STATE OF CALIFORNIA DEPARTMENT OF GENERAL SERVICES

REAL ESTATE SERVICES DIVISION
PROJECT MANAGEMENT AND DEVELOPMENT BRANCH

PROJECT MANUAL – Book 1 of 2

INTRODUCTORY INFORMATION
BIDDING REQUIREMENTS
CONTRACTING REQUIREMENTS
SPECIFICATIONS

FOR:

OES SECURITY UPGRADES

GOVERNOR'S OFFICE OF EMERGENCY SERVICES

MATHER, SACRAMENTO COUNTY, CALIFORNIA

Jenny Li, Project Director
West Sacramento, California

Designed By:State of California

October 1, 2025

000000000009324

DOCUMENT 00 01 01

PROJECT TITLE PAGE

Title	:	OES Security Upgrades
Client Agency	:	Governor's Office of Emergency Services
Location	:	3650 Schriever Ave. Mather, Sacramento County, California
Project Number	:	000000000009324
Project Director	:	Jenny Li State of California Department of General Services Real Estate Services Division Project Management and Development Branch 707 Third Street, 4th Floor West Sacramento, California 95605 Telephone Number: (916) 206.3264 Email: jenny.li@dgs.ca.gov
Consultant	:	State of California, DGS Lorenz Quinley Telephone Number: (279) 946-7989 Email: lorenz.quinley@dgs.ca.gov

APPROVED
DIV. OF THE STATE ARCHITECT
APP: 02-122133 INC:
REVIEWED FOR
SS ☐ FLS ☐ ACS ☑
DATE: 08/20/2025

OFFICE OF THE STATE FIRE MARSHAL
APPROVED FIRE AND PANIC ONLY
04/28/25
24-0106
Approval of this plan does not authorize or approve any omission or deviation from applicable regulations. Final approval is subject to field inspection. One set of approved plans shall be available on the project site at all times.

SECTION 00 01 05

CERTIFICATIONS PAGE

PROJECT TITLE:	OES SECURITY UPGRADES
CLIENT AGENCY:	OFFICE OF EMERGENCY SERVICES
LOCATION:	3650 SCHRIEVER AVENUE MATHER, CA 95655 SACRAMENTO COUNTY
PROJECT NUMBER:	000000000009324
OWNER:	STATE OF CALIFORNIA
PROJECT DIRECTOR :	Jenny Li Department of General Services, Real Estate Services Division, Project Management & Development Branch 707 Third Street, 4th Floor, Suite 4-105 West Sacramento, California 95605 916.206.3264

LICENSED ARCHITECT LAWRENCE QUINLEY C-30185 RENEWAL DATE 11/30/25 STATE OF CALIFORNIA	REGISTERED PROFESSIONAL ENGINEER TOMMY F. LEE No. EE-18534 ELECTRICAL STATE OF CALIFORNIA Tommy F. Lee 2/16/24	REGISTERED PROFESSIONAL ENGINEER JONATHAN P SHATTUCK C 083904 EXP. 9/30/2025 CIVIL STATE OF CALIFORNIA
ARCHITECT	ELECTRICAL ENGINEER	CIVIL ENIGNEER

DOCUMENT 00 01 10

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END OF DOCUMENT

STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION
PROJECT MANAGEMENT AND DEVELOPMENT BRANCH

DOCUMENT 00 11 00

INVITATION FOR BIDS

For Bidding by Invitation Only Pursuant to PCC § 10122(d): This project is being bid informally to select prime Contractors in accordance with Public Contract Code § 10122(d). Bid forms will be provided to bidders via email.

Bids shall be submitted electronically to hector.cavazos@dgs.ca.gov, December 12, 2025, before 2:00 P.M. Bids received after this date/time will not be considered received on time.

The bids shall include all Work pursuant to the Drawings and Project Manual, and Addenda as may be issued prior to bid opening date.

Readvertisement: This is a readvertisement of a Project for which bids were opened on October 14, 2025 and no contract was awarded. No revisions were made to scope of original work and Drawings and Project Manual, including Addenda, remain same as originally issued with exception of new bid opening date and updated Allowances. New Bid Forms will be issued to qualified bidders.

Scope of Work: Major components of Project Work consist of security upgrades at the two (2) vehicular entrances including, but not limited to, guard booths, crash barriers, access control, and the associated electrical work and site improvements.

License: Contractors' State License Classification required to bid Project is **A or B.**

Certificate of Reported Compliance (CRC) – Fleet Vehicles: As a condition of Contract award, prior to Contract execution, Contractor shall submit copies of the valid CRCs for any fleet retained by the Contractor or any listed Subcontractor, for which any vehicles subject to the California Air Resources Board In-Use Off-Road Diesel Fueled Fleet Regulations, Section 2449(i), Title 12, California Code of Regulations, are used in the completion of the work included in the Contract.
More information on the In-Use Off-Road Diesel-Fueled Fleets Regulation can be found at the following link: https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation

Generative Artificial Intelligence (GenAI): The State of California seeks to realize the potential benefits of GenAI, through the development and deployment of GenAI tools, while balancing the risks of these new technologies.

Bidder must notify the State in writing if it: (1) intends to provide GenAI as a deliverable to the State; or (2), intends to utilize GenAI, including GenAI from third parties, to complete all or a portion of any deliverable that materially impacts: (i) functionality of a State system, (ii) risk to the State, or (iii) Contract performance. For avoidance of doubt, the term “materially impacts” shall have the meaning set forth in State Administrative Manual (SAM) § 4986.2 Definitions for GenAI.

Failure to report GenAI to the State may result in disqualification. The State reserves the right to seek any and all relief to which it may be entitled to as a result of such non-disclosure.

Upon notification by a Bidder of GenAI as required, the State reserves the right to incorporate GenAI Special Provisions into the final contract or reject bids/offers that present an unacceptable level of risk to the State.

Government Code § 11549.64 defines “Generative Artificial Intelligence (GenAI)” as an artificial intelligence system that can generate derived synthetic content, including text, images, video, and audio that emulates the structure and characteristics of the system’s training data.

Availability of Funds: Award of this contract is subject to the availability of funds through the State’s normal budget process and/or transfer of funds to the Department of General Services through the Architecture Revolving Fund.

Pre-bid Site Inspection: Bids will only be accepted from those Contractors having attended the **MANDATORY** pre-bid site inspection tour on **November 12, 2025, at 10:00 A.M.,** at which time representatives of the State and prospective bidders shall meet at **OES Mather campus located at 3650 Schriever Ave., Mather, CA**, and check-in with ID verification at front desk upon entrance to facility. The State’s requirements for Disabled Veteran Business Enterprise (DVBE) participation and other Contract requirements will be presented. Prime Contractors are encouraged to have their Key Administrator and DVBE office coordinator attend to receive this information and to have their questions answered. **Attendance for the entire inspection is required in order for bidders to be eligible to submit a bid. Bidders that attended the Pre-bid Site Inspection as part of the previous solicitation held on September 30, 2025, are not required to attend this Pre-Bid Site Inspection, although attendance is highly recommended.**

Executive Order N-6-22: The Bidder must be advised of Executive Order N-6-22 Russia Sanctions. On March 4, 2022, Governor Gavin Newsom issued Executive Order (EO) N-6-22 regarding Economic Sanctions against Russia and Russian entities and individuals. “Economic Sanctions” refers to sanctions imposed by the U.S. government in response to Russia’s actions in Ukraine, as well as any sanctions imposed under state law. By submitting a bid, Bidder represents that it is not a target of Economic Sanctions. Should the State determine Bidder is a target of Economic Sanctions or is conducting prohibited transactions with sanctioned individuals or entities, that shall be grounds for rejection of the Bidder’s bid any time prior to contract execution, or, if determined after contract execution, shall be grounds for termination by the State.

Bid: Submit on Lump Sum basis as set forth in Bid Forms.

DVBE: Participation in Disabled Veterans Business Enterprises (DVBE) program **may** be required for this project. Refer to Project Manual Document 00 21 00, Project Manual Document 00 22 10 and Bid Forms for requirements. Bidders are advised to commence the required DVBE procedures immediately upon receipt of drawings and project manual.

DVBE Bid Incentive: The DVBE Incentive program is being applied on this project. Refer to Project Manual Document 00 21 00, Article 18.5.

Small Business Preference: Refer to Project Manual Document 00 21 00, Article 5.5

Non-Small Business Subcontractor Preference: Refer to Project Manual Document 00 21 00, Article 5.6

Bonds: Successful bidder shall furnish payment and performance bonds, each in the amount of 100 percent of the Contract price.

Non-Discrimination Program (Government Code § 12990): Refer to Project Manual Document 00 72 00, General Conditions of the Contract for Construction.

Labor Code: Pursuant to Labor Code § 1774, the Contractor to whom the contract is awarded, and any subcontractor under him, shall pay not less than the specified general prevailing rates of per diem to all workers employed in the execution of the contract. Pursuant to Labor Code § 1770 et seq., the Department of Industrial Relations (DIR) has ascertained general prevailing rate of per diem wages in

the locality in which the work is to be performed. Copies of the general prevailing rate of per diem wages are available from the Department of Industrial Relations, Labor Statistics & Research Division, P.O. Box 420603, San Francisco, CA 94142, (415) 703-4780; or general prevailing rate of per diem may be accessed on the internet at Department of Industrial Relations website (https://www.dir.ca.gov) for the August 2025 published general prevailing rate of per diem wages for this contract. Copies of the general prevailing rate of per diem wages are on file at DGS' principal office, which shall be made available to any interested party on request. Note that when the general prevailing rate of per diem determination shows an expiration date (noted by a double asterisk**), to expire during the term of the contract, the Contractor must call or write the DIR to obtain the new rates and incorporate them in this contract for submittal of bid. The Contractor is responsible to comply with the Labor Code Sections and general prevailing rate of per diem determinations, including all the guidelines and the fine print in the general prevailing rate of per diem determinations. Refer to Project Manual Document 00 72 00, General Conditions of the Contract for Construction.

Labor Compliance Monitoring and Enforcement: This project is subject to monitoring and enforcement by the Department of Industrial Relations (DIR), Compliance Monitoring Unit. All Contractors and subcontractors, regardless of tier, shall be required to comply with the Monitoring and Enforcement Program, including, but not limited to, contractor registration, submittal of electronic certified payroll reports directly to the DIR as applicable and cooperation with on-site monitoring by DIR personnel. Refer to Labor Code § 1771.4 et seq. and the General Conditions of the Contract for Construction, Document 00 72 00, Article 3.3.3 for more information.

END OF DOCUMENT

STATE OF CALIFORNIA

DEPARTMENT OF GENERAL SERVICES

REAL ESTATE SERVICES DIVISION

DOCUMENT 00 21 00

INSTRUCTIONS TO BIDDERS

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June 2025 Edition

DOCUMENT 00 21 00
INSTRUCTIONS TO BIDDERS

1. GENERAL

1.1 Bidder shall examine these instructions carefully and be responsive to conditions with which must be complied with prior to bid.

1.2 Bidders shall be aware of the requirements of codes referenced in the Bidding Requirements and in the Contract Documents. Bidders may access codes included in California law through publications or through the Internet. The web site for California law is: http://leginfo.legislature.ca.gov/faces/codes.xhtml.

2. COMPETENCE OF BIDDERS

2.1 License:

.1 Bidder may only bid on work for which Bidder is properly licensed by the Contractors' State License Board.

.2 Joint venture Bidders must possess a joint venture license. Each party to a joint venture shall be properly licensed for the Work of this Project.

2.2 Prior Disqualification: Public Contract Code Section 10162 provides that a bid may be rejected on the basis of a Bidder, any officer of such Bidder, or any employee of such Bidder who has a proprietary interest in such Bidder, having been disqualified, removed or otherwise prevented from bidding on, or completing a Federal, State or Local project because of a violation of a law or a safety regulation.

If the answer to the questionnaire included in the Bid Form is "yes" the Department will review the circumstances presented and if the Director deems acceptance of the bid is not in the best interest of the State, bid may be rejected.

2.3 Employment of Undocumented Aliens: Pursuant to Section 6101 of the Public Contract Code, the State may not award a public works contract to a bidder or contractor, nor shall a bidder or contractor be eligible to bid for or receive a public works contract, who has, in the preceding five years, been convicted of violating a state or federal law respecting the employment of undocumented aliens.

2.4 Contractor Registration:

.1 Pursuant to Sections 1725.5 and 1771.1 of the Labor Code, all contractors and subcontractors must be currently registered with the Department of Industrial Relations in order to qualify to bid on; be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code; or engage in the performance of any contract for public work.

.2 Limited exceptions for Joint Venture Bidders and Projects with Federal Funds may apply pursuant to Section 1771.1 of the Labor Code.

2.5 Ineligible Subcontractors: Pursuant to Section 1777.1 or 1777.7 of the Labor Code, a contractor is prohibited from bidding on, being awarded or performing work on a public works project with a subcontractor who is ineligible to perform work on the public works project. Refer to the General Conditions of the Contract for Construction, Article 4.1.3.

2.6 Asbestos Abatement Certification: If Contractor performs the asbestos abatement work; Contractor must be certified for asbestos abatement work by the Contractors' State License Board. If Contractor subcontracts the asbestos abatement work, Contractor need not be certified for asbestos abatement, but the subcontractor must be certified by the Contractor's State License Board.

2.7 Hazardous Substance Removal Certification: If Contractor performs the hazardous substance removal work or remedial action; Contractor must be certified for hazardous substance removal work by the Contractors' State License Board. If Contractor subcontracts the hazardous substance removal work or remedial action, Contractor need not be certified for hazardous substance removal, but the subcontractor must be certified by the Contractor's State License Board.

3. EXAMINATION OF BID DOCUMENTS AND SITE

3.1 Bidder's Responsibility:

.1 Bidder shall carefully examine the Work site, Drawings, and Specifications (contract documents). This includes reference only documents that will not be part of the agreement, but are provided in addition to documents that will be part of the agreement. See the Office of State Publishing Plan Room https://www.ospplanroom.com/ (Details tab, Documents folder) for reference only documents.

.2 By submitting a bid, Bidder acknowledges that the Bidder understands the character, quality and quantity of surface, locations of utilities, subsurface materials, or obstacles to be encountered; insofar as this information is reasonably ascertainable from inspection of the Work site, Drawings, and Specifications.

.3 Bidder's examination shall include all exploratory work done by the State, as well as information presented in the Drawings, Specifications, and other documents as available.

3.2 Refer to Document 00 11 00, Invitation to Bid, for availability of bidding documents.

3.3 Failure by Bidder to acquaint itself with available information will not relieve Bidder from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

3.4 In connection with the foregoing, Bidder's attention is invited to Paragraphs 3.1 and 9.1 of Document 00 72 00, General Conditions of the Contract for Construction.

4. DISCREPANCIES, CONFLICTS, OMISSIONS, OR ERRORS

4.1 If discrepancies, conflicts, omissions or errors are found in the Drawings and the Project Manual prior to the date of bid opening, Bidder shall request clarification from the State's Representative identified in the Project Manual. Bidder shall submit request on Request for Bidding Interpretation Form, Appendix 00 21 00.1.

4.2 Clarifications will be given only in the form of Addenda to all Bidders.

4.3 If no Addenda are issued related to supposed discrepancy, conflict, omissions or errors in figuring the Work, Bidders shall consider that discrepancies, conflicts, or omission between Drawings and Specifications shall be governed by Paragraph 1.5 of Document 00 72 00, General Conditions of the Contract for Construction.

4.4 Omission of an item in either the Specifications or Drawings does not create a discrepancy or conflict.

5. BIDDING DOCUMENTS

5.1 Bid Form: All bids must be on the forms provided by the Department of General Services. Bid not on the forms provided will be considered nonresponsive.

5.2 Completing the Bid Form:

.1 Bidder's name should be the same as listed on Bidder's license.

.2 Price(s) shall be in the manner required by the Bid Form.

.3 Bid Form shall be signed by Bidder or duly authorized representative.

1) If Bidder is an individual, name must be shown.
2) If Bidder is a partnership, name of the partnership must be shown and one or more partners shall sign the Bid Form.
3) If Bidder is a corporation, name of the corporation must be shown, the state of incorporation must be listed, the title of the signor must be shown, and the corporate seal must be used.
4) Bidder business and mailing address should be shown.

5.3 Required Listing of Proposed Subcontractors:

.1 Failure to list kind of Work, Name, or Location shall cause the bid to be rejected as non-responsive.

.2 Bidders' attention is directed to other provisions of the Subletting and Subcontracting Fair Practices Act, beginning with Public Contract Code Section 4100, related to penalties for failure to comply with the Act by using unauthorized subcontractors or by making unauthorized substitutions. See General Conditions of the Contract for Construction, Paragraph 1.1, for definition of subcontractor, and Article 4 for further reference to subcontractors.

.3 Bidder's attention is directed to Labor Code Section 1771.1, relating to inadvertent errors in the listing of subcontractors not currently registered with the Department of Industrial Relations.

5.4 Bidders Security:

.1 All bids shall be accompanied by the following forms of bidder's security: Bidder's Bond, cashier's check, certified check or cash. Bidder's Bond shall be executed by an admitted surety insurer, authorized to issue surety bonds in the State of California. Bond and checks shall be made payable to the director of the Department of General Services. The security shall be in an amount equal to at least 10 percent of the amount bid. A bid shall not be considered responsive unless one of the forms of bidder's security is enclosed with it.

.2 If Bidder's security is a Bidder's Bond, it must be executed on the form attached to the Bid Form.

5.5 Small Business:

.1 A five percent (5%) small business preference will be granted to Bidders certified as "Small Business" in accordance with Section 1896 et. Seq., Title 2, California Code of Regulations.

.2 If the Bidder is not already a Certified Small Business, applications for certification as "Small Business" must be submitted to the Office of Small Business and DVBE Certification (OSDS), 707 3rd Street, First Floor, Suite 1-400, West Sacramento, CA 95605; https://www.dgs.ca.gov/PD/About/Page-Content/PD-Branch-Intro-Accordion-List/Office-of-Small-Business-and-Disabled-Veteran-Business-Enterprise/Certification-Program. Firms can apply for small business certification online at https://www.dgs.ca.gov/PD/Services/Page-Content/Procurement-Division-Services-List-Folder/Certify-or-Re-apply-as-Small-Business-Disabled-Veteran-Business-Enterprise.

.3 Submit a copy of your OSDS certification letter with the Bid Form.

.4 Pursuant to Section 1896.14, in order to receive the small business preference, bidders must have a completed application (including proof of annual receipts) on file with the OSDS. The bidder must have requested a preference from OSDS and meet all applicable requirements under the subchapter and the State Small Business Procurement and Contract Act, (including but not limited to evidence to rebut presumptions) not later than five o'clock (5:00 p.m.) on the date on which the subject bid is opened.

5.6 Non-Small Business:

.1 The application of the five percent (5%) small business bidding preference is now extended to a bidder, whose business is not certified as a small business but commits to subcontracting at least twenty-five percent (25%) of its net bid price to businesses that are California certified small businesses and/or microbusinesses.

When applicable this preference will be granted when the non-small business:

- Has been determined to be a responsible bidder and submitted a timely responsive bid.
- Completes Document 00 43 16-2 list of California Certified Small Businesses that he/she commits to subcontract with for a commercially useful function in the performance of the project and submits this document no later than forty-eight (48) hours after the time of receipt of bids. Ascertain that the Bidder's Name and project Work Order number are noted. **If bidder fails to submit a properly completed Document 00 43 16-2 within 48 hours after the time of receipt of bids, the claim for non-small business preference will be denied.**

Submit completed Document 00 43 16-2 to Department of General Services, Administration Division, Office of Business and Acquisition Services, Contract Management Section, 707 3rd Street, Suite 2-300, West Sacramento, CA 95605 or by fax to (916) 376-1778.

6. SUBMISSION OF BID FORMS

6.1 It is the sole responsibility of the Bidder to see that its bid is received in proper time. Bid received after scheduled closing time for receipt of bids will be returned to Bidder unopened.

6.2 Bid Forms shall be submitted under sealed cover, plainly identified as a bid for the work of the Project being bid upon and addressed as directed in the Invitation to Bid and the Bid Form. Failure to do so may result in a premature opening of, or failure to open such bid. Bid Forms improperly marked may be disregarded.

7. WITHDRAWAL OF BID FORMS

7.1 Bids may be withdrawn prior to the time fixed in the public notice for opening of bids, provided that

a request in writing, executed by Bidder or Bidder's authorized representative, for withdrawal of such bid is filed with the Administration Division, Office of Business and Acquisition Services, Contract Management Section, or the Director of General Services at the location of the bid opening. Oral, facsimile, electronic, telegraphic, or telephonic request to withdraw the Bid Form is not acceptable. Withdrawal of a bid shall not prejudice the right of a Bidder to file a new bid.

7.2 This article does not authorize withdrawal of any bid after the time fixed in the Invitation to Bid for opening of bids.

8. PUBLIC OPENING OF BIDS

Bids will be publicly opened and read at time and place indicated in Invitation to Bid. Bidders or their authorized agents are invited to be present.

9. REJECTION OF IRREGULAR BIDS

9.1 Bids may be rejected if they show any alterations of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind. If bid amount is changed after the amount is originally inserted, the change must be initialed.

9.2 When Bid Form is signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf, or are signed by an agent other than a partner of a partnership, or by an agent for an individual, a power of attorney must be on file with the Department of General Services prior to opening bids or shall be submitted with the Bid Form; otherwise the bid will be rejected as irregular and unauthorized.

10. COMPETITIVE BIDDING

10.1 If more than one Bid Form is offered by an individual, firm, partnership, corporation, association, or any combination thereof, under the same or different names, all such Bid Forms may be rejected. A party who has quoted prices on materials or work to a Bidder is not thereby disqualified from quoting prices to other Bidders, or from submitting a bid directly for materials or work.

10.2 Bidders are put on notice that any collusive agreement fixing the prices to be bid so as to control or affect awarding of the Contract is in violation of competitive bidding requirements of the State Contract Act and may render void any Contract let under such circumstances.

11. AWARD OF CONTRACT

11.1 The right is reserved to reject any and all bids and waive any irregularity in any bid received.

11.2 Award of the Contract, if awarded, will be to the lowest responsible Bidder whose Bid Form complies with all requirements prescribed.

.1 Such award, if made, will be made within 45 days after opening of bids.

.2 If lowest responsible Bidder refuses or fails to execute the Contract, the Director of General Services may award the Contract to the second lowest responsible Bidder. Such award, if made, will be made within 60 days after opening of bids.

.3 If second lowest responsible Bidder refuses or fails to execute the Contract, the Director of General Services may award the Contract to the third lowest responsible Bidder. Such award if made, will be made within 75 days after opening of bids.

11.3 The above time periods within which award of Contract may be made are subject to extension of such further period as may be agreed upon in writing between the Department of General Services and the Bidder concerned.

11.4 When Project is segregated into more than one prime Contract, and a Bidder upon one of the prime Contracts fail or refuses to execute the Contract, then the time for award of such Contract will be extended as provided by this Article, and the time for award of each of the other segregated prime Contracts will be extended by an equivalent length of time, if required.

12. SUBSTITUTION OF ALTERNATIVE MATERIALS, ARTICLES, OR EQUIPMENT

12.1 Pursuant to Public Contract Code Section 3400, alternative material(s), article(s), or equipment that are of equal quality and of required characteristics for the purpose intended may be proposed during the bidding period; for use in the Work, provided the Bidder complies with the following requirements:

.1 Proposals for alternative material(s), article(s), or equipment, requested during the bidding period, shall be submitted in writing, not later than the deadline date and time identified on the Request for Bidding Interpretation (RFBI), Appendix 00 21 00.1.

.2 The proposal will not be considered unless the submittal is accompanied by complete information and descriptive data necessary to determine equality of offered material(s), article(s) or equipment. Samples shall be provided when requested by the State. Burden of proof as to comparative quality, suitability, and performance of offered material(s), article(s), or equipment shall be upon the Bidder submitting the proposal. The State will be the sole judge as to such matters. In the event the State rejects the use of such alternative(s) submitted, then one of the particular products originally specified in the Contract Documents shall be furnished. If the proposal is accepted, all Bidders will be notified by Addendum.

.3 Refer to the General Conditions of the Contract for Construction, Clauses 2.2.7 and 3.12.10, for substitution requests after Contract Award.

13. RETURN OF BIDDER'S SECURITY

13.1 Within 10 days after the award of the Contract, the Department of General Services will return all Bidder's security, other than Bidder's Bonds, accompanying the Bid Forms that are not to be fully considered in making the award.

13.2 Retained Bidder's security will be held until the Contract has been fully executed, after which all Bidder's security, except Bidder's Bonds, will be returned.

14. CONTRACT BONDS

Contractor will be required to furnish in duplicate the Performance Bond and Payment Bond required by the State Contract Act, each in the amount of 100 percent of the Contract amount; as set forth in Paragraph 11.3 of Document 00 72 00, General Conditions of the Contract for Construction.

15. INSURANCE

Contractor will be required to furnish to the State, concurrently with execution of the Contract, a certificate of insurance coverage as required by Paragraph 11.1 of Document 00 72 00, General Conditions of the Contract for Construction.

16. EXECUTION OF CONTRACT

16.1 Contract shall be signed by successful Bidder and returned within 7 days of receipt. The Contract shall not be binding upon the State until it is executed by the Contractor and the State. Contract Documents required for execution of the Contract consist of the following:

.1 Agreement, Document 00 52 00.

.2 Contract Bonds.

.3 Certificate of Insurance.

.4 Signed set of Drawings and Project Manual for filing with the Contract.

16.2 Should Contractor begin work in advance of receiving notice that the Contract has been approved, any work performed in advance of the date of approval shall be considered as having been done at risk as a volunteer. In no event shall Contractor commence work until Contractor has received notification from the State that the certificate of insurance has been approved.

17. FAILURE TO EXECUTE CONTRACT

Failure to execute Contract within 7 days after successful Bidder has received Contract for execution may be cause for forfeiture of Bidder's security. Failure to provide required bonds and insurance constitutes failure to execute Contract.

18. PARTICIPATION IN DISABLED VETERANS BUSINESS ENTERPRISES (DVBE) PROGRAM

18.1 Pursuant to Section 10115 et seq. of the Public Contract Code, and Section 999 et seq. of the Military and Veterans Code, the Department of General Services has established an overall goal of not less than 3% participation by Disabled Veteran Business Enterprises (DVBE). However, these DVBE Participation Requirements may be modified for this project; reference Document 00 22 10 of the Project Manual for the percentage requirements.

18.2 Bids will only be accepted from those Bidders that certify that they have achieved the required participation, as outlined in Document 00 22 10 of the Project Manual, and as set forth in the Bid Form.

18.3 Applicants for DVBE certification may apply online at https://www.dgs.ca.gov/PD/Services/Page-Content/Procurement-Division-Services-List-Folder/Certify-or-Re-apply-as-Small-Business-Disabled-Veteran-Business-Enterprise. DVBE applicants must submit specific support documentation to the OSDS.

18.4 Bidder's attention is directed to the requirement that certifications and documentation must be submitted with the bid; otherwise bids will be considered non-responsive.

BIDDERS ARE ADVISED TO COMMENCE THE REQUIRED DVBE PROCEDURES IMMEDIATELY UPON RECEIPT OF DRAWINGS AND SPECIFICATIONS, OR NOT LESS THAN THREE (3) WEEKS PRIOR TO THE BID OPENING, WHICHEVER OCCURS FIRST.

18.5 DVBE INCENTIVE

.1 A DVBE Incentive will be granted to Bidders in accordance with Section 999.5(a) and (d) of the Military and Veterans Code and California Code of Regulations 1896.98 et seq.

.2 The DVBE Incentive will be applied during the bid evaluation process and will only be applied to responsive bids from responsible bidders proposing the percentage(s) of DVBE Participation for the DVBE Incentive specified in the solicitation. Any Small Business Preference must be calculated prior to the DVBE Incentive calculation and evaluation.

.3 The incentive will be applied when a Bidder's DVBE Participation exceeds 3% the DVBE Mandatory participation Requirement, in an attempt to displace the apparent low bidder.

The DVBE Incentive is as follows:

Confirmed DVBE Participation	Incentive
7% and above	5%
6% to 6.99%	4%
5% to 5.99%	3%
4% to 4.99%	2%
3.01% to 3.99%	1%
0% -3%	No incentive – minimum 3% participation required

.4 The percentage of DVBE Incentive will not exceed 5% and will not exceed $500,000.00.

.5 For every bidder qualifying for the DVBE incentive, the amount (dollar value) of the incentive is computed using the qualifying bidder's percentage of DVBE incentive and the lowest responsive and responsible bid price. Calculations to determine adjusted bid price are for consideration only. Bids will be awarded for the actual bid amount as verified by the State.

.6 A certified Small Business may only be displaced by another certified Small Business with a higher percentage of DVBE participation and a lower adjusted bid price.

1) A certified Small Business shall not be displaced by a non-small business.
2) When applying the DVBE Incentive program, bidders claiming the "Non-Certified Small Business preference" are considered a non-small business.

19. CERTIFICATE OF REPORTED COMPLIANCE – FLEET VEHICLES

19.1 For any project using vehicles subject to the California Air Resources Board In-Use Off-Road Diesel Fueled Fleets Regulation, Section 2449(i), Title 12, California Code of Regulations, prior to the execution of a contract, Contractor shall be required to submit copies of the valid Certificates of Reported Compliance (CRC), issued by the California Air Resources Board. CRCs shall be provided for any fleet used by the Contractor or any listed Subcontractors.

19.2 CRCs are required for any contract involving the operation of self-propelled off-road diesel vehicles 25 horsepower or greater and most two-engine vehicles owned and operated in California, including vehicles that are rented or leased.

19.3 Certificates of Reported Compliance must be retained by the Contractor for three years after the completion of the project.

19.4 If no vehicles subject to the California Air Resources Board In-Use Off-Road Diesel Fueled Fleets Regulation shall be used on a project by the Contractor or any Subcontractor, Contractor shall provide a certification that no vehicles subject to these regulations will be used on the project.

END OF DOCUMENT

REQUEST FOR BIDDING INTERPRETATION (RFBI)

(Email no later than December 3, 2025, 5:00 p.m.)

PMDB RFBI No.: _____
Requestor RFBI No.: _____
Request Date:_____
From (Bidder): _____

To: **Jenny Li, Project Director**
Project Management and Development Branch
Real Estate Services Division
Phone: 916-206-3264

Email: jenny.li@dgs.ca.gov

Contact: _____
Phone: _____
Fax: _____
Email: _____

All RFBIs received prior to deadline identified above, and responses from the State will be published on http://www.caleprocure.ca.gov. Click on "Start Search." In the event name field, enter the project number and click search. While viewing the Event Details, click on "View Event Package" to view RFBI responses.

Project No.: 000000000009324
Project Name: OES Security Upgrades
Location: Mather, Sacramento County, CA

Drawing Reference: _____ **Project Manual Reference**: _____

Question:

Bidder's Authorized Signature: _____

[ ] Check here if additional pages attached

Page 1 of ____

DOCUMENT 00 22 00

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

The following requirements supplement Document 00 21 00, Instructions to Bidders:

1. PAYEE DATA RECORD

   Add the following to Subarticle 6.2:

   Bidders are requested to complete and return the State's Payee Data Record form, Std.204 (and Std. 205 if applicable), included with the Bid Forms. The Payee Data Record form is required in lieu of IRS W-9 when doing business with the State of California and will be used by the State to prepare tax information returns as stated on the form.

   .1 Completion and submission of the form with the Bid Forms will expedite processing of the Award of Contract.

   .2 Failure to submit the completed form with the Bid will not be cause for rejection of a Bid.

   .3 Forms of all Bidders will be kept on file by the State for use in future awarded Contracts.

   .4 Bidders who have a completed and current Payee Data Record form on file with the Department of General Services, Real Estate Services Division, Contracts Section, may so state on the form and will not be required to submit a duplicate form.

   .5 The form is subject to Section 7(b) of the Privacy Act of 1974 (Public Law 93-5791). Refer to the Privacy Statement on the back of the form.

END OF DOCUMENT

DOCUMENT 00 22 10

DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION PROGRAM REQUIREMENTS

Public Contract Code Section 10115 establishes a contract participation goal of at least three percent (3%) for Disabled Veteran Business Enterprise (DVBE) for State agencies.

DVBE participation is required for this contract. Mandatory participation has been set at 3%. **Participation above and beyond the requirement is strongly encouraged.** This bid package provides information for the DVBE Participation Program. Bidders must meet DVBE Participation Program requirements to be viewed as a responsive bidder and considered for contract award.

PLEASE READ THESE INSTRUCTIONS CAREFULLY

Bidders must fully comply with DVBE Participation Program requirements. Bidders that do not submit a complete response may find their bid determined to be non-responsive and the bid rejected.

For assistance with meeting the DVBE participation program requirements, please contact:

Department of General Services
Administrative Division
Office of Business and Acquisition Services
Contract Services Section – SB-DVBE Advocate
707 Third Street, MS 508
West Sacramento, CA 95605
Email: OBASAdvocate@dgs.ca.gov

The **Office of Small Business and DVBE Services** (OSDS) offers program information and may be reached at:

Department of General Services
Office of Small Business and DVBE Services (OSDS)
707 3RD Street, 1st Floor, Room 400
West Sacramento, CA 95605-2811
Homepage: Apply for or Re-Apply for Certification as a Small Business and/or Disabled Veteran Business Enterprise
Receptionist: (916) 375-4940
FAX: (916) 375-4950
Email: OSDSHelp@dgs.ca.gov

Mailing Address:
Office of Small Business and DVBE Services (OSDS)
Room 1-400, MS 210
P.O. Box 989052
West Sacramento, CA 95798-9052

INSTRUCTIONS FOR
DVBE PARTICIPATION PROGRAM COMPLIANCE OPTIONS

If for any reason you fail to meet the DVBE Participation Requirement for this bid, your bid will be considered non-responsive.

Meet or exceed the DVBE participation requirements for the proposed contract by one of the following two (2) ways:

1. **DVBE Bidder -** If you are a DVBE bidder, agree to perform the required percentage of the contract bid amount or value with your firm or in combination with other DVBE firms. You **must** write that commitment on Article 9.2 of the Bid Form, Document 00 41 00. Instructions on how to complete this document are on that page.

2. **Non-DVBE Bidder -** If you are a non-DVBE bidder, agree to use other firms for at least the required percentage of the contract bid amount or value. You **must** write that commitment on Article 9.2 of the Bid Form, Document 00 41 00. Instructions on how to complete this document are on that page.

DVBE Certification: OSDS-DVBE certification is the only acceptable certification. To verify if a contractor is certified refer to the Cal eProcure web-site at The State of California Certifications . Bidders must provide certification verification for each participating DVBE bidder, subcontractor, and/or supplier. Applicants for DVBE certification may apply online at Apply for or Re-Apply for Certification as a Small Business and/or Disabled Veteran Business Enterprise. DVBE applicants must submit specific support documentation to the OSDS.

DVBE Bid Incentive: A DVBE Incentive will be granted to Bidders who have achieved DVBE participation exceeding 3% or greater of the value of the bid in accordance with Section 999.5(a) and (d) of the Military and Veterans Code and California Code of Regulations 1896.98 et seq. Refer to Project Manual Document 00 21 00, Article 18.5.

Pursuant to Military and Veterans Code §999.7, the awarding department shall withhold, on a contract entered into on or after January 1, 2021, ten thousand dollars ($10,000) from the final payment, or the full final payment if less than ten thousand dollars ($10,000), until a prime contractor complies with the certification requirements of subdivision (d) of Section Military and Veterans Code §999.5. A prime contractor that fails to comply with the certification requirement shall, after notice, be allowed to cure the defect. Notwithstanding any other law, if, after at least 15 calendar days but not more than 30 calendar days from the date of notice, the prime contractor refuses to comply with the certification requirements, the awarding department shall permanently deduct ten thousand dollars ($10,000) from the final payment, or the full payment if less than ten thousand dollars ($10,000).

ANSWERS TO FREQUENTLY ASKED QUESTIONS:

The following questions are among the most frequently asked regarding DVBE requirements:

Q: ***If I am awarded the contract, am I required to use the subcontractor/supplier proposed in my bid?***

A: Yes, unless you have requested and received approval from the State for substitution. Written requests should include the person's or firm's name to be substituted, the substitution reason, the reason a non-DVBE subcontractor is proposed, if applicable and describe the business to be substituted including its business status as a sole proprietorship, partnership, corporation or other entity and the certification status of the firm, if any. See Title 2, California Code of Regulations, Section 1896.64 (c) & (d) for substitution criteria.

The request and the State's approval or disapproval is not construed as an excuse for non-compliance with any other provision of the law, including but not limited to the Subletting and Subcontracting Fair Practices Act, or any other contract requirements relating to substitution of subcontractors. Failure to adhere to at least the DVBE participation proposed by the successful Contractor may be cause for contract termination and recovery of damages under the rights and remedies due the State for default section of the contract(s) and any other penalties provided for by statute.

Q: ***Who notifies the subcontractor when an award is made?***

A: Upon award to a prime Contractor, the Awarding Department notifies listed subcontractors of their contract participation. Primes are encouraged to notify their listed subcontractors immediately after an award is made to formalize their business agreements.

Q: ***What happens to bids considered non-responsive to the DVBE Participation Program requirements?***

A: Non-responsive bids are subject to rejection. Many are rejected because of:

- Incomplete documentation
- Documentation not received by bid due date
- Mathematical error related to the percentages

Q: ***If I am a disabled veteran business enterprise, can I meet the percentage requirements as a single company?***

A: Yes.

Q: ***If my submitted bid meets the contract goal and the State decides to make multiple awards to the bid/contract, could my bid be considered non-responsive?***

A: No. The State's decision to make multiple awards will not jeopardize bid compliance.

END OF DOCUMENT

BID FORM

THE STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION
PROJECT MANAGEMENT AND DEVELOPMENT BRANCH

FROM: _____
(Name of Bidding Firm)

DELIVER TO: Hector Cavazos
hector.cavazos@dgs.ca.gov

BEFORE 2:00 P.M., December 10, 2025

FOR: OES Security Upgrades
Governor's Office of Emergency Services
Mather, Sacramento County, California
000000000009324

The undersigned hereby proposes and agrees to furnish all labor, materials, and equipment, and to perform all work required for the above-named Project in the manner and time prescribed in the Drawings and Project Manual, dated October 1, 2025 and such addenda thereto as may be issued prior to bid opening date and in accordance with prevailing wage rates ascertained by the Department of Industrial Relations and set forth on the DIR web site (Prevailing Wage Requirements) for General Prevailing Wage Rates as determined by the August 2025 DIR prevailing wage published rates. The Bid Price, set forth below in clear legible figures, includes the cost of Bonds, insurance, sales tax, and every other item of expense, direct or indirect, incidental to the Bid Price.

SCHEDULE OF WORK AND PRICES

WORK ITEM	DESCRIPTION	ITEM TOTAL IN FIGURES
1.	**Performing the scope of work of this Project listed in the drawings and specifications for the lump sum of:**	**$_____**
2.	**Allowance(s) as specified in Section 01 21 00, not included in Work Item 1 above for the sum of:**	**$ 35,000**
COMPLETE WORK: Total of Work Items 1 and 2 for the lump sum of:		**$_____**

DETERMINATION OF BID: Determination of amount of bid will be on the basis of total sum of Work Items as verified by the State.

SAMPLE

IMPORTANT - READ BEFORE SIGNING: Bid Form must be executed in same name-style in which the bidder is licensed. Bidder bidding jointly or as a combination of several business organizations is specially cautioned that such bidder must be jointly licensed in the same form and style in which the bid is executed. If making a bid as a joint venture, each person submitting the bid shall provide the information required below with respect to his or her licensure. The undersigned Bidder certifies and agrees to provide the information and comply with the requirements contained in Articles 1 through 10 on the following pages of the Bid Form. By signing, Bidder swears under penalty of perjury that the conditions of Article 2; Article 4, Paragraph 4.2; Article 7 and Article 9, Paragraph 9.2.1 are true.

Legal Name of Bidder:_____ Federal I.D. No.: _____

Contractor's License No.: _____ License Expiration Date: _____License Classification:_____

Contractor's Public Works Registration No. (Dept. of Industrial Relations): _____

Contractor's DGS Small Business/DVBE Certification Number: _____

Business Address: _____
(Street and/or P.O. Box) (City) (State) (Zip)

E-Mail Address:_____

Business Telephone No.:_____ Facsimile No.:_____

SIGN HERE ------>_____
Signature of Bidder

_____
Print Name and Title of Bidder

Executed this _____day of_____, 20_____at_____, California.

ARTICLE 1 – BIDDER'S BUSINESS IDENTIFICATION

THIS BID IS SUBMITTED BY (check one):

☐ Individual ☐ Partnership
☐ Joint Venture ☐ Corporation

_____
State in which Incorporated

NOTE: If Bidder is a corporation, the State in which incorporated shall be inserted above and the legal name of the corporation shall be set forth on Page 1, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if Bidder is a partnership, the true name of the firm shall be set forth on Page 1, together with the signature of a partner authorized to sign contract in behalf of the partnership; and if Bidder is an individual, that person's signature shall be placed on Page 1. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Department prior to opening bids or submitted with the bid; otherwise, the bid will be regarded as irregular and unauthorized. If bid is submitted by partnership or joint venture, the members are:

_____

_____

SAMPLE

ARTICLE 2 – PREFERENCES AND INCENTIVES

2.1 **Small Business Preference** - By checking "yes" below, Bidder requests preference as a "Small Business" and further certifies under penalty of perjury, that the firm still meets the requirements of Section 1896 et. seq. Title 2, of the California Code of Regulations, and has either: 1) been approved by the Office of Small Business and Disabled Veteran Business Enterprise (DVBE) Services (OSDS) or; 2) submitted a complete application pursuant to Section 1896.14 to the OSDS by 5:00 p.m. on the bid opening date.

The Legal Name of Bidder and the Bidder's OSDS Certification must be executed in the same name-style in which bidder is licensed. A Bidder bidding jointly or as a combination of several business organizations is specially cautioned that such bidder must be jointly licensed in same form and style in which the bid is executed.

Special attention is directed to Section 1896.16 for penalties for furnishing incorrect supporting information in obtaining preference.

2.1.1 Small Business Preference Claimed? ☐ **Yes** _____ ☐ **No**
(List date filed if not yet certified)

2.2 **Non-Small Business Subcontractor Preference** - By checking "yes" below Bidder requests preference as a Non-Small Business and agrees to complete and submit Document 00 43 16-2 attached hereto, no later than forty-eight (48) hours after the time of receipt of bids (or the following business day if a weekend or state holiday). Special attention is directed to Section 1896.16 for penalties for furnishing incorrect supporting information in obtaining preference.

2.2.1 Non-Small Business Subcontractor Preference Claimed? ☐ **Yes** ☐ **No**

2.3 **Disabled Veteran Business Enterprise Bid Incentive** - By checking "yes" below, Bidder certifies and claims credit for achieving 1% or greater of DVBE Participation on this bid as is shown in Article 9 of this bid form and also requests that the corresponding DVBE Incentive be applied to this bid.

2.3.1 DVBE Incentive Claimed? ☐ **Yes** ☐ **No**

ARTICLE 3 – BONDING ASSISTANCE

In the event Bidder has received assistance in obtaining bonding for this Project, Bidder shall set forth name and nature of firm providing such assistance. Should that firm be listed as subcontractor, Bidder shall set forth the percentage of contract to be performed by that subcontractor.

_____

Firm Providing Assistance and Nature of Assistance

Subcontractor: ☐ Yes ☐ No Percentage _____

ARTICLE 4 – CERTIFICATIONS - BID DEPOSITORY AND FEDERAL COURT FINDINGS

4.1 By signing this Bid Form, Bidder certifies that in preparation of this Bid Form, no bid was received by the bidder from a bid depository, which depository (as to any portion of the work) prohibits or imposes sanctions for the obtaining by bidder, or the submission to bidder by any subcontractor or vendor or supplier of goods and services, of a bid outside the bid depository. This certification shall constitute a warranty, the falsity of which shall entitle the State to pursue any remedy authorized by law, and shall include the right, at the option of the State, of declaring any contract made as a result thereof to be void.

4.2 By signing this Bid Form, Bidder swears under penalty of perjury that representations of the bid with respect to bidder's license are true and that no more than one final un-appealable finding of contempt of court by a Federal Court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a Federal Court which orders the Contractor to comply with an order of the National Labor Relations Board.

SAMPLE

4.3 By signing this Bid Form, Bidder acknowledges that in in accordance with the provisions of Section 3700 of the Labor Code, every contractor will be required to secure the payment of compensation to his employees. The Bidder agrees that they are aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and will comply with such provisions before commencing the performance of the work of this contract.

4.4 By signing this Bid Form, Bidder certifies they will not ask an applicant for onsite construction-related employment to disclose orally or in writing information concerning the conviction history of the applicant on or at the time of an initial employment application.

This section shall not apply to a position for which the person or the state is otherwise required by state or federal law to conduct a conviction history background check or to any contract position with a criminal justice agency, as that term is defined in Section 13101 of the Penal Code.

This section shall not apply to a person to the extent that he or she obtains workers from a hiring hall pursuant to a bona fide collective bargaining agreement.

ARTICLE 5 – STATEMENT OF COMPLIANCE - NONDISCRIMINATION

Bidder (hereinafter referred to as "prospective contractor" in this Statement), by signing this Bid Form, hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f), and CCR, Title 2, Division 4, Chapter 5, Section 8103, in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program; as set forth in the General Conditions of the Contract for Construction. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicants for employment because of sex, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS), medical disability (cancer), age (over 40), marital status, and denial of family care leave.

ARTICLE 6 – QUESTIONNAIRE

6.1 In accordance with Public Contract Code, Section 10162, the Bidder shall complete the following questionnaire:

6.1.1 Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State or Local government project because of a violation of law or a safety regulation?

☐ Yes ☐ No

6.1.2 Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever received a safety violation or failed to file notifications to the Cal-OSHA, Federal OSHA, or EPA Agencies for employee records as required by CCR, Title 8, Section 5208 and CFR 40, Part 61?

☐ Yes ☐ No

6.2 In order to verify compliance with California Air Resources Board In-Use Off-Road Diesel Fueled Fleets Regulation, Section 2449(i), Title 13, California Code of Regulations, the Bidder shall complete the following questionnaire:

6.2.1. Does the work for the above-named Project involve use of vehicles subject to California Air Resources Board In-Use Off-Road Diesel Fueled Fleets Regulation?

☐ Yes ☐ No

If the answer to 6.2.1 above is "Yes", successful low Bidder shall, prior to the execution of a contract, submit copies of the valid Certificates of Reported Compliance, issued by the California Air Resources Board, for the fleet selected for the contract and listed subcontractors.

If the answer to either 6.1.1 or 6.1.2 above is "Yes", then give the date(s) of the citation(s) or failure to make notifications, and explain the circumstances by attachment to this Bid Form.

SAMPLE

ARTICLE 7 – NON-COLLUSION DECLARATIONTO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

By signing this Bid Form, Bidder, being first duly sworn, deposes and says that he or she is the authorized representative of the Bidder, the party making the foregoing bid, that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and is not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

ARTICLE 8 – ADDENDA

In submitting this bid, Bidder represents that Bidder has examined copies of all the Contract Documents and acknowledges receipt of the following addenda:

Addendum No.: _____ Date: _____ Addendum No.:_____ Date: _____

Addendum No.: _____ Date: _____ Addendum No.:_____ Date: _____

Addendum No.: _____ Date: _____ Addendum No.:_____ Date: _____

Failure to acknowledge on the Bid Form receipt of an addendum shall not in itself be cause for withdrawal or rejection of bids, if it can be shown that bidder did, in fact, receive such addendum prior to bid opening.

ARTICLE 9 – DVBE COMPLIANCE & PARTICIPATION SUMMARY

9.1 In accordance with Public Contract Code Section 10115, et seq., the Department of General Services has established criteria to implement the DVBE Program Goal as set forth in Document 00 22 10 of the Project Manual. Document 00 22 10, DVBE PARTICIPATION PROGRAM REQUIREMENTS cites the specific percentage of DVBE Participation required for this contract. **Failure to meet this requirement will result in a non-responsive bid.**

If DVBE Participation is a requirement for this bid, Bidder must complete Article 9.2.1 - DVBE PARTICIPATION SUMMARY. Failure to meet the full percentage of required DVBE participation will cause the bid to be deemed non-responsive and the bid will be rejected by the State. Listed DVBE vendor or subcontractor relationships should be first tier.

Any DVBE person, firm, corporation or organization committed by the bidder to fulfill DVBE Participation must: 1) be certified with the OSDS, and; 2) perform or provide a Commercially Useful Function as defined in Military and Veterans Code Section 999. Failure to comply with these requirements will deem the bid non-responsive and the bid will be rejected by the State.

If DVBE participation is set at zero percent, Bidder may still claim DVBE Incentive for voluntary DVBE Participation of 1% or greater. To have DVBE Incentive applied to this bid, Bidder must claim the Incentive in ARTICLE 2.3 - PREFERENCES & INCENTIVES and complete ARTICLE 9.2 - DVBE PARTICIPATION SUMMARY of the Bid Form.

If any DVBE subcontractor will be performing work in excess of 1/2 of 1% of the bid amount, the subcontractor **MUST** be listed under ARTICLE 9.2.1 - DVBE PARTICIPATION SUMMARY.

SAMPLE

9.2 DVBE PARTICIPATION SUMMARY NAME OF BIDDER:_____

Completion Instructions: Capture all required and non-required first tier DVBE Participation in the space below. Identify the proposed work (services, trade or materials) to be completed by the DVBE. List the Company name, contact information, OSDS Certification Number, and the DIR Registration Number. If the Bidder is a DVBE, list only the Bidder's information as 100%; do not list additional subcontractors. Indicate the dollar amount of the work to be performed by each DVBE company and the corresponding percentage of this bid price rounded to two decimals. Add up each Dollar Amount and identify the total on the bottom row marked, TOTAL DVBE PARTICIPATION. Calculate and list the percentage of the bid price this amount represents.

Pursuant to Military and Veterans Code §999.7, the awarding department shall withhold, on a contract entered into on or after January 1, 2021, ten thousand dollars ($10,000) from the final payment, or the full final payment if less than ten thousand dollars ($10,000), until a prime contractor complies with the certification requirements of subdivision (d) of Section Military and Veterans Code §999.5. A prime contractor that fails to comply with the certification requirement shall, after notice, be allowed to cure the defect. Notwithstanding any other law, if, after at least 15 calendar days but not more than 30 calendar days from the date of notice, the prime contractor refuses to comply with the certification requirements, the awarding department shall permanently deduct ten thousand dollars ($10,000) from the final payment, or the full payment if less than ten thousand dollars ($10,000).

9.2.1 Listed hereinafter is the certified DVBE company(s) proposed to perform work if the contract is awarded to Bidder:

TYPE OF WORK PERFORMED (Service, Trade or Materials)	**NAME OF DVBE COMPANY, CONTACT PERSON AND PHONE NUMBER**	**OSDS CERTIFICATION NUMBER**	**DIR REGISTRATION NUMBER**	**DOLLAR AMOUNT OF WORK PERFORMED**	**PERCENTAGE OF BID PRICE**
			TOTAL DVBE PARTICIPATION:		

DETERMINATION OF TOTAL DVBE PARTICIPATION: Determination of total DVBE participation will be on the basis of total sum of all listed DVBE above and as verified by the State. When there is a discrepancy between the Dollar Amount and the Percentage of Bid, the higher of the two will prevail.

SAMPLE

NAME OF BIDDER: _____

ARTICLE 10 – LIST OF PROPOSED SUBCONTRACTORS

Listed hereinafter are the **name**, **location, license number, and registration number** of all subcontractors who will be employed, and the **kind of work** which each will perform if the contract is awarded to the undersigned. I understand that under Public Contract Code Section 4100, et. seq., I must here clearly set forth the name and location of each subcontractor who will perform work or labor or render service to me in or about the construction of the work in an amount in excess of one-half of one percent (1/2 of 1%), of my total bid, and that as to any work in which I fail to do so, I agree to perform that portion myself or be subject to penalty under the act. (Note: In case more than one subcontractor is named for the same kind of work, state the portion that each will perform.) I also understand that listed subcontractors must be registered with the Department of Industrial Relations in order to be listed for and to engage in the performance of work on Public Works projects. Notwithstanding General Conditions Paragraph 1.1, the definition of a **SUBCONTRACTOR** for the purposes of the Subletting and Subcontracting law is as follows: A trade Contractor who is licensed with the Contractors' State License Board with an A, B, C or D classification, as defined pursuant to PCC Section 4113.

- Vendors or suppliers of materials only need not be listed.

Failure to list Kind of Work, Name, Location or License Number shall cause the bid to be rejected as non-responsive.

Kind of Work	Name	Location (City)	CSLB License No.	DIR Registration No.

If further space is required below, copy this page and attached hereto to be made a part of the Bid Form. Sub List Page _____of _____

SAMPLE

Pursuant to Public Contract Code section 2010, a person that submits a bid or proposal to, or otherwise proposes to enter into or renew a contract with, a state agency with respect to any contract in the amount of $100,000 or above shall certify, under penalty of perjury, at the time the bid or proposal is submitted or the contract is renewed, all of the following:

1. CALIFORNIA CIVIL RIGHTS LAWS: For contracts executed or renewed after January 1, 2017, the contractor certifies compliance with the Unruh Civil Rights Act (Section 51 of the Civil Code) and the Fair Employment and Housing Act (Section 12960 of the Government Code); and

2. EMPLOYER DISCRIMINATORY POLICIES: For contracts executed or renewed after January 1, 2017, if a Contractor has an internal policy against a sovereign nation or peoples recognized by the United States government, the Contractor certifies that such policies are not used in violation of the Unruh Civil Rights Act (Section 51 of the Civil Code) or the Fair Employment and Housing Act (Section 12960 of the Government Code).

CERTIFICATION

I, the official named below, certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Proposer/Bidder Firm Name (Printed)	Federal ID Number
By (Authorized Signature)	
Printed Name and Title of Person Signing	
Executed in the County of	Executed in the State of
Date Executed	

SAMPLE

NONCOLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:
I am the _____ of _____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state].”

_____
Signed

SAMPLE

END OF DOCUMENT

BIDDER'S BOND

STATE OF CALIFORNIA

DEPARTMENT OF GENERAL SERVICES

KNOW ALL MEN BY THESE PRESENTS:

That we,

_____

_____, as Principal,

and _____

_____

as Surety, are held and firmly bound unto the State of California, hereinafter called the State, in the penal sum of ten percent (10%) of the total amount of the bid of the Principal above named, submitted by said Principal to the State of California, Department of General Services, for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION of this obligation is such that:

WHEREAS, the Principal has submitted the above-mentioned bid to the State of California, Department of General Services, for certain construction specifically described as follows, for which bids are to be opened at _____

_____ *(Insert place where bids will be opened)* on _____ *(Insert date of bid opening)*

for _____

(Copy here the exact description of work, including location, as it appears on the proposal)

NOW, THEREFORE, If the aforesaid Principal is awarded the contract and, within the time and manner required under the specifications, after the prescribed forms are presented to him for signature, enters into a written contract, in the prescribed form, in accordance with the bid, and files the two bonds with the Department, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____, 20____.

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

Name of Principal and Address for Service

By_____

Contractor Signature

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

Name of Surety and Address for Service

By_____

Attorney-in-Fact Signature

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

NOTE: Signatures of those executing for the Surety must be properly acknowledged.

CERTIFICATE OF ACKNOWLEDGMENT

STATE OF CALIFORNIA

COUNTY OF _____ ss

On this _____ day of _____ in the year of 20___ before me, a notary public in and for the county and state aforesaid, personally appeared, _____ and proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and proved to me on the basis of satisfactory evidence to be the attorney-in-fact of _____ and acknowledged to me that he/she subscribed the name of the said company thereto as surety, and his/her own name as attorney-in-fact.

(SEAL)

_____

Notary Public

SAMPLE

DOCUMENT 00 43 16-1

LIST OF CERTIFIED SMALL BUSINESS SUBCONTRACTOR(S)

COMPLETION INSTRUCTIONS

PLEASE READ THESE INSTRUCTION CAREFULLY

IN ORDER TO GRANT A FIVE PERCENT (5%) NON-SMALL BUSINESS SUBCONTRACTOR PREFERENCE TO A NON-SMALL BUSINESS, THE BIDDER MUST COMPLETE THE CERTIFIED SMALL BUSINESS SUBCONTRACTOR SUMMARY (CSBSS) FORM 00 43 16-2. THIS FORM **MUST** BE COMPLETED BY THE NON-SMALL BUSINESS BIDDER AND RETURNED TO THE AWARDING AGENCY NO LATER THAN FORTY-EIGHT (48) HOURS AFTER THE TIME OF RECEIPT OF BIDS. IF THE BIDDER FAILS TO RETURN THE COMPLETED FORM 00 43 16-2 WITHIN 48 HOURS, THE CLAIM FOR SMALL BUSINESS PREFERENCE WILL BE DENIED.

CSBS COMPANY NAME – list the name(s) of the certified small business subcontractor(s) to be used to complete this project.

CSBS COMPANY ADDRESS – list the address(es) of the certified small business subcontractor(s) to be used to complete this project.

CSBS COMPANY TELEPHONE NUMBER – list the telephone number(s) of the certified small business subcontractor(s) to be used to complete this project.

CSBS PERCENTAGE (%) OR DOLLAR ($) AMOUNT – list the percentage(s) or dollar amount(s) that will be given to the certified small business subcontractor(s) used to complete this project.

DESCRIPTION OF WORK – identify the proposed work including services or materials to be performed by the certified small business subcontractor(s) to complete this project.

TO OBTAIN THE 5% NON-CERTIFIED SMALL BUSINESS PREFERENCE, THE LISTED SUBCONTRACTOR(S) AND/OR SUPPLIER(S) FIRM(S) MUST BE FORMALLY CERTIFIED BY THE OFFICE OF SMALL BUSINESS AND DVBE CERTIFICATION (OSDC) AS A SMALL AND/OR MICROBUSINESS. (Prime contractors should ask Subcontractor/Supplier to provide them with a copy of their OSDC certification letter)

SAMPLE

BIDDER NAME _____ PROJECT NUMBER _____

STATE OF CALIFORNIA
CERTIFIED SMALL BUSINESS SUBCONTRACTOR(S) SUMMARY

Form date 09/28/2004

Listed hereinafter is the **name of business**, **address**, **telephone number**, **dollar amount or percentage** of all certified subcontractors who will be employed, and the **description of the work** which each will perform if the contract is awarded to this bidder.

Failure to list name of business, address, telephone number, description of work to be performed and dollar amount or percentage of work for each subcontractor may be cause for denial of the non-small business subcontractor preference.

(If further space is required for the List of Proposed Subcontractors, additional sheets showing the required information, as indicated below, shall be attached hereto and made a part of the Bid).

CERTIFIED SMALL BUSINESS SUBCONTRACTOR **(Name of Business)**	CERTIFIED SMALL BUSINESS SUBCONTRACTOR **(Address)**	CERTIFIED SMALL BUSINESS SUBCONTRACTOR **(Telephone Number)**	CERTIFIED SMALL BUSINESS SUBCONTRACTOR **($ or % Amount)**	CERTIFIED SMALL BUSINESS SUBCONTRACTOR **(Description of Work) (Service or Materials)**

SAMPLE

STATE OF CALIFORNIA – DEPARTMENT OF FINANCE

PAYEE DATA RECORD

(Required when receiving payment from the State of California in lieu of IRS W-9 or W-7)

STD 204 (Rev. 03/2021)

Section 1 – Payee Information

NAME (This is required. Do not leave this line blank. Must match the payee's federal tax return)

BUSINESS NAME, DBA NAME or DISREGARDED SINGLE MEMBER LLC NAME (If different from above)

MAILING ADDRESS (number, street, apt. or suite no.) (See instructions on Page 2)

CITY, STATE, ZIP CODE	E-MAIL ADDRESS

Section 2 – Entity Type

Check one (1) box only that matches the entity type of the Payee listed in Section 1 above. (See instructions on page 2)

- ☐ **SOLE PROPRIETOR / INDIVIDUAL**
- ☐ **SINGLE MEMBER LLC** *Disregarded Entity owned by an Individual*
- ☐ **PARTNERSHIP**
- ☐ **ESTATE OR TRUST**

CORPORATION (see instructions on page 2)

- ☐ **MEDICAL** *(e.g., dentistry, chiropractic, etc.)*
- ☐ **LEGAL** *(e.g., attorney services)*
- ☐ **EXEMPT** *(e.g., nonprofit)*
- ☐ **ALL OTHERS**

Section 3 – Tax Identification Number

Enter your Tax Identification Number (TIN) in the appropriate box. The TIN must **match** the name given in Section 1 of this form. Do not provide more than one (1) TIN. The TIN is a 9-digit number. **Note:** Payment will not be processed without a TIN.

- For **Individuals**, enter SSN.
- If you are a **Resident Alien**, and you do not have and are not eligible to get an SSN, enter your ITIN.
- Grantor Trusts (such as a Revocable Living Trust while the grantors are alive) may not have a separate FEIN. Those trusts must enter the individual grantor's SSN.
- For **Sole Proprietor or Single Member LLC (disregarded entity), in which the sole member is an individual**, enter SSN (ITIN if applicable) or FEIN (FTB prefers SSN).
- For **Single Member LLC (disregarded entity), in which the sole member is a business entity**, enter the owner entity's FEIN. Do not use the disregarded entity's FEIN.
- For all other entities including LLC that is taxed as a corporation or partnership, estates/trusts (with FEINs), enter the entity's FEIN.

Social Security Number (SSN) or Individual Tax Identification Number (ITIN)

___ ___ ___ - ___ ___ - ___ ___ ___ ___

OR

Federal Employer Identification Number (FEIN)

___ ___ - ___ ___ ___ ___ ___ ___ ___

Section 4 – Payee Residency Status (See instructions)

- ☐ **CALIFORNIA RESIDENT** – Qualified to do business in California or maintains a permanent place of business in California.
- ☐ **CALIFORNIA NONRESIDENT** – Payments to nonresidents for services may be subject to state income tax withholding.
  - ☐ No services performed in California
  - ☐ Copy of Franchise Tax Board waiver of state withholding is attached.

Section 5 – Certification

I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the state agency below.

NAME OF AUTHORIZED PAYEE REPRESENTATIVE	TITLE	E-MAIL ADDRESS

SIGNATURE	DATE	TELEPHONE *(Include area code)*

Section 6 – Paying State Agency

Please return completed form to:

STATE AGENCY/DEPARTMENT OFFICE	UNIT/SECTION
Department of General Services, Administrative Division	Office of Business and Acquisition Services, Contract Services Section

MAILING ADDRESS	FAX	TELEPHONE *(Include area code)*
707 Third Street, MS 508	n/a	n/a

CITY	STATE	ZIP CODE	E-MAIL ADDRESS
West Sacramento	CA	95605	n/a

SAMPLE

STATE OF CALIFORNIA – DEPARTMENT OF FINANCE

PAYEE DATA RECORD

(Required when receiving payment from the State of California in lieu of IRS W-9 or W-7)

STD 204 (Rev. 03/2021)

GENERAL INSTRUCTIONS

Type or print the information on the Payee Data Record, STD 204 form. Sign, date, and return to the state agency/department office address shown in Section 6. Prompt return of this fully completed form will prevent delays when processing payments.

Information provided in this form will be used by California state agencies/departments to prepare Information Returns (Form 1099).
NOTE: Completion of this form is optional for Government entities, i.e. federal, state, local, and special districts.

A completed Payee Data Record, STD 204 form, is required for all payees (non-governmental entities or individuals) entering into a transaction that may lead to a payment from the state. Each state agency requires a completed, signed, and dated STD 204 on file; therefore, it is possible for you to receive this form from multiple state agencies with which you do business.

Payees who do not wish to complete the STD 204 may elect not to do business with the state. If the payee does not complete the STD 204 and the required payee data is not otherwise provided, payment may be reduced for federal and state backup withholding. Amounts reported on Information Returns (Form 1099) are in accordance with the Internal Revenue Code (IRC) and the California Revenue and Taxation Code (R&TC).

Section 1 – Payee Information

Name – Enter the name that appears on the payee's federal tax return. The name provided shall be the tax liable party and is subject to IRS TIN matching (when applicable).

- Sole Proprietor/Individual/Revocable Trusts – enter the name shown on your federal tax return.
- Single Member Limited Liability Companies (LLCs) that is disregarded as an entity separate from its owner for federal tax purposes - enter the name of the individual or business entity that is tax liable for the business in section 1. Enter the DBA, LLC name, trade, or fictitious name under Business Name.
- Note: for the State of California tax purposes, a Single Member LLC is not disregarded from its owner, even if they may be disregarded at the Federal level.
- Partnerships, Estates/Trusts, or Corporations – enter the entity name as shown on the entity's federal tax return. The name provided in Section 1 must match to the TIN provided in section 3. Enter any DBA, trade, or fictitious business names under Business Name.

Business Name – Enter the business name, DBA name, trade or fictitious name, or disregarded LLC name.

Mailing Address – The mailing address is the address where the payee will receive information returns. Use form STD 205, Payee Data Record Supplement to provide a remittance address if different from the mailing address for information returns, or make subsequent changes to the remittance address.

Section 2 – Entity Type

If the Payee in Section 1 is a(n)…	THEN Select the Box for…
Individual • Sole Proprietorship • Grantor (Revocable Living) Trust disregarded for federal tax purposes	Sole Proprietor/Individual
Limited Liability Company (LLC) owned by an individual and is disregarded for federal tax purposes	Single Member LLC-owned by an Individual
Partnerships • Limited Liability Partnerships (LLP) • and, LLC treated as a Partnership	Partnerships
Estate • Trust (other than disregarded Grantor Trust)	Estate or Trust
Corporation that is medical in nature (e.g., medical and healthcare services, physician care, nursery care, dentistry, etc. • LLC that is to be taxed like a Corporation and is medical in nature	Corporation-Medical
Corporation that is legal in nature (e.g., services of attorneys, arbitrators, notary publics involving legal or law related matters, etc.) • LLC that is to be taxed like a Corporation and is legal in nature	Corporation-Legal
Corporation that qualifies for an Exempt status, including 501(c) 3 and domestic non-profit corporations.	Corporation-Exempt
Corporation that does not meet the qualifications of any of the other corporation types listed above • LLC that is to be taxed as a Corporation and does not meet any of the other corporation types listed above	Corporation-All Other

Section 3 – Tax Identification Number

The State of California requires that all parties entering into business transactions that may lead to payment(s) from the state provide their Taxpayer Identification Number (TIN). The TIN is required by R&TC sections 18646 and 18661 to facilitate tax compliance enforcement activities and preparation of Form 1099 and other information returns as required by the IRC section 6109(a) and R&TC section 18662 and its regulations.

Section 4 – Payee Residency Status

Are you a California resident or nonresident?

- A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California.
- A partnership is considered a resident partnership if it has a permanent place of business in California.
- An estate is a resident if the decedent was a California resident at time of death.
- A trust is a resident if at least one trustee is a California resident.
  - For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.

For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below:

Withholding Services and Compliance Section: 1-888-792-4900
For hearing impaired with TDD, call: 1-800-822-6268
E-mail address: wscs.gen@ftb.ca.gov
Website: www.ftb.ca.gov

Section 5 – Certification

Provide the name, title, email address, signature, and telephone number of individual completing this form and date completed. In the event that a SSN or ITIN is provided, the individual identified as the tax liable party must certify the form. Note: the signee may differ from the tax liable party in this situation if the signee can provide a power of attorney documented for the individual.

Section 6 – Paying State Agency

This section must be completed by the state agency/department requesting the STD 204.

Privacy Statement

Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, state, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it. It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and state law imposes noncompliance penalties of up to $20,000. You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the state agency(ies) with which you transact that business.

All questions should be referred to the requesting state agency listed on the bottom front of this form.

SAMPLE

STATE OF CALIFORNIA – DEPARTMENT OF GENERAL SERVICES

STANDARD AGREEMENT

STD 213 (Rev. 03/2019)

AGREEMENT NUMBER	PURCHASING AUTHORITY NUMBER (if applicable)

1. This Agreement is entered into between the Contracting Agency and the Contractor named below:

CONTRACTING AGENCY NAME

Department of General Services, Real Estate Services Division, Project Management and Development Branch

CONTRACTOR NAME

2.The Term of this Agreement is:

START DATE

As Identified in the Notice to Proceed

THROUGH END DATE

XXX Calendar Days, commencing on the Start Date Identified in the Notice to Proceed

3.The maximum amount of this Agreement is: $X,XXX,XXX.XX

4. The parties agree to comply with the terms and conditions of the following exhibits, which are by this reference made a part of the Agreement.

EXHIBITS	TITLE	PAGES
Project Title	Project Title Client Address City, County, CA Project Number	
Exhibit A	Performance Bond, Payment Bond, Bid Form, and Invitation to Bid	
Exhibit B	Project Manual (except Bidding Requirements), dated XXX including the following Contract Documents: Introductory Information General Conditions of the Contract for Construction Supplementary Conditions Specifications Addenda No.	
Exhibit C	XXX Drawings, dated XXX, as listed in Document 00 01 15 of the Project Manual	

Items shown with an asterisk (*), are here by incorporated by reference and made part of this agreement as if attached hereto. These documents can be viewed at https://www.dgs.ca.gov/ols/resources

IN WITNESS WHEREOF, THIS AGREEMENT HAS BEEN EXECUTED BY THE PARTIES HERETO.

CONTRACTOR

CONTRACTOR NAME (if other than an individual, state whether a corporation, partnership, etc.)

CONTRACTOR BUSINESS ADDRESS	CITY	STATE	ZIP

PRINTED NAME OF PERSON SIGNING	TITLE

CONTRACTOR AUTHORIZED SIGNATURE	DATE SIGNED

STATE OF CALIFORNIA

CONTRACTING AGENCY NAME

CONTRACTING AGENCY ADDRESS	CITY	STATE	ZIP

PRINTED NAME OF PERSON SIGNING	TITLE

CONTRACTOR AUTHORIZED SIGNATURE	DATE SIGNED

CALIFORNIA DEPARTMENT OF GENERAL SERVICES APPROVAL	EXEMPTION, IF APPLICABLE

SAMPLE

PERFORMANCE BOND TO ACCOMPANY CONSTRUCTION CONTRACT

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, The State of California, acting by and through the Department of General Services has awarded to _____, a _____ existing under and by virtue of the laws of the State of California as Contractor, a contract for the work described as follows:

Project Name
Client Agency
Project Information
Reference Number, Project Number, Contract Number

AND WHEREAS, Said Contractor is required to furnish a bond in connection with said contract, guaranteeing the faithful performance thereof;

NOW, THEREFORE, We the undersigned Contractor and surety are held and firmly bound unto the State of California in the sum of _____ Dollars, ($000,000) to be paid to the State or its certain attorney, its successors and assigns; for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if the above bounded Contractor, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the foregoing contract and any alteration thereof made as therein provided, on his or their part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the State of California, its officers and agents, as therein stipulated, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and virtue.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____, 20_____

_____

_____
Name of Contractor and Address for Service

By_____
Contractor Signature

_____

_____

_____ (SEAL)
Name of Surety and Address for Service

By _____
Attorney-in-Fact Signature

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

CERTIFICATE OF ACKNOWLEDGMENT

STATE OF CALIFORNIA
COUNTY OF _____ ss

On this _____ day of _____ in the year of 20____ before me, a notary public in and for the county and state aforesaid, personally appeared, _____ proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and proved to me on the basis of satisfactory evidence to be the attorney-in-fact of _____ and acknowledged to me that he/she subscribed the name of the said company thereto as surety, and his/her own name as attorney-in-fact.

(SEAL)

_____
NOTARY PUBLIC

SAMPLE

PAYMENT BOND TO ACCOMPANY CONSTRUCTION CONTRACT

(Public Contract Code Sections 7103 and 10221)

BOND NO. _____

The premium on this bond is _____ for the term of _____.

KNOW ALL MEN BY THESE PRESENTS:

That the State of California, acting by and through the _____ , has awarded to

_____ whose address for service is _____,

as Principal, a contract for the work described as follows:

Project Title: _____

Project Location: _____

WHEREAS, the provisions of Public Contract Code Sections 7103 and 10221 require that the Principal file a bond in connection with said contract and this bond is executed and tendered in accordance therewith.

NOW THEREFORE, Principal and _____ , a Surety Corporation organized under the laws of _____ , and authorized to transact a general surety business is in the State of California, as Surety, are held and firmly bound to the People of the State of California in the penal sum of _____, for which payment we bind ourselves, our heirs, executors, administrators, successors and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

1. That if said Principal or its subcontractors shall fail to pay any of the persons named in Civil Code Section 9100, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the surety herein will pay for the same, otherwise this obligation is to be void. In case suit is brought upon this bond, the Surety will pay a reasonable attorney's fee to be fixed by the court.
2. This bond shall inure to the benefit of any persons named in Civil Code Section 9100 as to give a right of action to such persons or their assigned in any suit brought upon this bond.
3. The aggregate liability of the Surety hereunder, including costs and attorney fees, on all claims whatsoever shall not exceed the penal sum of the bond in accordance with the provisions of Section 996.470(a) of the Code of Civil Procedure.
4. This bond is executed by the Surety, to comply with the provisions of Public Contract Code Sections 7103, 10221 and 10222, of Chapter 5, Title 3, Part 6, Division 4 of the Civil Code and of Chapter 2, Title 14, Part 2 of the Code of Civil Procedure and said bond shall be subject to all of the terms and provisions thereof.
5. This bond may be cancelled by the Surety in accordance with the provisions of Section 996.310 et seq. of the Code of Civil Procedure.
6. This bond to become effective _____.

_____ (NAME OF SURETY)

_____ (ADDRESS FOR SERVICE)

I certify (or declare) under penalty of perjury under the laws of the State of California that I have executed the foregoing bond under an unrevoked power of attorney.

Executed in _____ (CITY AND STATE) on _____ (DATE).

X _____ (SIGNATURE OF ATTORNEY IN FACT)

_____ (PRINTED OR TYPED NAME OR ATTORNEY IN FACT)

STATE OF CALIFORNIA
STD 807 (Rev. 10/2019)

SAMPLE

Department of General Services

Change Order

Date Issued: (Type Date)

Change Order No: _____

ABMS Contract No: _____
F$ Contract No.: _____
Project ID: **DGS000000XXXXXX**
Activity ID: **CN**
Resource Type: **CONTR**
Category: **10000**

From Division: **Real Estate Services Division**
Branch: **Project Management and Development Branch**
Address: **707 Third Street, 4th Floor**
City, State Zip: **West Sacramento, CA 95605**

Revision No.: _____
Date Revised: _____

Project: _____
Client Agency: _____
Facility Name: _____
Facility Location: _____

To: (Contractor's Name:)
(Contractor's Address:)
(Contractor's City/State/Zip:)

This Change Order is issued pursuant to the provisions of the General Conditions Article 6 of the Contract relating to **Changes in the Work** and shall not be effective until approved by the Department of General Services, REAL ESTATE SERVICES DIVISION. The State will issue the change order after the conditions have been agreed to. The contractor is directed to proceed with construction activities in such manner as to preclude the necessity for later altering the work in order to accomplish this change. This document must be completed in every detail, signed, dated and returned in **DUPLICATE** to the State's representative within **fifteen (15)** calendar days from the date of issue, as provided in the General Conditions of the Contract. Upon approval, a signed copy will be sent to the contractor as authority for proceeding with the changes (or as confirmation of previously issued instructions).

Change Order Description

Item #	Description	Amount

Total this Change Order $100,000.00

The Undersigned Contractor agrees to make this change in accordance with the printed conditions herein for
The Additive sum of $ or deductive sum ($).

This change is approved for the sum stated above and for a time extension of _____ calendar days.

This Agreement constitutes full and final settlement for all aspects of the work described herein. As part of this agreement, Contractor waives any and all rights to claim for any delay or impact costs associated with the work described herein, including, but not limited to, inefficiency, unabsorbed and extended home office overhead and extended field office overhead.

Authorized Contractor's Signature	Title	Date

Authorized State's Representative Signature	Title	Date

Distribution of Change Order:
Originals to: 1) Contractor 2) RESD Contract Unit
Copies to: 1) Project Manager 2) State Controllers Office 3) DGS Capital Outlay Account 4) State Inspector

SAMPLE

STATE OF CALIFORNIA DEPARTMENT OF GENERAL SERVICES REAL ESTATE SERVICES DIVISION

Document 00 72 00

General Conditions of the Contract for Construction

October 2011 Edition

000000000009324

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DOCUMENT 00 72 00 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1 - GENERAL PROVISIONS

1.1 **DEFINITIONS:** When the following terms appear in the Contract, they shall have the following meaning:

1.1.1 Acceptance of the Work: Written acceptance of the Work by the Director of the Department of General Services, State of California, or the Director's designee.

1.1.2 Act of God: An Act of God shall include only the following occurrences or conditions and effects:

.1 Earthquakes in excess of a magnitude of 3.5 on the Richter Scale; or
.2 Tidal waves.

1.1.3 Addendum (Addenda): A document issued by the State during the bidding period which modifies, supersedes or supplements the Contract Documents.

1.1.4 Alternative: Refer to Approved Equal and Substitution.

1.1.5 Applicable Codes: Include, but are not limited to, applicable laws, statutes, regulations, rules, building and other codes, ordinances, rulings, and lawful orders of all public authorities having jurisdiction over the State, the Contractor, Subcontractors, the Project, the Work, or the execution of the Work.

1.1.6 Approved Equal: Material, equipment, or method approved by the State for use in the Work, as being acceptable as an equivalent in essential attributes to the material, equipment, or method specified in the Contract Documents.

1.1.7 Agreement: The written and executed document known as Document 00 52 00, Agreement.

1.1.8 Architect or Engineer: The State, or the State's consultant listed in the Contract Documents as the designer of record responsible for the preparation and coordination of the Drawings and technical sections of the Project Manual.

1.1.9 Beneficial Occupancy: Occupancy and use by the State of all, or part, or parts, of the Work as selected by the State, prior to Completion.

1.1.10 Bidder: Any individual, partnership, corporation, association, joint venture, or any combination thereof, submitting a Bid Form for the Work.

1.1.11 Change Order: A written order issued by the State used to determine adjustments in the Contract based on:

.1 a change in the Work,
.2 the amount of the adjustment in the Contract Sum, and
.3 the extent of the adjustment in the Contract Time.

1.1.12 Claim: An unresolved Dispute arising under or relating to the performance of the Contract which can only be filed after Acceptance of the Work and the final statement to the Contractor.

1.1.13 Completion: When the entire Work has been performed in accordance with the Contract requirements as delineated in the Contract Documents and Project Manual. Completion of the Work occurs when the State's final inspection has been made and all construction, services and deliverables have been fully executed as determined by the State's Representative, including but not limited to completion of all punch-list items and delivery of as-built drawings, operation & maintenance manuals, guaranties, warranties, spare parts, reports and certifications as noted in the Project Manual, Section 01 77 00.

1.1.14 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 by a Change Order. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the State and the Contractor.

1.1.15 Contract Documents: The Contract Documents consist of the Agreement between the State and Contractor, Payment and Performance Bonds; the Conditions of the Contract, including General, Supplementary and other Conditions; Drawings, Specifications, Addenda and Change Orders.

1.1.16 Contract Sum: The Contract Sum is stated in the Agreement and, including authorized adjustments by Change Order, is the total amount payable by the State to the Contractor for performance of the Work under the Contract Documents.

1.1.17 Contract Time: The Contract Time is the period of time, from the Start Date to the date of Completion of the Work, including authorized adjustments, allotted in the Contract.

1.1.18 Contractor: The individual, partnership, corporation, association, joint venture, or any combination thereof, who has entered into a contract with the State, identified as such in the Agreement, and referred to throughout the Contract as if singular in number. The term "Contractor" means the Contractor or the Contractor's representative.

1.1.19 Day: Calendar day, unless otherwise specifically defined.

1.1.20 Department: The Department of General Services, State of California.

1.1.21 Director: The Director of the Department of General Services, State of California, or the Director's designee.

1.1.22 Dispute: A demand during performance of the Work seeking adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. A Dispute is not a Claim.

1.1.23 Drawings: The graphic and pictorial portions of the Contract Documents, illustrating the design, location and dimensions of the Work, generally including but not limited to, plans, elevations, sections, details, schedules and diagrams.

1.1.24 Emergency: A sudden, unexpected occurrence that poses a clear and imminent danger, requiring immediate action to prevent or mitigate the loss or impairment of life, health, property, or essential public services.

1.1.25 General Notes: The written instructions, provisions, conditions or other requirements appearing on the Drawings, and so identified thereon, which pertain to the performance of the Work.

1.1.26 Guarantee: The Contractor's assurance that the Project complies with the requirements of the Contract Documents.

1.1.27 Official Progress Schedule: The Contractor's baseline schedule and updates accepted by the State.

1.1.28 Or Equal: Refer to Approved Equal.

1.1.29 Owner: The State of California.

1.1.30 Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

1.1.31 Project: The total construction of which the Work performed under the Contract may be the whole or a part.

1.1.32 Project Manual: The volume(s) assembled for the Work which includes the Introductory Information, Bidding Requirements, Contracting Requirements, Specifications, and other information as may be listed in the Project Manual Table of Contents.

1.1.33 Request for Information (RFI): A written request by the Contractor submitted in a State provided format for information regarding Project specific issues.

1.1.34 Retention: A percentage of the Contract Sum held back upon completion of the Work, or any portion of the Work, to cover outstanding liabilities, contingencies, and the like, as specified in the Contract Documents.

1.1.35 Samples: Physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

1.1.36 Schedule of Values: A document furnished by the Contractor to the State reflecting the portions of the Contract sum allotted for the various parts of the Work, and used as the basis for reviewing the Contractor's applications for payment request.

1.1.37 Shop Drawings: Drawings, diagrams, schedules, and other data specially issued for the Work by the Contractor or a Subcontractor, Sub-subcontractor, and material suppliers to illustrate some portion of the Work.

1.1.38 Specifications: That portion of the Contract Documents consisting of the written requirements for materials, standards, equipment, construction systems, and standards of workmanship for the Work, and performance of related services.

1.1.39 State: The State of California acting through the Department of General Services.

1.1.40 State Construction Supervisor/Inspector: The person(s) authorized by the State to provide inspection services, field coordination and quality control during construction.

1.1.41 State Contract Act: The act which is set forth in the California Public Contract Code, Section 10100, et seq.

1.1.42 State's Representative: Person(s) authorized by the State to act on behalf of the State for the Project.

1.1.43 Subcontractor: An individual, partnership, corporation, association, joint venture, or any combination thereof, who has a direct contract with the Contractor to perform work or labor or render service in or about the Work. The term "Subcontractor" is referred to as if singular in number and means a Subcontractor or a representative of the Subcontractor. The term "Subcontractor" shall not include those who supply materials only or a separate contractor or subcontractors of a separate contractor.

1.1.44 Sub-subcontractor: A person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the work. The term "Sub-subcontractor" is referred to as if singular in number and means a Sub-subcontractor or a representative of the Sub-subcontractor.

1.1.45 Not Used

1.1.46 Substitution: A material and/or process offered by the Contractor in lieu of the specified material and/or process, and accepted by the State in writing as being equivalent (equal) to the specified material and/or process.

1.1.47 Warranty: A Contractor's, manufacturer's or material supplier's assurance that products and services provided meet the requirements of the Contract Documents.

1.1.48 Work: Construction, services and deliverables required by the Contract Documents and Project Manual, including labor, materials, equipment, services, and documents provided or to be provided by the Contractor to fulfill the Contractor’s obligations under the Contract, including but not limited to requirements such as; completion of punch-list items, as-built drawings, operation & maintenance manuals, guaranties, warranties, spare parts, reports, and certifications.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract will not be binding on the State until appropriately endorsed by the State's legal Representative, in accordance with Public Contract Code, Section 10220.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor is familiar with the methodology under which the work is to be performed and has correlated personal observations with requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include items necessary for completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.2.4 Organization of the Specifications into Groups, Divisions, subgroups, Sections and Articles, and arrangement of Drawings shall not be the basis that Contractor utilizes in dividing the Work among Subcontractors, nor in establishing the extent of work to be performed by any trade.

1.2.5 When standards of the Federal Government, trade societies, or trade associations are referred to in the Contract Documents by specific date of issue, these shall be considered as part of the Contract Documents. When such references do not bear date of issue, current published edition at the date of the first Invitation to Bid shall be considered as part of the Contract Documents.

1.2.6 Unless otherwise stated in the Contract Documents, words and terms which have well-known or commonly accepted technical or construction industry meanings shall be used in the Contract Documents in accordance with such recognized meanings.

1.2.7 Every part of the Work shall be accomplished in workmanship-like manner by workers, laborers, or mechanics specially skilled in the class of work required. Any person the State may deem incompetent or disorderly shall be promptly removed from the Project by the Contractor upon written notice from the State, and shall not be re-employed on this Project.

1.3 **USE OF THE STATE'S DRAWINGS, PROJECT MANUAL AND OTHER DOCUMENTS:** The Drawings, Project Manual and other documents issued by the State, and copies furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects, nor for additions to this Project outside the scope of the Work without the specific written consent of the State. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Project Manual and other documents issued by the State appropriate to, and for use in, the execution of their work under the requirements of the Contract Documents.

1.4 **CAPITALIZATION**

1.4.1 Terms capitalized in the General Conditions of the Contract for Construction include those which are:

.1 Specifically defined; or
.2 Titles of numbered Articles; or
.3 References to Paragraphs, Subparagraphs and Clauses; or
.4 Titles of other documents.

1.5 **CONFLICTS IN THE CONTRACT DOCUMENTS**

1.5.1 In the event of conflict in the Contract Documents, the following priorities shall govern:

.1 Addenda shall govern over other Sections of the Contract Documents to the extent specifically noted; subsequent Addenda shall govern over prior Addenda only to the extent specified.
.2 The General Conditions of the Contract for Construction shall govern over Drawings and Specifications except for specific modifications stated in the Supplementary Conditions, and except for Addenda.
.3 In case of conflict between the Drawings and the Specifications, the Specifications shall govern unless the requirement(s) in the Drawings is/are more stringent and/or of higher quality and/or of higher quantity.
.4 In the case of conflict within the Drawings, the following shall govern:
    1) Schedules, when identified as such, shall govern over all other portions of the Drawings.
    2) Specific notes shall govern over other notes and all other portions of the Drawings, except schedules described in the preceding Clause.
    3) Larger scale Drawings shall govern over smaller scale Drawings.
    4) Detail Drawings shall govern over standard plates bound within the Project Manual.
    5) Figured or numerical dimensions shall govern over dimensions obtained by scaling.

1.5.2 Omissions: If the Contract Documents are not complete as to any minor detail or required construction system or with regard to the manner of combining or installing of parts, materials, or equipment, but there exists accepted trade standard for good and workmanlike construction, such detail shall be deemed to have been implied by the requirements of the Contract Documents in accordance with such standard.

.1 "Minor Detail" shall include the concept of substantially identical components, where price of each such component is small even though aggregate cost or importance is substantial, and shall include a single component which is incidental, even though its cost or importance may be substantial. Quality and quantity of parts or material so supplied shall conform to trade standards and be compatible with type, composition, strength, size and profile of parts or materials otherwise set forth in the Contract Documents.

1.6 REQUESTS FOR INFORMATION, CLARIFICATION OR ADDITIONAL INSTRUCTIONS

1.6.1 Requests for Information (RFI): Should the Contractor discover conflicts, omissions, or errors in the Contract Documents, or have any questions concerning interpretation or clarification of Contract Documents, the Contractor shall immediately submit to the State in writing an RFI that complies with the following requirements:

.1 All RFIs, whether by the Contractor, a Subcontractor or supplier at any tier, shall be submitted by the Contractor to the State.
.2 RFIs shall be numbered sequentially and be presented in the format provided by the State.
.3 The Contractor shall clearly and concisely set forth the single issue for which interpretation or clarification is sought, indicate Specification Section number, article and subarticle numbers, and Contract Drawing number, and detail, or other item involved, and state why a response is required from the State.
.4 The Contractor shall set forth its own interpretation or understanding of the requirements, along with reasons why it has reached such an understanding in each RFI.
.5 RFIs shall be submitted in a timely manner in order that they may be adequately researched and answered before the response affects any critical activity of the Work.
.6 The State will review all RFIs to determine whether they are truly RFIs within the meaning of the term as defined in Paragraphs 1.1.33 and 1.6.1. RFI's which are determined to be not within the meaning of the term and/or RFIs where answers can readily be found in the Drawings and Project Manuals shall be deemed to be superfluous and the cost for reviewing these RFIs will be back-charged to the Contractor.
.7 Responses to RFIs will be made within 14 days unless the State notifies the Contractor in writing that a response will take longer. The 14 days will begin when the RFI is received and dated by the State. Should the State respond sooner, the Contractor shall not assume that a new timeline has been established. Delays in the progress of the Work due to late submittal of RFIs by the Contractor are solely the responsibility of the Contractor.
.8 Responses from the State will not change any requirement of the Contract unless so noted by the State in the response to the RFI.
.9 Should the Contractor believe that a response to an RFI causes a change to the requirements of the Contract, the Contractor shall, before proceeding, give written notice to the State, indicating that the Contractor considers the State's response to the RFI to be a Change Order. An RFI will not be considered to be automatically a notice for a Change Order. The Contractor shall give separate written notice within 7 days of receipt of the State's response to the RFI. If the Contractor fails to give notice within 7 days or prior to commencement of the change, the Contractor shall forfeit the right to seek additional time or cost under Article 6.

1.6.2 Additional Detailed Instructions: The State may furnish additional detailed written and/or graphic instructions to further explain the work, and such instructions shall be a part of the Contract requirements. Should additional detailed instructions, in the opinion of the Contractor, constitute work in excess of the scope of the Work, the Contractor shall submit written notice to the State within 14 days following receipt of such instructions, and in any event prior to commencement of the work thereon. The State will then consider the notice; and, if in the State's judgment it is justified, the State's instructions will be revised or the extra work authorized in accordance with the provisions of Article 6.

ARTICLE 2 - ADMINISTRATION OF THE CONTRACT

2.1 INFORMATION AND/OR SERVICES REQUIRED OF THE STATE

2.1.1 Information and/or services under the State's control shall be furnished by the State within a mutually agreed upon response time so as to avoid delay in the orderly progress of the Work.

2.1.2 The Contractor will be furnished Drawings and Project Manuals as specified in the Contract Documents.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.1 The State will provide administration of the Contract as described in the Contract Documents during construction, until final payment is due and during the correction period described in Paragraph 12.2 and throughout the guarantee period.

2.2.2 The State will visit the Project site appropriate to the stage of construction to become familiar with the progress and quality of the completed work and to determine if the Work is in accordance with the Contract Documents.

2.2.3 Unless so specified in the Contract Documents, the State will not have control over construction means, methods, techniques, sequences or procedures, or safety precautions and programs in connection with the Work. The State will not be responsible for the Contractor's failure to carry out the Work in accordance with the requirements of the Contract Documents. The State will not be responsible for acts, errors, or omissions of the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or of any other persons performing portions of the Work.

2.2.4 Communications Facilitating Contract Administration: Communications by and with the State's consultants shall be through the State. Communications by and with Subcontractors**,** Sub-subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the State.

2.2.5 If the State observes work that appears to not comply with the requirements of the Contract Documents, the State will have the authority to reject the Work. Whenever the State considers it necessary or advisable for implementation of the intent of the Contract Documents, the State will require additional inspection or testing of the Work, in accordance with Subparagraphs 3.13.2 and 3.13.3, whether or not such work is fabricated, installed or completed.

2.2.6 The State will review and take action upon the Contractor's submitted Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review of submittals is not conducted for the purpose of determining the accuracy and completeness of other details, such as dimensions and quantities, nor for substantiating instructions for installation or performance of equipment or systems, which remain the responsibility of the Contractor.

2.2.7 Substitutions and Approved Equals: Alternative material(s), article(s), or equipment that are of equal quality and of required characteristics for the purpose intended may be proposed by the Contractor. The State will examine proposed alternatives for compliance with the Contract Documents. The proposed material(s), article(s), or equipment, will be reviewed for comparative quality, suitability, and performance against the product(s) specified in the Contract Documents. Refer to Subparagraph 3.12.10, for Substitution procedures. If Contractor’s substitution is accepted, the Contractor shall be responsible for the costs of any changes resulting from the substitution, including, but not limited to redesign costs of the Project.

2.2.8 The State will conduct inspections to determine the Contractor’s compliance with the Contract Documents and the date of Completion; will receive, for review and record, written warranties and related documents required by the Contract Documents and assembled by the Contractor; and will issue a final Payment Authorization upon compliance with the requirements of the Contract Documents and Acceptance of the Work.

2.3 BREACHES, DEFAULTS AND TERMINATION FOR CAUSE

2.3.1 If the Director deems that the Contractor has failed to supply an adequate working force, or material of proper quality, or has failed to comply with Public Contract Code Section 10262, or has failed in any other respect to prosecute the Work with the diligence and force specified by the Contract, the Director may:

.1 after written notice of at least 5 days to the Contractor, specifying the defaults to be remedied, provide any such labor or materials and deduct the cost from any money due or to become due to the Contractor under the Contract; or
.2 if the Director considers that the failure is sufficient ground for such action, the Director may give written notice of at least 5 days to the Contractor and the Contractor's sureties, that if the defaults are not remedied, the Contractor's control over the Work will be terminated.

2.3.2 Should the State exercise its rights to terminate as noted in Subparagraph 2.3.1, the State may, without prejudice to any other rights or remedies of the State and subject to any prior rights of the Surety:

.1 terminate employment of the Contractor;
.2 take possession of the Project site, materials, equipment, tools, appliances, and construction equipment and machinery owned by the Contractor;
.3 accept assignment of Subcontractor Agreements pursuant to Paragraph 4.4; and/or
.4 finish the Work by whatever method(s) the State may deem expeditious and appropriate.

2.3.3 When the State terminates the Contract for reasons provided in Subparagraph 2.3.1, the Contractor shall not be entitled to receive any further payment until Completion of the Work. If the costs incurred by the State because of termination under Subparagraph 2.3.1 exceed the unpaid balance, the Contractor shall pay the difference to the State.

2.4 TERMINATION FOR THE STATE'S CONVENIENCE

2.4.1 The State reserves the right to terminate this Contract or any part thereof, due to an Act of God or for its sole convenience. In the event of such termination, the Contractor shall immediately stop hereunder and shall immediately cause its Subcontractors, Sub-subcontractors and material suppliers at any tier, to immediately stop work, leaving the site in a safe and secured condition. The Contractor shall not be paid for any work performed or costs incurred after the termination date that could have been avoided.

2.4.2 The Contractor shall be paid in accordance with the provisions of Article 8; except that the amount due the Contractor shall be based upon the State's final estimate of the Work completed, or acceptable materials furnished but not used, to the date of suspension of the Work, less any amounts required to be withheld pursuant to Article 8, and less any prior payment(s) made to, or on the account of the Contractor.

2.5 SUSPENSION BY THE STATE FOR CONVENIENCE

2.5.1 The State may, by written notice, order the Contractor to suspend, delay or interrupt the Work, in whole or in part, for such period of time as the State may determine.

2.5.2 An adjustment may be claimed by the Contractor in accordance with Article 6 and Article 7 for changes in the Work, caused by a suspension, delay or interruption. No adjustment will be made to the extent:

.1 that Contractor’s performance of the Work, is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
.2 that an equitable adjustment is made or denied under another provision of the Contract.

ARTICLE 3 - CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY THE CONTRACTOR

3.1.1 The Contractor shall carefully study and compare the Contract Documents with each other and shall report to the State, in writing, any errors, inconsistencies or omissions discovered. If the Contractor performs any work knowing it involves a recognized error, inconsistency or omission in the Contract Documents, without such notice to the State the Contractor shall assume responsibility for such performance and shall bear the cost for correction.

3.1.2 The Contractor shall take field measurements and verify field conditions and shall compare such field measurements, conditions and other related information known to the Contractor with the Contract Documents before proceeding.

3.1.3 The Contractor shall promptly, and before such conditions are disturbed, notify the State in writing of:

.1 subsurface or latent physical conditions at the site differing materially from those indicated, or
.2 unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract.
.3 Hazardous materials.

3.1.4 The State will promptly investigate the conditions, and if the State finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the Work, whether or not changed as a result of such conditions, a Change Order will be issued in accordance with Article 6.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 The Contractor shall supervise and direct the Work. The Contractor shall be responsible for, and have control over, construction means, methods, techniques, sequences, procedures, safety precautions and programs in connection with the Work, and for coordinating the Work under the Contract; unless otherwise noted or specified in the Contract Documents.

3.2.2 The Contractor shall be responsible to the State for acts and omissions of the Contractor's employees, Subcontractors, Sub-subcontractors or material suppliers and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

.1 Subcontractor Responsibility: The Contractor shall be responsible for the actions or inaction of Subcontractors, Sub-subcontractors or material suppliers, at all tiers, regardless of whether they are a Disabled Veterans Business Enterprise (DVBE) firm or are stipulated suppliers or sole sourced. No claim, request for equitable adjustment or Change Order request shall be submitted to the State for any action of any Subcontractor, Sub-subcontractor or material supplier, at any tier, unless the Contractor can demonstrate that the State is the proximate cause of the change or delay alleged in such request. The State will not accept any responsibility or liability for any action or inaction of any Subcontractor, Sub-subcontractor or material supplier, at any tier, except to the extent that the State is the proximate cause of the change or delay.

3.2.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents, either by activities or duties of the State, the State's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.2.4 The Contractor shall be responsible for inspections of portions of the Work already completed under the Contract to determine that such portions are in proper condition to receive subsequent work. If the Contractor determines that some work performed on the Project does not comply with the requirements of the Contract Documents, the Contractor shall repair or replace such defective work at the Contractor's sole expense.

3.2.5 Until Acceptance of the Work, the Contractor shall have the charge and care thereof, and shall bear risk of injury or damage to any part of the Work by action of the elements (except for an Act of God, or natural disaster as proclaimed by the State or Federal Government), or from any other reason except for such damages as are directly caused by acts of the Federal or State Government and the public enemy, except as provided in Paragraph 8.5.

3.3 LABOR AND MATERIALS

3.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Materials, articles and equipment furnished by the Contractor for incorporation into the Work shall be new unless otherwise specified in the Contract Documents.

3.3.2 Hours of Labor: Workers are limited and restricted to 8 hours during any one calendar day, and 40 hours during any one calendar week except that pursuant to Labor Code Section 1815, any work performed in excess of 8 hours per day and 40 hours during any one week, shall be permitted upon compensation for hours worked in excess of 8 hours per day at not less than 1-1/2 times the basic rate of pay. The Contractor shall pay the State $25 as a penalty for each worker for each calendar day worked in violation of the above limitations and restrictions.

3.3.3 Prevailing Wage: The Contractor shall comply with Labor Code, Section 1774 and 1775. Pursuant to Section 1774, the Contractor and any subcontractors, regardless of tier, shall pay not less than the specified prevailing wage rates to all workers employed in the execution of the Contract. In accordance with Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State not more than $50 for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rates for the work or craft, in which the worker is employed for any work executed under the Contract by the Contractor or by any subcontractor in violation of the provisions of the Labor Code; and, in particular, Labor Code, Sections 1770 to 1780, inclusive. In addition to such forfeiture, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each day, or portion thereof, shall be paid to each underpaid worker by the Contractor or subcontractor. This provision shall not apply to properly registered apprentices.

.1 Pursuant to Labor Code, Section 1770, the Director of the Department of Industrial Relations has ascertained the general prevailing rate of per diem wages and a general prevailing rate for legal holiday and overtime work for each craft required for execution of the Contract. The Contractor shall obtain copies of the prevailing rate of per diem wages from the Department of Industrial Relations, Division of Labor Statistics & Research, PO Box 420603, San Francisco, CA 94142-0603, (415) 703-4780; or wage rates may be accessed on the internet at http://www.dir.ca.gov/DLSR/statistics_research.html.The Contractor is responsible to read, understand and comply with all the guidelines, including the fine print in the prevailing wage determinations; and shall post a copy of the prevailing wage rates, specific to the Project, at the Project site.

.2 Wage rates set forth are the minimum that may be paid by the Contractor. Nothing herein shall be construed as preventing the Contractor from paying more than the minimum rates set. No extra compensation will be allowed by the State due to the inability of the Contractor to hire labor at minimum rates, nor for necessity for payment by the Contractor of subsistence, travel time, overtime, or other added compensations, all of which possibilities are elements to be considered and ascertained to the Contractor's own satisfaction in preparing the Bid Form.

.3 If it becomes necessary to employ crafts other than those listed in the General Prevailing Wage Rate booklet, the Contractor shall contact the Division of Labor Statistics and Research as noted above. The rates thus determined shall be applicable as minimum for the contract and incorporated in the bid. When the wage determination shows an expiration date (noted by a double asterisk**), to expire during the term of the contract, the Contractor must call or write the DIR to obtain the new rates and incorporate them in the bid to be applicable for the term of the contract.

.4 The Contractor and each subcontractor, regardless of tier, shall keep an accurate payroll record showing the names, addresses, social security numbers, work classifications, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or subcontractor in connection with the Work. Payroll records shall be certified and shall be on forms provided by the Division of Labor Standards Enforcement, or shall contain the same information as those forms. The Contractor's and subcontractor's certified payroll records for each employee shall be submitted with each payment request, covering the period of the payment request.

3.3.4 Travel and Subsistence Payments: The Contractor shall pay travel and subsistence payments to persons required to execute the Work as such travel and subsistence payments are defined in applicable collective bargaining agreements filed with the Department of Industrial Relations, pursuant to Labor Code, Sections 1773.1 and 1773.9.

3.3.5 Apprentices: Properly registered apprentices may be employed in the execution of the Work. Every apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which the apprentice is employed, and shall be employed only at the work of the craft or trade to which the apprentice is registered. The Contractor and each Subcontractor shall comply with the requirements of Labor Code, Section 1777.5, and any related regulations regarding the employment of registered apprentices.

3.4 NONDISCRIMINATION CLAUSE

3.4.1 Definitions: As they pertain to the Standard California Nondiscrimination Construction Contract Specifications:

.1 Administrator: The Administrator, Office of Compliance Programs (OCP), California Department of Fair Employment and Housing (DFEH), or any person to whom the Administrator delegates authority.

.2 Minority includes:

1) Black (all persons having primary origins in any of the Black racial groups of Africa, but not of Hispanic origin); or
2) Hispanic (all persons of primary culture or origin in Mexico, Puerto Rico, Cuba, Central or South America, or other Spanish derived culture or origin regardless of race); or
3) Asian/Pacific Islander (all persons having primary origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent or the Pacific Islands); or
4) American Indian/Alaskan Native (all persons having primary origins in any of the original peoples of North America and who maintain culture identification through tribal affiliation or community recognition).

3.4.2 Whenever the Contractor or any Subcontractor subcontracts a portion of the Work, it shall physically include in each subcontract of $5,000 or more, the Nondiscrimination Clause in the Contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.

3.4.3 The Contractor shall implement the specific nondiscrimination standards provided in Clauses 3.4.6.1 through 3.4.6.5.

3.4.4 Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities and/or women shall excuse the Contractor's obligations under these specifications, Government Code, Section 12990, or the regulations promulgated pursuant thereto.

3.4.5 In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees shall be employed by the Contractor during the training period, and the Contractor shall have made a commitment to employ the apprentices and trainees upon the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.

3.4.6 The Contractor shall take specific actions to implement the Contractor's nondiscrimination program. The evaluation of the Contractor's compliance with these specifications shall be based upon the Contractor's effort to achieve maximum results from the Contractor's actions. The Contractor shall be able to demonstrate fully the Contractor's efforts under Steps .1 through .5 below:

.1 Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites and at all facilities at which the Contractor's employees are assigned to work. The Contractor, whenever possible, shall assign two or more women to each construction project. The Contractor shall specifically ensure that all leadpersons, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligations to maintain such a working environment, with specific attention to minority and/or female individuals working at such sites or in such facilities.

.2 Provide written notification within 7 days to the Director of DFEH when the union(s) with which the Contractor has a collective bargaining agreement(s) has not referred to the Contractor a minority person and/or woman sent by the Contractor, or when the Contractor has other information that the union(s) referral process has impeded the Contractor's efforts to meet the Contractor's obligations.

.3 Disseminate the Contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the Contractor to meet the Contractor's obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.

.4 Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general leadpersons, on-site leadpersons, etc., are aware of the Contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.

.5 Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the Contractor's obligations under these specifications are being carried out.

3.4.7 Contractors are encouraged to participate in voluntary associations which assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of the Contractor's obligations under these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work-force participation, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. It is the Contractor's obligation to comply.

3.4.8 The Contractor is required to provide equal employment opportunity for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of the Fair Employment and Housing Act (Government Code, Section 12990 et seq.) if a particular group is employed in a substantially disparate manner.

3.4.9 Establishment and implementation of a bona fide affirmative action plan pursuant to Section 8104(b) of Title 2, California Code of Regulations (CCR), shall create a rebuttable presumption that the Contractor is in compliance with the requirements of Government Code, Section 12990, and its implementing regulations.

3.4.10 The Contractor shall not use the nondiscrimination standards to discriminate, harass or allow harassment against any person because of race, color, religion, sex, national origin, ancestry, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), marital status, or age over 40, denial of family and denial of family care leave.

3.4.11 The Contractor shall not enter into any subcontract with any person or firm decertified from State contracts pursuant to Government Code, Section 12990.

3.4.12 The Contractor shall carry out such sanctions and penalties for violation of these specifications and the Nondiscrimination Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code, Section 12990 and its implementing regulations by the awarding agency. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code, Section 12990.

3.4.13 The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company's equal employment opportunity policy is being carried out, to submit reports relating to the provisions herein as may be required by OCP, and to keep records. Records shall at least include for each employee the name, address, telephone number, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice

trainee, helper or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work is performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, the Contractor shall not be required to maintain separate records.

3.5 **GUARANTEE**

3.5.1 The Contractor unconditionally guarantees the Work will be completed in accordance with the requirements of the Contract Documents, and will remain free of defects in workmanship and materials for a period of 1 year from the date of Completion of the Work of the Project, unless a longer guarantee period is specifically called for in the Contract Documents. The Contractor shall repair or replace work, or adjacent work, or both, that may have been damaged or displaced, which was not in accordance with the requirements of the Contract Documents, or that may be defective in its workmanship or material within the guarantee period specified in the Contract Documents, without any expense whatsoever to the State; ordinary wear and tear and abuse excepted.

3.5.2 The Contractor further agrees, within 14 days after being notified in writing by the State, of work not in accordance with the requirements of the Contract Documents or defects in the Work, that the Contractor shall commence and execute, with due diligence, work necessary to fulfill the terms of the guarantee. If the State finds that the Contractor fails to perform the work under the guarantee, the State will proceed to have the work completed at the Contractor's expense and the Contractor will pay costs of the work upon demand. The State will be entitled to all costs, including attorney's fees necessarily incurred upon the Contractor's refusal to pay the above costs.

3.5.3 Notwithstanding the foregoing Subparagraph, in the event of an emergency constituting an immediate hazard to health or safety of State employees, property, or licensees, the State may undertake, at the Contractor's expense and without prior notice, work necessary to correct such hazardous condition(s) when it is caused by work of the Contractor not being in accordance with the requirements of the Contract Documents.

3.6 **TAXES:** The Contractor shall pay all applicable taxes for the Work, or portions thereof provided by the Contractor, which were legally enacted as of the bid date, whether or not yet effective or merely scheduled to go into effect.

3.7 **PERMITS, FEES AND NOTICES**

3.7.1 The Contractor shall secure and pay for required permits, governmental fees, licenses and inspections necessary to complete the Work, unless otherwise provided in the Contract Documents.

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on the performance of the Work.

3.7.3 If the Contractor observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, and rules and regulations, the Contractor shall promptly notify the State in writing. If the Contractor performs work known to be contrary, or should have known to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without prior notice to the State, the Contractor shall assume full responsibility for the Work and shall bear the attributable costs.

3.7.4 The Contractor is not subject to municipal, county, or district laws, rules, or regulations pertaining to building permits or regulating the design or construction of buildings upon State property, except as specified in the Contract Documents.

3.7.5 The Contractor may be subject to federal, state, municipal, county, local or district laws, rules, or regulations pertaining to off-site work, such as utility connections, fire protection systems and encroachment upon federal, state, private, city or county property, including, but not limited to storm water pollution prevention plans.

3.7.6 All construction work shall comply with the California Code of Regulations, Title 24, California Building Standards Code (CBSC), and other Applicable Codes, current edition, as of the bid date or as specified in the Specifications.

3.8 **ALLOWANCES:** The Contractor shall include in the Contract Sum, Allowances in accordance with the requirements of the Specifications, Division 01.

3.9 **SUPERINTENDENT**

3.9.1 The Contractor shall employ a competent Superintendent and assistants who shall be in attendance at theProject site during performance of the Work. The Superintendent, or the Contractor’s duly appointed representative, shall be the person in charge of

the construction of the Work and shall represent the Contractor. Communications given to the Superintendent shall be as binding as if given directly to the Contractor. All communications shall be confirmed in writing by the Contractor. Should the State deem the Superintendent to be incompetent, the State has the authority to request the Contractor to replace this person.

3.9.2 Should the Contractor decide to replace the Superintendent, the Contractor shall notify the State in writing, no fewer than 14 calendar days prior to the replacement. The Contractor shall submit the name and resume of the new Superintendent with the letter.

3.9.3 At any other time when the Superintendent is absent from the Project site because no Work is being performed, the Superintendent shall nevertheless keep the State advised of the Superintendent's whereabouts so that the Superintendent may readily be reached and available for consultation at the Project site at any time.

3.10 CONTRACTOR'S PROGRESS SCHEDULE

3.10.1 Within the time frame specified in the specifications and prior to the first payment request, the Contractor shall submit to the State a Progress Schedule, including submittal schedules, prepared in accordance with the Specifications, Division 01. The Progress Schedule shall show the order in which the Contractor proposes to execute the Work, dates on which the Contractor will start each major subdivision of the Work, and projected dates of completion of each such subdivision in accordance with the requirements of the Contract Documents. The Contractor shall submit adjusted Progress Schedules, including submittal schedules, to reflect changed conditions in accordance with the requirements of the Contract Documents with each payment request.

3.10.2 The Contractor shall, unless otherwise specified in the Contract Documents, or directed by the State in writing, show in the schedule that physical construction of the Work will start within 10 calendar days of the start date stipulated in the Notice to Proceed, and show execution to Completion, in accordance with the specified schedule, subject to adjustment in accordance with the requirements of the Contract Documents.

3.10.3 The Contractor shall provide an adequate work force, materials of proper quality, and equipment to properly execute the Work and to ensure completion of each part in accordance with the Progress Schedule and within the Contract Time specified.

3.10.4 The Contractor shall submit to the State a Schedule of Values consistent with the Progress Schedule and Article 8. The Schedule of Values will be used as a basis for payment in accordance with Article 8.

3.10.5 The State's review and acceptance of the Progress Schedule is for compliance with the requirements of the Contract Documents only. Review and acceptance by the State of the Progress Schedule does not mean approval and does not relieve the Contractor of any of the Contractor's responsibility for the accuracy or feasibility of the Progress Schedule, or of the Contractor's ability to meet the interim Project milestone dates and the date of Completion. The State's review and acceptance does not expressly or impliedly warrant, acknowledge or admit the reasonableness of the logic, durations, manpower or equipment loading of the Progress Schedule.

3.11 DOCUMENTS AND SAMPLES AT THE PROJECT SITE

3.11.1 The Contractor shall maintain at the Project site one record copy of the Drawings, Project Manual, Addenda, Change Orders and other modifications, in good order and marked currently to record changes and selections made during construction; and in addition, Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the State and shall be delivered to the State upon completion of the Work.

3.11.2 Daily Records Clause: The Contractor shall prepare and maintain daily inspection records to document the progress of the Work on a daily basis. Daily Records shall include a daily accounting of labor and equipment on the site for the Contractor and Subcontractors, at any tier. Daily Records shall make a clear distinction between work being performed under Change Order, base scope work, and/or disputed work. Daily Records shall be copied and provided to the State at the end of every week, unless otherwise agreed to in writing.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES (SUBMITTALS)

3.12.1 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate those portions of the work for which submittals are required and the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the State is subject to the limitations of Subparagraph 2.2.6.

3.12.2 The Contractor shall review, approve and submit to the State Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents within the number of days set forth in the Specifications, Division 01; except finishes which shall be submitted in a sequence so as to cause no delay in the progress of the Work or in the activities of the State or separate

contractors. Submittals that are not required by the Contract Documents may be returned to the Contractor without action.

3.12.3 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by the State. Such work shall be in accordance with reviewed submittals.

3.12.4 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and related field construction criteria, and has checked and coordinated the information contained within the submittal(s) with the requirements of the Contract Documents.

3.12.5 The Contractor shall not be relieved of the responsibility for any deviation from the requirements of the Contract Documents by the State's review of submittals unless the Contractor has specifically informed the State, in writing, or as directed by the State, of such deviation at the time of submittal, and the State has given written consent to the specific deviation. The State's review shall not relieve the Contractor of responsibility for errors or omissions in submittals. Any resulting cost increase due to such a deviation shall be the sole responsibility of the Contractor.

3.12.6 The Contractor shall respond per requirements of the Contract Documents, in writing or on resubmitted submittals, to revisions other than those requested by the State on previous submittals. After the second resubmittal of a specific item, that is still not accepted, the Contractor will be charged all costs of submittal review. The charges will be deducted from the Contract Sum.

3.12.7 Informational submittals on which the State is not expected to take action, may be identified in the Contract Documents.

3.12.8 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the State will be entitled to rely upon the accuracy and completeness of such calculations and certifications.

3.12.9 When descriptive catalog designations, including manufacturer's name, product brand name, or model number(s) are referred to in the Contract Documents, such designations shall be considered as being those found in industry publications of current issue at date of first Invitation to Bid.

3.12.10 Substitutions and Approved Equals: Alternative material(s), article(s), or equipment that are of equal quality and of required characteristics for the purpose intended may be proposed by the Contractor for use in the Work, provided the Contractor complies with the Specifications, Division 01, and the following requirements:

.1 The Contractor shall submit a proposal for the alternative material(s), article(s), or equipment, in writing, within 35 days after Contract start date stated in the Notice to Proceed. In exceptional cases where the best interests of the State so require, the State may give written consent to a submittal or resubmittal received after expiration of the time limit designated.

.2 The proposal will not be considered unless the submittal is accompanied by complete information and descriptive data necessary to determine equality of offered material(s), article(s), or equipment. Samples shall be provided when requested by the State. Burden of proof as to comparative quality, suitability, and performance of offered material(s), article(s), or equipment shall be upon the Contractor. The State will be the sole judge as to such matters. In the event the State rejects the use of such alternative(s) submitted, then one of the particular products originally specified in the Contract Documents shall be furnished.

.3 If mechanical, electrical, structural, or other changes are required for installation, fit of alternative materials, articles, or equipment, or because of deviations from Contract Drawings and Specifications, such changes shall not be made without consent of the State, and shall be made without additional cost to the State.

3.13 TESTS AND INSPECTIONS

3.13.1 The Contractor shall at all times permit the State, its agents, officers, and employees to visit the Project site and inspect the Work, including shops where work is in preparation. This obligation shall include maintaining proper facilities and safe access for such inspection. Including, but not limited to providing lifts, ladders, scaffolds, platforms and paths of travel. When the Contract Documents require a portion of the Work to be tested, such portion of work shall not be covered up until inspected and approved by the State. The Contractor shall be solely responsible for notifying the State where and when the work is ready for inspection and testing. Should any work be covered without the required testing and approval, such work shall be uncovered and recovered at the Contractor's expense. Whenever the Contractor intends to perform work on Saturday, Sunday, or a legal holiday, the Contractor shall give written notice to the State of such intention at least 48 hours prior to performing the Work, so that the State may make necessary arrangements.

3.13.2 If the State determines that portions of the Work require additional testing, inspection or approval not included in the Contract Documents, the State will instruct the Contractor, in writing, to make arrangements for additional testing, inspection or

approval by an entity acceptable to the State, and the Contractor shall give 48 hours written notice to the State of where and when tests and inspections will be conducted so that the State may observe the procedures. The State will bear the costs except as provided in Subparagraph 3.13.3.

3.13.3 If procedures for testing, inspection or approval under Subparagraphs 3.13.1 and 3.13.2 reveal failure of a portion(s) of the Work to comply with the Contract Documents, the Contractor shall bear all costs made necessary by such failure(s) including those of repeated procedures and compensation for the State's services and expenses.

3.13.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and delivered to the State within 14 days after each test.

3.14 **USE OF PROJECT SITE**

3.14.1 The Contractor shall confine operations at the Project site to areas permitted by law, ordinances, permits and the Contract Documents.

3.14.2 The Contractor shall perform no operations of any nature on or beyond the limits of Work or premises, except as such operations are authorized in the Contract Documents, or authorized by the State.

3.14.3 The Contractor shall ensure the limits of Work to be free of graffiti or other similar defacements during the time of the Contract; if such defacement occurs, then the Contractor shall properly remove, repair, or correct the affected area(s), or as otherwise directed by the State. The Contractor shall protect exposed surfaces within the limits of Work, with anti-graffiti coatings, and maintain such protection continuously effective during the time of the Contract.

3.14.4 Prohibitions: Pursuant to Subparagraph 3.2.2., the use of alcohol and tobacco products, and the use or possession of weapons, or illegal controlled substances by the Contractor, or others under the Contractor's control, on State property is not allowed. Residing on site in temporary facilities by the Contractor, or others under the Contractor's control, is not allowed unless otherwise specified in the Specifications, Division 01.

3.15 **CUTTING AND PATCHING**

3.15.1 The Contractor shall be responsible for cutting, fitting or patching as required to complete the Work.

3.15.2 The Contractor shall not damage nor endanger the Work by cutting, patching or otherwise altering the construction, and shall not cut nor otherwise alter the construction without prior written consent of the State.

3.16 **CLEANING UP**

3.16.1 The Contractor shall keep the Project site and surrounding areas free from waste materials and/or rubbish caused by operations under the Contract and at other times when directed by the State. At all times while finish work is being accomplished, floors shall be kept clean, free of dust, construction debris and trash. Upon completion of the Work, the Contractor shall remove from the Project site the Contractor's tools, construction equipment, machinery, and any waste materials not previously disposed of, leaving the Project site thoroughly clean, and ready for the State's final inspection.

3.16.2 If the Contractor fails to clean up as provided in the Contract Documents, the State may do so and charge the cost thereof to the Contractor.

3.17 **ACCESS TO WORK:** The Contractor shall provide the State continuous and safe access to the Work. Including, but not limited to providing lifts, ladders, scaffolds, platforms and paths of travel.

3.18 **ROYALTIES AND PATENTS:** The Contractor shall pay royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and hold the State harmless.

3.19 **INDEMNIFICATION**

3.19.1 Duty To Defend: To the fullest extent permitted by law, the Contractor shall defend the State and any officer or employee of the State from and against suits filed against the State alleging claims, (including costs of attorneys fees) by reason of liability imposed by law and claims, including but not limited to, claims of personal injury, death, damage to property and loss of use thereof, or any claims arising out of the Contractor's performance of the Contract, or damages of other relief based on allegations of the failure of the Contractor, or the Contractor's Subcontractors to properly perform their obligations under the Contract, of the Contractor's violations of any legal duties, even if the allegations of any suit are groundless, false or fraudulent, and the Contractor

may make such investigation and settlement of any suit as the Contractor deems expedient. This duty to defend is separate and independent from the Contractor's duty to indemnify and hold harmless the State from such claims. Any failure to fulfill this obligation shall be a default of the Contractor's performance obligations under the Contract.

3.19.2 Duty to Indemnify: To the fullest extent permitted by the law, the Contractor shall hold harmless and indemnify the State and any officer or employee of the State from and against claims, losses and expenses (including costs of attorneys fees) by reason of liability imposed by law for claims, including but not limited to, claims of personal injury, death, damage to property and loss of use thereof, or any claims arising out of the Contractor's performance of the Contract, or damages or other relief based on allegations of the failure of the Contractor, or the Contractor's Subcontractors to properly perform their obligations under the Contract, or the Contractor's violations of any legal duties. Any failure to fulfill this obligation shall be a default of the Contractor's performance obligations under the Contract.

3.20 **AIR POLLUTION:** The Contractor and Subcontractors shall comply with State and/or local air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract. If there is a conflict between the State and local air pollution control rules, regulations, ordinances and statutes, the most stringent shall govern.

3.21 **CERTIFICATION BY CONTRACTOR OF RECYCLED CONTENT:** The Contractor shall certify in writing, under penalty of perjury, to the State, the minimum, if not exact, percentage of recycled content, both postconsumer material and secondary material, as defined in Public Contract Code Sections 12153 and 12200 and 12209, in materials, goods, or supplies offered or products used in the performance of the Contract, regardless of whether the product meets the required recycled percentage as defined in Sections 12153 and 12200 and 12209. The Contractor may certify that the product contains zero recycled content.

3.22 **UNFAIR BUSINESS PRACTICES:** The Contractor agrees and will require the Subcontractors and suppliers to agree to assign to the State all rights, title, and interest in and to all causes of action they may have under Section 4 of the Clayton Act (15 U.S.C. Section 15), or under the Cartwright Act (commencing with Section 16700 of the Business and Professions Code), arising from the purchase of goods, services or materials, pursuant to the Contract Documents or subcontract thereunder. An assignment made by the Contractor, and additional assignments made by Subcontractors and suppliers, shall be deemed to have been made and will become effective at the time the State tenders final payment to the Contractor, without further acknowledgment of the parties.

3.23 **CHILD SUPPORT COMPLIANCE ACT:** For any contract in excess of $100,000, the Contractor acknowledges in accordance with Public Contract Code Section 7110, that: (a) the Contractor recognizes the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with Section 5200) of Part 5 of Division 9 of the Family Code; and (b) the Contractor, to the best of its knowledge is fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.

3.24 **NOT USED**

3.25 **CONTRACTOR REQUIRED NOTIFICATION OF CHANGES:** The Contractor shall notify the State's Representative in writing of any change to Contractor's name, status, or information including but not limited to:

1. Name
    a. An amendment is required to change the Contractor's name as listed on this Agreement. Upon receipt of Contractor's notification and legal documentation of the name change, the State will process the amendment. Payment of invoices presented with a new name cannot be paid prior to approval of said amendment.
    b. The State shall not be liable for penalties or interest on payments which are delayed due to Contractor's change of name and subsequent amendment processing.
2. Address/Location
3. Federal Employer Identification Number (FEIN)
4. Type of Organization or Legal Status – including:
    a. Corporate
    b. Partnership
    c. Individual/Sole-Ownership
    d. Joint Venture
    e. Limited Liability Company
    f. DBA
5. Ownership
6. Officers or Key Personnel
7. License
8. Other (Bankruptcy, Etc.)

Contractor shall immediately provide an updated Standard Form 204 (IRS/FTB form) to the Contracts Management & Procurement Services Section within five (5) calendar days of any such relevant change.

The State shall not be liable for penalties or interest on payments which are delayed do to Contractor's lack of proper or timely notice and documentation of a relevant change in status which impacts the State's ability to pay.

Contractor shall submit the firm's status change in writing including the Contract Number, Project Title and all necessary backup and legal documentation to support the status change to:

The State Department of General Services
Real Estate Services Division
Contracts Management & Procurement Services Section
707 Third Street, Suite 2-350
West Sacramento, CA 95605

ARTICLE 4 - SUBCONTRACTORS

4.1 SUBLETTING AND SUBCONTRACTING

4.1.1 The Contractor shall adhere to the rules governing subcontracting as set forth in the Subletting and Subcontracting Fair Practices Act, commencing with Public Contract Code, Section 4100. Subcontractor substitutions shall be in accordance with provisions of the Subletting and Subcontracting Fair Practices Act, beginning with Public Contract Code, Section 4100. Violations of this Act by the Contractor may subject the Contractor to penalties and disciplinary action as provided by the Subletting and Subcontracting Fair Practices Act.

4.1.2 The Contractor shall be responsible for the Work. Persons engaged in the Work of the Project are the responsibility and under the control of the Contractor. The Contractor shall give personal attention to fulfillment of the Contract and shall keep the Work under the Contractor's control. When any Subcontractor fails to execute a portion of the Work in a manner satisfactory to the State, the Contractor shall remove such Subcontractor immediately upon written request notice from the State, and the Subcontractor shall not again be employed on the Project. Although Specification Sections of the Contract Documents may be arranged according to various trades or general grouping of work, the Contractor is not obligated to sublet work in any manner. The State will not entertain requests to arbitrate disputes among Subcontractors or between the Contractor and Subcontractor(s) concerning responsibility for performing any part of the Work.

4.1.3 The State may not permit a contractor or subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to Sections 1777.1 or 1777.7 of the Labor Code to bid on, be awarded, or perform work as a subcontractor on a public works project.

.1 Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract, and any public money that may have been paid to a debarred subcontractor by a contractor on the project shall be returned to the awarding body. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

4.2 SUBCONTRACTUAL RELATIONS

4.2.1 The Contractor shall make available to each proposed Subcontractor, prior to the execution of a Subcontractor Agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed Subcontractor Agreement which may or may not be at variance with the Contract. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. The Contractor shall, by Subcontractor Agreement, require each Subcontractor, to the extent of the work to be performed by the Subcontractor:

.1 To be bound to the Contractor by terms of the Contract.
.2 To assume toward the Contractor the obligations and responsibilities which the Contractor, by the Contract, assumes toward the State.
.3 To preserve and protect the rights of the State under the Contract Documents with respect to the work to be performed by the Subcontractor.
.4 To be allowed, unless specifically provided otherwise in the Subcontractor Agreement, the benefits of rights, remedies and redress against the Contractor that the Contractor, by the Contract, has against the State.
.5 To enter into similar agreements with Sub-subcontractors.

4.2.2 Subcontractor Payments: The Contractor shall pay the Contractor's Subcontractors for work performed no later than 10 days after receipt of each progress payment. If there is a good faith dispute over all or any portion of the amount due a Subcontractor on a progress payment, the Contractor may withhold no more than 150 percent of the disputed amount. This provision shall apply to Sub-subcontractors also. A violation of these requirements invokes the payment and penalty provisions of Public Contract Code, Section 10262 and Section 10262.5.

4.3 **DISABLED VETERAN BUSINESS ENTERPRISE PROGRAM:** Pursuant to Public Contract Code (PCC) Section 10115 et. seq., the Contractor shall use, employ and utilize Disabled Veteran Business Enterprise (DVBE) subcontractors, sub-subcontractors or material suppliers who were listed in their bid documents for DVBE Program participation, to the full extent of the amount of money and/or percentage of commitment manifested in the bid documents. If the Contractor wishes to substitute any listed DVBE subcontractors, sub-subcontractors or material suppliers for just and legal cause, the Contractor shall follow the dictates of PCC Sections 4107 and 10115.12b, as well as Military and Veterans Code (M&VC) Section 999.5(e) and California Code of Regulations, Title 2, Section 1896.64. The DVBE may only be replaced by another DVBE and shall obtain the written authorization of the State prior to any such substitutions. The Contractor shall not unilaterally substitute a listed DVBE subcontractor, sub-subcontractor or material supplier. Failure of Contractor to seek substitution and adhere to the DVBE participation requirement identified in the bid may be cause for contract termination, recovery of damages under rights and remedies due to the State, and penalties as outlined in M&VC Section 999.9; PCC Sections 4110 and PCC Section 10115.10.

4.4 **CONTRACT ASSIGNMENTS:** Performance of the Contract may not be assigned except upon written consent of the State. Consent will not be given to an assignment which would relieve the Contractor or the Contractor's Surety of their responsibilities under the Contract.

ARTICLE 5 - CONSTRUCTION BY THE STATE OR BY SEPARATE CONTRACTORS

5.1 STATE'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

5.1.1 The State reserves the right to perform work or operations related to the Project with the State's own work force, and to award separate contracts in connection with other portions of the Project, and other construction or operations on the Project site or adjacent to the Project. The Contractor shall at all times conduct the Work so as to impose no hardship on the State or others engaged in work on the Project, nor to cause any unreasonable delay or hindrance to the Project.

5.1.2 When separate contracts are awarded for different portions of the Project, "the Contractor" in the Contract Documents in each case shall mean the contractor who executes each separate contract. Each contractor is the intended third part beneficiary of other contracts for the Project.

5.1.3 The Contractor shall not cause unnecessary hindrance or delay to another contractor working on or near the Project. If the performance of any contract for the Project is likely to be interfered with by the simultaneous execution of some other separate contract or contracts, the State will decide which contractor may proceed.

5.1.4 Costs caused by defective or ill-timed work shall be borne solely by the responsible contractor.

5.2 MUTUAL RESPONSIBILITY

5.2.1 The Contractor shall cooperate fully with the State and separate contractors with regard to the execution of their work as follows:

.1 The Contractor shall cooperate fully with the State and all separate contractors with regard to introduction and storage of their materials and equipment.

.2 The Contractor shall coordinate with the State and separate contractors with regard to construction scheduling and sequence of operations, subject to approval of the State.

.3 Each contractor shall monitor the schedule and progress of each other contractor whose work affects its work, and shall provide timely notice to the State of potential problems of interface so that the State can mitigate the problem.

.4 The Contractor shall properly connect the Work to the work of the State or the separate contractors.

.5 The Contractor shall inspect the work of the State or other contractors affecting the Work and promptly report to the State in writing irregularities or defects in the separate work, which renders it unsuitable for reception or connection of the Work.

.6 Failure of the Contractor to inspect and report shall constitute acceptance of the other work as fit and proper to receive the Work, except as to defects which may develop in the other work after execution of the Contractor's Work.

5.2.2 Claims Between Separate Contractors:

.1 Should the Contractor cause damage to the work or property of any separate contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement, mediation or arbitration, if they will so settle.

.2 If such separate contractor sues the State or initiates an arbitration proceeding on account of any damage alleged to have been so sustained, the State will notify the Contractor who shall defend such proceedings at the Contractor's sole expense.

.3 The Contractor shall pay or satisfy any judgement or award against the State, arising therefrom. In addition, the Contractor shall pay the State for attorney's fees, court, arbitration or mediation costs and additional administrative, professional, consultant, inspection, testing and other service costs which the State has incurred.

5.2.3 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to any completed or partially completed construction or to any property of the State or separate contractors as provided in Subparagraph 10.1.6.

5.2.4 Cutting and Patching Under Separate Contracts: The Contractor shall be responsible for any cutting, fitting and patching that may be required to complete the Work, except as otherwise specifically provided for in the Contract Documents. The Contractor shall not endanger any work of the State or of any other contractor by cutting, excavating, or otherwise altering any work, except with the written consent of the State.

5.3 **STATE'S RIGHT TO CLEAN UP:** If a dispute arises among the Contractor, separate contractors and/or the State as to the responsibility under their respective contracts for maintaining the Project site and surrounding areas free from waste materials and rubbish as described in Paragraph 3.16, the State may clean up and allocate the costs among those responsible.

ARTICLE 6 - CHANGES IN THE WORK

6.1 GENERAL

6.1.1 The State may order changes, including but not limited to, revisions to the Contract Documents, performance of extra work, and the elimination of work, without invalidating the Contract. Orders for such changes will be in writing. Changes shall not affect the obligations of the sureties on the contract bonds nor require their consent. Contract Time and Contract Sum will be adjusted, by written Change Order for changes which materially increase or decrease the time or cost or performance.

.1 Proposed Change Order: The Contractor will be issued a written proposed Change Order by the State describing the intended changes to the Work.

.2 Timeline: Within 14 days the Contractor shall submit to the State the Contractor's proposed cost estimate to be added or deducted from the Contract Sum due to the change, authenticated in full by completely detailed estimates and other authenticators of the cost by the Contractor, Subcontractors, Sub-subcontractors, vendors or material suppliers, and any adjustments of time of Completion of the entire Work that is directly attributable to the State's proposed Change Order.

.3 Agreement: If an agreement is reached as to the adjustment in compensation for performance of changed Work, but an agreement is not reached as to the adjustment of Time for such Work, then the Contractor shall proceed with the Work at the agreed cost, reserving to the Contractor the right to further pursue the Contractor's claim for adjustment of time in accordance with Paragraphs 7.4 and 9.1.

.4 Failure to Submit Cost Estimate: If the Contractor fails to submit the cost estimate within the 14 days timeline, or there is failure to agree to the Cost, then the State shall have the right to issue an order in writing to the Contractor to commence Work immediately, and the Contract Sum shall be changed in accordance with the State's estimate of cost, unless, within 14 days following completion of the added Work or with written notice to delete the Work, the Contractor submits to the State written proof that the State's estimate is in error.

6.1.2 The Contractor, when ordered by the State, shall proceed with changes before agreement is reached on adjustment, if any, in compensation or time for performance, and shall furnish to the State records as specified in Clause 6.2.1.3. If the Contractor fails to provide such records, the State's records will be used for the purpose of adjustment, if any, in Contract Time and Contract Sum.

.1 Contractor may make payment requests for such work.

6.1.3 The Contractor will forfeit compensation for cost and /or time for proceeding with changes to the Work without written authorization from the State. The Contractor shall notify the State, in writing, and request an evaluation whenever it appears a change is necessary. This written notice shall be made within 24 hours of such discovery. If the State concurs with the Contractor's request for a change to the Work, the State will follow the procedures under Article 6. Delays as a result of these requests will be the

responsibility of the Contractor.

6.2 **CHANGE ORDER**

6.2.1 Methods used in determining adjustments to the Contract Sum shall be based on one of the following methods:

.1 By mutual acceptance of a lump sum increase or decrease in costs. Upon the State's written request, the Contractor shall furnish a detailed estimate of increase or decrease in costs, together with cost breakdowns and other support data within the time specified in such request. The Contractor shall be responsible for any additional costs caused by the Contractor's failure to provide the estimate within the time specified.

.2 By the State, on the basis of the State's estimate of increase or decrease in the costs.

.3 By the State, whether or not negotiations are initiated as provided in Clause 6.2.1.1, by actual and necessary costs, as determined by the State, on the basis of records. Beginning with the first day and at the end of each day, the Contractor shall furnish to the State detailed hourly records for labor, construction equipment, and services; and itemized records of materials and equipment used that day in performance of the changes. Such records shall be on a form acceptable to the State. Such records shall be signed by the Contractor and, when agreed to by the State, will become the basis for compensation for the changed work. Such agreement shall not preclude subsequent adjustment based upon later audit by the State.

.4 By unit prices stated in the Contract Documents, or subsequently agreed upon.

.5 By a manner agreed upon by the State and the Contractor.

6.2.2 Allowable Costs: The only costs which will be allowed due to changes in the Work shall be computed in the following manner:

.1 Labor: Compensation for labor shall include the applicable payroll cost for labor, including first level supervision providing physical construction labor directly engaged in performance of the changes. Others, who may be involved in the preparation of the change order, including, but not limited to supervisors, superintendent, engineers, or estimators, shall be considered as overhead costs under Clause 6.2.2.4. Payroll cost for labor shall be the General Prevailing Wage Rates applicable for this project and in the locality for performance of the changes. In addition to the published rates, only social security, worker compensation, state and federal taxes shall be included in the total payroll cost. Other costs shall be considered as mark-ups under Clause 6.2.2.4. Use of a classification which would increase labor costs will not be permitted.

.2 Materials and Equipment: Compensation for materials and equipment shall include the necessary costs for materials and equipment directly required for performance of the changes. Cost of materials and equipment may include costs of transportation and delivery. If discounts by suppliers are available to the Contractor, they shall be credited to the State. If materials and equipment are obtained from a supply or source owned by, or in part, by the Contractor, payment therefore will not exceed current wholesale prices for such materials and equipment. If, in the opinion of the State, the cost of materials and equipment is excessive, or if the Contractor fails to furnish satisfactory evidence of costs from supplier, the cost of materials and equipment shall be the lowest current wholesale price at which similar materials and equipment are available in quantities required. The State reserves the right to furnish materials and equipment required for performance of the changes, and the Contractor shall have no claim for costs or mark-ups on such materials and equipment.

.3 Construction Equipment:

.1 Compensation for construction equipment shall include the necessary costs for use of construction equipment directly required for performance of the changes. Any use for less than 30 minutes shall be considered one-half hour. No costs will be allowed for time while construction equipment is inoperative, idle, or on stand-by, for any reason, unless such times have been approved in advance by the State. Rental time for construction equipment moved by its own power shall include the time required to move construction equipment to the Work site from the nearest available source for rental of such equipment, and time required to return such equipment to the source. If construction equipment is not moved by its own power, loading and transportation costs will be paid in lieu of such rental time. Neither moving time nor loading and transportation costs will be allowed if the construction equipment is used for any work other than the changes. No allowance will be made for individual pieces of construction equipment and tools having a replacement value of $500 or less. No construction equipment costs will be recognized in excess of rental rates established by distributors or equipment rental agencies in the locality for performance of the changes.

.2 Unless otherwise approved by the State, the allowable rate for use of construction equipment shall constitute full compensation to the Contractor for cost of fuel, power, oil, lubrication, supplies, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor except for construction equipment operators and any and all costs to the Contractor incidental to the use

of such construction equipment.

.4 Mark-Ups for Added Work:

.1 General: The following allowance for mark-ups for performance of the changes shall constitute full compensation for additional field and home office overhead, profit, insurance, taxes (excluding sales taxes for materials incorporated into the project), and bonds, and other costs not covered under Clauses 6.2.2.1 through 6.2.2.3.

.2 Contractor: When work is added, the Contractor may claim mark-up in addition to authorized allowable costs, a reasonable sum as compensation for the items identified in 6.2.2.4.1 above, subject to proof of entitlement based on actual job costs, actual job experience, the Contractor's bidding data, and industry custom and practice. Under no circumstance can this sum exceed the following percentages:

.1	Contractor Labor	:	21 percent, includes bond cost.
.2	Contractor Materials and Equipment	:	16 percent, includes bond cost.
.3	Subcontractor Work	:	6 percent of Subcontractor's costs, includes bond cost.

.1 Calculations of the Contractor's allowable 6 percent mark-up of the Subcontractor's Work shall not include the Subcontractor's allowable mark-up. Compounding of mark-up is not allowed.

.3 Subcontractors: When work is added, the Subcontractor may claim mark-up in addition to authorized allowable costs, a reasonable sum as compensation for the items identified in 6.2.2.4.1 above, subject to proof of entitlement based on actual job costs, actual job experience, the Subcontractor's bidding data, and industry custom and practice. Under no circumstance can this sum exceed the following percentages:

.1	Subcontractor Labor	:	20 percent
.2	Subcontractor Materials and Equipment	:	15 percent

.3 The aggregate mark-ups for all Subcontract tiers shall not exceed 20 percent for labor and 15 percent for materials and equipment. Compounding of mark-up is not allowed.

.5 For Deleted Work: When the State is entitled to a credit for deleted work, the credit shall include direct labor, materials, and supervision plus overhead of the Contractor or Subcontractor, as applicable for the deleted work. Deleted overhead shall be computed as no less than 5 percent of the direct labor, materials, and supervision, and should reflect the actual savings to the Contractor resulting from the deletion based upon actual job prices for the work at issue, actual job experience, the Contractor's bidding data for the project and industry custom and practice. For example, if a $10,000 item of work is deleted, the credit to the State would be no less than $10,500.

.6 For Combination of Added and Deleted Work: For Change Orders that involve both added and deleted work, the Contract Sum will be adjusted based on the following computation: Cost before mark-ups of added and deleted work shall each be separately estimated. If a difference between costs results in an increase to the Contract Sum, a mark-up for added work shall be applied to the difference. If a difference in costs results in a decrease, then the 5 percent credit to the State for deleted overhead set forth above shall be applied to the difference.

.7 General Limitations: Costs to the Contractor for changes which exceed market values prevailing at the time of the change will not be allowed unless the Contractor establishes that all reasonable means for performance of the changes at prevailing market values have been investigated and the excess cost could not be avoided. Notwithstanding actual charges to the Contractor on work performed or furnished by others, no mark-ups will be allowed in excess of those specified in Clause 6.2.2.4 above.

6.2.3 Cost Disallowance: Costs which will not be allowed or paid in Change Orders or Claim settlements under this Contract include, but are not limited to, interest cost of any type other than those mandated by statute; Claim preparation or filing costs; legal expenses; the costs of preparing or reviewing proposed Change Orders or Change Order proposals concerning Change Orders which are not issued by the State; lost revenues; lost profits; lost income or earnings; rescheduling costs; costs of idled equipment when such equipment is not yet at the site or has not yet been employed on the Work; lost earnings or interest on unpaid retainage; claims consulting costs; the costs of corporate officers or staff visiting the site or participating in meetings with the State; any compensation due to the fluctuation of foreign currency conversions or exchange rates; or loss of other business.

6.3 **ACCEPTANCE OF CHANGE ORDERS:** The Contractor's written acceptance of a Change Order shall constitute final and binding agreement to the provisions thereof and a waiver of Claims in connection therewith, whether direct, indirect, or consequential in nature.

6.4 **EFFECT ON SURETIES:** Alterations, extensions of time, extra and additional work, and other changes authorized by the Contract Documents may be made without securing consent of Surety(s) on Contract Bonds.

ARTICLE 7 - TIME

7.1 **NOTICE TO PROCEED**

7.1.1 The Contractor will be notified of the Contract start date as stated in the Notice to Proceed. Notwithstanding other provisions of the Contract, the State will not be obligated to accept or to pay for work furnished by the Contractor prior to the start date stated in the Notice to Proceed whether or not the State has knowledge of the furnishing of such work. The Contractor shall not be allowed on the site of the Work until the Contractor's Contract bonds and certificates of insurance comply with requirements of the Contract.

7.1.2 Work under the Contract shall be conducted in accordance with Paragraph 3.10. The Contractor shall not begin any Work until authorized in writing by the State.

7.2 **CONTRACT TIME:** The Contract Time is the period set forth in Document 00 73 00, Supplementary Conditions. The start and completion dates will be stated in a Notice to Proceed. It is essential that the Project be completed within the time fixed for Completion in Document 00 73 00 or liquidated damages will be assessed for delay. All portions of the Work shall be completed and shall be ready for full use by the State on, or prior to, the date of Completion.

7.2.1 Time is of the essence in this Contract.

7.3 **LIQUIDATED DAMAGES:** For every day that the Work remains unfinished after the time fixed for Completion in the Contract Documents, as modified by any approved extension of time, damage will be sustained by the State. Because of the difficulty in computing actual material loss and disadvantages to the State, it is determined in advance that the Contractor will pay the State the amount of damages set forth in the Agreement, as representing a reasonable forecast of actual damages which the State will suffer by failure of Contractor to complete the Work within the time fixed for Completion in the Contract. Execution of the Agreement shall constitute acknowledgment by the Contractor that the Contractor agrees that the State will actually suffer damages in the amount fixed for every Day during which Completion of the Work is avoidably delayed beyond the time fixed for Completion in the Contract.

7.4 **TIME EXTENSIONS**

7.4.1 Request for Time Extension: In the event the Contractor requests an extension of Contract Time for unavoidable delay, the Contractor shall furnish such justification and supporting evidence as the State may deem necessary for the determination as to whether the Contractor is entitled to an extension of Contract Time. The Contractor shall submit justification in writing no later than 7 days after the initial occurrence of any delay. The justification shall be based on the Official Progress Schedule as updated at the time of occurrence of the delay or execution of work related to any changes to the scope of the Work. The justification shall include, but is not limited to the following information:

.1 Duration to perform activity(ies) relating to changes in the Work and resources (manpower, equipment, material, etc.) required to perform these activities within the stated duration.

.2 Logical ties to the Official Progress Schedule for proposed changes or delay showing activity(ies) in the schedule start or completion dates are affected by the change or delay.

7.4.2 The State, upon receipt of such justification and supporting evidence, shall make its finding of fact. The State's decision shall be final and conclusive and the State will advise the Contractor in writing of such decision. If the State finds that the Contractor is entitled to an extension of Contract Time, the State's determination as to the total number of extension days shall be based upon the latest updated version of the Official Progress Schedule. Such data will be included in the next monthly updating of the schedule.

7.4.3 Time Extensions: For delays that the State agrees are unavoidable, and are Justified in accordance with Subparagraph 7.5.2, the Contractor shall, pursuant to the Contractor's application, be allowed an extension of time beyond the Contract Time. During such extension of time, neither extra compensation for engineering and inspection nor liquidated damages will be charged to the Contractor. Time extensions shall be granted only for delays or changes that extend the Completion date, based on the latest accepted updated version of the Official Progress Schedule. Time extensions for delays and changes shall not exceed one day for each day that the Contract Completion date of the Official Progress Schedule is extended by this change or delay.

7.5 **DELAYS IN COMPLETION OF THE WORK**

7.5.1 Notice of Delays: Whenever the Contractor foresees delay in the continuance and Completion of the Work, or immediately upon the occurrence of any delay which the Contractor regards as unavoidable, the Contractor shall notify the State in writing, in a separate notice of the delay. The Contractor's notice shall include the probability of the occurrences of such delay and its cause in

order that the State may take immediate steps to prevent the occurrence or continuance of the delay. If the delay cannot be prevented, the State will determine whether the delay is unavoidable and to what extent continuance and Completion of the Work is anticipated to be delayed.

.1 The Contractor shall make no claim for delay not called to the attention of the State in writing, at the time of its occurrence.

.2 Delay in the continuance of parts of the Work that does not prevent or delay the continuance of other parts of the Work or the Completion of the whole Work within the Contract Time shall be deemed to constitute neither avoidable delays nor unavoidable delays, within the meaning of the Contract. Such delay will be considered Unjustified and no extension to the Contract Time and/or additional compensation will be granted.

7.5.2 Justified Delay: Justified Delay in the continuance or Completion of the Work shall include delays which result from causes beyond the control of the Contractor and which could not have been avoided by the exercise of due care and diligence on the part of the Contractor or the Contractor's Subcontractors. Delay in Completion of the Work due to Contract modifications ordered by the State and unforeseeable delays in continuance or completion of the work of other contractors employed by the State may be considered Justified Delays insofar as they interfere with the Contractor's Completion of the Work within the Contract Time. Delays due to normal weather conditions which prevent the Contractor from proceeding with the controlling item on the Official Progress Schedule will not be regarded as a Justified Delay.

.1 Justified Delay will result in an extension beyond the Contract Time in accordance with Paragraph 7.4.

.2 Justified Delay that includes Contract modifications ordered by the State may entitle the Contractor to extra compensation in accordance with the provisions of Article 6.

.3 Delay that results from causes beyond the control of the State and is determined by the State to be the Contractor's responsibility shall be considered Unjustified and will result in no extension in the Contract Time or extra compensation. The State's decision shall be final and conclusive.

.4 The State will determine the net difference between overlapping or concurrent Justified Delays and Unjustified Delays and whether the Contractor is entitled to any extension in the Contract Time and/or extra compensation. The State's decision shall be final and conclusive.

7.5.3 Weather Delays: If weather conditions are the basis for delays in the continuance or completion of the Work, such delay shall be documented by 5 year climatological data obtained by the Contractor, from the nearest nationally recognized reporting station to the Work site, substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction. The State will not be responsible for additional costs of the Contractor caused by weather delays, including, but not limited to, costs of extended overhead.

7.6 ACCELERATION

7.6.1 The State reserves the right to accelerate the Work of the Contract. In the event that the State directs acceleration, such directive will be only in written form. The Contractor shall keep cost and other Project records related to the acceleration directive separately from normal Project costs and records, and shall provide a written record of acceleration cost to the State on a daily basis.

7.6.2 In the event that the Contractor believes that some action or inaction on the part of the State constitutes an acceleration directive, the Contractor shall immediately notify the State in writing that the Contractor considers the actions an acceleration directive. This written notification shall detail the circumstances of the acceleration directive. The Contractor shall not accelerate work efforts until the State responds to the written notification. If acceleration is then directed or required by the State, cost records referred to above shall be maintained by the Contractor and provided to the State on a daily basis.

7.6.3 In order to recover additional costs due to acceleration, the Contractor shall document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will be only overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will be only the cost of added equipment mobilized to the site to accomplish the accelerated work effort.

ARTICLE 8 - PAYMENTS AND COMPLETION

8.1 **SCHEDULE OF VALUES**: Before the first payment request, the Contractor shall submit to the State a Schedule of Values allocated to portions of the Work, included with the Contractor's Progress Schedule, and supported by such data to substantiate the accuracy as the State may require. This Schedule of Values, unless objected to by the State, shall be used as a basis for progress payments.

8.2 **TIMELINESS OF PAYMENTS**

8.2.1 Upon receipt of a payment request by the designated State's Representative with updated Progress Schedule from the Contractor, the State will review same to determine if it is a proper payment request based on the approved Schedule of Values. Any payment request determined by the State not to be suitable for payment shall be modified and processed in accordance with the State's assessment or returned to the Contractor for resubmittal. The reason(s) the payment request was deemed unsuitable shall be stated in writing.

8.2.2 Actual payment request submittal date shall be established by the State. Thereafter, the payment request submittal date will be monthly on the same date.

8.2.3 The State will make progress payments pursuant to Public Contract Code, Section 10261.5.

8.3 **RETENTIONS**

8.3.1 Upon submittal and receipt of a monthly payment request in accordance with Paragraph 8.2 above, the following shall apply:

.1 The Contractor's payment request shall include the total amount of Work completed to date, including materials as verified by the State, furnished and delivered on the Project site, not used, or in a secure off-site facility, pursuant to Public Contract Code, Section 10261. All materials included in the Contractor's payment requests furnished and delivered on the Project site, not used, and /or in a secure off-site facility shall be used exclusively for the Project. It shall be the sole responsibility of the Contractor to maintain, protect and secure such materials.

.2 The State shall retain not less than 5 percent of the estimated value of Work completed.

8.3.2 Securities in Lieu of Retention: At the request and expense of the Contractor, and in accordance with Public Contract Code, Section 10263, the Contractor may provide securities in lieu of retention.

8.4 **ASSIGNMENT OF CONTRACT FUNDS:** The Contractor may assign moneys due or to become due under the Contract, through an amendment to the Contract. Any assignment of moneys earned by the Contractor shall be subject to proper retention in favor of the State and to deductions provided for in the Contract. Moneys withheld, whether assigned or not, are subject to being used by the State to the extent permitted by law, for the Completion of the Work in the event that the Contractor is in default of the Contract.

8.5 **OCCUPANCY BY THE STATE PRIOR TO COMPLETION OF THE WORK**

8.5.1 The State reserves the right to occupy all or any part of the Project prior to Completion of the Work, upon written notice. Such occupancy or use is herein referred to as Beneficial Occupancy. In this event, the Contractor shall be relieved of responsibility to the State for liability arising out of such occupancy by the State. Nevertheless, the Builder's Risk Coverage must remain in effect, with either a "consent to occupy" endorsement or a waiver of occupancy endorsement, with no right of recovery against the State.

8.5.2 The State's Beneficial Occupancy does not constitute Completion of the Work or Acceptance of the Work by the State, or any portion of the Work, nor will it relieve the Contractor of responsibility for correcting defective Work or materials found at any time before Acceptance of the Work, as set forth in Article 12 or during the Guarantee period as set forth in Paragraph 3.5, or after the State's acceptance, as set forth in Subparagraph 8.6.1. However, when the Project includes separate buildings, and one or more of the buildings is entirely occupied by the State, then upon written request by the Contractor and by written consent from the State, the Guarantee period will commence to run from the date of the State's occupancy of such building or buildings.

8.6 **ACCEPTANCE OF THE WORK AND FINAL PAYMENT**

8.6.1 When the Contractor considers the Work complete, the Contractor shall request a final inspection in writing to be conducted by the State.

.1 The Contractor shall request this final inspection only when all Work, including deficient items identified on previous inspections, have been completed and deliverables delivered as noted in the Project Manual, Section 01 77 00.

.2 The State Representative shall conduct a final inspection within 14 days of receipt of a written request from the Contractor for final inspection.

.3 If, after the inspection, the State Representative determines that the Work is complete, the State Representative will establish a date for Completion of the Work. The State Representative will then recommend to the Director of the Department of General Services, or the Director's designee, to accept the Work within 60 days from the

date of Completion of the Work.

.4 Upon Acceptance of the Work by the Director:
  a) The Retention held by the State will be released, and
  b) The Contractor will be relieved of the duty of maintaining and protecting the Work.

.5 If the State determines that the Work is not complete, the Contractor will be notified in writing of deficiencies. After correcting all deficiencies the Contractor shall again initiate the procedures for final inspection as set forth above. If the process of re-inspection and correction of deficiencies goes beyond the Contract Time, the Contractor shall be assessed liquidated damages.

.6 Determination by the State that the Work is complete or Acceptance of the Work will not bar any Claim against the Contractor pursuant to Paragraph 3.5.

8.6.2 Upon Acceptance of the Work, the State will submit a final statement to the Contractor:

.1 The final statement shall take into account the Contract Sum as adjusted by any Change Orders, amounts already paid to the Contractor, sums to be withheld for incomplete Work, liquidated damages, stop notices, and for any other cause under the Contract.

.2 A warrant in the amount of the sum due the Contractor, if any, will be issued.

.3 If the Contractor owes any amount to the State, the final statement shall serve as an invoice to the Contractor.

8.6.3 The Contractor is required to pay Subcontractors from which a Retention has been withheld within 7 days of receipt from the State of Retention proceeds.

8.6.4 The Contractor has 30 days after receipt of the final statement to file a Claim with the State.

.1 All Claims shall comply with the requirements of Subparagraph 9.1.2.

.2 Failure to file a Claim within the 30 day period constitutes a failure to diligently pursue and exhaust the required administrative procedures set forth in the Contract. Such failure shall constitute waiver of additional rights to compensation under the Contract or the right to request Equitable Adjustment.

.3 If the Contractor does not file a Claim within the 30 day period, the final warrant made by the State will become a complete and final settlement between the State and the Contractor.

8.7 **INTEREST:** Payments due and unpaid under the Contract shall earn interest pursuant to Public Contract Code, Sections 7107 and 10261.5.

ARTICLE 9 - DISPUTES AND CLAIMS

9.1 DISPUTE AND CLAIM PROCEDURES

9.1.1 Dispute as to Contract Requirements: When the Contractor and the State fail to agree whether or not any work is within the scope of Contract requirements, the Contractor shall immediately perform such work upon receipt of a written notice to do so by the State. Within 14 days after receipt of such notice to perform disputed work, the Contractor may submit a written protest to the State, specifying in detail the Contract requirements that were exceeded, and approximate change in cost resulting so that the State will have notice of a potential Claim. Failure to submit a protest within the specified period shall constitute a waiver of any and all rights to an adjustment in Contract Sum and Contract Time due to such work, and the Contractor thereafter shall not be entitled to adjustment of Contract Sum or Contract Time. For any such work that is found to exceed Contract requirements, there shall be an adjustment in Contract Sum and Contract Time on same basis as any other change in the Work.

.1 The Contractor shall provide supporting data and shall provide and maintain records of costs attributable to Disputes in similar manner as for Change Orders in Article 6.

.2 The State's Representative and the Contractor's Superintendent will make every reasonable effort to resolve the Dispute prior to proceeding to the next step.

.3 Either the State or the Contractor may call a special meeting for the purpose of resolving the Dispute. Such a meeting will be held within 7 days of written request thereof.

.4 If the Dispute as to the Contract Documents has not been resolved, the Contractor shall, within 14 days after the special meeting, take one or more of the following actions:
  .1 submit additional supporting data requested by the State;
  .2 modify the initial Dispute; or
  .3 notify the State that the initial Dispute stands as is.

.5 If the Dispute has not been resolved within 7 days after the Contractor's action in response to Clause 9.1.1.4, another meeting may be scheduled, at the State's option, with senior management personnel of the State and the Contractor. The purpose of this meeting is to resolve the Dispute prior to proceeding to the action under

Subparagraph 9.1.2.

9.1.2 Claim Submission and Documentation: If a Dispute has not been resolved at the time of the State's final statement, the Contractor shall submit within 30 days a Claim along with detailed documentation required by Subparagraph 9.1.1 for the State's consideration.

.1 The Contractor shall furnish 3 certified copies of the required Claim documentation. The Claim documentation shall be complete when furnished. The evaluation of the Contractor's Claim will be based upon State records and the Claim documents furnished by the Contractor.

.2 Claim documentation shall conform to generally accepted accounting principles and shall be in the following format:

- .1 General Introduction
- .2 General Background Discussion
- .3 Issues
  - .1 Index of Issues (listed numerically)
  - .2 For each issue
    - .1 Background
    - .2 Chronology
    - .3 Contractor's position (reason for State's potential liability)
    - .4 Supporting documentation of merit or entitlement
    - .5 Supporting documentation of damages
    - .6 Begin each issue on a new page
- .4 All critical path method (CPM) schedules, both as-planned, monthly updates, schedule revisions, and as-built along with the computer disks of all schedules related to the Claim.
- .5 Productivity exhibits (if appropriate)
- .6 Summary of Issues and Damages

.3 Supporting documentation of merit for each issue shall be cited by reference, photocopies, or explanation. Supporting documentation may include, but shall not be limited to, General Conditions; General Requirements; technical Specifications; Drawings; correspondence; conference notes; Shop Drawings and submittals; Shop Drawing logs; survey books; inspection reports; delivery schedules; test reports; daily reports; subcontracts; fragmentary critical path method (CPM) schedules or time impact analyses; photographs; technical reports; requests for information; field instructions; and all other related records necessary to support the Contractor's Claim.

.4 Supporting documentation of damages for each issue shall be cited, photocopied, or explained. Supporting documentation may include, but shall not be limited to, documents related to the preparation and submission of the bid; certified, detailed labor records, including labor distribution reports; material and equipment procurement records; construction equipment ownership costs records or rental records; Subcontractor or vendor files and cost records; service cost records; purchase orders; invoices; Project as-planned and as-built cost records; general ledger records; variance reports; accounting adjustment records; and any other accounting materials necessary to support the Contractor's Claim.

.5 Each copy of the Claim documentation shall be certified by a responsible officer of the Contractor in accordance with the requirements of the Contract Documents.

.6 Should the Contractor be unable to support any part of the Claim, and it is determined that such inability is attributable to falsity of such certification or misrepresentation of fact or fraud on the part of the Contractor, the Contractor shall be liable to the State as provided for under California Government Code, Section 12650 et seq., known as the False Claims Act.

.7 The State will render a written decision to the Contractor relative to the Claim. The State's written decision shall be final and binding on the party(ies) but subject to arbitration. The State may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. If there is a Surety and there appears to be a possibility of a Contractor's default, the State may, but is not obligated to, notify the Surety and request the Surety's assistance in resolving the controversy.

.8 All issue items to be included in the Complaint in Arbitration shall be a part of the Claim submitted with the required documentation under this Subparagraph 9.1.2. Issues not included in the Claim under Subparagraph 9.1.2 shall not be considered.

9.1.3 Arbitration: Any Claim filed in compliance with Subparagraph 9.1.2 not resolved by the above procedures shall be resolved by arbitration in accordance with the provisions of Public Contract Code Section 10240 et seq., and Title 1, California Code of Regulations, Section 1300 et seq., unless the State and the Contractor agree in writing to waive arbitration and proceed to litigation. Either party may initiate arbitration by filing a Complaint in Arbitration with the Office of Administrative Hearings in

Sacramento, California, in compliance with the requirements of Public Contract Code Section 10240, et seq., and Title 1, California Code of Regulations, Section 1300 et seq. Arbitration shall be conducted in Sacramento, California.

9.2 AUDIT AND ACCESS TO RECORDS

9.2.1 The Contractor shall maintain books, records, documents, and other evidence directly pertinent to the performance of the Work under this Contract, in accordance with generally accepted accounting principles and practices consistently applied. The Contractor shall also maintain all financial information and data used by the Contractor in the preparation or support of any cost submission, including the Contractor's original bid required for this Contract, or any Change Order, Claim, or other request for equitable adjustment, and a copy of the cost summary or information submitted to the State. The State's Representative shall have access upon 24 hours advance written notice, at all times during normal business hours, to such books, records, documents, financial information, and all other evidence for the purpose of inspection, audit, and copying. The Contractor shall, at no cost to the State, provide proper facilities for such access, inspection and copying purposes.

9.2.2 The Contractor agrees to make the provisions of Paragraph 9.2 applicable to this Contract, and Change Orders, Claims, or other requests for Equitable Adjustment affecting the Contract Time or Contract Sum. The Contractor agrees to include the provisions of Paragraph 9.2 in subcontracts and sub-subcontracts or purchase orders, at any tier, and make Paragraph 9.2 applicable to subcontracts, at any tier, in excess of $10,000, and to make the provisions of Paragraph 9.2 applicable to Change Orders, Claims, and other requests for Equitable Adjustment related to Project performance.

9.2.3 Audits conducted under Paragraph 9.2 shall be in accordance with general accepted auditing standards and established procedures and guidelines of the reviewing or audit agency.

9.2.4 The Contractor agrees to the disclosure of all information and reports resulting from access to records under the provisions of Paragraph 9.2, to the State, and other affected agencies.

9.2.5 Records under the provisions of Paragraph 9.2 shall be maintained and made available during the performance of the Work under this Contract until 3 years past final payment, and until final settlement of all Disputes, Claims, or litigation, whichever occurs later. In addition, those records which relate to any portion of this Contract, to any Change Order, to any Dispute, to any litigation, to the settlement of any Claim arising out of such performance, or to the cost or items to which an audit exception has been taken, shall be maintained and made available until final payment or final resolution of such Dispute, litigation, Claim, or exception, whichever occurs later.

9.2.6 The right of access provisions of Paragraph 9.2 applies to financial records pertaining to this Contract and Change Orders and Claims. In addition, this right of access applies to records pertaining to all contracts, Change Orders, and Contract Amendments:

.1 To the extent the records pertain directly to Contract performance;
.2 If there is any indication that fraud, gross abuse, or corrupt practices may be involved;
.3 If the Contract is terminated for default or convenience.

9.2.7 Access to records is not limited to the required retention periods. The authorized State Representatives shall have access to records at any reasonable time for as long as the records are maintained.

9.2.8 Further, the Contractor agrees to include a similar right of the State to audit records and interview staff in any subcontract related to performance of this Agreement, in regards to the Disabled Veterans Business Enterprise (DVBE) Program.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY OF PERSONS AND PROPERTY

10.1.1 The Contractor shall initiate, maintain and supervise safety precautions and programs in connection with the performance of the Work.

10.1.2 The Contractor shall take precautions for safety and provide protection to prevent damage, injury or loss to:

.1 Employees working under the Contract and other persons who may be affected thereby;
.2 The Work and materials and equipment to be incorporated therein, whether in storage on or off the Project site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
.3 Other property at the Project site, or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities, except as otherwise noted or specified.

10.1.3 The Contractor shall comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on the safety of persons or property, or their protection from damage, injury or loss.

10.1.4 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying the State, other Owners (other than the State) and users of adjacent sites and utilities.

10.1.5 The Contractor shall comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities regarding the storage and/or use of explosives or other hazardous materials or equipment necessary for execution of Work. The Contractor shall employ properly qualified personnel for supervision of same.

10.1.6 The Contractor shall remedy damage and loss to property referred to in Clauses 10.1.2.2 and 10.1.2.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Clauses 10.1.2.2 and 10.1.2.3. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.19.

10.1.7 The Contractor shall not permit any part of the Work or Project site to be loaded so as to endanger its safety.

10.1.8 When conditions of the Work, in the judgment of the State, present risk of injury or death to persons or property damage, the State, may direct the Contractor, at the Contractor's sole expense, to close down the Work and not commence work again until dangerous conditions are eliminated.

10.1.9 The Contractor, at the Contractor's own cost, shall rebuild, repair, restore and make good damages to any portion of the Work affected by such causes before Acceptance of the Work.

10.2 **EMERGENCIES:** In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's sole discretion, to prevent any threatened damage, injury or loss. Additional compensation or extension of Contract Time claimed by the Contractor because of an emergency will be reviewed as provided in Article 6.

10.3 **DRUG-FREE WORKPLACE**

10.3.1 By signing the Agreement, the Contractor certifies, under penalty of perjury under the laws of the State of California, that the Contractor will comply with the requirements of the Drug-Free Workplace Act of 1990 (Government Code, Section 8350 et seq.), and will provide a drug-free workplace by taking the following actions:

.1 Publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees for violations.

.2 Establish a Drug-Free Awareness Program to inform employees about:

.1 The dangers of drug abuse in the workplace;

.2 The person's or company's policy of maintaining a drug-free workplace;

.3 Any available counseling, rehabilitation, and employee assistance programs; and,

.4 penalties that may be imposed upon employees for drug abuse violations.

.3 Provide, as required by Government Code, Section 8355(c), that every employee who works under the Contract will:

.1 receive a copy of the company's drug-free workplace policy statement; and

.2 agree to abide by the terms of the company's statement as a condition of employment.

ARTICLE 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S INSURANCE

11.1.1 General Insurance Requirements:

.1 Contractor shall procure and maintain insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Contractor, its agents, representatives, employees or subcontractors.

.1 Contractor shall furnish the State with original certificates and endorsements effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the State before work commences.

.2 The State reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

.2 Insurance Companies shall be acceptable to Department of General Services (DGS) and Office of Risk and Insurance Management (ORIM). Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A-VI. Exception may be made for the State Compensation Insurance Fund. If self-insured, review of financial information may be required.

.3 Except as otherwise provided for Builders Risk/Installation Floater under Clause 11.1.2.4, all coverage shall be in force until the Acceptance of the Work by the Director of DGS. If the insurance expires, the Contractor shall immediately provide a new current certificate or be declared in breach of Contract. The State reserves the right to withhold all progress and retention payments until the breach is cured to the satisfaction of the State. Renewal insurance certificates must be tendered to the State prior to or exactly at the expiration of the previous insurance certificate. There shall be no gap in insurance coverage. This renewed insurance shall be in accordance with the terms of the Contract.

.4 Insurance policies shall contain a provision that coverage will not be cancelled without 30 days prior written notice to the State.

.5 The Contractor shall be responsible for any deductible or self-insured retention contained within the insurance.

.6 In the event the Contractor fails to keep in effect at all times the specified insurance coverage, the State may, in addition to the remedies noted in Article 11.1.1.3 above and any other remedies it may have, remove the Contractor from the work site and/or may terminate this Contract upon the occurrence of such event, subject to the provisions of this Contract. In the event, the State elects to remove the Contractor from the work site, the Contractor will not be entitled to additional days or compensation.

.7 Any insurance required to be carried shall be primary.

.8 Minimum Scope of Insurance - Coverage shall be at least as broad as:

.1 Insurance Services Office Commercial General Liability coverage (occurrence Form CG 0001). The insurance Certificate shall show the GL form number.

.2 Insurance Services Office Form Number CA 0001 covering Automobile Liability, "any auto", or "scheduled, hired and nonowned".

.9 The State reserves the right to require the Contractor to provide the subcontractors' insurance certificates and policies, when so directed by the State.

11.1.2 Insurance Requirements: The Contractor shall furnish to the State evidence of the required insurance as follows:

.1 Commercial General Liability: The Contractor shall maintain commercial general liability with limits of not less than $5,000,000 per occurrence for bodily injury and property damage liability combined. If Commercial General Liability insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit. If the aggregate applies "per project or location", it shall so state on the certificate. The policy shall include coverage for liabilities arising out of premises, operations, independent contractors, products, completed operations, personal and advertising injury, and liability assumed under an insured contract. This insurance shall apply separately to each insured against whom claim is made or suit is brought subject to the Contractor's limit of liability. The policy shall include the Department of General Services and the State of California, its officers, agents, and employees, as additional insureds, but only insofar as the operations under the Contract are concerned.

.1 Additional Insured coverage shall be provided in the form of an insured endorsement (CG 20 10 11 85 r equivalent) to the contractor's insurance policy. The endorsement must be attached to the certificate.

.2 Deductibles and Self-Insured Retentions (for Commercial General Liability): Any deductibles or self-insured retentions must be declared to and approved by the State. At the option of the State, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the State of California and the Department of General Services, its officers, agents, employees and servants or the Contractor shall provide a financial guarantee satisfactory to the State guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

.2 Automobile Liability: The Contractor shall maintain motor vehicle liability with limits of not less than $1,000,000 per accident for bodily injury and property damage. The State is to be covered as additional insured with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the contractor.

.3 Workers' Compensation: The Contractor shall maintain statutory workers' compensation and employer's liability coverage for all its employees who will be engaged in the performance of the Contract, including special coverage extensions where applicable as required by the State of California. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the State for all work performed by the contractor, its employees, agents and subcontractors. Except for State Fund, all subrogation waiver endorsements shall be on a separate form attached to the certificate. The Contractor shall maintain Employer's Liability coverage of $1,000,000 per accident for bodily injury or disease.

.4 Builders Risk/Installation Floater: The Contractor shall maintain in force, at its own expense, Builders Risk/Installation Floater covering the Contractor's labor, materials, and equipment to be used for completion of the Work performed under this Contract against all risks of direct physical loss, excluding earthquake and flood, for an amount equal to the full amount of the Contract Sum.

.1 The Contractor agrees as a provision of the contract to waive all rights of recovery against the State.

.2 The State of California, Department of General Services shall be a named insured or additional insured under the policy.

.3 The policy shall have a loss payable clause in favor of the State of California, Department of General Services.

.4 The requirement for maintaining the Builders Risk/Installation Floater shall be in full force at all times during the entire duration of the Contract Time without any gaps, delays or breaks in coverage. This includes Beneficial Occupancy and authorized adjustment for time extensions. Coverage shall be maintained until Completion of the Work, except for delivery of as-built drawings, operation and maintenance manuals, guarantees, warranties, spare parts, reports and certifications as noted in the Closeout Procedures section of the Project Manual and as determined by the State's Representative in writing.

11.1.3 Neither the State, nor any officer or employee of the State, shall be liable for any loss or damage that may happen to the Work, or any part thereof; nor to any of the materials or other items used or employed in performing the Work; nor for injury to any person or persons, either workers or the public, for damage to property from any cause which might have been prevented by the Contractor, or the Contractor's employees or agents, against all of which injuries or damages the Contractor shall properly guard. The Contractor shall indemnify and hold harmless the State, and all officers and employees of the State, from all suits, actions or claims brought for, or on account of injuries or damages received or sustained by any person or persons, by or from the Contractor, the Contractor's employees or agents, in construction of the Work, or by or in consequence of the Contractor's failure to properly guard the same, or by or as a result of any act or omission of the Contractor, the Contractor's employees or agents. In addition to any remedy authorized by law, moneys due the Contractor under the Contract, as considered necessary by the State, may be retained until disposition has been made of such suits, actions, or claims for damages; however, this provision shall not be construed as precluding the State from enforcing any right of offset the State may have to any such moneys.

11.2 **NO PERSONAL LIABILITY:** Neither the State, nor any other officer or employee of the State will be personally responsible for liabilities arising under the Contract.

11.3 **PERFORMANCE BOND AND PAYMENT BOND**

11.3.1 The Contractor shall furnish bonds, each in the amount of 100 percent of the Contract Sum, covering faithful performance of the Contract and payment of obligations arising thereunder, as stipulated in the bidding requirements or as specifically required in the Contract Documents.

11.3.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bond(s) or permit a copy to be made.

ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING AND CORRECTION OF WORK

12.1.1 If a portion of the Work is covered prior to the State's review, it shall, if requested in writing by the State, be uncovered for the State's observation and replaced at the Contractor's expense without change in the Contract Time.

12.1.2 The Contractor shall notify the State 2 working days prior to covering any work.

12.2 CORRECTION OF WORK

12.2.1 The Contractor shall promptly correct work rejected by the State or Work failing to conform to the requirements of the Contract Documents, whether or not fabricated, installed or completed. The Contractor shall bear the costs of correcting such rejected work, including additional testing and inspections required and compensation for the State's services and expenses made necessary thereby.

12.2.2 Notwithstanding Paragraph 3.5, in the event of an emergency constituting an immediate hazard to the health or safety of any persons or property, the State may undertake, at the Contractor's expense and without prior notice, work necessary to correct such hazardous condition(s) arising from work performed by the Contractor that is not in conformance with the requirements of the Contract Documents.

12.2.3 The Contractor shall remove from the Project site portions of the Work that are not in accordance with the requirements of the Contract Documents, and are neither corrected by the Contractor nor accepted by the State.

12.2.4 If the Contractor fails to correct nonconforming work, as per Paragraph 3.5, the State may correct the nonconforming work in accordance with Paragraph 2.3. If the Contractor does not proceed with correction of such nonconforming work, within such time fixed by written notice from the State, the State may remove and store the salvable materials articles and/or equipment at the Contractor's expense. If the Contractor does not pay all costs of such removal and storage within 14 days after written notice, the State may, upon 14 additional calendar days written notice, sell such materials articles and/or equipment at an auction or private sale, and shall account for the proceeds thereof, after deducting costs and damages that would have been borne by the Contractor, including compensation for the State's services and expenses made necessary thereby. If the proceeds of a sale do not cover all costs that the Contractor would have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the State.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged Work executed by the State or separate contractors, whether fully completed or partially completed, which is caused by the Contractor's correction or removal of Work that is not in accordance with requirements of the Contract Documents.

12.2.6 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations that the Contractor might have in the Contract Documents. Establishment of the time period of 1 year, as described in Subparagraph 3.5.1, relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with requirements of the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 **ACCEPTANCE OF NONCONFORMING WORK:** If the State prefers to accept any or all of the Work that is not in accordance with requirements of the Contract Documents, the State may do so instead of requiring its correction and/or removal, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment to the Contractor has been made.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.1 **GOVERNING LAW:** The Contract shall be governed by the law of the State of California.

13.2 **SUCCESSORS AND ASSIGNS:** The Contract binds the Contractor, the Contractor's partners, successors, assigns and legal representatives to the State in respect to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations in the Contract Documents.

13.3 **WRITTEN NOTICE:** Written notice shall be deemed to have been duly served if delivered in person to the individual; or a member of the firm or entity; or to an officer of the corporation for which it was intended; or if delivered to or sent by US mail to the last business address known to the party giving notice.

13.4 **CONTRACTOR'S USE OF COMPUTER SOFTWARE:** The Contractor, by signing the Agreement, certifies that it has appropriate systems and controls in place to ensure that State funds will not be used in the performance of the Contract for the acquisition, operation or maintenance of computer software in violation of copyright laws.

13.5 **INDEPENDENT CONTRACTOR:** Contractor, and the agents, subcontractors, and employees of the Contractor, in the performance of this Contract, shall act in an independent capacity and not as officers or employees or agents of the State.

13.6 **UNENFORCEABLE PROVISIONS:** In the event that any provision of this Contract is unenforceable or held to be unenforceable, then the parties agree that all other provisions of this Contract have force and effect and shall not be affected thereby.

13.7 **EXPATRIATE CORPORATIONS:** Contractor herby declares that it is not an expatriate corporation or subsidiary of an expatriate corporation within the meaning of Public Contract Code Section 10286 and 10286.1, and is eligible to contract with the State.

13.8 **DOMESTIC PARTNERS:** For Contracts executed or amended after July 1, 2004, the Contractor may elect to offer domestic partner benefits to the Contractor's employees in accordance with Public Contract Code Section 10295.3. However, the Contractor cannot require an employee to cover the costs of providing any benefits which have otherwise been provided to all employees regardless of marital or domestic partner status.

13.9 **AIR OR WATER POLLUTION VIOLATION:** Under the State laws, the Contractor shall not be: (1) in violation of any order or resolution not subject to review promulgated by the State Air Resources Board or an air pollution control district; (2) subject to cease and desist order not subject to review issued pursuant to Section 13301 of the Water Code for violation of waste discharge requirements or discharge prohibitions; or (3) finally determined to be in violation of provisions of federal law relating to air or water pollution.

13.10 **CERTIFICATION BY CONTRACTOR OF DISABLED VETERAN BUSINESS ENTERPRISE/SMALL BUSINESS PARTICIPATION**

13.10.1 If, for this agreement, the Contractor made a commitment to achieve disabled veteran business enterprise (DVBE) participation, the Contractor must certify in writing to the State, the total amount the Contractor received under the contract, the name and address of the DVBE firms that participated in the performance of the contract, the amount each DVBE received from the Contractor, that all payments have been made to the DVBE and the actual percentage of DVBE participation achieved. Additionally, if for this agreement, the Contractor made a commitment to achieve 25% Small Business participation, the Contractor must certify in writing to the State, the actual percentage of Small Business participation that was achieved. The Contractor is instructed to comply with the procedures stated in CLOSEOUT PROCEDURES, Section 01 77 00. This certification shall be completed pursuant to Section 999.5 of the Military and Veterans Code (M&VC) and Section 14841 of the Government Code. A person or entity that knowingly provides false information shall be subject to a civil penalty for each violation.

END OF DOCUMENT

DOCUMENT 00 73 00
SUPPLEMENTARY CONDITIONS

Requirements included herein supplement DOCUMENT 00 72 00 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION.

1. ARTICLE 1 – GENERAL PROVISIONS

Paragraph 1.1, DEFINITIONS

Add the following definition:

Hazardous Materials: These materials include but are not limited to products and materials containing: Asbestos, Lead, PCB's, Petroleum fuels and lubricants (including chemical additives), oxidizers, corrosives, solvents, acids and carcinogens.

2. ARTICLE 2 – ADMINISTRATION OF THE CONTRACT

Paragraph 2.6, RUSSIAN SANCTION ORDERS

Add the following Subparagraph 2.6

2.6 On March 4, 2022, Governor Gavin Newsom issued Executive Order (EO) N-6-22 regarding Economic Sanctions against Russia and Russian entities and individuals. "Economic Sanctions" refers to sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any sanctions imposed under state law. The EO directs state agencies to terminate contracts with, and to refrain from entering any new contracts with, individuals or entities that are determined to be a target of Economic Sanctions. Accordingly, should the State determine Contractor is a target of Economic Sanctions or is conducting prohibited transactions with sanctioned individuals or entities, that shall be grounds for termination of this agreement. The State shall provide Contractor advance written notice of such termination, allowing Contractor at least 30 calendar days to provide a written response. Termination shall be at the sole discretion of the State.

Paragraph 2.7. GENERATIVE ARTIFICIAL INTELLIGENCE (GenAI) REPORTING

Add the following Subparagraph 2.7

2.7.1 Definitions: The following terms are in addition to the defined terms and shall apply to the Contract:

.1 "Generative AI (GenAI)" means an artificial intelligence system that can generate derived synthetic content, including text, images, video, and audio that emulates the structure and characteristics of the system's training data. (Gov. Code § 11549.64.)

2.7.2 Contractor shall immediately notify the State in writing if it: (1) intends to provide GenAI as a deliverable to the State; or (2), intends to utilize GenAI, including GenAI from third parties, to complete all or a portion of any deliverable that materially impacts: (i) functionality of a State system, (ii) risk to the State, or (iii) Contract performance. For avoidance of doubt, the term "materially impacts" shall have the meaning set forth in State Administrative Manual (SAM) § 4986.2 Definitions for GenAI.

2.7.3 Notification shall be provided to the State's Representative identified in this Contract.

2.7.4 At the direction of the State, Contractor shall discontinue the provision to the State of any previously unreported GenAI that results in a material impact to the functionality of the System, risk to

the State, or Contract performance, as determined by the State.

2.7.5 If the use of previously undisclosed GenAI is approved by the State, then Contractor will update the Deliverable description, and the Parties will amend the Contract accordingly, which may include incorporating the GenAI Special Provisions into the Contract, at no additional cost to the State.

2.7.6 The State, at its sole discretion, may consider Contractor's failure to disclose or discontinue the provision or use of GenAI as described above, to constitute a material breach of Contract when such failure results in a material impact to the functionality of the System, risk to the State, or Contract performance. The State is entitled to seek any and all remedies available to it under law as a result of such breach, including but not limited to termination of the contract.

Paragraph 2.8, NEWS RELEASES

Add the following Subparagraph 2.8

2.8 News releases pertaining to award of, or work performed as a result of, contract may not be made without prior written approval from:

The Public Information Officer
707 Third Street, MS 101
West Sacramento, CA 95605
Phone: (916) 376-5037
Email: DGSPublicAffairs@dgs.ca.gov

3. ARTICLE 3 – CONTRACTOR

Paragraph 3.2, SUPERVISION AND CONSTRUCTION PROCEDURES

Delete Subparagraph 3.2.5 in its entirety and replace it with new Subparagraph 3.2.5 as follows:

3.2.5 Until Acceptance of the Work, the Contractor shall have the charge and care thereof, and shall bear risk of injury or damage to any part of the Work by action on the elements (except for an Act of God, or natural disaster as proclaimed by the State or Federal Government provided that the loss does not involve Contractor negligence and if the Work damaged is built in accordance with the Contract and applicable building standards), or from any other reason except for such damages as are directly caused by acts of the Federal or State Government and the public enemy, except as provided in Paragraph 8.5.

Paragraph 3.3, LABOR AND MATERIALS

Delete Subparagraph 3.3.3 in its entirety and replace it with new Subparagraph 3.3.3 as follows:

3.3.3. Prevailing Wage: The Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1774, the Contractor and every subcontractor, regardless of tier, shall pay not less than the specified prevailing wage rates to all workers employed in the execution of the Contract. In accordance with Section 1775, the Contractor shall forfeit to the State up to $200 for each day, or portion thereof, for each worker paid less than the prevailing wage rates for the work or craft in which the worker is employed for any work executed under the Contract by the Contractor or by any subcontractor, regardless of tier, in violation of the provisions of the Labor Code; and, in particular, Labor Code Sections 1770 to 1780, inclusive. In addition to such forfeiture, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each day, or portion

thereof, shall be paid to each underpaid worker by the Contractor. This provision shall not apply to properly registered apprentices.

.1 Pursuant to Labor Code, Section 1770, the Director of the Department of Industrial Relations has ascertained the general prevailing rate of per diem wages and a general prevailing rate for legal holiday and overtime work for each craft required for execution of the Contract. The Contractor shall obtain copies of the prevailing rate of per diem wages from the Department of Industrial Relations, Division of Labor Statistics & Research, PO Box 420603, San Francisco, CA 94142-0603, (415) 703-4780; or wage rates may be accessed on the internet at Prevailing Wage Requirements. The Contractor is responsible to read, understand and comply with all the guidelines, including the fine print in the prevailing wage determinations; and shall post a copy of the prevailing wage rates, specific to the Project, at the Project site.

.2 Wage rates set forth are the minimum that may be paid by the Contractor. Nothing herein shall be construed as preventing the Contractor from paying more than the minimum rates set. No extra compensation will be allowed by the State due to the inability of the Contractor to hire labor at minimum rates, nor for necessity for payment by the Contractor of subsistence, travel time, overtime, or other added compensations, all of which possibilities are elements to be considered and ascertained to the Contractor's own satisfaction in preparing the Bid Form

.3 If it becomes necessary to employ crafts other than those listed in the General Prevailing Wage Rate booklet, the Contractor shall contact the Division of Labor Statistics and Research as noted above. The rates thus determined shall be applicable as minimum for the contract and incorporated in the bid. When the wage determination shows an expiration date (noted by a double asterisk**), to expire during the term of the contract, the Contractor must call or write the DIR to obtain the new rates and incorporate them in the bid to be applicable for the term of the contract.

.4 The Contractor and each subcontractor, regardless of tier, shall keep an accurate payroll record showing the names, addresses, social security numbers, work classifications, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or subcontractor in connection with the Work. Payroll records shall be certified and shall be on forms provided by the Division of Labor Standards Enforcement, or shall contain the same information as those forms. The Contractor's and subcontractor's certified payroll records for each employee shall be submitted with each payment request, covering the period of the payment request unless requested otherwise by the Labor Commissioner of the Department of Industrial Relations pursuant to Labor Code Section 1771.4(c)(2)(b) monthly payrolls should be sent directly to the Department of Industrial Relations in the current prescribed electronic format. Refer to Certified Payroll Reporting for access to the electronic Certified Payroll (eCRP) Application.

.5 Labor Compliance Monitoring and Enforcement: This project is subject to monitoring and enforcement by the Department of Industrial Relations (DIR), Compliance Monitoring Unit. All Contractors and subcontractors, regardless of tier, shall be required to comply with the Monitoring and Enforcement Program, including, but not limited to, contractor registration, submittal of electronic certified payroll reports directly to the DIR and cooperation with on-site monitoring by DIR personnel.

Paragraph 3.13, TESTS AND INSPECTIONS

Delete Subparagraph 3.13.1 in its entirety and replace with the following Subparagraph 3.13.1.

3.13.1 The Contractor shall at all times permit the State, its agents, officers, and employees to visit the Project site and inspect the Work, including shops where the work is in preparation. This obligation shall include maintaining proper facilities and safe access for such inspection. Including, but not limited to providing lifts, ladders, scaffolds, platforms and

paths of travel. When the Contract Documents require a portion of the Work to be tested, such portion of the work shall not be covered up until inspected and approved by the State. The Contractor shall be solely responsible for notifying the State where and when the work is ready for inspection and testing and shall give written notice no fewer than two business days prior to the time of inspection. For inspections that require the State Fire Marshal's (SFM) presence, the Contractor shall provide the State's Inspector of Record (IOR) written notice where and when the work is ready for inspection no fewer than three business days prior to the time of inspection.

Should any work be covered without the required testing and approval, such work shall be uncovered and recovered at the Contractor's expense.

Delete Subparagraph 3.13.2 in its entirety and replace with the following Subparagraph 3.13.2.

3.13.2 If the State determines that portions of the Work require additional testing, inspection or approval not included in the Contract Documents, the State will instruct the Contractor, in writing, to make arrangements for additional testing, inspection or approval by an entity acceptable to the State, and the Contractor shall give written notice to the State of where and when tests and inspections will be conducted no fewer than two business days prior to the time of the additional testing, inspection or approval so that the State may observe the procedures. For inspections that require the State Fire Marshal's (SFM) presence, the State's Inspector of Record (IOR) will make the necessary arrangements with the SFM. The Contractor shall provide ~~a~~ written notice no fewer than three business days prior to the time of inspection.

The State will bear the costs except as provided in Subparagraph 3.13.3.

Paragraph 3.25, CONTRACTOR REQUIRED NOTIFICATION OF CHANGES

Delete Paragraph 3.25 in its entirety and replace with the following Paragraph 3.25

3.25 CONTRACTOR REQUIRED NOTIFICATION OF CHANGES: The Contractor shall notify the State's Representative in writing of any change to Contractor's name, status, or information including but not limited to:

1. Name
   a. An amendment is required to change the Contractor's name as listed on this Agreement. Upon receipt of Contractor's notification and legal documentation of the name change, the State will process the amendment. Payment of invoices presented with a new name cannot be paid prior to approval of said amendment.
   b. The State shall not be liable for penalties or interest on payments which are delayed due to Contractor's change of name and subsequent amendment processing.
2. Address/Location
3. Federal Employer Identification Number (FEIN)
4. Type of Organization or Legal Status – including:
   a. Corporate
   b. Partnership
   c. Individual/Sole-Ownership
   d. Joint Venture
   e. Limited Liability Company
   f. DBA
5. Ownership
6. Officers or Key Personnel
7. License

8. Other (Bankruptcy, Etc.)

Contractor shall immediately provide an updated Standard Form 204 (IRS/FTB form) to the Architectural, Construction and Engineering Contracts Section within five (5) calendar days of any such relevant change.

The State shall not be liable for penalties or interest on payments which are delayed due to Contractor's lack of proper or timely notice and documentation of a relevant change in status which impacts the State's ability to pay.

Contractor shall submit the firm's status change in writing including the Contract Number, Project Title and all necessary backup and legal documentation to support the status change to:

The State Department of General Services, Administration Division
Office of Business and Acquisition Services, Contracts Services Section
707 Third Street, Suite 2-300
West Sacramento, CA 95605-2811

Paragraph 3.4, NONDISCRIMINATION CLAUSE

Delete Paragraph 3.4 in its entirety and replace with the following:

3.4.1. During the performance of this contract, the recipient, contractor, and its subcontractors shall not deny the contract's benefits to any person on the basis of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status. Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination.

3.4.2. Contractor shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, § 12900 et seq.), the regulations promulgated thereunder (Cal. Code Regs., tit. 2, § 11000 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Gov. Code, §§ 11135-11139.5), and the regulations or standards adopted by the awarding state agency to implement such article.

3.4.3. Contractor or recipient shall permit access by representatives of the Department of Fair Employment and Housing (DEFH) and the awarding state agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours' notice, to such of its books, records, accounts, and all other sources of information and its facilities as said Department or Agency shall require to ascertain compliance with this clause.

3.4.4. Recipient, contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

3.4.5. The contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

3.4.6 STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOV. CODE SECTION 12990)

These specifications are applicable to all state contractors and subcontractors having a construction contract or subcontract of $5,000 or more.

.1 As used in the specifications:

a. “Act” means the Fair Employment and Housing Act.

b. “Administrator” means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority.

.2 Whenever the contractor or any subcontractor subcontracts a portion of the work, it shall include in each subcontract of $5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.

.3 The contractor shall implement the specific nondiscrimination standards provided in paragraphs 6(a) through (e) of these specifications.

.4 Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer members of any group protected by the Act shall excuse the contractor's obligations under these specifications, Government Code section 12990, or the regulations promulgated pursuant thereto .5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.

.5 In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.

.6 The contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor must be able to demonstrate fully its efforts under steps a. through e. below:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the contractor's employees are assigned to work. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the contractor's obligations to maintain such a working environment.

b. Provide written notification within (7) seven days to the director of the DFEH when the referral process of the union or unions with which the contractor has a collective bargaining agreement has impeded the contractor's efforts to meet its obligations.

c. Disseminate the contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.

d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.

e. Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the contractor's obligations under these specifications are being carried out.

.7 Contractors are encouraged to participate in voluntary associations that assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on equal employment opportunity in the industry, ensures that the concrete benefits of the program are reflected in the contractor's workforce participation, and can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's.

.8 The contractor is required to provide equal employment opportunity for all persons. Consequently, the contractor may be in violation of the Fair Employment and Housing Act (Government Code section 12990 et seq.) if a particular group is employed in a substantially disparate manner.

.9 The contractor shall not use the nondiscrimination standards to discriminate against any person because race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status.

.10 The contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code section 12990.

.11 The contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code section 12990 and its implementing regulations by the awarding agency. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code section 12990.

.12 The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

4. ARTICLE 4 – SUBCONTRACTORS

Paragraph 4.2, SUBCONTRACTUAL RELATIONS

Delete Paragraph 4.2.2 and replace it with the following Paragraph 4.2.2:

4.2.2 Subcontractor Payments: Subcontractors and Sub-subcontractors shall be paid for work performed in accordance with Public Contract Code Sections 10262 and 10262.5.

Delete Paragraph 4.3 and replace it with the following Paragraph 4.3

4.3 DISABLED VETERAN BUSINESS ENTERPRISE PROGRAM: Pursuant to Public Contract Code (PCC) Section 10115 et. seq., the Contractor shall use, employ and utilize Disabled Veteran Business Enterprise (DVBE) subcontractors, sub-subcontractors or material suppliers who were listed in their bid documents for DVBE Program participation, to the full extent of the amount of money and/or percentage of commitment manifested in the bid documents. If the Contractor wishes to substitute any listed DVBE subcontractors, sub-subcontractors or material suppliers for just and legal cause, the Contractor shall follow the dictates of PCC Sections 4107 and 10115.12b, as well as Military and Veterans Code (M&VC) Section 999.5(e) and California Code of Regulations, Title 2, Section 1896.64. The DVBE may only be replaced by another DVBE and shall obtain the written authorization of the State prior to any such substitutions. The Contractor shall not unilaterally substitute a listed DVBE subcontractor, sub-subcontractor or material supplier. Failure of Contractor to seek substitution and adhere to the DVBE participation requirement identified in the bid may be cause for contract termination, recovery of damages under rights and remedies due to the State, and penalties as outlined in M&VC Section 999.9; PCC Sections 4110 and PCC Section 10115.10.

5. ARTICLE 7 – TIME

Paragraph 7.2, CONTRACT TIME

Delete Subparagraph 7.2.1 and replace it with the following Subparagraph 7.2.1:

7.2.1 Time is of the Essence in this Contract. The Contractor shall complete all the Work of the Contract within the Contract Time of:

TWO HUNDRED AND SEVENTY-FIVE (275)

calendar days, starting on the Start Date stipulated in the Notice to Proceed, which the Contractor will receive not less than 5 days in advance.

Add the following Subparagraph 7.2.2:

7.2.2 Contractor shall refer to 01 10 00 Summary, Article 1.7 Phased Construction.

Paragraph 7.3, LIQUIDATED DAMAGES

Add the following Subparagraphs 7.3.1 and 7.3.2:

7.3.1 The Contractor shall pay to the State the sum of $1,500 per day for each and every calendar day delay in finishing of Work under this Contract beyond the Contract time.

7.3.2 If the Contractor is more than 14 calendar days behind schedule at any point during the Contract Time, based on the latest updated Official Progress Schedule, the State will withhold $1,500 per day for each and every day that the Contractor is behind schedule from the monthly payment for that month. If the Contractor recoups all or a portion of the delay during the next pay period, the amount withheld will be reduced accordingly.

6. ARTICLE 8 – PAYMENTS AND COMPLETION

Paragraph 8.2, TIMELINESS OF PAYMENTS

Delete Paragraph 8.2.3 and replace it with following Paragraph 8.2.3:

8.2.3 The State will make progress payments pursuant to Public Contract Code, Sections 10261 and 10261.5.

Paragraph 8.3, RETENTIONS

Delete Subparagraph 8.3.1.2 and replace it with the following Subparagraph 8.3.1.2:

.2 The State shall retain 5 percent of the estimated value of Work completed.

Paragraph 8.5, OCCUPANCY BY THE STATE PRIOR TO COMPLETION OF THE WORK

Delete Paragraph 8.5.1 and replace it with the following:

8.5.1 The State reserves the right to occupy all or any part of the Project prior to Completion of the Work, upon written notice. Such occupancy or use is herein referred to as Beneficial Occupancy. In this event, the Contractor shall be relieved of responsibility to the State for liability arising out of such occupancy by the State.

7. ARTICLE 11 – INSURANCE AND BONDS

Paragraph 11.1, CONTRACTOR'S INSURANCE

Delete Paragraph 11.1 and replace it with the following 11.1:

11.1 CONTRACTOR'S INSURANCE

11.1.1 General Insurance Requirements:

.1 Contractor shall procure and maintain insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Contractor, its agents, representatives,

employees or subcontractors.

.1 Contractor shall furnish the State with certificates and endorsements effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the State before work commences.

.2 The State reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

.2 Insurance Companies shall be acceptable to Department of General Services (DGS) and Office of Risk and Insurance Management (ORIM). Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A-VII, unless otherwise acceptable to DGS, Office of Risk and Insurance Management. Exception may be made for the State Compensation Insurance Fund. If self-insured, review of financial information may be required.

.3 Except as otherwise provided for Builders Risk/Installation Floater under Clause 11.1.2.4, all coverage shall be in force until the Acceptance of the Work by the Director of DGS. If the insurance expires, the Contractor shall immediately provide a new current certificate or be declared in breach of Contract. The State reserves the right to withhold all progress and retention payments until the breach is cured to the satisfaction of the State. Renewal insurance certificates must be tendered to the State prior to or exactly at the expiration of the previous insurance certificate. There shall be no gap in insurance coverage. This renewed insurance shall be in accordance with the terms of the Contract.

.4 Contractor is responsible to notify the State a minimum of five (5) business days before the effective date of any cancellation, non-renewal or material change that affects required insurance coverage.

.5 Unless otherwise stated in the contract, the Contractor shall be responsible for any premium deductible or self-insured retention contained within the insurance.

.6 All insurance policies required by this contract must allow the State to pay and/or act as the contractor's agent in satisfying any self-insured retention (SIR). The choice to pay and/or act as the contractor's agent in satisfying any SIR is at the State's discretion.

.7 In the event the Contractor fails to keep in effect at all times the specified insurance coverage, the State may, in addition to the remedies noted in Article 11.1.1.3 above and any other remedies it may have, remove the Contractor from the work site and/or may terminate this Contract upon the occurrence of such event, subject to the provisions of this Contract.

In the event, the State elects to remove the Contractor from the work site, the Contractor will not be entitled to additional days or compensation.

.8 Any insurance required to be carried shall be primary and not excess or contributory, to any other insurance carried by the State.

.9 Any required endorsement requested by the State must be submitted with all requested certificates of insurance and not substituted by referring to such coverage on the certificate of insurance.

.10 Minimum Scope of Insurance - Coverage shall be at least as broad as:

.1 Insurance Services Office Commercial General Liability coverage (occurrence Form CG 0001). .2 Insurance Services Office Form Number CA 0001 covering Automobile Liability, "any auto", or "all owned, hired and non-owned".

.11 All coverage and limits available to the contractor shall also be available and applicable to the State.

.12 Contractor shall procure and maintain insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors.

.13 With the exception of Builders Risk/Installation Floater, Contractor shall require and verify that all subcontractors maintain insurance coverage and limits meeting or exceeding all the requirements stated herein. Contractor shall ensure that the Department of General

Services and the State of California, its officers, agents, and employees, as additional insured on insurance required from subcontractors but only insofar as the operations under the Contract are concerned. For Commercial General Liability coverage subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13. The State reserves the right to require the Contractor to provide the subcontractors' insurance certificates and policies, when so directed by the State.

11.1.2 Insurance Requirements: The Contractor shall furnish to the State evidence of the required insurance as follows:

.1 Commercial General Liability: The Contractor shall maintain commercial general liability with limits of not less than $5,000,000 per occurrence for bodily injury and property damage liability combined. If Commercial General Liability insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit. If the aggregate applies "per project or location", it shall so state on the certificate. The policy shall include coverage for liabilities arising out of premises, operations, independent contractors, products, completed operations, personal and advertising injury, and liability assumed under an insured contract. This insurance shall apply separately to each insured against whom claim is made or suit is brought subject to the Contractor's limit of liability. The policy shall include the Department of General Services and the State of California, its officers, agents, and employees, as additional insureds, but only insofar as the operations under the Contract are concerned.

.1 Additional Insured coverage shall be provided in the form of an insured endorsement as broad as the (CG 20 10 11 85) to the contractor's insurance policy. All coverage and limits available to the named insured shall be available and applicable to the additional insured. The endorsement must be attached to the certificate.

.2 Deductibles and Self-Insured Retentions (for Commercial General Liability): Any deductibles or self-insured retentions must be declared to and approved by the State. At the option of the State, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the State of California and the Department of General Services, its officers, agents, employees and servants or the Contractor shall provide a financial guarantee satisfactory to the State guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

.2 Automobile Liability: The Contractor shall maintain motor vehicle liability with limits of not less than $1,000,000 per accident for bodily injury and property damage. The State is to be covered as additional insured with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the contractor. The policy shall include the Department of General Services and The State of California, its officers, agents, and employees, as additional insureds, but only insofar as the operations under the Contract are concerned. All coverage and limits available to the named insured shall also be available and applicable to the additional insured.

.3 Workers' Compensation: The Contractor shall maintain statutory workers' compensation and employer's liability coverage for all its employees who will be engaged in the performance of the Contract, including special coverage extensions where applicable as required by the State of California. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the State for all work performed by the contractor, its employees, agents and subcontractors. Except for State Fund certificates, all subrogation waiver endorsements shall be submitted on a separate form. The Contractor shall maintain Employer's Liability coverage of $1,000,000 per accident for bodily injury or disease.

.4 Builders Risk/Installation Floater: The State shall insure all Work while in the course of

construction, reconstruction, remodeling or alteration, including materials incorporated in the Work, against physical loss or damage resulting from the perils normally insured under an All Risk Builders Risk/Installation Floater policy, including, but not limited to theft, fire and vandalism. The State will self-insure against Acts of God and natural disasters proclaimed by the State or Federal Government. The State will issue to the Contractor a "Summary of Coverage" provided under this Clause 11.1.2.4 Summary of Coverage and Certificate of Insurance will be provided to contractor as part of the executed contract.

.1 Contractor shall be responsible for paying a deductible to be determined on the certificate of insurance following project enrollment, per occurrence in the event of loss.

.2 The proceeds under the Builder's Risk/Installation Floater Insurance procured by the State will be payable to the State and Contractor as their respective interests, from time to time, may appear.

.3 State's Builders Risk/Installation Floater Insurance shall provide limited coverage for materials in transit and materials stored off-site, and full coverage for materials at the Project site; however, the Contractor is responsible for reviewing the "Summary of Coverage" and reporting values that exceed the limits provided within the Summary of Coverage. Notification to the State does not provide coverage. Value increases must be approved by the insurance carrier and contractor must have a Certificate of Insurance issued by the insurance carrier showing the increased values. Lacking confirmation from the State's insurance carrier that additional coverage was procured, Contractor will be responsible for damages in excess of the coverage limits provided within the Summary of Coverage.

.4 Nothing in this Clause 11.1.2.4 shall be construed to relieve the Contractor of Contractor's responsibilities referred to under Clause 11.1.1 and Clause 11.1.2.

.5 Insurance policies referred to in this Clause 11.1.2.4 shall provide the following:

.1 That the policies are primary and do not participate with nor are excess over any other valid collectible insurance carried by the Contractor.

.2 That the Insurer waives the right of subrogation against the Contractor.

END OF DOCUMENT

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Work required to be performed by the Contractor comprises:

1. OES Security Upgrades in conformity with the Drawings and Specifications hereinafter identified; including furnishing all material, labor, plant, tools, equipment, and services necessary therefor and incidental thereto, complete and ready for use, except as hereinafter otherwise provided.

1.2 WORK NOT INCLUDED

A. Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is NOT included in this Contract.

1. Work shown but marked "NIC" (Not in Contract). "BUA" (By Using Agency).

2. Work shown but marked "OFOI" (OWNER FURNISHED OWNER INSTALLED).

1.3 PROJECT INFORMATION

A. Project Location: Governor’s Office of Emergency Services, 3650 Schriever Ave., Mather, Sacramento County, California.

B. Project Identification: 000000000009324, OES Security Upgrades.

C. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.

1. See Sections 01 31 00 "Project Management and Coordination" and 01 31 25 “Web-based Project Management System” for requirements for using web-based project software.

1.4 SPECIFICATIONS

A. The Specifications are those bound in the Project Manual in **Books 1 and 2**, and enumerated in the Table of Contents. The General Conditions of the Contract for Construction, Supplementary Conditions, and Division 01 of the Specifications apply to all Work of this Contract.

1.5 DRAWINGS

A. The Drawings consist of Drawing Sheets as listed in Document 00 01 15 of Project Manual.

1.6 CONTRACTOR'S SET OF DRAWINGS AND PROJECT MANUALS

A. State Furnished Drawings and Project Manuals: Upon award of Contract, the State will provide Drawings and Project Manuals upon Contractor’s request as follows:

1. Electronic Files in PDF format.
2. Drawings: 1 set
3. Project Manuals: 1 set.
4. One set of State furnished Drawings shall be used as record prints.

B. Additional Sets shall be the responsibility of the contractor.

1.7 PHASED CONSTRUCTION

A. Work of this Contract shall be executed in three (3) phases to minimize construction disturbance to the existing facility operations, including the vehicular traffic and parking functionality.

B. Construct the Work in phases, with each phase complete as indicated below, commencing on the same date as the Start Date stipulated in the Notice to Proceed.

1. **Phase 1:** Sixty (60) Calendar Days
Upon Notice to Proceed Contractor shall complete all required submittals, purchasing of materials and all remaining items necessary to start Phase 2. Submittals include, but not limited to, Phased Construction Site Utilization Plans approved by authorities having jurisdiction and the State.

2. **Phase 2:** One Hundred and Sixty-Five (165) Calendar Days
Upon completion of Phase 1, Contractor shall complete all scope of work (including all deferred submittals/approvals, punch walk/list and State acceptance). Contractor shall not block any path of egress, exit or access point without prior approval from the State.

Contractor shall not obstruct the fire apparatus access road.

Contractor at all time shall not encumber both primary and secondary entrances simultaneously.

Contractor shall keep primary and secondary entrance shutdown durations to the minimum.

Contractor shall coordinate with the State any lane closures or shifts as required to accommodate the Work. Coordination shall be completed at a minimum of 3 working days in advance for proper notifications to the building occupants.

Contractor shall provide signage for traffic or pedestrian detour and ensure that pedestrian traffic is prevented from entering construction areas.

Contractor shall erect barriers as needed for sidewalk, ramp, or lane closures to accommodate the Work.

3. **Phase 3:** Fifty (50) Calendar Days
Upon completion of Phase 2, Contractor shall complete any outstanding punch work and project closeout. Security requirements and Hours of Work will be determined by the location of the punch work.

C. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule, showing the sequence, commencement and completion dates for all phases of the Work.

1.8 INTERRUPTION OF SERVICES

A. Make provisions to accomplish the work of this Contract without undue interference with facility operations. Interruptions to services for the purpose of making or breaking connection shall be made only after consultation with the State, minimum of one week in advance of connection break, and shall be at such time and of such duration as may be directed.

B. In addition, existing electrical, mechanical and security lines disconnected for work of this Contract is not permitted. Contractor shall provide temporary electrical service to restore required electrical power at Contractor’s expense. See additional requirements under Work Restrictions, Utility Shutdowns provision.

C. OES emergency site activation may require all construction activities on site be halted for a select period. See Section 01 21 00 for allowance of up to 30 days for work stoppage.

1.9 SEQUENCE OF CONSTRUCTION OPERATIONS

A. Before starting construction operations, confer with the State to review sequence of construction operations.

B. Prepare schedules as set forth in Section 01 32 00 “Construction Progress Documentation”.

1.10 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to between **7:00** a.m. to **4:00** p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by State and authorities having jurisdiction.

1. Weekend Hours and State Holidays: Work may be permitted if approval is received from the State at least 3 working days in advance.
2. Early Morning Hours: Regular early morning hours are permitted with approval from the State. Contractor workers without access badges must have the names to be provided to the State at least 1 working day in advance for coordination with the Building Security. .
3. Work in Existing Building: Contractor shall coordinate access with the State at least 1 working day prior to scheduled work.
4. Hours for Utility Shutdowns: Contractor shall submit Utility Shutdown Request Method of Procedure (MOP) to the State for review and approval at least 3 working days in advance of the scheduled work.
5. Hours for noisy motors, sawcutting, and core drilling shall be operated without disturbance to occupants of the building or adjacent buildings.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by State or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:

1. Notify State's Representative not less than three (3) working days in advance of proposed utility interruptions.
2. Obtain State's written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to State occupancy with State.

1. Notify State's Representative not less than two (2) working days in advance of proposed disruptive operations.
2. Obtain State's Representative's written permission before proceeding with disruptive operations.
3. Sensitive areas or other areas requiring special attention:

a. Building A, State Operations Center, West of Building B with a shared building entry lobby, is a fully-occupied Essential Services Building where continuous operation is critical.

b. Building B, a fully-occupied office building. During Activation, Building B may serve as the overflow of Building A serving as Essential Services Building where continuous operation is critical.

E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

1.11 CONTRACTOR'S USE OF SITE AND PREMISES

A. Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section. Contractor's use of Project site is limited by State's right to perform work or to retain other contractors on portions of Project.

B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways, parking areas, loading areas, and entrances serving premises clear and available to State, State's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

1) If deliveries will impact State's operations, request State's approval 48 hours prior to delivery.

b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

c. See Phased Construction for construction work affecting primary and secondary entrances and their associated driveways.

1.12 COORDINATION WITH OCCUPANTS

A. Full State Occupancy: State will occupy Project site and existing buildings during entire construction period. Cooperate with State during construction operations to minimize conflicts and facilitate State usage. Perform the Work so as not to interfere with State's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from State and approval of authorities having jurisdiction.
2. Notify State not less than 48 hours in advance of activities that will affect State's operations.

B. Use only State approved designated areas for work operations or storage.

1.13 HAZARDOUS MATERIALS ANTICIPATED ON-SITE

A. If existing construction materials are identified as containing hazardous materials and/or are disturbed while performing work under this Contract, cease work around the suspect area immediately and notify the State. Site conditions and extent of hazardous materials removal related work will be assessed by the State. Affected work activities under this Contract shall not resume until determination is made by the State.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.

1.2 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.3 SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.4 ALLOWANCE(S)

A. Allowance shall include cost to Contractor of specific products and materials ordered by or selected by the State under allowance and shall include taxes, freight, delivery to, labor, and installation at Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, protection from damage, overhead and profit, other expenses required to complete the Work, and similar costs related to products and materials ordered by or selected by the State under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. The State will review and delineate allowance work with Contractor.

1.5 CONTRACTOR RESPONSIBILITY FOR ALLOWANCE ITEMS

A. Make all arrangements for performance of allowance work.

B. Submit to State certified copies of invoices, bills of sale or other documents authenticating costs incurred by Contractor for allowance items.

1.6 ADJUSTMENT OF COSTS

A. Should net cost be more or less than specified amount of allowance, the Contract Sum will be adjusted accordingly by a Change Order in compliance with requirements of the Document 00 72 00 “General Conditions of the Contract for Construction”.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Lump-Sum Allowance: Include the sum of $15,000 ($500 daily rate per calendar day for a total of 30 days) in the event of OES headquarters is activated for emergency response.

B. Allowance No. 2: Lump-Sum Allowance: Include the sum of $20,000 for upgrades to existing intercom system.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to State.
2. Documentation: Show compliance with requirements for substitutions per Article 3.12.10, Document 00 72 00 “General Conditions of the Contract for Construction”, and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

h. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule.

1. Coordinate line items in the Schedule of Values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the Schedule of Values to State at earliest possible date, but no later than 14 days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.
b. State’s Project number.
c. Contractor's name and address.
d. Date of submittal.

2. Arrange the Schedule of Values in tabular form, with separate columns to indicate the following for each item listed:

a. Related Specification Section or division.
b. Description of the Work.
c. Change Orders (numbers) that affect value.
d. Dollar value, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.
4. Allowances: Provide a separate line item in the schedule of values for each allowance.
5. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
6. Schedule of Values Revisions: Revise the Schedule of Values when Change Orders result in a change in the Contract Sum. Include at least one separate line item for each Change Order.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments.

B. Payment Application Times: The date for each progress payment shall be established by the State. The period covered by each Application for Payment is one month.

1. Submit draft copy of Application for Payment three days prior to due date for review by State Construction Supervisor/Inspector.
2. State Construction Supervisor/Inspector will review the draft with the Contractor to verify requested payment percentages.
3. Submit Application for Payment upon approval by the State Construction Supervisor/Inspector.

C. Application for Payment Forms: Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. State will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders issued before last day of construction period covered by application.

E. Partial payment for "mobilization" shall be made in percentages as follows (less retainage):

Contract Amount Completed	Payment for Mobilization
5 %	50% of amount bid for mobilization, or 5% of original Contract amount, whichever is lesser.
10%	75% of amount bid for mobilization, or 7.5% of original Contract amount, whichever is lesser.
20%	95% of amount bid for mobilization, or 9.5% of original Contract amount, whichever is lesser.
50%	100% of amount bid for mobilization, or 10% of original Contract amount, whichever is lesser.

1. Upon completion of all Work on the Project, payment of any amount bid for mobilization in excess of 10% of the original Contract amount will be paid.

F. Project Record Drawings: Prior to each Application for Payment review, update Project Record Documents as required by Section 01 77 00 “Closeout Procedures” and submit for the State’s review and approval. Monthly Applications for Payment will not be processed without review and approval of Project Record Drawings by the State.

G. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored subject to or under the control of the State, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to State, and consent of surety to payment for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

H. Transmittal: Submit Application for Payment signed by the Contractor and State Construction Supervisor/Inspector to the State.

1. Submit with each Application for Payment such evidence as may be necessary to demonstrate costs incurred or estimated to be incurred in accordance with the Schedule of Values during such month and the percentage of completion of each category of Work.
2. Submit with each Application for Payment certified payroll records for each Contractor's and Subcontractor's employee per Document 00 72 00 "General Conditions of the Contract for Construction." Copies of the monthly payroll shall be sent directly to the Department of Industrial Relations in the current prescribed electronic format with evidence of such submission provided with each Application for Payment to the State.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. Schedule of values.
2. Contractor's construction schedule (preliminary if not final).
3. Key Personnel Names List.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements in accordance with Section 01 77 00 "Closeout Procedures."
2. Certification of completion of final punch list items.
3. Warranty certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Evidence that disputes have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Digital project management procedures.
4. Web-based Project management software package.
5. Project meetings.

1.2 SUBMITTALS

A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals, and their duties and responsibilities, list telephone numbers, and e-mail addresses. Provide names, e-mail addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project. Keep list current at all times.

1.3 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Subletting and Subcontracting Responsibilities: Refer to Document 00 72 00 “General Conditions of the Contract for Construction”, Article 4.
2. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
3. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
4. Coordinate the Work with related work being done by the State and other contractors operating in the area. This coordination shall include reasonable adjustments of schedule in order to allow other contractors or State to do their work. Make provisions for accommodating items installed by the State or under separate contracts.
   a. Other contractors shall include, but not limited to, OES Headquarters primary entrance and secondary entrance perimeter sliding gates retrofit project.
5. Make adequate provisions to accommodate items scheduled for later installation.
6. Carefully examine Drawings relating to entire work with actual conditions so that Work will be accommodated in spaces provided. General arrangement and location of elements of various systems is shown on the Drawings or specified. Final locations, levels, etc., shall

be governed by actual material size used, by building conditions encountered, and by work of all trades. Space conflicts and interferences shall be resolved before work is installed.

B. Site Examination: Visit the site prior to commencement of the Work and get familiar with existing conditions. Be prepared to carry out the Work within existing limitations.

1. Inspect and take responsibility for previously prepared or installed work of other contractors before applying subsequent materials or finishes. If work is in unsatisfactory condition, notify the State. Do not proceed until defective work has been corrected.

C. Work Layout

1. Property lines, location ties, and elevations of components of the Project to be built under this Contract are shown on the Drawings. Grade elevations shown for various parts of the Work are taken from a benchmark shown on the Drawings, or if not shown, will be designated by the State. In case of conflict therein, notify the State in writing before starting work.
2. Layout the Work and furnish surveys required for alignment and elevations of the Work. Furnish necessary lines, levels, locations, measurements and markers for all the Work and be responsible for their accuracy.
3. On building structures, layout on forms, walls, floors, and columns, the exact location of partitions as guide to all trades.

D. Allowable Entrance: Contractor, subcontractors, their employees, suppliers and delivery persons shall enter and exit property via designated entrance.

E. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.4 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. State will return without response those RFIs submitted to State by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.

2. State’s Representative name.
3. State’s Project number.
4. Date.
5. Name of Contractor.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Form bound in Project Manual or software-generated form with substantially the same content as indicated above, acceptable to the State.

1. Attachments shall be electronic files in PDF format.

D. State’s Action: State will review each RFI, determine action required, and respond.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of State’s actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. State’s action may include a request for additional information, in which case State’s time for response will date from time of receipt by State of additional information.
3. State’s action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Document 00 72 00 “General Conditions of the Contract for Construction”.

1.5 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of State’s Digital Data Files: Upon request and if available, digital data files of State’sCAD drawings will be provided by State for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
2. State makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Contractor shall execute a data release agreement in the form provided by the State upon request.

B. Web-Based Project Management Software Package: Use State's web-based Project management software package for purposes of hosting and managing Project communication and documentation until Acceptance of the Work.

1. Web-based project management software includes, at a minimum, the following features:

a. Compilation of Project data, including Contractor, subcontractors, State, State's consultants, and other entities involved in Project. Include names of individuals and contact information.
b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
c. Document workflow planning, allowing customization of workflow between project entities.
d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, Requests for Information, Submittals, Additional Detailed Instructions, Potential Changer Orders (PCO's), Inspection requests, and executed Change Orders.
e. Track status of each Project communication in real time, and log time and date when responses are provided.
f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
g. Processing and tracking of payment applications.
h. Processing and tracking of contract modifications.
i. Creating and distributing meeting minutes.
j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
k. Management of construction progress photographs.
l. Mobile device compatibility, including smartphones and tablets.

2. The web-based project management system is Procore (www.procore.com) and is updated monthly.

1.6 PROJECT MEETINGS

A. General: State will schedule and conduct, unless otherwise indicated, meetings and conferences at Project site.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify State of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Entity responsible for conducting meeting will prepare the meeting agenda, and distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, within three days of the meeting.

B. Preconstruction Conference: State will schedule and conduct a preconstruction conference before starting construction, at a time convenient to State, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of State, Architect or Engineer, and their consultants, State Construction Supervisor/Inspector; Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference. Participants

at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including but not limited to the following:

    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Lines of communications.
    f. Use of web-based Project software.
    g. Procedures for processing field decisions and Change Orders.
    h. Procedures for RFIs.
    i. Procedures for Quality Assurance / Quality Control (testing and inspecting).
    j. Procedures for processing Applications for Payment.
    k. Distribution of the Contract Documents.
    l. Submittal procedures.
    m. Sustainable design requirements including commissioning.
    n. Preparation of Record Documents.
    o. Use of the premises.
    p. Allowable entrance.
    q. Work restrictions.
    r. Working hours.
    s. State’s occupancy requirements.
    t. Installation of temporary facilities and controls.
    u. Storm Water Pollution Control.
    v. Procedures for disruptions and shutdowns.
    w. Construction waste management and recycling.
    x. Parking availability.
    y. Office, work, and storage areas.
    z. Equipment deliveries and priorities.
    aa. Safety.
    bb. Security.
    cc. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Progress Meetings: State will conduct progress meetings at weekly intervals.

1. Attendees: In addition to representatives of State and Architect or Engineer, each contractor, subcontractor, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting.

        1) Review schedule for next period.

    b. Review present and future needs, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Safety.
4) Status of submittals.
5) Status of commissioning.
6) Deliveries.
7) Off-site fabrication.
8) Access.
9) Site use.
10) Temporary facilities and controls.
11) Storm Water Pollution Control.
12) Progress cleaning.
13) Quality Assurance / Quality Control (testing and inspection).
14) Status of correction of deficient items.
15) Field observations.
16) Status of RFIs.
17) Status of Changes in the Work.
18) Payment requests.

3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Issue revised Contractor's construction schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 25

WEB-BASED PROJECT MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for the use of State's web-based project management software system for purposes of hosting and managing Project communication and documentation until Acceptance of the Work.

B. Use of this web-based project management system will not change any contractual responsibilities of the construction team members.

1.2 DEFINITIONS

A. System: A real time web-based software that shares data, translates data, organizes data, facilitates communication, archives actions, and offers status prompts to identified Users.

B. Users: Authorized participants of this Project furnished with a unique password and authorized to access the system to view/input/export data. State, Construction Manager (as applicable), Architect or Engineer, and the Contractors are all Users. Other Users may be added as necessary.

C. Contacts: Entities identified to automatically receive specific transmissions or entities selected to receive specific information sent by the system through to an e-mail address.

D. Signees: Those individuals identified, by the Contractors, authorized to sign change orders and payment applications via electronic signature. This electronic signature is as contractually binding as an original signature on paper.

1.3 SOFTWARE AND HARDWARE REQUIREMENTS

A. Each User shall provide and maintain a computer with high-speed internet access and an email address.

B. License(s) to Use System: State will provide licenses to use the system for this Project.

1.4 USE OF SYSTEM

A. Use of the system is mandatory for the documentation of the transmittal of all non-oral information, even if the actual transmission of the information is by another means.

1. The State will **NOT** accept faxed, emailed, and/or handwritten documentation of Requests for Information, Sketches, Drawings, and/or Submittals.

B. Use of the system will be mandatory by the Contractor to send, retrieve, and respond to data.

C. The State will provide each Project team member with an invitation to web-based project management system, and the supporting documentation of each Project team member's responsibility and how to operate within web-based project management system.

1. The State will administer User accounts for this Project.

D. Official Records:

1. Documentation and records uploaded and maintained in web-based project management system will be the "Official Records" for the Project and the sole property of the State.

1.5 SUBMITTALS

A. Submit to the State the contact information, including email address, of the Contractor's key personnel that will administer the system on behalf of the Contractor.

1.6 QUALITY ASSURANCE

A. A four-hour initial training session in the use of software for this Project will be offered by the State at a location convenient to the Project site. Instructional guides will be provided for the most common tasks.

1. Attendees shall have sufficient computer skills and previous experience with web-based project management software systems.

B. Web-based support is available at Aconex Support Central site (help.aconex.com).

C. Acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

D. Contractor shall be solely responsible for:

1. Training its staff on how to use the Aconex beyond the training provided by the State at no additional costs to the contract.
2. Validity of their information placed in Aconex.
3. Scanning of documents as necessary for the electronic submittal and attachment of necessary information related to Contractor's supporting documentation.

1.7 SYSTEM DESCRIPTION

A. The web-based project management system is Aconex (www.aconex.com) and is updated monthly.

1. Access into the various applications within Aconex will be role based.
2. The following Aconex applications shall be made available to the Project team:

a. Tasks.
b. Documents.
c. Workflows.
d. Mail.
e. Cost.

B. Web-based project management system includes, at a minimum, the following features:

1. Compilation of Project data, including Contractor, subcontractors, State, State's consultants, and other entities involved in Project. Include names of individuals and contact information.
2. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
3. Document workflow planning, allowing customization of workflow between Project entities.
4. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, Requests for Information, Submittals, Additional Detailed Instructions, and Change Orders.
5. Track status of each Project communication in real time, and log time and date when responses are provided.
6. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
7. Processing and tracking of payment applications.
8. Processing and tracking of contract modifications.
9. Creating and distributing meeting minutes.
10. Document management including revision control.
11. Management of construction progress photographs.
12. Mobile device compatibility, including smartphones and tablets.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 RESPONSIBILITIES

A. All documents submitted shall be in PDF file format unless otherwise requested.

B. The following documents shall be managed inside the system:

1. Correspondence, using Mail module.
2. RFIs
3. Submittals

    a. Placeholders
    b. Request for Substitutions

4. Financials

    a. Contract
    b. Payment Applications
    c. Change Events and Change Orders

5. Schedules including but not limited to:

    a. Baseline
    b. Monthly Progress
    c. Recovery
    d. Short Interval

6. Addenda
7. Specifications
8. Drawings, including ADI.
9. Reference Documents
10. Daily Reports
11. SWPPP
12. Inspection Reports (including Special Inspections)
13. Punchlists
14. Meeting Minutes
15. Regulatory Agency’s Permits
16. Photographs
17. Closeout Documentation

3.2 QUALITY CONTROL

A. Contractor is responsible for its own connectivity to the Internet. The State will not be liable for any delays associated from the usage of Aconex including, but not limited to slow response time, down time periods, connectivity problems, or loss of information. Under no circumstances shall the usage of the Aconex be grounds for a time extension or cost adjustment to the contract.

B. The document control system shall be available for Contractor use at all times unless system maintenance (i.e., backups, upgrades, etc.) is being performed. System maintenance will generally be limited to non-core business hours. In the event a Contractor’s authorized user cannot access the control system, the Contractor shall notify the State. In the event the control system becomes unavailable during normal business hours for an extended period, the Contractor may issue correspondence requiring immediate attention by the State in hard copy format. The hard copy correspondence must be entered into Aconex immediately upon becoming available again. Inability by the Contractor to gain access to the Aconex for any reason shall not be grounds for claim.

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Construction Schedule.
3. Short Interval Schedule.
4. Recovery Schedule.
5. Construction schedule updating reports.
6. Daily construction reports.
7. Unusual event reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.3 SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file in computer scheduling software native file format.
2. PDF file.
3. Three paper copies of sufficient size to display entire period or schedule, as required.

B. Startup construction schedule.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.
4. Projected Monthly Payment Requests Report: List of Contractor’s monthly planned billings from the Notice to Proceed until Completion of the Work.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Short Interval Schedule: Submit at weekly intervals.

H. Daily Construction Reports: Submit at weekly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Unusual Event Reports: Submit at time of unusual event.

1.4 QUALITY ASSURANCE

A. Scheduling Conference: State may conduct conference at Project site to review methods and procedures related to the Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including, but not limited to, phasing work, stages, area separations, interim milestones and beneficial occupancy.
4. Review delivery dates for State-furnished products.
5. Review submittal requirements and procedures.

6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for Project closeout and State startup procedures, including commissioning activities.
9. Review list of construction activities to be included in schedule.
10. Review procedures for updating schedule.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Use Microsoft Project, or equal, for current Windows operating system.

B. Time Frame: Extend schedule from date established for the Start Date stipulated in the Notice to Proceed to date of Completion of the Work.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 21 days.
2. Indicate start and completion dates for the following as applicable:

    a. Securing of approvals and permits required for performance of the Work.
    b. Temporary facilities.
    c. Construction of mock-ups, prototypes and samples.
    d. State interfaces and furnishing of items, if any.
    e. Regulatory agency approvals.
    f. Punch list.

3. Procurement Activities: Include procurement process activities for the long lead-time items and major items as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
4. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
6. Commissioning Time: Include no fewer than 15 days for commissioning.
7. Punch List and Completion: Include not more than 30 days for completion of punch list items and Completion. No activities other than Startup, Testing and/or Commissioning shall be scheduled during this period.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.

c. Uninterruptible services.
d. Use-of-premises restrictions.
e. Provisions for future construction.
f. Seasonal variations.
g. Environmental control.

E. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Completion percentage for each activity.

F. Distribution of Approved Copies:

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made post in the same locations.

1.6 SHORT INTERVAL SCHEDULE

A. Short Interval Scheduling (SIS) shall be used throughout onsite construction activity. Interval shall be a 3-week projection and shall include week submitted and two weeks thereafter. It shall contain sufficient detail to evaluate daily milestones and manpower/equipment loading and shall identify/tie into monthly updated Schedule.

1.7 RECOVERY SCHEDULE

A. When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

B. Upon acceptance by the State, incorporate Recovery Schedule into Contractor's Construction Schedule.

1.8 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within 10 days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

1.10 CPM SCHEDULE REQUIREMENTS

A. Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 45 days after date established for the Notice to Proceed.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

D. Contract Modifications:

1. For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
2. The State shall have no obligation to consider time extension request unless requirements of Contract Documents are complied with; the State shall not be responsible or liable to Contractor for constructive acceleration due to failure of the State to grant time extensions under the Contract Documents, should Contractor fail to comply with submission requirements and justification requirements of this Contract for time extension requests. Contractor's failure to perform in accordance with Schedule shall not be excused because Contractor has submitted time extension requests, until and unless such requests are approved by the State.

E. Initial Issue of Schedule: Prepare network diagram(s) from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.

2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.

F. Optional Schedule Reports: In addition to the above reports, the State may request, from month-to-month, any of the following reports:

1. Total float from least to most.
2. Activities by early start.
3. Activities by late start.
4. Activities grouped by subcontractors or selected trades.
5. Activities with scheduled early start dates in a given time frame (i.e. 30- or 60-day outlook).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

1.11 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. Equipment at Project site.
4. Material deliveries.
5. High and low temperatures and general weather conditions, including presence of rain or snow.
6. Testing and inspection.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Services connected and disconnected.
15. Equipment or system tests and startups.

B. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or

effects, and similar pertinent information. Advise State in advance when these events are known or predictable.

1. Submit unusual event reports directly to State within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

1.12 PAYMENTS WITHHELD

A. Progress Payments may be withheld in whole or in part should Contractor fail to comply with requirements of this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Concealed Work photographs.
3. Periodic construction photographs.
4. Final Completion construction photographs.
5. Preconstruction video recordings.

1.2 SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within seven days of taking photographs.

1. Submit photos by uploading to web-based Project management software site. Include copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in web-based Project management software site:

a. Name and number of Project.
b. Date photograph was taken.
c. Description of location, vantage point, and direction.
d. Unique sequential identifier keyed to accompanying key plan.

C. Video Recordings: Submit video recordings within seven days of recording.

1. Submit video recordings by uploading to web-based Project management software site. Include copy of key plan indicating each video's location and direction.
2. Identification: With each submittal, provide the following information on web-based Project management software site:

a. Name and number of Project.
b. Date video recording was recorded.
c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
d. Unique sequential identifier keyed to accompanying key plan.

1.3 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode. Provide supplemental lighting in low light levels or backlit conditions.

C. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

D. Metadata: Record accurate date and time and GPS location data from camera.

E. File Names: Name media files with date, Project number and sequential numbering suffix.

1.4 CONSTRUCTION PHOTOGRAPHS

A. Photographer:

1. Engage Contractor’s project staff to take construction photographs.

B. General: Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Preconstruction Photographs: Before commencement of the Work, and in the presence of the State’s Representative, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by State.

1. Take minimum of 20 photographs to show existing site conditions before starting the Work.
2. Take minimum of 20 photographs of existing buildings either on or adjoining Project site, to accurately record physical conditions at start of construction.
3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:

1. Underground utilities.
2. Underslab services.
3. Piping.
4. Electrical conduit.
5. Waterproofing and weather-resistant barriers.

E. Periodic Construction Photographs: Take minimum of 20 photographs weekly. Following suggestions by State, select vantage points to show status of construction and progress since last photographs were taken.

F. Final Completion Construction Photographs: Take minimum of 20 photographs after date of Completion for submission as Project Record Documents. State will inform photographer of desired vantage points.

1.5 CONSTRUCTION VIDEO RECORDINGS

A. Preconstruction Video Recording: Before starting construction, and in the presence of the State's Representative, record video recording of Project site and surrounding properties from different vantage points, as directed by State.
   1. Show existing site conditions before starting the Work.
   2. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of construction.
   3. Show protection efforts by Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

A. Submittals: Written and graphic information and physical samples that require State's responsive action. Submittals are those submittals indicated in individual Specification Sections. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by State and additional time for handling and reviewing submittals required by those corrections.

1. Schedule submissions during the first 60 days after a date established for the Notice to Proceed and at least 21 days before dates reviewed submittals will be needed and within the time periods specified below.

a. Items needed in initial stages of Work or requiring long lead-time for ordering: 30 days.
b. Major electrical, mechanical and equipment items: 60 days.

2. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
3. Initial Submittal Schedule: Submit within 10 days of date established for the Notice to Proceed. Include submittals required during the first 90 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
4. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.

5. Format: Arrange the following information in a tabular format:

a. Scheduled date for first submittal.
b. Specification Section number and title.

c. Description of the Work covered.
d. Scheduled date for State's final release or approval.
e. Scheduled dates for purchasing.
f. Scheduled dates for installation.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of firm or entity that prepared submittal.
5. Unique submittal number, including revision identifier.
6. Submittal purpose and description.
7. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
8. Drawing number and detail references, as appropriate.
9. Indication of full or partial submittal.
10. Location(s) where product is to be installed, as appropriate.
11. Other necessary identification.
12. Remarks.
13. Signature of transmitter.

B. Options: Identify options requiring selection by State.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by State on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

E. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. State reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on State's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 21 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. State will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 21 days for review of each resubmittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from State's action stamp.

E. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from State's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.

d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit physical samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Where size of Samples is not specified, Samples should be of sufficient size and quantity to clearly illustrate functional characteristics of product or material, with integrally related parts and attachment devices.
3. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.
4. Web-Based Project Management Software: Prepare submittals to accompany Samples in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
5. Paper Transmittal: Include paper transmittal to accompany Samples, including complete submittal information indicated.
6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. State will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to State.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional licensed to practice in the State of California, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to State.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. State will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 STATE'S REVIEW

A. Submittals: State will review each submittal, indicate corrections or revisions required, and return.

1. Submittals by Web-Based Project Management Software: State will indicate, on Project management software website, the appropriate action.

a. Actions taken by indication on Project management software website have the following meanings:

1) No Exception Taken: Where the submittal is marked "No Exception Taken," the Work covered by the submittal may proceed, provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
2) Exception, See Comments: Where the submittal is marked "Exception, See Comments," the Work covered by the submittal may proceed, provided it complies both with State's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.
3) Revise and Resubmit: Where the submittal is marked "Revise and Resubmit," do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise or prepare a new submittal according to State's notations and corrections.
4) Rejected: Where the submittal is marked "Rejected," do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

B. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from State.

C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

D. State will return without review submittals received from sources other than Contractor.

E. Submittals not required by the Contract Documents will be returned by State without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 29.08

BUY CLEAN CALIFORNIA ACT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes general requirements and procedures for compliance with Buy Clean California Act (BCCA) per California Public Contract Code, Sections 3500-3505.

B. Submit current facility-specific environmental product declaration for each eligible material proposed to be used on the Project.

1.02 DEFINITIONS

A. Global Warming Potential (GWP): Equivalent amount of carbon dioxide associated with the warming effect of a given quantity of a greenhouse gas produced when manufacturing a product.

B. Environmental Product Declaration (EPD): Type III environmental impact label, as defined by the International Organization for Standardization (ISO) standard 14025, or similarly robust life cycle assessment methods that have uniform standards in data collection consistent with ISO standard 14025, industry acceptance, and integrity.

C. Facility-specific EPD: Product EPD in which the environmental impacts are disclosed for a single manufacturer and single manufacturing facility. Companywide EPD may also be considered facility-specific if it discloses the GWP for each manufacturing facility separately.

D. Eligible Materials: Any of the following:

1. Carbon steel rebar.

a. Carbon steel bars: ASTM A615.
b. Low-alloy steel bars: ASTM A706.
c. Zinc-coated steel bars: ASTM A767.
d. Epoxy-coated steel bars: ASTM A775.

2. Flat glass: Float or rolled glass that is clear or tinted, either installed by itself or as a part of a window assembly.

3. Insulation: Mineral wool board insulation made of rock or slag in light- and heavy-density types.

a. Light-density: 2.5 to 4.3 lb./cu. ft.
b. Heavy-density: 4.4 to 8 lb./ cu. ft.

4. Structural steel.

a. Hot-rolled sections consisting of wide flange beams (W-shape and HP-shape used in structural applications), standard beams (S-shape), miscellaneous beams (M-shape), channels, angles, and tees.
b. Hollow structural sections with round, square, or rectangular cross-section.
c. Plate material.

1.03 REFERENCES

A. California Department of General Services Buy Clean California Act Website: https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act.

1.04 SUBMITTALS

A. General: Buy Clean California Act submittals are required to be submitted along with other required submittal items for eligible materials as described in the Specifications.

1. Do not incorporate these materials and products into the Work until the State has reviewed and accepted the submittals.

B. Facility-specific Environmental Product Declaration: For each eligible material proposed to be used on the Project.

1. Facility-specific EPDs must comply with ISO 14025 and applicable Product Category Rules (PCR) located on the California Department of General Services Buy Clean California Act website.

2. Global Warming Potential (GWP) of each eligible material or product as evidenced by its environmental product declaration shall not exceed the maximum acceptable global warming potential values established by the California Department of General Services and in effect on the date of the first Invitation to Bid.

a. Maximum acceptable GWP limits for eligible materials are located on the California Department of General Services Buy Clean California Act website: https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act.

C. Eligible Materials Quantity and Cost Data: Prior to project closeout, provide statement indicating total quantity and costs for eligible materials used on the Project. Costs exclude labor, overhead, and profit. Include breakout of quantities and costs for each eligible material.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes special procedures for alteration work shown on Drawings and specified in Sections pertaining to crafts or trades involved.

1.2 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Remove: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

D. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by State.

E. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

F. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

G. Retain: To keep existing items that are not to be removed or dismantled.

1.3 COORDINATION

A. Alteration Work: Coordinate sequence of alteration work activities to accommodate the following:

1. State’s continuing operations of the parking facilities, and occupancy of existing buildings.

    a. Interference with or inconvenience to occupants shall be kept to a minimum.

2. Separate construction project retrofitting the perimeter security sliding gates at primary and secondary entrances.
3. Tests and inspections.
4. Utility Services: Coordinate shutoff, capping, and continuation of utility services.

B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within the Project site. Some work is at or near circulation patterns or within fully-occupied existing buildings. Vehicular traffic patterns into OES Headquarters campus visitor and restricted parking

cannot be closed off entirely and in places can be only temporarily redirected around areas of work. Plan and execute the Work accordingly.

1.4 SUBMITTALS

A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

1. Submit itemized list of defects or damages, including items such as but not limited to, glass, window screens, drywall, salvage items, paving, walks.

1.5 QUALITY ASSURANCE

A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section.

1.6 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to State.
4. Transport items to State’s storage area on-site.
5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by State, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Salvaged Items: Salvaged items of value to State, and not reused in the Work, shall remain State property. Store on site where directed. Salvaged items of value to State include:

1. Circuit breakers

2. Card readers and intercom devices

E. Removed Items: Removed items and materials not of value to State and not reused in the Work shall be disposed of off premises at Contractor's expense.

F. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.

G. Storage Space:

1. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.7 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work.

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

B. Work Layout: Comply with requirements specified in Section 01 31 00 “Project Management and Coordination”.

C. Discrepancies: Notify State of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

D. At completion of the Work, defects not noted on the itemized list or not verifiable from the Survey of Existing Conditions shall be corrected or replaced at no cost to the State.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces. If indicated on Drawings, temporary dust-retarding partitions and barricades shall be built around work areas.

6. Provide shoring, bracing, underpinning, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify State, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
4. Provide temporary construction lighting and power, as required, in areas where Work is being performed when normal site power is disrupted.
5. Critical system rooms, security rooms, communications closets, and elevator machine rooms shall remain in operation 24 hours per day, 7 days per week throughout the duration of the project. Power, security, and building control affecting these areas shall not be interrupted unless approved in writing by the State. Critical systems rooms are defined as all electrical and telephone/data closets. Contractor shall make provisions acceptable to the State to provide temporary services as required.

E. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

F. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

G. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify State immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 GENERAL ALTERATION WORK

A. Replace, patch and finish in kind, adjacent surfaces or features displaced or disturbed in performance of alteration work. Broken and cut units shall be replaced with whole units.

B. Except as otherwise shown or specified, join new work to existing work to match similar existing adjoining work. Prepare existing surfaces to receive new work.

C. Materials and equipment shall be delivered, and rubbish removed, through passages designated by the State. Deliveries of materials and equipment to jobsite shall be made with a Contractor's representative present.

D. Keep corridors and entrances for use of occupants, and reasonable access thereto, clear of building materials, refuse, and the like.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by State, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

B. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

D. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

E. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" shall have the same meaning as the term "testing agency."

G. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

H. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by State.

1.3 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to State.

B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible design professional registered to practice in the State of California, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the State regarding the conflict. Use the requirement(s) that is/are more stringent and/or of higher quality and/or higher quantity.

1.5 SUBMITTALS

A. Reports: Prepare and submit certified written reports, products test reports, and documents as required and/or specified.

B. Permits, Licenses, and Certificates: For State’s record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 REPORTS AND DOCUMENTS

A. Manufacturer's Technical Representative's or Factory-Authorized Service Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of California or jurisdiction where Project is located, and who has minimum of five years of experience in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

F. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

G. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.8 QUALITY CONTROL

A. State Responsibilities: Where quality-control services are indicated as State’s responsibility, State will engage a qualified testing agency to perform these services.

1. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

2. Tests and inspections shall be performed by State's testing laboratory in conformance with California Code of Regulations, Title 24 as noted in individual specifications sections.

B. Contractor Responsibilities: Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor shall not employ same entity engaged by State, unless agreed to in writing by State.
    b. Testing, Adjusting, and Balancing of Systems: These services shall be provided by approved testing organization in conformance with requirements for services specified in individual sections pertaining to each system.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. The State shall have the right to reject materials and workmanship which are defective or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the State. If Contractor does not correct such rejected work within a reasonable time, fixed by a written notice, the State may correct same and charge the expenses to Contractor.

H. Should it be considered necessary or advisable by the State at any time before Acceptance of the Work to make examination of work already completed by removing or tearing out same, Contractor shall, on request, promptly furnish necessary facilities, labor and materials. If such work is found to be defective in any respect due to fault of Contractor or subcontractor, Contractor shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet requirements of the Contract, additional cost of labor and material necessarily involved in the examination and replacement will be allowed to the Contractor.

1.9 SPECIAL INSPECTIONS AND TESTS

A. Special Inspections and Tests: State will engage a qualified testing agency and/or special inspector to conduct special inspections and tests required by authorities having jurisdiction as the responsibility of State.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Notify State's Inspector 48 hours in advance of operations to allow for laboratory assignment of personnel and scheduling of tests. When tests or inspections cannot be performed after such notice, reimburse the State for laboratory personnel and travel expenses incurred due to Contractor's negligence.

B. When additional testing services are needed for Contractor's convenience, employ and pay for services of separate, equally qualified independent testing laboratory; or arrange with State's laboratory and pay for additional samples and tests required for Contractor's convenience.

C. Prepare each system for testing and balancing. Cooperate with testing agency and provide access to equipment and systems. Operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 50 50

EROSION CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall provide all materials, labor and equipment necessary to complete all work as specified herein, including but not limited to the following:

1. Apply specified treatments to all cuts and fill slopes, soil stockpiles, and all disturbed areas.

2. Install all temporary erosion control devices per Plans and Specifications.

B. All other labor and materials reasonably incidental to the satisfactory completion of the work, including cleanup of the site.

1.02 RELATED SECTIONS

A. Section 01 10 00, Supplemental General Requirements

1.03 RELATED DOCUMENTS

A. Caltrans Standard Specifications, latest edition

1. Section 21, Erosion Control

1.04 CONTRACTOR SUBMITTALS

A. The Contractor shall submit, in accordance with Section 01 10 00, Supplemental General Requirements, manufacturer's letters of compliance and manufacturer's literature for the following items:

1. Fiber Roll (weighted installation and free from seeds)

2. Erosion Control Blanket

1.05 SITE CONDITION

A. It is the responsibility of the Contractor to visit the site to determine existing conditions including access to the site, the nature and extent of existing improvements upon adjacent public and private property, the nature of materials to be encountered, and other factors that may affect the work of this section.

B. It is the responsibility of the Contractor to have finished the grading of the slopes, including track walking the areas to be treated with erosion control treatments.

1.06 WORK SCHEDULE

A. The Contractor shall proceed with work during a period of summer when possible. The work shall progress as soon as the site becomes available consistent with normal seasonal limitations.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All products shall be delivered to the site in manufacturer's unopened standard containers bearing original labels showing quantity, analysis and name of manufacturer.

B. All materials shall be stored in designated areas and in such a manner as to protect them from weather or other conditions that might damage or impair the effectiveness of the product.

1.08 ANALYSIS OF SAMPLES AND TESTS

A. Samples: The Owner reserves the right to take and analyze samples of materials for conformity to the Specifications at any time.

B. Rejected material: Rejected materials shall be removed immediately from the site at Contractor's expense. Contractor shall pay the cost of testing replacement materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. All products shall be in conformance with the Specifications listed below. Any changes to products to be used shall be approved, in writing, by the Owner or Owner's representative prior to job site delivery.

2.02 FINAL INSPECTION AND ACCEPTANCE:

A. Final inspection will be conducted upon completion of maintenance, replacements and corrective work. Five (5) days' notice shall be given. If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of the Owner's Representative, maintenance shall continue at Contractor's expense until such time as work has been successfully completed.

2.03 GUARANTEE AND REPLACEMENT

A. Guarantee all fiber roll shall be installed with weights instead of staked into ground. Fiber roll shall also be free from seeds.

B. Replace all fiber roll areas not good condition as soon as directed by Owner's Representative.

2.04 CLEAN-UP

A. Erosion control work areas shall be maintained in a neat and orderly condition. Keep paved area free of erosion treatment, soil, and other debris.

B. Overspray: Installing Contractor is responsible for washing or otherwise cleaning excess material off all areas not intended to receive treatment.

C. Debris: Clean up and remove erosion control associated materials and debris from project site before Final Acceptance.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and substitutions.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a substitution request, if applicable.

D. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures."

E. Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.4 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.

5. Store loose granular materials on solid surfaces in well-drained area; prevent mixing with foreign matter.
6. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
8. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the State or endorsed by manufacturer to State.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for State and issued in the name of the State or endorsed by manufacturer to State.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Components required to be supplied in quantity within individual Specification Sections shall be the same and shall be interchangeable.
3. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
4. State reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
5. Where products are accompanied by the term "as selected," State will make selection.
6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

7. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," comply with requirements in Section 01 25 00 “Substitution Procedures" to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by State in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the State, whose determination is final.
    b. Where the words "or equal" are used following trade names, patented products, or proprietary products or methods, they shall be deemed to read "or equal in quality, design, utility and suitability"; as solely determined by the State. Where such trade names, products, or methods are without the use of the words "or equal", they shall be deemed to be followed by the words "or equal in quality, design, utility and suitability" as solely determined by the State.

B. Product Selection Procedures:

1. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.

    a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
    b. Provision of an unnamed product is considered a substitution.

2. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.

    a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
    b. Provision of products of an unnamed manufacturer is considered a substitution.

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

    a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by State from manufacturer's full range" or a similar phrase, select a product that complies with requirements. State will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

D. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

1. Select products for which sustainable design documentation submittals are available from manufacturer.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Construction layout.
2. Installation of the Work.
3. Cutting and patching.
4. Coordination of State's portion of the Work.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection and repair of installed construction.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 PREINSTALLATION MEETINGS

A. Pre-Dig Conference: Conduct conference at Project site.

1. Prior to commencing each excavation activity, a pre-dig construction conference shall be conducted by the Contractor to discuss procedures that are to be followed during performance of the Work,
2. Review site logistics plans, phased construction, and schedule
3. Review procedures taken to physically locate existing utilities
4. Review coordination with municipality and utility companies
5. Review excavation activities
6. Review safety program and emergency response plans
7. Review any other contractual requirements.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural and Other Construction Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify State of locations and details of cutting and await

directions from State before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection. Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

2. Patching shall achieve security, strength, and weather protection, and shall preserve continuity of existing fire ratings.

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in State's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner. Patching shall successfully duplicate undisturbed adjacent finishes, colors, textures, and profiles. Where there is a dispute as to whether duplication is successful or has been achieved to a reasonable degree, the State's judgment shall be final.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to State for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and

verify the existence and location of all underground utilities, and other construction affecting the Work.

1. Contractor shall follow all legal requirements and excavate in accordance with the California Excavation Manual: https://www.usanorth811.org/images/pdfs/CA-LAW-2018.pdf
2. There are known, active underground gas pipelines at or near the areas scheduled for excavation, Contractor shall coordinate with utility company (PG&E) any applicable monitoring, inspection, and excavation requirements.
3. Water lines, at or near the areas scheduled for excavation, may be active; protection of Sacramento County Water Agency (SCWA) active facilities from damage during construction. Prior to construction, Contractor shall verify the identified abandoned water mains are depressurized and physically disconnected from SCWA active facilities with section of piping removed. If not physically separated, the Project shall disconnect the abandoned mains from the nearest watermain in the Right-of-Way.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to State in accordance with requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify State promptly.

B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb, and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with the manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure satisfactory results as judged by State. Maintain conditions required for product performance until Completion.

D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

F. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by State.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by State. Fit exposed connections together to form hairline joints.

I. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by State. Provide materials and comply with installation requirements specified in other Sections, where applicable.

I. Paint over complete surface plane, unless otherwise indicated. Over patched wall or ceiling surfaces, paint to nearest cutoff line for entire surface, such as intersection with adjacent wall or ceiling, beam, pilasters, or to nearest opening frame, unless otherwise indicated. Painted surfaces shall not present a spotty, touched-up appearance.

J. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 COORDINATION OF STATE’S PORTION OF THE WORK

A. Site Access: Provide access to Project site for State’s construction personnel and State’s separate contractors.

B. Coordination: Coordinate construction and operations of the Work with work performed by State’s construction personnel and State’s separate contractors.

1. Construction Schedule: Inform State of Contractor's preferred construction schedule for State’s portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify State if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include State’s construction personnel at preinstallation conferences covering portions of the Work that are to receive State’s work. Attend

preinstallation conferences conducted by State's construction personnel if portions of the Work depend on State's construction.

3.7 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace them with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Completion.

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

D. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the construction waste management and disposal.

B. Waste Management Objective for the Project:

1. Project shall minimize the generation of construction and demolition waste at the site.
2. Waste disposal in landfills shall be minimized.

1.2 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of the Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to State that may be uncovered during demolition remain the property of State.

1. Carefully salvage in a manner to prevent damage and promptly return to State.

1.4 SUBMITTALS

A. Construction Waste Estimate: Within 14 calendar days after Start Date of the Work, or prior to any waste removal, whichever occurs sooner, submit construction waste estimate, using the Form 01 74 19.01 “Construction Waste Estimate”. Include the following information:

1. Estimate of total job site waste to be generated, including material types and quantities.
2. Estimate of percentages of waste categories to landfill, to be reused, and to be recycled.

B. Waste Management Report: Upon completion of Work, including final cleanup, provide a final waste management report containing the information required in Form 01 74 19.02 “Waste Management Report”. Include the following information:

1. Total quantity of each waste material generated; and the date(s) removed from the project site.
2. Percentages of waste categories to landfill, to be reused, and to be recycled.
3. Identity of the landfill / receiving facility, handling costs, transport costs, tipping fees paid at the landfill, and total landfill costs. Attach copies of manifests, weight tickets, receipts, and invoices.
4. For each material reused or recycled from the Project, include the total costs of handling and transportation, and income. Attach manifests, weight tickets, receipts, and/or invoices.

C. Qualification Data: For waste management coordinator.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

1. California Department of Resources Recycling and Recovery (CalRecycle); Telephone (916) 341-6300; https://www.calrecycle.ca.gov/condemo.
2. Local Integrated Waste Management Programs and Re-Use Programs in the Project area.
3. California Department of Toxic Substances Control (DTSC).

1.6 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

B. Diversion from Landfill: Waste categories appropriate for diversion from landfill shall include, but not be limited to, the following:

1. Land clearing debris.
2. Soil.
3. Wood: Clean dimensional wood, palette wood.
4. Sheet Wood: Plywood, OSB and particle board.
5. Concrete.

6. Bricks.
7. Concrete Masonry Units (CMU).
8. Asphalt Concrete.
9. Paper.

    a. Bond.
    b. Newsprint.
    c. Cardboard and paper packaging materials.

10. Cement Fiber Products: Shingles, panels, and siding.
11. Metals.

    a. Ferrous.
    b. Non-ferrous.

12. Paint.
13. Rigid Foam.
14. Glass.
15. Plastics.
16. Carpet and pad.
17. Beverage containers.
18. Insulation.
19. Gypsum Board.
20. Piping.
21. Electrical conduit.
22. Porcelain Plumbing Fixtures.
23. Fluorescent Light Tubes (per Department of Toxic Substances Control regulations).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 IMPLEMENTATION

A. General: Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management during the entire duration of the Contract.

    1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator or designate on-site party to be responsible for implementing, monitoring, and reporting status of waste management work.

    1. Distribute copies of the Construction Waste Estimate and Waste Management Report forms to the Job Site Foreman and each Subcontractor.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

D. Meetings: Conduct Waste Management meetings with subcontractors who generate construction waste. Present current status of the Waste Management Report at regular job-site meetings.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 02 41 19 “Selective Demolition” for salvaging demolition waste.

3.3 DEMOLITION AND CONSTRUCTION WASTE MANAGEMENT

A. Materials Handling Procedures: Provide means by which waste materials will be protected from contamination and means to be employed in reuse or recycling of waste material consistent with requirements for acceptance by receiving facilities.

B. Separation Facilities: Lay out and label a specific area to facilitate separation of materials for reuse and recycling. Recycling and waste bin areas shall be kept neat and clean and clearly marked to avoid contamination of materials.

C. Hazardous Wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations, and in accordance with specifications for such work as may be included in this Project.

D. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at appropriate stages of the Project.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

3.5 ATTACHMENTS

A. Form 01 74 19.01: Construction Waste Estimate.

B. Form 01 74 19.02: Waste Management Report.

END OF SECTION

FORM 01 74 19.01 CONSTRUCTION WASTE ESTIMATE

This form must be completed by the Contractor. Attach additional sheets if necessary. Waste categories appropriate for diversion from landfill shall include but not be limited to categories listed below. Edit the list to suit Project's scope.

PROJECT NAME: _____ **PROJECT NUMBER:** _____

CONTRACTOR'S / VENDOR'S NAME: _____ **DATE:** _____

Waste Material (edit to suit)	Unit	Estimated Quantity Generated	Percent to Landfill	Percent Reused	Percent Recycled
Land Clearing Debris	CY				
Soil	CY				
Wood	CY				
Sheet Wood	CY				
Concrete	CY				
Bricks	CY				
Concrete Masonry Units	CY				
Asphalt Concrete	CY				
Paper	CY				
Cement Fiber Products	CY				
Metal (ferrous)	TON				
Metal (non-ferrous)	LBS				
Paint	CF				
Rigid Foam	CF				
Glass	CF				
Plastics	CF				
Carper and Pad	SY				
Beverage Containers	LBS				
Insulation	CF				
Gypsum Board	CF				
Porcelain Plumbing Fixtures	EA				
Fluorescent Light Tubes	EA				

FORM 01 74 19.02 WASTE MANAGEMENT REPORT

QUANTITIES

Waste Material (edit to suit)	Unit	Date Removed	Total Quantity Generated	Percent to Landfill	Percent Reused	Percent Recycled
Land Clearing Debris	CY					
Soil	CY					
Wood	CY					
Sheet Wood	CY					
Concrete	CY					
Bricks	CY					
Concrete Masonry Units	CY					
Asphalt Concrete	CY					
Paper	CY					
Cement Fiber Products	CY					
Metal (ferrous)	TON					
Metal (non-ferrous)	LBS					
Paint	CF					
Rigid Foam	CF					
Glass	CF					
Plastics	CF					
Carper and Pad	SY					
Beverage Containers	LBS					
Insulation	CF					
Gypsum Board	CF					
Porcelain Plumbing Fixtures	EA					
Fluorescent Light Tubes	EA					

COST/INCOME

Waste Material (edit to suit)	Unit	Receiving Facility	Landfill Cost in $			Reused in $		Recycled in $	
			Handling	Transport	Fee	Cost	Income	Cost	Income
Land Clearing Debris	CY								
Soil	CY								
Wood	CY								
Sheet Wood	CY								
Concrete	CY								
Bricks	CY								
Concrete Masonry Units	CY								
Asphalt Concrete	CY								
Paper	CY								
Cement Fiber Products	CY								
Metal (ferrous)	TON								
Metal (non-ferrous)	LBS								
Paint	CF								
Rigid Foam	CF								
Glass	CF								
Plastics	CF								
Carper and Pad	SY								
Beverage Containers	LBS								
Insulation	CF								
Gypsum Board	CF								
Porcelain Plumbing Fixtures	EA								
Fluorescent Light Tubes	EA								
		TOTAL:							

SECTION 01 74 20

RECYCLED CONTENT CERTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the recycled content certification.

1.2 REFERENCES

A. State Agency Buy Recycled Campaign: https://www.calrecycle.ca.gov/buyrecycled/stateagency.

1. Access this website for information on the Buy Recycled Campaign.

1.3 DEFINITIONS

A. Product Categories: Recycled content categories identified for purchasing and reporting of products.

1. Paper products.
2. Printing and writing papers.
3. Soil amendments and toppings.
4. Erosion control products.
5. Glass products.
6. Lubricating oils.
7. Plastic products.
8. Paint.
9. Tires.
10. Tire-derived products.
11. Antifreeze.
12. Metals.
13. Carpet.
14. Pavement surfacing.
15. Building finishes.
16. Textiles.

B. Recycled Content Product (RCP): All materials, goods, and supplies that are from one of the sixteen (16) Product Categories that meet the requirements identified in Public Contract Code, Section 12209, including any good or material that has been reused or refurbished without substantial alteration of its original form. For reused or refurbished products, there is no minimum content requirement.

C. Non-Recycled Content Product (non-RCP): All materials, goods, and supplies that are from one of the sixteen (16) Product Categories having no recycled content or less than the minimum content or not meeting recyclability requirements, as identified in Public Contract Code, Section 12209.

1.4 REQUIREMENTS

A. Recycled content reporting for the Project.

1. Document and report the percentage of recycled content in materials, products, equipment and furnishings installed and provided for this Project.
2. State Agency Buy Recycled Campaign (SABRC) is a joint effort between the Department of General Services and the California's Department of Resources Recycling and Recovery (CalRecycle) to implement State law. Public Contract Code, Sections 12200-12320, requires State agencies to purchase recycled content products instead of non-recycled content products in sixteen (16) product categories whenever price, quality, and availability are comparable, to ensure that a minimum percentage of purchases in those categories have recycled content, and report these purchases annually to CalRecycle. This certification and reporting are utilized to comply with those requirements.
3. State and State's contractor(s) are required to purchase recycled content products in sufficient quantities to ensure that mandated recycled content products procurement goals are attained within sixteen (16) product categories.
4. The sixteen (16) product categories and their respective minimum postconsumer-content requirements are outlined in SABRC Handout on CalRecycle website: https://www2.calrecycle.ca.gov/Docs/Web/114687 .
5. In order to help state agencies identify all reportable purchases and all reportable recycled content products purchases, Contractor is mandated by the Public Contract Code, Section 12205 to certify in writing to the State the minimum percentage, if not the exact percentage, of postconsumer recycled-content material in the products, materials, goods, and supplies offered or sold to the State regardless of whether the product meets the requirements of Public Contract Code, Section 12209.
6. All products that can be classified as being in one of the sixteen (16) categories must be included in the reporting, whether the product is recycled content products or non- recycled content products. Only products that can be classified in one of the categories shall be reported.

1.5 SUBMITTALS

A. Form 01 74 20.01 "Recycled Content Certification Worksheet": Submit with each product submittal from one of the sixteen (16) Product Categories, containing the following information:

1. Product Description, with applicable specification section of product.
2. Quantity of product.
3. Estimated material dollar value including any taxes and delivery cost.
4. Designate the Product Category for each product listed.
5. Designate whether product is a Recycled Content Product.
6. Estimate of percentage of material content.
7. Attach a copy of the manufacturer's or vendor's data sheet showing recycled content percentages if product is reported as a Recycled Content Product.

B. Form 01 74 20.02 "State Agency Buy Recycled Campaign Procurement Summary": Submit with each product submittal from one of the sixteen (16) Product Categories, containing the following information:

1. Product Category.
2. All reportable purchases, quantity and dollar value including any taxes and delivery cost.
3. Recycled Content Product purchases, quantity and dollar value including any taxes and delivery cost.

4. Percent of Recycled Content Product purchases, quantity and dollar value including any taxes and delivery cost.

1.6 CLASSIFICATION OF PRODUCTS

A. Recycled content products and non-recycled content products that are made from multiple material types should be reported in the product category of the material type representing most of the product.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 IMPLEMENTATION

A. Recycled Content Manager: Designate an individual responsible for instructing suppliers and subcontractors, and overseeing and documenting results of Recycled Content Certification for the Project.

B. Recycled Content Manager shall document results of submitted Form 01 74 20.01 “Recycled Content Certification Worksheets” on the Form 01 74 20.02 “State Agency Buy Recycled Campaign Procurement Summary”, in total for each product category. Only reportable products from one of the sixteen (16) categories should be recorded.

C. Distribution:

1. Recycled Content Manager shall insure that Form 01 74 20.01 “Recycled Content Certification Worksheet” is submitted with each product submittal from one of the sixteen (16) Product Categories or at intervals agreed to by the State’s Representative for monitoring of the program.
2. Recycled Content Manager shall provide copies of the Form 01 74 20.02 “State Agency Buy Recycled Campaign Procurement Summary” at intervals agreed to by the State’s Representative for monitoring of the program. At the conclusion of the construction and prior to final payment, Recycled Content Manager shall provide a copy of the final Form 01 74 20.02 “State Agency Buy Recycled Campaign Procurement Summary” under provisions of Section 01 77 00 “Closeout Procedures”.

3.2 ATTACHMENTS

A. Form 01 74 20.01: Recycled Content Certification Worksheet (Example).

1. An example of a completed form is attached for Contractor’s reference. An electronic version of this form for Contractor’s use will be provided by the State at the Project start meeting.

B. Form 01 74 20.02: State Agency Buy Recycled Campaign Procurement Summary (Example).

1. An example of a completed form is attached for Contractor’s reference. An electronic version of this form for Contractor’s use will be provided by the State at the Project start meeting.

END OF SECTION

FORM 01 74 20.01 RECYCLED CONTENT CERTIFICATION WORKSHEET (EXAMPLE)

This form must be completed by the contractor. The contractor must submit a worksheet with each product submittal to the State agency, with a row completed for each product supplied to the State. Attach additional sheets if necessary. Information must be included, even if the product does not contain recycled content material but it is within one of the 16 categories. Refer to footnotes following this form.

PROJECT NAME: Visitor's Non-Secure Entrance, Statewide Youth Correctional Agency **PROJECT NUMBER:** 000000000001234

CONTRACTOR'S / VENDOR'S NAME: XYZ Contractors **DATE:** December 1, 2024

ADDRESS: 4300 Pleasant Valley Dr, Lincoln Logs, CA 95000 **PROJECT DIRECTOR:** (AS NAMED)

PHONE: (123) 456-7890 **EMAIL:** Super.Intendent@xyzcont.com

Product Description / Specification Section	Quantity	Estimated Dollars	Product Category[1]	RCP Y/N?	Virgin Content (Percent)[2]	Postconsumer Material (Percent)[3]	Secondary Material (Percent)[4]	Total Percent[5]
High Impact Resistant Gypsum Board / 092900	N/A	$2,500	Paper	Y	50	10	40	100%
Cellulose Building Insulation / 072126	N/A	$10,000	Paper	Y	20	10	70	100%
Underslab Vapor Barrier / 033000	N/A	$1,500	Plastic	Y	20	20	60	100%
Electrical Cover Plates / 260533	N/A	$2,500	Plastic	N	90	0	10	100%
Interior and Exterior Paint / 099100	300gal	$8,000	Paint	N	100	0	0	100%
Recessed Entrance Mats / 124800	N/A	$1,800	Tire Derived	Y	40	20	40	100%
Ceramic Tile / 093013	N/A	$5,000	Glass	Y	35	10	55	100%
Exterior and Interior Windows / 085000	N/A	$30,000	Glass	N	70	10	20	100%
Metal Studs / 092216	N/A	$6,000	Metal	Y	65	15	10	100%

Public Contract Code Section 12205 (b) requires all businesses to certify in writing, under penalty of perjury, the minimum percentage, if not the exact percentage, of postconsumer material in the products, materials, goods, or supplies offered or sold to the State.

Public Contract Code Section 12205 (a) requires all State agencies to require all contractors to certify in writing, under penalty of perjury, the minimum percentage, if not the exact percentage, of postconsumer material in the products, materials, goods, or supplies offered or sold to the State.

Printed name of person completing form Title Signature of person completing form

EXAMPLE

Footnotes

You must submit copies of this form and/or other documentation for each product that is reportable.

1. Product category refers to one of the product categories into which the reportable product purchase falls. For products made from multiple materials, choose the category that comprises most of the product, either by a weight or volume criteria. The product categories and corresponding content requirements are defined as follows:

   1. Paper products
   2. Printing and writing papers
   3. Soil amendments and toppings
   4. Erosion control products
   5. Glass products
   6. Lubricating oils
   7. Plastic products
   8. Paint
   9. Tires
   10. Tire-derived products
   11. Antifreeze
   12. Metal
   13. Carpet
   14. Pavement surfacing
   15. Building finishes
   16. Textiles

   Minimum content and recyclability requirements for the above product categories are identified in Public Contract Code, Section 12209. For reused or refurbished products, there is no minimum content requirement.

2. Virgin material content is that portion of the product made from non-recycled material, that is, the material is neither secondary nor postconsumer material.
3. Postconsumer material is defined as “a finished material which would have been disposed of as a solid waste, having completed its life cycle as a consumer item, and does not include manufacturing wastes.” This is material such as newspaper that you read and was recycled and then made into recycled-content newsprint or some other recycled product. Postconsumer material is generally any product that was bought by the consumer, used, and then recycled into another product.
4. Secondary material is defined as “fragments of finished products or finished products of a manufacturing process, which has converted a resource into a commodity of real economic value, and includes postconsumer material, but does not include excess virgin resources of the manufacturing process.” This is material such as newsprint that is trimmed from a roll in the paper plant that is returned to the beginning of the process to make recycled-content newsprint. The material (product) did not get to the consumer before being recycled.
   For example, if a printing and writing paper contained 20 percent postconsumer material, you would indicate 20 percent in the postconsumer column and 80 percent in the virgin column. If the product had 40 percent secondary material and 20 percent postconsumer material, you would indicate 40 percent in the secondary column, 20 percent in the postconsumer column, and 40 percent in the virgin column. To meet the 50/10 content requirement of another product category, the product would contain 50 percent recycled content (40 percent secondary and 10 percent postconsumer material) and 50 percent virgin material.
5. The sum of the virgin column, the postconsumer column, and the secondary column must equal 100 percent.

Note: Products that are made from multiple material types should be reported in the product category of the material type representing most of the product. The amount of material used in the product can be measured by weight or volume. If, for instance, a chair is made from steel, aluminum, and plastic and most of the material, either by weight or volume, is plastic, report it as a plastic product. If, however, most of the product, either by weight or volume, is metal, report the purchase as a metal product.

EXAMPLE

FORM 01 74 20.02 STATE AGENCY BUY RECYCLED CAMPAIGN PROCUREMENT SUMMARY (EXAMPLE)

Attach copies of the recycled-content certification form(s) and/or other documentation for each product that contains any amount of recycled material. Refer to footnotes following this form.

PROJECT NAME: Visitor's Non-Secure Entrance, Statewide Youth Correctional Agency **PROJECT NUMBER:** 000000000001234

CONTRACTOR'S / VENDOR'S NAME: XYZ Contractors **DATE:** December 1, 2024

ADDRESS: 4300 Pleasant Valley Dr, Lincoln Logs, CA 95000 **PROJECT DIRECTOR:** (AS NAMED)

PHONE: (123) 456-7890 **EMAIL:** Super.Intendent@xyzcont.com

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Product Category[1]	**All Reportable Purchases (QUANTITY)[2]**	**All Reportable Purchases (DOLLARS)[3]**	**RCP Purchases (QUANTITY)[4]**	**RCP Purchases (DOLLARS)[5]**	**Percent of RCP (QUANTITY)[6]**	**Percent of RCP (DOLLARS)[7]**
Paper products		$ 18,000.00		$ 12,500.00		70%
Printing and writing paper		$ 0.00		$0.00		0%
Soil amendments and toppings	0(cu yd)	$ 0.00	0(cu yd)	$ 0.00	0%	0%
Erosion control products		$ 20,000.00		$ 20,000.00		100%
Glass products		$ 35,000.00		$ 5,000		14%
Lubricating oils	0(gal)	$ 0.00	0(gal)	$ 0.00	0%	0%
Plastic products		$ 4,000.00		$ 1,500.00		38%
Paint	300(gal)	$ 8,000.00	0(gal)	$ 0.00	0%	0%
Tires	0	$ 0.00	0	$ 0.00	0%	0%
Tire-derived products		$ 2,000.00		$ 2,000.00		100%
Antifreeze	0(gal)	$ 0.00	0(gal)	$ 0.00	0%	0%
Metal		$ 11,000.00		$ 6,000.00		54%
Carpet	12,000 (sq ft)	$ 78,000.00	4,000 (sq ft)	$ 42,000.00	33%	54%
Pavement surfacing	150 (ton)	$50,000	75 (ton)	$ 20,000.00	50%	40%

EXAMPLE

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Product Category[1]	**All Reportable Purchases (QUANTITY)[2]**	**All Reportable Purchases (DOLLARS)[3]**	**RCP Purchases (QUANTITY)[4]**	**RCP Purchases (DOLLARS)[5]**	**Percent of RCP (QUANTITY)[6]**	**Percent of RCP (DOLLARS)[7]**
Building finishes		$ 25,000.00		$ 5,000.00		20%
Textiles		$12,000.00		$2,000.00		17%
		Total[8]: $ 263,000		**Total[9]: $ 116,000**		**Total[10]: 44.1%**

Footnotes

Attach copies of the recycled-content certification forms and/or other documentation for each product.

Note: All purchases within these product categories, regardless of the source of the product or the type of contract used to purchase them, should be included in your report. Include **all** product purchases — RCPs and non-RCPs.

1. Include **all** purchases (RCPs and non-RCPs) within the 16 product categories. RCPs outside of the 16 product categories **cannot** be counted toward attaining the procurement goals and are not reportable.
2. Indicate the quantity (units) of **all** purchases (RCPs and non-RCPs) in each product category during the course of the project. Quantities do not need to be reported for the product categories with shading.
3. Indicate the total dollars spent on **all** purchases (RCPs and non-RCPs) in each product category purchased during the course of the project.
4. Indicate the total quantity (units) of RCPs purchased during the course of the project. Quantities do not need to be reported for the product categories with shading.
5. Indicate the total dollars spent on RCPs during the course of the project for each category.
6. Indicate the percentage of RCPs purchased. The percent recycled is calculated by dividing the figure in column 4 by the figure in column 2 and multiplying by 100. Percentages do not need to be calculated for the product categories with shading.
7. Indicate the percentage of total dollars spent on RCPs in each category. The percentage recycled is calculated by dividing the figure in column 5 by the figure in column 3 and multiplying by 100.
8. The total of column 3 should be equivalent to the total estimated dollars spent on **all** products (RCPs and non-RCPs) during the course of the project.
9. The total of column 5 should be equivalent to the estimated total dollars spent on reportable RCPs during the course of the project.
10. Column 7 is calculated by dividing the figure in column 5 by the figure in column 3 and multiplying by 100.

EXAMPLE

SECTION 01 75 00

STARTING AND ADJUSTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Procedures for starting, testing, adjusting, and balancing of the following systems:

a. Parking control system

b. Security system

1.2 SUBMITTALS

A. Sequencing Schedule:

1. Preliminary schedule listing times and dates for start-up of each item of equipment, in sequence: Submit two weeks prior to proposed dates. Accepted Schedule shall be the sequencing schedule.

B. Reports:

1. Submit manufacturer authorized representative's reports within one week after start-up, listing start-up dates.
2. Submit final reports of testing, adjusting, and balancing performed. Submit reports of testing, adjusting, and balancing which are postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

C. Qualification Statements: For manufacturer's authorized representative.

1.3 QUALITY ASSURANCE

A. When specified in individual Specifications Sections, require manufacturer to provide authorized representative to be present at site to perform the following:

1. Inspect, check, and approve equipment or system installation prior to start-up.
2. Supervise placing equipment or system in operation.
3. Provide written report that equipment or system has been properly installed and is functioning correctly.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to the State Construction Inspector to facilitate spot checks during testing. Retain possession of instruments and remove upon completion of services.

1.4 PROJECT CONDITIONS

A. Ensure excess packing and shipping bolts are removed.

B. Ensure interdependent systems have been checked and are operational.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. Prepare each system for testing and balancing.

B. Comply with procedural standards of certifying association under whose standards service will be performed. Accurately record data for each step.

C. Report to State Construction Inspector about defects or deficiencies noted during performance of services.

3.2 EXAMINATION

A. Verify Project conditions comply with specified and manufacturer’s requirements.

B. Verify status of work meets requirements for start-up of equipment and systems.

3.3 PREPARATION

A. Coordinate sequence of start-up for various items of equipment.

B. Notify the State Inspector seven (7) days prior to start-up of each item of equipment.

C. Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during entire start-up process.

D. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

E. Verify control systems are fully operational in automatic mode.

F. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

G. Verify that wiring and support components for equipment, motors and controls are complete and tested.

1. Bearings: Inspect for cleanliness. Clean and remove foreign matter. Verify alignment and take corrective measures, if required.
2. Drives: Inspect for tension on belt drives, adjustment of variable pitch sheaves and drives, alignment, proper equipment speed and cleanliness. Take corrective measures, if required.
3. Motors: Verify that motor amperage agrees with nameplate value. Inspect for conditions which produce excessive current flow, and which exist due to equipment malfunction. Take corrective measures, if required.

3.4 STARTING SYSTEMS

A. Execute start-up under supervision of Contractor's personnel and/or manufacturer’s representative when so specified in accordance with manufacturer’s instructions.

B. Place equipment for operation in proper sequence, in accordance with approved sequencing schedule.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Beneficial Occupancy procedures.
2. Completion procedures.
3. Warranties.
4. Record Drawings.
5. Operation manuals.
6. Maintenance manuals.
7. Operation and maintenance documentation directory manuals.
8. Final cleaning.

1.2 DEFINITIONS

A. Punch-list (List of Incomplete Items): Contractor-prepared list of items to be completed or corrected, prepared for the State's use prior to State's inspection, to determine if the Work is complete.

1.3 SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's Punch-list: Initial submittal at Beneficial Occupancy.

C. Certified Punch-list: Final submittal at Completion.

D. Certificate of Insurance: For continuing coverage.

E. Guaranties, Warranties and Bonds: Submittal prior to Final Inspection.

F. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.

G. Record Drawings Reports: Submit written report monthly at the time of Application for Payment submittal indicating items incorporated into Project Record Drawings concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

H. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specifications Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Format: Submit operation and maintenance manuals in the following format:
    a. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.

I. Certification of Disabled Veteran Business Enterprise Participation: Submit Form STD 817 with final Application for Payment.

J. Certification of Small Business Participation:

1. Preliminary Report upon Completion of the Work.
2. Final Report upon receipt of Final Payment.

K. Waste Management Report: Submittal prior to Final Inspection. Provide as specified in individual Specifications Section.

L. Recycled-Content Certification Worksheet: Submittal prior to Final Inspection. Provide as specified in individual Specifications Section.

M. State Agency Buy Recycled Campaign Procurement Summary: Submittal prior to Final Inspection. Provide as specified in individual Specifications Section.

N. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.4 COMPLETION PROCEDURES

A. Punch-list: Prepare and submit a list of items to be completed and corrected a minimum of 30 calendar days prior to the end of the Contract Time.

B. Submittals Prior to Completion: Before requesting final inspection for determining the date of Completion of the Work, complete the following.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting State unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Waste Management Report and Recycled-Content Certification Worksheet.
3. Submit Project Record Drawings, and similar final record information.
4. Submit each operation and maintenance manual in final form prior to requesting inspection for Completion and at least 30 days before commencing demonstration and training.
5. Submit closeout submittals specified in individual Sections, including warranties, certifications, training and similar documents.
6. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by State. Label with manufacturer's name and model number. Obtain State’s signature for receipt of submittals.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section.

7. Submit testing, adjusting, and balancing records.
8. Submit Final Completion photographic documentation.

C. Procedures Prior to Completion: Complete the following a minimum of 14 days prior to requesting inspection for determining date of Completion of the Work. List items below that are incomplete at time of request.

1. Make final changeover of permanent locks and deliver keys to State. Advise State's personnel of changeover in security provisions.
2. Complete startup and testing of systems and equipment.
3. Perform preventive maintenance on equipment used prior to Completion.
4. Instruct State's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
5. Advise State of changeover in utility services.
6. Participate with State in conducting inspection and walkthrough with authorities having jurisdiction.
7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Complete final cleaning requirements.
9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Final Inspection: Submit a written request for final inspection to determine Completion a minimum of 14 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, State will either proceed with inspection or notify Contractor of unfulfilled requirements. After inspection, State will notify Contractor of items, either on Contractor's list or additional items identified by State, that must be completed or corrected before Acceptance of the Work.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

E. Submittals After Final Inspection:

1. Submit a final Application for Payment in accordance with Section 01 29 00 "Payment Procedures."
2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
3. Certified Punch-list: Submit certified copy of punch list, endorsed and dated by Architect or Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

F. Completion of the Work date and Acceptance of the Work will be determined as specified in Document 00 72 00 “General Conditions of the Contract for Construction”, Article 8.6.

1.5 PUNCH-LIST ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information on each page:

a. Project name and number.
b. Date.
c. Page number.

4. Submit list of incomplete items in the following format:

a. MS Excel Electronic File: State will return annotated file.

1.6 CONTRACTOR'S CERTIFICATION OF DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) PARTICIPATION

A. Submit, upon Completion of the Work, together with a final Application for Payment, complete and accurate Form STD 817 “Prime Contractor’s Certification – DVBE Subcontractor Report”. The State shall review the Form STD 817, and if it is determined to be complete and accurate, the payment will be authorized.

B. If the Form STD 817 is late or determined to be incomplete or inaccurate, the State shall withhold ten thousand dollars ($10,000) from the final payment, or the full final payment if less than ten thousand dollars ($10,000), and provide the Contractor with a notice allowing at least 15 days, but not more than 30 days to cure the defect.

1. If the Contractor does not comply by the deadline identified in the Cure Notice, the State shall permanently deduct the ten thousand dollars ($10,000) from the final payment, or the full final payment if less than ten thousand dollars ($10,000).

1.7 CONTRACTOR’S CERTIFICATION OF SMALL BUSINESS (SB) PARTICIPATION

A. If final payment has been made to Small Business, upon Completion of the Work, submit the two-page certification, Forms 01 77 00.01 and 01 77 00.02 "Contractor’s Certification of Small Business Participation”.

B. If retention has been withheld, and final payment to Small Business subcontractors will not be made until the Contractor has received final payment from the State, Contractor shall:

1. Upon completion of the Work submit the two-page certification, Forms 01 77 00.01 and 01 77 00.02 "Contractor’s Certification of Small Business Participation”; and mark the box entitled “PRELIMINARY REPORT” on Form 01 77 00.02.
2. Within 30 days of receipt of final payment submit an updated two-page certification, Forms 01 77 00.01 and 01 77.00.02 "Contractor’s Certification of Small Business Participation” and mark the box entitled “FINAL REPORT” on Form 01 77 00.02. The FINAL REPORT shall be mailed to: DGS, Real Estate Services Division, Project Management & Development Branch, 707 Third Street 4th Floor, West Sacramento, CA 95605; or sent as a scanned Adobe PDF or similar e-mail attachment to State’s Representative.

C. When completing the Certification, include all Small Businesses even if the firms were not listed at bid time when completing percentage calculations. Provide comments if Small Business utilization was different than that approved in original Agreement. The second page of the Certification may be copied as needed to list all firms.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Standard Guarantee: Refer to Document 00 72 00 “General Conditions of the Contract for Construction”, Article 3.5. Submittal is not required for a standard one year guarantee for Work on this project.

B. Additional Guaranties/Warranties: Provide additional guaranties/warranties, in excess of one year, where specifically required by individual Specifications Sections. Additional guaranties/warranties will commence on the date of Completion of the Work as established by the State’s Representative.

C. Time of Submittal: Submit written warranties on request of State for designated portions of the Work where warranties are indicated to commence on dates other than date of Completion, or when delay in submittal of warranties might limit State’s rights under warranty.

1. For equipment put into use with State's permission during construction, submit warranties within 10 days after first operation.

D. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

E. Provide duplicate, notarized copies of warranties. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers.

F. Warranties:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name and number, and name of Contractor.

G. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

H. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.9 RECORD DRAWINGS

A. General: Use one set of State furnished paper copies of the Contract Drawings as record prints.

B. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Information entered on record prints shall be neat, legible, and emphasized by drawing "revision clouds" around changed items.
d. Symbols and designations used in preparing record prints shall match those used in Contract Drawings.
e. Record data as soon as possible after obtaining it.
f. Record and check the markup before enclosing concealed installations.
g. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Special measurements.
k. Changes made by Change Order.
l. Changes made following Additional Detailed Instructions.
m. Details not on the original Contract Drawings.
n. Field records for variable and concealed conditions.
o. Record information on the Work that is shown only schematically.
p. Miscellaneous records required by other Specification Sections.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Change Order, Request for Information and Additional Detailed Instructions numbers, and similar identification, where applicable.

1.10 MAINTENANCE OF RECORD DRAWINGS

A. Maintenance of Record Drawings: Store Record Drawings in the field office apart from the Contract Documents used for construction. Do not use Project Record Drawings for construction purposes. Maintain Record Drawings in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Drawings for State reference during normal working hours.

B. Monthly Applications for Payments will not be processed without review and approval of Project Record Drawings by the State.

C. Final Inspection will not be scheduled until Project Record Drawings are submitted to the State.

1.11 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
3. All material shall be neatly typewritten; handwritten instructions are not acceptable.
4. Extraneous Data: Where contents of manuals include manufacturers' catalog pages, clearly indicate precise items included in this installation and delete, or otherwise clearly indicate, manufacturer's data with which this installation is not concerned.

1.12 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Date of submittal.
4. Name and contact information for Contractor.
5. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system.

1. Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by State’s operating personnel for types of emergencies indicated.

a. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1) Fire.

2) Flood.
3) Gas leak.
4) Water leak.
5) Power failure.
6) Water outage.
7) System, subsystem, or equipment failure.
8) Chemical release or spill.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents.

1.13 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.14 OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by State’s operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

1.15 MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by State’s operating personnel.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

D. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

E. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

F. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Types of cleaning agents to be used and methods of cleaning.
7. List of cleaning agents and methods of cleaning detrimental to product.
8. Schedule for routine cleaning and maintenance.
9. Demonstration and training video recording, if available.

G. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

H. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

I. Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
f. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
g. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
h. Vacuum and mop hard surfaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
n. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
o. Clean strainers.

C. Deficient cleaning operations, as determined by the State, shall be immediately corrected as directed.

D. Construction Waste Disposal: Comply with waste-disposal requirements.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 01 73 00 "Execution" before requesting inspection for determination of Completion.

3.3 ATTACHMENTS

A. Certification of Disabled Veteran Business Enterprise Participation: Form STD 817 “Prime Contractor’s Certification – DVBE Subcontractor Report”

B. Certification of Small Business Participation: 2 pages.

1. Form 01 77 00.01: Contractor’s Certification of SB Participation (the first page).
2. Form 01 77 00.02: Contractor’s Certification of SB Participation (the second page).

END OF SECTION

State of California
Department of General Services - Procurement Division
Prime Contractor's Certification - DVBE Subcontractor Report
STD 817, Formerly DGS PD 810P

STATE DEPARTMENT AND CONTRACT INFORMATION

State Department Information		Contract Information		Prime Contractor Information:		FOR STATE USE ONLY	
State Department Name:		Contract #:		Name:		Date Received:	
State Department Address:		FI$Cal Supplier ID#:		Address:			
Contract Manager Name:		Contract Execution Date:		Phone #:			
Contract Manager Phone #:		Date Work Completed:		Email:			
Contract Manager Email Address:		Contract Award Amount:		Date Last Payment Received:			
				Contract Received Amount:			

SECTION 3 — List all Disabled Veteran Business Enterprise firms involved with this contract.

	(A) DVBE Subcontractor(s) Name	(B) DVBE Subcontractor(s) Address	(C) DVBE Certification ID Number	(D) Total Contract Commitment Percentage to DVBE	(E) Total Contract Commitment Amount to DVBE	(F) Total Payment Amount to DVBE	(G) Difference in Amount Paid to DVBE (F - E)	(H) Percentage Paid to DVBE (F/Contract Received Amount)
Number of DVBE Subcontractors			Grand Total		$ 0.00	$ 0.00	$ 0.00	0.00%
1.				0.00%			0.00	0.00%
2.				0.00%			0.00	0.00%
3.				0.00%			0.00	0.00%
4.				0.00%			0.00	0.00%
5.				0.00%			0.00	0.00%
6.				0.00%			0.00	0.00%
7.				0.00%			0.00	0.00%
8.				0.00%			0.00	0.00%
9.				0.00%			0.00	0.00%
10.				0.00%			0.00	0.00%
11.				0.00%			0.00	0.00%
12.				0.00%			0.00	0.00%
13.				0.00%			0.00	0.00%
	(I) Comments/Explanations							

Use next page for additional lines

I certify under penalty of perjury under the laws of the State of California that all information submitted is true and correct.

Prime Contractor	Print Name:		Date:	
	Title:			
	Signature:			

Return upon completion of contract.

Americans with Disabilities (ADA) Notice: Persons with disabilities requiring reasonable modifications should contact the OSDS Report Coordinator at OSDSReports@dgs.ca.gov

State of California
Department of General Services - Procurement Division
Prime Contractor's Certification - DVBE Subcontractor Report
STD 817, Formerly DGS PD 810P

STATE DEPARTMENT AND CONTRACT INFORMATION

State Department Information		Contract Information		Prime Contractor Information		FOR STATE USE ONLY	
State Department Name:		Contract #:		Name:		Date Received:	
State Department Address:		FI$Cal Supplier ID#:		Address :			
Contract Manager Name:		Contract Execution Date:		Phone #:			
Contract Manager Phone #:		Date Work Completed:		Email:			
Contract Manager Email Address:		Contract Award Amount:		Date Last Payment Received:			
				Contract Received Amount:			

List all Disabled Veteran Business Enterprise firms involved with this contract.

	(A) DVBE Subcontractor(s) Name	(B) DVBE Subcontractor(s) Address	(C) DVBE Certification ID Number	(D) Total Contract Commitment Percentage to DVBE	(E) Total Contract Commitment Amount to DVBE	(F) Total Payment Amount to DVBE	(G) Difference in Amount Paid to DVBE (F - E)	(H) Percentage Paid to DVBE (F/Contract Received Amount)
Number of DVBE Subcontractors			**Total**		$ 0.00	$ 0.00	$ 0.00	0.00%
14.				0.00%			0.00	0.00%
15.				0.00%			0.00	0.00%
16.				0.00%			0.00	0.00%
17.				0.00%			0.00	0.00%
18.				0.00%			0.00	0.00%
19.				0.00%			0.00	0.00%
20.				0.00%			0.00	0.00%
21.				0.00%			0.00	0.00%
22.				0.00%			0.00	0.00%
23.				0.00%			0.00	0.00%
24.				0.00%			0.00	0.00%
25.				0.00%			0.00	0.00%
26.				0.00%			0.00	0.00%
27.				0.00%			0.00	0.00%
28.				0.00%			0.00	0.00%
29.				0.00%			0.00	0.00%
30.				0.00%			0.00	0.00%
31.				0.00%			0.00	0.00%
32.				0.00%			0.00	0.00%
33.				0.00%			0.00	0.00%
34.				0.00%			0.00	0.00%
35.				0.00%			0.00	0.00%
36.				0.00%			0.00	0.00%

Attach copies of this page for additional lines

I certify under penalty of perjury under the laws of the State of California that all information submitted is true and correct.

Americans with Disabilities (ADA) Notice: Persons with disabilities requiring reasonable modifications should contact the OSDS Report Coordinator at OSDSReports@dgs.ca.gov

Form Completion Instructions

GENERAL INFORMATION: Military and Veteran Code (MVC) 999.5(d), 999.7 and Government Code (GC) 14841, and California Code of Regulations (CCR) 1896.78(e) requires all Prime Contractors that committed to have a Disabled Veteran Business Enterprise (DVBE) perform an element of work for a contract to report DVBE subcontractor participation information and certify to the state that all DVBE subcontracting payments were made. Departments are required to withhold $10,000 from the final payment, or the full payment if less than $10,000, on contracts until the Prime Contractor complies with the certification requirements by submitting this form.

If prime contractors do not comply with the requirements after given notice to cure by the state departments, the withheld amount will be permanently deducted.

All contracted work must be completed before submission of invoice(s) and this certification form.

Prime Contractors are required to maintain records supporting the information submitted on this form and that all payments to DVBE subcontractor(s) were made. Upon request, proof of payment must be provided (MVC 999.5(d)).

INCLUDE

- **ONLY ONE contract per Report**
- **All DVBEs that performed an element of work for this contract regardless of tier**

State Department Information:

State Department Name: Enter the State Department name

State Department Address: Enter the State Department address

Contract Manager Name: Enter the Contract Manager name

Contract Manager Phone Number: Enter the Contract Manager phone #

Contract Manager Email Address: Enter the Contract Manager email address

Contract Information

Contract Number: Enter the Contract Number

Contractor's FI$Cal Supplier ID Number: Enter your FI$Cal supplier ID number

Contract Execution Date: Enter the date contract was signed

Date Work Completed: Enter the date the work was completed on the contract

Contract Award Amount: Enter the total dollar amount awarded for this contract including all financial amendments

State of California
Department of General Services Procurement Division
Prime Contractor's Certification - DVBE Subcontracting
Report STD 817, Formerly DGS PD 810P
(Rev. 10/2021)

Form Completion Instructions

Prime Contractor Information:

Prime Contractor Name: Enter your name as shown on the contract

Prime Contractor Address: Enter your address

Phone Number: Enter your number (with area code)

Email Address: Enter your email address

Date Last Payment Received: Enter the date the last payment for work performed was received

Contract Received Amount: Enter the dollar amount of the last payment received

For State Use Only

Date STD 817 Received: Enter date the Contract Manager received the STD 817 from the Prime Contractor

TABLE INSTRUCTIONS

A) DVBE Subcontractor(s) Name: Enter the name of all DVBEs that are listed to perform an element of work or supplies for this contract and any formal approved substitution(s). (Use additional lines if the name does not fit on a single line) Use page two for additional lines.

B) DVBE Subcontractor(s) Address: Enter the address of each DVBE (Use page 2 for additional lines if address does not fit on a single line)

C) DVBE Certification ID Number: Enter each DVBE's certification number

D) Total Contract Commitment Percentage to DVBE: Enter the total percentage of contracted dollars to each DVBE at the time of award

E) Total Contract Commitment Amount to DVBE: Enter the entire amount contracted to each DVBE at the time of award

F) Total Payment Amount to DVBE: Enter the total amount paid to all DVBEs that performed an element of work or were suppliers for this contract

Form Completion Instructions

Note: Complete and accurate certifications are due upon completion of contract.

G) **Difference in Amount Paid to DVBE**: The form will compute the difference of DVBE dollars contracted compared to dollars paid

H) **Percentage Paid to DVBE:** The form will compute the percentage paid to DVBEs using the Contract Received Amount entered under State and Contract Information

Instructions I

I) **Comments/Explanations:** Enter any relevant comments and explanations for any differences between the DVBE amounts or percentages committed and paid. Reference the line number if comments and explanations are used.

SIGNATURE BLOCK

Prime Contractor's Signature: Enter your printed name, title, sign with an electronic signature or a wet signature, and date

STATE OF CALIFORNIA DEPARTMENT OF GENERAL SERVICES

CONTRACTOR'S CERTIFICATION OF SMALL BUSINESS PARTICIPATION

TO:	Real Estate Services Division (Construction Services Area Office Address)	Date: Project Number: Contract Number:

FROM:

PROJECT TITLE:

THIS IS TO CERTIFY THAT I, _____
(Print Name)

AS AN AUTHORIZED OFFICIAL OF _____
(Firm or Corporation)

WORKING IN THE CAPACITY OF _____
(Title)

HAVE BEEN PROPERLY AUTHORIZED BY SAID FIRM OR CORPORATION TO SIGN THE FOLLOWING STATEMENT PERTAINING TO SUBJECT CONTRACT.

Pursuant to Government Code, Section 14841,

I, the undersigned, hereby certify that to the best of my knowledge, the Small Business participation information listed on the attached report for the above contract is complete and correct.

SIGNED: DATE:

FORM 01 77 00.02 CONTRACTOR'S CERTIFICATION OF SMALL BUSINESS PARTICIPATION

State of California · Department of General Services

☐ **PRELIMINARY REPORT**

CONTRACTOR'S CERTIFICATION OF SMALL BUSINESS (SB) PARTICIPATION

☐ **FINAL REPORT**

CONTRACT NUMBER	PROJECT NUMBER	CONTRACT COMPLETION DATE	CONTRACT ACCEPTANCE DATE

PRIME CONTRACTOR	ORIGINAL CONTRACT AMOUNT	FINAL CONTRACT AMOUNT

DESCRIPTION OF WORK PERFORMED AND MATERIALS PROVIDED	SB BUSINESS NAME AND ADDRESS	SB CERT. NO.	SB CONTRACT PAYMENTS			
			PAYMENT AMOUNT	DATE WORK COMPLETED	DATE OF FINAL PAYMENT	COMMENTS
		TOTAL $				

ORIGINAL SMALL BUSINESS COMMITMENT: _____%

ACTUAL SMALL BUSINESS ACHIEVED: _____%

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing State's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, products and equipment.
2. Demonstration and training video recordings.

1.2 SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Submit a minimum of 6 weeks prior to requesting inspection for determining date of Completion of the Work.
2. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, within seven days of end training, submit list of participants and length of instruction time.

C. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name of Contractor.
c. Date of video recording.

2. At completion of training, submit complete training manual(s) for State's use prepared in same PDF file format required for operation and maintenance manuals.

1.3 QUALITY ASSURANCE

A. When so specified in individual Sections, provide demonstration and instruction to State personnel, performed by a representative approved by the equipment or system manufacturer.

1.4 COORDINATION

A. Coordinate instruction schedule with State's operations. Adjust schedule as required to minimize disrupting State's operations and to ensure availability of State's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and accepted by State.

1.5 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

    a. Diagnostic instructions.
    b. Test and inspection procedures.

7. Maintenance: Include the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning.
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.

8. Repairs: Include the following:

    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

1.6 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 77 00 "Closeout Procedures."

B. Set up instructional equipment at instruction location.

1.7 INSTRUCTION

A. Engage qualified instructors to instruct State’s personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. State will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction for all seasons of operations.

1. Schedule training with State with at least 14 days' advance notice.
2. All demonstration and training shall be completed prior to requesting final inspection.

C. Time Allocated for Instructions: Amount of time required for instruction on each item of equipment and system shall be as specified in individual Sections, and not less than one hour.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

1. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

E. Cleanup: Collect used and leftover educational materials and give them to State. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.8 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Provide digital recording with audio of demonstrations and instructions in digital video MPEG format. Recording shall clearly show equipment or systems as they are being described. Audio portion of recording shall include entire session narrative, including questions and answers.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 50

EROSION CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall provide all materials, labor and equipment necessary to complete all work as specified herein, including but not limited to the following:

1. Apply specified treatments to all cuts and fill slopes, soil stockpiles, and all disturbed areas.

2. Install all temporary erosion control devices per Plans and Specifications.

B. All other labor and materials reasonably incidental to the satisfactory completion of the work, including cleanup of the site.

1.02 RELATED SECTIONS

A. Section 01 10 00, Supplemental General Requirements

1.03 RELATED DOCUMENTS

A. Caltrans Standard Specifications, latest edition

1. Section 21, Erosion Control

1.04 CONTRACTOR SUBMITTALS

A. The Contractor shall submit, in accordance with Section 01 10 00, Supplemental General Requirements, manufacturer's letters of compliance and manufacturer's literature for the following items:

1. Fiber Roll (weighted installation and free from seeds)

2. Erosion Control Blanket

1.05 SITE CONDITION

A. It is the responsibility of the Contractor to visit the site to determine existing conditions including access to the site, the nature and extent of existing improvements upon adjacent public and private property, the nature of materials to be encountered, and other factors that may affect the work of this section.

B. It is the responsibility of the Contractor to have finished the grading of the slopes, including track walking the areas to be treated with erosion control treatments.

1.06 WORK SCHEDULE

A. The Contractor shall proceed with work during a period of summer when possible. The work shall progress as soon as the site becomes available consistent with normal seasonal limitations.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All products shall be delivered to the site in manufacturer's unopened standard containers bearing original labels showing quantity, analysis and name of manufacturer.

B. All materials shall be stored in designated areas and in such a manner as to protect them from weather or other conditions that might damage or impair the effectiveness of the product.

1.08 ANALYSIS OF SAMPLES AND TESTS

A. Samples: The Owner reserves the right to take and analyze samples of materials for conformity to the Specifications at any time.

B. Rejected material: Rejected materials shall be removed immediately from the site at Contractor's expense. Contractor shall pay the cost of testing replacement materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. All products shall be in conformance with the Specifications listed below. Any changes to products to be used shall be approved, in writing, by the Owner or Owner's representative prior to job site delivery.

2.02 FINAL INSPECTION AND ACCEPTANCE:

A. Final inspection will be conducted upon completion of maintenance, replacements and corrective work. Five (5) days' notice shall be given. If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of the Owner's Representative, maintenance shall continue at Contractor's expense until such time as work has been successfully completed.

2.03 GUARANTEE AND REPLACEMENT

A. Guarantee all fiber roll shall be installed with weights instead of staked into ground. Fiber roll shall also be free from seeds.

B. Replace all fiber roll areas not good condition as soon as directed by Owner's Representative.

2.04 CLEAN-UP

A. Erosion control work areas shall be maintained in a neat and orderly condition. Keep paved area free of erosion treatment, soil, and other debris.

B. Overspray: Installing Contractor is responsible for washing or otherwise cleaning excess material off all areas not intended to receive treatment.

C. Debris: Clean up and remove erosion control associated materials and debris from project site before Final Acceptance.

END OF SECTION

SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Demolition and removal of selected site elements.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.3 MATERIALS STATESHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 FIELD CONDITIONS

A. State will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so State's operations will not be disrupted.

B. Notify State of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.5 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with State's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. State will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to State.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
.

B. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 1 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by State, items may be removed to a suitable, protected storage location during selective demolition, cleaned, and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least three-quarter inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 031000
CONCRETE FORMING AND ACCESSORIES

1.1 SUMMARY

A. Section Includes:

1. Form-facing material for cast-in-place concrete.
2. Shoring, bracing, and anchoring.

1.2 DEFINITIONS

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Exposed surface form-facing material.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.5 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."

2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

a. For architectural concrete specified in Section 033300 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).

B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1.6 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
   a. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      1) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

1.7 RELATED MATERIALS

A. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.

PART 2 - EXECUTION

2.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities as follows:

1. Surface Finish-1.0: ACI 117 Class D, 1 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

2.2 REMOVING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

SECTION 032000
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: acceptable to adjacency having jurisdiction qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Carbon Steel Reinforcing Bars:

1. Steel Bars: ASTM A615/A615M, Grade 60, deformed bars.

2.2 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.3 INSTALLATION TOLERANCES

A. Comply with ACI 117

3.4 FIELD QUALITY CONTROL

A. Inspections:

1. Steel-reinforcement placement.

END OF SECTION 032000

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.

1.5 QUALITY ASSURANCE

A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:

a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.
f. Permeability.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.8 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg. F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.

2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type 1 gray.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

2.3 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

2.4 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

2.5 CONCRETE MIXTURES

A. Normal-weight concrete used for interior slabs-on-ground.

1. Exposure Class: ACI 318
2. Minimum Compressive Strength: 4000 psi at 28 days.

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time,

quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.4 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify State and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 but not to exceed the amount indicated on the concrete delivery ticket.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

a. Do not use vibrators to transport concrete inside forms.
b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

3.5 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.

a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
b. Remove projections larger than 1 inch.
c. Tie holes do not require patching.
d. Surface Tolerance: ACI 117 Class D.
e. Apply to concrete surfaces.

2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.

a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
b. Remove projections larger than 1/4 inch (6 mm).
c. Patch tie holes.
d. Surface Tolerance: ACI 117 Class B.

3.6 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

This article is an example only. Insert, revise, or delete items to suit Project.

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 8" high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 3000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.

    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.7 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.

B. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.

3.8 TOLERANCES

A. Conform to ACI 117.

3.9 FIELD QUALITY CONTROL.

A. Testing Agency: Enage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31.
2. Testing agency to immediately report to State, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency to report results of tests and inspections, in writing, to Owner, State, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

a. Test reports to include reporting requirements of ASTM C31. ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

1) Project name.
2) Name of testing agency.
3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
4) Name of concrete manufacturer.
5) Date and time of inspection, sampling, and field testing.
6) Date and time of concrete placement.
7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Inspections:
1. Verification of use of required design mixture.
2. Concrete placement, including conveying and depositing.
3. Curing procedures and maintenance of curing temperature.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Slump: ASTM C143/C143M:

   a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   b. Perform additional tests when concrete consistency appears to change.

2. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;

   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

3. Concrete Temperature: ASTM C1064/C1064M:

   a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 24 hours of completion of floor finishing and promptly report test results to State.

3.10 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

05 50 00

METAL FABRICATIONS

PART 1 SUMMARY

1.1 Section Includes:

1. Metal bollards.

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Metal bollards.

1.4 INFORMATIONAL SUBMITTALS

A. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

B. Research Reports: For post-installed anchors.

1.5 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 80 steel pipe, 5” outside diameter, 3’-6” tall, steel cap.

   1. Cap bollards with 1/4-inch thick, steel with steel domed top.
   2. Fabricate bollards with 3/8-inch-thick, steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

B. Prime steel bollards with zinc-rich primer.

PART 2 - EXECUTION

2.1 INSTALLATION OF METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

1. Do not fill removable bollards with concrete.

B. Anchor bollards to existing construction with anchor bolts Provide four 3/4-inch bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches in concrete.

SECTION 11 12 00
PARKING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Automatic barrier gates, meeting ASTM F2200 Class IV vertical pivot gates.
2. Vehicle detectors.
3. Gate openers / operators meeting UL 325.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for parking control equipment.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties.

B. Shop Drawings: For parking control equipment.

1. Include plans, elevations, sections and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.
4. Vehicle Detectors: Layout and method of placement of vehicle loop detector system.

C. Samples: For each exposed product and for each color and texture specified, 6 inches square in size.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For parking control equipment to include in emergency, operation, and maintenance manuals.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media and approved online or cloud solution.
3. Device address list.
4. Printout of software application and graphic screens.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 Basis of Design:

a. DELTA SCIENTIFIC DSC7090 M30

1) Or Approved Equal meeting Class IV requirements for ASTM F2200, vertical pivot gates.

2.2 SYSTEM DESCRIPTION

A. The DSC 7090 M30 Drop Arm Beam Barrier System incorporates a unique binary crash resistant arm that is comprised of a special high strength alloy steel shell and a series of high strength composite elastic elements. The strength to weight ratio of the binary beam makes it highly effective as a powered Barrier system, DSC 7090 M30.

B. The DSC 7090 M30 version of this system is operated remotely by means of an integral Hydraulic Pumping Unit (HPU) that is wholly enclosed in the hinge end enclosure. The HPU can be powered from a local single or three phase power source.

C. The DSC 7090 M30 version of this system is operated remotely by means of an integral Hydraulic Pumping Unit (HPU) that is wholly enclosed in the hinge end enclosure. The HPU can be powered from a three phase power source.

D. DSC 7090 M30 shall be surface mounted via bolts to an embedded foundation. The unique bolt down foundation modules allow the installer to form and pour the foundation of the barrier up to surface grade level, and return after concrete cure time to bolt the barrier to the supplied bolt down holes in the modules.

E. The beam shall be a dual beam structure utilizing Delta Scientific's dual composite elements.

F. The DSC 7090 M30 shall be capable of operational speeds of five seconds up and two seconds down, adjustable.

G. The DSC 7090 M30 shall have an opening angle of +90 degrees.

H. The system shall have Delta smart control logic for heavy vehicle traffic in both directions.

2.3 AUTOMATIC BARRIER GATES

A. Barrier Construction. Barrier shall be a structural assembly containing a crash beam hinged at one end – lockable at the other, which can be raised and lowered hydraulically. When in the down locked position, the beam shall present a formidable obstacle to vehicles moving in either direction.

B. Beam Locking Method. The DSC7090 will withstand an M30 impact without the use of a manual or automated locking device such as a locking pin or maglock.

C. Manual Locking Pin. For unattended use such as afterhours, the Barrier shall be provided with a locking pin with padlock locking point to secure the Barrier in the guard position. Padlock to be furnished by state.

D. Actuation. The Drop Arm Barricade shall be raised and lowered by means of a hydraulic cylinder driven by a Hydraulic Power Unit located within the cabinet at the hinge end buttress.

E. Control. The Barricade shall be controlled from a push button control station, touch screen control station, or customer supplied control station. Controls may be integrated with the barrier control circuit located in the barrier hydraulic power unit via low voltage control wire up to 1500 feet away (greater when integrated with fiber optic network).

F. Emergency Override: The Barricade shall be controlled by an emergency override located in Knox Box model type 3501 mounted on a pole at the access point. If power is lost, the accumulators are to store charge and battery backup on controls will be utilized to open the gate.

G. Barrier Height. Height of the Barrier shall nominally be 36 inches as measured from the roadway surface to the centerline of the crash beam. Height of the lower beam of the barrier shall be nominally 20 inches from the roadway surface to the centerline of the crash beam.

H. Barrier Clear Opening. The 2 Barriers at Shriever way are 24’-0” clear. The 2 Barriers at Old Placerville Road are 14’-0”. Verify dimensions in field.

I. Finish. The foundation base of the Barrier shall be asphalt emulsion coated for corrosion protection. Exposed barrier surfaces shall be painted with a gloss white, two-part epoxy high weather resistant paint The drop arm beam shall be furnished with red reflective tape sufficient to provide alternate 20 inch bands.

2.4 VEHICLE DETECTORS. See E521.

A. General: Provide detection devices that sense presence or transit of vehicles and emit signals activating gate-arm operators.

1. Products:
    a. BD Loops
    b. Protect Controls
    c. Jutai
    d. Or Approved Equal.

B. Vehicle Loop Detector System: Self-tuning electronic presence detector with adjustable detection patterns, adjustable sensitivity and frequency settings, and panel indicator light. Include automatic closing timer with adjustable time delay before closing, timer cut-off switch, designed to hold gate arm open until traffic clears. Provide number of loops consisting of multiple strands of wire, number of turns, loop size, and method of placement at location indicated on Drawings, as recommended in writing by detection system manufacturer for pave-over and saw-cut installation.

1. Field-Assembled Loop: Wire, in size indicated for field assembly.
2. Operation:

    a. Recognize vehicles within 6 inches of each other on standard-sized loop.
    b. Recognize vehicle direction by detecting vehicle moving from one loop to another.

2.5 ACCESS CONTROL UNITS See E521.

A. General: Provide access control unit that activates barrier gates.

1. See Sheet E521, systems to be compatible with existing system, per the following manufacturers:
    a. Honeywell
    b. Hager
    c. DoorKing
    d. Or approved equal.

B. Unit Housing: Fabricate from welded cold-rolled steel with weatherproof front access panel equipped with flush-mounted lock and 2 card access locations. See Sheet E521. Provide face-lighted unit fully visible at night.

Retain "Steel Finish" Subparagraph below with first option in "Unit Housing" Paragraph above.

1. Steel Finish: Manufacturer's standard baked-enamel or powder-coat finish system.

C. Card Reader Controlled Unit: Functions only when authorized card is presented.

First option in "System" Subparagraph below is not programmable, costs less initially, and is generally available with fewer functions and less flexibility than second option.

1. System: Programmable, multiple-code capability permitting validation or voiding of individual cards.

    a. Permit four different access time periods.

2. Reader Type: Proximity.
   a. Proximity reader for proximity cards.

3. Operation: Online communication to remote security-access control system computer.
4. Characteristics: Limited-time usage and Capable of monitoring and auditing barrier gate activity with Digital display or LCD
5. Mounting: With pedestal, see E521.

D. Digital Keypad Controlled Unit: Functions only when authorized code is entered on keypad.

1. System: Programmable, multiple-code capability.
   a. Programmable, multiple-code capability permitting validation or voiding of no fewer than 10,000 possible individual codes, consisting of 6 digits.

2. Operation: Online communication to remote security-access control system computer.
3. Characteristics: Timed antipassback and Capable of monitoring and auditing barrier gate activity.
4. Mounting: As indicated on E521.

2.6 ANCHORAGES

A. Anchor Bolts: Galvanized

1. Hot-dip galvanized according to ASTM A153/A153M and ASTM F2329/F2329M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including equipment bases; accurate placement, pattern, and orientation of anchor bolts; critical dimensions; and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical and communication systems to verify actual locations of connections before parking control equipment installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Excavation for Traffic Controllers: Saw cut existing pavement for recessed traffic controllers and hand-excavate recesses to dimensions and depths and at locations as

required by traffic controller manufacturer's written instructions and as indicated on Drawings.

3.3 INSTALLATION, GENERAL

A. Install parking control equipment as required for complete and integrated installation.

1. Rough-in electrical connections.

3.4 INSTALLATION OF AUTOMATIC BARRIER GATES

A. Anchor cabinets to concrete bases with anchor bolts or expansion anchors, and mount barrier gate arms.

1. Install barrier gates according to UL 325.

3.5 INSTALLATION OF VEHICLE DETECTORS

A. Cut Grooves and or Bury and seal wire loop at locations indicated on Drawings according to manufacturer's written instructions. Connect to parking control equipment operated by detector.

3.6 INSTALLATION OF TRAFFIC CONTROLLERS

A. Anchor controllers to recessed concrete bases and driveway surfaces with anchor bolts or expansion anchors.

3.7 INSTALLATION OF CARD READER PEDESTALS

A. Pad mount with mounting bolts.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.9 ADJUSTING

A. Adjust parking control equipment to function smoothly, and lubricate as recommended by manufacturer.

B. Confirm that locks engage accurately and securely without forcing or binding.

C. After completing installation of exposed, factory-finished parking control equipment, inspect exposed finishes and repair damaged finishes.

3.10 PROTECTION

A. Remove barrier gate arms during the construction period to prevent damage, and install them immediately before Substantial Completion.

3.11 MAINTENANCE SERVICE

Verify with State that maintenance service is required for Project.

A. Maintenance Service Description: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by manufacturer's authorized service representative. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper parking control equipment operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

B. Engage a factory-authorized service representative to train state's maintenance personnel to adjust, operate, and maintain parking control equipment.

END OF SECTION 111200

SECTION 133423.16

FABRICATED CONTROL BOOTHS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fabricated steel control booths.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Fabricated steel control booths.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for control booths.
2. Include rated capacities, operating characteristics, and electrical characteristics, for included systems.

C. Shop Drawings: For control booths. Include plans, elevations, sections, details, accessories, and fastening and anchorage details, including mechanical fasteners.

1. Anchor-Bolt Plans: Submit anchor-bolt plans and templates. Include location, diameter, and projection of anchor bolts required to attach control booths to foundation. Indicate post reactions at each location.

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For each type of exposed finish in manufacturer's standard sizes.

1. Include Samples of wall panels and accessories to verify finish selection.

F. Delegated Design Submittals: For fabricated control booths, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For control booths to include in maintenance manuals.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair finish or replace control booths that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Basis of Design:

A. B.I.G. Enterprises
1. Or Approved Equal.

B. Old Placerville Road guardhouse
1. Not Ballistic Rated
2. Dimensions: Approximately 6'-5" x 6'-5"
3. Roof mounted HVAC equipment.
4. Refer to drawing A402

C. Shriever Way Guardhouse
1. Level III Ballistic Rated
2. Dimensions: Approximately 7'-1" x 12'-0"
3. Slab mounted HVAC equipment.
4. Refer to drawing A401.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design fabricated control booths.

B. Structural Performance: Fabricated control booths to withstand the following loads and stresses within limits and under conditions indicated in accordance with ASCE/SEI 7

C. Seismic Performance: Fabricated control booths to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

E. Ballistic Resistance: Provide components, including windows, walls, and doors, identical to those tested for compliance with requirements indicated, and as follows:

1. UL Rating: Level 3 when tested in accordance with UL 752 at Shriever Way Guardhouse.

F. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70 and marked for intended location and application.

G. Safety Glazing: Comply with 16 CFR 1201, Category II.

1. Safety Glazing Labeling: Permanently mark glazing with certification label of the SGCC indicating manufacturer's name, glass type, thickness, and safety glazing standard with which glass complies.

H. Regulatory Requirements: Comply with applicable provisions in the U.S. Department of Justice's "2010 ADA Standards for Accessible Design"

2.3 FABRICATED STEEL CONTROL BOOTHS

A. Building Style: Standard square corners.

B. Structural Framework: Fabricated from 2-by-2-by-0.075-inch steel structural or mechanical tubing. Connect framework by welding.

C. At Shriever Way Guardhouse:
1. Sliding Doors: Top suspended from aluminum track with ball-bearing rollers; 1-3/4 inches thick; tubular-frame design fabricated from galvanized steel; with top half of door glazed. Equip door with deadlock, lock support, guide hardware, and full weather stripping. Provide door on both sides of booth.
   a. Glazing: Fixed unit with clear insulating glass.
   b. Deadlock: Mortised, laminated-hook bolt type with removable cylinder capable of being master keyed.

D. At Old Placerville Road:
1. Swinging Doors: 1-3/4 inches thick; tubular-frame design fabricated from galvanized steel with top half of door glazed. Equip door with deadlock, three butt hinges, closer, and full weather stripping.

2. Glazing: Fixed unit with clear insulating glass.
3. Deadlock: Mortised, with lever handle and removable cylinder capable of being master keyed.

E. Windows: Extruded-aluminum sash frames glazed with clear insulated glass.

1. Frame Finish: Manufacturer's standard mill.
2. Corner Shape: Square.
3. Shriever Way Guardhouse:
   a. 4” x 1” tapered sill plate: galvanized metal, PVDF factory applied Slate Gray.
   b. 12” x 1” sunshade at window head: galvanized metal, PVDF factory applied Slate Gray.

F. Wall Panel Assemblies:
   1. Assembly consisting of exterior face panel fabricated from 0.079-inch nominal-thickness, galvanized-steel sheet; and interior face panel fabricated from 0.064-inch nominal-thickness, galvanized-steel sheet; with 3-inch dimension thick, rigid fiberglass or polystyrene board insulation in cavity between exterior and interior face panels. Exterior surfaces painted PVDF Dark Bronze.
   2. At Shriever Way Guardhouse: 6 inch folded panels 24-gauge metal panels with exposed fasteners at 12" on center aligned arrangement. Factory applied painted PVDF slate gray.

G. Insulated Floor Assembly: Assembly consisting of 0.079-inch nominal-thickness, galvanized-steel sheet underside with rigid insulation core; covered by 0.125-inch thick, aluminum rolled tread plate; with overall assembly thickness of 2 inches.

H. Flush Base Assembly: No perimeter frame, with finished floor fabricated from 0.108-inch nominal-thickness, galvanized, rolled steel tread plate.

I. Roof Assemblies:
   1. At Old Placerville Road:
      a. Flat Roof/Ceiling Assembly: Assembly consisting of exterior roof panels, interior ceiling panels, and insulation between exterior and interior panels; sloped to drain at booth perimeter.
      b. Exterior Roof Panel: Fabricated from 0.079-inch nominal-thickness, galvanized-steel sheet; with painted finish, continuously welded seams.
      c. Fascia: Fabricated from 0.079-inch nominal-thickness, galvanized-steel sheet; with painted finish, continuously welded seams. 9" Deep.
      d. Interior Ceiling Panel: Fabricated from 0.079-inch nominal-thickness, galvanized-steel sheet; with fiberglass insulation in cavity between ceiling and roof.
      e. Roof Scupper: Fabricated from 0.079-inch nominal-thickness, galvanized-steel sheet; with painted finish, continuously welded seams, with ½" overhang.
   2. At Shriever Way
      a. Sloped Roof: 12" standing seam roofing fabricated from 24-gauge sheet metal with factory finish, PVDF slate gray.
      b. Fascia: 24-gauge custom shape sheet metal with factory finish, PVDF slate gray.
      c. Roof Gutter: 4" x 4" continuous gutter fabricated from 24-gauge sheet metal with factory finish, PVDF slate gray. Slope to rear.
      d. Soffits: Dimensions per sheet A401. 24-gauge sheet metal with factory finish PVDF slate gray.
      e. Ceiling tiles: Provide 2' x 2' acoustical tile with 2' x 2' LED lighting and return and supply registers.

J. Electrical:

   1. Single-Point Connection: Service-entrance-rated, fused safety switch located on exterior for connection of 125 A, 120/240 V, single-phase, three-**wire** feeder with equipment ground conductor.

2. Power Connections:

    a. One duplex, weatherproof, ground-fault circuit interrupter (GFCI), NEMA 5-15R power outlet(s) for servicing exterior equipment.
    b. Two duplex, GFCI NEMA 5-15R power outlet(s) under counter(s) near access openings.
    c. 2 Type USB-A power outlets above counter for charging portable devices.
    d. Provide power connections and means of disconnect for interior and exterior HVAC equipment.

3. Lighting:

    a. Booth Interior: LED. Provide 20-fc average horizontal illuminance, with uniformity not exceeding 2:1 average-to-minimum, dimmable from 100 percent to 10 percent, on counter work surfaces.
    b. Guardhouse at Old Placerville Road: Exterior: LED, located above door. Provide not less than 0.5-fc average horizontal illuminance, with uniformity not exceeding 3:1 maximum-to-minimum, when measured at finished grade over the distance of 15 ft. from entrance door.
    c. Guardhouse at Shriever Way: Exterior LED strip light recessed at soffits. Provide not less than 0.5-fc average horizontal illuminance, with uniformity not exceeding 3:1 maximum-to-minimum, when measured at finished grade over the distance of 15 ft. from entrance door.

    d. Controls: Provide manual switches for interior and exterior lighting on wall inside booth door

K. Communications:

1. Provide VOIP on communication system and provide POE switches for new POE cameras and VOIP communication at each booth.

L. Heating and Cooling Systems:

1. Heating Unit at Old Placerville Road Guardhouse: Roof mounted, thermostatically controlled, 230/208-V, electric heater with fan-forced operation and with capacity of not less than 5000 Btu/h Enclosed in enameled-steel cabinet.
2. Heating Unit at Shriever Way Guardhouse: Wall mounted, thermostatically controlled, 230/208-V, electric heater with fan-forced operation and with capacity of not less than 5000 Btu/h Enclosed in enameled-steel cabinet.
3. Cooling Unit at Old Placerville Road: Roof-mounted thermostatically controlled air conditioner with cooling capacity of not less than 12,000 Btu/h.
4. Cooling Unit at Shriever Way Guardhouse: Ground mounted Roof-mounted thermostatically controlled air conditioner with cooling capacity of not less than 15,000 Btu/h.

M. Accessories: Provide the following:
1. Antifatigue mats.
2. Intercom.

3. Traffic control light at Old Placerville Road..

N. Anchorage: Cast-in-place anchor bolts] fabricated from non-ferrous or corrosion-resistant materials, with allowable load or strength design greater than or equal to the design load, as determined by testing conducted by a qualified testing agency.

O. Materials:

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, commercial quality, G90 coating designation; mill phosphatized.
2. Galvanized Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D; hot-dip galvanized in accordance with ASTM A123/A123M.
3. Steel Structural Tubing: ASTM A500/A500M, Grade B.
4. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
5. Steel Mechanical Tubing: ASTM A513/A513M, welded-steel mechanical tubing.
6. Zinc-Coated (Galvanized) Steel: Hot-dip galvanized in accordance with ASTM A123/A123M.
7. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

    a. Sheet: ASTM B209/B209M.
    b. Extruded Shapes: ASTM B221
    c. Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T4 or Alloy 6061-T6.

8. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
9. Plywood: DOC PS 1, Exterior grade.
10. Particleboard: ANSI A208.1, Grade M-2.
11. Clear Insulating Glass: ASTM E2190. Factory-assembled units consisting of two lites of 2.5-mm-thick clear float glass, ASTM C1036, Type I, Class 1, Quality q3, and dehydrated air space, with a total overall unit thickness of ¾" Inch. and with manufacturer's standard dual seal. Provide tempered lites where indicated.
12. At Shriever Way Guardhouse: Ballistic-Resistant Glazing: Tested to comply with bullet-resistant testing level indicated.

P. Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on finish, including thermosetting, electrostatically applied, and powder coatings. Comply with coating manufacturer's written instructions for applying and baking.

1. Color and Gloss: As selected by state from manufacturer's full range, colors PVDF Slate Gray and Dark Bronze.

2.4 FABRICATION

A. Factory fabricate complete control booths, with accessories and options installed at factory.

B. Factory preglaze windows and doors.

C. Factory prewire control booths, ready for connection to service at Project site.

D. Fabricate control booths with forklift pockets in base of booth or removable lifting eye centered in roof.

E. Accessible Control Booths: Both Guard houses to be accessible per requirements below:
   1. Provide door opening with minimum 32-inch clear width.
   2. Provide minimum 60-inch clear turning spacing within the booth.
   3. Provide minimum 27-inch clearance beneath interior work surfaces. Locate work surfaces 28 inches minimum and 34 inches maximum above the floor.
   4. Locate controls and operable parts no lower than 15 inches and no higher than 48 inches above the floor where reach is unobstructed. Where side reach is obstructed, locate controls and operable parts no lower than 15 inches (381 mm) and no higher than 46 inches above the floor.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including concrete bases; accurate placement, pattern, and orientation of anchor bolts; critical dimensions; and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical and communication systems to verify actual locations of connections before control booth installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Accessible Control Booths: Install with interior floor surface at same elevation as adjacent paved surfaces.

B. Set control booths plumb and aligned. Level baseplates true to plane, with full bearing on concrete bases.

C. Fasten control booths securely to concrete base with anchorage indicated.

D. Connect to electrical power service and communication systems.

E. Perform startup checks of heating and cooling units in accordance with manufacturer's written instructions.

3.3 ADJUSTING

A. Adjust doors, operable windows, and hardware to operate smoothly, easily, properly, and without binding. Confirm that locks engage accurately and securely without forcing or binding.

B. Adjust interior and exterior lighting controls.

C. Lubricate hardware and other moving parts.

D. After completing installation, inspect exposed finishes and repair damaged finishes.

END OF SECTION 133423.16

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

1.2 DEFINITIONS

A. RoHS: Restriction of Hazardous Substances.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Okonite Company
2. Southwire Company.
3. WESCO.
4. Or equal.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. 3M Electrical Products.
2. AFC Cable Systems; a part of Atkore International.
3. Hubbell Power Systems, Inc.
4. ILSCO.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Thomas & Betts Corporation; A Member of the ABB Group.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: Two hole with standard barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type XHHW-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Perform each of the following visual and electrical tests:

a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
b. Test bolted connections for high resistance using one of the following:

1) A low-resistance ohmmeter.
2) Calibrated torque wrench.
3) Thermographic survey.

c. Inspect compression-applied connectors for correct cable match and indentation.
d. Inspect for correct identification.
e. Inspect cable jacket and condition.
f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
g. Continuity test on each conductor and cable.
h. Uniform resistance of parallel conductors.

3. Infrared Scanning: After Work Completion and Operation Testing, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 19

SECTION 26 05 23

CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Category 5e balanced twisted pair cable.
   2. Category 6 balanced twisted pair cable.
   3. Category 6a balanced twisted pair cable.
   4. Balanced twisted pair cable hardware.
   5. Twin-axial data highway cable.
   6. RS-232 cable.
   7. RS-485 cable.
   8. Control cable.
   9. Control-circuit conductors.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Category 5e balanced twisted pair cable.
   2. Category 6 balanced twisted pair cable.
   3. Category 6a balanced twisted pair cable.
   4. Balanced twisted pair cable hardware.
   5. Twin-axial data highway cable.
   6. RS-232 cable.
   7. RS-485 cable.
   8. Control cable.
   9. Control-circuit conductors.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.

   1. Flame Travel Distance: 60 inch or less.
   2. Peak Optical Smoke Density: 0.5 or less.
   3. Average Optical Smoke Density: 0.15 or less.

C. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.

D. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

2.2 CATEGORY 5e BALANCED TWISTED PAIR CABLE

A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.

B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 5e cables.

C. Conductors: 100 ohm, No. 24 AWG solid copper.

D. Shielding/Screening: Shielded twisted pairs (FTP).

E. Cable Rating: Riser.

F. Jacket: Gray thermoplastic.

2.3 CATEGORY 6 BALANCED TWISTED PAIR CABLE

A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.

B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.

C. Conductors: 100 ohm, No. 23 AWG solid copper.

D. Shielding/Screening: Shielded twisted pairs (FTP).

E. Cable Rating: Riser.

F. Jacket: Gray thermoplastic.

2.4 CATEGORY 6a BALANCED TWISTED PAIR CABLE

A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6a cable at frequencies up to 500 MHz.

B. Standard: Comply with TIA-568-C.2 for Category 6a cables.

C. Conductors: 100 ohm, No. 23 AWG solid copper.

D. Shielding/Screening: Shielded twisted pairs (FTP).

E. Cable Rating: Riser.

F. Jacket: Gray thermoplastic.

2.5 BALANCED TWISTED PAIR CABLE HARDWARE

A. Description: Hardware designed to connect, splice, and terminate balanced twisted pair copper communications cable.

B. General Requirements for Balanced Twisted Pair Cable Hardware:

1. Comply with the performance requirements of Category 5e, Category 6, and Category 6a.
2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
3. Cables must be terminated with connecting hardware of same category or higher.

C. Source Limitations: [Obtain balanced twisted pair cable hardware from single source from single manufacturer] [Obtain balanced twisted pair cable hardware from same manufacturer as balanced twisted pair cable, from single source].

D. Connecting Blocks: 110-style IDC for Category 5e and 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.

E. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

F. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.

1. Features:

a. Universal T568A and T568B wiring labels.
b. Labeling areas adjacent to conductors.
c. Replaceable connectors.
d. 24 or 48 ports.

2. Construction: 16-gauge steel and mountable on 19 inch equipment racks.
3. Number of Jacks per Field: One for each four-pair cable indicated.

G. Patch Cords: Factory-made, four-pair cables in 36 inch lengths; terminated with an eight-position modular plug at each end.

1. Patch cords must have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords must have latch guards to protect against snagging.
2. Patch cords must have color-coded boots for circuit identification.

H. Plugs and Plug Assemblies:

1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair 100 ohm unshielded or shielded balanced twisted pair cable.
2. Comply with IEC 60603-7-1, IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, and IEC 60603-7.5.
3. Marked to indicate transmission performance.

I. Jacks and Jack Assemblies:

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100 ohm unshielded or shielded balanced twisted pair cable.
2. Designed to snap-in to a patch panel or faceplate.
3. Standards:

    a. Category 5e, unshielded balanced twisted pair cable must comply with IEC 60603-7-2.
    b. Category 5e, shielded balanced twisted pair cable must comply with IEC 60603-7-3.
    c. Category 6, unshielded balanced twisted pair cable must comply with IEC 60603-7-4.
    d. Category 6, shielded balanced twisted pair cable must comply with IEC 60603-7.5.
    e. Category 6a, unshielded balanced twisted pair cable must comply with IEC 60603-7-41.
    f. Category 6a, shielded balanced twisted pair cable must comply with IEC 60603-7.51.

4. Marked to indicate transmission performance.

J. Faceplate:

1. Two port, vertical single-gang faceplates designed to mount to single-gang wall boxes.
2. Eight port, vertical double-gang faceplates designed to mount to double-gang wall boxes.
3. Plastic Faceplate: High-impact plastic. Coordinate color with Section 26 05 33 "Raceways and Boxes for Electrical Systems."
4. Metal Faceplate: Stainless steel, complying with requirements in Section 26 05 33 " Raceways and Boxes for Electrical Systems."
5. For use with snap-in jacks accommodating any combination of balanced twisted pair, optical fiber, and coaxial work area cords.

    a. Flush mounting jacks, positioning the cord at a 45-degree angle.

K. Legend:

1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

2.6 TWIN-AXIAL DATA HIGHWAY CABLE

A. Standard Cable: NFPA 70, Type CM.

1. Paired, pairs, No. 20 AWG, stranded (7x28) tinned-copper conductors.
2. Polypropylene insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. PVC jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
6. Flame Resistance: Comply with UL 1685.

2.7 RS-232 CABLE

A. PVC-Jacketed, TIA 232-F:

1. Three, No. 22 AWG, stranded (7x30) tinned copper conductors.

2. Polypropylene insulation.
3. Aluminum foil-polyester tape shield with 100 percent shield coverage.
4. PVC jacket.
5. Conductors are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. NFPA 70 Type: Type CM.
7. Flame Resistance: Comply with UL 1581.

B. Plenum-Type, TIA 232-F:

1. Three, No. 22 AWG, stranded (7x30) tinned copper conductors.

2. PE insulation.
3. Aluminum foil-polyester tape shield with 100 percent shield coverage.
4. Fluorinated ethylene propylene jacket.
5. Conductors are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

2.8 RS-485 CABLE

A. Standard Cable: NFPA 70, Type CMG.

1. Paired, two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1685.

2.9 CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. Multi-pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1685.

2.10 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

B. Class 2 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

D. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.

1. Smoke control signaling and control circuits.

2.11 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test twisted pair cables according to TIA-568-C.2.

C. Cable will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Test cables on receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.

3.2 INSTALLATION OF RACEWAYS AND BOXES

A. Comply with requirements in Section 26 05 33 " Raceways and Boxes for Electrical Systems " for raceway selection and installation requirements for conduits as supplemented or modified in this Section.

B. Comply with requirements in Section 26 05 33 " Raceways and Boxes for Electrical Systems " for raceway selection and installation requirements for wireways as supplemented or modified in this Section.

C. Comply with requirements in Section 26 05 33 " Raceways and Boxes for Electrical Systems " for raceway selection and installation requirements for boxes as supplemented or modified in this Section.

1. Outlet boxes must be no smaller than 2 inch wide, 3 inch high, and 2-1/2 inch deep.
2. Outlet boxes for cables must be no smaller than 4 inch square by 1-1/2 inch deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
3. Flexible metal conduit must not be used.

D. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.

E. Install manufactured conduit sweeps and long-radius elbows if possible.

F. Raceway Installation in Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.

2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard if entering the room from overhead.
4. Extend conduits 3 inch above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

G. Backboards: Install backboards with 96 inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA-568-C Series of standards.
2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
3. Terminate all conductors; cable must not contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced and must be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
5. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
6. Secure and support cables at intervals not exceeding 30 inch and not more than 6 inch from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
11. Support: Do not allow cables to lie on removable ceiling tiles.
12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
13. Provide strain relief.
14. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
15. Ground wire must be copper, and grounding methods must comply with IEEE C2. Demonstrate ground resistance.

C. Balanced Twisted Pair Cable Installation:

1. Comply with TIA-568-C.2.
2. Do not untwist balanced twisted pair cables more than 1/2 inch at the point of termination to maintain cable geometry.

D. Installation of Control-Circuit Conductors:

1. Install wiring in raceways.

2. Use insulated spade lugs for wire and cable connection to screw terminals.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inch above ceilings by cable supports not more than 30 inch apart.
3. Cable must not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

F. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Below each feed point, neatly coil a minimum of 72 inch of cable in a coil not less than 12 inch in diameter.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment must be as follows:

   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inch.
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inch.
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inch.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment must be as follows:

   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inch.
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inch.
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inch.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures must be as follows:

   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inch.
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inch.

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inch.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inch.

3.4 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

3.5 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits; No 14 AWG.
2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.6 GROUNDING

A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.

B. For control-voltage wiring and cabling, comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

3.7 IDENTIFICATION

A. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers must use label stocks, laminating adhesives, and inks complying with UL 969.

C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire must have a unique tag.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.

    a. Test instruments must meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters

that are qualified by test equipment manufacturer for channel or link test configuration.

B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

C. End-to-end cabling will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 26 05 23

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes grounding and bonding systems and equipment.

B. Section includes grounding and bonding systems and equipment, plus the following special applications:

1. Underground distribution grounding.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Ground wells.
2. Ground rods.
3. Ground rings.
4. Grounding arrangements and connections for separately derived systems.
5. Ground bar.
6. Grounding arrangements and connections for packaged equipment.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. Harger Lightning & Grounding.
4. ILSCO.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Siemens Industry, Inc., Energy Management Division.
7. Thomas & Betts Corporation; A Member of the ABB Group.
8. Or equal.

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bar: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 2 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

F. Conduit Hubs: Mechanical type, terminal with threaded hub.

G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

H. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.

I. Straps: Solid copper, copper lugs. Rated for 600 A.

J. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

K. Water Pipe Clamps:

1. Mechanical type, two pieces with stainless-steel bolts.

a. Material: Die-cast zinc alloy.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, 3/0 AWG minimum.

1. Bury at least 24 inches below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.

C. Grounding Bus/Bar: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors
3. Connections to Ground Rods at Ground Wells: Welded connectors.
4. Connections to Structural Steel: Compression and irreversible connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.4 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Receptacle circuits.
3. Single-phase motor and appliance branch circuits.
4. Three-phase motor and appliance branch circuits.
5. Flexible raceway runs.

B. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

C. Metallic Fences: Comply with requirements of IEEE C2.

1. Grounding Conductor: Bare copper, not less than 1/0 AWG.
2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
3. Barbed Wire: Strands shall be bonded to the grounding conductor.

3.5 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. Use exothermic welds for all below-grade connections.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

E. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

F. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than 3/0 AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

G. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Substations and Pad-Mounted Equipment: 5 ohms.
5. Manhole Grounds: 10 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.
4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal: For hangers and supports for electrical systems.

1. Include design calculations and details of hangers.
2. Include design calculations for seismic restraints.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved.

B. Seismic Qualification Data: Certificates, for hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.

C. Welding certificates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design hanger and support system.

B. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified."
2. Component Importance Factor: 1.5

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.

1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel, Stainless steel, Type 304.
3. Channel Width: Selected for applicable load criteria.
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
5. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
6. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
5. Toggle Bolts: All-steel springhead type.

6. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA 101
3. NECA 111.

B. Comply with requirements for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

C. Comply with requirements for raceways and boxes specified in Section 26 05 33 "Raceways and Boxes for Electrical Systems."

D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps, single-bolt conduit clamps using spring friction action for retention in support channel.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69, Spring-tension clamps.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 26 05 29

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. ENT raceways and fittings.
4. Corrugated Orange HDPE Non Split Tubing raceways.
5. Metal wireways and auxiliary gutters.
6. Boxes, enclosures, floor mount enclosures, and cabinets.
7. Handholes and boxes for exterior underground cabling.

1.2 DEFINITIONS

A. GRC: Galvanized rigid steel conduit.

B. ENT: Electrical Nonmetallic Tubing

1.3 ACTION SUBMITTALS

A. Product Data: For wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AFC Cable Systems; a part of Atkore International.
b. Allied Tube & Conduit; a part of Atkore International.
c. Opti-Com Manufacturing Network, Inc (OMNI).
d. O-Z/Gedney; a brand of Emerson Industrial Automation.
e. Perma-Cote.
f. Picoma Industries, Inc.
g. Republic Conduit.
h. Southwire Company.
i. Thomas & Betts Corporation; A Member of the ABB Group.
j. Western Tube and Conduit Corporation.
k. Or equal.

2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

a. Comply with NEMA RN 1.
b. Coating Thickness: 0.040 inch, minimum.

5. EMT: Comply with ANSI C80.3 and UL 797.
6. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AFC Cable Systems; a part of Atkore International.
b. Allied Tube & Conduit; a part of Atkore International.
c. Opti-Com Manufacturing Network, Inc (OMNI).
d. O-Z/Gedney; a brand of Emerson Industrial Automation.
e. Perma-Cote.
f. Picoma Industries, Inc.
g. Republic Conduit.
h. Southwire Company.
i. Thomas & Betts Corporation; A Member of the ABB Group.
j. Western Tube and Conduit Corporation.
k. Or equal.

2. Comply with NEMA FB 1 and UL 514B.
3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Fittings, General: Listed and labeled for type of conduit, location, and use.
5. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
6. Fittings for EMT:

a. Material: Steel.
b. Type: compression.

7. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
8. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

C. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AFC Cable Systems; a part of Atkore International.
    b. CANTEX INC.
    c. Kraloy.
    d. Lamson & Sessions.
    e. Niedax Inc.
    f. RACO; Hubbell.
    g. Thomas & Betts Corporation; A Member of the ABB Group.
    h. Topaz Electric; a division of Topaz Lighting Corp.
    i. Or equal.

2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. RNC: Type EPC-40-PVC; Type EPC-80-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

B. Nonmetallic Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AFC Cable Systems; a part of Atkore International.
    b. CANTEX INC.
    c. Kraloy.
    d. Lamson & Sessions.
    e. Niedax Inc.
    f. RACO; Hubbell.
    g. Thomas & Betts Corporation; A Member of the ABB Group.
    h. Topaz Electric; a division of Topaz Lighting Corp.
    i. Or equal.

2. Fittings, General: Listed and labeled for type of conduit, location, and use.
3. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 ENT RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1653 and UL Category Control Number FKHU.

B. Electrical Nonmetallic Tubing (ENT) and Fittings:

1. Ctube.
2. CANTEX INC.
3. Carlon.
4. Or equal.
5. Options:

a. Minimum Trade Size: 2”C.
b. Colors: As indicated on Drawings.
c. Markings: Outdoor
d. Fittings:

1) Mechanically Attached Fittings: UL 1653.
2) Solvent-Attached Fittings: UL 651.

2.4 Corrugated Orange HDPE Non Split Tubing raceways

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for outdoor locations and use.
2. General Characteristics: UL 1653.

B. Corrugated Orange HDPE Non Split Tubing and Fittings:

1. Ctube.
2. CANTEX INC.
3. Carlon.
4. Or equal.
5. Options:

a. Minimum Trade Size: 1”C.
b. Colors: Orange.
c. Markings: Outdoor
d. Fittings:

1) Mechanically Attached Fittings: UL 1653.
2) Solvent-Attached Fittings: UL 651.

2.5

2.6 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. B-line, an Eaton business.
2. Hoffman; a brand of Pentair Equipment Protection.
3. MonoSystems, Inc.
4. Square D.
5. Or equal.

B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 3R, Type 4, Type 12 unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type, Screw-cover type unless otherwise indicated.

E. Finish: Manufacturer's standard enamel finish.

2.7 BOXES, ENCLOSURES, FLOOR MOUNT ENCLOSURES AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Adalet.
2. Crouse-Hinds, an Eaton business.
3. EGS/Appleton Electric.
4. Hoffman; a brand of Pentair Equipment Protection.
5. Hubbell Incorporated.
6. Hubbell Incorporated; Wiring Device-Kellems.
7. Kraloy.
8. Milbank Manufacturing Co.
9. Oldcastle Enclosure Solutions.
10. O-Z/Gedney; a brand of Emerson Industrial Automation.
11. Plasti-Bond.
12. RACO; Hubbell.
13. Spring City Electrical Manufacturing Company.
14. Thomas & Betts Corporation; A Member of the ABB Group.

B. General Requirements for Boxes, Enclosures, Floor mount enclosures and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations rated for NEMA 3R.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep minimum unless otherwise noted.

J. Gangable boxes are prohibited.

K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R, Type 4, Type 12 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

L. Cabinets:

1. NEMA 250, Type 3R, Type 12 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.8 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Armorcast Products Company.
b. NewBasis.
c. Oldcastle Enclosure Solutions.
d. Oldcastle Precast, Inc.
e. Quazite: Hubbell Power Systems, Inc.

2. Standard: Comply with SCTE 77.
3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, "ELECTRIC.".
7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
8. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.9 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
2. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: GRC.
3. Underground Conduit: RNC, Type EPC-40-PVC; Type EPC-80-PVC, concrete encased.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:

    a. Mechanical rooms.
    b. Gymnasiums.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Boxes and Enclosures: NEMA 250, Type 12 steel, except use NEMA 250, Type 3R steel in institutional and commercial kitchens and damp or wet locations.

C. Minimum Raceway Size: 1/2-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.

4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

C. Do not fasten conduits onto the bottom side of a metal deck roof.

D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

E. Complete raceway installation before starting conductor installation.

F. Arrange stub-ups so curved portions of bends are not visible above finished slab.

G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.

I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

J. Support conduit within 12 inches of enclosures to which attached.

K. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Arrange raceways to keep a minimum of 2 inches. of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by the state for each specific location.
5. Change from ENT to GRC before rising above floor.

L. Stub-Ups to Above Recessed Ceilings:

1. Use EMT, GRC for raceways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

N. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

O. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

P. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

Q. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

R. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

S. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

T. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

U. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Conduit extending from interior to exterior of building.
4. Conduit extending into pressurized duct and equipment.
5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
6. Where otherwise required by NFPA 70.

V. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

W. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.

2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
    d. Attics: 135 deg F temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

X. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

Y. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.

Z. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

AA. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

BB. Locate boxes so that cover or plate will not span different building finishes.

CC. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

DD. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

EE. Set metal floor boxes level and flush with finished floor surface.

FF. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit.

2. Install backfill.
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

5. Underground Warning Tape: Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.

E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes and stencils.
5. Tags.
6. Signs.
7. Cable ties.
8. Paint for identification.
9. Fasteners for labels and signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 70.

B. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

C. Comply with ANSI Z535.4 for safety signs and labels.

D. Comply with NFPA 70E requirements for arc-flash warning labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for feeder and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 4 AWG if authorities having jurisdiction permit.
2. Colors for 208/120-V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.

3. Colors for 240-V Circuits:

a. Phase A: Black.
b. Phase B: Red.

4. Colors for 480/277-V Circuits:

a. Phase A: Brown.
b. Phase B: Orange.
c. Phase C: Yellow.

5. Color for Neutral: White.
6. Color for Equipment Grounds: Bare copper; Green.
7. Colors for Isolated Grounds: Green with white stripe.

C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

E. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

2.4 BANDS AND TUBES

A. Snap-around, Color-Coding Bands: Slit, pre-tensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameter and that stay in place by gripping action.

B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameters of and shrunk to fit firmly around item being identified. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.

2.5 TAPES AND STENCILS

A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.

C. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over orange background and is 12 inches wide. Stop stripes at legends.

D. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.6 TAGS

A. Write-on Tags:

1. Polyester Tags: 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment.
2. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
3. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.7 SIGNS

A. Baked-Enamel Signs:

1. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 7 by 10 inches.

B. Metal-Backed Butyrate Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 10 by 14 inches.

C. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:

    a. For signs up to 20 sq. in., minimum 1/16 inch thick.
    b. For signs larger than 20 sq. in., 1/8 inch thick.
    c. Engraved legend with black letters on white face.
    d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
    e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.8 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of each item before installing identification products.

D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

G. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

H. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

I. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

J. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.

L. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:

1. "EMERGENCY POWER."
2. "POWER."
3. "UPS."

M. Vinyl Wraparound Labels:

1. Secure tight to surface at a location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.

N. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.

O. Self-Adhesive Wraparound Labels: Secure tight to surface of raceway or cable at a location with high visibility and accessibility.

P. Self-Adhesive Labels:

1. On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.

Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

R. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.

S. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.

T. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

U. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

V. Write-on Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using plenum-rated cable ties.

W. Baked-Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

X. Metal-Backed Butyrate Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

Y. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

Z. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.

2. In Spaces Handling Environmental Air: Plenum rated.

3.2 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive wraparound labels with the conductor or cable designation, origin, and destination.

F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with the conductor designation.

G. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

H. Workspace Indication: Apply tape and stencil to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

I. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.

J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive equipment labels.

1. Apply to exterior of door, cover, or other access.
2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:

a. Power-transfer switches.
b. Controls with external control power connections.

K. Arc Flash Warning Labeling: Self-adhesive labels.

L. Operating Instruction Signs: Self-adhesive labels; Laminated acrylic or melamine plastic signs.

M. Equipment Identification Labels:

1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
2. Outdoor Equipment: Laminated acrylic or melamine sign.

END OF SECTION 26 05 53

SECTION 26 22 00

LOW VOLTAGE TRANSFORMER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Distribution, dry-type transformers rated 600 V and less, with capacities up to 1500 kVA.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
2. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.

B. Shop Drawings:

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.
3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For transformers, accessories, and components, from manufacturer.

B. Qualification Data: For testing agency.

C. Source quality-control reports.

D. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Eaton Electrical Sector; Eaton Corporation.

2. General Electric Company.

3. Powersmiths International Corp.

4. Siemens Power Transmission & Distribution, Inc.

5. Square D; by Schneider Electric.Source.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Transformers Rated 15 kVA and Larger: Comply with NEMA TP 1 energy-efficiency levels as verified by testing according to NEMA TP 2.

D. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.

E. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.

2. Coil Material: Copper.

F. Encapsulation: Transformers smaller than 30 kVA shall have core and coils completely resin encapsulated.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NFPA 70, and list and label as complying with UL 1561.

B. Provide transformers that are constructed to withstand seismic forces specified in Section 260548.16 "Seismic Controls for Electrical Systems."

C. Cores: One leg per phase.

D. Enclosure: Ventilated.

1. NEMA 250, Type 2: Core and coil shall be encapsulated within resin compound to seal out moisture and air.
2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.

E. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: Gray.

F. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

G. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.

H. Insulation Class, Smaller than 30 kVA: 185 deg C, UL-component-recognized insulation system with a maximum of 115-deg C rise above 40-deg C ambient temperature.

I. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with a maximum of 150-deg C rise above 40-deg C ambient temperature.

J. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for nonsinusoidal load current-handling capability to the degree defined by designated K-factor.

1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor.
2. Indicate value of K-factor on transformer nameplate.
3. Unit shall meet requirements of NEMA TP 1 when tested according to NEMA TP 2 with a K-factor equal to one.

K. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.

1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.

2. Include special terminal for grounding the shield.

L. Neutral: Rated 200 percent of full load current for K-factor rated transformers.

M. Wall Brackets: Manufacturer's standard brackets.

N. Fungus Proofing: Permanent fungicidal treatment for coil and core.

2.4 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.01 and IEEE C57.12.91.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

B. Environment: Enclosures shall be rated for the environment in which they are located. Covers for NEMA 250, Type 4X enclosures shall not cause accessibility problems.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Install transformers level and plumb on a concrete base with vibration-dampening supports. Locate transformers away from corners and not parallel to adjacent wall surface.

E. Secure transformer to concrete base according to manufacturer's written instructions.

F. Secure covers to enclosure and tighten all bolts to manufacturer-recommended torques to reduce noise generation.

G. Remove shipping bolts, blocking, and wedges.

3.2 CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

D. Provide flexible connections at all conduit and conductor terminations and supports to eliminate sound and vibration transmission to the building structure.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports:

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS for dry-type, air-cooled, low-voltage transformers. Certify compliance with test parameters.

B. Remove and replace units that do not pass tests or inspections and retest as specified above.

C. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. Perform two follow-up infrared scans of transformers, one at four months and the other at 11 months after Substantial Completion.
3. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

D. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.4 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 5 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.

C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.5 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 26 22 00

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power panelboards.
2. Load centers.

1.2 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. SPD: Surge protective device.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Include evidence of NRTL listing for SPD as installed in panelboard.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Include wiring diagrams for power, signal, and control wiring.
9. Key interlock scheme drawing and sequence of operations.
10. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

1.4 INFORMATIONAL SUBMITTALS

A. Panelboard schedules for installation in panelboards.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 FIELD CONDITIONS

A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 36 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

E. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 12.
b. Outdoor Locations: NEMA 250, Type 3R.
c. Kitchen, Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
d. Other Wet or Damp Indoor Locations: NEMA 250, Type 3R.
e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

2. Height: 84 inches maximum.
3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.

4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.

F. Incoming Mains Location: As shown on the plans.

G. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

I. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

J. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

K. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include label or manual with size and type of allowable upstream and branch devices listed and labeled by an NRTL for series-connected short-circuit rating.

L. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

B. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

2.3 POWER PANELBOARDS

A. Panelboards: NEMA PB 1, distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches high, provide two latches, keyed alike.

C. Mains: Circuit breaker.

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 100 A and Smaller: Bolt-on circuit breakers, or Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

F. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. External Control-Power Source: 120-V branch circuit.

2.4 LOAD CENTERS

A. Listing Criteria: Comply with UL 67.

B. Mains: **Circuit breaker.**

C. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Concealed hinges secured with flush latch with tumbler lock; keyed alike.

E. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

a. Inverse time-current element for low-level overloads.
b. Instantaneous magnetic trip element for short circuits.
c. Adjustable magnetic trip setting for circuit-breaker frame sizes 125 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip Circuit Breakers:

a. RMS sensing.
b. Field-replaceable rating plug or electronic trip.
c. Digital display of settings, trip targets, and indicated metering displays.
d. Multi-button keypad to access programmable functions and monitored data.
e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
f. Integral test jack for connection to portable test set or laptop computer.
g. Field-Adjustable Settings:

1) Instantaneous trip.
2) Long- and short-time pickup levels.
3) Long and short time adjustments.
4) Ground-fault pickup level, time delay, and I squared T response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Subfeed Circuit Breakers: Vertically mounted.
9. MCCB Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.
b. Breaker handle indicates tripped status.
c. UL listed for reverse connection without restrictive line or load ratings.
d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
g. Communication Capability: Universal-mounted, Integral, Din-rail-mounted communication module with functions and features compatible with power monitoring and control system specified in Section 26 09 13 "Electrical Power Monitoring and Control."
h. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
i. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

B. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses and Spare-Fuse Cabinet: Comply with requirements specified in Section 26 28 13 "Fuses."

2.6 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Typewritten directory card inside panelboard door, mounted in metal frame with transparent protective cover.

2.7 ACCESSORY COMPONENTS AND FEATURES

A. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install panelboards and accessories according to NECA 407.

C. Comply with mounting and anchoring requirements for Electrical Systems.

D. Mount top of trim 90 inches above finished floor unless otherwise indicated.

E. Mount panelboard cabinet plumb and rigid without distortion of box.

F. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

G. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

H. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

I. Install filler plates in unused spaces.

J. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

K. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

E. Install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems" identifying source of remote circuit.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 26 24 16

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard receptacles, 125 V, 20 A.
2. GFCI receptacles, 125 V, 20 A.
3. Toggle switches, 120/277 V, 20 A.
4. Wall plates.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wiring devices: One for every 50, but no fewer than one of each type.
2. Cover plates: One for every 50, but no fewer than two of each type.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Comply with NFPA 70.

C. RoHS compliant.

D. Comply with NEMA WD 1.

E. Configurations: As shown on Drawings.

F. Devices for Owner-Furnished Equipment:

1. Receptacles: Match plug configurations.

G. Device Color: To be selected by Architect.

H. Wall Plate Color: For nylon covers, match device color.

I. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

B. Eaton (Arrow Hart): “Premium Industrial Grade” series.

C. Hubbell Incorporated; Wiring Device-Kellems: “HBL Extra Heavy-Duty Industrial” series.

D. Leviton Manufacturing Co., Inc.: “Extra Heavy-Duty Industrial Grade” series.

E. Or Equal.

2.3 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact nylon. Thermoset plastic is not acceptable.
3. Material for Unfinished Spaces: Galvanized steel.

4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 10 AWG are installed on 20-A circuits, splice No. 10 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical. Group adjacent switches under single, multigang wall plates.

3.2 GFCI RECEPTACLES

A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

A. Comply with Section 26 05 53 "Identification for Electrical Systems."

B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

END OF SECTION 26 27 26

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Molded-case switches.
5. Enclosures.

1.2 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Manufacturer's field service report.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. Items include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: Two for each size and type.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in latest edition of CEC, by a qualified testing agency, and marked for intended location and application.

E. Comply with latest CEC.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by the State or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify State no fewer than three days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without State's written permission.
4. Comply with California Electric Code (CEC).

1.10 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. ABB Inc.
2. Eaton.
3. General Electric Company.
4. Siemens Industry, Inc.
5. Square D; by Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.
6. Accessory Control Power Voltage: Remote mounted and powered; 120-V ac.

2.2 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Eaton.
2. General Electric Company.
3. Siemens Industry, Inc.
4. Square D; by Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Lugs: Mechanical type, suitable for number, size, and conductor material.
4. Accessory Control Power Voltage: Remote mounted and powered; 120-V ac.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Eaton.
2. General Electric Company.
3. Siemens Industry, Inc.
4. Square D; by Schneider Electric.

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 125 A and larger.

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I^2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

I. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 12.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 3R

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height, unless otherwise indicated.

B. Comply with mounting and anchoring requirements specified in Section 26 05 48.16 "Seismic Controls for Electrical Systems."

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NECA 1.

3.3 IDENTIFICATION

A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Completion of the Work, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit

26 56 19
LED EXTERIOR LIGHTING

1.1 SUMMARY

A. Section Includes:
   1. Luminaire types.

1.2 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of the following:

   1. Luminaire.
   2. Photoelectric relay.

B. Product Test Reports: For each luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Source quality-control reports.

D. Sample warranty.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and photoelectric relays to include in operation and maintenance manuals.

   1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
   2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1. Lamps: 4 of each type and rating installed. Furnish at least one of each type.
   2. Glass, Acrylic, and Plastic Lenses, Covers, and Other Optical Parts: 1 of each type and rating installed. Furnish at least one of each type.
   3. Diffusers and Lenses: 1 of each type and rating installed. Furnish at least one of each type.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications:

1. Luminaire manufacturers' laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Provide luminaires from a single manufacturer for each luminaire type.

C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

D. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.7 FIELD CONDITIONS

A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.

B. Mark locations of exterior luminaires for approval by State prior to the start of luminaire installation.

1.8 WARRANTY

PART 2 - PRODUCTS

2.1 Product Data

1. See Keynote 2614, sheet A105.
2. Basis of Design:
   a. Forms and Surfaces: Light Column Pedestrian
   b. Model: LPLCO-512
   c. Series 500
   d. Stainless Steel Finish
   e. 5” Diameter and 132.5” Height
   f. 3000K LED Fixture
   g. Light Shield: 360 Perforated
   h. 8” Inch J bolt anchorage into concrete.
   i. Photoelectric relay.
3. Or Approved Equal.

4. Manufacturer's Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance:
   1. Luminaires and lamps shall be labeled vibration and shock resistant.

2.3 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. UL Compliance: Comply with UL 1598 and listed for wet location.

D. Lamp base complying with ANSI C81.61.

E. Bulb shape complying with ANSI C79.1.

F. L70 lamp life of 35,000 hours.

G. Lamps dimmable from 100 percent to 0 percent of maximum light output.

H. Internal driver.

I. Nominal Operating Voltage: 120 Vac.

J. Lamp Rating: Lamp marked for outdoor use.

K. Source Limitations:

   1. Obtain luminaires from single source from a single manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Install lamps in each luminaire.

3.3 INSTALLATION OF INDIVIDUAL GROUND-MOUNTED LUMINAIRES

A. Install on concrete base with top 4 inches above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth.

3.4 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Photoelectric Control Operation: Verify operation of photoelectric controls.

B. Luminaire will be considered defective if it does not pass tests and inspections.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

breaker. Remove front panels so joints and connections are accessible to portable scanner.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 28 16

SECTION 27 05 28

PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Metal wireways and auxiliary gutters.
3. Metallic surface pathways.
4. Hooks.
5. Boxes, enclosures, and cabinets.

1.2 ACTION SUBMITTALS

A. Product data for each type of product.

B. Shop Drawings: For custom enclosures and cabinets and custom underground handholes and boxes. Include plans, elevations, sections, and attachment details.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Pathway routing plans, drawn to scale and coordinated with each other, using input from installers of items involved.

B. Qualification Data: For professional engineer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Description: Metal raceway of circular cross section with manufacturer-fabricated fittings.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. O-Z/Gedney; a brand of Emerson Industrial Automation.
2. Southwire Company.
3. Thomas & Betts Corporation; A Member of the ABB Group.

C. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
2. Comply with TIA-569-D.

D. GRC: Comply with ANSI C80.1 and UL 6.

E. ARC: Comply with ANSI C80.5 and UL 6A.

F. IMC: Comply with ANSI C80.6 and UL 1242.

G. EMT: Comply with ANSI C80.3 and UL 797.

H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
2. Fittings for EMT:

a. Material: Steel.
b. Type: compression.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

I. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 SURFACE METAL PATHWAYS

A. Description: Galvanized steel with snap-on covers, complying with UL 5.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. MonoSystems, Inc.
2. Panduit Corp.
3. Wiremold / Legrand.

C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with TIA-569-D.

2.3 HOOKS

A. Description: Prefabricated sheet metal cable supports for telecommunications cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. MonoSystems, Inc.
2. Panduit Corp.
3. Wiremold / Legrand.

C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with TIA-569-D.

E. Galvanized stainless steel.

F. J shape.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Description: Enclosures for communications.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carlon; a brand of Thomas & Betts Corporation.
2. Crouse-Hinds, an Eaton business.
3. Hoffman; a brand of nVent.

C. General Requirements for Boxes, Enclosures, and Cabinets:

1. Comply with TIA-569-D.
2. Boxes, enclosures, and cabinets installed in wet locations shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for use in wet locations.
3. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
4. Device Box Dimensions: size to suit.

D. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

E. Metal Floor Boxes:

1. Material: Cast metal.
2. Type: Fully adjustable.
3. Shape: Rectangular.
4. Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Nonmetallic Floor Boxes: Nonadjustable, rectangular.

1. Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

A. Minimum Pathway Size: 3/4-inch trade size for copper cables.

B. Pathway Fittings: Compatible with pathways and suitable for use and location.

C. Install surface pathways only where indicated on Drawings.

3.2 INSTALLATION

A. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA/BICSI 568.
3. TIA-569-D.
4. NECA 101
5. NECA 102.
6. NECA 105.
7. NECA 111.

B. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

C. Comply with requirements in Section 07 84 13 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

D. Comply with requirements in Section 27 05 29 "Hangers and Supports for Communications Systems" for hangers and supports.

E. Comply with requirements in Section 27 05 44 "Sleeves and Sleeve Seals for Communications Pathways and Cabling" for sleeves and sleeve seals for communications.

F. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

G. Complete pathway installation before starting conductor installation.

H. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches of changes in direction. Utilize long radius ells for all optical-fiber cables.

I. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

J. Support conduit within 12 inches of enclosures to which attached.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.

L. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

M. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway-sealing fittings according to NFPA 70.

1. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
2. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

N. Hooks:

1. Size to allow a minimum of 25 percent future capacity without exceeding design capacity limits.
2. Shall be supported by dedicated support wires. Do not use ceiling grid support wire or support rods.
3. Hook spacing shall allow no more than 6 inches of slack. The lowest point of the cables shall be no less than 6 inches adjacent to ceilings, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
4. Space hooks no more than 5 feet o.c.
5. Provide a hook at each change in direction.

O. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

P. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

Q. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.3 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

END OF SECTION 27 05 28

SECTION 27 05 53

IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Color and legend requirements for labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes.
5. Fasteners for labels and signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Identification Schedule:

1. Outlets: Scaled drawings indicating location and proposed designation.
2. Racks: Scaled drawings indicating location and proposed designation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 70 and TIA 606-B.

B. Comply with ANSI Z535.4 for safety signs and labels.

C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Brady Corporation.
    b. Champion America.
    c. Panduit Corp.

B. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, polyester flexible labels with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Brady Corporation.
    b. Ideal Industries, Inc.
    c. Panduit Corp.

2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating protective shields over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
3. Marker for Labels: Permanent, waterproof black ink marker recommended by tag manufacturer.
4. Marker for Labels: Machine-printed, permanent, waterproof black ink recommended by printer manufacturer.

C. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Brady Corporation.
    b. Ideal Industries, Inc.
    c. Panduit Corp.

2. Minimum Nominal Size:

    a. 1-1/2 by 6 inches for raceway and conductors.
    b. 3-1/2 by 5 inches for equipment.
    c. As required by authorities having jurisdiction.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Verify identity of each item before installing identification products.

C. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

D. Apply identification devices to surfaces that require finish after completing finish work.

E. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
3. Provide label 6 inches from cable end.

F. Snap-Around Labels:

1. Secure tight to surface at a location with high visibility and accessibility.
2. Provide label 6 inches from cable end.

G. Self-Adhesive Wraparound Labels:

1. Secure tight to surface at a location with high visibility and accessibility.
2. Provide label 6 inches from cable end.

H. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.

END OF SECTION 27 05 53

SECTION 27 15 23

COMMUNICATIONS OPTICAL FIBER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. 850 nanometer laser-optimized 50/125 micrometer multimode optical fiber cable (OM4).
2. 9/125 micrometer, single-mode, indoor-outdoor optical fiber cable (OS2).
3. Optical fiber cable hardware.
4. Cross-connects and patch panels.
5. Grounding.
6. Identification products.

1.2 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

C. RCDD: Registered Communications Distribution Designer.

1.3 ACTION SUBMITTALS

A. Product Data:
1. 850 nanometer laser-optimized 50/125 micrometer multimode optical fiber cable (OM4).
2. 9/125 micrometer, single-mode, indoor-outdoor optical fiber cable (OS2).
3. Optical fiber cable hardware.
4. Cross-connects and patch panels.
5. Grounding.
6. Identification products.

B. Shop Drawings: Reviewed and stamped by RCDD.

1. System Labeling Schedules:

a. Electronic copy of labeling schedules, in software and format selected.
b. Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.

2. Cabling administration Drawings and printouts.

3. Wiring diagrams and installation details of telecommunications equipment, to show location and layout of telecommunications equipment, including the following:

    a. Telecommunications rooms plans and elevations.
    b. Telecommunications pathways.
    c. Telecommunications system access points.
    d. Telecommunications grounding system.
    e. Telecommunications conductor drop locations.
    f. Typical telecommunications details.

C. Fiber optic cable testing plan.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For RCDD, installation supervisor, and field inspector.

B. Product Certificates: For each type of product.

C. Source quality-control reports.

D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

B. Maintenance Data: For optical fiber cable, splices, and connectors to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.

2. Installation Supervision: Installation is to be under the direct supervision of Level 2 Installer] who is to be present at all times when Work of this Section is performed at Project site.
3. Testing Supervisor: Currently certified by BICSI as an RCDD.

B. Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical fiber flashlight] [or] [optical loss test set.
2. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.10 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications equipment and service suppliers.

1.11 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning with Substantial Completion, provide software support for two years.

B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software is to include operating system. Upgrade is to include new or revised licenses for use of software.

1. Provide 15 days notice to the State to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system is to comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

2.2 850 NANOMETER LASER-OPTIMIZED, 50/125 MICROMETER, MULTIMODE OPTICAL FIBER CABLE (OM4)

A. Description: Multimode, 50/125-micrometer, 12-fiber strand, nonconductive, tight buffer, optical fiber cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BELDEN
2. CORNING
3. PANDUIT
4. Or equal.

C. Standards:

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA-568-C.3 for performance specifications.
3. Comply with TIA-492AAAD for detailed specifications.

D. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.

E. Minimum Overfilled Modal Bandwidth-length Product: 3500 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

F. Minimum Effective Modal Bandwidth-length Product: 4700 MHz-km at 850 nm.

G. Jacket:

1. Jacket Color: Aqua.
2. Cable cordage jacket, fiber, unit, and group color are to be according to TIA-598-D.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

H. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

1. Plenum Rated, Nonconductive:

a. Type OFNP, complying with NFPA 262.
b. Type OFNP in listed plenum communications raceway.
c. Type OFNP or Type OFNR in metallic conduit.
d. Type OFNP, complying with NFPA 262; Type OFNP in listed plenum communications raceway; or Type OFN, Type OFNG, Type OFNP, or Type OFNR in metallic conduit.

2. Plenum Rated, Conductive:

a. Type OFCP, complying with NFPA 262.
b. Type OFCP or Type OFNP in listed plenum communications raceway.
c. Type OFCP, Type OFNP, Type OFCR, or Type OFNR in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

2.3 9/125 MICROMETER, SINGLE-MODE, INDOOR-OUTDOOR OPTICAL FIBER CABLE (OS2)

A. Description: Single mode, 9/125-micrometer, 12 fibers strand, tight buffered, nonconductive optical fiber cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BELDEN
2. CORNING
3. PANDUIT
4. Or equal.

C. Maximum Attenuation: 0.5 dB/km at 1310 nm; 0.5 dB/km at 1550 nm.

D. Jacket:

1. Jacket Color: Yellow.
2. Cable cordage jacket, fiber, unit, and group color are to be according to TIA-598-D.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

E. Standards:

1. Comply with TIA-492CAAB for detailed specifications.
2. Comply with TIA-568-C.3 for performance specifications.
3. Comply with ICEA S-104-696 for mechanical properties.

F. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

1. Plenum Rated, Nonconductive:

a. Type OFNP, complying with NFPA 262.
b. Type OFNP in listed plenum communications raceway.
c. Type OFNP or Type OFNR in metallic conduit.
d. Type OFNP, complying with NFPA 262; Type OFNP in listed plenum communications raceway; or Type OFN, Type OFNG, Type OFNP, or Type OFNR in metallic conduit.

2. Plenum Rated, Conductive:

a. Type OFCP, complying with NFPA 262.
b. Type OFCP or Type OFNP in listed plenum communications raceway.
c. Type OFCP, Type OFNP, Type OFCR, or Type OFNR in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

2.4 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BELDEN
2. CORNING
3. PANDUIT
4. Or equal.

B. Standards:

1. Comply with Fiber Optic Connector Intermateability Standard (FOCIS) specifications of the TIA-604 series.
2. Comply with TIA-568-C.3.

C. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: Twelve for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

D. Patch Cords: Factory-made, single-fiber cables in 36-inch (900-mm) lengths.

E. Connector Type: Type LC complying with TIA-604-10-B connectors.

F. Plugs and Plug Assemblies:

1. Male; color-coded modular telecommunications connector designed for termination of a single optical fiber cable.
2. Insertion loss not more than 0.25 dB.
3. Marked to indicate transmission performance.

G. Jacks and Jack Assemblies:

1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of a single optical fiber cable.
2. Insertion loss not more than 0.25 dB.
3. Marked to indicate transmission performance.
4. Designed to snap-in to a patch panel or faceplate.

H. Faceplate:
1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
2. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.

a. Flush mounting jacks, positioning the cord at a 45-degree angle.

2.5 GROUNDING

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Comply with TIA-607-B.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.7 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test multimode optical fiber cables according to TIA-526-14-B and TIA-568-C.3.

C. Factory test preterminated optical fiber cable assemblies according to TIA-526-14-B and TIA-568-C.3.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 WIRING METHODS

A. Wiring Method, Raceways: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in

attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."

B. Wiring Method, Concealed: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

A. Comply with NECA 1, NECA 301 and NECA/BICSI 568.

B. General Requirements for Optical Fiber Cabling Installation:

1. Comply with TIA-568-C.1 and TIA-568-C.3.
2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
3. Terminate all cables; no cable is to contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps are not to be used for heating.
9. In the communications equipment room, provide a 10-foot-long service loop on each end of cable.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
11. Cable may be terminated on connecting hardware that is rack mounted.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

2. Cable is not to be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 6 feet long not less than 12 inches in diameter below each feed point.

E. Group connecting hardware for cables into separate logical fields.

3.3 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.4 INSTALLATION OF GROUNDING

A. Install grounding according to BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.

B. Comply with TIA-607-B and NECA/BICSI-607.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.5 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
1. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Paint and label colors for equipment identification are to comply with TIA-606-B.

C. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, horizontal pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

E. Cable and Wire Identification:

1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
4. Label each unit and field within distribution racks and frames.
5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

F. Labels are to be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606-B, for the following:

1. Flexible vinyl or polyester that flexes as cables are bent.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections with the assistance of a factory-authorized service representative.

D. Tests and Inspections:

1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Optical Fiber Cable Tests:

a. Test instruments are to meet or exceed applicable requirements in TIA-568-C.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
b. Link End-to-End Attenuation Tests:

1) Horizontal and Multimode Horizontal Link Measurements: Test at 850 or 1300 nm in one direction according to TIA-526-14-B, Method B, One Reference Jumper.
2) Attenuation test results for horizontal links are to be less than 2.0 dB. Attenuation test results are to be less than those calculated according to equation in TIA-568-C.1.

E. Data for each measurement are to be documented. Data for submittals are to be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

F. Remove and replace cabling where test results indicate that it does not comply with specified requirements.

G. End-to-end cabling will be considered defective if it does not pass tests and inspections.

H. Prepare test and inspection reports.

END OF SECTION 27 15 23

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. UTP cabling.
2. Coaxial cabling.
3. Low-voltage control cabling.
4. Control-circuit conductors.
5. Fire alarm wire and cable.
6. Identification products.

1.2 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. EMI: Electromagnetic interference.

C. IDC: Insulation displacement connector.

D. Low Voltage: As defined in 2019 CEC for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

E. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).

F. RCDD: Registered Communications Distribution Designer.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For coaxial cable, include the following installation data for each type used:

a. Nominal OD.
b. Minimum bending radius.
c. Maximum pulling tension.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

B. Source quality-control reports.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An NRTL.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.
   1. Test each pair of UTP cable for open and short circuits.

1.7 FIELD CONDITIONS

A. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.

   1. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.

B. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84 2007 Edition; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 50 or less.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in 2019 CEC, by a qualified testing agency, and marked for intended location and application.

2.2 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

B. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

   1. ADC.
   2. AMP Netconnect; a brand of Tyco Electronics Corporation.
   3. Belden Inc.
   4. Berk-Tek; a Nexans company.
   5. CommScope, Inc.
   6. Draka Cableteq USA.
   7. Genesis Cable Products; Honeywell International, Inc.
   8. Mohawk; a division of Belden Networking, Inc.
   9. Superior Essex Inc.
   10. SYSTIMAX Solutions; a CommScope, Inc. brand.
   11. 3M; Communication Markets Division.

12. Or equal.

C. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 5e.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and 2019 CEC for the following types:

a. Communications, General Purpose: Type CM or CMG.
b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
c. Communications, Limited Purpose: Type CMX.
d. Multipurpose: Type MP or MPG.
e. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.

2.3 UTP CABLE HARDWARE

A. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

1. ADC.
2. American Technology Systems Industries, Inc.
3. AMP Netconnect; a brand of Tyco Electronics Corporation.
4. Belden Inc.
5. Dynacom Inc.
6. Hubbell Incorporated; Hubbell Premise Wiring.
7. Leviton Commercial Networks Division.
8. Molex Premise Networks; a division of Molex, Inc.
9. Panduit Corp.
10. Siemon.
11. Or equal.

B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.

C. Connecting Blocks: 110-style for Category 5e. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

2.4 LOW-VOLTAGE CONTROL CABLE

A. Paired Cable: 2019 CEC, Type CMG.

1. One pair, twisted, No. 18 AWG, stranded (19x29) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated, Paired Cable: 2019 CEC, Type CMP.

1. One pair, twisted, No. 18 AWG, stranded (19x29) tinned copper conductors.

2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

2.5 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway.

B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway power-limited cable, complying with UL 83, concealed in building finishes.

2.6 FIRE ALARM WIRE AND CABLE

A. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

1. Comtran Corporation.
2. Draka Cableteq USA.
3. Genesis Cable Products; Honeywell International, Inc.
4. Rockbestos-Suprenant Cable Corp.
5. West Penn Wire.
6. Or equal.

B. General Wire and Cable Requirements: NRTL listed and labeled as complying with 2019 CEC, Article 760.

C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG size as recommended by system manufacturer.

1. Circuit Integrity Cable: Twisted shielded pair, 2019 CEC, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.

D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 18 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

2.7 IDENTIFICATION PRODUCTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

1. Brady Worldwide, Inc.
2. HellermannTyton North America.
3. Kroy LLC.
4. Panduit Corp.
5. Or equal.

B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

C. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP cables according to TIA/EIA-568-B.2.

C. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for installation of supports for cables.

3.2 WIRING METHOD

A. Install wiring in metal pathways and wireways.

1. Minimum conduit size shall be 3/4 inch. Control and data transmission wiring shall not share conduit with other building wiring systems.
2. Comply with requirements in Section 28 05 28 "Pathways for Electronic Safety and Security."
3. Comply with requirements in Section 26 05 36 "Cable Trays for Electrical Systems."

B. Install cable, concealed in accessible ceilings, walls, and floors when possible.

C. Wiring within Enclosures:

1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
2. Install lacing bars and distribution spools.
3. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer.
4. Install conductors parallel with or at right angles to sides and back of enclosure.
5. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks.
6. Mark each terminal according to system's wiring diagrams.
7. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.

C. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

D. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 6 rating of components and that ensure Category 6 performance of completed and linked signal paths, end to end.

1. Comply with TIA/EIA-568-B.2.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 72 inches long shall be neatly coiled not less than 12 inches in diameter below each feed point.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

4. Separation between cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 FIRE ALARM WIRING INSTALLATION

A. Comply with NECA 1 and NFPA 72, 2019 with California Amendments.

B. Wiring Method: Install wiring in metal raceway according to Section 26 05 33 "Raceways and Boxes for Electrical Systems."

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour, fire-rated fire alarm cables, 2019 CEC, Types MI and CI, is not permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with

the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

H. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.5 POWER AND CONTROL-CIRCUIT CONDUCTORS

A. 120-V Power Wiring: Install according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.

B. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.

3.6 FIRESTOPPING

A. Comply with TIA-569-B, "Firestopping" Annex A.

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.7 GROUNDING

A. For communications wiring, comply with J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. For low-voltage wiring and cabling, comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

3.8 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections:

1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.

a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 28 05 13

SECTION 28 05 26

GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Grounding conductors.
2. Grounding connectors.

1.2 DEFINITIONS

A. Signal Ground: The ground reference point designated by manufacturer of the system that is considered to have zero voltage.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Harger Lightning and Grounding.
2. Panduit Corp.
3. Tyco Electronics Corp.
4. or equal.

B. UL 486A-486B.

C. Insulated Conductors: Stranded copper wire, green or green with yellow stripe insulation, insulated for 600 V, and complying with UL 83.

1. Ground wire for custom-length equipment ground jumpers shall be No. 6 AWG, 19-strand, UL-listed, Type THHN wire.

D. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmils (14.2 sq. mm), 14 strands of No. 17 AWG conductor, and 1/4 inch (6.3 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Tinned-copper tape, braided conductors terminated with two-hole

copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.2 CONNECTORS

A. Irreversible connectors listed for the purpose. Listed by an NRTL as complying with CEC for. for specific types, sizes, and combinations of conductors and other items connected. Comply with UL 486A-486B.

B. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. Chatsworth Products, Inc.
3. Harger Lightning and Grounding.
4. Panduit Corp.
5. Tyco Electronics Corp.
6. or equal.

C. Compression Wire Connectors: Crimp-and-compress connectors that bond to the conductor when the connector is compressed around the conductor. Comply with UL 467.

D. Electroplated tinned copper, C and H shaped.

E. Busbar Connectors: Cast silicon bronze, solderless compression-type, mechanical connector; with a long barrel and two holes spaced on 5/8- or 1-inch centers for a two-bolt connection to the busbar.

F. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING BUSBARS

A. Comply with Section 270526 "Grounding and Bonding for Communications Systems."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with IEEE 1100, "Recommended Practice for Power and Grounding Electronic Equipment."

1. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
2. Bond shields and drain conductors to ground at only one point in each circuit.

B. Signal Ground:

1. For each system, establish the signal ground and label that location as such.
2. Bond the signal ground to the alternating-current (ac) power system service by connecting to one of the following listed locations, using insulated No. 6 AWG, stranded, Type THHN wire:

a. Grounding bar in an electrical power panelboard if located in the same room or space as the signal ground.
b. Telecommunications grounding busbar.

C. Comply with NECA 1.

3.2 APPLICATION

A. Conductors: Install solid conductor for No. 8 AWG and smaller and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Grounding and Bonding Conductors:

1. Install in the straightest and shortest route between the origination and termination point, and no longer than required. The bend radius shall not be smaller than eight times the diameter of the conductor. No one bend may exceed 90 degrees.
2. Install without splices.
3. Support at not more than 36-inch (900-mm) intervals.

3.3 CONNECTIONS

A. Stacking of conductors under a single bolt is not permitted when connecting to busbars.

B. Assemble the wire connector to the conductor, complying with manufacturer's written instructions and as follows:

1. Use crimping tool and the die specific to the connector.
2. Pretwist the conductor.
3. Apply an antioxidant compound to all bolted and compression connections.

C. Shielded Cable: Bond the shield of shielded cable to the signal ground. Comply with TIA/EIA-568-B.1 and TIA/EIA-568-B.2 when grounding screened, balanced, twisted-pair cables.

D. Rack- and Cabinet-Mounted Equipment: Bond powered equipment chassis to the cabinet or rack grounding bar. Power connection shall comply with 2019 CEC; the equipment grounding conductor in the power cord of cord- and plug-connected equipment shall be considered as a supplement to bonding requirements in this Section.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 28 05 26

SECTION 28 05 28

PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetallic conduits, tubing, and fittings.
3. Boxes, enclosures, and cabinets.
4. Handholes and boxes for exterior underground cabling.

1.2 DEFINITIONS

A. ARC: Aluminum rigid conduit.

B. GRC: Galvanized rigid steel conduit.

C. IMC: Intermediate metal conduit.

1.3 ACTION SUBMITTALS

A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit IEQ 4: For solvent cements and adhesive primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Pathway routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of pathway groups with common supports.
2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

B. Qualification Data: For professional engineer.

C. Seismic Qualification Certificates: For pathway racks, enclosures, cabinets, and equipment racks and their mounting provisions, including those for internal components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which certification is based and their installation requirements.
4. Detailed description of conduit support devices and interconnections on which certification is based and their installation requirements.

D. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit; a Tyco International Ltd. Co.
3. Alpha Wire Company.
4. Anamet Electrical, Inc.
5. Electri-Flex Company.
6. O-Z/Gedney; a brand of EGS Electrical Group.
7. Picoma Industries; Subsidiary of Mueller Water Products, Inc.
8. Republic Conduit.
9. Robroy Industries
10. Southwire Company.
11. Thomas & Betts Corporation.
12. Western Tube and Conduit Corporation.
13. Wheatland Tube Company; a division of John Maneely Company.
14. Or equal.

B. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in 2019 CEC, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. ARC: Comply with ANSI C80.5 and UL 6A.

E. IMC: Comply with ANSI C80.6 and UL 1242.

F. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

G. EMT: Comply with ANSI C80.3 and UL 797.

H. FMC: Comply with UL 1; zinc-coated steel.

I. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

J. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and 2019 CEC.
2. Fittings for EMT:

a. Material: Steel.
b. Type: Compression or Set Screw.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 467, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

K. Joint Compound for IMC, GRC: Approved, as defined in 2019 CEC, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit; a Tyco International Ltd. Co.
3. Anamet Electrical, Inc.
4. Arnco Corporation.
5. CANTEX Inc.
6. CertainTeed Corp.
7. Condux International, Inc.
8. Electri-Flex Company.
9. Kraloy.
10. Lamson & Sessions; Carlon Electrical Products.
11. Niedax-Kleinhuis USA, Inc.
12. RACO; a Hubbell Company.
13. Thomas & Betts Corporation.
14. Or equal.

B. General Requirements for Nonmetallic Conduits and Fittings:

1. Listed and labeled as defined in 2019 CEC, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

C. ENT: Comply with NEMA TC 13 and UL 1653.

D. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

E. LFNC: Comply with UL 1660.

F. RTRC: Comply with UL 1684A and NEMA TC 14.

G. Fittings RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

H. Fittings for LFNC: Comply with UL 514B.

I. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

J. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Adalet.
2. Cooper Technologies Company; Cooper Crouse-Hinds.
3. EGS/Appleton Electric.
4. Erickson Electrical Equipment Company.
5. Hoffman; a Pentair company.
6. Hubbell Incorporated; Killark Division.
7. Lamson & Sessions; Carlon Electrical Products.
8. Milbank Manufacturing Co.
9. Molex, Woodhead Brand
10. Mono-Systems, Inc.
11. O-Z/Gedney; a brand of EGS Electrical Group.
12. RACO; a Hubbell Company.
13. Robroy Industries.
14. Spring City Electrical Manufacturing Company.
15. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.
16. Thomas & Betts Corporation.
17. Wiremold / Legrand.
18. Or equal.

B. General Requirements for Boxes, Enclosures, and Cabinets:

1. Comply with TIA-569-B.
2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

E. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

H. Device Box Dimensions: 4-inches square by 2-1/8 inches deep.

I. Gangable boxes are prohibited.

J. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

K. Cabinets:

1. NEMA 250, Type 1, Type 3R, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in 2019 CEC, by a qualified testing agency, and marked for intended location and application.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND CABLING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in 2019 CEC, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in 2019 CEC, by a qualified testing agency, and marked for intended location and application.
3. Comply with TIA-569-B.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass or a combination of the two.

1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

a. Armorcast Products Company.
b. Carson Industries LLC.
c. CDR Systems Corporation; Hubbell Power Systems.
d. NewBasis.
e. Oldcastle Precast, Inc.; Christy Concrete Products.
f. Synertech Moulded Products; a division of Oldcastle Precast, Inc.
g. Or equal.

2. Standard: Comply with SCTE 77.
3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

6. Cover Legend: Molded lettering, "ELECTRIC.".
7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
8. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.5 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

A. Outdoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC, RNC, Type EPC-40-PVC.
2. Concealed Conduit, Aboveground: GRC, RNC, Type EPC-40-PVC.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Pathway locations include the following:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
    d. Gymnasiums

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric-Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Pathways for Concealed General Purpose Distribution of Optical-Fiber or Communications Cable: General-use, optical-fiber-cable pathway General-use, communications-cable pathway EMT.
8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

C. Minimum Pathway Size: 3/4-inch trade size. Minimum size for optical-fiber cables is 1 inch.

D. Pathway Fittings: Compatible with pathways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

F. Install surface pathways only where indicated on Drawings.

G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

A. Comply with NECA 1, NECA 101, and TIA-569-B for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with 2019 CEC limitations for types of pathways allowed in specific occupancies and number of floors.

B. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

C. Complete pathway installation before starting conductor installation.

D. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications wiring conduits for which only two 90-degree bends are allowed. Support within 12 inches of changes in direction.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

H. Support conduit within 12 inches of enclosures to which attached.

I. Pathways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
2. Arrange pathways to cross building expansion joints at right angles with expansion fittings.
3. Arrange pathways to keep a minimum of 1 inch of concrete cover in all directions.

4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.

J. Stub-ups to Above Recessed Ceilings:

1. Use EMT or RMC for pathways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.

L. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.

N. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to conduit assembly to assure a continuous ground path.

P. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

Q. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground pathways designated as spare above grade alongside pathways in use.

R. Surface Pathways:

1. Install surface pathway for surface electrical outlet boxes only where indicated on Drawings.
2. Install surface pathway with a minimum 2-inch radius control at bend points.
3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight pathway section. Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

S. Pathways for Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install pathways in maximum lengths of 50 feet.

2. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.

3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

T. Install pathway sealing fittings at accessible locations according to 2019 CEC and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway sealing fittings according to 2019 CEC.

U. Install devices to seal pathway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service pathway enters a building or structure.
3. Where otherwise required by 2019 CEC.

V. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.

W. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
    d. Attics: 135 deg F temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

X. Flexible Conduit Connections: Comply with NEMA RV 3. Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC in damp or wet locations not subject to severe physical damage.

Y. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.

Z. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

AA. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

DD. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 31 23 33 "Excavating, Backfilling, and Compacting for Utilities" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 31 23 33 "Excavating, Backfilling, and Compacting for Utilities."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 31 23 33 "Excavating, Backfilling, and Compacting for Utilities."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

6. Underground Warning Tape: Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

E. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 27 05 44 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 28 05 28

SECTION 282300

VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes video surveillance system consisting of cameras, data transmission wiring, and a control station with its associated equipment.

1.2 DEFINITIONS

A. AGC: Automatic gain control.

B. B/W: Black and white.

C. CCD: Charge-coupled device.

D. MPEG: Moving picture experts group.

E. NTSC: National Television System Committee.

F. UPS: Uninterruptible power supply.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, including dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: Detail assemblies of standard components that are custom assembled for specific application on this Project.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
4. UPS: Sizing calculations.
5. Wiring Diagrams: For power, signal, and control wiring.

C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

D. Delegated-Design Submittal: For mounting and supports of cameras and other major equipment (including but not limited to CCTV cabinet). Engage a qualified professional engineer to design camera mounting, and support system. Design and details shall be signed and sealed by the qualified professional engineer responsible for their

preparation.

1. Include design calculations and details of camera mounting, anchorage, and supports.
2. Include design calculations for seismic restraints.

E. Closeout Submittals:

1. Operation, maintenance data, warranty, and support information.
   a. Provide two hard copies to be kept on-site complete with tabs and properly bound.
   b. Provide digital copy (in pdf format).

F. System Warranty: 2 years (starting at the acceptance by the State of the completed project).

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in 2022 CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NECA 1.

C. Comply with 2022 CEC.

D. Electronic data exchange between video surveillance system with an access control system shall comply with SIA TVAC.

1.5 PROJECT CONDITIONS

A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Control Station: Rated for continuous operation in ambient temperatures of 60 to 85 deg F and a relative humidity of 20 to 80 percent, noncondensing.
2. Interior, Controlled Environment: System components, except central-station control unit, installed in air-conditioned interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing. NEMA 250, Type 1 enclosures.
3. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of 0 to plus 115 deg. F dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph. NEMA 250, Type 4 enclosures.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SYSTEM REQUIREMENTS

A. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor entry connection to components.
1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Division 26 Section "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits."
2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Division 26 Section "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits" as recommended by manufacturer for type of line being protected.

B. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

2.3 GENERAL REQUIREMENTS

A. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

B. All manufactured products shall be thoroughly tested and proven in actual use.

C. All manufactured products shall include, at no additional cost, online support services and availability of a toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) for emergencies.

D. The manufacturer shall repair or replace without charge, manufactured products proven defective in material or workmanship for the stated warranty period from the date of shipment.

2.4 NETWORK CAMERA

A. The network dome camera shall offer multiple simultaneous video streams with 2.1 megapixel (MPx) 1920 x 1080 resolution, auto iris and varifocal lens.

B. The camera shall use a Dual Streaming Codec with JPEG and MPEG-4 Part 2 Video Compression. Camera shall be capable of streaming up to 30ips.

C. The network dome camera shall provide a manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.

D. The network dome camera shall provide a discreet liner integrated to the camera module.

E. The network dome camera shall feature an unsupervised alarm input, relay output and line level/external microphone input connections.

F. The network dome camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm. Video can be retrieved from the card through the FTP protocol.

G. The network dome camera shall provide a service video stream in addition to and independent of the video streams.

H. The network dome camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0.01 lux in night mode.

I. The network dome camera shall support industry standard Power over Ethernet (PoE) IEEE 802.3af, Class 2 to supply power to the camera over the network.

J. The network dome camera shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable through an embedded Web browser.

K. The network dome camera shall support H.264 High or Main profiles, or MJPEG using constant bit rate (CBR), and constrained variable bit rate (CVBR) with configurable maximum value.

L. The network dome camera shall operate normally from 18 to 32 VAC.

M. The network dome camera shall support two simultaneous, configurable video streams. H.264 and MJPEG compression formats shall be available for primary and secondary streams with selectable Unicast and Multicast protocols.

N. The network dome camera shall support configurable frame rates, bit rates and group of pictures (GOP) structures for additional bandwidth administration.

O. The network dome camera shall be conformant to the ONVIF Profile S and Profile G supporting open architecture best practices with a published API available to third-party network video recording and management systems.

P. The network dome camera shall support 4 window blanks to conceal user-defined privacy areas that cannot be viewed by an operator.

Q. The network dome camera shall offer local storage capture of 10-second video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.

R. The network dome camera shall offer the ability to record continuous video in the case of network outage, where the camera is powered by 24 VAC. It will be accessible through FTP protocol.

S. The network dome camera shall provide the ability to backup and restore camera settings through an embedded Web browser.

T. The network dome camera shall provide 802.1x port security to establish point-to-point access through a wired or wireless port using Extensible Authentication Protocol (EAP). Supported EAP methods shall include EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP.

U. The network dome camera shall support SNMP v2c and v3.

V. The network dome camera shall provide flicker correction with selections for 50 Hz or 60 Hz line frequency.

W. The network dome camera shall provide motorized zoom capabilities with a Web browser interface for remote configuration and administration.

X. The network dome camera shall provide autofocus capabilities with a Web browser interface for remote configuration and administration. The automatic autofocus shall be triggered when the camera detects an environmental temperature change and when the camera changes from color to monochrome or vice versa. User-selectable options for full-range auto-focus and quick auto-focus shall be available.

Y. The network dome camera shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.

Z. The network dome camera shall provide User and Group settings to assign permissions and access levels to the camera. The camera shall provide local management where the camera manages the access levels or remote mode where the camera authenticates the user through a Lightweight Directory Access Protocol (LDAP) server.

AA. The network dome camera shall provide simple motion detection to detect motion within a user-defined field of view or within a user specified rectangular zone. Such behaviors shall trigger an alarm.

BB. The network dome camera shall provide camera sabotage analytics to detect changes in the camera's field of view, including obstruction of the lens and unauthorized movement of the camera. Such behaviors shall trigger an alarm.

CC. The network dome camera shall be plenum-rated per 2020 NEC article 300.22(C)(2) for in-ceiling mounted applications.

DD. The network dome camera shall provide a 3/4-inch NPT conduit attachment on the back box for in-ceiling mounted applications.

EE. The network dome camera shall provide a 3/4-inch NPT conduit attachment for pendant mounted applications.

FF. The network dome camera shall attach to a standard double-gang electrical box for surface mounted applications.

GG. The network dome camera shall be capable of firmware upgrades through a network using a web user interface or a software-based device utility.

HH. The network dome camera shall meet or exceed the following design and performance specifications.

1. Camera Specifications

a.	Imaging Device	1/3-inch
b.	Imager Type	CMOS
c.	Imager Readout	Progressive scan
d.	Maximum Resolution	2.1 MPx (1920 x 1080)
e.	Electronic Shutter Range	1 ~ 1/8,000 sec
f.	Electronic Wide Dynamic Range	Up to 65 dB
g.	White Balance Range	2,500° to 8,000°K
h.	Noise Reduction	Yes, (ON/OFF selectable)
i.	Signal to Noise Ratio	50 dB
j.	Sensitivity	Down to 0.01 lux – mono mode, 200 ms, f/1.2
k.	Day/Night Capabilities	Yes
l.	Mechanical IR Cut Filter	Yes, (AUTO/MANUAL selectable), with different set points on lux
m.	Available Languages	Chinese, English, French, German, Italian, Portuguese, Russian, Spanish, and Turkish

2. Lens Specifications

a.	Lens Type	Built-in; varifocal
b.	Focal Length	3 ~ 9 mm
c.	Focus	Autofocus, motorized
d.	Zoom	Remote
e.	Auto Iris Type	DC drive lens

3. Video Specifications

a. Video Streams

- Multiple simultaneous streams with up to 2 different configurations plus service stream; the second stream is variable based on the setup of the primary stream

b. Text Overlay

- Camera name, time, date, and customizable text with multiple supported languages

c.	Available Resolutions	Two configurable streams as follows:
d.	2.1 Megapixel	1920 x 1080; 16:9 aspect ratio
e.	1.9 Megapixel	1600 x 1200; 4:3 aspect ratio
f.	1.2 Megapixel	1280 x 960; 4:3 aspect ratio
g.	0.9 Megapixel	1280 x 720; 16:9 aspect ratio
h.	0.6 Megapixel	1024 x 576; 16:9 aspect ratio
i.	0.5 Megapixel	960 x 540; 16:9 aspect ratio
j.	0.5 Megapixel	800 x 600; 4:3 aspect ratio
k.	0.3 Megapixel	640 x 480; 4:3 aspect ratio
l.	0.1 Megapixel	320 x 240; 4:3 aspect ratio
m.	0.1 Megapixel	320 x 180; 16:9 aspect ratio
n.	Frame Rate	Up to 30, 20, 25, 16.67, 15, 12.5, 10, 5, 1 (depending on the coding, resolution, and stream configuration)
o.	Video Encoding	H.264 High or Main profiles and MJPEG

p. Bit Rate Control — Constant bit rate (CBR), and constrained variable bit rate (CVBR) with configurable maximum value
q. Service Stream — 640 x 480 or 640 x 352; 2 ips, JPEG
r. Window Blanking — 4 configurable windows
s. Supported Protocols
- TCP/IP, UDP/IP, ICMP (Unicast, Multicast IGMP), ICMP, IPv4, IPv6, SNMP v2c/v3, HTTP, HTTPS, SSL, SSH, SMTP, FTP, RTSP, UPnP, DNS, NTP, RTP, RTCP, LDAP (CLIENT), QoS

t. Users
- Unicast
  a) 1 administrator, up to 4 viewers
- Multicast
  a) Unlimited H.264

u. Security Access
- Multiple user access levels with password protection

v. Web Browser Support
- Microsoft® Internet Explorer® 9.0, Apple® Safari® 7.0.6, Mozilla® Firefox® 31.0, Google® Chrome™ 37.0.2062.124 m and later

w. Pelco System Integration
- Digital Sentry 7.3 (or later); Endura 2.0 (or later);Third-party VMS through Pelco API 1.0 and ONVIF Profile S and Profile G

x. Mobile Application
- Integrated with Pelco Mobile Application

y. Analytics
- Simple motion detection and camera sabotage detection

z. Local Storage
- Capture 1-, 5-, or 10-second video clips on camera sabotage, motion detection, or alarm input; record video continuously in the case of network outage with option to overwrite access video through FTP protocol and ONVIF Profile G

aa. Camera Discovery and Firmware
- Cameras discovered and firmware upgraded through the Pelco Device Utility 2 version 2.2 (or later); cameras discovered and firmware upgrade through Endura Utilities

4. Electrical Specifications
a. Network Port — RJ-45 for 100Base-TX
b. Cable Type — Cat5 cable or better for 100Base-TX
c. Input Power — PoE (IEEE802.3af, Class 2); 24 VAC nominal, 18 to 32 VAC range
d. Power Consumption — <6 W nominal
e. Local Storage — Up to 32 GB on Micro SDHC or SDXC card
f. Alarm
- Input — 1
- Output — 1; PhotoMOS™ relay (30 V, 1 A)

g. Triggers — Unsupervised mode that detects switch closures (N.O. and N.C.)
h. Audio
- Streaming — Dual-channel
- Input/Output — Line-in/terminal block
- Compression — G.711 A-law / G.711 U-law

5. General Specifications

a. Construction — Plastic body, polycarbonate bubble
b. Pan/Tilt Adjustment — Manual
- Pan — 355°
- Tilt — 75°
- Rotation — 360°

6. Environmental Specifications
a. Operating Temperature — –10º to 50ºC (14º to 122ºF)
b. Operating Humidity — 20 to 85%, RH condensing
7. Certifications
a. CE, EN 55022 (Class A), EN 50130-4, EN 60950-1
b. FCC (Class A) – 47 CFR Part 15
c. UL/cUL Listed, UL60950-1
d. CAN/CSA-C22.2 No. 60950-1-07
e. ICES-003
f. KCC
g. ONVIF Profile S and Profile G conformant
8. Warranty
a. 36 months, parts and labor

2.5 NETWORK VIDEO RECORDER

A. Each camera shall support individual Recording Rate and Image Quality settings for each of Emergency, Event, Schedule and Manual Recording Modes. This array of Camera Recording Rate and Image Quality settings by the Recording Modes shall form one of 4 Program Actions. The Program Action shall be assignable to a Time Table.

2.6 NETWORK SWITCH:

1. Install the network switch per design and construction documents, and as specified by the OEM.
2. Connect network switch to AC power (UPS).
3. Connect network cameras to network switch.
4. Configure the network switch per manufacturer's recommendation and project requirements.

2.7 SIGNAL TRANSMISSION COMPONENTS

A. Cable: CAT 6 cable.

2.8 POWER SUPPLIES

A. Power supplies shall be a low-voltage power supplies matched for voltage and current requirements of cameras and accessories, type as recommended by camera, infrared illuminator, and lens manufacturer.

B. Technical specifications:
1. Input: 115VAC, 50/60Hz, 2.7 amps
2. Outputs:
a. Number of outputs, 16
b. Output voltage & power:

- 24VAC @ 12.5 amps (300VA) or 28VAC @ 10-amp (280VA) supply current

3. Illuminated power disconnect circuit breaker with manual reset
4. Surge suppression
5. Camera synchronization
6. Rack mount.
7. NEMA 250, Type 1 enclosure.

2.9 UNINTERRUPTED POWER SUPPLY

A. 1.5kVA On-Line Double-Conversion UPS, 2U Rack/Tower, Interactive LCD display, 100/110/120/127V NEMA outlets.
1. 1500VA / 1.5kVA / 1350W on-line double conversion 2U rack / tower UPS
2. 100/110/120/127V 50/60Hz output; High efficiency economy mode option
3. Interactive LCD with 9 selectable screens of UPS and site power data
4. Expandable runtime, Hot-swap batteries, 18.5 in / 47cm depth
5. USB, RS232 & EPO ports, support for SNMP/WEB card option
6. 2 independently switched load banks
7. NEMA 5-15P input; 6 NEMA 5-15R outlets
8. Two switched 3-outlet load banks support remote reboot or programmable load shedding options
9. Supports 2% output voltage regulation and zero transfer time in double conversion mode
10. Economy mode option offers enhanced efficiency, reduced power consumption and lower BTU emissions
11. 14 minutes runtime at 50% load (675W) and 4.2 minutes at 100% load (1350W) with internal batteries.

2.10 MONITORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Pelco
2. Planar
3. Sharp
4. LG
5. Samsung
6. Or Equal

B. Color:

1. HD Format: 4K UHD
2. Screen Size/Aspect Ratio: Min. 24”, 16:9.
3. Display Resolution: Ultra HD
4. Minimum Front Panel Devices and Controls: Power switch; power-on indicator; and brightness, contrast, color, and tint controls.
5. Mounting: Desktop mounted coordinate with Architectural Plans.
6. Electrical: 120-V ac, 60 Hz.

PART 3 - EXECUTION

3.1 WIRING

A. Wiring Method: Install cables in raceways unless otherwise indicated. Conceal raceways and wiring except in unfinished spaces.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

C. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

D. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.2 VIDEO SURVEILLANCE SYSTEM INSTALLATION

A. Install cameras and infrared illuminators level and plumb.

B. Install cameras with 84-inch- minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.

C. Install power supplies and other auxiliary components at control stations, unless otherwise indicated.

D. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system component enclosures, and mounted in self-protected, inconspicuous positions.

E. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Identification of Electrical Systems."

3.3 LICENSING STRUCTURE

1. Base Server License
   a. An VMS Base Server license is mandatory for installing the product.
2. The Base Server license contains:
   a. Unlimited numbers of Recording Server licenses
   b. Unlimited numbers of Smart Clients, Remote Clients, PDA Clients, and Matrix Monitor licenses
3. Camera License
   a. To connect to a camera, a Device License per camera channel is required
   b. In total, for all copies of the product installed under a given Base Server license, the product may only be used with as many cameras as you have purchased camera licenses for • Video encoders and DVRs with multiple analog cameras require a license per channel to operate.

c. Camera Licenses can be purchased in any numbers. To extend the installation with additional Camera Licenses, the Base Server License number (SLC) is required when ordering.

4. Client License:
   a. All client modules are not licensed and can be installed and used on any number of computers.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory representative to inspect field-assembled components and equipment installation and supervise pretesting, testing, and adjusting of video surveillance equipment.
   1. Engage a factory representative to provide system configuration (Min. 2 days).
   2. Engage a factory representative to provide network configuration (Min. 2 days).

B. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.

C. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video surveillance equipment for acceptance and operational testing as follows:

   1. Prepare equipment list described in Part 1 "Submittals" Article.
   2. Verify operation of auto-iris lenses.
   3. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
   4. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
   5. Set and name all preset positions; consult State's personnel.
   6. Set sensitivity of motion detection.
   7. Connect and verify responses to alarms.
   8. Verify operation of control-station equipment.

D. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.

E. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

F. Remove and replace malfunctioning items and retest as specified above.

G. Record test results for each piece of equipment.

H. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions and to optimize performance of the installed equipment. Tasks shall include, but are not limited to, the following:

1. Check cable connections.
2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
3. Adjust all preset positions; consult State's personnel.
4. Recommend changes to cameras, lenses, and associated equipment to improve State' utilization of video surveillance system.
5. Provide a written report of adjustments and recommendations.

3.6 CLEANING

A. Clean installed items using methods and materials recommended in writing by manufacturer.

B. Clean video surveillance system components, including camera-housing windows, lenses, and monitor screens.

3.7 DEMONSTRATION

A. Engage a factory representative to train State's security, employees, and maintenance personnel to adjust, operate, and maintain video surveillance equipment.

1. Train State's maintenance personnel on procedures and schedules for troubleshooting, servicing, and maintaining equipment.
2. Demonstrate methods of determining optimum alignment and adjustment of components and settings for system controls.
3. Review equipment list and data in maintenance manuals. Refer to Division 01 Section "Operation and Maintenance Data"
4. Conduct a minimum of eight hours' training with a minimum of eight staff members present, as specified in instructions to State's employees Security staff in Division 01 Section "Demonstration and Training"

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal of existing trees and vegetation

B. Clearing vegetation, debris, trash and other materials within limits indicated

C. Grubbing of vegetation within limits indicated

D. Stripping of topsoil within limits indicated

E. Removing above-grade site improvements within limits indicated

F. Disconnecting, capping or sealing, and abandoning site utilities in place

G. Disconnecting, capping or sealing, and removing site utilities

H. Disposing of objectionable material

1.02 RELATED SECTIONS

A. Section 31 20 00, Earth Moving

B. Section 32 12 16, Asphalt Paving

C. Section 32 13 13, Concrete Pavement

1.03 RELATED DOCUMENTS

A. Geotechnical Report: GEOCON Geotechnical Investigation Report dated June 1, 2022.

B. ANSI A300: Industry Standards for Tree Care Practices

C. Applicable Publications

1. “Trees and Building Sites,” official publication of the International Society of Arboriculture.

2. “Arboriculture,” the care of trees and shrubs by Dr. Richard Harris.

1.04 DEFINITIONS

A. ANSI: American National Standards Institute

B. CAL-OSHA: California Occupational Safety and Health Administration

C. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

1.05 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

1.06 QUALITY ASSURANCE

A. Do not remove or prune trees without first securing a permit from the appropriate agency.

B. Prune to the standards of the International Society of Arborists and to ANSI A300.

1.07 PROJECT CONDITIONS

A. Except for materials indicated to be stockpiled or to remain the Owner's property, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the Owner's Representative. Avoid damaging materials designated for salvage.

C. Unidentified Materials;

1. If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the Owner's Representative.

2. If necessary, the Owner's Representative will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Backfill excavations resulting from demolition operations with on-site or import materials conforming to engineered fill defined in Section 31 20 00, Earth Moving.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain during construction.

3.02 TREE REMOVAL

A. Remove trees designated for removal prior to the construction of new improvements in the vicinity:

1. When demolishing trees indicated to be removed within areas for new pavement or hardscape, remove tree, stump to a depth of two (2) feet below finish grade, and all roots located in the top twelve (12) inches of soil. Remove wood chips created from grinding process down to remaining stump then refill void and re-compact to 80% relative compaction. Use import soil as indicated in specifications for this purpose. Import soil and compaction in future paved areas shall be in accordance with Section 321216, Asphalt Paving and Section 321313, Concrete Pavement.

2. When demolishing trees indicated to be removed within new landscaped areas, removal shall be done in one of the following ways:

   a. For trees located in accessible areas, remove tree and grind stump to four (4) inches below finish grade. Backfill the void and re-compact to 80% relative compaction. Use import soil as indicated in specifications for this purpose. Do not remove existing roots.

   b. For trees located in inaccessible areas, cut stump flush with finish grade, and cover with 3 inches of bark mulch. Do not grind the stump and do not remove existing roots.

B. Perform tree removal work in a safe and proper manner, adhering to CAL-OSHA tree work protection standards and ANSI A300 Standards.

C. All trees to be demolished shall be removed in such a way as to not damage branches, trunks, or root systems of adjacent trees.

3.03 RESTORATION

A. Restore damaged improvements to their original condition, as acceptable to the Owner's Representative.

B. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, as directed by the Owner's Representative.

1. Employ a qualified arborist, licensed in jurisdiction where the Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.

2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the Owner's Representative.

3.04 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned.

B. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner's Representative or others unless authorized in writing by the Owner's representative, and then only after arranging to provide temporary utility services according to requirements indicated.

D. Coordinate utility interruptions with utility company affected.

E. Do not proceed with utility interruptions without the permission of the Owner's Representative and utility company affected. Notify Owner's Representative and utility company affected two working days prior to utility interruptions.

F. Excavate and remove underground utilities that are indicated to be removed.

G. Securely close ends of abandoned piping with tight fitting plug or cement slurry minimum 6 inches thick.

3.05 CLEARING AND GRUBBING

A. Areas to be graded shall be cleared of existing vegetation, rubbish, existing structures, and debris.

B. Remove obstructions, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

C. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

D. Prior to trenching or grading within the protection zones of the trees, carefully excavate, expose, and mark roots >/+ 2-inches diameter and preserve if possible or cut cleanly with a sharp saw under Arborist supervision. If roots >/= 2-inches in limbs larger than 3-inches in diameter are cut or damaged during construction, contact Consulting Arborist for inspection and recommendations for remedial treatments.

3.06 SITE STRIPPING

A. Strippings and spoils shall be disposed at an off-site location, per geotechnical recommendations.

B. Remove vegetation before stripping soil.

C. Surface soils that contain organic matter should be stripped. In general, the depth of required stripping will be relatively shallow (i.e. less than 2 inches); deeper stripping and grubbing may be required to remove isolated concentrations of organic matter or roots.

D. Remove trash, debris, weeds, roots, and other waste materials.

E. Stockpile soil materials designated to remain on site at a location approved by the General Contractors at a location away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

F. Do not stockpile soil within drip line of remaining trees.

3.07 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.08 BACKFILL

A. Place and compact material in excavations and depressions remaining after site clearing in accordance with Section 31 20 00, Earth Moving.

3.09 DISPOSAL

A. Remove surplus soil material, unsuitable soil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

END OF SECTION

SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavation and/or embankment from existing ground to subgrade, including soil sterilant, for roadways, driveways, parking areas, building pads, walks, paths, or trails and any other site improvements called for on the Plans.

1.02 SECTION EXCLUDES

A. Earthwork related to underground utility installation shall be performed in accordance with Sections 31 21 00, Utility Trenching and Backfill.

1.03 RELATED SECTIONS

A. Section 31 10 00, Site Clearing

1.04 RELATED DOCUMENTS

A. Geotechnical Report: GEOCON Geotechnical Investigation Report dated June 1, 2022.

B. ASTM

1. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
2. D1586, Method for Penetration Tests and Split-Barrel Sampling of Soils
3. D2487, Classification of Soils for Engineering Purposes
4. D3740, Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
5. D4318. Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils
6. E329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
7. E548, Guide for General Criteria Used for Evaluating Laboratory Competence

C. California Building Code, California Code of Regulations, Title 24, Part 2, Chapter 18, Soils and Foundations, and Chapter 33, Safeguards During Construction

D. Caltrans Standard Specifications, latest edition

1. Section 17, General
2. Section 19, Earthwork

E. CAL/OSHA, Title 8.

1.05 DEFINITIONS

A. Borrow: Approved soil material imported from off-site for use as Structural Fill or Backfill.

B. Excavation: Removal of material encountered above subgrade elevations.

1. Authorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions as shown on plans or authorized by the Geotechnical Engineer.

2. Unauthorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions without authorization by the Geotechnical Engineer. Unauthorized excavation shall be without additional compensation.

C. Geotechnical Testing Agency: An independent testing agency qualified according to ASTM E329 to conduct soil materials and rock definition testing, as documented according to ASTM D3740 and ASTM E548 provided by the Owner.

D. Structural Backfill: Soil materials approved by the Geotechnical Engineer and used to fill excavations resulting from removal of existing below grade facilities, including trees.

E. Structural Fill: Soil materials approved by the Geotechnical Engineer and used to raise existing grades.

F. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material ¾ cubic yards or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D1586, exceeds a standard penetration resistance of 100 blows/2 inches.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.

H. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, base or topsoil materials.

I. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

J. Unsuitable Material: Any soil material that is not suitable for a specific use on the Project. The Geotechnical Engineer will determine if a soil material is unsuitable.

K. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure ASTM D1557.

L. Utilities: onsite underground pipes, conduits, ducts and cables.

1.06 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Samples:

1. If required by the Geotechnical Engineer, provide 20 pound samples, sealed in airtight containers, tagged with source locations and suppliers of each proposed soil material from on-site or borrow sources, 72 hours prior to use. Do not import materials to the Project without written approval of the Geotechnical Engineer.

2. Provide materials from same source throughout work. Change of source requires approval of the Geotechnical Engineer.

1.07 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.

B. Conform all work in accordance with Caltrans Standard Specification Section 17, General and Section 19, Earthwork.

C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D1557.

D. Perform excavation, filling, compaction and related earthwork under the observation of the Geotechnical Engineer. Materials placed without approval of the Geotechnical Engineer will be presumed to be defective and, at the discretion of the Geotechnical Engineer, shall be removed and replaced at no cost to the Owner. Notify the Geotechnical Engineer at least 24 hours prior to commencement of earthwork and at least 48 hours prior to testing.

E. The Geotechnical Engineer will perform observations and tests required to enable him to form an opinion of the acceptability of the Project earthwork. Correct earthwork that, in the opinion of the Geotechnical Engineer, does not meet the requirements of these Technical Specifications and the Geotechnical Report.

F. Upon completion of the construction work, certify that all compacted fills and foundations are in place at the correct locations, and have been constructed in accordance with sound construction practice. In addition, certify that the materials used are of the types, quality and quantity required by these Technical Specifications and the Geotechnical Report. The Contractor shall be responsible for the stability of all fills and backfills constructed by his forces and shall replace portions that in the opinion of the Geotechnical Engineer have been displaced or are otherwise unsatisfactory due to the Contractor's operations.

G. Finish subgrade tolerance at completion of grading:

1. Building and paved areas: ±0.05 feet

2. Other areas: ±0.10 feet

1.08 PROJECT CONDITIONS

A. Promptly notify the Owner's Representative of surface or subsurface conditions differing from those disclosed in the Geotechnical Report. First notify the Owner's Representative verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and disclosed in the Geotechnical Report will be allowed unless the Contractor has notified the Owner's Representative in writing of differing conditions prior to the Contractor starting work on affected items.

B. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

C. Prevent erosion of freshly-graded areas during construction and until such time as permanent drainage and erosion control measures have been installed in accordance with the erosion and sediment control plans.

D. Temporarily stock-pile fill material in an orderly and safe manner and in a location approved by the Owner's Representative.

E. Environmental Requirements: When unfavorable weather conditions necessitate interrupting earthwork operation, areas shall be prepared by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion. After interruption, compaction specified in last layer shall be re-established before resuming work.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. General: On-site soils are considered suitable for use as fill provided the materials are placed in accordance with Geotechnical Recommendations. Highly expansive soils shall not be used as select structural fill, or used as backfill for trenches located within hardscape areas.

B. Imported fill soils, if required, should be predominantly granular in nature, and should be free of organics, debris, or rocks over 3 inches in size, and shall be approved by the Geotechnical Engineer before importing to the site. Imported non-expansive soils shall have a Plasticity Index less than 15 as determined by ASTM D4318, an R-value of at least 20, and fines content between 15 and 65 percent. Import fill shall be considered non-hazardous per Department of Toxic Substances Control guidelines (DTSC, 2017) and non-corrosive per Caltrans Corrosion Guidelines (Caltrans, latest edition).

PART 3 - EXECUTION

3.01 GENERAL

A. Perform work in accordance with Caltrans Standard Specification Section 19, Earthwork, as modified by the Contract Documents.

B. Placement and compaction of material by flooding, ponding, or jetting will not be permitted.

C. The use of explosives will not be permitted.

D. Grading and earthwork operations shall be observed and tested by a representative of the Geotechnical Engineer for conformance with the project plans/specifications and the geotechnical recommendations. This work includes site preparation, selection of satisfactory materials, and placement and compaction of the subgrades and fills. Sufficient notification prior to commencement of earthwork is essential to make certain that the work will be properly observed.

3.02 CONTROL OF WATER AND DEWATERING

A. Comply with Section 31 23 19, Dewatering, if dewatering is necessary.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding the site and surrounding area. Provide dewatering equipment necessary to drain and keep excavations and site free from water.

C. Dewater during backfilling operation so that groundwater is maintained a least 1 foot below level of compaction effort.

D. Obtain the Geotechnical Engineer's approval for proposed control of water and dewatering methods.

E. Protect subgrades from softening, undermining, washout and damage by rain or water accumulation.

F. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

G. Maintain dewatering system in place until dewatering is no longer required.

3.03 WET WEATHER CONDITIONS

A. Do not prepare subgrade, place or compact soil materials if subgrade or materials are above optimum moisture content.

B. If the Geotechnical Engineer allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the Geotechnical Engineer.

3.04 BRACING AND SHORING

A. Refer to section 31 60 00 Lateral Support for shoring specifications.

B. Conform to California and Federal OSHA requirements.

C. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

D. Be solely responsible for all bracing and shoring and, if requested by the Owner's Representative, submit details and calculations to the Owner's Representative. The Owner's Representative may forward the submittal to the Geotechnical Engineer, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner's Representative.

E. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.05 TOPSOIL STRIPPING

A. Remove topsoil in accordance with Section 31 10 00, Site Clearing and sections C-2.00 and C-3.00 of Geotechnical Report.

3.06 EXCAVATION

A. Excavate earth and rock to lines and grades shown on plans and to the neat dimensions indicated on the plans, required herein or as required to satisfactorily compact backfill.

B. Remove and dispose of large rocks, pieces of concrete and other obstructions encountered during excavation.

C. Excavation through buried concrete and other unknown obstructions will require specialized techniques for demolition and removal.

D. Where forming is required, excavate only as much material as necessary to permit placing and removing forms.

E. Provide supports, shoring and sheet piles required to support the sides of excavations or for protection of adjacent existing improvements.

3.07 GRADING

A. Uniformly grade the Project to the elevations shown on plans

B. Finish ditches, gutters and swales to the sections, lines and grades indicated and to permit proper surface drainage.

C. Round tops and bottoms of slopes as indicated or to blend with existing contours.

3.08 SUBGRADE PREPARATION

A. Subgrade Preparation: Prior to backfilling depressions created by the removal of old foundations and utility lines, scarify the bottom of the excavation to a minimum depth of 12 inches, moisture conditioned and compacted to at least 90 percent of the maximum dry density.

B. Over-excavate any remaining soft (pumping) areas down to firm soil and backfill the area.

C. Subgrade shall be maintained in a moist, but not wet, condition by periodically sprinkling water prior to the placement of additional fill or installation of roads. Subgrade that has been permitted to dry out and loosen or develop desiccation cracking should be scarified, moisture conditioned, and re-compacted as recommended above.

D. Install underground utilities and service connections prior to final preparation of subgrade and placement of base materials for final surface facilities. Extend services so that final surface facilities are not disturbed when service connections are made.

E. Prepare subgrades under the structural section of paved areas, curbs, gutters, walks, structures, other surface facilities and areas to receive structural fill.

F. Protect utilities from damage during compaction of subgrades and until placement of final pavements or other surface facilities.

G. Obtain the Geotechnical Engineer’s approval of subgrades prior to placing pavement structural section.

3.09 LOT FINISH GRADING

A. Blade finish lots to lines and grades indicated.

3.10 FILL PLACEMENT AND COMPACTION

A. Place fill in uniformly moisture conditioned and compacted lifts not exceeding 6 inches in loose thickness. Each lift should be thoroughly moisture conditioned and compacted to 90 percent before successive fill layers are placed.

B. In order to achieve satisfactory compaction in the subgrade and fill soils, it may be necessary to adjust the soil moisture content at the time of soil compaction per geotechnical recommendations. This may require that water be added and thoroughly mixed into any soils which are too dry or that scarification and aeration be performed in any soils which are too wet.

C. Obtain the Geotechnical Engineer's approval of surface to receive structural fill prior to placement of structural fill material.

D. Place structural fill on prepared subgrade.

E. Do not drop fill on structures. Do not backfill around, against or upon concrete or masonry structures until structure has attained sufficient strength to withstand loads imposed and the horizontal structural system had been installed.

F. Do not compact by ponding, flooding or jetting.

G. Perform compaction using rollers, pneumatic or vibratory compactors or other equipment and mechanical methods approved by the Geotechnical Engineer.

H. Compaction requirements (unless specified otherwise by the Geotechnical Engineer):

1. Compact structural fills less than 5 feet thick to 90 percent compaction.

2. Compact structural fill 5 feet thick or greater to 95 percent compaction.

3. Compact the upper 6 inches of subgrade soils beneath pavements, curbs and gutters to 95 percent compaction. Extend compaction 5 feet beyond pavement edges unless specified otherwise by the Geotechnical Engineer.

4. Compact the upper 6 inches of subgrade soils under walks, structures and areas to receive structural fill to 90 percent compaction.

3.11 DISPOSAL

A. Lawfully dispose of all unsuitable and excess or surplus material off-site. Disposal shall be at no cost to the Owner unless it is hazardous material.

END OF SECTION

SECTION 31 21 00

UTILITY TRENCHING AND BACKFILL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavation, bedding, and backfill for underground storm drain and water piping, and associated structures.

B. Provide labor, material, equipment, and services necessary to complete the backfilling and compacting as necessary for this project. Section includes, but is not limited to:

1. Select Backfill Material
2. Aggregate Base
3. Detectable Tape
4. Trench Excavation
5. Pipe Bedding
6. Trench Backfill
7. Trench Surfacing

C. This section excludes excavation, bedding, and backfill for underground HVAC piping, electrical conduit, telephone conduit, gas piping, cable TV conduit, and drainage fill material and placement around subdrains.

1.02 RELATED SECTIONS

A. Section 31 10 00 – Site Clearing

B. Section 31 20 00 – Earth Moving

C. Section 31 23 19 - Dewatering

D. Section 33 41 00 – Storm Utility Drainage Piping

1.03 RELATED DOCUMENTS

A. Geotechnical Report: GEOCON Geotechnical Investigation Report dated June 1, 2022.

B. ASTM

1. D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
2. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity-Flow Applications.

C. California Administrative Code, Title 24, Part 2 - Basic Building Regulations, Chapter 24, Excavations, Foundations, and Retaining Walls.

D. Caltrans Standard Specifications, latest edition

1. Section 19, Earthwork

2. Section 26, Aggregate Bases

3. Section 68, Subsurface Drains

4. Section 96, Geosynthetics

E. CAL/OSHA, Title 8

1.04 DEFINITIONS

A. AC: Asphalt Concrete

B. ASTM: American Society for Testing and Materials

C. Base: The layer placed between the subgrade and surface pavement in a paving system.

D. Bedding: Material from bottom of trench to bottom of pipe

E. CDF: Controlled Density Fill

F. DIP: Ductile Iron Pipe

G. Engineered Fill:

1. Soil or soil-rock material approved by the Owner and transported to the site by the Contractor in order to raise grades or to backfill excavations.

2. Contractor shall provide sufficient tests, and a written statement that all materials brought onto the project site comply with specification requirements.

H. Excavation: Consists of the removal of material encountered to subgrade elevations

I. Initial Backfill: Material from bottom of pipe to 12 inches above top of pipe

J. PCC: Portland Cement Concrete

K. RCP: Reinforced Concrete Pipe

L. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure ASTM D1557.

M. Springline of Pipe: Imaginary line on surface of pipe at a vertical distance of ½ the outside diameter measured from the top or bottom of the pipe.

N. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base.

O. Subsequent Backfill: Material from 12 inches above top of pipe to subgrade of surface material or subgrade of surface facility or to finish grade.

P. Trench Excavation: Removal of material encountered above subgrade elevations and within horizontal trench dimensions.

1. Authorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions as shown on plans or authorized by the Geotechnical Engineer.

2. Unauthorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions without authorization by the Geotechnical Engineer. Unauthorized excavation shall be without additional compensation.

Q. Utility Structures:

1. Storm drainage manholes, catch basins, drop inlets, curb inlets, vaults, etc.

2. Sanitary sewer manholes, vaults, etc.

3. Water vaults, etc.

1.05 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Samples:

1. Provide to the Geotechnical Engineer 50-pound or 1 large sample bag of all imported trench bedding and backfill material sealed in airtight containers, tagged with source locations and suppliers of each proposed material. Do not import materials to Project without written approval of the Geotechnical Engineer and the Owner.

2. Provide materials from same source throughout work. Change of source requires approval of the Geotechnical Engineer and the Owner.

1.06 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.

B. Conform all work to the appropriate portion(s) of the Caltrans Standard Specifications, Section 19, Earthwork.

C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.

D. The Geotechnical Engineer will perform observations and tests required to enable him to form an opinion of the acceptability of the trench backfill. Correct the trench backfill that, in the opinion of the Geotechnical Engineer, does not meet the requirements of these Technical Specifications and the Geotechnical Report.

1.07 PROJECT CONDITIONS

A. Promptly notify the Owner of surface or subsurface conditions differing from those disclosed in the Geotechnical Report. First notify the Owner verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and disclosed in the Geotechnical Report will be allowed unless Contractor has notified the Owner in writing of differing conditions prior to contractor starting work on affected items.

B. Barricade open excavations and post with warning lights.

1. Operate warning lights and barricades as required.

2. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout, and other hazards.

3. Protect open trenches, and utility structure excavations with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

C. Stockpile on-site and imported backfill material temporarily in an orderly and safe manner.

D. Provide dust and noise control in conformance with Section 01 50 00 Temporary Facilities and Controls.

E. Environmental Requirements:

1. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the Owner.

2. Protect existing streams, ditches and storm drain inlets during work on this project.

F. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

G. Transport all excess soils materials by legally approved methods to disposal areas.

1. Coordinate with the Engineer.

2. Any additional fill requirements shall be the responsibility of the Contractor.

1.08 EXISTING UTILITIES

A. Locate existing underground utilities in the areas of work. For utilities that are to remain in place, provide adequate means of protection during excavation operations.

1. Locating of existing underground utilities shall include but not be limited to pot-holing prior to the start of construction.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult Owner and/or utility agency immediately for directions.

1. Cooperate with the Owner and public and private utility companies in keeping their respective services and facilities in operation.

2. Repair damaged utilities to the satisfaction of the agency with jurisdiction.

C. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.

D. Contractor shall document field conditions in as-built markups.

PART 2 - PRODUCTS

2.01 GENERAL

A. Import materials will be subject to approval of the Geotechnical Engineer.

B. For approval of imported fill material, notify the Owner in advance of intention to import material with approval from geotechnical engineer.

2.02 PIPE BEDDING AND INITIAL BACKFILL

A. Bedding materials will be subject to approval of the Geotechnical Engineer

B. Pipe bedding and initial backfill material shall conform to the County of Sacramento design detail P-01. Bedding materials shall be densified to at least 90% relative compaction (ASTM D1557) by mechanical methods. Backfill and bedding shall be clean and free of clay, silt or organic matter.

C. Permeable Material: In accordance with Section 68-2.02F of Caltrans Standard Specifications, Class 1, Type A or Class 2.

D. Class 2 Aggregate Base: In accordance with Section 26 of Caltrans Standard Specifications, ¾ inch maximum.

2.03 SELECT BACKFILL

A. Backfill materials for storm drain piping shall conform to County of Sacramento design detail P-01. Backfill shall be ½" or ¾" crushed rock and shall conform to the following gradation:

	Percentage Passing	
Sieve Size	½" crushed rock	¾" crushed rock
¾"	100	90-100
½"	90-100	30-60
3/8"	20-60	0-20
No. 4	0-15	0-5
No. 200	0-2	0-2

2.04 WARNING TAPE

A. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

1. Warning Tape Color Codes

a. Red: Electric

b. Yellow: Gas, Oil; Dangerous Materials

c. Orange: Telephone and Other Communications

d. Blue: Water Systems

e. Green: Sewer Systems

f. White: Steam Systems

g. Gray: Compressed Air

2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

3. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.05 DETECTION WIRE FOR NON-METALLIC PIPING

A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

2.06 SUBSEQUENT BACKFILL

A. Conform to on-site or imported structural backfill in Section 31 20 00, Earth Moving.

2.07 CONTROLLED DENSITY FILL (CDF) (IN TRENCHES)

A. Provide non-structural CDF, from bottom of trench to finish subgrade of subbase or base material, that can be excavated by hand and produce unconfined compressive 28-day strengths from 50-psi to a maximum of 150-psi. Provide aggregate no larger than 3/8 inch top size. The 3/8 inch aggregate shall not comprise more than 30% of the total aggregate content.

B. Cement: Conform to the standards as set forth in ASTM C150, Type II Cement. The backfill must contain at least 188 pounds of cement per cubic yard.

C. Fly Ash: Conform to the standards as set forth in ASTM C618, for Class F pozzolan. Do not inhibit the entrainment of air with the fly ash.

D. Air Entraining Agent: Conform to the standards as set forth in ASTM C260.

E. Aggregates need not meet the standards as set forth in ASTM C33. Any aggregate, producing performances characteristics described herein will be accepted for consideration. The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present.

F. Provide CDF that is a mixture of cement, Class F pozzolan, aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks.

G. The Contractor shall determine the actual mix proportions of the controlled density fill to meet job site conditions, minimum and maximum strengths, and unit weight. Entrained air content shall be a minimum of 4.0%. The actual entrained air content shall be established for each job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.

H. Mix design shall meet the Geotechnical Engineer's approval.

2.08 CONCRETE STRUCTURE BEDDING AND BACKFILL

A. Precast Structures: Same materials to the same heights as specified for pipe bedding and backfill, or other material approved by the Geotechnical Engineer.

B. Poured-in-Place Structures:

1. Bedding: Bedding shall meet the approval of the Geotechnical Engineer. In general, bedding is not required, pour bases against undisturbed native earth in cut areas and against engineered fill compacted to 90% relative compaction in embankment areas.

2. Side Backfill: On-site or imported structural fill meeting the requirements given in Section 31 20 00, Earth Moving.

2.09 GEOSYNTHETICS

A. Filter Fabric:

1. Filter Fabric: Section 96-1.02 of Caltrans Standard Specifications.

2. Mirafi 140N, Mirafi Inc..

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with the recommendations of the Geotechnical Engineer.

B. Protect existing trees to remain. Use only hand methods for grading under the drip line of protected trees.

C. Excavations for appurtenant structures, such as, but not limited to, manholes, transition structures, junction structure, vaults, valve boxes, catch basins, thrust blocks, and boring pits, shall be deemed to be in the category of trench excavation.

D. Unless otherwise indicated in the Plans, all excavation for pipelines shall be open cut.

E. Prior to commencement of work, become thoroughly familiar with site conditions.

F. In the event discrepancies are found, immediately notify the Owner in writing, indicating the nature and extent of differing conditions.

G. Backfill excavations as promptly as work permits.

H. Do not place engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the Owner, Inspector, or Owner's Representative, as applicable.

I. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

J. In excavations, use satisfactory excavated or borrow material.

K. Under grassed areas, use satisfactory excavated or borrow material.

3.02 SITE PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, which are to remain, from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the Owner.

3.03 EXISTING UTILITIES

A. Identity the location of existing utilities.

1. Prior to trenching, the Contractor shall excavate at locations specifically indicated on the Plans, if any, and where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.

2. The Contractor shall contact Underground Service Alert (USA NORTH) at 811 or 1-800-227-2600 for assistance in locating existing utilities.

3. If, after the excavation, a crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Engineer to clear the utility.

B. Protect all existing utilities to remain in operation.

C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at Contractor's risk.

D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.

1. Use hand or light equipment for excavating immediately adjacent to known critical utilities such as communications, electrical, water lines, gas, or pressurized systems or for excavations exposing a utility or buried structure.

2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.

3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained if necessary to ensure uninterrupted service.

4. Report damage of utility line or subsurface structures immediately to the Owner.

E. Backfill trenches resulting from utility removal in lifts of 8 inches maximum.

3.04 TRENCH EXCAVATION

A. General

1. Excavation shall include removal of all water and materials that interfere with construction. The Contractor shall remove any water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.

2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining utilities.

3. The Contractor shall be responsible to safely direct vehicular and pedestrian traffic through or around his/her work area at all times.

4. The Contractor shall relocate, reconstruct, replace or repair, at his/her own expense, all improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor.

B. Existing Paving and Concrete:

1. Existing pavement over trench shall be sawcut, removed, and hauled away from the job. Existing pavement shall be neatly sawcut along the limits of excavations.

2. Existing concrete over the trench shall be sawcut to a full depth in straight lines, at a minimum distance of 12 inches beyond the edge of the trench, either parallel to the curb or a right angles to the alignment of the sidewalk.

3. Boards or other suitable material shall be placed under equipment outrigging to prevent damage to paved surfaces.

C. Trench Width:

1. The maximum allowable trench width for all pipe materials is outside diameter of barrel pipe plus 36-inches. Maximum trench width requirements shall be as follows:

   a. The maximum trench width shall be inclusive of all shoring.

   b. If the maximum trench width is exceeded, the State's representative may direct the Contractor to encase or cradle the pipe in concrete at no additional charge.

2. For pipes 3 inch diameter and larger, the free working space on each side of the pipe barrel shall not be less than 6 inches.

D. Excavation Width at Springline of Pipe:

1. Up to a nominal pipe diameter of 24 inches: Minimum of twice the outside pipe diameter, or as otherwise allowed or required by the Geotechnical Engineer.

2. Nominal pipe diameter of 30 inches through 36 inches: Minimum of the outside pipe diameter plus 2 feet, or as otherwise allowed or required by the Geotechnical Engineer.

3. Nominal pipe diameter of 42 inches through 60 inches: Minimum of the outside pipe diameter plus 3 feet, or as otherwise allowed or required by the Geotechnical Engineer.

E. Open Trench:

1. No trench shall be left open at the end of the day, unless written approval is provided by Owner or Owner's Representative to support construction progress.

2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves, and fire hydrants.

3. Excavate by hand or machine. For gravity systems begin excavation at the outlet end and proceed upstream. Excavate sides of the trench parallel and equal distant from the centerline of the pipe. Hand trim excavation. Remove loose matter.

4. Excavation Depth for Bedding: Minimum of 6 inches below bottom of pipe or as otherwise allowed or required by the Geotechnical Engineer, except that bedding is not required for nominal pipe diameters of 2 inches or less.

5. Over-Excavations: Backfill trenches that have been excavated below bedding design subgrade, with approved bedding material.

6. Where forming is required, excavate only as much material as necessary to permit placing and removal of forms.

7. Grade bottom of trench to provide uniform thickness of bedding material and to provide uniform bearing and support for pipe along entire length. Remove stones to avoid point bearing.

F. Excavated Material:

1. All excavated material not required for backfill shall be immediately removed and properly disposed of in a legal manner by the Contractor.

2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.

3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

3.05 CONTROL OF WATER AND DEWATERING

A. Contractor attention is directed to Section 31 23 19, Dewatering.

B. Be solely responsible for dewatering trenches and excavations and subsequent control of ground and surface water. Provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage to the satisfaction of the Geotechnical Engineer and the Owner until backfilling is completed.

C. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.

D. Obtain the Geotechnical Engineer's approval for proposed control of water and dewatering methods.

E. Reroute surface water runoff away from open trenches and excavations. Do not allow water to accumulate in trenches and excavations.

F. Maintain dewatering system in place until dewatering is no longer required.

3.06 BRACING AND SHORING

A. Refer to section 31 60 00 Lateral Support for shoring specifications.

B. Conform to California and Federal OSHA requirements.

C. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the pipes and appurtenances being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

D. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Geotechnical Engineer, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations in trench section or around structures shall precede a response to the submittal by the Owner.

E. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the line, grade, or backfill compaction or operation of the utility being installed or adjacent utilities and facilities.

3.07 PIPE BEDDING

A. Obtain approval of bedding material from the Geotechnical Engineer. The onsite fill soils will not be suitable for use as pipe bedding for buried utilities.

B. Accurately shape bedding material to the line and grade called for on the Plans. Carefully place and compact bedding material to the elevation of the bottom of the pipe in layers not exceeding 8 inches in loose thickness, or as otherwise allowed per the Geotechnical Engineer's recommendations. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of bedding material will not be permitted.

C. Stabilization of Trench Bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The Inspector or Geotechnical Engineer Representative will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock in accordance with the Geotechnical Engineer's recommendations.

D. Placement of Bedding Material: The trench bottom shall be cleaned to remove all loose native material prior to placing select backfill material. Sufficient bedding material to maintain

consistency in material specifications and descriptions shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe. The relative compaction of tamped material shall be not less than 90 percent. It is the intention of these requirements to provide uniform bearing under the full length of pipe to a minimum width of 60 percent of the external diameter.

3.08 BACKFILLING

A. Initial Backfill:

1. Obtain approval of backfill material from Geotechnical Engineer.

2. Bring initial backfill up simultaneously on both sides of the pipe, so as to prevent any displacement of the pipe from its true alignment. Carefully place and compact initial backfill material to an elevation of 12 inches above the top of the pipe in layers not exceeding 8 inches in loose thickness, or as otherwise allowed per the Geotechnical Engineer's recommendations. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of initial backfill material will not be permitted.

B. Pipe Detection: In trenches containing pressurized plastic pipes, tracer wire shall be placed directly above the pipe and shall be connected to all valves, existing exposed tracer wires, and other appurtenances as appropriate.

C. Installation of Tracer Wire:

1. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe. If continuous length is not feasible, Contractor shall splice per section 4 below.

2. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

3. Form a mechanically and electrically continuous line throughout the pipeline, extending to the nearest valve or other pipeline appurtenance. Extend the wire up the outside of the valve box/riser and cut a hole that is 8 inches from the top, extend a 12 inch wire lead to the inside of the box. At other pipeline appurtenances, terminate the 12 inch wire lead inside the enclosure.

4. Splice wire with a splicing device consisting of and electro-tin plated seamless copper sleeve conductor. Install as recommended by the manufacturer. Wrap splices and damaged insulation with electrician's tape.

D. Installation of Warning Tape

1. Install tape approximately 1 foot above and along the centerline of the pipe.

2. Where tape is not continuous lap tape ends a minimum of 2 feet.

E. Subsequent Backfill:

1. Above the level of initial backfill, the trench shall be backfilled with non-expansive native material from trench excavation or with imported select backfill material (Contractor's option).

Subsequent backfill shall be free of vegetable matter, stones or lumps exceeding 4 inches in greatest dimension, and other unsatisfactory material.

2. Bring subsequent backfill to subgrade or finish grade as indicated. Carefully place and compact subsequent backfill material to the proper elevation in layers not exceeding 8 inches in loose thickness, or as otherwise allowed per the Geotechnical Engineer's recommendations. Compact bedding material at optimum water content to 90% relative compaction, except that the upper 36 inches in areas subject to vehicular traffic shall be compacted to at least 95% relative compaction, unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of subsequent backfill material will not be permitted.

F. Do not use compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive pipe displacement or damage the pipe. Jetting of trench backfill is not permitted.

G. Utility backfill shall be inspected and tested by the Geotechnical Engineer during placement. Cooperate with the Geotechnical Engineer and provide working space for such tests in operations. Backfill not compacted in accordance with these specifications shall be re-compacted or removed as necessary and replaced to meet the specified requirements, to the satisfaction of the Geotechnical Engineer and the Owner prior to proceeding with the Project at no cost to the Owner.

H. Compaction testing shall be in accordance with California Test Method ASTM D1556 or D1557.

3.09 CLEANUP

A. Upon completion of utility earthwork all lines, manholes catch basins, inlets, water meter boxes and other structures shall be thoroughly cleaned of dirt, rubbish, debris and obstructions of any kind to the satisfaction of the Owner.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Prior to dewatering operations, Contractor shall reach agreement with Owner for plan and costs required for dewatering activities.

B. The Contractor shall provide all labor, materials, and equipment necessary to dewater trench and structure excavations, in accordance with the requirements of the Contract Documents. The Contractor shall secure all necessary permits to complete the requirements of this section. The Contractor shall refer to Section 015723, Storm Water Pollution Control and 312100, Utility Trenching and Backfill for other dewatering requirements.

1.02 RELATED SECTIONS

A. Section 312000, Utility Trenching and Backfill

1.03 CONTRACTOR SUBMITTALS

A. Follow submittal procedure outlined in Section 013300, Submittal Procedures.

B. Prior to commencement of excavation, the Contractor shall submit a detailed plan and operation schedule for dewatering of excavations. The Contractor may be required to demonstrate the system proposed and to verify that adequate equipment, personnel and materials are provided to dewater the excavations at all locations and times. The Contractor's dewatering plan is subject to review by the Owner’s Representative.

1.04 QUALITY CONTROL

A. It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.

B. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.

C. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals (at least weekly) to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely on the Contractor. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.

D. It is the Contractor’s responsibility to obtain all necessary local, state, and federal permits, permissions, and approvals for the selected discharge location.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. Dewatering, where required, may include the use of well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pump equipment shall be maintained on the jobsite.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Contractor shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all time, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.

B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level. Dewatering shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this section or other requirements.

C. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and be pumped or drained by gravity from the excavation to maintain a bottom free from standing water.

D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

E. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with drain rock at no cost to the Owner. Drain rock layer shall be approved Class II Permeable Material.

F. The Contractor shall maintain the water level below the bottom of excavation in all work areas where groundwater occurs during excavation, construction, backfilling, and up to acceptance.

G. Flotation shall be prevented by the Contractor by maintaining a positive and continuous removal of water. The Contractor shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations dewatered.

H. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sand packed and/or other means shall be used to prevent pumping of fine sands or silts from the subsurface. A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation. If well points or wells are used, a permit from the County shall be obtained by the Contractor. Wells, well points and piezometers shall be installed and removed or abandoned in accordance with County requirements.

I. Dewatering wells, well points, sump pumps, or other means shall be used to remove water and continuously maintain groundwater at a level at least two feet below the bottom of excavations before the excavation work begins at each location. Water shall be removed and excluded until backfilling is complete and all field soils testing have been completed.

J. Dewatering Design Criteria: The Contractor shall design its dewatering systems to meet the following minimum requirements:

1. Provide stable excavation walls and bottom in accordance with California and Federal OSHA requirements.
2. Provide reasonably dry base of excavation.
3. Prevent boiling of the excavation bottom.
4. Filter native soil and prevent loss of soil through piping action.
5. Preserve the undisturbed bearing capacity of subgrade soils at the bottom of the excavation.
6. Draw down the groundwater level below and beyond the excavation bottom and sidewalls where shoring is not designed to resist hydrostatic pressures.

K. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent floatation or movement of structures, pipelines and sewers.

L. Discharge of removed groundwater shall be in accordance with the Contractor's SWPPP and State and Federal regulations. Water removed from excavations shall be discharged to a sedimentation tank(s). Groundwater shall be tested for contaminants prior to discharge. All discharges shall be approved by the local and State jurisdiction.

M. It is the Contractor’s responsibility to obtain all necessary local, state, and federal permits, permissions, and approvals for the selected discharge location.

N. Discharge of groundwater removed by the dewatering system may be allowed to the Sanitation District wastewater collection system. Groundwater must meet specific quality and quantity requirements before discharge to the sewer is allowed. The Contractor shall coordinate with the Sanitation District and obtain approval for discharge to the sewer. If the Contractor elects to discharge elsewhere, it is the Contractor's responsibility to obtain all necessary local, state, and federal permits, permissions, and approvals for the selected discharge location.

END OF SECTION

SECTION 32 11 00

PAVEMENT BASE COURSE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Aggregate base

1.02 RELATED SECTIONS

A. Section 01 10 00, Supplemental General Requirements

B. Section 31 20 00, Earth Moving

1.03 RELATED DOCUMENTS

A. Geotechnical Report: GEOCON Geotechnical Investigation Report dated June 1, 2022.

B. ASTM:

1. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort

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

3. E329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

4. E548, Guide for General Criteria Used for Evaluating Laboratory Competence

C. Caltrans Standard Specifications, latest edition

1. Section 24, Stabilized Soils

2. Section 25, Aggregate Subbases

3. Section 26, Aggregate Bases

4. Section 27, Cement Treated Bases

1.04 DEFINITIONS

A. Geotechnical Testing Agency: An independent testing agency qualified according to ASTM E329 to conduct soil materials and rock definition testing, as documented according to ASTM D3740 and ASTM E548 provided by the Owner.

B. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material ¾ cubic yards or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D1586, exceeds a standard penetration resistance of 100 blows/2 inches.

C. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.

D. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, base or topsoil materials. Perform work in accordance with Section 31 20 00, Earth Moving.

1.05 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Submit material certificates signed by the material producer and the Contractor, certifying that that each material item complies with, or exceeds the specified requirements.

1.06 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.

B. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D1557.

C. Perform installation of base materials under the observation of the Geotechnical Engineer. Materials placed without approval of the Geotechnical Engineer will be presumed to be defective and, at the discretion of the Geotechnical Engineer, shall be removed and replaced at no cost to the Owner. Notify the Geotechnical Engineer at least 24 hours prior to commencement of base material installation and at least 48 hours prior to testing.

D. Do not mix or place cement treated base when the temperature is below is below 36 degrees F or when the ground is frozen.

E. Finish surface of material to be stabilized prior to lime treatment shall be in accordance with Caltrans Standard Specification Section 24, Stabilized Soils.

F. Finish surface of the stabilized material after lime treatment shall be in accordance with Caltrans Standard Specifications Section 24, Stabilized Soils.

G. Finish surface of cement treated base shall be in accordance with Caltrans Standard Specification Section 27, Cement Treated Bases.

H. Do not project the finish surface of aggregate subbase above the design subgrade.

I. Finish grade tolerance at completion of base installation: +0.05 feet

1.07 PROJECT CONDITIONS

A. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

B. Temporarily stockpile material in an orderly and safe manner and in a location approved by the Owner.

C. Provide dust and noise control in accordance with Section 01 10 00, Supplemental General Requirements.

PART 2 - PRODUCTS

2.01 AGGREGATE BASE

A. Material: Class 2, ¾ inch maximum in accordance with Caltrans Standard Specification Section 26, Aggregate Bases.

PART 3 - EXECUTION

3.01 GENERAL

A. Placement and compaction of material by flooding, ponding, or jetting will not be permitted.

3.02 WET WEATHER CONDITIONS

A. Do not place or compact subgrade if above optimum moisture content.

B. If the Geotechnical Engineer allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the Geotechnical Engineer.

3.03 AGGREGATE BASE

A. Watering, Spreading and Compacting: In accordance with Caltrans Standard Specification Section 26-1.03D, Spreading and 26-1.03E, Compacting.

3.04 DISPOSAL

A. Lawfully dispose of all unsuitable and excess or surplus material off-site. Disposal shall be at no cost to the Owner unless it is hazardous material.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Hot Mix Asphalt

B. Tack coat

C. Hot Mix Asphalt paving

D. Hot Mix Asphalt overlay

E. Speed bumps

F. Asphalt curbs

G. Pavement grinding

H. Adjusting manholes, valves, monument covers and other structures to grade

1.02 RELATED SECTIONS

A. Section 01 10 00, Supplemental General Requirements

B. Section 31 20 00, Earth Moving

C. Section 32 11 00, Pavement Base Course

1.03 RELATED DOCUMENTS

A. Report: GEOCON Geotechnical Investigation Report dated June 1, 2022.

B. ASTM

1. D979: Standard Practice for Sampling Bituminous Paving Mixtures

2. D1188: Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples

3. D2041: Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

4. D2726: Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures

5. D2950: Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods

6. D3549: Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.

C. Caltrans Standard Specifications, latest edition

1. Section 20: Landscape

2. Section 39: Asphalt Concrete

3. Section 88: Engineering Fabrics

4. Section 92: Asphalt Binder

5. Section 94: Asphaltic Emulsions

6. Section 96: Geosynthetics

1.04 DEFINITIONS

A. ASTM: American Society for Testing Materials.

B. Caltrans: State of California, Department of Transportation

1.05 QUALITY ASSURANCE

A. Testing Agency: Owner's Representative will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

B. Thickness of hot mix asphalt: In-place compacted thickness of asphalt courses will be determined according to ASTM D3549.

C. Surface Smoothness: Finished surface of each asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to ASTM D979.

1. Reference maximum theoretical density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041, and compacted according to job-mix specifications.

2. In-place density of compacted pavement may be determined by testing core samples according to ASTM D1188 or ASTM D2726.

a. One core sample may be taken for every 1000 square yard or less of installed pavement, but in no case will fewer than 3 cores be taken.

b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2726.

1.06 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.

B. Job-Mix Designs: Certificates signed by manufacturers certifying that each hot mix asphalt mix complies with requirements.

C. Material Certificates: Certificates signed by manufacturers certifying that each material complies with requirements.

1.07 PROJECT CONDITIONS

A. Environmental Limitations:

1. Tack Coat: Minimum surface temperature of 60 F at application.

2. Asphalt Base Course: Minimum surface temperature of 40 F and rising at application.

3. Asphalt Surface Course: Minimum surface temperature of 60 F at application.

4. Reinforcing Fabric: Air temperature is 50 F and rising and pavement temperature is 40 F and rising.

PART 2 - PRODUCTS

2.01 HOT MIX ASPHALT

A. Type A In accordance with Caltrans Standard Specifications Section 39-2, Hot Mix Asphalt.

B. Hot Mix Asphalt Materials:

1. Asphalt Binder: Grade PG 64-10 in accordance with Caltrans Standard Specification Section 92, Asphalt Binders.

2. Tack Coat: Grade SS1 in accordance with Caltrans Standard Specification Section 94, Asphaltic Emulsions.

C. Aggregates: 1 inch max gradation for virgin aggregate and recycled asphalt pavement (RAP) in accordance with to Caltrans Standard Specification Section 39-2.02, Type A Hot Mix Asphalt.

D. Geosynthetic Pavement Interlayer: Paving Fabric in accordance with Caltrans Standard Specification Section 96, Geosynthetics.

E. Soil Sterilant: In accordance with Caltrans Standard Specifications Section 20-5.03, Inert Ground Covers and Mulches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

C. If necessary, perform subgrade preparation or remediation in accordance with Section 31 20 00, Earth Moving.

D. Notify Owner in writing of any unsatisfactory conditions. Do not begin paving until these conditions have been satisfactorily corrected.

3.02 PAVEMENT GRINDING

A. Clean existing paving surface of loose or deleterious material immediately before pavement grinding.

B. Grind conforms as indicated.

3.03 SOIL STERILANT

A. Furnish and apply to areas per manufacturer's specifications.

3.04 SURFACE PREPARATION FOR AGGREGATE BASE MATERIALS

A. General: Immediately before placing asphalt materials remove loose and deleterious material from substrate surfaces and ensure that prepared subgrade is ready to receive paving in accordance with Caltrans Standard Specification Section 39-2.01C(3)(b) and in accordance with Section 32 11 00, Pavement Base Course.

B. Tack Coat: Apply uniformly and at specified rates between HMA layers, to vertical surfaces of curbs, gutters and construction joints, and to existing pavement, including planed surfaces, in accordance with Caltrans Standard Specification Section 39-2.01C(3)(f).

1. Allow tack coat to cure undisturbed before paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.05 SURFACE PREPARATION FOR PAVEMENT AT HOT MIX ASPHALT OVERLAYS

A. Pavement Irregularities: Level with hot mix asphalt, Type A, ½ inch max aggregate.

B. Pavement Cracks:

1. Less than ¼ inch wide: Clean of all dirt by compressed air jet, spray and seal with RS-1 asphaltic emulsion.

2. Wider than ¼ inch: Clean of all dirt by compressed air jet, spray and seal with RS-1 asphaltic emulsion and skin patch.

C. Clean surface of all material, such as leaves, dirt, sand, gravel, water and vegetation prior to applying binder of paving asphalt to existing surface.

3.06 GEOSYNTHETIC PAVEMENT INTERLAYER

A. Place geosynthetic pavement interlayer in accordance with Caltrans Standard Specification Section 39-2.01C(3)g.

3.07 HOT MIX ASPHALT SPREADING AND COMPACTING EQUIPMENT

A. Provide spreading and compacting equipment in accordance with Caltrans Standard Specification Section 39-2.01C(2).

3.08 HOT MIX ASPHALT PLACEMENT

A. Place, spread and compact hot mix asphalt to required grade, cross section, and thickness in accordance with Caltrans Standard Specification Sections 39-2.01C(2), 39-2.01C(3), and 39-2.01C(8).

B. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.09 JOINTS

A. Construct joints to ensure continuous bond between adjoining paving sections in accordance with Caltrans Standard Specification Sections 39-2.01C(4)

1. Construct joints free of depressions with same texture and smoothness as other sections of asphalt course.

2. Clean contact surfaces and apply tack coat.

3. Offset longitudinal joints in successive courses a minimum of 6 inches.

4. Offset transverse joints in successive courses a minimum of 24 inches.

5. Compact joints as soon as hot mix asphalt will bear roller weight without excessive displacement.

3.10 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact in accordance with Caltrans Standard Specification Sections 39-2.01C(2).

B. Compaction Requirements: Average Density to be 92 percent of reference maximum theoretical density according to ASTM D2041, but not less than 90 percent nor greater than 96 percent.

C. Finish Rolling: Finish roll paved surfaces to remove roller marks while asphalt is still warm.

D. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method.

E. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh asphalt. Compact by rolling to specified density and surface smoothness.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.11 HOT MIX ASPHALT CURBS AND DIKES

A. Construction: Place over compacted surfaces in accordance with Caltrans Standard Specification Section 39-2.01C(9). Apply a light tack coat prior to construction, unless pavement surface is still tacky and free of dust.

B. Shape: Place hot mix asphalt to curb cross section indicated.

3.12 ADJUSTING MANHOLES, VALVES, MONUMENT COVERS AND OTHER STRUCTURES TO GRADE

A. Remove pavement, using vertical cuts, as needed to remove frame and provide for concrete collar. Do not damage adjacent pavement.

1. Circular Covers: Cut circle with radius 6 inches larger than cover and concentric with cover.

2. Rectangular Covers: Cut rectangle 6 inches larger than cover on all sides.

B. Install grade rings or blocking as needed to raise cover to finish grade.

C. Pour concrete collar:

1. Bottom of Collar: Top of existing collar or 6 inches below top of proposed collar, whichever is at a higher elevation.

2. Top of Collar: Bottom of existing asphalt pavement.

3. Apply tack coat to all exposed surfaces.

4. Fill excavation with hot mix asphalt and, while still hot, compact flush with adjacent surface.

3.13 INSTALLATION TOLERANCES

A. Hot Mix Asphalt Pavement:

1. Course thickness and surface smoothness shall be in accordance with Caltrans Standard Specification Section 39-2.01A(4)(i)(iii)

2. Total Thickness: Not less than indicated.

B. Trench Patch:

1. Compacted surface: Within 0.01 foot of adjacent pavement.

2. Do not create ponding.

C. Adjust Covers:

1. Compacted surface: Up to 0.01 foot higher, and no lower, than adjacent pavement.

2. Do not create ponding.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Furnishing, placing, spreading, compacting and shaping portland cement concrete pavement with undoweled transverse weakened plane joints, for vehicular traffic.

B. Form construction and use in placing portland cement concrete pavement.

C. Joints for portland cement concrete pavement.

D. Finishing portland cement concrete pavement.

E. Curing and protecting portland cement concrete pavement.

1.02 RELATED SECTIONS

A. 31 20 00, Earth Moving

B. 32 11 00, Pavement Base Course

C. 32 13 18, Cement and Concrete for Exterior Improvements

1.03 RELATED DOCUMENTS

A. Geotechnical Report: GEOCON Geotechnical Investigation Report dated June 1, 2022.

B. AASHTO Standard Specifications

1. T132: Standard Method of Test for Tensile Strength of Hydraulic Cement Mortars

C. ASTM Standards

1. D36: Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

2. A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

3. A706: Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

4. A775: Standard Specification for Epoxy Coated Steel Reinforcing Bars.

5. A934: Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.

6. A996: Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement

7. C94: Standard Specification for Ready-Mixed Concrete

8. C603: Standard Test Method for Extrusion Rate and Application Life of Elastomeric Sealants

9. C639: Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants

10. C661: Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer

11. C679: ASTM C679-15 Standard Test Method for Tack-Free Time of Elastomeric Sealants

12. C719: Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

13. C793: Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants

14. C881: Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

15. D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

16. D1640: Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings

17. D2628: Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

18. D2835: Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements.

19. D3963: Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.

20. D6690: Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

D. Caltrans Standard Specifications, latest edition

1. Section 10, General

2. Section 40, Concrete Pavement

3. Section 52, Reinforcement

4. Section 95, Epoxy

E. Caltrans Standard Plans, latest edition:

1. Plan P1: Jointed Plan Concrete Pavement – New Construction

2. Plan P10: Concrete Pavement Dowel Bar Details

1.04 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials

B. ASTM: American Society for Testing and Materials

C. Caltrans: State of California, Department of Transportation

1.05 QUALITY ASSURANCE

A. Testing Agency: Owner's Representative will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

C. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.

D. Installer Qualification: An experienced installer who has completed pavement work similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

1.06 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.

C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements.

1. Cementitious materials and aggregates

2. Steel reinforcement and reinforcement accessories

3. Admixtures

4. Curing compound

5. Applied finish material

6. Bonding agent of adhesive

7. Joint filler

8. Joint Sealant

9. Tie Bars

10. Epoxy

11. Backer Rods

12. Joint shop drawings

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT CONCRETE

A. In accordance with Section 32 13 18, Cement and Concrete for Exterior Improvements.

2.02 BASE MATERIAL

A. In accordance with Section 32 11 00, Pavement Base Course.

2.03 TIE BARS

A. Deformed reinforcing steel bars conforming to the requirements of ASTM Designation A615, Grade 40 or 60

B. Epoxy-coat in accordance with Caltrans Standard Specification Section 52-2.02, Epoxy-Coated Reinforcement, except bars must comply with ASTM A706; ASTM A996; or ASTM A615, Grade 40 or 60.

C. Do not bend tie bars.

2.04 EPOXY

A. Bond tie bars to existing concrete with epoxy resin in accordance with Caltrans Standard Specification Section 95-1.02D, Epoxy Adhesive for Bonding Freshly Mixed Concrete to Hardened Concrete.

2.05 SILICONE JOINT SEALANT

A. Furnish low modulus silicone joint sealant in a one-part silicone formulation. Do not use acid cure sealants. Compound to be compatible with the surface to which it is applied and conform to the following requirements:

Specification	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 77°± 1°F and 45% to 55% Relative Humidity	ASTM D412 (Die C)	45 psi max.
Flow at 77° ± 1°F	ASTM C639[a]	Shall not flow from channel
Extrusion Rate at 77° ± 1°F	ASTM C603[b]	75-250 g per min.
Specific Gravity	ASTM D792 Method A	1.01 to 1.51
Durometer Hardness, at 0°F, Shore A, cured 7 days at 77° ± 1°F	ASTM C661	10 to 25
Ozone and Ultraviolet Resistance, after 5000 hours	ASTM C793	No chalking, cracking or bond loss
Tack free at 77° ± 1°F and 45% to 55% Relative Humidity	ASTM C679	Less than 75 minutes
Elongation, 7 day cure at 77° ± 1°F and 45% to 55% Relative Humidity	ASTM D412 (Die C)	500 percent min.
Set to Touch, at 77° ± 1°F and 45% to 55% Relative Humidity	ASTM D1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquets, air cured 7 days at 77° ± 1°F	AASHTO T132[c]	50 psi min.
Movement Capability and Adhesion, 100% extension at 0°F after air cured 7 days at 77° ± 1°F, and followed by 7 days in water at 77° ± 1°F	ASTM C719[d]	No adhesive or cohesive failure after 5 cycles

Notes:

a. ASTM Designation: C639 Modified (15 percent slope channel A).

b. ASTM Designation: C603, through $^{1}/_{8}$ inches opening at 50 psi.

c. Mold briquets in conformance with the requirements in AASHTO Designation: T132, sawed in half and bonded with a $^{1}/_{16}$ inches maximum thickness of sealant and tested in conformance with the requirements in AASHTO Designation: T132. Briquets shall be dried to constant mass at 212 ± 10°F.

d. Movement Capability and Adhesion: Prepare 12 inch x 1 inch x 3 inch concrete blocks in conformance with the requirements in ASTM Designation: C719. A sawed face shall be used for bond surface. Seal 2 inch of block leaving ½ inches on each end of specimen unsealed. The depth of sealant shall be $^{3}/_{8}$ inches and the width ½ inches.

B. Formulate the silicon joint sealant to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

C. Furnish to the Owner's Representative a Certificate of Compliance. Accompany certificate with a certified test report of the results of the required tests performed on the sealant material within the

previous 12 months prior to proposed use. Provide the certificate and accompanying test report for each lot of silicone joint sealant prior to use on the project.

2.06 ASPHALT RUBBER JOINT SEALANT

A. Conform to the requirements of ASTM Designation: D6690 as modified herein or to the following:

1. Provide a mixture of paving asphalt and ground rubber. Ground rubber to be vulcanized or a combination of vulcanized and de-vulcanized materials ground so that 100 percent will pass a No. 08 sieve and contain not less than 22 percent ground rubber, by mass. Modifiers may be used to facilitate blending.

2. The Ring and Ball softening point shall be 135°F minimum, when tested in conformance with the requirements in ASTM D36.

3. Provide asphalt rubber sealant material capable of being melted and applied to cracks and joints at temperatures below 400°F.

B. The penetration requirements of Section 4.2 of ASTM Designation: D6690 do not apply. The required penetration at 77˚F, 5 oz, 5s, shall not exceed 120.

C. The resilience requirements of Section 4.5 of ASTM Designation: D6690 do not apply. The required resilience, when tested at 77°F, shall have a minimum of 50 percent recovery.

D. Accompany each lot of asphalt rubber joint sealant shipped to the job site, whether as specified herein or conforming to the requirements of ASTM Designation D6690, as modified herein, by a Certificate of Compliance, storage and heating instructions and precautionary instructions for use.

E. Heat and place in conformance with the manufacturer's written instructions and the details shown on the Plans. Provide manufacturer's instructions to the Owner's Representative. Do not place when the pavement surface temperature is below 50 ˚F.

2.07 PREFORMED COMPRESSION JOINT SEALANT

A. Material: ASTM Designation: D2628.

1. Number of cells: 5 or 6.

2. Lubricant Adhesive: ASTM Designation D2835.

3. Install compression seals along with lubricant adhesive according to the manufacturer's recommendations. Submit manufacturer's recommendations to the Owner's Representative`.

B. Accompany each lot of compression seal and lubricant adhesive by a Certificate of Compliance, storage instructions and precautionary instructions for use. Also submit the manufacturer's data sheet with installation instructions and recommended model or type of preformed compression seal for the joint size and depth as shown on the Plans. Show evidence that the selected seal is being compressed at level between 20 and 50 percent at all times for the joint width and depth shown on the Plans.

2.08 BACKER RODS

A. Provide backer rods that have a diameter prior to placement at least 25 percent greater than the width of the saw cut after sawing and are expanded, crosslinked, closed-cell polyethylene foam

that is compatible with the joint sealant so that no bond, adverse reaction occurs between the rod and sealant. In no case use a hot pour sealant that will melt the backer rod. Submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

2.09 SLIP RESISTIVE AGGREGATE FINISH

A. Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

PART 3 - EXECUTION

3.01 WATER SUPPLY

A. Provide water supply in accordance with Caltrans Standard Specification Section 10-6, Watering.

3.02 SUBGRADE

A. The subgrade soils should be scarified and the moisture adjusted to within 2% of the optimum moisture content. The subgrade soils shall be compacted to a minimum of 95% relative compaction.

B. Prepare subgrade in accordance with Caltrans Standard Specification Section 40-1.03F, Placing Concrete.

3.03 PLACING

A. Prepare concrete in accordance with Caltrans Standard Specification Section 40-1.03F, Placing Concrete.

3.04 SPREADING COMPACTING AND SHAPING

A. Conform to the following:

1. Stationary Side Form Construction: In accordance with Caltrans Standard Specification Section 40-1.03F(4), Stationary Side-Form Construction.

2. Slip Form Construction: In accordance with Caltrans Standard Specification Section 40-1.03F(4), Slip Form Construction.

3.05 INSTALLING TIE BARS

A. Install at longitudinal contact joints, longitudinal weakened plane joints, and transverse contact joints as shown on the Plans. In no case, shall any consecutive width of new portland cement concrete pavement tied together with tie bars exceed 50 feet. In no case shall tie bars be used at a joint where portland cement concrete and asphalt concrete pavements abut.

B. Tie bars shall be installed at longitudinal joints by one of the 3 following methods:

1. Drilling and bonding in conformance with the details shown on the Plans. Provide a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C881, Type V. Grade 3 (Non-Sagging), Class shall be as follows:

Temperature of Concrete	Required Class of Epoxy Resin
Lower than 40° F	A
40° F through 60° F	B
Above 60° F	C

2. Provide, at least 7 days prior to start of work, a Certificate of compliance and a copy of the manufacturer's recommended installation procedure. The drilled holes shall be cleaned in accordance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during the curing and shall remain undisturbed until the epoxy has cured a minimum time as specified by the manufacturer. Tie bars that are improperly bonded, as determined by the Owner's Representative, will be rejected. If rejected, adjacent new holes shall be drilled, as directed by the Owner's Representative, and new tie bars shall be placed and securely bonded to the concrete. All work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.

3. Insert the tie bars into the plastic slip-formed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished to such an extent that there is no evidence on the surface of the completed pavement that there has been any insertion performed. Any loose tie bars shall be replaced by drilling and grouting into place with epoxy as described in method 1 above at the Contractor's expense.

4. By using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance and installation instructions. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.

3.06 JOINTS

A. Construct joints in accordance with Caltrans Standard Specification Section 40-1.03B, Joints, except that tie bars shall be as specified under Part 1, Materials.

1. Construction Joints: In accordance with Caltrans Standard Specification Section 40-1.03B(2), Construction Joints.

   a. Construct a construction joint at the end of each day's work, or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.

   b. If sufficient concrete has not been mixed to form a slab to match the next contraction joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of any excess concrete shall be at the Contractor's expense. Any excess material shall be become the property of the Contractor and shall be properly disposed of.

   c. A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of tie bars.

2. Contraction Joints: In accordance with Caltrans Standard Specification Section 40-1.03B (3), Contraction Joints, except that the insert method of forming joints in pavement shall not be used.

3.07 FINISHING

A. Finish concrete in accordance with Caltrans Standard Specification Section 40-1.03H, Finishing.

3.08 CURING

A. Cure concrete in accordance with Caltrans Standard Specification Section 40-1.03I, Curing.

3.09 SEALING JOINTS

A. Liquid Joint Sealant Installation.

1. The joint sealant detail for transverse and longitudinal joints, as shown on the Plans, shall apply only to weakened plane joints. Construct weakened plane joints by the sawing method. Should grinding or grooving be required over or adjacent to any joint after sealant has been placed, completely remove the joint material and disposed of, and replace at the Contractor's expense. Recess sealant below the final finished surface as shown on the Plans.

2. At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the Plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the Plans.

3. Seven days after the concrete pavement placement and not more than 4 hours before placing backer rods and joint sealant materials, clean the joint walls by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, remove all traces of sand, dust and loose material from and near the joint for a distance along the pavement surfaces of at least 2 inch on each side of the joint by the use of a vacuum device. Remove surface moisture at the joints by means of compressed air or moderate hot compressed air or other means approved means. Do not use drying procedures that leave a residue or film on the joint wall. Sandblasting equipment shall have a maximum nozzle diameter size of 1/4 $\pm$ 1/32 inches and a minimum pressure of 90-psi.

4. Install backer rod as shown on the Plans. Provide an expanded, closed-cell polyethylene foam backer rod that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Install backer rod when the temperature of the portland cement concrete pavement is above the dew point of the air and when the air temperature is 40°F or above. Install backer rod when the joints to be sealed have been properly patched, cleaned and dried. Do not use a method of placing backer rod that leave a residue or film on the joint walls.

5. Immediately after placement of the backer rod, place the joint sealant in the clean, dry, prepared joints as shown on the Plans. Apply the joint sealant by a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Apply adequate pressure to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant recess the surface of the sealant as shown on the Plans.

6. Any failure of the joint material in either adhesion or cohesion of the material will be cause for rejection of the joint. Conform the finished surface of joint sealant to the dimensions and allowable tolerances shown on the Plans. Rejected joint materials or joint material whose finished surface does not conform to the dimensions shown on the Plans shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.

7. After each joint is sealed, remove all surplus joint sealer on the pavement surface. Traffic shall not be permitted over the sealed joints until the sealant is tack free and set sufficiently to prevent embedment of roadway debris into the sealant.

B. Preformed Compression Joint Seal Installation

1. The compression seal alternative joint detail for transverse and longitudinal joints, as shown on the Plans, shall apply only to weakened plane joints. Construct weakened plane joints by the sawing method. Should grinding or grooving be required over or adjacent to any joint after the compression seal has been placed, completely remove the joint materials and disposed of, and replace at the Contractor's expense. Compression seal shall be recessed below the final finished surface as shown on the Plans.

2. At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the Plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the Plans.

3. Seven days after the concrete pavement placement and not more than 4 hours before placing preformed compression joint seals, clean the joint walls by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, remove all traces of sand, dust and loose material from and near the joint for a distance along the pavement surfaces of at least 50 mm on each side of the joint by the use of a vacuum device. Remove surface moisture at the joints by means of compressed air or moderate hot compressed air or other means. Do not use drying procedures that leave a residue or film on the joint wall. Sandblasting equipment shall have a maximum nozzle diameter size of 1/4 $\pm$ 1/32 inches and a minimum pressure of 90 psi.

3.10 PROTECTING CONCRETE PAVEMENT

A. Protect pavement in accordance with Caltrans Standard Specification Section 40-1.03J Protecting Concrete Pavement.

END OF SECTION

SECTION 32 13 15

CONCRETE PAVING FOR ACCESSIBLE ROUTES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes Concrete Paving for Accessible Routes. Including the Following:

1. Walks.
2. Landings.
3. Other concrete paving within the Accessible route.

1.2 DEFINITIONS

A. Accessible Routes: (Designated on drawings as “AR”) A continuous unobstructed path connecting accessible elements and spaces of an accessible site, building or facility that can be negotiated by a person with a disability using a wheelchair, and that is also safe for and usable by persons with other disabilities. Exterior accessible routes include parking access aisles, curb ramps, crosswalks at vehicular ways, walks, ramps and lifts.

B. CASp: Certified Access Specialist by the California Division of the State Architect.

C. CBC: California Building Code

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meetings: Conduct meeting at concrete placement location(s) prior to every concrete placement. There shall be a minimum of one meeting on each concrete placement day.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:

a. Concrete mixture design.
b. Form work.
c. Tools.
d. Quality control of concrete materials and concrete paving construction practices.
e. Person’s roles and responsibilities.

1.4 SUBMITTALS

A. Qualification Data: For qualified Land Surveyor and Certified Access Specialist (CASp).

B. Field Quality-Control Reports: Stamped as-built survey signed by California Land Surveyor and a signed CASp report indicating that the work is compliant with the CBC Chapter 11-B.

1.5 QUALITY ASSURANCE

A. Quality Standard: ACI 301, ACI 306R and as listed in this section and as detailed in the contract plans.

B. Testing: See Specification Section 32 13 13 “Concrete Paving.”

C. The Contractor shall purchase and have on-site at all times two new digital levels able to read percent grade at a minimal accuracy of 1/10th of a percent. One level shall be 4-feet and the second shall be 2-feet in length. Both levels shall be calibrated according to manufacturer’s written requirements prior to each day’s work and if suspected to be out of calibration. Level’s shall be the property of the State and turned in to the State at the completion of the project.

D. The Contractor shall confirm that the top of all forms are set using grades and slopes as shown on grading plans and associated details. Contractor shall notify the State of any conflicts in grading prior to finalizing form work.

E. The Contractor shall verify that all concrete work meets requirements of the contract plans and specifications. The Contractor shall have a CASp review and state that the accessible route as listed in the contract plans complies with the CBC accessibility requirement in Chapter 11-B. The CASp shall provide a signed report indicating compliance with CBC Chapter 11-B. Both the CASp report and As-Built survey shall be conducted per the requirements of these specifications or in a manner approved by the State.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. See Section 32 13 13 “Concrete Paving.”

2.2 FORMS

A. Steel.

B. New, unused lumber free from warps, cups or twists.

2.3 SCREED

A. Magnesium screed meeting ASTM B107/B107M-07.

B. New, unused lumber free from warps, cups or twists.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Examine form work and reinforcement steel.

C. Proceed with installation only after unsatisfactory conditions have been corrected to the States satisfaction.

3.2 PREPARATION

A. The Contractor shall have a concrete foreman on site during all phases of the concrete placement that has experience related to concrete work along **accessible routes**. The foreman shall familiarize him/herself with the contract plans and specifications and review the layout, grades and slopes prior to setting up form work. The Contractor shall bring forward all concerns to the State prior to placing concrete.

B. The Contractor shall designate one or more person(s) to perform continuous check of form work with digital level throughout the concrete placement.

C. Use only clean, undamaged concrete tools (no loose, broken or missing pieces) and keep tools clean during the placement operations

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms prior to each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

A. Expansion joints shall be filled flush with the top surface of the concrete.

3.5 FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. All walkways shall be medium broom finish. All finishes within vehicle paved areas shall be a medium to heavy broom finish with a static coefficient of friction not less than 0.35 meeting California Test Method 342.

3.6 PAVING TOLERANCES

A. The Contractor shall be aware that no tolerances are allowed for compliance with the CBC Chapter 11-B related to slopes for concrete surfaces on an **accessible route.** The use of digital levels direct readings shall be interpreted as the true value and be within the limits as stated in the CBC. Adjustment for instrument error shall not be allowed when at the limit of CBC compliance.

3.7 FIELD QUALITY CONTROL

A. Verification of Contract compliance shall be required at the end of the project and may be required at any time during construction when the State takes exception to any portion of the completed

work. Verification shall be a two-part process and both parts shall be required to pass CBC compliance. The following is the process to which all **accessible routes** shall be verified:

1. The contractor shall conduct a topographic survey from a California licensed land surveyor or civil engineer. This survey shall be stamped and signed by the licensed surveyor or engineer. The topographic survey shall include the use of an electronic total station instrument. Include point data for all points listed on the grading plan(s) and at all grade breaks (see Figures 1, 3, 6 and 7). Include point data at both sides of walkway and at intervals not to exceed 10 feet. When the walkway is wider than 10 feet, include point data along the centerline of walkway. Include point data within parking stall(s) and access isle(s) at intervals not to exceed 10 feet as shown in Figure 3.
2. The Contractor shall conduct a flatness check with a CASp. This check shall be documented in a report and signed by the CASp. A flatness check shall include the use of a 2-foot and 4-foot digital level. The flatness check shall be conducted as follows:

    a. Digital level measuring devices shall be calibrated according to manufacturer's written requirements prior to every use, if suspected to be out of calibration and be capable of measuring to a precision of 0.1 percent.
    b. A 2-foot digital level shall be used for cross-slope along walkways and ramps. Readings shall be taken at a minimum of 10 foot interval along non-ramps, 4 foot intervals along ramps and where there are noticeable variations on the surface (see Figure 2 and 6 respectively). Where noticeable variations cause valleys or high-spots, additional flatness measurements shall be conducted. There shall be no portion of the work that exceeds the limits required by CBC.
    c. A 4-foot digital level shall be used for running slope along non- ramps. Running slope along non-ramps shall be conducted at 10-foot interval at locations shown in Figure 1 and at locations where noticeable variations occur. Running slope along ramps shall be conducted using an overlapping 2-foot level (see Figure 4) at locations shown in Figure 5 and at locations where noticeable variations occur. Where noticeable variations occur, additional flatness measurements shall be conducted. There shall be no portion of the work that exceeds the limits required by CBC.
    d. A 2-foot digital level shall be used for checking slopes within parking stalls, access aisles/passenger loading zones and landings. Slopes at parking stalls and access aisles/passenger loading zones shall be conducted at intervals shown in Figure 3 and at locations where noticeable variations occur. Slopes at landings shall be conducted at intervals shown in Figure 7 and at locations where noticeable variations occur. There shall be no portion of the work that exceeds the limits required by CBC.

3. If during either verification, the State finds any portion of work out of compliance, the contractor shall bear the cost of correcting the work including additional surveys, flatness checks and compensation for the State's services and expenses.

3.8 REPAIR

A. Any work found to be out of compliance with the contract plans may be grounds for rejection by the State. All work found to be out of compliance with the CBC shall be removed to the nearest joint as approved by the State and be made compliant with the CBC. Saw cut a true line to a minimum depth of 1-1/2" deep before concrete removal. Do not damage the pavement that is to remain. Do not use heavy equipment adjacent to the concrete repair until the concrete has had adequate curing time to achieve adequate strength (3,000 psi minimum).

B. Patching or grinding of concrete shall not be allowed for correcting non-compliant work.

C. FIGURES

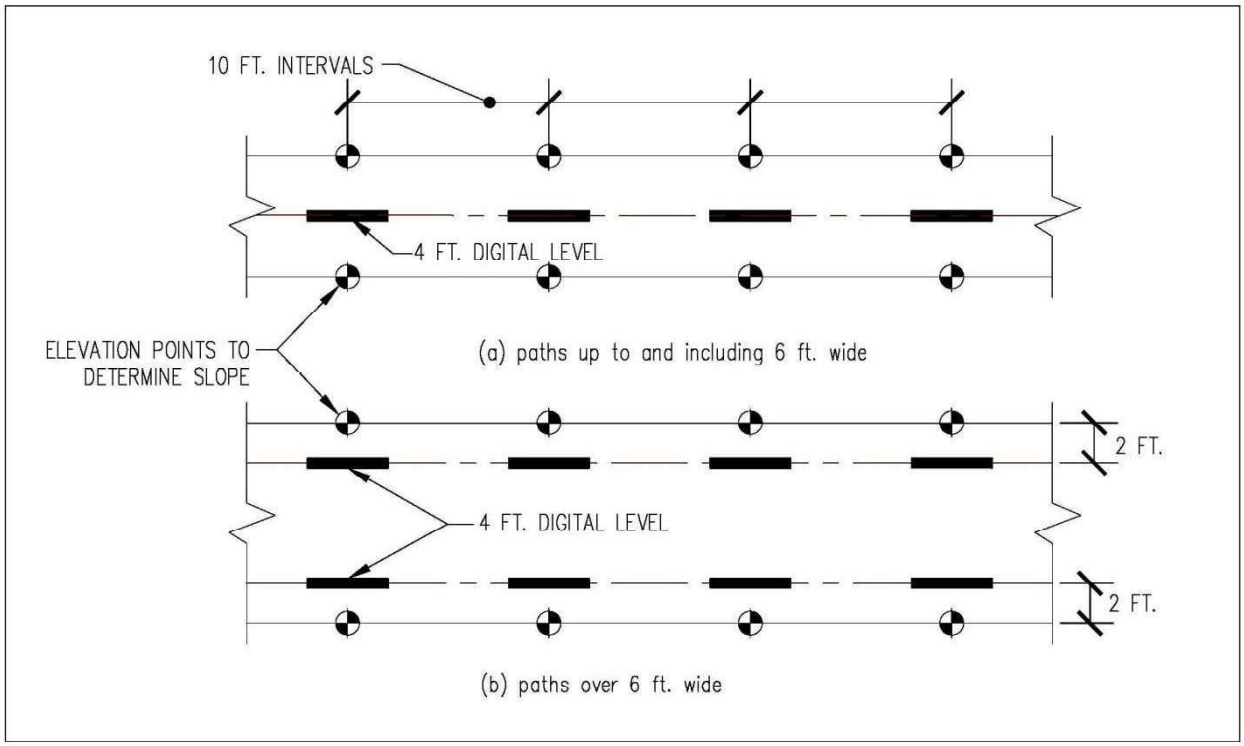


Figure 1. Non-ramp pedestrian path flatness and measurement for running slope.

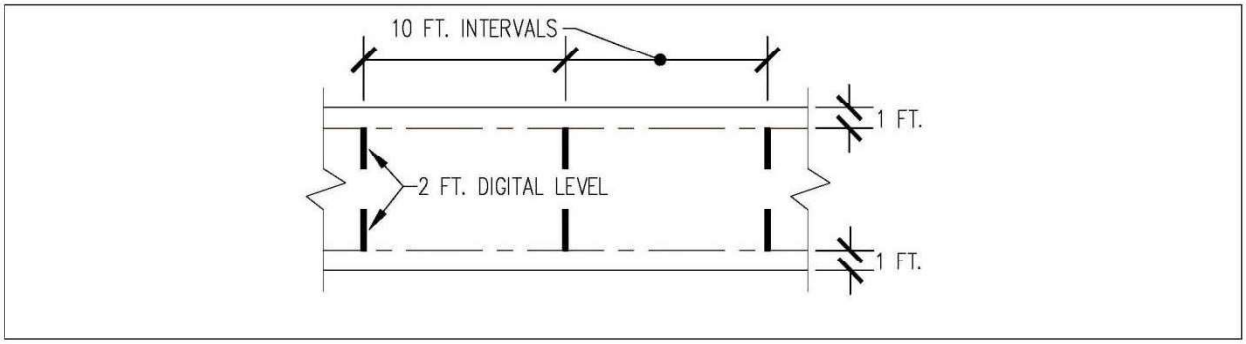


Figure 2. Non-ramp pedestrian path flatness measurements for cross slope.

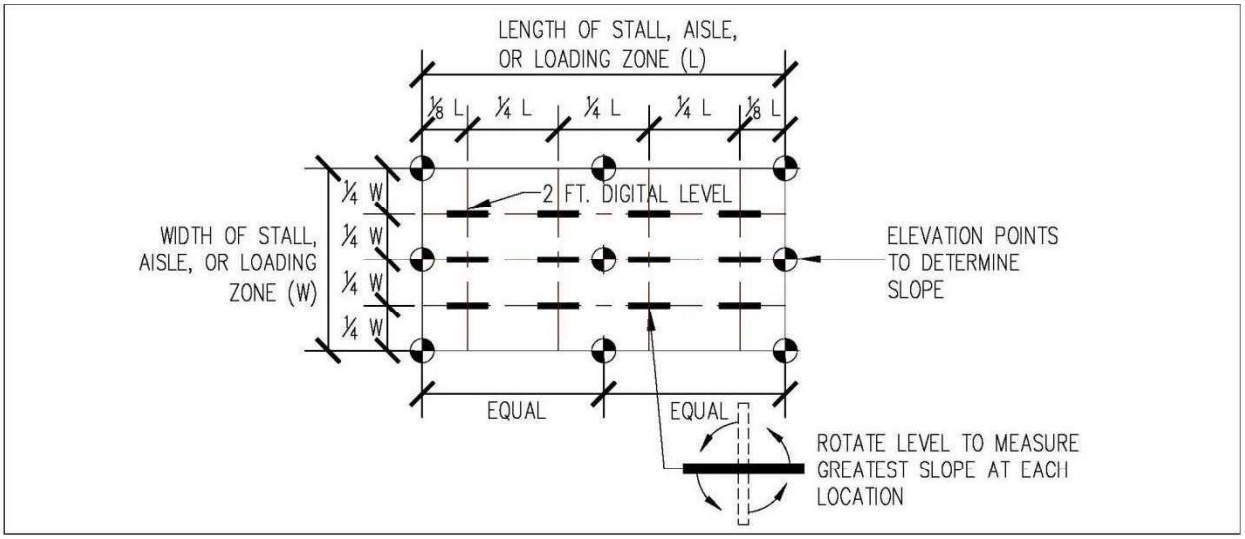


Figure 3. Parking stall access aisles and passenger loading zone flatness and measurements for slope.

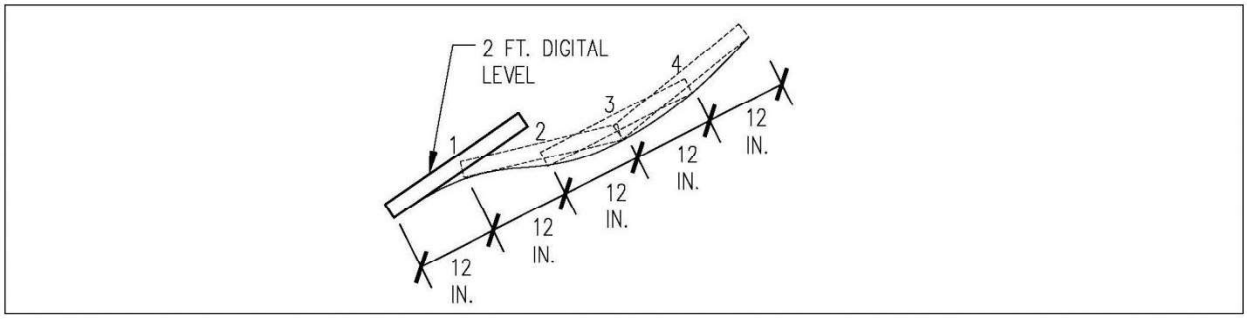


Figure 4. Measuring flatness on ramp running slope.

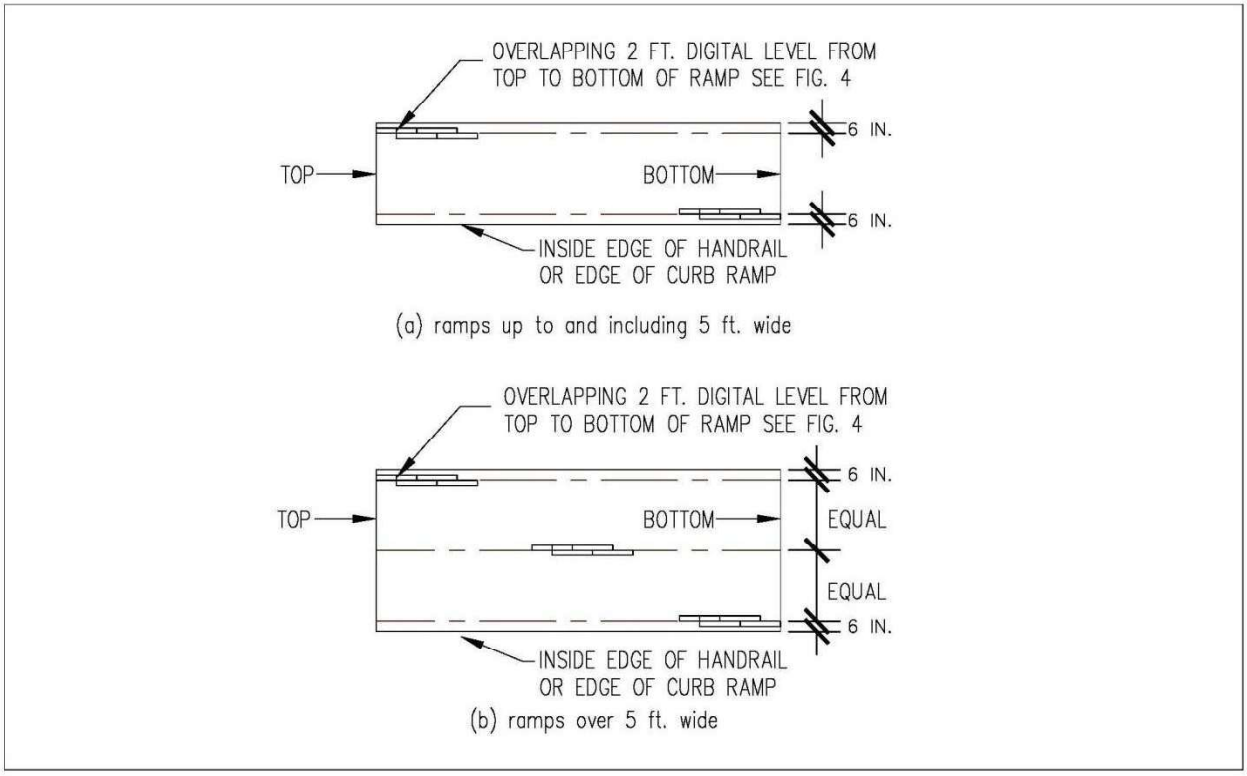


Figure 5. Ramp flatness measurement for running slope.

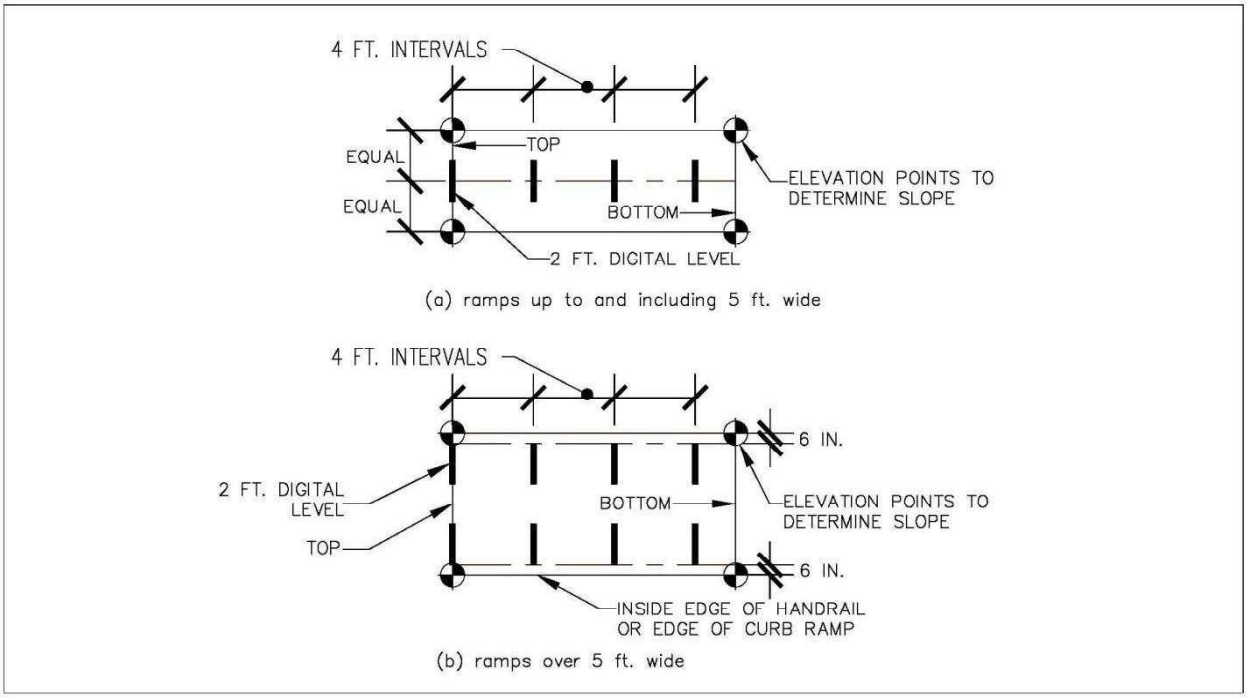


Figure 6. Ramp flatness measurement for cross slope.

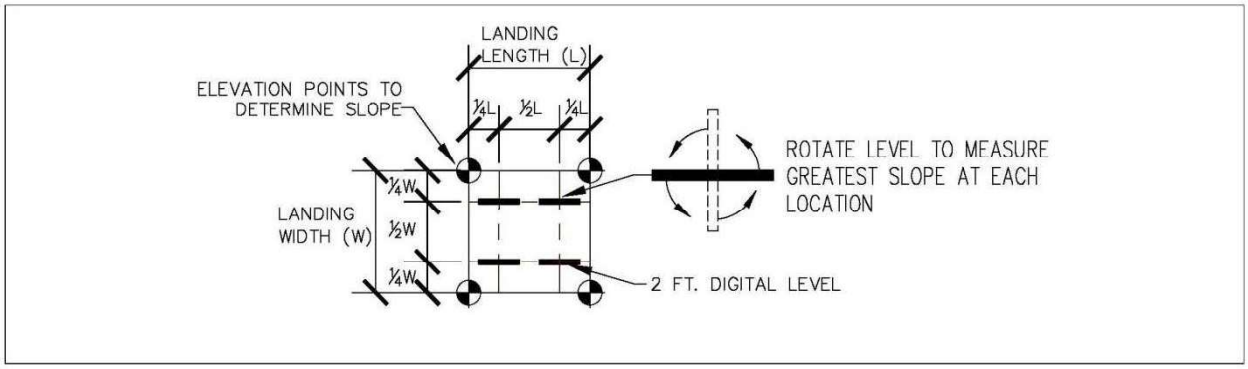


Figure 7. Landing flatness measurement for slope.

END OF SECTION

SECTION 32 13 18

CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Materials for portland cement concrete

B. Aggregate and aggregate grading for portland cement concrete

C. Water for portland cement concrete

D. Admixtures for portland cement concrete

E. Proportioning for portland cement concrete

F. Mixing and transporting portland cement concrete

G. Formwork for cast in place portland cement concrete

H. Embedded materials for portland cement concrete

I. Steel reinforcement for portland cement concrete

J. Placing and finishing portland cement concrete

K. Curing portland cement concrete

L. Protecting portland cement concrete

1.02 RELATED SECTIONS

A. Section 32 12 16, Asphalt Paving

B. Section 32 13 13, Concrete Pavement

1.03 RELATED DOCUMENTS

A. ASTM Standards

1. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

2. A1064, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

3. C94, Standard Specification for Ready-mixed Concrete

4. C150, Standard Specification for Portland Cement

5. C260, Standard Specification for Air-Entraining Admixtures for Concrete

6. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

7. C494, Standard Specification for Chemical Admixtures for Concrete.

8. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Portland Cement

9. C1017, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete

10. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

11. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

B. Caltrans Standard Specifications, latest edition

1. Section 51: Concrete Structures

2. Section 73: Concrete Curbs and Sidewalks

3. Section 90: Concrete

1.04 DEFINITIONS

A. ASTM: American Society for Testing and Materials

1.05 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Concrete Mix Design: Have all concrete mixes designed by a testing laboratory and approved by the Consulting Engineer. Conform all mixes to the applicable building code requirement, regardless of other minimum requirements listed herein or on the Plans. Submit mix designs for review before use. Show proportions and specific gravities of cement, fine and coarse aggregate, and water and gradation of combined aggregates.

C. Reinforcing Steel Shop-Drawings

D. Control joint layout Shop-Drawings for pour sequence alignment and acceptable crack control spacing prior to releasing site contractor to pour.

1.06 QUALITY ASSURANCE

A. Concrete shall be subject to quality assurance in accordance with Section 90 of the Caltrans Standard Specifications.

1. Slump tests: Have available, at job site, equipment required to perform slump tests. Make one slump test for each cylinder sample, from same concrete batch. Allowable maximum slump shall be 3 inches +/- 1 inch for slabs on grade and other work.

B. Certifications:

1. Provide Owner's Representative at the time of delivery with certificates of compliance signed by both Contractor and Supplier containing the following statements:

a. Materials contained comply with the requirements of the Contract Documents in all respects.

b. Proportions and mixing comply with the design mix approved by the Consulting Engineer. Design mix shall have been field tested in accordance with the herein requirements of the Caltrans Standard Specifications and produces the required compressive strength under like conditions.

c. Statement of type and amount of any admixtures.

2. Provide Owner's Representative, at time of delivery, with certified delivery ticket stating volume of concrete delivered and time of mixing, or time of load-out in case of transit mixers.

1.07 DESIGNATION

A. General: Whenever the 28 day compressive strength is designated herein or on the Plans is 3,600 psi or greater, the concrete shall considered to be designated by compressive strength. The 28 day compressive strength shown herein or on the plans which are less than 3,600 psi are shown for design information only and are not considered a requirement for acceptance of the concrete. Whenever the concrete is designated by class or as minor concrete herein or on the Plans, the concrete shall contain the cement per cubic yard shown in Section 90-2 of the Caltrans Standard Specifications unless specifically for curbs, gutters, and sidewalks which shall contain the cement per cubic yard shown in Section 73 of the Caltrans Standard Specifications.

B. Unless specified otherwise herein or on the Plans, portland cement concrete for curbs, gutters, sidewalks and their appurtenances such as island paving, curb ramps and driveways, shall be minor concrete as specified in Section 90-2 of the Caltrans Standard Specifications.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT

A. General: Type II or Type V cement conforming to the requirements of ASTM C150. Contractor may substitute pozzolan for portland cement in amounts up to 15% of the required mix unless high early strength concrete is specified. Pozzolan shall consist of Class F Fly Ash meeting the requirements of ASTM C618.

2.02 AGGREGATE AND AGGREGATE GRADATION

A. General: Fine and coarse aggregates shall be 1 inch maximum size; clean and crushed aggregate free of materials which may cause staining. Aggregates shall conform to the requirements of section 90-1.02C of the Caltrans Standard Specifications for 1 inch x No.4 gradation.

B. Aggregate Size and Gradation: Conform to the requirements of section 90-1.02C(4)(d) of the Caltrans Standard Specifications for 1 inch maximum combined aggregate.

2.03 WATER

A. General: Water shall be clean, free from injurious amounts of oil, alkali, organic matter, or other deleterious material, and not detrimental to concrete per ASTM C94. Water shall conform to the requirements of section 90-1.02D of the Caltrans Standard Specifications, for mixing and curing portland cement concrete and for washing aggregates.

2.04 CHEMICAL ADMIXTURES

A. Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material. Admixtures shall conform to the requirements of section 90-1.02E of the Caltrans Standard Specifications and as noted herein or on the Plans.

1. Air-Entraining Admixture: ASTM C260/C260M

2. Water-Reducing Admixture: ASTM C494/C494M, Type A

3. Retarding Admixture: ASTM C494/C494M, Type B

4. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D

5. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F

6. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G

7. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II

2.05 CLASSIFICATION OF PORTLAND CEMENT CONCRETE

A. Unless specified otherwise herein or on the Plans, portland cement concrete for the following items shall be designated as follows:

1. Vehicular Concrete Pavement: The concrete shall consist of a minimum of 590 pounds of Portland cement per cubic yard of concrete.

2. Curbs, Gutters, and Sidewalks: Minor concrete per Caltrans Standard Specification Section 73.

3. Cast in Place Concrete Pipe: The concrete shall consist of a minimum of 564 pounds of portland cement per cubic yard of concrete.

4. Sign and Fence Footings: The concrete shall consist of a minimum of 376 pounds of portland cement per cubic yard of concrete.

5. Water, Storm, and Sanitary Structures: The concrete shall consist of a minimum of 564 pounds of portland cement per cubic yard of concrete.

6. Minor concrete: Per Caltrans Standard Specification Section 90-2.

2.06 EXPANSION JOINT MATERIAL

A. Material for expansion joints in portland cement concrete improvements shall be premolded expansion joint fillers conforming to the requirements of ASTM D1751. Expansion joint material shall be shaped to fit the cross section of the concrete prior to being placed. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site. Unless specified otherwise herein or on the Plans, expansion joint thickness shall be as follows:

1. Concrete Slope Protection, Gutter Lining, Ditch Lining and Channel Lining: ½ inch

2. Structures: As indicated

2.07 REINFORCEMENT AND DOWELS

A. Bar reinforcement for concrete improvements shall be deformed steel bars of the size or sizes called for on the plans conforming to the requirements of ASTM A615 for Grade 60 bars. Size and shape for bar reinforcement shall conform to the details shown or called for on the Plans. Substitution of wire mesh reinforcement for reinforcing bars will not be allowed.

B. Slip dowels, where noted or called for on the Plans or detail drawings shall be smooth billet-steel bars as designated and conforming to the requirements of ASTM A615 for Grade 60 bars. Ends of bars inserted in new work shall be covered with a cardboard tube sealed with cork; no grease or oil shall be used.

C. Mesh for reinforcement for concrete improvements shall be cold drawn steel wire mesh of the size and spacing called for on the plans conforming to the requirements of ASTM A1064. Size and extent of mesh reinforcement shall conform to the details shown or called for on the plans.

D. Tie wire for reinforcement shall be eighteen (18) gauge or heavier, black, annealed conforming to the requirements of ASTM A1064.

E. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site.

2.08 CURING AND SEALING MATERIALS

A. Curing Compounds per Caltrans Standard Specification Section 90-1.03B(3):

1. Concrete surface repellent-vertical and/or flatwork: Repello surface treatment, invisible chemical treatment barrier system.

2.09 FORMS

A. Conform to the requirements of Section 73-1.03C and Section 90-1.03B(5) of the Caltrans Standard Specifications.

B. Tolerance: Not to deviate more than ¼ inch in 10 feet in grade and alignment.

2.10 PRECAST CONCRETE STRUCTURES

A. Conform to the following Sections of Caltrans Standard Specifications:

1. 51-7, Minor Structures

2. 70-5.02, Flared End Sections

PART 3 - EXECUTION

3.01 STRUCTURAL EXCAVATION

A. Structural excavation may be either by hand, or by machine and shall be neat to the line and dimension shown or called for on the plans. Excavation shall be sufficient width to provide adequate space for working therein, and comply with CAL-OSHA requirements.

B. Where an excavation has been constructed below the design grade, refill the excavation to the bottom of the excavation grade with approved material and compact in place to 95% of the maximum dry density as determined by ASTM D1557, or as approved by the Geotechnical Engineer.

C. Remove surplus excavation material remaining upon completion of the work from the job site, or condition it to optimum moisture content and compact it as fill or backfill on the site.

3.02 BRACING AND SHORING

A. Refer to specification section 31 60 00 Lateral Support as part of shoring package.

B. Conform to California and Federal OSHA requirements.

C. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

D. Be solely responsible for all bracing and shoring and, if requested by the Owner's Representative, submit details and calculations to the Owner's Representative. The Owner's Representative may forward the submittal to the Consulting Engineer for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner's Representative.

E. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.03 PLACING CONCRETE FORMS

A. Form concrete improvements with a smooth and true upper edge. Side of the form with a smooth finish shall be placed next to concrete. Construct forms rigid enough to withstand the pressure of the fresh concrete to be placed without any distortion.

B. Thoroughly clean all forms prior to placement and coat forms with an approved form oil in sufficient quantity to prevent adherence of concrete prior to placing concrete.

C. Carefully set forms to the alignment and grade established and conform to the required dimensions. Rigidly hold forms in place by stakes set at satisfactory intervals. Provide sufficient clamps, spreaders and braces to insure the rigidity of the forms.

D. Provide forms for back and face of curbs, lip of gutters and edge of walks, valley gutters or other surface slabs that are equal to the full depth of the concrete as shown, noted or called for on the Plans. On curves and curb returns provide composite forms made from benders or thin planks of sufficient ply to ensure rigidity of the form.

3.04 PLACING STEEL REINFORCEMENT

A. Bars shall be free of mortar, oil, dirt, excessive mill scale and scabby rust and other coatings of any character that would destroy or reduce the bond. All bending shall be done cold, to the shapes shown on the plans. The length of lapped splices shall be as follows:

1. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, and reinforced bars Nos. 9, 10, and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the plans.

2. Splice locations shall be made as indicated on the plans.

B. Accurately place reinforcement as shown on the plans and hold firmly and securely in position by wiring at intersections and splices, and by providing precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads. Provide supports and ties of such strength and density to permit walking on reinforcing without undue displacement.

C. Place reinforcing to provide the following minimum concrete cover:

1. Surfaces poured against earth: 3 inches.

2. Formed surfaces exposed to earth or weather: 2 inches.

D. Minimum spacing, center of parallel bars shall be two and one half (2 ½) times the diameter of the larger sized bar. Accurately tie reinforcing securely in place prior to pouring concrete. Placing of dowels or other reinforcing in the wet concrete is not permitted.

3.05 MIXING AND TRANSPORTING PORTLAND CEMENT CONCRETE

A. Transit mix concrete in accordance with the requirements of ASTM Designation C94. Transit mix for not less than ten (10) minutes total, not less than three (3) minutes of which shall be on the site just prior to pouring. Mix continuous with no interruptions from the time the truck is filled until the time it is emptied. Place concrete within one hour of the time water is first added unless authorized otherwise by the Owner's Representative.

B. Do not hand mix concrete for use in concrete structures.

3.06 PLACING PORTLAND CEMENT CONCRETE

A. Thoroughly wet subgrade when concrete is placed directly on soil. Remove all standing water prior to placing concrete.

B. Do not place concrete until the subgrade and the forms have been approved.

C. Convey concrete from mixer to final location as rapidly as possible by methods that prevent separation of the ingredients. Deposit concrete as nearly as possible in final position to avoid re-handling.

D. Place and solidify concrete in forms without segregation by means of mechanical vibration or by other means as approved by the Owner's Representative. Continue vibration until the material is sufficiently consolidated and absent of all voids without causing segregation of material. The use of vibrators for extensive shifting of fresh concrete will not be permitted.

E. Concrete in certain locations may be pumped into place upon prior approval by the Owner's Representative. When this procedure requires redesign of the mix, such redesign shall be submitted for approval in the same manner as herein specified for approval of design mixes.

3.07 PLACING ACCESSORY MATERIALS

A. Place water stops and other items required to be embedded in of portland cement concrete structures at locations shown or required in accordance with Section 51-2.04 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans.

B. Curing Compounds:

1. Regular Portland Cement Concrete: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.08 FORM REMOVAL

A. Remove forms without damage to the concrete. Remove all shores and braces below the ground surface, before backfilling.

B. Do not backfill against concrete until the concrete has developed sufficient strength to prevent damage.

C. Leave forms for cast-in-place walls in place at least 72 hours after pouring.

D. Leave edge forms in place at least 24 hours after pouring.

3.09 FIELD QUALITY CONTROL

A. Finish subgrade for concrete improvements shall be subject to approval prior to placement of forms.

B. No concrete shall be placed prior to approval of forms.

C. Concrete improvements constructed shall not contain "bird baths" or pond water and shall be smooth and ridge free.

D. Conform the finish grade and cross section of concrete improvements to the design grades and cross sections.

E. Variation of concrete improvements from design grade and cross section as shown or called for on the plans shall not exceed the tolerances ACI 117 and as follows:

1. Elevation: ¼ inch.

2. Thickness: Plus 3/8 inch, minus 1/4 inch.

3. Surface: Gap below 10 foot long, unleveled straightedge not to exceed 1/4 inch.

4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.

5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.

6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.

7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.

8. Joint Spacing: 3 inches, unless otherwise indicated.

9. Contraction Joint Depth: Plus 1/4 inch, no minus.

10. Joint Width: Plus 1/8 inch, no minus.

3.10 RESTORATION OF EXISTING IMPROVEMENTS

A. Replace in kind all pavement or other improvements removed or damaged due to the installation of concrete improvements.

B. Remove, landscaping or plantings damaged or disturbed due to the installation of concrete improvements. Replace in kind.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal of existing traffic stripes and pavement markers

B. Removal of existing signs

C. Cleaning and sweeping of streets before application of traffic stripes and pavement markings

D. Materials and application for traffic stripes and pavement markings

1.02 RELATED SECTIONS

A. Section 01 10 00, Supplemental General Requirements

B. Section 32 13 18, Cement and Concrete for Exterior Improvements

1.03 RELATED DOCUMENTS

A. Caltrans Standard Specifications, latest edition
   1. Section 78, Incidental Construction
   2. Section 81, Miscellaneous Traffic Control Devices
   3. Section 82, Signs and Markers
   4. Section 84, Markings

B. Caltrans Standard Plans, latest edition
   1. Plan A20A through A20D: Pavement Markers and Traffic Lines, Typical Details
   2. Plan A24A and A24B: Pavement Markings Arrows
   3. Plan A24C: Pavement Markings, Symbols and Numerals
   4. Plan A24D: Pavement Markings, Words
   5. Plan A24E: Pavement Markings, Words, Limit and Yield Lines
   6. Plan A24F: Pavement Markings, Crosswalks
   7. Plan A73A: Object Markers
   8. Plan A73B: Markers
   9. Plan A73C: Delineators, Channelizers and Barricades
   10. Plan A74: Survey Monuments
   11. Plan RS1: Roadside Sign, Typical Installation Details No. 1
   12. Plan RS2: Roadside Sign, Wood Post - Typical Installation Details No. 2
   13. Plan RS3: Roadside Sign, Laminated Wood Box Post - Typical Installation Details No. 3
   14. Plan RS4: Roadside Sign, Typical Installation Details No. 4

C. The State of California Traffic Manual, latest edition

D. The regulations, standards, and tests of the State of California Department of Transportation Materials and Research Division, edition in effect at time of date on Plans.

E. Professional Land Surveyor's Act, Business and Professions Code §§ 8700 – 8805

1.04 SUBMITTALS

A. Submit product data for each of the following in accordance with Section 01 10 00, Supplemental General Requirements:
   1. Traffic paint
   2. Pavement markers and adhesives
   3. Reflectorized markers and posts

1.05 QUALITY ASSURANCE

A. Deliver certificates showing conformance with this specification to the Owners Representative with each shipment of materials and equipment to the Project site.

B. Provide proper facilities for handling and storage of products to prevent damage. Where necessary, stack products off ground on level platform, fully protected from weather.

1.06 PROJECT CONDITIONS

A. Do not apply traffic striping or pavement markings to the pavement until after approval to proceed has been given by the Owners Representative.

B. Thoroughly cure new asphalt concrete and portland cement concrete before application of stripes, markings or markers.

PART 2 - PRODUCTS

2.01 THERMOPLASTIC STRIPES AND MARKING

A. Thermoplastic striping and marking materials shall be in accordance with Caltrans Standard Specifications Sections 84-2.02 and 84-2.02B, unless noted otherwise herein or on the Plans.

B. Glass Beads shall be in accordance with Caltrans Standard Specification Section 84-2.02D, Glass Beads, unless noted otherwise herein or on the Plans.

C. Thermoplastic stripes and markings shall have a minimum skid friction value of BPN 35.

2.02 PAINTED STRIPES AND MARKINGS

A. Painted striping and marking materials shall be in accordance with Caltrans Standard Specifications Sections 84-2.02 and 84-2.02C, unless noted otherwise herein or on the Plans.

B. Glass Beads shall be in accordance with Caltrans Standard Specification Section 84-2.02D, Glass Beads, unless noted otherwise herein or on the Plans.

PART 3 - EXECUTION

3.01 REMOVAL OF TRAFFIC STRIPES, PAVEMENT MARKINGS AND PAVEMENT MARKERS

A. Where blast cleaning is used for the removal of painted traffic stripes and pavement markings, or for removal of objectionable material, remove the residue, including dust and

water, immediately after contact with the surface being treated. Remove by a vacuum attachment operating concurrently with the blast cleaning operation.

B. Where grinding is used for the removal of thermoplastic traffic stripes and pavement markings; remove the residue by means of a vacuum attachment to the grinding machine. Do not allow the residue to flow across or be left on, the pavement.

C. Where markings are to be removed by blast cleaning or by grinding, the removed area shall be approximately rectangular so that no imprint of the removed marking remains on the pavement.

D. Contractor will be responsible for repairing any damage to the pavement during removal of pavement markers. Damage to the pavement, resulting from removal of pavement markers, shall be considered as any depression more than 1/4-inch deep.

3.02 TEMPORARY PAVEMENT MARKERS

A. If permanent pavement markers cannot be installed immediately, and the street or road is to be placed in service, install short term, temporary pavement markers on the new pavement prior to opening the street or road to traffic.

B. Place markers, at a minimum, of 24 feet on centers, or as required by the governmental agency having jurisdiction, in the appropriate colors to delineate centerlines and travel lanes on multi-lane roadways.

3.03 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

A. Apply in conformance with the manufacturer's instructions and the applicable requirements Caltrans Standard Specification Section 84-2.03, Construction, and Caltrans Standard Plans A20A through A20D, and A24A through A24E.

3.04 PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS

A. Apply in conformance with the manufacturer's instructions and the applicable requirements of Caltrans Standard Specification Section 84-3.03, 3.04 and 3.05 and Caltrans Standard Plans A20A through A20D, and A24A through A24F.

3.05 PROTECTION

A. Protect the newly installed traffic stripes and pavement markings from damage until the material has cured.

B. Replace any traffic stripes or pavement markings or markers broken, misaligned or otherwise disturbed prior to opening roadway to traffic.

3.06 RESTORATION OF EXISTING IMPROVEMENTS

A. Existing signs striping or other markings removed or damaged due to the installation of new facilities shall be replaced in kind.

B. Existing landscaping or planting removed, damaged or disturbed due to the installation of traffic control signs or street name signs shall be replaced in kind.

END OF SECTION

SECTION 32 17 26

TACTILE WARNING SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface-applied detectable warning tiles.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of exposed finish requiring color selection.

C. Samples for Verification: For each type of tactile warning surface, in manufacturer's standard sizes unless otherwise indicated, showing edge condition, truncated-dome pattern, texture, color, and cross section; with fasteners and anchors.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For tactile warning surfacing, to include in maintenance manuals.

1.4 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Adhesive Application:

1. Apply adhesive only when ambient temperature is above 50 deg F and when temperature has not been below 35 deg F for 12 hours immediately before application. Do not apply when substrate is wet or contains excess moisture.

C. Weather Limitations for Mortar and Grout:

1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Provide artificial shade and windbreaks, and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and higher.

a. When ambient temperature exceeds 100 deg F, or when wind velocity exceeds 8 mph and ambient temperature exceeds 90 deg F, set unit pavers within 1 minute of spreading setting-bed mortar.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of tactile warning surfaces that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering and wear.
b. Separation or delamination of materials and components.

2. Warranty Period: Five years from date of acceptance of the work.

PART 2 - PRODUCTS

2.1 TACTILE WARNING SURFACING, GENERAL

A. Accessibility Requirements: Comply with applicable provisions in 2022 CBC for tactile warning surfaces.

1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.

B. Source Limitations: Obtain each type of tactile warning surfacing, joint material, setting material, anchor, and fastener from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 DETECTABLE WARNING MATS

A. Surface-Applied and Cast-In-Place Detectable Warning Tiles: Accessible truncated-dome detectable warning concrete tiles configured for surface application on existing concrete walkway surfaces, with slip-resistant surface treatment on domes, field of tile, and beveled outside edges.

1. Material: Molded glass- and carbon-fiber-reinforced polyester.
2. Color: Federal Yellow conforming to FS 33538 of Federal Standard 595C.
3. Shapes and Sizes:

a. Rectangular panel, as indicated on plans.

4. Dome Spacing and Configuration: Truncated domes shall have a center-to-center spacing of 2.3 inches minimum and 2.4 inches maximum, and a base to-base spacing of 0.65 inch minimum, measured between the most adjacent domes on a square grid.
5. Mounting: Adhered and fastened to existing concrete walkway of cast in to new concrete.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:

1. Furnish Type 304 stainless-steel fasteners for exterior use.
2. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.

B. Adhesive: As recommended by manufacturer for adhering tactile warning surfacing unit to pavement.

C. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF TACTILE WARNING SURFACING

A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.

B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

3.3 INSTALLATION OF DETECTABLE WARNING MATS

A. Lay out detectable warning mats as indicated and mark concrete pavement at edges of mats.

B. Prepare existing paving surface by grinding and cleaning as recommended by manufacturer.

C. Apply adhesive to back of mat in amounts and pattern recommended by manufacturer, and set mat in place. Firmly seat mat in adhesive bed, eliminating air pockets and establishing full adhesion to pavement. If necessary, temporarily apply weight to mat to ensure full contact with adhesive.

D. Install anchor devices through face of mat and into pavement using anchors located as recommended by manufacturer. Set heads of anchors flush with mat surface.

E. Mask mat perimeter and adjacent concrete, and apply sealant in continuous bead around perimeter of mat.

F. Remove masking, adhesive, excess sealant, and soil from exposed surfaces of detectable warning mat and surrounding concrete pavement using cleaning agents recommended in writing by manufacturer.

G. Protect installed mat from traffic until adhesive has set.

3.4 CLEANING AND PROTECTION

A. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by State. Replace using tactile warning surfacing installation methods acceptable to State.

B. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION

32 21 19.13

DECORATIVE METAL SECURITY FENCES AND GATES

1.1 SUMMARY

A. Section Includes:
   1. The salvaging and reinstallation of:
      a. Decorative metallic-coated-steel security fences.
      b. Swing gates.
      c. Gate operators, including controls.
   2. The installation of new:
      a. Decorative metallic-coated-steel security fences

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.

   1. Include diagrams for power, signal, and control wiring.

C. Samples: For each fence material and for each color specified.

   1. Provide Samples 12” long to match existing.

PART 2 - PRODUCTS

2.1 DECORATIVE METALLIC-COATED-STEEL SECURITY FENCES

A. Decorative Metallic-Coated-Steel Security Fences. Match existing configuration and dimensions.

   1. Manfacturers: Subject to compliance with requirements, provide products by on of the following:
      a. Omega II
      b. Fortress Fence
      c. Ameristar
      d. BASTEEL
      e. Nexan
      f. Or Approved Equal.

2. Posts:
    1) Line, End, and Corner Posts: 4-by-4-inch (square tubes formed from 0.079-inch nominal-thickness), uncoated steel sheet, hot-dip galvanized after fabrication, with post caps to match.

B. Rails: 1-3/4-by-1-3/4-inch (square tubes.

1. Metal and Thickness: 0.079-inch nominal-thickness, metallic-coated steel sheet or 0.075-inch nominal-thickness, uncoated steel sheet, hot-dip galvanized after fabrication.

C. Pickets: 3/4-by-2-3/4-inch M-shaped pales.

1. Metal and Thickness: 0.079-inch nominal-thickness, metallic-coated steel sheet or 0.075-inch nominal-thickness, uncoated steel sheet, hot-dip galvanized after fabrication.
2. Picket Spacing: 6 inches o.c., maximum.

D. Fasteners: Stainless-steel carriage bolts with tamperproof nuts.

E. Metallic-Coated Steel Sheet: Galvanized-steel sheet or aluminum-zinc, alloy-coated steel sheet.

F. Interior surface of tubes formed from uncoated steel sheet shall be hot-dip zinc coated same as exterior

G. Galvanizing: For components indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M. For hardware items, hot-dip galvanize to comply with ASTM A 153/A 153M.

H. Finish: Organic coating complying with requirements in ASTM F 2408

2.2 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 033000 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi (20 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum aggregate size.

C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M and specifically recommended by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.2 DECORATIVE SECURITY FENCE INSTALLATION

A. Install fences according to manufacturer's written instructions.

B. Install fences by setting posts as indicated and fastening rails to posts. Peen threads of bolts after assembly to prevent removal.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Exposed Concrete: Extend 2 inches above grade. Finish and slope top surface to drain water away from post.
    b. Concealed Concrete: Top 2 inches below grade [allow covering with surface material. Slope top surface of concrete to drain water away from post.

3. Posts Set in Concrete: Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.
4. Posts Set into Concrete in Sleeves: Use galvanized-steel pipe sleeves with inside diameter at least 3/4 inch larger than outside diagonal dimension of post, preset and anchored into concrete for installing posts.

    a. Extend posts at least 5 inches into sleeve.
    b. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink grout, mixed and placed to comply with grout manufacturer's written instructions; shape and smooth to shed water. Finish and slope top surface of grout to drain water away from post.

5. Posts Set into Voids in Concrete: Form or core drill holes not less than 3/4 inch larger than outside diagonal dimension of post.

    a. Extend posts at least 5 inches into concrete.
    b. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink grout, mixed and placed to comply with grout manufacturer's written instructions. Finish and slope top surface of grout to drain water away from post.

SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Roadway and/or site storm drainage system up to five feet of any on-site building

1.02 RELATED SECTIONS

A. Section 31 21 00, Utility Trenching and Backfill

B. Section 32 13 18, Cement and Concrete for Exterior Improvements

1.03 RELATED DOCUMENTS

A. AASHTO

1. M199: Precast Reinforced Concrete Manhole Sections
2. M252: Corrugated Polyethylene Drainage Pipe
3. M294: Corrugated Polyethylene Pipe, 12 to 604 inch Diameter

B. ASTM

1. A74: Cast Iron Soil Pipe and Fittings
2. A615: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3. C143: Standard Test Method for Slump of Hydraulic-Cement Concrete
4. C443: Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
5. C478: Circular Precast Reinforced Concrete Manhole Sections
6. C564: Rubber Gaskets for Cast Iron Soil Pipe and Fittings
7. C923: Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
8. C1173: Flexible Transition Couplings for Underground Piping Systems
9. D1785: Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
10. D2321: Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications
11. D2564: Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
12. D3034: Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
13. D4101: Propylene Injection and Extrusion Materials

14. F477: Elastomeric Seals (Gaskets) for Joining Plastic Pipe

15. F656: Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings

16. F679: Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

17. F1336: Poly(Vinyl Chloride) (PVC) Gasket Sewer Fittings

C. AWWA

1. C104: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings

2. C105: Polyethylene Encasement for Ductile-Iron Pipe Systems

3. C110: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. for Water

4. C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

5. C115: Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges

6. C116: Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings

7. C150: Thickness design of Ductile Iron Pipe

8. C151: Ductile-Iron Pipe, Centrifugally Cast

9. C153: Ductile-Iron Compact Fittings

10. C219: Bolted, Sleeve-type Couplings for Plain-End Pipe

11. M41: Ductile Iron Pipe and Fittings

D. Caltrans Standard Specifications, latest edition

1. Section 51, Concrete Structures

2. Section 52, Reinforcement

3. Section 65, Concrete Pipe

4. Section 66, Corrugated Metal Pipe

5. Section 70, Miscellaneous Drainage Facilities

6. Section 72, Slope Protection

7. Section 75, Miscellaneous Metal

8. Section 90, Concrete

E. Caltrans Standard Plans, latest edition

1. Plan D94A: Metal and Plastic Flared End Sections

2. Plan D94B: Concrete Flared End Sections
3. Plan D97A: Corrugated Metal Pipe Coupling Details No. 1, Annular Coupling Band Bar and Strap and Angle Connection
4. Plan D97C: Corrugated Metal Pipe Coupling Details No. 3, Helical and Universal Couplers
5. Plan D97D: Corrugated Metal Pipe Coupling Details No. 4, Hugger Coupling Bands
6. Plan D97E: Corrugated Metal Pipe Coupling Details No. 5, Standard Joint
7. Plan D97F: Corrugated Metal Pipe Coupling Details No. 6, Positive Joint
8. Plan D97G: Corrugated Metal Pipe Coupling Details No. 7, Downdrain
9. Plan D98A: Slotted Corrugated Steel Pipe Drain Details
10. Plan D98B: Slotted Corrugated Steel Pipe Drain Details

1.04 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials

B. ASTM: American Society for Testing Materials

C. AWWA: American Water Works Association

D. CMP: Corrugated metal pipe

E. DIP: Ductile iron pipe

F. HDPE: High-density polyethylene

G. NPS: Nominal pipe size

H. PE: Polyethylene

I. PVC: Polyvinyl Chloride

J. RCP: Reinforced concrete pipe

1.05 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 33 00, Submittal Procedures.

B. Product data for the following:

1. Piping materials and fittings
2. Special pipe couplings
3. Polymer-concrete, channel drainage systems (trench drains)
4. Joint sealants

5. Plastic area drains

6. Cleanout plugs or caps

7. Precast concrete catch basins, inlets, curb inlets, junction structures and area drains, including frames and grates

8. Precast clean out boxes and box covers

9. Concrete, metal and plastic flared end sections

C. Shop drawings: Include plans, elevations, details and attachments for the following:

1. Precast concrete manholes, frames and covers

D. Design Mix Reports and Calculations: For each class of cast in place concrete

E. Field Test Reports: Indicate and interpret test results for compliance with performance.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage

1. Piping: Inspect materials delivered to site for damage; store with minimum of handling. Store materials on site in enclosures or under protective coverings. Store HDPE piping and jointing materials and rubber gaskets under cover out of direct sunlight. Do not store HDPE materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

2. Metal Items: Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

B. Handling

1. Handle pipe, fittings, and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. When handling lined pipe, take special care not to damage linings of pipe and fittings; if lining is damaged, make satisfactory repairs. Carry, do not drag, pipe to trench.

2. Handle precast concrete pipe, manholes and other precast structures according to manufacturer's written instructions.

3. Protect imported bedding and backfill material from contamination by other materials.

PART 2 - PRODUCTS

2.01 PVC PIPE, 4 INCH AND LARGER

A. Pipe

1. 4 inch through 15 inch: ASTM D3034, SDR 35

2. 18 inch through 36 inch: ASTM F679, T-1 wall

B. Bell and spigot joints

C. Fittings:

1. 4 inch through 27 inch: ASTM F1336

D. Joint Gasket: Elastomeric seal, ASTM F477

E. Special Pipe Coupling: ASTM C 1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined

2.02 HDPE PIPE AND FITTINGS: 12 INCH THROUGH 48 INCH

A. Pipe shall be in accordance to AASHTO M294. Type S, smooth interior and corrugated exterior.

B. Bell and spigot joints

C. Bell and Spigot Joint Gasket: Elastomeric seal, ASTM F477

D. Couplings: AASHTO M252, corrugated band type, engage a minimum of 4 corrugations, 2 on each side of pipe joint

2.03 REINFORCED CONCRETE PIPE

A. Designated by Class, rubber gasketed joints, Type II or V cement

1. Circular Reinforced Concrete Pipe: Caltrans Standard Specification Section 65-2.02C(2). Class III

2. Oval shaped (Elliptical) Reinforced Concrete Pipe: Caltrans Standard Specification Section 65-2.02D. Class HE-III and VE-III

B. Rubber Gasketed Joints: Caltrans Standard Specification Section 65-2.02F

C. Special Pipe Couplings: Portland cement collar as indicated

2.04 MANHOLES

A. Manholes shall be pre-cast concrete of the size and shape shown on the Plans and shall conform to ASTM C478. Equivalent poured-in-place structures may be used at the Contractor's option. Concrete shall consist of Caltrans Type I/II cement. Rate for AASHTO H20 loading in traffic areas.

B. Frames and Covers: As indicated and in accordance with Caltrans Standard Specification Section 75-2.02B. Manhole covers shall have the letter "D" at center of cover in letters not less than 2 inches cast into the cover. The clear opening for all manhole covers shall be 24 inches.

C. Frames and lids for manholes shall be match-marked in pairs before delivery to the job site. The lids shall fit into their frames without rocking.

D. Reinforcing Bars: Reinforcing bars shall be of intermediate grade billet steel conforming to ASTM A615 and shall be of the size shown on the Standard Details or in the Plans. Bars shall be of the round deformed type, free from injurious seams, flaws, or cracks, and shall be cleaned of all rust, dirt, grease and loose scales.

E. Portland Cement Concrete: Concrete for manhole bases, inlets, and other concrete structures shall conform to the requirements of Caltrans Standard Specifications Section 90 and as herein specified. The concrete shall be Class "A" containing six (6) sacks of portland cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the CDT requirements of the three-quarter inch maximum. The consistency of the fresh aggregate shall be such that the slump does not exceed four inches, as determined by ASTM C143. The concrete shall have a minimum design compressive strength of 3,000 psi after 28 days.

2.05 JOINT SEALANT FOR PRECAST STRUCTURES AND MANHOLES

A. Mortar: Caltrans Standard Specification Section 51-1.02F

1. Use to seal around pipes at connections to structures and manholes. Also use to seal joints between precast sections of structures and manholes.

B. Gaskets: Preformed flexible rubber or plastic gasket

1. Rubber Gaskets: ASTM C443

2. Plastic Gaskets: Federal Specification SS-S-00210 (GSA-FSS), Type I, Rope Form; or alternate standard which may exist. Acceptable material is "Ram-Nek," as manufactured by Henry Company.

2.06 PIPE TO STRUCTURE CONNECTOR/SEAL, CONNECTION TO EXISTING STRUCTURE

A. A flexible pipe to manhole connector shall be used for all pipe penetrations to pre-cast and/or cast-in-place concrete structures.

1. The seal shall provide a flexible, positive, watertight connection between pipe and concrete wastewater structures. The connector shall assure that a seal is made between (1) the connector and the structure wall, and (2) between the connector and the pipe. The seal between the connector and the manhole wall shall be made by casting the connector integrally with the structure wall during the manufacturing process in such a manner that it will not pull out during coupling. The seal between connector and pipe will be made by way of a stainless steel take down band compressing the gasket against the outside diameter of the pipe.

2. The connector shall be molded from materials whose physical/chemical properties meet or exceed the physical/chemical resistant properties outlined in ASTM C923. The connector and stainless steel hardware shall meet or exceed the performance requirements proscribed in ASTM C923.

3. The connector shall be of size specifically designed for the pipe material being used and shall be installed in accordance with recommendations of the manufacturer.

4. Connectors shall be Z-LOK or G3 connectors manufactured by A-LOK Products Inc.

PART 3 - EXECUTION

3.01 PIPE INSTALLATION

A. General: Install pipe, fittings, and appurtenances utilizing best practices, manufacturer's instructions, and in accordance with Section 6 and 7 of ASTM D 2321 for plastic pipe, Caltrans Standard Specification Section 65-2.03 for reinforced concrete pipe, Caltrans Standard

Specification Section 66-1.03 for corrugated metal pipe, and chapter 11.3.3 of AWWA M41 for cast iron and ductile iron pipe.

B. Pipe Depth and Trench Configuration: Conform to typical trench section(s) indicated.

C. Excavation, Bedding, Backfill, and Compaction: Section 31 21 00, Utility Trenching and Backfill

D. Handling: Carefully handle during loading, hauling, unloading and placing operations to avoid breakage or damage. Use strap type slings for lifting and placing; no chains or hooks will be permitted. Comply with the manufacturer's recommendations.

E. Laying: Before lowering pipe into the trench, remove all stakes, debris, loose rock and other hard materials from the bottom of the trench. Lay accurately in conformance with lines and grades indicated. Start laying the pipeline at the low end and proceed upstream. Lay bell and spigot pipe with the bell end facing upstream. Lay pipe on a bed prepared by handwork, dug true to grade. Furnish firm bearing for pipe throughout its entire length with bell holes provided at the ends of each pipe length of sufficient size to permit making up the particular type of joint being used. Adjust pipe to line and grade by scraping away or filling and tamping material under the body of the pipe for the entire pipe length and not by blocking or wedging. After final positioning, hold pipe in place in trench with backfill material placed equally on both sides of the pipe at as many locations as required to hold the pipe section in place.

F. Curved Alignment: When necessary to conform to the alignment specifically indicated, lay pipe on a curved alignment by means of asymmetrical closure of joints or bending of the pipe barrel. Use shorter lengths of pipe than the standard length if necessary to achieve curvature specified. Do not exceed the recommendations of the pipe manufacture for deflections at the joints or pipe bending.

G. Closure: Close open ends of pipes and appurtenance at the end of each day's work or when work is not in progress.

3.02 POURED-IN-PLACE CONCRETE

A. Concrete shall be mixed in accordance with applicable provisions of Section 90 of Caltrans Standard Specifications.

B. Construction of concrete structures shall conform to applicable provisions of Section 51 of the Caltrans Standards Specifications. Unless otherwise noted herein or in the Plans, exposed surfaces of structures shall be Class 1 surface finish.

C. Curing shall conform to applicable portions in Section 90 of Caltrans Standard Specifications. No pigment shall be used in curing compounds. All work shall be subject to inspection. No concrete shall be placed until the Project Manager has approved the forms and reinforcement.

D. Concrete shall not be cropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.03 PIPELINE FLUSHING

A. Newly constructed storm drain pipes shall be flushed with water to clean. A metal screen shall be used to collect and remove any rock, silt and other debris that is flushed out during cleaning.

3.04 DEFLECTION TESTING

A. Upon completion of work, perform a deflection test on entire length of installed plastic pipeline. Completed work includes superimposed loads adjacent to and over the pipeline, such as compacted backfill and earthwork, and does not include paving, concrete curbs and gutters, sidewalks, walkways, and landscaping.

B. Under external loads, deflection of pipe in the installed pipeline shall not exceed 4.5 percent of the average inside diameter of pipe.

C. Determine whether the allowable deflection has been exceeded by use of a pull-through device or a deflection-measuring device.

D. Pull-Through Device:

1. Provide a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft.

   a. Circular sections shall be so spaced on the shaft that distance from external faces of front and back sections will equal or exceed diameter of the circular section.

   b. Pull-through device may also be of a design approved by the Uni-Bell Plastic Pipe Association, provided that the device meets the applicable requirements specified in this paragraph, including those for diameter of the device.

2. Ball, cylinder, or circular sections shall conform to the following:

   a. A diameter, or minor diameter as applicable, of 95 percent of the average inside diameter of the pipe; tolerance of plus 0.5 percent will be permitted.

   b. A homogeneous material throughout, with a density greater than 1.0 as related to water at 39.2 degrees F, and a surface Brinell hardness of not less than 150.

   c. Center bored and through bolted with a ¼ inch minimum diameter steel shaft having a yield strength of not less than 70,000 pounds per square inch, with eyes or loops at each end for attaching pulling cables.

   d. Each eye or loop shall be suitably backed with a flange or heavy washer such that a pull exerted on opposite end of shaft will produce compression throughout remote end.

3. Pull-Through Device:

   a. Pass the pull-through device through each run of pipe, either by pulling it through or flushing it through with water.

   b. If the device fails to pass freely through a pipe run, replace pipe which has the excessive deflection and completely retest in same manner and under same conditions as specified.

E. Deflection measuring Device:

1. Sensitive to 1.0 percent of the diameter of the pipe being tested and accurate to 1.0 percent of the indicated dimension.

2. Obtain approval of County's Construction inspector for deflection measuring device prior to use.

F. Deflection Measuring Device Procedure:

1. Measure deflections through each run of installed pipe.

2. If deflection readings in excess of 4.5 percent of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction.

3. If retest continues to show a deflection in excess of 4.5 percent of average inside diameter of pipe, remove pipe which has excessive deflections, replace with new pipe, and completely retest in same manner and under same conditions.

3.05 CLEANING

A. Thoroughly clean storm drain lines, manholes, catch basins, field inlets, culverts, and similar structures, of dirt, debris, and obstructions of any kind.

END OF SECTION