

PROJECT MANUAL
FOR
LONGFELLOW ELEMENTARY SCHOOL
HVAC REPLACEMENT

PROJECT 1723400

OCTOBER 2017

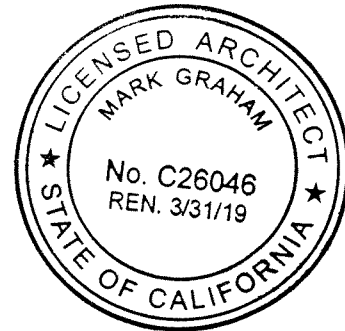
Compton Unified School District
501 South Santa Fe
Compton, CA 90221-3814

WLC ARCHITECTS, INC.
8163 ROCHESTER AVENUE, SUITE 100
RANCHO CUCAMONGA, CA 91730
(909) 987-0909


MARK GRAHAM
ARCHITECT

C26046

Stamp




WLC Architects, Inc.
8163 Rochester Avenue, Suite 100
Rancho Cucamonga, CA 91730
Phone: (909) 987-0909
Fax: (909) 980-9980

**DIVISION OF THE STATE ARCHITECT
APPROVALS**

Structural Safety

Fire and Life Safety

Access Compliance

IDENTIFICATION STAMP DIV. OF THE STATE ARCHITECT OFFICE OF REGULATION SERVICES		
APPL 03-118423		
AC _____	FLS 	SS <u>EY</u>
DATE _____	MAR 06 2018	

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HVAC REPLACEMENT

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DSA APPLICATION NO. 03-118423
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Compton, CA 90221-3814

WLC ARCHITECTS, INC.
8163 ROCHESTER AVENUE, SUITE 100
RANCHO CUCAMONGA, CA 91730
(909) 987-0909



ABBY BANERJEE
MECHANICAL ENGINEER

M29253 Stamp

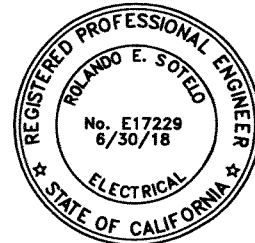
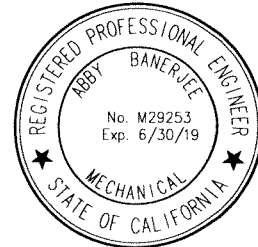
Optimum Energy Design, Inc.
5200 East La Palma Avenue
Anaheim, CA 92807
(510) 837-8182



ROLANDO E. SOTELO
ELECTRICAL ENGINEER

E17229 Stamp

A & F Engineering Group, Inc.
9320 Baseline Road, Suite C
Alta Loma, CA 91701-5829
(909) 941-3008



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LONGFELLOW ELEMENTARY SCHOOL
HVAC REPLACEMENT

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NOT USED

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NOT USED

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NOT USED

DIVISION 48 ELECTRICAL POWER GENERATION

NOT USED

DIVISION 49 RESERVED

NOT USED

SECTION 01 11 00

SUMMARY OF WORK

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Work Included.
- B. Work under separate contracts.
- C. Work by Owner.
- D. Owner furnished products.
- E. Contractor use of site and premises.
- F. Work Sequence.
- G. Owner occupancy.
- H. Work restrictions.

1.2 WORK INCLUDED

- A. Work of this Contract comprises general construction of replacing 5 HVAC units on the ground and 1 HVAC unit on the roof, and modify 1 existing HVAC unit, and add zone control dampers at ceiling spaces located at Longfellow Elementary School, 1101 South Dwight Avenue, Compton, CA 90020 for Compton Unified School District, Owner.
- B. Construct the work under a single lump sum contract.

1.3 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.4 WORK BY OWNER

- A. Items noted "NIC" (Not In Contract) will be furnished and installed by Owner.

1.5 OWNER FURNISHED PRODUCTS

- A. Items noted "OFCI" (Owner-Furnished Contractor Installed) will be furnished by Owner and installed by Contractor.
- B. Items noted "OFOI" (Owner-Furnished Owner Installed) will be furnished by Owner and installed by Owner.
- C. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed Shop Drawings, Product Data, and Samples to Contractor.
 - 2. Arrange and pay for Product delivery to site.
 - 3. On delivery, inspect Products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

5. Arrange for manufacturer's warranties, inspections, and service.

D. Contractor's Responsibilities:

1. Review Owner reviewed Shop Drawings, Product Data, and Samples.
2. Receive and unload Products at site; inspect for completeness or damage, jointly with Owner.
3. Handle, store, install and finish Products.
4. Repair or replace items damaged after receipt.

1.6 CONTRACTOR USE OF SITE AND PREMISES

A. Limit use of site and premises to allow:

1. Owner occupancy.
2. Use of site and premises by public.
3. Work by others and Work by Owner.

1.7 OWNER OCCUPANCY

- A. Full Owner Occupancy: Owner will occupy entire site and premises during entire construction period for conduct of his normal operation.
- B. Partial Owner Occupancy: Owner will occupy the entire site and premises during entire construction period, with the exception of areas under construction.
- C. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
- D. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
- E. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
- F. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.
- G. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage.
- H. Perform the Work so as not to interfere with Owner's day-to-day operations.
- I. Maintain existing exits, unless otherwise indicated.
- J. Provide not less than 48 hours notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours, Monday through Friday, except as otherwise indicated or required to conform to construction schedule and labor codes.
 1. Weekend Hours: 7:00 a.m. to 7:00 p.m.

2. Early Morning Hours: 7:00 a.m.
 3. Hours for Noisy Operations: Before or after school.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted to do so and then only after arranging to provide temporary utility services according to requirements indicated.
1. Notify Architect not less than 5 days in advance of proposed utility interruptions. Do not proceed with utility interruptions without Architect's permission.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency allowances.
- C. Schedule of Values.
- D. Application for Payment.
- E. Defect assessment.
- F. Non-payment for rejected work.
- G. Change procedures.
- H. Alternates.
- I. Unit prices.

1.2 CASH ALLOWANCES

- A. Include in the contract sum all cash allowances stated herein.
- B. Items covered by cash allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection.
- C. Costs Included in Cash Allowances: Cost of Product to Contractor or Subcontractor, less applicable trade discounts; delivery to site and applicable taxes.
- D. Costs Not Included in the Cash Allowance: Product handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; labor for installation and finishing; and overhead profit and other expenses contemplated. These expenses shall be included in the contract sum and not in the allowance.
- E. Funds will be drawn from cash allowance amount only by written authorization of the Owner.
- F. At closeout of contract, funds remaining in cash allowance amount will be credited to Owner by change order.
- G. Whenever costs are more than cash allowance amount, the contract amount will be adjusted accordingly by change order.
- H. Contractor Responsibilities:
 - 1. Assist Architect in selection of products and suppliers.
 - 2. Obtain proposals from suppliers and offer recommendations.
 - 3. On notification of selection by Owner, execute agreement with designated supplier.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery and product handling at site.

5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for damage.

1.3 CONTINGENCY ALLOWANCE:

- A. Include in the contract sum all contingency allowances stated herein.
- B. Costs included in contingency allowance: Cost of work to Contractor or subcontractor, less applicable trade discounts; delivery to site and applicable taxes; product handling, including unloading, uncrating, and storage; protection of products from damage; labor for installation and finishing; reasonable overhead and profit and other expenses required by work.
- C. Funds will be drawn from contingency allowance amount only by written authorization of Owner.
- D. At closeout of Contract, funds remaining in contingency allowance amount will be credited to Owner by Change Order.
- E. Whenever costs are more than contingency allowance amount, the Contract amount will be adjusted accordingly by Change order.
- F. Contractor Responsibilities:
 1. Assist Architect in selection of products and suppliers.
 2. Obtain proposals from suppliers and offer recommendations.
 3. On notification of selection by Owner, execute agreement with designated supplier.
 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery of product to site.
 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for damage.
- G. Contingency Allowance: A stipulated sum of \$52,500.00.

1.4 SCHEDULE OF VALUES

- A. Submit Schedule of Values for approval in duplicate within fourteen days after receipt of Notice to Proceed.
- B. Format: Submit typed schedule based upon the attached Schedule of Values augmented by the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section.
- C. Where work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- D. Include in each line item, the amount of Allowances specified in this Section.
- E. Include within each line item, a directly proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, on continuation sheet, with each Application For Payment.

1.5 APPLICATIONS FOR PAYMENT

- A. Submit six copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA Form G703 Continuation Sheet.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Application Times: The date for each progress payment is indicated in the General Conditions of the Contract.

- D. Payment Application Periods: The period of construction covered by each application for payment is the period indicated in the General Conditions of the Contract.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents. Architect will return incomplete applications without action.
- F. Waiver of Stop Notices: With each application for payment, submit waivers of stop notices from subcontractors for construction period covered by previous application.
- G. Final Payment: As specified in the General Conditions of the Contract and in Section 01 77 00 - Closeout Procedures.
- H. Refer to the General Conditions of the Contract for additional payment provisions.

1.6 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Architect, it is not practical to remove and replace the Work, the Architect will direct one of the following remedies:
 - 1. The defective Work may remain, but the listed schedule of value will be adjusted to a new value at the discretion of the Architect.
 - 2. The defective Work will be partially repaired to the instructions and satisfaction of the Architect and the listed schedule of value will be adjusted to reflect a new value at the discretion of the Architect.

1.7 NON-PAYMENT FOR REJECTED WORK

- A. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined to be unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required work.
 - 5. Products remaining on hand after completion of the work.
 - 6. Loading, hauling and disposing of rejected products.

1.8 CHANGE PROCEDURES

- A. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by General Conditions on AIA Form G710 Architect's Supplemental Instructions.
- B. The Architect may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications. Proposal Requests are for information only and are not to be considered instructions to stop the work or to execute the proposed change. Contractor will prepare and submit a detailed estimate within 14 days.
- C. Any change in the Work which involves the adjustment to contract sum/price or contract time shall be properly certified by the Contractor as indicated in the General Conditions of the contract.
- D. The Contractor may propose a change by submitting a Change Order Request to the Architect, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

- E. Stipulated Sum Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's Change Order Request as approved by Architect.
- F. Time and Material/Force Account Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the General Conditions of the Contract.
- G. Maintain detailed records of work done on Time and Material/Force Account basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work as indicated in the General Conditions of the Contract.
- H. Construction Change Directive: Architect may issue a directive, signed by the Owner and Architect, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum or Contract Time. Promptly execute the change.
- I. Allowance Adjustment: Adjustment of allowance amounts shall be based upon a properly documented and detailed Change Order Request which substantiates distribution of allowance amounts and actual costs of work in place.
- J. Change Order Forms: AIA G701 Change Order.
- K. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the General Conditions of the Contract.
- L. All addenda (changes and/or revisions prior to award of contract) and construction changes (changes and revisions after award of contract) shall be approved by the Architect and the Division of the State Architect prior to start of construction covered by those changes and/or revisions in accordance with the requirements of Title 24 of the California Code of Regulations, Part 1, Section 4-338.
- M. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- N. Promptly revise progress schedules to reflect any changes in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change and resubmit.
- O. Promptly enter changes in Project Record Documents.

1.9 UNIT PRICES

- A. A unit price is an amount proposed by the bidder and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by change order in the event the estimated quantities of work required by the Contract Documents are increased or decreased.
- B. Unit prices shall include all necessary material, overhead, profit and applicable taxes.
- C. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established prices, and to have this work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.
- D. Refer to individual specification sections for construction activities requiring the establishment of unit prices.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

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SCHEDULE OF VALUES FORMAT*

Project: Longfellow Elementary School HVAC Replacement

Contractor: _____

Date: _____

Item Description	Amount
1. Mobilization and initial expenses	
2. General Conditions	
Temporary Utilities	
Engineering Layout	
Temporary Construction/Dust Control	
General Clean Up/Trash Removal	
Project Manager/Supervision/Truck	
Rental Equipment	
3. Bonds and Insurance	
4. SITE WORK	
Demolition/Removal	
Site	
Building(s)	
Site Preparation	
General Brush and Tree Clearing	
Earthwork	
Site Improvements	
Termite/Weed Treatment	
AC Paving/Base/Striping	
Concrete Curb/Gutters	
Concrete Retaining Walls	
Concrete Paving	
Concrete Site Stairs	
Masonry Garden Walls	
Chain Link Fences/Gates	
Wrought Iron Fences/Gates	
Irrigation	
Planting	
Site Equipment (misc)	
Site Utilities	
Fire Hydrants	
Fire Lines	
Storm Drainage	
Site Water	
Site Gas	
Site Sewer	
Electrical Site Service/Lighting	

Item Description	Amount
Off-site Work	
AC Paving/Base	
Concrete Curb/Gutters	
Irrigation	
Planting	
Fire Hydrants	
Fire Lines	
Storm Drainage	
Site Water	
Site Gas	
Site Sewer	
Street Lights	
Other	
5. FOUNDATIONS	
Wall Foundations	
Column Foundations	
Special Foundations	
Other	
6. SUBSTRUCTURE	
Slab on Grade	
Trenches/pits/bases	
Basement Excavation/Walls	
Subgrade Moisture Protection	
Other	
7. SUPERSTRUCTURE	
Columns and Beams	
Concrete Columns/Beams	
Masonry Columns	
Steel Columns/Beams	
Wood Columns/Beams	
Glue Laminated Beams	
Structural Walls	
Concrete Walls	
Masonry Walls	
Wood Framed Walls	
Floor Construction	
Concrete Cast in Place	
Steel Deck/Framing	
Trusses	
Wood Framed Floors	
Roof Construction	
Concrete Cast in Place	
Steel Deck/Framing	
Trusses	
Wood Framed Roofs	
Stairs	
Other	

Item Description**Amount****8. EXTERIOR CLOSURE**

Exterior Walls/Soffits

Sandblast Concrete Seal/Paint

Sandblast Masonry Seal/Paint

Glass Block

Metal Studs

Wood Studs

Exterior Plaster

Exterior Insulation

Windows/Frames/Glazing

Steel Windows/Glazing

Aluminum Windows/Glazing

Store Front/Glazing

Doors

Metal Doors/Frames

Wood Doors/Frames

Aluminum Doors/Frames/Glazing

Sectional Doors/Frames

Roll Up Doors/Frames

Store Front

Frames

Hardware

Insulation

Thermal Wall

Sound Wall

Sealants/Caulking

Other

9. ROOFING

Roof Coverings and Flashing

Built Up Roofing

Single Ply

Preformed Metal

Asphalt Shingle

Clay/Concrete Tile

Roof Walkway System

Roof Insulation and Fill

Lightweight Concrete

Insulating Concrete Fill

Rigid Insulation

Flashing and Trim

Roof Openings

Roof Hatches

Smoke Hatches

Skylights

Skyroofs/Walls

Ladders to Roof

Other

Item Description	Amount
10. INTERIOR CONSTRUCTION	
Fixed Partitions	
Metal Studs	
Wood Studs	
Gypsum Board	
Interior Plaster	
Movable Partitions	
Compartments & Cubicles	
Toilet Partitions	
Interior Doors	
Wood Doors	
Metal Doors	
Aluminum Doors	
Roll Up Doors	
Special Doors	
Frames	
Interior Finishes	
Painting	
Walls	
Ceiling	
Vinyl Wall Coverings	
Ceramic Tile	
Fiberglass Reinforced Panels	
Concrete Sealer	
Vinyl Sheet/Tile	
Rubber Flooring	
Carpet	
Wood Flooring	
Suspended Acoustical Ceiling System	
Suspended Gypsum Ceiling System	
Specialties	
Chalkboard/Markerboard/Tackboards	
Cabinets	
Toilet Room Accessories	
Graphics and Signage	
Other	
11. CONVEYING SYSTEMS	
Elevators	
Moving Stairs and Walks	
Pneumatic Tube Systems	
Lifts, Hoists, and Cranes	
Wheel Chair Lift	
Dock Leveler/Bumpers	
Automotive Hoists (single)	
Two Post Hoist (twin)	
Other	

Item Description	Amount
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12. EQUIPMENT

- Library
 - Book Theft System
 - Fixed Book Shelves
 - Rolling Book Shelves
- Multipurpose/Stage
 - Fireproof Curtain
 - Projection Screen(s)
 - Folding Tables/Benches
- Athletic
 - Steel Athletic Lockers
 - Basketball Backstops
 - Bleachers
 - Pool
- Classroom
 - Window Coverings
 - Book Lockers
- Food Service
 - Kitchen Equipment
 - Walk in Freezer/Refrigerator
- Other

13. MECHANICAL

- Plumbing
 - Supply Service
 - Disposal Service
 - Rainwater Service
 - Gas Service
 - Finish Fixtures
- Fire Protection
 - Sprinklers
 - Fire Extinguishers
- HVAC System
 - Equipment
 - Ductwork/Distribution
 - System Controls
 - Testing and Balancing
- Other

14. ELECTRICAL

- Distribution
- Lighting and Power
- Special Systems
 - Alarm System
 - Communications
 - Emergency System
- Other

Item Description	Amount
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15. SPECIAL CONSTRUCTION	
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Miscellaneous Special Construction	
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TOTAL COST	\$ _____
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*The above categories may be subdivided and items added if the overall order remains the same and the subtotal cost for each category complies with the format as shown. Items not applicable to a particular job may be deleted from this list. Overhead and profit shall be a combined mark up and added proportionally to each line item.

SECTION 01 25 13

PRODUCT SUBSTITUTION PROCEDURES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Product options.
- B. Substitution procedures.

1.2 DEFINITIONS

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

1.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with Provision for Substitution: Products of manufacturers named and meeting specifications with substitution of products or manufacturer only when submitted under provisions of this section.
- C. Products Specified by Naming One or More Manufacturers without Provision for Substitution: No substitution allowed.

1.4 LIMITATIONS ON SUBSTITUTIONS SUBMITTED PRIOR TO THE RECEIPT OF BIDS

- A. The Bid shall be based upon the standards of quality established by those items of equipment and/or materials which are specifically identified in the Contract Documents.
- B. Architect may consider requests for substitutions of specified equipment and/or materials only when requests are received by Architect prior to the date established for the receipt of bids as stipulated in Document 00 21 13 - Instructions to Bidders.
- C. Consideration by Architect of a substitution request will be made only if request is made in strict conformance with provisions of this section.
- D. Burden of proof of merit of requested substitution is the responsibility of the entity requesting the substitution.
- E. It is the sole responsibility of the entity requesting the substitution to establish proper content of submittal for requests for substitutions. Incomplete submittals will be rejected.
- F. Architect's decision on substitution requests are final and do not require documentation or justification.
- G. When substitution is not accepted, provide specified product.
- H. Substitute products shall not be included within the bid without written acceptance by Addendum.

1.5 LIMITATIONS ON SUBSTITUTIONS SUBMITTED AFTER THE AWARD OF THE CONTRACT

- A. The Contract is based upon the standards of quality established by those items of equipment and/or materials which are specifically identified in the Contract Documents.
- B. Consideration by Architect of substitution requests received after the established date of the receipt of bids or contract award will only be made when one or more of the following conditions are met and documented:
 - 1. Specified item fails to comply with regulatory requirements.
 - 2. Specified item has been discontinued.
 - 3. Specified item, through no fault of the Contractor, is unavailable in the time frame required to meet project schedule.
 - 4. Specified item, through subsequent information disclosure, will not perform properly or fit in designated space.
 - 5. Manufacturer declares specified product to be unsuitable for use intended or refuses to warrant installation of product.
 - 6. Substitution would be, in the sole judgement of the Architect, a substantial benefit to the Owner in terms of cost, time, energy conservation, or other consideration of merit.
- C. Notwithstanding the provisions of Article 1.4 of this section and the above, the Architect may consider a substitution request after the date of the receipt of bids or contract award, if in the sole discretion of the Architect, there appears to be just cause for such a request. The acceptance of such a late request does not waive any other requirement as stated herein.
- D. Consideration by Architect of a substitution request will be made only if request is made in strict conformance with provisions of this section.
- E. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without separate written request as required by provisions of this section.
- F. Review of shop drawings does not constitute acceptance of substitutions indicated or implied on shop drawings.
- G. Substitutions will not be considered when requested or submitted directly by subcontractor or supplier.
- H. Substitutions will not be considered as a result of the failure to pursue the work promptly or coordinate activities properly.
- I. Burden of proof of merit of requested substitution is the responsibility of the Contractor.
- J. It is the sole responsibility of the Contractor to establish proper content of submittal for requests for substitutions. Incomplete submittals will be rejected.
- K. Owner shall receive full benefit of any cost reduction as a result of any request for substitution.
- L. Architect's decision on substitution requests is final and does not require documentation or justification.
- M. When substitution is not accepted, provide specified product.
- N. Substitute products shall not be ordered or installed without written acceptance.

1.6 REGULATORY REQUIREMENTS

- A. It shall be the responsibility of the entity requesting the substitution to obtain all regulatory approvals required for proposed substitutions.

- B. All regulatory approvals shall be obtained for proposed substitutions prior to submittal of substitution request to Architect.
- C. All costs incurred by the Owner in obtaining regulatory approvals for proposed substitutions to include the costs of the Architect and any authority having jurisdiction over the project shall be reimbursed to the Owner. Costs of these services shall be reimbursed regardless of final acceptance or rejection of substitution.
- D. Substitutions of materials or work procedures which affect the health, safety and welfare of the public shall have prior approval of the Division of the State Architect (DSA) field representative.

1.7 SUBSTITUTION REPRESENTATION

- A. In submitting a request for substitution, the entity requesting the substitution makes the representation that he or she:
 - 1. Has investigated the proposed substitution and has determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty or guarantee for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other work which may be required for the work to be completed with no additional cost to the Owner.
 - 4. Waives claims for additional cost or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner for the cost of Architect's review or redesign services associated with substitution request.

1.8 SUBMITTAL PROCEDURE

- A. Submit six copies of each request.
- B. Submit request with Architect's Substitution Request Form. Form may be obtained at the office of the Architect. Substitution requests received without request form will be returned unreviewed.
- C. Limit each request to one proposed substitution.
- D. Request to include sufficient data so that direct comparison of proposed substitution can be made.
- E. Provide complete documentation for each request. Documentation shall include the following information, as appropriate, as a minimum:
 - 1. Statement of cause for substitution request.
 - 2. Identify product by specification section and article number.
 - 3. Provide manufacturer's name, address, and phone number. List fabricators, suppliers, and installers as appropriate.
 - 4. List similar projects where proposed substitution has been used, dates of installation and names of Architect and Owner.
 - 5. List availability of maintenance services and replacement materials.
 - 6. Documented or confirmation of regulatory approval.
 - 7. Product data, including drawings and descriptions of products.
 - 8. Fabrication and installation procedures.
 - 9. Samples of proposed substitutions.

10. Itemized comparison of significant qualities of the proposed substitution with those of the product specified. Significant qualities may include size, weight, durability, performance requirements and visual effects.
 11. Coordination information, including a list of changes or modifications needed to other items of work that will become necessary to accommodate proposed substitution.
 12. Statement on the substitutions effect on the construction schedule.
 13. Cost information including a proposal of the net change, if any, in the Contract sum if the substitution is submitted after the receipt of bids or contract award.
 14. Certification that the substitution is equal to or better in every respect to that required by the Contract Documents and that substitution will perform adequately in the application intended.
 15. Waiver of right to additional payment or time that may subsequently become necessary because of failure of substitution to perform adequately.
- F. Inadequate warranty, vagueness of submittal, failure to meet specified requirements, or submittal of insufficient data will be cause for rejection of substitution request.

1.9 ARCHITECT'S REVIEW

- A. Within 14 days of receipt of request for substitution, the Architect will accept or reject proposed substitution.
- B. If a decision on a substitution cannot be made within the time allocated, the product specified shall be used.
- C. There shall be no claim for additional time for review of proposed substitutions.
- D. Final acceptance of a substitution submitted prior to the date established for the receipt of bids will be in the form of an addendum.
- E. Final acceptance of a substitution submitted after the award of the contract will be in the form of a Change Order.

2. PART 2 PRODUCTS

Not Used.

3. PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination.
- B. Preconstruction conference.
- C. Progress meetings.
- D. Request for Information (RFIs).
- E. Preinstallation conferences.
- F. Post construction dedication.

1.2 DEFINITIONS

- A. RFI - Request from Contractor seeking additional information, interpretation or clarification of the Contract Documents.

1.3 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Coordinate construction operations of the different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
- C. Prior to commencement of a particular type or kind of work examine relevant information, contract documents and subsequent data issued to the project.
- D. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. In locations where several elements of mechanical and electrical work must be sequenced and positioned with precision in order to fit into available space, prepare coordination drawings showing the actual conditions required for the installation. Prepare coordination drawings prior to purchasing, fabricating or installing any of the elements required to be coordinated.
- H. Closing up of walls, partitions or furred spaces, backfilling and other covering up operations shall not proceed until all enclosed or covered work and inspections have been completed. Verify before proceeding.
- I. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owners partial occupancy.
- J. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

- K. Coordinate all utility company work in accordance with the General Conditions.
- L. Coordinate field engineering with the provisions of Section 01 73 00.

1.4 PRECONSTRUCTION CONFERENCE

- A. Architect will schedule a conference immediately after receipt of fully executed contract documents prior to project mobilization.
- B. Mandatory Attendance: Owner, Owner's Resident Inspector, Owner's Testing Laboratory Representative, Architect, Contractor, Contractor's Project Manager and Contractor's Job Superintendent.
- C. Optional Attendance: Architect's consultants, subcontractors and utility company representatives.
- D. Architect will preside at conference, record minutes and distribute copies.
- E. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Issue Notice to Proceed.
 - 3. Submission of executed bonds and insurance certificates.
 - 4. Distribution of Contract Documents.
 - 5. Federal and State labor law requirements applicable to Contract.
 - 6. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 7. Designation of responsible personnel representing the parties.
 - 8. Procedures and processing of RFIs, field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders and Contract closeout procedures.
 - 9. Procedures for testing and inspection.
 - 10. Scheduling.
 - 11. Critical work sequence and long lead items.
 - 12. Work restrictions and working hours.
 - 13. Progress meetings.
 - 14. Use of site and premises.
 - 15. Storage.
 - 16. Authorities having jurisdiction over project.
 - 17. Owner occupancy requirements.
 - 18. Owner-Furnished equipment.
 - 19. Preparation of Record Drawings.
 - 20. Security.
 - 21. Parking availability.

1.5 PROGRESS MEETINGS

- A. Architect will schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
- B. Architect will make arrangements for meetings, prepare agenda, preside at meetings, record minutes (Field Reports), and distribute copies.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Owner's Inspector, and Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings. (Field Reports)
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Requests For Information (RFIs).
 - 7. Status of Proposal Requests (PRs).
 - 8. Status of Change Order Requests (CORs).
 - 9. Status of Change Orders (COs).
 - 10. Review of off-site fabrication and delivery schedules.
 - 11. Maintenance of construction schedule.
 - 12. Corrective measures to regain projected schedules.
 - 13. Planned progress during succeeding work period.
 - 14. Coordination of projected progress.
 - 15. Maintenance of quality and work standards.
 - 16. Effect of proposed changes on progress schedule and coordination.
 - 17. Other business relating to Work.

1.6 REQUEST FOR INFORMATION (RFI'S)

- A. Procedure: Immediately on discovery of the need for additional information, interpretation of the Contract Documents, and if not possible to request interpretation at Progress Meeting, prepare and submit an RFI in the form specified.
 - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 - 3. Each RFI shall address only one subject matter.

- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
1. Date.
 2. Project name.
 3. Owner's name.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. Specification Section number and title and related paragraphs, as appropriate.
 8. Drawing number and detail references, as appropriate.
 9. Field dimensions and conditions, as appropriate.
 10. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above. Attachments shall be electronic files in a format that will allow electronic editing by the Architect.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow fifteen days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day. If the RFI is required to be forwarded to a consultant, subconsultant, or Owner for a response, the response time will be twenty five days.
1. The following RFIs will be returned without action:
 - (a) Requests for approval of submittals.
 - (b) Requests for approval of substitutions.
 - (c) Requests for information already indicated in the Contract Documents.
 - (d) Requests for coordination information which is the responsibility of the Contractor.
 - (e) Requests for adjustments in the Contract Time or the Contract Sum.
 - (f) Requests for interpretation of Architect's actions on submittals and substitutions.
 - (g) Incomplete RFIs or RFIs with numerous errors.
 2. Architect's action may include a request for additional information, in which case Architect's allowable time for response will start again.
 3. Architect's review of or response to RFIs shall not constitute an approval, direction, or procedure related to construction means, methods, techniques, sequences, or procedures of Contractor.

4. Architect's review of or response to RFIs shall not constitute an approval, direction, or procedure related to the construction site safety precautions, procedures or methodology of Contractor.
5. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Order Request according to Division 01 Section 01 20 00 - Price and Payment Procedures.
 - (a) If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five days of receipt of the RFI response.
 - (b) Under no circumstances is the Architect's review of or response to RFIs to be considered an authorization to depart from the Contract Documents or an authorization to perform extra work.
- F. On receipt of Architect's action immediately distribute the RFI response to affected parties.
- G. Review response and notify Architect within three days if Contractor disagrees with response.

1.7 PREINSTALLATION CONFERENCES

- A. When required in individual specification Section, convene a preinstallation conference prior to commencing work of the Section. Refer to individual specification section for timing requirements of conference.
- B. Require attendance of parties directly affecting, or affected by, work of the specific Section.
- C. Notify Architect a minimum of seven days in advance of meeting date.
- D. Preinstallation conference to coincide with regularly scheduled progress meeting.
- E. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants.
- F. Agenda:
 1. Review of Contract Documents.
 2. Manufacturer's recommendations.
 3. Status of submittals.
 4. Schedule of work activities.
 5. Deliveries of materials and equipment.
 6. Sequence of operation.
 7. Interface requirements.
 8. Access.
 9. Site utilization.
 10. Tests and inspections.
 11. Temporary facilities and controls.
 12. Quality and work standards.
- G. Preinstallation Schedule:
 1. Section 03 30 00 - Cast-in-Place Concrete.

1.8 POST CONSTRUCTION DEDICATION

- A. Attendance Required: Project superintendent, project manager, major subcontractors, Owner and Architect.
- B. Preparation prior to Dedication:
 - 1. Assist Owner in operation of mechanical systems.
 - 2. Verify operation and adjust controls for communication systems.
 - 3. Assist Owner in operation of lighting systems.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 32 17

CONSTRUCTION SCHEDULE - BAR CHART

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. References.
- B. Performance requirements.
- C. Qualifications.
- D. Quality Assurance.
- E. Project record documents.
- F. Submittals.
- G. Review and evaluation.
- H. Format.
- I. Cost and schedule reports.
- J. Early work schedule.
- K. Construction schedule.
- L. Short interval schedule.
- M. Requested time adjustment schedule.
- N. Recovery schedule.
- O. Updating schedules.
- P. Distribution.

1.2 REFERENCES

- A. Construction Planning and Scheduling Manual - A Manual for General Contractors and the Construction Industry, The Associated General Contractors of America (AGC).
- B. National Weather Service - Local Climatological Data.

1.3 PERFORMANCE REQUIREMENTS

- A. Ensure adequate scheduling during construction activities so work may be prosecuted in an orderly and expeditious manner within stipulated Contract Time.
- B. Ensure coordination of Contractor and subcontractors at all levels.
- C. Ensure coordination of submittals, fabrication, delivery, erection, installation, and testing of materials and equipment.
- D. Ensure on-time delivery of Owner furnished materials and equipment.
- E. Ensure coordination of jurisdictional reviews.
- F. Assist in preparation and evaluation of applications for payment.

- G. Assist in monitoring progress of work.
- H. Assist in evaluation of proposed changes to Contract Time.
- I. Assist in evaluation of proposed changes to Construction Schedule.
- J. Assist in detection of schedule delays and identification of corrective actions.

1.4 QUALIFICATIONS

- A. Scheduler: Personnel with 3 years minimum experience in scheduling construction work of a complexity and size comparable to this Project.
- B. Administrative Personnel: 3 years minimum experience in using and monitoring schedules on comparable projects.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with Construction Planning and Scheduling Manual published by the AGC.
- B. In the event of discrepancy between the AGC publication and this section, provisions of this section shall govern.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Section 01 77 00.
- B. Submit one electronic file and three copies of final Record Construction Schedule which reflects actual construction of this Project.
- C. Record schedule shall be certified for compliance with actual way project was constructed.
- D. Receipt of Record Construction Schedule shall be a condition precedent to any retainage release or final payment.

1.7 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Within 7 days from the Notice of Award submit proposed Early Work Schedule and preliminary Cost Report defining activities for first 60 days of Work.
- C. Within 45 days from the Notice of Award submit proposed Construction Schedule and final Cost Report.
- D. Submit updated Construction Schedule at least 10 days prior to each Application for Payment.
- E. Submit Short Interval Schedule at each Construction Progress Meeting.
- F. Submit Time Adjustment Schedule within 10 days of commencement of a claimed delay.
- G. Submit Recovery Schedules as required by completion of work.
- H. Submit one electronic file and three copies of each schedule and cost report.

1.8 REVIEW AND EVALUATION

- A. Early Work Schedule shall be reviewed during Preconstruction Conference with Owner and Architect.
- B. Within 5 days of receipt of Owner and Architect's comments provide satisfactory revision to Early Work Schedule or adequate justification for activities in question.

- C. Acceptance by Owner of corrected Early Work Schedule shall be a condition precedent to making any progress payments for first 60 days of Contract.
- D. Cost loaded values of Early Work Schedule shall be a basis for determining progress payments during first 60 days of Contract.
- E. Participate in joint review of Construction Schedule and Reports with Owner and Architect.
- F. Within 7 days of receipt of Owner and Architect's comments provide satisfactory revision to Construction Schedule or adequate justification for activities in question.
- G. In the event that an activity or element of work is not detected by Owner or Architect review, such omission or error shall be corrected by next scheduled update and shall not affect Contract Time.
- H. Acceptance by Owner of corrected Construction Schedule shall be a condition precedent to making any progress payments after first 60 days of Contract.
- I. Cost-loaded values of Construction Schedule shall be basis for determining progress payments.
- J. Review and acceptance by Owner and Architect of Early Work Schedule or Construction Schedule does not constitute responsibility whatsoever for accuracy or feasibility of schedules nor does such acceptance expressly or impliedly warrant, acknowledge or admit reasonableness of activities, logic, duration, or cost loading stated or implied on schedules.

1.9 FORMAT

- A. Shall be fully developed horizontal bar-chart-type schedule prepared under concepts and methods outlined in AGC Construction Planning and Scheduling Manual.
- B. Provide separate bar for each activity or operation.
- C. Activity shall not have a duration longer than 14 days or a value over \$20,000.00 except non-construction activities for procurement and delivery.
- D. Prepare schedule on sheet of sufficient width to clearly show data.
- E. Provide continuous heavy vertical line identifying first day of week.
- F. Provide continuous subordinate vertical line identifying each day of week.
- G. Identify activities by number, description, and cost.
- H. Show each activity in proper sequence.
- I. Indicate graphically sequences necessary for related activities.
- J. Provide legend of symbols and abbreviations used.

1.10 COST AND SCHEDULE REPORTS

- A. Activity Analysis: Tabulate each activity and identify for each activity:
 - 1. Description.
 - 2. Interface with outside contractors or agencies.
 - 3. Duration.
 - 4. Start date.
 - 5. Finish date.

6. Actual start date.
 7. Actual finish date.
 8. Monetary value keyed to Schedule of Values.
 9. Responsibility.
 10. Percentage complete.
 11. Variance positive or negative.
- B. Cost Report: Tabulate each activity and identify for each activity:
1. Description.
 2. Total cost.
 3. Percentage complete.
 4. Value prior to current period.
 5. Value this period.
 6. Value to date.

1.11 EARLY WORK SCHEDULE

- A. Shall establish scope of work to be performed during the first 60 days of Contract.
- B. Shall contain the following phases and activities:
 1. Procurement activities to include mobilization, shop drawings and sample submittals.
 2. Identification of key and long-lead elements and realistic delivery dates.
 3. Construction activities in units of whole days limited to 14 days for each activity except non-construction activities for procurement and delivery.
 4. Approximate cost and duration of each activity.
- C. Shall contain seasonal weather considerations. Seasonal rainfall shall be 10 year average for the month as evidenced by Local Climatological Data obtained from U.S. National Weather Service.
- D. Activities shall be incorporated into Construction Schedule.
- E. No application for payment will be evaluated or processed until Early Work Schedule has been submitted and reviewed.
- F. Shall be updated on a monthly basis while Construction Schedule is being developed.
- G. Failure to submit an adequate or accurate Early Work Schedule or failure to submit on established dates will be considered a substantial breach of Contract.

1.12 CONSTRUCTION SCHEDULE

- A. Shall include Early Work Schedule as first 60 days of Construction Schedule.
- B. Shall be a fully developed horizontal bar-chart-type schedule.
- C. Shall indicate a completion date for project that is no later than required completion date.

- D. Conform to mandatory dates specified in the contract documents.
- E. Should schedule indicate a completion date earlier than any required completion date, Owner or Architect shall not be liable for any costs should project be unable to be completed by such date.
- F. Seasonal weather shall be considered in planning and scheduling of all work. Seasonal rainfall shall be 10 year average for the month as evidenced by Local Climatological Data obtained from U.S. National Weather Service.
- G. Provide sub-schedules to define critical portions of entire schedule.
- H. Indicate procurement activities, delivery and installation of Owner furnished material and equipment.
- I. Level of detail shall correspond to complexity of work involved.
- J. As developed shall show sequence of activities required for complete performance of Work.
- K. Shall be logical and show a coordinated plan of Work.
- L. Show order of activities. Include specific dates of completion.
- M. Duration of activities shall be coordinated with subcontractors and suppliers and shall be best estimate of time required.
- N. Failure to include any activity shall not be an excuse for completing all work by required completion date.
- O. An activity shall meet the following criteria:
 - 1. Any portion or element of work, action, or reaction that is precisely described, readily identifiable, and is a function of a logical sequential process.
 - 2. Descriptions shall be clear and concise. Beginning and end shall be readily verifiable. Starts and finishes shall be scheduled by logical restraints.
 - 3. Responsibility shall be identified with a single performing entity.
 - 4. Additional codes shall identify building, floor, bid item and CSI classification.
 - 5. Assigned dollar value (cost-loading) of each activity shall cumulatively equal total contract amount. Mobilization, bond and insurance costs shall be separate. General requirement costs, overhead, profit, shall be prorated throughout all activities. Activity costs shall correlate with Schedule of Values.
- P. For major equipment and materials show a sequence of activities including:
 - 1. Preparation of shop drawings and sample submissions.
 - 2. Review of shop drawings and samples.
 - 3. Finish and color selection.
 - 4. Fabrication and delivery.
 - 5. Erection or installation.
 - 6. Testing.
- Q. Include a minimum of 15 days prior to completion date for punch lists and clean up. No other activities shall be scheduled during this period.

1.13 SHORT INTERVAL SCHEDULE

- A. Shall be fully developed horizontal bar-chart-type schedule directly derived from Construction Schedule.
- B. Prepare schedule on sheet of sufficient width to clearly show data.
- C. Identify activities by same description as Construction Schedule.
- D. Show each activity in proper sequence.
- E. Indicate graphically sequences necessary for related activities.
- F. Indicate activities completed or in progress for previous 2 week period.
- G. Indicate activities scheduled for succeeding 2 week period.
- H. Further detail may be added if necessary to monitor schedule.

1.14 REQUESTED TIME ADJUSTMENT SCHEDULE

- A. Updated Construction Schedule shall not show a completion date later than the Contract Time, subject to any time extensions processed as part of a Change Order.
- B. If an extension of time is requested a separate schedule entitled "Requested Time Adjustment Schedule" shall be submitted to Owner and Architect.
- C. Indicate requested adjustments in Contract Time which are due to changes or delays in completion of work.
- D. Extension request shall include forecast of project completion date and actual achievement of any dates listed in Agreement.
- E. To the extent that any requests are pending at time of any Construction Schedule update, Time Adjustment Schedule shall also be updated.
- F. Schedule shall be a fully developed horizontal bar-chart-type schedule.
- G. Accompany schedule with formal written time extension request and detailed impact analysis justifying extension.
- H. Time impact analysis shall demonstrate time impact based upon date of delay, and status of construction at that time.
- I. Activity delays shall not automatically constitute an extension of Contract Time.
- J. Failure of subcontractors shall not be justification for an extension of time.
- K. Extensions will be granted only to extent that time adjustments extend Contract completion date.
- L. Owner shall not have an obligation to consider any time extension request unless requirements of Contract Documents, and specifically, but not limited to these requirements are complied with.
- M. Owner shall not be responsible or liable for any construction acceleration due to failure of Owner to grant time extensions under Contract Documents should requested adjustments in Contract Time not substantially comply with submission and justification requirements of Contract for time extension requests.
- N. In the event a Requested Time Adjustment Schedule and Time Impact Analysis are not submitted within 10 days after commencement of a delay it is mutually agreed that delay does not require a Contract time extension.

1.15 RECOVERY SCHEDULE

- A. When activities are behind Construction Schedule a supplementary Recovery Schedule shall be submitted.
- B. Form and detail shall be sufficient to explain and display how activities will be rescheduled to regain compliance with Construction Schedule.
- C. Maximum duration shall be one month and shall coincide with payment period.
- D. Ten days prior to expiration of Recovery Schedule verification to determine if activities have regained compliance with Construction Schedule will be made. Based upon this verification the following will occur:
 - 1. Supplemental Recovery Schedule will be submitted to address subsequent payment period.
 - 2. Construction Schedule will be resumed.

1.16 UPDATING SCHEDULES

- A. Review and update schedule at least 10 days prior to submitting an Application for Payment.
- B. Approved change orders which affect schedule shall be identified as separate new activities.
- C. Change orders of less than \$20,000.00 value or less than 3 days duration need not be shown unless completion date is affected.
- D. Maintain schedule to record actual prosecution and progress.
- E. No other revisions shall be made to schedule unless authorized by Owner.
- F. Provide narrative Progress Report at time of schedule update which details the following:
 - 1. Activities or portions of activities completed during previous reporting period.
 - 2. Actual start dates for activities currently in progress.
 - 3. List of major construction equipment used during reporting period and any equipment idle.
 - 4. Number of personnel by craft engaged on Work during reporting period.
 - 5. Progress analysis describing problem areas.
 - 6. Current and anticipated delay factors and their impact.
 - 7. Proposed corrective actions for Recovery Schedule.
 - 8. Proposed modifications, additions, deletions and changes in Construction Schedule.
- G. Schedule update will form basis upon which progress payments will be made.
- H. Owner will not be obligated to review or process Application for Payment until schedule and Progress Report have been submitted.

1.17 DISTRIBUTION

- A. Following joint review and acceptance of updated schedules distribute copies to Owner, Architect, and all other concerned parties.
- B. Instruct recipients to promptly report in writing any problem anticipated by projections shown in schedule.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Related submittals.
- B. Architect's digital data files.
- C. Proposed products list.
- D. Processing time.
- E. Submittal review.
- F. Submittal procedures - paper submittals.
- G. Shop drawings - paper submittals.
- H. Submittal procedures - electronic submittals.
- I. Shop drawings - electronic submittals.
- J. Product data.
- K. Samples.
- L. Manufacturers' instructions.
- M. Manufacturers' certificates.
- N. Submittal schedule.

1.2 RELATED SUBMITTALS

- A. Progress Payments: Section 01 20 00- Price and Payment Procedures.
- B. Schedule of Values: Section 01 20 00- Price and Payment Procedures.
- C. Substitutions: Section 01 25 13 – Product Substitution Procedures.
- D. Coordination Drawings: Section 01 31 00 - Project Management and Coordination.
- E. Construction Schedule: Section 01 32 17 - Construction Schedule - Bar Chart.
- F. Tests and Inspections: Section 01 45 29 – Testing Laboratory Services.
- G. Certified Final Property Survey: Section 01 73 00 – Execution Requirements.
- H. Waste Reduction Progress Reports: Section 01 74 19 - Construction Waste Management and Disposal.
- I. Closeout Procedures: Section 01 77 00 – Closeout Procedures.
- J. The General Conditions set forth additional requirements for submittals.

1.3 ARCHITECT'S DIGITAL DATA FILES

- A. Upon written request, Architect's electronic CAD files will be provided for use in connection with preparation of shop drawings subject to the acceptance of the Architect's standard terms and conditions for electronic file transfer.

1.4 PROPOSED PRODUCTS LIST

- A. Within fourteen days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, model number, and designated specification section of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PROCESSING TIME

- A. Time period for review of submittals will commence upon receipt of submittal by Architect.
- B. Initial Review: Allow ten working days for each submittal.
- C. Resubmittal Review: Allow ten working days for each resubmittal.
- D. Sequential Review: Allow fifteen working days for initial and resubmittal review of each submittal where review is required by Architect's consultant's, Owner or other parties indicated.

1.6 SUBMITTAL REVIEW

- A. The Architect's review is only for general conformance with design concept and Contract requirements. Contractor is responsible for compliance with Contract Documents, dimensions, quantities, fit and coordination with other Work. Review does not authorize substitutions, exclusions and limitations to Contract requirements unless specifically requested by Contractor and acknowledged by Architect.
- B. Definitions for submittal review:
 - 1. Review Completed - Do Not Resubmit: The Work covered by the submittal has been reviewed by the Architect and may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
 - 2. Revise as Noted - Do Not Resubmit: The Work covered by the submittal has been reviewed by the Architect and may proceed provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.
 - 3. Revise as Noted - Resubmit for Record: The Work covered by the submittal has been reviewed by the Architect and the submittal is to be revised according to the Architect's notations and corrections and a new submittal is to be made. Do not proceed with the Work covered by the submittal. Once the revised submittal is received it will be reviewed again by the Architect and retained as the record submittal. Once reviewed, the Work may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
 - 4. Not Acceptable - Make New Submittal: Do not proceed with the Work covered by the submittal. Prepare a new submittal that complies with the Contract Documents. Once the revised submittal is received it will be reviewed again by the Architect. Once reviewed, the Work may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
 - 5. Comment Box / Line: This line is for the Architect to take other action as may be appropriate for the actual submittal made. Notations may include a request for additional items or a statement regarding the submittal. This area can also be used in conjunction with other boxes that have been marked.

1.7 SUBMITTAL PROCEDURES - PAPER SUBMITTALS

- A. Transmit each submittal in conformance with requirements of this section.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphanumeric suffix.
- C. Identify Project and Architect's project number, Contractor, Subcontractor or supplier; pertinent Drawing and detail number(s), and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals without Contractor's stamp and signature will be returned without review.
- E. Schedule submittals to expedite the Project, and deliver to Architect at 8163 Rochester Avenue, Suite 100, Rancho Cucamonga, CA 91730. Coordinate submission of related items.
- F. Make submittals in groups containing associated and related items to make sure that information is available for checking each item when it is received.
- G. Submittals for all items requiring color selection must be received before any will be selected.
- H. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- I. Make submittals in advance of scheduled dates for installation to allow specified time for review, revisions, and resubmission prior to final review and subsequent placement of orders.
- J. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit proper processing.
- K. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- L. Provide space for Contractor and Architect review stamps.
- M. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- N. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- O. Partial submittals will be considered non responsive and will be returned without review.
- P. Submittals not requested will not be recognized or processed. Submittals not requested will be returned without review.
- Q. Architect will not review submittals that contain material data safety sheets (MSDS) and will return them for resubmittal.
- R. Substitutions will not be considered when they are indicated or implied on submittals without separate written request as required by provisions of Section 01 25 13 - Product Substitution Procedures.

1.8 SHOP DRAWINGS - PAPER SUBMITTALS

- A. Submit six prints of each drawing. Four copies will be retained by Architect.
- B. Review comments will be shown on returned print. Contractor will make and distribute copies as required for his purpose.
- C. After review, distribute in accordance with article on procedures stated above and provide copies for Record Documents described in Section 01 77 00 - Closeout Procedures.

- D. Do not reproduce Contract Documents or copy standard information and submit as shop drawings.
- E. Standard information prepared without specific reference to project requirements will not be considered a shop drawing.
- F. Do not use or allow others to use shop drawings which have been submitted and have been rejected.

1.9 SUBMITTAL PROCEDURES - ELECTRONIC SUBMITTALS

- A. Transmit each electronic submittal in conformance with requirements of this section.
- B. Submittals for all items requiring color selections will not be accepted as an electronic submittal.
- C. Assemble complete submittal package into a single indexed Portable Document Format (PDF) file. File format licensed by Adobe Systems.
- D. Transmit electronic submittals as PDF files via Architect's Project Collaboration Site address or designated e mail address.
- E. Transmittal form for submittals shall be an electronic form acceptable to the Architect which identifies the Project, the Architect's project number, the Contractor, the Subcontractor or material supplier; pertinent Drawing and detail number(s), and specification Sections, as appropriate.
- F. Provide links enabling navigation to each item of submittal package.
- G. Name electronic submittal file with consistent project identifier composed of Architect's project number, Architect's alpha numeric file designation, and specification section number followed by sequential number. (e.g., 0920800-56-SUB - 06412-01.pdf)
- H. Resubmittals shall include an alphabetic suffix after initial point number. (e.g., 0920800-56-SUB – 06412-01-A.pdf)
- I. Resubmittals shall identify all changes made since previous submittal.
- J. Insert Contractor's review stamp to permanently record Contractor's action.
- K. Contractor's stamp shall be signed or initialed certifying that review, verification of Products required, field dimensions, adjacent work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- L. Submittals without Contractor's stamp and signature will be returned without review.
- M. Provide space for Architect's electronic review stamp.
- N. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- O. Make submittals in advance of scheduled dates for installation to allow specified time for review, revisions, and resubmission prior to final review and subsequent placement of orders.
- P. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit proper processing.
- Q. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- R. Contractor shall reproduce and distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- S. Partial submittals will be considered non responsive and will be returned without review.

- T. Submittals not requested will not be recognized or processed. Submittals not requested will be returned without review.
- U. Architect will not review submittals that contain material data safety sheets (MSDS) and will return them for resubmittal.
- V. Substitutions will not be considered when they are indicated or implied on submittals without separate written request as required by provisions of Section 01 25 13 - Product Substitution Procedures.

1.10 SHOP DRAWINGS - ELECTRONIC SUBMITTALS

- A. Submit electronic copy of shop drawings in PDF format as specified in this section.
- B. Review comments will be indicated on reviewed document.
- C. After review, distribute in accordance with article on procedures stated above and provide copies for Record Documents described in Section 01 77 00 - Closeout Procedures.
- D. Do not reproduce Contract Documents or copy standard information and submit as shop drawings.
- E. Standard information prepared without specific reference to project requirements will not be considered a shop drawing.
- F. Do not use or allow others to use shop drawings which have been submitted and have been rejected.

1.11 PRODUCT DATA

- A. When specified in individual specification sections, submit copies of data for each product which Contractor requires.
- B. Submit six copies of product data made in paper format. Four copies will be retained by Architect.
- C. Electronic submittals for product data will comply with Article for electronic submittal procedures stated in this section.
- D. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.
- E. Manufacturer's standard product data or catalogs that do not indicate materials or products that are specific to project will be returned without review.
- F. After review, distribute in accordance with article on procedures stated above and provide copies for Record Documents described in Section 01 77 00 - Closeout Procedures.

1.12 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Include identification on each sample, with full Project information.
- C. Submit the number of samples which Contractor requires, plus two which will be retained by Architect.
- D. Reviewed samples which may be used in the Work are indicated in individual specification Sections.
- E. Submittals for all items requiring color selection must be received before any will be selected.
- F. If a variation in color, pattern, texture or other characteristic is inherent within the material or product submitted, sample shall approximate limits of variation.

1.13 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturer's instructions and Contract Documents.

1.14 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturer's certificate to Architect for review, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

3.1 SUBMITTAL SCHEDULE

SUBMITTAL SCHEDULE				
SPEC. SECTION	TITLE	*SAMPLE	**CATALOG SHEET	**SHOP DRAWING
07 62 00	Sheet Metal Flashing and Trim	2	6	6
07 92 00	Joint Sealants	2	6	
09 90 00	Painting	2	6	
23 00 00	Heating, Ventilation and Air Conditioning		6	
26 00 00	General Electrical Requirements		6	
28 31 00	Fire Alarm System		6	
32 12 16	Asphalt Paving		6	

* Samples are required for Architect's "color and material board". To expedite approval, Contractor shall expedite the submittal of these items. Color selections will not be made until all such items are received.

* * Number of Catalog Sheets and Shop Drawings are for submittals made in paper form.

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Definitions.
- B. Specification format and content.
- C. Industry standards.
- D. Codes and standards.
- E. Governing regulations/authorities.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the General Conditions.
- B. Regulations: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the work.

1.3 SPECIFICATION FORMAT AND CONTENT

- A. Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 50-Division Master Format 2016 numbering system.
- B. The sections are placed in the Project Manual in numeric sequence; however, this sequence is not complete and the Table of Contents of the specifications must be consulted to determine the total listing of sections.
- C. The section title is not intended to limit the meaning or content of the section, nor to be fully descriptive of the requirements specified therein.
- D. The organization of the specifications shall not control the division of the work among subcontractors or establish the extent of work to be performed by any trade.
- E. Specifications use certain conventions regarding style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are:
 - 1. Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable to maintain the context of the Contract Document indicated.
 - 2. Imperative and streamlined language is generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. Subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - 3. The words "shall be" are implied wherever a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Except where Contract Documents include more stringent requirements, applicable construction industry standards shall apply as if bound into the Contract Documents to the extent referenced. Such standards are made part of Contract Documents by reference.
- B. Conform to reference standard by date of issue current on date for receiving bids except when a specific date is indicated.
- C. Where compliance with 2 or more standards is specified and where standards may establish different or conflicting requirements for quantities or quality levels, the more stringent, higher quality and greater quantity of work shall apply.
- D. The quantity or quality level shown or specified shall be the minimum provided or performed. Indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements.
- E. Each entity engaged in construction of the work is required to be familiar with industry standards applicable to its construction activity.
- F. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required activity, Contractor shall obtain copies directly from publication source.
- G. Trade associations names and titles of general standards are frequently abbreviated. Where such abbreviations are used in the Specifications or other Contract Documents, they shall mean the recognized trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the content of the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.
- H. Refer to individual specification sections and related drawings for names and abbreviations of trade associations and standards applicable to specific portions of the work. In particular, refer to Division 23 for names and abbreviations applicable to mechanical work, and refer to Division 26 for names and abbreviations applicable to electrical work.
- I. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 CODES AND STANDARDS

- A. Latest edition of pertaining ordinances, laws, rules, codes, regulations, standards, and others of public agencies having jurisdiction of the work are intended wherever reference is made in either the singular or plural to Code or Building Code except as otherwise specified, including but not limited to latest edition of those in the following listing.
 - 1. 2016 California Building Standards Administrative Code (CBSAC), California Code of Regulations (CCR), Title 24, Part 1
 - 2. 2016 California Building Code (CBC) California Code of Regulations (CCR) Title 24, Part 2 (2015 International Building Code (IBC) with California amendments)
 - 3. 2016 California Electrical Code (CEC) California Code of Regulations (CCR) Title 24, Part 3 (2014 National Electric Code (NEC) with California amendments)
 - 4. 2016 California Mechanical Code (CMC) California Code of Regulations (CCR) Title 24, Part 4 (2015 Uniform Mechanical Code (UMC) with California amendments)
 - 5. 2016 California Plumbing Code (CPC) California Code of Regulations (CCR) Title 24, Part 5 (2015 Uniform Plumbing Code (UPC) with California amendments)
 - 6. 2016 California Energy Code, California Code of Regulations (CCR) Title 24, Part 6

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|-----|--|--|
| 7. | 2016 California Fire Code (CFC) California Code of Regulations (CCR) Title 24, Part 9 | (2015 International Fire Code (IFC) with California Amendments) |
| 8. | 1990 State Fire Marshal Regulations California Code of Regulations (CCR) Title 19 (As amended to date) | |
| 9. | 2016 California Existing Building Code (CEBC) California Code of Regulations (CCR) Title 24, Part 10 | (2015) International Existing Building Code (IEBC) with California Amendments) |
| 10. | 2016 State Referenced Standards Code (CRSC) California Code of Regulations (CCR) Title 24, Part 12 | |
| 11. | 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design. (ADAS) | |

1.6 GOVERNING REGULATIONS/AUTHORITIES

- A. Authorities having jurisdiction have been contacted where necessary to obtain information for preparation of Contract Documents. Contact authorities having jurisdiction directly for information having a bearing on the work.
- B. Comply with all federal, state and local laws, ordinances, rules and regulations indicated and which bear on the conduct of the work.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 43 00

QUALITY ASSURANCE

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interpretation of requirements.
- B. Quality assurance and control of installation.
- C. Tolerances.
- D. Field samples.
- E. Mock-up.
- F. Manufacturers' field services and reports.

1.2 INTERPRETATION OF REQUIREMENTS

- A. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
- B. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation shall comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits.
- C. Where codes or specified standards indicate higher standards, more stringent tolerances or more precise workmanship than levels shown or specified, comply with most stringent requirements.
- D. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and - control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
- E. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- F. Comply fully with manufacturers' instructions, including each step in sequence.
- G. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

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

1.4 TOLERANCES

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

1.5 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual sections to be removed, clear area after field sample has been reviewed by Architect.

1.6 MOCK-UP

- A. Mock-up will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes.
- C. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- D. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been reviewed by Architect.

1.7 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and other field services as applicable, and to initiate instructions when necessary.
- B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report in duplicate within 15 days of observation to Architect for review.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

3.1 GENERAL INSTALLATION

- A. Comply with requirements specified in Section 01 73 00.

3.2 EXAMINATION

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

- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.3 PREPARATION

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

END OF SECTION

SECTION 01 45 29

TESTING LABORATORY SERVICES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selection and payment.
- B. Contractor submittals.
- C. Laboratory responsibilities.
- D. Laboratory reports.
- E. Limits on testing laboratory authority.
- F. Contractor responsibilities.
- G. Schedule of inspections and tests.
- H. Test and inspection form.

1.2 REFERENCES

- A. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
- B. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- C. ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
- D. CBC - California Building Code, Title 24, Part 2 of the California Code of Regulations (CCR).
- E. DSA - Division of the State Architect, Office of Regulation Services, Structural Safety Section.
- F. IR - Interpretation of Regulation Documents, Division of the State Architect.

1.3 SELECTION AND PAYMENT

- A. Owner will employ and pay for services of an independent testing laboratory to perform specified inspection and testing as specified by Owner's testing laboratory.
- B. Owner will pay cost of testing and inspection except the following for which the Contractor shall reimburse the Owner through deductive change order:
 - 1. Any retesting and sampling required due to failure of original test.
 - 2. Any testing and inspection required to be performed that requires testing laboratory or agency to perform services outside the state of California.
 - 3. Concrete design mix.
 - 4. Additional testing expenses caused by failure of the Contractor to adhere to construction schedule or caused by failure of the Contractor to give proper advanced notice or caused by Contractor delay.
- C. Contractor shall employ and pay for services required to perform specified inspection and testing specified as Contractor responsibility.

- D. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.4 QUALITY ASSURANCE

- A. Comply with requirements of ASTM E329 and ASTM D3740.
- B. Laboratory Staff: Maintain a full time registered engineer on staff to review services.
- C. Testing Equipment: Capable of performing tests required calibrated at reasonable intervals with devices acceptable to the National Bureau of Standards.
- D. All testing agency management, laboratory, and field supervisory personnel shall have at least five years experience in the inspection and testing of work and materials of construction.
- E. Testing laboratory shall maintain a current letter of acceptance issued by the Division of the State Architect (DSA) demonstrating that it has met the criteria established by the Division of the State Architect for performance of inspection work and testing of materials. Laboratory to furnish copy of acceptance letter upon request.

1.5 OWNER'S TESTING LABORATORY RESPONSIBILITIES

- A. Test samples of mixes submitted by Inspector.
- B. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
- F. Perform additional inspections and tests required by Architect.
- G. Attend preconstruction conferences and progress meetings when requested by Architect.

1.6 LABORATORY REPORTS

- A. After each inspection and test, promptly submit within no more than 14 days of the date of the inspection or test one copy of laboratory report to Architect, Engineer, Owner's Resident Inspector, Division of the State Architect and to Contractor. Reports of test results of materials and inspections found not to be in compliance with the requirements of the Contract Documents shall be forwarded immediately to the Architect, Engineer, Owner's Resident Inspector, Division of the State Architect and the Contractor.
- B. Include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and Specifications section.
 - 6. Location in the Project.
 - 7. Type of inspection or test.
 - 8. Date of test.

9. Ambient conditions at time of test or sample-taking.
 10. Results of tests and interpretation of test results.
 11. Professional opinion as to whether tested work is in conformance with Contract Documents.
 12. Recommendations on retesting.
- C. Verification of Test Reports: Each testing agency shall submit to the Architect and the Division of the State Architect a verified report in duplicate covering all of the tests which were required to be made by that agency during the progress of the project. Such report shall be furnished each 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.

1.7 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.8 CONTRACTOR RESPONSIBILITIES

- A. Submit proposed mix designs to Architect for review in accordance with Section 32 13 13.
- B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturer's facilities.
- C. Notify Architect, Owner's Resident Inspector and testing laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to the Contractor's negligence.
 2. The Contractor shall notify the Owner's representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must by terms of the Contract be tested, in order that the Owner may arrange for the testing of same at the source of supply.
 3. 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.
- D. Employ and pay for services of Owner's testing laboratory to perform additional inspections, sampling and testing required when initial tests indicate work does not comply with contract documents.

1.9 SCHEDULE OF INSPECTIONS AND TESTS BY OWNER'S TESTING LABORATORY

- A. Perform tests and inspections for the following in conformance with the (CBC) California Building Code (International Building Code with State of California Amendments), Title 24, Part 2, of the California Code of Regulations (CCR).
 1. Structural Tests and Special Inspections
 - (a) General - 1701A
 - (b) Approvals - 1703A
 - (c) Special Inspections - 1704A
 - (1) Concrete - 1705A.3 and Table 1705A.3

2. Concrete (Chapter 19A)

(a) Concrete Inspection

- (1) Portland Cement Tests - 1910A.1
- (2) Gunite/Shotcrete - 1908A.5, 1908A.10
- (3) Reinforcing Bars Table - 1705A.2.1, 1910A.2
- (4) Waiver of Reinforcing Bar Tests - 1910A.2
- (5) Prestressing Steel & Anchorage - 1910A.3
- (6) Batch Plant Inspection - 1705A.3.3
- (7) Waiver of Batch Plant Inspection - 1705A.3.3.1, 1705A.3.3.2
- (8) Frequency of Tests for Concrete - 1905A.1.16

(b) Concrete Quality

- (1) Proportions of Concrete - 1903A, 1904A, 1905A

(c) Job Site Inspection

- (1) Site Placement Inspection - 1705A.3.5

(d) Anchors in Concrete

- (1) Drilled-In-Expansion Bolts or Epoxy-Type Anchors in Concrete - 1910A.5

1.10 SCHEDULE OF INSPECTIONS AND TESTS BY CONTRACTOR

A. Contractor Responsibility:

1. Statement of Responsibility - 1704A.4. Refer to listed special inspections under Article 1.9.

B. Planting and Irrigation:

1. Testing as specified in Division 32 including, but not limited to; soils analysis and irrigation pressure testing.

C. Plumbing:

1. Testing as specified in Division 22 including, but not limited to: Sterilization, soil waste and vent, water piping, source of water, gas piping, downspouts and storm drains.

D. Heating, Ventilating and Air Conditioning:

1. Testing as specified in Division 21 shall include, but not be limited to: Ductwork tests, cooling tower tests, boiler tests, controls testing, piping tests, water and air systems, and test and balance of heating and air conditioning systems.

E. Electrical

1. Testing as specified in Division 26 including, but not limited to: Equipment testing, all electrical system operations, grounding system and checking insulation after cable is pulled.

1.11 INSPECTION BY THE OWNER

- A. An Inspector employed by the Owner in accordance with the requirements of the California Code of Regulations Title 24, Part 1 will be assigned to the work. His duties are specifically defined in Section 4-342 of Title 24, Part 1.
- B. The Owner and his representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.
- C. 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 the character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract. The presence of an Inspector shall in no way change, mitigate or alleviate the responsibility of the Contractor.
- D. The Inspector is not authorized to change, revoke, alter, enlarge or decrease in any way any requirement of the Contract Documents, drawings, specifications or subsequent change orders.
- E. Whenever there is insufficient evidence of compliance with any of the provisions of Title 24, Part 2 of the California Code of Regulations or evidence that any material or construction does not conform to the requirements of Title 24, Part 2 of the California Code of Regulations, the Division of the State Architect may require tests as proof of compliance. Test methods shall be as specified herein or by other recognized and accepted test methods determined by the Division of the State Architect. All tests shall be performed by a testing laboratory accepted by the Division of the State Architect.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

3.1 STRUCTURAL TEST AND INSPECTION FORM

- A. Form DSA 103 attached.

END OF SECTION



DSA-103
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List of Required Structural Tests & Special Inspections - 2016 CBC

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Revised: _____

School Name	Longfellow Elementary School	District	Compton Unified School District
-------------	------------------------------	----------	---------------------------------

IMPORTANT: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.

NOTE: This form is also available for projects submitted for review under the 2007, 2010, and 2013 CBC.

INSTRUCTIONS: Click a plus sign (+) before any category or subcategory to reveal additional tests and special inspections. A shaded box indicates a test or special inspection that may be required, depending on the scope of the construction and other issues. A shaded box can be clicked indicating your selection of that test. **Note:** A minus (-) on a category or subcategory heading indicates that it can be collapsed. However, any selections you may have made will be cleared. Click on the "COMPILE" button to show only the tests and inspections finally selected. For more information on use of this form, see DSA-103.INSTR.

TEST OR SPECIAL INSPECTION		PERFORMED BY 2		CODE REFERENCE AND NOTES
REQUIRED	TYPE 1	TYPE 2		
+ SOILS				
- CONCRETE				Table 1705A.3, ACI 318-14 Sections 26.12 & 26.13
- 7. CAST IN PLACE CONCRETE				
	Material Verification and Testing:			
X	a. Verify use of required design mix.	Periodic	SI*	Table 1705A.3 Item 5, 1910A.1 (1909.2.3)*. * To be performed by qualified batch-plant inspector and concrete sampling technician
X	b. Identify, sample, and test reinforcing steel.	Test	LOR	1910A.2 (1909.2.4*); ACI 318-14 Section 26.6.1.2. DSA IR 17-10.16
X	c. During concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Test	LOR	Table 1705A.3 Item 6; ACI 318-14 Sections 26.5 & 26.12
X	d. Test concrete (f'_c).	Test	LOR	1905A.1.16 (1909.3.7*); ACI 318-14 Section 26.12.
	Inspection:			
X	e. Batch plant inspection <input checked="" type="radio"/> Continuous <input type="radio"/> Periodic	See Notes	SI	Default of 'Continuous' per 1705A.3.3; if approved by DSA, batch plant inspection may be reduced to 'Periodic' subject to requirements in Section 1705A.3.3.1 or eliminated per 1705A.3.3.2. (See Appendix for exemptions.)
- 11. POST-INSTALLED ANCHORS:				
X	a. Inspect installation of post-installed anchors	See Notes	SI*	Table 1705A.3 Item 4a (Continuous) & 4b (Periodic) (see Appendix for exemptions). ACI 318-14 Sections 17.8 & 26.13 * May be performed by the project inspector when specifically approved by DSA.
X	b. Test post-installed anchors.	Test	LOR	1910A.5 (1909.2.7*). (See Appendix for exemptions.)
+ MASONRY				TMS 402-13/ACI 530-13/ASCE 5-13 Table 3.1.3 & TMS 602-13/ACI 530.1-13/ASCE 6-13 Table 5

Note: References are to the 2016 edition of the California Building Code (CBC) unless otherwise noted.

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Table 1705A.2.1, AISC 303-10, AISC 360-10, AISC 341-10, AISC 358-10, AISI S100-07/S2-10				
-	STEEL, ALUMINUM			
-	17. STRUCTURAL STEEL, COLD-FORMED STEEL, AND ALUMINUM USED FOR STRUCTURAL PURPOSES			
	Material Verification:			
X	a. Verify identification of all materials and: • Mill certificates indicate material properties that comply with requirements. • Material sizes, types and grades comply with requirements.	Periodic	*	2203A.1 (2203.1*), Table 1705A.2.1 Item 3a-3c; AISI S100-07/S2-10 Section A2.1 & A2.2, AISI S200-12 Section A3, AISI S220-11 Section A4. * By special inspector or qualified technician when performed off-site.
X	b. Test unidentified materials	Test Periodic	LOR	2203A.1 (2203.1*)
X	c. Examine seam welds of HSS shapes	Periodic	SI	2203A.1 (2203.1*) DSA IR 17-3.
	Inspection:			
X	e. Verify and document steel fabrication per DSA approved construction documents.	Periodic	SI	Not applicable to cold-formed steel light-frame construction, except for trusses (1705A.2.4).
-	19. WELDING:			1705A.2.5, Table 1705A.2.1 Items 4 & 5; DSA IR 17-3, AWS D1.1 and AWS D1.8 for structural steel, AWS D1.2 for Aluminum, AWS D1.3 for cold-formed steel, AWS D1.4 for reinforcing steel. (See Appendix for exemptions.)
	Verification of Materials, Equipment, Welders, etc.:			
X	a. Verify weld filler material identification markings per AWS designation listed on the DSA approved documents and the WPS.	Periodic	SI	DSA IR 17-3.
X	b. Verify weld filler material manufacturer's certificate of compliance.	Periodic	SI	DSA IR 17-3.
X	c. Verify WPS, welder qualifications and equipment.	Periodic	SI	DSA IR 17-3.
-	19.1 SHOP WELDING:			
X	b. Inspect single-pass fillet welds ≤ 5/16" floor and roof deck welds	Periodic	SI	1705A.2.2, Table 1705A.2.1 Item 5a.5 & 5a.6. Per AISC 360-10 (and AISC 341-10 as applicable). DSA IR 17-3.
-	19.2 FIELD WELDING:			
X	b. Inspect single-pass fillet welds ≤ 5/16"	Periodic	SI	Table 1705A.2.1 Item 5a.5. Per AISC 360-10 (and AISC 341-10 as applicable). DSA IR 17-3.
+	WOOD			
+	OTHER			

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List of required verified report(s):

- 1 All Structural Testing: Laboratory Verified Report - Form DSA-291
- 2 Concrete Batch Plant Inspection: Laboratory Verified Report - Form DSA-291
- 3 Shop Welding Inspection: Laboratory Verified Report - Form DSA-291, or, for independently contracting SI, Special Inspection Verified Report - Form DSA-292
- 4 Field Welding Inspection: Laboratory Verified Report - Form DSA-291, or, for independently contracting SI, Special Inspection Verified Report - Form DSA-292

KEY to Columns

1	Type -	2	Performed By -
Continuous	- Indicates that a continuous special inspection is required	GE	- Indicates that the special inspection is to be performed by a registered geotechnical engineer or his or her authorized representative
Periodic	- Indicates that a periodic special inspection is required	LOR	- Indicates that the test or inspection is to be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See section 4-335, 2013 CCR Title 24, Part 1.
Test	- Indicates that a test is required	SI	- Indicates that the special inspection is to be performed by a special inspector

Mark Graham

Name of Architect or Engineer in general responsible charge

Peter Tran

Name of Structural Engineer (When structural design has been delegated)

[Signature] 1-5-18
 date

Signature of Architect or Structural Engineer

IDENTIFICATION STAMP
 DIV OF THE STATE ARCHITECT
 APP. # **03-118423**
 AC N/A F/LS N/A SS SS
 DATE _____

INCREMENT # DSA File No.: 19-23
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 Revised:

Appendix: Work Exempt from DSA Requirements for Special Inspection or Structural Testing


Exempt items given in IR A-22 or the 2016 CBC (including DSA amendments) and those items identified below with an "X" by the design professional are NOT subject to DSA requirements for the structural tests or special inspections noted. Items marked as exempt shall be identified by either: 1) listing specific details/sheets noted in the spaces provided below OR 2) on the approved construction documents. The project inspector shall verify all construction complies with the approved construction documents.

Exempted by Design Prof.

Soils:	
X	1. Deep foundations acting as a cantilever footing designed based on minimum allowable pressures per 2016 CBC Table 1806A.2 and having no geotechnical report for the following types of structures: free standing sign, scrolling message sign, scoreboard, covered walkway or shade structure with dead load less than 5 psf and other light-weight structures of which the apex is less than 8' above the highest adjacent grade.
X	2. Shallow foundations meeting the exception item #1 criteria specified in 2016 CBC Section 1803A.2.
(Optional) List details for applicable exempt items:	
Concrete/Masonry:	
X	1. Post-installed anchors for the following: 1) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment - see item 7 for "Welding") given in CBC Section 1616A.1.18 (which replaces ASCE 7-10, Section 13.1.4) or 2) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding."
X	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.
X	3. Masonry retaining walls less than 4'-0" above the top of foundation not supporting a surcharge and free standing nonbearing non-shear masonry walls up to 6'-0" above adjacent grade do not require grout, mortar or masonry core testing or DSA special inspection.

Exempted by Design Prof.

Welding:	
X	1. Solid-clad and open-mesh gates with maximum leaf span or rolling section for rolling gates of 10' and apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
X	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds cannot be ground flush.
X	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
X	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	5. Manufactured components (e.g., Tolco, B-Line, Afton, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	7. Any support for exempt non-structural components given in CBC Section 1616A.1.18 (which replaces ASCE 7-10, Section 13.1.4) meeting the following: 1) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) <= 4' above supporting floor/roof, 2) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.



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Revised:
Revised:

☒ 4. Epoxy shear dowels in site flatwork.

(Optional) List details for applicable exempt items:

(Optional) List details for applicable exempt items:

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, communication service, water, and sanitary facilities.
- B. Temporary Controls: Barriers, enclosures and fencing. Water, erosion, pollution, noise and fire protection control.
- C. Construction Facilities: Access roads, parking, progress cleaning, project signage, and temporary buildings.

1.2 TEMPORARY ELECTRICITY

- A. Connect to existing power service at location as directed. Power consumption shall not disrupt Owner's need for continuous service. Owner will pay for cost of energy used. Exercise measures to conserve energy.
- B. Provide power outlets for construction operations, with branch wiring and distribution boxes. Provide flexible power cords as required.
- C. Provide main service disconnect and over current protection at convenient location.
- D. Comply with NECA, NEMA, and UL standards and regulations for temporary electric service.
- E. Permanent convenience receptacles may not be utilized during construction.

1.3 TEMPORARY WATER SERVICE

- A. Connect to existing water source for construction operations. Owner will pay cost of water used. Exercise measures to conserve water. Water consumption shall not disrupt Owner's need for continuous service.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide temporary chemical type toilet facilities and enclosures.
- B. Maintain temporary toilet facilities in a sanitary manner.
- C. Existing facilities shall not be used.
- D. Facilities shall comply with the accessibility requirements of the CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Section 11B-201.4.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide protection for plant life and trees designated to remain and for soft and hardscape areas adjacent to work, replace damaged materials in kind.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.6 FENCING

- A. Construction: Commercial grade chain link fence.

- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Post fences and gates with no trespassing signs.

1.7 TEMPORARY FIRE PROTECTION

- A. Maintain temporary fire protection facilities of the types needed until permanent facilities are installed.
- B. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".
- C. Fire safety during construction shall comply with CFC - California Fire Code (CCR) California Code of Regulations, Title 24, Part 9, Chapter 33.
- D. Store combustible materials in containers in fire-safe locations.
- E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes.
- F. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

1.8 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.9 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Conform to Best Management Practices for waste management and material controls as defined in Section 4 of the Construction Activity Handbook published by the Storm Water Quality Association.

1.10 SECURITY

- A. Coordinate with Owner's security program.

1.11 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
- B. Stabilize temporary vehicle transportation routes and construction entrances to prevent erosion and control dust immediately after grading in accordance with best management practice techniques defined in Section 3 of the Construction Activity Handbook published by the Storm Water Quality Association.
- C. Maintain stabilization techniques as work progresses.
- D. Provide and maintain access to fire hydrants, free of obstructions.
- E. Designated existing on-site roads may be used for construction traffic.

1.12 TRAFFIC CONTROL

- A. Comply with requirements of authorities having jurisdiction.
- B. Obtain all permits, provide all materials and maintain controls as required of authorities having jurisdiction.
- C. Maintain access for fire-fighting equipment and access to hydrants.

1.13 PROGRESS CLEANING

- A. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- B. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- C. Provide walk-off mats at each building entry.

1.14 WASTE DISPOSAL

- A. Provide waste collection containers in sizes adequate to handle waste from construction operations.
- B. Maintain building areas free of waste materials, debris, and rubbish.
- C. Remove waste materials, debris, and rubbish from site periodically and legally dispose of off site.
- D. Maintain site area in a clean and orderly condition.

1.15 PROJECT IDENTIFICATION

- A. Provide 8 x 4 foot project sign of exterior grade plywood and wood frame construction, painted, with exhibit lettering by professional sign painter to Architect's design and colors.
- B. List title of Project, names of Owner, Architect and Contractor.
- C. List funding source for project in minimum 3 inch high upper and lower case lettering. Funding source statement to contain the following language:

This modernization project was funded by the State Allocation Board from Proposition 47 state bond funds as part of the Build California Initiative.

- D. Erect on site at location established by Architect.
- E. Sign to remain in place through construction period and shall be removed only after dedication of the project.
- F. Provide temporary directional signs for construction personnel and visitors.
- G. No other signs are allowed except those required by law.

1.16 FIELD OFFICES

- A. Office: Weather-tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture drawing rack and drawing display table.
- B. Maintain daily janitorial service for offices. Maintain approach to office free of mud and water.
- C. Provide space for Project meetings, with table and chairs to accommodate 8 persons.
- D. Provide separate private office, minimum of 120 sq. ft., similarly equipped and furnished, for use of Resident Inspector.
- E. When permanent facilities are enclosed with operable utilities, relocate offices into building, with written agreement of Owner, and remove temporary buildings.
- F. Facilities shall comply with the accessibility requirements of the CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Section 11B-201.4.

1.17 STORAGE AREAS AND SHEDS

- A. Size to storage requirements for products of individual Sections. Allow for access and orderly provision for maintenance and for inspection of products.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Maintain temporary equipment, facilities and controls until Substantial Completion or when use is no longer required.
- B. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion review.
- C. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- D. Clean and repair damage caused by installation or use of temporary work.
- E. Materials and facilities that constitute temporary facilities are property of the Contractor.
- F. Restore existing facilities used during construction to original condition.
- G. Restore permanent facilities used during construction to specified condition.
- H. Replace construction that cannot be satisfactorily restored.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 61 00

PRODUCT REQUIREMENTS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Damage and restoration.

1.2 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.
- B. Products may also include existing materials or components required for reuse that were obtained from this project.
- C. Products specified or recycled from other projects are not considered new products.
- D. Provide interchangeable components of the same manufacturer, for similar components.
- E. Provide products that comply with the Contract Documents, that are undamaged and are unused at the time of installation.
- F. Provide products complete with all accessories, trim, finish, safety guards and other devices and detail needed for a complete installation and for the intended use and effect.
- G. Where a specific manufacturer's product is specified as the basis of design, the designation shall establish the qualities relating to type, function, dimension, in-service performance, physical properties, appearance and other characteristics for comparable products of other named manufacturers.
- H. Where products are specified by name or by manufacturer provide the product or manufacturer specified. No substitutions will be permitted unless made under the provisions of Section 01 25 13.
- I. Where specifications only describe a product or assembly by listing exact characteristics required, provide a product or assembly that provides the characteristics.
- J. Where specifications only require compliance with performance requirements, provide products that comply with those requirements.
- K. Where the specifications only require compliance with an imposed code, standard or regulation, provide a product that complies with the standards, codes or regulations specified.
- L. Where specifications require review and acceptance of a sample, the Architect's decision will be final on whether a proposed product sample is acceptable or not.
- M. Provide materials and products specified in the full range of color, texture and pattern for selection by Architect. Range shall include standard color/texture/pattern not stocked, but available from manufacturer, and special color/ texture/pattern available from manufacturer as advertised in product data and brochures. Unless otherwise indicated in individual specification sections, Architect may select from any color range at no additional cost to Owner.
- N. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

- O. Where product is designated to match an existing product, provide product that matches in size, profile, finish, dimension and other characteristics the existing product identified.

1.3 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Schedule delivery to minimize long-term storage at site to prevent overcrowding of construction spaces.
- C. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
- D. Deliver products in manufacturer's original sealed container or packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- E. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 STORAGE

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- B. Store sensitive products in weather-tight, climate controlled enclosures.
- C. Store products in a manner that will not damage or overload project structure.
- D. For exterior storage of fabricated products, place on sloped supports, above ground.
- E. Provide off-site storage when site does not permit on-site storage .
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
- J. Prevent the discharge of pollutants to storm water from storage of materials on-site using best management practice techniques defined in Chapter 4 of the Construction Activity Handbook published by the Storm Water Quality Task Force.

1.5 PROTECTION

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Provide humidity and temperature control for installed products as recommended by materials manufacturer.
- G. Prohibit traffic from landscaped areas.

1.6 DAMAGE AND RESTORATIONS

- A. Damage to existing or new work whether accidental or not shall be restored or replaced as specified or directed by Architect.
- B. Restoration shall be equal to structural performance of original work.
- C. Finish shall match appearance of existing adjacent work.
- D. Work not properly restored or where not capable of being restored shall be removed and replaced.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 73 00

EXECUTION REQUIREMENTS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General procedural requirements governing execution of the Work.
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.

1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- B. Certified Surveys: Submit two copies signed by land surveyor.
- C. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: Existence and location of site improvements and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify existence and location of construction affecting the Work.
- B. Existing Utilities: Existence and location of underground and other utilities indicated as existing are not guaranteed. Before beginning work, investigate and verify existence and location of underground utilities affecting the Work.
 - 1. Before construction, verify location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where conditions detrimental to performance of the Work are encountered, provide a written report listing the following:
 - (a) Description of the Work.
 - (b) List of detrimental conditions, including substrates.
 - (c) List of unacceptable installation tolerances.
 - (d) Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of need for clarification of Contract Documents, submit a Request For Information (RFI) to Architect. Include a detailed description of problem encountered, together with recommendations for resolution of the item discovered.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor, registered in the state of California to lay out the Work using accepted surveying practices.
 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Control datum for survey is that established by Owner provided survey.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain maximum headroom clearance in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

END OF SECTION

SECTION 01 73 29
CUTTING AND PATCHING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements and limitations for cutting and patching of Work.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore surfaces to original or specified conditions after installation of other work.

1.3 REGULATORY REQUIREMENTS

- A. Unless specifically shown on the drawings, no structural member shall be cut, drilled, or notched without prior written authorization from the Architect and the Division of the State Architect.

1.4 SUBMITTALS

- A. Submit written request in advance of cutting or patching which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.
- B. Include in request:
 - 1. Identification of Project.
 - 2. Location and description of affected work.
 - 3. Necessity for cutting or patching.
 - 4. Description of proposed work, and Products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate contractor.
 - 7. Written permission of affected separate contractor.
 - 8. Date and time work will be executed.

1.5 QUALITY ASSURANCE

- A. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Do not cut or patch operating elements that would reduce their capacity to perform or that would result in increased maintenance or decreased operational life or safety.

- C. Do not cut or patch construction that would result in visual evidence of cutting or patching.
- D. Remove and replace construction that has been cut or patched in a visually unsatisfactory manner.

2. PART 2 PRODUCTS

2.1 MATERIALS

- A. Primary Products: Those required for original installation.
- B. Substitutions: Under provisions of Section 01 25 13.

3. PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing Work, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.

3.3 CUTTING AND PATCHING

- A. Execute cutting, fitting, and patching to complete Work.
- B. Fit Products together, to integrate with other work.
- C. Uncover work to install ill timed work.
- D. Remove and replace defective or non-conforming work.
- E. Remove samples of installed work for testing when requested.
- F. Provide openings in the Work for penetration of mechanical and electrical work.
- G. Cut rigid materials using saw or drill. Pneumatic tools not allowed without prior approval.

3.4 PERFORMANCE

- A. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. Employ skilled and experienced installer to perform cutting and patching.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- D. Restore work with new Products in accordance with requirements of Contract Documents.
- E. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.

- G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.5 CLEANING

- A. Clean areas and spaces where cutting and patching was performed.
- B. Completely remove paint, mortar, oils, sealant, and similar materials.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout Procedures.
- B. Final Cleaning.
- C. Adjusting.
- D. Demonstration and Instructions.
- E. Project Record Documents.
- F. Operation and Maintenance Data.
- G. Warranties.
- H. Spare Parts and Maintenance Materials.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's review.
- B. Prepare and submit to Architect a list of items to be completed or corrected, the value of the items on the list, and reasons why the Work is not complete.
- C. Submit written request to Architect for review of Work.
- D. Submit warranties, bonds, service agreements, certifications, record documents, maintenance manuals, receipt of spare parts and similar closeout documents.
- E. Make final changeover of permanent locks and deliver keys to Owner.
- F. Terminate and remove temporary facilities from Project site.
- G. Advise Owner of change over in heat and other utilities.
- H. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- I. Submit affidavit of payment of debts and claims, AIA Document G706.
- J. Submit affidavit of release of liens, AIA Document G706A.
- K. Submit consent of contractors surety to final payment, AIA Document G707.
- L. Owner will occupy all of the building as specified in Section 01 11 00.

1.3 REGULATORY REQUIREMENTS

- A. Provide final verified reports required by Section 39151 and 81141 of the Education Code in the manner prescribed by Title 24, Part 1, Section 4-336 and 4-343 in compliance with DSA Procedure: Project Certification Process PR 13-02.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final review by Architect.
- B. Employ experienced professional cleaners for final cleaning.
- C. Vacuum carpeted and soft surfaces. Shampoo if visible stains exist.
- D. Clean equipment and plumbing fixtures to a sanitary condition.
- E. Clean exposed surfaces of grilles, registers and diffusers.
- F. Replace filters of operating mechanical equipment.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.
- H. Leave project clean and ready for occupancy by Owner.

1.5 ADJUSTING

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

1.6 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products, systems, and equipment to Owner's personnel two weeks prior to date of final review.
- B. For each demonstration submit list of participants in attendance.
- C. Provide two copies of video tape of each demonstration and instructions session.
- D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.7 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work in contrasting color.
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.

- D. Specifications: Legibly mark and record at each Product Section in contrasting color ink, description of actual Products installed, including the following:
1. Manufacturer's name and product model and number.
 2. Supplier and installer's name and contact information.
 3. Changes made by Addenda and Modifications.
- E. Contract Drawings and Shop Drawings: Legibly mark each item in contrasting color ink to record actual construction including:
1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 3. Field changes of dimension and detail.
 4. Details not on original Contract Drawings.
 5. Revisions to electrical circuitry and locations of electrical devices and equipment.
 6. Note change orders, alternate numbers, and similar information, where applicable.
 7. Identify each record drawing with the written designation of "RECORD DRAWING" located in prominent location.
- F. Record Digital Data Files: Immediately before inspection for Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 4. Refer instances of uncertainty to Architect for resolution.
 5. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - (a) Refer to Section 01 33 00 "Submittal Procedures" for requirements related to use of Architect's digital data files.
 - (b) Architect will provide data file layer information. Record markups in separate layers.
- G. Final Property Survey: Under the provisions of Section 01 73 00.
- H. Record Construction Schedule: Under the provisions of Section 01 32 17.
- I. Submit documents to Architect at time of Substantial Completion.

1.8 OPERATION AND MAINTENANCE DATA

A. Summary:

1. Organize operation and maintenance data with directory.

2. Provide operation and maintenance manuals for products, systems, subsystems, and equipment.
 3. Refer to Divisions 02 thru 49 for specific operation and maintenance manual requirements for the Work in those Divisions.
- B. Submit two sets prior to final review, bound in 8-1/2 inch x 11 inch, three ring D size binders with durable vinyl covers.
- C. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- D. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with laminated plastic tabs.
- E. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Engineers, Contractor, subcontractors, and major equipment suppliers and manufacturers.
- F. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
1. Performance and design criteria.
 2. List of equipment.
 3. Parts list for each component.
 4. Start-up procedures.
 5. Shutdown instructions.
 6. Normal operating instructions.
 7. Wiring diagrams.
 8. Control diagrams.
 9. Maintenance instructions for equipment and systems.
 10. Maintenance instructions for finishes, including recommended cleaning methods and materials.
- G. Part 3: Project documents and certificates, including the following:
1. Shop drawings and product data.
 2. Air and water balance reports.
 3. Certificates.
 4. Warranties.

1.9 WARRANTIES

- A. Commencement of warranties shall be date of Substantial Completion.
- B. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
- C. Provide duplicate notarized copies in operation and maintenance manuals.
- D. Each prime contractor is responsible for warranties related to its own contract.

- E. Execute and assemble documents from subcontractors, suppliers, and manufacturers.
- F. Provide Table of Contents and assemble in binder with durable plastic cover.
- G. Submit prior to final Application for Payment.
- H. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of warranty on the work that incorporates the products.
- I. Manufacturer's disclaimer and limitations on product warranties do not relieve suppliers, manufacturer's, and subcontractors required to countersign special warranties with Contractor.
- J. When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- K. When work covered by warranty has failed and has been corrected, reinstate warranty by written endorsement. Reinstated warranty shall be equal to original warranty with equitable adjustment for depreciation.
- L. Upon determination that Work covered by warranty has failed, replace or repair Work to an acceptable condition complying with requirements of the Contract Documents.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site and place in location as directed.
- C. Obtain signed receipt for delivery of materials and submit prior to request for final review by Architect.

2. PART 2 PRODUCTS

Not Used

3. PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-coated flashings.
- B. Counter flashing at piping penetrations, vent pipes, and conduits.
- C. Counterflashings at roof mounted equipment, curbs and supports.

1.2 REFERENCES

- A. ASTM A653 - Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM A755 - Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
- C. ASTM A792 – Steel Sheet, Aluminum-Zinc Alloy. Coated by the Hot-Dip Process, General Requirements.
- D. ASTM A924 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM B32 - Solder Metal.
- F. ASTM B101 - Standard Specifications for Lead-Coated Copper Sheet and Strip for Building Construction.
- G. ASTM D4586 - Asphalt Roof Cement, Asbestos Free.
- H. SMACNA - Architectural Sheet Metal Manual.

1.3 SYSTEM DESCRIPTION

- A. Work of this Section is to physically protect base flashings from damage that would permit water leakage to building interior.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in sheet metal flashing work with five years minimum experience.
- B. Perform work in accordance with SMACNA standard details and requirements.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings capable of resisting an ultimate design wind speed of 115 miles per hour.

1.5 SUBMITTALS

- A. Submit shop drawings, product data, and samples under provisions of Section 01 33 00.
- B. Submit shop drawings of sheet metal items indicating profiles, jointing, terminations and installation details. Indicate type and spacing of fasteners.
- C. Submittal of specific plates from the SMACNA Architectural Sheet Metal Manual constitutes acceptable documentation of installation details.
- D. Submit product data for pre-coated galvanized steel.
- E. Submit two samples, 4 x 4 inch in size illustrating metal finish color for pre-coated steel.

- F. Submit product data for flashing accessories.
- G. Submit warranty for water tightness.
- H. Submit warranty for metal finish.

1.6 STORAGE AND HANDLING

- A. Store products under provisions of Section 01 61 00.
- B. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.7 WARRANTY

- A. Provide warranty under provisions of Section 01 77 00.
- B. Provide 2-year warranty coverage for degradation of water tightness and integrity of seals.
- C. Provide 20-year warranty coverage for metal finish from all defects.

2. PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Pre-Coated Galvanized Steel: ASTM A755 on zinc-coated galvanized substrate, ASTM A653, Grade 33, G90 zinc coating in accordance with ASTM A924 or ASTM A792, Grade 50, AZ55 aluminum zinc coating; 0.0299 inch thick core steel.

2.2 ACCESSORIES

- A. Lead-Coated Copper: ASTM B101, Temper H00 and H01, cold-rolled copper sheet, coated both sides with lead weighing not less than 12 lb/100 sq. ft. or more than 15 lb./100 sq. ft. total weight of copper sheet with lead applied to both sides.
- B. Fastener: Galvanized steel or stainless steel with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as pre-coated metal.
- C. Underlayment: Spunbound reinforced polypropylene coated fabric sheet.
 - 1. Premium Grade Feltex as manufactured by SystemComponents Corp., www.systemcomponents.net.
 - 2. Premium Summit Synthetic Underlayment as manufactured by Atlas Roofing Corp., www.atlasroofing.com.
 - 3. Roof Top Guard II Underlayment as manufactured by Underlayment Specialties Plus, www.uspunderlayment.com.
 - 4. Substitutions: Under provisions of Section 01 25 13.
- D. Slip Sheet: 0.05 lb./sq. ft., rosin sized building paper.
- E. Sealant: Type specified in Section 07 92 00.
- F. Bedding Compound: Rubber-asphalt type.
- G. Plastic Cement: ASTM D4586, Type I.
- H. Metal Flashing System: Two piece pre-coated galvanized steel similar to Springlok Flashing System, manufactured by Fry Reglet, www.fryreglet.com, type as indicated. Include fabricated end closures and mitered corners.

- I. Solder for Lead-Coated Copper: ASTM B32, Grade SN 60 percent tin, 40 percent lead.
- J. Solder for Zinc: ASTM B32; 50/50 tin/lead type, with rosin flux.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate concealed cleats of galvanized steel, ASTM A653, Grade 33, G90 zinc coating, 0.0478 inch thickness, interlockable with sheet.
- C. Fabricate exposed cleats and coverplates of same material as sheet, interlockable with sheet.
- D. Form pieces in longest practical lengths.
- E. Hem exposed edges on underside 1/2 inch. Miter and seam corners.
- F. Form material with flat lock seam.
- G. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- H. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- I. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- J. Fabricate flashings to allow toe to extend 2 inches over roofing surface. Return and brake edges.
- K. Fabricate vent pipe and roof penetration flashings of lead-coated copper with clamping ring.

2.4 FINISH

- A. Kynar 500 or Hylar 5000 shop pre-coated finish with 0.2 mil baked on primer and 0.8 mil baked on topcoat for a 1.0 mil dry film thickness. Color to be selected by Architect from manufacturer's entire range of standard and custom colors.

3. PART 3 EXECUTION

3.1 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets are in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Install surface mounted reglets true to line and level. Seal top with sealant.
- D. Install underlayment with protective slip sheet over parapets, caps, copings, gravel stops and curbs.

3.3 INSTALLATION

- A. Conform to indicated details on the drawings and the recommendations included in the SMACNA Architectural Sheet Metal Manual.

- B. Provide for thermal expansion of exposed sheet metal work. Space movement joints at 10 feet - 0 inches o.c. maximum with no joints within 2 feet - 0 inches of corners.
- C. Form expansion joints of intermeshing hooked flanges filled with sealant.
- D. Insert flashings into reglets to form tight fit. Secure in place with lead wedges at maximum 12 inches on center. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.
- E. Secure flashings in place using concealed fasteners. Use exposed fasteners only where indicated.
- F. Lap, lock, seam and seal all joints.
- G. Apply plastic cement compound between metal flashings and felt flashings. Apply bituminous coating between dissimilar metals where occurs.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Roof-Penetration, Vent Pipe Flashing: Turn lead flashing down inside vent piping. Clamp flashing to other pipes penetrating roof except for vent piping. Seal with elastomeric sealant.
- J. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

- A. Conform to SMACNA Architectural Sheet Metal Manual.
- B. Field observation will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing.

1.2 SUMMARY OF SEALANT LOCATIONS

- A. Joints in horizontal surfaces.
 - 1. Expansion and isolation joints in cast-in-place concrete slabs.
 - 2. Expansion and isolation joints in masonry paving.
 - 3. Joints in precast concrete paving units.
 - 4. Joints in stone paving units.
 - 5. Control and expansion joints in ceramic and quarry tile.
 - 6. Control and expansion joints in soffits, ceilings and overhead surfaces.
 - 7. Joints on underside of precast beams and planks.
 - 8. Perimeter joints in exterior openings.
 - 9. Joints between ceiling surfaces and frames for doors and windows.
 - 10. Joints in flashing and sheet metal.
 - 11. Perimeter joints of plumbing fixtures.
 - 12. Acoustical isolation joints between head and sill of walls and floor and ceiling surfaces.
 - 13. Joints between countertops and wall surfaces.
 - 14. Isolation joints in plaster soffits and ceilings.
 - 15. Joints between dissimilar materials and those listed above.
 - 16. Other joints as indicated.
- B. Joints in vertical surfaces:
 - 1. Expansion and isolation joints in cast-in-place concrete.
 - 2. Expansion and isolation joints in masonry.
 - 3. Joints in precast concrete.
 - 4. Expansion and isolation joints in stonework.
 - 5. Control and expansion joints in ceramic and quarry tile.
 - 6. Perimeter joints in exterior openings.

7. Joints in flashing and sheet metal.
8. Perimeter joints of plumbing fixtures.
9. Acoustical isolation joints of walls.
10. Joints between cabinets and walls.
11. Joints between wall surfaces and door and window frames.
12. Joints in skylights and framing.
13. Isolation joints in plaster walls.
14. Joints between dissimilar materials and those listed above.
15. Other joints as indicated.

1.3 REFERENCES

- A. ASTM C834 - Latex Sealing Compounds.
- B. ASTM C919 - Practices for Use of Sealants in Acoustical Applications.
- C. ASTM C920 - Elastomeric Joint Sealants.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- E. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- F. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
- G. SWRI - (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, and color availability.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 4 inches long in size illustrating colors selected.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.
- B. Applicator: Company specializing in applying the Work of this Section with minimum three years documented experience, approved by sealant manufacturer.
- C. Conform to Sealant, Waterproofing, and Restoration Institute (SWRI) requirements for materials and installation.
- D. Perform Work in accordance with ASTM C1193.
- E. Perform acoustical sealant application work to provide maximum STC values in accordance with ASTM C919.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Do not install sealant when temperature is less than 40 degrees F.
- C. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit maintenance data under the provisions of Section 01 77 00.
- B. Submit recommended inspection intervals for sealant joints.
- C. Submit instructions for repairing and replacing failed sealant joints.

1.8 WARRANTY

- A. Provide 5 year warranty under provisions of Section 01 77 00.
- B. Include coverage for installed sealants and accessories which fail to achieve air and water seal and exhibit loss of adhesion or cohesion or do not cure.

2. PART 2 PRODUCTS

2.1 MATERIALS

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content limits when calculated according to South Coast Air Quality Management District (SCAQMD) Rule 1168, and must meet or exceed the requirements for the Bay Area Quality Management District Regulation 8, Rule 5.
 - 1. Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.

2.2 MANUFACTURERS

- A. Manufacturers and their products are listed for each type of sealant. Acceptable manufacturers include the following:
 - 1. Dow Corning Corp., www.dowcorning.com.
 - 2. General Electric Co., www.gesealants.com.
 - 3. Pecora Corp., www.pecora.com.
 - 4. Sika Corp., www.sikausa.com.
 - 5. Sonneborn/ChemRex, www.chemrex.com.
 - 6. Tremco, Inc., www.tremcosealants.com.
 - 7. United States Gypsum Co., www.usg.com.
 - 8. W.R. Meadows, Inc., www.wrmeadows.com.

- B. Substitutions: Under provisions of Section 01 25 13.

2.3 SEALANTS

- A. Type A - Acrylic Latex: One-part, non-sag, mildew resistant acrylic emulsion compound complying with ASTM C834, Type S, Grade NS, formulated to be paintable.
1. Tremco, Inc., Acrylic Latex Caulk.
 2. Pecora Corporation, AC-20.
 3. Sonneborn, Chemrex, Sonolac.
- B. Type B - Butyl Sealant: One-part, non-sag solvent-release-curing sealant complying with FS TT-S-001657 for Type 1 and formulated with a minimum of 75 percent solids.
1. Tremco, Inc., Tremco Butyl Sealant.
 2. Pecora Corporation, BC-158.
 3. Sonneborn, Chemrex, Multi-Purpose Sealant.
- C. Type C - Silicone Sealant: One-part nonacid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
1. Dow Corning Corp., Dow Corning 790.
 2. General Electric Co., Silpruf.
 3. Tremco, Inc., Spectrem 1.
 4. Pecora Corp., 864 or 890.
 5. Sonneborn/Chemrex, Omniseal.
- D. Type D - Non-Sag Polyurethane Sealant: Single component sealant complying with ASTM C920, Type S, Grade NS, Class 25:
1. Pecora Corp., Dynatrol I-XL.
 2. Tremco, Inc., Vulkem 921.
 3. Sika Corp., Sikaflex 1a.
 4. Sonneborn/ChemRex, Sonolastic NP-1.
- E. Type E - Neutral-Curing Silicone Sealant: One part medium modulus neutral-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
1. Dow Corning Corp., Dow Corning 795.
 2. General Electric Co., Ultraglaze 4000.
 3. Tremco, Inc., Spectrum 3.
 4. Pecora Corp., 895.
- F. Type F - One-Part Mildew-Resistant Silicone Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.
1. Dow Corning Corp., Dow Corning 786.

2. General Electric Co., Sanitary 1700.
 3. Tremco, Inc., Tremsil 200.
 4. Pecora Corp., 863 or 898 White.
- G. Type G - Multi-Part Pourable Sealant: Complying with ASTM C920, Type M, Grade P, Class 25. Shore A hardness +40.
1. Tremco, Inc., THC900/901.
 2. Pecora Corp., Dynatred or Urexpan NR-200.
 3. Sika Corporation, Sikaflex 2c NS TG.
 4. W.R. Meadows, Pourthane NS/SL.
- H. Type H - Acoustical Sealant: Nondrying, nonhardening permanently flexible conforming to ASTM C834.
1. Pecora Corp., AIS-919 Acoustical Sealant.
 2. Tremco, Inc., Tremco Acoustical Sealant.
 3. United States Gypsum Co., Sheetrock Acoustical Sealant.

2.4 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

3. PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joint openings are ready to receive Work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing substrate.

3.2 PREPARATION

- A. Clean and prime joints in accordance with manufacturer's instructions. Prime if recommended by manufacturer.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Perform preparation in accordance with ASTM C1193.
- E. Protect elements surrounding the Work of this Section from damage or disfiguration.

3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Tool joints concave unless otherwise detailed.

3.4 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 01 77 00.
- B. Clean adjacent soiled surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this Section.

3.5 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.

3.6 SCHEDULE

<u>Type</u>	<u>Location</u>	<u>Color</u>
A. Type A - Acrylic Latex Cure	All interior joints not otherwise scheduled	To match adjacent surfaces
B. Type B - Butyl	Under thresholds	Black
C. Type C - One-Part Nonacid Curing Silicone	Prefinished metal flashing	To match adjacent material
D. Type D - Non-Sag Polyurethane Sealant	Painted metal flashing	To match adjacent surface.
E. Type E - Neutral-Curing Silicone	Joints within glass and glazing.	White
F. Type F - Mildew-Resistant Silicone	Interior joints in ceramic tile and at plumbing fixtures.	White
G. Type G - Multi-part Pourable Urethane	Exterior and interior joints in horizontal surfaces of concrete.	To match adjacent material
H. Type H - Acoustical Sealant	Interior walls between stud track/runner and adjacent construction. Between outlet boxes and gypsum board.	White

END OF SECTION

SECTION 09 90 00

PAINTING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Products and application.
- C. Surface finish schedule.

1.2 SUMMARY OF PAINTED SUBSTRATES

- A. Section includes the application of paint systems on the following interior substrates:

- 1. Concrete.
- 2. Primed or unprimed steel.
- 3. Cast iron.
- 4. Galvanized metal.
- 5. Steel handrails, guardrails and fittings.
- 6. Steel roof deck.
- 7. Steel lintels and shelf angles.
- 8. Steel doors, frames and lights.
- 9. Glass frames in steel and wood doors.
- 10. Wood doors.
- 11. Access doors and frames.
- 12. Wood.
- 13. Glu Lam beams.
- 14. Horizontal and vertical gypsum board.
- 15. Plaster.
- 16. Spray-textured ceilings.
- 17. Suspended acoustic ceilings.
- 18. Applied acoustic ceilings.
- 19. Mechanical equipment.
- 20. Electrical panel board covers.

- B. Section includes the application of paint systems on the following exterior substrates:

- 1. Concrete.

2. Primed or unprimed steel.
 3. Steel handrails, guardrails, and fittings.
 4. Steel roof deck.
 5. Steel lintels and shelf angles.
 6. Decorative metal fencing.
 7. Bollards.
 8. Sheet metal flashing and trim.
 9. Sheet metal gutters and downspouts.
 10. Steel pipe downspouts.
 11. Steel doors, frames and lights.
 12. Glass frames in steel and wood doors.
 13. Access doors and frames.
 14. Portland cement plaster (stucco).
 15. Horizontal or vertical gypsum board or sheathing.
 16. Mechanical roof mounted equipment.
 17. Electrical panel board covers.
- C. Substrate listings are for principal surfaces only. Refer to drawings, details and individual specification sections for items, surfaces, and substrates not specifically listed.

1.3 REFERENCES

- A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
- B. SSPC - The Society for Protective Coatings.

1.4 SYSTEM DESCRIPTION

- A. Preparation of all surfaces to receive final finish.
- B. Painting and finishing work of this section using coating systems of materials including primers, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.
- C. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
- D. Painting and finishing all exterior and interior surfaces of materials including structural, mechanical, and electrical work on site, in building spaces, and above or on the roof.
- E. Paint exposed surfaces except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces.

1.5 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.6 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with five years experience.
- B. Applicator: Company specializing in commercial painting and finishing with five years documented experience.
- C. Coats: The number of coats specified is the minimum number acceptable. If full coverage is not obtained with the specified number of coats, apply such additional coats as are necessary to produce the required finish.
- D. Employ coats and undercoats for all types of finishes in strict accordance with the recommendations of the paint manufacturer.
- E. Provide primers and undercoat paint produced by the same manufacturer as the finish coat.
- F. The minimum dry film thickness of each coat of paint shall comply with the manufacturer's recommendations for each type of paint used.

1.7 REGULATORY REQUIREMENTS

- A. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this specification, comply with the more stringent provisions.
- B. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
- C. Comply with South Coast Air Quality Management District (SCAQMD) Rule 1113. A copy of this regulation can be obtained from <http://www.aqmd.gov/rules/reg/reg11/r1113.pdf>.
- D. In the South Coast Air Quality Management District (SCAQMD), where lower VOC contents are specified for a number of categories, certain products may be covered under the manufacturer's SCAQMD - approved Averaging Program. As a result, certain products may be fully compliant with SCAQMD Rule 1113, despite having VOC contents higher than specified limits.

1.8 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Provide manufacturer's technical information and instructions for application of each material proposed for use by catalog number.
- C. List each material by catalog number and cross-reference specific coating with specified finish system.
- D. Provide manufacturer's certificate that products proposed meet or exceed specified materials.
- E. Submit samples under provisions of Section 01 33 00.
- F. Submit two samples 8-1/2 x 11 inch in size of each paint color and texture applied to cardboard. Resubmit samples until acceptable color, sheen and texture is obtained.
- G. On same species and quality of wood to be installed, submit two 4 x 8 inch samples showing system to be used.

1.9 FIELD SAMPLES

- A. Provide field samples under provisions of Section 01 33 00.
- B. On wall surfaces and other exterior and interior components, duplicate specified finishes on at least 100 sq.ft. of surface area.

- C. Provide full-coat finishes until required coverage, sheen, color and texture are obtained.
- D. Simulate finished lighting conditions for review of field samples.
- E. After finishes are accepted, the accepted surface may remain as part of the work and will be used to evaluate subsequent coating systems applications of a similar nature.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site and store and protect under provisions of Section 01 61 00.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- C. 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. Paint containers not displaying product identification will not be acceptable.
- D. Store paint materials at minimum ambient temperature of 50 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain interior surface and ambient temperatures above 50 degrees F with a maximum humidity level of 50 percent for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 50 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Urethane Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 foot candles measured mid-height at substrate surface.

1.12 EXTRA MATERIAL

- A. Provide a one gallon unopened container of each color and surface texture to Owner.
- B. Label each container with color, texture, and room locations in addition to the manufacturer's label.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - PAINT

- A. Unless specifically identified otherwise, product designations included in this section are those of the Dunn-Edwards Corporation, www.dunnedwards.com and shall serve as the basis of design standard for kind, quality, performance and function.
- B. Subject to full compliance with specified requirements, other manufacturers offering equivalent products are:
 - 1. Benjamin Moore Paints, www.benjaminmoore.com.
 - 2. Glidden Professional, www.gliddenprofessional.com.
 - 3. Kelly-Moore Paint Company, www.kellymoore.com.

4. Pittsburgh Paints, www.ppg.com.
5. Sherwin Williams, www.sherwin-williams.com.
6. Tnemec Company, Inc., www.tnemec.com.
7. Vista Paint Corporation, www.vistapaint.com.

C. Substitutions: Under provisions of Section 01 25 13.

2.2 ACCEPTABLE MANUFACTURERS - MULTICOLORED PAINT COATING

- A. Bollen International, Inc., (Crafton), www.bolleninternational.com.
- B. Dunn-Edwards Corporation (Multispec), www.dunnedwards.com.
- C. Textured Coatings of America (Tex-Cote), www.texcote.com.
- D. Trikes (Polomyx and Zolatone), www.zolatone.com.
- E. Substitutions: Under provisions of Section 01 25 13.

2.3 ACCEPTABLE MANUFACTURERS - CERAMIC EPOXY COATING

- A. Tnemec Company, Inc. www.tnemec.com.
- B. Vitrocem, www.vitrocem.com.

2.4 ACCEPTABLE MANUFACTURER - HEAT REFLECTIVE COATING

- A. Textured Coatings of America (Tex-Cote), www.texcote.com.

2.5 MATERIALS

- A. Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- B. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. "Deep Tone" colors to be composed of 100 percent acrylic pigments with a colored base.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- E. Chemical Components of Interior Paints and Coatings: Shall not exceed the limitations of Green Seal's Standard GS-11 and SCAQMD Rule 1113 averaging method for VOC content and the following restrictions:
 1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 2. Non-Flat Paints and Coatings: VOC content of not more than 50 g/L.
 3. Anticorrosive Coatings: VOC content of not more than 100 g/L.
 4. Varnishes and Sanding Sealers: VOC content of not more than 275 g/L.
 5. Stains: VOC content of not more than 250 g/L.
 6. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

7. Restricted Components: Paints and coatings shall not contain any of the following:

- (a) Acrolein.
- (b) Acrylonitrile.
- (c) Antimony.
- (d) Benzene.
- (e) Butyl benzyl phthalate.
- (f) Cadmium.
- (g) Di (2-ethylhexyl) phthalate.
- (h) Di-n-butyl phthalate.
- (i) Di-n-octyl phthalate.
- (j) 1,2-dichlorobenzene.
- (k) Diethyl phthalate.
- (l) Dimethyl phthalate.
- (m) Ethylbenzene.
- (n) Ethylene Glycol.
- (o) Formaldehyde.
- (p) Hexavalent chromium.
- (q) Isophorone.
- (r) Lead.
- (s) Mercury.
- (t) Methyl ethyl ketone.
- (u) Methyl isobutyl ketone.
- (v) Methylene chloride.
- (w) Naphthalene.
- (x) Toluene (methylbenzene).
- (y) 1,1,1-trichloroethane.
- (z) Vinyl chloride.

2.6 FINISHES

- A. Refer to schedule at end of Section for surface finish schedule.

3. PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard : 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry : 12 percent.
 - 3. Interior Located Wood : 15 percent.
 - 4. Exterior Located Wood : 15 percent.
- D. Beginning of installation means acceptance of existing surfaces.

3.2 SURFACE PREPARATION - GENERAL

- A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
- B. Remove all finish hardware from doors and frames prior to preparing surfaces or finishing.
- C. Correct minor defects and clean surfaces which affect work of this Section.
- D. Shellac and seal marks which may bleed through surface finishes.
- E. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Aluminum Surfaces: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Gypsum Board: Repair all voids, nicks, cracks and dents with patching materials and finish flush with adjacent surface. Latex fill minor defects. Spot prime defects after repair.
- J. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Pretreat with phosphoric acid etch or vinyl wash. Apply coat of etching primer the same day as pretreatment is applied.
- K. Concrete and Unit Masonry: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- L. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- M. Uncoated Steel and Iron: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint after repairs.

- N. Shop Primed Steel: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime paint steel surfaces.
- O. Interior Wood: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- P. Exterior Wood: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.
- Q. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- R. Wood Doors: Seal top and bottom edges with 2 coats of spar varnish sealer.
- S. Existing surfaces to be recoated shall be thoroughly cleaned and deglossed by sanding or other means prior to painting. Patched and bare areas shall be spot primed with same primer as specified for new work.

3.3 SURFACE PREPARATION - MODERNIZATION

- A. Properly prepare all existing surfaces to receive new paint.
- B. Prior to application of any new paint, existing surfaces to be cleaned free of damaged paint, dust, corrosion, and other foreign matter which will destroy bond or mar appearance of new paint.
- C. Sand, scrape, fill and repair surfaces flush with suitable fillers. Patch and repair; feather edges to provide smooth transitions; match existing surfaces.
- D. Remove hardware and accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not-to-be-finish painted, or provide surface-applied protection. Reinstall removed items upon completion of work in each area.
- E. Existing surfaces to be painted shall be thoroughly cleaned and deglossed by sanding or other means prior to painting. Patched and bare areas shall be shall be spot primed with same primer as for new work.
- F. Existing paint removal:
 - 1. Remove loose, blistered, scaled, oxidized, cracked, alligatored, or defaced paint down to a sound surface.
 - 2. Brush and clean free all loose material.
 - 3. Feather edges of removal areas to provide a smooth transition between surfaces.
- G. Perform preparation and cleaning procedures in strict accordance with coating manufacturer's instructions for each substrate condition.
- H. Washing and Cleaning:
 - 1. Remove all loose and foreign materials.
 - 2. At building interiors, wash all surfaces clean with approved cleaner and rinse with clean water.
 - 3. At building interiors, vacuum existing ceiling panels to remove all dirt and dust from the material surface. Utilize caution so as not to mar or damage the finish surface in any way.
 - 4. Completely remove wax from surfaces which receive new paint.
- I. Remove dust, grit, and foreign matter from existing wood surfaces. Sand surfaces and dust clean. Spot coat knots, pitch streaks, and sappy section with pigmented stain sealer when surfaces are to be painted. Fill nail holes, cracks, and other defects after priming and spot prime repairs when fully cured.

- J. Repair and crack filling:
1. Wood: Putty cracks and holes flush at stained and or varnished work, color putty to match. Sand smooth any rough spots. Seal knots and pitch pockets.
 2. Gypsum Wallboard: Fill all nail heads, screw heads, holes, cracks, or defects with drywall joint compound or spackle. Sand any rough spots smooth; do not raise nap on paper covering. Remove dust. Skim coat drywall must be sealed with a suitable sealer recommended by the coating manufacturer.
 3. Plaster:
 - (a) Cracks exceeding 1/16 inch wide shall be V-grooved out, and then filled flush.
 - (b) Interior Plaster: Fill with spackle or patching plaster.
 - (c) Exterior Plaster: Small defects may be filled with exterior spackle. Cracks more than 1/16 inch wide shall be filled with cement grout, textured to match adjacent surfaces.
 4. Concrete / Masonry: Fill as specified for exterior plaster.
- K. Natural / Stain Finished Wood Doors:
1. Typically, fully strip existing natural finish clear coat, fill all dents, gouges, scrapes, etc., and finish sand to prepare surface to receive a complete new finish coat system.
 2. All patching materials shall be natural wood dough tinted to match existing natural wood color.
 3. Doors shall appear as new when work is finished.
- L. Concrete and masonry surfaces shall be dry, clean, and free of dirt, efflorescence, encrustation, mortar spots, and other foreign matter. Glazed surfaces on concrete shall be roughened or etched to uniform texture.
- M. Ferrous metal shall be cleaned of oil, grease, and foreign matter. Cleaning method: SSPC-SP No. 1 "Solvent Cleaning".
- N. Ferrous Steel: Where raw metal surface is exposed, proceed s follows:
1. Cleaning method: SSPC-SP No. 2 "Hand Cleaning" or No. 3 "Power Brush Cleaning" as required to remove corrosion, loose paint, and rust.
 2. Priming: Prime immediately after cleaning.
- O. Galvanized Metal: Where galvanizing is exposed, proceed as follows:
1. Cleaning: Solvent clean per SSPC-SP No. 1 " Solvent Cleaning".
 2. Pre-Treatment; Apply Supreme Chemical Metal Clean and Etch SC-ME01, follow manufacturer's recommendations and the following:
 - (a) Application: Brush apply in a thin even coat. Remove excessive solution from surface with rags, squeegee, or sponge. When using full strength, rinse surface with water.
 - (b) Thinning: Use water, do not reduce solution beyond 3 parts water to 1 part Supreme Chemical Metal Clean and Etch SC-ME01.
 - (c) Drying: Allow to dry for 10 minutes, rinse thoroughly with water and wipe dry with rags.
 3. Cleaned and treated galvanized metal should be primed within 48 hours.

- P. Thoroughly back paint all surfaces of exterior and interior finish lumber and millwork, including doors and window frames, trim, cabinetwork, etc., which will be concealed after installation. Back paint items to be painted with a priming coat. Use a clear sealer for back priming where transparent finish is required.
- Q. Pipes, ducts, hangers, exposed steel and ironwork, and primed metal surfaces of equipment installed under mechanical and electrical work shall be cleaned prior to priming.

3.4 PROTECTION OF ADJACENT WORK

- A. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

3.5 WORK NOT TO BE PAINTED

- A. Painting is not required on surfaces in concealed and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces and duct shafts.
- B. Do not paint metal surfaces such as stainless steel, chromium plate, brass, bronze, and similar finished metal surfaces.
- C. Do not paint anodized aluminum or other surfaces which are specified to be factory pre-finished.
- D. Do not paint sandblasted or architecturally finished concrete surfaces.
- E. Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or identifications.

3.6 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply prime coat to surfaces which are to be painted or finished.
- D. Apply each coat to uniform finish.
- E. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- F. Sand lightly between coats to achieve required finish.
- G. Allow applied coat to dry before next coat is applied.
- H. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
- I. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Prime back surfaces of interior and exterior woodwork with primer paint.
- K. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
- L. Paint mill finished door seals to match door or frame.

- M. Paint primed steel glazing stops in doors to match door or frame.
- N. Cloudiness, spotting, lap marks, brush marks, runs, sags, spikes and other surface imperfections will not be acceptable.
- O. Where spray application is used, apply each coat of the required thickness. Do not double back to build up film thickness of two coats in one pass.
- P. Where roller application is used, roll and redistribute paint to an even and fine texture. Leave no evidence of roller laps, irregularity of texture, skid marks, or other surface imperfections.

3.7 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop primed equipment. Do not paint shop prefinished items.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- C. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
- D. Replace identification markings on mechanical or electrical equipment when painted accidentally.
- E. Paint interior surfaces of air ducts, and connector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and connector and baseboard cabinets to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas.
- G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- H. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.
- I. Paint grilles, registers, and diffusers which do not match color of adjacent surface.
- J. Paint all mechanical and electrical equipment, vents, fans, and the like occurring on roof.
- K. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts.
- L. Do not paint over labels or equipment identification markings.
- M. Do not paint mechanical room specialties such as compressors, boilers, pumps, control panels, etc.
- N. Do not paint switch plates, light fixtures, and fixture lenses.

3.8 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.9 PROTECTION OF COMPLETED WORK

- A. Protect finished installation under provisions of Section 01 61 00.
- B. Erect barriers and post warning signs. Maintain in place until coatings are fully dry.

- C. Confirm that no dust generating activities will occur following application of coatings.

3.10 PATCHING

- A. After completion of painting in any one room or area, repair surfaces damaged by other trades.
- B. Touch-up or re-finish as required to produce intended appearance.

3.11 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 29.
- B. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary.
- C. The Owner will engage the services of an independent testing agency to sample paint material being used.
- D. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
- E. The testing agency will perform appropriate quantitative materials analysis and other characteristic testing of materials as required by the Owner.
- F. If test results show materials being used and their installation do not comply with specified requirements or manufacturer's recommendations, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing and repaint surfaces to acceptable condition.

3.12 COLOR SCHEDULE

- A. Paint and finish colors shall be selected by the Architect from manufacturer's entire range of standard and custom color selections and special colors selected to match or compliment the colors of other materials, equipment, or components which comprise the work.
- B. Access doors, registers, exposed piping, electrical conduit and mechanical/electrical panels: Generally the same color as adjacent walls.
- C. Exterior and interior steel doors, frames and trim: Generally a contrasting color to adjacent walls.
- D. Doors generally are all the same color, but of a contrasting color from frame and trim.
- E. Exterior and interior steel fabrications: Generally a contrasting color to adjacent walls.
- F. Exposed interior mechanical/ductwork: Generally a contrasting color to adjacent walls or ceiling.
- G. Ceilings are generally to be painted a different color than walls.
- H. Five different color schemes for painting of walls.
- I. Approximately 20 percent of overall painting work will be required to be "Deep Tone" colors. This work will require one additional coat of paint beyond that as specified.

3.13 SCHEDULE - EXTERIOR SURFACES

- A. Wood-Painted (Flat Acrylic)

1st coat:	ESZPROO EZ Prime Premium
2nd coat:	EVSH10 Evershield
3rd coat:	EVSH10 Evershield

- | | | |
|----|---|--------------------------------|
| B. | Wood Painted (Eggshell Acrylic) | |
| | 1st coat: | EZPROO EZ Prime Premium |
| | 2nd coat: | EVSH30 Evershield |
| | 3rd coat: | EVSH30 Evershield |
| C. | Wood - Painted (Semi-Gloss Acrylic) | |
| | 1st coat: | EZPROO EZ Prime Premium |
| | 2nd coat: | SSHL50 Spartashield |
| | 3rd coat: | SSHL50 Spartashield |
| D. | Wood - Painted (Gloss Acrylic) | |
| | 1st coat: | EZPROO EZ Prime Premium |
| | 2nd coat: | SSHL60 Spartashield |
| | 3rd coat: | SSHL60 Spartashield |
| E. | Wood - Semi-Transparent | |
| | 1st coat: | WPT3 "OKON Weatherpro" |
| F. | Concrete (Flat Acrylic) | |
| | 1st coat: | ESPROO Eff-Stop Premium |
| | 2nd coat: | EVSH10 Evershield |
| | 3rd coat: | EVSH10 Evershield |
| G. | Concrete (Eggshell Acrylic) | |
| | 1st coat: | ESPROO Eff-Stop Premium |
| | 2nd coat: | EVSH30 Evershield |
| | 3rd coat: | EVSH30 Evershield |
| H. | Concrete Masonry Units (Flat Acrylic) | |
| | Fill coat: | SBRPROO Smooth Blocfil Premium |
| | 1st coat: | EVSH10 Evershield |
| | 2nd coat: | EVSH10 Evershield |
| I. | Concrete Masonry Units (Eggshell - Acrylic) | |
| | Fill coat: | SBRPROO Smooth Blocfil Premium |
| | 1st coat: | EVSH30 Evershield |
| | 2nd coat: | EVSH30 Evershield |
| J. | Concrete Masonry Units (Flat Elastomeric) | |
| | 1st coat: | FPSL00 Flex Prime Select |
| | 2nd coat: | EDLX10 Enduralastic 10 |
| | 3rd coat: | EDLX10 Enduralastic 10 |

- K. Cement Plaster (Flat Acrylic)
- 1st coat: ESPROO Eff-Stop Premium
- 2nd coat: EVSH10 Evershield
- 3rd coat: EVSH10 Evershield
- L. Cement Plaster (Eggshell Acrylic)
- 1st coat: ESPROO Eff-Stop Premium
- 2nd coat: EVSH30 Evershield
- 3rd coat: EVSH30 Evershield
- M. Cement Plaster (Flat Elastomeric)
- 1st coat: FPSL00 Flex Prime Select
- 2nd coat: EDLX10 Enduralastic 10
- 3rd coat: EDLX10 Enduralastic 10
- N. Steel-Primed or Unprimed (Flat Acrylic)
- 1st coat: BRPR00 Bloc-Rust Premium
- 2nd coat: EVSH10 Evershield
- 3rd coat: EVSH10 Evershield
- O. Steel - Primed or Unprimed (Eggshell Urethane Alkyd Enamel)
- 1st coat: BRPR00 Bloc-Rust Premium
- 2nd coat: ASHL30 Aristoshield
- 3rd coat: ASHL30 Aristoshield
- P. Steel - Primed or Unprimed (Semi-Gloss Urethane Alkyd Enamel)
- 1st coat: BRPR00 Bloc-Rust Premium
- 2nd coat: ASHL50 Aristoshield
- 3rd coat: ASHL50 Aristoshield
- Q. Steel - Primed or Unprimed (Gloss Urethane Alkyd Enamel)
- 1st coat: BRPR00 Bloc-Rust Premium
- 2nd coat: ASHL70 Aristoshield
- 3rd coat: ASHL70 Aristoshield
- R. Steel - Galvanized (Flat Acrylic)
- 1st coat: Pre Treat - Supreme Chemical Metal Clean and Etch
SCME-01
- 2nd coat: Ultrashield Galvanized Metal Primer
- 3rd coat: EVSH10 Evershield
- 4th coat: EVSH10 Evershield

- S. Steel - Galvanized (Eggshell Urethane Alkyd Enamel)
- | | |
|-----------|---|
| 1st coat: | Supreme Chemical Metal Clean and Etch SCME-01 |
| 2nd coat: | Ultrashield Galvanized Metal Primer |
| 3rd coat: | ASHL30 Aristoshield |
| 4th coat: | ASHL30 Aristoshield |
- T. Steel - Galvanized (Semi-Gloss Urethane Alkyd Enamel)
- | | |
|-----------|---|
| 1st coat: | Supreme Chemical Metal Clean and Etch SCME-01 |
| 2nd coat: | Ultrashield Galvanized Metal Primer |
| 3rd coat: | ASHL50 Aristoshield |
| 4th coat: | ASHL50 Aristoshield |
- U. Steel - Galvanized (Gloss Urethane Alkyd Enamel)
- | | |
|-----------|---|
| 1st coat: | Supreme Chemical Metal Clean and Etch SCME-01 |
| 2nd coat: | Ultrashield Galvanized Metal Primer |
| 3rd coat: | ASHL70 Aristoshield |
| 4th coat: | ASHL70 Aristoshield |

3.14 SCHEDULE - INTERIOR SURFACES

- A. Steel - Primed or Unprimed (Flat Acrylic)
- | | |
|-----------|--------------------------|
| 1st coat: | BRPR00 Bloc-Rust Premium |
| 2nd coat: | SPMA10 Suprema |
| 3rd coat: | SPMA10 Suprema |
- B. Steel - Primed or Unprimed (Eggshell, Urethane Alkyd Enamel)
- | | |
|-----------|--------------------------|
| 1st coat: | BRPR00 Bloc-Rust Premium |
| 2nd coat: | ASHL30 Aristoshield |
| 3rd coat: | ASHL30 Aristoshield |
- C. Steel - Primed or Unprimed (Semi-Gloss Urethane Alkyd Enamel)
- | | |
|-----------|--------------------------|
| 1st coat: | BRPR00 Bloc-Rust Premium |
| 2nd coat: | ASHL50 Aristoshield |
| 3rd coat: | ASHL50 Aristoshield |
- D. Steel - Primed or Unprimed (Gloss Urethane Alkyd Enamel)
- | | |
|-----------|--------------------------|
| 1st coat: | BRPR00 Bloc-Rust Premium |
| 2nd coat: | ASHL70 Aristoshield |
| 3rd coat: | ASHL70 Aristoshield |

E.	Gypsum Board (Flat Acrylic)	
	1st coat:	VNPROO Vinylastic Premium
	2nd coat:	SPMA10 Suprema
	3rd coat:	SPMA10 Suprema
F.	Gypsum Board (Eggshell Acrylic)	
	1st coat:	VNPROO Vinylastic Premium
	2nd coat:	SPMA30 Suprema
	3rd coat:	SPMA30 Suprema
G.	Gypsum Board (Semi-Gloss Acrylic)	
	1st coat:	VNPROO Vinylastic Premium
	2nd coat:	SPMA50 Suprema
	3rd coat:	SPMA50 Suprema
H.	Gypsum Board (Gloss Acrylic)	
	1st coat:	VNPROO Vinylastic Premium
	2nd coat:	SSHL60 Spartashield
	3rd coat:	SSHL60 Spartashield
I.	Gypsum Board (Gloss Epoxy)	
	1st coat:	Carboline Sanitile 120
	2nd coat:	Carboline Carboguard 890 VOC
	3rd coat:	Carboline Carboguard 890 VOC
J.	Plaster (Flat Acrylic)	
	1st coat:	ESPROO Eff-Stop Premium
	2nd coat:	SPMA10 Suprema
	3rd coat:	SPMA10 Suprema
K.	Plaster (Eggshell Acrylic)	
	1st coat:	ESPROO Eff-Stop Premium
	2nd coat:	SPMA30 Suprema
	3rd coat:	SPMA30 Suprema
L.	Plaster (Semi Gloss Acrylic)	
	1st coat:	ESPROO Eff-Stop
	2nd coat:	SPMA50 Suprema
	3rd coat:	SPMA50 Suprema
M.	Plaster (Gloss Acrylic)	
	1st coat:	ESPROO Eff-Stop Premium Primer
	2nd coat:	SSHL60 Spartashield
	3rd coat:	SSHL60 Spartashield

N. Plaster (Gloss Epoxy)

1st coat:	Carboline Sanitile 120
2nd coat:	Carboline Carboguard 890 VOC
3rd coat:	Carboline Carboguard 890 VOC

O. Acoustic Ceiling Panels (Flat polyvinyl acetate)

1st coat:	W615 AcoustiKote
2nd coat:	W615 AcoustiKote

P. Acoustic Panels - Wood - Tectum (Latex Dry Fall Eggshell)

1st coat:	Aqua 30 Aquafall
2nd coat:	Aqua 30 Aquafall

END OF SECTION

SECTION 23 00 00
HEATING, VENTILATION AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work under this section includes all labor, equipment, material, services, transportation, etc. required for and reasonably incidental to the complete and satisfactory installation of all of the HVAC Systems as indicated on the Drawings or specified herein.

1.2 WORK INCLUDED IN THIS SECTION

- A. Air Conditioning Units.
- B. Ductwork and Accessories.
- C. Grilles, Registers, and Diffusers.
- D. Insulation Materials.
- E. Vibration Isolation.
- F. Test and Balance.
- G. Submittals and Shop Drawings.
- H. Record Drawings.
- I. Operation and Maintenance Manuals.
- J. Guarantee.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Related Sections:
 - 1. 23 09 00 HVAC Instrumentation and Controls.
- B. Electrical supply to units. See Electrical Drawings & Division 26.

1.4 GENERAL REQUIREMENTS

- A. This section of the specification shall be considered as a part of the entire specification and all applicable portions of General Conditions, Special Conditions, and Division 01 shall apply.
- B. Before commencement of work this contractor shall determine the exact location, size, elevation, and availability of all utilities relevant to the mechanical work and immediately notify the District with written notification of any discrepancies. In addition, this Contractor shall contact all involved utility companies, make all necessary arrangements for service, and pay all fees incurred due to connection of services.
- C. Erection: The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the erection of the work, together with all necessary journeymen, helpers, and laborers required to properly unload, erect, connect, adjust, start of operate and test the work involved.

1.5 REFERENCES

- A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test code for sound rating air-moving devices.
- D. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation System.
- E. ARI 270 - Sound rating of Outdoor Unitary Equipment.
- F. ASHRAE 52-76 - Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

- G. ASTM A90 - Weight of Coating on Zinc - Coated (Galvanized) Iron or Steel Articles.
- H. ASTM A120 - Black and Galvanized Steel Pipe.
- I. ASTM B88 - Seamless Copper Water Tube.
- J. ASTM C518 - Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- K. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.
- L. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
- M. ASTM E84 - Surface Burning Characteristics of Building Materials.
- N. ASTM E96 - Water vapor Transmission of Materials.
- O. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- P. NFPA 255 - Surface Burning Characteristics of Building Materials.
- Q. SMACNA - Low Pressure Duct Construction Standards.
- R. UL 181 - Factory Made Air Ducts and Connectors.
- S. UL 723 - Surface Burning Characteristics of Building Materials.
- T. California Mechanical Code - 2016 Edition.

1.6 SUBMITTALS AND SHOP DRAWINGS

- A. Contractor agrees that shop drawings submittals processed by the District do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his work and to permit the District to monitor the Contractor's progress and understanding of the design. The process of review of the Contractor's submittals is not of testing the District's perception. If deviations, discrepancies or conflicts between shop drawings submittals and the Contract Documents are discovered either prior to or after the shop drawing submittals are processed by the District, the Contractor agrees that the Contract Documents shall control and shall be followed.
- B. Prepare and furnish fully coordinated shop drawings showing ductwork and piping on separate drawings. The drawings shall be minimum 1/4" = 1'-0" scale and shall show dimensioning of piping and ductwork from gridlines, bottom of elevation marks for ductwork and piping and fittings, valves, dampers, devices, etc. with labels. In addition, coordinate with related work and reference on the same drawings major plumbing piping, structural steel, fire protection piping, conduit runs and cable trays. Review and sign these drawings to verify coordination of related equipment. Conflicts, which occur shall be brought to the attention of the District prior to issuance of the drawings.
- C. Contractor shall provide detailed shop drawings min. 45 days prior to installation for a complete functional system indicating all equipment, ductwork routing, and etc. including changes in elevation, direction, sway bracing, and etc. Contractor shall indicate all roof curb locations and sizes.
- D. Materials and Equipment: As soon as possible and within 35 days after award of the contract, and before their purchase, the Contractor shall submit to the District seven bound booklets for approval containing a complete list of materials, specialties and equipment he is to furnish for the installation. Literature shall be standard manufacturer's catalog cuts and items to be installed shall be clearly indicated. All submittals shall be made at one time.
- E. Each item shall be identified by manufacturer, brand and trade name, number, size, rating and whatever other data is necessary to properly identify and check the materials and equipment. The words: "as specified" will not be considered sufficient identification.
- F. Accessories, controls, finish, etc., not submitted or identified with the submitted equipment shall be furnished and installed as specified.
- G. Shop drawings shall be approved only to extent of information indicated. Approval of an item of equipment shall not be construed to mean approval for components for that item for which Contractor has provided no information.

- H. Approval of shop drawings shall not relieve Contractor of responsibility for providing all controls, wiring, components, etc. which are shown or specified, or all additional controls, wiring, components, etc. required to provide complete and correctly operating mechanical systems.
- I. Provide acoustical system calculations for all duct systems with silencers to demonstrate that the resultant ductborne sound levels of the equipment as measured in the occupied spaces meet the specified criteria. In the absence of specified background sound level criteria, the guidelines as expressed in Table 34 of Chapter 47, "Sound and Vibration Control" of the 2003 ASHRAE Handbook - HVAC Applications, shall be used.
- J. The manufacturer shall supply certified test data for each scheduled silencer. The data shall include dynamic insertion loss, generated noise and pressure drop for forward or reverse flow, matching the project's air distribution system requirement. All ratings shall be conducted in the same facility and shall utilize the same silencer.
- K. The manufacturer shall test the silencer(s) as indicated in the silencer schedule. The engineer shall be notified of the test date at least two weeks in advance and the test may be witnessed by the engineer. Test shall show compliance with the project criteria and is subject to engineer approval.
- L. Test facilities and test reports shall be open to inspection upon request from the Engineer. Silencer performance must have been substantiated by laboratory testing according to ASTM E-477-06a and so certified when submitted for approval. The aero-acoustic laboratory must be NVLAP accredited for the ASTM E-477-06a test standard. A copy of the accreditation certificate must be included with the submittals. Data from non-NVLAP accredited test facilities will not be accepted.
- M. Submit product data for the following manufactured products, assemblies, personnel and testing agencies required for this project.
 - 1. Air Conditioning Units.
 - 2. Controls (As part of a building energy management system).
 - 3. Diffusers, Registers, and Grilles.
 - 4. Refrigerant Piping.
 - 5. Ductwork and Accessories.
 - 6. Insulation Materials.
 - 7. Vibration Isolation.
 - 8. Detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guarantee.
 - 9. Stand alone Controls (As indicated on mechanical plans).

1.7 SUBSTITUTIONS

- A. Should the Contractor desire to substitute any material, equipment or other items for those specified, he shall submit a complete list, including detailed equipment layouts and performance characteristics within 35 calendar days after the scheduled Start of Construction. Said data shall be submitted in 7 copies, assembled in individual brochures.
- B. The entire cost of all changes of any type due to substitution for materials specified shall be born by the Contractor at no extra cost to the District.
- C. Unsolicited and voluntary deducts, on the part of the Contractor for substituting unapproved systems and/or equipment, shall not be considered for the purpose of awarding the Contract.
- D. The contractor shall submit the amount of cost credit to the Contract in the event the proposed substitution is accepted.
- E. In all cases where substitutions are proposed after bids are received, the Contractor shall bear the cost of evaluation on the basis of 2-1/2 times technical salaries of engineering personnel involved.

1.8 AVAILABILITY OF SPECIFIED EQUIPMENT

- A. Verify prior to bidding that all specified equipment is available and can be obtained in time for installation during orderly and timely progress of the work.

- B. In the event that specified items will not be so available, notify the District prior to receipt of bids.
- C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by proper investigation on the part of the Contractor, will be back-charged as necessary and shall not be born by the District.

1.9 RECORD DRAWINGS

- A. The contractor shall arrange and pay for one set of white prints of the HVAC drawings, which he shall alter in red to show all changes made to the original layout. These drawings shall be kept current.
- B. The contractor shall deliver these completed drawings in ACAD format to the District when the job is finished and accepted prior to final payment.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit two sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, binders with durable plastic covers. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of project. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- B. Contents: Prepare a Table of Contents with each Product or system description identified.
 - 1. Part 1: Directory listing names, addresses, and telephone numbers of District, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
- C. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with District comments. Revise content of documents as required prior to final submittal.
- D. Submit final volumes (revised) within ten days after final inspection.

1.11 GUARANTEES

- A. The Contractor, in accepting this contract, binds himself to replace or repair at his own expense any defect in workmanship or material which may appear within a period of one year from the date of Notice of Completion of the building and District Acceptant, and to pay for all resulting damage which shall appear within the said period; provided always that the Contractor shall not be liable for anything attributable to acts of the agents of the District, or for ordinary wear. Also, given date of work performed by the Contractor be accepted as complete, he shall agree to correct any deficiencies or omissions in respect to the plans or specifications which may appear in the aforementioned twenty-four month period.
- B. The Contractor guarantees that all piping as provided in this specification will be free from all obstructions, and that all piping will be tight and drip free.
- C. All refrigerant compressors shall carry a five-year manufacturer's warranty from the date of Notice of Completion of the building and District Acceptant.

1.12 LOCAL CONDITIONS

- A. The Contractor and trade submitting tenders on this work shall visit and will be deemed to have visited the site to ensure that they are familiar with all conditions relating to the work. Site visit is

mandatory as stated in "Notice Calling for Bid." Failure to visit the site will in no way relieve the successful Contractor of the necessity of furnishing any material or performing any work that may be required to complete the work in accordance with the drawings and specifications without additional cost to the District.

1.13 RULES, REGULATIONS AND CODES

- A. All work and materials shall be in full accordance with the latest California Mechanical Code, California Plumbing Code, California Building Code and local rules and regulations, State Fire Marshal regulations, the safety orders of the Division of Industrial Safety; the National Electric Code; the standards of the National Fire Protection Association; American Gas Association; Occupation and Safety Act; American National Standards Institute; American Society of Mechanical Engineers; American Society for Testing and Materials; Installation Standards published by the International Association of Plumbing And Mechanical officials (IAPMO) and other applicable laws, codes, or regulations. Nothing in these specifications shall be construed to permit work not conforming to these codes.
- B. Electrical Work: Motors, electrical apparatus and wiring specified in this section shall conform to the National Electrical Manufacturer's Standards and the California Electric Code and bear the Underwriter's label of approval.
- C. The Contractor shall furnish, without extra charge, any additional material and labor when and where required to comply with these rules and regulations, though the work be not mentioned in these Specifications or shown on the Drawings. When these Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of these specifications and accompanying drawings shall take precedence.

1.14 FEES AND PERMITS

- A. The Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by any legally constituted authority. Coordinate exact requirements with the District prior to bid. Refer to general condition Article 35 for more information.

1.15 COORDINATION

- A. Following the general arrangement indicated on the Drawings as closely as possible, the Contractor shall coordinate with the architectural, structural, plumbing, electrical and all other trades prior to installation of the materials and equipment to verify adequate space available for installation of the work shown. The District shall be immediately notified if an area of conflict occurs between trades.
- B. The Contractor shall bear all costs incurred for work that must be relocated due to conflicts between trades.
- C. The Mechanical Contractor shall coordinate all requirements for all points of connection with the General Contractor and other trades prior to bid.

1.16 DRAWINGS

- A. The work shall be installed as indicated on Drawings, however, changes to accommodate installation of this work with other work, or in order to meet Architectural or structural conditions, shall be made without additional cost to the District.
- B. For the purpose of clarity and legibility, the Drawings are essentially diagrammatic to the extent that many offsets, bonds, unions, special fittings and exact locations are not indicated. The Contractor shall make use of all data in all of the Contract Documents, and shall verify this information at the site.

1.17 INSPECTION

- A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.
- B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.18 DELIVERY, STORAGE AND PROTECTION OF PROPERTY

- A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the contractor.
- B. Materials shall be delivered in ample quantities from time to time as may be necessary for the uninterrupted progress of the work. They shall be stored as to cause the least obstruction to the premises and distributed so as to prevent overloading to any portion of the structure.
- C. The Contractor shall provide temporary storage and shop areas that are required at the site for the safe and proper storage of materials, tools, and other items used in the performance of this work. These areas shall be constructed only in approved locations and shall not interfere with the work of any other Contractor.
- D. All work, equipment and materials shall be protected at all times. The Contractor shall make good all damage caused either directly or indirectly by his own workmen. The Contractor shall also protect his own work from damage. He shall close all pipe and duct openings with caps or plugs during installation. He shall protect all of his equipment and materials against dirt, water, chemical, and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

1.19 DAMAGE BY LEAKS, ETC.

- A. The Contractor shall be responsible for all damage to any part of the premises or work of other Contractors, caused by leaks or breaks in the piping or equipment furnished and/or installed under this section, during the construction and guarantee period.

1.20 ACCESS TO EQUIPMENT FOR MAINTENANCE

- A. Install all equipment, piping, etc. to permit access for normal maintenance. Maintain easy access to filters, motors, etc. Install all such equipment and accessories to facilitate maintenance. Perform any relocation of pipes, etc. required to permit access at request of District at no additional cost to District.
- B. Furnish and install access doors or panels in walls, floors, and ceilings to permit access to equipment, dampers, and all other items requiring service. Coordinate location of access doors with other trades as required. Size access panels to allow inspection and removal of all items served.
- C. Use Milcor style as required for material in which door is installed. Where door is installed in fire rated construction, provide door bearing UL label required for condition. Refer to Section 08 31 13 for product required for door style.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials and equipment shall be new and of the best of their respective grades, free from all defects and of the make, brand or quality herein specified or as accepted by the District.
- B. All materials and equipment shall be identified by manufacturer's name or nameplate data. Unidentified material or equipment shall be removed from the site.
- C. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in the catalog as standard with the equipment. Optional or additional accessories shall be furnished as specified.
- D. Where no specific make of material or equipment is mentioned, any first class product of a reputable manufacturer may be used, provided it conforms to the requirements of the system and meets with the approval of the District.
- E. Equipment and materials damaged during transportation, installation and operation shall be considered as "totally damaged" and shall be replaced with new. Any variance from this clause shall be made only with written approval of the District.

2.2 MANUFACTURER

- A. Air Conditioning Units:
 - 1. Carrier
 - 2. Approved Equal.
- B. Diffusers, Registers, and Grilles:
 - 1. Krueger.
 - 2. Price.
 - 3. Approved Equal.
- C. Controls
 - 1. See 230900 specifications for energy management system.
- D. Stand-alone Controls
 - 1. As indicated on mechanical plans.
- E. Vibration Isolation:
 - 1. Mason.
 - 2. Canfab.
 - 3. MicroMetl.
 - 4. Approved Equal.

2.3 ROOF-TOP PACKAGE AIR CONDITIONING UNITS (Carrier model 48LC Units)

- A. General
 - 1. The unit shall be a fully factory assembled, pre-tested, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, Puron refrigerant charge (R-410A), and all special accessories noted in this specification prior to field start-up.
- B. Unit Cabinet
 - 1. Constructed of galvanized steel, bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
 - 2. Evaporator fan compartment interior cabinet insulation shall conform to AHRI 210/240 or 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum ½-inch thick, 1 lb. density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
 - 3. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60_F / 16_C: 60, Hardness: H-2H Pencil Hardness.
 - 4. Return air filters shall be accessible through an easily-removal (tool-less) access door and shall use standard size filters. Filter shall be standard off the shelf sizes. Contractor shall provide filters of the size and quantity as shown on the equipment schedule.
 - 5. Panels covering control box, indoor fan, indoor fan motor, gas compartments, and compressors shall have molded composite handles.
 - 6. Unit shall have a factory-installed internally sloped condensate drain pan, providing a minimum 3/4-in.—14 NPT connection to prevent standing water from accumulating. Pan shall be fabricated of high impact polycarbonate material and shall slide out for cleaning and or maintenance. An alternate vertical drain (3/4-in. NPT) connection shall also be available. All drain pans conform to ASHRAE 62 self-draining provisions.

7. Unit shall have standard exterior electrical and gas piping connections. Alternatively, the unit shall have through-the-base capability for each using a raised, embossed knockout portion of the drain pan. If specified, this option requires the use of the accessory, factory-approved thru-the-base connection kits for water-tight installation.

C. Fans

1. Indoor blower (evaporator fan):
 - a. Centrifugal supply air blower shall have rubber--isolated, cartridge type ball bearings and adjustable belt drive.
 - b. Fan wheel shall be made from steel with a corrosion resistant finish. It shall be a dynamically balanced, double--inlet type with forward--curved blades.
 - c. Evaporator--fan motors shall be continuous operation, open drip--proof. Bearings shall be sealed, permanently lubricated ball bearing type for longer life and lower maintenance.
 - d. Fan motor shall have automatic-reset thermal overload protection, and shall have a maximum continuous BHP rating for continuous duty operation; no safety factors above that rating shall be required.
2. Condenser fans shall be of the direct-driven propeller type, with corrosion-resistant aluminum blades riveted to corrosion-resistant steel supports. They shall be dynamically balanced and discharge air upwards. Condenser-fan motors shall be totally enclosed, thermally protected, and be of a shaft down design to protect from direct contact from harsh environments.
3. Induced--draft blower shall be of the direct driven, single inlet, forward--curved, centrifugal type. It shall be made from aluminized steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressor(s)

1. Fully hermetic, scroll type for each independent refrigeration circuit, cooled by refrigerant gas passing through motor windings.
2. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.
3. Compressor shall be protected from an over-temperature and over-ampereage conditions by internal motor overloads.
4. Compressor shall have internal line break thermal, current overload and high pressure differential protection.
5. Provide extended 5-year overall warranty from the date of Notice of Completion of the building and District Acceptant.

E. Coils

1. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
2. Coils shall be leak tested at 150 psig and pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.

F. Heating Section

1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve. Positive pressure heat exchanger designs shall not be allowed.

2. Heat exchangers shall meet the requirement of the California Air Quality Management District (SCAQMD) low-NOx emissions of 40 nanograms per joule or less. Heat exchanger primary tubes shall be 409 stainless steel. Heating shall have single stage control. Warranty shall be 10 years from the date of Notice of Completion of the building and District Acceptant.
3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
4. All gas piping shall enter the unit at a single location. Gas entry shall be capable through side or bottom for unit.
5. All factory-installed orifices are for operation up to 2,000 feet of altitude. For altitudes between 2,000 ft and 7,000 ft, a factory certified kit shall be furnished for field installation.
6. The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).
7. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.
8. The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.
9. The LED shall be visible without removal of control box access panel.
10. Gas burner tray, when disconnected, shall easily slide out for maintenance.

G. Refrigerant Components

1. Each refrigerant circuit shall include:
 - a. One balanced port thermostatic expansion valve (TXV) with removable power element.
 - b. Solid core refrigerant filter drier.
 - c. Refrigerant pressure gage ports and connections on suction and discharge lines.
 - d. Pressure gauge access through a specially designed access port in the top panel of the unit to facilitate correct and accurate condenser pressure by enabling the user to keep the compressor access panel on.

H. Filter Section

1. Units shall have 2" thick pleated panel filters with an ASHRAE efficiency of MERV rating of 11 (ClimateMaster 2" pleated or approved equal). Provide (2) sets for filters.
2. Direct dial reading Magnehelic gauge mounted in the control compartment.
3. Contractor shall furnish and install filters of the sizes and quantity as shown on the equipment schedule.
4. All AC units shall be provided with MERV-8 filters. MERV-8 filters shall remain in place until the construction phase is complete, and all items have been cleaned as per Section 23 00 00 - 3.3, 3.4 and 3.7. MERV-8 filters shall be replaced with 2-inch MERV-11 filters.

I. Controls and Safeties

1. Unit shall be complete with self-contained low voltage control circuit protected by a resettable circuit breaker on the 24V transformer side. Transformer shall have 75VA capability.

2. Electro mechanical Control. Verify with control contractor. Control contractor to provide controller and all accessories to connect to energy management system and all sensors to control Carrier economizer mode.

3. Safeties:

- 1) Compressor over-temperature, over-current. High internal pressure differential.
- 2) Low-pressure switch.
- 3) Freeze protection (evaporator coil).
- 4) High-pressure switch.
- 5) Automatic reset, motor thermal overload protector.

Induced draft heating section shall be provided with the following minimum protections:

- 6) High-temperature limit switch.
- 7) Induced--draft motor speed sensor.
- 8) Flame rollout switch.
- 9) Flame proving controls.

- J. Operating Characteristics

1. Standard unit shall be capable of starting and running at 125 F. ambient outdoor temperature per maximum load criteria of ARI Standard 210.
2. Standard unit shall be capable of operating in cooling mode down to an outdoor ambient temperature of 35 F.
3. Unit shall be provided with fan time delay to prevent cold air delivery in heating mode.

- K. Electrical Requirements

1. All unit power wiring shall enter unit cabinet at a single location through the unit side or bottom.

- L. Motors

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
2. Evaporator fan motor shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection. Evaporator motors are designed specifically for Carrier and do not have conventional horsepower (hp) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous BHP rating that is the maximum application BHP rating for the motor; no "safety factors" above that rating may be applied.
3. Totally enclosed condenser-fan motor shall have permanently lubricated, sealed bearings, and inherent automatic-reset thermal overload protection.
4. Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.

M. Special Features

1. Integrated Economizer:

- a. Integrated, gear-driven parallel modulating blade type capable of simultaneous economizer and compressor operation. Approved manufacturers shall be Carrier, MicroMetl Corporation, or CanFab, Inc.
- b. Independent modules for vertical or horizontal return configurations shall be available. Vertical return configurations shall be available as a factory installed option. Horizontal return configurations shall be field-installed.
- c. Low-leakage (less than 2%), opposing, gear-driven dampers with UL approved gears.
- d. Capable of introducing up to 100% outdoor air for minimum ventilation as well as free cooling.
- e. Integral barometric relief damper shall be sized equal to that of the OSA damper (100 percent relief). Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure. Damper shall close due to gravity upon unit shutdown.
- f. Economizer shall have CO2 sensor capability (if required) to provide demand control ventilation when used in conjunction with a wall-mounted CO2 sensor.

2. Modulating Power Exhaust :

- a. Shall include VFD-driven, centrifugal-type exhaust fan with damper and modulating control. Factory assembled and designed to exhaust between 75% and 100% of the supply air. Manufacturer shall be MicroMetl Corporation, CanFab, Inc., or approved equal.
- b. Shall be unit-mounted on vertical configured unit, and duct mounted on horizontal configured unit.
- c. Shall be field-installed by mechanical contractor.
- d. Power shall be single point connection on vertical configured unit.
- e. Include 100% shut-down on loss of power, and barometric relief damper.
- f. Include 30 feet of field-installed pressure pick-up tubing (room termination by installing contractor).

3. Flue Discharge Deflector :

- a. Flue discharge deflector shall direct unit exhaust vertically instead of horizontally.

4. Stainless Steel Heat Exchanger:

- a. Optional stainless steel heat exchanger shall be of the tubular—section type, constructed of a minimum of 20 gauge type 409 stainless steel.
- b. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.
- c. SS heat exchanger warranty shall be 10 year from the date of Notice of Completion of the building and District Acceptant.

2.4 DUCTWORK AND ACCESSORIES

- A. Air duct system construction shall be as defined by ASHRAE Standard 62.1-2004 Sections 5.5, 5.6, and 7.1.5. All construction shall be per the referenced standard and as defined below. Most stringent requirements shall apply.

- B. General: Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.
- C. Steel Ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per sq. ft. for each side in conformance with ASTM A90. Round duct shall be spiral seam construction.
- D. Spiral Ducts: Interlocking spiral of galvanized steel or aluminum construction; rated to (2 inches WG positive and 1.5 inches WG negative for low pressure ducts) (and 15 inches WG positive or negative for medium high pressure ducts.)
- E. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by Pressure Ductwork: seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F w/metal connectors.
- F. All flex ducts shall not exceed 7'-0" in length to respective diffusers, registers, and etc.
- G. Fasteners: Rivets, bolts, or sheet metal screws.
- H. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic. Duct sealant shall be RCD Corporation #9 Mastic or approved equal.
- I. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- J. Low Pressure Ducts:
 - 1. Fabricate and support in accordance with 2016 CMC, SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Gages for galvanized steel ducts for low pressure systems where velocities do not exceed 2000 FPM shall be as follows:

RECTANGULAR DUCT		ROUND DUCT	
Dimension of Largest Side (L) in Inches	Gage	Diameter (D) in Inches	Ga.
$L \leq 12$	26	$D < 9$	26
$12 < L \leq 30$	24	$9 \leq D < 14$	24
$30 < L \leq 54$	22	$14 \leq D < 23$	22
$54 < L \leq 84$	20	$23 \leq D < 37$	20
$84 < L$	18	$37 \leq D < 51$	18
		$51 \leq D < 61$	16
		$61 \leq D < 84$	14

- 2. All joint and seam constructions as indicated in the CMC are acceptable.
- 3. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
- 4. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes. Turning vanes not to be used in rectangular exhaust duct.
- 5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
- 6. Use double nuts and lock washers on threaded rod supports.
- K. Volume Control Dampers:
 - 1. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.

2. Manual dampers shall have factory-fabricated blades, with factory assembled linkages, mounted in frames. Blades shall have interlocking edges and ends. Rectangular dampers 6" or more wide, shall be the multi-blade type. Blades on multi-blade type dampers must not be over 6" wide. Dampers shall have bar or channel frames and corner bracing. All blade and linkage bearings shall be self lubricating bearing. Damper assembly leakage not to exceed 1% with 4.0 W.C. static pressure.
 3. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 4. Provide metal type end bearings for all volume dampers.
 5. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
- L. Duct Test Holes:
1. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- M. Diffusers, Supply Registers, Return Registers, and Exhaust Grilles:
1. Fabricate of steel with steel or aluminum frame and baked enamel off-white finish.
 2. Provide manual volume damper and multi-louvered equalizing grid with damper adjustable from diffuser face as indicated on the drawings.
 3. Supply Diffusers (SD): Supply: Krueger Model 1240, 4-way throw, with balancing damper and architectural (aluminum) frame, or approved equal. Return: Krueger EGC5, with balancing damper and architectural (aluminum) frame, or approved equal.
 4. Exhaust Grille (EG): Krueger Type 88OH and S8OH, steel with manual volume damper, or approved equal.
 5. Provide manual volume damper per air distribution schedule.
 6. See mechanical sheets for final requirements.
- 2.5 THERMOSTATS
- A. Thermostats are part of an energy management system (See 230923 specifications). They shall be electronic auto-changeover type and shall comply with all Title 24 energy requirements. See plans for locations of thermostats.
- 2.6 CONTROLS
- A. See requirements in section 230923 for Energy Management System (EMS) controls.
- B. The Mechanical Contractor shall be responsible for the proper coordination of all control work and electrical work in connection therewith. He shall also be responsible for the proper operation of the entire system.
- C. The Electrical Contractor shall furnish and install all line voltage control wiring, and in all conduit. Wire sizing and length of run shall be coordinated with the manufacturer and Electrical Engineer. The Mechanical Contractor shall furnish and install all low voltage control wiring, and in all conduit. Exception: All low voltage control wiring and conduit for the Energy Management System shall be furnished and installed by the Controls Contractor.
- D. Electrical Work: All electric relays, hand-off automatic switches and all electrical wiring and all conduit will be provided under the Electrical Section, except as otherwise specified. Furnish and install additional conduit, wiring, relays, hand-off automatic switches made necessary by the use of approved substituted equipment under this Section with no additional cost to the District.
- E. Refer to drawings for control diagrams and additional requirements.
- F. Calibration of Controls: The Controls Contractor shall carefully calibrate and adjust all controls as required to maintain comfort conditions and maximum energy conservation.
- G. Mechanical contractor shall provide electrical, gas, and water meter dry contacts. Contacts shall be compatible with EMS controls. Coordinate installation and requirements with controls contractor.
- H. Stand-alone Controls (As indicated on mechanical plans for Split Ductless system).

2.7 INSULATION

A. General:

1. All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire smoke hazard ratings as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding:
Flame Spread: 25
Smoke Developed: 50
2. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements. Any treatment of jackets or facings to impart flame and smoke safety shall meet the above requirements.
3. The Contractor shall certify that all products used have met the above criteria.
4. The insulation values shown are a minimum. If the requirements of Title 24 exceed these values, the amount of and/or type must be increased to meet the Title 24 requirements.

B. Duct Insulation:

1. Acoustical Duct Lagging:
 - a. Insulation: ASTM E90; flexible, noncombustible blanket, meets UL94 and FMVSS-302.
 - 1) Sound Transmission Class: 27.
 - 2) Maximum service temperature: 180 degrees F.
 - 3) Density: 1.0 lb/ ft³.
 - 4) All Duct Lagging shall be Sound Seal B-10 LAG or approved equal.
 - b. Mass-loaded Vinyl Barrier Jacket:
 - 1) Vinyl noise barrier with a reinforced foil facing on one side.
 - 2) Secure with foil lag tape, stick pins, and banding per manufacturer's instructions.
2. Glass Fiber Duct Liner, Flexible:
 - a. Insulation: ASTM C177 or C518; flexible, noncombustible, UL181.
 - 1) 'K' value: ASTM C518, 0.25 at 75 degrees F.
 - 2) Maximum service temperature: 250 degrees F.
 - 3) Density: 3.0 to 6.0 lb/ft³.
 - 4) Maximum Velocity on Coated Air Side: 4,000 ft/min.
 - b. Adhesive: Waterproof (fire-retardant) type.
 - c. Liner Fasteners: Pressure sensitive adhesive system, non-pinned.
 - d. All duct liner shall be John Manville Linacoustic RC or approved equal.
 - e. Shall meet following surface erosion resistance standards:
 - 1) ASTM C 1071
 - 2) ASTM C 1104
3. Fiberglass Duct Wrap:
 - a. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1) 'K' value: ASTM C518, 0.48 at 75 degrees F.
 - 2) Maximum service temperature: 250 degrees F.
 - 3) Density: 0.75 lb/ ft³.

- 4) All duct wrap shall be Johns Manville Microlite XG or approved equal.
 - b. Vapor Barrier Jacket:
 - 1) Kraft paper reinforced with glass fiber yarn and bonded to aluminized film vinyl.
 - 2) Moisture vapor transmission: ASTM E96; 0.5 perm.
 - 3) Secure with pressure sensitive tape.
 - c. Vapor Barrier Tape: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
 - d. Tile Wire: Annealed steel, 16 gage.
- C. Refrigerant Piping Insulation
1. Refrigerant Piping Insulation
 - a. All refrigerant piping insulation shall be Armacell Armaflex or approved equal

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all equipment in locations indicated on the Drawings. Contractor will be responsible to verify with the District, if suitability is doubted. Contractor shall notify the District before installation into any apparent improper locations of interference with other work such as electrical outlets, windows, cabinetwork or other features.
- B. Factory installed drain pan shall be certified (in writing) by the manufacturer for proper drainage when installed as recommended, as defined by AHRAE Standard 62.1-2004 Section 7.2.3. If such certification cannot be provided, contractor shall perform required field testing under normal operating conditions to assure proper drainage.
- C. Follow all installation, construction, and start-up requirements as defined by ASHRAE Standard 62.1-2004 Sections 5 and 7, as applicable to new building construction. Submit all required reports and documentation as defined by ASHRAE Standard 62.1-2004 Section 7. Coordinate all requirements with all subcontractors.
- D. All HVAC units shall have MERV-11 filters installed during construction phase. During construction and system start-up HVAC unit fans shall operate during installation of materials containing VOC. Turn ventilation systems off and protect HVAC supply and return openings from dust infiltration during dust producing activities. Provide temporary ventilation as required. All filters shall be replaced with new MERV-11 filters immediately before building is occupied.

3.2 INSTALLATION

- A. Rooftop Package Unit Air Conditioner: Install in accordance with manufacturer's instructions. Mount units on factory built roof-mounting frame providing watertight enclosure to protect ductwork and utility services, or on platforms. Install roof mounting frame level.
- B. Ductwork and Accessories:
 1. Duct cleaning: Oil film on sheet metal should be removed before shipment to site. On-site inspect ducts to confirm that no oil film is present. Remove any oil. If ducts contain dusts and dirt, clean them immediately, prior to substantial completion and prior to using the ducts to circulate air.
 2. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
 3. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
 4. Install accessories in accordance with manufacturer's instructions and to meet the provisions of "Seismic Restraint Manual: Guidelines for Mechanical Systems," Latest SMACNA guidelines.

5. Provide balancing dampers at points on low-pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.
 6. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
 7. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 12 x 12 inch size for hand access, 30 x 30 inch size for body access, and as indicated.
 8. Provide duct test holes where indicated and required for testing and balancing purposes.
 9. Check location of outlets and inlets and make necessary adjustments in position to conform to Architectural features, symmetry, and lighting arrangement.
 10. Install diffusers to ductwork with airtight connection.
 11. Provide balancing dampers on duct take-off to diffusers and registers, regardless of whether dampers are specified as part of the diffuser, or register assembly.
 12. Paint ductwork visible behind air outlets and inlets matte black.
 13. Paint all exposed ductwork and equipment. Verify finish with Architect prior to installation.
- C. Thermostats and over-ride switches: Install at 48" above finished floor unless otherwise stated. Coordinate with other trades. Controls Contractor shall be responsible for verifying, furnishing all controls and wiring for tie-in of thermostats to energy management system and shall co-ordinate all requirements with other trades including notifying electrical contractor of necessary conduit and power requirements. All costs for scope of work shall be submitted for final bid.
- D. Insulation:
1. Duct Insulation:
 - a. Unless specifically indicated on the drawings the Contractor may line or wrap ductwork to meet insulation requirements. Provide Duct Lagging to meet acoustical requirements.
 - b. Fiberglass duct wrap:
 - 1) Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2) Secure insulation without vapor barrier with staples, tape, or wires.
 - 3) Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
 - 4) Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5) Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
 - c. Duct (and Plenum) liner Application:
 - 1) Install as indicated (sound lining) on the drawings.
 - 2) Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing. Seal and smooth joints. Seal liner surface penetrations with adhesive.
 - 3) Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.
 - d. Shall meet following surface erosion resistance standards:
 - 1) ASTM C 1071

2) ASTM C 1104

- E. Install Spring Curb Rail vibration isolation system per manufacturer's recommendations. Provide seismic clips (each end of each side –8 total) from A/C unit to roof curb, and z straps from A/C unit to equipment curb per manufacturer's recommendations. Submit shop drawings for location of points of attachment, and methods and materials.

3.3 DUCT CLEANING

- A. Perform all cleaning as defined by ASHRAE Standard 62.1-2004 Section 7.
- B. Clean new duct systems before testing, adjusting, and balancing.
- C. Use service openings for entry and inspection.
1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer.
 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 3. Remove and reinstall ceiling to gain access during the cleaning process.
- D. Particulate Collection and Odor Control:
1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- E. Clean the following components by removing surface contaminants and deposits:
1. Air outlets and inlets (registers, grilles, and diffusers).
 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
 4. Coils and related components.
 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
 6. Supply-air ducts, dampers, actuators, and turning vanes.
 7. Dedicated makeup air systems.
- F. Mechanical Cleaning Methodology:
1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
 2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
 3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
 4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
 5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

6. Provide drainage and cleanup for wash-down procedures.

Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

- G. All filters shall be replaced one week prior to occupancy of the District.

3.4 AIR SYSTEM TEST AND BALANCE

- A. Air balance shall be as per AABC certified and as defined by ASHRAE Standard 62.1-2004 Section 7.2.2 and ASHRAE Standard 111. Most stringent shall apply. All ASHRAE requirements must be met.

- B. Regulating and Adjusting Air Systems:

1. The following test data shall be taken and three (3) copies submitted in tabulated form to the Architect for each system:
 - a. Test and adjust all supply, return & exhaust blower RPM to design requirements.
 - b. Test and record all motor full load amperes.
 - c. Test and record system static pressures, suction and discharge.
 - d. Test and adjust system for design re-circulated air, CFM.
 - e. Test and adjust system for design CFM outside air.
 - f. Adjust all supply and return outlets to within 5% of design CFM.

3.5 SOUND AND VIBRATION ISOLATION

- A. All vibrating equipment shall be sound isolated from the structure.
- B. The Contractor shall submit all necessary data for each vibration isolator, including static deflection and weight loading, for equipment in operation.
- C. All vibrating equipment shall be provided with flexible pipe connections. Submit for approval prior to installation.

3.6 JOB COMPLETION

- A. Equipment Identification:

1. Name plates shall be constructed of black bakelite with white center engraved letters three-sixteenth inch (3/16") high and shall be cemented to equipment with an epoxy resin. The Contractor shall submit to the Architect, a complete list of name plate titles for approval prior to installation.

- B. Clean-Up:

After all heating, ventilating and air conditioning work has been tested and approved, the Contractor shall thoroughly clean all parts of the equipment installation. Exposed parts which are to be painted are to be thoroughly cleaned of cement plaster and other materials and all greases and oil spots removed with solvent. Exposed rough metal work to be carefully brushed down with steel brushes to remove rust and other spots and left in proper condition to receive painter's finish.

1. Remove all debris from the job site, all cartons, boxes, packing crates, excess materials not used occasioned by the work and to the satisfaction of the District.

END OF SECTION

SECTION 23 01 30.51
HVAC EQUIPMENT AND DUCT CLEANING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
- B. Related Sections:
 - 1. Section 23 00 00 Heating, Ventilation and Air Conditioning
 - 2. Section 23 09 00 HVAC Instrumentation Control - Energy Management System
 - 3. Section 26 00 00 General Electrical Requirements

1.03 GENERAL CONDITIONS

- A. General Conditions of the construction contract shall be a part of these specifications, and shall govern the HVAC Systems Rehabilitation Contractor. All work shall be done in accordance with requirements of the Owner and the construction contractor.
 - 1. Contractor's License: The Contractor shall be licensed in the State of California. This License shall be a C-61 Specialty License in the D-64 Duct Cleaning Sub-Division.
 - 2. "National Air Duct Cleaners Association (NADCA): The contractor shall be a Certified Member in good standing with NADCA.
 - 3. Contractor shall visit the site prior to bid and make himself thoroughly familiar with the site and existing conditions. By submitting a bid for HVAC equipment and duct cleaning, Contractor declares that he is familiar with existing conditions and is capable of executing work detailed herein at no additional cost(s) to the Owner.

1.04 QUALITY ASSURANCE

- A. Contractor shall have thorough knowledge and experience in the rehabilitation and cleaning of projects of similar type, size, and degree of difficulty completed within the last two years. Contractor agrees:
 - 1. All work shall be supervised by a foreman having thorough knowledge and experience in the cleaning of air conditioning systems. Experienced, qualified personnel shall perform the work.
 - 2. Contractor shall be fully covered by Workmen's Compensation, Public Liability and Property Damage Insurance, and certificates of these coverage's and limits shall be provided to the Owner upon request.
 - 3. Any mechanical problems discovered during the course of cleaning will be reported in writing within 24 hours to the project coordinator.

4. Contractor shall leave area of work in same condition as when work started (on a day-to-day basis and from project start to finish).
 5. Contractor shall keep work area free of all surplus material and debris. Upon completion of each shift, all tools, equipment, debris, etc. shall be moved to a designated area selected by the Owner.
 6. Contractor shall take all necessary measures to minimize the migration of dust and other air borne particles during the cleaning process. ALL outlets and inlets leading to (or from) occupied spaces must be covered with a leak-proof catch basin. At no time shall dust and/or other air borne particles be blown or dispersed into any space within the building.
 7. Contractor shall at all times be in compliance with Cal OSHA and EPA regulations.
 8. Unless otherwise noted, Contractor shall be responsible for cleaning all existing supply, return, exhaust, and outside air intake duct to remain as indicated on plans. Any deviations from said section must be approved in writing by the Owner.
- B. Photo Documentation: Documentation shall include the use of a digital camera and a fiberoptic boroscope, where required. Contractor shall take photos of conditions before and after cleaning for inclusion in a project report to be presented to the Owner at the conclusion of the work.

1.05 LABOR AND MATERIALS

- A. Contractor shall furnish all labor, materials, supplies, tools, equipment, supervision, transportation and any other services or items necessary to accomplish the work.
- B. Safety Procedures and Policy: Contractor shall provide adequate and necessary management personnel to ensure that all safety policies and project requirements are met.
1. Maintain safe and healthy employee working conditions and establish safe operating procedures at each job site.
 2. Comply with the safety standards of all federal and state regulatory agencies as a minimum requirement for safety performance at each job site.
 3. Comply with all of the safety requirements of the job site and safety requirements mandated by the Owner.
 4. Contractor shall provide all necessary safety devices and personal protective equipment for employee use, and shall require their use when needed.
 5. The work in progress shall be subject to random unannounced inspections by a representative of Owner.
 6. Upon total completion of the project, representatives of Owner will do a quality control inspection. Any area that does not meet the standards of this specification shall be redone at no additional cost.
 7. Electrical equipment, sensors and control devices shall be masked, or blocked off where required for protection for water or chemicals.
 8. Disinfectant, when used, shall be applied in accordance with the manufacturer instructions, and may be used prior to coating application. System shall be dried after application of disinfectant.
 9. HVAC coating shall be applied according to manufacturer instructions. Coating shall be sprayed, brushed, or rolled directly into interior ductwork surface. A continuous film of coating must be achieved. (Provide supplemental ventilation as required.)

10. All ducts too small to allow direct entrance shall have access openings installed approximately every 10-15 feet as required, and at each elbow and vertical riser. Each access opening shall be recovered with a panel made of the same gauge metal, and installed in such a manner as to insure an airtight job. All sheet metal ductwork shall be in accordance with SMACNA Standards, unless otherwise noted.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

- A. Material Safety Data sheets for all materials and products used by Contractor shall be provided to Owner prior to start-up of cleaning operations.
- B. Degreaser: Maintex 7-11 Armex Baking Soda Blasting Crystals or equal as approved by Owner.
- C. Sanitizer Oxine BBJ Microbicide or other EPA registered equal as approved by Owner.
- D. Re-Surfacing Treatments: Schuller Superseal Edgecoat Fosters 40-20 Vac-Systems Tough Coat Porta Sept by Porter Paints, containing EPA registered anti-microbial Swamp Cooler Repair condensate drain pan sealant or other EPA registered equal as approved by Owner.
- E. Paint: Styletone Series 8 19 Machinery Grey Zynolite Spray Paint.
- F. Insulating Lining Material: To match existing or Certainteed Tough Gard Certainteed Ultra-Lite Armaflex Astro-Foil or equal as approved by Owner.
- G. Adhesives: Armstrong 520 DPIO/20 Super 77 Spray Adhesive or equal as approved by Owner.
- H. Duct Sealant: DP 10/10 Top 12000 Silicone Sealant or equal as approved by Owner.

PART 3 - EXECUTION

3.01 METHODOLOGY

- A. Cleaning of Ductwork
 1. All registers and diffusers shall be removed and cleaned with a mild detergent.
 2. All ductwork (not accessible to personnel) shall be cleaned by compressed air, light brush agitation, or vibration agitation, or a combination of any of the above. All duct to be opened so the interior is as visible as possible
 3. Large ductwork shall be cleaned by manual brushing, or vibration agitation. All duct to be opened so as to visually observe the cleaning process.
 4. All agitation of contaminants shall be accompanied by negative air pressure created by a negative air machine using a HEPA filter.
 5. Access needed for proper cleaning shall be cut into rigid metal ducts at elbows and approximately every 15 feet. Holes shall be sized as appropriate to allow cleaning and visual inspection inside duct.
 6. All flexible ducts shall be disconnected at joints and registers for cleaning. Flexible duct lengths of over 15 feet shall be cut at intervals not exceeding 15 feet.
 7. Contractor shall provide access in existing ceilings and walls as required. Where openings are made for cleaning purposes, Contractor shall repair such ceilings and walls as required to give a uniform surface. Match existing materials, color and texture.

8. All interior dampers and turning vanes shall be cleaned with a stiff bristle brush and then vacuumed.
9. The surface of all unreplaced liner shall be coated. Any small tears in fiberglass will be repaired with lagging materials and then encapsulated.
10. All access holes made in ducts for cleaning purposes shall be sealed with galvanized sheet panels of the same or heavier gauge metal as the duct. Panels shall be installed with duct sealant and screwed into the duct at four-inch maximum on center, all around as required to maintain an airtight seal. Proof will be required.
11. All flexible ducts disconnected for the purpose of cleaning shall be reattached in the same manner as originally installed.
12. Clean all duct serving remodeled areas, including supply duct and transfer duct. Do not clean main return ductwork at the central air conditioning unit.

B. Hazardous Materials

1. When asbestos or other hazardous materials are encountered, Contractor shall document concern and forward to Owner forthwith.
2. Respiratory protection shall be OSHA/NIOSH approved with HEPA cartridges, or cartridges designed for specific contaminants.
3. No material that is not approved by regulatory authorities shall be introduced to the project as means for accomplishing work outlined herein.

END OF SECTION

SECTION 23 09 00

DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. The Direct-Digital Control (DDC) System specified herein shall include materials, operator workstation, building controllers, sensors, control valves, wiring, installation, start-up, testing, documentation and training for a complete operable system as required for this project.
- B. Controls Engineering shall be provided by the local controls manufacture representative.
- C. Work specified under this section shall be performed by, or under the direct supervision of the local controls manufacture representative, or by a contractor that is certified by the controls manufacture to perform all work within Section 23 09 00 Instrumentation and Control for HVAC and those sections of 23 09 00 that have been specified herein.
- D. Alternate techniques, modifications or changes to any aspect of these specifications may be submitted as a voluntary alternate no later than (15) days prior to the bid date and with sufficient information for a complete evaluation. This information shall include product data sheets, a UL508A Standard for Industrial Control Panels statement of compliance for any locally manufactured control panels, a detailed sequence of operation and engineered shop drawing. Shop drawings shall include the following as a minimum. Point to point wiring diagrams for each piece of equipment to be controlled, a network riser diagram that will depict quantity and location of all operator workstation, controllers, routers and repeaters required for this project.

1.2 RELATED SECTIONS

- A. 01 33 00: Submittal Procedures
- B. 23 00 00: Heating, Ventilating, and Air Conditioning (HVAC)
- C. 26 00 00: Electrical

1.3 SUBMITTALS

- A. Submit engineered shop drawings, sequences of operation, third party equipment and controls integration points and product data sheets covering all items of equipment for the proposed system prior to installation for approval. Any deviation from the contract documents shall be noted and the drawings signed and dated by the Contractor. Additionally, submit a UL508A Standard for Industrial Control Panels statement of compliance for any locally manufactured control panels.
- B. After completion of the installation and commissioning, a full set of as-built documentation shall be turned over to the Owner. The as-built shall include operation and maintenance manuals, sequence of operation, shop drawings and digital copies of the following.
 - 1. Complete DDC System databases backup
 - 2. Source files for all custom written controller applications
 - 3. Source files for graphics if required for this project

1.4 WARRANTY

- A. Components, system software, and parts shall be guaranteed against defects in materials, fabrication, and execution for (1) year from date of system acceptance. Provide labor and materials to repair, reprogram, or replace components at no charge to the Owner during the warranty period.

- B. Provide a list of applicable warranties for components, this list shall include warranty information, names, addresses, telephone numbers, and procedures for filing a claim and obtaining warranty services.
- C. Respond to the Owner's request for warranty service within (24) hours during normal business hours. Submit records of the nature of the call, the work performed, and the parts replaced or service rendered.
- D. Contractor shall request VPN access from owner and provide remote maintenance, software updates and repair service for the duration of the warranty period.

1.5 TRAINING

- A. Provide a competent instructor who is factory trained and has comprehensive knowledge of system components and operations to provide full instructions to designated personnel in the system operation, maintenance, and programming. Training shall be specifically oriented to installed equipment and systems.
- B. Provide (8) hours of onsite owner familiarization and training for the installed system. Training shall include system overview, time schedules, emergency operation, and programming and report generation.
- C. Owner employees attending this training session shall be provided with the following documentation:
 - 1. System layout point to point connection diagram.
 - 2. System components cut sheets.
 - 3. Operations and maintenance data.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Do not store or install electronic hardware on the project until non-condensing environmental conditions have been established.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. DDC Equipment: Carrier OPEN BACnet Controls. No substitutions will be accepted.
- B. Controls installation will be by Russell Sigler Inc. Controls Group.
- C. The local manufacture representative will operate a free 40 hour a week, toll free customer support hotline for additional user support services that are required.

2.2 SYSTEM LISTING COMPLIANCE

- A. Locally manufactured control panels shall meet all requirements as outlined by UL 508A standard and shall be both approved and listed by Underwriters Laboratories, Inc.

2.3 COMMUNICATION

- A. Controller and operator interface communication shall conform to ANSI/ASHRAE Standard 135, BACnet.
- B. Each controller shall have a communication port for temporary connection to a laptop computer or other operator interface. Connection shall support memory downloads and other commissioning and troubleshooting operations.
- C. Use owner provided Ethernet backbone for network segments.

2.4 OPERATOR INTERFACE

- A. Description. The control system shall be as shown and consist of a high-speed, peer-to-peer network of DDC controllers and a stand-alone web server operator interface. Depict each mechanical system and building floor plan by a point-and-click graphic. A web server shall gather data from this system and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators with sufficient access level shall have an ability to make changes to all system and equipment graphics in the web server in addition to having full DDC system access to make configuration changes to the control system. Any tools required for making graphic changes shall be provided with web server.
- B. Operator Interface. Furnish (1) Carrier i-Vu Pro Web server interface as shown on the system drawings.
 - 1. With the use of an owner provided remote SMTP email server the operators interface web server shall notify personnel of an alarm and record information about an alarm in the DDC system.
 - 2. Any required installation or commissioning software shall be provided to the owner.
- C. Operator Functions. Operator interface shall allow each authorized operator to execute the following functions as a minimum:
 - 1. Log In and Log Out
 - 2. Point-and-click Navigation
 - 3. View and Adjust Equipment Properties
 - 4. View and Adjust Operating Schedules
 - 5. View and Respond to Alarms
 - 6. View and Configure Trends
 - 7. Manage Control System Hardware
 - 8. Manage Operator Access
- D. System Graphics. Operator interface shall be graphical and shall include at least one graphic per piece of equipment and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using dynamic colors to represent zone temperature relative to zone setpoint.
- E. Trend Configuration. Operator shall be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and shall be able to retrieve data for use in spreadsheets and standard database programs.
- F. Reports and Logs. Operator shall be able to select, to modify, to create, and to print reports and logs. Furnish the following standard system reports:
 - 1. Alarm Reports
 - 2. Schedule Reports
 - 3. Security Reports
 - 4. Commissioning Reports
 - 5. Equipment Reports
- G. Energy Conservation
 - 1. Outside Air Lockout. Lock out heating or cooling modes based on configurable outside air temperature limits.
 - 2. Demand Limiting
 - a. System shall monitor building power consumption from building power meter pulse generator signals or from building feeder line watt transducer or current transformer.

- b. The system shall include all required hardware and software necessary to receive an Automated Demand Response (ADR) signal from the utilities Demand Response Automation Server (DRAS).
 - c. When power consumption exceeds adjustable levels, or the system receives an ADR signal from the utility, the system shall automatically adjust set points, and take other programmatic actions to reduce demand.
- 3. Optimal Start. The system shall bring the conditioned space to within occupied set points prior to the occupied time period to ensure occupant comfort.

2.5 CONTROLLERS

- A. General. The control system shall be available as a complete package with the required input sensors and devices readily available. Provide BACnet Building Controllers (BC), Advanced Application Controllers (AAC), Application Specific Controllers (ASC), and Sensors (SEN) as required.
- B. Stand-Alone Operation. Each piece of equipment shall be controlled by a single controller to provide stand-alone control in the event of communication failure.
- C. Serviceability. Controllers shall have diagnostic LEDs for power, communication, and processor.
- D. Rooftop Unit Controller (RTC). Defined as Application Specific Controllers (ASC), shall be factory installed by the HVAC manufacturer and shall control all associated HVAC rooftop equipment functions in a single zone application or as part of a zoning system application.
 - 1. Capacity control shall be based by the RTC internal time clock and setpoints (cooling and heating) coupled with a communicating room sensor. The controls shall provide separate occupied and unoccupied cooling and heating setpoints.
 - 2. RTC shall utilize up to 2 speed of fan control, up to 3 stages of cooling, and up to 4 stages of heating.
 - 3. RTC shall provide economizer control that has been certified for Fault Detection and Diagnostics (FDD) by California Energy Commission (CEC). The FDD system shall detect the following faults:
 - a. Air temperature sensor failure/fault
 - b. Not economizing when it should
 - c. Economizing when it should not
 - d. Damper not modulating
 - e. Excess outdoor air
- E. Zone Controller (ZC). Defined as Application Specific Controllers (ASC) shall be capable of independent zone control or function as part of the zoning system.
 - 1. ZC shall have an integrated brushless actuator, onboard pressure sensor and shall perform pressure independent zone control by measuring and controlling CFM being delivered to the zone.
- F. Bypass Controller (BC). Defined as Application Specific Controllers (ASC) shall be capable of reading supply static pressure and controlling the bypass damper (or a VFD speed control output) to maintain the supply static set point in the supply duct. This operation shall be provided when operating within a zoning system application, or in a stand-alone mode.
 - 1. BC shall have an integrated brushless actuator and onboard pressure sensor to measure and control duct static pressure.

2.6 FIELD INSTALLED SENSORS

- A. Space Temperature Sensors shall communicate to the controller over a 4-wire communication network and have setpoint adjustment, after hours override, LCD display and a communication service port.

- B. Status indication for fans or pumps shall be provided by a split core design current sensing sensor. The sensor shall be installed at the motor starter or motor to provide load indication. The unit shall consist of a current transformer, a solid state current sensing circuit (with adjustable set point) and a solid state switch. A light emitting diode (LED) shall indicate the on off status of the unit.

2.7 CONTROL PANELS

- A. Provide single-door, UL 508A Listed; Type 4, wall-mount enclosures for each system under automatic control. Mount relays, switches, and controllers in cabinet and indicators, pilot lights, push buttons and switches flush on enclosure exterior face as required.
- B. Fabricate panels from 16 gauge steel with ANSI 61 gray finish and shall include (1) black padlock handle that will accommodate a padlock with up to a 5/16-in. locking bar for secure access to the enclosure contents. All additional latches shall be black non-locking handle type.
- C. Provide engraved name plates that identify each control panel and for each component mounted to the exterior of the enclosure.
- D. Provide a complete wiring diagram, bill of material for all components and markings with the following information:
 - 1. Manufacturer's name or trademark
 - 2. Supply voltage, number of phases, frequency, and full-load current for each incoming supply circuit
 - 3. Enclosure type number

PART 3 - EXECUTION

3.1 ELECTRICAL WIRING

- A. This contractor is responsible for all low voltage electrical installation and wiring for a fully operational DDC System as shown on the drawings and shall perform electrical installation in accordance with local and national electrical codes and in accordance with Division 26.
- B. Install all HVAC control wiring, 24vdc or less, in electrical metallic tubing (EMT) when wire is concealed in walls and in exposed areas. Rigid metal conduit (RMC) will be used when conduit will be installed on roofs. Plenum wire may be used in ceilings where anchored support is provided every 10 feet.
- C. Electrical Contractor is responsible for providing power from local electrical panels to the DDC System control panels.
- D. When transitioning between buildings above or below ground level, provide a pull box with necessary surge suppression hardware to transition exterior rated wiring to interior applications.

3.2 ACCEPTANCE PROCEDURE

- A. Upon completion of the installation, the contractor shall start-up the system and perform all necessary calibration and testing to ensure the proper operation of the DDC System.
- B. After all calibration and testing have been completed, the contractor shall schedule a hardware demonstration and system acceptance test to be performed in the presence of the designated owner's representatives.
- C. The contractor shall be a member of the designated District Commissioning Team and shall be responsible for performing procedures presented in specification and contract drawings as detailed in the Functional Performance Tests (FPT).

END OF SECTION

SECTION 26 00 00

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

- A. Work of this section includes everything necessary for or incidental to completing the electrical work, to provide a complete and operable electrical system, except as herein specifically excluded.

1.2 GENERAL REQUIREMENTS

- A. Electrical System Characteristics: 480/277V. 3PH, 4W., 208/120V. 3PH, 4W.
- B. Guarantee: Furnish a written guarantee for a period of one-year from date of acceptance.
- C. Codes and Regulations: Work done under this Section shall comply with the latest edition of the following: California Electrical Code, State of California Title 24, State Building Standards, Occupational Safety and Health Administration (OSHA) requirements, State of California Title 17 and to all local codes having jurisdiction. In the case where the codes have different levels of requirements, the most stringent rule shall apply.
- D. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to insure complete and operable systems as required by the Owner and Engineer.
- E. The General and Supplementary Conditions, as well as Special Conditions apply in addition to items in the Electrical Section. Special attention is directed to the following sections:
 - 1. Drawings and Specifications at the site.
 - 2. Shop drawings and samples.
 - 3. Record drawings.
 - 4. Cutting and Patching.
 - 5. Cleaning up.
 - 6. Guarantee.
 - 7. Tests.
- F. Additional Work: Refer to Mechanical specifications for additional Electrical requirements.
- G. Testing:
 - 1. All circuits shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.
 - 2. All test reports shall be submitted to the Owner at completion of project.
- H. All Core Cutting, Drilling, and Patching:
 - 1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications.
 - 2. No holes will be allowed in any structural members without the written approval of D.S.A. or the Structural Engineer.

3. The contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.
4. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.

I. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.
2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

J. Shop Drawings:

1. Drawings shall be submitted in six (6) bound sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.
2. The Drawings submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Drawings have been checked by the Contractor. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.
3. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment which may be caused by the substitution. Samples shall be submitted when requested.
4. Shop drawings shall be submitted on the following but not limited to:
 - a. Fire alarm system.
 - b. Junction/Pull boxes.
 - c. Wire/Cable.
 - d. Conduit and fittings.
 - e. Disconnect switches.
 - f. Circuit breakers.

- K. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of blueprints. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.3 WORK IN COOPERATION WITH OTHER TRADES

- A. Examine the Drawings and Specifications and determine the work to be performed by the mechanical, plumbing, general contractor and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.
- B. Provide power and control circuits, conduit and wire as indicated on the Mechanical and Plumbing drawings as required for complete and operable systems.

1.4 TESTING AND ADJUSTMENT

- A. Upon completion of all electrical work, this Contractor shall test all circuits, switches, motors, breakers, motor starter(s) and their auxiliary circuits and any other electrical items to insure perfect operation of all electrical equipment.
- B. Equipment and parts in need of correction and discovered during such testing shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.
- C. All circuit shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.
- D. All certified testing reports shall be submitted to the Engineer at completion of project.

1.5 IDENTIFICATION

- A. Identification nameplates shall be Micarta 1/8" thick and of approved size, with bevelled edges and engraved white letters 1/4" high minimum on black background. Nameplates shall be provided for all circuits in the distribution switchboards, and selector switches. Inscriptions on equipment shall be identical to those indicated in panels and/or motor control centers and other similar devices. Each nameplate shall be provided with drillings and suitable mounting screws corresponding to finish of the nameplate. The inscriptions in each nameplate shall be as indicated on the Drawings.
- B. Identification of Air Conditioning Equipment: Equipment to be so identified shall include, but shall not be limited to: Pressure and temperature controllers; switches; equipment motors and boxes or cans housing other control items. Mechanical equipment nameplates shall have letters a minimum of 3/8" high.

1.6 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRINGDIAGRAMS

- A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete wiring diagrams for the following item(s) or equipment:
 - 1. Circuit breakers.
 - 2. Disconnect switches
 - 3. Fire alarm system.
- B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Two (2) copies shall be presented to the Electrical Engineer and four (4) copies to the Owner.

1.7 ELECTRICAL CONTRACTOR'S RESPONSIBILITY

- A. It shall be the Electrical Contractor's responsibility to obtain a complete set of Drawings and Specifications. He shall check the Drawings of the other trades and shall carefully read the entire Specifications and determine his responsibilities.
- B. The contractor shall be responsible for reviewing the plans and specifications to ensure each room, where electrical line or low voltage equipment is to be installed, has sufficient space to accommodate the system cabinets, equipment and terminations while maintaining code mandated clearances about said equipment. The contractor shall identify problem areas prior to bid, include all costs required for corrective measures in his bid and submit alternate equipment and materials suitable for the installation to the Architect/Engineer for acceptance as part of the product submittal process.

1.8 FINAL INSPECTION AND ACCEPTANCE

- A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.
- B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

1.9 RECORD DRAWINGS

- A. Contractor shall furnish one set of reproducible record drawings before final payment of retention.

1.10 SUBSTITUTIONS

- A. Substitution to specified equipment shall be submitted and received by the Engineer fifteen (15) days after the bid date for review and approval. Obtain D.S.A. approval for all substitutions.
- B. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letter form and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples must be included in the submittal.
- C. In the event that authorization is given for a substitute equal to bid, after award of contract the Contractor shall submit to the Engineer certified quotations from suppliers of both the specified and proposed equal material for price comparison and delivery dates.
- D. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.
- E. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.
- F. Substitutions or requests for substitution shall not be accepted and rejected for failure to comply with items A-E above.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety. In addition, the materials and equipment shall comply with the requirements of the following:
 - 1. American Society of Testing Materials (ASTM).
 - 2. Insulated Cable Engineers Association (ICEA).
 - 3. National Electrical Manufacturer's Association (NEMA).
 - 4. National Fire Protection Association (NFPA).
 - 5. American National Standard Institute (ANSI).
- B. Existing Panelboards/Switchboards – Circuit Breakers:
 - 1. Circuit breakers shall match existing in manufacturer, operation and short circuit duty. Provide new circuit breakers with required mounting hardware.
 - 2. Circuit breakers AIC rating shall be equal to or greater than the highest AIC rating of any one existing circuit breaker in the panel/switchboard.
 - 3. Circuit breakers shall be the number of poles and current capacity as indicated on the single line diagram.
 - 4. Circuit breakers shall be provided with a device for locking circuit breaker in "OFF" position.
 - 5. Provide screw-on nameplates for all feeder circuit breakers. Nameplates shall be 1/8" thick, Micarta or Lamacoid plate or approved size, with bevelled edges and engraved white letters on black background.

C. Conduit:

1. Rigid conduit shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing or sherardizing process.
2. Galvanized Rigid Conduit (GRC), shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing, or sherardizing process.
3. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242 and meeting Federal Specification WWC-581 (latest revision).
4. Electrical Metallic Tubing (EMT), shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces.
5. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Used only as directed by the Engineer.
6. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory installed fittings. For outdoor installations and motor connection.

D. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fitting shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.
2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductor do not pass through the cover.
3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.
4. EMT fittings, connectors and couplings, shall be steel, zinc or cadmium plated, raintight, threadless, compression or tap-on multiple point, steel locking ring type with insulated throat.
5. Flexible steel conduit connectors shall be or malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.
6. Die cast, set screw or indenter type fittings are not acceptable.
7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.

E. 600 Volt Conductors - Wire and Cable:

1. All conductors shall be copper. Simpull or approved equal.
2. Type THHN/THWN thermoplastic, 600 volt, UL approved, dry and wet locations, for conductor sizes up to and including #4 AWG.
3. Type XHHW cross-linked synthetic polymer, 600 volt, UL approved, for dry and wet locations, for conductor sizes #2 AWG. and above.
4. Cross-linked synthetic polymer, XHHW, 600 volts, UL approved, for installation underground, in concrete or masonry.

5. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.
6. Wire and cable shall be factory color coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color coded and it shall be maintained throughout.
7. Systems Conductor Color Coding:
 - a. Power 480/277V, 3PH, 4W:
 - (1) Phase A = Brown
 - (2) Phase B = Orange
 - (3) Phase C = Yellow
 - (4) Neutral = White
 - b. Power 208/120V, 3PH, 4W:
 - (1) Phase A = Black
 - (2) Phase B = Red
 - (3) Phase C = Blue
 - (4) Neutral = White
 - (5) Switchlegs = Purple (Switchlegs shall also be identified separately by numerical tags).
 - (6) Travelers = Purple with Black stripe.
 - c. Ground Conductors:
 - (1) Green
 - d. Communication/Fire Alarm System:
 - (1) As recommended by the manufacturer.
8. All color coding for #8 conductor and above shall be as identified above, utilizing phase tape at each termination.
9. No conductors carrying 120 volt or more shall be smaller than #12 AWG.

F. Junction and Pullboxes:

1. For interior dry locations, boxes shall be galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.
2. For outside, damp or interior/exterior surface mounted locations, boxes shall be heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.
3. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required. Each conductor shall be terminated at an insulated, barriered terminal connector and completely identified with an engraved fiber identification marker, Electrovert or Underwriter's Safety Device Company.

G. Disconnect Switches:

1. Switches controlling or disconnecting single phase motor loads in excess of 1/3HP shall be horsepower rated and approved for motor control service. Switches shall be complete with overload device of proper motor nameplate rating, where required.
2. Disconnect (safety) switches shall be fused, heavy duty type meeting NEMA Specifications. Switches shall be provided with rejection type fuse blocks. Provide switches with the number of poles, the voltage, current and horsepower ratings as required. Provide externally operable, quickmake, quick-break type mechanism with cover interlock and padlockable in either the open or closed position. Unless indicated otherwise, provide switches indoors in NEMA Type 1 enclosure and in NEMA Type 3R rain-tight enclosure where indicated to be outdoors or weatherproof. Provide nameplate indicating equipment served. Provide unit as manufactured by Challenger or approved equal Siemens or Westinghouse.

H. Painting:

1. Junction boxes, pull boxes, etc., and conduit installed outdoors shall be painted with colors selected by the Architect to match the subject exterior surface.

I. Seismic Design and Anchoring of Electrical Equipment:

1. Seismic anchorage of electrical equipment shall conform to C.C.R. Title 24, 2016 CBC with California Amendments.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit exposed shall be galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).
2. All conduit except as hereinafter specified, installed in damp locations, hazardous locations, surface mounted up to 8'-0" above finished floor or subject to mechanical injury shall be heavy wall, threaded, galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).
3. Flexible steel conduit shall only be permitted to be used for connections to vibrating electrical equipment. All flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Use of flexible conduit shall be as approved by the Engineer.
4. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or EMT and in accordance with Article 345 of CEC and UL Information card #DYBY.
5. Conduit shall be run so as not to interfere with other piping fixtures or equipment.
6. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.
7. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.
8. PVC conduit aboveground is not permitted.
9. Where conductors enter a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.
10. Where conduit extends through roof to equipment on roof area, this Contractor shall provide 24 gauge galvanized sheet metal flashing cones with 4" flanges on roof surface. This flashing shall be delivered to the roofing contractor for installation. The actual location of all such roof penetrations and outlet shall be verified by the Contractor.
11. All conduit shall be supported at intervals not less than 6'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two hole conduit clamp properly secured.
12. Where conduit racks are used the rack shall consist of two piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.
13. Nail-in conduit supports will not be allowed. One piece set-screw type conduit clamps or perforated iron for supporting conduit will not be permitted.

14. Seismic Conduit Support:

- a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

<u>CONDUIT SIZE</u>	<u>MAXIMUM SPACING</u>
1/2" to 3" Standard incl.	6'-0"
3-1/2" to 4" Standard incl.	8'-0"

15. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.
16. Open knockouts in outlet boxes only where required for inserting conduit.
17. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or bolted to studs; on wood studs attachment shall be with wood screws, nails not acceptable.
18. All boxes shall be covered with outlet box protector, Appleton SB-CK. Keep dirt from entering box or panels. If dirt does get in, it shall be removed prior to pulling wires.
19. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover and painted as directed by the Architect with weatherproof paint to match building.
20. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.
21. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches.
22. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/rack, see note 12. Refer to note 11 for support of single conduit runs within suspended ceilings. Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system.
23. All conduit shall be installed concealed in walls or ceilings. Exposed conduit will not be permitted unless specifically approved in writing by the Architect/Engineer. When approved by the Architect/Engineer exposed conduits shall be painted to match the finish of the wall or ceiling to which it is supported to.

B. Installation of 600 Volt Conductors:

1. All line voltage wire, including control circuits, shall be installed in conduit.
2. All communications wire/cable shall be plenum rated listed for "open wiring". Communications wire/cable shall be supported by "J" hooks installed along the perimeter walls of the building or full-height interior walls.
3. All circuits and feeder wires for all systems shall be continuous from the service point to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.
4. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires. No joint shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.
5. Install UL approved, fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.

C. Joints in 600 Volt Conductors:

1. Joints in 600 volt conductors smaller than No. 4 AWG shall be made with Scotchlok spring type connectors. Wires No 4 AWG and larger shall be joined together with approved type of pressure connector and taped with #33 3M tape, three (3) layers minimum to provide insulation not less than that of conductor. Connections to switch or busbar shall be made with one-piece copper lugs. Splicing of all 600 volt or less in-line connections #2 AWG through 350 MCM shall be made with 3M brand PST connector.
2. Joints/splices shall be done in junction or pull boxes.

D. Grounding:

1. Provide grounding for entire electric installation as shown on plans and as required by applicable codes. Included as requiring grounding are:
 - a. Conduit.
 - b. Neutral or identified conductors of interior wiring system.
 - c. Non-current carrying metal parts of fixed equipment.
 2. Grounding and bonding conductors shall be sized per the latest edition of the California Code of Regulations, Title 24, State of California and CEC,
 3. Provide and install a grounding conductor in all feeder and branch circuit conduits.
 4. Where required to be installed, ground rods shall be 3/4" x 10', copper clad, installed individually or grouped as required to meet the specified resistance. Provide ground rods with all required clamps, fittings, wire and concrete boxes.
 5. Building grounding system resistance to ground shall not exceed 25 ohm.
- E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.

END OF SECTION

SECTION 28 31 00

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish and install a complete Fire-Lite MS-9600 Fire Alarm System modification as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. Include addressable duct smoke detectors, control modules, all wiring, connections to devices, outlet boxes, junction boxes, programming, and all other necessary material for a complete operating system.
- B. Scope of work includes the replacement of the existing non-addressable duct smoke detectors and associated addressable monitor modules, in the HVAC units being replaced, with new addressable duct smoke detectors. Removed devices shall be turned over to the School District in "as-found" condition.
- C. Equipment, devices, connections and wiring required for the operation and expansion of the fire alarm system, whether shown on the plans or not, shall be a part of this contract and the responsibility of this contractor to provide and install required equipment, devices, connections and wiring for a fully operable system functioning in compliance with the requirements of the Owner, DSA and the Architect/Engineer.
- D. All peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name on each component. The equipment and devices provided under this section shall match existing and be fully compatible with the existing system.
- E. The fire alarm system scope of work shall be performed by the School District's fire alarm system contractor, Advanced Alarm Co., 13128 Telegraph Rd. Suite H, Santa Fe Springs, CA 90670, (562) 944-2356.
- F. The contractor shall furnish all labor, equipment, materials, and performance of all operations in connection with the expansion of the existing Fire Alarm System as shown on the drawings and as herein specified.
- G. The contractor shall schedule a site visit with the School District Maintenance & Operations (M&O) department prior to start of the construction phase to assess the status of the existing system. The contractor shall submit a pre-construction report to the School District M&O department outlining any deficiencies found during the site visit. At the conclusion of the construction phase the existing system shall function as described in the pre-construction report.
- H. The scope of work includes re-programming the existing system as required to integrate the new system devices. All work shall be coordinated with the School District.
- I. At no time during the construction phase shall it be acceptable for the existing fire alarm system to be inoperable or not protecting the buildings connected to the fire alarm system. The contractor shall provide a 24 hours per day, seven days per week firewatch whenever the system is inoperative or shut-down for any reason. A firewatch plan to be implemented during system shut-downs or inoperable periods shall be submitted to the School District for approval prior to start of the demolition phase

1.2 CODES AND REGULATIONS

- A. 2016 California Building Code, Part 2, Title 24.
- B. 2016 California Electrical Code, Part 3, Title 24, CCR.
- C. 2016 California Mechanical Code, Part 4, Title 24.
- D. 2016 California Fire Code, Part 9, Title 24, CCR.
- E. 2016 California Referenced Standards Code, Part 12, Title 24.
- F. Public Safety, Title 19, C.C.R. State Fire Marshal regulations.

G. National Fire Protection Association Standards:

NFPA 72
NFPA 101

National Fire Alarm Code 2010 edition.
Life Safety Code 2010 edition.

H. Division of the State Architect (DSA) requirements.

I. Underwriters Laboratories Inc.

J. Americans with Disabilities Act (ADA).

K. Manufacturers Specifications.

1.3 WORK IN COOPERATION WITH OTHER TRADES

- A. Examine the Drawings and Specifications and determine the work to be performed by other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical and other systems or equipment.
- B. Provide power and control circuits, conduit and wire as indicated on the drawings as required for complete and operable systems.
- C. The electrical contractor shall be responsible for providing and installing specialty back-boxes. The electrical contractor shall patch, repair and refinish walls, ceilings or floors disturbed by the installation of the subject back boxes.

1.4 TESTING AND ADJUSTMENT

- A. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.
- B. The equipment and installation supervision furnished under this specification is to be provided by a manufacturer who has been engaged in production of this type of equipment for at least ten (10) years, and has a fully-equipped service organization within fifty (50) miles of the installation. A list of five (5) references of similar installations within fifty (50) miles of this project shall be provided upon request.

1.5 ALARM SEQUENCE

- A. The system alarm operation subsequent to the alarm activation of any automatic detection device is to be as follows.
 - 1. Audible alarm notification appliances shall sound a uniform voice evacuation signal until silenced by the alarm silence switch at the control panel or the remote annunciator.
 - 2. Visible alarm notification appliances shall flash continuously until the control panel is restored to normal status.
 - 3. The mechanical controls shall shutdown the air handling systems per life safety specification, NFPA-101.
- B. An alarm is to be displayed on the panel display per these specifications:
 - 1. The alarm LED shall flash on the control panel and the remote annunciator until the alarm has been acknowledged at the control panel or the remote annunciator.
 - 2. Once acknowledged, this same LED shall latch on.
 - 3. A subsequent alarm received from another zone after acknowledged shall flash the alarm LED on the control panel and the panel display shall show the new alarm information.
 - 4. A pulsing alarm tone shall occur within the control panel and the remote annunciator until acknowledge.

1.6 SUBMITTALS

A. General:

1. Two copies of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight copies of a complete submission.
2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.
3. The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.
4. The second section shall include a copy of the Installing Fire Alarm Contractor's valid C-10 and C-7 California State Contractors License, letters of factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.
5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.
6. The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications and current CSFM listings.
7. The fifth section shall contain voltage drop calculations for each circuit, battery calculations for the FACP and remote power supplies, sequence of operation, installation details, system/device wiring diagrams and plan/site drawings indicating equipment/device locations and interconnecting wiring.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

D. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site.

E. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval.
- B. Refer to the Fire Alarm plans for the manufacturer and type of devices to be provided.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation:

1. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of CEC - Article 760 A and C, Power-Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with CEC-Article 760 A and B. Upon completion, the contractor shall so certify in writing to the owner and general contractor
2. All junction boxes shall be sprayed red and labelled "Fire Alarm".
3. All conduit shall be painted red every ten feet to identify it as part of the fire alarm system.
4. Wiring color code shall be maintained throughout the installation.
5. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.
6. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.
7. The manufacturer's authorized representative shall provide on-site supervision of installation.

B. Testing:

1. The completed fire alarm system will be tested in accordance with NFPA 72 by the vendor, in the presence of the owner's representative and, if required, the local AHJ. A computer generated or typewritten testing report will be submitted, indicating each device tested, type of test performed, and test result. Control panels, remote processing units, and annunciators will also be tested and will list measured battery voltages with and without charger, supply voltage, and circuit breaker number and location. Handwritten reports will NOT be accepted for this final inspection report.

C. Warranty:

1. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

D. Training:

1. The Contractor shall provided four (4) hours of end user training to the district personnel after final system acceptance. Training shall be preformed by a factory trained representative of the equipment manufacture.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete sidewalks.

1.2 REFERENCES

- A. 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ACI 301 - Specifications for Structural Concrete for Buildings.
- C. ACI 117 - Standard Specification for Tolerances for Concrete Construction and Materials.
- D. ASTM A82 - Specification for Steel Wire, Plain, for Concrete Reinforcement.
- E. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- F. ASTM A184 - Specification for Fabricated Deformed Steel Bar Mats for Concrete.
- G. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- H. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- I. ASTM C33 - Concrete Aggregates.
- J. ASTM C94 - Ready Mixed Concrete.
- K. ASTM C150 - Portland Cement.
- L. ASTM C260 - Air-Entraining Admixtures for Concrete.
- M. ASTM C289 - Potential Reactivity of Aggregates.
- N. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- O. ASTM C494 - Chemical Admixtures for Concrete.
- P. ASTM C618- Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture for Concrete.
- Q. ASTM C979 - Pigments for Integrally Colored Concrete.
- R. ASTM C1116 - Specification for Fiber-Reinforced Concrete and Shotcrete.
- S. ASTM C1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- T. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- U. DSA/AC - Division of State Architect/Access Compliance.
- V. National Ready Mix Concrete Association - Plant Certification Program.
- W. Southern California Chapter, American Public Works Association - Standard Specifications for Public Works Construction.

- X. Stormwater Best Management Practice Handbook (BMP Handbook), Construction Edition, as published by the California Storm Water Quality Association.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain materials from same source throughout.

1.4 QUALIFICATIONS

- A. Manufacturer: Manufacturer of ready-mix concrete products complying with ASTM C94 requirements for production facilities and equipment. Certified according to National Ready Mix Concrete Association's Plant Certification Program.
- B. Pavement Installer: Company who has completed pavement work similar in material, design, and extent to that indicated for this project.
- C. Detectable Warning Pavement Installer: Company specializing in applying the work of this section with a minimum of 5 years experience and approved by manufacturer of the detectable warning products used.

1.5 REGULATORY REQUIREMENTS

- A. Conform to (CBC) California Building Code, (CCR) Title 24, Part 2, and the 2010 ADA Standards for Accessible Design for access requirements for individuals with disabilities.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Provide concrete curing, finishing, and waste management techniques as defined in Section 4 of the Storm Water Best Management Practice Handbook, (BMP Handbook) Construction Edition.

1.7 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Include data on joint filler, admixtures and curing compounds.
- C. Submit proposed mix design to testing laboratory and to Architect for review prior to commencement of work.
- D. Submit manufacturer's instructions under provisions of Section 01 33 00.

1.8 WARRANTY

- A. Provide five year warranty under the provisions of Section 01 77 00 for detectable warning pavement.
- B. Warranty: Shall indicate compliance with standards required by CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 12, Section 12-11B.209. Warranty coverage shall include durability criteria which indicates that the shape, color fastness, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five years after original installation. As used in this Article, "not degrade significantly" means that the product maintains at least 90 percent of its approved design characteristics, as determined by the Division of The State Architect.

2. PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150 Normal-Type I or Type II Portland type, gray color, from single source throughout project.
- B. Fine and Coarse Aggregates: ASTM C33, non-reactive when tested in accordance with ASTM C289 and Appendix X-1 of ASTM C33.

- C. Water: ASTM C1602, clean and not detrimental to concrete.

2.2 BASE MATERIALS

- A. Aggregate Base: Crushed rock conforming to Section 200-2.2 of the Standard Specifications for Public Works Construction.

2.3 FORM MATERIALS

- A. Conform to ACI 301.

2.4 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 coiled rolls or flat sheets; uncoated finish.
- C. Fabricated Bar Mats: ASTM A184; welded or clip-assembled steel bar mats of ASTM A615, Grade 60 steel bars.
- D. Tie Wire: ASTM A82, annealed steel, minimum 16 gage size.
- E. Dowels: ASTM A615; 40 ksi yield grade, plain steel, uncoated finish.
- F. Supports: Chairs, spacers, dowel bar supports and other devices for spacing, supporting and fastening reinforcing bars, welded wire fabric, and dowels in place.

2.5 ACCESSORIES

- A. Curing Compound: ASTM C309, Type 1-D, Class B.
- B. Preformed Joint: ASTM D1751, 1/2 inch thick.
- C. Joint Sealers: As specified in Section 07 92 00.

2.6 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Surface Retarder: ASTM C494, Type B or D.
- C. Fly Ash: ASTM C618, Class F.
- D. Water Reducing Admixture: ASTM C494, Type A.

2.7 FINISH MATERIALS

- A. Aggregate: Natural river gravel; smooth; 1/4 inch minimum size to 3/8 inch maximum size; clean washed type. No reactive or iron bearing aggregate permitted. Grey color from single source throughout.
- B. Slip Resistant Aggregate: 95 percent minimum fused homogeneous aluminum oxide.

2.8 CONCRETE MIX

- A. Mix concrete in accordance with ASTM C94, Alternative No. 3.
- B. Provide concrete of the following characteristics:
 - 1. Concrete Pad: Compressive strength of 3,500 psi at 28 days.
 - 2. Sidewalks, curbs, gutters and utility slabs: Compressive Strength of 2,500 psi at 28 days.

3. Slump: 4 to 6 inches.
4. Maximum aggregate size: 1 inch.
5. Cement Content: Minimum 540 lbs/cu. yd.
6. Fly Ash: Maximum 25 percent by weight.
7. Air Entrainment: 2 to 4 percent.
8. Water Cement Ratio: 0.50.

3. PART 3 EXECUTION

3.1 INSPECTION

- A. Verify compacted subgrade is ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of existing conditions.

3.2 BASE

- A. All subgrade is to be brought to optimum moisture condition and compacted to 90% relative compaction.

3.3 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of adjacent manholes, catch basins, inlets, and other fixed objects with oil to form isolation joint and prevent bond with paving.
- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.4 FORMING

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

3.5 REINFORCEMENT

- A. Place reinforcement at mid-height of slabs-on-grade.
- B. Lap adjoining pieces of welded wire fabric one full mesh and lace splice with wire. Offset laps of adjoining sheets.
- C. Place fabricated bar mats in lengths as long as practical. Overlap adjacent mat 2 inches.
- D. Interrupt reinforcement at expansion joints.
- E. Place reinforcement to achieve slab and curb alignment as detailed.
- F. Provide doweled joints at interruption of concrete with one end of dowel set in capped sleeve to allow longitudinal movement.

3.6 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Hot and Cold Weather Placement: ACI 301.
- C. Place concrete formwork on public property in conformance with applicable code.
- D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- E. Place concrete continuously between predetermined construction joints and control joints. Do not break or interrupt successive pours such that cold joints occur.
- F. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Place concrete to pattern indicated in strip sequence.

3.7 JOINTS

- A. Review locations of joints when indicated and make recommendations for any additional joints or suggestions for new locations. Lack of joints or misplacement of joints will not constitute justification of pavement cracking.
- B. Place expansion joints at not to exceed 20 foot intervals to correct elevation and profile. Align curb, gutter, and sidewalk joints.
- C. Place joint filler between paving components and building or other appurtenances. Recess top of filler for sealant placement by Section 07 92 00.
- D. Provide control joints at not to exceed 5 foot intervals.
- E. Hand tool control joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.
- F. Provide keyed joints as indicated.
- G. Finish each edge of joint with radiused jointer tool.
- H. Form isolation joints where paving abutts curbs, catch basins, manholes, inlets, structures, and other fixed objects.

3.8 FINISHING

- A. Uniformly spread, screed and consolidate concrete. Do not spread concrete by vibration.
- B. Medium Broom Finish:
 - 1. Float surface and trowel to smooth even finish.
 - 2. While surface is still plastic draw a soft fiber bristle broom uniformly over surface in perpendicular direction to traffic.
 - 3. Use for sidewalks, utility slabs which have a slope of 6 percent or less.

3.9 CURING

- A. Cure concrete surfaces in accordance with ACI 301.
- B. Apply curing compound on finished slab surfaces in accordance with manufacturer's instructions.

3.10 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 29.
- B. Owner's Inspector will take cylinders and perform slump and air entrainment tests in accordance with ACI 301 and will arrange for pick-up of cylinders by Testing Laboratory.
- C. Three concrete test cylinders will be taken for every 50 or less cu yds of each class of concrete placed each day.
- D. One slump test will be taken for each set of test cylinders taken.
- E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 TOLERANCES

- A. Provide tolerances under provisions of Section 01 43 00 in accordance with ACI 117.
- B. Maximum Variation of Surface Flatness: 1/4 inch in 10 feet.
- C. Maximum Variation from True Position: 1/4 inch.
- D. Variation of Pavement Thickness: Plus 3/8 inch, minus 1/4 inch.
- E. Maximum Variation of Pavement Joints: 1/8 inch vertical alignment.

3.12 PROTECTION

- A. Immediately after placement, protect concrete under provisions of Section 01 61 00 from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit traffic over pavement for 7 days after finishing.

END OF SECTION