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SECTION 01 11 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY OF THE WORK

A. The Work under this Contract necessary for and incidental to the execution and completion of all Work indicated in the Contract Documents for the construction of:

Imperial Valley College
Campus Security Camera Replacement
Imperial, California
Imperial Community College District

1.02 GENERAL DESCRIPTION OF WORK

A. The Work under this Contract includes furnishing all labor, materials, services, and transportation, except as expressly excluded, which is required for completion of the Project in accordance with the provisions of the Contract Documents.

1.03 REGULATORY REQUIREMENTS

A. CODE INFORMATION:

1. Codes: All Work shall comply with the following Codes:

2022 CALIFORNIA ADMINISTRATIVE CODE, PART 1, TITLE 24, CCR
2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24, CCR
2022 CALIFORNIA ELECTRIC CODE (CEC), PART 3, TITLE 24, CCR
(2020 NATIONAL ELECTRIC CODE WITH CALIFORNIA 2022 AMENDMENTS)
2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24, CCR
(2021 UNIFORM MECHANICAL CODE WITH CALIFORNIA 2022 AMENDMENTS)
2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24, CCR
(2021 UNIFORM PLUMBING CODE WTH CALIFORNIA 2022 AMENDMENTS)
2022 CALIFORNIA ENERGY CODE, PART 6 TITLE 24 CCR
2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24, CCR
(2021 INTERNATIONAL FIRE CODE WITH CALIFORNIA 2022 AMENDMENTS)
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE, PART 11, TITLE 24 CCR
2022 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHALL REGULATIONS

B. Addenda and Change Orders:

1. In accordance with Part 1, Title 24, Section 4-338, California Code of Regulations, all addenda and change orders shall be approved by the Office of Regulation Services, Division of the State Architect (ORS / DSA).

C. Perform Work in accordance with the applicable provisions of Parts 1 through 12, inclusive, Title 24 (T-24), California Code of Regulations.

D. Particular attention is directed to the following Sections of the Safety of Construction of Public Schools, Chapter 4, Part 1, T-24, CCR.

1. Section 4-343: Responsibility of the Contractor.

2. Section 4-342: Continuous Inspection of the Work.

3. Section 4-335: Tests.

4. Section 4-336: Verified Reports.

E. During the entire construction period, it shall be the sole responsibility of each Contractor to maintain conditions at the Project Site to meet the requirements of the Federal Occupational Safety and Health Administration (OSHA) and California occupational regulations. This provision shall cover the Contractor's employees and all other persons working upon or visiting the site. The Contractor shall become fully informed of all applicable standards and regulations and inform all persons and representatives responsible for Work under this Contract.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Limit the use of site and premises to allow:

1. Work by Owner, if required.

2. Use of site and premises by Owner and public when and if Owner takes beneficial occupancy of portions of the project.

B. Access to Site: Coordinate with Architect.

C. Building Exits During Construction: Maintain all exits. Do not obstruct at any time.

D. Time and Construction Schedule Considerations affecting school operations if the Owner requires partial occupancy.

1. Schedule all construction operations with the Architect.

2. Construction operations generating excessive noise, such as using pneumatic tools and power-actuated fastener equipment, shall be scheduled with the Architect and approved by the Owner.

Locate all noise-generating equipment, such as cut-off saws, in a remote location away from classroom areas.

Provide Architect with 10 working days notice prior to commencing such operations.

3. Construction operations, such as material deliveries, debris removal, and crane operations shall not occur when students, staff or visitors are present at construction site. Schedule such operations around school schedule, including recess and lunch periods. Where, in the sole opinion of the Architect the construction site is sufficiently remote or isolated that students, staff or visitors are not exposed to such operations construction operations may proceed as scheduled.

4. After Owner takes a beneficial occupancy of portions of project the Prime Contractor, subcontractors and all support staff will not be allowed to enter such school facilities during hours school is in session. Where access is required to complete the Work, coordinate access and scheduling with Architect for non-school time.

E. Utility Outages and Shutdown: Provide minimum 15 working days notice of any utility interruption. No deviation to the commencement, nor duration of the outage or shutdown from the schedule agreed upon is allowed.

F. Storage Areas: Coordinate with Architect. Contractor will establish acceptable path for products, staging areas and trash disposals.

1.05 OWNER OCCUPANCY

A. The Owner may take beneficial occupancy of certain portions of the project for the conduct of normal school and business operations prior to final completion.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

1.06 FEES, BONDS AND PERMITS

A. Obtain all required permits required for Work under this Contract, including but not necessarily limited to the following:

1. Encroachment permits.

2. Shoring, trenching and grading permits.

3. Permits required for connection to public services and utilities.

B. Arrange for all required improvements bonds required for Work under this Contract.

C. All fees, improvement bond costs, public utility engineering fees and related fees, shall be paid by Contractor. Upon submission of documentation satisfactory to the Owner, such costs paid by Contractor shall be reimbursed by Owner.

1.07 PERMISSIBLE WORKING DAYS AND HOURS

A. CONFORM TO Section 01 20 00 for required payment for Inspector's services performed during overtime hours.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 11 00

SECTION 01 20 00 – CONTRACT MODIFICATIONS AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Schedule of Values.

B. Inspector of Record Payment Provisions

C. Change Procedures.

D. Progress Payment Coordination

E. Payment for Contract Modifications

F. Request for Information

1.02 RELATED DOCUMENTS OR SECTIONS

A. Document 00 52 26 – Agreement Form.

B. Document 00 72 26 – General Conditions.

C. Document 01 33 00 – Submittal Procedures.

1.03 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703-Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic print-out format may be considered, at Architects and General Contractors discretion.

B. Submit Schedule of Values per schedule defined in General Conditions.

1. Provide separate schedule of values for each building, and a single schedule for site work. Provide separate line items for each allowance.

C. Format: Conform, to the requirements of the General Conditions. Identify each line item with number and title of the major specification section. Identify site mobilization bonds and insurance.

D. Revise schedule to list approved Change Orders, with each Application for Payment.

E. Include in each line item a directly proportional amount representing Contractors overhead and profit.

1.04 INSPECTOR OF RECORD PAYMENT PROVISIONS

A. In the event Contractors performance of the work activities requires the District's Inspector of Record to work overtime, holidays or weekends, Inspector's cost shall be reimbursed by Contractor to District by deductive contract adjustment.

1.05 CHANGE PROCEDURES

A. Architect's Supplemental Instructions (ASI): The Architect will advise of minor changes in the Work that does not involve an adjustment to Contract Price or Contract Time by issuing supplemental instructions on AIA Form G710.

B. Proposal Request (PR): The Architect may issue a Proposal Request, which includes a detailed description of a proposed change with supplementary or revised drawings and specifications. Contractor shall prepare and submit an estimate within 10 days. If accepted by Owner, General Contractor will prepare Change Order.

C. Change Order Request (COR):

1. Contractor may submit a COR to the General Contractor for submittal to the Architect for changes in conditions, Owner changes, or other direction from the Architect, jurisdictional authority or Owners inspector

2. Document the proposed change and its complete impact, including its effect on the cost and schedule of the work.

3. General Contractor and Architect will review COR and either deny request or prepare a Change Order.

4. Present total cost and schedule impacts in documentation, including all mark-ups permitted by General Conditions. Provide detailed back-up as required by Architect, including supplier costs, subcontractor labor time and rates, and all other data deemed necessary by Architect.

5. Following final review by Architect of original and supplemental information, and if COR is accepted, no additional cost or schedule adjustments will be included.

D. Change Order (CO): Change Order and Construction Change Directives will be issued by the Architect in accordance with procedures established in General Conditions.

1. Change Order Forms: AIA G701 Change Order Form, current edition, or other format as selected by Architect.

2. Execution of Change Orders: General Contractor will issue Change Orders for signatures of parties as provided in the General Conditions of the Contract.

E. Construction Change Directives (CCD): Construction Change Directives (CCD) will be issued by the Architect.

1. Construction Change Directive Forms: AIA G701 Change Order Form, current edition, or other format as selected by Architect.

2. Unless otherwise agreed, maintain detailed records of work done under the direction of a CCD on Time and Materials basis. Provide full information required to substantiate costs for changes in the work.

F. Execution of Change Orders: Architect will issue Change Orders for signature of parties as provided in the General Conditions of the Contract.

G. All changes in contract for construction, regardless of effects on Contract Price or Contract Time, require the approval of DSA in accordance with Section 4-338, Part 1, T-24 CCR,

"Addenda and Change Orders".

1.06 PROGRESS PAYMENT COORDINATION

A. See Section 01 77 19 – Closeout Procedures for requirements and relationship between progress payment and maintenance of record drawings.

B. See Section 01 33 00 – Submittals for requirements and relationship between progress payment and construction schedule updates.

C. Submit application on AIA Form G702-Application and Certificate for Payment as follows:

1. Submit initial rough draft of pay application on or before the 20th day of each calendar month during Work progress, for a sum equal to ninety percent (90%) of the value of work performed up to the last day of the previous month, less the aggregate of previous payments to Architect, General Contractor, and Inspector of Record for review.

2. General Contractor will return initial rough draft of pay application to Contractor following review by all parties.

3. Submit six (6) copies of adjusted pay application to General Contractor for submittal to DISTRICT, consisting of 3 complete copies with all back-up and justification, 2 [partial copies (cover sheet, schedule of values and releases) and one pencil copy showing corrections required on initial rough draft. Failure to attach applicable attachments within the time frames specified by the General Contractor will result in processing not sooner than the next application period.

4. Submit conditional lien releases for work covered by current application, and unconditional releases for work covered by previous month's billings.

D. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

E. Payment Period: Monthly, scheduled as defined in General Conditions.

1.07 PAYMENT FOR CONTRACT MODIFICATIONS

A. The Contractor shall compensate the Owner, by Owner-Contractor Contract adjustment, for the Architect's reasonable costs to modify Contract Documents required by work not performed in accordance with approved Contract Documents.

1.08 REQUEST FOR INFORMATION

A. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item.

1. Whenever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the General Contractor for submittal to the Architect.

B. Submit all RFI's on attached form. Use of Contractors form will not be accepted. RFI's submitted by subcontractors or suppliers will not be accepted.

C. RFI's shall be originated by the Contractor:

1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the General Contractor for Architect's approval.

2. RFI's sent by subcontractor directly to the General Contractor or Architect shall not be accepted and will be returned unanswered.

D. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's which request information available in the Contract Documents will be deemed either "improper" or "frivolous".

E. In cases where RFI's are issued to request clarification of coordination issues, for example pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.

F. The Architect will respond to legitimate and bonafide Requests for Information (RFI) initiated by Contractor.

G. Contractor shall compensate the Architect, by Owner-Contractor Contract adjustment, for the Architects reasonable costs to respond to RFI's if the Architect determines:

1. The RFI does not reflect careful study and review of the documents, or;

2. Demonstrates a lack of knowledge or construction competency reasonably expected of a Contractor performing the work.

H. The Architect's action will be taken with such reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review.

I. In the event the Contractor believes that a clarification by the Architect results in additional cost or time. Contractor shall not proceed with the work indicated by the RFI until an Instruction Bulletin is issued to the Contractor to proceed with the work. RFI's shall not automatically justify a cost increase in the work or a change in the project schedule.

1. Answered RFI's shall not be construed as approval to perform extra work.

2. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.

J. General Contractor shall prepare and maintain a log of RFI's, and at each weekly meeting, General Contractor shall furnish copies of the log showing outstanding RFI's. General Contractor shall note unanswered RFI's in the log.

K. Contractor shall allow up to 14 days review and response time for RFI's, however, the Architect will endeavor to respond in a timely fashion to RFI's.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

ATTACHMENT:REQUEST FOR INFORMATION FORM

END OF SECTION 01 20 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

A. The contractor shall provide the following Allowances for the exclusive use of the owner and their representatives. The allowances shall be carried as a separate line item included in the bid.

B. Types of allowances required include the following:

1. Lump-sum allowances.

C. Any unused Allowances shall be returned to the owner via deductive change order.

D. Provide Lump-sum allowances for the following items:

1.	Provide Allowance 01 for Unknown Utilities:	$ 50,000.00
2.	Provide Allowance 02 for Architectural Finishes:	$ 38,000.00
3.	Provide Allowance 03 for Additional Site Improvements	$ 45,000.00
4.	Provide Allowance 04 for Landscape and Irrigation:	$ 64,000.00

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 21 00

SECTION 01 29 76 - APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.01 SUMMARY

A. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule.

B. Schedule of Values: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

1. Submit the Schedule of Values at the earliest possible date but no later than seven days before the initial Applications for Payment submittal.

C. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.

D. Applications for Payment shall be consistent with previous applications and payments as certified by the General Contractor and Architect and paid for by the Owner.

E. Payment-Application Times: As per General Conditions, Article 58.

F. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 (OR EQUAL) as the form for Applications for Payment.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 29 76

SECTION 01 31 19 - COORDINATION AND MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination.

B. Preconstruction meeting.

C. Progress meetings.

D. Preinstallation meetings.

1.02 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure an efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later and for accommodating items to be installed by the Owner.

B. Coordinate the sequence of Work to accommodate the Owner's occupancy, as specified in Document 01 12 00.

1.03 PRECONSTRUCTION MEETING

A. General Contractor will schedule a meeting after the Notice of Award.

B. Attendance Required: General Contractor, Architect, Project Coordinator, Prime Contractors, Major Subcontractors, Project Inspector, and key Owner personnel.

C. Agenda:
1. Contract Agreement:
   a. Transmit Performance and Material Bonds to Architect.
   b. Review General/Supplementary Conditions.
   c. Deferred Approvals.

2. Receive documentation from Contractor:
   a. Construction Schedule
   b. Schedule of Values
   c. List of Subcontractors with addresses and phone numbers.
   d. List of Submittals and estimated date of submittal.

3. Project Administration:
   a. Application for Payment, Project Schedule, Lien Release, As-built Documents.
   b. L.C.P. Requirements
   c. Change Orders and Proposal Requests.
   d. Submittals and Substitutions, Deferred Approvals.
   e. Site Meetings.
   f. Testing Lab.
   g. Verified Reports

4. Special Owner Conditions
   a. Temporary facilities.
   b. Owner Occupancy.

c. Work by Owner.
d. Access to Site - Owner Contact.

5. Construction Process:
   a. Contractor will give an overview of construction.
   b. The Contractor will identify items to be selected by the architect/owner, and date selections must be made.
   c. Contractor will review special requirements for equipment, safety, and noise.

6. Project Closeout:
   a. Closeout Binder.
   b. As-Built Documents.
   c. Final Verified Reports.

D. The General Contractor will record minutes and distribute copies to participants and those affected by decisions made within five (5) days after the meeting.

1.04 PROGRESS MEETINGS

A. General Contractor will schedule and administer meetings throughout the progress of the Work as needed.

B. The General Contractor will make meeting arrangements, prepare agendas with copies for participants, and preside at meetings.

C. Attendance Required: General Contractor, Project Coordinator, Prime Contractors, Major Subcontractors, Project Inspector, key Owner personnel, and Architect as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede planned progress.
   5. Review the submittal schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during the succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.

E. The General Contractor will record minutes and distribute copies to participants and those affected by decisions made within two (2) days after the meeting.

1.05 PREINSTALLATION MEETING

A. When required in individual specification sections, the Contractor shall convene a preinstallation meeting before commencing the section's Work.

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

C. Notify the Architect and General Contractor fourteen days before the meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of installation, preparation, and installation procedures.

2. Review coordination with related Work.

E. Contractor will record minutes and distribute copies within two days after the meeting to participants, the architect, the general Contractor, and those affected by decisions made.

1.06 COORDINATION OF SUBMITTALS

A. Submit submittals as specified in Section 01 33 00 – Submittal Procedures.

1.07 COORDINATION OF SPACE

A. Coordinate use of Project space and sequence of mechanical and electrical Work installation, which is indicated diagrammatically on Drawings. Follow routings shown for pipes, ducts, and conduits as closely as practical, with due allowance for available physical space; make runs parallel with lines of the building. Utilize space efficiently to maximize accessibility for other installations, maintenance, and repairs.

B. In finished areas, except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.08 COORDINATION WITH WORK BY OWNER

A. Coordinate with the General Contractor for any work by the Owner and installation of all Owner-provided and Contractor-installed F.O.B. material pertaining to Work in each Bid Package.

1.09 COORDINATION OF CONTRACT CLOSEOUT

A. Coordinate completion and cleanup of own Work in preparation for Substantial Completion.

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

C. Assemble and coordinate closeout submittals under provisions of Section 01 77 19, Contract Closeout Procedures.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 31 19

SECTION 01 32 16 – PROJECT CONSTRUCTION SCHEDULE

PART 1 – GENERAL

1.01 SUMMARY

A. The work includes preparing and submitting the sub-schedules and reports specified herein, including the up-to-date maintenance as required by the GENERAL CONTRACTOR. The Conditions of the contract and the other sections of Division 1 apply to this section as fully as if repeated herein.

1.02 CONSTRUCTION SCHEDULE

A. The enclosed "PROJECT CONSTRUCTION SCHEDULE" is composed of tentative starting dates and fixed durations for each significant activity of work on the project.

1. Within 14 days of the contractor's receipt of the District's Notice of Award Letter, each Prime Contractor will be required to provide the following details to the General Contractor:

2. Proposed manpower loading of each scheduled field activity to correctly complete same within the PROJECT CONSTRUCTION SCHEDULE'S fixed duration.

3. Establish submittal lead time, which will allow for the proper review time by the Architect without delaying the timely scheduled procurement of products, materials, and/or assemblies.

4. Establish fabrication and/or procurement lead times to ensure no operation is delayed from its scheduled starting date.

B. Bid Package Contractor acknowledges that the Pull Planning (a.k.a. Last Planner®) supplemental means of activity scheduling is required to meet the project schedule. Therefore, the Bid Package Contractor agrees to provide a supervisory and management level of representation at all Pull Planning weekly sessions. The Bid Package Contractor also agrees to provide a Foreman level of representation at all Pull Planning daily update "quick meets."

C. CONTRACTOR must coordinate all work with all other contractors on the project through the GENERAL CONTRACTOR'S Project Superintendent to complete each activity of their work within the fixed durations assigned to same as shown on the "PROJECT CONSTRUCTION SCHEDULE."

D. Schedule start dates shown on the PROJECT CONSTRUCTION SCHEDULE are referred to as "tentative" only to the effect that said dates will be continually adjusted forward or backward by the GENERAL CONTRACTOR as the project progresses. Upon receipt of 48 hours advanced notice by the GENERAL CONTRACTOR to begin work on an activity, CONTRACTOR must properly man and perform the work of said activity and complete same within the noted number of consecutive working days or less assigned to said activity in the PROJECT CONSTRUCTION SCHEDULE.

E. CONTRACTOR is expected to continually monitor all phases of the project field construction progress to ensure that CONTRACTOR'S work is correctly implemented into the overall project improvements.

F. CONTRACTOR is expected to provide appropriately trained and skilled mechanics in adequate numbers and equipment needed and/or required to properly and efficiently complete all work activities per the schedule. Should the GENERAL CONTRACTOR have reason to believe at any time that the CONTRACTOR is not providing an adequate workforce armed with the proper materials and/or equipment, the GENERAL CONTRACTOR shall give the CONTRACTOR written notice of same. Activity Manpower loading submitted in item 1.02-A-2 above shall in no way limit the responsibility of the CONTRACTOR to perform to the fixed duration requirements of the PROJECT CONSTRUCTION SCHEDULE.

G. The time for total project completion shall be within the total time specified in the Contract documents. The GENERAL CONTRACTOR will use established contract fixed durations (refer to 1.02A) to prepare and update a Critical Path Method Schedule (C.P.M.) by buildings and site. This schedule will be the basis of weekly production review meetings and the method of measuring each CONTRACTOR'S performance and impact on dependent CONTRACTORS, required cure, and the assessment of liquidated damages.

ATTACHMENT: CONSTRUCTION SCHEDULE

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Submittal Procedures: Coordinate submittal preparation with construction, fabrication, other submittals, and activities that require sequential operations. Transmit in advance of construction operations to avoid delay.

1. Coordinate submittals for related operations to avoid delay because of the need to review submittals concurrently for coordination. The Architect reserves the right to withhold action on a submittal requiring coordination until related submittals are received. Specifically, in order to assure proper coordination of all project colors, no submittals which require the selection of material colors will be processed and released until all submittals requiring the selection of material colors have been submitted.
2. Processing: Allow 14 days for initial review. Allow more time if the Architect must delay processing to permit coordination. Allow 14 days for reprocessing.

    a. No extension of Contract Time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.

3. Submittal Preparation: Place a permanent label on each submittal for identification. Provide a 4- by 5-inch (100- by 125-mm) space on the label or beside title block to record review and approval markings and action taken. Include the following information on the label for processing and recording action taken.

    a. Project name.
    b. Date.
    c. Name and address of the Architect.
    d. Name and address of the Contractor.
    e. Name and address of the subcontractor.
    f. Name and address of the supplier.
    g. Name of the manufacturer.
    h. Number and title of appropriate Specification Section.

4. Submittal Transmittal: Package each submittal appropriately. Transmit with a transmittal form. The Architect will not accept submittals from sources other than the Contractor.
5. An extended processing period is required for submittals and resubmittal of “Deferred Approval Items” which required approval of the Division of the State Architect. The Owner cannot guarantee processing of such submittals within a stipulated time period.

B. Contractor's Construction Schedule:

1. As per General Conditions, Article 32.

C. Daily Construction Reports: Prepare a daily report recording events at the site. Submit duplicate copies to the GENERAL CONTRACTOR at daily intervals. Include the following information:

1. List of subcontractors at the site.
2. High and low temperatures, general weather conditions.
3. Accidents and unusual events.
4. Stoppages, delays, shortages, and losses.
5. Meter readings and similar recordings.

6. Emergency procedures.
7. Orders and requests of governing authorities.
8. Services connected, disconnected.
9. Equipment or system tests and startups.
10. Substantial Completions authorized.

D. Shop Drawings: Submit newly prepared information drawn to scale. Indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates and full-size Drawings, submit six copies on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.

    a. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

E. Product Data: Collect Product Data into a single submittal for each element of construction. Mark each copy to show applicable choices and options. Where Product Data includes information on several products, mark copies to indicate applicable information.

1. Include the following information:

    a. Manufacturer's printed recommendations.
    b. Compliance with trade association standards.
    c. Compliance with recognized testing agency standards.
    d. Application of testing agency labels and seals.
    e. Notation of dimensions verified by field measurement.
    f. Notation of coordination requirements.

2. Submittals: Submit 6 copies. The Architect will retain two and return the others marked with action taken. Electronic copies where applicable may be submitted in lieu of hard copies.

    a. Unless noncompliance with Contract Documents is observed, the submittal serves as the final submittal.

3. Distribution: Furnish copies to installers, subcontractors, suppliers, and others required for performance of construction activities. Show distribution on transmittal forms. Do not proceed with installation until a copy of Product Data is in the Installer's possession.

    a. Do not use unmarked Product Data for construction.

F. Samples: Submit full-size Samples cured and finished as specified and identical with the material proposed. Mount Samples to facilitate review of qualities.

1. Include the following:

    a. Specification Section number and reference.
    b. Generic description of the Sample.
    c. Sample source.
    d. Product name or name of the manufacturer.
    e. Compliance with recognized standards.

f. Availability and delivery time.

2. Submit Samples for review of size, kind, color, pattern, and texture, for a check of these characteristics, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed. Where variations are inherent in the material, submit at least 3 units that show limits of the variations.

   a. Refer to other Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar characteristics.
   b. Refer to other Sections for Samples to be incorporated in the Work. Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
   c. Samples not incorporated into the Work, or designated as the Owner's property, are the Contractor's property and shall be removed from the site.

3. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. One set will be returned marked with the action taken. Maintain sets of Samples, at the Project Site, for quality comparison.

   a. Unless noncompliance with Contract Documents is observed, the submittal may serve as the final submittal.
   b. Sample sets may be used to obtain final acceptance of the construction associated with each set.

4. Distribution of Samples: Distribute additional sets to subcontractors, manufacturers, and others as required for performance of the Work. Show distribution on transmittal forms.

G. Quality Assurance Submittals: Submit quality-control submittals, including design data, certifications, manufacturer's instructions, and manufacturer's field reports required under other Sections of the Specifications.

1. Certifications: Where certification that a product or installation complies with specified requirements is required, submit a notarized certification from the manufacturer certifying compliance.

   a. Signature: Certification shall be signed by an officer authorized to sign documents on behalf of the company.

H. Architect's Action: Except for submittals for the record or information, where action and return are required, the Architect will review each submittal, mark to indicate action taken, and return. Compliance with specified characteristics is the Contractor's responsibility.

1. Action Stamp: The Architect will stamp each submittal with an action stamp. The Architect will mark the stamp appropriately to indicate the action taken.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 33 00

SECTION 01 35 23 – CONTRACTOR SAFETY

1.01 GENERAL

A. HEALTH AND SAFETY POLICY

1. The policy of the District is to promote safety at a level to minimize personal injury and potential property damage.

2. Employees of contractors working on this project are required to meet or exceed all established and recognized codes and standards for safety and protection of personnel and property.

3. The safety guidelines included here are made available to you, the Contractor, as an extension of the safety clause in your Contract General Conditions Article 72.

4. These guidelines are not intended to be complete in every detail, but are merely of a general nature. The separate contractors are in no way relieved of their responsibilities for safety of persons and property, and compliance with all statutes, rules, regulations and orders applicable to the conduct of the work.

5. The possession, use of and/or sale of any alcoholic beverage or illegal controlled drug substance will not be permitted on or immediately adjacent to the job site by any contractor, contractor employee, subcontractor employer or associate.

6. The abuse of prescribed medication will not be permitted on or immediately adjacent to the job site by any contractor, contractor employee, subcontractor employee or associate.

7. This Contractor, and other contractors, share the responsibility of monitoring and enforcing, as necessary, A.5 and A.6 above. Any known, (or with due cause believed to be), violator of A.5 or A.6 shall be immediately reported to the General Contractor.

8. The District reserves the right to take corrective action, as deemed in the best interest of the project and the DISTRICT, for violation of any health or safety standard. This corrective action may include, but is not limited to; removal (from the job site) any unsafe tools/equipment, temporary work stoppage for any unhealthy or unsafe condition, immediate removal (from the job site) any person that is unwilling or incapable of conducting themselves in a manner that promotes a healthy and safe working atmosphere. Any person found to be repeatedly in violation of health and/or safety standards will be permanently removed from the site.

B. RESPONSIBILITIES

1. The District demands that all project contractors perform in a reasonable and safe manner.

2. The Contractors working on this project have the ultimate and total responsibility to conduct a sound accident control program as it pertains to their work and their employees, as well as to ensure safe working conditions for employees of other contractors.

3. The Contractor will ensure his employees cooperate with and coordinate safety matters with other contractors to form a joint safety effort.

4. Employees who have been, or will be exposed to excessive (measured against applicable standards) levels of toxic materials or harmful physical agents shall be notified by the Contractor. Notice of corrective action being taken shall be provided to the employees. Accurate records must be kept of all exposures which are required to be monitored under the State and Federal Codes.

5. In the event of a defense by the Contractor against unsafe independent employee actions, the Appeals Board requires that you must show evidence of the following:
   a. That the employee was experienced in the job being performed;
   b. That you as the employer have a well devised safety program which includes training employees in safety matters relating to their individual job assignments;
   c. That you effectively enforce your safety program;
   d. That you have and enforce a policy of sanctions against employees who violate your safety program; and
   e. That the employee caused a safety infraction which he or she knew was in violation of your safety requirement.

C. SAFETY ACTIVITIES

1. Contractors will conduct or initiate:
   a. Safety program as required by current State of California requirements.
   b. Weekly “tool box” safety meetings between Contractor and Contractor’s supervisors, foremen, employees, and subcontractors working on the project; and

   c. Weekly safety inspections of your work area and those areas of work under your responsibility or shared responsibility as well as taking any other necessary safety precautions.

D. REPORTS

1. Submit all preliminary, weekly, periodic and special reports to the General Contractor. The Contractor is in no way relieved of the requirements for submission of reports to any agency or authority.
   a. All reports listing deficiencies, accidents, or injuries shall show corrective action taken.
   b. A weekly status and summary report of each “tool box” meeting held and items discussed. Each report shall also contain attendance names, signatures and company affiliation.
   c. A weekly status report of inspection results. The attached status forms are for your convenience only.
   d. A continuing list of deficiencies found, date identified, responsible party, corrective action and date corrected.
   e. Accident reports and injury forms. Submit a copy of one of the following to the General Contractor for each case:
      1) California Division of Labor Statistics and Research Form 5020 (latest rev.), or;
      2) Federal OSHA Form 101, or;
      3) Insurance Company form similar to 1 or 2 above.
   f. A copy of CAL/OSHA Form 200 “Log and Summary of Occupational Injuries and Illness”.

2. Special Reports
   a. Notify the General Contractor immediately of any accident involving injury to personnel or property; and complete written reports within 24 hours of a death or injury of five (5) or more employees as a result of one accident.
   b. Copies of all toxic or harmful agent reports (See paragraph B.4.)

3. Governmental Reports
   a. Notification of governmental authorities is the responsibility of each affected contractor.

E. SAFETY DEFICIENCY CORRECTION

1. All safety deficiencies will be corrected by contractors in accordance with the following priorities.
   a. Immediate correction of items with any probability of major or minor injury to people.
   b. Correction immediately of any accident probability which could involve people an/or equipment.
   c. Correction within one day (or sooner) of potential injury or damage to property.

F. OUTSIDE SAFETY INSPECTIONS

1. Unannounced inspections by city, state or federal safety agencies or insurance companies may occur.
   a. Contractors are to escort representatives of these agencies or companies directly to the General Contractor and assist him as required or directed.
   b. If the General Contractor is not available, the Contractor’s foreman or representative shall accompany the inspector on the inspection.

G. INVESTIGATING

1. All injuries are to be investigated by the contractors and reported.

2. The General Contractor shall be notified prior to proceeding with an investigation.

H. SAFETY STANDARDS AND CODE

1. All contractors are to provide their job supervision with applicable safety code publications and ensure they are familiar with the contents.

2. Occupation Safety and Health Administration Standards (latest applicable edition) on the designated applicable safety standards.

3. In states with OSHA approved plans, state codes will take precedence unless federal standards are more stringent, in which case federal standards shall apply.

4. On General Services Administration (GSA) projects, applicable sections of the GSA Manual Accident & Fire Prevention on Construction and Alteration Work will apply in addition to all other codes and standards.

5. All code and standard conflicts will be resolved by applying the most restrictive code and/or standard.

6. Suggested references for contractors are:
   a. Safety & Health Regulation for construction, U.S. Department of Labor, OSHA, Volume 37, No. 243.
   b. Construction safety orders, State Standard, CAL/OSHA, state of California, latest edition.
   c. GSA Manual - GSA - PBSP 5900.3.
   d. U.S. Army Engineering Manual - EM 385-1.
   e. Accident Prevention, Associated General Contractors.
   f. A short guide to the California Occupational Safety and Health Act - National Federation of Independent Business, 150 West 20th Avenue, San Mateo, California 94403.

I. REQUIRED NOTICES: TO BE VISIBLY DISPLAYED

1. Workers' Compensation Insurance Notice.

2. OSHA poster: Safety and Health Protection on the job.

3. State of California Department of Human Resources: Notice to Employees Unemployment Insurance - Disability Insurance.

4. Hard Hat Area Signs.

5. List of ambulances, doctors and hospitals with telephone numbers which can be called during an emergency.

6. Name and title of the safety representative from each contractor's organization.

7. Any other safety signs, slogans, etc. that will improve the general awareness of a joint safety program.

J. PERMITS

1. Permits from the Division in Industrial Safety are required before contractors may undertake the following kinds of work:
   a. Construction of trenches or excavations which are 5 feet or more deep, into which a person is required to descend;
   b. Construction of any building, structure, false work, or scaffolding more than three stories high.

2. The Division of Industrial Safety may investigate or confer with the employer before the start of work. If a pre-job safety conference between the Division of Industrial Safety personnel and the employer is a requirement specified by the Division of Industrial Safety at the time the permit is issued, employees or their representatives are to be included at the conference.

3. Permits must be posted at or near each place of employment requiring a permit. If posting at the actual job site is not possible, the permit must be available for inspection at all times on the site, or, in the case of a mobile unit, at the employer's head office in the area.

4. Additional permits may be required from the Division of Industrial Safety or other applicable governmental agencies. It is the responsibility of each contractor to determine, procure, and pay for their own such permits.

END OF SECTION 01 35 23

SECTION 01 45 24 – TESTING AND INSPECTION REQUIREMENTS FOR SCHOOL CONSTRUCTION

PART 1 - GENERAL

1.01 SUMMARY

A. Regulatory Requirements:

1. Part 1, Title 24, Section 4-335, California Code of Regulations: Testing required by the Division of the State Architect (DSA).
2. Part 2, Title 24, California Code of Regulations (2015 IBC and 2016 California Amendments): Inspections, testing and approvals required by individual sections therein.

B. Selection of the material required to be tested shall be by the laboratory or the Owner's representative and not by the Contractor.

C. Minimum test and inspections required: See Structural Tests and Inspections, Division of the State Architect form DSA 103 (2016 CBC).

D. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.

E. Selection and Payment of Testing Laboratory:

1. Owner will employ and pay for services of an independent Testing Laboratory approved by the Architect, DSA, and the Structural Engineer to perform inspection and testing in accordance with Part 1, Title 24, Section 4-335, California Code of Regulations.
2. Contractor shall pay for mileage and travel time for inspection services, required travel more than 300 miles from this project to test products purchased by Contractor. Testing Laboratory shall forward all billings and records of such costs to the Owner for approval. Such costs, if determined by the Owner to be attributable to the Contractor under this provision, will be deducted from Contractors final payment (or any funds due and payable) by change order.
3. When materials tested fail to meet requirements herein specified, they shall be promptly corrected or removed and replaced and retested. Costs involved in retesting will be paid by the Owner and deducted from Contractors final payment (or any funds due and payable) by change order.

F. Laboratory Responsibilities:

1. Laboratory shall be licensed to conduct testing and inspection operations in California. It shall be supervised by a State Licensed Civil Engineer who shall certify all reports.
2. Perform specified inspection, sampling and testing of Products in accordance with standards specified herein.
3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
4. Promptly notify Architect, Project Inspector and Contractor by letter of observed irregularities of non-conformance of Work or Products.
5. Immediately upon Testing Laboratory determination of a test failure, the laboratory shall telephone the results of test to Architect. On the same day laboratory shall send written test results to those named on the distribution list below.

G. Laboratory Reports:

1. After each inspection and test, the testing facility shall promptly (no later then 14 days after test is complete) submit one copy of laboratory report to the following.

    a. Owner
    b. Architect
    c. Project Inspector
    d. General Contractor
    e. Structural Engineer
    f. Mechanical and Electrical Engineers (Related Tests and Inspections)
    g. Division of the State Architect

2. Test reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Titles 21 and 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements.
3. Submit a report verifying that tests and inspections herein specified and otherwise required have been completed and material and workmanship complies with the contract documents. Such verification reports shall be submitted at any time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.

H. Limits on Testing Laboratory Authority

1. Laboratory may not release, revoke, alter or enlarge on requirements of Contract Documents.
2. Laboratory may not approve or accept any portion of the Work.
3. Laboratory may not assume any duties of the Contractor.
4. Laboratory has no authority to stop work.
5. Laboratory shall not interpret code in relation to the design of the building.

I. Contractor Responsibility

1. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing.
2. Cooperate with laboratory personnel, Owner’s Representatives, Project Inspector and the Architect, and provide access to the work including weekends and after hours and to manufacturer’s facilities.
3. Provide incidental labor and materials and facilities to provide at all times, safe access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.
4. Notify General Contractor, Project Inspector and laboratory 24 hours prior to expected time and operations requiring inspection and testing services. Also notify Owner in advance of manufacturer of materials to allow testing at source of supply for materials which require testing and inspection.
5. Inspecting and Testing performed exclusively for the Contractor’s convenience shall be the sole responsibility of the Contractor.

J. Inspection by the Owner

1. The Owner and his representative shall at all times have access for the purpose of inspection to all parts of the work and to the shops therein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.

2. The Owner shall have the right to reject materials and workmanship which are defective or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be removed from the premises without cost to owner the Owner. If the Contractor fails to correct such rejected work within a reasonable time, fixed by written notice, the Owner will correct same and charge the expense to the Contractor by Change Order.
3. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor by change order.

K. Inspector - Owners:

1. An Inspector employed by the Owner and approved by the Division of the State Architect in accordance with the requirements of State of California Code of Regulations, Title 24 Part 1 will be assigned to the continuous inspection of the work. His duties are specifically defined in Section 4-342 Part I, Title 24 CCR.
2. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.

L. Inspector -- Owner -- FIELD OFFICE: See General Conditions.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 45 24

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY

A. Cutting and Patching Proposal: Submit a proposal describing procedures in advance of the time cutting and patching will be performed. Request approval to proceed. Include the following:

1. Describe the extent of cutting and patching. Show how it will be performed and indicate why it cannot be avoided.
2. Describe changes to existing construction. Include changes to structural elements and operating components and changes in the building's appearance and other significant visual elements.
3. List products to be used and firms that will perform Work.
4. Indicate dates when cutting and patching will be performed.
5. Utilities: List utilities that will be disturbed or relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing the integration of reinforcement with the original structure.
7. Approval to proceed does not waive the Architect's right later to require complete removal and replacement of unsatisfactory Work.

B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Unless shown explicitly on plans, no structural member shall be cut, neither drilled nor notched, without prior written authorization from the structural engineer and the Division of the State Architect.
2. Obtain approval before cutting and patching the following structural elements:

a. Foundation construction.
b. Bearing and retaining walls.
c. Timber and primary wood framing.

C. Operational Limitations: Do not cut and patch operating elements in a manner that would reduce their capacity to perform as intended. Do not cut and patch operating elements in a manner that would increase maintenance or decrease operational life or safety.

1. Obtain approval before cutting and patching the following operating elements or safety related systems:

a. Primary operational systems and equipment.
b. Fire protection systems.
c. Electrical wiring systems.

D. Visual Requirements: Do not cut and patch exposed construction in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1. Retain the original Installer to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer, engage a recognized experienced and specialized firm.

a. Ornamental metal.
b. Matched-veneer woodwork.
c. Stucco and ornamental plaster.

E. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged in such a manner as not to void warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use materials identical to existing materials. Use materials that visually match adjacent surfaces to the fullest extent possible if identical materials are unavailable. Use materials whose performance will equal that of existing materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which Work is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action.

1. Before proceeding, meet with parties involved. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction to prevent damage. Provide protection from adverse weather conditions for portions that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Avoid cutting pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. Performance: Employ skilled workmen. Proceed at the earliest feasible time and complete without delay.

1. Cut construction to install other components or perform other construction and subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut using methods that will not damage elements retained or adjoining construction. Comply with the original Installer's recommendations.

1. Use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
5. Where services are required to be removed, relocated, or abandoned, by-pass utility services before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove floor and wall coverings and replace with new materials to achieve uniform color and appearance.

    a. Where patching occurs in a smooth painted surface, extend final paint coat over entire surface containing the patch after the area has received primer and second coat.

4. Patch, repair, or rehang ceilings as necessary to provide an even-plane surface of uniform appearance.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar items. Clean piping, conduit, and similar features before applying paint or finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

SECTION 01 74 00 PROGRESS AND FINAL CLEANING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Maintain project site, surrounding areas, and public properties free from accumulations of waste, debris, and rubbish caused by operations.

C. After work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean sight-exposed surfaces. Leave the project site clean and ready for occupancy.

1.02 GENERAL

A. Conduct cleaning and disposal operations in accordance with legal requirements.

1. Do not dump or bury rubbish and waste materials on the project site.
2. Do not dispose of volatile wastes in storm or sanitary drains.

B. Hazards Control:

1. Store volatile wastes and hazardous materials (i.e., paint, oils, etc.) in covered metal containers and remove them from the premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during the use of volatile or noxious substances.

1.03 MATERIALS

A. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by the material manufacturer.

1.04 PROGRESS CLEANING DURING CONSTRUCTION

A. Execute cleaning daily to ensure project site, Owner’s premises, adjacent and public properties are maintained free from accumulations of waste materials, debris and rubbish.

B. Provide on project dump site, containers for collection of waste materials, debris, and rubbish.

C. Remove waste materials, debris and rubbish from Owner’s premises and legally dispose of off Owner’s property.

D. Vacuum clean interior areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

E. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

1.05 FINAL CLEANING

A. Employ experienced workers or professional cleaners for final cleaning.

B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of accessible concealed spaces.

C. Clean glass and surfaces exposed to view. Remove temporary labels, stains, and foreign substances.

D. Repair, patch, and touch-up marred surfaces to specified finish, and to match adjacent surfaces.

E. Broom-clean paved surfaces.

F. Polish transparent and glossy surfaces.

G. Vacuum carpeted and soft surfaces.

H. Wax and polish resilient floor surfaces.

I. Wash and polish ceramic surfaces.

J. Clean machinery and equipment.

K. Clean plumbing fixtures to a sanitary condition. Use non-corrosive, non-abrasive cleaning materials.

L. Replace filters of operating equipment.

M. Clean and polish light fixtures.

N. Clean and polish hardware and metal surfaces.

O. Clean walls and ceilings of dust, dirt, stains, hand marks, paint spots, plaster drops, and like defects.

P. Clean construction site. Sweep paved areas and rake clean landscaped surfaces.

Q. Clean out and flush drains from construction debris. Flood-test prior to occupancy.

R. Remove waste and surplus materials, rubbish, and construction facilities from the site. Do not use Owner's waste removal system or any system belonging to owners of adjacent properties.

S. Keep project clean until it is occupied by the Owner.

T. Schedule final cleaning as accepted by the CONSTRUCTION MANAGER to enable the ARCHITECT and SCHOOL DISTRICT to accept a completely clean project.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION 01 74 00

SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section Includes Procedures for ensuring the optimal diversion of construction waste generated by the Work within the limits of the Construction Schedule, Contract Sum, and available materials, equipment, and products.

1. The SUBCONTRACTOR shall promote the CLIENT's efforts to create a resource-efficient and environmentally sensitive structure and effect optimum control of solid waste and recoverable resources generated in the Work.
2. Subcontractor shall recycle, salvage, reuse, or otherwise divert 75% of the construction waste generated in the Work from the landfill.

B. Related Work: Documentation affecting the Work of this Section includes, but is not necessarily limited to, the following Scope of Work:

1. Removal, Cleanup, and Demobilization
2. Minor Demolition
3. Selective Demolition
4. All Construction Activities, All Divisions

1.02 DEFINITIONS

A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A Class III landfill must have a solid waste facilities permit from the California Integrated Waste Management Board (CIWMB) and be regulated by the Local Enforcement Agency (LEA).

B. Construction and Demolition Waste: Includes all non-hazardous solid resources resulting from construction, remodeling, alterations, repair, and demolition operations.

C. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of landfilling. Includes Class III landfills and inert fills.

D. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring, or other soil engineering operation.

E. Inert Fill: A facility that legally accepts inert waste such as asphalt and concrete exclusively for disposal.

F. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete, that do not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional Water Board pursuant to Division 7 (Section 13000 et seq.) of the California Water Code and does not contain significant quantities of decomposable solid resources.

G. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.

H. Mixed Debris Recycling Facility: A solid resources processing facility that accepts loads of commingled construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing the non-recyclable residual materials.

I. Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

J. On-site Recycling: Materials that are sorted and processed for use in an altered form in the Work, (e.g. concrete is crushed for use as base for a parking lot on the site).

K. Off-site Recycling: Materials hauled to a location and used in an altered form in the manufacture of a new product.

L. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from the CIWMB or be regulated by the LEA.

M. Reuse: Materials that are recovered for use in the same form. This includes materials are used on-site or off-site. Refers also to Salvage Material, in which materials recovered for reuse and sold or donated to a third party.

N. Source-Separated Materials: Materials that are sorted at the site of generation by individual material type for the purpose of recycling, i.e., loads of concrete that are source-separated for delivery to a base course recycling facility.

O. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.

P. Transfer Station: A facility that can legally accept solid wastes for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for reuse or recycling. Transfer stations must be permitted by the CIWMB and regulated by the LEA.

1.03 SUBMITTALS

A. Construction Waste Management Plan:

1. Prior to the Bid, SUBCONTRACTOR shall conduct a site assessment and estimate the types and quantities of materials under the Work that are anticipated to be feasible for on-site processing, source separation for recycling, or reuse, and shall note the procedures intended for a recycling, reuse, or salvage program.
2. Not more than twenty (20) working days after award of Contract and prior to the commencement of the Work, SUBCONTRACTOR shall prepare and submit a written Solid Resources Management Plan including, but not limited to, the following (submit in format provided herein as Attachment A):

    a. SUBCONTRACTOR and Project identification information.
    b. Procedures to be used.

c. Materials to be reused and recycled.
d. Estimated quantity of materials.
e. Names and location of reused and recycling facilities/sites.

B. Required Submittal of Summary of Diversion and Disposal With Each Application for Progress Payment:

1. A summary of recyclables and solid resources generated by the construction and demolition operations. Submit on Document 00 62 23 Construction Waste Diversion Form. Failure to submit the form and its supporting documentation may render the application for progress payment incomplete and delay progress payments. Include manifests, weight tickets, receipts, and invoices specifically identifying the Project and materials sent to:

a. Source Separated Recycling Facilities
b. Mixed Debris Recycling Facilities
c. Class III Landfills
d. Inert Materials accepted at Class III Landfills as daily cover
e. Inert Fills
f. Inert Backfill Sites other than Inert Fills

2. With each submittal of SUBCONTRACTOR'S application for process payment, the SUBCONTRACTOR is required to submit to the LEED Coordinator the attached, "Summary of Solid Waste Diversion and Disposal, " quantifying all materials generated in the Work, disposed in Class III Landfills, or diverted from disposal through recycling. Indicate zero (0) if there is no quantity to report for a type of material. As indicated on the form:

a. Disposal or recycling reporting shall be made either in tons or in cubic yards. If scales are available at disposal or recycling facility, report in tons; otherwise, report in cubic yards.
b. Indicate locations to which materials are delivered for disposal, recycling, accepted as daily cover, or taken for inert backfill.
c. The Summary Form must be accompanied by legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials for the purpose of reuse, recycling, or disposal.
d. Indicate the Project title, Work Order Number; name of the company completing the Summary Form and compiling backup documentation; the printed name, signature, and daytime phone number(s) of the person completing the form, the beginning and ending dates of the period covered on the Summary Form; and the date that the Summary Form is completed.

1.04 RECYCLING, REUSE, AND SALVAGE REQUIREMENTS

A. Development and Implementation of Recycling Procedures: Based upon Contract Documents, the SUBCONTRACTOR'S Construction Waste Management Plan, estimated quantities of available materials, and availability of recycling facilities, SUBCONTRACTOR shall develop and implement procedures to reuse, salvage, and recycled materials to the greatest extent feasible. Procedures shall include source separated recycling, as well as mixed recycling efforts. Procedures shall include consideration of on-site recycling.

1. On-site or Off-site Recycling Source-Separated Materials: SUBCONTRACTOR shall develop and implement a program to include source separation of solid resources, to the greatest extent feasible, of the following types:

    a. Asphalt
    b. Concrete, concrete block, slump stone (decorative concrete block), and rocks
    c. Dirt
    d. Metal, ferrous and non-ferrous
    e. Wood
    f. Green materials (i.e. tree trimmings)
    g. Other materials, as appropriate, such as red clay brick and corrugated cardboard

    Off-site Recyclables shall be legally transported to a source separated or mixed debris-recycling facility. On-site Recycling program shall produce a quality product to meet the requirements identified in the Contract Documents. On-site recycling Plans shall also estimate the amount to be used in the Work and include a program for off-site recycling of any excess material that cannot be used in the Work. At no time shall the on-site recycling, stock piling of separated or to-be-separated materials cause or create any nuisance or health menace to the site, other public or private properties.

2. Mixed Debris Recycling: Develop and implement a program to transport loads of commingled construction and demolition materials that cannot be feasibly source-separated to a mixed recycling facility.
3. Salvageable Items: Perform a site pre-assessment, identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
4. Disposal Operations:

    a. Using a permitted waste hauler or its own trucking services, SUBCONTRACTOR shall legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility, to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.
    b. Do not burn, bury or otherwise dispose of solid waste on the project Jobsite.

5. Hauling:

    a. SUBCONTRACTOR is responsible for arranging collection of materials, by a permitted waste hauler or using its own trucks, to facilities that can legally accept construction and demolition materials for purpose of reuse, recycling, or disposal.
    b. Prior to delivering materials, SUBCONTRACTOR shall familiarize itself with the Specifications for acceptance of construction and demolition materials at recycling facilities.

B. Participate in Reuse Programs: Implement a reuse program to the greatest extent feasible. Alternatives include:

1. California Materials Exchange (CAL-MAX) Program sponsored by the California Integrated Waste Management Board. CAL-MAX is a free service provided by the California Integrated Waste Management Board, designed to help businesses find markets for materials that traditionally would be discarded. The premise of the CAL-MAX Program is that material discarded by one business may be a resource for another

business. To obtain a current Materials Listings Catalog, call CAL-MAX/California Integrated Waste Management Board at [(916) 255-2369 or (800) 553-2962.]

2. Habitat for Humanity: a non-profit housing organization that rehabilitates and builds housing for low-income families.
3. Other reuse organizations or activities.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 74 19

SECTION 01 77 19 CONTRACT CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division One Specification Sections, apply to this section.

B. This section includes administrative and procedural requirements for contract closeout, including but not limited to the following:

1. Inspection procedures.
2. Operation and maintenance manuals.
3. Warranties.
4. Instruction of Owner's personnel.

C. Related Sections include the following:

1. Divisions 2 through 33 are for specific closeout and special cleaning requirements for products of those sections.

1.02 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Complete the following before requesting an inspection to determine the substantial completion date. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the work is not complete.
2. Advise the Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation, and maintenance manuals.
6. Deliver tools, spare parts, extra materials, and similar items to the location designated by the Owner. Label with manufacturer's name and model number where applicable.
7. Complete startup testing of systems.
8. Submit test/adjust/balance records.
9. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.
10. Complete final cleaning requirements, including touchup painting.

B. Inspection: Submit a written request for inspection for substantial completion via the CONSTRUCTION MANAGER. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, which must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.
2. If a reinspection identifies work that remains uncompleted, the Contractor shall be responsible for the cost of additional inspections by the Architect. The Architect will submit a time and

material invoice to the Owner, who will deduct the amount from the balance due to the Contractor.

3. Results of completed inspection will form the basis of requirements for final completion.

1.03 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 section "Payment Procedures".
2. Submit certified copy of Architect's substantial completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Revise paragraph and subparagraph below to comply with office policy and project requirements.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.
2. If a reinspection identifies work that remains uncompleted, the Contractor shall be responsible for the cost of additional inspections by the Architect. The Architect will submit a time and material invoice to the Owner, who will deduct the amount from the balance due to the Contractor.

1.04 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual specification sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
d. Description of controls and sequence of operations.
e. Piping diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.

h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy duty, 3-ring, vinyl covered, loose leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," project name, and subject matter of contents.

1.05 WARRANTIES

A. Submittal Time: Submit written warranties to the Construction Manager for designated portions of the work where commencement of warranties, other than date of substantial completion, is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the project manual.

1. Bind warranties and bonds in heavy duty, 3-ring, vinyl covered, loose leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch (115 by 280 mm) paper.
2. Provide heavy paper dividers with plastic covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES", project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS – Not Used

PART 3 - EXECUTION

3.01 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed upon times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner with at least 14 days advanced notice.

B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual specification sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations, Adjustments and Troubleshooting.
4. Maintenance and Repairs.

END OF SECTION 01 77 19

SECTION 01 78 39 PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Maintain at the project site one copy of the following:

1. Complete contract documents (prints and reproducible) as noted below:

a. Specifications and addenda.
b. Reviewed shop drawings and samples.
c. Modifications: Change orders and other written amendments to the contract.
d. Field Test Records.

C. Store record documents in the temporary field office, separate from documents used for construction. Replace soiled or illegible documents.

D. Provide files and racks for storage of documents.

E. Maintain documents in clean, dry, and legible condition.

F. Do not use record documents for construction purposes.

G. Make documents available at all times for inspection by Owner and Architect.

H. Drawings shall be the same size and format as the original construction documents.

1.02 MARKING DEVICES

A. Provide fine ballpoint colored pens for marking.

1.03 RECORDING

A. Label each document (on the first sheet or page) “RECORD DRAWING” in 2-inch high printed letters.

B. Keep record documents current. Record concisely and neatly all actual revisions to the work on a weekly basis.

1. Do not permanently conceal any work until the required information has been recorded.
2. Drawings. Legibly mark to record actual construction:

a. Measured depths of various foundation elements in relation to the main floor level or survey datum.
b. Measured horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Identify drains and sewers by invert elevation.
c. Measured locations of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of the work. Identify ducts, dampers, valves, access doors, and control equipment wiring.

d. Field changes of dimension and detail.
e. Changes made by change orders and other modifications, including all clarification drawings, instruction bulletins, and other construction correspondence.
f. Details not on original drawings.

C. Specifications and Addenda: Legibly mark and record at each product section description of actual products installed to include the following:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment.
2. Authorized product substitutions or alternates utilized.
3. Changes made by change orders and other modifications.
4. Other matters not originally specified.

D. Shop Drawings and Samples: Maintain as record documents; legibly annotate shop drawings and samples to record changes made after review.

E. Record Drawings:

1. The Contractor shall furnish a set of reproducible structural, mechanical, plumbing, electrical and landscape record drawings upon completion of construction, to the requirements noted above. These record drawings shall be in the same size and format as the original drawings.
2. Structural, mechanical, plumbing, and electrical information shall include circuiting, wiring sizes, equipment/member sizing, etc., drawn in a professional manner similar to that indicated on the construction drawings. The record drawings for each discipline shall represent a complete picture of that entire system, as constructed.

1.04 SUBMITTALS

A. Obtain Inspector's signed certification that record documents have been fully updated prior to submitting monthly payment requests. Compliance is mandatory before payment will be made.

B. Submit Inspector's certified documents to Architect with claim for final application for payment. Fully complete record documents are a prerequisite to final payment.

C. At completion of project, deliver all record documents to Architect. Architect and consultants will review the completed record drawings, both prints and mylars, and return to the Contractor with required changes annotated.

1. Architect will transfer data from the record drawing prints to the Architect's office originals.

D. Accompany submittal with transmittal letter containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Number and title of each record document
5. Certification that each document, as submitted, is complete and accurate and signature of Contractor or his authorized representative.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION 01 78 39

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

Scope of work: Complete all demolition work as shown on contract documents or as required to permit the installation of new construction, including but not limited to the following

1. Remove existing site concrete and misc. Site improvements.
2. Remove existing trees as required for completion of new construction.

1.02 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property. They shall be removed from the site with further disposition at the Contractor's option.

B. Record drawings at Project closeout according to Section 01 77 19 "Contract Closeout."

1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.03 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed demolition work similar to that indicated for this project.

B. Public Utilities: Give all required notices, pay fees and charges, and arrange for disconnection and removal of abandoned public utilities and meters.

C. Photographic and Video Documentation: Refer to Section 01380. Before starting work on this section, provide one set of photographs and one video of existing conditions to be affected by the demolition work. Provide progress videos as demolition work progresses, at intervals as approved, illustrating substrates, connections, concealed conditions, preservation of historical construction, and other conditions that will benefit subsequent work.

1.04 DEFINITIONS: The following terms have the meanings indicated when used in this section and on related drawings.

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain on the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify the contents of containers and deliver them to the Owner's designated storage area.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the locations indicated.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.

1.05 ENVIRONMENTAL CONDITIONS

A. Hazardous Materials: Prior to starting work, obtain from the Owner certification that hazardous materials have been removed. In the event additional material which is suspected to be friable asbestos or other regulated hazardous material is encountered during the demolition work, the Contractor shall stop work in such areas and notify the Owner. The materials will be inspected and tested, if necessary, by the Owner. If the material is found to be friable asbestos or other hazardous material, the Owner will provide for its removal or encapsulation without delay at Owner's expense. After treatment the Owner will test and certify that the contamination has been removed or controlled to within legal requirements and Contractor will be notified to proceed with the work in writing.

B. Noise Control: Perform all work in a manner and at times which will keep production of objectionable noise to a minimum amount of noise. Instruct all workers in noise control procedures. Noise that adversely affects adjacent properties will not be tolerated. Such conditions shall be the Owner's determination.

C. Dust Control: Take appropriate action to check the spread of dust, and to avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions, such as flooding or pollution. Comply with all dust regulations imposed by local air pollution agencies. Remove dust and dirt from work area at least daily or more frequently as needed or directed.

D. Pest Control: Take appropriate measures to prevent the spread of pests and vermin from areas where work is being performed to other areas including the site and adjacent buildings.

1.06 PROJECT SITE CONDITIONS

A. The intent of the drawings is to show existing site and building conditions with information developed from the original construction documents, field surveys, and Owner's records, and to generally show the amount and types of demolition and removals required to prepare existing areas for new work. Contractor shall make a detailed survey of existing conditions pertaining to the work before commencing demolition.

B. Extent: perform removals to extent required plus such additional removals as are necessary for completion even though not indicated or specified.

1.07 PROTECTION

A. Existing Work: Protect existing work which is to remain in place.

B. Trees: Protect trees within the project site which might be damaged during demolition.

1.08 EXPLOSIVES: Use of explosives will not be permitted.

1.09 BURNING: Burning will not be permitted.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION: Verify that utilities have been disconnected and capped.

3.02 PREPARATION: Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.03 UTILITIES

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

B. Prior to demolition or in the event unrecorded utilities are encountered, notify Owner or serving utility companies, as applicable, for work necessary and scheduled to be performed. Coordinate responsibility for limits of utility removals and be responsible for the removal of all utility installations both above and below grade except for those installations the utility companies agree to remove. Use care to protect utility lines to remain in service, repair all damage which does occur, and remove those not to remain in service.

C. Interruption of Service: In the event existing utility service requires interruption to accomplish the demolition work, obtain written approval by the Owner for interruption of service. Request approval not less than 48 hours prior to proposed scheduled interruption. State the exact services involved and the expected duration. Except in an emergency affecting life and limb, do not cause any interruption of utility service without written authorization from the Owner.

D. Provide for protection of utility lines to remain in service. Repair damage done to these facilities as a result of the work of this section, to the satisfaction of the Owner. Locations of existing utilities to remain shall be identified on record drawings, and their physical location shall be indicated by tags or stakes as applicable.

3.04 WORKMANSHIP

A. Partial demolition and removal: When portions of pavement, slabs, sidewalks, curbs, curb and gutters and cross-gutters are to be removed, cut with a concrete saw full depth along all joint lines. Provide additional saw cut 2" away from saw cut on joint line, on the demolition side. Provide double saw cut at all areas to be demolished. All saw cuts shall be full depth.

3.05 DEMOLITION OF SITE IMPROVEMENTS

A. Site Improvements: Remove walks and pavement, including base courses and miscellaneous improvements.

B. Paving and Slabs: Remove asphaltic concrete paving and slabs including aggregate base as indicated.

C. Underground Utilities: Expose pipe and conduit and cap at property line with permanent waterproof plugs or seals of concrete or metal. Except for items indicated to be abandoned in place, remove on-site abandoned pipe and conduit, cap and seal remaining pipe or conduit ends, and backfill the excavations as specified for new construction.

3.06 SALVAGE AND DISPOSAL

A. General: Existing items Owner intends to retain will be designated by the Owner prior to start of work. Contractor shall carefully remove, salvage, box or bundle as approved, and deliver such items to storage as directed.

B. Disposal: All removed material other than items to be salvaged or reused shall become Contractor's property and be removed from Owner's property. Clean up and dispose of debris promptly and continuously as the work progresses, and do not allow to accumulate. Sprinkle water on the surface to prevent dust nuisance. Secure and pay for required hauling permits and pay dumping fees and charges.

END OF SECTION 02 41 31

SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Scope Of Work: The work under this division includes furnishing all labor, material, and equipment necessary for the installation and placing into operation of the electrical systems as indicated on the drawings. The work includes, but is not necessarily limited to, furnishing and installing the following:

1. Complete power and lighting, distribution board, generator and all accessories, transformers, panels, switches, feeders, branch circuits, lighting fixtures, lamps, controls and accessories.
2. Motor and power wiring for all motor and/or equipment furnished under the contract. Except as otherwise specified to be furnished by or under other divisions of this specification, all wiring devices, conduit, feeders, and final connections to all equipment shall be furnished under this section.
3. Install electrical control wiring for all equipment, except as described in 1.24, "Mechanical/Electrical Coordination Requirements".
4. All equipment and materials specified in this division.
5. Empty conduit systems as indicated on the drawings.
6. All other items and/or work indicated on the drawings.
7. Extension of the existing power and communications systems.

B. This division of the specification outlines the provisions of the contract work to be performed under this division. 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. In addition, work in this division is governed by the provisions of the bidding requirements, contract forms, general conditions, supplementary conditions, and all sections under general requirements.

C. 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.

D. Where the word 'provide' or 'provision' is 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.

E. 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.

1.02 DEFINITIONS

A. Concealed: Hidden from sight, as in trenches, chases, hollow construction, or above furred spaces, hung ceilings B 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.

B. 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'.

C. Finish Space: Any space ordinarily visible, including exterior areas.

1.03 SUBMITTALS

A. Shop Drawings:

1. Submit shop drawings and all data in accordance with Section 01 33 00 for all equipment provided under this division.
2. Shop drawings submittals processed are not change orders: the purpose of shop drawings submittals by the contractor is to demonstrate to the Architect that the Contractor understands the design concept. He 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, the design drawings and specifications shall control and shall be followed.

B. 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.

C. Index all submittals and reference to these specifications. All submittal items shall be assembled and submitted in a single complete binder. Partial submittals will not be reviewed.

D. Project Closeout: Prior to completion of project, compile a complete equipment maintenance manual for all equipment supplied under sections of this division, as described below.

1. Equipment Lists and Maintenance Manuals:

a. 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:

2. Name, model, and manufacturer
3. Complete parts drawings and lists
4. Local supply for parts and replacement and telephone number.

5. 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.

6. 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.

1.04 QUALITY ASSURANCE

A. 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.

1. National Electrical Code
2. National Fire Protection Association

3. Underwriters' Laboratories, Inc. (UL)
4. Certified Ballast Manufacturers' Association (CBM)
5. National Electrical Manufacturers' Association (NEMA)
6. Institute of Electrical & Electronics Engineers (IEEE)
7. American Society for Testing & Materials (ASTM)
8. National Board of Fire Underwriters (NBFU)
9. National Board of Standards (NBS)
10. American National Standards Institute (ANSI)
11. Insulated Power Cable Engineers Association (IPECS)
12. Electrical Testing Laboratories (ETL)
13. National Electrical Safety Code (NESC)
14. California Electrical Code Title 24, Part 3
15. California Building Code
16. Americans with Disability Act (ADA)

B. 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.

C. Owner shall pay all permit fees and inspections required by any public authority having jurisdiction. Contractor shall coordinate work and arrange inspections with any public authority having jurisdiction.

D. Installation procedures methods and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

E. 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.

1.05 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or the specifications, request clarification.

B. The Architect shall interpret the drawings and the specifications, and his decision as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.

C. In case of conflicts not clarified prior to Bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful Bidder as soon as feasible after the Award and if appropriate, a deductive change order will be issued.

D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word “may” or “option”.

1.06 EXAMINATION OF PREMISES

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

1.07 WORK AND MATERIALS

A. Unless otherwise specified, all materials must be new and of the best quality. Perform all labor in a thorough and workmanlike manner, to the satisfaction of the Architect.

B. 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.

1.08 SUBSTITUTIONS

A. Substitutions will be allowed only in strict conformance with the General Conditions of the Contract and Division.

1. Whenever in specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer such specification shall be deemed to be used for the purpose of facilitating description of material, process, or article desired and shall be substantially equal or better in every respect to that so indicated or specified. If material, process, or article offered by Contractor is not, in opinion of architect, substantially equal or better in every respect to that specified, then Contractor shall furnish material, process or article specified. Burden of proof as to equality of any material, process, or article shall rest with Contractor. Contractor shall submit request together with substantiating data for substitution of an "or equal" item within thirty-five (35) days after award of contract. Provision authorizing submission of "or-equal" justification data shall not in any way authorize an extension of time for performance of this contract.

1.09 EQUIPMENT PURCHASES

A. 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.

B. Provide all materials of similar class or service by one manufacturer.

1.10 COOPERATIVE WORK

A. 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.

B. 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.

1.11 VERIFICATION OF DIMENSIONS

A. 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 properly fitting equipment and materials together and to the structure in spaces provided.

B. 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 clean, and maintain proper clearances.

1.12 CLEANUP

A. 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.

B. Use steel brushes on exposed metal work to carefully remove rust, etc., and leave smooth and clean.

C. During the progress of the work, keep the premises clean and free of debris.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING

A. 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 without the consent of the Architect and DSA.

3.02 CONCRETE

A. Where used for structures to be provided under the contract such as bases, etc., concrete work, and associated reinforcing shall be as specified under architectural. See architectural drawings for details.

B. See other sections for additional requirements for underground vaults, cable ducts, etc.

3.03 PAINTING

A. Paint all unfinished metal with one coat of rust-inhibiting primer. (Galvanized and factory painted equipment shall be considered as having a sub-base finish.)

B. Finished painting is specified Under "Finishes".

C. Furnish all connections to electrical services furnished under other sections except as otherwise specifically designated. Provide all necessary connections, etc., required to properly connect all services and equipment.

D. General: Painting requirements of this section are supplementary to other Painting Sections.

E. Switchboards, panels, terminal cabinets, equipment enclosures, wireways, boxes, conduit, etc.: Standard gray or galvanized manufacturers' finish unless otherwise noted herein.

F. Exceptions in public areas:
1. Flush panels and cabinets: Fronts shall have factory applied primer and field applied oil base semi-gloss enamel finish coat (except metal plated parts) to match adjacent wall surfaces.

2. Surface panels, cabinets and wireways: Same as "1. Flush Panels" above except also paint the enclosure (can) using the same paint as is on adjacent surface in lieu of semi-gloss paint. Apply etching compound (galvanized surfaces) and undercoater prior to finish coat.
3. Surface and flush boxes: Paint to match adjacent surfaces as described in "2. Surface panels" above.
4. Exposed conduit: Paint to match adjacent surfaces as described in "2. Surface panels" above.
5. Ferrous metal miscellaneous parts (except stainless steel): Galvanized in accordance with ASTM A123 or A153.
6. Lighting fixtures in public areas: Standard manufacturers' finish except as modified by the LIGHTING section, including Fixture Schedule. Exception: Paint the trims of recessed fixtures to match adjacent wall or ceiling surface if so directed by Owner's representative.
7. Wiring devices, device plates and floor boxes in public areas: As specified in WIRING DEVICES and DEVICE PLATES Sections.

3.04 UTILITY SERVICES

A. Upon notification of award of contract, notify the serving power, telephone utilities of the following:

1. Name and address of Contractor.
2. Estimated times of construction start, completion and required service connections.
3. Project service voltage, phase load, and service size.

3.05 TEMPORARY LIGHTING AND POWER

A. Contractor shall provide on-site generation, labor, materials and/or any required utility fees associated with the installation and maintenance of a temporary power source for Contractor's equipment or field offices during the period of construction.

B. Building and site shall be sufficiently illuminated so that construction work can be safely performed. Lights shall be controlled by switches located with consideration for safety, security, and convenience.

3.06 RECORD DRAWINGS

A. The Electrical Division shall maintain record drawings as specified in Section 01 78 39.

B. Drawings shall show locations of all concealed and exposed conduit runs, giving the number and size of conduit wires. Underground ducts shall be shown with cross section elevations. Drawing changes shall not be identified only with referencing COR's and RFI's, the drawings shall reflect all the actual changes made.

C. Two sets of reproducible as-built drawings shall be delivered to the Architect. See Section 01 78 39 for additional requirements.

3.07 EXCAVATION AND BACKFILL

A. 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. Remove all excess excavated materials from the site, or as otherwise directed by the Architect.

B. 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.

C. Trenching and backfilling shall be done as per Section 31 23 33. No stones or coarse lumps shall be laid directly on conduit or conduits.

D. Provide pumps and drainage of all open trenches for purposes of installing electrical duct and wiring.

3.08 ACCESSIBILITY

A. Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal, or replacement conveniently and accessibly throughout the finished building.

B. All required access doors or panels in walls and ceilings are to be furnished and installed as part of the work under this section.

C. Provide doors which pierce a fire separation with same fire ratings as the separations.

D. Refer to 'Finish Schedule' for types of walls and ceilings in each area and the architectural drawings for rated wall construction.

E. Coordinate work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

3.09 FLASHING

A. Flash and counterflash all conduits penetrating roofing membrane.

3.10 IDENTIFICATION OF EQUIPMENT

A. All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedules:

B. General:

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.
2. All auxiliary systems, including communications, shall be labeled to indicate function.
3. All labels, tags, and stamps shall use the owner room designation and room numbering system.
4. Provide nameplates for safety switches, switchboards, breakers mounted in switchboards, relay cabinets, signal terminal cabinets, individually mounted enclosed breakers, panelboards, starters, time clocks, remote control switches and similar items. Nameplates shall be laminated black-white-black backlit or phenolic plastic with ¼-inch high lettering engraved through the outer covering except where specifically described otherwise. Affix with self-tapping machine screws (no rivets or glue). The screws shall not project beyond the backside face of enclosure doors or panels.

C. Conduits and outlet boxes for all special systems including emergency power, fire alarm, and communications systems shall be color coded for identification throughout. Conduits shall be spray painted with the system color code at 3-foot intervals. Outlet and junction boxes shall be spray painted with the system color code on the exterior of the box, except boxes which are flush mounted in walls, ceilings, or floors shall be painted on the inside of the box. System color codes shall be as follows:

1.	Emergency Power Systems	Orange
2.	Fire Alarm System	Red

3.	Nurse Call System	Blue
4.	Music/Paging System	Yellow
5.	Intercom System	Pink
6.	Telephone System	White
7.	Data System	Gray
8.	SMATV/Radio Program System	Brown
9.	Miscellaneous Signaling Systems	Violet

D. Lighting and Local Panelboards Transformers:

1. Panel identification shall be with white and black micarta nameplates. Emergency power distribution panels shall be identified with red and white micarta nameplates. Letters shall be no less than 3/8" high.
2. Circuit directory shall be 2-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.
3. The circuit directory shall reference the building number and room number as designated by the school directory. Circuit directories which reference the building number and room number as designated on drawings are not acceptable.

E. Distribution Switchboards and Feeders Sections, Motor Control Centers, Automatic Transfer Switches:

1. Identification shall be with 1" H 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. Emergency power distribution panels shall be identified with red micarta nameplates and white lettering. Letters shall be no less than 3/8" high.
2. Circuit breakers and switches shall be identified by number and name with 3/8" H 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to or on circuit breaker or switch.

F. Disconnect Switches, Motor Starters and Transformers:

1. Identification shall be with white micarta laminated labels and 3/8" high black lettering.
2. Emergency equipment shall be identified with red labels and 3/8" high white lettering.

3.11 CONSTRUCTION FACILITIES

A. 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.

B. Temporary power and lighting for construction purposes shall be provided under this section. Refer to 'temporary facilities' for description of work.

3.12 GUARANTEE

A. 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 proving 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.

3.13 PATENTS

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

3.14 MECHANICAL / ELECTRICAL COORDINATION REQUIREMENTS

A. All electrical work performed for this project shall conform to the National Electrical Code, to Local Building Codes and in conformance with Division 26 of these specifications whether provided under the Mechanical or the Electrical sections of the specifications. Where the mechanical contractor is required to provide electrical work, he shall arrange for the work to be done by a licensed electrical contractor using qualified electricians. The Mechanical Contractor shall be solely and completely responsible for the correct functioning of all mechanical equipment regardless of who provided the electrical work.

B. The Mechanical Contractor shall provide the following:

1. All motors required by mechanical equipment.
2. All starters for mechanical equipment which are integral to equipment scheduled and / or specified.
3. All wiring interior to packaged equipment furnished as an integral part of the equipment.
4. All control wiring for mechanical systems.
5. All control systems required by mechanical equipment.
6. Control wiring shall be defined as all wiring, either line voltage or low voltage, required for the control and interlocking of equipment, including but not limited to wiring to motor control stations, solenoid valves, pressure switches, limit switches, flow switches, thermostats, humidistats, safety devices and other components required for the proper operation of the equipment.
7. Motor starters supplied by Mechanical shall be fused combination type minimum size 1, and conform to appropriate NEMA standards for the service required. Provide NEMA type 3R/12 enclosures in wet locations. Provide all starters with appropriately sized overload protection and heater strips provided in each phase, hand/off auto switches, a minimum of 2 NO and NC auxiliary contacts as required, and an integral disconnecting means. For 1/2 horsepower motors and below, when control requirements do not dictate the use of a starter, a manual motor starter switch with overload protection in each phase may be provided. Acceptable manufacturers are Allen Bradley, General Electric, Square D, Furnas and Westinghouse.

C. The Electrical Contractor shall provide the following for mechanical equipment:

1. All power wiring.
2. Electrical disconnects as shown on the electrical drawings.
3. All starters not integral to equipment scheduled and / or specified and all starters forming part of a motor control center.

D. All power wiring and conduit to equipment furnished under Mechanical Division shall be provided under Electrical Division. Control wiring, whether line voltage or low voltage, shall be provided under the division which furnishes the equipment.

E. Conduit for wiring for all HVAC and plumbing control shall be furnished and installed under Electrical Division.

F. Power wiring shall be defined as all wiring between the panelboard switchboard overcurrent device, motor control center starter or switch, and the safety disconnect switch or control panel serving the equipment. Also, the power wiring between safety disconnect switch and the equipment line terminals.

G. All motor starters which are not part of motor control centers and which are required for equipment furnished under this division shall be furnished and installed under the Electrical Division.

H. Electrical Division shall make all final connections of power wiring to equipment furnished under this division.

I. Wiring diagrams complete with all connection details shall be furnished under each respective section.

3.15 EQUIPMENT ROUGH-IN

A. 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. The exact rough-in locations for manufactured equipment must be determined from large scale certified drawings. 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 drawings.

3.16 OWNER-FURNISHED AND OTHER EQUIPMENT

A. 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.

3.17 EQUIPMENT FINAL CONNECTIONS

A. Provide all final connections for the following:

1. All equipment furnished under this Division.
2. Electrical equipment furnished under other sections of the specification.
3. Owner-furnished equipment as specified under this Division.

3.18 INSERTS, ANCHORS, AND MOUNTING SLEEVES

A. Inserts and anchors must be:

1. Furnished and installed for support of work under this Division.
2. Adjustable concrete hanger inserts installed in new concrete work shall be as manufactured by Grinnell or approved equal.
3. Installed in location as approved by the Architect. Expandable lead type anchors installed in existing concrete with minimum surface damage, as manufactured by Ackerman-Johnson, Pierce, Diamond, or Hilti.
4. Toggle Bolts, or "Molly-Anchors" where installed in concrete block walls.
5. Complete with 3/16" or heavier steel back-up plate where used to support heavy items. Thru-bolts for back-up plate shall be concealed from view, except as otherwise indicated. Refer to drawings for details of supports at post-tension concrete slab.
6. 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.

B. Furnish and install all sleeves as required for the installation of all work under all sections of this division. Sleeves through floors, roof, and walls shall be as described in conduit section.

3.19 SEISMIC RESTRAINTS

A. Provide the work in compliance with the most stringent seismic requirements for site specific, of applicable Codes including the Title 24 and California Code of Regulations (CCR) Uniform Building Code, but with the requirements herein as minimum standards. Provide seismic restraints for materials and equipment of this Division, including (but not limited to) the items listed below. The attachments shall resist forces applied to the center of gravity of the components. Criteria shall be the operating weight of the item times .5g for horizontal forces and .33g for vertical forces. Design for the horizontal force to be applied in any direction. Wall mounted or suspended components shall, in addition, resist a downward force of 200 pounds minimum added to the operating weight.

B. All switchgear and other free standing electrical equipment shall be anchored to withstand seismic forces in this area.

C. Switchboards, transformers, and all free-standing panels or cabinets and similar equipment.

D. Suspended lighting fixtures.

E. Lighting fixtures integral with ceiling or directly mounted to ceiling.

F. Suspended conduit hangers and trapezes.

G. Suspended electrical conduit, 2-1/2" nominal size and larger, shall have individual hangers not longer than 12" from the top of the pipe to the bottom of the support for the hanger. If a longer hanger is used, Contractor shall apply seismic restraints. Supporting calculations and details shall be submitted for Title 24 compliance review.

H. Four #9-12 gauge hanger wires shall be provided to each recessed troffer one located at each diagonal corner. In addition troffers shall be fastened with two self tapping screws at each end of fixture through housing to main runners of the T-bar grid. Installation of these screws shall in no way deform the fixture housing. Provide spacers between the fixture housing and the T-bar grid where required.

I. Provide bracing and anchorage of conduit hangers and trapezes in accordance with SMACNA published "Guidelines for Seismic Restraints of Mechanical Systems".

J. Pendant, suspended, or stem mounted lighting fixtures shall have approved earthquake resistant hangers if code required and have movable joints at ceiling and fixture when more than one stem is used per fixture. In addition, fixtures shall have steel stranded aircraft cable attached to the structure and to the fixture at each point of support, in addition to the fixture hanger. Cables shall be installed slack and shall be capable of supporting four times the vertical load. The fixture shall be capable of swinging 45° in any direction. Where a 45° swing would cause the fixture to strike a wall or other object, suitable cables or other means of bracing shall be added to prevent the fixture from swinging against the other object.

K. Carefully review the space available to insure that the restraint systems proposed will not impair the required equipment clearance, working space or access.

L. Submit details of the seismic anchorages and receive approval of the IOR and EOR prior to installation. Details shown on the drawings are for reference only and may not be suitable for the actual equipment to be installed. Exception: Details for seismic anchorage may be omitted for equipment installed on a floor or roof and weighing less than 400 lbs. but the installation shall be subject to the approval of the Owner's representative.

3.20 RUSTPROOFING

A. Rust proofing must be applied to all ferrous metals as follows:

1. Hot-dipped galvanized shall be applied after forming of angle-iron, bolts, anchors, etc.
2. Hot-dipped galvanized shall be applied after fabrication for junction boxes and pull boxes cast in concrete.

3.21 GENERAL WIRING

A. 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.

B. In those isolated instances in which construction conditions will not permit staggered outlet boxes, provide "Flamesafe" FSD 1077 fire stopping pads or approved equal, over the outlet box.

C. 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.

D. Provide proper size and type of feeds from proper sources for all such items indicated, checking drawings of all trades to ensure inclusion of all items.

3.22 SEPARATE CONDUIT SYSTEMS

A. 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, emergency system, sound system, control system, fire alarm system, etc.

B. 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.

3.23 SPECIAL CONDUIT REQUIREMENTS

A. The electrical contractor shall furnish and install all conduits for the total and complete conduit for the following communication systems.

1. Clock and Bell

B. The fire alarm system shall be in conduit at all areas.

C. Conduit for all low voltage systems, including fire alarm and clock and bell located above suspended ceiling shall be installed below gypsum board on bottom chord of truss, exposed.

D. Provide a pull chord in all spare conduit and where conductors are installed by others.

END OF SECTION 26 05 00

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, Division One, and Section 26 05 00 Common Work Results for Electrical apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Conductors, as indicated on the drawings specified herein or reasonably required to complete the work. The work includes, but is not limited to, the following:

1. Furnishing and installing wire and cable for branch circuits and feeders.

1.02 SUBMITTALS

A. Submit manufacturer's data for the following items:

1. Conductor cables.

PART 2 - PRODUCTS

2.01 WIRE AND CABLE RATED 120 VOLT TO 600 VOLT

A. All wire and cable shall be new, 600-volt insulated copper of types specified below for different applications.

1. Conductor Material: Copper
2. All conductor sizes shall be designated by American Wire Gauge (AWG) or Thousand Circular Mills. (kcmil).
3. The wire used as feeders to switchboards, panelboards, motor control centers, or other major electrical components shall be typed XHHW-2.
4. All underground conductors shall be Type XHHW-2.
5. Wire and cable larger than #6 AWG shall be type XHHW-2
6. Wire #6 AWG and smaller shall be type THHN.
7. Conductors for branch circuit lighting, receptacle, power, and miscellaneous systems shall be a minimum of No. 12 AWG.
8. 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.
9. The wire indicated to be larger than No. 12 must be increased to the entire circuit length.
10. Wire sizes No. 14 through No. 10 shall be solid. No. 8 and larger shall be stranded.

B. All wire and cable shall bear the UL label and shall be brought to the job in unbroken packages.

C. Wire insulation shall be color as specified herein.

2.02 WIRE AND CABLE FOR SYSTEMS BELOW 120 VOLTS

A. All low voltage and communications systems cables shall be plenum-rated.

PART 3 - EXECUTION

3.01 SYSTEMS 600 VOLT OR BELOW

A. Wire and cable shall be pulled into conduits without strain using powdered soapstone, mineralac, or other approved lubricant. The wire shall never be repulled if the same has been pulled out of a conduit run for any purpose. No conductor shall be pulled into the conduit until the conduit system is complete, including junction boxes, pull boxes, etc.

B. All connections and joints in wires shall be made as noted below:

C. Connections to outlets: Wire formed around the binding post of the screw.

D. No. 8 wire and larger - Burndy "Quick-Lug" type QDA, or approved equal, round flange, solderless lug.

E. Fixture Connections: Circuit wiring connections to fixture wire shall be made with pressure-type solderless connectors, Buchanan, Scotchlock, Wing Nut, or approved equal.

F. Joints in Wire: No. 6 wire and larger, Burndy or approved equal.

G. No. 8 wire and smaller - Buchanan, Scotchlock, Wing Nut, or equal pressure type solderless connectors.

H. Uninsulated solderless connectors shall be insulated as follows: Tape and covering of rubber tape, equal in thickness in the insulation. This shall be followed with an outer covering of vinyl tape in two layers.

I. All wiring throughout shall be color-coded as follows:

	480-Volt System	208-Volt System
A Phase	Brown	Black
B Phase	Orange	Red
C Phase	Yellow	Blue
Neutral	Grey	White
Ground	Green	Green

J. 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.

K. 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.

L. At all control wiring terminations, the wiring shall have a numbered T & B or Brady plastic wire marker.

M. 120-volt control wiring may be installed with the power conductors when insulated at the same voltage level as the power conductors. All other control and instrumentation wiring must be installed in a separate conduit.

N. 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 that might damage it.

O. Wire and cables when installed in underground pull boxes shall not be spliced. All wire and cable in underground pull boxes shall be continuous.

P. Wire and cable when installed in underground pull boxes shall be neatly strapped / looped together and anchored to side walls of junction box. The wire and cable shall be neatly strapped to the side walls of junction boxes to keep the floor of the junction box open.

END OF SECTION 26 05 13

SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, Division One, and Section 26 05 00 Common Work Results for Electrical apply to this section.

B. The scope of work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Grounding, as indicated on the drawings specified herein or reasonably required to complete the work. The work includes, but is not limited to, the following:

1. Furnish and install grounding and grounding conductors.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 GROUNDING

A. All Grounding shall be in accordance with CEC Article 250.

B. All panelboard cabinets, equipment, enclosures, and complete conduit system shall be grounded securely in accordance with pertinent sections of Article 250 of CEC. 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 Article 250 CEC. All ground connections shall have clean contact surfaces. Install all grounding conductors in conduit and make connections readily accessible for inspection. Furnish and install grounding electrodes as described on the drawings.

C. 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 grounds bus in the panelboard to the conduit grounding bushings.

D. Except for connections for which access for periodic testing is required, make grounding connections that are buried or otherwise inaccessible by an exothermic type process.

E. Equipment Grounding Conductors:

1. Provide copper THWN insulated equipment grounding conductors in all raceways.
2. The grounding conductors shall be provided whether scheduled or shown on the drawings or not, and, if necessary, the conduit size shall be increased to accommodate them. These grounding conductors shall be connected to the ground terminals on the device or enclosure at each end of the installation. They shall be interconnected with the other ground terminals and conductors to form a continuous wired grounding system throughout the electrical wiring system.

F. Ground Rods: 3/4" diameter × 8-feet copper clad steel. Drive full length into the earth with the top 3-inch minimum below grade or underside of the slab. Where ground rods cannot be driven vertically to the desired depth below grade, they shall be driven at an angle away from or parallel to the exterior wall. When driven parallel to the wall, the angle shall not exceed 45 degrees. The rod shall penetrate to a depth of permanent ground moisture. When ground rods cannot be driven because of bedrock at less than 4 feet below grade level, a counterpoise ground electrode shall be used in place of rods. The

counterpoise system shall consist of not less than 50 feet of No. 2 AWG bare tinned copper wire, buried to a depth of at least 18" below grade for each ground rod shown. The wires shall be run in a straight line. Each pad-mounted transformer and vacuum interrupting sectionalizing switch shall be grounded using the methods indicated herein.

G. Connections: Connecting inaccessible ground rods below ground shall be made using exothermic welding devices. Above-ground and accessible connections shall be made using exothermic devices. Multiple bolt silicon bronze connectors, Burndy or O.Z. Electric or exothermic welded, Burndy, Erico Cadweld products, or equal.

H. Test each grounding electrode for resistance at the connection point before connecting any wires. Resistance at the grounding electrode shall not exceed the following:

1. Service Equipment, 25 ohms
2. Interior Electrical Systems, 25 ohms
3. Exterior Transformers, 10 ohms
4. Junction Boxes and Manholes, 10 ohms

I. If the installed system does not achieve the above values, notify the Owner's representative.

J. Each ground electrode shall be tested using a ground resistance meter or other suitable instrument in conformance with the manufacturer's directions. Submit a report listing, as a minimum, the date of testing, name of tester, instrument used, location and type of ground electrode, and resistance in ohms. Submit within five (5) days after testing is completed.

END OF SECTION 26 05 26

SECTION 26 05 33 – RACEWAY AND BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General and Supplementary Conditions, Division One, and Section 26 05 00 Common Work Results for Electrical apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Raceway and Boxes, as indicated on the drawings specified herein, or reasonably required to complete the work.

1.02 SUBMITTALS

A. Submit manufacturer's data on the following:

1. Conduit
2. Fittings
3. Fire Seal Material

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidight flexible metal conduit.

F. LFNC: Liquidight flexible nonmetallic conduit.

G. RNC: Rigid nonmetallic Conduit.

1.04 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for the intended use.

B. Comply with CEC.

PART 2 - PRODUCTS

2.01 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.

4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. IMC: ANSI C80.6.

C. EMT: ANSI C80.3.

D. FMC: Zinc-coated steel or aluminum.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (including all types and flexible and liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel, set-screw or compression type.

2.02 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. Certain Teed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise noted.

C. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

2.03 BOXES

A. Boxes shall be as manufactured by Steel City, Appleton, Raco, or approved equal.

B. 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.

C. Boxes generally shall be hot dipped galvanized steel with knockouts. Boxes on exterior surfaces or in damp locations shall be corrosion resistant, cast aluminum. Boxes 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. Bodies shall

have threaded hubs for rigid Conduit and neoprene gaskets for their covers. Bodies shall be Appleton Unilets, Crouse-Hinds, or the approved equal. Where recessed, boxes shall have square cut corners.

D. 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.

E. All light, switch, receptacle, 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.

F. 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 3/4" past boxes all around. Covers for 4" square and 4" ganged boxes shall extend 1/4" past box all around.

PART 3 – EXECUTION

3.01 CONDUIT INSTALLATION – GENERAL

A. Continuously check the work previously installed to prevent any interference between the various installations. Should structural difficulties or other work prevent the routing of Conduit as indicated on the drawings, make necessary deviations there from as directed by the Owner's representative.

B. Route conduit so as to clear beams, plates, footings and structural members, whether or not indicated on the plans. Do not run Conduit through any structural member of the building, except as specifically directed by the Owner's representative. Under no circumstances run conduits through column footings or grade beams.

C. Concrete Slabs on Grade: Conduit shall not be installed in slab on grade.

D. Where Conduit penetrates a fire-rated separation, any of the following packing methods may be used to restore the integrity of the separation if Code approved: cement, mineral fiber sprayed with a flame retardant coating, or Dow Corning 3-6548 RTV silicon foam, 3M caulk #CP25, 3M putty #303, or equal. Seal shall be water-tight and shall be accomplished prior to wire pulling.

E. Where a conduit enters building through the concrete foundation wall or floor below ground water level, a watertight entrance seal shall be used. These seals shall be 0.Z. Type "FSK" or "WSK", or as equal.

F. Do not run Conduit closer than 6 inches to any uninsulated hot water or steam pipe, heater flue or vent. If pipe is insulated, the clearance may be reduced to 2-inch. Provide condulets for exposed runs of Conduit where junction, bends or offset are required, whether such condulets are indicated on the plans or not. No bends are permitted around corners, beams, wall or equipment. No running threads are permitted. Run a die over factory threads to ensure that they are clean and free from all coating material and that good metallic contact with the fittings is obtained. Paint the exposed portion of field-cut threads with a suitable zinc-rich paint.

G. Upon completion of each run of Conduit, test the run and clear it of all obstructions. Plug each conduit end with conduit pennies and bushings or manufacturers' seals until ready for pulling wire.

Provide a 200-pound test nylon or polypropylene pull rope in each empty Conduit, tie off rope at each end, and provide an identification tag on rope at each end.

H. All branch circuits shall be installed in void spaces and not in concrete floor slabs unless for floor receptacles.

I. Conduit sizes for various numbers and sizes of wire shall be as required by the CEC, but not smaller than 3/4-inch.

J. 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 NEC. If because of bends or elbows a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner.

K. Flexible Conduit shall be used as shown on drawings and only to connect motors, transformers, and other equipment subjected to vibration. Flexible Conduit shall not be used to replace EMT in other locations.

L. Flexible metal conduit shall be ferrous, in lengths not exceeding 6 feet. Installation shall be such that considerable slack is realized. The Conduit shall contain separate code sized grounding conductor.

M. Liquid tight flexible Conduit shall be used in conformance with NEC in lengths not to exceed 4 feet. 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 in possible corrosive areas, e.g. kitchens and outside areas.

N. 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.

O. 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.

P. All conduits shall be concealed wherever possible. All conduit runs may be exposed in mechanical equipment rooms, electrical equipment rooms, and electrical closets. No conduit shall be run exposed in finished areas without the specific approval of the Architect.

Q. 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. Baling wire shall not be used to support Conduit.

R. Where possible, all conduits for wiring within stud or movable partitions shall enter the partition from above.

S. 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.

1. Water and waste piping not less than 3-inch.

2. Steam and condensate lines not less than 12-inch.
3. Radiation and reheat lines not less than 6-inch.

T. 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.

U. All empty conduits shall be provided a 1/2-inch polypropylene plastic pull cord and plastic plugs over the ends.

V. 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.

3.02 CONDUIT INSTALLATION – ABOVE GRADE

A. All conduits above grade or inside of a structure shall be metallic, except in masonry and concrete walls Schedule 40 may be used.

B. Run Conduit concealed, except as otherwise indicated.

C. Run exposed conduit parallel with or at right angles to walls or as directed by the Owner's representative.

D. Where conduits are placed in partitions necessitating cutting of any structural member, provide supports as directed by Owner's representative in accordance with applicable structural requirements.

E. Locate Conduit so as not to obstruct access or service to equipment.

F. Conduit Passing Through the Roof: Flash and counterflash and/or provide a pitch pocket. Method shall be compatible with roofing system and acceptable to the Owner's representative.

G. Conduit 1-inch and smaller over metal channel for lath and plaster or acoustical ceilings shall be tied to the supporting channels with 12 gauge galvanized tie wire spaced at a maximum of 10-feet intervals. Conduits shall not obstruct accessibility of ceiling or removal of panels. Do not use ceiling wires for support. Support exposed conduit 1-inch and smaller from building with T & B, or equal, pipe straps spaced at a maximum of 10-feet intervals. Attach supports with machine screws, nets and lock washers in metal; wood screws in wood; and expansion shields or inserts in masonry or concrete. Perforated strap iron shall not be use. Conduits larger than 1-inch shall be suspended on pipe racks with Grinnell No. 107B, or equal, split-ring hangers and rods from concrete inserts.

H. RSC shall be installed in interior wet locations, exposed exterior locations, and wherever specifically shown. Where installed in exterior locations, RSC and fittings shall be encased in PVC coated for corrosion protection. Conduit, from slab to bottom of surface-mounted panelboards, distribution panels, device outlet boxes, terminal cabinets, where exposed, shall be RSC. Conduit concealed in wall from slab to flush-mounted panels, distribution panels, terminal cabinets, and all device outlet boxes for all systems shall be EMT except to devices mounted at 36" or less in which case flexible Conduit may be used. Contractor shall be allowed a dimension of 3 inches above slab to make transition from PVC to EMT, flex or rigid steel as allowed above.

I. All above grade metallic conduit shall be EMT, unless noted otherwise

J. Rigid steel conduit or IMC shall be used at thefollow locations:

1. Exposed exterior locations.

2. Emergency feeders routed overhead.

3.03 CONDUIT INSTALLATION – UNDERGROUND

A. Bury underground Conduit (except under buildings) to a 30-inch minimum depth below finish grade to top of Conduit. Deeper burial depths shall be as indicated on drawings, or as required to meet minimum spacing from other utilities' lines and obstructions.

B. Plastic Conduit shall be used only for all exterior underground systems, in slab, not on grade, and below slab, on grade. Install bell ends at all conduit terminations in manholes and pull boxes.

C. Risers to grade shall be PVC-coated rigid galvanized steel unless otherwise noted.

D. The ends of all underground conduits entering buildings and equipment shall be capped or sealed with acceptable compound, such as Crouse Hinds "Chico A", or equal, after installation of wire. Cap empty conduit stubouts at both ends. In landscaped areas, terminate in a waterproof J-box.

E. Provide a plastic warning tape in the backfill over the ductlines approximately 12 inches below grade. Tape shall be run continuously along the entire length of the underground utility lines. Tape shall be polyethylene plastic manufactured specifically for warning and identification of all buried utility lines. Tape shall be of the type provided in rolls, 6-inches minimum width, color-coded for electric lines (red), and communications (orange) with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Tape shall consist of top and bottom layers of B-721 polyethylene or polyester with a center metallic foil core suitable for locating by a conventional detector at the specified depth. Tape shall be by Thor Enterprises, Brady, Seton, or equal. Submit data sheets as specified under "SUBMITTALS".

F. Conduit Location Markers: Conduits stubbed or capped-off underground shall have their location identified with a concrete marker 6" × 6" × 12" high with a flush brass plate set in the 6" face. Identification of the Conduit shall be stamped or engraved into the plate and the marker set flush with finished grade. Show exact location of markers and identification markings on as-built drawings. Submit data sheets as specified under "SUBMITTALS".

G. Excavated materials not required or unsuitable for backfill shall be removed from the project site. Provide sheeting and shoring as necessary for protection of work and safety of personnel. Remove water from excavations by pumping or other approved method.

H. Backfill shall be placed in layers not more than 6" thick and each layer shall be compacted. Backfilling shall progress as rapidly as the construction, testing and acceptance of the work permits. Backfill shall be free from roots, wood, scrap material, and other vegetable matter and refuse. Compaction of backfill shall be to 95 percent of maximum density. 80% of ASTM D method "D" maximum density.

I. Backfill around underground structures such as manholes or handholes shall consist of sand and gravel, free from large clods of earth or stones over one inch size. Backfill materials shall be placed symmetrically on all sides in loose layers not more than nine inches deep. Each layer shall be moistened and compacted with mechanical or hand tampers to 90% compaction.

3.04 CONDUIT BENDING

A. 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 NEC requirements.

B. Not more than four 90 degree bends will be allowed in one raceway run. Where more bends are necessary, a pull box shall be installed. All bends in 1-inch and smaller shall be made with a conduit bender and all larger sizes shall have machine bends.

3.05 CONDUIT SUPPORTS

A. Conduit shall be supported at intervals as required by the National 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.

B. 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-inch diameter minimum. Each Conduit shall be clamped to the trapeze hanger with conduit clamps.

C. 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.

D. Openings through fire-rated floors and fire and/or smoke walls through which conduits or cables pass shall be sleeved and sealed by fire stop material to seal off flame, heat, smoke and fire gases. Fire-seal material shall have an hourly fire rating equal to or higher than the fire rating of the floor or wall through which the cable or Conduit pass. Sleeves provide for communication system cable shall be filled with fire-seal material.

3.06 CONDUIT FITTINGS

A. Bushings and Lock Nuts: Where conduits enter boxes, panels, cabinets, etc., they shall be rigidly clamped to the box by lock nuts on the outside, and a lock nut and bushing on the inside of the box. All conduits shall enter the box squarely.

B. Furnish and install insulated bushings as per CEC on all conduits. The use of insulated bushings does not exclude the use of double lock nuts to fasten Conduit to the box.

C. Couplings and connectors for rigid steel or IMC conduit shall be steel or malleable iron, threaded, rain- and concrete-tight. Transition from plastic to steel conduits shall be with PVC female threaded adaptors. Couplings and connectors exposed, installed in hollow construction or above ceilings must be threaded, or compression type.

D. Couplings and connectors for EMT shall be compression, watertight. Set screw connectors are not acceptable, except for systems below 120 volts.

E. Connectors for flexible metal conduit shall be steel or malleable iron with screw provided to clinch the Conduit into the adapter body.

F. Install approved expansion fittings for conduits passing through all expansion and seismic joints.

3.07 BOXES

A. Boxes shall be installed where required to pull cable or wire, but only in finished areas 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.

B. 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.

C. 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.

D. All cabinets and boxes shall be secured by means of 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.

E. Boxes with unused punched-out openings shall have the openings filled with factory made knockout seals.

F. Where emergency 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.

G. All outlet boxes and junction boxes for Fire Alarm and Emergency systems shall be painted red.

END OF SECTION 26 05 33

SECTION 26 05 43 - UNDERGROUND PULL BOXES

PART 1 – GENERAL

1.01 SUMMARY

A. Section 26 05 00 provisions, entitled Common Work Results for Electrical, General Conditions, Supplementary Conditions, and Division One, apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with furnishing and installing underground pull boxes and manholes, as indicated on the drawings specified herein or reasonably required to complete the work.

PART 2 - PRODUCTS

2.01 GENERAL

A. Communication Pull Box: JENSON PRECAST Variable Depth Pull Box, 3672 DPB, 3’-8” x 6’-8” dimension.

B. Communication Pull Box Cover: JENSON PRECAST, Parkway, Hinged Cover, Style E, (2) Piece, with hold open assembly. Marked as "Communication".

C. Electrical Pull Box: JENSON PRECAST Variable Depth Pull Box, 3048 DPB, 3’-2" x 4’-8" dimension.

D. Electrical Pull Box Cover: JENSON PRECAST, Parkway, Bolt Down Cover, (1) Piece, Style F, with hold open assembly. Marked as "Electrical"

PART 3 - PRODUCTS

3.01 INSTALLATION

A. Communication and electrical pull boxes shall be installed so the cover elevation is 6" above the adjacent soil.

B. Installation of Wire and Cable:

1. When installed in underground pull boxes, wires and cables shall not be spliced. All wire and cable in underground pull boxes shall be continuous.
2. When installed in underground pull boxes, wire and cable shall be neatly strapped/looped together and anchored to the side walls of the junction box. The wire and cable shall be neatly strapped to the side walls of junction boxes to keep the floor of the junction box open.

C. Install as per manufacturer's instructions.

END OF SECTION 26 05 43

SECTION 27 10 00 STRUCTURED CABLING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. The provisions of Section 26 00 00 General Electrical Provisions and Section 26 05 00 Basic Electrical Materials and Methods apply to this section as if fully repeated herein.

C. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Structured Cabling, as indicated on the drawings specified herein or reasonably required to complete the work. The work includes, but is not limited to, the following:

1. Copper Communications Cabling – Unshielded.
2. Copper Communications Cabline – Shielded.
3. ~~Copper Telephone Cabling.~~
4. Fiber Optic Communications Cabling.
5. ~~Coax Television Cabling.~~
6. ~~Audio/Visual Cabling.~~

D. This section specified standards of materials and execution in the provision of wiring, cable, and related terminations to be provided under the work of Division 27 Sections. Refer to the requirements of such sections for the functional requirements of systems to be delivered using the materials and methods of this section, as well as the additional standards, material, and execution specific to each section.

1.02 SUBMITTALS

A. In addition to the requirements of Division 01, submit as applied all review materials arranged in the same order as the specifications, individually referencing the specification section, paragraph, and contract drawing number. Conform in every detail as applies to each referencing section.

B. Coordination Drawings: Prepare coordination drawings in accordance with the provisions in Section 01 30 00.

C. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.

D. Progress Schedule: Include duration and milestones for at least the following:

1. All submittals specified.
2. Shipment to site.
3. Installation.
4. Field testing.

E. Manufacturer's Product Data:

1. List of Material. For each item, include:

a. Manufacturer.
b. Model number.

c. Listing: UL or none.
d. Quantity.

F. Shop Drawings:

1. Floor Plans indicating rough-in, mounting height, conduit size, wire type, and wire fill.
2. Sections/Elevations with mounting location reference.
3. Enlarged plans as necessary.
4. Wire run sheets (if used) indicating wire number, source, designation, signal type, and wire type.
5. Provide full-size front elevation details of patch bays with layout and text designations.

G. Samples: Samples for review by the Architect of all finishes/materials which will be visible to the public, including but not limited to:

1. Receptacles and controls with the associated trim plate.
2. Provide at least a 2" x 2" sample for other items.

H. Shop and Project Site Test Reports:

1. Schedule: Submit test reports in a timely manner relative to project schedule such that the Architect's representative may verify submitted test data without delay in progress.
2. Shop test report: Submit the completed equipment racks to the project site prior to shipping them.
3. Project site test report: Submit the following system completion prior to and as a condition precedent to acceptance review and testing of the work of this section.
4. Pull tension study: The Contractor shall furnish a cable pull tension study for all inter-building cables greater than 200 feet in length or containing more than 180 degrees of bend in the conduit path. The study shall utilize a three-dimensional computer-generated model of the conduit path. The study shall calculate pull tensions, sidewall pressures, and jamming ratios as a minimum. The study shall be performed in both pull directions, and a pull direction that generates lesser tension shall be recommended. The pull tension study shall be submitted and reviewed by the District prior to the installation of any cables.
5. Content: Include at least:

a. Time and date of test.
b. Personnel conducting a test.
c. Test equipment, including serial and date of calibration.
d. Test object.
e. Procedure used.
f. Results of test – numerical or graphical presentation.

1.03 QUALITY ASSURANCE

Comply with the requirements of Division 01 and the following:

A. Company: Work of each section in this Division shall be performed by an installer who has at least eight (8) years of direct experience with the devices, equipment, and systems of the type and scope specified herein and who has fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the project jurisdiction. A licensed C-10 contractor shall perform raceway installation. All other work shall be conducted by parties licensed to perform such work.

B. Personnel: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are entirely familiar with the specified requirements and the methods needed for the proper performance of the work of this section. Supervisors shall have at least eight (8)

years of direct experience in similar work. Installation and maintenance personnel shall have at least five (5) years of direct experience in similar work.

C. Designated supervisor: Provide a designated supervisor who is present and in responsible charge of the fabrication shop and on the project site during all phases of installation and testing of the work of this section. This supervisor shall be the same individual through the execution of the work unless illness, loss of personnel, or other circumstances reasonably beyond the Contractor's control intervene.

D. Coordination: Coordinate the work of this section with the work of all other sections. Comply with Division 01.

E. Verification: Verify dimensions and conditions at the project site. Submit any conflicts in a timely manner for resolution.

F. Project site installation and testing: Install as specified herein. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein—request verification of project site test in a timely manner.

G. Verification of submitted test data: Retest in the presence of designated representatives of the Architect at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with the work of this section. Provide all test equipment. Provide a complete set of the latest stamped, actioned submittals of record for reference. Provide a complete set of shop and project site test reports. Provide a complete set of the manufacturer's original operation, instruction, and service manuals for each equipment item for reference.

H. Reference/Project record documents: At all times when the work is in progress, maintained at the workplace, fabrication shop, or project site as applicable, a complete set of the latest stamped, actioned submittals of record for reference. Also, maintain a separate, clean, undamaged set to prepare Project Record Documents. Also, maintain a complete set of the manufacturer's original operation, instruction, and service manuals for each equipment item at the workplace for reference.

I. Schedule: Comply with the project schedule. Make all submittals specified herein in a timely manner. Failure to complete timely submittals as specified herein is considered to be a lack of substantial progress in the work of this section.

J. Deliver all equipment, devices, and materials required for the work of this section and install, test, and ready all work for acceptance testing at least 14 days prior to the completion date for the associated area of the project.

1.04 DELIVERY, STORAGE, AND HANDLING

Comply with the requirements of Division 01, Section 27 10 05 and the following:

A. Shipping conditions:

1. All cables shall be shipped on reels with a drum diameter at least 13 times the diameter of the cable.

B. Storage:

1. Retain factory cable protection until installation. Supplement with heavy gauge plastic sheeting if the factory protective membrane is pierced before installation. Tape ends and seams water and dust tight.
2. Equipment and cable shall be protected from the weather, humidity, temperature variation, dirt and dust, or other contaminants.

1.05 REGULATORY REQUIREMENTS

A. Codes and regulations: Perform all work strictly with all applicable Federal, State, County, and City codes, laws, and ordinances.

1.06 APPLICABLE STANDARDS & AGENCIES

A. Conform to the following:

1. CEC California Electrical Code.
2. NFPA National Fire Protection Association.
3. CBC California Building Code.
4. UL Underwriters Laboratories.
5. ANSI American National Standards Institute.
6. ASTM American Society for Testing Materials.
7. TIA Telecommunications Industry Association
8. ICEA Insulated Cable Engineers Association.

1.07 PERFORMANCE STANDARDS

A. Voice and Data Category 6A, to ANSI/TIA Category 6A.

B. Fiber Optic Cabling:

1. Optical Budget: For specified cabling, not more than 2 dB over the cabling manufacturer's specified loss for that same length plus .4dB for each connector and 0.3 dB for each splice measured at 1300 nm.
2. Bandwidth: 500 MHz/km or per cable specification, whichever is more restrictive.

1.08 OPERATING AND MAINTENANCE DATA

A. Manuals: In addition to the requirements of Division 01, submit two (2) additional sets. Submit in three (3) post binders (not ring binders) with tabs.

B. Include:

1. Index.
2. Reduced set of system record drawings.
3. Maintenance and spare parts schedule.
4. Equipment manuals. Collate alphabetically by manufacturer. Provide the manufacturer's original operation, instruction, and service manuals for each item. For each set, provide the manufacturer's original printed copies only. Photocopies are not acceptable.

C. As-Built drawings:

1. Quantity: Three (3) sets.
2. Format: CAD and PDF files on CD-ROM or DVD-ROM.
3. Content: All drawings required under "Shop Drawings." Show "as installed" condition. Where room designations according to project permanent signage differ from construction designations in the contract documents, show both designations.

D. Warranty certificates: Comply with Division 01.

1.09 WARRANTY SERVICE

In addition to provisions of Division 01, provide the following:

A. Warranty: Warrant all of the work of this section to be free from defects in materials and workmanship for a period of twelve (12) months from the date of District acceptance.

B. Response time: Provide a qualified technician familiar with the work at the project site within twenty-four (24) hours after receipt of a notice of malfunction. Provide the District with the telephone number attended eight (8) hours a day, five (5) days a week, to be called in the event of a malfunction.

C. Off-site service: Conduct all warranty repairs and services at the project site unless in violation of the manufacturer's standard product warranty. Provide substitute systems, equipment, and devices acceptable to the District for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts, and personnel to and from the project site.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Copper Communications Cabling

1. Belden https://www.belden.com

B. Copper Telephone Cabling

1. Belden https://www.belden.com

C. Fiber Optic Communications Cabling

1. CommScope http://www.commscope.com

2.02 COPPER COMMUNICATIONS CABLING – UNSHIELDED: CAT6A UTP

A. Horizontal Cabling

1. Model: Belden #10GXS13 CAT6A Enhanced (625MHz), 4-unbonded-pair.
2. Rating: CMP rated.
3. Spares: Provide (1) spare cable to each audio-video system.

B. Termination

1. MDF/IDF Rooms: CAT6A patch panels with rear cable manager.
2. Wall/Ceiling Plate: RJ45 Category 6A 10GX modular jack.
3. Floor Mount: RJ45 Category 6A 10GX modular jack.

C. Patch Cords – As Required

1. Model: Belden or Uniprise.
2. Category: As required for equipment being connected.
3. Length: As required.
4. Quantity: As required.
5. Color: Per Owner's standard.

2.03 COPPER COMMUNICATIONS CABLING – SHIELDED: CAT6A F/UTP

A. Horizontal Cabling

1. Model: Belden #10GX63F CAT6A Enhanced (625MHz), four shielded bonded-pair.
2. Rating: CMP rated.

B. Termination

1. MDF/IDF Rooms: CAT6A patch panels with rear cable manager.
2. Wall/Ceiling Plate: RJ45 Category 6A 10GX modular jack.
3. Floor Mount: RJ45 Category 6A 10GX modular jack.

C. Patch Cords – As Required

1. Model: Belden or Uniprise.
2. Category: As required for equipment being connected.
3. Length: As required.
4. Quantity: As required.
5. Color: Per Owner's standard.

2.05 FIBER OPTIC COMMUNICATIONS CABLING

A. Inter Building Backbone – Armored

1. Innerduct: Not required with armored cable.
2. Single Mode: CommScope R-012-DZ-8W-FSUBK.

    a. Mode: Singlemode.
    b. Rating: OFNR rated.
    c. Strands: 12 Strand Cable.
    d. Armor Type: Interlocking Aluminum.
    e. Fiber Type: (OS1) G.652.D and G.657.A1.
    f. Standard: ANSI/ICEA S-83-596.
3. Multimode: None of this project.

B. Intra Building Backbone

1. None of this project.

C. Fiber Termination

1. Cable Ends: LC-type connectors.
2. Housing: CommScope Uniprise

    a. LC-type connectors mounted inside LC Duplex connector panels within the Closet Connector Housing.
    b. 4U sized housing at MDF.
    c. 1U-sized housing at BDF's.
3. Connectors: Provide fusion splice-on connectors (SOC); mechanical connectors are not permitted.

PART 3 - EXECUTION

3.01 GENERAL

A. All system cabling and terminations are to be installed in accordance with the manufacturer's instructions and as shown.

B. All necessary interconnections, services, and adjustments required for a complete and operable system shall be provided. All installation work must be done in accordance with the safety requirements set forth in the general requirements of ANSI C2 and NFPA 70.

3.02 TEST EQUIPMENT

A. Provide at least one (1) each of the following items or approved functional equivalents for the duration of each test:

1. Level 11, Cat 6 Cable Pair Tester.
2. Time Domain Reflectometer.
3. True RMS Audio Digital Volt-Phm-Millimeter.
4. Tone Test Sets.
5. Optical Power Meter.
6. Site Portable Communication Systems.
7. Any other items of equipment or materials required to demonstrate conformance with the contract documents.
8. Voice Cabling Plant Tester – Capable of detecting shorts, opens, reversals, miswiring, and cross twists.
9. All testing equipment models are to be approved by the District Information Services Department.

3.03 WIRE AND CABLE INSTALLATION

A. All wire and cable shall be continuous and splice-free for the entire run length between designated connections or terminations.

B. Identify data and voice cables distinctly using different colors of the overall jacket or insulation.

C. Verify that all raceways have been de-burred and properly joined, coupled, and terminated before installation of cables. Verify that all raceways are clear of foreign matter and substances before installing wire or cable.

D. Inspect all conduit bends to verify the proper radius. Comply with the Code for minimum permissible radius and maximum permissible deformation.

E. Apply a chemically inert lubricant to all wires and cables before pulling in the conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer. Use multi-spool rollers where the line is pulled in place around bends. Do not pull reverse bends.

F. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool-formed thermal expansion loops at cable at manholes, handholes, and both sides of all fixed-mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.

G. Cable Tray Exposed Cable Installation: To conform to EIA/TIA 569, 10.4. Provide at least twice the listed separation for all high-intensity EMF sources (including but not limited to motors, transformers, and copiers).

H. Placement: Do not obscure access to access doors, hatches, air dampers, valves, cable trays, junction boxes, pull boxes, or similar access areas.

I. All wall and floor penetrations are to have pipe sleeves.

3.04 SIGNAL POLARITY AND COLOR CODE CONVENTION

A. RJ45 – Per EIA 568B.

3.05 WIRING AND CABLE INSTALLATION, SUPPLEMENTAL OUTSIDE PLANT PROCEDURES

A. Cable Pulling: Test existing duct lines with a mandrel and thoroughly swab out to remove foreign material before pulling cables. Pull cables downgrade with the feed-in point at the manhole or buildings of the highest elevation. Use flexible cable feeds to convey cables through manhole openings and into duct runs. Accumulate cable slack at each manhole or junction box where space permits by training cable around the interior to form one complete loop. Maintain minimum allowable bending radii forming such loops. Do not exceed the specified cable bending radii when installing cable under any conditions, including turnips into outdoor pedestals or other enclosures. The cable with tape shield shall have a bending radius not less than 12 times the overall diameter of the completed cable. If basket-grip cable-pulling devices are used to pull cable in place, cut off the cable section under the grip before splicing and terminating.

B. Cables in Manholes and Handholes. Do not install cables utilizing the shortest route, but route along those walls providing the longest route and the maximum spare cable lengths. Form cables to closely parallel walls so as not to interfere with duct entrances and support on brackets and cable insulators. In existing manholes and handholes where new ducts are to be terminated or where new cables are to be installed, locate the existing installation of cables, cable supports, and grounding as required for a uniform installation with cables carefully arranged and supported. Install cables at the middle and bottom of cable racks, leaving top space opening or future cables, except as indicated for existing installations.

1. No splices are allowed in manholes. Provide continuous inter-building cabling.

C. Cable tags in manholes and handholes. Provide cable markers (or tags) per TIA/EIA 606.

3.06 WIRING PRACTICE

A. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.

B. Dress, lace, or harness all wire and cable to prevent mechanical stress on electrical connections. A connection point shall support no wire or cable. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.

C. Correct any and all of the following unacceptable wiring conditions:

1. Deformed, brittle, or cracked insulation.
2. Torn or worn cable jacket.
3. Excessively scored cable jackets.

4. Insulation shrunken or stripped further than 1/8" away from the actual connection point within a connector or on a punch block.
5. Ungrommeted, unbushed, or uninsulated wire or cable entries.
6. Deformation or improper radius of wire or cable.

3.07 VOICE AND DATA CABLING WIRING PRACTICE

Conform to the following in addition to the general requirements above:

A. Limit cable bends to a minimum radius of eight (8) times the cable diameter except where otherwise noted herein.

B. Box Loops: At data cabling, form circular radius bends of eight (8) times the cable diameter minimum. Up to two (2) flat bends of 90 degrees or less are permitted in any single cable run where necessary to accommodate field wiring conditions. Flat bends exceeding 90 degrees will not be accepted.

C. Receptacle Loop: At the receptacle, a single bend of 90 degrees or less and a 1-inch radius shall be permitted, subject to the cable manufacturer's certification of such an installation meeting Category 6 requirements. The Contractor will verify the performance of the proposed installation in a mockup using the proposed cabling, jacks, raceway, and listed test equipment before proceeding.

D. Secure: Tie wraps to be hand (not tool) tightened.

E. Run Lengths:

1. Station, Horizontal, and Closet Links:

a. Horizontal distribution runs (including vertical portions) shall not exceed 90 meters (295 feet) from the station outlet to the associated communications closet.
b. Station cabling runs to be three (3) meters (10 feet) or less.
c. Closet distribution wiring should not exceed 6 meters (19.5 feet).

F. Lightning Protection: Provide a solid-state lightning protection system for all incoming voice copper cable pairs. Lightning protection system shall allow for the easy removal/replacement of protector units. All incoming copper voice cable pairs shall be cross-connected from the lightning protection system to a rack-mounted patch panel.

3.08 LABELING

A. Cable and MDF/IDF Labeling:

1. The Contractor shall label and document all installed data cable infrastructure components. All labeling information shall be recorded on the as-built drawings, and all test documents shall reflect the appropriate labeling scheme.
2. All label printing will be machine-generated using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the cable's outside diameter, and placed within view at the termination point on each end. Outlet labels will be the manufacturer's labels provided with the outlet assembly.
3. Faceplates:

a. Each faceplate shall be labeled as follows:

i. At the top of the faceplate: The name of the MDF/IDF (or name provided by the District Information Systems Department) where the destination's cable is located.

ii. If more than one rack is located in the MDF or IDF room, a rack number shall also be included in the label.

3.09 TESTING

A. Category 6 System:

1. Test and report on each segment separately, including station cabling, horizontal distribution (each segment, if multiple), and telecommunications closet wiring.
2. Test each collective segment as a whole.
3. Note exceptions to Category 6 standards, as applies. Remedy and retest.
4. Submit a copy of the final results on CD-ROM or DVD-ROM organized by circuit number, consistent with the circuit numbering scheme used in preparing submittal drawings and labeling receptacles and terminations.

3.10 ACCEPTANCE REVIEW AND TESTING PROCEDURES

Complete all work of this section. Submit test report. Submit review copies of Operating and Maintenance Manuals, less reduced Record Drawings. Notify the Architect in writing that the work of this section is complete and fully complies with the contract documents. Request acceptance and review testing. The Architect's representative will verify the submitted test data and otherwise direct testing and adjustment of this work. These procedures may be performed at any hour of the day or night as required by the representative of the Architect to comply with the project schedule and avoid conflict with these procedures from possible ongoing work of other sections. Provide all specified personnel and equipment at any time without claim for additional cost or time.

A. Personnel: Provide services of the designated supervisor and additional technicians familiar with the work of this section. Provide a quantity of technicians as required to comply with the project schedule.

B. In addition, provide the following:

1. All testing equipment.
2. Complete set of the latest stamped, actioned submittals of record for reference.
3. Complete set of shop and project site test reports.
4. Complete set of manufacturer's original operation, instruction, and service manual for each equipment item for reference.

C. Demonstrate complete operation of all systems.

D. Make adjustments as directed by the Architect's representative.

E. Correct all items that fail to comply with contract documents, as reasonably determined by the representative of the Architect, in a timely manner.

3.11 FIBER TESTING

A. Fiber – in accordance with the current TIA standard ANSI/TIA-568-B.3 specifications for fiber optic cable.

1. District Information Systems Department shall provide all test results and fiber lengths.

3.12 CLOSEOUT

A. Punch List: Perform all remedial work with no claim for additional cost or time. Where required, retest and submit test report. Notify the Architect of the completion of the punch list.

B. Portable Equipment: Furnish all portable equipment and spares to the designated representative of the District, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.

C. Submit Operating and Maintenance Data Manuals.

D. Submit Project Record Documents.

E. If applicable, replace construction locks with permanent locks. Transmit keys to the District.

F. Conduct specified training.

G. Submit warranty dated to run from the date of the District's acceptance of the work.

3.13 DISTRICT'S RIGHT TO USE EQUIPMENT

Acceptance of the work of this section will be after the completion of corrections and adjustments required by the Punch List, which results from acceptance review and testing of the completed installation. The District reserves the right to use equipment, material, and services provided as part of the work of this section before acceptance without incurring any obligation to accept any equipment or completed systems until all punch list work is complete and all systems comply with the contract documents, or accept any claim for additional cost or time.

END OF SECTION 27 10 00

SECTION 27 11 00 COMMUNICATIONS EQUIPMENT

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. The provisions of Section 16011, "General Requirements, Electrical," and Section 16050, "Basic Electrical Materials and Methods," apply to this section as if fully repeated herein.

C. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Communications Equipment, as indicated on the drawings specified herein or reasonably required to complete the work. The work includes, but is not limited to, the following:

1. Equipment enclosure systems, including racks and accessories.
2. Uninterruptable power systems and surge suppressors.
3. Routers.
4. Switches.
5. Grounding.

D. This section specifies common standards of materials and execution for the work of Division 16700 Sections. Refer to the requirements of such sections for the functional requirements of systems to be provided using the materials and methods of this section, as well as the additional standards, material, and execution specific to each section.

1.02 SUBMITTALS

A. In addition to the requirements of Division 01, submit as applies, all materials for review arranged in same order as Specifications, individually referenced to specification section, paragraph and contract drawing number. Conform in every detail as applies to each referencing section.

B. Submit all drawings on sheets of the same size.

C. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.

D. Progress Schedule: Include duration and milestones for at least the following:

1. All submittals specified.
2. Completion of equipment buyout.
3. Completion of equipment receipt at fabrication shop.
4. Shop fabrication.
5. Shop testing.
6. Shipment to site.
7. Installation.
8. Field testing.
9. District's first event date.

E. Manufacturer's Product Data:

1. List of Material. For each item include:

a. Manufacturer.
b. Model number.
c. Listing: UL or none.
d. Quantity.

2. Manufacturer's Product Data Sheets: In a sequence of List of Materials, a data sheet for each item, including all accessories, is marked for the proposed product.

F. Shop Drawings:

1. Floor Plans indicating rough-in, mounting height, conduit size, wire type, and wire fill.
2. Sections/Elevations with mounting location reference.
3. Enlarged plans and mounting details as necessary.
4. Wire run sheets (if used) indicating wire number, source, designation, signal type, wire type, and operating level or voltage (if applicable).
5. Provide full-size front elevation details of patch bays with layout and text designations.

G. Samples: Samples for review by the Architect of all finishes/materials which will be visible to the public, including but not limited to:

1. Receptacles and controls with the associated trim plate.
2. Provide at least a 2" x 2" sample for other items.

H. Samples: Samples for review by the Architect of all finishes/materials which will be visible to the public, including but not limited to:

1. Receptacles and controls with the associated trim plate.
2. Provide at least a 2" x 2" sample for other items.

I. Shop and Project Site Test Reports:

1. Schedule: Submit test reports in a timely manner relative to project schedule such that the Architect's representative may verify submitted test data without delay in progress.
2. Shop test report: Submit before shipping completed equipment racks to the project site.
3. Project site test report: Submit the following system completion prior to and as a condition precedent to acceptance review and testing of the work of this section.
4. Content: Include at least:

a. Time and date of start of burn-in.
b. Time and date of test.
c. Personnel conducting a test.
d. Test equipment, including serial and date of calibration.
e. Test object.
f. Procedures used.
g. Results of test – numerical or graphical presentation.

1.03 QUALITY ASSURANCE

Comply with the requirements of Division 01 and the following:

A. Company: Work of each section in this Division shall be performed by an installer who has at least five (5) years of direct experience with the devices, equipment, and systems of the type and scope specified herein and who has a fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the project jurisdiction. A licensed C-10 contractor shall

perform raceway installation. All other work shall be performed by parties licensed to perform such work.

B. Personnel: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for the proper performance of the work of this section. Supervisors shall have at least five (5) years of direct experience in similar work. Installation and maintenance personnel shall have at least three (3) years of direct experience in similar work.

C. Designated supervisor: Provide a designated supervisor who is present and in responsible charge of the fabrication shop and on the project site during all phases of installation and testing of the work of this section. This supervisor shall be the same individual through the execution of the work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the contractor intervene.

D. Coordination: Coordinate the work of this section with the work of all other sections. Comply with Division 01.

E. Verification: Verify dimensions and conditions at the project site. Submit any conflicts in a timely manner for resolution.

F. Project site installation and testing: Install as specified herein. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein—request verification of project site test in a timely manner.

G. Verification of submitted test data: Retest in the presence of designated representatives of the Architect at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with the work of this section. Provide all test equipment. Provide a complete set of the latest stamped, actioned submittals of record for reference. Provide a complete set of shop and project site test reports. Provide a complete set of the manufacturer's original operation, instruction, and service manuals for each equipment item for reference.

H. Reference/Project record documents: At all times when the work is in progress, maintained at the workplace, fabrication shop, or project site as applicable, a complete set of the latest stamped, actioned submittals of record for reference. Also, maintain a separate, clean, undamaged set to prepare Project Record Documents. Also, maintain a complete set of the manufacturer's original operation, instruction, and service manuals for each equipment item at the workplace for reference.

I. Schedule: Comply with the project schedule. Make all submittals specified herein in a timely manner. Failure to make timely submittals complete as specified herein is considered to be a lack of substantial progress in the work of this section.

J. Deliver all equipment, devices, and materials required for the work of this section and install, test, and ready all work for acceptance testing at least 14 days prior to the completion date for the associated area of the project unless specifically instructed otherwise by the Architect.

K. Shop Fabrication and Testing: Assemble and fully wire equipment racks and equipment backboards at a fabrication shop off the project site. Burn in for not less than one hundred sixty-eight (168) hours. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein—request verification of shop test in timely manner. Following verification of the shop test and when installation locations are ready as specified herein, deliver such equipment racks and equipment backboards to the project site and install them.

L. Temporary Equipment: Provide and operate, without claim for additional cost or time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the Architect,

in lieu of the work of this section which is incomplete or found not in conformance with the Contract Documents as of seven (7) days prior to the completion date. Provide such temporary equipment until acceptance of the work of this section. Thereafter, remove such temporary equipment.

1.04 DELIVERY, STORAGE, AND HANDLING

Comply with the requirements of Division 01 and the following:

A. Deliver materials in manufacturer's original undamaged packages or in bulk packing which provides equivalent protection.

B. Store packaged materials off ground or slab in manner to protect them from elements, especially moisture damage.

C. Deliver equipment to associated equipment rooms at the project site when major work of all other sections is complete, equipment room ventilation is operating with clean filters in place, the area is clean and free from airborne contaminates, and continuing work of other trades will not produce airborne contaminates or permit transport of such airborne contaminates to the equipment rooms.

1.05 REGULATORY REQUIREMENTS

A. Codes and regulations: Perform all work in strict accordance with all applicable Federal, State, County and City codes, regulations, and ordinances.

B. Unlisted Equipment: Certain equipment specified herein does not bear listing by Underwriters Laboratories (UL). Such equipment is specified herein only where no equipment is known to exist bearing such listing which will perform the function required by the District. In such case, apply for field inspection of such equipment. Pay cost of such inspection.

1.06 APPLICABLE STANDARDS & AGENCIES

A. Conform to the following:

1. CEC California Electrical Code.
2. NFPA National Fire Protection Association.
3. CBC California Building Code.
4. UL Underwriters Laboratories.

1.07 OPERATING AND MAINTENANCE DATA

A. Manuals: In addition to the requirements of Division 01, submit two (2) additional sets. Submit in three (3) post binders (not ring binders) with tabs.

B. Include:

1. Index.
2. Systems operating instructions.
3. Maintenance and spare parts schedule.
4. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals for each equipment item. For each set, provide manufacturer's original printed copies only. Photocopies not acceptable.
5. Reduced set of system record drawings.
6. Key schedule.

C. As-Built drawings:

1. Quantity: Three (3) sets.
2. Format: CAD and PDF files on CD-ROM or DVD-ROM.
3. Content: All drawings required under "Shop Drawings". Show "as installed" condition. Where room designations according to project permanent signage differ from construction designations in the contract documents, show both designations.

D. Warranty certificates: Comply with Division 01.

1.08 WARRANTY SERVICE

In addition to provisions of Division 01, provide the following:

A. Warranty: Warrant all of the work of this section to be free from defects in materials and workmanship for a period of twelve (12) months from the date of District acceptance.

B. Response time: Provide a qualified technician familiar with the work at the project site within twenty-four (24) hours after receipt of a notice of malfunction. Provide the District with the telephone number attended eight (8) hours a day, five (5) days a week, to be called in the event of a malfunction.

C. Off-site service: Conduct all warranty repairs and services at the project site, unless in violation of manufacturer's standard product warranty. Provide substitute systems, equipment, and/or devices acceptable to the District for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts and personnel to and from project site.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

~~A. Equipment Enclosures and Accessories~~

~~4. APC http://www.apc.com~~

~~B. Uninterruptable Power Systems and Surge Suppressors~~

~~1. Tripp Lite http://www.tripplite.com~~

C. Routers and Switches

1. Ruckus® www.ruckusnetworks.com

~~D. Security~~

~~1. Palo Alto Networks https://www.paloaltonetworks.com~~

2.02 ROUTERS

A. MDF Aggregation Router

1. None of this project.

B. Internet Edge Router

1. None of this project.

2.03 SWITCHES

A. MDF Aggregation Switch (Layer 3)

1. None of this project.

B. Ethernet Switch

1. Model: ICX8200-C08ZP. – Rugged for hot climate weather.
2. Quantity: As specified in drawings.
3. Ports: 8 Port Multigigabit PoE Switch

C. IDF Access Switch (Layer 2)

1. None of this project.

D. Server Network Switch (Layer 2)

1. None of this project.

2.04 SECURITY

1. None of this project.

2.05 WIRELESS LAN

1. None of this project.

PART 3 - EXECUTION

3.01 GENERAL

A. Perform the work of this section in accordance with acknowledged industry and professional standards and practices and the procedures specified herein.

B. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.

3.02 TEST EQUIPMENT

A. Furnish, store, and maintain test equipment for both routine and acceptance testing of the work of this section:

1. Provide all items of equipment or materials required to demonstrate conformance with the contract documents.

3.03 FINISHES

A. Finishes and materials for equipment mounting in furniture or casework, and in general any item or component herein which is visible shall adhere to the following:

1. Finish shall be as directed by the Architect.
2. Wooden speaker back boxes and baffles shall be painted flat black if not otherwise finished or stained.

3.04 EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT BACKBOARD FABRICATION

A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.

B. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.

C. Provide permanent labels for all equipment and devices. Where possible, fasten; such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.

D. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.

3.05 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

A. Upon completion of the installation of all equipment in an area, perform the following tests and record results. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Correct all non-conforming conditions prior to requesting acceptance review testing. Perform at least the following procedures:

1. Mechanical Verification:

   a. Integrity of all support provisions.
   b. Absence of debris of any kind, tools, etc.

2. Power and Isolated Ground Verification:

   a. Isolation of Isolated Ground System from raceway and related ground.
   b. Grounding of devices and equipment. Integrity of signal and technical power system ground connections.
   c. Proper provision of power to devices and equipment.

3. Signal Wiring Verification:

   a. Integrity of all insulation, shield terminations and connections.
   b. Routing and dressing of wire and cable.
   c. Continuity, including conformance with wire designations on running sheets, field and shop drawings.
   d. Absence of ground faults.
   e. Polarity.

4. Use the proper sequence of energizing systems to minimize the risk of damage. Energize.

3.06 ACCEPTANCE REVIEW AND TESTING PROCEDURES

A. Complete all work of this section. Submit test report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Architect in writing that the work of this section is complete and fully complies with the contract documents. Request acceptance review testing. The representative of the Architect will condut verification of submitted test data, and otherwise direct testing and adjustment of this work. These procedures may be performed at any hour of the day or night as required by the representative of the Architect to comply with the project schedule and avoid conflict with these procedures from possible ongoing work of other sections. Provide all specified personnel and equipment at any time without claim for additional cost or time.

B. Personnel: Provide services of the designated supervisor and additional technicians familiar with work of this section. Provide quantity of technicians as required to comply with the project schedule.

C. In addition, provide:

1. Set of hand and power tools appropriate for performance of adjustment of and corrections to this work. Include spare wire and connectors and specified tooling for application.
2. Ladders, scaffolding and/or lifts as required to access high devices.
3. All test equipment.
4. Complete set of latest stamped, actioned submittals of record for reference.
5. Complete set of shop and project site test reports.
6. Complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.

D. Demonstrate complete operation of all systems and equipment including portable equipment.

E. Adjust as directed by the representative of the Architect.

F. Correct, in a timely manner, any work that fails to comply with the contract documents as reasonably determined by the representative of the Architect.

3.07 CLOSEOUT

A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit test report. Notify Architect of completion of punch list.

B. Portable Equipment: Furnish all portable equipment and spares to the designated representative of the District along with the complete documentation of the materials presented.

C. Submit Operating and Maintenance Data manuals.

D. Submit project record documents.

E. Conduct specified training.

F. Submit warranty, dated to run from the date of acceptance of the work.

3.08 DISTRICT'S RIGHT TO USE EQUIPMENT

A. Acceptance of the work of this section will be after completion of corrections and adjustments required by the Punch List which results from acceptance review and testing of the completed installation. The District reserves the right to use equipment, material, and services provided as part of the work of this section, prior to acceptance, without incurring any obligation to accept any equipment

or completed systems until all punch list work is complete and all systems comply with the contract documents, or accept any claim for additional cost or time.

END OF SECTION 27 11 00

SECTION 31 23 33 – TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Trenching and Backfilling, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes but is not limited to the following:

1. Excavation, backfill and compaction for utilities.

C. Related Section:

1. Section 33 11 16: Site Water Distribution Piping.
2. Section 33 31 00: Sanitary Sewerage Piping.

1.02 GENERAL PROVISIONS

A. Contractor is responsible for the accuracy of all layout work and grades. Erect sheeting, shoring and bracing as necessary for protection of persons, improvements, and excavations. Keep excavation free from water and other fluids until backfilling is completed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Backfill material shall be non-expansive granular soils that meet the USCS classifications of SM, SP-SM, or SW-SM, with a maximum rock size of 3 inches, and 5 to 20% passing the No. 200 sieve and a minimum sand equivalent of 20.

B. Select bedding sand shall be Class A screened fill sand with a maximum particle size of 1-1/2 inches, not to exceed 18 percent, free of expansive materials, debris, and organic matter.

PART 3 - EXECUTION

3.01 TRENCHING

A. Layout: Lay out route of each underground utility prior to trenching. Review drawings and coordinate with adjacent underground work to avoid conflicts.

B. Clearances: Maintain required horizontal and vertical depth clearances from structural footings or utility trenches running parallel to footings. Maintain area of footing bearing prism and in event that the utility cannot be relocated or its depth changed, proceed as directed by Architect. Where required, lowering of structural footings to maintain proper clearances for underground utilities trenching shall be accomplished as directed.

C. Excavate trenches for utilities to required lines, grades and elevations indicated on drawings and as specified. Hand trim changes in direction and bottoms of trenches. Provide shoring in trenches over 5 feet in depth and also in trenches where unstable soil conditions are encountered.

D. Pipe Trench Dimensions: Following requirements are considered minimal unless drawings indicate otherwise in order to provide adequate pipe clearances and bedding. Provide trenches wider than specified minimum where required to properly install particular type of piping. In event that utility company regulations, code requirements, or pipe manufacturer's recommendations differ from these provisions, most restrictive requirements shall take precedence. Pipe burial depth is from finish grade or pavement surface to top of pipe. Trench width shall be measured at top of pipe.

1. Pipe Burial Depths:

Sewer and Drainage:	24" + pipe O.D. + 3" bed
Gas:	30" + pipe O.D. + 4" bed
Water (Domestic)	
PVC:	30" + pipe O.D. + 4" bed

2. Trench Width:

Sewer & Drainage:	12" min., 18" max + pipe O.D. for 4" to 18" dia. pipe
Gas:	8" + pipe O.D.
Water (Domestic):	8" + pipe O.D.

E. Common Trench Requirements:

1. Copper piping or metal gas piping shall not be installed in a common trench with any other dissimilar.
2. Multiple parallel lines of piping in a common trench shall be separated a minimum of 12 inches, both horizontally and vertically, between individual pipes.
3. Domestic water piping shall not run parallel in a common trench with sewer of drainage lines.
4. Electrical power and communications conduit, etc. shall not be run in a common trench with sewer, drainage, water or gas piping.

F. Additional provisions for Underground Piping within Building Areas: Refer to applicable specification sections of Division 15 and as indicated on drawings.

G. Requirements for Underground Electrical and Communications Conduit, Ducts, etc.: Refer to applicable specification sections of Division 23 and as indicated on drawings.

3.02 BEDDING AND BACKFILLING OF TRENCHING

A. Bedding: Lay and bed pipe in compacted select bedding sand of thickness specified above, and backfill with same material to a height of 8” above top of pipe. Place in 8” layers and compact to a minimum relative density of 90 percent. Compact in a manner that will not displace or damage pipe.

1. Excavate under bell portions of the piping for uniform bearing.
2. Conduits and ducts which are laid in a single layer, parallel and in same horizontal plane and which are not concrete encased, shall have bedding as specified above. Select sand bedding for multi-layered banks of unencased conduit shall be water settled but not flooded to fill voids between conduits with sand.

B. Backfilling: Trenches above top of bedding, and concrete encased utilities, shall be backfilled with select backfill material at optimum moisture content, placed in 6 to 8 inch layers and compacted to a minimum relative density of 90 percent. Trench backfill in pavement or other areas where

compaction greater than 90 percent is required shall be compacted in accordance with those requirements to specified depth.

C. Do not backfill until installation has been approved. Promptly install pipe after trenching has been done to keep excavation open as short a time as possible.

D. Underground utility materials requiring special bedding and backfilling methods shall be installed as recommended in conjunction with these materials or as indicated on drawings.

3.03 PROTECTION OF WORK FROM FLOODING

A. Construct all temporary ditches and berms and supply and maintain adequate pumps, piping, and other equipment necessary to protect work, existing structures, and equipment, and to other property located on premises or adjacent thereto, from damage by flooding due to rain or subsurface water. Utility lines shall not be laid in trenches which contain water or that are muddy.

3.04 SITE CLEANUP

A. All excess and unsuitable excavated material shall be removed from site.

3.05 FIELD QUALITY CONTROL

A. Obtain Soils Engineer’s approval for excavation, fill materials, method of placing and compaction. Soils Engineer will perform tests to evaluate compliance with specifications.

END OF SECTION 31 23 33

SECTION 32 12 16.13 PLANT - MIX ASPHALT PAVING

1.1 GENERAL

A. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Hot-Mix Asphalt Paving, as indicated on the Drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following.

1. Hot-Mix Asphalt Paving as per drawings.

B. References:

1. ASTM C 131-96, Standard Test Method for Resistance to Degradation of Small-Size Course Aggregate by Abrasion and Impact in the Los Angeles Machine
2. ASTM D 977-98, Standard Specification for Emulsified Asphalt
3. Caltrans Standard Specifications, April 2006 Edition
4. ASTM D 1188-96, Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
5. ASTM D 1559-89, Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
6. ASTM D 2027-97 Standard Specification for Cutback Asphalt (Medium-Curing Type)
7. ASTM D 2041-95, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
8. ASTM D 2397-98, Standard Specification for Cationic-Emulsified Asphalt
9. ASTM D 2726-96a, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
10. ASTM D 3381-92, Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction

C. Submittals: Product Data, material certificates, and the following:

1. Mix design of asphalt concrete mixture. Hveem or Marshall Method
2. Copy of test results from tests conducted to assure compliance to contract documents.
3. Manufacturer’s application instructions for soil sterilant.

D. Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

E. Regulatory Requirements: Conform to applicable standards of authorities having jurisdiction for asphalt paving work.

F. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:

1. Tack Coats: Minimum surface temperature of 60 deg F.
2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

1.2 PRODUCTS

A. Coarse Aggregate: Caltrans, Type A, ½" maximum, medium grading, sound; angular crushed stone; crushed gravel;

B. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone; gravel, properly cured blast-furnace slag, or combinations thereof.

C. Asphalt Cement: PG70-10 Paving Grade

D. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

E. Soil Sterilant: Selective type pre-emergence control chemical containing 60 percent Trifluralin minimum.

1. Trflan or Spike 80W by Dow AgroSciences
2. Trific 60DF by Terra Industries Inc.
3. Equal

L. Hot-Mix Asphalt: Central plant hot mix

1. Central plant hot mix
2. Develop mix design according to Marshall Method (ASTM D1559) to achieve optimum asphalt content as shown by test data curves based on testing samples containing ½ percent increments of asphalt content. Samples shall include minimum of two with asphalt content above optimum and two with asphalt content below optimum.
3. Make tests in accordance with ASTM D 1559 and ASTM D 1075. (50 blow count Marshall)
4. Final Design by Hveem Method shall meet the following criteria:

   a. Stability: 1200 lbs. minimum
   b. Flow: 8 minimum, 18 maximum
   c. Air voids: 2 percent minimum, 5 percent maximum
   d. Voids in mineral aggregate: 15 percent minimum
   e. Asphalt cement by weight of total: 5 percent minimum
   f. Dry Strength: 200 psi
   g. Index of Retained Strength: 75%

4. The following mix design shall mee the minimum requirements for this project
   a. CALTRANS ¾" HMA Type A with 15% RAP
   b. Asphalt Binder PG-70-10

1.3 EXECUTION

A. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

1. Before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

B. Soil Sterilant: Apply sterilant according to manufacturer's recommended rates and written application instructions.

1. Applicatoin shall be no more than one day before installation of paving
2. Take necessary precautions to protect adjoining property and areas designated for planting

D. Tack Coat: Apply uniformly to existing surfaces of previously constructed asphalt or portland cement concrete paving and to surfaces abutting or projecting into new, hot-mix asphalt pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. of surface. Allow tack coat to cure undisturbed before paving.

1. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

E. Place base and surface courses of hot-mix asphalt at temperatures between 250 and 325 deg F on prepared surface, spread uniformly, and strike off. Place asphalt with self-propelled laydown machine. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness, when compacted.

F. Promptly correct surface irregularities in paving course behind paver. Remove excess material and fill depressions with hot-mix asphalt.

G. Construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

H. Compact paving as soon as placed hot-mix asphalt will bear roller weight. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.
2. Compact to 95 percent minimum.
3. Begin breakdown rolling immediately after asphalt is placed when asphalt temperature is at maximum. Complete breakdown rolling before mix temperature drops below 240 deg F.
4. Complete intermediate rolling as soon as possible after breakdown rolling and before mix temperature drops below 185 deg F. Do not roll paving for compaction purposes after asphalt temperature falls below 185 deg F.
5. Execute compaction so visibility of joints is minimized. Complete finish rolling to improve asphalt surface as soon as possible after intermediate rolling and while asphalt paving is still warm. Do not use vibration for finish rolling.

J. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt compacted by rolling to specified density and surface smoothness.

K. Surface shall be uniform with no “birdbaths”. Leave finished surfaces clean and smooth. Variations from specified grades shall not exceed ¼”

L. Field Quality Control: When tested with 10 foot straight edge, surface of complete work shall not contain irregularities in excess of ¼”.

END OF SECTION 32 12 16.13

SECTION 32 13 00 SITEWORK CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this Section.

B. Scope of work: The work under this Section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Sitework Concrete, as indicated on the Drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following.

1. Cast-In-Place concrete sidewalks.
2. Curbs and gutters.
3. Interior and exterior raised concrete planters and benches.
4. Concrete Pavers

C. Related Sections:

1. Section 31 22 19 Finish Grading

1.02 REFERENCES

A. ASTM A185 – Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
B. ASTM A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
C. ASTM C33 – Concrete Aggregates.
D. ASTM C94 – Ready-mixed Concrete.
E. ASTM C150 – Portland Cement.
F. ASTM C171 – Sheet Materials for Curing Concrete.
G. ASTM C979 – Pigments for Integrally Colored Concrete.
H. ASTM D1751 – Preformed Expansion Joint Fillers for Concrete, Paving and Structural Construction.
I. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
J. Chapter 19A, California Building Code.

1.03 ACCESSIBILITY REQUIREMENTS

A. Concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Section 11B-302 and 11B-403.
B. Stairs

1. The radius of curvature at the leading edge of the read shall be no greater than ½”. Nosings that project beyond risers shall bave the underside of the leading edge curved or beveled. The maximum angle for a riser to slope under the tread shall be 30 degrees from vertical. Nosings shall extend 1 ¼” maximum over the tread below
2. Treads shall be 11” deep minimum. Risers shall be 7” high maximum and 4” high minimum. All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Open risers are not permitted.

C. Detectable Warning Surfaces

1. Detectable warning surfaces shall comply with CBC Section 11B-705.1.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00, Submittal Procedures.

B. Layout Drawings: Provide layout drawing showing location of each type of pavement and construction, and dimensioned locations of expansion and control joints. Do not deviate from location of expansion joints and control joints shown on the drawings.

C. Design Mixtures: Provide design mix for each concrete mixture. Design mix shall include data substantiating the reliability of the proposed mix. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Each design mixture shall be stamped and signed by a registered professional engineer licensed in the state of California.
2. Indicate amounts of mixing water to be withheld for later addition at project site.

D. Product Data

1. Expansion material
2. Curing materials

E. Site Samples

1. Prepare samples indicating slab construction and finish, at the site, cast in the directed locations and orientations. Prepare a minimum 8 foot square sample of each texture and finish required for the project. Include a transverse expansion joint, control joints and edging. Where paving adjoins other material such as pavers, include one edge of sample constructed of the other materials.
2. Approved samples may be part of permanent construction if the sample meets all project requirements and is approved.

1.05 QUALITY ASSURANCE

A. Sitework Concrete work subject to the provisions of Section 01 45 24, Testing and Inspection Requirements, at the option of the Architect.

B. Maintain one copy of all records on site.

C. Acquire cement and aggregate from same source for all work.

D. Conform to Section 1904A.1of CBC and 5.13 of AC1 318-11 when concreting during hot weather.

E. Conform to Section 1904A.1of CBC and 5.12 of AC1 318-11 when concreting during cold weather. No pouring permitted below 40 degrees Fahrenheit.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded sleeves, utilities and components which are concealed from view.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150 – Type V Portlant Type, one manufacturing plant only.

B. Aggregates: ASTM C33, single source for all materials.

C. Water: Clean, fresh and potable

2.02 ACCESSORIES

A. Expansion joints:

1. Expansion Joint Filler – ASTM D1751: Close cell bituminous saturated fiberboard, ½ inch thick; FIBER EXPANSION JOINT manufactured by The Burke Co., Montebello, CA, or approved equal.
2. Joint Devices: Integral extruded polystyrene plastic; ½ inch thick, with removable top strip exposing sealant trough; JOINT CAPS, manufactured by The Burke Company, or equal.
3. Sealant: Polyurethane two-component type, self leveling, for level surface application, UREXPAN NR-200, manufactured by the Pecora Corp., Harleysville PA, or equal. Color shall be selected by the Architect from manufacturer's standard list of colors.
4. Sealant Primer: As recommended by Sealant Manufacturer.

2.03 CONCRETE MIX

A. Mix and deliver concrete in accordance with Section 1905A, California Building Code.

1. Deliver concrete in transit mixers only. Mix concrete for 10 minutes minimum at a peripheral drum speed of approximately 200 feet per minute. Mix at jobsite minimum 3 minutes. Discharge loads in less than 1-1/2 hours or under 300 revolutions of the drum, whichever comes first, after water is first added.
2. Design Mix: Conform to 1904A.2 California Building Code.
3. A registered civil engineer with experience in concrete mix design shall select the relative amounts of ingredients to be used as basic proportions of the concrete mixes proposed for use under this provision.
4. Selection of Concrete Proportions: Concrete proportions shall be determined in accordance with the provisions of ACI 318, Section 5.2.
5. Quantities of Materials: Provide Weighmaster's Certificate for each load of concrete.
6. Do not exceed 0.45 water-cement ratio, by weight.
7. Concrete shall be mixed by transit mixers only.

B. Required Strength: Minimum 4,500 psi for sitework concrete.

2.04 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars, uncoated finish.

B. Welded Steel Wire Fabric: Plain type, ASTM A185; in flat sheets; uncoated finish, 6 x 6 inch, No. 6 gage.

C. Tie Wire: Annealed steel, minimum 16 gage size.

D. Dowels: ASTM A615; 60 ksi yield grade, deformed steel, uncoated finish.

E. Fiber Reinforced Concrete

1. FIBERMESH 150: ASTM C 1116/C 1116M, Type III Fiber Reinforced Concrete. Manufactured by PROPOX CONCRETE SYSTEMS. 100% virgin homopolymer polypropylene multifilament fibers containing no reprocessed olefin materials. Provide 1.0 – 1.5 lbs. per cubic yard.
2. FIBERMESH 650: ASTM C 1116/C 1116M, Type III Fiber Reinforced Concrete. Manufactured by PROPOX CONCRETE SYSTEMS. Alloy polymer macro-synthetic fiber featuring e3 patented technology manufactured to an optimum gradation and highly oriented to

allow greater surface area contact within the concrete resulting in increased interfacial bonding and flexural toughness efficiency. Provide a minimum of 3.0 lbs. per cubic yard

2.05 CURING MATERIALS

A. Polyethylene Film ASTM C171; 8 mil thick, clear, manufactured from virgin resin with no scrap or additives. POLYETHYLENE, No. 227, manufactured by The Burke Co., Montebello, CA, or equal.

B. Water: Potable and not detrimental to concrete.

C. Curing Compound: ASTM C309; wax resin base, WHITE PIGMENTED CURING COMPOUND, by The Burke Co., Montebello, CA, or equal.

2.06 COLORED CONCRETE

A. Provide colored concrete as marked on the AS (Architectural Site) Sheets. Colored concrete shall be as selected by Architect from the DAVIS COLORS color chart. Color Group: Standard.

2.07 PAVERS

A. Concrete Pavers shall be WAUSAU TILE Type 3, 24” x 24” x 2 ¾”. Provide (2) colors: FDX 5008 Tan and FDX 3008 Gray.

B. Pavers for ADA curb ramps shall be WAUSAU TILE ADA-1 Precast Concrete Truncated Domes, 24” x 24” x 2 ¾”. Color shall be Yellow 33538 per Federal Standard 595B.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site concerns.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer’s instructions.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer’s written instructions. Remove sharp projections.

3.03 PLACING CONCRETE (GENERAL)

A. Convey and deposit concrete in accordance with Section 1905A, California Building Code. Remove loose dirt from excavations.

B. Notify Job Inspector minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and accessories are not disturbed during concrete placement.

D. Ensure sub-base or base materials have been compacted or otherwise treated.

E. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.

F. Place concrete continuously between predetermined expansion joints.

G. Do not interrupt successive placement; do not permit cold joints to occur. Avoid segregation of materials. Perform tamping and vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.

H. Do not allow concrete to fall free from any height which will cause materials to segregate. Maximum height of free fall permitted in any case: 5 feet.

I. Defective Installation: Repair and clean at Contractor's expense all concrete damaged or discolored during construction. Where concrete requires repair before acceptance, the repair shall be made by removing and replacing entire Section between joints and not by refinishing the damaged portion.

J. Proper curing of concrete surfaces is the responsibility of the Contractor. Concrete failing to meet specified strength shall be removed and replaced.

3.04 ON-SITE CONCRETE SIDEWALKS AND RAMPS

A. Forms, Wood: Free from warp, with smooth and straight upper edges, surfaced one side, minimum thickness 1-1/2 inches adequate to resist springing or deflection from placing concrete.

B. Forms, Metal: Gage sufficient to provide equivalent rigidity and strength.

C. Reinforcement: Unless indicated otherwise on the drawings, provide welded steel wire fabric, 6 inches by 6 inches, No. 6 gage at mid-height of sidewalks and ramps. Interrupt reinforcement at expansion joints.

D. Concrete Placement: Dampen subgrade to retain moisture in concrete mix. Tamp and spade to consolidate concrete for entire length of pour. Strike off upper surface to specified grades.

E. Expansion Joint: Locate joint filler as shown on drawings or at maximum 60 feet centers and where slabs join vertical surfaces. Install vertically, full depth of concrete leaving plastic cap at ½ inch depth at top for sealant application.

1. Provide ½ inch diameter greased steel dowels, 12 inches long at expansion joints with one end of dowel lubricated to allow for longitudinal movement. Spacing: 16 inches on center maximum, 6 inches from edges.
2. Remove plastic caps. Prime both sides of joint and apply self-leveling sealant. Provide smooth concave surface.

F. Control Joints – Saw Cut: After floating and finishing, saw cut concrete to a depth of: depth of concrete/4. Curved or non-aligned joints not acceptable. Sealant application not required. Space joints 12 ft maximum oc both ways or as patterned on the drawings.

G. Finish:

1. Screed concrete to required grade, float to a smooth, flat, uniform surface. Edge all headers to ¼ inch radius. Edge expansion joints to ¼ inch radius. Steel trowel to hard surface.

2. Grades less than 6 percent: After final troweling, apply a medium hard broom finish transverse to centerline or direction of traffic.
3. Grades 6 percent or more: Apply slip resistant heavy broom finish and remark as necessary after final finish to assure neat uniform edges, joints and score lines.
4. Walkway grades in excess of five percent shall conform to Section 1133B.7, California Building Code.

H. Curing: Cure surfaces utilizing one of the following methods:

1. Spraying: Spray water over slab areas and maintain wet for 7 days.
2. Spread polyethylene film over slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator. Do not apply liquid curing compound to surfaces scheduled to receive paving units of any kind.

3.05 RAISED PLANTER, BENCHES AND SIMILAR SITE STRUCTURES

A. Forms: Suitable material and type, size, shape, quality and strength to insure construction as designed, true to line and sufficiently rigid to resist deflection during placing of concrete. Clean forms of all dirt, mortar and foreign matter before use.

B. Reinforcement: Refer to drawings for size and spacing. Place accurately and hold in position, using metal chairs, spacers, metal hangers, supporting wires and other devices of sufficient strength to resist crushing under full load. Clean reinforcing steel of mortar, oil, dirt, loose or thick rust and coatings.

C. Coordinate installation of conduits or other inserts.

D. Finish: Provide a smooth, straight, plumb and acceptable finish without burrs or form marks. Cement sacking is not acceptable.

E. Curing: Cure surfaces utilizing one of the following methods:

1. Spraying: Spray water over slab areas and maintain wet for 7 days.
2. Spread polyethylene film over slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator. Do not apply liquid curing compound to surfaces scheduled to receive paving units or finish of any kind.

3.06 CURB AND GUTTER

F. Subgrade Preparation: Subgrade material, base material and compaction requirements as approved by the Geotechnical Engineer.

G. Forms: Single face type required, cut to conform exactly with face batter and radius, sufficiently rigid to resist springing or deflection from concrete placement. Clean forms of all loose dirt, mortar or similar materials and apply a light coating of oil or other suitable material prior to concrete placement.

1. Slip Forms: contractor’s option upon approval of the Architect.

H. Reinforcement: Refer to drawings for size and spacing. Interrupt reinforcement at expansion joints.

I. Concrete Placement: Dampen subgrade to retain moisture in concrete mix. Tamp and spade to consolidate concrete to entire length of pour. Strike off upper surface to specified grades. Cut drain pipies to conform to curb batter.

J. Expansion Joints: Locate joint filler as shown on drawings, or at maximum 20 foot centers. Trim off excess filler material flush to finish surface. No sealant application required.

K. Finish: Trowel to a smooth and even finish with a fine hair broom applied parallel with the line of the work. Round all edges to ½ inch radius. No Contractor identification permitted.

L. Curing: Cure surfaces utilizing one of the following methods:

1. Spraying: Spray water over curb and gutter and maintain wet for 7 days.
2. Spread polyethylene film over areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator.

END OF SECTION 32 13 00

SECTION 32 17 23 PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Pavement Marking, as indicated on the drawings specified herein or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Accessible parking spaces. Provide accessible spaces limited to Keynote 9, 20, and 21 as per Sheet AS1.

1.02 REFERENCES

A. SSPWC – Standard Specifications for Public Works Construction, 1997 Edition.

B. AQMD – Air Quality Management District.

C. Fed Std 595c – Colors Listed in Government Procurement.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00, Submittal Procedures.

B. Submit product data.

C. Submit shop drawing layout of accessible parking spaces, indicating stalls, lettering, safety zones, widths of lines and colors.

D. Field Samples:

1. Provide field sample under the provisions of Section 01 33 00, Submittal Procedures.
2. Provide field sample in the form of one parking lot stall, illustrating coating color, width of stroke, thickness of application and dimensioning.
3. Locate where approved.
4. Accepted sample may remain as part of the work.
5. Do not proceed with pavement marking until sample panel has been approved.

1.04 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality traffic line paint products with ten years experience.

B. Applicator: Company specializing in commercial pavement painting with five years experience.

C. Regulatory Requirements:

1. Conform to Federal Regulations concerning lead content of paints.
2. Conform to AQMD, Local Regulations.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers.

B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, unless otherwise recommended by the manufacturer.

1.06 EXTRA STOCK

A. Provide a one gallon unopened container of each color to the Owner.

B. Label each container with color in addition to the manufacturer's label.

1.07 ACCESSIBILITY REQUIREMENTS

A. Accessible parking spaces serving a particular building or facility shall be located, and dispersed if serving more than one accessible entrance, on the shortest accessible route to an entrance or to multiple accessible entrances. CBC Section 11B-208.3.1.

B. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. CBC Section 11B-208.3.1

C. Minimum number of required accessible parking spaces shall be provided in accordance with CBC Table 11B-208.2 for each parking facility provided.

D. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. CBC Section 11B-208.2.4.

E. Accessible parking spaces and access aisles shall comply with CBC Section 11B-502 and shall be dimensioned to the centerline of the marked lines as follows:

1. Parking spaces and access aisle shall be marked according to CBC Figures 11B-502.2, 11B-502.3 and 11B502.3.3. Their surfaces shall comply with CBC Section 11B-302 and shall be at the same level with slopes not steeper than 1:48 in any direction. CBC Section 11B-502.4
2. Parking spaces shall be 9'x18' minimum and van parking spaces shall be 12'x18' minimum with an adjacent access aisle of 5'x18' minimum. Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces. Van parking spaces shall be permitted to be 9'x18' minimum where the access aisle is 8'x18' minimum.
3. Access aisles shall be marked by a blue painted borderline around their perimeter. The area within the blue borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface, preferably blue or white. Access aisle markings may extend beyond the minimum required length. CBC Section 11B-502.2.3.3
4. Access aisles (parking spaces as well – similar application) shall not overlap the vehicular way. CBC Section 11B-502.3.4.
5. A vertical clearance of 8'-2" minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. CBC Section 11B-502.5.

F. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with CBC Sections 11B-209 and 11B-503 as follows:

1. Vehicle pull-up spaces shall be 8'x20' minimum. Access aisles shall be 5'x20' minimum and shall be adjacent and parallel to the vehicular pull-up spaces. They shall be at the same level with slopes not steeper that 1:48 in any direction. CBC Section 11B-503.4
2. Access aisles for passenger drop-off and loading zone shall be marked with a painted borderline around their perimeter. The area within the borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface. CBC Section 11B-503.3.
3. A vertical clearance of 9'-6" minimum shall be provided for vehicle pull-up spaces, access aisles, and a vehicular route serving them connecting a vehicular entrance and a vehicular exit. CBC Section 11B-503.5

G. Bus loading zones and bus stops shall comply with CBC Section 11B-209 and 11B-810.2 as follows:

1. Boarding and alighting areas shall be of 8'x5' minimum, with 8' measured perpendicular to the curb or vehicle roadway edge, and with 5' measured parallel to the vehicle roadway. Slopes in 8' direction shall be 1:48 maximum. Slopes in 5' direction shall be the same as that of the roadway, the maximum extent practicable. CBC Figure 11B-810.2.2
2. Bus shelters shall provide a minimum 30"x48" clear floor or ground space (36"x 48" or 36" x 60" as applicable in an alcove), with slopes not steeper than 1:48 in any direction, entirely within the shelter complying with CBC Section 11B-305.
3. Bus shelters shall be connected by an accessible route complying with CBC Section 11B-402 to a boarding and alighting area complying with CBC Section 11B-810.2 CBC Figure 11B-810.3

H. Detectable Warning Surfaces:

1. Detectable warning surfaces shall comply with CBC Section 11B-705.1.
2. Detectable warning surfaces shall be yellow conforming to FS 33538 of Federal Standard 595C, except for locations at curb ramps, islands, or cut-through medians where color used shall contract visually with that of adjacent walking surfaces, either light-on-dark, or dark-on-light. CBC Sections 11B-705.1.1.3and 11B-705.1.1.5.
3. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. CBC Section 11B-705.1.1.4.
4. Provide minimum 5 year warranty per DSA Bulletin 10/31/02, revised 04/09/08.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturers:

1. Products of the following manufacturer or supplier form the basis for design and quality intended.

   a. ICI/Sinclair Paint, Commerce, CA.

2. Equal products of the following may be submitted for approval.

   a. Dunn-Edwards Corporation, Los Angeles, CA.
   b. Frazee Paint and Wallcovering, Inc., City of Commerce, CA.
   c. or approved equal.

2.02 MATERIALS

A. Traffic Line Paint:

1. ICI/Sinclair: No. 160 VINYL TRAFFIC PAINT.
2. Dunn-Edwards: VIN-L-STRIPE TRAFFIC PAINT, VINYL EPOXY EMULSION, W801.
3. Frazee: No. 502 TRAFFIC LINE PAINT.

2.03 COLORS

A. Accessible Parking Stalls and Signage: Blue, conforming to No. 15090 Fed. Std 595C.

B. Parking stalls, lettering, arrows and traffic signage: Yellow on concrete paving, White on AC paving.

C. Stalls: Single line, 4 inches wide.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

3.02 APPLICATION

A. Surfaces to be painted shall be clean and free of dust, dirt, grease, oil, water or other contaminates.

1. Existing lines to be removed shall be sandblasted clean.

B. Traffic paint shall not be applied until seal coat has been in place a minimum of ten days.

C. Apply material by machine spray, airless sprayer, roller or brush to provide a minimum thickness of 12 mils average. Precise edges required, no overspray allowed.

D. Perform work in accordance with approved shop drawings. Conform to Section 310-5.6.8, SSPWC.

3.03 DEFECTIVE WORK

A. Remove any paint which demonstrates evidence of checking, cracking, peeling, discoloration, lack of bonding or poor coverage. Misplaced lines shall be completely removed by paint remover or sandblasting. Painting over misplaced lines will not be permitted. Conform to Section 310.5.6.3, SSPWC.

END OF SECTION 32 17 23

DIVISION 33, 34, 35, 40, 41, 42, 43, 44, 45, 46, 48

None this project

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