

Technical Specifications For:

ESS RELOCATABLE BUILDING

Lemon Crest Elementary School

ASDG Job Number: 25-022

Client:

Lakeside Union School District
12335 Woodside Avenue
Lakeside, CA 92040

Architect:

AlphaStudio Design Group
6152 Innovation Way
Carlsbad, CA 92009
760-431-2444

Electrical:

Johnson Consulting Engineers, Inc.
12875 Brookprinter Place, Suite 300
Poway, CA 92064
858-513-0559

Civil:

Pasco Lauret Suiter & Associates
535 N. Highway 101, Ste A
Solana Beach, CA 92075
858-259-8212



ESS RELOCATABLE BUILDING

Lemon Crest Elementary School



Architect:
Paul Gallegos



Electrical Engineer:
Monica Hansen



Civil Engineer:
William J. Suiter

TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 0110 TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01 1000 SUMMARY
01 2000 PRICE AND PAYMENT PROCEDURES
01 2100 ALLOWANCES
01 2300 ALTERNATES
01 2500 SUBSTITUTION PROCEDURES
01 3000 ADMINISTRATIVE REQUIREMENTS
01 3010 SUBMITTALS
01 3020 SHOP DRAWING PREPARATION REQUIREMENTS
01 3216 CONSTRUCTION PROGRESS SCHEDULE
01 3553 SECURITY PROCEDURES
01 4000 QUALITY REQUIREMENTS
01 5000 TEMPORARY FACILITIES AND CONTROLS
01 5100 TEMPORARY UTILITIES
01 5213 FIELD OFFICES AND SHEDS
01 5500 VEHICULAR ACCESS AND PARKING
01 6000 PRODUCT REQUIREMENTS
**01 6116 VOLATILE ORGANIC COMPOUND (VOC) CONTENT
RESTRICTIONS**
01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS
01 7410 CLEANING
01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 7800 CLOSEOUT SUBMITTALS
01 7900 DEMONSTRATION AND TRAINING

DIVISION 02 - EXISTING CONDITIONS

02 4100 DEMOLITION

DIVISION 03 - CONCRETE

03 0100 MAINTENANCE OF CONCRETE
03 0516 UNDERSLAB VAPOR BARRIER - STEGO
03 1000 CONCRETE FORMING AND ACCESSORIES
03 2000 CONCRETE REINFORCING
03 3000 CAST-IN-PLACE CONCRETE

DIVISION 05 - METALS

05 5213 PIPE AND TUBE RAILINGS

DIVISION 26 - ELECTRICAL

26 0100 ELECTRICAL GENERAL PROVISIONS
26 0519 POWER CONDUCTORS

26 0526	GROUNDING
26 0533	CONDUIT AND FITTINGS
26 0534	OUTLET AND JUNCTION BOXES
26 0543	UNDERGROUND PULL BOXES AND MANHOLES
26 9090	ELECTRICAL CLOSEOUT
DIVISION 27 - COMMUNICATIONS	
27 0100	COMMUNICATIONS GENERAL PROVISIONS
27 1000	VOICE-DATA IP INTERCOM INFRASTRUCTURE
DIVISION 28 – ELECTRONIC SAFETY AND SECURITY	
28 0100	ELECTRONIC SAFETY AND SECURITY GENERAL PROVISIONS
28 3001	FIRE ALARM SYSTEMS AND VOICE EVAC
DIVISION 31 - EARTHWORK	
31 1000	SITE CLEARING
31 2200	GRADING
31 2316	EXCAVATION
31 2317	TRENCHING
31 2323	FILL
DIVISION 32 - EXTERIOR IMPROVEMENTS	
32 1120	SUBBASE AND AGGREGATE BASE COURSES
32 1216	ASPHALT PAVING
32 1313	CONCRETE PAVING
32 1723	PAVEMENT MARKINGS
32 1726	TACTILE WARNING SURFACING
32 3113	CHAIN LINK FENCES AND GATES
32 9310	LANDSCAPE AND IRRIGATION REPAIR
DIVISION 33 - UTILITIES	
33 0110	DISINFECTION OF WATER UTILITY PIPING SYSTEMS
33 1416	SITE WATER UTILITY DISTRIBUTION PIPING
33 3113	SITE SANITARY SEWERAGE GRAVITY PIPING
33 4211	STORMWATER GRAVITY PIPING

SECTION 01 1000 SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Lemon Crest Elementary School ESS Relocatable Building
- B. Owner's Name: Lakeside Union School District .
- C. Architect's Name: AlphaStudio Design Group.
- D. The Project consists of the construction of and installation of (1) 48x40 relocatable building, (1) 20x20 shade structure, and miscellaneous site improvements. .

1.02 REGULATORY REQUIREMENTS

- A. The Project shall comply with Title 24, Parts 1-6 and 9.
- B. A copy of Title 24, Parts 1-5 must be kept on site at all times during construction.

1.03 DEFINITIONS

- A. C.B.C.: California Building Code
- B. C.C.R.: California Code of Regulations
- C. Furnish: To supply products to the project site, including delivery.
- D. Install: To put products in place in the work ready for the intended use, including unloading, unpacking, handling, storing, assembling, installing, erecting, placing, applying, anchoring, working, finishing, curing, protecting, cleaning, and similar operations.
- E. Provide: To furnish and install products.
- F. Indicated: Shown, noted, scheduled, specified, or drawn, somewhere in the Contract Documents.

1.04 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.

1.05 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Contractor to cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.06 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: as negotiated with Owner.
 - 1. The Contractor shall have an approved logistics plan prior to beginning construction activities.
- B. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Others.
 - 3. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage.

E. Utility Outages and Shutdown:

1. Limit disruption of utility services to hours the building is unoccupied.
2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.
4. In the event that any or all life safety systems are shutdown, the Contractor shall provide Life and Safety watch for the entirety of the shutdown.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

- A. Definitions:
 - 1. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- B. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- C. Substitute forms containing equivalent information may be considered in lieu of AIA G703. Contractor shall submit proposed form to Architect for review within 10 days after issuance of the notice to proceed for approval.
- D. Forms filled out by hand will not be accepted.
- E. Submit Schedule of Values in PDF format, electronically within 10 days after the notice to proceed.
- F. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization and bonds and insurance. Avoid vague terms when itemizing the Schedule of Values.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list **approved** Change Orders, with each Application For Payment.
- I. Coordination: When conflicts in Construction Documents are identified, the Contractor shall, at the time of bidding, assume the most costly solution as presented in the Construction Documents unless otherwise clarified by a Request for Information. Contractor shall provide notification to the design team when such circumstances are identified.
 - 1. When conflicts in Construction Documents are identified, the Contractor shall, at the time of bidding, assume the most costly solution as presented in the Construction Documents unless otherwise clarified by a Request for Information. Contractor shall provide notification to the design team when such circumstances are identified.
 - 2. All Items shown in the construction drawings or specifications should be assumed by the Contractor to have all necessary connections, even when not indicated on the Construction Documents. Drinking fountains, roof drains, pumps, outlets, etc, should be assumed to be furnished with all necessary plumbing, electrical, data, mechanical, or structural connections for the equipment or item to function. Contractor to assume the scope of all such items in their initial bids.
- J. Contractor and subcontractors to provide Schedule of Values for all lump sum items at or prior to the pre-construction meeting and when submitting Payment Application.
- K. The Schedule of Values shall be organized in a manner that itemizes major construction elements and their associated costs. At a minimum the Schedule of Values line items shall be formatted as follows:
 - 1. The Schedule of Values shall be organized in a logical manner that lists tasks in the sequence in which the work will be performed.

2. Contractor's insurance and bonds shall be listed as separate items.
3. Development of the project's CPM schedule and subsequent monthly updates shall be listed as separate line items.
4. Elements that require recurring maintenance during construction, such as storm water BMP's, shall include line items for initial installation and subsequent maintenance.
5. Each major construction element shall have separate line items for labor, material, associated equipment and material storage (if required).
6. Construction assemblies, such as concrete foundations, shall be listed by individual components (concrete, rebar, vapor barrier, etc.) not final assemblies.
7. All Allowances and Contingency shall be listed as separate line items.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. The Contractor shall submit a pencil draft of the payment application for review and comment a minimum of five business days prior to issuance.
 1. Sequencing: The Contractor shall route the payment applications for review first to the Inspector, then the Architect, then to the Owner, or as previously agreed.
- C. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- D. Substitute forms containing equivalent information may be considered in lieu of AIA G702 and G703. Contractor shall submit proposed form to Architect for review within 10 days after issuance of the notice to proceed for approval.
- E. Forms filled out by hand will not be accepted.
- F. For each item, provide a column for listing each of the following:
 1. Item Number.
 2. Description of work.
 3. Scheduled Values.
 4. Previous Applications.
 5. Work in Place and Stored Materials under this Application.
 6. Approved Change Orders
 7. Approved Allowance Usage Requests (AUR's)
 8. Total Completed and Stored onsite to Date of Application.
 9. Percentage of Completion.
 10. Balance to Finish.
 11. Retainage.
- G. Execute certification by signature of authorized officer.
- H. Submit Application for Payment in electronic PDF format.
- I. Include the following with the application (in electronic format where applicable):
 1. Construction progress schedule, revised and current as specified in Section 01 3216.
 2. Partial release of liens from major subcontractors and vendors.
 3. Project record documents for review by Inspector and Architect.
- J. The Contractor shall be responsible for obtaining all required signatures. Once all signatures are obtained, Application for Payment may be submitted to the Owner.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.

- B. When direction provided by the Architect or Owner appears to modify the contract scope, time, or price the following procedure shall be followed:
 - 1. The Contractor shall notify the Architect in writing within three business days of receiving direction that a potential change to the above may occur.
 - 2. The Contractor shall provide to the Architect within ten business days of receiving direction, a Change Order Request (COR) detailing what the modifications to the contract scope, price, or time are as well as including all relevant substantiation of costs and supporting documentation. Change Order Requests shall be on the Contractor's own form and numbered sequentially.
 - 3. If the Contractor does not comply with Items 1 and 2 above, the Contractor voids their ability to claim a contract modification of time and/or price.
 - 4. Within ten business days of receiving the Contractor's COR, the Architect shall respond in writing to the request.
 - 5. Once accepted, the COR shall be included in a Change Order for the Owner's approval. The Contractor can invoice for the COR once approved by the Owner.
- C. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time with updated project schedule.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
 - a. Time and Material work must be authorized by the Owner or the Architect prior to commencement of work.
 - b. Time and Material verification must be reviewed and verified by the Inspector at the conclusion of each day or portion thereof.
- D. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
 - 1. Change Orders shall be invoiced once the Owner has approved and the fully executed Change Order has been provided to the Contractor.
- E. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- F. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- G. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 7000.
 - 2. Verification of completion of final punch list items.

3. Provide completed record drawings including all supplemental instructions, request for information, and other relevant project information. These items shall be included as a permanent part of the record drawings.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2100 ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contingency allowance.

1.02 CONTINGENCY ALLOWANCE

- A. At closeout of Contract, funds remaining in Allowance will be credited to Owner by deductive Change Order.
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in usage request authorizing expenditure of funds from this Contingency Allowance.
- C. The Contractor will prepare detailed breakdown of all costs associated with the work defined for the Allowance. These amounts will be based on final detailed payment receipts and back-up or estimates as required by Architect, and will include all direct costs of work performed under the defined work scope and will be charged against the Allowance through the Allowance Usage Request (AUR).
- D. Types of allowance scheduled herein for the Work include lump sum cash allowances. Include all allowances in Contract sum, and identify all allowances in Schedule of Values as separate line items.
- E. The Allowance is used only as directed by the Owner.
- F. The Allowance is used exclusively for the Owner's purposes and for the defined scope of work.
- G. The Contractor shall include in the base bid contract amount all cost of coordination, supervision, bond costs, insurance and all indirect project costs associated with performing the work of the Allowance.
- H. Changes that exceed the amount of each allowance will be processed as a Change Order per Contract Documents.
- I. All backup information provided for allowance usage shall include, but not be limited to:
 - 1. Material and/or equipment rental receipts
 - 2. Invoices
 - 3. Delivery tickets
 - 4. Contractor and sub contractor daily reports

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2300
ALTERNATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option.
Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2500 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 01 2300 - Alternates: Product alternatives affecting this section.
- B. Section 01 3010 - Submittals: Submittal procedures, coordination.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project, but are not required in order to meet other Project requirements.
 - a. Substitution requests offering advantages solely to the Contractor shall be considered on a case by case basis.

1.04 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage); Current Edition.
- B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase); Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
 - 6. Contractor and sub contractors shall submit written requests for substitution or an 'equal' material, process, or article, together with substantiating data, no later than 35 days after award of the contract or at the pre-construction meeting, whichever is earlier.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:

- a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - 2) Owner's, Architect's, and Contractor's names.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.
 - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 5) Description of Substitution.
 - 6) Reason why the specified item cannot be provided.
 - 7) Differences between proposed substitution and specified item.
 - 8) Description of how proposed substitution affects other parts of work.
 - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Sustainable design features.
 - 6) Warranties.
 - 7) Other salient features and requirements.
 - 8) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
 - d. Impact of Substitution:
 - 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.
 - 3) Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract time.
 - 4) If specified product or method of construction cannot be provided within the Contract Time, include a letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- D. Limit each request to a single proposed substitution item.
- 1. Submit an electronic document, combining the request form with supporting data into single document.
- E. Substitutions affecting DSA regulated items shall be considered an Addendum or Construction Change Document and shall be approved prior to fabrication or procurement of substituted product.
- 1. All addenda shall be signed by the Architect of Record and approved by DSA.
 - 2. All Construction Change Documents (CCD's) shall be signed by the Architect of Record, Structural Engineer (where applicable), and delegated professional engineer (where applicable). CCD's shall be reviewed and approved by DSA prior to fabrication, procurement, and installation of substituted product.

3.02 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- B. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 business days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 business days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
 - b. Other construction by Owner.
 - c. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.

3.03 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 - 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.04 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.05 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Web-based project software service.
- C. Electronic document submittal service.
- D. Preconstruction meeting.
- E. Progress meetings.
- F. Requests for Information (RFI) procedures.
- G. Digital files use and release
- H. Punch walk and associated punch list procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 3010 - Submittals: Submittal procedures, coordination.
- B. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01 6000 - Product Requirements: General product requirements.
- D. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- E. Section 01 7410 - Cleaning: Progress cleaning and final clean requirements.
- F. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Information (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Design data.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Construction and progress schedules.
 - 8. Coordination drawings.
 - 9. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 10. Closeout submittals.
 - 11. Digital Photo Documentation of the Project Site and Adjacent Areas
 - a. Required to be submitted within 30 days of pre-construction meeting.
 - 12. Corner Records of all Survey Monuments Tie-Out in or Near the Work Area (if Surveying is to be Provided by the Contractor)
 - a. Required to be submitted within 30 days of Contractor mobilization on site.
 - 13. Specifications and Certifications for Each Material or Item to be Used on the Project
 - 14. Traffic Control Plans
 - a. Required to be submitted 30 days prior to traffic control being performed on site.
 - b. Each traffic control plan and/or permit shall be required to be submitted.
 - 15. Illness and Injury Prevention Program Plan
 - a. Required to be submitted prior to pre-construction meeting.

16. Schedule of Values for all Lump Sum Bid Items
 - a. Required to be submitted prior to pre-construction meeting.
17. Staff Names with a list of staff assignments, including superintendent and other personnel in attendance at project site. (Identify individuals and their duties and responsibilities; list email addresses and telephone numbers)
 - a. Required to be submitted prior to pre-construction meeting.
18. All Permits and Contractor Licenses
19. Confined Space Entry Program and Shoring Plan, (if required)
 - a. Required to be submitted within 30 days prior mobilization of confirmed space entry and/or installation of shoring.
20. Sewer Spill Prevention Plan, (if required)
 - a. Required to be submitted prior to excavation or grading activities on site.
21. Cut Sheet/Shop Drawings, Manufacturers Brochures, Technical Bulletins and Reports, Specifications, Diagrams for all Products to be Used on the Project
22. Plans, Schematics, Drawings and Engineering Calculations as Required per the Contract Documents and/or Permitting
23. SWPPP (if required)
24. Data, including, but not limited to, catalog sheets, manufacturers brochures, technical bulletins, specifications, diagrams, product samples, and other information necessary to describe a system, product or item. This information is required for irrigation systems, lighting systems, and may also be required for any product, manufactured item, or system.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice to Proceed.
- B. Attendance Required:
 1. Owner
 2. Architect
 3. Contractor
 - a. Contractor's site superintendent, project manager, and project engineer shall be required to attend.
 4. Inspector
 5. Program Manager
 6. School Site Representative (if applicable).
- C. Agenda:
 1. Designation of Contractor's personnel for the project.
 2. 24 hour emergency contact information for Contractor and Owner.
 3. List of all subcontractors regardless of percentage of work.
 4. Construction CPM Schedule
 5. Copy of Public Notification/Door Hangers
 6. Digital photo documentation of project site and adjacent area. This item can be processed as a formal project submittal.
 7. Schedule of values for all lump sum bid items. This item can be processed as a formal submittal.
 8. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 9. Example pay application showing conformance to Owner requirements.
 10. Any required Contractor agenda items shall be submitted to the Architect or Program Manager a minimum of 48 hours prior to the meeting.
- D. Record minutes and distribute copies within 7 days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
 - 1. Exceptions: When Program Manager or the Contractor coordinate the meetings, their respective parties shall perform the responsibilities noted above.
- B. Progress meetings shall be scheduled weekly or as agreed upon by the Owner, Architect, and Contractor.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent, project manager, and project engineer
 - 5. Inspector.
 - 6. Program Manager.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - a. Contractor shall provide a three week look ahead schedule projecting upcoming work activities.
 - b. Three week look-ahead schedule shall be provided to the Architect, Inspector, and Program Manager a minimum of 24 hours prior to the meeting.
 - c. Current Construction Progress Schedule (CPM Schedule) shall be available upon request. See Section 01 3216 - Construction Progress Schedule .
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - a. Contractor's submittal log shall be provided to the Architect, Inspector, and Program Manager a minimum of 24 hours prior to the meeting.
 - b. Submittal log shall list items anticipated to be submitted prior to the next progress meeting.
 - 6. Review of RFIs log and status of responses.
 - a. Contractor's RFI log shall be provided to the Architect, Inspector, and Program Manager a minimum of 24 hours prior to the meeting.
 - b. RFI log shall list pending RFI's anticipated to be submitted prior to the next progress meeting.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Corrective measures to regain projected schedules.
 - 9. Coordination of projected progress.
 - 10. Maintenance of quality and work standards.
 - 11. Effect of proposed changes on progress schedule and coordination.
 - 12. Other business relating to work.
- E. Record minutes and distribute copies within 7 days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.
- F. The Progress Meetings are intended to be conducted in an orderly and professional manner. Any foul language or unprofessional conduct will not be tolerated and will result in the cessation of the meeting.
- G. Meetings shall not be recorded without the concurrence of all parties in attendance.

3.03 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or

- system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
2. A resolution to an issue which has arisen due to field conditions and affects design intent.
 3. Confirmation of previous discussions between Architect and Contractor resulting in a resolution to an on site issue. Confirming RFI's should only be submitted after mutual agreement by Architect and Contractor.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit an RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
 - a. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Architect.
 3. Combine RFI and its attachments into a single electronic file.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (See Section 01 3010 - Submittals)
 - b. Approval of substitutions (See Section 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract)
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract)
 - e. Confirmation of existing contract information
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
 - b. Multiple versions of the same RFI submitted without new or relevant information shall be considered frivolous and will be returned without a response.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information / interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract

Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

8. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- E. Review Time: Architect will respond and return RFIs to Contractor within 10 calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 1. Response period may be shortened or lengthened for specific items.
 2. RFIs that require input from Architect's consultants shall require an additional 7 calendar days of review time.
- F. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner and Architect.
 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.
- G. RFI Log: The Contractor shall maintain a detailed and up-to-date RFI log. Each entry on the log shall accurately correspond to an issued RFI. Pending or forthcoming RFI's shall be noted as such and be located at the end of the log. At a minimum the log shall include the following information:
 1. RFI Subject with Title and Number
 2. Submission Date
 3. Architect's Response Date
 4. Current Status (Open, Closed, Pending)
 - a. Highlight items requiring priority or expedited response.
 5. Current Responsible Party or Ball in Court

3.04 DIGITAL FILE USE AND RELEASE

- A. General
 1. Digital files are provided solely as a convenience to the Contractor.
 2. Digital files are not Contract Documents and may not be relied upon for construction or coordination.
 3. Signed and approved Contract Documents govern and take precedence over any electronic version.
 4. Use of the files is at the Contractor's sole risk. The Design Team shall not be held liable for errors, conflicts, or damages arising from use of the electronic data.
- B. Conditions of Use
 1. Digital files are for informational purposes only.
 2. The Design Team makes no representations or warranties regarding the accuracy or completeness of the data.
 3. The Contractor shall not:
 - a. Modify, distort, or misrepresent the content of the files.
 - b. Use the files for fabrication, layout, or construction in lieu of signed and sealed drawings.

- C. Digital File Request and Delivery Procedure
 1. Contractor shall submit a written requests to the Architect identifying the specific discipline(s) and type of digital file(s) required.
 2. Architect shall supply the Contractor with a Digital Data Release Form for each discipline requested.
 3. The Contractor shall complete, sign, and return the form to the Architect.
 - a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall also complete and sign the Digital Data Release Form.
 4. Upon approval, the Architect shall release files in a read-only format (e.g., AutoCAD .DWG with locked layers or .PDF as applicable).
 5. Architect, at their discretion, may deny release of files.
- D. Coordination and Responsibility
 1. Contractor shall be responsible for verifying all information derived from digital files against the Contract Documents.
 2. Contractor shall ensure all subcontractors, suppliers, and fabricators adhere to the same use limitations.
 3. Where Contractor, as a component of BIM coordination, re-routes assemblies or building systems due to conflict coordination procedures, changes for these revisions will not be considered a change in cost, scope or schedule as they are identified in advance of installation

3.05 PUNCH LIST

- A. Contractor's requirements for punch list: Prior to requesting the Architect to perform the final punch walk, the Contractor shall meet the following requirements:
 1. List of Incomplete Items: The Contractor shall furnish a comprehensive list of items that are not anticipated to be complete at the time of the Architect's punch walk.
 2. Contractor's Pre-Punch List: The Contractor shall furnish a comprehensive pre-punch list for review prior to the Architect's punch walk. The Contractor's list shall include corrective items identified by the Contractor during their internal pre-punch walk. The list shall also include the date each item was addressed by the Contractor. The Contractor's pre-punch list shall be completed in full prior to the Architect performing their punch walk.
 3. Scheduling of Architect's Final Punch Walk: Once the above items have been completed and submitted to the Architect for review, the Contractor shall schedule the Architect's final punch walk. The final punch walk shall be coordinated and scheduled by the Contractor with the Architect a minimum of 21 calendar days prior to the contract completion date or as previously agreed upon.
- B. Architect's punch walk:
 1. Once scheduled, the Architect and their required consultants will perform a final punch walk of the project. At the conclusion of the walk the Architect and consultants shall provide a punch list indicating deficient items. This list is not all encompassing and does not relieve the Contractor of any contractual requirements as it relates to the project.
 2. The Architect's punch list should not be considered a 'list to complete' as it is the Contractor's responsibility to ensure all items are completed prior to scheduling the punch walk. The Architect, at their discretion, may terminate the punch walk if it is determined that the project is not complete.
 3. The Architect shall issue the final punch list to the Contractor within 14 calendar days of the punch walk or as previously agreed upon.
 4. Once the Contractor has addressed all items on the Architect's punch list, the Contractor shall submit a verified punch list that includes the following minimum items:
 - a. Corrective measures taken to address the item.
 - b. Photo of the corrective measure taken.
 - c. Date of when the corrective measures were verified as being completed by the Contractor.
 - d. Initials of the Contractor who verified the completed corrective measures.

5. At the Architect's discretion a punch list verification walk shall be conducted to confirm the punch list items have been addressed.

END OF SECTION

SECTION 01 3010 SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittal log.
- B. Preparing and processing of submittals for review and action.
- C. Preparing and processing of informational submittals.

1.02 DEFINITIONS

- A. "Shop drawings" are drawings and other data prepared, by the entity who is to do the Work, specifically to show a portion of the Work.
- B. "Product data submittals" are standard printed data which show or otherwise describe a product or system, or some other portion of the Work.
 - 1. Product data submittals also include:
 - a. Performance curves, when issued by the manufacturer for all products of that type.
 - b. Selection data showing standard colors.
 - c. Wiring diagrams, when standard for all products of that type.
- C. "Samples" are actual examples of the products or work to be installed.
- D. Informational Submittals: Submittals identified in the contract documents as to be submitted for information only.

1.03 SUBMITTAL REQUIREMENTS

- A. Submit all submittals to the Architect for review and action.
- B. All Submittals for the project shall be provided to the Architect's via electronic means or physically delivered to the Architect within fifteen (15) days from the Notice to Proceed, unless otherwise agreed upon.
- C. Submittal review is only for general conformance with the design concept of the project and compliance with information given or implied in the contract documents. The Architect and/or Engineer's approvals, markings, or other comments shall not relieve the Contractor of compliance with the project plans and specifications.
- D. Related Sections: The following are specified elsewhere in Division 1:
 - 1. 01 2000 - Price and Payment Procedures
 - a. Payment, modification, and completion submittals.
 - 1) Applications for payment.
 - 2) Schedule of values.
 - 3) Change proposals.
 - 2. 01 3000 - Administrative Requirements
 - 3. 01 3020 - Shop Drawing Preparation Requirements
 - 4. 01 3216 - Construction Progress Schedule
 - a. Progress of work submittals:
 - 1) Contractor's construction schedules.
 - 5. 01 4000 - Quality Requirements
 - a. Quality control submittals:
 - 1) Inspection reports.
 - 2) Test reports.
 - 6. 01 6000 - Product Requirements
 - a. Product submittals:
 - 1) Requests for Substitution.
 - 2) Maintenance materials and tools.
 - 7. 01 7800 - Closeout Submittals

- a. Contract closeout submittals:
 - 1) Equipment and systems demonstration reports.
 - 2) Operating and maintenance data.
 - 3) Request for determination of substantial completion.
 - 4) Project record documents.
 - 5) Warranties.
 - 6) Bonds.

1.04 SUBMITTAL LOG

- A. Contractor shall prepare submittal log in format approved by the Architect and Owner.
 - 1. Refer to Section 01 3000 - Administrative Requirements - for related information.
 - 2. Submit at the same time as the preliminary schedule specified in Section 01 3216 - Construction Progress Schedule.
- B. At a minimum, the submittal log shall list all submittals required by the contract documents and at a minimum shall include the following information:
 - 1. Submittal Title
 - 2. Specification Section Number and Article / Paragraph
 - 3. Submission Date
 - a. Time in accordance with SUBMITTAL COORDINATION AND SCHEDULING article below.
 - 4. Resubmittal Date (if applicable)
 - 5. Current Status (Open, Closed, Pending)
 - a. Highlight items requiring priority or expedited review.
 - 6. Architect's Reviewed Date
 - 7. Current Responsible Party or Ball in Court
- C. Identify submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
- D. The Contractor shall maintain a detailed and up-to-date Submittal log to allow tracking of submittal status throughout duration of construction.

1.05 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for the Architect's review and action:
 - 1. Shop drawings.
 - 2. Structural design information required by the contract documents.
 - 3. Product data.
 - 4. Samples.
 - 5. Submittals indicated as "for approval."
 - 6. Submittals for which procedures are not defined elsewhere.
- B. The Architect shall review submittals for general conformance with the design concept of the project and compliance with the information given or implied in the contract documents.
- C. Approvals, markings or other comments made by the Architect shall not relieve the Contractor with compliance with the project plans and specifications.
- D. The Contractor remains responsible for details and accuracy, for conforming and correlating all quantities and dimensions, for selecting fabrication processes and techniques of construction and for coordination of their work with that of other trades and for performing their work in a safe and satisfactory manner.
- E. Deviations from the contract documents shall be brought to the attention of the Architect in writing at the time of each submittal in which the deviation(s) occur.
- F. Samples will be reviewed only for aesthetic, color, or finish selection. Samples will not be returned to the Contractor unless requested prior to the submittal.

- G. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

1.06 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
1. Design Data.
 2. Certificates.
 3. Coordination drawings.
 4. Test reports.
 5. Inspection reports.
 6. Manufacturer's instructions.
 7. Manufacturer's field reports.
 8. Qualification statements from manufacturers / installers.
 9. Verified Reports in accordance with Title 24, Part 1, Article 47336, C.C.R.
 10. Other types indicated.
 - a. Submit for Architect's knowledge as contract administrator or for Owner.
 - b. Subcontract List.
 11. Prepare a written summary identifying subcontracts selected for each portion of the work, including those who are to furnish products or equipment fabricated to a special design.
 12. In tabular form include name, address, telephone number, and email address of entity performing subcontract or supply products.

1.07 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

1.08 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
1. Electronic Documents: Submit one electronic copy in PDF format; an electronically marked-up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
 2. Hard Copy Submittals: Required for material and/or color selection samples.
- B. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- C. Samples: Submit the number specified in individual specification sections.
1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.
- D. Copies in excess of the number requested will not be returned.
- E. Provide additional copies, if required for operating and maintenance data, marked to indicate their purpose.

1.09 SUBMITTAL PROCEDURES

- A. Submittal Preparation:
1. Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

- a. Provide a space approximately 4" x 5" on the label or besides the title block on Shop Drawings to record the Architect's/Engineer's review and approval markings and the action taken.
 - b. Include the following information on the label for processing and recording action taken:
 - 1) Project Name.
 - 2) Date.
 - 3) Name and address of Architect.
 - 4) Name and address of District/Owner.
 - 5) Name and address of Contractor.
 - 6) Name and address of Subcontractor.
 - 7) Name and address of Supplier.
 - 8) Name of Manufacturer.
 - 9) Number and title of the appropriate Specification Section.
 - 10) Drawing number and detail references, as appropriate.
 - 11) Description of Submittal
 - 12) Submittal Category (For Review or For Information)
 - 13) Other necessary identifying information.
 - c. Do not submit substitute items that have not been approved by means of the procedure specified elsewhere.
 - d. Do not include requests for substitution (either direct or indirect) on submittals; comply with procedures for substitutions specified elsewhere.
 - e. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the Work, and have received prior approval for their use.
- B. Submittal Transmittals:
1. Package each submittal appropriately for transmittal and handling. Transmit each submittal from the General Contractor to the Architect using a standard "Submittal Transmittal" form in a format that is acceptable to the Architect and District. Submittals received from sources other than the General Contractor or Submittals received without a transmittal form will not be acknowledged, reviewed, or returned.
 2. Use a separate transmittal for each package and sequentially identify each item. For revised submittals, use original number and a sequential numerical suffix.
 3. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 4. Deliver each submittal at or before the date noted in Submittal Log, unless a different date has been agreed to by all affected parties, and is of benefit to the project.
 - a. Send submittals in electronic format via email to Architect.
 5. Identify all variations from Contract Documents and all Product or system limitations which may be detrimental to successful performance of the completed Work.
 - a. All submittals for materials or equipment other than that specified must be submitted with properly completed Substitution Request Form. See Section 01 2500 - Substitution Procedures.
 - b. When revised for resubmission, identify all changes made since previous submission.
 - c. Failure to identify all variations and limitations will be cause for retroactive rejection of submittals previously approved.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SUBMITTAL COORDINATION AND SCHEDULING

- A. Coordination of Submittals:
 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

- B. Account for time required for preparation, review, manufacturing, fabrication, testing and delivery when establishing submittal delivery and review deadline dates.
 - 1. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
 - 2. Schedule submittals to expedite the Project, coordinate submission of related items, and include enough information so that the Architect can properly review each submittal:
 - a. Coordinate submittals of different types for the same product and system.
 - b. Coordinate related submittals, activities and related elements of the Work that must be reviewed and performed in sequence.
 - c. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- C. Deliver each informational submittal prior to start of the Work involved, unless the submittal is of a type which cannot be prepared until after completion of the Work; submit promptly.
- D. For each submittal for review, allow 15 calendar days.
 - 1. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.
 - 2. Deferred Approval Submittal through the Division of the State Architect's office or for sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval. Due to the nature of these submittals, no estimated return date can be given.
 - 3. Complicated Shop Drawings may require more days for proper review time and coordination.
 - 4. If numerous Submittals are provided within a short period of time, the review time may not be able to be met. In these cases, the Contractor should clearly identify on the Submittal Transmittal which Submittals have the highest priority in terms of the Project Schedule and related construction activities.
- E. No extension of Contract Time will be authorized because of the failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing and review.

3.02 PRODUCT DATA

- A. Content:
 - 1. Submit manufacturer's standard printed data sheets.
 - 2. Identify the particular product being submitted; submit only pertinent pages.
 - 3. Show compliance with properties specified.
 - 4. Identify which options and accessories are applicable.
 - 5. Show compliance with the specific standards referenced.
 - 6. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
 - 7. Identify dimensions which have been verified by field measurement.
 - 8. Show special coordination requirements for the product.
- B. Preparation:
 - 1. Submit information required by individual specification sections.
 - 2. Collect required information into a single submittal.
 - 3. Do not submit (Material) Safety Data Sheets for materials or products.

3.03 SAMPLES

- A. Samples:
 - 1. Required for material and/or color selection samples.
 - 2. Provide samples that are the same as proposed product.
 - 3. Where unavoidable variations must be expected, submit "range" samples, minimum of 3 units, and describe or identify variations among units of each set.
 - 4. Where selection is required, provide full set of all options.

- B. Preparation:
1. Physical samples shall be photographed prior to submitting to Architect. Photographs shall be included in submittal package provided electronically for documentation.
 2. Transmit related items together as a single package.
 3. Attach a description to each sample. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
 4. Attach name of manufacturer or source to each sample.
 5. Where compliance with specified properties is required, attach documentation showing compliance.
 6. Where there are limitations in availability, delivery, or other similar characteristics, attach description of such limitations.
 7. Where selection is required, the first submittal may be a single set of all options; after return of submittal with selection indicated, submit standard number of sets of selected item.
- C. Keep final sample set(s) at the project site, available for use during progress of the Work.

3.04 REVIEW OF SUBMITTALS

- A. Submittals for Review: Architect will review each submittal and approve or take other appropriate action.
- a. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 - b. Architect's and consultants' actions on items submitted for review:
 - 1) Authorizing purchasing, fabrication, delivery, and installation:
 - (a) "No Exceptions Taken", or language with same legal meaning.
 - (1) When utilizing Web-based Project Software, contractor must provide "No Exceptions Taken" as a review option.
 - (b) "Make Corrections Noted, Resubmittal Not Required", or language with same legal meaning.
 - (1) At Contractor's option, submit corrected item with review notations acknowledged and incorporated.
 - 2) Not authorizing fabrication, delivery, and installation:
 - (a) "Revise and Resubmit".
 - (1) Resubmit revised items with review notations acknowledged and incorporated.
 - (2) Non-responsive resubmittals may be rejected.
 - (b) "Rejected".
 - (1) Submit item complying with requirements of Contract Documents.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- a. Architect's and consultants' actions on items submitted for information:
 - 1) Items for which no action was taken:
 - (a) "Received" - to notify the Contractor that the submittal has been received for record only.
 - 2) Items for which action was taken:
 - (a) "Reviewed" - no further action is required from Contractor.
- C. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.

3.05 RETURN, RESUBMITTAL, AND DISTRIBUTION

- A. Electronic submittals will be returned to the Contractor via email or Web-based Project Software.
- B. Perform resubmittals in the same manner as original submittals; indicate all changes other than those requested by the architect.

1. Exception: Transmittal number for resubmittals shall be the number of the original submittal plus a letter or number suffix; example: 05500-1 would become 05500-1 A.
- C. Do not allow submittals without an acceptable action marking to be used for the project.
- D. Do not commence work that requires review of any submittals until receipt of returned submittals with an acceptable action.
- E. Distribution:
 1. Distribute returned submittals with review comments to all subcontractors and suppliers involved in work covered by the submittal. Instruct parties to promptly report any inability to comply with requirements.
 2. Ensure review comments are recorded and included in project record documents.

END OF SECTION

SECTION 01 3020
SHOP DRAWING PREPARATION REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes requirements for preparation, coordination, and submission of Shop Drawings for review by the Architect of Record.
- B. Shop Drawings shall be prepared by the , subcontractor, supplier, manufacturer, or fabricator responsible for the Work.
- C. Copies, traces, or reproductions of Contract Documents are not acceptable as Shop Drawings.

1.02 RELATED SECTIONS

- A. Section 01 3000 - Administrative Requirements
- B. Section 01 3010 - Submittals
- C. Technical Specification Sections requiring Shop Drawings.

1.03 DEFINITIONS

- A. Shop Drawings: Drawings, diagrams, schedules, and data prepared specifically to illustrate fabrication, installation, and coordination.
- B. Unacceptable Submittals:
 - 1. Traced, redrawn, or repackaged design drawings.
 - 2. Excerpts or screenshots from Contract Documents.
 - 3. Manufacturer literature lacking project-specific integration.
 - 4. Mark-ups without fabrication detail.

1.04 QUALITY ASSURANCE

- A. Shop Drawings shall reflect actual means, methods, materials, fabrication, and installation of the trade providing the work.
- B. Prepared under supervision of individuals qualified in the relevant trade.
- C. Provide seal of licensed engineer where required by code.

1.05 SUBMITTALS

- A. Submit Shop Drawings in accordance with Section 01 3010 - Submittals.
- B. Each Shop Drawing shall include:
 - 1. Project name and number.
 - 2. DSA Application Number.
 - 3. Trade/subcontractor name.
 - 4. Date, revision, and preparer.
 - 5. Sheet references and specification cross-references.
- C. Contractor Review Requirements:
 - 1. Contractor shall review, coordinate, and stamp each submittal prior to submission.
 - 2. Stamps shall confirm field verification, compliance, coordination, and responsibility.
 - 3. Submittals without Contractor review shall be returned without review.

PART 2 PRODUCTS

2.01 SHOP DRAWING PREPARATION

- A. Prepared by the entity responsible for fabrication or installation.
- B. Do not use Contract Documents as fabrication drawings.
- C. Submittals that simply redraw or trace design documents will be rejected.

2.02 REQUIRED LEVEL OF DETAIL

- A. Provide, as applicable:

1. Verified field dimensions.
2. Material types, thicknesses, profiles, finishes.
3. Fabrication details including connections, welds, fasteners.
4. Anchorage, supports, backing, and bracing.
5. Integration with adjacent trades.
6. Installation sequencing.
7. Manufacturer data incorporated into trade-specific drawings.

2.03 PROHIBITED CONTENT

- A. The following shall not be accepted as Shop Drawings:
 1. Traced design drawings.
 2. CAD exports or PDFs without added fabrication detail.
 3. Generic catalog sheets lacking project-specific adaptation.
 4. Submittals prepared by unrelated drafting services unless approved.

PART 3 EXECUTION

3.01 COORDINATION

- A. Contractor shall coordinate all Shop Drawings before submission.
- B. Resolve dimensional conflicts and interferences prior to submitting.
- C. Uncoordinated drawings shall be returned without review.

3.02 FIELD VERIFICATION

- A. Verify all dimensions before preparing Shop Drawings.
- B. Do not rely solely on design drawing dimensions.
- C. "Verify in field" notes do not limit Contractor responsibility.

3.03 REVIEW AND RESUBMITTAL

- A. Review is for general conformance with design intent only.
- B. Deviations must be clearly identified and clouded.
- C. Resubmittals shall incorporate all revisions and comments.
- D. Approved Shop Drawings do not authorize changes unless noted.

END OF SECTION

**SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type, Critical Path Method, CPM, cost loaded schedule

1.02 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016, with Addendum (2021).

1.03 SUBMITTALS

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule identifying start and completion dates.
- E. Submit updated schedule with each Application for Payment or monthly.
 - 1. Application for payment may not be approved if the project schedule has not been accepted.
- F. Submit in PDF format.

1.04 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.05 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Show procurement activities for long lead items and major items.
- E. Identify startup & testing time and commissioning time.

- F. Provide sub-schedules to define critical portions of the entire schedule.
- G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
 - 1. Coordinate with requirements in Section 01 3010 - Submittals.
- I. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.
- J. 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.
- K. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- D. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.

3.05 REVIEW AND EVALUATION OF SCHEDULE

- A. Evaluate project status to determine work behind schedule and work ahead of schedule.
- B. After review, revise as necessary as result of review, and resubmit within 10 days.
- C. When periodic update indicates the Work is behind the current approved schedule, Owner may request submittal of 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.

3.06 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.07 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of approved schedule and all subsequent updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

**SECTION 01 3553
SECURITY PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Security measures including entry control, personnel identification, miscellaneous restrictions, and entry and exit control, personnel identification, protective devices, and miscellaneous restrictions.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: use of premises and occupancy.
- B. Section 01 5000 - Temporary Facilities and Controls: Temporary lighting.

1.03 SECURITY PROGRAM

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program at project mobilization.
- C. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.

1.04 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site .
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workers and visitors, make available to Owner on request.

1.05 PERSONNEL IDENTIFICATION

- A. Provide identification badge to each person authorized to enter premises.
- B. Badge To Include: Personal photograph, name and employer.
- C. Maintain a list of accredited persons, submit copy to Owner on request.
- D. Require return of badges at expiration of their employment on the Work.

1.06 RESTRICTIONS

- A. Do no work on Sundays unless previously authorized by Owner, in the event the work is ordered by the Owner and there is written direction specifically authorizing Sunday work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4000 QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. Testing and inspection agencies and services.
- D. Control of installation.
- E. Mock-ups.
- F. Tolerances.
- G. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 01 3010 - Submittals: Submittal procedures.

1.03 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
 - 1. Contractor to submit to Owner, Inspector, and Architect detailed quality control plan prior to initiation of construction activities onsite.

1.04 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. The Project Inspector and testing lab shall be employed by the Owner and approved by the Architect of Record, Structural Engineer of Record (where applicable), delegated professional engineer (where applicable), and DSA.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Mock-ups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances.

- B. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- C. Assemble and erect specified items on site with specified attachment and anchorage devices, flashings, seals, and finishes.
- D. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- E. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

7. On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
8. Testing and Inspection Log:
 - a. Prepare a record of tests and inspections. Include the following:
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

**SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Project identification sign.

1.02 RELATED REQUIREMENTS

- A. Section 01 3553 - Security Procedures.
- B. Section 01 5100 - Temporary Utilities.
- C. Section 01 5213 - Field Offices and Sheds.
- D. Section 01 5500 - Vehicular Access and Parking.
- E. Section 01 7419 - Construction Waste Management and Disposal.

1.03 TEMPORARY UTILITIES - SEE SECTION 01 5100

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Temporary telephone service in common-use facilities for use by all construction personnel.
 - 2. Install one telephone line for each field office.
 - 3. Provide a list of important telephone numbers including police and fire departments, Contractor's main office, Architect's office, Owner's office, and primary subcontractors main office.
 - 4. Provide superintendent with cellular telephone or portable two-way radio when away from field office.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization through to project completion.
 - 1. Provide temporary toilets, wash facilities, and drinking water for use by construction personnel. Comply with authority having jurisdiction regarding type, quantity and maintenance of fixtures and facilities.
- B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

- A. Provide barriers with sound proofing to prevent unauthorized entry to construction areas as well as mitigate noise pollution into the active school site and public right-of-way. Barrier should be constructed to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.07 FENCING

- A. Provide 6 foot (1.8 m) high chain link fence with steel pipe posts and galvanized steel base for supporting posts.
 - 1. Posts to be a minimum 2-3/8" OD line posts, 2-7/8" OD corner and pull posts, and 1-5/8" OD top and bottom rails.
 - 2. Minimum 2 inch, 9 gauge galvanized steel, chain link fencing fabric.
 - 3. Secure temporary fence with tie wire only with prior approval from Architect.
- B. Fencing to be located around construction site and equipped with vehicular and pedestrian gates with locks.
- C. Fence panels shall be locked to maintain access for the Contractor, Owner, Program Manager, Local Fire Authority, or other required agencies as discussed with project team.
 - 1. The Contractor shall coordinate Local Fire Authority access prior to start of construction.
- D. Provide screen on all temporary construction fence panels to limit the visibility of the construction site from the public.

1.08 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.09 SECURITY - SEE SECTION 01 3553

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.10 VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and Maintain access to all fire lanes and fire hydrants, free of obstruction, during all construction activities.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.11 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 5100
TEMPORARY UTILITIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity and water.

1.02 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls:

1.03 GENERAL REQUIREMENTS

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

1.04 TEMPORARY ELECTRICITY

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Provide temporary electric feeder from existing building electrical service at location as directed.

1.05 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Temporary water service for fire protection shall be installed prior to combustibles arriving onsite.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 5213
FIELD OFFICES AND SHEDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary field offices for use of Contractor.
- B. Maintenance and removal.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: use of premises and responsibility for providing field offices.
- B. Section 01 5000 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.
- C. Section 01 5500 - Vehicular Access and Parking: Parking and access to field offices.

PART 2 PRODUCTS

2.01 CONSTRUCTION

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table. Maintain during progress of Work; remove when no longer needed.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.
- D. Exterior Materials: Weather resistant, finished in one color.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 fc (538 lx) at desk top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.02 ENVIRONMENTAL CONTROL

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

2.03 CONTRACTOR OFFICE AND FACILITIES

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Furnishings in Meeting Area: Conference table and chairs to seat at least ten persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.
- D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch (250 mm) outdoor weather thermometer and six high visibility construction vests for visitors.

PART 3 EXECUTION

3.01 PREPARATION

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.02 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work. Location to be approved by Owner prior to installation.

3.03 MAINTENANCE AND CLEANING

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

3.04 REMOVAL

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION

**SECTION 01 5500
VEHICULAR ACCESS AND PARKING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Flag persons.
- E. Haul routes.
- F. Maintenance.
- G. Removal, repair.
- H. Mud from site vehicles.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: For access to site, work sequence, and occupancy.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Temporary Construction: Contractor's option.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.02 ACCESS ROADS

- A. Provide and maintain access to fire hydrants free of obstructions during all construction activities.

3.03 PARKING

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
- B. Arrange for temporary parking areas to accommodate use of construction personnel.
- C. When site space is not adequate, provide additional off-site parking.
- D. Locate as approved by Owner and identified in Contractor's approved logistics plan.

3.04 FLAG PERSONS

- A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.05 HAUL ROUTES

- A. Consult with governing authorities and Owner, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.06 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.

- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.07 REMOVAL, REPAIR

- A. Repair existing facilities damaged by use, to original condition.
- B. Repair damage caused by installation.

3.08 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets. Identify system on Contractor's logistics plan.

END OF SECTION

SECTION 01 6000 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Lists of products to be removed from existing building.
- B. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 4000 - Quality Requirements: Product quality monitoring.
- D. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment, appliances and other products.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Remove from site existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor.
 - 1. The Owner has the first right of refusal on all existing materials and equipment indicated to be removed, but not to be re-used.
- C. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is not prohibited, unless noted otherwise.
 - 1. If reuse of other existing materials or equipment is desired, submit substitution request.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.

2. If wet-applied, have lower VOC content, as defined in Section 01 6116.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request for substitution constitutes a representation that the submitter:
 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 1. Arrange and pay for product delivery to site.
 2. On delivery, inspect products jointly with Contractor.
 3. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 4. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 1. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 2. Handle, store, install and finish products.
 3. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.02 RELATED REQUIREMENTS

- A. Section 01 3010 - Submittals: Submittal procedures.

1.03 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2025.
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2020.
- D. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.06 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.

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

PART 2 PRODUCTS

2.01 MATERIALS

- A. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Protection of installed work.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3010 - Submittals: Submittal procedures
- C. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- F. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- G. Section 07 8400 - Firestopping.

1.03 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
 - 4. Final property survey
 - a. Submit two hardcopies, one CAD file, and one PDF showing the work performed and record survey data.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate ContractorContractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

- A. For demolition work, employ a firm specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.

- B. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities.
- C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

- A. Use of explosives is not permitted, unless approved prior by Owner and Architect.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
- H. Pest and Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises and pests / insects from damaging the work.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
 - 1. Coordinate scheduling of loud and heavy construction work with the Owner to minimize disturbance during standardized testing and other blocks of time in which the site will conduct such activities. Site bell and testing schedule will be provided to Contractor for scheduling purposes.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- H. Observation of Work by others shall not be interpreted as relieving the Contractor from responsibility for coordination of all Work, superintendence of the Work, or scheduling and direction of the Work

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 2500 - Substitution Procedures and 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Existing Survey control points damaged by the contractor shall be restored by the Contractor at no additional cost to the District.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.

- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000.
 - 2. Provide sound retardant partitions between areas of alteration work and areas occupied by Owner during construction.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated **and** as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
 - 5. The Contractor is responsible to perform all demolition work necessary to allow execution of all requirements of the new construction.
 - a. Elements not specifically noted for demolition shall be removed by the contractor in order to facilitate all requirements of the new construction.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
 - c. Provide Owner with 72 hour minimum notification before existing systems taken off line.
 4. Verify that abandoned services serve only abandoned facilities.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean new and existing systems and equipment as necessary.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the Work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:

1. Complete the work.
 2. Fit products together to integrate with other work.
 3. Provide openings for penetration of mechanical, electrical, and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- H. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.08 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.

- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.09 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.
- B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.11 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7410 CLEANING

PART 1 GENERAL

1.01 SCOPE

- A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

1.02 RELATED SECTIONS

- A. Section 01 7000 - Execution and Closeout Requirements.
- B. Section 01 7419 - Construction Waste Management and Disposal.

1.03 DEFINITIONS

- A. "Clean", for the purpose of this Section, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

1.04 QUALITY ASSURANCE

- A. Conduct daily inspections, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. Review cleaning and maintenance instructions for installed material prior to cleaning. Use only the cleaning materials and equipment, which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

- A. General Requirements:
 - 1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
 - 2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
 - 3. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
 - 4. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 5. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 - 6. At least twice each month, and when requested by the Owner / Owner's Representative, completely remove all scrap, debris, and waste material from the job site.
 - 7. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:
 - 1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
 - 2. Weekly, and more often, if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.01 A above.

3. Maintain the site in a neat and orderly condition at all times.
- C. Structure(s):
1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
 2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
 3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
 4. Following the installation of finish floor materials, clean the finish floor daily, and more often if necessary, at all times while work is being performed in the space in which finish materials are installed.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material, which, in the opinion of the Architect, may be harmful to the finish floor material.

3.02 FINAL CLEANING

- A. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.
- C. One (1) pre-punch clean prior to Architect's punch walk and one (1) final clean prior to Owner occupancy shall consist of full and thorough cleaning using appropriate non-marring cleaners for all areas of the building, all accessible equipment and all visible building components. Cleaning shall include, but not be limited to the items listed below in this Article.
- D. Site:
 1. Unless otherwise specifically directed by the Owner, broom clean paved areas on the site and public paved areas adjacent to the site.
 2. Sweep paved areas broom clean and power wash all exterior concrete sidewalks, curbs, asphalt, parking lots. Remove stains, spills and other foreign deposits.
 3. Power wash all exterior hard surfaces around buildings that contain work on the project.
 4. Completely remove resultant debris.
- E. Structures:
 1. Exterior:
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter. All protective coverings and coatings shall be removed along with adhesive residues.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
 - e. Furnish all labor, material and equipment to complete all final cleaning of the Work as described in the Contract Documents.
 - f. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
 - g. Exterior cleaning shall include washing all windows, exposed metal and stone surfaces, removing any stains from exterior plaster, wash down of roof equipment wells and cleaning roof mounted equipment and all rain gutters shall be cleared of any obstructions.

2. Interior:
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter. Finish surfaces shall be cleaned free of fingerprints, smudges and non-code-required labels and stickers.
 - b. All protective coverings and coatings shall be removed along with adhesive residues. Remove temporary floor protection.
 - c. Remove labels that are not permanent. Do not remove permanent labels (UL, WH, etc.). Do not paint or otherwise cover fire test labels or nameplates on any equipment.
 - d. Sweep and mop all floors. Vacuum all carpeted areas and wipe base. Spot clean carpet as needed. Wax all VCT and sheet vinyl. All concrete and tile floors shall be mopped and left free of water or cleaner residue. Machine scrub ceramic flooring. Clean all thresholds. Use proper products per Specification and manufacturer requirements.
 - e. Dust and wipe down walls and wall coverings. Clean all vinyl tack panel. This includes heavy cleaning with complete/detailed vacuum and spot removal of all wall coverings throughout the building(s) to remove stains and adhesives.
 - f. All shades, storefront, rolling shutters and coiling doors wiped down inside and out.
 - g. Clean and polish transparent materials, including mirrors and glass in doors and windows, including frames. Restore reflection surfaces to their original reflection condition.
 - h. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean tops, sides and bottoms (if accessible) of equipment. Dust visible air shaft louvers, grilles and registers. Clean filters of operating equipment.
 - i. General roof clean-up.
 - j. Wipe surfaces of millwork, railing, and any exposed duct, pipe, and conduit.
 - k. Clean all openings and frames. Remove drywall texture where required. All windows and mullions shall be professionally cleaned on both sides. Clean all doors, jambs and hardware.
 - l. Clean all surfaces in restrooms including all plumbing fixtures, electrical fixtures, toilet partitions and accessories. Clean plumbing fixtures to a sanitary condition. Clean and shine hardware. Clean all mirrors. Clean all floor and wall tile. Remove any and all temporary protection and labels not required to remain.
 - m. All ceramic tiles wiped clean using special cleaning materials for best reflection.
 - n. Clean all casework and cabinetry, including fire cabinets, inside and out. Clean all countertops. All stainless steel kitchen cabinets, countertops and appliances shall be wiped clean.
 - o. Clean all closets including janitor closets, mop sinks, plumbing fixtures and floor sinks. Wall finishes, such as FRP, shall also be cleaned.
 - p. Clean all fixtures, including plumbing fixtures, electrical / lighting fixtures and any other wall or ceiling mounted fixtures/devices,
 - q. Signage shall be wiped clean, including exit signs.
 - r. Clean horizontal surfaces, including all furniture.
3. Remove all traces of splashed material from adjacent surfaces, paint droppings, spots, stains, and dirt from finished surfaces.
4. Clean all other permanent items shown in the plans.
5. Provide additional touch up cleaning as required prior to Owner occupancy. Contractor shall include final touch-up of stained plaster at Building exteriors due to weather, soil staining, or any other staining seen on Buildings.

3.03 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Trade Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

3.04 TRADE CONTRACTOR RESPONSIBILITY FOR MISUSE OF MATERIALS

- A. Should construction materials or debris created by the construction process not be properly stored in a secure area or placed in the proper secured debris containers and such materials are used in acts of vandalism, the Contractor shall be responsible to the Owner and adjacent property Owners for the repair or replacement of items damaged in such vandalism.

END OF SECTION

SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Owner requires that this project generate the least amount of trash and waste possible.
- C. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- D. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, and project documentation.
- B. Section 01 3010 - Submittals: Submittal procedures.
- C. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- D. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- E. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Contractor to submit for review a Waste Management Plan. The Waste Management Plan shall be an outline of the items required for the Waste Disposal Reports as indicated below. The Waste Management Plan shall be submitted for review prior to the start of construction.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers with lids as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
 - 4. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
 - 1. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

2. Container shall be appropriately marked; Include list of acceptable and unacceptable materials at each container and bin.
 3. Recycle paper and beverage containers used by on-site workers.
 4. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.
 5. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

**SECTION 01 7800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01 3010 - Submittals: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. General Requirements:
 - 1. Contractor shall submit all closeout documents digitally in PDF format. Each required document type (Project Record Documents, Warranties and Bond, and Operations and Maintenance Manuals) shall be submitted as a separate digital files. Each document shall be fully bookmarked or tabbed by discipline for ease of navigation.
- B. Project Record Documents: Submit documents to Architect within 15 days after date of substantial completion.
- C. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- D. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
- E. Submission Format and Organization
 - 1. Project Record Documents:
 - a. Submit as a single PDF file, fully bookmarked per discipline.
 - b. Include updated sheet index and revision history.
 - 2. Warranties and Bonds
 - a. Submit as a single PDF file.
 - b. Individual warranties shall be bookmarked.
 - 3. Operations and Maintenance Data/Manuals:
 - a. Submit as a single PDF file, fully bookmarked per section.

- b. Include troubleshooting guides, maintenance schedules, and manufacturer contact information.
- 4. All digital submissions must be formatted for easy reference and navigation. Failure to comply with digital organization and timing requirements may result in delays in project closeout approval.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - a. Approved Change Order shall be made a permanent part of the record drawings.
 - b. Allowance Usage Requests shall be made a permanent part of the record drawings.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
 - 7. Requests for Information (RFI)
 - a. RFI's shall be made a permanent part of the record drawings.
 - 8. Architect's Supplementary Instructions (ASI)
 - a. ASI's shall be made a permanent part of the record drawings.
 - 9. Approved Construction Change Directives (CCD)
 - a. Approved CCD's shall be made a permanent part of the record drawings.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
 - 1. Record drawings shall be reviewed by Architect, Inspector, and Owner at the time of Application for Payment. If Record Drawings are deemed incomplete, delays in payment may occur.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract Drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. 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.
 - 1. Submit on digital media acceptable to Architect and by uploading to web-based project software site and by email to Architect.
 - 2. Warranty items shall be submitted at substantial completion, as one complete package.
 - a. Warranty items submitted separately outside of the package will be rejected.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

**SECTION 01 7900
DEMONSTRATION AND TRAINING**

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Conveying systems.
 - 6. Landscape irrigation.
 - 7. Kitchen equipment.
 - 8. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.

1.03 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit not less than two weeks prior to start of training.
 - 2. Revise and resubmit until acceptable.
 - 3. Provide an overall schedule showing all training sessions.
 - 4. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

2. General Requirements
 - a. The final video format shall be coordinated with the Owner. At a minimum, video shall be provided in high definition, minimum 1080p resolution.
 - b. The video must include both the presenter(s) and any visual aids (e.g., slides, software screens, system components) used during the training/demonstration.
 - c. All recordings must be free of background noise, echo, or any other interference that could compromise audio clarity.
 - d. Lighting must be sufficient to clearly capture the presenter(s) and any physical demonstrations.
3. Recording Requirements
 - a. The video must include:
 - 1) A brief introduction with the name of the system, purpose of the training, and presenter(s).
 - 2) Full coverage of the training/demonstration, including all instructions, interactions, and Q&A sessions.
 - b. The video must be recorded in a continuous, uninterrupted format unless breaks are clearly defined.
 - c. The contractor must provide a version of the video with optional closed captions for accessibility compliance.
4. Deliverables
 - a. The final video file(s) on a USB drive and/or via a digital link.
 - b. All materials must be labeled with the project name, date, and system being demonstrated.

1.04 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.

3.02 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- C. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 1. The location of the O&M manuals and procedures for use and preservation; backup copies.

2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 3. Typical uses of the O&M manuals.
- D. Product- and System-Specific Training:
1. Review the applicable O&M manuals.
 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 6. Discuss common troubleshooting problems and solutions.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 10. Review spare parts and tools required to be furnished by Contractor.
 11. Review spare parts suppliers and sources and procurement procedures.
- E. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 4100 DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Selective demolition of building elements for alteration purposes.
- D. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- E. Section 31 1000 - Site Clearing: Vegetation and existing debris removal; earth stripping and stockpiling.
- F. Section 31 2200 - Grading: Rough and fine grading.
- G. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Site Safety Plan:
 - 1. Contractor to provide a site safety plan per Chapter 33 of the CBC and CFC.
 - 2. Site safety plan shall contain the following minimum items:
 - a. Name and contact information of site safety director.
 - b. Documentation of training of the site safety director and fire watch personnel.
 - c. Procedures for reporting emergencies.
 - d. Fire department vehicle access routes during construction.
 - e. Locations of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
 - f. Smoking and cooking policies, designated area to be used where approved, and signage locations in accordance with CFC Section 3305.8.
 - g. Location and safety considerations for temporary heating equipment.
 - h. Hot work (welding, roofing, etc.) plan.
 - i. Plans for control of combustible waste.
 - j. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
 - k. Provisions for site security.
 - l. Changes that affect this plan.
 - m. Other site specific information requested by the local fire authority (LFA).

- C. Promptly repair any damaged trees to prevent death or loss of vigor.
 - 1. Where the Contractor's operations result in dead or severely damaged trees, remove trees and provide new trees of similar size, except provide 6 inch-caliper trees to replace existing trees over 6 inches caliper.
 - a. Species as selected by the Architect.
 - 2. Contractor to submit complete Site Safety Plan to the Architect within 5 days of being issued the notice to proceed.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.
- E. Predemolition Photographs or Video: Survey existing conditions and record by use of photographs. Submit before Work begins.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - a. Provide not less than 72 hours notice of activities that will affect operations of adjacent occupied buildings.
 - b. When required, arrange demolition schedule so as not to interfere with school's on-site operations
 - 5. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
 - 6. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
 - 7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements to remain in place and not removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
- D. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- E. Hazardous Materials:
 - 1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.
- F. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Comply with requirements of Section 01 7419 - Construction Waste Management and Disposal.
 - 2. Dismantle existing construction and separate materials.

3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.02 EXISTING UTILITIES

- A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 1. Report discrepancies to Architect before disturbing existing installation.
 2. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and required to accomplish new work.
 1. Remove items indicated on drawings.
 2. Removed and Salvaged Items:
 - a. Clean salvaged items.
 - b. Pack or crate items after cleaning. Identify contents of containers.
 - c. Store items in a secure area until delivery to Owner.
 - d. Transport items to Owner's storage area designated by Owner
 - e. Protect items from damage during transport and storage.
 3. Removed and Reinstalled Items:
 - a. Clean and repair items to functional condition adequate for intended reuse.
 - b. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - c. Protect items from damage during transport and storage.
 - d. 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.
- C. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
 1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. Verify that abandoned services serve only abandoned facilities before removal.
 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- D. Protect existing work to remain.
 1. Prevent movement of structure. Provide shoring and bracing as required.

2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch to match new work.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

**SECTION 03 0100
MAINTENANCE OF CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cleaning of existing concrete surfaces.
- B. Resurfacing of new concrete surfaces having spalled areas and other damage.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

1.03 REFERENCE STANDARDS

- A. ASTM C928/C928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs; 2025.
- B. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2024.
- C. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.
- C. Manufacturer's instructions.
- D. Field quality control submittals.
- E. Manufacturer's qualification statement.
- F. Cleaner's qualification statement.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Cleaner Qualifications: Company specializing in, and with minimum of 3 years of experience in, the type of cleaning specified.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

1.06 MOCK-UPS

- A. Where color or texture matching is required, first prepare a small size sample on cementitious board.
- B. Locate mock-up(s) where directed.
- C. Satisfactory mock-up(s) may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.
- B. Deliver polymer resin materials in original factory-sealed containers with manufacturer's labels intact and legible. Verify product nomenclature, manufacturer's name, product identification, batch number, date of manufacture, and shelf life or expiration date. Do not use polymer resin materials that have exceeded shelf life.

- C. Store materials in covered, well-ventilated area and according to manufacturer's written storage instructions. Store polymer resins and hardeners separate from construction materials that can absorb odors.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

- A. Degreaser:
 - 1. Manufacturers:
 - a. Euclid Chemical Company; Euco Clean and Strip: www.euclidchemical.com/#sle.
 - b. LATICRETE International, Inc; CITREX: www.laticrete.com/#sle.
 - c. SpecChem, LLC; Orange Peel-Citrus Cleaner: www.specchemllc.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Detergent: Non-ionic detergent.
- C. Acidic Cleaning Agent:
 - 1. Manufacturers:
 - a. United Gilsonite Laboratories; DRYLOK® Concrete and Masonry Etch and Cleaner: www.ugl.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
 - 1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 - 2. LATICRETE International, Inc: www.laticrete.com/#sle.
 - 3. The QUIKRETE Companies: www.quikrete.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Bonding Slurry: Water-based latex admixture; comply with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.
- C. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.
 - 1. In-place material resistant to freezing conditions.
 - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
 - 3. Recommended Thickness: Feather edge to 1/8 inch (Feather edge to 3 mm).
 - 4. Manufacturers:
 - a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.
 - b. LATICRETE International, Inc; L&M DURACRETE: www.laticrete.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- D. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
 - 1. In-place material resistant to freezing conditions.
 - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
 - 3. Dry Material: Complies with ASTM C928/C928M.
 - 4. Manufacturers:
 - a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.
 - b. LATICRETE International, Inc; L&M DURACRETE: www.laticrete.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

- A. Prepare concrete surfaces to be repaired according to ICRI 310.2R.

3.03 CLEANING EXISTING CONCRETE

- A. Provide enclosures, barricades, and other temporary construction as required to protect adjacent work from damage.
- B. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
 - 1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
 - 2. Clean out cracks and voids using same methods.
- C. The following are acceptable cleaning methods, in order from gentlest to less gentle:
 - 1. Increasing the water washing pressure to maximum of 400 psi.
 - 2. Adding detergent to washing water; with final water rinse to remove residual detergent.
- D. Do not use any of the following cleaning methods, unless otherwise indicated:
 - 1. Brushes with wire bristles, grinding with abrasives, solvents, hydrochloric or muriatic acid, sodium hydroxide, caustic soda, or lye.
 - 2. Soap or detergent that is not non-ionic.
 - 3. Water washing pressure to over 100 psi.
 - 4. Steam-cleaning or steam-generated hot-water washing.
 - 5. Abrasive blasting.

3.04 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

- A. The following does not apply to concrete paving or concrete curbing, refer to specification section 32 1313 for specific requirements related to concrete paving repair.
- B. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.
- C. Apply coating of bonding agent to entire concrete surface to be repaired.
- D. Fill voids with cementitious mortar flush with surface.
- E. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch (6 mm) over entire surface, terminating at a vertical change in plane on all sides.
- F. Trowel finish to match adjacent concrete surfaces.

END OF SECTION

**SECTION 03 0516
UNDERSLAB VAPOR BARRIER - STEGO**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet vapor barrier under concrete slabs on grade.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3000 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

1.03 REFERENCE STANDARDS

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2024.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Samples: Submit samples of underslab vapor barrier to be used.
- D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Underslab Vapor Barrier:
 - 1. Water Vapor Permeance: Not more than 0.010 perms (0.6 ng/(s m² Pa)), maximum.
 - 2. Thickness: 15 mils (0.4 mm).
 - 3. Product:
 - a. Stego Industries LLC; Stego Wrap Vapor Barrier (15-mil):
www.stegoindustries.com/#sle.
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

3.02 INSTALLATION

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
- C. Lap joints minimum 6 inches (150 mm).
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.

F. Repair damaged vapor retarder before covering with other materials.

END OF SECTION

**SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
- B. Form accessories.
- C. Form stripping.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

1.04 QUALITY ASSURANCE

- A. Perform work of this section in accordance with Highways standards of the State of California.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.
- B. Forms shall be of suitable material and type, size, shape, quality, and strength to ensure construction as designed.
- C. Forms shall be true to line and grade, mortar tight, and sufficiently rigid to resist deflection during the placement of concrete.
- D. All dirt, chips, sawdust, nails, and other foreign matter shall be completely removed from forms prior to the placement of concrete.
- E. The surface of the forms shall be smooth and free from irregularities, dents, sags, and holes that would deface the finished surface.
- F. Before concrete is placed in forms, all inside surfaces shall be treated with an approved releasing agent. The releasing agent shall leave no objectionable film on the surface of the forms which would transfer to the finished concrete.
- G. Forms for all surfaces that will not be completely of hidden below the permanent surface of the adjacent grade shall be made of surface lumber or of a material which provides a surface equal to surfaced lumber or plywood.
- H. Any lumber that becomes badly checked or warped, prior to placing concrete, shall not be used.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Locate and set in place items that will be cast directly into concrete.
- B. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- C. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

3.08 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 03 2000 CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2025.
- B. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2025.
- C. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2025.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.
- E. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).
- F. CRSI (DA4) - Manual of Standard Practice; 2024.
- G. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI SPEC-301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars Grade 60 (for bar reinforcement that is to be welded).
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

- B. Welding of reinforcement is permitted only with the specific approval of Structural Engineer and Architect. Perform welding in accordance with AWS D1.4/D1.4M.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Reinforcing bars shall be placed in accordance with the size and spacing shown on the plans. Reinforcing bars shall be firmly and securely held in position in accordance with the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute.
- B. Before placing in the form, all reinforcing steel shall be cleaned thoroughly of mortar, oil, dirt, loose mill scale, loose or thick rust, and coatings of any character that would destroy or reduce the bond. No concrete shall be deposited until the placing of the reinforcing steel has been inspected and approved.
- C. Do not displace or damage vapor barrier.
- D. Maintain concrete cover around reinforcing as noted by Structural Drawings. Where not indicated on drawings, maintain cover as follows:
 - 1. Walls (exposed to weather or backfill): #6 through #18 bars 2 inch, #5 bar and smaller 1-1/2 inch.
 - 2. Footings and concrete formed against earth: 3 inch.

3.02 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Floors and slabs on grade.
- B. Concrete shear walls, elevator shaft walls, and foundation walls.
- C. Concrete foundations and footings.
- D. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.
- E. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- D. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

- A. California Building Code, Title 24, Part 2, C.C.R.; Chapter 19A.
- B. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- C. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- D. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.
- E. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- F. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.
- G. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
- H. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
- I. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- J. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.
- K. ASTM B231/B231M - Standard Specification for Concentric-Lay-Stranded Aluminum 1350 Conductors; 2023.
- L. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2025b.
- M. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.
- N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2024.
- O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2025.
- P. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.
- Q. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2025.
- R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2024.

- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2025.
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2024.
- U. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2025a.
- V. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.
- W. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2022.
- X. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types); 2023.
- Y. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Test Reports: Submit report for each test or series of tests specified.
- D. Quality Control Submittals: Submit the following information related to quality assurance requirements specified:
 - 1. Design data: Submit proposed mix designs and test data before concrete operations begin. Identify for each mix submitted the method by which proportions have been selected.
 - a. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength f_{cr} calculations. Provide 30 test results from the previous 12 months from the date of the concrete pour.
 - b. Indicate quantity of each ingredient per cubic yard of concrete.
 - c. Indicate type and quantity of admixtures proposed or required.
 - 2. Certifications: Submit affidavits from an independent testing agency certifying that all materials furnished under this section conform to specifications.
 - 3. Delivery tickets: Submit copies of delivery tickets complying with ASTM C94/C94M for each load of concrete delivered to site.
 - a. Include on the tickets the additional information specified in the ASTM document.
 - 4. Hot weather concreting: Submit description of planned protective measures.
- E. Waiver of Continuous Batch Plant Inspection
 - 1. Continuous batch plant inspection may be waived by the registered design professional, subject to approval by the enforcement agency under either of the following conditions:
 - a. The concrete plant complies fully with the requirements of ASTM C94/C94M, Sections 9 and 10, and has a current certificate from the National Ready Mixed Concrete Association or another agency acceptable to the enforcement agency. The certification shall indicate that the plant has automatic batching and recording capabilities.
 - b. For single-story light-framed construction (without basement or retaining walls higher than 6 feet in height measured from bottom of footing to top of wall) and isolated foundations supporting equipment only, where deep foundation elements are not used.
 - 2. When continuous batch plant inspection is waived, the following requirements shall apply and shall be described in the construction documents:
 - a. An approved agency shall check the first batch at the start of the day to verify materials and proportions conform to the approved mix design.

- b. A licensed weighmaster shall positively identify quantity of materials and certify each load by a batch ticket.
 - c. Batch tickets, including material quantities and weights shall accompany the load, shall be transmitted to the inspector of record by the truck driver with load identified thereon. The load shall not be placed without a batch ticket identifying the mix. The inspector of record shall keep a daily record of placements, identifying each truck, its load, and time of receipt at the jobsite, and approximate location of deposit in the structure and shall maintain a copy of the daily record as required by the enforcement agency.
- 3. Batch Plant Inspection Not Required
 - a. Batch plant inspection is not required for any of the following conditions, provided they are identified on the approved construction documents and the licensed weighmaster and batch ticket requirements of Section 1705A.3.3.1 are implemented:
 - 1) Site flatwork.
 - 2) Unenclosed site structures, including but not limited to lunch or car shelters, bleachers, solar structures, flag or light poles, or retaining walls.
 - 3) Controlled low-strength material backfill.
 - 4) Single-story relocatable buildings less than 2,160 square feet.
- F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- G. Construction Joint Layout: Submit drawing showing proposed location and type of each joint.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.
- B. Acquire cement from same source and aggregate from same source for entire project.
- C. Follow recommendations of ACI PRC-305 when concreting during hot weather.
 - 1. Well in advance of proposed concreting operations, advise the architect of planned protective measures including but not limited to cooling of materials before or during mixing, placement during evening to dawn hours, fogging during finishing and curing, shading, and windbreaks.
- D. Follow recommendations of ACI PRC-306 when concreting during cold weather.
- E. If any of the test cylinders do not reach the required specified design strength, comply with ACI 318 Section 26.12.4 for core drilling and testing.

1.06 MOCK-UPS

- A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish as result of formwork.
 - 1. Panel Size: Sufficient to illustrate full range of treatment.
 - 2. Locate where directed during construction.
- B. Mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type II Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.

- C. Water: ASTM C1602/C1602M; Clean and not detrimental to concrete.

2.04 ADMIXTURES

- A. Admixtures may be used with prior approval by the Architect and Structural Engineer of Record. Use of admixtures shall require the approval of DSA prior to use.
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C260/C260M.
- D. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: See Section 03 0516 - Underslab Vapor Barrier - Stego.
- B. Chemical Hardener: Fluosilicate solution designed for densification of cured concrete slabs.
- C. Non-Shrink Cementitious Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents.
- D. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.
 - 1. Non-yellowing formulation where subject to ultraviolet light.
 - 2. Where compounds are proposed for use on surfaces to which finishes, coatings, or coverings subsequently will be applied, compound shall possess demonstrated compatibility with finish, coating, or covering, and use shall be subject to approval of the architect.

2.06 BONDING AND JOINTING PRODUCTS

- A. Slab Isolation Joint Filler: 1/2-inch (13 mm) thick, height equal to slab thickness, with removable top section forming 1/2-inch (13 mm) deep sealant pocket after removal.
- B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick (6 mm thick) and 4 inches deep (200 mm deep); tongue and groove profile.

2.07 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

2.08 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
- B. Proportioning Normal Weight Concrete: Comply with the California Building Code, Chapter 19A, Section 1905A.
- C. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - a. The contractor may elect to replace a portion of the portland cement with fly ash up to a maximum of 15 percent by weight of cement plus fly ash (per Section 1903A.6).
 - 3. Water-Cement Ratio: Maximum 40 percent by weight.
 - 4. Maximum Aggregate Size: 3/4 inch (19 mm).
- E. Admixtures:
 - 1. Air-entraining admixture: Add at rate to achieve specified air content.
 - a. Do not use in slabs-on-grade scheduled to receive topping, unless manufacturer of topping recommends use over air-entrained concrete.
 - 2. Water-reducing admixture: Add as required for placement and workability.

3. Water-reducing and retarding admixture: Add as required in concrete mixes to be placed at ambient temperatures above 90 degrees F.
 4. Do not use admixtures not specified or approved.
- F. Design mixes to meet or exceed each requirement specified. Where more than one criterion is specified, the most stringent shall apply. For example, a minimum cement content or maximum water-cement ratio might result in strengths greater than the minimum specified; likewise, a greater cement content or lower water-cement ratio may be required in order to achieve the required strength.

2.09 CONTROL OF MIX IN THE FIELD

- A. Slump: A tolerance of up to 1 inch above that specified will be permitted for 1 batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
1. If slump upon arrival at the site is lower than 1 inch below the value specified, one addition of water in accordance with ASTM C94/C94M will be permitted to bring slump within tolerance, provided that:
 - a. A positive means is available to measure the amount of water added at the site.
 - b. The specified (or approved) maximum water-cement ratio is not exceeded.
 - c. Not more than 45 minutes have elapsed since batching.
- B. Total Air Content: A tolerance of plus or minus 1-1/2 percent of that specified will be allowed for field measurements.
1. Do not use batches that exceed tolerances.

2.10 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
1. At ambient temperatures of 85 to 90 degrees F, reduce mixing and delivery time to 75 minutes.
 2. At ambient temperatures above 90 degrees F, reduce mixing and delivery time to 60 minutes.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
- D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 VAPOR RETARDER INSTALLATION

- A. General: Place vapor retarder sheet over prepared base material, aligning longer dimension parallel to direction of pour and lapped 6 inches. Seal joints with appropriate tape. Cover with sand to depth shown on drawings.

3.04 JOINT CONSTRUCTION

- A. Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the architect.
 - 1. Keyways: Provide keyways not less than 1-1/2 inches deep.
 - 2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.
- B. Expansion Joints: Construct expansion joints where indicated. Install expansion joint filler to full depth of concrete. Recess edge of filler to depth indicated to receive joint sealant (and backer rod where necessary) specified in Division 7.
- C. Control Joints: Construct contraction joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 14 feet apart in either direction.
 - 1. Saw cuts: Form control joints by means of saw cuts one-third the depth of the slab, performed as soon as possible after slab finishing without dislodging aggregate.

3.05 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set anchorage devices and other items required for other work connected to or supported by cast-in-place concrete, using templates, setting drawings, and instructions from suppliers of items to be embedded.
 - 1. Edge Forms and Screeds: Set edge forms and intermediate screeds as necessary to achieve final elevations indicated for finished slab surfaces.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI PRC-304.
- B. Preparation: Provide materials necessary to ensure adequate protection of concrete during inclement weather before beginning installation of concrete.
- C. Inspection: Before beginning concrete placement, inspect formwork, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
 - 1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.
- D. Placement - General: Comply with requirements of ACI 304 and as follows:
 - 1. Schedule continuous placement of concrete to prevent the formation of cold joints.
 - 2. Provide construction joints if concrete for a particular element or component cannot be placed in a continuous operation.
 - 3. Deposit concrete as close as possible to its final location, to avoid segregation.
- E. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
 - 1. Consolidate concrete by means of mechanical vibrators, inserted vertically in freshly placed concrete in a systematic pattern at close intervals. Penetrate previously placed concrete to ensure that separate concrete layers are knitted together.
 - 2. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
 - 3. Do not use vibrators to move concrete laterally.
- F. Hot Weather Placement: Comply with recommendations of ACI 305R when ambient temperature before, during, or after concrete placement is expected to exceed 90 degrees F or when combinations of high air temperature, low relative humidity, and wind speed are such that the rate of evaporation from freshly poured concrete would otherwise exceed 0.2 pounds per square foot per hour.
 - 1. Do not add water to approved concrete mixes under hot weather conditions.
 - 2. Provide mixing water at lowest feasible temperature, and provide adequate protection of poured concrete to reduce rate of evaporation.

3. Use fog nozzle to cool formwork and reinforcing steel immediately prior to placing concrete.
- G. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- H. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.07 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

3.08 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
 1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).
 2. Under Seamless Resilient Flooring or Epoxy Flooring: 1/4 inch (6 mm) in 10 feet (3 m).
 3. Under Carpeting: 1/4 inch (6 mm) in 10 feet (3 m).
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.09 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
 1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting. Dampen patch location and area immediately surrounding it prior to applying bonding compound or patching mortar.
 2. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal portland cement as necessary to achieve color match. Consolidate thoroughly and strike off slightly higher than surrounding surface.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
 1. Do not directly apply water to slab surface or dust with cement.
 2. Use hand or powered equipment only as recommended in ACI 302.1R.
 3. Screeding: Strikeoff to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
 4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.
 5. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than 1/4-inch indentation or weight of power floats without damaging flatness.
 6. Final floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
 7. Troweling: Trowel immediately following final floating. Apply first troweling with power trowel except in confined areas, and apply subsequent trowelings with hand trowels. Wait

between trowelings to allow concrete to harden. Do not over-trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over it. Consolidate concrete surface by final troweling operation. Completed surface shall be free of trowel marks, uniform in texture and appearance, and within surface tolerance specified.

- a. Grind smooth surface defects which would telegraph through final floor covering system.
 - b. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI PRC-302.1; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
 - c. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI PRC-302.1; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
8. Decorative Exposed Surfaces: Trowel as described in ACI PRC-302.1; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
- a. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.
 - b. Chemical Hardener: See Section 03 3511.
9. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 2% maximum.
10. Concrete Finishing: See Section 03 3511.
11. Slab Surface Tolerances:
- a. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.
 - b. Floated finishes: Depressions between high spots shall not exceed 5/16 inch under a 10-foot straightedge.
 - c. Troweled finishes: Achieve level surface plane so that depressions between high spots do not exceed the following dimension, using a 10-foot straightedge:
 - 1) 1/8 inch.
12. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified. Repair defects as follows:
- a. High areas: Correct by grinding after concrete has cured for not less than 14 days.
 - b. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the architect.
 - c. Crazed or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact, and finish patching concrete to match adjacent concrete.
 - d. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to architect while bonding compound is still active:
 - 1) Dry-pack mix: One part portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.
 - 2) Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.

3.10 CURING AND PROTECTION

- A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
 - 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Composite Sampling, and Making and Curing of Specimens: ASTM C172/C172M and ASTM C31/C31M.
 - 1. Take samples at point of discharge.
 - 2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line. Results obtained at discharge from line shall be used for acceptance of concrete.
- D. Slump: ASTM C143/C143M. One test per strength test and additional tests if concrete consistency changes.
 - 1. Modify sampling to comply with ASTM C94/C94M.
- E. Air Content of Normal Weight Concrete: ASTM C173/C173M or ASTM C 231. One test per strength test performed on air-entrained concrete.
- F. Concrete Temperature:
 - 1. Test hourly when air temperature is 90 degrees F or above.
 - 2. Test each time a set of strength test specimens is made.
- G. Compressive Strength Tests: ASTM C39/C39M and Section 1903A, California Building Code, and ACI 318-19, Chapter 19.
 - 1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength test required.
 - 2. Testing for acceptance of potential strength of as-delivered concrete:
 - a. Obtain samples on a statistically sound, random basis.
 - b. Minimum frequency:
 - 1) One set per 50 cubic yards or fraction thereof for each day's pour of each concrete class.
 - 2) One set per 2000 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
 - 3) When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than 5.
 - c. Test one specimen per set at 7 days for information unless an earlier age is required.

- d. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence, discard the test result and inform the architect.
- e. Retain one specimen from each set for later testing, if required.
- f. Strength potential of as-delivered concrete will be considered acceptable if the following criteria is met:
 - 1) Minimum of all sets of 3 consecutive strength test results equals or exceeds specified compressive strength $f'(c)$.
- g. Evaluate construction and curing procedures and implement corrective action when strength results for field-cured specimens are less than 85 percent of test values for companion laboratory-cured specimens.
- 3. Removal of forms or supports: Mold additional specimens and field-cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.
- H. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.12 CONCRETE SURFACE REPAIRS:

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
- B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
- C. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
- D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- I. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Architect.

- J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete

3.13 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
 - 1. Test reports shall contain the following data:
 - a. Project name, number, and other identification.
 - b. Name of concrete testing agency.
 - c. Date and time of sampling.
 - d. Concrete type and class.
 - e. Location of concrete batch in the completed work.
 - f. All information required by respective ASTM test methods.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Nondestructive testing devices such as impact hammer or sonoscope may be used at architect's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.
- E. The testing agency shall make additional tests of in-place concrete as directed by the architect when test results indicate that specified strength and other concrete characteristics have not been attained.
 - 1. Testing agency may conduct tests of cored cylinders complying with ASTM C42 and 2605(g), or tests as directed.
 - 2. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.

3.14 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

**SECTION 05 5213
PIPE AND TUBE RAILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall mounted handrails.
- B. Handrails and guardrails.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 09 2116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.03 REFERENCE STANDARDS

- A. California Building Code; Title 24, Part 2, C.C.R.; Chapter 10 and Chapter 11.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- F. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2024.
- G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- H. CBC - California Building Code, Title 24, Part 2.; 2025.
- I. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Fabricator's Qualification Statement.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Design railing assembly, wall rails, and attachments to comply with CBC Section 1607A.9. Handrail assemblies shall resist a lateral force of 50 lbs (222.4 N) per lineal foot at any point without damage or permanent set. Handrail assemblies shall resist a single concentrated load of 200 pounds. Test in accordance with ASTM E935.
- C. Allow for expansion and contraction of members and building movement without damage to connections or members.
- D. Dimensions: See drawings for configurations and heights.

- E. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
- F. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.
- G. Requirements for Railings and Handrails per CBC Section 11B-505:
 - 1. Top of gripping surface of handrails shall be 34" minimum and 38" maximum vertically above the walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above such surfaces.
 - 2. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1-1/2" minimum. Handrail may be located in a recess if the recess is 3" maximum deep and 18" minimum clear above the top of the handrail.
 - 3. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of the handrail gripping surfaces shall not be obstructed for more than 20% of their length. Where provided, horizontal projections shall occur 1-1/2" minimum below the bottom of the handrail gripping surfaces.
 - 4. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1-1/4" minimum and 2" maximum.
 - 5. Handrail gripping surfaces with a non-circular cross section shall have an outside dimension of 4" minimum and 6-1/4" maximum, and a cross-sectional dimension of 2-1/4" maximum.
 - 6. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.
 - 7. Handrails shall not rotate within their fittings.
 - 8. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with CBC Section 11B-505.10. Such extensions are not required for continuous handrails at the inside turn of a switchback or dogleg stairs and ramps. Handrail extensions shall extend horizontally above the landing for 12 inches minimum beyond the top and bottom of ramp runs. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent ramp run.
 - 9. The orientation of at least one handrail shall be in the direction of the stair run, perpendicular to the direction of the stair nosing, and shall not reduce the minimum required width of the stair per CBC Section 11B-505.2.1.
 - 10. A 2" minimum high curb or barrier shall be provided to prevent the passage of a 4" diameter sphere rolling off the edges on a ramp or landing surface. Such a curb or barrier shall be continuous and uninterrupted along the length of the ramp per CBC Section 11B-405.9.2.

2.02 STEEL RAILING SYSTEM

- A. Steel Pipe: Standard Grade as indicated on drawings, galvanized finish.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- C. Straight Splice Connectors: Steel concealed spigots.
- D. Hot Dip Galvanizing: ASTM A123/A123M, minimum 1.3 oz/sq ft (390 g/sq m) galvanized coating.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic. Touch up primer shall only be used when approved by the Architect.

2.03 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.

- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints: All welded joints and surfaces shall be ground smooth, no sharp or abrasive corners, edges or surfaces. Wall surfaces adjacent to handrail shall be smooth.
- E. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
- F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- B. Where railings are required to be field cut and/or welded, grind weld smooth, free from all sharp or abrasive edges. With prior approval of Architect, Contractor to apply touch up galvanized primer at exposed welds.
- C. Railings shall be installed per the details indicated on the drawings.
- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 260100

ELECTRICAL GENERAL PROVISIONS

PART 1 SUMMARY

- 1.1 This Division of the specification outlines the provisions of the contract work to be performed under this Division.
- 1.2 This Section applies to and forms a part of each section of specifications in Division 26 and all work performed under the electrical and communications contracts.
- 1.3 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under general requirements.
- 1.4 These specifications contain statements which may be more definitive or more restrictive than those contained in the General Conditions. Where these statements occur, they shall take precedence over the General Conditions.
- 1.5 Where the words 'provide' or 'provision' are used, it shall be definitely interpreted as 'furnishing and installing complete in operating condition'. Where the words 'as indicated' or 'as shown' are used, it shall mean as shown on contract drawings.
- 1.6 Where items are specified in the singular, this Division shall provide the quantity as shown on drawings plus any spares or extras mentioned on drawings or specifications. All specified and supplied equipment shall be new.

PART 2 CONTRACTOR QUALIFICATIONS

- 2.1 The Contractor shall have a current California C-10 Electrical Contractor's license and all individuals working on this project shall have passed the Department of Industrial Relations Division of apprenticeship Standards – "Electrician Certification Program."

PART 3 CODES, PERMITS AND FEES

- 3.1 Comply with all applicable laws, ordinances, rules, regulations, codes, or rulings of governmental units having jurisdiction as well as standards of NFPA, and serving utility requirements.
- 3.2 Obtain permits, fees, inspections, meter and the like, associated with work in each section of this Division.
- 3.3 Installation procedures, methods and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

PART 4 EXAMINATION OF PREMISES

- 4.1 Examine the construction drawings and premises prior to bidding. No allowances will be made for not being knowledgeable of existing conditions.

PART 5 STANDARDS

- 5.1 The following standard publications of the latest editions enforced and supplements thereto shall form a part of these specifications. All electrical work must, as a minimum, be in accordance with these standards.
- 5.1.1 2025 California Electrical Code (CEC), Part 3 Title 24 CCR.
 - 5.1.2 National Fire Protection Association.
 - 5.1.3 Underwriters' Laboratories, Inc. (UL).
 - 5.1.4 Certified Ballast Manufacturers' Association (CBM).
 - 5.1.5 National Electrical Manufacturers' Association (NEMA).
 - 5.1.6 Institution of Electrical & Electronics Engineers (IEEE).
 - 5.1.7 American Society for Testing & Materials (ASTM).
 - 5.1.8 National Board of Fire Underwriters (NBFU).
 - 5.1.9 National Board of Standards (NBS).
 - 5.1.10 American National Standards Institute (ANSI).
 - 5.1.11 Insulated Power Cable Engineers Association (IPECS).
 - 5.1.12 Electrical Testing Laboratories (ETL).
 - 5.1.13 National Electrical Safety Code (NESC).
 - 5.1.14 2025 California Building Code (CBC), Part 2, Title 24 CCR.
 - 5.1.15 2025 California Fire Code (CFC), Part 9, Title 24, CCR.
 - 5.1.16 2025 NFPA 72 with California State Amendments
 - 5.1.17 National Electrical Testing Association (NETA), 2010 or most current

PART 6 DEFINITIONS

- 6.1 Concealed: Hidden from sight, as in trenches, chases, hollow construction, or above furred spaces, hung ceilings - acoustical or plastic type, or exposed to view only in tunnels, attics, shafts, crawl spaces, unfinished spaces, or other areas solely for maintenance and repair.
- 6.2 Exposed, Non-Concealed, Unfinished Space: A room or space that is ordinarily accessible only to building maintenance personnel, a room noted on the 'finish schedule' with exposed and unpainted construction for walls, floors, or ceilings or specifically mentioned as 'unfinished'.
- 6.3 Finish Space: Any space ordinarily visible, including exterior areas.

PART 7 WORK AND MATERIALS

- 7.1 Unless otherwise specified, all materials must be new and of the best quality. Materials previously incorporated into other projects, salvaged, or refurbished are not considered new. Perform all labor in a thorough and workmanlike manner.
- 7.2 All materials provided under the contract must bear the UL label where normally available. Note that this requirement may be repeated under equipment specifications. In general, such devices as will void the label should be provided in separate enclosures and wired to the labeled unit in proper manner.

PART 8 SHOP DRAWINGS AND SUBMITTALS

- 8.1 Submit shop drawings and all data in accordance with Division 1 of these specifications and as noted below for all equipment provided under this Division.
- 8.2 Shop drawings submittals demonstrate to the Architect that the Contractor understands the design concept. The Contractor demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods of material and equipment he intends to use. If deviations, discrepancies, or conflicts between submittals and specifications are discovered either prior to or after submittals are processed, notify the Architect immediately.
- 8.3 Manufacturer's data and dimension sheets shall be submitted giving all pertinent physical and engineering data including weights, cross sections and maintenance instructions. Standard items of equipment such as receptacles, switches, plates, etc., which are cataloged items, shall be listed by manufacturer.
- 8.4 Index all submittals and reference them to these specifications. All submittal items shall be assembled and submitted, one for each specification section. (Multiple specification sections may be grouped together in one common submittal binder, as long as each individual section is clearly identified.) Partial or incomplete submittal sections will not be reviewed.

PART 9 EQUIPMENT PURCHASES

- 9.1 Arrange for purchase and delivery of all materials and equipment within 20 days after approval of submittals. All materials and equipment must be ordered in ample quantities for delivery at the proper time. If items are not on the project in time to expedite completion, the Owner may purchase said equipment and materials and deduct the cost from the contract sum.
- 9.2 Provide all materials of similar class or service by one manufacturer.

PART 10 COOPERATIVE WORK

- 10.1 Correct without charge any work requiring alteration due to lack of proper supervision or failure to make proper provision in time. Correct without charge any damage to adjacent work caused by the alteration.
- 10.2 Cooperative work includes: General supervision and responsibility for proper location and size of work related to this Division, but provided under the other sections of these specifications, and installation of sleeves, inserts, and anchor bolts for work under each section in this Division.

PART 11 VERIFICATION OF DIMENSIONS

- 11.1 Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions, etc., and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.
- 11.2 Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact location, routes, building obstructions, etc. and install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, keep openings and passageways clear, and maintain proper clearances.

PART 12 CUTTING AND PATCHING

- 12.1 All cutting, and patching shall be in accordance with Division 1 of these specifications and as noted below.
- 12.2 Cut existing work and patch as necessary to properly install new work. As the work progresses, leave necessary openings, holes, chases, etc., in their correct location. If the required openings, holes, chases, etc., are not in their correct locations, make the necessary corrections at no cost to the Owner. Avoid excessive cutting and do not cut structural members including wall framing without the consent of the Architect.

PART 13 CLOSING-IN OF UNINSPECTED WORK

- 13.1 Cover no work until inspected, tested, and approved by the Architect. Where work is covered before inspection and test, uncover it and when inspected, tested, and approved, restore all work to original proper condition at no additional cost to Owner.

PART 14 EXCAVATION AND BACKFILL

- 14.1 All excavation and backfill shall be in accordance with Division 1 of these specifications and as noted below.
- 14.2 Perform all necessary excavation, shoring, and backfilling required for the proper laying of all conduits inside the building and premises, and outside as may be necessary.
- 14.3 Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms no wider than necessary to provide ample work room. Grade trench bottoms accurately. Machine grade only to the top line of the conduits, doing the remainder by hand. Do not cut any trench near or under footings without first consulting the Architect. All trenches shall be done in accordance with OSHA standards and regulations.
- 14.4 Backfilling shall be done with each layer compacted before another layer is added. No stones or coarse lumps shall be laid directly on a conduit or conduits.
- 14.5 Trenches shall be filled with the specified material. Sod, if any, shall be removed in cut sections and replaced in same manners.
- 14.6 Provide pumps and drainage of all open trenches for purposes of installing electrical duct and wiring.
- 14.7 Perform all backfilling in accordance with the requirements of and under the direction of the Geotechnical Engineer.
- 14.8 Where new underground trenching is required on sites or in any area where existing underground utilities exist, the Contractor shall provide an independent professional utility locating service to locate exact vertical and horizontal locations of all existing utilities. Where existing utilities are found the Contractor shall hand dig those areas to avoid disruption. The Contractor shall be responsible for immediate repairs to existing underground utilities damaged during construction. The Contractor shall repair all existing asphalt, concrete and landscape surfaces damaged or removed during construction to match their original conditions. Where trenching extends through public streets or roadways, the Contractor shall notify underground service alert in addition to the

independent locating service 48 hours before start of construction to determine location of existing utilities by calling (800) 422-4133.

PART 15 CONCRETE

- 15.1 Where used for structures to be provided under the contract such as bases, etc., concrete work, and associated reinforcing shall be as specified under Division 3 of these specifications.
- 15.2 See other sections for additional requirements for underground vaults, cable ducts, etc.

PART 16 ACCESSIBILITY

- 16.1 Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal, or replacement conveniently and accessibly throughout the finished building.
- 16.2 All required access doors or panels in walls and ceilings are to be furnished and installed as part of the work under this Section. Refer to Division 1 of these specifications and as noted below.
- 16.3 Where located in fire rated assemblies, provide doors which match the rating of the assembly and are approved by the jurisdictional authority.
- 16.4 Refer to 'finish schedule' for types of walls and ceilings in each area and the architectural drawings for rated wall construction.
- 16.5 Coordinate work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

PART 17 FLASHING

- 17.1 Flash and counter flash all conduits penetrating roofing membrane as shown on Architectural drawings. All work shall be in accordance with Division 7 of these specifications.

PART 18 IDENTIFICATION OF EQUIPMENT

- 18.1 All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedules:
 - 18.1.1 General:
 - 18.1.1.1 In general, the installed laminated nameplates as hereinafter called for shall also clearly indicate its use, areas served, circuit identification, voltage and any other useful data.
 - 18.1.1.2 All auxiliary systems, including communications, shall be labeled to indicate function.
 - 18.1.2 Lighting and Local Panelboards:
 - 18.1.2.1 Panel identification shall be with white and black micarta nameplates. Letters shall be no less than 3/8" high.

- 18.1.2.2 Circuit directory shall be two column typewritten card set under glass or glass equivalent. Each circuit shall be identified by the room number and/or number of unit and other pertinent data as required.

18.1.3 Distribution Switchboards and Feeders Sections:

- 18.1.3.1 Identification shall be with 1" x 4" laminated white micarta nameplates with black lettering on each major component, each with name and/or number of unit and other pertinent data as required. Letters shall be no less than 3/8" high.
- 18.1.3.2 Circuit breakers and switches shall be identified by number and name with 3/8" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to or on circuit breaker or switch.

18.1.4 Disconnect Switches, Motor Starters and Transformers:

- 18.1.4.1 Identification shall be with white micarta laminated labels and 3/8" high black lettering.

- 18.1.5 All communication system terminal boxes including T.V., telephone/intercom, security, fire alarm, clock, and computer networking shall be provided with white micarta laminated labels and 3/8" high black lettering.

PART 19 CONSTRUCTION FACILITIES

- 19.1 Furnish and maintain from the beginning to the completion all lawful and necessary guards, railings, fences, canopies, lights, warning signs, etc. Take all necessary precautions required by City, State Laws, and OSHA to avoid injury or damage to any persons and property.
- 19.2 Temporary power and lighting for construction purposes shall be provided under this Section. All work shall be in accordance with Division 1 of these specifications.

PART 20 GUARANTEE

- 20.1 Guarantee all material, equipment and workmanship for all sections under this Division in writing to be free from defect of material and workmanship for one year from date of final acceptance, as outlined in the general conditions. Replace without charge any material or equipment proven defective during this period. The guarantee shall include performance of equipment under all site conditions, conditions of load, installing any additional items of control and/or protective devices, as required.

PART 21 PATENTS

- 21.1 Refer to the General Conditions for Contractor's responsibilities regarding patents.

PART 22 EQUIPMENT ROUGH-IN

- 22.1 Rough-in all equipment, fixtures, etc. as designed on the drawings and as specified herein. The drawings indicate only the approximate location of rough-ins. Mounting heights of all switches, receptacles, wall mounted fixtures and such equipment must be

coordinated with the Architectural Designs. The Contractor shall obtain all rough-in information before progressing with any work for rough-in connections. Minor changes in the contract drawings shall be anticipated and provided for under this Division of the specifications to comply with rough-in requirements.

PART 23 OWNER FURNISHED AND OTHER EQUIPMENT

- 23.1 Rough-in and make final connections to all Owner furnished equipment shown on the drawings and specified, and all equipment furnished under other sections of the specifications.

PART 24 EQUIPMENT FINAL CONNECTIONS

- 24.1 Provide all final connections for the following:
 - 24.1.1 All equipment furnished under this Division.
 - 24.1.2 Electrical equipment furnished under other sections of the specification.
 - 24.1.3 Owner furnished equipment as specified under this Division.

PART 25 INSERTS, ANCHORS, AND MOUNTING SLEEVES

- 25.1 Inserts and anchors must be:
 - 25.1.1 Furnished and installed for support of work under this Division.
 - 25.1.2 Mounting of equipment that is of such size as to be free standing and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle of Unistrut or B-line systems with all unfinished edges painted.
 - 25.1.3 Furnish and install all sleeves as required for the installation of all work under all Sections of this Division and for all communication systems including any communication systems described in this Section which are bid to the General Contractor. Sleeves through floors, roof, and walls shall be as described in "Conduit and Fittings" Section 26 05 33.

PART 26 SEISMIC ANCHORING

- 26.1 All switchgear and other free standing electrical equipment or enclosures shall be anchored to the floor and braced at the top of the equipment to the structure. Where details have not been provided on the drawings, anchorage shall comply with CBC Section 1616A.1.17 and the MEP Anchorage & Bracing notes on the drawings. The Contractor shall submit drawings signed by the Contractors registered structural Engineer indicating method of compliance prior installation.
- 26.2 All sound systems, communication, signal or data networking equipment or enclosures shall be anchored to the structure. Where details have not been provided on the drawings, anchorage shall comply with CBC Section 1616A.1.17. The Contractor shall submit drawings signed by the Contractors registered Structural Engineer indicating method of compliance prior to installation.

PART 27 RUST PROOFING

- 27.1 Rust proofing must be applied to all ferrous metals and shall be in accordance with Section 05500 of these specifications and as noted below.
 - 27.1.1 Hot-dipped galvanized shall be applied and after forming of angle-iron, bolts, anchors, etc.
 - 27.1.2 Hot-dipped galvanized coating shall be applied after fabrication for junction boxes and pull boxes cast in concrete.

PART 28 GENERAL WIRING

- 28.1 Where located adjacent in walls, outlet boxes shall not be placed back to back, nor shall extension rings be used in place of double boxes, all to limit sound transmission between rooms. Provide short horizontal nipple between adjacent outlet boxes, which shall have depth sufficient to maintain wall coverage in rear by masonry wall.
- 28.2 In those instances where outlet boxes, recessed terminal boxes, or recessed equipment enclosures are installed in a fire rated assembly, provide "Flamesafe FSD 1077" fire stopping pads or approved equal, over the outlet or box.
- 28.3 Complete rough-in requirements of all equipment to be wired under the contract are not indicated. Coordinate with respective trades furnishing equipment or with the Architect as the case may be for complete and accurate requirements to result in a neat, workmanlike installation.

PART 29 SEPARATE CONDUIT SYSTEMS

- 29.1 Each electrical and signal system shall be contained in a separate conduit system as shown on the drawings and as specified herein. This includes each power system, each lighting system, each signal system of whatever nature, telephone, standby system, sound system, control system, fire alarm system, etc.
- 29.2 Further, each item of building equipment must have its own run of power wiring. Control wiring may be included in properly sized conduit for equipment feeders of #6 AWG and smaller, having separate conduit for larger sizes.

PART 30 CLEANUP

- 30.1 In addition to cleanup specified under other sections, thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any spattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners.
- 30.2 Use steel brushes on exposed metal work to carefully remove rust, etc., and leave smooth and clean.
- 30.3 During the progress of the work, keep the premises clean and free of debris.

PART 31 PAINTING

- 31.1 Paint all unfinished metal as required in accordance with Division 1 of these specifications. (Galvanized and factory painted equipment shall be considered as having a sub-base finish.)

PART 32 GENERAL DEMOLITION REQUIREMENTS

- 32.1 Remove existing work and items which are required to be removed in such manner that minimum damage and disturbance is caused to adjacent and connection work scheduled to remain. Repair or replace existing work schedule.
- 32.2 Include preparation of existing areas to receive new materials and removal of materials and equipment to alter or repair the existing building as indicated and as specified.
- 32.3 Perform demolition exercising proper care to prevent injury to the public, workmen and adjoining property.
- 32.4 Perform the removal, cutting, drilling of existing work with extreme care and use small tools in order not to jeopardize the structural integrity of the building.
- 32.5 Rebuild to existing condition or better, existing work which has to be removed to allow the installation of new work as required.
- 32.6 Remove, protect and reinstall existing items as indicated. Replace materials scheduled for reuse which are damaged by the Contractor to the extent that they cannot be reused, with equal quality material, and installation.
- 32.7 Do not reuse in this project materials and items removed from existing site or building, except with specific written approval by the Architect in each case, unless such removed material or item is specifically indicated or specified to be reused.
- 32.8 Remove materials and equipment indicated to be salvaged for reinstallation and store to prevent damage, and reinstall as the work progresses. Do not reuse in this project, other materials and equipment removed from existing site or building, except with specific written approval by the Architect in each case.
- 32.9 Patch areas requiring patching, including damage caused by removing, relocating or adding fixtures and equipment, damages caused by demolition at adjacent materials.
- 32.10 Do not stockpile debris in the existing building, without the approval of the Architect. Remove debris as it accumulates from removal operations to a legal disposal area.
- 32.11 Contractor to assume existing oil filled and dry transformers, oil switches, ballasts, lamps, wooden poles, cross arms, computers, computer monitors, and conductor insulation containing materials considered hazardous. Comply with local, state and federal regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution. Contractor shall be responsible for removal of the above hazardous materials where encountered. Include all costs for such removal as part of this contract.
- 32.12 All fluorescent, compact fluorescent, high intensity discharge, metal halide, mercury vapor, high and low pressure sodium, and neon lamps are to be disposed of as required

by the California Waste Rule Regulations as described in the California Code of Regulations, Title 22, Division 4.5 and Chapter 23.

- 32.13 **Communication System:** Where new communication systems, (including telephone, intercom, clock, security, fire alarm, data, multimedia, CATV or lighting controls) are installed to replace existing systems, unless where otherwise directed the existing systems shall remain fully operational until the new system has been installed and tested. Demolition of the existing systems shall include removal of all equipment and associated wiring and exposed conduits and providing new blank covers for all abandoned device locations.
- 32.14 **Salvage Power Equipment:** The Contractor shall carefully remove all existing switchboards, panelboards, transformers, and confirm in writing which items the Owner wishes to keep. These items shall be transported to the Owner's maintenance facilities by the Contractor. All remaining items shall be disposed of by the Contractor.
- 32.15 **Salvage Lighting Equipment:** The Contractor shall confirm in writing which items the Owner wishes to keep. These items shall be transported to the Owner's maintenance facilities by the Contractor. All remaining items shall be disposed of by the Contractor.
- 32.16 **Salvage Communication Equipment:** The Contractor shall carefully remove all communication devices (telephone, intercom, clock, security, fire alarm, data, multimedia, CATV or lighting controls) and box each type of devices separately. The Contractor shall deliver all items to the Owner's maintenance facility.

PART 33 PROJECT CLOSEOUT

- 33.1 Prior to completion of project, compile a complete equipment maintenance manual for all equipment supplied under sections of this Division, in accordance with Division 1 of these specifications and as described below.
- 33.2 Equipment Lists and Maintenance Manuals:
 - 33.2.1 Prior to completion of job, Contractor shall compile a complete equipment list and maintenance manuals. The equipment list shall include the following items for every piece of material equipment supplied under this Section of the specifications:
 - 33.2.1.1 Name, model, and manufacturer.
 - 33.2.1.2 Complete parts drawings and lists.
 - 33.2.1.3 Local supply for parts and replacement and telephone number.
 - 33.2.1.4 All tags, inspection slips, instruction packages, etc., removed from equipment as shipped from the factory, properly identified as to the piece of equipment it was taken from.
- 33.3 Maintenance manuals shall be furnished for each applicable section of the specifications and shall be suitably bound with hard covers and shall include all available manufacturers' operating and maintenance instructions, together with "as-built" drawings to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to the Architect for approval not less than 10 days prior to the completion of the job. The maintenance manuals shall also include the

name, address, and phone numbers of all subcontractors involved in any of the work specified herein. Four copies of the maintenance manuals bound in single volumes shall be provided.

PART 34 RECORD DRAWINGS

- 34.1 The Division 26 Contractor shall maintain record drawings as specified in accordance with Division 1 of these specifications, and as noted below.
- 34.2 Drawings shall show locations of all concealed underground conduit runs, giving the number and size of conduit and wires. Underground ducts shall be shown with cross section elevations and shall be dimensioned in relation to permanent structures to indicate their exact location. Drawing changes shall not be identified only with referencing CORs and RFIs, the drawings shall reflect all of the actual additions or changes made. All as-built drawing information shall be prepared by the contractor in AutoCAD, updating the contract computer files as needed to reflect actual installed conditions for all site plans, lighting, power, communication, networking, audio visual, security or fire alarms systems included in the scope of work for this project.
- 34.3 One set of these record drawings shall be delivered to the Architect. The engineer will review documents for completeness, and will not be responsible for editing contractor computer files.

PART 35 CHANGES AND EXTRA WORK

- 35.1 When **changes** in work are requested, the Division 26 Contractor shall provide unit prices for the work involved in accordance with Division 1 of these specifications, and the following:
 - 35.1.1 The material Costs shall **not exceed** the invoice pricing from an Electrical Distributor indicating the pricing provided at the time of bid. The Contractor shall submit a print out copy of the pricing with the change order to substantiate these values. s
 - 35.1.2 The labor Costs shall **not exceed** the latest edition of the "NECA Manual of Labor Units" **normal column**.
- 35.2 When **credits** in work are requested, the Division 26 Contractor shall provide unit prices for the work involved in accordance with Division 1 of these specifications, and the following:
 - 35.2.1 The Material Costs shall **not be less than 80% of** the invoice pricing from an Electrical Distributor indicating the pricing provided at the time of bid. Restocking fees may also be included in this amount where applicable.
 - 35.2.2 The Labor Costs shall **not be less than 80% of** the latest edition of the "NECA Manual of Labor Units" **normal column**.
- 35.3 Conduit pricing for conduits of all types sized 3" or smaller.

When changes in the scope of work require the Contractor to estimate conduit Installations, they shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for conduit installation

represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

35.3.1 Couplings.

35.3.2 Set Screw or Compression Fittings, locknuts, Bushings and washers.

35.3.3 Conduit straps and associated screws or nails.

35.3.4 LB fittings or other specialty fittings or specialty mounting hardware may be included where needed.

35.4 Wire pricing for all types and sizes.

When changes in the scope of work require the Contractor to estimate wire installations they shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for wire installation represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

35.4.1 Locknuts, Bushings, tape, wire markers.

35.5 When changes in the scope of work require other equipment installations such as lighting fixtures, panelboards, switchboards, wiring devices, communications equipment etc. the Contractor shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for these equipment items represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

35.5.1 Associated screws, nails, bolts, anchors or supports.

35.5.2 Locknuts, washers, tape.

35.6 The total labor hours for extra work will be required to be calculated as follows:

35.6.1 Change orders with 1 to 30 total labor hours

General Laborer	10%	of total labor hours
Journeyman	10%	of total labor hours
Foreman	80%	of total labor hours

35.6.2 Change orders with 31 to 100 total labor hours

General Laborer	20%	of total labor hours
Journeyman	40%	of total labor hours
Foreman	40%	of total labor hours

35.6.3 Change orders with over 100 total labor hours

General Laborer	30%	of total labor hours
Journeyman	50%	of total labor hours
Foreman	20%	of total labor hours

35.7 When change orders are issued which allow the work to be completed in the normal sequence of construction, the labor rates shall be based on the most current "Prevailing

Wage” – straight time total hourly rate. When change orders require the Contractor to work out of sequence the “Prevailing Wage” – daily overtime hourly rate shall apply. Special condition situations shall be reviewed on an individual basis for alternate hourly rate schedules.

- 35.8 Costs **will not** be permitted for additional supervision on site or office time for processing any change order other than the 10% overhead allowance as described in Division 1. Cost for special equipment required to install items for an individual change order are permitted and must be individually identified. Lump Sum cost for small tools or any other cost not specifically required for the change order are **not** permitted.
- 35.9 Contractor estimates shall be formatted to clearly identify each of the following:
- 35.9.1 Line item description of each type of material or labor item.
 - 35.9.2 Description of quantity for each item.
 - 35.9.3 Description of (material cost per / quantity).
 - 35.9.4 Description of (labor cost per / quantity).
 - 35.9.5 Description of total labor hour breakdown per Foreman, Journeyman or General Laborer as described above.

PART 36 ELECTRONIC FILES

- 36.1 The Contractor shall make a **written** request directly to Johnson Consulting Engineers for electronic drawing files. As a part of the written request, please include the following information:
- 36.1.1 Clearly indicate each drawing sheet needed (i.e., E1.1, E2.1, etc.).
 - 36.1.2 Identify the name, phone number, mailing address and e-mail address of the person to receive the files.
 - 36.1.3 Provide written confirmation and agreement with the requirements described for payment of computer files, as described below.
- 36.2 Detail or riser diagram sheets, or any other drawings other than floor plans or site plans, **will not be made available to the Contractor.**
- 36.3 Files will only be provided in the AutoCAD format in which they were created.
- 36.4 Requests for files will be processed as soon as possible; a minimum of 7 working days should be the normal processing time. The Contractor shall be completely responsible for requesting the files in time for their use.

END OF SECTION

SECTION 260519
POWER CONDUCTORS

PART 1 GENERAL

- 1.1 Furnish and install wire and cable for branch circuits and feeders specified herein and as shown on the electrical drawings.
- 1.2 Submittals: Submit manufacturers' data for the following items:
 - 1.2.1 All cables and terminations
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining, or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed

PART 2 PRODUCTS

- 2.1 Wire and cable Rated 120 volt to 600 volt.
 - 2.1.1 All wire and cable shall be new, 600 volt insulated copper, of types specified below for each application. All wire and cable shall bear the UL label and shall be brought to the job in unbroken packages. Wire insulation shall be the color as specified herein and shall be type THWN-2. Insulated conductors shall be installed in all exterior exposed raceways. Conductors for branch circuit lighting, receptacle, power and miscellaneous systems shall be a minimum of No. 12 AWG. Increase conductor size to No. 10 AWG for 120 volt circuits greater than 100 feet from the panel to the load and for 277 volt circuits greater than 200 feet from the panel to the load. Circuit home-runs indicated to be larger than No. 12 must be increased the entire length of the circuit, including equipment grounding conductor. Wire sizes No. 14 through No. 10 shall be solid. No. 8 and larger shall be stranded.
 - 2.1.2 Aluminum conductors will be permitted (only where specifically identified on the drawings. See "600 Volt Feeder Schedule") in sizes 2/0 or larger. Conductors shall be listed by Underwriters Laboratories (UL) and suitable for operation at 600 volts or less, at a maximum operating temperature of 90N C maximum in wet or dry locations. Conductors shall be marked "SUN-RES". Aluminum alloy conductors shall be compact stranded conductors of STABILOY® (AA-8030) as manufactured by Alcan Cable or Listed equal. AA-8000 Series aluminum alloy conductor material shall be recognized by The Aluminum Association.
 - 2.1.3 MC type armored cable reference Section 26 05 33.

2.2 Wire and cable for systems below 120 volts.

- 2.2.1 All low voltage and communications systems cables routed underground shall be provided with a moisture resistant outer jacket, West Penn "Aquaseal" or equal, unless otherwise specified.

PART 3 EXECUTION

- 3.1 Wire and cable shall be pulled into conduits without strain using powdered soapstone, mineralac, or other approved lubricant. In no case shall wire be repulled if same has been pulled out of a conduit run for any purpose. No conductor shall be pulled into conduit until conduit system is complete, including junction boxes, pull boxes, etc.

3.2 All connections of wires shall be made as noted below:

- 3.2.1 Connections to outlets and switches: Wire formed around binding post of screw.
- 3.2.2 No. 10 wire and smaller: Circuit wiring connections to lighting fixtures and other hard wired equipment shall be made with pressure type solderless connectors, Buchanan, Scotchlock, Wing Nut, or approved equal. Alternate "WAGO" #773 series or "IDEAL" #32, 33, 34 and 39 series push wire style connectors are also acceptable.

3.3 All wiring shall be continuous without splicing unless where specifically noted on the drawings or where permitted below.

- 3.3.1 No. 10 wire and smaller above grade: Quantities as needed, connection made with pressure type solderless connectors, Scotchlock or equal.
- 3.3.2 No. 10 wire and smaller below grade: Quantities as needed, connection made with 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).
- 3.3.3 No. 8 wire and larger above grade: Quantities only where indicated, 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).
- 3.3.4 No. 8 wire and larger below grade: Quantities only where indicated, 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).

3.4 All wiring throughout shall be color coded as follows:

480 volt system

208 or 240 volt system

A Phase	Brown	Black
B Phase	Orange	Red
C Phase	Yellow	Blue
Neutral	Grey	White
Ground	Green	Green

- 3.5 Wiring must be color coded throughout its entire length, except feeders may have color coded plastic tape at both ends and any other accessible point.
- 3.6 All control wiring in a circuit shall be color coded, each phase leg having a separate color, and with all segments of the control circuit, whether in apparatus or conduit, utilizing the same color coding.
- 3.7 At all terminations of control wiring, the wiring shall have a numbered T&B or Brady plastic wire marker.
- 3.8 Cables when installed are to be properly trained in junction boxes, etc., and in such a manner as to prevent any forces on the cable which might damage the cable.
- 3.9 All conductors to be installed into a common raceway, shall be pulled into the raceway at the same time.
- 3.10 All conductors shall be installed in such a manner as to not exceed the manufacturers' recommended pulling tension and bending radius. The equipment used for pulling must be specifically designed for the purpose. Motorized vehicles such as pickup trucks, are not acceptable.

END OF SECTION

SECTION 26 0526

GROUNDING

PART 1 GENERAL

- 1.1 Furnish and install grounding and grounding conductors and electrodes as specified herein and as shown on the drawings.
- 1.2 Submit catalog data for all components.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 EXECUTION

- 2.1 Grounding
 - 2.1.1 All panelboard cabinets, equipment, enclosures, and complete conduit system shall be grounded securely in accordance with pertinent sections of CEC Article 250. Conductors shall be copper. All electrically operated equipment shall be bonded to the grounded conduit system. All non-current carrying conductive surfaces that are likely to become energized and subject to personal contact shall be grounded by one or more of the methods detailed in CEC Article 250. All ground connections shall have clean contact surfaces. Install all grounding conductors in conduit and make connections readily accessible for inspection.
 - 2.1.2 Provide an insulated equipment grounding conductor in all branch circuit and feeder raceway systems, sized in accordance with CEC 250-1122.
 - 2.1.3 Provide an additional individual insulated grounding conductor for each circuit which contains an isolated ground receptacle or surge suppression receptacle.
 - 2.1.4 Grounding of metal raceways shall be assured by means of provisions of grounding bushings on feeder conduit terminations at the panelboard, and by means of insulated continuous stranded copper grounding wire extended from the ground bus in the panelboard to the conduit grounding bushings.
 - 2.1.5 Except for connections which access for periodic testing is required, make grounding connections which are buried or otherwise inaccessible by exothermite type process.

2.1.6 The following ohmic values shall be test certified for each item listed. A written report signed and witnessed by the project IOR shall be provided to the engineer. If the ohmic value listed cannot be obtained additional grounding shall be installed to reach the value listed.

2.1.6.1 Service.10 ohms.

2.1.6.2 Step down transformers and non-current carrying metal parts
..... 25 ohms.

2.1.6.3 Manholes, handholes, etc.
..... 10 ohms.

END OF SECTION

SECTION 260533

CONDUIT AND FITTINGS

PART 1 GENERAL

- 1.1 Furnish and install conduit and fittings as shown on the drawings and as specified herein.
- 1.2 Submit Manufacturer's data on the following:
 - 1.2.1 Conduit.
 - 1.2.2 Fittings
 - 1.2.3 Fire stopping Material.
 - 1.2.4 Surface Raceways.
 - 1.2.5 Type MC or MC-PCS cable, provide construction details and UL "E" number.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 PRODUCTS

- 2.1 Rigid steel conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT) and flexible metallic conduit shall be steel, hot dipped galvanized after fabrication.
- 2.2 PVC conduit shall be Carlon or approved equal.
- 2.3 Liquid tight flexible metal conduit shall be Anaconda Sealtite type UA or approved equal. Fittings shall be Appleton, Crouse-Hinds, Steel City, T&B, or equivalent.
- 2.4 MC type armored cable, when utilized, shall be provided with the following:
 - 2.4.1 Comply with UL 1479 and CEC 330
 - 2.4.2 90°C, copper, THHN conductors.
 - 2.4.3 Minimum #12 insulated grounding conductor.

- 2.4.4 Conductors sized No. 10 and smaller shall be solid, No. 8 and larger shall be stranded.
- 2.4.5 Oversized (150%) neutrals or separate neutrals shall be provided.
- 2.4.6 Increase phase conductors to No. 10 AWG for 120 volt circuits greater than 100 feet from panel to load and for 277 volt circuits greater than 200 feet from panel to load. Where required increase conductor sizes for entire length of circuit.
- 2.4.7 Interlocked armored aluminum sheath.
- 2.4.8 AC or BX type armored cable shall not be substituted in lieu of MC type cable.
- 2.4.9 Color code cable according to cable type and configuration.
- 2.4.10 Acceptable manufacturers are AFC and Alfex.
- 2.5 MC-PCS luminary armored cable , when utilized, shall be provided with the following:
 - 2.5.1 Comply with UL 1479 and CEC 330
 - 2.5.2 90°C, copper, THHN conductors.
 - 2.5.3 Minimum #12 insulated grounding conductor.
 - 2.5.4 Lighting phase conductors sized No. 10 and smaller shall be solid, lighting control conductors shall be sized no. 16 solid.
 - 2.5.5 Interlocked armored aluminum sheath.
 - 2.5.6 AC or BX type armored cable shall not be substituted in lieu of MC type cable.
 - 2.5.7 Color code phase cable according to cable type and configuration. color code control conductors purple/gray.
 - 2.5.8 Acceptable manufacturers are AFC and Alfex.
- 2.6 Fire stopping material shall provide an effective seal against fire, heat, smoke and fire gases. Fire stopping material shall be tested to comply with ASTM E 814 and UL 1479. The submittal for this product shall include the UL listed system number and installation requirements for each type of penetration seal required for this project.
- 2.7 Each length of conduit shall be stamped with the name or trademark of the manufacturer and shall bear the UL label.
- 2.8 All plastic conduit shall be rigid, schedule 40, heavy wall PVC. All PVC conduit shall be UL listed. Underground utility company conduits shall comply with local utility co. requirements.
- 2.9 Plastic conduit shall be stored on a flat surface, and protected from the direct rays of the sun.
- 2.10 Where branch circuit or communication raceways cannot be concealed in ceilings or walls and are required to be exposed in interior spaces, provide nonmetallic surface

raceway system sized per the manufacturer capacity requirements. A full complement of nonmetallic fittings must be available and matching device boxes and cover plates must be provided. The color of the raceway system, components and boxes shall be (white). Where data networking cabling is to be installed, all raceway fittings shall meet Category 5 radius requirements. Where specific raceway types have been noted on the drawings they shall be as follows:

2.10.1	System 'SR'	Hubbell Wiremold Panduit Hellerman-Tyton	WALLTRAK 1 series ECLIPSE PN05series LD5 series TSR2 series
2.10.2	System 'SR2'	Hubbell Wiremold Panduit Hellerman-Tyton	WALTRAK 22 2300D Series D2P10 TSR3 series
2.10.3	System 'SR3'	Hubbell Wiremold Panduit Hellerman-Tyton	BASETRAK series 5400 - series 70 series MCR Infostream" series

Provide with offset boxes, inline boxes may only be used where specifically shown on the drawings.

PART 3 FITTINGS

- 3.1 All metallic fittings, including those for EMT, flexible conduit, or malleable iron. Die cast fittings of any other material are not permitted.
- 3.2 Locknuts shall be steel or malleable iron with sharp clean cut threads.
- 3.3 Entrance seals shall be O.Z. type FSK or equivalent.
- 3.4 Bushings and locknuts: Where conduits enter boxes, panels, cabinets, etc., they shall be rigidly clamped to the box by locknuts on the outside, and a lock nut and plastic bushing on the inside of the box. All conduits shall enter the box squarely.
- 3.5 Furnish and install insulated bushings as per CEC article No. 300 - 4 (F) on all conduits. The use of insulated bushings does not exclude the use of double locknuts to fasten conduit to the box.
- 3.6 Transition from plastic to steel conduits shall be with PVC female threaded adaptors.
- 3.7 Couplings and connectors for rigid steel or IMC conduit must be threaded, or compression type (set screw fittings are not permitted).
- 3.8 Couplings and connectors for EMT shall be compression, watertight. Set screw connectors are not acceptable, except for systems below 120 volts.
- 3.9 MC or MC-PCS type armored cable shall be provided with listed clamp type die cast zinc set screw connectors. Anti-short bushings shall be provided at all cable ends.

- 3.10 Connectors for flexible metal conduit shall be steel or malleable iron with screw provided to clinch the conduit into the adapter body. For sizes up to $\frac{3}{4}$ " a screw-in, "Jake type," fitting may be used.
- 3.11 Install approved expansion fittings, or liquid tight flex conduit with a minimum 6" slack for conduits passing through all expansion and seismic joints.

PART 4 EXECUTION

- 4.1 All branch circuits shall be installed concealed in walls or above ceilings or in concrete floor slabs. PVC conduits installed in concrete floor slabs shall transition to PVC coated rigid steel where conduits penetrate above finished grade or finished floor.
- 4.2 Conduit sizes for various numbers and sizes of wire shall be as required by the CEC, but not smaller than $\frac{1}{2}$ " for power wiring and $\frac{3}{4}$ " for communications and fire alarm systems unless otherwise noted. Conduit in slab or below grade shall be $\frac{3}{4}$ " minimum trade size, unless otherwise identified.
- 4.3 Conduit size shall be such that the required number and sizes of wires can be easily pulled in and the Contractor shall be responsible for the selection of the conduit sizes to facilitate the ease of pulling. Conduit sizes shown on the drawings are minimum sizes in accordance with appropriate tables in the CEC. If because of bends or elbows a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner.
- 4.4 The Contractor shall be entirely responsible for the proper protection of this work from the other trades on the job. When conduit becomes bent or holes are punched through same, or outlets moved after being roughed-in, the Contractor shall replace same, without additional cost to the Owner.
- 4.5 Rigid steel conduit or IMC shall be used as follows:
 - 4.5.1 Exposed exterior locations.
 - 4.5.2 Exposed interior locations below eight feet above floor, except in electrical rooms and closets.
 - 4.5.3 In hazardous or classified areas as required by CEC.
- 4.6 EMT conduit shall be used for areas as follows:
 - 4.6.1 All interior communications, signal, and data networking systems.
 - 4.6.2 All interior power wiring systems where not required to be in rigid steel, IMC or flexible conduit.
- 4.7 Flexible conduit shall be used for areas as follows:
 - 4.7.1 To connect motors, transformers, and other equipment subjected to vibration or where specifically detailed on the drawings.
 - 4.7.2 Flexible conduit shall not be used to replace EMT in other locations where the conduit will be exposed.

- 4.7.3 Flexible metal conduit shall be ferrous. Installation shall be such that considerable slack is realized. The conduit shall contain separate code sized grounding conductor.
- 4.7.4 Liquid tight flexible conduit shall be used in conformance with CEC in lengths not to exceed 4'. For equipment connections, route the conduit at 90 degrees to the adjacent path for point of connection. The conduit shall contain separate code sized grounding conductor. Use liquid tight flexible conduit for all equipment connections exposed in possible wet, corrosive or oil contaminated areas, e.g., shops and outside areas.
- 4.8 MC armored cable may be used as follows:
 - 4.8.1 All branch circuit wiring for lighting and power circuits where permitted and installed in compliance with UL 1569 and CEC 330.
- 4.9 MC-PCS luminary armored cable may be used as follows:
 - 4.9.1 All Lighting branch circuit wiring for lighting circuits where permitted and installed in compliance with UL 1569 and CEC 300-22(c), 330. This cable permits conductors of control circuits to be placed in a cable with lighting power circuits or class 1 circuits.
 - 4.9.2 It shall not be considered an acceptable option to install lighting control class 1 circuits as an open wire installation.
- 4.10 MC and MC-PCS armored cable shall **not** be used for the following areas:
 - 4.10.1 Any exterior, underground or buried in concrete circuits.
 - 4.10.2 Any circuits feeding HVAC equipment or pumps or any circuit with 30 AMPs or greater overcurrent protection.
 - 4.10.3 Any exposed interior locations except in electrical, communication or mechanical equipment rooms.
 - 4.10.4 Any exposed interior damp/wet locations, kitchens, science classrooms, shop areas, or concealed in science classroom casework, unless provided with approved PVC jacket.
 - 4.10.5 Any hazardous rated area.
- 4.11 Plastic conduit shall be used for all exterior underground, in slab, and below slab on grade conduit installations. Install bell ends at all conduit terminations in manholes and pull boxes. Where plastic conduit transitions from below grade to above grade, no plastic conduit shall extend above finished exterior grade, or above interior finished floor level.
- 4.12 Plastic conduit joints shall be made up in accordance with the manufacturer's recommendations for the particular conduit and coupling selected. Conduit joint couplings shall be made watertight. Plastic conduit joints shall be made up by brushing a plastic solvent cement on the inside of a plastic fitting and on the outside of the conduit ends. The conduit and fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly.

- 4.13 All underground conduit depths shall be as detailed on the drawings or a minimum of 30" below finished grade (when not specifically detailed otherwise), for all exterior underground conduits. Where concrete slurry or concrete encasement is provided, include "Red" color dye in mixture.
- 4.14 All underground conduits for power systems (600v and higher), shall be concrete encased and a minimum of 48" below grade or as detailed on the drawings. Where concrete slurry or concrete encasement is provided, include "Red" color dye in mixture.
- 4.15 Conduit shall be continuous from outlet to outlet, cabinet or junction box, and shall be so arranged that wire may be pulled in with the minimum practical number of junction boxes.
- 4.16 All conduits shall be concealed wherever possible. All conduit runs may be exposed in mechanical equipment rooms, electrical equipment rooms, electrical closets, and in existing or unfinished spaces. No conduit shall be run exposed in finished areas without the specific approval of the Architect.
- 4.17 All raceways which are not buried or embedded in concrete shall be supported by straps, clamps, or hangers to provide a rigid installation. Exposed conduit shall be run in straight lines at right angles to or parallel with walls, beams, or columns. In no case shall conduit be supported or fastened to other pipes or installed to prevent the ready removal of other trades piping. Wire shall not be used to support conduit.
- 4.18 It shall be the responsibility of the Contractor to consult the other trades before installing conduit and boxes. Any conflict between the location of conduit and boxes, piping, duct work, or structural steel supports, shall be adjusted before installation. In general, large pipe mains, waste, drain, and steam lines shall be given priority.
- 4.19 Conduits above lay-in grid type ceilings shall be installed in such a manner that they do not interfere with the "lift-out" feature of the ceiling system. Conduit runs shall be installed to maintain the following minimum spacing wherever practical.
- 4.19.1 Water and waste piping not less than 3".
- 4.19.2 Steam and steam condensate lines not less than 12".
- 4.19.3 Radiation and reheat lines not less than 6".
- 4.20 Provide all necessary sleeves and chases required where conduits pass through floors or walls as part of the work of this section. Core drilling will only be permitted where approved by the Architect.
- 4.21 All empty conduits and surface mounted raceways shall be provided with a 1/4" polypropylene plastic pull cord and threaded plastic or metal plugs over the ends. Fasten plastic "Dymo" tape label to exposed spare conduit to identify "power" or "communication" system, and to where it goes.
- 4.22 The ends of all conduits shall be securely plugged, and all boxes temporarily covered to prevent foreign material from entering the conduits during construction. All conduit shall be thoroughly swabbed out with a dry swab to remove moisture and debris before conductors are drawn into place.

- 4.23 Bending: Changes in direction shall be made by bends in the conduit. These shall be made smooth and even without flattening the pipe or flaking the finish. Bends shall be of as long a radius as possible, and in no case smaller than CEC requirements.
- 4.23.1 For power conduits for conductors (600v and below), provide minimum 36" radius (vertical) and 72" radius (horizontal) bends.
- 4.23.2 For power conduits for conductors (greater than 600v), provide minimum 72" radius (vertical) and 72" radius (horizontal) bends.
- 4.24 Supports: Conduit shall be supported at intervals as required by the California Electrical Code. Where conduits are run individually, they shall be supported by approved conduit straps or beam clamps. Straps shall be secured by means of toggle bolts on hollow masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction. **[No perforated straps or wire hangers of any kind will be permitted. Where individual conduits are routed, or above ceilings, they shall be supported by hanger rods and hangers.]** Conduits installed exposed in damp locations shall be provided with clamp backs under each conduit clamp, to prevent accumulation of moisture around the conduits.
- 4.25 Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers. Hanger rods shall be fastened to structural steel members with suitable beam clamps or to concrete inserts set flush with surface. A reinforced rod shall be installed through the opening provided in the concrete inserts. Beam clamps shall be suitable for structural members and conditions. Rods shall be galvanized steel 3/8" diameter minimum. Each conduit shall be clamped to the trapeze hanger with conduit clamps.
- 4.26 All concrete inserts and pipe clamps shall be galvanized. All steel bolts, nuts, washers, and screws shall be galvanized or cadmium plated. Individual hangers, trapeze hangers and rods shall be prime-coated.
- 4.27 Openings through fire rated floors/walls and/or smoke walls through which conduits pass shall be sealed by Fire stopping material to comply with Division 1 to seal off flame, heat, smoke and fire gases. Sleeves shall be provided for power or communication system cables which are not installed in conduits, and shall be sealed inside and out to comply with manufacturers UL system design details. Where multiple conduits and/or cable tray systems pass thru fire-rated walls at one location, the Contractor shall submit copies of the manufacturers UL system design details proposed for use on this project. All Fire stopping material shall have an hourly fire-rating equal to or higher than the fire rating of the floor or wall through which the conduit, cables, or cable trays pass.
- 4.28 Provide cap or other sealing type fitting on all spare conduits. Conduits stubbed into buildings from underground where cable only extends to equipment, the conduit/cable end shall be sealed to prevent moisture from entering the room or space.
- 4.29 All conduits which are part of a paralleled feeder or branch circuit shall be installed underground.
- 4.30 All conduits which are required as a part of systems specified in Divisions 27 or 28, or any other low voltage communication systems, shall be furnished and installed by the Division 26 Contractor.

- 4.30.1 The Contractor shall coordinate all conduit requirements with each system supplier prior to bid to determine special conduit system requirements.
- 4.30.2 The Contractor shall provide a pull rope in all conduits for these systems.
- 4.30.3 The Contractor shall provide conduit sleeves for all open cable installations thru rated walls or block walls. Provide conduit from each building main termination cabinet or backboard to the nearest accessible ceiling for access into all electrical or communications rooms.
- 4.31 In addition to the above requirements, the following requirements shall apply to all data networking conduits:
 - 4.31.1 Flexible metal conduit may only be used where required at building seismic and/or expansion joints.
 - 4.31.2 All underground conduits shall be provided with minimum 24" radius elbows (vertical) and 60" (horizontal).
 - 4.31.3 No length of conduit above grade shall be installed to exceed 150 feet between pull boxes, or points of connection, unless where specifically detailed on the drawings.
 - 4.31.4 No length of conduit shall be installed to exceed two 90 degree bends between pull boxes, or points of connection, unless where specifically detailed on the drawings.
- 4.32 Where surface raceways are installed in interior spaces, the Contractor shall take care to route in straight lines at right angles to or parallel with walls, beams, or columns. All raceways and device boxes shall be securely screwed to the finish surface with zinc screw "Auger" anchors Stk #ZSA1K by Gray Bar Electric or equal. Tape adhesive application will not be permitted.
- 4.33 The Contractor who installs surface raceway systems shall provide and install complete with wire retention clips, one for every (8) vertical feet or (5) horizontal feet or portion thereof. This Contractor shall also provide each raceway channel with pull strings.
- 4.34 It shall be the responsibility of the Contractor installing the raceway to coordinate the installation of raceway device plates and inserts with the communications or data contractors.
- 4.35 MC or MC-PCS cable shall be cut using a specific metallic sheath armor stripping tool. The use of hacksaws, dikes or any other tools not specifically designed to remove the armor sheath will not be permitted.
- 4.36 MC or MC-PCS cables installed in attic spaces or above lay-in ceilings shall be installed to be protected from physical damage. The cable shall be mounted along the sides or bottom of joists, rafters or studs.
- 4.37 Support wires used for supporting ceilings, lighting fixtures or other equipment items shall **not** be used to support MC or MC-PCS cables. Conduits, duct work, piping or any other equipment shall not be used to support or mount MC cables.

- 4.38 MC or MC-PCS cable supports, fasteners and clips shall be designed specifically for use with MC cables. Standard conduit supports, fasteners and clips, nails or other items are not permitted for installing MC cables.

END OF SECTION

SECTION 260534

OUTLET AND JUNCTION BOXES

PART 1 GENERAL

- 1.1 Furnish and install electrical wiring boxes as specified and as shown on the electrical drawings.
- 1.2 Submit manufacturer's data for all items.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 PRODUCTS

- 2.1 Boxes shall be as manufactured by Steel City, Appleton, Racor, or approved equal.
- 2.2 All boxes must conform to the provisions of Article 370 of the CEC. All boxes shall be of the proper size to accommodate the quantity of conductors enclosed in the box. Minimum box size shall be 4" square x 1-1/2" deep.
- 2.3 Boxes generally shall be hot dipped galvanized steel with knockouts. Boxes on exterior surfaces or in damp locations shall be corrosion resistant, cast ferrous and shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Boxes shall be Appleton Type FS, Crouse-Hinds, or the approved equal. Conduit bodies shall be corrosion resistant, cast malleable iron. Conduit bodies shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Conduit bodies shall be Appleton Unilets, Crouse-Hinds, or the approved equal. Where recessed, boxes shall have square cut corners.
- 2.4 Deep boxes shall be used in wall covered by wainscot or paneling and in walls or glazed tile, brick, or other masonry which will not be covered with plaster. Through the wall type boxes shall not be used unless specifically called for. All boxes shall be nongangable. Boxes in concrete shall be of a type to allow the placing of conduit without displacing the reinforcing bars. All lighting fixture outlet boxes shall be equipped with the proper fittings to support and attach a light fixture.
- 2.5 All light, switch, receptacle, fire alarm devices and similar outlets shall be provided with approved boxes, suitable for their function. Back boxes shall be furnished and installed as required for the equipment and/or systems under this contract.

- 2.6 Pull and junction boxes shall be code gauge boxes with screw covers. Boxes shall be rigid under torsional and deflecting forces and shall be provided with angle from framing where required. Boxes shall be 4" square with a blank cover in unfinished areas and with a plaster ring and blank cover in finished areas. Covers for flush mounted oversize boxes shall extend $\frac{3}{4}$ " past boxes all around. Covers for 4" square boxes shall extend $\frac{1}{4}$ " past box all around.
- 2.7 All terminal cabinets and junction boxes or equipment back boxes which are required as a part of systems specified in Divisions 27 or 28, or any other low voltage communication systems, shall be furnished and installed by the Division 26 Contractor.
- 2.7.1 The Division 26 Contractor shall coordinate all box requirements with each system supplier prior to bid to determine special cabinet or back box requirements. The Contractor shall also provide stainless steel blank cover plates for all low voltage systems installed for future equipment.
- 2.7.2 The Contractor shall provide all plywood backboards indicated on walls or inside equipment enclosures. All backboards shall be a minimum of $\frac{3}{4}$ " thick fire rated type plywood.
- 2.7.3 The Contractor shall coordinate exact rough in locations and requirements with each system supplier.
- 2.8 In addition to the above requirements, boxes for data networking wiring and equipment shall comply with the following:
- 2.8.1 All boxes shall be a minimum of 4-11/16" square x 2-1/8" deep.
- 2.8.2 Where pull boxes are required on individual conduits 1-1/4" or smaller, provide 4-11/16" square x 2-1/8" deep boxes. Where pull boxes are required on conduits larger than 1-1/4" for straight pull through, provide eight times the conduit trade size for box length. Where pull boxes are required on conduits larger than 1-1/4" for an angle or a U-pull through installation, provide a minimum distance of six times the conduit trade size between the entering and exiting conduit run for each cable.
- 2.9 Recessed boxes installed in fire rated floors/walls and /or smoke walls shall be sealed by Fire stopping material to comply with Division 1 to seal off flame, heat, smoke and fire gases. The Contractor shall submit copies of the manufacturers UL system design details proposed for use on this project. All Fire stopping material shall have an hourly fire-rating equal to or higher than the fire rating of the floor or wall through which the conduit, cables, or cable trays pass.

PART 3 EXECUTION

- 3.1 Boxes shall be installed where required to pull cable or wire, but in finished areas only by approval of the Architect. Boxes shall be rigidly attached to the structure, independent of any conduit support. Boxes shall have their covers accessible. Covers shall be fastened to boxes with machine screws to ensure continuous contact all around. Covers for surface mounted boxes shall line up evenly with the edges of the boxes.
- 3.2 Outlets are only approximately located on the plans and great care must be used in the actual location of the outlets by consulting the various detailed drawings and specifications. Outlets shall be flush with finished wall or ceiling, boxes installed

symmetrically on such trim or fixture. Refer to drawings for location and orientation of all outlet boxes.

- 3.3 Furnish and install all plaster rings as may be required. Plaster rings shall be installed on all boxes where the boxes are recessed. Plaster rings shall be of a depth to reach the finished surface. Where required, extension rings shall be installed so that the plaster ring is flush with the finished surface.
- 3.4 All cabinets and boxes shall be secured by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard precast inserts on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. All wall and ceiling mounted outlet boxes shall be supported by bar supports extending from the studs or channels on either side of the box. Boxes mounted on drywall or plaster shall be secured to wall studs or adequate internal structure.
- 3.5 Boxes with unused punched-out openings shall have the openings filled with factory-made knockout seals.
- 3.6 Where standby power and normal power are to be located in the same outlet box or 480V in a switch box, install partition barriers to separate the various systems.
- 3.7 All device boxes and junction boxes for fire alarm system shall be painted red and shall be per manufacturer's requirements.

END OF SECTION

SECTION 26 0543
UNDERGROUND PULL BOXES AND MANHOLES

PART 1 – GENERAL

- 1.1 Furnish and install electrical underground pullboxes and manholes as specified and as shown on the electrical drawings.
- 1.2 Submit manufacturer's data for all items.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

- 2.1 The concrete for pull boxes and manholes shall be class 5500 psi or as noted on the drawings. All pullboxes and manholes and covers located in parking lots, driveways, roads, or any other driveable areas shall be traffic rated.
- 2.2 Each manhole shall be provided with a fiberglass ladder and ground rod. Ground rods shall be copper or a copper-clad steel 3/4" diameter by 10-feet long. All non-current carrying metallic components shall be grounded to the ground rods with minimum #6 copper wire.
- 2.3 All underground pullboxes shall be provided with steel bolt down type covers. Bolts shall be bronze or brass. All communication or signal system pullboxes shall be sized to comply with CEC Article 370 unless where other sizes are specifically noted on the drawings.
- 2.4 All underground pullbox and manhole covers shall be provided with either "electrical" or "telephone" or "fire alarm" markings. The telephone marking shall be used to identify telephone, T.V., clock or any other types of communication systems.
- 2.5 All power and communication systems shall be provided with separate pullboxes or manholes. Fire alarm circuits shall also be provided with separate pullboxes from any other type of communication systems.

PART 3 – INSTALLATION

- 3.1 Shoring of the excavation shall be in accordance with all federal, state and local regulations.
- 3.2 Provide sealing material for the joints between sections per manufacturer's instructions.
- 3.3 The contractor shall make the top and access assembly or lid flush with surrounding areas where installed in driveable or normal walking areas.

END OF SECTION

SECTION 26 9090

ELECTRICAL CLOSEOUT

PART 1 GENERAL

- 1.1 Upon completion of the electrical work, the entire installation shall be tested by the Contractor, and demonstrated to be operating satisfactorily to the Architect, Engineer, Inspector and Owner.
- 1.2 All testing and corrections shall be made prior to demonstration of operation to the Architect, Engineer, Inspector and Owner.
- 1.3 In addition to the demonstration of operation, the Contractor is also required to review the content and quality of instructions provided on items demonstrated with the Architect, Engineer, Inspector and Owner.

PART 2 EXECUTION

- 2.1 Wiring shall be tested for continuity, short circuits and/or accidental grounds. All systems shall be entirely free from "grounds," "short circuits," and any or all defects.
- 2.2 Motors shall be operating in proper rotations, and control devices functioning properly. Check all motor controllers to determine that properly sized overload devices are installed, and all other electrical equipment for proper operation.
- 2.3 Tests and adjustments shall be made prior to acceptance of the electrical installation by the Architect, and a certificate of inspection and acceptance of the electrical installation by local inspection authorities shall be provided.
- 2.4 All equipment or wiring provided which tests prove to be defective or operating improperly shall be corrected or replaced promptly, at no additional cost to the Owner.
- 2.5 Test all motor and feeder circuits with a "megger" tester to determine that insulation values conform to Section 110-20, California Electrical Code (CEC). Test reports must be submitted and approved by the engineer before final acceptance.
- 2.6 Test all grounding electrode connections to assure a resistance of no more than 10 ohms is achieved. Augment grounding until the ohmic value stated above is achieved. Provide certified test results to the Architect, Engineer and Inspector.

END OF SECTION

SECTION 270100

COMMUNICATIONS GENERAL PROVISIONS

PART 1 SUMMARY

- 1.1 This Division of the specifications outlines the provisions of the contract work to be performed as a sub contract under the Division 26 scope of work. Reference the Division 26 Electrical General Provisions for scope of work and general requirements.
- 1.2 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under Division 1 requirements.

END OF SECTION

SECTION 271000

VOICE / DATA / IP INTERCOM INFRASTRUCTURE

PART 1 GENERAL

- 1.1 Include all labor, equipment and materials necessary for providing a complete networking infrastructure system as described herein and/or as indicated on the drawings.
- 1.2 Related specification sections:
 - 1.2.1 Section 26 01 00 - General Provisions
 - 1.2.2 Section 26 05 19 - Conductors
 - 1.2.3 Section 26 05 33 - Conduit and Fittings
 - 1.2.4 Section 26 05 34 – Outlet and Junction Boxes
- 1.3 Approved minimum Product and Contractor Extended Warranty Certifications;
 - 1.3.1 All components shall be manufactured by one of approved manufacturers, the installing Contractor must have the accompanying certification from the product manufacturer(s) for installation of a “Extended Warranted System” as required by each manufacturer and as indicated in these specifications.
 - 1.3.1.1 Specified system warranties are to be established between the component and cable manufacturers and the District, warranties between the cable manufacturer only or installing Contractor and the District are not considered equal.
 - 1.3.1.2 Warranty shall be a full “Performance Warranty” installed by a “Certified Contractor” as specified by one of the approved manufacturer’s. A “Component Warranty” will not be considered equal. All components, labor, and “Performance Criteria” shall be warranted by one of the approved manufacturers;
- 1.4 Acceptable manufacturers are:
 - 1.4.1 **LEVITON / BERK-TEK**
 - 1.4.1.1 Installing Contractor must be LEVITON Network Solutions Premier certified to install this system.
 - 1.4.1.2 Warranty provision and training must be for the Leviton/Berk-Tek – Limited Lifetime Premium Performance Warranty program.
 - 1.4.2 **COMMSCOPE**
 - 1.4.2.1 Commscope’s Training and Warranty programs encompass the brand names known as Systimax and Uniprise.
 - 1.4.2.2 Installing Contractor must be PartnerPro certified to install any of the systems under the Commscope Family of brand names. Alternate certification that apply as well is Systimax Premier Certification for products installed with the Systimax brand name.

1.4.2.3 Warranty provision and training must be for the Commscope (Uniprise and Systimax) – 25-Year Premium Performance Warranty program.

1.4.3 **ORTRONICS (Legrand)/Superior Essex**

1.4.3.1 Installing Contractor must be CIP-ESP or CIP certified to install this system.

1.4.3.2 Warranty provision and training must be for the nCompass – Lifetime Premium Performance program.

1.4.4 Warranty shall be to the District, for the period as defined by the Network Infrastructure System selected for installation, after District acceptance and sign-off of the completed system. The Contractor must provide documentation from one of the approved manufacturers, as indicated in Section 1.3, indicating their qualifications for installation of this system in compliance with the manufacturer's warranty period requirements as a warranted Contractor.

1.4.5 Equipment qualifications: It is the intent of these specifications that each bidder provides all hardware, components and installation services that are necessary to ensure a fully operational wiring system including warranties, as shown in the EIA/TIA Category-6 guidelines.

1.4.6 All components, parts, infrastructure, patch cables, termination panels and cables must be classified by the manufacturer or manufacturers as a part of the "Extended Warranty" program. Contractor may not mix in components from other certified programs or materials that are not considered part of the "Lifetime" warranty.

1.4.7 Systems or components as manufactured by any other manufacturer which, are not specifically listed in 1.3, are **not** approved for use on this project..

1.5 **Installing Contractor qualifications:** Firms and their personnel must be regularly engaged in the installation of data networking cabling and equipment for systems of similar type and scope. The Contractor must have a full-service office able to respond to emergency callouts during the warranty period. The Contractor must also provide complete installation of all wiring and devices or equipment. **Subcontracts with Electrical Contractors or other warranted or non-warranted Contractors for supervised installation of any part of this system are not approved.**

1.5.1 Contractor shall have on staff a minimum of (1) BICSI RCDD on staff as full-time employees.

1.5.2 The successful Contractor shall be a California licensed C7 or C10 Premise Wiring Contractor as defined in this specification.

1.5.3 All work shall be performed under the supervision of a company accredited and trained by the Manufacturer of the components and cable and such accreditation must be presented with the bid submittal. All personnel performing work on this project must have successfully completed the manufacturer's training courses to completely comply with the extended warranty requirements prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer or manufacturers.

- 1.5.4 All personnel engaged in the testing of premises fiber optic and copper UTP cable systems must have successfully completed the test equipment manufacturer's training courses. Certification of such training must be presented with the bid submittal. Cut sheets of the test equipment to be utilized shall be provided with the Phase I project material submittals.
- 1.5.5 **This project shall employ Category-6 cabling. The Contractor shall install the related components in relation to the performance requirements for the type of cable installed.**
- 1.5.6 If Contractor routes cables and/or associated pathways in another route than indicated on the drawings, they shall maintain all maximum cable installation distances as required by the manufacturer's distance limitations.
- 1.6 In order to ensure project cohesion, a single point of contact is required to provide a "TURNKEY" solution. The work covered under this section of the specification consists of furnishing all; labor; cabling; equipment; supplies; materials, and training. The Contractor will perform all operations necessary for the "TURNKEY" and fully completed installation in accordance with the specifications herein. As such, the successful Contractor must be factory trained on all aspects of Network Infrastructure Cabling System.
- 1.7 The drawings indicate a schematic routing of cables above ceilings. The Contractor shall field-verify the most appropriate routing of all above-ceiling cable prior to bid. Where cables penetrate through walls a conduit sleeve shall be provided. Where cables pass through fire rated walls, the conduit sleeve shall be sealed to maintain the rating of the wall assembly.
- 1.8 Unless otherwise noted in the project drawings or these specifications, the Division 26 Contractor shall provide the installation of all conduits, outlet and junction boxes, trenching and pull box installation.
- 1.9 General Submittal Requirements
 - 1.9.1 **Phase I Submittal** shall be made in electronic format within (20) working days after the award of the contract by the District. This submittal shall include the following:
 - 1.9.1.1 Complete Bill of Materials in Excel Spreadsheet format with bills of quantities, including all materials, components, devices, and equipment required for the work. The bills of quantities shall be tabulated respective of each and every system as specified, and shall contain the following information for each Section listed:
 - 1.9.1.2 Description and quantity of each product.
 - 1.9.1.3 Manufacturer's Name and Model Number.
 - 1.9.1.4 Manufacturer's Specification Sheet or Cut Sheet.
 - 1.9.1.5 Specification Item Number referenced for each required product or if not shown in the specifications, Drawing Detail Number being referenced. (ie; Spec. 271000 Item 2.1 or DWG E4.15/#1)

- 1.9.1.6 Include with submittals all warranty information and a description of support and maintenance services to be provided. Also include all licenses and maintenance agreements required for continued operation of the equipment.
- 1.9.2 **Phase II Submittal** shall be provided within (20) working days after the approval of the Phase I submittals and prior to any fabrication or field conduit installations. All shop drawings shall be engineered in a CAD Software. Submission shall include electronic print copies to match the contract drawings, and Phase II submittals drawings shall include the following.
 - 1.9.2.1 MDF and IDF equipment rack or cabinet elevations will be required to be provided including cable routing, grounding, support, UPS, network electronics, etc. and position of all components in the rack or cabinet.
 - 1.9.2.2 Provide labeling plan which identifies the proposed scheme for identifying all components including Racks, patch panels (fiber and copper), site distribution feed cables, horizontal station cables and site conduit systems (handholes, pullboxes, etc.).
 - 1.9.2.3 Provide shop drawings showing all end device locations, tap values, paging zones and amplifier sizing for each zone for analog speakers and horns, including devices connected to IP-Based zone controllers.
- 1.9.3 Common submittal mistakes which will result in submittals being rejected:
 - 1.9.3.1 Not including the qualifications of the installing Contractor Company and Contractor's Staff.
 - 1.9.3.2 Not including all items listed in the above itemized description.
 - 1.9.3.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed (provided for the project) or crossing out the items which are not applicable.
 - 1.9.3.4 Not including actual manufacturer's cut sheets or catalog information of proposed products.
 - 1.9.3.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.
- 1.9.4 The Contractor shall make a written request directly to Johnson Consulting Engineers for electronic drawing files (CAD). As a part of the written request, please include the following information:
 - 1.9.4.1 Clearly indicate Project Name and Client, Johnson Consulting Job Number (located in bottom left corner of JCE Engineering Stamp) and each drawing Sheet Number required (i.e., E1.1, E2.1, E4.1 etc.).

- 1.9.4.2 Identify the name, Company, Title, phone number, mailing address and e-mail address of the person to receive the files.
- 1.9.4.3 Detail or Riser diagram sheets, System Schematic drawings or any other drawings other than floor plans or site plans, will not be made available to the Contractor.
- 1.9.4.4 Files will only be provided in the AutoCAD format in which they were created (i.e., version 2015 or version 2016). Files will not be made available in REVIT format.
- 1.9.4.5 Requests for files will be processed as soon as possible; a minimum of 7 working days should be the normal processing time. The Contractor shall be completely responsible for requesting the files in time for their use and delays in requesting files will not alleviate the Contractor from submitting required documents within the required timeline.

PART 2 PRODUCTS

- 2.1 Equipment racks have been detailed on the drawings and additional component information requirements have been described in the following sections and on the drawings. The following is a list of approved manufacturers for each type of rack to be furnished.
 - 2.1.1 **(Enclosed Swing Wall Mount)** shall be manufactured by Middle Atlantic DWR Series or Cooper B-Line V-Line Dual Hinge. Reference drawing details and specifications for complete requirements.
- 2.2 **Enclosed Swing Wall Mount**
 - 2.2.1 Enclosed swing wall mount cabinets quantity as shown in the MDF or IDF room layouts. Provide Middle Atlantic Model #DWR-24-32 "DWR" Series dual-swing equipment cabinet, 49" Overall Height by 23.5" Wide by 32" Deep (Usable 42" height and usable 30" depth), black color. (No known alternate.)
 - 2.2.1.1 This is the Standard Height Wall Mount IDF Cabinet. Refer to the floor plans and drawing details for the requirement for a higher RU count (taller) for this type of cabinet. Wall mounted IDF cabinets shall not be less than 45" in overall height unless specifically noted in the drawings.
 - 2.2.2 Provide with Solid Front Door Model #FD-24 with keylock. All cabinets shall be provided with the same lock.
 - 2.2.3 Provide cabinet with (2) 4-1/2" fans mounted in top of cabinet for ventilation, Middle Atlantic Model #QFAN with protective grilles, with power plug kit Model #FANCORD-2X1 and vent blocker kit Model #VBK-S32. Vent blockers shall be installed on the upper vents on the side and front of the cabinet. Plug power cord into the thermostatic controller.

- 2.2.4 Provide thermostatic controller Model #FC-2-215-1CA mounted in the backcan of the cabinet. Set the temperature threshold for the fan controller at 80-degrees for fan activation.
- 2.2.5 Provide full length vertical lacing bars in the rear of the cabinet for cable management Middle Atlantic Model #LACE-23-OP. Install lacing bars for cable entry and dressing in the cabinet.
- 2.2.6 Provide horizontal wire managers between each patch panel or (1) manager per patch panel. Provide (1) spare manager per rack. Provide 1RMU height managers only for wall mounted IDF cabinets. Middle Atlantic Part #PHCM-1-2 (1RU) or approved equal.
- 2.2.7 (1) Rack mounted surge arrest style power distribution unit per cabinet, 1 rack unit in height, TrippLite Model #PDUMH15NET2 with (8) NEMA 5-15R outlets, built-in SNMP Ethernet interface and NEMA I5-15P input with 5-20P adapter or approved equal by APC. Custom order PDU with shorter 6-foot power cord. Refer to drawing details for the PDU quantities.
 - 2.2.7.1 Contractor shall be responsible for neatly routing, storing and connecting the power cords from the PDUs to the electrical outlet or UPS as directed by the District. Power cords shall be dressed separately from the UTP cables or any other low voltage cable and shall be secured to the back of the rack or cable runway with Velcro ties.
- 2.2.8 Furnish grounding to each IDF Cabinet as shown in the detail drawings. Each cabinet shall be provided with a ground bus bar, grounding terminal block, #6 Ground wire from the cabinet to the bus bar and a compression lug on the end of the ground wire at the bus bar. Provide grounding components as manufactured by CPI #13622-010 ground bus bar, #40167-001 terminal block and #40162-901 compression lug or approved equal.

Main Distribution Frame (MDF)

- 2.3 The Main Distribution Frame shall be the central wiring and equipment location for the infrastructure systems. The MDF is EXISTING.

Intermediate Distribution Frame (IDF)

- 2.1 The Intermediate Distribution Frame (IDF) Room shall be a secondary wiring and equipment location for the data networking system. The Contractor shall include the following items at this location:
 - 2.1.1 Category-6 Modular Patch Panels (rack mounted) with RJ45 style connectors, for terminating all twisted pair cable from each Voice/Data/IP-Page device outlet served from this location. Provide 25% spare capacity for future wiring requirements. All patch panels shall be 24 or 48-ports maximum. Provide cable

support bars at the rear of each patch panel. All cable shall be secured to bars with Velcro straps.

2.1.2 Additional items required at each IDF closet are as follows:

2.1.2.1 Fiber patch cords shall be provided and connected to the electronics by others.

2.1.2.2 Provide (blue) Category-6 (patch panel end) patch cords with pre-molded boot, provide quantity equal to 100% of the total data cable drop or port provided. Verify with Customer all ports which will be activated. All patch cords to be installed by contractor. Allow for 100% of total copper patch cords required to be (9) inches in length. Patch cords shall be in compliance with the manufacturer's "Channel" warranty requirements.

2.1.2.3 Provide (blue) Category-6 (workstation end) patch cords with pre-molded boot, provide quantity equal to 100% of the total data cable drops or ports provided. Verify with Customer all ports which will be activated. All patch cords to be installed by contractor. Provide for 10% of total copper patch cords required to be (10) feet in length and all remaining patch cords shall be (15) feet in length. Patch cords shall be in compliance with the manufacturer's "Channel" warranty requirements.

2.1.2.4 Provide all other items as detailed on the drawings.

2.2 **Voice /Data/Access Point/ IP Intercom Station Cable**

2.2.1 Provide one Category-6, 4-pair, unshielded twisted pair (UTP) cable from the nearest MDF or IDF to each RJ45 data outlet port indicated on the drawings. Dual port outlets will require two such cables. Four port outlets will require four cables.

2.2.2 Category 6 cables shall be copper wire, individually insulated and color coded.

2.2.3 The cables shall be UL or ETL rated and UL verified in compliance with proposed Category-6.

2.2.4 The cables shall be UL or ETL rated and UL verified in compliance with proposed Category-6.

Superior Essex	—	NextGain Cat 6eX - #54-246-xA
Commscope	—	CS37R
Berk-Tek	—	Lanmark 2000 series

2.2.5 Where data cables are indicated to run underground, contractor shall use a Category-6 flooded cable: Comm Scope - Ultra Media Series - #6NF4.

2.2.6 **(Blue)** cables for all data specific cables

2.2.7 **(Grey)** cables for all IP intercom specific cables.

2.2.8 **(Black)** cables for all Access Point Locations

2.2.9 **(Red)** cables for all Video Surveillance locations

2.3 **Voice /Data/Access Point Outlets**

- 2.3.1 Unshielded twisted pair data outlets shall be an RJ45 Enhanced performance type 8-position / 8 conductor modular jacks, and shall comply with proposed Category-6 performance requirements, single port, dual port or four port as noted on drawings. All outlets shall be wired in an EIA/TIA 568B configuration.
- 2.3.2 Fiber optic local origination outlets shall be SC Duplex type inserts and shall occupy the same faceplate as the data outlets.
- 2.3.3 Category-6 UTP local origination outlets shall be of the same type and manufacture as the data outlets. Refer to drawings for faceplate configurations.
- 2.3.4 For single port data outlet or single port voice outlet locations, the faceplates shall have space for two connections with one port fully operational for connection to all of the specified protocols. The second port shall be covered by a blank plate.
- 2.3.5 For dual port data, dual port voice, or dual port voice/data outlet locations, the faceplates shall have space for two connections with both ports fully operational for connection to all of the specified protocols.
- 2.3.6 For triple port data outlet or any combination of voice and data totaling three ports, the faceplates shall have space for four connections with three ports fully operational for connection to all of the specified protocols. The fourth port shall be covered by a blank plate.
- 2.3.7 For quad port data outlet or any combination of voice and data totaling four ports, the faceplates shall have space for four connections with all four ports fully operational for connection to all of the specified protocols.
- 2.3.8 For dual port data outlet locations with local origination, the faceplates shall have space for four connections with all ports fully operational for connection to all of the specified protocols. The fourth port shall be covered by a blank plate.
- 2.3.9 For single port voice outlet locations intended for wall telephone connections, a wall telephone type faceplate with attachment studs shall be provided. The wall telephone jack shall be 8-pin, RJ45 type and use IDC wire terminations only. Screw terminal type jacks will not be accepted as an alternative.
- 2.3.10 All data outlet faceplates shall be (white) and shall have a unique sequential identification number applied to faceplate. Hand written labels are not permitted. Faceplates, with the exception of wall telephone outlets, shall include interchangeable colored icons or color coded port inserts. All color schemes shall be approved by the customer prior to installation.
- 2.3.11 Reference the drawings for special outlet configurations or plate requirements.

2.4 **IP Paging Speakers/Horns**

- 2.4.1 The Contractor shall furnish and install the IP based paging speakers and horns.

- 2.4.2 Data Contractor shall be responsible for providing enclosures for all IP based speakers and horns. Contractor shall provide vandal resistant screws with all enclosures for attachment of the speaker/horn baffle. Exterior locations shall be provided with stainless steel vandal resistant screws.
- 2.4.3 Flush mount enclosures shall be furnished and installed by the 27 10 00 Contractor in all areas shown in the floor plans.
- 2.4.4 **Paging speakers shall be per model number on E4 series floor plan.**
- 2.4.5 Provide a (2) foot long, CAT-6, UTP patch cord, gray in color, for the speaker location to connect to the ethernet drop located in the enclosure. Provide patch cords for 100% of IP Speaker/horn locations. Provide (10) spare patch cords, deliver all Patch cords to the District IT Department.
- 2.4.6 IP speakers/horns shall be connected to the powered ethernet switch in the MDF / IDF Room or cabinet. Provide 4-foot long, Category-6 UTP patch cords, gray in color. Provide patch cords for 100% of IP Speaker/horn/zone controller locations. Provide (20) spare patch cords, deliver all Patch cords to the District IT Department.
- 2.4.7 All speaker connections to be terminated at the data patch panel. Speakers must be patched to a powered switch in the IDF to allow for proper operation.
- 2.4.8 Contractor for 27 10 00 section is responsible for providing licensing requirements and Informacast software to drive speakers and program tones, bell schedules and announcement controls.
- 2.4.9 Programming of speakers for page coverage zones, tones, time schedules, pass class bell and VoIP interface to be completed by 27 10 00 contractor and is also responsible for providing IP addressing and identification of individual speakers.
- 2.4.10 Contractor shall provide server for this system and all associated programming.
 - 2.4.10.1 HP DL360 G9 E5-2620V3, E6-2620V3, 16GB, SAS, P440AR cont w/2G
 - 2.4.10.2 HP 300GB SAS 12G 10K HOD
 - 2.4.10.3 HP Lights out ADV License 3 year
 - 2.4.10.4 HP Smart Cache License

PART 3 INSTALLATION

- 3.1 Upon completion of 10% of the cabling installation, the contractor shall notify the engineer for an inspection of the methods and types of materials used on the project. The contractor shall give a minimum of 72 hours notification to the engineer for the inspection. The contractor will be given a written review of the findings, so if adjustments are required, they can be done before the project proceeds.
- 3.2 Pull strings will be provided with all cable runs including but not limited to; conduit stub ups, conduit sleeves, cable trays, open wiring routes, innerduct, and point-to-point

conduits. Pull strings shall be free from cable bundles in open wiring routes. Pull strings shall not be substituted for pull ropes.

- 3.3 Velcro cable management straps are required on all Category-6 cable bundles, the last 20 feet or upon entry into equipment closet, a maximum of 12" apart. Cable bundles shall also be routed through cable management or "D" rings in the equipment closet.
- 3.4 Data contractor shall supply protective bushings or slide on rings at the ends of all exposed conduits used for the data system cabling. This is to include all conduits installed for any future data cabling requirements. Contractor shall submit planned protection bushing prior to installation of cabling for approval.
- 3.5 Velcro cable management straps are required on the rear of the equipment racks and on the patch cords within the vertical cable managers. Straps shall be a maximum of 12" apart.
- 3.6 Labeling
 - 3.6.1 Each cable run shall be permanently labeled at each end with a unique sequential number which corresponds to a similar number provided for each data outlet and punch down point. A printed label shall be placed at each of the following locations;
 - 3.6.1.1 On the cable at the rear of the patch panel or termination block. Requires the use of a self laminating wrap around label. Brady Label self laminating 1.2" by 1.5" wrap around label Part # 29689 or equal.
 - 3.6.1.2 On each cable in the j-box behind the faceplate location. Requires the use of a self laminating wrap around label. Brady Label self laminating 1.2" by 1.5" wrap around label Part # 29689 or equal.
 - 3.6.1.3 On the face of the patch panel, provide a 3/4" by 3/4" label with a letter or number identifying the patch panel designation.
 - 3.6.1.4 On the face of the faceplate in the label holder window.
 - 3.6.2 Hand written labels are not permitted. Where cable ID includes room number identification the contractor shall obtain written verification of actual room numbers prior to beginning labeling (numbers on plans do not always match actual room numbers). Cable pulling cross reference lists will not be accepted with final documentation.
 - 3.6.3 Each patch panel port shall be identified with a unique sequential labeling scheme. Port identification labeling pattern shall be consistent throughout the project.
 - 3.6.4 All faceplates shall be identified with permanent printed labels. Labels must not be subject to removal by incidental contact. Contractor shall be responsible for replacing defective labeling for a period of one year from date of final sign-off of project.
 - 3.6.5 All fiber optic and UTP feed cables shall be identified with a permanent, water resistant, printed labels. Labeling information shall include closet identifications,

quantity of conductors (UTP) or strands (fiber) and house pair designations (UTP).

- 3.6.6 Labeling will follow recommended EIA/TIA standards or as requested by the customer. Contractor will confirm labeling pattern prior to final identification or testing. All test results will be identified by the final labeling scheme.
- 3.6.7 All fiber optic cables and/or innerduct shall be tagged with fiber optic warning tags in every manhole or pullbox. Fiber warning tags shall also be placed at each end of the cable in the termination closets in clear view. A minimum of (3) tags are required at each end. Fiber warning tags shall be placed on fiber optic cable and/or innerduct routed through open ceiling environments at increments no less than 15 feet apart.
- 3.7 Where open wiring cables are run through the ceiling space (only permitted where specifically noted on the drawings), the wire shall be bundled together and supported above the ceiling.
- 3.8 All cables must be fastened to the building structure via "j-hooks" or an approved Category 6 suspension system, and not directly in contact with ceiling system. For "j-hooks" maximum fill capacity is as follows: 1-5/16" hooks – 35 cables; 2" hooks - 60 cables; 4" hooks - 120 cables. For quantities beyond 120 cables use a sling support system such as "Erico Cable Cat" or equal. Maximum fill capacity 200 cables. D-rings, "Caddy #WMX cable hangar", "Caddy Bridle Rings", drive rings or any other type of wire ring support is not allowed.
- 3.9 Where cables pass through a fire-resistant portion of the structure, conduit sleeves shall be provided to maintain the rating of the wall penetrated. Sealing of all penetrations with an approved fire barrier is required. Conduits and sleeves must remain accessible for future use. Permanent sealants may not be used to seal sleeves and conduits.
- 3.10 Fiber optic cables connecting to equipment racks shall be installed with not less than 20 feet of slack cable between the rack and the terminal backboard. See drawings for fiber optic service loop requirements.
- 3.11 Provide 6 inches of cable slack at computer data system outlets inside conduit box.
- 3.12 In an accessible ceiling area, provide a 10 foot (circle 8 configuration) service loop above the data/voice outlet locations. Service loop must be tied up off of ceiling tiles or ceiling surface. Neatly coil cable without exceeding minimum bend radius limitations. Do not provide length in excess of 15 feet. May cause improper test results.
- 3.13 The minimum bending radius for all cables and the maximum pulling tension shall not exceed manufacturer's recommendations.
- 3.14 Cables installed in manholes and pullboxes on terminal backboards shall be installed on wall mounted cable support racks.
- 3.15 Provide a full 360 degree loop of cable around manhole and pullbox interiors.
- 3.16 Cable pulling shall use a split mesh grip over the cable jacket. Connection directly to optical fibers and copper wire conductors shall not occur.

- 3.17 When pulled through conduits, cable pulling lubricants shall be continuously applied to all cables and be specifically approved by the manufacturer.
- 3.18 Where cables are pulled through or pulled from a center of run, pull without splices or terminations, lead out the cables at all manholes, pullboxes, and conduits, taking care to feed them in again by hand for the next run.
- 3.19 For each cable pull where a cable direction change is required, flexible feed-in tubes, pullout devices, multi-segmented sheaves, etc., shall be used to ensure proper cable pulling tensions and side wall pressures. Cables shall not be pulled directly around a short right angle bend. Any device or surface the cable comes in contact with when under pull-in tension shall have a minimum radius 50% greater than the final specified minimum installed cable bending radius. The maximum possible size radius sheaves and feed-in tubes, usable in the available working space, shall be provided in all situations, to ensure the minimum possible cable sidewall pulling pressure. Do not use devices with multi-segment "roller" type sheaves.
- 3.20 Cable lengths over 250 feet shall be machine pulled, not hand pulled. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull. Maximum cable pulling speed shall be less than 50 feet per minute. Minimum pulling speed shall be greater than 15 feet per minute.
- 3.21 When pulling cable through conduit, cables shall be pulled straight into or out of the raceway without bends at the raceway entrance or exit. Pull in cable from the end having the sharpest bend (i.e., bend shall be closest to the reel.) Keep pulling tension to minimum by liberal use of lubricant, hand turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one at manhole or pullbox during this operation. Cables shall be pulled directly from cable reels.
- 3.22 All cables shall be new and extend continuous from each MDF or IDF backboard or rack to all voice/data outlets or other equipment locations.
- 3.23 Where cables are not installed in a conduit or other raceway system, they shall not be routed parallel with other line voltage equipment or wiring (120 volt and above) within 36" or within 12" of line voltage equipment or wiring where crossing. Where Flooded Enhanced Category-5 cables or outdoor rated fiber optic cables are routed exposed through ceilings for more than 50'-0", install in innerduct or EMT conduit system.

PART 4 TESTING

- 4.1 All Category-6 cables shall be point to point (link) tested after installation/termination, and verified to operate at minimum 1000Mbps. Performance of installed cables shall satisfy all current addendums to the EIA/TIA 568A standard for Category-6 wiring. In addition, testing shall satisfy all proposed amendments to the existing ISO/IEC requirements. The wiring shall support all specified communication protocols. Testing shall support the Category-6 requirements by the EIA/TIA.
- 4.2 Upon completion of testing cable links, the Contractor shall supply a copy of the original database files downloaded from the tester in original format on disk. Contractor shall provide with database files an original copy of the tester's manufacturer software program (included in original cost) for record management and archiving, in a Windows format (e.g., MicroTest's software program - ScanLink ver.

- 4.2.1 10 PC for Windows, WaveTek's software program-LTRM ver.1.07, etc). The manufacturer's software program will be used by the engineer to review all test results, and then turned over to the customer to keep as their record copy with the final approved test results. Provide (3) copies of tests on disk.
- 4.3 Contractor will repair or replace cable runs or connecting hardware that do not meet specified criteria.
- 4.4 Upon completion of submittal of original test results, and after review and approval of those results, the contractor shall provide testing equipment and personnel to randomly re-test 10% or 20 drops minimum, whichever is greater, of all UTP cable locations on the campus in the presence of the designated customer representative and project engineer. The customer representative shall choose which cables are to be retested. If 10% of the re-tested cables fail to match the previously submitted original tests, the contractor must hire an independent testing firm to re-test all UTP cable on the campus, at no cost to the customer. All cables which do not meet the specifications criteria as determined by the independent test report, shall be replaced and retested by the contractor at no cost to the customer. Final sign-off of the testing shall be approved after receipt of all other documentation.
- 4.5 Special testing
 - 4.5.1 The Owner will furnish and install all active networking electronic components. After the electronics have been installed the Contractor will provide for an independent test of the complete system. This test may include Active or Dynamic testing of all infrastructure components. The contractor will be required to repair any portions of the infrastructure system and or replace any components which do not meet the manufacturer's performance criteria.
- 4.6 Multimode fiber optic cables shall be tested bi-directionally at 850nm and 1300nm. Single mode fiber optic cable shall be tested bi-directionally at 1310nm and 1550nm. All fiber strands shall be tested with a power meter and light source as well as an OTDR (Optical Time Domain Reflectometer). OTDR fiber tests for runs under 100 meters are not required. All fiber test results shall contain final source and destination information that matches IDF or MDF labeling shown on drawings. Fiber test results shall be submitted as PDF and editable electronic copy.
- 4.7 Test procedures shall comply with EIA/TIA 526-14 Method B. Test results shall meet the minimum following criteria:
 - 4.7.1 Fiber optic test results shall not exceed 2db attenuation loss in addition to inherent loss published by manufacturer tested at minimum 2000 Mhz for 850nm and 500 Mhz for 1300nm for the fiber optic cable.
 - 4.7.2 Test all voice/data cables minimum Category-6 UTP cable to test results for "Link Testing" requirements @ 250 Mhz per current EIA/TIA draft requirements. Any cables which do not meet these minimum requirements shall be replaced or repaired at no cost to the customer.
- 4.8 End to end attenuation termination points measure the power loss between end points from both directions.

- 4.9 End to end attenuation testing shall be performed with a temporary test jumper cable at each end of the installed fiber cable. The test jumper shall be the same size as the installed cable. The measured attenuation of the test jumpers, test connectors, and test interconnection sleeve between the two test jumpers shall be less than 1dB as calibrated at the time of the test at indicated wave lengths and frequencies.
- 4.10 Provide (3) hard bound copies of "E-size" drawings and (1) disk copy in AutoCAD format and Visio 2013 copy of floor plan drawings of each building. These drawings shall include all outlet locations, major cable routes and outlet and cable identification numbers. Provide detailed elevations of each MDF or IDF locating all equipment and connections.
- 4.10.1 The contractor shall also provide As-Built documentation of all existing data and voice outlets in each building. Contractor shall be responsible for documenting the location of the outlets, port count, voice or data and existing label designations on faceplates. The Contractor will not be responsible for testing existing locations or confirming the label ID information on existing outlets.
- 4.10.2 Provide detailed elevations of each MDF and IDF closet or cabinet reflecting the complete rack equipment and components. This is to include all existing equipment as well as new equipment added by the Contractor for this project.

END OF SECTION

SECTION 28 0100

ELECTRONIC SAFETY AND SECURITY GENERAL PROVISIONS

PART 1 SUMMARY

- 1.1 This Division of the specifications outlines the provisions of the contract work to be performed as a sub contract under the Division 26 scope of work. Reference the Division 26 Electrical General Provisions for scope of work and general requirements.
- 1.2 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under Division 1 requirements.

END OF SECTION

SECTION 28 3001

FIRE ALARM VOICE EVACUATION SYSTEM

PART 1 GENERAL

- 1.1 Work Included:
 - 1.1.1 Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating fire alarm system.
- 1.2 Related Work:
 - 1.2.1 Division 26 01 00: Electrical General Provisions
 - 1.2.2 Division 26 05 33: Conduit and Fittings
 - 1.2.3 Division 26 05 34: Outlet and Junction Boxes
- 1.3 The equipment and installation shall comply with the current applicable provisions of the following standards:

NFPA 72-2022. National Fire Alarm Code with California Amendments.
CBC - 2022. California Building Code (CBC), Part 2, Title 24, CCR.
CEC - 2022. California Electrical Code, (CEC), Part 3, Title 24, CCR.
CFC - 2022. California Fire Code (CFC), Part 9, Title 24, CCR.
- 1.4 The system and all components shall be listed by Underwriters Laboratories, Inc. for use in Fire Protective Signaling Systems under the following standards as applicable:

UL 38 Manually Actuated Signaling Boxes.
UL 50 Cabinets and Boxes.
UL 268 Smoke Detectors for Fire Protective Signaling Systems.
UL 268A Smoke Detectors for Duct Applications
UL 346 Waterflow Indicators for Fire Protective Signaling Systems.
UL 464 Audible Signaling Appliances.
UL 521. Heat Detectors for Fire Protective Signaling Systems.
UL 864 Control Units for Fire Protective Signaling Systems.
UL 1481. Power supplies for Fire Protective Signaling Systems.
UL 1971. Visual Signaling Appliances.
- 1.5 Only Fire Alarm Control Panel Equipment and Peripheral Field Devices have been shown on the Contract Bid Single Line Block Diagram. Specific and complete wiring between Control Equipment and Peripheral Equipment has been deleted for clarity.
- 1.6 Fire Alarm system and installation shall meet all of the following DSA Requirements:
 - 1.6.1 Applicable Standard NFPA 72, as adopted and amended in CBC Chapter 35
 - 1.6.2 A stamped set of approved fire alarm design documents shall be on the job site and used for installation.
 - 1.6.3 Any discrepancies between the drawings and the code or recognized standards shall be brought to the attention of DSA and the architect/engineer of the project.

- 1.6.4 Wall mounted visible notification devices shall have their bottoms mounted at 80" minimum and 96" maximum from finished floor.
- 1.6.5 Wall mounted Audible devices shall have their tops mounted at 90" minimum and 100" maximum from finished floor and no closer than 6" to a horizontal structure.
- 1.6.6 Audible devices shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or five dBA above the maximum sound level having a duration of at least 60 seconds, whichever is greater, in every occupiable space within the building.
- 1.6.7 Audible devices shall be synchronized temporal code 3 pattern.
- 1.6.8 The contractor shall adjust/install all devices to maximize performance and minimize false alarms.
- 1.6.9 Visible devices shall not exceed two flashes per second and should not be slower than one flash every second. The device shall have a pulsing light source not less than 15 candela. Visible devices within 55' from each other shall be synchronized.
- 1.6.10 Underground and exterior conduits to have watertight fittings and wire to be approved for wet locations.
- 1.6.11 All fire alarm wiring shall be FPL OR FPLP (fire power limited or fire power limited plenum) as required for application. Wiring in conduit above grade may be type THHN or THWN.
- 1.6.12 Smoke detectors shall not be any closer than 1' from fire sprinklers or 3' from any supply diffuser. In area of construction or possible damage/contamination on newly installed fire alarm, devices shall be covered until that area is ready to be turned over to owner.
- 1.6.13 Fire alarm panel, remotes, and components shall be secured to mounting surfaces per manufacturers specifications. No single device shall exceed 20 lbs without special mounting details.
- 1.6.14 A dedicated branch circuit shall be provided for fire alarm equipment. This circuit shall be energized from the common use area panel and shall have no other outlets. The breaker shall have a red locking device to block the handle in the "on" position. The circuit breaker shall be labeled "Fire Alarm Circuit Control" Circuit ID to be labeled at fire alarm panel/extendere.
- 1.6.15 The installing contractor shall provide a completed "System Record of Completion" per NFPA 72, figure 17.8.2.
- 1.6.16 Fire alarm control panels and remote annunciators shall be installed with their bottoms mounted at 48" above the finished floor.
- 1.6.17 Microphones associated with emergency voice alarm communication systems (EVAC) shall be accessible for use. Installed in compliance with CBC sections 11B-305 and 11B-308.

- 1.6.18 The installing contractor shall provide system programming for supervisory monitoring per CBC section 901.6.2.
- 1.6.19 Supervisory monitoring shall be tested and verified as sending correct signals in conjunction with final acceptance test.
- 1.6.20 Owner shall be responsible for establishing a fire system monitoring contract or provisions.
- 1.7 Submittal shall be made **in accordance with Division 26 01 00 – Shop Drawings and Submittals.** This submittal shall include the following:
 - 1.7.1 Complete bills of quantities, including all materials, components, devices, wiring and equipment required for this work. The bills of quantities shall be tabulated respective of each and every system as specified, and shall contain the following information for each item listed:
 - 1.7.1.1 Quantity of each type of equipment item.
 - 1.7.1.2 Quantities of 10% spare devices as per 1.16.
 - 1.7.1.3 Description of each item.
 - 1.7.1.4 Manufacturer's Name and Model Number.
 - 1.7.1.5 Manufacturer's Specification Sheet.
 - 1.7.1.6 Back box type and dimensions per device type.
 - 1.7.1.7 California State Fire Marshall Listing Sheets for all components.
 - 1.7.1.8 Equipment items which have individual components, will require that all component parts be listed individually.
 - 1.7.1.9 Letter indicating the contractor's intent to comply with Phase II submittal drawings.
- 1.8 Phase II Submittal shall be provided **within (20) working days** after the approval of the Phase I submittals and prior to any fabrication or field conduit installations. All shop drawings shall be engineered and drawn on a CAD System. Each submission shall include 'D' or 'E' size print copies to match the contract drawings, and one (1) data disk copy with files in an AutoCAD 2000i or 2004 format. Building floor plan CAD files on disk, will be made available via express mail after the receipt of payment of \$50.00 per building floor plan, or \$300.00 minimum which ever is less. Contractor shall make the request for drawings in writing directly to Johnson Consulting Engineers, confirmation of the request and a release form will be forwarded to the contractor to include a signed copy with payment prior to release of files. Detail or riser diagram sheets or any other drawings other than floor or site plans, will not be made available to the contractor.
 - 1.8.1 **Provide complete shop drawings to include the following:**
 - 1.8.1.1 Complete floor plans, at scale of contract documents, showing the locations throughout the project of all devices, panels conduits, wireways, tray, pullboxes, junction boxes, number and type of conductors, and other devices.
 - 1.8.1.2 Point to point wiring diagrams showing wiring from panel terminals to each device.
 - 1.8.1.3 Riser diagram indicating all wiring and circuits.

- 1.8.1.4 Current State Fire Marshal listing sheets for all components and devices.
- 1.8.1.5 Provide battery power supply calculations, indicate point of power supply connection, means of disconnect, over-current protection, etc. for each panel.
- 1.8.1.6 Provide detailed information on conductors to be used-manufacturer, type, size, insulation, etc.
- 1.8.1.7 Provide voltage drop calculations for all conductor run is from each panel (i.e., main FACP, remotes, power extenders, etc.) for each panel.
- 1.8.1.8 Provide written sequence of system operation matrix.
- 1.8.1.9 Provide list of zones. (Every device that is addressable.)
- 1.8.1.10 Provide detailed drawing for annunciator panel indicating all zones and initiating devices.

1.9 **Common submittal mistakes which will result in submittals being rejected:**

- 1.9.1 Not including the qualifications of the installing contractor.
 - 1.9.2 Not including all items listed in the above itemized description.
 - 1.9.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.9.4 Not including actual manufacturer's catalog information of proposed products.
 - 1.9.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.
- 1.10 All equipment and material shall be new and unused, and listed by Underwriter's Laboratories for the specific intended purpose. All control panel components and field peripherals shall be designed for continuous duty without degradation of function or performance. All equipment covered by this specification or noted on Installation. Drawings shall be equipment suited for the application and shall be provided by a single manufacturer or be recognized and UL listed as compatible by both manufacturers.
- 1.11 It will be the responsibility of the Contractor to ensure proper specification adherence for system operation, final connection, test, turnover, warranty compliance, and after-market service. The distributor of the equipment specified must be factory-trained and certified.
- 1.12 Basic System Functional Operation, upon operation of any automatic, manual or other initiation device the following shall occur:

- 1.12.1 The system alarm LED shall flash.
- 1.12.2 A local piezo electric signal in the control panel shall sound.
- 1.12.3 A backlit 80-character LCD display shall indicate all information associated with the fire alarm condition, including the alarm point and its location within the protected premises.
- 1.12.4 History storage equipment shall log the information associated with each new fire alarm control panel condition, along with time and date of occurrence.
- 1.12.5 All system output programs assigned via control by event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
- 1.12.6 LED display and audible signaling at the remote annunciator indicating building, fire zone, and type of device. Annunciator shall also provide a separate audible signal for CO detection with a green flashing light, with classroom number indication.
- 1.12.7 Automatic retransmission to a UL central station for fire department notification.
- 1.12.8 Automatic shut down of air conditioning units shall be performed by control modules at each unit when required as part of a complete area coverage design scheme. Each building shall shut down all A/C units and dampers within that building as one zone.
- 1.13 All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of a protective signaling system.
- 1.14 All equipment and components shall be installed in strict compliance with manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- 1.15 All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place. Fasteners and supports shall be adequate to support the required load.
- 1.16 All wiring shall be installed in a conduit system.
- 1.17 The contractor shall provide as a part of this contract additional control modules, heat detectors, smoke detectors, CO detector, duct detectors, manual pull stations, strobes, speakers, speaker/strobes exterior speakers devices etc. along with all required programming, to equal 10% of the total quantity of devices shown on the drawings, or a minimum of three (3) for each type, whichever is greater. Installation of 50' of conduit, boxes and all wiring for each of the devices shall be included, and required locations coordinated with CSFM final approved shop drawings. Any devices not required to be included during construction shall be delivered to the District at the completion of the project. The quantities of these devices shall be listed as a part of the Phase I submittals.

- 1.18 The installing contractor shall provide a copy of current documentation, indicating that the contractor installing the fire alarm systems or devices and wiring, is certified by Underwriters Laboratories (UL) in its product directories under the listing category "PROTECTIVE SIGNALING SERVICES - LOCAL, AUXILIARY, REMOTE STATION, AND PROPRIETARY." The contractor shall be certified by the manufacturer to install and program the system. The contractor must also provide complete installation of all wiring and equipment, and software programming. Supervised installation of the wiring, devices and/or any software programming shall not be permitted.
- 1.18.1 The installing contractor must also be an "authorized dealer" by the equipment manufacturer, and must have completed all required training prior to the bid of this project.
- 1.18.2 The fire alarm system installation shall be warranted by the manufacturer's representative.
- 1.18.3 The Contractor shall have a current California C-10 or C-7 Contractor's License, and all individuals working on this project shall have passed the Department of Industrial Relations Division of Apprenticeship Standards – "Fire / Life Safety Certification Program."
- 1.18.4 The installing contractor shall provide, at the time of submittal, a letter of intent to provide an extended service warranty. This warranty shall extend for a total of three (3) years, starting at the completion, testing, and training of this project. The service warranty shall cover all material and labor to keep operational all system devices installed under this project and shall include two (2) complete U.L. system's tests and cleaning of all devices at year two (2) and year three (3) of the warranty. Routine cleaning of devices, other than at the two (2) specified U.L. system's testing periods, will not be included as a part of this warranty.
- 1.18.5 The installing contractor shall provide, at the time of submittal, a letter indicating that the installation crew for this project meets the following NICET certifications:
- 1.18.5.1 25% of the installing field personnel must have completed NICET Level 2 Certification.
- 1.18.5.2 One of the installing field personnel and /or supervisor must have completed NICET Level 3 Certification.
- 1.18.5.3 Contractor shop drawings shall be signed by an individual who has completed NICET Level 4 Certification.
- 1.19 All conduit and standard backboxes will be furnished and installed by the Division 26 Contractor. Specialty boxes will be furnished by the equipment supplier to be installed by the Division 26 Contractor.
- 1.20 Equipment and materials shall be the standard product of **FCL**.
- 1.21 Alternate equipment as manufactured by any other manufacturer not specifically listed above will not be approved for use on this project.
- 1.22 D.S.A approved drawings are included as a part of the drawing set.

PART 2 PRODUCTS

- 2.1 Main Fire Alarm Control Panel:
 - 2.1.1 Provide new FCI E3 Panel with voice evacuation adjacent to existing fire alarm control panel. Connect all existing devices to new E3 panel and convert existing panel to a pull can.
- 2.2 REMOTE POWER SUPPLIES shall provide a minimum of (4) Class B NAC circuits.
 - 2.2.1 Remote Power Supplies shall be provided adjacent to each Fire Alarm Control Panel that is incapable of supporting NAC strobe circuit(s). Refer to Fire Alarm Riser Diagram for quantity of strobe circuits required at each of these Fire Alarm Control Panels and provide additional Remote Power Supplies as required.
- 2.3 SPEAKER / STROBE DEVICE shall be of the semi-flush type designed for mounting to a standard 4 11/16" deep electrical back box. Each device shall be provided with a semi-flush accessory plate. Exterior speakers shall be weatherproof. The strobe unit shall have a meantime between failure (MTBF) of 1,000 hours or greater. The strobe section shall have a minimum flash rate of approximately one flash per second, with candela rating as per UL standard 1971. Housing shall be white.
 - 2.3.1 In areas containing two or more audible devices, or three or more visual devices, these devices shall be synchronized, Per NFPA 72, Chapter 18 California Amendments (2022).
- 2.4 STROBES. The strobe unit shall have a meantime between failure (MTBF) of 1,000 hours or greater. The strobe section shall have a minimum flash rate of approximately one flash per second, with candela rating as per UL standard 1971. Housing shall be white.
 - 2.4.1 In areas containing two or more audible devices, or three or more visual devices, these devices shall be synchronized, per NFPA 72, Chapter 18 California Amendments (2022).
 - 2.4.2 Maximum pulse duration to be 0.20 of a second with an ADAAG 4.28.3(3). Visual alarms maximum duty cycle of 40%.
 - 2.4.3 Capable of providing minimum candela. Intensity as shown on plans (effective strength measured at the source).
 - 2.4.4 The flash rate to be a minimum of 1 Hz and a maximum of 2 Hz per NFPA 18.5.3.1.
- 2.5 HEAT DETECTOR DEVICES shall be analog addressable, fixed temperature x rate of rise, fixed at 200°F and a 15°F/min rate of rise. In janitor rooms equipped with kilns, devices shall be fixed at 200°F.
- 2.6 SMOKE DETECTOR DEVICES shall be analog addressable, photo-electric.

PART 3 EXECUTION

- 3.1 All wiring shall be (min) #18 AWG copper or as noted on drawings. All underground conductors shall be UL wet location rated for use in wet locations, West Penn "Aquaseal" or equal. There shall be no splices in underground handholes or vaults. A multi-conductor cable rated for use in wet locations will also be acceptable. It must be labeled "FIRE ALARM" in all pull boxes, using a water-tight labeling system.
- 3.2 Interior, dry location wiring for low voltage initiating circuits shall be #18 AWG copper, twisted shielded pair minimum, signaling circuits shall be No. 14 AWG minimum, and wiring for 120 volt circuits shall be No. 12 AWG minimum. All wiring shall be color coded, solid copper conductor. Use of power limited cable shall be restricted to controls listed for this purpose. Single conductors shall be type THHN/THWN-2 insulated copper.
- 3.3 Wire markers shall be provided for each wire connected to equipment. The marker shall be of the taped bank type, of permanent material, and shall be suitable and permanently stamped with the proper identification. The markers shall be attached in a manner that will not permit accidental detachment. Changing of wire colors within circuits shall be unacceptable.
- 3.4 A terminal cabinet shall be installed in the electric room for the fire alarm systems at each building. All fire alarm wiring shall terminate on UL approved strips in this terminal cabinet. All wiring shall be labeled at each termination strip. Wiring shall be configured such that all end-of-line resistors will be installed at the terminal cabinet.
- 3.5 Fire Sprinkler Activation detecting System(s) shall each be indicated on a separate zone in the fire alarm control panel.
- 3.6 Fire Alarm Control Panel and all other equipment shall be mounted with the center of all operable reset buttons, located a maximum of 48" front approach / 54" side approach above floor level.
- 3.7 Contractor shall provide complete wiring between all equipment.
- 3.8 The Fire Alarm/Life Safety Installation shall comply fully with all Local, State and National Codes, and the Local Authority Having Jurisdiction (AHJ) DSA.
- 3.9 The Fire Alarm Control Panel and power supply shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the Panelboard as FIRE ALARM CIRCUIT.
- 3.10 The Control Panel Cabinet shall be grounded securely to a power system ground conductor. Provide a 1/2-inch conduit and 1#12 grounding conductor to the building electrical service ground bus.
- 3.11 Conduit shall enter into the Fire Alarm Control Panel back box only at those areas of the back box which have factory conduit knockouts.
- 3.12 All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; an audible and visual trouble signal will be activated until the system and its associated field wiring are restored to normal condition.

- 3.13 All cables and wiring shall be listed for Fire Alarm/Life Safety use, and shall be of the type as required by and installed per CEC Article 760.
- 3.14 Final System Acceptance
- 3.14.1 Provide an NFPA Certificate of Compliance to DSA and the engineer of record. Complete fire alarm system shall comply with Chapter 14 of NFPA for testing and inspection and be sound-tested for audibility in all spaces requiring voice evacuation. This testing shall be performed in the presents of the project electrical engineer. Adjust speaker taps or provide additional speakers as required to provide correct audibility.
- 3.14.2 The system will be accepted only after a satisfactory test of the entire system has been accomplished by a Factory-Trained Distributor in the presence of a representative of the authority having jurisdiction and the Owner's representative. This contractor shall provide all personnel, ladders and testing equipment to assist the local authority in completing this test. Actuate each device and verify that the system performs as specified.
- 3.14.3 The Contractor will present a complete set of "as-built" Fire Alarm/Life Safety system drawings, and the factory supplied Operator's Manuals as required by the General Provisions section of this specification.
- 3.14.4 Once the system has been tested and the certificate of compliance completed, the contract shall not be considered complete until after owner training has been completed. The contractor shall notify in writing their intent to provide the training for the system. This notification shall be given to the Division 21 Contractor, Architect and the Project Engineer a minimum of 2 weeks prior to the scheduled training session. The Division 21 Contractor and/or the architect shall be responsible for notifying the owner to confirm that the appropriate District personnel will be made available for this training session. If the Division 21 Contractor does not receive confirmation that the training session can be performed on the proposed date, then another time shall be provided. The training shall consist of the following:
- 3.14.4.1 Provide a minimum of one (1) four-to-six -hour training period located at the project site, to instruct District personnel in proper operation of all systems.
- 3.14.4.2 Provide a minimum of three (3) complete owner operation manuals for the District records.
- 3.14.4.3 Provide a minimum of two (2) complete as built sets of drawings for the District records.
- 3.14.4.4 Provide all spare parts as described in part 1 of these specifications
- 3.14.4.5 Provide written confirmation and proposed scheduled dates for follow up training and 1-year complete system test.
- 3.15 Follow up Training

- 3.15.1 Provide as a part of this contract, the follow up instructional training period within six (6) months after the final acceptance of the systems. This training shall include a minimum of one four-to-six-hour training period to instruct District personnel in proper operation of all systems and shall instruct the District technicians how to repair any non-operational parts of the system as required. All defective parts shall be replaced at no cost to the owner.

END OF SECTION

SECTION 31 1000 SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and grubbing.
- B. Selective removal and trimming.
- C. Repair and restoration.
- D. Debris removal.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Alterations, surveying.
- B. Section 01 7410 - Cleaning: Cleaning and contractor responsibility.
- C. Section 02 4100 - Demolition: Removal of built elements and utilities.
- D. Section 31 2323 - Fill: Material for filling holes, pits, and excavations generated as result of removal operations.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Comply with additional requirements specified in Section 01 7000 - Execution and Closeout Requirements.

3.02 PREPARATION

- A. Coordinate work with utility companies; notify before starting work and comply with local requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are to remain.
- E. Develop dust remediation controls and methods. Do not use water if that results in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- F. All temporary shoring, bracing, etc., and maintenance required for the completion of clearing and removal work shall be provided by the Contractor whose work requires protection.

3.03 CLEARING AND GRUBBING

- A. Clearing: Cut trees, stumps, shrubs, downed timber, and other vegetation for removal within identified area as indicated on drawings according to 29 CFR 1910.266. Follow recommendations of ANSI Z133 and best local practices for species involved.
- B. Do not remove or damage vegetation beyond limits indicated on drawings.
- C. Grubbing: Remove stumps, roots, buried timber, and other vegetation minimum depth 18 inches (450 mm) from ground. Remove rocks minimum depth 6 inches (15 cm) from ground. Tree root balls to be removed entirely.

3.04 SELECTIVE REMOVAL AND TRIMMING

- A. Selective Removal: Individual tree and shrub identified for removal as indicated on drawings according to 29 CFR 1910.266.
 - 1. Includes trees, root balls, stumps, shrubs, downed timber, and other vegetation identified for removal as indicated on drawings.
 - 2. Fill holes left by removal of stumps, root balls, and roots, using suitable fill material, with top surface neat in appearance and matching existing grade.

- B. Selective Trimming: Individual limbs and branches cut back according to ANSI A300 Part 1 identified for removal as indicated on drawings. Follow recommendations of ANSI Z133 and best local practices for species involved.

3.05 PROTECTION OF TREES

- A. Provide temporary guards to protect trees and vegetation to remain. Place guards so as to prevent all forms of vehicular traffic or parking within drip lines.
 - 1. Do not allow excess foot traffic within drip lines.
 - 2. Do not stockpile construction materials, soil, or aggregates within drip lines.
 - 3. Water trees and other vegetation to remain within limits of the area of construction activities as required to maintain their health during course of construction operations.
- B. Engage a qualified arborist to remove branches or roots to the extent required by this specification or shown on the drawings.
- C. Excavate within drip line of trees only where indicated.
- D. Where underground utilities must pass within drip line, hand-dig tunnels to avoid cutting main lateral roots and taproots. Minor roots may be cut only when necessary.
 - 1. Where root system is damaged or cut back, prune branches to maintain root/branch balance.
- E. Immediately protect exposed roots until re-establishment in backfill. Cover with approved mulching material and keep continuously moist.
- F. Where cutting is required, cut branches and roots using properly sharpened tools and without breaking members.

3.06 REMOVED VEGETATION PROCESSING

- A. Do not burn, bury, landfill, or leave on-site, except as indicated on drawings.
- B. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; give preference to on-site uses.

3.07 REPAIR AND RESTORATION

- A. Remaining Existing Facilities, Utilities, and Site Features: If damaged due to this work, repair or replace to original condition at no cost to Owner:
- B. Vegetation: Replace damaged or destroyed vegetation identified to remain as indicated on drawings at no cost to Owner:
 - 1. Outside removal limits.
- C. Contractor shall report any existing damage prior to the beginning of their work.

3.08 DEBRIS REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and windblown debris from public and private lands.

3.09 CLEANING

- A. See Section 01 7410 - Cleaning for additional requirements.

END OF SECTION

SECTION 31 2200 GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rough grading.
- B. Fine grading.

1.02 RELATED REQUIREMENTS

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2316 - Excavation.
- C. Section 31 2317 - Trenching.
- D. Section 31 2323 - Fill.

1.03 REFERENCE STANDARDS

- A. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- B. ASTM D2166/D2166M - Standard Test Method for Unconfined Compressive Strength of Cohesive Soil; 2016.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. See Section 01 7800 - Closeout Submittals for closeout submittal requirements.
- C. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.05 QUALITY ASSURANCE

- A. Perform in accordance with State of California Public Works Department standards.

1.06 PROJECT CONDITIONS

- A. Protect above- and below-grade utilities that remain.
- B. Protect plants, lawns, and other features to remain as a portion of final landscaping.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from grading equipment and vehicular traffic.

1.07 SITE CONDITIONS

- A. The owner makes no representation as to the existing soil or sub-surface conditions or its suitability for the proposed/intended use. The Contractor shall take all necessary measures required to verify and substantiate the existing site conditions, and incorporate in his bid the required materials, methods and labor required to provide an acceptable finished product based on the provisions and requirements of this section.
- B. Site Utilities:
 - 1. Advise utility companies of excavation activities before starting excavations. Locate and identify underground utilities passing through work area before starting work.
 - 2. If underground utilities are encountered in locations other than indicated, immediately advise utility owners before proceeding. Amend project record documents to show actual locations.
 - 3. Protect existing utilities indicated to remain.
 - 4. Do not interrupt existing utilities without advance notice to and written approval from the owner.
 - 5. Repair or replace any existing utilities that are damaged due to the work of this contract at no cost to the owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify survey bench mark and intended elevations for grading areas are as indicated.
- B. Verify the absence of standing or ponding water.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Protection: Provide markers indicating limits of work and clear identification of items and areas requiring protection.
- D. Do not allow excavation subgrades and soil at foundations to be subjected to effects of rain or other sources of excessive moisture. Provide protective covering materials and divert site drainage and run off as necessary. Should prepared, compacted subgrades be damaged by rain or excessive moisture, remove soil materials to the depth required by the Soils Engineer and replace with acceptable materials and recompact in conformance with specified requirements.
- E. Locate, identify, and protect above- and below-grade utilities to remain.
- F. Provide temporary means and methods to remove standing or ponding water from areas prior to grading.
- G. Site Preparation: Site preparation shall begin with the removal of vegetation and other deleterious debris from the project area. Clearing and grubbing should extend outside of the proposed excavation and fill areas when reasonable. The debris and unsuitable material generated during clearing and grubbing shall be removed from the project area and disposed of at a legal dumpsite away from the project area, unless directed otherwise by the District Representative.

3.03 EROSION CONTROL

- A. To the maximum extent practicable, prevent erosion or displacement of soils and discharge of soil-bearing water runoff to adjacent properties and waterways.
- B. The Contractor shall implement and maintain such BMP's as re relevant to the work and as specifically required by the plans or special provisions.
- C. The Contractor shall be responsible throughout the duration of the contract for installing, constructing, inspecting, maintaining, removing and disposing of BMP's for wind erosion control, tracking control, erosion and sediment control, non-storm water control, and waste management and pollution control. Unless otherwise directed by the Owner, the Contractor shall be responsible for BMP implementation and maintenance throughout any temporary suspension of the work.

3.04 COMPACTION

- A. Refer to project soils report for specific compaction requirements. Where soils report is not available, follow the requirements of this Article.
- B. Place materials used in backfilling and filling in layers not exceeding loose depths as follows:
 - 1. Heavy equipment compaction: 8 inches.
 - 2. Hand-operated tampers: 4 inches.
- C. Place material simultaneously on opposite sides of walls, small structures, utility lines, etc. to avoid displacement or overstressing.
- D. In-Place Density Requirements: Compact soil to not less than the values given below, expressed as a percentage of maximum density at optimum moisture content.
 - 1. Unpaved areas: Top 12 inches of bottom of over-excavation and subsequent lifts:
 - a. 90 percent.

2. Paved areas: Top 12 inches of bottom of over-excavations and subsequent lifts, except the upper one foot from rough finish grade:
 - a. 95 percent.
 3. Exterior steps and ramps: Top 12 inches of bottom of over-excavation and subsequent lifts:
 - a. 95 percent.
 4. Building areas and structures: Top 12 inches of bottom of over-excavation and subsequent lifts:
 - a. 95 percent.
 5. Utility trenches: Compact backfill and fill materials to in-place density specified for applicable area of trench, but in no case less than 95 percent.
- E. Moisture Control: During compaction, control moisture of bottom of over-excavations and subsequent lifts to within tolerances from optimum moisture content as recommended by testing laboratory. Wet surface with water when additional moisture is required. Aerate soil to aid in drying or replace soil when excessive moisture is present.

3.05 ROUGH GRADING

- A. Excavate and fill subgrade material to elevations indicated on plans.
- B. General: Smooth grade to a uniform surface that complies with compaction requirements and required lines, grades, and cross sections and is free from irregular surface changes.
- C. Provide smooth transition between existing adjacent grades and changed grades. Cut out soft spots, fill low spots, and cut down high spots to conform to required surfaces tolerances.
- D. Replace displaced subgrade in accordance with Section 31 2323.
- E. Remove and replace unsuitable materials. Replace in accordance with Section 31 2323.
- F. Slope grades to direct water away from structures and to prevent ponding. Finish subgrade to required elevations within the following tolerance:
 1. Unpaved areas: Plus or minus 0.10 foot.
 2. Paved areas: Plus or minus 0.05 foot.
 3. Exterior steps and ramps: Plus or minus 0.05 foot.
 4. Inside building lines: 1/2 inch in 10 horizontal feet.

3.06 FINE GRADING

- A. Scrape and spread subgrade material uniformly smooth and without disruptions or as indicated on drawings.
- B. Slopes: Transition smoothly to adjacent areas.
- C. Before Finish Grading:
 1. Trench backfilling has been inspected.
 2. Verify subgrade has been contoured and compacted.
- D. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- E. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- F. Place topsoil where required to level finish grade. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- G. Place topsoil during dry weather.
- H. Spread topsoil manually near plants to prevent damage.
- I. Lightly compact placed topsoil.
- J. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.07 PROOFROLLING

- A. After completion of required compaction and immediately prior to proceeding with subsequent construction, proof roll in the presence of testing laboratory representative.
- B. Areas to Receive:
 - 1. Pavement.
 - 2. Building slabs on grade.

3.08 TOLERANCES

- A. Top Surface: Plus or minus 1/2 inch (13 mm).

3.09 FIELD QUALITY CONTROL

- A. Testing Laboratory Services: Provide timely notice to testing laboratory. Do not proceed with construction until testing of each bottom of over excavation and lift of fill or backfill has been performed and required inspections and approvals have been obtained.
- B. Maximum Density at Optimum Moisture Content: Determine in accordance with ASTM D 1557-91.
- C. In-Place Density Tests: ASTM D 1557-90 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2922 (nuclear method), as applicable.
- D. If testing service reports indicate that subgrade or fills are below specified density, scarify or remove and replace to the required depth, recompact, and retest at no cost to the owner.

3.10 MAINTENANCE

- A. Completed Areas: Protect from damage by pedestrian or vehicular traffic, freezing, erosion, and contamination with foreign materials.
 - 1. Repair and re-establish grades to specified tolerances in settled, eroded, or rutted areas.
- B. Damaged Areas: Where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction and whether due to subsequent construction operations or weather conditions, restore materials to required conditions: Scarify or remove and replace to the required depth, return to optimum moisture content, and compact materials to the required density before continuing construction.
- C. Correction: Should settling occur within the project correction period, remove finished surfacing, add additional approved material, compact material, and reconstruct surfacing. Construct surfacing to match and blend in with adjacent surfacing as nearly as practicable.

3.11 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Leave site clean and raked, ready to receive work.

END OF SECTION

SECTION 31 2316 EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and protection.
- B. Dewatering.
- C. Excavation.
- D. Excavation repairs.

1.02 RELATED REQUIREMENTS

- A. Section 02 4100 - Demolition.
- B. Section 31 1000 - Site Clearing.
- C. Section 31 2200 - Grading.
- D. Section 31 2317 - Trenching.
- E. Section 31 2323 - Fill.

1.03 REFERENCES

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Delegated Design Documents: Where shoring is required, submit support and protection plan drawings and calculations sealed by designer.
- C. Field Quality Control Submittals: Document visual inspection of loadbearing excavated surfaces.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify survey bench mark elevations are as indicated on drawings.
- B. Verify prevailing groundwater level is as indicated on drawings.

3.02 PREPARATION

- A. See Section 31 1000 for site clearing and topsoil removal.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect survey bench marks, control points, and monuments from excavating equipment and vehicular traffic.
- D. Protect existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Protect plants, lawns, rock outcroppings, and other features to remain.
- F. Locate and identify known utilities to remain and protect from damage.

3.03 SUPPORT AND PROTECTION

- A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.
- B. Prior to excavating any trenches 5 feet or more in depth, the Contractor shall submit a detailed shoring plan showing the design of the shoring, bracing, sloping, or other provisions used for the worker's protection. If the shoring plan varies from the shoring system standards, the shoring plan shall be prepared by a licensed structural or civil engineer.
 - 1. If the Contractor fails to submit a shoring plan or fails to comply with the accepted shoring plan, the Contractor shall suspend work at the affected area. Such suspension of work

shall not be the basis of a claim for extra work and the Contractor shall not receive additional compensation or contract time.

3.04 DEWATERING

- A. Prevent surface water and groundwater from entering excavations and surrounding areas.
- B. Dispose of water without causing surface erosion, sediment buildup, or endangering public health or property.
- C. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.05 EXCAVATION

- A. Grade top perimeter of excavation to prevent surface water collection.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- C. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.
- D. Do not interfere with 45-degree bearing splay of foundations.
- E. Hand trim excavations. Remove loose matter.
- F. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect. If the proposed excavation extends more than 1 foot (305 mm) into the excavation, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by the Geotechnical Engineer.

3.06 EXCAVATION REPAIRS

- A. Notify Architect of over-excavations.
- B. Correct areas over-excavated with native soil.
- C. See Section 31 2323 for additional requirements.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.

3.08 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Stockpile excavated material for re-use in area designated on-site and approved by Owner: see Section 31 2200.
- C. Remove excavated material unsuitable for re-use from site.
- D. Remove excess excavated material from site.

3.09 PROTECTION

- A. Divert surface water away from excavations.
- B. Keep excavations free of standing water.
- C. Maintain stability of banks and loose soils; prevent from falling into excavations.
- D. Maintain excavations in satisfactory, undisturbed condition.
- E. Protect bottom of excavations from freezing.

END OF SECTION

SECTION 31 2317 TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Trench excavation.
- B. Backfill and compaction.
- C. Dewatering.

1.02 RELATED REQUIREMENTS

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2200 - Grading.
- C. Section 31 2316 - Excavation.
- D. Section 31 2323 - Fill.

1.03 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2025.
- B. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2024.
- C. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012 (Reapproved 2021).
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- F. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.
- G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.

1.04 REFERENCES

- A. Geotechnical Report: Report Title; Site Name, Site Address, dated Month Day, Year by Engineering Firm Name; Firm Address, Firm Phone Number.

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Source Quality Control Submittals: Submit name of imported materials source.
 - 1. Results of gradation tests on proposed and actual materials used.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Deliver fill to project site in advance of need.
- C. When fill materials need on-site storage, locate stockpiles where indicated on drawings.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Comprised of sand and gravel; free of shale, clay, friable materials, and debris.
 - 1. Fill Type: Complying with State of California Public Works Department standard.
- B. Bedding Material: Bedding material shall be sand, gravel, crushed aggregate or approved native material. Bedding material shall have a sand equivalent of not less than 30 or have a coefficient of permeability greater than 0.001 centimeters per second. Bedding material shall be sized within the following range:
 - 1. 3/4" Sieve: 100 percent passing.
 - 2. No. 4 Sieve: 35 to 65 percent passing.
 - 3. No. 200 Sieve: 0 to 10 percent passing.

2.02 ACCESSORIES

- A. Underground Warning Tape: Acid and alkali-resistant polyethylene film specifically manufactured for marking and identifying underground utilities. Suitable for direct burial.
 - 1. Bright-colored, continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mils, 0.004 inch (0.10 mm) thick.
 - 2. Continuous printed inscription shall describe utility. Tape color:
 - a. Electric: Red.
 - b. Gas: Yellow.
 - c. Telephone: Orange.
 - d. CATV: Orange.
 - e. Water System: Blue.
 - f. Sewer: Green.
- B. Buried Detection Wire: Copper, single strand, continuously insulated, 12 AWG, suitable for direct burial.

2.03 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Test fill materials in accordance with specified standard before delivery to site.
- C. Nonconforming Materials: Change and retest.
- D. Provide materials of each type from same source or as directed by Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify survey benchmarks and intended elevations for work are as indicated on drawings.
- B. See Section 31 2316 - Excavation for excavation requirements.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 1000 for site clearing and topsoil removal.
- C. Protect survey benchmarks, control points, and monuments from excavating equipment and vehicular traffic.
- D. Protect existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Protect plants, lawns, rock outcroppings, and other features to remain.
- F. Locate and identify existing utilities to remain as indicated on drawings and protect from damage.

3.03 DEWATERING

- A. Prevent surface water and groundwater from entering excavations and surrounding areas.

- B. Dispose of water without causing surface erosion, sediment buildup, or endangering public health or property.

3.04 TRENCH EXCAVATION

- A. Grade top perimeter of excavation to prevent surface water collection.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected work in area until notified to resume.
- C. General: Cut trenches neat and clean.
 - 1. Slope banks of excavations deeper than 4 feet (1.2 m) to angle of repose or less until shored.
 - 2. Do not interfere with 45-degree bearing splay of foundations.
 - 3. Cut trenches wide enough to allow inspection of installed utilities.
 - 4. Hand trim excavations and remove loose matter.
 - 5. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- D. Remove excavated material that is unsuitable for re-use from site.
- E. Remove excess excavated material from site.
- F. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- G. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.05 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.06 BACKFILL AND COMPACTION

- A. Backfill to contours and elevations indicated on drawings using specified materials.
- B. Fill to subgrade elevations unless otherwise indicated on drawings.
- C. Employ placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen, or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. General Fill: Place and compact materials in equal continuous layers not exceeding 8 inches (200 mm) compacted depth.
- G. Correct areas that are over-excavated.
 - 1. Thrust-Bearing Surfaces: Fill with concrete.
 - 2. Other Areas: Backfill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- H. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
 - 2. At Other Locations: 90 percent of maximum dry density.
- I. Underground Warning Tape:
 - 1. Install 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.
- J. Buried Detection Wire: Install 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.

3.07 TOLERANCES

- A. Maximum Variation from Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.
- B. Maximum Variation from Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.

3.08 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 modified proctor, AASHTO T 180, or ASTM D698 standard proctor.
- D. Nonconforming Work: For failed tests, remove work, replace, and retest.

3.09 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Stockpile excavated material re-used in area designated on-site; see Section 31 2200.
- C. Remove excavated material that is not required or unsuitable for re-use from site.

END OF SECTION

SECTION 31 2323 FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for footings, paving, and utilities within the building.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Site grading.
- B. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.
- C. Section 31 2317 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- D. Section 32 9119 - Landscape Grading.

1.03 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: Indicated on drawings and/or as determined by paving or slab sections.

1.04 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2025.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012 (Reapproved 2021).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2024.
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017 (Reapproved 2025).
- G. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- C. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need as indicated in Contractor's approved logistics plan.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Subsoil excavated on-site.
 - 1. Graded.
 - 2. Clean deposits free of roots, stumps, vegetation, deleterious matter, trash, debris, and unsuitable materials as approved in the field by the project geotechnical consultant.
- B. Concrete for Fill: Slurry mix.
- C. Granular Fill: Coarse aggregate, complying with State of California Public Works Department standard.
- D. Topsoil: Topsoil excavated on-site or imported.
 - 1. Graded; Free of roots, rocks larger than 2 inch, subsoil, debris, large weeds and foreign matter.

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. See Section 31 2200 for additional requirements.
- D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

- A. Scarify and proof roll subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

- A. Fill to contours and elevations indicated using specified materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches (150 mm) compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
 - 1. Load-bearing foundation surfaces: Fill with concrete.

2. Other areas: Use general fill, flush to required elevation, compacted to minimum 90 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
 1. Under paving, slabs-on-grade, and similar construction: 90 percent of maximum dry density.
 2. At other locations: 90 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.
- K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch (25 mm) from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1/2 inch (12.5 mm) from required elevations.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D 1557 ("modified Proctor"), and ASTM D 698 ("standard Proctor").
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.06 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

**SECTION 32 1120
SUBBASE AND AGGREGATE BASE COURSES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Subbase course.
- B. Aggregate base course.
- C. Herbicide treatment.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading.
- B. Section 31 2317 - Trenching.
- C. Section 31 2323 - Fill.
- D. Section 32 1313 - Concrete Paving.

1.03 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; 2025.
- B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2025.
- C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012 (Reapproved 2021).
- D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2024.
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017 (Reapproved 2025).
- H. ASTM D3665 - Standard Practice for Random Sampling of Construction Materials; 2024.
- I. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2023.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Test Reports:
 - 1. Aggregate Composition: Results of laboratory tests on proposed and actual materials used.
 - 2. Compaction Density: Results of laboratory tests on compacted course.
- C. Source Quality Control Submittals: Submit name of imported materials source.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Aggregate Storage: Prevent material intermixing, contamination, and deterioration.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Subbase Course:

1. Fine Aggregate : Sand; Comply with State of California Highway Department standard.
2. Graded in accordance with ASTM C136/C136M, within the following limits:
 - a. 3/4" sieve: 100 percent passing.
 - b. 3/8 inch (9 mm) sieve: 60 to 100 percent passing.
 - c. No.4 (4.75 mm) sieve: 50 to 85 percent passing.
 - d. No.10 (2 mm) sieve: 40 to 70 percent passing.
 - e. No.40 (425 micro m): 25 to 45 percent passing.
 - f. No.200 (75 micro m): 8 to 15 percent passing.
- B. Aggregate Base Course:
 1. Type Class II Road Base; Comply with State of California Highway Department standard.
- C. Herbicide: United States EPA-registered chemical herbicide suitable for application indicated,
 1. Manufacturer: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. E. I. du Pont de Nemours and Company, Inc.
 - b. Ciba-Geigy Corporation.
 - c. DowElanco.
 2. Product: DuPont Oust XP Herbicide or equal.
 - a. Herbicide must meet Owner and California EPA requirements.

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.
- D. For aggregate materials using classification complying with ASTM D2487, provide testing before delivery to site.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, and gradients and elevations are correct and dry.

3.02 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and recompacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 PLACEMENT

- A. Under Bituminous Concrete Paving:
 1. Subbase Compacted Thickness: According to design drawings.
 2. Aggregate Base Compacted Thickness: According to design drawings.
 3. Compact to 95 percent of maximum dry density.
- B. Under Portland Cement Concrete Paving:
 1. Subbase Compacted Thickness: According to design drawings.
 2. Aggregate Base Compacted Thickness: According to design drawings.
 3. Compact to 95 percent of maximum dry density.
- C. Place course in maximum 4 inch (100 mm) layers and roller compact to specified density.
- D. Level and contour surfaces to elevations and gradients indicated.
- E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

- G. Herbicide application over subbase:
 - 1. Apply herbicide treatment over dry compacted subbase, adhering strictly to herbicide manufacturer's instructions.
 - 2. Take extreme precaution to confine weed killer to only those areas to be covered by asphalt concrete and provide all necessary protection to prevent injury or damage to life and property.

3.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch (6.4 mm) measured with 10 foot (3 m) straight edge.
- B. Scheduled Compacted Thickness: Within 1/2 inch (12.8 mm).

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Subbase Compaction Density Testing: In accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
- C. Aggregate Base Compaction Density Testing: In accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
- D. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").
- E. Frequency of Tests: In accordance with ASTM D3665.
- F. Remove, replace, and retest work that does not meet specified requirements.
- G. Proof roll compacted sub-base and aggregate at surfaces going underneath flexible paving and rigid paving to check for unstable areas and areas requiring additional compaction. Repair these areas as required. Do not begin paving work until deficient sub-base areas have been corrected and are ready to receive paving.

3.06 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal for additional requirements.
- B. Sweep loose granular particles from surface of aggregate course. Do not dislodge or disturb in any way the aggregate embedded in compacted surface of subbase course.
- C. Remove unused stockpiled materials, leave area in a clean and neat condition. grade areas to prevent standing surface water.

END OF SECTION

SECTION 32 1216 ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Redwood headers.
- B. Single course bituminous concrete paving.
- C. Surface sealer.
- D. Slurry seal coat.
- E. Asphalt grind and overlay.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base.
- B. Section 31 2323 - Fill: Compacted subgrade for paving.
- C. Section 32 1120 - Subbase and Aggregate Base Courses.
- D. Section 32 1723 - Pavement Markings.

1.03 REFERENCE STANDARDS

- A. AI MS-2 - Asphalt Mix Design Methods; 2015.
- B. AI MS-19 - Basic Asphalt Emulsion Manual; 2008.
- C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.
- D. ASTM D946/D946M - Standard Specification for Penetration-Graded Asphalt Binder for Use in Pavement Construction; 2025.
- E. Standard Specifications for Public Works Construction ("Greenbook")
- F. Standard Specifications, State of California, Department of Transportation (Caltrans).

1.04 SUBMITTALS

- A. Mix Design:
 - 1. Submit for approval each job-mix formula proposed for work of this section.
- B. Approved Mix:
 - 1. Furnish licensed weighmaster certificates with each load of asphalt concrete delivered to project. Yield of asphalt concrete material shall be twenty four (24) pounds per square foot of paving area based on two inch thickness after rolling. A five (5) percent tolerance will be allowed between total calculated weight and actual weight incorporated in the work.
- C. Material Certificates for emulsions, base rock, mineral filler, and seal coat products.
- D. Proposed schedule for paving operations, including phasing and traffic control plan as required to complete the scope.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with State of California Public Work's standard.
 - 1. Provide aggregate base asphalt concrete and installation complying with Standard Specifications for Public Works Construction (PWC Specifications), current edition, and the Regional Supplement Amendments to the Standard Specifications for Public Works Construction, current edition, and as herein specified.
- B. Mixing Plant: Complying with State of California Public Work's standard.
- C. Obtain materials from same source throughout.
- D. Installer's Qualifications: Firm specializing in paving installation, with not less than 5 years of experience in installation of paving similar to that required for this project.

- E. Testing and Inspection:
 - 1. The owner will engage an independent testing and inspection agency to perform quality control procedures and to prepare test reports.

1.06 FIELD CONDITIONS

- A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.
- B. Place bitumen mixture when temperature is not more than 15 F degrees (8 C degrees) below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with applicable code for paving work on public property.

2.02 MATERIALS

- A. Asphalt Cement: ASTM D946/D946M.
- B. Aggregate for Binder Course: In accordance with State of California Public Work's standards.
- C. Aggregate for Wearing Course: In accordance with State of California Public Work's standards.
- D. Fine Aggregate: In accordance with State of California Public Work's standards.
- E. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.
- F. Seal Coat: AI MS-19
 - 1. Parking area, driveways, asphalt walks and ramps: Fog seal of slow breaking asphalt emulsion, grade SS-1H per PWC Specifications 203-3.
 - 2. Playground areas and adjacent access drives, walks and ramp transitions: Seal coat shall be "Plush-Tex", as manufactured by Koch Asphalt Co., or an approved equal.
- G. Wood Headers, Stakes, Benders and Splices: "Foundation" grade redwood as graded by Redwood Inspection Service. Minimum 2" thick lumber for headers and stakes and minimum 1" thick boards for splices. Use galvanized nails for fastening.
- H. Asphalt Grind and Overlay: Located as indicated on drawings.

2.03 ASPHALT PAVING MIXES AND MIX DESIGN

- A. Asphalt Base Course: See Section 32 1120 - Subbase and Aggregate Base Courses.
- B. Asphalt Binder Course: State of California Public Work's standards.
- C. Asphalt Wearing Course: State of California Public Work's standards.
- D. Submit proposed mix design of each class of mix for review prior to beginning of work.
- E. Asphalt Concrete: As indicated on drawings or as follows:
 - 1. Paving section shall be minimum 3" asphalt paving (rolled thickness) over 9" class two base over 95% compacted subgrade unless noted otherwise on drawings.
 - 2. Top course in playground areas: PWC Specifications, Section 203-6, Class E-PG 64-10. Rolled thickness shall be 1".
 - 3. Parking areas, driveways and first course of playground areas: PWC Specifications, Section 203-6, Class C1-PG 64-10. Rolled thickness in parking areas and driveway shall be as shown on the plans. Rolled thickness of first course in playground areas shall be specified thickness as shown on plans minus the 1" top course.

2.04 SOURCE QUALITY CONTROL

- A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 GENERAL

- A. Comply with cross sections, elevations, and grades indicated on the drawings.

- B. Prepare and install pavement structures in accordance with practices recommended in the "Asphalt Paving Manual"; Publication MS-8; Asphalt Institute, except to the extent that such practices are superseded by specific requirements of this section.

3.02 EXAMINATION

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Notify architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.
- D. Commencement of paving work shall constitute acceptance of subbase conditions.

3.03 PREPARATION

- A. General: Immediately before placing asphalt concrete mix, remove all loose or deleterious material from surface over which pavement will be placed. Ensure that subbase is properly prepared to receive paving per Section 32 1120.
- B. General Surface Preparation for Slurry Seal Coat Application
 - 1. Potholes and other structural failure of the surface shall be repaired prior to placing the seal coat.
 - 2. The surface shall be swept clean of all debris, dirt, loose gravel and other loose articles. If necessary, the surface can be washed, but the surface must be dry before the seal coat is applied.

3.04 INSTALLATION

- A. Techniques:
 - 1. Placing the mix:
 - a. Spread mix at minimum temperature of 225 degrees F.
 - b. Place asphalt concrete mix on prepared surface and strike off. Place inaccessible and small areas using hand tools.
 - 1) Check mat frequently during placement, to verify correct thickness.
 - c. Before rolling operations begin, check surface using template and straightedge, and correct irregularities.
 - d. Width of paving strips:
 - 1) Place mix in paving strips at least 10 feet wide.
 - 2) Roll first paving strip after placement. Place subsequent paving strips, extending rolling operation to overlap preceding strips.
 - e. Coursing requirements:
 - 1) Lifts:
 - (a) Base Course:
 - (1) Place plant-mixed asphalt concrete base course in single lift.
 - (2) Compact to 95 percent.
 - (3) Moisture Content: Use only the amount of moisture needed to achieve the specified compaction.
 - 2. Joints:
 - a. General: Construct joints to form continuous bond between adjoining portions of work. Ensure that texture and density of pavement are continuous across the joint. Surface across joint shall form smooth, uninterrupted plane and shall not pond water.
 - b. Joint locations include the following:
 - 1) Between pavements laid on successive days.
 - 2) At any point in paving where material already laid has become cold because of delay.
 - c. Clean by brushing, or cut fresh vertical face using power saw if necessary, wherever contact surface of previously constructed pavement has become coated by dust, sand, or other objectionable material.

- d. Apply thin tack coat on vertical contact surface before beginning placement of new material.
3. Rolling:
 - a. Start rolling operation as soon as hot mix will bear weight of roller and can be compacted without unacceptable displacement of material.
 - b. Comply with roller manufacturer's recommended rolling speed, but in no case exceed 3 miles per hour.
 - c. Avoid sharp turns and abrupt starts and stops.
 - d. Compact mixture in areas inaccessible to rollers using hot hand tampers or vibrating plate compactors.
 - e. Breakdown rolling:
 - 1) If grade is not absolutely level, begin breakdown rolling on low side of spread. Progress toward high side.
 - 2) Execute initial breakdown pass with drive wheel forward toward the direction of paving.
 - 3) Examine surface immediately after breakdown rolling. Repair as necessary by loosening material in defective areas and filling with hot material.
 - f. Second (intermediate) rolling:
 - 1) Execute second rolling as soon as possible after breakdown rolling, while mixture is still hot enough to achieve maximum density.
 - 2) Continue repeating the pattern until mixture has been compacted thoroughly and has reached 95% of target density.
 - g. Finish rolling:
 - 1) Execute finish rolling while mixture is sufficiently warm to allow removal of roller marks.
 - 2) Continue rolling operation until maximum density is achieved and roller marks are entirely eradicated.
4. Asphalt Concrete Curbs:
 - a. Construct curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust.
 - b. Place curb material to cross-section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms as soon as material has cooled.
5. Seal Coat:
 - a. Parking Areas, Driveways, Walkways and Ramps: Dilute the asphalt emulsion with water at the rate of 1 part emulsion to 1 part water and apply at a rate of 0.1 gallons (of diluted material) per square yard. Emulsion shall be applied uniformly over entire area, and extreme care must be exercised so there will be no spots with excess material which would remain tacky.
 - b. Playground Areas:
 - 1) Prior to application of Plush-Tex, the asphalt concrete pavement surface shall be clean and free of all dust, dirt, debris and foreign matter. The pavement surface can be cleaned by use of power vacuums, compressed air and/or washing with water. If washed with water, allow surface of pavement to dry prior to application.
 - 2) Minor depressions and "bird baths" shall be located and leveled prior to application of seal coat. Locate minor depressions and "bird baths" which need to be filled by flooding area with water. All depressions of more than 1/8" under a 10 foot straight edge and all damaged areas such as foot prints, animal tracks or tire tracks are to be filled.
 - (a) Depressions of 1/4" or less shall be filled with undiluted Plush-Tex and struck off with a straight edge. Care should be taken to blend the outside edge of the area leveled into the existing pavement surface so as not to create an unsightly ridge or shadow.

- (b) Depressions greater than 1/4" in depth may be filled with a mixture of one-part Plush-Tex to one-part clean sand by volume. For depressions greater than 1/4" in depth, the leveling may have to be done in multiple applications. After the area leveled has cured dry, it shall be rolled with a mechanical roller.
 - 3) Application: (Minimum of two.)
 - (a) Plush-Tex should be mixed thoroughly to an even consistency prior to application. Plush-Tex may be diluted up to 20 percent by volume with clean fresh water. Care should be taken to thoroughly mix the water with Plush-Tex so that the material is of an even consistency.
 - (b) Apply Plush-Tex to the surface by pouring from a can or wheeled container in continuous parallel lines and spreading immediately with rubber faced squeegees or with long-handled hair brooms. Pull the squeegee or broom on an angle from the line of spread so as to continually roll the material toward the operator and not overflow or "spill" on its forward edge away from the operator. After each coat has dried, remove any ridges or shadows with scrapers.
 - (c) Plush-Tex shall be applied in two or more applications. A minimum total of undiluted Plush-Tex for two applications should be 0.54 gallons per square yard. The controlling factor, however, shall not be the number of applications nor the quantity of Plush-Tex, but shall be the following specified result:
 - (1) After the final coat of Plush-Tex has been applied and allowed to dry thoroughly, its surface shall be smooth and uniform, showing no evidence of course or uneven texture.
 - (2) The completed surface shall not vary more than 1/8" from a 10-foot straight edge.
- 6. Patching:
 - a. Remove paved areas which are contaminated with foreign materials or which are defective in any way. Replace removed material with fresh, hot mix. Compact by rolling until maximum density and smoothness are achieved and there is no detectable variation between patch and adjacent paving.
 - b. Patch or re-pave area as required as a result of reconstruction or adjusting manholes, cleanouts, vaults, grates, etc. to proper grade.
- 7. Restriction of traffic:
 - a. Upon completion of rolling operations, do not permit vehicular traffic on pavement until it has cooled and hardened sufficiently.
 - b. Erect clearly-visible barricades and take other measures as required to protect pavement.
- 8. Wood Headers:
 - a. Install along all edges of asphalt concrete paving except where concrete paving, walks and curbs occur. Set top edge of header to conform to grade of asphalt paving. Benders of lesser thickness may be used to form returns.
 - b. Space stakes not exceed 4' on centers, unless otherwise noted. Drive stakes to a depth of 1" below the top of the header and nail to headers.
 - c. Splice joints between individual header boards with a 1" thick board same height as header and not less than 24" long.
- B. Installation Tolerances:
 - 1. Maximum allowable variance of in-place compacted thickness from design thickness -- base course: Plus 1/2 inch, minus zero inches.
 - 2. Maximum allowable variance of surface smoothness - base course: Plus or minus 1/4 inch.
 - a. Use 10-foot straightedge moved systematically over entire paved area to determine compliance with surface smoothness tolerance indicated.

3. In-place density: Pavement shall be compacted to at least 96 percent of density obtained by laboratory compaction.

3.05 AGGREGATE BASE COURSE

- A. See Section 32 1120.

3.06 PREPARATION - PRIMER

- A. Apply primer in accordance with manufacturer's instructions.

3.07 PREPARATION - TACK COAT

- A. Apply tack coat in accordance with manufacturer's instructions.

3.08 PLACING ASPHALT PAVEMENT - SINGLE COURSE

- A. Install Work in accordance with State of California Public Work's standards.
- B. Place asphalt within 24 hours of applying primer or tack coat.
- C. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- D. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.09 GRIND AND OVERLAY

- A. Asphalt grind and overlay as indicated on drawings.
- B. Grind existing upper 2" of asphalt paving or as indicated on drawings.
- C. Apply tack coat in accordance with manufacturer's instructions.
- D. Place asphalt in single lift in accordance with State of California Public Work's standards.
- E. Place asphalt within 24 hours of applying tack coat.
- F. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- G. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.
- H. Allow overlay to cure for 48 hours prior to application of seal coat.

3.10 SEAL COAT

- A. Apply seal coat to surface course in accordance with State of California Public Work's standards.
- B. Repair cracks in asphalt prior to placement of slurry seal.
 1. Prepare cracks by removing any dirt, weeds, or old crack filler from cracks. If weeds are growing through cracks, apply herbicide per specifications on affected areas.
 2. Fill cracks with rubberized asphalt-emulsion crack filler.
 3. Compact filler with tamp as required to eliminate voids.
 4. Prior to applying sealcoat allow crack filler to cure 48 hours minimum or as recommended by the manufacturer.
- C. Mix asphalt emulsion, water, mineral filler and aggregate in a mixer.
- D. Apply mixture in an average thickness of 1/8 to 1/4 inch. The mixture should form a creamy-textured mixture which, when spread, will flow in a wave approximately two (2) feet ahead of the strike-off squeegee.
- E. Allow mixture to cure for 48 hours.
- F. Apply a second seal coat in the same manner as the first coat and allow the second coat to cure for 48 hours.
- G. Test surface at the end of the second curing process to insure surface is dry and not tacky. Apply paint for striping and open for traffic after paint has dried.

3.11 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.
- B. Compacted Thickness: Within 1/4 inch (6 mm) of specified or indicated thickness.
- C. Variation from True Elevation: Within 1/2 inch (12 mm).

3.12 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for quality control.
- B. General: Test in-place asphalt concrete courses for compliance with requirements for thickness, surface smoothness and density. Repair or remove and replace unacceptable paving as directed by Architect.
- C. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness.
 - 1. Base Course: Specified thickness minus 1/2".
 - 2. Surface Course: Specified thickness plus or minus 1/4".
- D. Surface Smoothness: Test unfinished surface of each asphalt concrete course for smoothness, using 10' straight edge applied parallel with, and at right angles to centerline of paved area. Surface will not be acceptable if exceeding the following tolerances for smoothness.
 - 1. Base Course Surface: 1/4".
 - 2. Wearing Course Surface: 1/8".
- E. Flood Test: Prior to application of seal coats, perform a flood test in the presence of the Owner's representative.
 - 1. Method:
 - a. Flood the entire asphalt concrete paved areas with water by use of a tank truck or hoses.
 - b. If a depression occurs, where water ponds to a depth of more than 1/8", fill or otherwise correct to provide proper drainage.
 - c. Feather and smooth the edges of fill so that the joint between fill and original surface is invisible.
 - d. After corrections have been made, perform an additional flood test to confirm entire asphalt concrete paved areas drain correctly.
- F. Densities:
 - 1. Density of the asphalt concrete after rolling shall be 95 percent of the density obtained with the California Kneading Compactor per California Test 304.
 - a. Density of the aggregate base course shall be 95 percent of maximum relative density.
- G. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.13 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for 10 days or until surface temperature is less than 140 degrees F (60 degrees C).

END OF SECTION

SECTION 32 1313 CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Form materials.
- B. Reinforcement.
- C. Concrete materials.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3000 - Cast-in-Place Concrete.
- D. Section 07 9200 - Joint Sealants: Sealing joints.
- E. Section 31 2323 - Fill: Compacted subbase for paving.
- F. Section 32 1120 - Subbase and Aggregate Base Courses.

1.03 REFERENCE STANDARDS

- A. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- B. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- C. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.
- D. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
- E. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
- F. California Building Code, Chapter 19A.
- G. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2025.
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.
- J. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.
- K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2024.
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.
- M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2024a.
- N. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2025.
- O. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2025a.
- P. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types); 2023.
- Q. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2018 (Reapproved 2023).

R. CBC - California Building Code, Title 24, Part 2.; 2025.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Samples: Submit two sample panels, 12 by 12 inch (300 by 300 mm) in size illustrating exposed aggregate finish.
- C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.
- D. Quality Control Submittals: Quality control requirements noted in Section 03 3000 - Cast-in-Place Concrete shall apply to this section.

1.05 MOCK-UPS

- A. Construct mock-up of full-thickness sections of all site concrete paving type to demonstrate typical joints; surface color, pattern, and texture; curing; and standard of workmanship.
 - 1. Panel Size: Sufficient to illustrate full range of treatment..
 - 2. Number of Panels: Two per type, minimum.
- B. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.
- C. Mock-up may not remain as part of the Work.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Wood form material, profiled to suit conditions.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751).
 - 1. Thickness: 1/2 inch (12 mm) or as indicated on drawings.

2.02 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa) yield strength; deformed billet steel bars; unfinished. Size and spacing as indicated on drawings.
- B. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.
- C. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi (280 MPa) yield strength; deformed billet steel bars; unfinished finish. Dowel sizing and spacing shall be as indicated on drawings.

2.03 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Cement: ASTM C150/C150M, Type II/V Portland cement, gray color.
- C. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- D. Fly Ash: ASTM C618, Class C or F.
- E. Water: Clean, and not detrimental to concrete.

2.04 ACCESSORIES

- A. Curing Compound: ASTM C 309, Type 1, Class A.
- B. Joint Sealer: Type as specified in Section 07 9005 - Joint Sealers.

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
- B. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended by manufacturer.
- C. Concrete Properties (unless otherwise noted on the drawings and details):

1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3,250 psi (22.41 MPa).
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Minimum cement content per cubic yard: 6.5 sacks.
4. Maximum water-cement ratio per 94-pound sack of cement (gallons): 6.75.
5. Water-Cement Ratio: Maximum 50 percent by weight.
6. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
7. Maximum Slump: 4 inches (100 mm).
8. Maximum Aggregate Size: 1 inch (25.4 mm).

2.06 CODE REGULATIONS

- A. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CCBC Sections 11B-302 and 11B-403.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. See Section 32 1120 for construction of base course for work of this Section.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement at midheight of slabs-on-grade utilizing chairs or dobies.
- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.

3.06 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI PRC-305 when concreting during hot weather.
- B. Follow recommendations of ACI PRC-306 when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

3.07 PLACING CONCRETE

- A. Place concrete in accordance with ACI PRC-304.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Apply surface retarder to exposed aggregate finishes or where indicated in accordance with manufacturer's instructions.

3.08 JOINTS

- A. Align joints with adjacent surfaces.

- B. Place 3/8 inch (10 mm) wide expansion joints at 20 foot (6 m) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch (13 mm) of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints.
 - 1. At 5 feet (1.524 m) intervals, or as indicated on the drawings.
 - 2. Between adjacent surfaces.

3.09 FINISHING

- A. Sidewalk Paving: (Surfaces less than 5% slope): medium broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- B. Sidewalk / Ramp Paving: (Surfaces greater than 5% slope): heavy broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch (6 mm) in 10 ft (3 m).
- B. Maximum Variation From True Position: 1/4 inch (6 mm).

3.11 CONCRETE CURING

- A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Moist cure and maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than 5 days.
- C. Surfaces Not in Contact with Forms:
 - 1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - 2. Begin final curing after initial curing but before surface is dry.
 - a. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.12 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.
 - 1. Pedestrian traffic can be allowed within 3 days of finishing when protection of the surface is provided. Architect to review the Contractor's proposed method of protection.
- C. Do not permit vehicular traffic over pavement for 14 days minimum after finishing.

3.13 CONCRETE PAVING REPAIR

- A. Where damage to concrete paving or concrete curbing occurs, the contractor shall remove and replace the damaged material to the nearest joint. Patching concrete paving and curbing is not an acceptable means of repair.

END OF SECTION

**SECTION 32 1723
PAVEMENT MARKINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Painted pavement markings.

1.02 RELATED REQUIREMENTS

- A. Section 32 1216 - Asphalt Paving.
- B. Section 32 1313 - Concrete Paving.

1.03 REFERENCE STANDARDS

- A. AASHTO MP 24 - Standard Specification for Waterborne White and Yellow Traffic Paints; 2015 (Reapproved 2020).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work of this section with adjoining work.

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Manufacturer's Instructions:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements for additional provisions.
 - 2. Extra Paint: 2 containers, 1 gallon (4 liter) size, of each type and color.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver paint in containers of at least 5 gallons (18 L) accompanied by batch certificate.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F (10 degrees C) or more than 95 degrees F (35 degrees C).

1.08 SEQUENCING

- A. Allow new pavement surfaces to cure for a period of not less than 14 days or as recommended by the manufacturer before application of markings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Painted Pavement Markings:
 - 1. Dunn-Edwards Corporation; Vin-L-Stripe Specialty Interior/Exterior Flat Zone Marking Paint.
 - 2. PPG Traffic Solutions; Ennis Flint Fast Dry Waterborne Traffic Paint, 9852x Series.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTED PAVEMENT MARKINGS

- A. Comply with State of California Highway Department standards.

- B. Painted Pavement Markings: As indicated on drawings.
 - 1. Marking Paint: Chlorinated rubber-alkyd paint (FS TT-P-115, Type III); factory-mixed, quick-drying, and non-bleeding; In accordance with AASHTO MP 24.
 - a. Parking Lots: White.
 - b. Symbols and Text: White.
 - c. Pavement Markings for Accessible Parking, Aisles, Drop-Off, Crosswalk, and Symbols: Provide blue and white.
 - d. Hardcourt Striping: As indicated on drawings.
 - 2. Obliterating Paint: Type I, in accordance with AASHTO MP 24.
 - a. Bituminous Pavement: Black.
 - b. Concrete Pavement: Gray.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Identify existing markings for removal.
- B. Verification of Conditions: Verify that pavement is dry and ready for installation.
- C. Notify Architect of unsatisfactory conditions before proceeding. Do not begin application of pavement-marking paint until Architect has approved marking placement.

3.02 PREPARATION

- A. Clean surfaces thoroughly immediately before application of marking paint.
 - 1. Remove dust, dirt, and other debris.
- B. Apply paint stencils by type and color at necessary intervals. Verify proper placement of each color of marking paint prior to installation.

3.03 INSTALLATION

- A. General:
 - 1. Position pavement markings as indicated on drawings.
 - 2. Field location adjustments require approval of Architect.
- B. Painted Pavement Markings:
 - 1. Apply in accordance with manufacturer's instructions.
 - 2. Apply in accordance with State of California Public Works Department standards.
 - 3. Obliterating Paint: Apply as necessary to cover existing markings completely.
 - 4. Marking Paint: Apply uniformly, with sharp edges using mechanical paint applicator.
 - a. Applications: Two coats at paint manufacturer's recommended spreading rates.
 - b. Wet Film Thickness: 0.015 inch (0.4 mm), minimum.
 - c. Stencils: Lay flat against pavement, align with striping, remove after application.

END OF SECTION

**SECTION 32 1726
TACTILE WARNING SURFACING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Plastic tactile warning surfacing.

1.02 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project, written installation, and maintenance instructions.
- C. Executed warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Plastic Tactile Warning Surfacing:
 - 1. Safety Step TD: www.safetystepstd.com

2.02 MATERIALS

- A. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, pre-molded tactile dome sheet composed of fiber-reinforced, polymermodified cement and coated with an acrylic resin emulsion. Mats are 1 mm thick with truncated domes .9 inches in diameter by .2 inches high.
- B. Detectable warning surfaces shall comply with CBC BC Section 11B-705.1.
- C. Detectable warning surfaces shall be yellow and approximate Federal Standard FS 33538 of SAE AMS-STD-595A per CBC Section 11B-705.1.1.3.1.
- D. Existing detectable warning surfaces, and replacement of less than 20% of truncated dome material at a single contiguous location, shall either approximate Federal Standard FS 33538 of SAE AMS-STD-595A, or a color providing a 70 percent minimum visual contrast with that of adjacent walking surfaces per CBC Section 11B-705.1.1.3.2. The material used to provide visual contrast shall be an integral part of the surface.
- E. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. Such constraint shall not be required for detectable warning surfaces at curb ramps, islands, or cut-through medians. CBC Section 11B-705.1.1.4.
- F. Material Properties:
 - 1. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.
 - 2. Slip Resistance: .80 minimum combined wet/dry static coefficient of friction, when tested in accordance with ASTM D2047.
 - 3. Compressive Strength: 5,690 pounds per square inch (39 MPa), minimum, when tested in accordance with ASTM D695.
 - 4. Tensile Strength: 855 pounds per square inch (5.89 MPa), minimum, when tested in accordance with ASTM D638.
 - 5. Abrasion Resistance: less than 500 when tested in accordance with ASTM C501.
 - 6. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
 - 7. Adhesion: No delamination of tile prior to board failure in a temperature range of 20 to 180 degrees F (minus 7 to 82 degrees C), when tested in accordance with ASTM C903.
 - 8. Salt and Spray Performance: No deterioration or other defect after 200 hours of exposure, when tested in accordance with ASTM B117.
 - 9. Shape: As required by application.
 - 10. Pattern: In-line pattern of truncated domes complying with ADA Standards.
 - 11. Color: SAE AMS-STD-595, Table IV, Federal Yellow No. 33538.

2.03 ACCESSORIES

- A. Bond Coat Adhesive: Water based acrylic emulsion resin adhesive.
 - 1. SSTD-589 as manufactured by Safety Step TD.
- B. Top Coat: Water based pigmented acrylic.
 - 1. SSTD-100 as manufactured by Safety Step TD.
- C. Clear Finish Sealer: Water based, clear, acrylic sealer.
 - 1. SSTD-1250 as manufactured by Safety Step TD.
- D. Texture: Skid Resistant Silica

END OF SECTION

**SECTION 32 3113
CHAIN LINK FENCES AND GATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Posts, rails, and frames.
- B. Wire fabric.
- C. Concrete.
- D. Manual gates with related hardware.
- E. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2011a (Reapproved 2022).
- D. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.
- E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2025.
- G. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2023.
- H. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework; 2018 (Reapproved 2022).
- I. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2018 (Reapproved 2022).
- J. CBC - California Building Code, Title 24, Part 2.; 2025.
- K. CLFMI CLF-SFR0111 - Security Fencing Recommendations; 2014.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.ASTM A123/A123M
- C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

1.06 REGULATORY REQUIREMENTS

- A. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC Section 11B-404 and shall comply with CBC Chapter 10.
- B. The levers of lever actuated latches or locks for accessible gates shall be curved with a return to within 1/2" of the gate surfaces to prevent catching on the clothing or persons. California Referenced Standards Code. T-24 Part 12, Section 12-10-202, Item (F).
- C. Swing doors and gate surfaces within 10" of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped.
CBC Section 11B-404.2.10.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Line Posts:
 - 1. 2.375 inch (60 mm) outside diameter for fences less than 72 inches in height.
 - 2. 2.875 inch (73 mm) outside diameter for fences 72 inches in height and higher.
- B. Corner and Terminal Posts:
 - 1. 2.375 inch (60 mm) outside diameter for fences less than 72 inches in height.
 - 2. 2.875 inch (73 mm) outside diameter for fences 72 inches in height and higher.
- C. Gate Posts:
 - 1. Up to 6'-0" Leaf Width: 2.875 inch (73 mm) outside diameter; 5.79 lbs./ft.
 - 2. Over 6'-0" to 16'-0" Leaf Width: 4.0 inch (102 mm) outside diameter; 9.11 lbs./ft.
 - 3. Over 16'-0" to 26'-0" Leaf Width: 6.625 inch (168 mm) outside diameter; 18.97 lbs./ft.
- D. Top and Brace Rail: 1.625 inch (41 mm) outside diameter, plain end, sleeve coupled.
- E. Bottom Rail: 1.625 inch (41 mm) outside diameter, plain end, sleeve coupled.
- F. Gate Frame: 1.625 inch (41 mm) outside diameter for welded fabrication.
- G. Fence Fabric: 2 inch (51 mm) diamond mesh interwoven wire, 9 gauge, 0.1483 inch (3.8 mm) thick, top selvage knuckle end closed, bottom selvage knuckle end closed.
- H. Gate Fabric: 1 inch (25 mm) diamond mesh interwoven wire, 9 gauge, 0.1483 inch (3.8 mm) thick, top selvage knuckle end closed, bottom selvage knuckle end closed.
- I. Tension Wire: 6 gauge, 0.1920 inch (4.9 mm) thick steel, single strand.
- J. Tension Bar: 3/4 inch wide by 3/16 inch thick steel.
- K. Tie Wire: Aluminum alloy steel wire.

2.02 MATERIALS

- A. Posts, Rails, and Frames:
 - 1. ASTM A1011/A1011M, Designation SS; hot-rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi (345 MPa); zinc coating complying with ASTM F1043 Schedule 40 pipe, hot-dip galvanized per ASTM F1083.
- B. Wire Fabric:
 - 1. ASTM A392 zinc coated steel chain link fabric.
- C. Concrete:
 - 1. Ready-mixed, complying with ASTM C94/C94M; normal Portland cement; 2,500 psi (17 MPa) strength at 28 days, 3 inch (75 mm) slump; 3/4 inch nominal size aggregate.

2.03 MANUAL GATES AND RELATED HARDWARE

- A. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches (1,525 mm) high or per leaf up to 4 feet, 3 for taller gates or per leaf over 4 feet; balance of hardware as shown on drawings.
- B. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches (1,525 mm) high or per leaf up to 4 feet, 3 for taller gates or per leaf over 4 feet; balance of hardware as shown on drawings.
- C. Swing gates shall be furnished with pivot-type hinges, center stop, and hold open devices.
- D. Hinges: Finished to match fence components.
 - 1. Triple-weight, concealed ball-bearing, full-surface application complying with ANSI A8391.

2.04 LIGHT-DUTY ARCHITECTURAL HARDWARE

- A. Exit Devices: As indicated in drawings.
 - 1. Provide panic hardware on gates in required exit pathways to public right-of-way or safe dispersal areas per CBC 1010.2.9 and 1028.5. See details on drawings.
 - 2. Panic hardware shall be in compliance with SFM Standard 12-10-3, Section 12-10-302, as follows:
 - a. The cross bar shall extend across not less than one-half the width of the gate.
 - b. The ends of the cross bar shall be curved, guarded or otherwise designed to prevent catching on the clothing of persons during egress.
- B. Mechanical Gate Latches: Steel fork latch with gravity drop and mounting bracket sized to fit diameter pipe post frame indicated.
 - 1. Auto-Latches: Self-latching, padlockable assembly.
 - a. Swing Direction: Both ways.
 - b. Locking: Padlockable from either side.
 - 2. Finish: Galvanized.

2.05 ACCESSORIES

- A. Caps: Cast steel galvanized and Malleable iron galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

2.06 FINISHES

- A. Components (Other than Fabric): Galvanized in accordance with ASTM A123/A123M, at 1.7 ounces per square foot (530 g/sq m).
- B. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.
- C. Accessories: Same finish as framing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify that fence line location has been properly identified.
 - 2. Verify location of underground utilities and structures.

3.02 PREPARATION

- A. Verify that proper grade has been established.
- B. Begin fence construction only after adequate clearance on both sides of fence is available.

3.03 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Concrete Placement: Posts and gate hold open devices shall be placed in concrete. Concrete shall meet the minimum requirements of Section 03 3000 - Cast-in-Place Concrete.
- C. Place fabric on outside of posts and rails. Fabric shall be stretched out enough to resist a 6-inch deflection laterally, top or bottom, when force is exerted with the hand.

1. Posts bracing and other structural members of the fence shall be located on the inside of the security fence.
- D. Post Setting and Spacing:
 1. All posts shall be spaced in the line of fence not to exceed 10-foot centers for a fence not exceeding 8 feet and 8-foot centers for a fence height greater than 8 feet not exceeding 16 feet.
 2. Set terminal posts (end, corner, and gate) at beginning and end of each continuous length of fence and at abrupt changes in vertical and horizontal alignments.
 3. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
 4. Line Post Footing Depth Below Finish Grade: ASTM F567.
 - a. Line posts shall be set in a concrete foundation to a depth as indicated on drawings.
 - b. Footing diameter shall be as indicated on drawings.
 5. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.
 - a. Corner and terminal posts shall be set in a concrete foundation to a depth as indicated on drawings.
 - b. Gate posts shall be set in a concrete foundation to a depth as indicated on drawings.
 - c. Footing diameter shall be as indicated on drawings.
- E. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
 1. Corner posts, unless otherwise shown, shall be suitably braced with pipe set in horizontal position, with adjustable truss braces between terminal and first line of posts, complete with all fittings.
- F. Provide top rail through line post tops and splice with 6 inch (150 mm) long rail sleeves.
- G. Install center brace rail on corner gate leaves.
- H. Do not stretch fabric until concrete foundation has cured 48 hours.
- I. Stretch fabric between terminal posts or at intervals of 100 feet (30 m) maximum, whichever is less.
- J. Position bottom of fabric, bottom rail, or bottom tension wire 2 inches (50 mm) above finished grade.
 1. Notify Architect if clearance is not achievable at irregularities in grade.
- K. Fasten fabric to top rail, line posts, braces, and bottom rails or tension wire with tie wire at maximum 15 inches (380 mm) on centers. There shall be two complete wraps made with the tie wire around the fabric on all perimeter security fence.
- L. Attach fabric to corner posts, terminal posts, gate posts, plates, and rails with tension bars and tension bar clips or tension bands.
- M. Install bottom tension wire stretched taut between terminal posts.
- N. Do not attach the hinged side of gate to building wall; provide gate posts.
- O. Install hardware and gate with fabric to match fence.
- P. Fastenings:
 1. Bolts shall be cut flush on the face of the nut and shall have a smooth surface.
 2. Screws, nuts, bolts, bars, wire mesh, hinges and hinge pins shall be securely fastened inward and tamper resistant.
 3. Bolts protruding into areas of travel or that will pose a threat of injury will be cut so as only 2 or less threads are exposed beyond the nut.
- Q. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

- R. Surfaces that have been cut, filed, or where the galvanized coating has been damaged shall be coated with zinc enriched paint, anti-corrosive aluminum paint, or suitable substitute to prevent corrosion per ASTM A780/A780M.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm).
- B. Maximum Offset From True Position: 1/2 inch (12.7 mm).
- C. Do not infringe on adjacent property lines.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.
- C. Gates: Inspect for level, plumb, and alignment.

END OF SECTION

**SECTION 32 9310
LANDSCAPE AND IRRIGATION REPAIR**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Repair and reestablishment of existing landscape damaged by construction activities.
- B. Reestablishment of landscape areas affected by lack of water during construction.
- C. Repair, replacement, or reconfiguration of irrigation systems damaged or disrupted by construction.
- D. 90-day maintenance period for repaired landscape and irrigation work.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements
- B. Section 01 3010 - Submittals

1.03 REFERENCE STANDARDS

- A. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning); 2017.
- B. ANSI A300 Part 5 - American National Standard for Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction); 2019.
- C. ANSI A300 Part 6 - Tree, Shrub, and Other Woody Plant Management--Standard Practices (Planting and Transplanting); 2012 (Reapproved 2018).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- E. ASTM D5268 - Standard Specification for Topsoil Used for Landscaping and Construction Purposes; 2023.
- F. Irrigation Association Standards & Guidelines - Current Edition

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Contractor shall coordinate and schedule a pre-installation meeting for all landscape reestablishment and repair. The meeting shall at a minimum include the landscape subcontractor, Contractor, Architect, and Owner.

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Landscape Repair Plan: Indicate areas of disturbance, proposed plant materials, methods of soil preparation, and schedule.
- C. Irrigation Repair Plan: Show proposed modifications, replacement of components, and reconfiguration to maintain or modify coverage in affected areas.
- D. Maintenance Plan: Outline watering, mowing, pruning, fertilization, and weed control procedures for the 90-day maintenance period.
- E. Product Data: For replacement plant materials, irrigation components, and soil amendments.

1.06 QUALITY ASSURANCE

- A. Landscape and irrigation work shall be supervised by a qualified landscape contractor with a C-27 license.
- B. Installer Qualifications: Company specializing in performing work of type specified, with minimum 5 years of documented experience.
- C. All work shall comply with the Owner's district standards for materials and installation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Contractor shall maintain all repaired or replaced landscape and irrigation for a period of 90 days after Substantial Completion of repairs.
- C. Warranty: Replace plant materials that fail to survive or irrigation components that fail to function properly during the maintenance period at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 PLANT MATERIAL

- A. All plant material shall match existing species, size, and quality of adjacent undisturbed areas, unless otherwise directed.
- B. Nursery stock shall conform to ANSI Z60.1.

2.02 IRRIGATION COMPONENTS

- A. Replacement irrigation heads, valves, piping, and controllers shall be equal to existing in type, size, and manufacturer unless previously approved by Architect.
- B. Substitutions permitted only with prior approval by Architect and Owner.

2.03 SOIL AMENDMENTS AND MULCH

- A. Match existing soils in repaired areas with amendments as required for healthy plant growth.
- B. Mulch type, depth, and color to match adjacent landscape areas.

PART 3 EXECUTION

3.01 PREPARATION

- A. Protect existing trees, shrubs, lawns, and irrigation to remain from damage during construction.
- B. Verify areas of disturbance with Architect and Owner before beginning repairs.

3.02 LANDSCAPE REPAIR

- A. Remove and dispose of damaged plant materials.
- B. Prepare soil, install new plantings, and restore turf to match adjacent undisturbed conditions.
- C. Establish uniform grades and drainage consistent with existing conditions.

3.03 IRRIGATION REPAIR

- A. Repair or replace damaged irrigation piping, valves, heads, and controllers.
- B. Reconfigure irrigation lines to provide full and even coverage to restored landscape areas.
- C. Adjust irrigation timing and coverage to support new plantings during establishment period.

3.04 PROTECTION

- A. Protect installed plant and irrigation material from subsequent construction operations.

3.05 MAINTENANCE

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Perform maintenance for 90 days after completion of repair work, including:
 - 1. Watering at intervals sufficient to maintain healthy growth.
 - 2. Mowing, pruning, fertilizing, and weed control as required.
 - 3. Inspection and adjustment of irrigation system for proper operation.
- C. At the end of maintenance period, provide final walkthrough with Owner and Architect to confirm acceptance.

END OF SECTION

**SECTION 33 0110
DISINFECTION OF WATER UTILITY PIPING SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Disinfection of site domestic water lines and site fire water lines specified in Section 33 1416.

1.02 RELATED REQUIREMENTS

- A. Section 33 1416 - Site Water Utility Distribution Piping.

1.03 REFERENCE STANDARDS

- A. AWWA B300 - Hypochlorites; 2024.
- B. AWWA B301 - Liquid Chlorine; 2024.
- C. AWWA B302 - Ammonium Sulfate; 2023.
- D. AWWA B303 - Sodium Chlorite; 2024.
- E. AWWA C651 - Disinfecting Water Mains; 2023.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Test Reports: Indicate results comparative to specified requirements.
- C. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.
- D. Disinfection report:
 - 1. Type and form of disinfectant used.
 - 2. Date and time of disinfectant injection start and time of completion.
 - 3. Test locations.
 - 4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
 - 5. Date and time of flushing start and completion.
 - 6. Disinfectant residual after flushing in ppm for each outlet tested.
- E. Bacteriological report:
 - 1. Date issued, project name, and testing laboratory name, address, and telephone number.
 - 2. Time and date of water sample collection.
 - 3. Name of person collecting samples.
 - 4. Test locations.
 - 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
 - 6. Coliform bacteria test results for each outlet tested.

1.05 QUALITY ASSURANCE

- A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.
- B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of the State in which the Project is located.
- C. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300 Hypochlorite, AWWA B301 Liquid Chlorine, AWWA B302 Ammonium Sulfate, and AWWA B303 Sodium Chlorite.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping system and water well has been cleaned, inspected , and pressure tested.
- B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.02 DISINFECTION

- A. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction, or in the absence of any of these follow AWWA C651.
- B. Provide and attach equipment required to perform the work.
- C. Inject treatment disinfectant into piping system.
- D. Maintain disinfectant in system for 24 hours.
- E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
- F. Replace permanent system devices removed for disinfection.

END OF SECTION

**SECTION 33 1416
SITE WATER UTILITY DISTRIBUTION PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water pipe for site conveyance lines.
- B. Pipe valves.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for thrust restraints.
- B. Section 31 2317 - Trenching: Excavating, bedding, and backfilling.
- C. Section 33 0110 - Disinfection of Water Utility Piping Systems: Disinfection of site service utility water piping.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.04 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.01 WATER PIPE

- A. PVC Pipe: ASTM D1785 Schedule 40.
 - 1. Fittings: ASTM D2466, PVC.
 - 2. Joints: ASTM D2855, solvent weld.
- B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service" in large letters.

2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Gate Valves Up To 3 Inches (75 mm):
 - 1. Manufacturers:
 - a. Ford type Fip.
 - b. Jones 1900 Flat Head Fip.
 - c. McDonald part #6101w
 - 2. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, post indicator, valve key, and extension box.
- C. Gate Valves 3 Inches (75 mm) and Over:
 - 1. Manufacturers:
 - a. Mueller 2" keyed head resident wedge gate valve #2360.
 - b. Clow 6100.
 - 2. AWWA C500, iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, post indicator, valve key, and extension box.

- D. Ball Valves Up To 2 Inches (50 mm):
 - 1. Brass body, Teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA inlet end, compression outlet with electrical ground connector, with control rod, valve key, and extension box.

2.03 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Section 31 2317.
- B. Cover: As specified in Section 31 2317.

2.04 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03 3000.
 - 1. Concrete thrust restraints shall be constructed as indicated on the drawings. Restraints shall be constructed between undisturbed ground and fittings to be anchored. The quantity of concrete and the bearing area of the pipe against undisturbed soil shall be as shown on the drawings or regional standard plans. Unless otherwise shown, concrete shall be placed in a manner that allows pipe joints and fittings to remain accessible for repairs.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING

- A. Refer to Section 31 2317 - Trenching.

3.04 INSTALLATION - PIPE

- A. Maintain separation of water main from sewer piping in accordance with local code.
- B. Group piping with other site piping work whenever practical.
- C. Establish elevations of buried piping to ensure not less than two and one-half feet of cover, or as indicated on drawings.
- D. Install pipe to indicated elevation to within tolerance of 5/8 inches (16 mm).
- E. Route pipe in straight line.
- F. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- G. Slope water pipe and position drains at low points.
- H. Install trace wire 6 inches (150 mm) above top of pipe; coordinate with Section 31 2317.

3.05 INSTALLATION - VALVES, HYDRANTS, BACKFLOW PREVENTERS

- A. Set valves on solid bearing. Position valves to allow for easy access.
- B. Center and plumb valve box over valve. Place in pre-cast concrete yard box with concrete cover labeled "WATER". Set box cover flush with finished grade.

3.06 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform field inspection and testing in accordance with Section 01 4000.

- C. Valves and appurtenances shall be pressure tested at the same time connecting pipelines are pressure tested. Valves, operators, or control and instrumentation elements whose pressure rating is less than the test pressure shall be protected or isolated during testing.
- D. A minimum 4-hour hydrostatic pressure test shall be performed and successfully completed in accordance with AWWA C600 or AWWA C605 and the following:
 - 1. The Contractor shall apply test pressure at an approved outlet or fitting located within 5 feet vertically of the lowest point of each pipe section to be tested. The Contractor shall securely plug such fittings. Where air valves or other suitable outlets are unavailable, the Contractor shall provide approved taps and fittings for air release and plug at a later time.
- E. The Contractor shall flush all mains and services with potable water after the completion of construction. A sufficient number of suitable outlets at the ends of lines being flushed shall be provided in addition to those shown on the plans to permit flushing of mains with water at a velocity of at least 2.5 feet per second (750 mm/s) over its entire length. Drainage facilities shall be constructed as necessary to ensure water lines do not become contaminated during flushing.
- F. The Contractor shall provide sufficient hoses, fittings, and equipment to direct flushing water to an established point of discharge. The Contractor shall also provide dechlorination of the flushing water chlorine residual as required to meet applicable NPDES permit requirements. Unless otherwise specified, the Contractor shall make the arrangements for, and provide the water for, flushing and its subsequent discharge.
- G. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

**SECTION 33 3113
SITE SANITARY SEWERAGE GRAVITY PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sanitary sewerage drainage piping, fittings, and accessories.
- B. Connection of building sanitary drainage system to municipal sewers.
- C. Cleanout access.

1.02 RELATED REQUIREMENTS

- A. Section 31 2316 - Excavation: Excavating of trenches.
- B. Section 31 2317 - Trenching: Excavating, bedding, and backfilling.
- C. Section 31 2323 - Fill: Bedding and backfilling.

1.03 DEFINITIONS

- A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Project Record Documents:
 - 1. Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
 - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

- A. Provide products that comply with applicable code(s).
- B. Plastic Pipe: ASTM D3350, SDR 35, High Density Polyethylene (HDPE) material; inside nominal diameter of 4 and 8 inches, with cell classification of 335434C or better, thermal butt fusion joints and fittings in accordance with manufacturer's recommendations; pipe and fittings same material utilizing transition fittings when connecting to existing piping.
- C. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 PIPE ACCESSORIES

- A. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Sewer Service" in large letters.

2.03 CLEANOUT MANHOLE

- A. Lid and Frame: Cast iron construction, hinged lid, or as indicated on drawings.
- B. Shaft Construction and Concentric Cone Top Section: Reinforced precast Concrete pipe sections, lipped male/female dry joints, cast steel ladder rungs into shaft sections at 12 inches (300 mm); nominal shaft diameter of 36 inches (900 mm).

2.04 BEDDING AND COVER MATERIALS

- A. Pipe Bedding Material: As specified in Section 31 2323.
- B. Pipe Cover Material: As specified in Section 31 2323.

PART 3 EXECUTION

3.01 GENERAL

- A. Perform work in accordance with applicable code(s).
- B. The flow of sewage shall not be interrupted. Should the Contractor disrupt the operation of existing sanitary sewer facilities, or should disruption be necessary for performance of the work, the Contractor shall bypass the sewage flow around the work. Sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches nor be covered by backfill. Whenever sewer bypass and pumping is required by the Plans or Specifications, or the Contractor so elects to perform, the Contractor shall submit a working drawing detailing its proposed plan of sewage bypass and pumping.

3.02 TRENCHING

- A. See Section 31 2317 for additional requirements.
- B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

- A. Sewer pipe installation work shall be done in accordance with the following conditions:
 - 1. As shown on San Diego Area Regional Standard Drawings (SDARSD) noted on the Plans.
 - 2. Pipe shall be installed in a dry excavation.
 - 3. Pipe shall be properly bedded at the required line and grade.
 - 4. Care shall be taken in installing the pipe zone material with proper support of the pipe under the haunches and bells to avoid vertical or circumferential deflection of the pipe section.
 - 5. Care shall be taken in moving the trench shield, if used, to avoid movement of the pipe.
 - 6. Care shall be taken during backfill of the pipe zone and trench to avoid moving the pipe, while also achieving required relative compaction.
- B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D2321.
- C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch (3 mm) in 10 feet (3 m).
- D. Install trace wire 6 inches (150 mm) above top of pipe; coordinate with Section 31 2317.
- E. Contractor shall perform pre and post installation CCTV inspection for all gravity sewers. Any defects found shall be repaired by the Contractor at no extra cost to the Owner.
- F. For new sewers installed in relatively dry, stable trenches and subgrade, as determined by the Engineer, there shall be no tolerance of reverse slope, as evidenced by ponding of flushing water in the pipeline during video inspection. Any such pipeline shall be removed upstream and downstream to the nearest sewer structure, unless otherwise approved by the Engineer, and shall be replaced at proper line and grade and retested. Point repairs of sags are not acceptable. The process of sag repair shall be repeated, if necessary, until no sags or ponding remain. The minimum waiting period before deflection and air pressure testing is allowed shall be 30 days. For new sewers that are installed in saturated, wet or unstable soils, over-excavation and installation of crushed rock and geotextile shall be completed as shown on the San Diego Area Regional Standard Drawings (SDARSD) noted on the Plans.

3.04 INSTALLATION - CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.

- D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 FIELD QUALITY CONTROL

A. Air Pressure Test

1. Air test equipment shall be approved by the Engineer unless otherwise shown on the Plans or specified in the Special Provisions. Air tests shall be performed per the manufacturer's requirements and shall not exceed their recommendations.
2. The Contractor may conduct an initial air test of the sewer mainline after compaction of the backfill, but prior to installation of the building connection sewers. Such tests will be considered to be for the Contractor's convenience and need not be performed in the presence of the Engineer.
3. Each section of sewer shall be tested between successive manholes by plugging and bracing all openings in the sewer mainline and the upper ends of the all building connection sewers.
4. Prior to any air pressure testing, pipe plugs shall be checked with a soap solution to detect any air leakage. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again. The Contractor may, at its option, wet the interior of the pipe prior to the test.
5. The final leakage test of the sewer mainline and branching building connection sewers shall be conducted in the presence of the Engineer in the following manner:
 - a. Air shall be introduced into the pipeline until 30 pounds per square inch (210 kPa) gauge pressure has been reached, at which time the flow of air shall be reduced and the internal air pressure shall be maintained between 2.5 and 3.5 pounds per square inch (17 kPa and 24 kPa) gauge pressure for at least 2 minutes to allow the air temperature to come to equilibrium with the temperature of the pipe walls. Pressure in the pipeline shall be constantly monitored by a gauge and hose arrangement separate from the hose used to introduce air into the line. Pressure in the pipeline shall not be allowed to exceed 5 pounds per square inch (34 kPa) gauge pressure. After the temperature has stabilized and no air leaks at the plugs have been found, the air pressure shall be permitted to drop and, when the internal pressure has reached 2.5 pounds per square inch (17 kPa) gauge pressure, a stopwatch or sweep-second-hand watch shall be used to determine the time lapse required for the air pressure to drop to 1.5 pounds per square inch (10 kPa) gauge pressure. If the time lapse (in seconds) required for the air pressure to decrease from 2.5 to 1.5 pounds per square inch (17 to 10 kPa) gauge pressure exceeds that shown in ASTM C828, the pipe shall be presumed to be within the acceptance limits for leakage. If the time lapse is than that shown in the table, the Contractor shall make the necessary corrections to reduce the leakage to the acceptance limits.

- B. Perform field inspection and testing in accordance with Section 01 4000.

- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.06 PROTECTION

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

**SECTION 33 4211
STORMWATER GRAVITY PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stormwater drainage piping.
- B. Stormwater pipe accessories.

1.02 RELATED REQUIREMENTS

- A. Section 31 2316 - Excavation: Excavating of trenches.
- B. Section 31 2317 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

- A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.
- B. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2025.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 01 3010 - Submittals for submittal procedures.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Field Quality Control Submittals: Document results of field quality control testing.
- D. Project Record Documents:
 - 1. Record location of pipe runs, connections, and invert elevations.
 - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 STORMWATER PIPE MATERIALS

- A. Plastic Pipe: ASTM D1785, Schedule 40, Poly Vinyl Chloride (PVC) SD material; inside nominal diameter of 18 inches, bell and spigot style solvent sealed joint end.

2.02 PIPE ACCESSORIES

- A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

PART 3 EXECUTION

3.01 TRENCHING

- A. See Section 31 2317 - Trenching for additional requirements.
- B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

- A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions and as indicated on drawings. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D2321.
- B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch (3 mm) in 10 feet (3 m).

- C. Connect to building storm drainage system, foundation drainage system, and utility/municipal system.

3.03 PROTECTION

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION