in Section 07 2500 "Weather Barriers", ASTM E1643, and per manufacturer's recommendations including taping and lapping of seams, sealing of penetrations, and repair of damage. Do not extend vapor retarder below footings.

3.07 FLATWORK

A. General Requirements for All Concrete Formed & Finished Flat:

1. Edge Forms and Screeds: Set accurately to produce indicated design elevations and contours in the finished surface, edge forms sufficiently strong to support screed type proposed.
2. Jointing: Located and detailed as indicated.
3. Consolidation: Concrete in slabs shall be thoroughly consolidated.

B. Flatwork Schedule:

1. Exterior Slabs-On-Grade: Place concrete directly over sub-base as indicated.
   a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.

3.08 FORMED SURFACES

A. Form all concrete members level and plumb, except as specifically indicated. Comply with tolerances specified in ACI 318 Section 26.11, ACI 301 Section 2, and this specification, except that maximum permissible deviation is 1/4 inch end-to-end for any single member.

3.09 CONCRETE FINISHES

A. Flatwork Finishing:

1. All exposed concrete flatwork surfaces shall be non-slip. See Architectural, Civil, and Landscape drawings.
2. Perform with experienced operators.
3. Finish surfaces monolithically. Establish uniform slopes or level grades as indicated. Maintain full design thickness.
4. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.
5. Flatwork Finish Types:
   a. Wood Float Finish: Surfaces to receive quarry tile, ceramic tile, or cementitious terrazzo with full bed setting system, or wood frame for raised finished floors.
   b. Steel Trowel Finish: Surfaces to receive carpeting, resilient flooring, seamless flooring, thin set terrazzo, thin set tile or similar finishes specified in related sections. Trowel twice, minimum.
   c. Broom Texture Finish: Exterior surfaces as indicated or for which no other finish is indicated. Finish as for steel trowel finish, except immediately following first troweling, (depending on conditions of concrete and nature of finish required) provide uniform surfaces texture using a medium or coarse fiber broom.

B. Other Concrete: Provide as required to achieve appearance indicated on structural and architectural drawings and related sections.

1. Repair surface defects, including tie holes, immediately after removing formwork.
2. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

3. Exposed Form Finish: Finish concrete to match forms. Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   a. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   b. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
   c. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
4. Intermediate joint and score marks and edges: Tool smooth and flush unless otherwise indicated or as directed by the Architect.
5. Use steel tools of standard patterns and as required to achieve details shown or specified. All exposed corners not specified to be chamfered shall have radiused edges.

3.10 TOLERANCES

A. Minimum Flatwork Tolerances: Measure flatness of slabs with in 48 hours after slab installation in accordance with ACI 302.1R and ASTM E1155 and to achieve the following FF and FL tolerances:

1. Exterior surfaces: 1/8 inch minimum per foot where sloped to drain. Level otherwise. FF20 and FL15.

B. Formed Surface Tolerances:

1. Permanently Exposed Joints and Surfaces: Provide maximum differential height within two feet of, and across construction joints of 1/16 inch.

3.11 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing, and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Apply sand and cement slurry coat on base course, immediately prior to placing toppings.

E. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels not to exceed 20 feet in either direction.

F. Screed toppings level, maintaining surface tolerances per above.

3.12 CONCRETE CURING

A. Curing - General: Cure in accordance with ACI 308. Maintain concrete water content for proper hydration and minimize temperature variations. Begin curing immediately following finishing.

B. Protection During Curing: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. The General Contractor is responsible for the protection of the finished slab from damage.

1. Avoid foot traffic on concrete for minimum of 24-hours after placement.
2. Protect concrete from sun and rain.
3. Maintain concrete temperature at or above 50 degrees F. during the first 7 days after placement. See Article ENVIRONMENTAL REQUIREMENTS.
4. Do not subject concrete to design loads until concrete is completely cured, and until concrete has attained its full specified 28-day compressive strength or until 21 days after placement, whichever is longer.
5. Protect concrete during and after curing from damage during subsequent building construction operations. See Article PROTECTION.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than 7 days.

D. Begin curing immediately following finishing.

E. Surfaces Not in Contact with Forms:

1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than 3 days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
2. Begin final curing after initial curing but before surface is dry.
   a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
   b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.
3. In addition, see specific conditions noted below.

F. Slabs on Grade: Cure by one of the following methods:

1. Water Cure (Ponding): Maintain 100 percent coverage of water over floor slab areas, continuously for minimum 7 calendar days.
2. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
3. Moisture-Retaining Film or Paper: Lap strips not less than 6 inches and seal with waterproof tape or adhesive; extend beyond slab or paving perimeters minimum 6 inches and secure at edges; maintain in place for minimum 7 days.
4. Absorptive Moisture-Retaining Covering: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides and extend beyond slab or paving perimeters 6 inches minimum; maintain in place for minimum 7 days.
5. Liquid Membrane-forming Curing Compound: Provide only when subsequent concrete treatments or finish flooring specified in related sections will not be affected by cure/sealer. Apply curing compound in accordance with manufacturer's instructions at the maximum recommended application rate in two coats, with second coat applied at right angles to first.

G. Foundations: Apply curing compound immediately after floating.

3.13 CONCRETE HARDENER

A. Apply hardener to all floor slabs not receiving other finishes after 30 days minimum curing. Clean slabs of non-compatible cure/sealers or other foreign material(s) and apply in strict accordance with the manufacturer's directions.

3.14 GROUTING AND DRY PACK

A. Set steel plates on concrete or masonry with high strength grout bed, completely fill all voids; thoroughly compact in place. See Section 05 1100.

B. Bolts or inserts dry packed or grouted in place shall cure for minimum 7 days before tensioning.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspections by Independent Testing Agency: Provided verification and inspection of concrete per CBC Table 1705A.3. Provide written reports for to Engineer, Architect, Contractor and Building Official for the following tests and inspections:

B. Testing & Inspection: Provide periodic inspection of reinforcing steel. Provide continuous inspection during placement of structural class concrete, 3000 psi or more. Non-structural class concrete with a design strength of 2500 psi or less to have periodic inspection on a 150 cubic yard basis as required to assure conformance.

1. Provide periodic inspection of bolts in concrete prior to and during placement where so noted on the construction documents.
2. Structural Concrete Cylinder Tests: Perform in accordance with ASTM C31.
   a. Take four standard 6 inch x 12 inch (or five 4 inch x 8 inch) cylinder specimens on the site, of each class of concrete as specified in PART 2, not less than once a day or for each 50 cubic yards or 2000 sq ft or fraction thereof placed each day.
   b. Record the location of each concrete batch in the building in a log and also note on each specimen.
   c. Perform standard compression test of cylinders in accordance with ASTM C39, one at 7 days and two (three for 4x8 cylinders) at 28 days.
   d. Hold fourth (fifth) cylinder untested until specified concrete strengths are attained.
3. Structural Concrete Slump Test and Air Tests: Perform in accordance with ASTM D143 and C231 or C173 at the time of taking test cylinders, and/or at one-hour intervals during concrete placing.
4. Measure and record concrete temperature upon arrival of transit mixers and when taking specimens. Note weather conditions and temperature.
5. Propose adjustments to reviewed mix designs for Architect / Engineer review to account for variations in site or weather conditions, or other factors as appropriate.
6. Water Vapor Transmission Tests: Floors receiving floor finishes specified in related sections will be tested prior to installation of flooring systems. Refer to sections specifying floor finishes for related requirements.

C. Services by Contractor:

1. Rejection of Concrete Materials: Do not use the following without prior written approval of the Architect/Engineer;
   a. Materials without batch plant certificates.
   b. Materials not conforming to the requirements of these specifications.

3.16 ADJUSTING

A. Inspect all concrete surfaces immediately upon formwork removal. Notify Architect/Engineer of identified minor defects. Repair all minor defects as directed.

B. Surface and Finish Defects: Repair as directed by the Architect/Engineer, at no added expense to the Owner. Repairs include all necessary materials; reinforcement grouts, dry pack, admixtures, epoxy and aggregates to perform required repair.

1. Repair minor defective surface defects by use of drypack and surface grinding. Specific written approval of Architect/Engineer is required. Submit proposed patching mixture and methods for approval prior to commencing work.
2. Slabs-on-Grade, Elevated Slabs and on Slabs on Metal Deck: Review for "curled" slab edges and shrinkage cracks prior to installation of other floor finishes. Grind curled edges flush, fill cracks of 1/16 inch and greater with cementitious grout.
3. Grind high spots, fins or protrusions caused by formwork; Fill-in pour joints, voids, rock pockets, tie holes and other void not impairing structural strength. Provide surfaces flush with surrounding concrete.

3.17 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required compressive strength, lines, details, dimensions, tolerances, finishes or specified requirements; as determined by the Architect/Engineer.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer who may order additional testing and inspection at his option. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Specific Defects:

1. "Low-Strength"; Concrete Not Meeting Specified Compressive Strength after 28 days:
   a. Concrete with less than 25% Fly Ash or 35% Slag as cementitious material: Test remaining cylinder(s) at 56 days. If strength requirements are met, concrete strength is acceptable.
   b. Concrete with 25% or more Fly Ash or 35% or more Slag as cementitious material: Test remaining cylinder(s) at 70 days. If strength requirements are met, concrete strength is acceptable.
2. Excessive Shrinkage, Cracking, Crazing or Curling; Defective Finish: Remove and replace if repair to acceptable condition is not feasible.
3. Lines, Details, Dimensions, Tolerances: Remove and replace if repair to acceptable condition is not feasible.
4. Slab sections not meeting specified tolerances for trueness/flatness or lines/levels: Remove and replace unless otherwise directed by the Architect/Engineer. Minimum area for removal: Fifteen square feet area unless directed otherwise by the Architect/Engineer.

5. Defective work affecting the strength of the structure or the appearance: Complete removal and replacement of defective concrete, as directed by the Architect/Engineer.

3.18 CLEANING

A. Maintain site free of debris and rubbish. Remove all materials and apparatus from the premises and streets at completion of work. Remove all drippings; leave the entire work clean and free of debris.
B. Slabs to Receive Floor Finishes Specified in other sections: Remove non-compatible cure/sealers or other foreign material(s) which may affect bonding of subsequent finishes. Leave in condition to receive work of related sections.

3.19 PROTECTION

A. Protect completed work from damage until project is complete and accepted by Owner.

B. Construction Loads: Submit engineering analysis for equipment loads (including all carried loads) specified in article submittals.

C. Keep finished areas free from all equipment traffic for a minimum of 4 additional days following attainment of design strength and completion of curing.

D. Protection of Drainage Systems:

1. Care shall be taken not to introduce any foreign material into any specified drainage, piping or duct system.
2. Cost of work to repair or clean drainage system as a result of failure to comply with this requirement will be back charged to the contractor.

E. Cover traffic areas with plywood sheets or other protective devices; maintain protection in place and in good repair for as long as necessary to protect against damage by subsequent construction operations.

END OF SECTION

SECTION 05 1100

STRUCTURAL AND MISCELLANEOUS STEEL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: All labor, materials, equipment and operations required to complete structural and miscellaneous metals in shapes and configurations indicated; including:

1. Structural steel columns, base plates, and bolts.
2. Miscellaneous structural steel and connections; fabricated connectors and hangers installed by related sections.
3. Anchor bolts and steel inserts embedded in concrete, installed by related sections.
4. Fabricated steel items embedded in concrete installed by related sections.
5. Supervision of anchor bolt setting, leveling and elevations to insure required fit of steel work.
6. Shop priming and field touch-up, galvanizing.
7. Bracing, Shoring, Fabrication and Erection.

B. Related Sections:

1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
2. Pertinent Sections of other Divisions specifying concrete reinforcement, formwork, concrete, structural and miscellaneous metal fabrications, steel joists, metal decking, cold-formed metal framing, rough carpentry.

1.02 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 22A Steel.

B. American Institute of Steel Construction (AISC) 303 “Code of Standard Practice for Steel Buildings and Bridges”.

C. AISC 360 “Specification for Structural Steel Buildings”.

D. American Welding Society (AWS) D1.1 “Structural Welding Code - Steel”.

E. Underwriters Laboratories (UL) FRD “Fire Resistance Directory”.

1.03 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

D. Shop drawings: Submit each building as a complete unit. Do not mix components from multiple buildings or units of work in a submittal. Include all of the following;

1. Profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Fabrication tolerances for all steel.
3. Connections: All, including type and location of shop and field connections.
4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths, type, size, and sequence. Designate demand critical welds.
5. Cross-reference all shop drawing detail references to contract document detail references.
6. Secure all field measurements as necessary to complete this work prior to submitting shop drawings for review.
7. Provide holes, welded studs, etc. as necessary to secure work of other sections.
8. Provide the following as separate submittals for each building or unit of work:
   a. Bolt and anchor setting plans.
   b. Layout, fabrication, and erection drawings.

E. Certifications:

1. Steel Materials: Submit the following for identified materials.
   a. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
   b. Mill Test Reports: Indicate structural strength, destructive test analysis, and non-destructive test analysis.
   c. Contractor's affidavit certifying that all identified steel materials provided are of the grades specified and match the certificates supplied.
2. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification per AWS D1.1.

F. Samples: Provide samples to the Testing Agency as specified in Article SOURCE QUALITY CONTROL, at no additional costs.

1.04 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 17A.

B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.

C. Certification and Identification of Materials and Uses: Provide Testing Agency with access to fabrication plant to facilitate inspection of steel. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.

1. Test all steel as required by ASTM A6.
2. Provide manufacturer's Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.
3. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each material type and/or heat number in the project (i.e. walls, braced frames etc.).
4. Unidentified Material Tests: Where identification of materials by heat number or mill tests cannot be made, Owner's Testing Agency shall test unidentified materials.
5. Provide all certification, verifications, and other test data required to substantiate specified material properties at no additional cost to the Owner.

D. Testing and Inspection: Tests and Inspections performed by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent sections of Division 01.

E. The following standards are the minimum level of quality required. Provide higher quality work as specifically indicated in the Contract Documents.

1. Workmanship and details of structural steel work shall conform to the CBC and AISC 360.
2. The quality of materials and the fabrication of all welded connections shall conform to AWS D1.1.
3. Comply with Section 10 of AISC 303 for architecturally exposed structural steel.

F. The Testing Agency will review all submittals and testing of materials.

G. All re-inspections made necessary by non-conforming work shall be at the Contractor's expense.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in bundles marked with durable tags indicating heat number, mill, member size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.

B. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

1.06 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.

B. Provide schedule and sequence information to Testing Agency in writing upon request.

Update information as work progresses.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel Plates: ASTM A36

B. HSS (Hollow Structural Sections):

1. Round: ASTM A500, Gr. C.
2. Rectangular or Square: ASTM A500, Gr. C.

C. Pipe: ASTM A53, Grade B.

D. Bolts, Nuts, and Washers: ASTM A307 Grade A machine bolts with ASTM A563 Grade A nuts and ASTM F844 washers to match. See FINISHES section for galvanization, where required.

E. Anchor Bolts/Rods, Nuts, and Washers: ASTM F1554 Gr. 36 with ASTM A563 Grade A nuts, and ASTM F436 Type 1 washers. No upset thread allowed.

F. Arc-Welding Electrodes: AWS Standards E70 or equivalent, except no E70T-4 allowed.

G. Other Welding Materials: AWS D1.1; type required for materials being welded.

H. Deformed Bar Anchors: ASTM A496.

2.02 ACCESSORIES

A. High Strength Grout: ASTM C1107, non-shrink, premixed compound consisting of aggregate, cement, and water reducing plasticizing agents. Minimum compressive strength f'c = 7000 psi at 28 days. Non-metallic where exposed to view. BASF "MasterFlow 928" or equivalent.

B. Building Structural Steel Primers: Comply with local VOC limitations of authorities having jurisdiction and the California Green Building Code. Verify compatibility with finish coats specified in other sections. Follow manufacturers printed instructions. Apply one coat unless otherwise directed.

1. Type A: Self-Crosslinking Hydrophobic Acrylic passing 2000 hours ASTM D4585 & 7000 hours ASTM D5894. "Series 115 Uni-Bond DF" by Tnemec (2.0 to 4.0 mils DFT).
2. Type B: Organic Zinc-Rich Urethane passing 50,000 hours ASTM B117 and 15000 hours ASTM G855. "Series 90-97 Tneme-Zinc" by Tnemec (2.5 to 3.5 mils DFT) or "Series 94-H20 Hydro-Zinc" by Tnemec (2.5 to 3.5 mils DFT).
3. Type C: MIO-Zinc Filled Urethane passing 10,000 hours ASTM B117 and 5000 hours ASTM D4585. "Series 394 PerimePrime" by Tnemec (2.5 to 3.5 mils DFT).

C. Galvanizing: ASTM A153 and A123.

D. Touch-Up Primer for Galvanized Surfaces: Type B primer.

2.03 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal built up members by continuous welds where exposed to weather.

C. Fabricate connections for bolt, nut, and washer connectors.

D. Protect all materials, before and after fabrication, from rust, corrosion, dirt, grease, and other foreign matter.

E. Fabricate framing members free from twists or bends. Form holes, cut and sheared edges neatly without kinks, burrs, or warped edges.

F. Exposed Steel: Straight, smooth, free of nicks, scars or dents.

G. Gas Cutting: Gas cutting of holes in a member shall not be permitted.

H. Splicing of members: Members requiring splicing due to length requirements may be spliced using full penetration butt welds when such welds and procedures are inspected and certified by the Testing Agency, in conformance with AWS and AISC standards. The location of splices shall be approved by the Architect/Engineer in writing prior to fabrication.

I. Welding: Welding of structural steel connections shall be performed by qualified welders in accordance with AWS Standards. All weld sizes shall match those shown on the drawings.

1. Preparation: Clean all surfaces free of rust, paint and all foreign matter. Remove paint or scale by brushing, chipping or hammering as required. Chip clean and wire brush burned or flame cut edges before welding. Space and alternate welds, clamping as necessary to prevent warp or misalignment.
2. Sequence Welding: When welds enclose, or partially enclose, the perimeter or portion of the surface of a member, make weld bead in sequence, or staggered. Minimize internal stresses. Weld groups of members occurring in a single line in staggered sequence to minimize distortion of the structural frame.
3. Faulty and Defective Welding: Welds failing to meet AWS standards and the Contract Documents shall be rejected and remade at Contractor expense. All welds showing cracks, slag inclusion, lack of fusion, bad undercut or other defects, ascertained by visual or other means of inspection shall be removed and replaced with conforming work.
4. Minimum Weld Strengths: All welds shall match the minimum weld sizes recommended by AISC. Details of fabrication not specifically shown shall match similar details which are specifically shown. All bevel and groove welds shall be full penetration unless size is noted otherwise.
5. Threaded studs, headed studs, and deformed bar anchors shall be full-fusion welded conforming to ASW D1.1.

J. Grinding: Grind smooth the following structural steel and connections;

1. Exposed cut ends of structural and fabricated shapes.
2. All welds exposed to view.
3. Mitered and fit-up corners and intersections.

K. Back-Up Bars: Required for all complete penetration welds.

L. Bolt Holes: Edge, end distances and spacing shall conform to dimensions shown on the drawings, and as follows;

1. Round: Size indicated and 1/16 inch maximum oversize, except 1 inch and larger bolts may have 1/8 inch maximum oversize.
2. Slotted: At locations specifically noted on the drawings, provide size indicated and 1/16 inch by 1/4 inch oversize slotted in direction perpendicular to applied loads.
3. Holes in base plates for anchor bolts may be 1/8 inch oversize.

M. Comply with Section 10 of AISC 303 for architecturally exposed structural steel (AESS). See architectural & structural drawings for locations of AESS.

2.04 FINISHES

A. Steel exposed to inclement atmospheric conditions or weather (such as coastal moisture or seasonal rain) shall be sufficiently primed or otherwise protected against corrosion. If condition of steel is suspect due to weathering/corrosion, Contractor shall bear cost of inspection to determine if excessive corrosion is present and if steel member(s) requires repair or replacement. Contractor shall bear cost of repair or replacement.

B. Prepare and finish structural and miscellaneous steel component surfaces as follows, unless a higher standard-of-care is determined necessary per item A:

1. Unpainted, interior, dry exposure surfaces need not be primed.
2. Finished painted, interior, dry exposure surfaces:
   a. Surface Preparation: SSPC-SP2 Hand-Tool and/or SP3 Power-Tool Cleaning. Apply Primer Type A. Field touchup with same primer.
   b. Where jobsite exposure is expected to exceed 6 months, SSPC-SP6 / NACE No. 3 Commercial Blast-Cleaning is required. Apply Primer Type B or C. Field touchup with same primer.
3. Finish painted surfaces with exterior exposure, interior exposure subject to wet conditions or fumes, or surfaces to receive high performance finish coatings (for example epoxy or urethane coatings).
   a. Surface Preparation: SSPC-SP6 / NACE No. 3 Commercial Blast-Cleaning to create a dense, uniform angular surface profile of 2.0 mils minimum. For severe (immersion) exposure, SSPC-SP10 / NACE No. 2 Near-White Blast-Cleaning is required.
   b. Apply Primer Type B. Field touchup with same primer.
4. Exterior exposed (unpainted) surfaces and as otherwise indicated to receive galvanizing:
   a. Galvanize per ASTM A123 Class 55 minimum. Passivation agents are not permitted on galvanized metal that is to be painted. Provide vent holes per ASTM A385 at closed sections (such as HSS). Submit proposed location of vent holes for review by Engineer.
   b. Connection hardware shall be hot-dip galvanized per ASTM A153 or F2329. Mating bolts and nuts shall receive the same zinc-coating process.
   c. Repair all uncoated, damaged, or altered galvanized surfaces per ASTM A780.

C. Do not prime the following surfaces unless otherwise indicated:

1. Connections to be field welded.
2. Steel in contact with concrete.

D. Do not cover up work with finish materials until inspection is complete and work is approved by the Testing Agency.

2.05 SOURCE QUALITY CONTROL

A. An independent Testing Agency will perform source quality control tests and submit reports, as specified in pertinent sections of Division 01.

B. Steel Materials Testing:

1. No testing is required for materials identified in accordance with CBC 2202A.1 (heat number, grade stencil, etc.).
2. Unidentified steel- General: Test all structural shapes. In addition, test to verify Fy and Fu values when engineering requirements exceed Fy = 25 ksi for design.

C. Shop Welding Inspection:

1. Testing Agency shall inspect and certify all structural welds.
2. Welder Qualifications: Welding inspector shall verify that all the welders are properly qualified prior to steel fabrication and state the qualifications of each welder in the welding inspection report.
3. Welding Inspection: Continuous inspection required unless otherwise noted below. Comply with requirements of AWS D1.1.
   a. Welding Inspector shall check all welds, materials, equipment and procedures.
   b. Welding Inspector shall provide reports certifying the welding is as required and has been done in conformity with the plans, specifications and codes.
   c. Welding Inspector shall use radiographic, ultrasonic, magnetic particle, or any other necessary aid to visual inspection to assure adequacy of welds. Ultrasonic Testing (UT) shall be required for all complete joint penetration (CJP) welds of material 5/16 inch thick or greater.
4. Periodic Inspection Acceptable:
   a. Single pass fillet welds not exceeding 5/16 inch.

D. Bolts, Nuts, and Washers: Provide samples to Testing Agency for required testing, at no additional cost.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Framing:

1. Erect all structural steel true and plumb.
2. Verify proper final alignment prior to making final connections.

C. Field Connections:

1. Workmanship of field bolted and welded connections shall conform in all respects to methods and tolerances specified for fabrication.
2. Field weld components indicated on shop drawings. Sequence field welds to minimize built-up stress and distortion of the structural frame. Verify sequence with Engineer. Coordinate field welding schedule with Testing Laboratory.
3. Welded Studs: Install in accordance with manufacturer's instructions and structural welding code AWS D1.1.

D. Templates: Provide bolt setting templates for all anchor bolts. Provide instructions for the setting of anchors and bearing plates, verify these items are set correctly as work progresses.

E. Column base plates: Set level to correct elevations, support temporarily on steel wedges, shims, or leveling nuts where shown, until the supported members are plumbed and base plate is grouted.

1. Grout solid the full bearing area under base plates prior to installation of floor and/or roof decks.
2. Comply with manufacturer's instructions for high strength grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

F. Bolting:

1. Inspect mating surfaces to insure that bolt head and nut will have full bearing and that metal plies will mate flush between bolts.
2. Install bolts in matching holes. Do not distort metal or enlarge holes by drifting during assembly. Remake mismatched components to achieve tolerances indicated.
3. Holes mismatched in excess of 1/8 inch will be rejected.
4. Holes mismatched less than 1/8 inch may be reamed to the next larger size bolt.
5. Do not enlarge holes by flame cutting or air/arc (“plasma“) cutting.
6. Provide flat washer(s) at over-size holes.
7. Provide washer at bolt head and nut where connected part is less than ¼ inch thick.
8. Provide ASTM F436 beveled washers when the slope of the surfaces of parts in contact with the bolt head or nut is greater than 1:20.
9. Do not install bolts with damaged threads.
10. Threads shall commence outside of the shear plane.
11. Machine Bolts (MB): Install and tighten to a snug condition (ST) such that laminated surfaces bear fully on one another, using an impact wrench or “full effort” of an installer using a standard spud wrench.

G. Supports, Shoring and Bracing: Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion

of erection and installation of permanent bracing. Conform to requirements of all applicable laws and governing safety regulations. Resist imposed loads, including those of stored materials and equipment.

1. Provide all temporary supports, shoring and bracing necessary to achieve work of tolerances indicated.
2. Provide all necessary temporary flooring, planking and scaffolding required for erection of steel, and support of erection machinery.
3. Construction Loading: Do not overload the structure or temporary supports with stored materials, equipment or other loads.
4. Maintain temporary bracing and shoring until work is complete, and longer as required to ensure stability and safety of structure.

H. Do not make final connections until structure is aligned to meet specified tolerances.

3.03 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. The independent Testing Agency will perform field quality control tests, as specified in pertinent sections of Division 01.

B. Field Welding Inspection: Conform to all requirements of section SOURCE QUALITY CONTROL.

1. Inspect mating surfaces.
2. Test all materials prior to use. Use only materials meeting specified requirements.

3.05 ADJUSTING

A. Touch-up damaged finishes with compatible specified primer.

B. Replace defective or damaged work with conforming work. Replace all defective work at Contractor's expense.

C. Straighten materials by means that will not injure the materials.

D. Replace defective or damaged work which cannot be corrected in the field with new work, or return defective items to the shop for repair.

E. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.

F. Pay expenses incurred by Owner for Architect/Engineer's costs for (re-)design and obtaining approvals of Authorities Having Jurisdiction (AHJ) necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent

sections of Division 01.

G. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

3.06 CLEANING AND PROTECTION

A. Clean all surfaces upon completion of erection; leave free of grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave surfaces broomed clean.

B. Protect work from damage by subsequent operations.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Pertinent Sections specifying sealants or referencing this Section for sealant products and execution requirements.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2006 (Reapproved 2011).

B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2000 (Reapproved 2011).

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

G. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.

H. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.

I. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015, with Editorial Revision (2017).

J. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

K. Manufacturer's recommendations and specifications.

L. SWRI (VAL) - SWR Institute Validated Products Directory; Current Listings at www.swrionline.org.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.

3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
4. Substrates the product should not be used on.
5. Substrates for which use of primer is required.
6. Substrates for which laboratory adhesion and/or compatibility testing is required.
7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
8. Sample product warranty.
9. Certification by manufacturer indicating that product complies with specification requirements.
10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
   1. Manufacturer's Installation Instructions: Indicate limitations, special procedures, surface preparation, and perimeter conditions requiring special attention.
   2. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant colors (multiple colors will be required).

E. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

G. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

H. Sustainable Design Documentation: For sealants and primers, submit VOC content and emissions documentation as specified in Section 01 6116.

I. Manufacturer Qualifications. Demonstrate compliance with specified requirements.

J. Installer Qualifications. Demonstrate compliance with specified requirements.

K. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

L. Installation Plan: Submit at least four weeks prior to start of installation.

M. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

N. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

O. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

P. Installation Log: Submit filled out log for each length or instance of sealant installed.

Q. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

D. Manufacturer of sealant and caulking material to certify that cleaners, joint filler or bond breakers, and primers, for a particular application, are compatible with sealant.

E. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. Adhesion Testing: In accordance with ASTM C794.
   2. Compatibility Testing: In accordance with ASTM C1087.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver to manufacturer sufficient samples for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

F. Installation Plan: Include schedule of sealed joints, including the following.
   1. Joint width indicated in Contract Documents.
   2. Joint depth indicated in Contract Documents; to face of backing material at centerline of joint.
   3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
   4. Approximate date of installation, for evaluation of thermal movement influence.
   5. Installation Log Form: Include the following data fields, with known information filled out.
      a. Location on project.
      b. Substrates.
      c. Sealant used.
      d. Primer to be used, or indicate as "No primer" used.
      e. Size and actual backing material used.
      f. Date of installation.
      g. Name of installer.
      h. Actual joint width; provide space to indicate maximum and minimum width.
      i. Actual joint depth to face of backing material at centerline of joint.

j. Air temperature.

G. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
2. Name(s) of sealant manufacturers' field representatives who will be observing
3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
   a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
   b. Test date.
   c. Location on project.
   d. Sealant used.
   e. Stated movement capability of sealant.
   f. Test method used.
   g. Date of installation of field sample to be tested.
   h. Date of test.
   i. Copy of test method documents.
   j. Age of sealant upon date of testing.
   k. Test results, modeled after the sample form in the test method document.
   l. Indicate use of photographic record of test.

H. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
   a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.
   b. If any failures occur in the first 10 linear feet, continue testing at 12 inch intervals at no extra cost to Owner.
3. Destructive field adhesion testing of sealant joints, except interior acrylic latex sealant.
   a. For each different sealant and substrate combination, allow for one test every 100 feet in the first 1000 linear feet, and one test per 1000 linear feet thereafter, or once per floor on each elevation.
   b. If any failures occur in the first 1000 linear feet, continue testing at frequency of one test per 500 linear feet at no extra cost to Owner.
4. Field testing agency's qualifications.
5. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

I. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.
3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.

5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

J. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
2. Repair failed portions of joints.

K. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inch long.
2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.
4. Record results on Field Quality Control Log.
5. Repair failed portions of joints.

1.06 MOCK-UP

A. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

B. Construct mock-up with specified sealant types and with other components noted.

C. Locate where directed.

D. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000.

B. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

C. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.08 FIELD CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.09 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content as specified in Section 01 6116.

B. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors: Provide color of exposed joint sealants to comply with the following:
   1. Provide colors matching selections made by Architect from manufacturer's full range of colors for products of type indicated. Colors may be listed in schedule at the end of this section or on the drawings. Request color selection for all products listed without a preselected color.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.

e. Other joints indicated below.

2. Do not seal the following types of joints.
   a. Intentional weepholes in masonry.
   b. Intentional weepholes in window assemblies and head flashings.
   c. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
   d. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
   e. Joints where installation of sealant is specified in another section.
   f. Joints between suspended panel ceilings/grid and walls.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.

B. Colors: As indicated on the drawings. If no colors are indicated, request colors before preparation of schedule submittals and include on all schedule submittals.

2.04 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 50 percent, minimum.
   2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   5. Color: To be selected by Architect from manufacturer's standard range.
   6. Service Temperature Range: Minus 20 to 180 degrees F.
   7. Manufacturers:
      a. Dow Chemical Company; DOWSIL 790 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
      b. Pecora Corporation: www.pecora.com/#sle.
      c. Sika Corporation; Sikasil WS-290: www.usa-sika.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 50 percent, minimum.
   2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Architect from manufacturer's standard range.
   4. Cure Type: Single-component, neutral moisture curing
   5. Service Temperature Range: Minus 65 to 180 degrees F.
   6. Manufacturers:
      a. Dow Corning Corporation; 795: www.dowcorning.com.
      b. Substitutions: See Section 01 6000 - Product Requirements.

C. Silicone Sealant: ASTM C920, Type S, Grade NS, Class 25, single component, neutral curing, non-sagging, non-staining, non-bleeding, RTV silicone designed for adhesion to low energy surfaces common in sheet or peel-and-stick flexible flashings and air/weather barriers.
   1. Color: To be selected by Architect from manufacturer's standard range.
   2. Service Temperature Range: -65 to 180 degrees F.
   3. Products:

a. Dow Corning Corporation; 758: www.dowcorning.com.
b. Sika Corporation, Construction Products Division; Sikasil-N.
c. Substitutions: See Section 01 6000 - Product Requirements.

D. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A, Class 25; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.
2. Manufacturers:
a. BASF Construction Chemicals-Building Systems; Omniplus: www.buildingsystems.basf.com.
b. Dow Corning Corporation; 786-M White.
c. GE Construction Sealants; SCS1700 Sanitary.
d. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
e. Substitutions: See Section 01 6000 - Product Requirements.

E. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus ____ percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: Custom as selected..
4. Manufacturers:
a. BASF Building Systems, MasterSeal (Sonolastic) NP-2.
b. Sika Corporation; Sikaflex-2c NS: www.usa-sika.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

F. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Products:
a. BASF Building Systems, MasterSeal (Sonolastic) NP-1.
b. Sika Corporation; Sikaflex-1a: www.usa-sika.com.
c. Substitutions: See Section 01 6000 - Product Requirements.

G. Type ___ - Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Service Temperature Range: Minus 40 to 180 degrees F.
5. Manufacturers:
a. Pecora Corporation; Dyna-Tred: www.pecora.com.
b. Sika Corporation, Construction Products Division; Sikaflex 2C-NS.
c. Substitutions: See Section 01 6000 - Product Requirements.

H. Non-Curing Butyl Sealant: Solvent-based, single component, non-sag, non-skinning, non-hardening, non-bleeding; non-vapor-permeable; intended for fully concealed applications.
1. Manufacturers:

a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: www.pecora.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 SELF-LEVELING SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Color at colored concrete: Custom-mixed colors matching colored concrete floors or paving.
5. Service Temperature Range: Minus 40 to 180 degrees F.
6. Manufacturers:
a. BASF Construction Chemicals-Building Systems; MasterSeal (Sonneborn) SL-2 Slope Grade or Self Leveling Sealant: www.buildingsystems.basf.com.
b. Sika Corporation; Sikaflex-2c SL: www.usa-sika.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

B. Concrete Paving Joint Sealant: Polyurethane, pourable self-leveling; ASTM C920, Class 25, Uses T, I, M and A; multi- component.
1. Color: Custom mixed color matching colored concrete.
2. Products:
a. BASF Construction Chemicals-Building Systems; MasterSeal (Sonneborn) SL-2: www.buildingsystems.basf.com.
b. Pecora Corporation; Dyna-Trol II-SG: www.pecora.com.
c. Sika Corporation, Construction Products Division; Sikaflex 2C-SL.
d. Substitutions: See Section 01 6000 - Product Requirements.

C. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
1. Meet requirements of American Concrete Institute 302.1 R-04 “Guide for Concrete Floor and Slab Construction” and American Concrete Institute 360 R10 “Guide to Design of Slabs-on-Ground” for industrial floor joint fillers
2. Composition: Multi-component, 100 percent solids by weight.
3. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
4. Color: To be selected by Architect from manufacturer's standard colors.
5. Joint Width, Minimum: 1/8 inch.
6. Joint Width, Maximum: 1/4 inch.
7. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.
8. Manufacturers:
a. Euco 700 by The Euclid Chemical Company.
b. MM-80 by Metzger-McGuire.
c. BASF Construction Chemicals, MasterSeal CR190.
d. W.R. Meadows, Inc; Rezi-Weld Flex: www.wrmeadows.com/#sle.
e. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
   1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
   2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
   3. Arrange for sealant manufacturer's technical representative to be present during tests.
   4. Record each test on Preinstallation Adhesion Test Log as indicated.
   5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
   6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
   1. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air

pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

2. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.
3. Provide flush joint configuration, per Figure 8B in ASTM C 1193, where indicated.
4. Provide recessed joint configuration, per Figure 8C in ASTM C 1193, of recess depth and at locations indicated.
   a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.

C. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect immediately.

D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

E. Repair destructive test location damage immediately after evaluation and recording of results.

3.05 FINISHING

A. Work that is exposed to view: Uniform surface with neat, straight edges and no excess material on adjacent surface.

3.06 CLEANING

A. Clean adjacent soiled surfaces.

3.07 PROTECTION

A. Protect sealants until cured. Replace damaged work with repairs indistinguishable from original work.

3.08 SCHEDULE

A. Architect will provide color selections and locations for each sealant type and for Contractor's use. Not all locations will have the same color.
   1. Custom colors will be required.

B. Exterior Locations:
   1. Horizontal joints in sidewalks, decks, concrete floors, and driveways: Exterior or Interior Horizontal Expansion Joint Sealant - Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A;single component.
      a. At walk expansion joints.
      b. Where walks abut structural slabs or stoops.
      c. Where walks abut exterior wall of buildings.
      d. Where exposed interior concrete slabs abut vertical surfaces.
      e. Where sealant is shown on the Drawings for concrete slabs.

C. General:

1. Joints in construction between interior and exterior spaces and other designated or required locations to provide effective barrier against passage of elements, Other joints for which no other type of sealant is indicated.:
   a. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT, M, A and O; capable of 50% extension and compression movement.
   b. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
2. Specialty perimeters where required for appearance or weathertightness:
   a. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT, M, A and O; capable of 50% extension and compression movement.
   b. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

D. Paving:
1. Exterior joints in the following horizontal traffic surfaces:
   a. Isolation (Expansion) and contraction joints within cement concrete pavement.
   b. Isolation (Expansion) Joints between building and site concrete.
   c. Joints between different materials listed above.
   d. Other joints as indicated.
2. Horizontal Joints, less than 5 percent slope; Multicomponent, Pourable, Self-leveling, Urethane Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Exposure T, Uses M, A and O; .
3. Horizontal Joints, grades steeper than 5 percent; Multicomponent, Non-Sag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Exposure T, Uses M, A and O.
4. Vertical Joints; Multicomponent, Non-Sag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Exposure T, Uses M, A and O.

3.09 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

D. Section 31 2200 - Grading: Topsoil removal.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

A. Comply with other requirements specified in Section 01 7000.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 VEGETATION

A. Do not remove or damage vegetation beyond the limits indicated on drawings.

B. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.

C. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

D. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.

E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.03 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 2200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site.

C. Finish grading.

1.02 RELATED REQUIREMENTS

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of California, Highway Department standards.

1.05 PROJECT CONDITIONS

A. Protect above- and below-grade utilities that remain.

B. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from grading equipment and vehicular traffic.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil - Soil Type turf: Topsoil excavated on-site.

B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

D. Place topsoil where required to level finish grade.

E. Place topsoil during dry weather.

F. Remove roots, weeds, rocks, and foreign material while spreading.

G. Near plants spread topsoil manually to prevent damage.

H. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

I. Lightly compact placed topsoil.

J. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

C. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

D. Top Surface of Finish Grade: Plus or minus 1/2 inch.

3.07 FIELD QUALITY CONTROL

A. See Section 31 2323 for compaction density testing.

3.08 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive future landscaping.

END OF SECTION

SECTION 32 1216

ASPHALT CONCRETE PAVING AND BASE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Section, apply to this Section.

1.02 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Provide, spread and compact aggregate base as shown on the Contract Documents and as specified herein.

2. Provide, spread and compact asphaltic concrete pavement.

3. Provide and install redwood headerboards (HB) where indicated on the plans.

4. Adjusting to finish grade any and all new or existing, cleanouts, drainage structures, utility vaults, manholes, etc., which are included in the limits of work.

B. Related Sections includes, but are not limited to the following:

1. Earthwork - Section 31 2000

2. Trenching, Backfilling and Compaction - Section 31 2316

1.03 REFERENCES

A. Reference Data:

1. If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual or test designation in effect the date the Notice to Proceed with the Work is given.

B. Town of Windsor Standard Plans and Specifications.

C. Caltrans Standard Specifications.

1.04 QUALITY ASSURANCE

A. Testing and inspection of the aggregate base and asphaltic concrete shall be done by a testing laboratory retained and paid for by the District. Any areas receiving failing tests shall be reworked by the Contractor to achieve the minimum specified degree of compaction. It shall be the sole responsibility of the Contractor to achieve satisfactory results.

B. Test Methods: Unless otherwise indicated, tests shall be made in conformance with the

following standard methods:

1. Relative compaction shall be determined by Test Method No. California 216 and 231.
2. Design and Construction Standards of the Town of Brentwood latest edition.
3. Caltrans Standards and Specifications, July 2006 Edition.

1.05 SUBMITTALS

A. Submit asphalt mix design parameters and certificates of compliance.

B. Submit certificate of compliance for aggregate base.

C. Submittals shall conform to the requirements of Section 01 33 00.

PART 2 PRODUCTS

2.01 AGGREGATE BASE

A. Aggregate for aggregate bases shall be clean and free of vegetable matter and other deleterious substances.

B. Aggregate base shall be of such a nature that it can be compacted readily under watering and rolling to form a firm, stable base.

C. Aggregate base shall be Class 2, and the combined aggregate shall conform to the ¾" maximum grading specified in Section 26-1.02A "Class 2 Aggregate Base" of the 1992 Caltrans Specifications.

D. Recycled Class 2 aggregate base materials meeting the gradation and strength requirement of virgin material is acceptable.

E. At the Contractor's option, the non-contaminated, demolished aggregate base may be reused provided it is approved by the project Geotechnical Engineer. See Section 31 1000, Site Preparation.

2.02 ASPHALT CONCRETE

A. The asphalt concrete shall be Type A, ½" maximum, medium and shall conform to the applicable portions of Section 39 of the Caltrans Standard Specifications. See Pavement Plan for locations of each size.

2.03 HEADER BOARDS

A. Header boards shall be constructed of nominal 2"x 6" wood, meeting the requirements of Section 20-2.12, "Lumber", of the Caltrans specifications.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION FOR BASE MATERIAL

A. Subgrade preparation shall conform with the requirements in Section 31 2000 - Earthwork, and shall not vary more than 0.05 foot above, or 0.05 foot below the grade established by

the plans.

B. Prepared subgrade shall be inspected by the independent testing laboratory retained by the District prior to the placement of any aggregate base.

C. As per Section 31 2200 - Grading

3.02 SPREADING

A. Aggregate base and aggregate subbase shall be delivered to the roadbed as uniform mixtures and shall be graded in layers or windrows. Segregation shall be avoided and the base/subbase shall be free from pockets of coarse or fine material.

B. The aggregate base and aggregate subbase, after spreading as above specified, shall be shaped to such thickness that after watering and compacting the completed base will conform to the required grade and cross section, within the tolerances specified in Section 26-1.05 "Compacting" of the Caltrans Specifications.

C. The base/subbase shall be spread, watered and compacted in layers not to exceed 6 inches in compacted thickness to achieve the specified thickness.

3.03 COMPACTION AND TOLERANCE

A. The relative compaction of the base shall not be less than 95 percent.

B. The finished surface of the aggregate base and aggregate subbase shall not vary more than 0.05 foot from the design grades.

C. Aggregate base and aggregate subbase which fails to meet the specified tolerances shall be reshaped, dewatered and recompacted at the Contractor's expense.

3.04 SUBGRADE PREPARATION FOR ASPHALT CONCRETE

A. All construction beneath the subgrade shall be completed, including pipeline testing, prior to asphalt concrete placement.

B. Subgrade shall not vary more than 0.05 foot above or below design grade.

C. Any soft spots in the subgrade shall be repaired by the Contractor, regardless of cause, prior to paving.

D. Minimum Class 2 aggregate base material under private walkways as shown on the Drawings shall be 4 inches in compacted thickness, unless otherwise noted.

3.05 TACK COAT

A. Apply tack coat of RS-1 or CRS1 Emulsion to vertical surfaces of existing surfacing that will come into contact with asphalt concrete.

3.06 SPREADING AND COMPACTING ASPHALT CONCRETE

A. Shall be in accordance with Section 39 of the Caltrans Standard Specifications.

3.07 STRUCTURE ADJUSTMENT

A. The Contractor shall mark the location of all structures to be adjusted to grade and shall be responsible for their location after paving operations are completed.

B. After surfacing or resurfacing is completed, the Contractor shall construct or reconstruct the structures to grade as shown on the plans.

3.08 FLOW TEST

A. Finished pavement areas shall be flow tested in the presence of the Inspector of record to confirm that positive gradients that facilitate proper and complete surface drainage, have been achieved in all paved areas.

B. Any areas that fail the flow test, defined as any area where depth of ponding water exceeds 1/8 inch or where the surface of a ponding area exceeds 10 square feet, shall be repaved to achieve positive drainage.

3.09 CLEAN UP

A. Remove all debris and stains resulting from the work of this section.

END OF SECTION

SECTION 32 1313

CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide Portland cement concrete site work complete. including the following items:
   1. Concrete pavement.

B. Related requirements include:
   1. Section 03 3000, Cast-In-Place Concrete
   2. Section 32 3113, Chain Link Fences and Gates

1.2 QUALITY ASSURANCE

A. Reference and Standards
   1. Perform work in accordance with all applicable laws. codes and regulations required by City of Brentwood and County of Contra Costa and the State of California.
   2. Reference to "Standard Specifications" shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
   3. The American Concrete Institute (ACI): "Manual of Concrete Practice," Parts 1, 2 and 3.

B. Stipulations
   1. Finish Surface Tolerance: 1/4-inch maximum variation in 10 feet.

1.3 TESTS

A. The Project Inspector will select a qualified testing laboratory to take samples for testing during the course of the work as considered necessary. The Owner will pay costs for such tests. Contractor shall cooperate in making tests and shall be responsible for notifying the designated laboratory in sufficient time to allow taking of samples at time of pour.

B. Should tests show that concrete is below specified strength, Contractor shall remove all such concrete, as directed by the Project Inspector. Full cost of removal of low strength concrete, its replacement with concrete of proper specified strength and testing, shall be borne by Contractor.

1.4 COORDINATION

A. Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in the concrete and for the provision of holes, openings, etc., necessary to the execution of the work of the trades.

1.5 SOILS REPORT:

A. A soil investigation report has prepared for the project by the firm of BSK, entitled:
   1. Geotechnical Investigation Report and Geologic Hazard Assessment, Liberty High School Campus Expansions by BSK dated April 11, 2018.

B. This report is available in the office of the Architect and the Construction Manager for inspection by the Contractor. Unless otherwise specified, it is intended that all work be performed in accordance with the provisions of these report.

1.6 SOILS BORINGS

A. Subsurface soils investigations have been made at the site and logs of the test holes are available with the soils report. Such investigations have been made for the purposes of design only, and neither the Landscape Architect, Architect, the Owner, nor the Soils Engineers guarantee adequacy or accuracy of the data, or that data are representative of all conditions to be encountered. Such information is made available for general information only and shall not relieve the Contractor of the responsibility for making their own investigations

1.7 SUBMITTALS

A. Submittals per Division 1 requirements

B. The Contractor's Testing Laboratory's certificate of compliance.

C. The Contractor shall submit:
1. Certified copies of mix designs for each concrete class specified including compressive strength test reports.
2. Certification that materials meet requirements specified.
3. Certification from vendor that samples originate from and are representative of each lot proposed for use.

D. Mock-ups of all materials under this Division shall be supplied for testing as requested by the Architect

E. Provide mockup of all concrete finishes, color and joints (with curing compound if any to be used) indicated on the drawings. Accepted mock-ups shall be kept at the job site to serve as a prerequisite for all finishes.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Supply ready mixed concrete throughout. Batch mix and transport in accordance with ASTM C-94, "Specifications for Ready Mixed Concrete."

B. Mix and deliver concrete in quantities that will permit immediate use only.

C. Indiscriminate addition of water for any reason will be cause for rejection of the load.

PART 2 - PRODUCTS

2.1 FORMWORK MATERIALS

A. Forms shall be wood.
1. Plywood: APA Plyform, Grade B-B, 5/8-inch thickness minimum.
2. Lumber: Douglas fir, "Standard" grade or better (grade marks not required).
3. Plywood: 5/8-inch thickness minimum. Use overlaid plywood complying with U.S.Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form", Class 1. Panels to receive specified form sealer to ensure uniform finish of exposed surfaces

B. Form Coatings: Knox-Crete, or equal.

C. Form Ties: Burke "Penta-Tie," or equal, cone and rod type with 1-inch break-back. Do not use form ties on exposed concrete of seat walls.

2.2 REINFORCING MATERIALS

A. Bar Reinforcement ASTM A615.
1. #3 and smaller: Grade 40.

2 #4 and larger: Grade 60.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type II.

B. Aggregate: ASTM C33.
1. Coarse Aggregate: Normal weight; 3/4-inch maximum size; clean, uncoated, crushed aggregate, free of materials which cause staining or rust spots.
2. Fine Aggregate: Clean, natural sand.

C. Water: Clear and potable, free from deleterious impurities.

D. Admixtures: Admixtures are optional, must be compatible with color pigments where required. Any proposed admixture shall comply with State Section 2603(b) 5 of Part 2, Title 24 CCR. Accelerating admixtures are not permitted.

2.4 CONCRETE MIXES

A. Concrete mixes shall be accepted and shall be in accordance with CalTrans Standard Specifications Section 90. Unless otherwise noted, mix shall be Class "A," 3,000 psi, Type II Portland cement and 3/4-inch maximum aggregate.

B. Lamp Black: Concrete for exposed "natural colored" concrete shall be darkened by the addition of accepted agents at the mixer. The proportion of lampblack or other accepted colorant, to a great extent dependent on the color of the cement used in the mix, shall be that required to property darken the concrete to reduce glare, and shall be subject to the approval of the Project Inspector or as required by Architect. Provide mockups with a ratio of one pound of lamp black for each cubic yard of concrete or as otherwise approved.

2.5 ANCILLARY MATERIALS

A. Expansion Joint Material:. Fiber Expansion Joint: A non-extruding resilient filler, saturated with high quality bituminous materials having preserving characteristics. W. R. Meadows or accepted equal. Conform to ASTM- 01751-83. Include Joint Sealant

B. Curing Compound: ASTM C309, Water-base type, free of permanent color, oil or wax, or accepted equal. Curing compound shall be compatible with color pigments.

C. Concrete Sealer: As manufactured by L. M. Scofield Co. or silicone-based, non-staining product such as Siloxane as manufactured by Prosoco and available from White Cap (415) 626-3750 and as accepted by Architect. Concrete Sealer shall be compatible with color pigments.

D. Combination Curing Compound Concrete Sealer: W. R. Meadows Vocomp-20, (800-342-5976) or accepted equal. Combination Curing Compound. Combination Curing Compound Concrete Sealer shall be compatible with color pigments.

E. Joint Sealant: W. R. Meadows or Sonneboum 2-part joint sealant or Sikaflex-1a elastomeric joint sealant or equal product. Available from Sika Corporation, Hayward (510) 487-2294. Color shall be as selected by Architect.

F. Color of Concrete: Pigments for integral colored concrete as manufactured by Davis Colors, 800-356-4848, applied at manufacturer's specified rates of application, or accepted equal

2.6 WATERPROOFING

A. Subseal-60 Self-adhering Waterproofing Membrane available from MFM Building Products Corp or accepted equal.

2.7 TRUNCATED DOMES

A. Detectable dome spacing and size to meet detail on Architectural Drawings.

B. Detectable warning devices to be color yellow conforming to Federal color number 33538.

C. When placed on asphalt, adhesive type detectable warning surface may be installed in lieu of cast-in concrete.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Install all concrete work true to line and grade as indicated on the drawings.

B. Correct irregularities to the satisfaction of the Project Inspector.

3.2 PREPARATION

A. Take every precaution to obtain a subgrade of uniform bearing power by compaction to provide a firm base.

B. Subgrade shall be kept moist and shall not be allowed to dry out before placement of concrete. Place no material on muddy subgrade.

C. Aggregate base, where indicated, shall be placed and compacted in conformance with CalTrans Standard Specifications 26-1.04 and 26-1 .05.

D. Obtain acceptance of subgrade from Project Inspector prior to placing steel and concrete.

3.3 FORMS

A. Forms shall be constructed in accordance with ACI 347 and shall be of sufficient strength and sufficiently tight to prevent visible distortion or leakage of mortar and fines.

B. Forms for exposed surfaces shall be designed to protect intended finish. Deflection of facing material between studs shall not exceed 0.0025 of the span. Facing material and pattern of joints shall be as accepted by the Architect.

C. For vertical surface of wall footings below grade, clean-cut trench may be used in lieu of form if character of soil will permit installation without sluffing and width of concrete is increased at least 1 inch beyond indicated dimension of each face poured against earth.

D. Curb and pavement edge forms shall extend full depth of concrete. Curves shall be formed with flexible metal or wood made up of thin laminations. Curve forms shall extend one stake space straight beyond tangent point.

E. Maintain forms within the following tolerances.
   1. Top of Form: Plus or minus 1/8 inch in 10 feet and no abrupt variations; at required elevation to plus 3/8 inch.
   2. Face of Form: Plus or minus 1/4 inch in 10 feet longitudinal and no abrupt variations; perpendicular to surface plus or minus 1/8 inch.

F. Obtain approval of formwork from Project Inspector prior to placing concrete. Forms may be reused upon cleaning and coating with parting compound to ensure

separation from concrete without damage. After concrete is placed, the following minimum times shall elapse before removal of forms.

1. Footing sides: 24 hours.
2. Mow bands, curbs and pads: 48 hours.

3.4 REINFORCEMENT

A. All concrete shall be steel reinforced unless specifically noted to be "not reinforced." If no reinforcement is shown, reinforce in same manner as that shown in similar places.

B. Fabricate and place reinforcement as indicated on the Drawings and in accordance with ACI "Detailing Manual" SP-66. No reinforcement shall be placed prior to distribution of the accepted shop drawings.

C. Secure reinforcement in position by suitable supports and by wiring at intersections with tie wire. Supports shall be of sufficient number and strength to resist crushing or displacement under full load. Metal shall not extend to surface of concrete.

D. At time of placing concrete, reinforcing shall be free of excessive rust, mill scale, or other bond reducing matter. Immediately before placing concrete. check and adjust position, support and anchorage.

3.5 MIXING AND PLACING CONCRETE

A. Conform to applicable requirements set forth in CalTrans Standard Specifications Section 90.

3.6 JOINTS AND GROOVES

A. Plane of joints shall be perpendicular to surface. Where new pavements join existing, joints shall align.

B. Install joint sealant at fiber expansion joints per manufacturer's specifications.

C. Construction Joints: Place construction joints at the end of pours and at locations where placement operations are stopped for a period of more than one half hour, except where such pours terminate at expansion joints.

1. Construction joints shall be keyed with formed tongue and groove.
2. Tool concrete edge both sides of construction joint.

D. Saw Cut Joints: Begin as soon as concrete has hardened enough to support saw and operator, and to allow cutting without raveling, or deforming the surface finish. Use a concrete cutting blade. Form a smooth uniform joint 1/8" wide, to 1" depth unless shown otherwise. Joints shall be cut within 48 hours of pour. Hold saw cuts 1/2" from edge of concrete.

E. Score Joints: Form in the fresh concrete using a jointer to cut the groove so that a smooth uniform impression is obtained to 1" depth unless shown otherwise. All joints shall be struck before and after brooming. Tool concrete both sides of joint.

F. Expansion Joints and Edging: Provided at the location and intervals as shown on the drawings, and at all locations where concrete paving abuts buildings, curbs or other structures, and not greater than 20 feet on center. Approved joint material shall be placed with top edge below the paved surface and shall be securely held in place to prevent movement. Joint and other edges shall be formed in the fresh concrete using an edging tool to provide a smooth uniform impression. All edges shall be struck before and after brooming.

3.7 FINISHING

A. Mow bands, headers, paving and other exposed work.

1. Surface Finishes

a. Float Finish (typical preliminary finishing for slabs to receive other finishes): The surface of the slab shall be screeded and all surface water and laitance removed. Floating shall be started as soon as the screeded surface has stiffened sufficiently. Floating shall be performed by hand using a wood float and shall be the minimum necessary to produce a relatively smooth, level, even-textured surface.
b. Medium Broom Finish: After the slab has been float finished as described above, the surface shall be uniformly directional textured by coarse stable broom to match accepted mock up to be a non-slip finish.
c. Sandblast Finish: Perform in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish to match accepted mock up. Use abrasive grit of the proper type and gradation to expose the aggregate and surrounding matrix surfaces to match mock up panel, as follows:
   1) Medium Cut: Approximately 1/8" to 3/16" depth.
   2) Heavy cut: Approximately 1/2" to 3/4" depth.
   3) Blast corners and edge of patterns carefully, using backup boards in order to maintain a uniform corner of edge line.
   4) Use same nozzle, nozzle pressure and blasting technique as used for mock up panel.
   5) Maintain control of abrasive grit and concrete dust in each area of blasting. Clean up and remove all expended abrasive grit, concrete dust and debris at the end of each day of blasting operations.

3.8 DEFECTIVE CONCRETE

A. If any concrete work is not formed as indicated, is under strength concrete, if concrete is out of line, level or plumb, or showing objectionable cracks, honeycomb, rock pockets, voids, spelling or exposed reinforcing, it shall be removed, repaired or replaced as directed by the Architect.

3.9 CURING

A. Cure exposed concrete in accordance with CalTrans Standard Specifications Section 90.

B. Only water or curing compounds that impart no permanent color or gloss shall be used for curing concrete.

3.10 CONCRETE SEALING

A. Seal all exposed surfaces according to manufacturer's specifications.

3.11 WATERPROOFING

A. Where soil is backfilled against seat walls install waterproofing per manufacturer's specifications. Hold 2" below finish grade.

B. During construction, wash off work as quickly as possible when stains or splotches are unavoidable.

3.12 TRUNCATED DOMES

A. Detectable warning surface shall be recessed and cast in concrete.

3.13 CLEANUP: Per Division 1 requirements.

A. Upon completion, clean exposed surfaces carefully. Brushing and cleaning solution, if used, must be preceded and followed with a through rinsing of clear water. No sandblasting will be allowed to clean surfaces.

B. Remove from premises; equipment, debris and surplus material needed for, or resulting from, this

work. Remove all concrete waste from planting areas and legally dispose of it.

C. All work shall be left in a condition satisfactory to the Architect.

END OF SECTION

SECTION 32 3113

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SUMMARY

A. Scope of Work

The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to furnish and construct the fencing specified herein, and shown on the Drawings, complete.

B. The work shall include, but shall not be limited to:
1. Fence and Gate Fabric, Rails, Hardware, Framework, and Posts
2. Excavation for Post Bases
3. Concrete Anchorage for Posts

C. Related Work
1. 03 3000 Cast-In-Place Concrete
2. 32 1313 Concrete Paving

1.02 COORDINATION

A. Coordinate work fully with all other trades involved. Coordinate with items of other trades to be furnished and set in place. Such portions of their work as is all or in part embedded, built-in, attached to, or supported by the work shall be executed by them in ample time that progress of the work is not delayed. Contractor shall be responsible for the proper installation of all items related to this section.

1.03 REFERENCE

A. Perform work in accordance with all applicable laws, codes and regulations, as required by the Architect.

B. Reference to "Standard Specifications" shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.

1.04 SUBMITTALS

The following information shall be submitted for approval by the Architect.

A. Erector Qualifications:

B. List of seven (7) similar fence installations in Northern California. Include job location and name and phone number of project administrator.

C. Product Data: Submit Manufacturer's descriptive literature and/or standard catalog "cut-sheets" of all materials, coatings, fittings and equipment proposed to be furnished and installed under this portion of the work. Include Manufacturer's name and catalog number for each item where applicable. Clearly annotate (star or asterisk – in black ink) which portions of "cut-sheets" are applicable if more than one product is shown.

1. Framework (rail, post and gate)
2. Wire mesh
3. Support arm
4. Hinges and latches
5. Gate hardware

D. Shop Drawings: Submit complete Shop Drawings for all different types and sizes of gates and fencing systems.
   1. Shop Drawings shall include, but not be limited to:
      a. All information regarding clearances, connections, components and any miscellaneous related appurtenances (such as locking mechanisms, wiring etc.).
      b. Concrete footing and reinforcement information.

E. Installation instructions and/or drawings: Submit as applicable.

1.05 SEQUENCE AND SCHEDULING

A. Contractor shall coordinate construction timing of all fencing and related work with installation of concrete work and all other work.

1.06 CLEAN UP

A. Keep job site free of debris and rubbish as well as excess materials, tools and equipment connected with work specified herein. Clean up periodically during construction and at completion of work specified herein; lawfully dispose of all such material off District's premises.

PART 2 PRODUCTS

2.01 MATERIALS

A. General Note: It is intended that all fencing, by area, receive the same finish coating wherever possible. Nuts, bolts, applicable moving portions of hinges etc, shall be finished to match.

B. Fabric
   1. Selvage: Knuckled finish top and bottom.
   2. Steel Fabric: Comply with Chain Link Fence Manufacturers Institute (CLFMI) Product Manual. Furnish one-piece fabric widths for fencing up to sixteen feet (16') feet high. Wire sizes includes zinc coating.
   3. Size: One and one quarter inch (1.25"), 9-gauge (0.148 inch diameter) as noted on the Drawings.
   4. Galvanized Wire: Zinc coated wire-ASTM A 392, Class 1, with not less than 1.2 oz. zinc per sq. ft.

C. Framing
   1. Strength requirements for posts and rails shall conform to ASTM F 669.
   2. Pipe shall be straight, true to section, material, and sizes specified, and shall conform to the following weights per foot:

NPS in Inches	Outside Diameter (OD in inches)	Type 1 Steel	Type 2 Steel
1	1.315	1.68	1.35
1.25	1.660 (1-5/8")	2.27	1.84
1.5	1.900 (2")	2.72	2.28

2	2.375 (2-1/2")	3.65	3.12
2.5	2.875 (3")	5.79	4.64
3	3.500	7.58	5.71
3.5	4.000	9.11	6.56
4	4.500	10.79	---
6	6.625	18.97	---
8	8.625	28.55	---

D. Steel Framework
   1. Posts, Rails, Braces, and Gate Frames:
      a. Type I Steel Pipe: Hot-dipped galvanized steel pipe conforming to ASTM F 1083, plain ends, standard weight (Schedule 40) with not less than 1.8 oz. zinc per sq. ft. of surface area.
      b. Type II pipe: not applicable.
   2. Top, Bottom and Horizontal Intermediate Rails:
      a. Top, bottom and horizontal intermediate rails (as applicable) shall be as shown on the Drawings.
   3. Gate Frames: Furnish frames (single or double gate), for nominal gate widths as shown on the Drawings.

E. Fittings and Accessories
   1. Material: Comply with ASTM F 626. Mill-finished aluminum or galvanized iron or steel, in accordance with Manufacturer's standards.
      a. Zinc Coating: Unless specified otherwise, steel fence fittings and accessories shall be galvanized in accordance with ASTM A 153, with zinc weights per Table 1 of ASTM A153.
   2. Tension Wire: 7 gauge (0.177 inch diameter) coil spring steel with finish to match fabric.
   3. Tie Wires: 9 gauge (0.148 inch diameter) steel with finish to match fabric.
   4. Post and Line Caps: Provide weather tight closure cap for each post. Provide line post caps with loop to receive wire or top rail with finish to match fabric.
   5. Tension Bars: Hot dipped galvanized steel with minimum length two inches (2") less than full height of fabric, minimum cross-section of 3/16 inch by ¾ inch and minimum of 1.2 oz. zinc coating per sq. ft. of surface area.
   6. Tension Clips: Minimum ¾ inch wide 12 gauge (0.105 inch) thick with finish to match fabric.
   7. Truss Rods: Hot dipped galvanized steel rods with minimum diameter of 5/16 inches (5/16") (7.9 mm).
   8. Hinges: Master Halco heavy duty for maintenance gates, or acceptable equal.
   9. Accessible gates shall have hydraulic hinges, self-closing and adjustable speed, Mammoth or approved equal. Adjust and maintain gate so that from the open position of 70 degrees, the gate shall move to the closed position in 1.5 seconds minimum (11B-404.2.8.2).
   10. Provide or fabricate all mounting hardware as required for hinges, closers, lever handles, strike plates and panic hardware.
   11. Concrete: Concrete for footings shall conform to the requirements of ASTM C94, normal Portland cement, 3000 psi at twenty-eight (28) days, four inch (4") slump. Refer to Section 03 3000 – Cast-In-Place Concrete.

PART 3 EXECUTION

3.01 PREPARATION

A. Prior to excavation, layout all fencing locations for review and acceptance by Architect.

3.02 INSTALLATION

A. Chain link fencing shall be constructed as shown on the Drawings and a height therein specified. The line of the fence shall be cleared of all obstructions and surface irregularities and the bottom of the fence shall be to uniform grade.

B. Unless otherwise set forth in the Drawings, all fences shall be constructed with a top rail, and bottom rail.

C. The posts shall be spaced as specified on the Drawings. Terminal posts and gate posts shall be set as specified on Drawings. Line posts shall be set as specified on Drawings.

D. Post shall be set as specified on the Drawings.

E. Concrete bases for terminal, line, and gate posts shall be allowed to cure for not less than seven (7) days before wire fabric is placed.

F. Fabric shall be fastened to line posts with fabric bands spaced approximately fourteen inches (14″) apart and to top rail and bottom tension wire with tie wires spaced approximately twenty-four inches (24″) apart.

G. Stretcher bar and truss bands shall be spread and slipped on end, corner, pull, brace, and gate posts before installation of top rails. Extension joints shall be provided from rails at intervals of one hundred feet (100′). Bottom tension wire shall be seven (7) gauge galvanized coil spring steel.

H. Pass top rail through line post tops to form continuous bracing. Install seven inch (7″) long couplings midspan at pipe ends.

I. The placing of the rails, braces, and the wire fabric shall be accomplished in such a manner that the finished fence shall be taut, true, and of precise workmanship throughout. The fabric shall be stretched so that no slack sections remain at any point. The fabric shall be securely tied to posts and rails in a manner so that the fabric will remain tight and immovable.

J. Position bottom of fabric two inches (2″) above finished grade, or as shown on the Drawings.

K. Cut and peen bolts so that bolts protrude one quarter inch (1/4″) maximum beyond nuts and there are no sharp edges.

END OF SECTION

SECTION 32 1700
PAVEMENT MARKING AND SIGNS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Provide painted traffic striping, traffic signs and posts, thermoplastic pavement markings.

B. Obtain and pay for encroachment permit for work within public rights of way.

1.02 RELATED SECTIONS

A. Pertinent sections of Division 32 addressing Asphalt Concrete Paving and Base.

1.03 REFERENCES

A. Caltrans Traffic Manual and Standard Specifications, latest edition.

B. California Building Code,Title 24, Part 2, California Building Code.

C. ADA STANDARDS - Americans with disabilities Act (ADA) Standards for Accessible Design; 2010.

D. Standards for jurisdiction where project is located.

E. ASTM E303 Standard Test Method for Measuring Surface Frictional Properties.

F. ASTM C1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surface

G. ASTM D2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces

1.04 PERFORMANCE REQUIREMENTS

A. All work shall conform to referenced standards..

B. Provide a slip-resistant surface measurable by the ASTM E 303 standard.

1.05 SUBMITTALS

A. See Section 01 3300 - Submittals for submittal procedures.

B. Provide a mock up of pavement marking finishes, color and texture. Demonstrate acceptable slip resistance under wet conditions.

PART 2 PRODUCTS

2.01 PARKING STALL STRIPING

A. The paint to be used on Parking stall striping shall be a commercial quality paint and be applied in two coats to achieve the designed coverage. Thinner shall not be mixed with paint.
   1. Formula shall include an evenly dispersed fine-aggregate additive to provide a textured slip-resistant coating complying with CBC 11B-302.1.

B. Manufacturers:
   1. Dunn-Edwards.
   2. Plexi Pave . Plexicolor textured line paint
   3. Nova Sports. Novatex textured line paint.

2.02 THERMOPLASTIC MARKINGS

A. Thermoplastic materials shall comply with the requirements of Section 84-2 of the State Standard Specifications. Glass beads are required on all thermoplastic markings.

2.03 SIGNS

A. Traffic and Regulatory Signs: Conform to requirements of local authority having jurisdiction and CalTrans Traffic Manual for the type of sign indicated.

B. Mount at standard heights on 2 inch diameter round galvanized steel posts embedded in concrete per referenced standards.

PART 3 EXECUTION

3.01 PARKING STALL STRIPING

A. No parking stall striping shall be started until all paving work on the entire job has been completed, and the various finished surfaces are sufficiently cured to prevent undue tracking onto new striping.

B. Paint shall dry "track free" in not less than thirty (30) minutes and not more than ninety (90) minutes.

C. The air compressor used shall have a capacity of 60 cubic feet per minute.

D. All stripes for parking spaces shall have a width of four inches. All widths shall be within 1/3-inch of the specified widths.

E. Paint application rate:
1. Solid single stripes: 17 to 18 gallons per mile.

F. All lines and other shapes shall be clean and sharp as to dimensions and shall be painted in the locations shows on the plans. Ragged ends of segments, fogginess along the sides, or objectionable dribbling along the unpainted portions of the stripe shall not be permitted.

G. The finished product shall have an opaque, well painted appearance with no black or other discolorations showing through. All smears shall be painted out with black paint to the satisfaction of the Owner's Representative.

H. Take all reasonable precautions to protect the paint during drying time. Paint out all objectionable tracking. Provide appropriate traffic control necessary to insure non-tracking while maintaining reasonable traffic flows.

I. Painted stripes shall receive two coats of paint.

J. No work shall be done when the pavement is appreciably damp.

3.02 THERMOPLASTIC PAVEMENT MARKINGS

A. Thermoplastic pavement markings shall be applied in strict conformance with the requirements of Section 84-2.04, Application, of the State Standard Specifications

B. Glass beads shall be applied immediately to the surface of the molten thermoplastic material at a rat of not less than 8 pounds per 100 square feet.

3.03 CLEANING and PROTECTION

A. Clean and remove all debris and stains resulting from the work of this section..

B. Protect installed work from subsequent construction operations.

C. Do not permit traffic over painted markings.

END OF SECTION

SECTION 32 1726
TACTILE WARNING SURFACES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tactile Warning Surfaces: Truncated dome detectable warnings required for compliance with State and Federal accessibility regulations.

1.02 RELATED SECTIONS

A. Pertinent sections of other Divisions specifying paving, striping, storm drainage or site plumbing work affecting this Section.

B. Section 07 9005 - Sealants.

C. Pertinent sections of other Divisions specifying electrical work affecting this Section.

1.03 REFERENCES

A. ADA STANDARDS - Americans with disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.

C. California Building Code (CBC), Title 24, Part 2.

D. Manufacturer's recommendations and specifications.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide manufacturer's brochures illustrating conformance to specified characteristics.

C. Shop Drawings: Provide standard installation details. Indicate dome spacing, height, width and length of dome fields for required conditions.

D. Installation Instructions: Include recommended environmental conditions for installation.

E. Samples: Submit two samples of each exposed finish or product, 8x10 inch in size, illustrating finish, appearance and color.

F. Test Reports: Indicate that products will meet all performance requirements of this specification. Previously completed test reports will be acceptable if they are current and indicative of products used on this project.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner 's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Regulatory Requirments: Meet all requirements of ADAAG 4.29.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in installing products specified in this section, licensed by Manufacturer.

1.06 MOCK-UP

A. Construct mock-up comprised of one horizontal field sample panel, approximately 4 feet long. Mock-up shall be ready for review not less than 4 weeks before placement of work is scheduled to begin.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products and materials to project site in original containers and packaging.

B. Comply with pertinent provisions of Section 01 6000.

C. Prevent contact with materials which may cause discoloration or staining. Clean materials which are discolored or stained.

D. Replacements: In the event of damage, immediately make repairs and replacements necessary to the approval of the Architect and Division of the State Architect, without change in contract amount or time.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install products until environmental conditions are within range recommended by manufacturer.

1.09 WARRANTY

A. See Section 01 7000 - Contract Closeout, for additional warranty submittal requirements.

B. Provide five year manufacturer warranty for products. Manufacturer shall warrant that the installation's shape, color-fastness, confirmation, sound-on-cane acoustic quality, resilience and attachment will not degrade significantly (defined as maintaining at least 90 percent of the approved design characteristics as determined by the Authority Having Jurisdiction) for five years from the date of installation.

1.10 EXTRA MATERIALS

A. See Section 01 6000 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Substitutions: See Section 01 6000 - Product Requirements.
   1. Request For Substitution of proposed alternate products must be made in writing as specified in Section 01 6000 and shall demonstrate that the proposed substitution meets or exceeds each of the specified characteristics.
   2. All product and manufacturer requirements listed in Articles titled QUALITY ASSURANCE and WARRANTY must be met and provided with the Request For Substitution.
   3. Submit complete product and test data as specified in the Article titled SUBMITTALS for each proposed substitution.
   4. No substitutions will be accepted following the bid, except as otherwise specified in Section 01 6000.

2.02 MANUFACTURERS

A. Detectable/Tactile Warning Surfaces: Armor-Tile: www.armortile.com. Substitutions per Section 01 6000 - Product Requirements.
   1. Cast-In-Place or Surface-Applied Vitrified Polymer Composite Tactile Warnings Surfaces
      a. Compressive Strength: ASTM D695-02a, 28,000 psi minimum.
      b. Water Absorption: ASTM D 570-98, 5 percent maximum absorption.
   2. Tactile Warning Shapes: Conform to referenced codes and standards;
      a. Height: 0.20 inches nominal.
      b. Spacing and Configuration: As indicated.
   3. Size: 12 inch by 12 inch nominal minimum, or as required to conform to size required on drawings.
   4. Color: Selected by Architect from full range of available colors including custom and premium price options.

2.03 ACCESSORIES

A. Sealant: Compatible material of types specified in Section 07 9005.

B. Adhesive: "Armor-Bond" as supplied by Engineered Plastics Inc., or type recommended by manufacturer.

C. Fasteners: Color matched, corrosion resistant, flat head drive anchors as recommended by manufacturer.

D. Expansion Joint Filler: Types specified in Section 32 1313.

E. Accessory Materials: Other materials not specifically indicated but required to achieve the results specified; commercial quality. Types recommended by manufacturer to suit conditions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work. Correct conditions detrimental to the proper and timely performance of this work before proceeding with installation. Commencement of work indicates acceptance of substrates.

B. Verify all opening sizes, dimensions and tolerances in field.

C. Verify location and sizes of utility rough-in associated with work of this section.

3.02 PREPARATION - SURFACE-APPLIED TACTILE WARNING TILES

A. Surface-applied tactile warning tiles must be installed on concrete substrate. Asphalt substrate is not acceptable.

B. Examine surfaces to receive tiles and conditions under which tiles will be installed. Do not proceed with installation until surfaces and conditions comply with requirements indicated in referenced installation standards and manufacturer's printed instructions.

C. Verify that concrete substrate is smooth and flat within the tolerances specified for that type of work and are ready to receive tiles.

D. Verify that concrete substrate is dry, fully-cured, dust-free and free of substances which would impair bonding of tile to concrete. Mechanicaly clean and scarify concrete substrate to remove curing compounds if these are used and roughen surface per the manufacturer's instructions.

E. Clean the backside of tile using acetone per the manufacturer's instructions.

3.03 INSTALLATION - TACTILE WARNING TILES

A. Cast-In-Place Tactile Warning Tiles
   1. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use materials as recommended by manufacturer and as required to suit field conditions.
   2. Cast-in-place tactile warning tiles must be installed in concrete; installation in asphalt is not acceptable.
   3. The physical characteristics of the concrete shall be consistent with the contract specifications while maintaining a slump range of 4 - 7 to permit solid placement of the tiles.
   4. Do not remove concrete in the area to accept the tiles. It is imperative that the installation technique eliminates any air voids under the tile. Holes in the tile perimeter allow air to escape during the installation process. Concrete will flow through the large holes in each embedment flange on the underside of the tile which will lock the tile solidly into the cured concrete.
   5. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. Immediately after finishing concrete verify that required slopes are achieved. Tactile warning tiles shall be tamped or vibrated into the fresh concrete to ensure that the field level of the tile is flush to the adjacent concrete surface. The embedment process should not be accomplished by stepping on the tile as this may cause uneven setting which can result in air voids under the tile surface.
   6. Tiles shall be placed true and square in accordance with the contract drawings. Individual tiles shall be bolted together using hardware recommended by the manfacturer to ensure that adjacent tiles are flush to each other during the installation process.
   7. The factory-installed plastic sheeting must remain in place during the entire installation process to prevent the splashing of concrete onto the finished surface of the tile. Following the concrete curing stage, the protective plastic wrap is to be removed per the manufacturer's instructions.
   8. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile that may rock the tile causing a void between the underside of tile and concrete.

B. Surface Applied Tactile Warning Tiles
   1. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use materials as recommended by manufacturer and as required to suit field conditions.
   2. Apply adhesive to the backside of of the tile per the manufacturer's instructions.
   3. Tiles shall be set true and square in accordance with the contract drawings.
   4. After adhering tiles, drill and install all fasteners in the tile's molded recesses, working from the center of the tile outward.
   5. Clean the concrete around the tile's perimeter using acetone to ensure a clean, dry surface to receive perimeter sealant.
   6. Apply sealant around the tile installation perimeter using care to work sealant into any void between the tile and concrete interface. Tool the perimeter sealant to create a cove profilr between the tile and adjacent concrete.
   7. Do not allow foot traffic on installed tiles until perimeter sealant has cured sufficiently to avoid tracking.

3.04 ERECTION TOLERANCES

A. Maximum Variation From True Position: one-sixteenth inch.

B. Maximum Offset From True Alignment: one-sixteenth inch.

C. Maximum Out-of-Position: 1/8 inch.

D. Maximum Misalignment of Two Adjoining Surfaces Abutting in Plane: one-sixteenth inch.

3.05 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 4523.

3.06 ADJUSTING

A. Repair damaged and defective work and eliminate functional and visual defects. Where repair is not possible replace work. Adjust joints for uniform appearance. No unfinished surfaces or irregularities in completed work.

3.07 CLEANING and PROTECTION

A. Clean exposed surfaces.

B. Strictly follow manufacturer guidelines when removing foreign substances from finished surfaces.

C. Protect installed work from subsequent construction operations until Owner's acceptance. Utilize durable protective wrappings and panel materials using methods which will not damage surfaces or finishes. Do not remove until Owner acceptance following move-in.

D. Do not permit traffic near unprotected finish surface(s).

END OF SECTION