PROJECT MANUAL

SESP KITCHEN REMODEL

UC Davis Health
4800 2nd Ave, Suite 3010
Sacramento, CA 95817

Taylor Design Project No. 5976.200L
UCDH Project No. 9557520
HCAI Project No. S221202-34-00

REVIEWED IN ACCORDANCE WITH THE REQUIREMENTS OF T24, CCR
APPROVED
Donald W. Harris,Sr. Architect
October 04, 2022
Department of Health Care Access and Information
FACILITIES DEVELOPMENT DIVISION

BID SET

Revised: December 15, 2023

TAYLOR design

1400 S St, Suite 100
Sacramento, CA 95811
916.238.7992

SECTION 00 01 07
SEALS PAGE

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BUEHLER ENGINEERING

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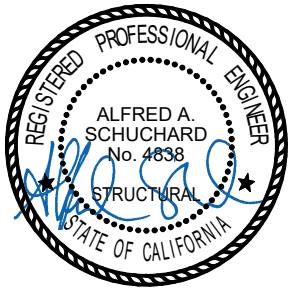
SACRAMENTO, CA 95811



MECHANICAL:

BRADEN BILL

R&A ENGINEERING SOLUTIONS

601 UNIVERSITY AVE, SUITE 255

SACRAMENTO, CA 95825

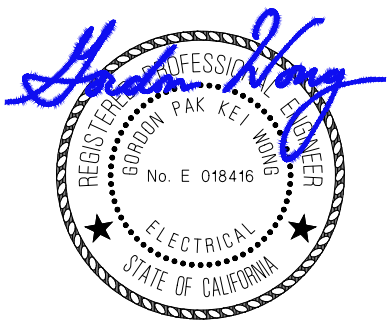
ELECTRICAL:

GORDON WONG

EDGE ELECTRICAL CONSULTING

1801 7TH ST, SUITE 150

SACRAMENTO, CA 95811



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SUMMARY OF THE WORK

PART I - GENERAL

1.01 SECTION INCLUDES

A. Description of the Work

B. Contractor Warrants

C. Contract Document Intent and Relationships

D. University Furnished/Contractor Installed Products

E. University Furnished/University Installed Products

F. Concurrent Work Under Separate Contracts

G. Site Condition Survey and Protection of Existing Improvements

H. Contractor Use of Site and Premises

I. University Beneficial Occupancy (if applicable)

J. Project Phasing (if applicable)

1.02 DESCRIPTION OF THE WORK

A. Project is titled: SESP KITCHEN REMODEL; SESP BASEMENT FOOD KITCHEN CONFIG FOR ROOM SERVICE

B. University Project No.: M052923

C. Project is located at (2315 Stockton Blvd., UC Davis Health, Sacramento, CA, 85917, as shown on the vicinity map.

D. Project Scope:

Multi-Phased food service equipment replacement for the existing kitchen located in the SESP (Surgical & Emergency Services Pavilion) Building. Remodel of approximately 5,000 SF within a fully operational kitchen to accommodate a “Room Service” food delivery model including reconfiguration and replacement of food service equipment and supporting utilities. Multi-Phasing allows for kitchen to operate during construction.

E. Refer to contract drawings for the description of work, areas of work per each phase, types of construction and general nature of the Work. Refer to below subsection 1.11 for phased work details:

F. Build-out as shown and herein specified, complete and ready for occupancy, the following renovation of occupied kitchen facility shown on the Contract Documents.

G. Special Constraints and Criteria:

1. Refer to below subsection 1.11 and Section 011400 Work Restrictions for dates and hours when the building is occupied and operational, work-shift hour requirements and other work restrictions.

2. Noise Mitigation shall be required when the building is occupied.

3. Public egress shall not be restricted or impacted unless scheduled when the building is not occupied.

1.03 CONTRACTOR WARRANTS

A. Contractor warrants that it is skilled and experienced in the use and interpretation of Contract Documents such as those included in the bid documents for this Contract. The Contractor further warrants that it has carefully reviewed the Contract Documents for this Work and has found them to be free of ambiguities and sufficient for bid purposes.

B. Contractor warrants that it has inspected the Project Site and based on these observations, has satisfied itself as to the nature and location of the Work; and any special conditions likely to be encountered at the site which may affect the performance of the Work.

C. Contractor warrants that its bid is based solely on the Contract Documents provided, its own observations, and written explanations and interpretations obtained from University's Representative and not on any explanation or interpretation, oral or written, from any other source.

1.04 CONTRACT DOCUMENT INTENT AND RELATIONSHIPS

A. Contract Documents Intent: Provide all labor, material, equipment, tools, transportation, insurance, services, and all other requirements necessary to construct the project described in the Contract Documents.

B. Relationship of Contract Documents: Drawings, Specifications and other Contract Documents in the Contract are intended to be complementary. What is required by one shall be as if required by all. What is shown or required, or may be reasonably inferred to be required, or which is usually and customarily provided for similar work, shall be included in the Work. For example, the drawings may not show every variation of an anchor clip that is required to support a curtain wall from its structural support; it can be reasonably inferred that variations of or additions to these clips are necessary to complete the installation of the working system and therefore all such clips are understood to be included in the Work.

C. Discrepancies in Contract Documents: In the event of error, omission, ambiguity, or conflict in the Contract Documents, Contractor shall bring the matter to University's Representative's attention in a timely manner, for University's Consultant's determination and direction in accordance with provisions of the General Conditions of the Contract.

D. Bidding and Contract requirements: Information for bidding, Conditions of the Contract and other Contract documents will be produced by University and may be included in the Contract Documents for convenience. Such documents are not Specifications. Specifications are found in Divisions 1 through 48 of the Contract, as listed in the Table of Contents of the Contract.

E. Contract Drawings: The Drawings provided with and identified in the Contract are the Drawings referenced in the Agreement.

1. Drawings produced for this project may encompass Civil, Landscape, Architectural, Structural, HVAC, Plumbing, Piping, Fire Protection, and Electrical portions of the Work. Interior Design drawings may also be provided for product selection and installation information.

2. The location, extent and configuration of the required construction and improvements are shown and noted on the Drawings. A list of Drawings is included in the Contract Documents.

3. Drawings are arranged according to design discipline. Such organization and all references to trades, subcontractor, specialty contractor or supplier shall not control the Contractor in dividing the work among subcontractors or in establishing the extent of the work to be performed by any trade.

4. Where the terms "as shown", "as indicated", "as noted", "as detailed", "as scheduled" or terms of like meaning, are used in the Drawings or Specifications, it shall be understood that reference is being made to the List of Drawings and the Specifications as bound in the Contract Documents.

5. Where reference to the word "plans" is made anywhere in the Drawings, Specifications and related Contract Documents, it shall be understood to mean the Drawings listed in the List of Drawings.

F. Contract Specifications: The Specifications provided as a part of the Contract Documents are the Specifications referenced in the Agreement.

1. The Specifications are organized by Division and Sections in accordance with recommended practice of the Construction Specifications Institute. Such organization shall not control Contractor in dividing the work among subcontractors or in establishing the extent of the work to be performed by any trade.

2. Specifications are included in the Contract, which also includes other Bidding and Contract Documents. Contents of the Contract are listed in the TABLE OF CONTENTS.

3. Information for bidding, Conditions of the Contract and other Contract documents will be produced by University. Such documents are not Specifications. Specifications are found in Division 1 through 48 of the Contract.

1.05 UNIVERSITY-FURNISHED, CONTRACTOR-INSTALLED (UFCI) PRODUCTS

A. University-Furnished Products: University will furnish, for installation by Contractor products which may be identified on the Drawing and in the Specifications as UFCI (University-Furnished/ Contractor -Installed).

1. Refer to Food Service “FS” drawings food service equipment schedules.

B. Relationship to Work Under the Contract: Work under the Contract shall include all provisions necessary to fully incorporate such products into the Work, including, as necessary but not limited to: fasteners, backing, supports, piping, conduit, conductors, and other such provisions from point of service to point of connection, and field finishing, as shown on the Drawings and/or Specified herein. See Section 013100 - COORDINATION for additional requirements.

1.06 UNIVERSITY-FURNISHED, UNIVERSITY-INSTALLED (UFUI) PRODUCTS

A. University-Furnished Products: University will furnish and install products which may be identified on the Drawing and in the Specifications as UFUI (University-Furnished/University-Installed).

1. Refer to Food Service “FS” drawings food service equipment schedules.

B. Relationship to Work Under the Contract: Work under the Contract shall include all provisions necessary to provide all rough-in requirements into the Work, including as necessary but not limited to fasteners, backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection, and field finishing, as shown on the Drawings and/or specified herein. See Section 013100 - COORDINATION for additional requirements.

1.07 CONCURRENT WORK UNDER SEPARATE CONTRACTS

A. Work Under Separate Contracts: University will award separate contracts for the following work and other work as may be indicated on the Drawings as NIC (Not in Contract), including the following:

1. Multiple Vendors refer to “FS” drawings food service equipment schedules.

B. Relationship to Work Under the Contract: Work under the Contract shall include all provisions necessary to make such concurrent work under separate contracts complete in every respect and fully functional, including field finishing. Provide necessary backing, supports, piping, conduit, conductors, and other such provisions from point of service to point of connection for additional requirements.

C. Related Contract Documents: University will make available, in a timely manner, Contract Documents of work under separate contracts for coordination and further description of that work. Such drawings and other data required for the coordination of the work of separate contracts with the Work of this Contract may be included with the Contract Documents. If so, they are provided for convenience only and are not to be considered Contract Documents.

1.08 SITE CONDITION SURVEY & PROTECTION OF EXISTING IMPROVEMENTS

A. Site Condition Survey: Prior to commencing work, the Contractor University's Representative and other University representatives shall tour the Project site together to examine and record the existing condition of site, adjacent buildings, and improvements. This record shall serve as a basis for determination of damage (if any) due to the construction process. The record shall be signed by all parties participating in the tour.

B. Protection of Existing Improvements: Locate all known existing utilities prior to proceeding with construction. Existing utilities shall be kept in service where possible

and protected by the Contractor from damage. If any structure or utility is damaged, take immediate action to ensure the safety of persons and University property and effect repair. If previously undiscovered structures or utilities are encountered, request University's Representative to provide direction on how to proceed with the work. Cracks, sags or damage to adjacent structures or improvements not noted in the original survey shall be reported to University's Representative.

C. University does not normally charge for its shutdown support services. However, if poor planning or execution of a shutdown by Contractor causes excessive time and effort for University, University reserves the right to back charge Contractor for additional work.

1.09 CONTRACTOR USE OF SITE AND PREMISES

A. Site Access: Limit access to site as indicated on the drawings. If routes and access points are not indicated, access shall be as directed or approved by University's Representative.

B. Hours of Operation: Except for Phasing Plan 2A, 2B and 3, construction activities are limited to the hours of 7:00 a.m. to 5:00 p.m., Monday through Friday. Prior University approval is required for Contractor construction work at any other time or day.

C. Construction Limit: Limit construction activities to areas indicated on Drawings as Project Area or, if not indicated, to areas immediately adjacent to buildings and as necessary for immediate construction or utility services and sitework, See Section 015100 - TEMPORARY UTILITIES for additional requirements.

D. Utility Outages and Shutdowns: Schedule utility outages and shutdowns to times and dates acceptable to University's Representative. Duration of outages and shutdowns shall not hinder University normal business operations. Provide fourteen (14) calendar days' notice of all utility outages and shutdowns.

1.10 UNIVERSITY BENEFICIAL OCCUPANCY

A. The following portions of the Work are designated for occupancy by University as indicated.

1. Areas shown in Phase1, Phase2A, Phase2B and Phase3. Refer to below section 1.11 and drawing G-701.

1.11 PROJECT PHASING

A. The WORK OF THIS contract is divided into four (4) Phases.

1. Phasing Plan 1 "Phase1": Work performed Mon-Fri during standard shift. See F1/G-701. Work of Phase1 must be completed prior to start of Phase 2A.

2. Phasing Plan 2A "Phase2A": Refer to F5/G-701.All equipment, materials and manpower required for Phase2A shall be received and confirmed prior to start of work. Phase2A Work performed 24/7 (3 shifts Mon-Sun.) with maximum duration of 14 calendar days (day 13 is punch list/punch list corrections and day 13 is HCAI field officer inspection/acceptance). Phase2A liquidated damages are $1,200/calendar day.

3. Phasing Plan 2B "Phase2B": Refer to A1/G-701. All equipment, materials and manpower required for Phase2B shall be received and confirmed prior to start of

work. Phase2B Work performed 24/7 (3 shifts Mon.-Sun.) with maximum duration of 14 calendar days (day 13 is punch list/punch list corrections and day 13 is HCAI field officer inspection/acceptance). Phase2B liquidated damages are $1,200/calendar day.

4. Phasing Plan 3: Refer to A5/G-701. All equipment, materials and manpower required for Phase3 shall be received and confirmed prior to start of work. Phase3 Work performed 24/7 (3 shifts Mon.-Sun.) with maximum duration of 14 calendar days (day 13 is punch list/punch list corrections and day 13 is HCAI field officer inspection/acceptance). Phase3 liquidated damages are $1,200/calendar day.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not applicable to this Section

END OF SECTION 01 11 00

SECTION 01 14 00

WORK RESTRICTIONS

PART I - GENERAL

1.01 WORK HOURS

A. Refer to Summary of Work, section 011100, subsection 1.11

1.02 PROJECT PHASING

A. Refer to Summary of Work, section 011100, subsection 1.11

1.03 WORK SEQUENCE and WORK RESTRICTIONS

A. Refer to Summary of Work, section 011100, subsection 1.11

1.04 CONTRACTOR'S USE OF PROJECT SITE

A. UCDH campus and Main Hospital are occupied and operational 24 hours per day, 7 days per week, 365 days of the year.

B. CONTRACTOR's use of the Project site for the Work is restricted to the areas designated on the Drawings and as described in below subsection 1.10. Contractor shall provide offsite storage for the duration of the project.

1.05 UNIVERSITY OCCUPANCY

A. Refer to Summary of Work, section 011100, subsections 1.10 and 1.11

1.06 SUBSTANTIAL COMPLETION

A. Substantial Completion shall be applicable to the entire Work.

1.07 PROTECTION OF PERSONNEL

A. Patients, University of California Davis (UCD) personnel and Students, will be occupying parts of the adjacent buildings during the construction period. CONTRACTOR shall take proper precautions to ensure the safety of all persons during the construction period.

1.08 WORK SITE DECORUM

A. Extreme care to limit noise shall be taken at all times that the building is occupied. Loud or unnecessary conversation shall be avoided. The playing of radios, or any audio devices shall be strictly prohibited. Noise, that in the sole opinion of the University's Representative, is disturbing or disruptive to occupants of the building shall be scheduled for periods when the building is not occupied.

B. CONTRACTOR shall control the conduct of its employees so as to prevent unwanted

interaction initiated by CONTRACTOR's employees with UCD staff, patients, students or other individuals, adjacent to the Project site. Without limitation, unwanted interaction by CONTRACTOR's employees includes whistling at or initiating conversations with passersby. In the event that any CONTRACTOR's employee initiates such unwanted interaction, or utilizes profanity, CONTRACTOR shall, either upon request of University's Representative or on its own initiative, replace said employee with another of equivalent technical skill, at no additional cost to the University.

C. SMOKE AND TOBACCO-FREE ENVIRONMENT: The University of California Davis is committed to a healthy campus and workplace culture and environment. Effective January 2, 2014, the University of California Davis is a Smoke and Tobacco-Free environment. Smoking and the use of smokeless tobacco products (e.g., e-cigarettes and other unregulated nicotine products) is strictly prohibited on all University of California Davis-controlled properties, owned or leased and regardless of location. This policy is intended to provide a healthier, safer, and productive work and learning environment for the entire University of California Davis community. For more information on the Smoke/Tobacco-Free Policy, please visit (http://breathefree.ucdavis.edu). For more information on the President's Mandate and other related resources, please visit http://uctobaccofree.com/.

D. Alcoholic beverages are prohibited on the University's Project site.

1.09 INTERRUPTION OF BUILDING SERVICES

A. Planned utility service shutdowns shall be accomplished during periods of minimum usage. In some cases, this will require Work activities before 8:00 a.m. and after 5:00 p.m. and weekend Work, at no additional cost to the University. At least 14 calendar days advance notice shall be given to the University's Representative before interruptions to utility service (refer to Utility Service Interruption/Shut Down Request) and other interferences with use of existing buildings, surrounding hardscape and roads.

B. Shutdowns critical to the completion of the project shall be listed as Milestones on the project schedule. The CONTRACTOR shall program. Work so that service will be restored in the minimum possible time and shall cooperate with the University in reducing shutdowns of utility systems.

C. The University reserves the right to deny shutdown requests based on scheduled workload, research projects, and usage of surrounding buildings or other activities planned on campus.

D. University's costs for initial planned utility service shutdowns shall be borne by the University. If repeat utility service shutdowns are required due to work necessary to correct CONTRACTORs defective work, mistakes in new work layout such as misalignment or installation conflicts with other new work, University's costs for repeat shutdown(s) will be deducted from Contract Sum.

1.10 SITE INGRESS AND EGRESS

A. Access to Project site shall be from east end of Main Hospital loading dock, down Elevators C or D to ground floor and restricted to corridors between elevators and project site (e.g. 0781, 0780, 0704, 0700B and 0700C). Access to Project site is limited to designated routing on existing access roads. The CONTRACTOR and their employees, subcontractors, suppliers or delivery personal must stay on the designated access

pathways and/or roads and may not drive, ride or walk to other locations unless prior permission is provided in writing by the University's Representative.

B. CONTRACTOR shall take all necessary precaution to ensure the safety of the bicyclists and pedestrians that use the campus roads.

C. CONTRACTOR shall clean the site access and roads affected by the Work and shall maintain such in a dust free and safe and usable condition for motorists, bicyclists and pedestrians. During inclement weather CONTRACTOR shall closely monitor conditions to prevent slickness of roads.

D. CONTRACTOR shall be permitted to block only 1/2 of a street at a time for momentary site access, unless specified otherwise. The street shall be operational and usable by the University at all times.

1.11 MOTOR VEHICLE AND BICYCLE TRAFFIC CONTROL

A. CONTRACTOR shall adopt all practical means to minimize interference to traffic. Access to other facilities in the area shall be maintained at all times. The CONTRACTOR shall provide a schedule of any activity that will impact traffic, or any planned lane or street closure, for approval by the University's Representative and shall give a minimum of 14 business days notice before closing any street or access.

B. CONTRACTOR shall furnish at CONTRACTOR's expense all signage barricades, lights, and flaggers required to control traffic and shall provide and maintain suitable temporary barricades, fences, directional signs, or other structures as required for the protection of the public; and maintain, from the beginning of twilight through the whole of every night on or near the obstructions, sufficient lights and barricades to protect the public and Work.

C. CONTRACTOR shall provide directional signs for use throughout the duration of the Project. The quantity shall be determined by the University's Representative and CONTRACTOR during a mandatory Pre-construction site meeting. CONTRACTOR shall prepare a mock-up of the sign for approval by the University's Representative.

D. It is the responsibility of the CONTRACTOR performing Work on, or adjacent to, a roadway or highway to install and maintain such devices which are necessary to provide reasonably safe passage for the traveling public, including pedestrians and bicyclists, through the Work, as well as for the safeguard of workers. Before Work begins, a site meeting shall be held to discuss motor vehicle and bicycle traffic control plans for handling traffic through a construction or maintenance zone. Traffic control plans shall be submitted for review by the University's Representative and public agency or authority having jurisdiction over the roadway or highway. These traffic control plans shall be prepared by persons knowledgeable about the fundamental principals of temporary traffic controls and the work activities to be performed. The design, selection, and placement of traffic control devices for the traffic control plan shall be based on engineering judgment and in accordance with Part 6 of the California Manual on Uniform Traffic Control Devices for Streets and Highways.

E. Sidewalk closures shall be per the current Policy of Department of Transportation, City of Sacramento. https://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Publications/Maintenance/Sidewalk-Closure-Policy.pdf?la=en

F. All metal plating and metal bridging shall be non-skid with waffle-patterns or right-angle undulations or shall be coated with a non-skid product. Plating shall be installed with no protruding edges or corners sticking up and with no bouncing or shifting.

PART II - PRODUCTS – Not applicable to this Section.

PART III - EXECUTION – Not applicable to this Section.

END OF SECTION 01 14 00

SECTION 01 22 00

ALLOWANCES

PART I - GENERAL

1.01 GENERAL

A. The Contract Lump Sum Base Bid as entered in Article 4.0 of the Bid Form shall include the amounts for all Allowances required in this section and elsewhere in the Contract Documents. All Allowances shall be provided by the Contractor for the amounts indicated.

B. The following shall apply to the Allowances, unless otherwise indicated in the Contract Documents:

1. Allowance amounts shall be for the full amount of compensation, both direct and indirect, and contain all overhead costs including but not limited to supervision, support, taxes, bonds, insurance, and profit.

2. Allowances shall be for complete compensation to the Contractor for all materials and equipment delivered at the Project site, including all overhead, taxes, insurance, shipping, and handling.

3. Allowances shall be for complete compensation to the Contractor for all labor amounts and shall include all overhead, supervision, support, tools and equipment to perform the work directed by the University's Representative.

4. Allowances for tradesmen in labor amounts will be utilized and directed by the University's Representative. These amounts are for work not included in the scope of the contract documents and are solely for the use and direction by the University's Representative

5. Upon project closeout, adjustments for any remaining quantities of the amounts included in the Allowances will be deleted from the contract sum on a per unit basis.

1.02 DESCRIPTION OF ALLOWANCES

A. Contractor shall provide $1,630,200 for replacement of the Kitchen's main dishwasher and pot machine/monsoon dishwasher equipment (see Bid Memo for scope of work) for allowance to be included in the Lump Sum Bid of the Contract.

PART II – PRODUCTS – Not Applicable to this section.

PART III – EXECUTION – Not Applicable to this section.

END OF SECTION 01 22 00

SECTION 01 25 00

CLARIFICATION/INFORMATION PROCEDURES

PART I - GENERAL

1.01 DESCRIPTION

A. This Section contains the procedures to be followed by Contractor for submitting a Request for Information (RFI) upon discovery of any apparent conflicts, omissions, or errors in the Contract Documents or Drawings or upon having any question concerning interpretation.

B. Section Includes

1. RFI Administrative requirements

2. RFI Procedures

3. RFI Execution

1.02 RELATED DOCUMENT SECTIONS

A. Conditions of the Contract: Governing requirements for changes in the Work, in Contract Sum and Contract Time.

B. Section 016100 – PRODUCT REQUIREMENTS: Product options, substitutions, omissions, and improper descriptions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Description: Section provides procedure for Contractors to obtain interpretation or clarification of the Contract Documents, or identify apparent conflicts, omissions, or errors in the Contract Documents.

B. Responsible Person for Contractor: Submit name of the individual authorized to receive Requests for Information documents, and who is responsible for forwarding Request.

C. RFI Format: Submit all Requests for Information on the form attached at the back of this Section, or electronic and/or web-based construction administration software provided or accepted by the University.

1.04 RFI PROCEDURES

A. RFI Format, Numbering and Subject:

1. RFI Format: Submit all requests for clarification or additional information in writing to University's Representative using the RFI Request for Information form provided at the back of this Section or obtained from University's Representative.

2. RFI Numbering: Number RFIs sequentially. Follow RFI number with sequential alphabetical suffix for resubmissions. For example, the first RFI is numbered "001". The second RFI is numbered "002" and so on. The first resubmittal of RFI "002" will be numbered "002a".

3. RFI Subject: Limit each RFI to one (1) subject only.

B. RFI Submittal conditions:

1. Discovery of unforeseen condition or circumstance not described in the Contract Documents.

2. Discovery of an apparent conflict, discrepancy, or inconsistency in or between portions of the Contract Documents.

3. Discovery of a situation, direction or apparent omission that cannot be reasonably inferred from the intent of the Contract Documents.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 EXECUTION OF RFI's

A. Email the University's Representative the RFIs. Emailed RFI requests received after normal business hours and/or received on non-normal workdays, as defined in Specification Section 013100–COORDINATION, Item 1.07.F.4.A will begin notification time starting at 7:00 a.m. the following workday.

B. Failure to provide proper information: RFIs will not be recognized or accepted if, in the opinion of University's Representative, one of the following conditions exist:

1. Contractor submits the RFI as a request for substitution.

2. Contractor submits the RFI as a Submittal.

3. Contractor submits the RFI as a Contract Document discrepancy or omission without through review of the Documents (Capricious submission).

4. Contractor submits the RFI assuming portions of the Contract Documents are excluded or by taking an isolated portion of the Contract Document in part rather than in whole.

5. Contractor submits the RFI in an untimely manner without proper coordination and scheduling of Work of other Trades.

C. Response Time: Request clarifications or information immediately upon discovery of need. Submit RFI's in a timely manner allowing full response time to avoid impacting Contract Schedule.

1. University's Representative, whose decision will be final, shall resolve issues and respond to questions of Contractor, in most cases, within fourteen (14) calendar days. Actual time may be lengthened for complex issues, or shortened for expedited situations, as mutually agreed in writing.

2. After submission of an RFI by Contractor and prior to receipt of the RFI response from University, the Contractor proceeds with effected Work at own risk. Any portion of the Work not constructed in accordance with University interpretation, clarification, instruction or decision is subject to removal and replacement at Contractor expense.

D. Failure to Agree: In the event of failure to agree to the scope of the Contract requirements, Contractor shall follow procedures set forth in Article 4 of the General Conditions of the Contract.

3.02 Refer to the following Attachment

A. Request for Information

END OF SECTION 01 25 00

REQUEST FOR INFORMATION

Project #: _____ **Project Title:** _____

RFI #: _____ **Date:** _____ **HCAI #:** _____

UC Davis Health Facilities Design & Construction 4800 2nd Avenue, Suite 3010, Sacramento, CA 95817 **Attn.: Project Manager** P: 916-734-#### C: ###-###-#### Email: ########@ucdavis.edu	From:	

SUBJECT: _____

SPEC SECTION/DRAWING #: _____ **PARA:** _____ **DETAIL:** _____

RM # _____ **GRID #** _____

TRANSMITTAL RECORD	Requestor to FD&C	FD&C to A/E	A/E to FD&C	FD&C to Requestor	Notes
Date Submitted					

INFORMATION NEEDED: _____

CONTRACTOR'S PROPOSED RESOLUTION: _____

REQUESTOR SIGNATURE: _____ **REPLY REQUIRED BY:** _____

☐ **ATTACHMENTS:** _____

REPLY: _____

REPONDER SIGNATURE: _____ **DATE:** _____

UNLESS OTHERWISE INDICATED ABOVE, THE REPLY TO THIS RFI IS NOT INTENDED TO BE A CHANGE DIRECTIVE. SHOULD THE CONTRACTOR, SUBCONTRACTOR, OR SUPPLIERS FEEL THAT THE REPLY WILL IMPACT THE PROJECT COST OR SCHEDULE; IT SHOULD IMMEDIATELY BE CONVEYED TO THE UNIVERSITY'S FD&C PROJECT MANAGER IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

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SECTION 01 25 50

CONTRACT MODIFICATION PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Change Order Administrative Requirements

B. Documentation of Change in Contract Sum and Contract Time

C. Change Procedures

D. Field Orders

E. Stipulated Sum Change Orders

F. Unit Price Change Orders

G. Time and Material Change Orders

H. Cost Proposals and Supporting Documentation

I. Execution of Change Orders

J. Reconciliation of Change Orders

1.02 RELATED DOCUMENT SECTIONS

A. General Conditions of the Contract: Governing requirements for changes in the Work, in Contract Sum and Contract Time.

B. Section 012500 – CLARIFICATION/INFORMATION PROCEDURES

C. Section 012900 – MEASUREMENT AND PAYMENT: Applications for Payment.

D. Section 016100 – PRODUCT REQUIREMENTS: Product options, substitutions, omissions, and improper descriptions.

E. Section 017700 – CLOSEOUT PROCEDURES: Project record documents.

1.03 DEFINITIONS

A. Total Wage Rate: Base rate paid to the worker, including his/her fringe benefits, workman's compensation insurance and subsequent payroll taxes paid by the employer.

1. Use Wage Rate Calculator issued with Division One.

2. Projects in the University Controlled Insurance Program (UCIP) should not include workman's compensation in the wage rates.

B. Consumables: Material purchased in bulk and not expressly accounted for in the listed materials on a change order request. These include but are not limited to, rags, washers, screws, nuts, small bolts, lubricants, cleaning materials, pens, chalk, pencils, tie wire, caution tape, etc. Compensation for consumables shall be incorporated as a 3% percentage increase on direct material costs for trades where these items are routinely used.

C. Non-working Supervision: Non-working supervision is not allowed to be included on a change order per GC article 7.3.3.

1.04 SUBMITTALS

A. Submit the items listed below prior to submitting the 2nd Application for Payment.

1. Total Wage Rates: Provide a wage rates for each key worker of the General Contractor and all Subcontractor tradespeople using the University's digital form for review and in compliance with the general conditions article 7 for approval by the University. Approved rates will be used in the Exhibit 7 Labor Rate Breakdown forms submitted with each Cost Proposal.

1.05 CHANGE ORDER ADMINISTRATIVE REQUIREMENTS

A. Responsible Person for Contractor : Submit name of the individual authorized to receive construction change documents, and who is responsible for informing others in Contractor's employ of subcontractors of changes in the work.

B. Exhibit 7 of the Contract includes the following Forms:

1. COST PROPOSAL Form

2. SUPPORTING DOCUMENTATION FOR THE COST PROPOSAL SUMMARY Form

3. CHANGE ORDER Form

4. REPORT OF SUBCONTRACTOR INFORMATION Form

1.06 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Documentation of Changes in Contract Sum and Contract Time: Provide full information required for evaluation of proposal, of proposed changes and to substantiate costs of changes in the Work.

1. Maintain detailed records of Work completed on time and material basis.

2. Document each quotation for a change in Contract Sum and Contract Time with sufficient data to allow evaluation of the quotation.

B. Additional Data: Upon request, provide additional data to support computations.

1. Quantities of products, labor, and equipment.

2. Taxes, insurance, and bonds.

3. Overhead and profit.

4. Justification for change in Contract Time, if claimed.

5. Credit for deletions from Contract, similarly documented.

1.07 CHANGE PROCEDURES

A. University's Supplemental Instructions: Minor changes in the Work, not involving adjustments to the Contract Sum or Contract time, as authorized by the General Conditions of the Contract, may be presented using Supplemental Instructions or correspondence containing similar information.

B. University Initiated Changes: A Request for Proposal may be issued by University's Representative, which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications.

1. The Request for Proposal may include an estimate of additions or deductions in the Contract Sum or Contract Time for executing the change and may include stipulations regarding overtime work and the period of time the requested response from the Contractor shall be considered valid.

2. Contractor shall prepare and submit a response to the Request for Proposal within fourteen (14) calendar days.

C. Contractor initiated Changes: Contractor may propose a change by submitting a request for change to University's Representative, describing proposed change and its full effect on the Work.

1. Include statement describing reason for change, and full description of effects on Contract Sum, Contract Time, related Work and work being performed under separate contracts.

2. Requests for substitutions shall be included under this category, with procedures as specified in Section 016100 – PRODUCT REQUIREMENTS.

1.08 FIELD ORDER

A. Field Order: University's Representative may issue a Field Order, signed by University's Representative, instructing the Contractor to proceed immediately with a change in the Work, for subsequent inclusion in a Change Order.

1. The document will describe changes in the Work, and will designate the method of determining what, if any, change is due in the Contract Sum or the Contract Time.

2. Promptly execute the change in the Work indicated in the Field Order prior to acceptance of a Cost Proposal for the Work by the University.

B. Cost and Time Resolution: Costs and time adjustments for changes in the Work shall be per provisions of the General Conditions of the Contract, unless otherwise agreed to prior to issuance.

1.09 CHANGE ORDERS

A. Stipulated Sum Change Orders: Contractor 's response to Request for Proposal or Field Order will be considered and a mutually acceptable adjustment in Contract Sum and Contract Time will be determined. Change Order for this stipulated amount will be prepared by University's Representative for execution by University and Contractor.

B. Unit Price Change Order: Change Order will be prepared by University's Representative for execution by University and Contractor, based on mutually acceptable quantities and pre-determined unit prices.

1. For unit cost or quantities not pre-determined, the Work shall be accomplished under a Stipulated Sum Change Order, if there is no dispute over the estimated or stipulated maximum cost and time for the change.

2. If the amounts are not defined or are disputed, a Field Order will be prepared and issued by University's Representative.

C. Time and Material Change Orders: As directed for changes for where amounts are not defined or are disputed, Contractor shall execute the Work, keeping accurate records of time, both labor and calendar days, and cost of materials.

1. Contractor shall prepare and submit an itemized account and supporting data after completion of the change, within the time limits indicated in the Conditions of the Contract.

2. University's Representative will determine the change allowable in Contract Sum and Contract Time, as provided elsewhere in the Contract Documents, and make recommendation to University for acceptance of Change Order.

3. Contractor shall provide full information as required and requested for evaluation of proposed changes, and to substantiate costs for changes in the Work.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 CONTENT OF COST PROPOSALS

A. Cost Proposals shall include the following:

1. Detailed description of the work involved including:

a. What work is being performed?

b. Where the work is performed?

c. When the work was performed if already completed?

d. When the work is scheduled to be performed if not yet completed?

e. Why this work is a change to the contract?

2. Detailed description of any time impacts associated with the work; refer to General Conditions, paragraph 8.4.

3. Materials

a. Material shall be submitted at the cost paid by the contractor.

1) Invoices may be required to validate that meet the following criteria:

a) Invoices may be from different projects if the following conditions are met:

(1) The COR is before the contractor would reasonably have the material on site to accomplish the COR.

(2) Recent, within last 6 months.

(3) There must be at least enough of the material in question to accomplish the work in the proposed COR.

b) The invoice shall not be modified from the version provided by the vendor.

4. Labor unit breakdown backed up by some sort of industry standard (NECA for electrical, MCAA for plumbing and mechanical, SMACNA for mechanical, Etc.) These standards shall be used at their base rate, with no added percentages nor adjustments. This has been found to be a fair representation of the man-hours required to do these types of work.

a. This project has been determined as NECA normal.

5. Wage rate back up matching the submitted back up as described in 1.03.A.

B. Submittal of a Cost Proposal using the Cost of the Work plus Contractor Fee described in General Conditions paragraphs 7.3.5 and 7.3.6 shall include the following items in addition to those listed above:

1. Field Order instructing the change. Only a field order may instruct work to be completed using this basis.

2. Material invoices shall be provided for any item used in Extra Work.

3. Job site work tags identifying daily labor and material usage shall be submitted with:

a. Specific description of the work performed on that tag.

b. Identification of large equipment used

c. Identification of labor class for each individual

d. Location - room number, gridline or distinct location.

e. Signed by the Contractor and University’s Representative.

C. Any coordination required for implementation of a change into the work, documents, or model is and shall be considered part of the allowable markups provided in General Conditions paragraphs 7.3.3.1-18 and 7.3.4.

3.02 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: After the University’s Representative has accepted the Change Order Proposal; the University's Representative shall prepare Change Order documents for signature by parties as provided in the Conditions of the Contract.

3.03 RECONCILIATION OF CHANGE ORDERS

A. Schedule of Values: Promptly revise the Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjustment to the Contract Sum.

B. Schedules: Upon completion of the Change Order, promptly revise progress schedules to reflect changes in Contract Time, revising sub-schedules to adjust time for other items of Work as may be affected by the change. Submit revised schedules with next Application for Payment.

END OF SECTION 01 25 50

SECTION 01 29 00

MEASUREMENT AND PAYMENT

PART I - GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and presentation of Application for Payment.

B. Procedures for preparation and presentation of Schedule of Values.

1.02 RELATED DOCUMENTS AND SECTIONS

A. GENERAL CONDITIONS of the Contract: Progress Payments and Final Payment.

B. Section 013200 – CONTRACT SCHEDULES

C. Section 017700 – CLOSEOUT PROCEDURES

D. Section 017800 – CLOSEOUT SUBMITTALS

1.03 PAYMENT APPLICATION FORM

A. Payment Application Form: Prepare Applications for Payment using Exhibit 4 provided in the Contract.

1.04 SCHEDULE OF VALUES

A. Coordination. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Contract Schedule and as directed by the University's Representative.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

a. Contractor's Contract Schedule.

b. Application for Payment form.

c. List of Subcontractors.

d. List of products (where/if appropriate).

e. List of principal supplier and fabricators.

f. Submittal Schedule

g. Construction Cost Breakdown Sheet.

2. Submit the Schedule of Values to the University's Representative at the earliest feasible date, but in no case later than 7 calendar days before the date scheduled for Submittal of the Initial Application for Payment.

B. Format and Content. Use the Specification Table of Contents as a guide to establish the format for the Schedule of Values.

1. Include the following Project identification on the Schedule of Values:

a. Project name and location.

b. Name of the University's Representative.

c. Project Number.

d. Contractor's name and address.

e. Date of Submittal.

2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:

a. Generic name.

b. Performance Specification or University Specification section.

c. Name of Subcontractor.

d. Name of manufacturer or fabricator.

e. Name of supplier (if appropriate).

f. Change orders (number) that have affected value.

g. Dollar value. (Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.)

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.

4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.

5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

    a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Contractor's General Conditions overhead and profit shall be a separate line item per month.

8. Allowances (if applicable). Show the line item value of allowances.

1.05 PREPARATION OF APPLICATIONS

A. Preparation of Applications for Payment: The following requirements supplement the provisions of the General Conditions of the Contract. Refer to the GENERAL CONDITIONS OF THE CONTRACT.

1. Present required information in PDF electronic file on the required forms. Media-driven forms are acceptable.

2. Execute certification by verified electronic signature of authorized officer of the Contractor.

3. Use data from the approved Schedule of Values. Provide dollar value in each column of application for each line item and portion of Work performed and for products stored, if permitted.

    a. List value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for progress Payments. Round off values to nearest dollar. Listed items of work shall be identified by Specification Section number.

    b. List products and operations of each major subcontract as separate line item.

    c. Include Work Allowances (if any) within line item of Work.

d. Coordinate percentage complete with Progress Schedule.

e. Provide separate line items for each area of work such as but not limited to floors, zones, wings, or other areas that can be clearly identified.

f. The sum of values listed shall equal total Contract Sum.

4. List each authorized Change Order as an extension on the continuation sheet, listing the Change Order number and dollar value as for an original item of Work. Change Order shall be broken down same as Application for Payment.

5. No Change Order shall be included with Application for Payment until approved in writing by University and University's Representative.

6. Refer to 1.05 for other items required for the Application for Payment.

B. Final Payment: Prepare Application for Final Payment as specified in Section 017700 – CLOSEOUT PROCEDURES.

1.06 SUBMISSION OF APPLICATIONS FOR PAYMENT

A. Submission of Applications for Payment: The following requirements supplement provisions of the General Conditions of the Contract. Refer to the GENERAL CONDITIONS OF THE CONTRACT.

1. Submit one (1) PDF electronic file of each Application for Payment with verified electronic signature, such as DocuSign. Round values to nearest dollar or as specified for the Schedule of Values.

2. Submit an updated Construction Progress Schedule with each Application for Payment and specified in Section 013200 – CONTRACT SCHEDULES.

3. Submit one (1) PDF electronic file of Schedule of Values in accordance with the General Conditions of the Contract. Form and content shall be acceptable to the University. Transmit under PDF electronic transmittal letter. Identify University's Project Name and University's Project Number.

a. List installed value of each major item of Work and for each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar. Listed items of Work shall be identified by Specification section number. Each value will be based on a percent complete of that line item.

b. For each major subcontract, list products and operations of that subcontract as separate line items.

c. Coordinate listings with Progress schedule. Contractor project General Conditions plus overhead and profit shall be a separate line item in the Application for Payment; and be divided in an equal amount for each month part of the Contract Time period.

1) At 50 percent completion of the work, or at other times the University's Representative deems appropriate, the University's Representative may request the monthly amount of overhead and profit be adjusted, if the contract schedule indicates going beyond the Contract End Date.

d. For items on which payments will be requested for on-site stored products, list sub-values for cost of on-site stored products with taxes paid. If stored products are not on-site, they must be stored in a bonded warehouse or location approved by the University's Representative prior to including on the Application for Payment.

e. Submit a sub-schedule for each separate Phase of Work specified in Section 011100. Include scheduling of sequences within each phase indicated on the drawings.

f. The Sum of values listed shall equal total Contract Sum.

g. When University's Representative requires substantiating information, submit data justifying line-item amounts in question.

h. Provide one (1) PDF electronic file of data with cover letter for each copy of Application. Show Application number and date, and line item by number and description.

4. Submit Applications for Payment, Continuation Sheets and Schedule of Values under PDF electronic transmittal letter. Contractor shall identify all payment application documents by University's Project Name and University's Project Number.

1.07 SUBSTANTIATING DATA

A. University's Representative may request substantiating information. Submit data reconciling line-item amounts in question.

B. Provide one (1) PDF electronic file of data with cover letter for each copy of submittal. Show Application number including date and line item by number with description.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 29 00

SECTION 01 31 00

COORDINATION

PART I - GENERAL

1.01 SECTION INCLUDES

A. Project Meetings

B. Submittals Requirements

C. General Contractor Coordination

D. Coordination of Subcontractor and Separate Contracts

E. University Criteria

1.02 RELATED REQUIREMENTS

A. Section 011100 – SUMMARY OF THE WORK: Description of Contract Documents.

B. Section 013200 – CONTRACT SCHEDULES

C. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

D. Section 013500 – SPECIAL PROCEDURES: Interim Life Safety Measures (ILSM).

E. Section 014500 – QUALITY CONTROL

F. Section 014550 – INSPECTION AND TESTING OF WORK

G. Section 015100 – TEMPORARY UTILITIES

H. Section 015200 – CONSTRUCTION FACILITIES

I. Section 015500 – VEHICULAR ACCESS AND PARKING: Traffic Regulation.

J. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS

K. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

L. Section 016100 – PRODUCT REQUIREMENTS

M. Section 017300 – CUTTING AND PATCHING

N. Section 017700 – CLOSEOUT PROCEDURES: Coordination of completion reviews, inspections, and submission of documents.

O. Section 017800 – CLOSEOUT SUBMITTALS: Record Drawings.

P. Division 21 - Fire Protection Systems.

Q. Division 28 - Fire Alarm Systems

1.03 MEETINGS

A. Pre-Construction/Site Mobilization Conference: University's Representative will administer site mobilization conference at Project site for clarification of responsibilities of University, University's Representation and Contractor , use of site and for review of administrative procedures. Site mobilization conference shall be held within fourteen (14) calendar days of Notice to Proceed, unless otherwise directed by University's Representative.

1. Agenda: Pre-Construction/Site Mobilization Conference shall cover the following topics at a minimum:

a. Special Project Procedures: Implementation of requirements as specified in Section 013100 – COORDINATION.

b. Subcontractors List: Provide PDF electronic file. Distribute and discuss list of subcontractors and suppliers.

c. Construction Schedule: Provide per Section 013200. Distribute and discuss initial construction schedule and critical work sequencing of major elements of Work, including coordination of University furnished/Contractor installed (UFCI) products, University furnished/ University installed (UFUI) products, and work under separate contracts, by utility agencies and companies and University.

d. Designation of Key personnel: Designate key personnel and update project directory for University, University's Consultants, Contractor , major subcontractors, major materials suppliers, serving utility agencies and companies, other contractors performing work under separate contracts and governing authorities having jurisdiction.

e. Project Communication Procedures: Review requirements and administrative requirements for written, electronic and oral communications.

f. Change Procedures: Review requirements and administrative procedures for Change Orders, Field Orders, University's Representative's Supplemental Instructions, and Contractor 's Requests for Information.

g. Coordination: Review requirements for Contractor 's coordination of Work; review sequence and schedule for work being performed for University under separate contracts.

h. Submittals Administration: Provide per Section 013300 and Section 016100. Review administrative procedures for shop drawings, project data and sample submittals and review of preliminary submittals schedule.

i. Project Record Drawings: Provide per Section 017700 and Section 017800. Review requirements and procedures for project record drawings, specifications and other documents.

j. Construction Facilities and Temporary Utilities: Provide per Section 015100 and Section 015200. Designate storage and staging areas, construction office areas; review temporary utility provisions; review University requirements for use of premises.

k. Materials and Equipment: Review substitution requirements; review schedule for major equipment purchases and deliveries; review materials and equipment to be provided by University (UFCI and UFUI products).

l. Site Access by University's Representative and University's Consultants: Review requirements and administrative procedures Contractor may institute for identification and reporting purposes.

m. Testing and Inspection: Provide per Section 014550 and other sections of the Contract. Review tests and inspections by independent testing and inspection agencies, manufacturers, and governing authorities having jurisdiction.

n. Permits and Fees: Review Contract requirements; review schedule and process for obtaining permits and paying fees.

o. Hours of Work and Work Restrictions per Section 011400.

p. Hot Works Permit.

B. Billing Meetings: A billing meeting will be conducted by the University's Representative each month prior to submittal of the Application for Payment. Agenda: review of the percent complete relating to the submitted Schedule of Values. Prior to the Billing Meeting the Contractor will submit a draft of the Application for Payment for review by the IOR and University Representative.

C. Progress Meetings: Progress meetings shall be periodically scheduled throughout progress of the Work. Frequency shall be as determined necessary for progress of Work. Generally, it is intended progress meetings be held once a week as designated by the University's Representative.

1. Administration: University's Representative shall make physical arrangements for meetings and prepare agenda with copies for participants, preside at meetings, record minutes and distribute an electronic file within four (4) workdays to Contractor University’s Consultants, and other participants affected by decisions made at meetings.

2. Attendance: Contractor's Project Manager and jobsite Superintendent shall attend each meeting. Contractor's subcontractors and suppliers may attend as appropriate to subject under discussion. University will have a representative at each meeting. University's Consultants, as appropriate to agenda topics for each meeting and as provided in University/Consultant Agreement, will also attend.

    a. Suggested Agenda for Progress Meetings:

        1) Building Code/Fire Marshal Issues

        2) Design Issues

        3) Submittals and Long Lead Items

        4) UFCI and UFUI products.

        5) Request for Information

        6) Safety Issues

        7) Scheduling Status/1 Week Prior and 3~~2~~ Week Look Ahead

        8) Potential Schedule Delay Issues

        9) Incomplete or Non-Conforming Work

        10) Inspection Requests

        11) Utility Shutdowns and Dig Notifications

        12) Instructional Bulletins and Field Orders

        13) Change Orders/Cost Proposals

        14) Payment Applications and As-Built Drawings

        15) Miscellaneous Business

        16) Other items affecting progress of the Work

D. Guarantees, Bonds, Service and Maintenance Contracts Review Meeting: Eleven months following the date of Substantial Completion, a meeting will be conducted by University's Representative to review the guarantees, bonds and service and maintenance contracts for materials and equipment.

E. Pre-installation Conferences: Prior to installation of work for Phase2A, Phase2B and Phase3, contractor will build a full-scale mockup and perform a pre-installation “rehearsal” prior to commencing Work. “Rehearsal” attendees shall include all trade personnel that will be installing work for the specific Phase.

    a. Require attendance by representatives of firms whose activities directly affect or are affected by the Work specified.

b. Review conditions of installation, preparation and installation procedures and coordination with related Work and Work under separate contracts.

F. Location of all meetings will be as designated by University's Representative. Participants at all meetings shall be University's Representatives, Consultants and/or Vendors, Contractor, Superintendent, Subcontractors and others as appropriate.

1.04 SUBMITTALS

A. Coordination of Submittals: Schedule and coordinate submittals as specified in Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, Section 017700 – CLOSEOUT PROCEDURES and Section 017800 – CLOSEOUT SUBMITTALS.

1. Coordinate submittal effort of various trades, subcontractors and suppliers having interdependent responsibilities for installing, connecting, and placing into service such equipment, materials or installations as necessary for the Work.

2. Coordinate requests for substitutions to assure compatibility of space, operating elements, and effect on work of others.

3. Contractor shall submit the following submittals to the University's Representative who will forward directly to the appropriate State Agencies for their review and approval:

a. HCAI Deferred Approvals: Refer to list of deferred approvals as shown on the Contract Documents.

B. Coordination/Engineering Drawings: Submit in accordance with Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES and as specified herein.

C. Work Plans: Submit as specified herein.

1.05 COORDINATION

A. Coordination: Contractor shall coordinate the Work as stated in the General Conditions of the Contract. Work of the Contract includes coordination of the entire work of the Project, from beginning of construction activity through Project closeout and warranty periods. Contractor shall also coordinate Work under the Contract with work under separate contracts by University. Contractor shall cooperate with University and others as directed by University's Representative in scheduling and sequencing the incorporation into the Work of University Furnished/Contractor Installed (UFCI) products identified in the Contract Documents.

1. Coordinate completion and cleanup of work of the separate trades, subcontractors, vendors, etc., in preparation for University occupancy

2. After University occupancy, coordinate access to site by various trades, subcontractors, vendors, etc., for correction of defective work and/or work not in accordance with Contract Documents, to minimize University disruption.

3. Assemble and coordinate closeout submittals specified in Section 017700 – CLOSEOUT PROCEDURES.

B. Construction Interfacing and Coordination: Layout, scheduling and sequencing of Work shall be solely Contractor's responsibility. Contractor shall bring together the various parts, components, systems and assemblies as required for the correct interfacing and integration of all elements of Work. Contractor shall coordinate Work to correctly and accurately connect abutting, adjoining, overlapping and related elements, including work under separate contracts by University and utility agencies, if any.

C. Installation of Systems into Project Space: Follow routings shown for pipes, ducts and conduits as closely as practicable, as shown on the Contract Documents with due allowance for available physical space; make runs parallel with line of building. Utilize space efficiently to maximize accessibility for other installations, future maintenance and repairs. In finished areas, except as otherwise shown, conceal pipes, ducts and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

D. Utility Work: Work occurring on or in the immediate vicinity of critical utilities must be directly supervised at all times by Contractor's qualified personnel. Requirements stated herein for notification, work plans, dig notification forms and marking locations of existing utilities shall apply. Contractor will be held fully liable for costs and damages due to unplanned interruption of critical utilities, including any personal injury to Hospital patients, visitors, or staff.

1. Provide supervision and coordination necessary to meet requirements of electrical power connection as set forth by the Sacramento Municipal Utility District (SMUD).

2. Provide reasonable and convenient staging and access areas to permit SMUD, its vendors or subcontractors, to install, modify or remove electrical transformers or other components of the electrical power system furnished and installed by SMUD.

1.06 COORDINATION OF SUBCONTRACTORS AND SEPARATE CONTRACTS

A. Conflicts: Conflicts shall be resolved by the Contractor. Contractor bears primary responsibility for conflict resolution regarding the coordination of all building trades, subcontractors and suppliers.

B. Superintendence of Work: Contractor shall appoint a field superintendent who shall direct, supervise, and coordinate all Work in the Contract Documents.

C. Subcontractors, Trades and Materials Suppliers: Contractor shall require all subcontractors, trades, crafts and suppliers to coordinate their portions of Work with the Superintendent to prevent scheduling, sequencing, dimensional and other conflicts and omissions.

D. Coordination with Work Under Separate Contracts: Contractor shall coordinate and schedule Work under Contract with work being performed for Project under separate contracts by University. Contractor shall make direct contacts with parties responsible for work of the Project under separate contracts, in order to provide timely notifications and to facilitate information exchanges.

E. Service Connections: Except as otherwise indicated, final connection of mechanical services to general work is defined as being mechanical work; final connection of electrical services to general work is defined as electrical work.

1.07 UNIVERSITY CRITERIA

A. During the Base Construction time, Contractor shall allow University one (1) calendar day to move University equipment for each Phase and/or provide furnishings at the SESP Kitchen. Contractor shall notify University's Representative in writing a minimum of fourteen (14) calendar days prior to completion of area described above.

B. Equipment Coordination: Contractor and University supplied equipment will require complete installation data be exchanged directly between Contractor and vendors and subcontractors involved as progress of Project requires. Individual requesting information shall advise when it is required. Incorrect, incomplete, delayed or improperly identified equipment causing delay or error in installation will require entity causing such action to be liable for modifications or replacements necessary to provide correct and proper installation, including relocations.

C. Contractor shall provide large scale casework and equipment drawings for casework and equipment service rough-in locations (dimensioned from building features), service characteristics, and locations of studs or blocking where such locations are critical to mounting or otherwise installing equipment and casework. Furnish sizes and spacing required for mechanical and electrical cutouts, and a complete brochure of fittings, sinks, outlets, or other information to provide a complete assemblage of the items and accessories being furnished.

D. Interruption of Services: Construction Work shall accommodate University's use of surrounding and adjacent premises during the construction period and shall provide continuous public access and use of surrounding and adjacent facilities. Contractor shall not deny access to public use facilities until an alternate means of public use has been provided. An interruption of service is defined as any event which in any way interrupts, disrupts or otherwise discontinues, even momentarily, the services provided by University to its patients and staff. Adequate notice, as described below, shall be given to University when any interruption of services or interference with the use of existing buildings and roads are anticipated. Any interruption of service will be made only by University upon such notice. Interruptions to University services will not be made without prior notification and approval by University. Contractor shall never interrupt any University service without direct University participation.

1. Dig Notification: Contractor shall complete and submit for review to University's Representative, a Dig Notification Form, included at the end of this section, and obtain written authorization from University prior to the commencement of any digging activities. Digging activities include exploratory demolition, soils excavation, concrete core drilling, and saw cutting. Contractor shall include all pertinent information with the Dig Notification Form and submit with detailed work plan fourteen (14) calendar days prior to desired digging activity.

2. The Contractor shall contact USA North 811 prior to starting underground Work to locate existing underground utilities.

3. Contractor shall mark locations of all known utilities on ground of dig area with marker paint.

4. Prior to commencement of digging activities, Contractor shall verify project inspector has inspected the dig site and confirmed the site marking as accurate, complete and in conformance with site utility plans.

5. Contractor shall verify with University's Representative that all interested hospital departments have been notified of intent to begin digging operation.

6. Record documents are required for dig activities. Contractor shall provide As-Built drawings.

E. Shutdown Procedures: Contractor shall complete and submit for review and approval to University a Request for Shutdown form, included at the end of this section. Contractor shall include all pertinent information to assist University in coordination of shutdown activities. The Shutdown Request Form shall be submitted with a detailed work plan addressing the proposed shutdown not less than fourteen (14) calendar days prior to desired shutdown.

F. The University does not normally charge for its shutdown support services. However, if poor planning and/or poor execution of a shutdown by the Contractor causes excessive time and effort for University personnel, the University reserves the right to back charge the Contractor for this effort required to support such shutdown.

1. Contractor shall verify with University's Fire Marshal that all appropriate Interim Life Safety Measures (ILSM) are in place.

2. Contractor shall determine that proper and appropriate coordination and notification has been completed, including written authorization from University's Representative, prior to shut down.

3. Service shutdowns shall require specific work plans to be submitted to and coordinated with University's Representative. Work Plan should reflect various work trades, activities or entities requiring active participation with University teams to coordinating hospital functions with construction activities.

a. Contractor shall request, schedule, and conduct a General Work Plan Meeting prior to any work activity occurrence. During this meeting Contractor and University shall produce and agree to a list of work activities, which will require digging and/or shutdown coordination and procedures.

b. University's Representative, upon receiving the agreed submission for coordination, shall schedule the actual digging and/or shutdown at the earliest possible date not later than fourteen (14) calendar days from receipt of the submission. Operation of valves, switches, etc. to affect shutdowns shall be operated by University personnel only.

c. A shutdown is defined as any interruption of services provided by University to its patients and staff.

4. Planned service shutdowns shall be accomplished during periods of minimum usage. Contractor shall plan work to restore service in minimum possible time and shall cooperate with the University to reduce number of shutdowns.

a. Notwithstanding the provisions of Article 14.6 of the General Conditions of the Contract, Contractor may be required to perform certain types of work outside normal time periods.

1) Non-normal times shall include, but not be limited to, periods of time before 7:00 a.m. and after 5:00 p.m. in the evening, weekend days, or legal holidays, or such periods of time which constitute split shifts or split working periods.

2) Contractor shall include allocation of the cost of this work as part of the base bid and shall not be entitled to additional compensation as a result of such work during non-normal time periods.

3) Contractor shall include the non-normal periods as distinct activities on the detailed project schedule.

4) Contractor is advised and Contractor shall be prepared, at University written request, to perform certain shutdown work during non-normal time periods.

G. Utility locations: Refer to Section 017600. General location of utility lines and services may be shown on the drawings or described elsewhere, University does not warrant the accuracy of the locations shown or described. Determination of the actual on-site locations of utility lines and services prior to the commencement of work shall be the responsibility of the Contractor . Contractor shall complete layout/research for Points of Connection (P.O.C.) and clean/prep piping at P.O.C. All capping, relocation or removal of such lines and services shall be performed by Contractor as a part of the Contract. New/continued piping and services installation shall be prefabricated and in place prior to the shutdown. All materials and tools required to complete the work must be at the shutdown location(s). Contractor shall not assume existing valves will hold 100%. Contractor is required to have at least one (1) alternate method (including parts and equipment) to complete installation once shutdown has started. Note: only wheel type cutters shall be used on copper pipe to reduce contamination to existing systems/valves.

H. Detailed Work Plans: Contractor shall develop and submit for review and approval to University's Representative detailed work plans for specific work activities, both inside and outside the work area, associated with impact to, or interruption of services and operation, and dig activities. Work Plans shall be submitted as a PDF electronic file with Table of Contents indexed. Work Plans shall include written description of work activity, detailed schedule with proposed sequence of operation and activity duration, type of equipment to be used, a copy of site plan highlighted to indicate sequencing and location of work and equipment, completed Request for Shutdown and/or Dig Notification forms as applicable, conformance to ILSM, and control methods for noise, vibration and airborne contaminants.

1. Work Plan submittal will not be accepted unless all required information is provided at time of submittal.

2. Submit Work Plan at least fourteen (14) calendar days prior to the commencement of any associated work activities.

3. Coordination/Engineering Drawings: Contractor shall provide a complete set of Coordination/ Engineering Drawings that indicates the architectural and structural building components; and combines all piping, conduits, fire sprinkler system, equipment, hangers, braces and other building components into one composite drawing for each floor, wing or area of work. Submit the Coordination/ Engineering Drawings as a bookmarked PDF electronic file. These drawings

are for the Contractor's and University's use during construction and shall not be construed as replacing any shop drawings, "As-Builts", or record drawings required elsewhere in the Contract Documents. University's review of these drawings is for design intent only and shall not relieve the Contractor of the responsibility for coordination of all work performed per the requirements of the Contract.

a. Contractor shall prepare and submit complete ¼" = 1' - 0" coordination drawings, including plans, sections, details as are appropriate indicating the area layout, complete with debris removal area and materials access points, and all mechanical and electrical equipment in all areas and within above and below ceiling spaces for new and existing conditions, including bottom of all ducts, plenum, pipe and conduit elevations. Drawings shall show all structural and architectural components, restraints and other obstructions that may affect the work. Electronic or photo reproduction of University's Architectural Drawings is not acceptable.

b. Contractor and each Subcontractor shall ensure all relevant mechanical and electrical equipment, piping, conduit, fire sprinkler system, ceiling hangers, braces etc., are shown and will fit, together with necessary items such as lights, ducts, fans, pumps, piping, conduit and the like.

c. Contractor shall indicate all locations of expansion/ seismic joints and indicate how expansion for piping, conduit and other components is provided.

d. Contractor shall indicate all locations for access doors or other means of access at conditions above and below for items requiring access or service including but not limited to valves, mechanical equipment, electrical equipment valves and other components. The Contractor is responsible that piping, conduit, braces and other obstructions do not block access to items indicated above.

e. Submit completed and fully coordinated PDF electronic indexed file drawings with bookmarked Sheet Index together with Contractor's comments indicating possible areas of conflict for review to University's Representative prior to start of work.

f. Penetrations: Contractor shall prepare a sleeving layout (¼" scale) indicating size and locations of sleeves. Trades shall indicate to Contractor their requirements and locations. PDF electronic files to applicable trades and University's Representative.

g. Completion of work: All coordination drawings shall be submitted together with record (as built) drawings of all trades involved in accordance with Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 Refer to the following attachments

A. Request for Shutdown (RFS) Info/Impact Report

B. Dig Notification Form

END OF SECTION 01 31 00

REQUEST FOR SHUTDOWN (RFS) INFO/IMPACT REPORT

PROJECT NAME: _____

UNIVERSITY RFS# _____

PROJECT #: _____ **HCAI #:** _____ **CONTRACTOR RFS #:** _____

TODAY'S DATE: _____ **SHUTDOWN DATE:** _____ **SUSPEND DATE:** _____

TO: UC DAVIS HEALTH
Facilities Design & Construction
4800 2nd Avenue, Suite 3010
Sacramento, CA 95817
P: 916-734-7024

FROM: _____

Project Manager's email address: _____

Request Date: _____ **Shutdown Target Date:** _____

Requested By: _____ **Requestor's Phone #:** _____

Shutdown Work (**Utility Specific**): _____

Scope (**Brief Description of Work**): _____

Impact (**Areas & Users**): _____

Additional Comments: _____

DIG NOTIFICATION FORM

PROJECT #: _____ **HCAI#:** _____ **DATE:** _____

TO: UC DAVIS HEALTH **Facilities Design & Construction** **4800 2nd Avenue, Suite 3010** **Sacramento, CA 95817** **P: 916-734-7024**	**FROM:** _____
Project Manager's email address:	_____

1. Has USA been notified? YES ___ NO ___
   When? _____
2. Are all known utilities marked? YES ___ NO ___
3. Location of dig shown on attached site plan? YES ___ NO ___
   Purpose _____
4. **Dates digging will take place** _____
   Place _____

Signed: _____

UNIVERSITY USE ONLY

Date received: _____

1. Utilities verified by IOR? YES ___ NO ___
2. Dig activities coordinated with all parties? YES ___ NO ___
3. Comments: _____

Date Authorized: _____ Signed: _____

Date Returned: _____ Signed: _____

Comments: (Utilities encountered, disruptions, successes, weather, etc.)

Copies: **University** _____ **Consultants** _____ **File** _____

SECTION 01 32 00

CONTRACT SCHEDULES

PART I - GENERAL

1.01 SCOPE

A. Preliminary Contract Schedule, Contract Schedule, updated Contract Schedules, Short Interval Schedules (SIS), Recovery Schedules and As Built Schedule.

B. Sub-networks of activities (Fragnets) supporting Time Extension Requests.

1.02 DEFINITIONS

A. Construction Schedule/CPM Schedule/Schedule: The most recent; Baseline Schedule, Updated Schedule or Revised Schedule.

B. Final Baseline Schedule: A final and ongoing Schedule for the project that has been reviewed and accredited by the University's Representative

C. Critical Work activities are defined as Work activities that, if delayed or extended, will cause a critical delay as defined in General Conditions Article 8. All other Work activities are defined as non-critical Work activities and are considered to have float.

D. Float is defined as the time that a non-critical Work activity can be delayed or extended without causing a critical delay as defined in General Conditions Article 8. Neither the **Contractor** nor the University shall have an exclusive right to the use of float. Float is a shared resource available to each party to the contract. The **Contractor** shall document the effect of the use of float on the updated Contract Schedule.

E. Recovery Schedule: Schedule required when any Revised Schedule or Update Schedule shows the work to be more than 14 calendar days behind the latest University-accepted contract end date

F. Short Interval Schedule (SIS): Schedule prepared on a weekly basis demonstrating the work accomplished the prior week and work planned for the upcoming three weeks.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00 Shop Drawings, Product Data, Samples:

1. Proposed Scheduling Software and qualifications of individual preparing schedules.

2. Preliminary Contract Schedule

3. Contract Schedule including graphical and tabular reports.

4. Monthly Updates to Contract Schedule, including Narrative Report.

5. Short Interval Schedules

6. Final As-Built Schedule

B. Include an electronic version of all submittals required by this specification, including Narrative prepared in MS Word or .pdf format, CPM schedule in .xer file (P6 backup) or other schedule native file format if accepted under 1.3. A.1 above, .pdf of full schedule, and .pdf of critical path. The following fields shall be included:

1. Activity identification

2. Activity description

3. Duration, start, and finish dates.

4. Percentage of completion

5. Total float

6. Responsible party

7. Predecessors and successors

PART II - PRODUCTS

2.01 SOFTWARE

A. The **Contractor** shall use Primavera P6 by Oracle Corporation, or equal to produce the schedule and all required graphical and tabular reports.

PART III - EXECUTION

3.01 PRELIMINARY CONTRACT SCHEDULE

A. Within 10 calendar days after the Notice of Selection as the Apparent Lowest Responsible Bidder, **Contractor** shall submit the Preliminary Contract Schedule in both native and .pdf format to the University's Representative for acceptance. The Preliminary Contract Schedule shall represent the **Contractor**’s plan for accomplishing the work within the Contract time showing all significant milestones for the Contract period as well as a detailed work plan for the first 90 calendar days following the Notice to Proceed. This detailed work plan shall identify in detail the following activities for the first 90 calendar days:

1. Preparation of equipment and material submittals for review. List Project submittals within Schedule per each specification section including Division 1 requirements. Indicate dates for submission of required submittals. Note: schedule shall include 18 calendar days for the University’s review of the Preliminary Contract Schedule.

2. Make submissions within the following number of days after the Notice to Proceed:

a. Items needed in initial stages of Work or requiring long lead-time for ordering: 30 calendar days.

b. Deferred approval submittals, for review and approval by agencies such as University's when required: 60 calendar days.

c. Electrical, mechanical and equipment items other than those covered by item "a" above: 60 calendar days.

d. All other items: 90 calendar days.

3. Procurement schedule.

4. Critical Path for the first 90 calendar days.

B. The Preliminary Contract Schedule shall acknowledge significant known constraints and include all anticipated activities prior to the Notice to Proceed.

C. The Preliminary Contract Schedule shall not include any actual dates or progress measured against any activities.

D. Acceptance of the Preliminary Contract Schedule is a condition for approval of the first progress payment application.

E. The **Contractor**'s progress shall be measured against the Preliminary Contract Schedule until such time as the University accepts the **Contractor**'s first Contract Schedule. The Preliminary Contract Schedule shall be incorporated into the **Contracto**'s proposed Contract Schedule.

F. Unless approved by the University's Representative, there shall be no activities shown with durations greater than 14 calendar days (excluding submittals, submittal reviews, and procurement activities).

3.02 CONTRACT SCHEDULE (BASELINE)

A. The Contract Schedule shall represent a practical plan to fully complete the Contract within the Contract Time. The Contract Schedule shall include a complete sequence of construction, in adequate detail for coordination of the Work and shall be coordinated with the preparation of the Schedule of Values per 01 29 00 Measurement and Payment.

B. Form

1. The proposed first contract schedule shall be produced using CPM (Critical Path Method) techniques, in the PDM (Precedence Diagram Method) method of scheduling. The Contract Schedule shall be calculated using the Retained Logic method. Progress override calculations shall not be acceptable. The schedule shall not use negative float or constraints on work activities.

2. The Contract Schedule shall identify all holidays and non-working days.

3. Identity of the party responsible for the activity (i.e., University, General **Contractor**, specific subcontractor, etc.)

4. The Contract Schedule activities shall be coded with the following information applicable to each activity:

   a. Area of the project

   b. Identity of the party responsible for the activity (i.e., University, General **Contractor**, specific subcontractor…)

   c. Specification section applicable to activity

   d. Phase

   e. Sequence – The following sequences shall be identified:

      1) Administrative

      2) Submittal and Review

      3) Fabrication

      4) Construction: including phasing and sequencing as identified in 011400 Work Restrictions

      5) Inspection, Commissioning, and Close-out

C. Content

1. The Contract Schedule shall identify all Work activities in correct sequence for the completion of the Work within the Contract Time. Work activities shall include the following:

   a. Major **Contractor**-furnished equipment, materials, and building elements, and scheduled activities requiring submittals or University's Representative's prior acceptance.

      1) Show dates for the submission, review, and approval of each such submittal. Dates shall be shown for the procurement, fabrication, delivery, and installation of major equipment, materials, and building elements, and for scheduled activities designated by the University.

      2) The schedule shall allow submittal review time in accordance with Section 01 33 00 Shop Drawings, Product Data, Samples.

   b. System test dates.

   c. Scheduled overtime Work to the extent permitted by Contract Documents.

d. Dates **Contractor** requests designated workspaces, storage area, access, and other facilities to be provided by the University.

e. Dates **Contractor** requests orders and decisions from the University on designated items.

f. Dates **Contractor** requests University-furnished equipment.

g. Dates **Contractor** requests University-furnished utilities.

h. Planned dates for shutdown, connection and relocation of existing utilities.

i. Planned dates for connecting to or penetrating existing structures.

j. Planned dates for scheduled inspections as required by Codes, or as otherwise specified.

k. Commissioning Sequence and activities for all Building Systems.

2. Unless approved by the University's Representative, there shall be no activities shown with durations in excess of 7 calendar days (excluding submittals, submittal reviews, and procurement activities). Milestones should be listed for the completion of wings, floors, and other similar areas.

3. The allowable monthly rain days per the Supplemental Conditions shall be incorporated into the Schedule.

4. Identify types of calendars used and the logic of their application.

D. Submission

1. The first Contract Schedule shall be submitted to the University not later than 30 calendar days after Notice to Proceed. The period covered by Contract Schedule shall be the Contract Time as specified in the Notice to Proceed. The Contract Schedule shall incorporate the logic of the Preliminary Contract Schedule covering the first 90 calendar days following the Notice to Proceed. Items to be included with first submission:

a. Contract Schedule (Baseline)

b. Critical Path Schedule excluding all non-critical Work activities.

c. Narrative

2. Tabular Computer Reports

a. As requested by the University, the **Contractor** shall submit various computer-generated tabular reports.

b. As requested by the University's Representative, the **Contractor** will be required to submit additional Schedule Reports.

E. Acceptance

1. Upon receipt, the University's Representative shall review the proposed first Contract Schedule. Within 21 calendar Days of the University's receipt of the proposed first Contract Schedule, the University's Representative shall schedule a review meeting with the **Contractor** for the purpose of jointly reviewing the proposed first Contract Schedule.

2. If the proposed first Contract Schedule is accepted by the University's Representative, it shall become the Contract Schedule (or Baseline Schedule). Such acceptance shall not relieve **Contractor** from its responsibility to fully complete the Contract within the Contract Time, nor shall it relieve **Contractor** from sole responsibility for any errors in the Contract Schedule.

3. If the **Contractor** or the University's Representative determines the proposed first Contract Schedule to need revision, the **Contractor** shall revise and resubmit the proposed first contract schedule to the University's Representative within 14 calendar days for acceptance. If accepted, it shall become the Contract Schedule. Such acceptance shall not relieve **Contractor** from its responsibility to fully complete the Contract within the Contract Time, nor shall it relieve **Contractor** from sole responsibility for any errors in the Contract Schedule If not accepted the **Contractor** will resubmit within 10 calendar days for a new review period to start.

   a. No progress payment beyond the second progress payment will be paid to the **Contractor** until such time as the University's Representative has approved the **Contractor**'s first proposed Contract Schedule.

F. Schedule Logic

1. Activity schedule logic should normally be of Finish-to-Start relationship type and assembled to show order in which **Contractor** proposes to carry out the Work. The logic should indicate restrictions of access, availability of Work areas, and availability and use of manpower, materials, and equipment. Form basis for assembly of schedule logic on the following criteria:

   a. Indicate which activities must be completed before subsequent activities can be started.

   b. Indicate which activities can be performed concurrently.

   c. Indicate which activities must be started immediately following completed activities.

   d. Indicate resource sequencing due to availability or space restrictions.

   e. Lags shall not be used if can be represented with additional schedule detail. Finish-to-start logic ties with positive lags are not permitted. All positive time consumption should be represented by a schedule activity. Start-to-start, or finish-to-finish logic ties with negative lags are not permitted.

f. Lags in Start-to-Start or Finish-to-Finish relationships must not exceed the duration of the predecessor or successor activity, respectively.

G. Non-Sequestering of Float

1. **Contractor** shall not sequester float through scheduling techniques, including, but not limited to, constrained dates, extending Work Activity duration estimates, using preferential logic, such as lag or negative lag (lead), unless specifically requested in writing and approved by University's Representative. It is acknowledged that University-caused or **Contractor**-caused time savings to Activities on, or near, the critical path will increase float, such increase in float shall not be for the exclusive use or benefit of either University or **Contractor**.

H. Out of Sequence Logic:

1. Resolution of conflict between actual work progress and schedule logic: When out of sequence activities develop in Schedule because of actual construction progress, **Contractor** shall submit revision to schedule logic to conform to current status and direction and include reasons in schedule update Narrative.

I. Preferential Logic:

1. The intended purpose of scheduling on a construction project is to help ensure that **Contractor**'s work on the project is adequately planned, tracked and managed. A construction schedule can be as simple as a list of activities, organized in a logical sequence, and time scaled. The concept of construction scheduling is to see that all activities necessary to complete the work, in accordance with the contract documents requirements, are properly planned, coordinated and managed. When **Contractor**'s schedule activities are not sequenced in the most logical manner, but rather, in a manner as to create the maximum possible opportunity for University interference to claim delay or interruption, the University will reject the schedule with a request of different sequence of activities.

3.03 EXPERIENCE REQUIREMENTS

A. **Contractor** shall designate an individual from **Contractor**'s staff or a consultant who shall be responsible throughout the duration of the project for preparation of all schedules and reports as required by this specification. This individual shall also be required to attend all meetings with the University's Representative as required by this specification. The **Contractor** shall demonstrate to the satisfaction of the University that the individual or consultant has at least 3 years of experience preparing, maintaining, and administering detailed project schedules on projects of the same or similar size and complexity as this project. The **Contractor** shall also demonstrate to the satisfaction of the University that the individual or consultant is proficient in the use of the scheduling software proposed for use by the **Contractor** on this project.

B. Within 14 calendar days after the Notice of Selection as the Apparent Lowest Responsible Bidder, **Contractor** shall provide the University with the identification, qualifications, and experience of and references for the proposed individual or consultant.

3.04 MONTHLY UPDATES

A. After acceptance of the first proposed Contract Schedule, **Contractor** shall update the Contract Schedule monthly. The update shall reflect progress as of the end of each month. **Contractor** shall submit monthly schedule update to the University's Representative for acceptance with the draft payment application and no later than the tenth day of the following month. The updates shall be made as follows:

1. The Monthly updates shall report progress based upon percent complete of each activity or remaining duration. Actual start dates shall be recorded for those activities that have started. Actual finish dates shall be recorded for those activities that are completed. Activities that are in progress shall reflect an actual start date and the percentage completion for the activity. Actual dates shall be clearly distinguishable from projected dates.

2. The updated Contract Schedule shall reflect an up-to-date status of the contract work as completed, and materials furnished and in permanent place that qualify for payment.

3. The updated Contract Schedule shall reflect Contract Time changes included in all processed change orders for the progress month and each preceding month.

B. Within 5 calendar days after receipt of the updated Contract Schedule in conjunction with the Application for Payment, the University's Representative shall review both and determine which work and material pay items qualify for payment; the approved data will then be returned to the **Contractor** for input. Within 14 calendar days, the **Contractor** and the University's Representative shall meet to review the Construction CPM Schedule and discuss any changes required.

C. The **Contractor** shall then revise and resubmit (if required) the Updated Contract Schedule and Application for Payment to the University's Representative for payment approval.

D. The monthly update shall be calculated using retained logic with a required finish date specified as the current contract completion date. Progress Override calculations shall not be acceptable.

E. No Applications for Payment will be processed, nor shall any progress payments become due until updated Contract Schedules are accepted by University's Representative. The accepted, updated Contract Schedule shall be the Contract Schedule of record for the period it is current and shall be the basis for payment during that period. Acceptance of any updated Contract Schedules shall not relieve **Contractor** from its responsibility to fully complete the Contract within the Contract Time, nor shall it relieve **Contractor** from sole responsibility for any errors in the updated Contract Schedules.

F. **Contractor** shall perform the Work in accordance with the updated Contract Schedule. **Contractor** may change the Contract Schedule to modify the order or method of accomplishing the Work only with prior agreement by the University.

G. With each monthly updated Contract Schedule, the **Contractor** shall provide an accompanying narrative describing the progress anticipated during the upcoming month, critical activities, delays encountered during the prior month, delays anticipated during the upcoming month, and an audit of the Contract Time. The audit shall show current days allowed by contract, days used through the end of the month, days remaining, percent of time used to date, and percent complete as measured by cost loaded schedule, and days ahead of or behind schedule. In the event that the **Contractor** was delayed by any occurrence during the prior month, the narrative report shall include a listing of all delays that affected the critical path and shall clearly explain the impact the claimed delay(s) had on the critical path and shall include an accounting of days lost or gained.

H. In the event the monthly update shows the **Contractor** to be behind schedule (negative float), the narrative shall include a description of actions needed to bring the project back on schedule.

3.05 LOOK AHEAD SCHEDULES

A. Look Ahead Schedule is a schedule derived from the Contract Schedule (or the most current monthly update of the Contract Schedule) which indicates in detail all activities scheduled or worked on for the 1 prior weeks, and all activities scheduled to occur during the next 3 weeks.

B. Provide detailed Look Ahead Schedules every week.

C. Submit in 11-inch by 17-inch Gantt chart format.

D. Look Ahead Schedule shall be generated from the then current Preliminary Contract Schedule, Contract Schedule, or updated Contract Schedule. Activities listed in the Look Ahead Schedule shall reference the activity identification or other such coding for correlation to the activities listed in the Contract Schedule.

3.06 TIME EXTENSION REQUEST DOCUMENTATION

A. In the event the **Contractor** shall request an extension of Contract Time, **Contractor** shall comply with the requirements of the General Conditions, including without limitation, General Conditions Article 8. In addition to the requirements of the General Conditions, as a condition to obtaining an extension of the Contract Time, **Contractor** shall timely submit a sub-network of the events of the delay that demonstrates the impact to the activities in the **Contractor**'s then current schedule, as well as the impact to the overall completion date of the project.

B. If the University's Representative approves the extension of time, the next monthly updated Contract Schedule shall incorporate the subnetwork with the extension of time. In addition, the monthly updated Contract Schedule shall contain all changes mutually agreed upon by the **Contractor** and the University during preceding periodic reviews and all changes resulting from Change Orders and Field Orders.

3.07 AS BUILT SCHEDULE

A. As a condition precedent to the release of retention, the last update of the Contract Schedule submitted shall be identified by the **Contractor** as the "As Built Schedule". The "As Built Schedule" shall be submitted when all activities are 100 percent complete. The

"As Built Schedule" shall reflect the exact manner in which the project was actually constructed (including start and completion dates, activities, sequences, and logic) and shall include a statement signed by the **Contractor**'s scheduler that the "As Built Schedule" accurately reflects the actual sequence and timing of the construction of the project.

3.08 WEATHER DAYS ALLOWANCE

A. Should inclement weather conditions, or the conditions resulting from weather, prevent the **Contractor** from proceeding with seventy-five (75) percent of the normal labor and equipment force engaged in the current critical activity item(s), (as shown on the latest CPM Progress Schedule accepted by the University's Representative), for a period of at least five (5) hours per day toward completion of such operation or operations, and the crew is dismissed as a result thereof, it shall be a weather delay day.

B. The expected loss of days specified in the Supplementary Conditions, item 3 "Modification of General Conditions, Article 8 – Contract Time", shall be included in a separate identifiable critical activity labeled "Weather Days Allowance" to be included as the last critical activity of the project schedule prior to substantial or final completion (whichever is contractual). The weather allowance activity shall be on, and remain on, the critical path of the project throughout the life of the project until it has been absorbed. Typically, all activity's leading to completion shall go through the weather allowance activity first. When weather days are experienced, and are approved as such by the University's Representative, the **Contractor** shall either:

1. Increase the duration of the current critical activity(ies) by the number of weather days experienced, or

2. Add a critical activity to the schedule to reflect the occurrence of the weather day(s).

C. The duration of the weather day allowance activity shall be reduced as weather days are experienced and included in the schedule. Any remaining weather days in the weather day allowance activity at the completion of the project shall be considered as float and shall not be for the exclusive use or benefit of either the University or **Contractor**.

D. The **Contractor** shall not receive any additional compensation for unavoidable delays due to inclement or unsuitable weather. If all the weather allowance has been used, any additional weather delay experienced by the **Contractor** may result in a non-compensable time extension upon submission of acceptable supporting documentation to the University's Representative.

END OF SECTION 01 32 00

SECTION 01 32 20

CONSTRUCTION PROGRESS REPORTING

PART I - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements and procedures for documentation of construction progress using still photographs and videos.

B. Related sections include the following:

1. Division 01, Section “Closeout Procedures” for general closeout procedures.

2. Division 01, Section “Closeout Submittals.”

1.02 PROGRESS PHOTOS/VIDEOS

A. Maintain a daily photographic record of the progress of the Work as outlined in Part III of this Section.

1. Photographs to accompany Superintendent Daily Reports will be done on a daily basis.

1.03 AS-BUILT DOCUMENTATION

A. The Contractor shall be responsible for the maintenance and completion of As-Built PDF Drawings and Models the following procedure shall be strictly adhered to:

1. Contractor shall download and save all of the construction documents. This set of Drawings along with the Specifications, shall be kept on file available to University's Representative's until the completion of the Project.

2. As the Work progresses, a complete and accurate notation of all documented changes or deviations from the Drawings and Specifications shall be recorded thereon and in the record model by the Contractor. Such indications shall be neatly made and kept current. Where exact locations are critical, such as in the case of buried piping or conduit, such locations - both horizontal and vertical - shall be dimensioned back to an above ground, permanent fixed point.

3. Properly note construction deviations or changes on the monthly As-Builts, prior to proceeding with any Work in those locations. Do not complete Work or request inspections if such Work has been installed in locations contrary to the Drawings.

4. University's Representative may request to review the As-Builts, on a monthly basis and prior to each Application for Payment. If requested by University's Representative, provide access to the following:

a. Approval of Application for Payment is contingent upon timely review of monthly changes on As-Builts Drawings and Record Models.

b. PDF drawings and The Record Model must be available for review to the University's Representative of the sheets or areas on which changes have been noted during the preceding month.

5. All As-Built and Record indications shall be clear and legible.

6. At the completion of the Project, Refer to Section 017800 CLOSE OUT SUBMITTALS.

PART II - PRODUCTS – Not applicable to this section.

PART III - EXECUTION

3.01 Contractor is required to maintain a daily digital photographic record of the progress of the Work and is to submit the photographs and video coverage as required to the University Representative. Daily Photographs are required for Superintendent Daily Reports.

END OF SECTION 01 32 20

SECTION 01 33 00

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Administrative requirements for shop drawings, product data and samples submittals

B. University's and University's Consultant's review of submittals

C. **Contractor**'s review of submittals

D. Shop Drawing Submittals

E. Product Data submittals

F. Sample submittals

G. Field Samples and mock-ups

H. Submittal Schedule requirements

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK: Subcontractor and materials suppliers list.

B. Section 013200 – CONTRACT SCHEDULES: Submission and review of schedules and submittals.

C. Section 014500 – QUALITY CONTROL: Test and Inspection Reports.

D. Section 016100 - PRODUCT REQUIREMENTS

E. Section 017700 – CLOSEOUT PROCEDURES: Occupancy/Acceptance /Final Payment Submittals.

F. Section 017800 – CLOSEOUT SUBMITTALS: Preparation of Maintenance and Operating Data.

1.03 ADMINISTRATIVE REQUIREMENTS

A. General Submittals Review: Submittals shall be made in accordance with requirements specified herein and in individual Sections.

1. Submittals shall be a communication aid between **Contractor**, University's Representative, and University's Consultant(s) by which interpretation of Contract Documents requirements may be confirmed in advance of construction.

2. Submit on all products to be used on the Project. Make all submittals through the University unless otherwise directed.

    a. The University's Representative shall provide timely review of submittals and re-submittals.

        1) University's Representative shall have twenty-one (21) days from receipt to review all submittals twenty-one (21) days from receipt to review re-submittals.

        2) The Fire Marshal shall have twenty-eight (28) days from receipt to review all submittals twenty-eight (28) days from receipt to review re-submittals.

        3) University's Representative will prepare and keep a log of review time of all submittals.

3. Substitutions shall be submitted in accordance with Section 016100 – PRODUCT REQUIREMENTS.

4. Make submittals sufficiently in advance of construction activities to allow shipping, handling and review by the University's Representative and their consultants.

B. University's and University's Consultants Review: University's Consultant's review will be only for general conformance with the design intent of the Contract Documents. Review of submittals is not conducted for purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the **Contractor** as required by the Contract Documents. Review actions of the University's Consultant or University shall not relieve **Contractor** from compliance with requirements of the Contract Documents. Changes shall only be authorized by separate written Change Order in accordance with the General Conditions of the Contract.

C. Contractors Review: **Contractor** shall review, mark-up as appropriate and stamp Shop Drawings, Product Data, and Samples prior to submission. Submittal shall clearly show it has been reviewed by **Contractor** for conformance with the Contract Documents and for coordination with requirements of the Work. Notify University's Representative in writing, at time of submission, of any changes in the submittals from requirements of Contract Documents.

1.04 SUBMITTAL REQUIREMENTS

A. Prompt Submission: Submittals shall be submitted promptly in accordance with Submittal Schedule and in such sequence as to cause no delay in the Work or in the work of any separate contractor. Present information in a clear and thorough manner to aid orderly review.

B. Preparation: Title each submittal with the University's Project Name and the University's Project number, submittal date and dates of any previous submissions. Clearly mark each copy to identify product or model.

1. Identify each item on submittal by reference to Drawing sheet number, detail, schedule, room number, assembly or equipment number, Specification number Reference Standard (such as ASTM or Fed Spec Number) and other pertinent information to clearly correlate submittal with Contract Documents.

2. Include the names of the **Contractor**, Subcontractor, Supplier and Manufacturer.

3. Include field dimensions, clearly identified as such to establish relationship to adjacent or critical features of the Work or materials.

4. Include pertinent information such as performance characteristics and capacities, wiring or piping diagrams and controls, catalog numbers and similar data.

5. Modify manufacturer's standard schematic drawings and diagrams and other diagrams to delete information not applicable to the Work. Supplement standard information to provide information specifically applicable to the Work.

6. Identify changes from requirements of the Contract Documents.

7. Include 8" x 3" blank space on face of submittal for review stamps.

8. Include **Contractor**'s review stamp, initialed or signed, and dated, certifying to the review of the submittal, verification of materials, field measurements, conditions, and compliance of the information within the submittal with the requirements of the Work and of the Contract Documents.

C. Number of submittals required:

1. Product Data Submittals: Submit PDF electronic file with booked marked table of contents and/or sheet index. Submittals for the Fire Department require an electronic file and two (2) hard copies.

2. Initial/Re-submitted Shop Drawing Review(s): Submit PDF electronic file with booked marked table of contents and/or sheet index. Submittals for the Fire Department require an electronic file and two (2) hard copies.

3. Final Shop Drawing Review and Approval: After obtaining University's Representative approval of initial/re-submitted shop drawing submittals, as described in Section 1.04.C.2 above, **Contractor** shall submit PDF electronic file with booked marked table of contents and/or sheet index. Submittals for the Fire Department require an electronic file and two (2) hard copies. **Contractor** is responsible for providing all approved shop drawings for its use and use by subcontractors and/or suppliers.

4. Samples: Submit number specified. Samples shall be of sufficient size and quality to clearly illustrate the functional characteristics of the products, with integrally related parts and attachment devices, including full range of colors, textures and patterns.

D. Identifying Submittals: Identify each submittal by Specification section number followed by a number indicating sequential submittal for that Section. Re-submittals shall use the same number as the original submittal, followed by a letter indicating sequential re-submittal. Examples:

1. 092500 – 1 First submittal for Section 092500 – Gypsum Board
2. 092500 – 2 Second submittal for Section 092500 – Gypsum Board
3. 092500 – 2A Re-submittal of second submittal for Section 092500 – Gypsum Board
4. 092500 – 2B Second re-submittal of second submittal for Section 092500 – Gypsum Board

E. Resubmission Requirements: Revise and resubmit as specified for initial submittal. Identify any Changes other than those requested. Note any departures from Contract Documents or changes in previously reviewed submittals.

F. Grouping of Submittals: Unless otherwise specifically permitted by University's Representative, make all submittals in groups containing all associated items as described in each Specification Section. The University's Representative will reject partial submittals as incomplete.

G. Unsolicited Submittals: Unsolicited submittals will be returned NOT REVIEWED.

1.05 DISTRIBUTION

A. Reproduce and distribute finalized copies of Shop Drawings and Product Data, to the following:

1. **Contractor**'s Project site file.
2. Record Documents file maintained by **Contractor**.
3. Pertinent Separate Contractors.
4. Pertinent Subcontractors.
5. Pertinent Supplier or Manufacturer.

1.06 FIELD SAMPLES AND MOCK-UPS

A. Erect at the project site, at a location directed by University's Representative, mock-ups to a size as specified.

1. The following full-scale mock-ups for install rehearsal are required for this project:

a. Equipment layout of Phase2A

b. Equipment layout of Phase2B

c. Equipment layout of Phase3

B. Fabricate each Sample and mock-up to be complete and fully furnished. Unless otherwise agreed, full-size complete samples will be returned and may be incorporated into field mock-ups and Work.

C. Mock-ups shall be removed by the **Contractor** at conclusion of the Work at no additional cost to the University.

1.07 SUBMITTAL SCHEDULE

A. Submittals Schedule: refer to Section 013200 – CONTRACT SCHEDULES.

1. The Submittal Schedule is a schedule for submission of Shop Drawings, Product Data and Samples by **Contractor**, and the processing and return of same by University.

2. **Contractor** shall prepare the Submittal Schedule as described herein and coordinate it with the Contract Schedule. No submittals will be processed before the Submittal Schedule has been submitted to and accepted by University.

3. Submittal Schedule shall be adjusted to meet needs of construction process and the Contract Schedule. Submit PDF electronic file with booked marked table of contents and/or sheet index of the Submittal Schedule after it is completed and each time it is update by **Contractor**.

4. **Contractor** shall NOT begin fabrication or Work which requires submittals until the return of final reviewed and approved submittals have been received by the **Contractor**.

1.08 ENVIRONMENTAL PRODUCT DECLARATIONS

A. Contractor must comply with Buy Clean California Act requirements per California Public Contract Code, Sections 3500-3505.

B. Contractor shall submit to Project Manager/Construction Manager current facility-specific Environmental Product Declaration for each eligible material proposed to be used on the Project.

C. Environmental Product Declaration (EPD): Type III environmental impact label, as defined by the International Organization for Standardization (ISO) standard 14025, or similarly robust life cycle assessment methods that have uniform standards in data collection consistent with ISO standard 14025, industry acceptance, and integrity.

D. Eligible Materials: Any of the following:

1. Carbon steel rebar.
2. Flat glass.
3. Mineral wool board insulation.
4. Structural steel.

E. Eligible Materials installed on the Project by Contractor must comply with any standards to the extent established in the BCCA or by University, whichever is more stringent. The facility-specific global warming potential for any Eligible Materials must not exceed any

existing maximum acceptable global warming potential for that material pursuant to the BCCA or by University, whichever is more stringent ("EM Standards"). The standards are published on the Department of General Services (DGS) website and updated information can be found on this link: https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act

F. Contractor shall not install any eligible materials on the project before submitting a facility-specific Environmental Product Declaration for that material.

G. This section shall not apply to an eligible material for a particular contract if the University determines, upon written justification published on its Internet website, that requiring those eligible materials to comply would be technically infeasible, would result in a significant increase in the project cost or a significant delay in completion, or would result in only one source or manufacturer being able to provide the type of material needed by the state.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 33 00

SECTION 01 34 00

CONTRACTOR(S) EMERGENCY PROCEDURES

PART I - GENERAL

1.01 The purpose of this specification is to outline, to the Contractor, the University's policy and procedures for effective project site management of an emergency situation during the construction of projects at UC Davis Health.

1.02 This procedure applies to all Contractors and their subcontractors who have contractual agreements with UC Davis Health.

PART II - DEFINITIONS

2.01 Disaster – any natural or human-made event that causes major disruption such as damage to the organization's buildings or grounds from severe weather conditions, earthquakes, other natural phenomena or loss of utilities (power, water and telephones), acts of civil disobedience, accidents or emergencies within the organization or in the surrounding community.

2.02 Code Green – a code notifying all employees that an emergency event has occurred, and University operations will be opening the Hospital Command Center and shifting to emergency operations.

2.03 Code Red – Fire

2.04 Code White – Hazardous Material / Chemical Spill

2.05 Control Facility – the County of Sacramento has designated UC Davis Health as the Control Facility for Sacramento County. The Control Facility coordinates medical control of patients and victim's dispersal to hospitals in the community/region.

2.06 Other emergency situations include the following systems failures as outlined in the UC Davis Emergency Response Plan.

A. Water system failure
B. Telephone system failure
C. Fire
D. Electrical system failure
E. Security
F. Chemical spill
G. Evacuation

PART III - PROCEDURES

3.01 The Contractor will be issued a UC Davis Health Emergency Response Plan at the project

A. Pre-construction meeting. This plan must be posted at the project site at all times in a visible location known to all project contractors.

B. Contractor is directed to contact appropriate emergency personnel as outlined in the Emergency Response Plan information during an emergency.

C. Contractor is required to compile and maintain a “spill kit” which includes, but is not limited to:

1. 10LF of 4” diameter flex piping.

2. Rolling container with lid, minimum 50 gallons.

3. 36” wide floor squeegee.

4. Two 40 lb bags of absorbent universal cellulose.

D. If the emergency involves an outside utility company, Contractor is to contact utility company directly. Known outside utilities located at the Sacramento campus are as follows.

1. Emergency Telephone Numbers

a.	Police Dispatch:	916-734-2555
b.	PO&M Dispatch (Electrical)	916-734-2763
c.	PG&E (Gas)	800-743-5000
d.	City of Sacramento Water	3-1-1
e.	HazMat Spill	916-734-2740

END OF SECTION 01 34 00

SECTION 01 35 00

SPECIAL PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Interim Life Safety Measures (ILSM)

B. Security Procedures

C. Hazardous Materials Procedures

1.02 RELATED SECTIONS

A. General Conditions of the Contract

B. Section 011100 – SUMMARY OF THE WORK

C. Section 013100 – COORDINATION

D. Section 013200 – CONTRACT SCHEDULES

E. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS

F. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

G. Section 017300 – CUTTING AND PATCHING

H. Section 017400 – CLEANING

1.03 INTERIM LIFE SAFETY MEASURES (ILSM)

A. ILSM Definition: Interim Life Safety Measures are those activities that are undertaken during construction, repair, and improvement operations that are established to temporarily compensate for the deficiencies caused in fire safety and protection that may be associated with such projects.

B. Quality Assurance: Interim Life Safety Measures (ILSM) program shall comply with The Joint Commission Standards, Life Safety (LS) Section, LS.01.02.01.

1. Contractor shall be responsible for setting up control procedures to adhere to ILSM Criteria Implementation Matrix and/or the ILSM Inclusion Criteria. Contractors shall notify University's Representative of anticipated and actual problems complying with ILSM.

2. Contractor shall submit proposed Fire and Life safety impairments (21) calendar days prior to implementation. Submittal of ILSM does not infer or guarantee acceptance by University. All submitted measures shall be reviewed and returned to Contractor indicating approval, approval as noted, or rejection, revision, or re-submittal requirement by University in writing no less than fourteen (15) calendar

days prior to proposed implementation. If re-submittal is required, twenty-one (21) day review period from date of re-submittal will be required.

C. Project ILSM Procedures: If a life safety code deficiency occurs, or is identified by any source, or the requirements of the current Life Safety Code are not being met; Interim Life Safety Measures must be implemented to the extent necessary to compensate for any deficient element(s) predicated on magnitude, severity, extent and duration before corrective actions are completed.

Any minor life safety code deficiency that could be corrected within 45 calendar days that is confined to a single smoke compartment or fire zone will not merit for declaring a hospital-wide ILSM(s) but would require reduction in flammable and combustible loads in the affected smoke compartment or zone as well as issuing a work order to complete the Plan For Improvement (PFI) within 45 calendar days of discovery.

The ILSM Criteria Implementation Matrix and/or the ILSM Inclusion Criteria forms completed by a University Representative are used to determine when and to what extent applicable ILSM measures as it pertains to each condition is required to be implemented. Based on the ILSM Inclusion Criteria assessment form, it may not be necessary to declare the need to implement ILSM measures under certain conditions as delineated in the form. When ILSMs are determined to be required, an ILSM Implementation Matrix shall be utilized by the contractor.

ILSMs must be implemented upon project development and must be continuously enforced through project completion. A comprehensive plan of correction is to be developed by the Project Representative, or designee using the ILSM Evaluation Form.

D. Any impairment or shutdown of a passive or active fire and life safety device/system for a period of 4 hours or longer in a 24 hour period will require implementation of an ILSM. Some of the most common impairments are outlined below. The listing of these ILSM examples is not intended to limit or preclude preventative actions that may be required to temporarily compensate for other life safety deficiencies that may arise during construction activities due to unforeseen conditions, the contractor's changing work plan, or required continuing activities of University. Comments following each ILSM are known ILSM requirements at time of bid. These comments are made to assist Contractor in bid preparation and later preparation of ILSM plan for the Project. University makes no guarantee these comments address all conditions requiring action by Contractor.

1. ILSM example #1: Ensure exits provide free and unobstructed egress. Maintain free and unobstructed access and exits from all buildings to public ways. Maintain escape facilities for construction workers at all times. Inspect means of egress in construction areas daily.

2. ILSM example #2: Maintain free and unobstructed access to emergency departments/services.

3. ILSM example #3: Ensure fire alarm, detection, and suppression systems are not impaired.

4. ILSM example #4: Ensure temporary construction partitions are smoke tight and built of noncombustible or limit combustible material that will not contribute to the

5. ILSM example #5: Provide additional firefighting equipment and use training for construction workers.

6. ILSM example #6: No smoking. Contractor shall follow the Universities smoking policy.

7. ILSM example #7: Develop and enforce storage, housekeeping, and debris removal practices that reduce the flammable and combustible fire load of the building to the lowest level necessary for daily operations.

8. ILSM example #8: Conduct a minimum of two (2) fire drills per shift per quarter.

9. ILSM example #9: Conduct regular hazard surveillance of buildings, grounds, and equipment with special attention to excavations, construction areas, construction storage, and field office.

10. ILSM example #10: Train personnel when structural or compartmentalization features compromise fire safety measures.

11. ILSM example #11: Conduct organization-wide safety education programs to ensure awareness of any LSC (Life Safety Control) deficiencies, construction hazards, and ILSM.

1.04 SECURITY PROCEDURES

A. Security Program: Protect Work, existing premises, and University operations from theft, vandalism, and unauthorized entry.

1. Security of the area shall be strictly maintained. Contractor shall control entrance of persons and vehicles related to University operations.

B. Entry Control: Restrict entry of persons and vehicles into Project site and existing facilities. Allow entrance only to authorized persons with proper identification. Maintain log of workers and visitors, make available to University's Representative.

1. Contractor shall control entrance of persons and vehicles related to University operations.

C. Personnel Identification: Provide identification card to each person authorized to enter premises, showing: Personal photograph, name and assigned number, expiration date, and employer. Maintain a list of accredited persons; submit copy to University's Representative on request.

D. Miscellaneous Restrictions: Do not allow cameras on site; do not allow photographs except with written approval of University.

1.05 HAZARDOUS MATERIALS PROCEDURES

A. Except as otherwise specified, should Contractor encounter site materials, reasonably believed to be asbestos, polychlorinated biphenyl (PCB), radioactive material, lead in paint, lead lining in walls or glass windows, lead in ceramic products, mold, water leaks or other hazardous materials or conditions, the Contractor shall immediately stop work in the affected area and report the condition to University's Representative in writing. The work in the affected area shall not thereafter be resumed except by written agreement of University and Contractor if in fact the material is identified as hazardous and has not been rendered harmless. The work in the affected area shall be resumed in the absence of hazardous materials, or when such materials have been rendered harmless.

A. Spills, discharges, overruns, or similar occurrences involving hazardous materials on site shall be promptly reported in writing to University's Representative. If Contractor fails to notify University in a prompt and timely manner of an occurrence, University will contract with licensed hazardous materials abatement contractor to clean up the hazardous material. Contractor shall pay all costs of removal, including financial penalties incurred, the result of the Contractor's failure to act promptly in response to the product emergency.

C. Contractor shall provide means and personnel to contain and control product emergencies or shall provide means and methods to render hazardous materials harmless.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 35 00

Fire Marshal's Office

4800 2nd Ave. #1200
Phone: (916) 734-3036
Fax: (916) 451-7754
hs-fireprevention@ucdavis.edu

Interim Life Safety (ILSM)

Based upon documentation received (ILSM Impact worksheet) a risk analysis of this project has been made. The impairments to life safety systems have been identified and interim measure provided as set forth below.

PROJECT TITLE:		OSHPD #		A/C#	
ILSM START DATE:		END DATE:			
FIRE LIFE SAFETY DEFICENY(IES):					
INTERIM MEASURE(S):					

Unless otherwise noted below, these requirements apply to impairments of a duration extending beyond the current shift (greater than 8 hours)		ILSM1	ILSM2	ILSM3	ILSM4	ILSM5	ILSM6	ILSM7	ILSM8	ILSM9	ILSM10	ILSM11	ILSM12	ILSM13	ILSM14	ILSM15
Check all impairments that apply.																
	Construction activity or repair															
	Any impairment of a required egress															
	Fire detection ALARM system impairment **greater than 4 hours *****															
	Fire SUPPRESSION system impairment **greater than 10 hours**															
	Fire &/or smoke door hardware impaired															
	Fire or smoke barriers with impairment															
	Missing or incomplete fire or smoke barriers															
	OTHER: *See below*															

**** Requires inspection by The Fire Marshal's Office prior to ILSM commencement.**

***** Fire Watch shall be documented and log provided to the Fire Marshal's Office at the end of each fire watch shift*****
Daily Inspection Log shall be completed by construction team daily & Fire Prevention staff weekly

INTERIM LIFE SAFETY IMPLEMENTATION MEASURES	
ILSM 1	Life safety deficiencies have been evaluated per UCDH Policy 1635 based upon the submitted ILSM Impact Worksheet
ILSM 2	Policy for deficiencies is followed for a sprinkler system out of service more than 10 hours in a 24 hour period & fire alarm out of service for more than 4 hours in a 24 hour period.
ILSM 3	Post signage identifying the location of alternative exits to everyone affected
ILSM 4	Inspect exits in affected area on a daily basis
ILSM 5	Provide temporary but equivalent fire alarm & detection system for alarm impairment
ILSM 6	Provide additional fire fighting equipment (i.e. fire extinguishers)
ILSM 7	Temporary construction barrier smoke-tight, will not contribute to the development of fire & of solid construction (see UCDH Policy 1635 & OSHPD 9-3301)
ILSM 8	Increase surveillance of building, special attention to construction area & storage
ILSM 9	Enforce storage, housekeeping & debris removal practices to reduce fire load
ILSM 10	Provide additional training to those who work in the hospital on the use of firefighting equipment
ILSM 11	Conduct one additional fire drill per shift per quart.
ILSM 12	Inspect & test *temporary* systems monthly. -Document testing
ILSM 13	Conduct education to promote awareness of building deficiencies, hazards & temporary measures
ILSM 14	Train those who work in the hospital to compensate for impaired structural or compartmental fire safety features
ILSM 15	OTHER:

Responsible Individual Signature: Date:	Fire Marshal's Office Signature: Date:

Fire Marshal's Office

4800 2nd Ave. #1200
Phone: (916) 734-3036
Fax: (916) 451-7754
hs-fireprevention@ucdavis.edu

Interim Life Safety (ILSM)

DAILY INSPECTION LOG

This list is not a comprehensive list of all items inspected and maintained for safey during construcion.

Address or room identification is clearly visible	Ensure alternative Exit signage is visible
Check fire extinguishers are current and visible	Smoke detectors bagged at start & unbagged at end of work day *Coordinate with Aux so as to not roll Fire Trucks
Clear debris from site	Construction barrier is intact and doors latch
Ensure all exits are unobstructed	Sprinklers are protected & any shut down is under 10 hours *Coordinate with PO & M and Aux Services

Contractor	Inspector	Comments
Walk each area indicated by the ILSM and ensure measures are in place.	Review the progress and verify the responsible parties adhere to ILSM provisions.	
Effective Dates:	Effective Dates:	
Daily - Initial and Date	**Weekly – Initial and Date**	

UC Davis Health
Fire Marshal's Office
4800 2nd Ave., Suite 1200
Sacramento, Ca 95817
916-734-3036
hs-fireprevention@ucdavis.edu
www.ucdmc.ucdavis.edu/fire/

Interim Life Safety Measure (ILSM)
Impact Worksheet

This form is completed by the Project Manager or Contractor or Contractor's Representative. Complete the form and submit to the Fire Marshal's Office for an evaluation of the need for an ILSM, Fire Watch, or other safety measure.

Project Title:			
Date of Project(s):		Time of Project(s):	
A/C#		OSHPD #	
Project Description:			

	Yes	No
Project alters or significantly compromises exit access, exiting, or exit discharge building elements? If yes, provide a floor plan showing how exiting is affected. Temporary exit and/or evacuation signs may be required.	☐	☐
Compromise of building compartmentation including fire or smoke walls, floor / ceiling assemblies, corridor walls, use area doors, or other defend in place elements? If yes, describe in information.	☐	☐
The issue impairs the building fire alarms or sprinkler systems?	☐	☐
The activity includes significant ignition sources such as cutting, welding, or other operations using flame or producing sparks?	☐	☐
The activity includes large quantities of combustible materials, flammable materials, or generation of large amounts of dust and debris?	☐	☐
Access to fire or life safety equipment affected? If yes, what systems or equipment? (i.e.: fire watch, Fire Inspector, extinguisher, etc.)	☐	☐
Are construction barriers present / required?	☐	☐

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Documentation – When ILSMs are required, the following documentation must be maintained:

a. Training rosters
b. Fire drill reports
c. Monthly inspection and testing of temporary fire alarm, detection, and suppression systems
d. Daily inspection of construction area
e. Weekly inspection of buildings, grounds, and equipment with special attention to excavations, construction areas, construction storage, and field offices
f. Completed ILSM form at the job site

Note* Contractor activities that pose an immediate threat to the health and safety or patients, visitors, hospital employees or construction personnel shall be discontinued immediately until the hazards are abated and corrected and the appropriate ILSM(s) are developed.

Requestor's Signature	Date
UCDH Fire Marshal's Office Representative	Date

Information:

I.L.S.M.

Interim Life Safety Measures Requirement Verification Card

Contractor	Inspector	Fire Marshal	Comments
Walk each area indicated by the ILSM and ensure measures are in place. Effective Dates	Review the progress and verify the responsible parties adhere to ILSM provisions. Effective Dates	Fire Marshal has visited the site and reviewed the program with the responsible parties	
Daily -Initial and Date	**Weekly – Initial and Date**	**Monthly – Initial and Date**	

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Relationship between Code, Ordinances, Standards and Contract Documents

B. Applicable Codes, Laws and Ordinances

C. Project Inspections

D. California State Fire Marshal Requirements

E. Department of Health Care Access and Information Projects

1.02 RELATED SECTIONS

A. Section 013500 – SPECIAL PROCEDURES

B. Section 014200 – REFERENCES

C. Section 014500 – QUALITY CONTROL

1.03 RELATIONSHIP BETWEEN CODES, ORDINANCES, STANDARDS AND THE CONTRACT DOCUMENTS

A. Authority: All codes, ordinances and standards referenced in Contract Documents shall have full force and effect as though printed in their entirety in the Contract Specifications.

B. Precedence:

1. Where specified requirements differ from requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.

2. Where Contract Drawings or Contract Specifications require or describe products or execution of better quality, higher standard or greater size then required by applicable codes, ordinances and standards, the Contract Drawings and Contract Specifications shall take precedence so long as such increase is legal.

3. Where no requirements are identified in Contract Documents, comply with all requirements of applicable codes, ordinances and standards of governing authorities having jurisdiction.

1.04 APPLICABLE CODES, LAWS AND ORDINANCES

A. Building Codes, Laws, and Regulations:

1. Work shall meet or exceed the requirements of and be performed in accordance with applicable, adopted code requirements, laws and requirements of all other regulatory agencies, including, but not limited to the following:

a. California Code Series - 2019 Edition

1) California Administrative Code, California Code of Regulations – Title 24, Part 1

2) California Building Code, California Code of Regulations – Title 24, Part 2, Volume 1& 2

3) California Electrical Code, California Code of Regulations – Title 24, Part 3

4) California Mechanical Code, California Code of Regulations – Title 24, Part 4

5) California Plumbing Code, California Code of Regulations – Title 24, Part 5

6) California Energy Code, California Code of Regulations – Title 24, Part 6

7) Elevator Safety Construction Code, California Code of Regulations – Title 24, Part 7

8) California Historical Building Code, California Code of Regulations – Title 24, Part 8

9) California Fire Code, California Code of Regulations – Title 24, Part 9

10) California Existing Building Code, California Code of Regulations – Title 24, Part 10

11) California Referenced Standards Code, California Code of Regulations – Title 24, Part 12

b. NFPA Code Series. National Fire Protection Association (NFPA) (as adopted by State agencies)

1) NFPA 13 – Standard for the Installation of Sprinkler Systems.

2) NFPA 14 – Standard for the Installation of Standpipe and Hose System

3) NFPA 72 – National Fire Alarm and Signaling Code

4) NFPA 80 – Standard for Fire Doors and Other Opening Protectives

5) NFPA 99 – Health Care Facilities Code

6) NFPA 101 – Life Safety Code

7) NFPA 252 – Standard Methods of Fire Tests of Door Assemblies

8) NFPA 701 – Standard Methods of Fire Tests of Flame Propagation of Textiles and Films

c. California Code of Regulation Series (embodied in California model codes as noted above)

1) Title 8, Industrial Relations

2) Title 17, Public Health (Chapter 7)

3) Title 19, Public Safety

4) Title 21, Public Works

5) Title 22, Social Security

6) Title 24, Parts 1, 2, 3, 4, 5, 9 and 12

7) Title 25, Energy Insulation Standards

d. Americans with Disabilities Act (ADA) 2010 (Federal Law)

e. Rules and regulations of private and public utilities

f. American National Standards Institute (ANSI)

g. American Society of Testing Materials (ASTM)

h. Federal Specifications (Fed. Spec.)

i. Underwriters Laboratories

j. Traffic controls per California MUTCD requirements

2. All dates to comply with editions adopted and accepted by University and California State Fire Marshal (CSFM).

3. Unless otherwise specified, specific references to codes, regulations, standards, manufacturers' instructions, or requirements of regulatory agencies, when used to specify requirements for materials or design elements, shall mean the latest edition of each in effect at the date of submission of bids, or the date of the Change Order, as applicable.

4. References on Drawings or in Specifications to "code" or "building code' not otherwise identified shall mean the codes specified above, together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction having authority over the project.

B. Other Applicable Laws, Ordinances and Regulations:

1. Work shall be accomplished in conformance with all applicable laws, ordinances, rules and regulations of Federal, State and local governmental agencies and jurisdictions having authority over the Project.

2. Work shall be accomplished in conformance with all regulations of Public Utilities and utility districts.

3. Where such laws, ordinances, rules and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to Contract Time or Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to execution date of the Agreement.

4. General **Contractor** shall not self-perform specialty contracting work defined in sections 7055 – 7059.1 of the California Business and Professions Code unless the General **Contractor** has the specialty contractor's license appropriate for the work performed. Otherwise, specialty contractors shall be retained by the **Contractor** to perform specialty work identified in the project scope.

1.05 PROJECT INSPECTIONS

A. Provision of inspectors by University, if any, or by Department of Health Care Access and Information pursuant to this Section and Section 1.04 above shall be subject to the following:

1. **Contractor** shall allow inspectors full access to Project at all times.

2. **Contractor** shall not take any direction, approvals or disapprovals from inspectors.

3. **Contractor** shall not rely on inspectors to ensure Work is completed in accordance with Contract Documents.

4. Acts of omissions of any inspector (including without limitation inspector's failure to observe or report deficiencies in **Contractor**'s Work) shall not relieve **Contractor** for responsibility to complete Work in accordance with Contract Documents.

1.06 DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION PROJECTS

A. Department of Health Care Access and Information (HCAI) is the agency having jurisdiction over all acute care medical project design and construction unless a Memorandum of Understanding (MOU) has been established assigning University staff to perform regulatory duties.

B. HCAI will approve an inspector for the Project who shall have full access to the Project at all times.

C. HCAI will require Verified Report forms to be filed per testing, inspection and observation form during construction and a final verified report at completion of the project. Separate verified reports are required from Consultants, Project Inspector, and Contractor.

D. HCAI will require a Building Permit for project submitted by University's Representative. No HCAI Building Permit fees are required to be paid by the Contractor.

E. HCAI will require Change Order Approval submitted by University's Representative.

F. HCAI will require a Licensed Contractor's Declaration from the Contractor.

G. HCAI projects shall comply with the 2016 California Administration Code.

1.07 DEFERRED APPROVAL

A. Where noted in the Contract Documents, certain items of materials and/or systems may require HCAI/CSFM deferred approval pending submittals of shop drawings. For these items, Contractor shall submit details and structural calculations for anchorage, to comply with State of California Code of Regulations Title 24, table T17-23-J. Calculations shall be made by a licensed Structural Engineer registered in the State of California.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 41 00

SECTION 01 42 00

REFERENCES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Definitions and terms used in Contract Documents

B. Reference Standards used in Contract Documents

C. Common abbreviations and acronyms which may be used in Contract Documents

1.02 RELATED SECTIONS

A. Section 014100 – Regulatory Requirements

1.03 DEFINITIONS OF TERMS

A. Basic Contract Definitions: Words and terms governing the Work are defined in the General Conditions of the Contract, provided in the Contract Documents.

B. Additional words and terms are used in the Drawings and Specifications and are defined as follows:

1. Applicable: As appropriate for the particular condition, circumstance or situation.

2. Approve (d): Used in conjunction with action on submittals, applications, and requests, is limited to duties and responsibilities stated in the General Conditions. Approvals shall only be valid if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences and procedures of construction. Approval shall not release Contractor from responsibility to fulfill Contract requirements.

3. And/or: If used, shall mean that either or both items so joined are required.

4. By others: Work on the project that is outside the scope of Work to be performed under the Contract, but that will be performed by University, separate contractors or other means.

5. Contractor-Furnished/University-Installed (CFUI): Items, systems or equipment purchased by the Contractor as part of the project and handed over to the University for installation.

6. Construction Site: Same as site.

7. Directed: As instructed by University or University's Representative, in writing, regarding matters other than the means, methods, techniques, sequences and procedures of construction. Terms such as "directed", "requested", "authorized", "selected", approved", "required", and "permitted" mean "directed by University's Representative", requested by University's Consultant" or University's Representative and similar phrases. No implied meaning shall be interpreted to extend the University's Representative responsibility into Contractor's supervision of construction.

8. Equal or Equivalent: As determined by the University's Consultant as being of the same quality, appearance, utility, durability, finish, function, suitability, and performance.

9. Furnish: Means "supply and deliver, ready for unloading, unpacking, assembly, installation, and similar operations".

10. Indicated: Refers to graphic representations, notes or schedules on Drawings, or Paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference.

11. Install: Describes operations at the site including unloading, unpacking, assembly, erection, anchoring, applying, working to dimension, protecting, cleaning, and similar operations.

12. Installer: "Installer" is the Contractor or an entity engaged by the Contractor, as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

    a. Experienced Installer: The term "experienced", when used with "installer" means having a minimum of five (5) previous Projects similar in size to this Project, and familiar with the precautions required, and with requirements of the authority having jurisdiction.

13. Jobsite: Same as site.

14. Necessary: as determined in the professional judgement of the University Representative through the University's Consultant as being necessary for the Work, in conformance with the requirements of the Contract Documents, and excluding matters regarding the means, methods, techniques, sequences and procedures of construction.

15. Noted: Same as indicated.

16. Owner-Furnished/Contractor-Installed (UFCI): Item, system or equipment furnished by University at its cost and installed by the Contractor as part of the Work.

17. Per: In accordance with or in compliance with.

18. Products: Materials, systems or equipment.

19. Project site: Same as site.

20. Proper: As determined by the University's Representative as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, which are solely the Contractor's responsibility to determine.

21. Provide: Means "furnish and install, complete and ready for use".

22. Regulation: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, and rules, conventions and agreements within the construction industry that control performance of the Work, whether lawfully imposed by authorities having jurisdiction or not.

23. Required:

    a. As required by regulatory requirements of governing authorities.

    b. As required by referenced standards.

    c. As required by existing job conditions.

    d. As generally provided by accepted construction practices of the locale.

    e. As indicated on the Drawings and in the Specifications.

    f. As otherwise required by the Contract Documents.

24. Scheduled: Same as indicated.

25. Selected: As selected by University's Representative or University's Consultant from the full national product selection of the manufacturer, unless otherwise specifically limited in the Contract Documents to a particular quality, color, texture or price range.

26. Shown: Same as indicated.

27. Site: Same as Site of the Work or Project Site; the area or areas or spaces occupied by the Project and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.

28. Testing Laboratories: Same as Testing and Inspection Agency.

29. Testing and Inspection Agency: An independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests.

30. University-Furnished/Contractor-Installed (UFCI): Same as Owner-Furnished/Contractor-Installed.

1.04 REFERENCE STANDARDS

A. References: The Drawings and Specifications contain references to various standards, standard specifications, codes, practices and requirements for products, execution, tests, and inspections. These reference standards are published and issued by the agencies, associations, organizations and societies listed in this Section or identified in individual Sections of the Specifications.

B. Relationship to Drawings and Specifications: Such references are incorporated into and made a part of the Drawings and Specifications to the extent applicable.

C. Referenced grades, Classes and Types: Where an alternative or optional grade, class or type of product or execution is included in a reference but is not identified in the Drawings or Specifications, provide the highest, best and greatest of the alternatives or options for the intended use and prevailing conditions.

D. Copies of Reference Standards:

1. Reference standards are not furnished with the Drawings and Specifications. It is the responsibility of the Contractor, subcontractors, manufacturers, suppliers, trades and crafts to be familiar with these generally recognized standards of the construction industry.

E. Jobsite Copies:

1. Contractor shall obtain and maintain at the Project site copies of reference standards identified on the Drawings and in the Specifications in order to properly execute the Work.

F. Edition Date of References:

1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of the Contract.

2. All amendments, changes, errata, and supplements as of the effective date shall be included.

G. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision or amendment. It is the responsibility of the Contractor to be familiar with and have access to these nationally, and industry recognized specifications and standards.

1.05 ABBREVIATIONS & ACRONYMS

A. Abbreviations and Names: Where acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction or other entity applicable.

B. Refer also to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.

C. The following are commonly used abbreviations which may be found on Contract Drawings

and in Contract Specifications:

AA	Aluminum Association
AAA	American Arbitration Association
AAC	Architectural Anodizers Council
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ACPA	American Concrete Pumping Association
ADA	Americans with Disabilities Act
ADC	Air Diffusion Council
AFSA	American Fire Sprinkler Association
AGA	American Galvanizers Association (formerly AHDGA)
AGA	American Gas Association
AGC	Associated General Contractors of American
AI	Asphalt Institute
AIA	American Institute of Architects
AIMA	Acoustical and Insulation Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association International
ANSI	American National Standards Institute
APA	Engineered Wood Association (formerly American Plywood Association)
APWA	American Public Works Association
ARMA	Asphalt Roofing Manufacturers Association
ASAC	American Subcontractors Association of America
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BOC	Board of Corrections
CABO	Council of American Building Officials
CAC	California Administrative Code (see California Code of Regulations (CCR)
CAL/OSHA	State of California Construction Safety Orders
CBC	California Building Code
CCR	California Code of Regulations
CEC	California Electrical Code
CFC	California Fire Code
CFR	Code of Federal Regulations
CIMA	Construction Industry Manufacturers Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers' Institute
CMC	California Mechanical Code
CPC	California Plumbing Code
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America, Inc.
DHI	Door and Hardware Institute
DSA	Division of the State Architect
EJMA	Expansion Joint Manufacturers Association
FGMA	Flat Glass Marketing Association
FM	Factory Mutual Research Organization
FS	Federal Specification (from GSA)
GA	Gypsum Association
GSA	General Services Administration
HCAI	Department of Health Care Access and Information (State of California)
IAPMO	International Association of Plumbing and Mechanical Officials
IEEE	Institute of Electrical and Electronics Engineers, Inc.

ISO	International Organization for Standardization
MIA	Masonry Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MM	State of California, Business and Transportation Agency, Department of Transportation, "Materials Manual"
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAAMM	National Association of Architectural Metal Manufacturers
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFC	National Fire Code
NFPA	National Fire Protection Association
NFSA	National Fire Sprinkler Association
NGA	National Glass Association
NIBS	National Institute of Building Sciences
NIST	National Institute of Standards and Technology
NPCA	National Precast Concrete Association
NRCA	National Roofing Contractors Association
NSC	National Safety Council
NSF	National Sanitation Foundation
NSPE	National Society of Professional Engineers
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDCA	Painting and Decorating Contractors of America
PDI	Plumbing and Drainage Institute
PS	Product Standard (U.S. Department of Commerce)
RIS	Redwood Inspection Service
SDI	Steel Deck Institute
SFM	State Fire Marshal (California)
SFPE	Society of Fire Protection Engineers
SGCC	Safety Glazing Certification Council
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Society for Protective Coatings (Steel Structure Painting Council)
SSPWC	Standard Specifications for Public Works Construction
SWRI	Sealant, Waterproofing and Restoration Institute
TCA	Tile Council of America
TJC	The Joint Commission
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USS	United States Standard
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

D. Words and terms not otherwise specifically defined in this Section or in the Contract Documents, shall be as customarily defined by trade or industry practice, by reference standard and by specialty dictionaries such as Dictionary of Architecture and Construction (Cyril M. Harris, McGraw-Hill Educational; 4th Edition, September 5, 2005).

E. Additional abbreviations, used on the Drawings, are listed thereon.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 42 00

SECTION 01 45 00

QUALITY CONTROL

PART I - GENERAL

1.01 SECTION INCLUDES

A. **Contractor**'s Quality Control

B. Quality of the Work

C. Inspections and tests by governing authorities

D. Inspections and tests by serving utilities

E. Inspections and tests by manufacturer's representatives

F. Inspections and Independent testing and Inspection Laboratories/Agencies

G. Contractor responsibilities in inspections and tests

H. Contractor responsibilities regarding the University’s testing laboratory

I. Test reports

J. Geotechnical engineer

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 014100 – REGULATORY REQUIREMENTS: Compliance with applicable codes, ordinances and standards.

C. Section 014550 – INSPECTION and TESTING of WORK

D. Section 016100 – PRODUCT REQUIREMENTS: Product Options, substitutions, transportation and handling requirements, storage and protection requirements, and system completeness requirements.

1.03 [CONTRACTOR'S] [CM/CONTRACTOR’S] QUALITY CONTROL

A. Contractor's Quality Control: Contractor shall ensure that products, services, workmanship and site conditions comply with requirements of the Contract Documents by coordinating, supervising, testing and inspecting the Work and by utilizing only suitably qualified personnel.

B. Quality Requirements: Work shall be accomplished in accordance with quality requirements of the Contract Documents, including, by reference, all Codes, laws, regulations and standards. When no quality basis is prescribed, the quality shall be in accordance with the best-accepted practices of the construction industry for the locale of

the Project, for projects of this type.

C. Quality Control Personnel: Contractor shall employ and assign knowledgeable and skilled personnel as required by contract or necessary if not prescribed to perform quality control functions to ensure the Work is provided as required.

1.04 QUALITY OF THE WORK

A. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.

B. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements and adjacent construction.

C. Protection of Completed Work: Take all measures necessary to preserve completed Work free from damage, deterioration, soiling and staining, until Acceptance by University.

D. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report (ICC) requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.

E. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviation is acceptable and appropriate for the Project.

F. Verification of Quality: Work shall be subject to verification of quality by University's Representative and University's Consultant in accordance with provisions of the General Conditions of the Contract.

1. Contractor shall cooperate by making Work available for inspection by University's Representative, University's Consultant or their designated representatives.

2. Such verification may include mill, plant, shop, or field inspection as required.

3. Provide access to all parts of the Work, including plants where materials or equipment are manufactured, fabricated or stored.

4. Provide all information and assistance as required, including that by and from subcontractors, fabricators, materials suppliers and manufacturers, for verification of quality by University's Representative or University's Consultant.

5. Contract modifications, if any, resulting from such verification activities shall be governed by applicable provisions in the General Conditions of the Contract.

G. Observations by University's Consultants: Periodic and occasional observations of the Work in progress will be made by University's Consultant and their consultants as deemed necessary to review progress of Work and general conformance with design intent.

H. Limitations on Inspections, Tests and Observations: Neither employment of independent

testing and inspection agencies nor observations by University's Consultant and their consultants shall relieve Contractor of obligation to perform Work in full conformance to all requirements of Contract Documents.

I. Acceptance and Rejection of Work: University's Representative reserves the right to reject all Work not in conformance to the requirements of the Contract Documents.

1. If initial tests or inspections made by University's Testing Laboratory or Geotechnical Engineer reveal any portion of the Work fails to comply with Contract Documents, or if it is determined that any portion of Work requires additional testing or inspection, additional tests and inspections shall be made as directed by University's Representative.

2. If such additional tests or inspections establish such portions of the Work comply with Contract Documents, all costs of such additional testing or inspection will be paid by University.

3. If such additional tests or inspections establish such portions of the Work fail to comply with Contract Documents, all costs of such additional tests and inspection shall be deducted from the Contract sum.

J. Correction of Non-conforming Work: Non-conforming Work shall be modified, replaced, repaired or redone by Contractor at no change in the Contract Sum or Contract time.

K. Acceptance of Non-Conforming Work: Acceptance of non-conforming Work, without specific written acknowledgement and approval of University shall not relieve Contractor of the obligation to correct such Work.

L. Contract Adjustment for Non-conforming Work: Should University or University's Consultants determine it is not feasible or in University's interest to require non-conforming Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between University and Contractor. If equitable reduction in Contract Sum cannot be agreed upon, a Directed Change Order will be issued and the amount in dispute resolved in accordance with applicable provisions of the General Conditions of the Contract.

1.05 INSPECTIONS AND TESTS BY GOVERNING AUTHORITIES

A. Regulatory Requirements for Testing and Inspection: Comply with California Building Code (CBC) requirements and all other requirements of governing authorities having jurisdiction.

B. Inspections and tests by governing Authorities: Contractor shall cause all tests and inspections required by governing authorities having jurisdiction to be made for Work under this Contract.

1. Such authorities include University's Building Inspection (code compliance), University's Fire Marshal’s office and similar agencies.

1.06 INSPECTIONS AND TESTS BY SERVING UTILITIES

A. Inspections and Tests by Serving Utilities: Contractor shall cause all tests and inspections required by serving utilities to be made for Work under this Contract. Scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.

1.07 INSPECTIONS AND TEST BY MANUFACTURER'S REPRESENTATIVES

A. Inspections and Tests by Manufacturer's Representatives: Contractor shall cause all tests and inspections specified to be conducted by materials or systems manufacturers, to be made. Additionally, all tests and inspections required by materials or systems manufacturers as condition of warranty or certification of Work shall be made, the cost of which shall be included in the Contract Sum. Manufacturer's Representatives shall provide a PDF electronic report indicating but not limited to work or materials that are missing, not installed correctly, damaged or need correction. Manufacturer's Representatives shall issue a final PDF electronic report once all work and materials are installed correctly, functioning and in compliance with the Manufacturer's Warranty.

1.08 INSPECTION BY INDEPENDENT TESTING AND INSPECTION LABORATORIES

A. Definitions:

1. The term "University's Testing Laboratory" means a testing laboratory retained and paid for by University for the purpose of reviewing material and product reports, performing material and product testing and inspection, and other services as determined by University.

B. University will select an independent testing and inspection laboratory or agency to conduct tests and inspections as called for in the Contract Documents and as required by governing authorities having jurisdiction.

1. Responsibility for payment for tests and inspection shall be as indicated in the schedule below. All time and costs for Contractor's services related to such tests and inspections shall be included in Contract Time and Contract Sum.

C. Contractor shall notify University, and if directed by University's Representative testing and inspection laboratory, when Work is ready for specified tests and inspections.

D. Contractor shall pay for all additional charges by testing and inspection agencies and governing authorities having jurisdiction due to the following:

1. Contractor's failure to properly schedule or notify testing and inspection agency or authority having jurisdiction.

2. Changes in sources, lots or suppliers of products after original tests or inspections.

3. Changes in means, methods, techniques, sequences and procedures of construction that necessitate additional testing, inspection and related services.

E. Changes in mix designs for concrete and mortar after review and acceptance of submitted mix design. Test and inspections shall include, but not be limited to, the following:

Material Inspections and Tests		Paid by:
Post-installed Anchors	Visual Inspection	University
	Testing	University
Stainless Steel	Welding Inspection	University
Domestic Water	Assist with H2O Disinfection	Contractor

	H2O Disinfection	University

F. Test and Inspection Reports: After each inspection and test, one (1) PDF electronic report shall be promptly submitted to University's Representative, Contractor and to agency having jurisdiction (if required by code).

1. Reports shall clearly identify the following:

a. Date issued

b. Project name and Project number

c. Identification of product and Specification Section in which Work is specified

d. Name of inspector

e. Date and time of sampling or inspection was conducted

f. Location in Project where sampling or inspection was conducted

g. Type of inspection or test

h. Date of tests

i. Results of tests

j. Comments concerning conformance with Contract Documents and other requirements

2. Test reports shall indicate specified or required values and shall include statement whether test results indicate satisfactory performance of products.

3. Samples taken but not tested shall be reported.

4. Test reports shall confirm that methods used for sampling and testing conform to specified test procedures.

5. When requested, testing and inspection agency shall provide interpretations of test results.

6. Verification reports shall be prepared and submitted, stating tests and inspections specified or otherwise required for Project, have been completed and material and workmanship comply with the Contract Documents. Verification reports shall be submitted at intervals not exceeding six (6) months, at Substantial Completion of the Project, and at all times when Work of Project is suspended.

1.09 CONTRACTOR RESPONSIBILITIES IN INSPECTIONS AND TESTS

A. Tests, inspections and acceptances of portions of the Work required by the Contract Documents or by Applicable Code Requirements shall be made at the appropriate times. Except as otherwise provided, Contractor shall notify University's Representative to make arrangements for such tests, inspections and acceptances. Contractor shall give

University's Representative timely notice of all required inspections as outlined in Specification Section 014550 – INSPECTION and TESTING of WORK, Item 1.05, Scheduling Inspections – Notification Requirements.

B. If such procedures for testing, inspection or acceptance reveal failure of any portion of the Work to comply with requirements of the Contract Documents, Contractor shall bear all costs made necessary by such failure including those of repeated procedures, including compensation for University's Consultant's services and expenses.

C. If University and/or University's Consultants are to observe tests, inspections or make acceptances required by the Contract Documents, University and/or University's Consultant will do so promptly and, where practicable, at the normal place of testing.

D. Cooperate with testing and inspection agency personnel, University, University's Consultant's and their consultants. Provide access to Work areas and off-site fabrication and assembly locations, including during weekends and after normal work hours.

E. Provide incidental labor and facilities to provide safe access to Work to be tested and inspected, to obtain and handle samples at the Project site or at source of products to be tested, and to store and cure test samples.

1.10 CONTRACTOR RESPONSIBILITIES REGARDING UNIVERSITY TESTING LABORATORY

A. Secure and deliver to University's Testing Laboratory adequate quantities of representative samples of materials proposed for use as specified.

B. Submit to University's Representative the preliminary design mixes proposed for concrete and other materials, which require review, by University's Consultants and/or University's Testing Laboratory.

C. Submit copies of product test reports as specified.

1.11 TEST REPORTS

A. University's Testing Laboratory shall submit one (1) PDF electronic copy of all reports to the University's Representative, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

1.12 University will distribute one (1) PDF electronic copy of the reports to University's Consultants and Contractor.

A. University will retain and pay the expense of a Geotechnical Engineer to perform inspection, testing and observation functions specified by University. Geotechnical Engineer will communicate only with University. University's Representative shall then give notice to Contractor, of any action required of Contractor.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 45 00

SECTION 01 45 10

SEISMIC CONTROL – HCAI

PART I - GENERAL

1.01 DESCRIPTION

A. Provide all required seismic restraints and calculations to ensure that the installation of all architectural, mechanical, and electrical equipment/components are in compliance with all applicable seismic codes, standards, and specific information listed herein.

1.02 QUALITY ASSURANCE

A. ASTM standards

B. 2019 California Building Code, Title 24 (CBC)

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of material listed in this Section including shop drawing and other documentation to comply to the requirement of this Section.

B. Submit special seismic certification (OSP) for mechanical and electrical equipment/components as noted on CBC 1705A.13.3.1. Contractor shall bear all costs associated with all tests, engineering calculations and documentation required to obtain Department of Health Care Access and Information (HCAI) approval in accordance with this section in a timely manner if the Contractor chooses to select equipment that does not already have special seismic certification as noted on the design documents.

C. Submit HCAI Pre-approved Manufacturer’s Certification (OPM) as noted on the design drawings with only one applicable OPM per application.

PART II - PRODUCTS

2.01 SEISMIC RESTRAINT REQUIREMENTS

A. SUMMARY

1. This section covers the seismic restraint requirements for suspended distribution systems, vibration and non-vibration isolated items, systems and/or related suspended equipment.

2. The designers of record (DOR) as referenced in this specification shall be the project architect, structural engineer, and the appropriate system engineer (e.g., electrical, etc.).

3. An HCAI OPM determined by the DOR shall be considered as the specified seismic design for this project. Other non-OPM designs may be submitted as an alternate if they meet or exceed all the requirements contained within these specifications, HCAI pre-approved service loads, installation applications, and engineering services.

4. Channel framing materials, fittings and related accessories shall be as indicated on the OPM and on the drawings. All channel members (trapezes and braces) shall be solid strut. Field drill bolt holes at 1/16" larger than bolt size as required for connections. Back-to-back struts shall be stitch groove welded or button welded.

5. To facilitate plan review and construction, all construction documents should include an equipment schedule identifying all applicable equipment, its classification (fixed, movable, mobile, other, countertop, interim or temporary) and reference to support and attachment per Pin 68-Table 1.

B. SEISMIC RESTRAINT DESIGN

1. The attachment supports and seismic restraints of suspended non-structural components and distribution systems listed below shall be designed to resist the total design seismic forces prescribed in the CBC.

   a. All equipment/components including but not limited to: electrical, mechanical, plumbing, fire sprinkler and architectural.

   b. Without referencing OPM or HCAI pre-approved seismic attachment and supports shown on the design document, seismic support and attachment shall be engineered and built by the applicable system contractor. Engineering shall be performed (signed & sealed) by a licensed California Structural Engineer and submitted to the DOR and HCAI for acceptance prior to installation. Cost to be borne by the contractor.

   c. Design and installation shall consider seismic relative displacement in accordance with ASCE 7-16-13.3.2.

   d. Pipes with hazardous contents including but not limited to medical gas, fuel oil, natural gas piping, etc., regardless of size and weight shall be seismically braced per the OPM or HCAI pre-approved design.

   e. Support and attachment requirements for fixed, interim, mobile, movable, other, and temporary equipment shall be in accordance with HCAI PIN 68.

2. Seismic restraint transverse and/or longitudinal spacing shall be in accordance with CBC and OPM and limited to the following:

   a. Seismic design forces equal to or less than the capacity of the building structure.

   b. 40' feet transversely and/or 80' feet longitudinally where pipes, conduits, and their connections are constructed of ductile materials (copper, ductile iron, steel, or aluminum and brazed, welded, or screwed connections).

   c. 20' feet transversely and/or 40' feet longitudinally where pipes, conduits,

and their connections are constructed of nonductile materials (e.g., cast iron, no-hub pipe, and plastic).

d. 20’ feet transversely and/or 40’ feet longitudinally for bus ducts and cable trays, baskets, channels.

3. Contractor shall not adopt, use, or otherwise implement the omission of any seismic restraints without prior review and acceptance by the designers of record. All submittals for omission of seismic restraints must include the following and must be performed (signed & sealed) by a licensed California Structural Engineer and approved by HCAI.

   a. Project specific cover letter clearly indicating that said engineer has completely reviewed the project documents, and that the items/systems were designed individually and in coordination with all other trades and references the code section(s) where the omission of seismic restraints is allowed.

   b. Lateral motion of the supported items/systems shall not directly or indirectly impact adjacent life safety, emergency services and/or hazardous items/systems or their supports.

4. Seismic hardware brackets shall provide a (Captive) 360-degree connection that completely encloses or encircles the rod, anchor, bolt, fastener, etc. Open hook and/or open slot seismic hardware brackets shall not be allowed.

5. Seismic restraint assembly connections shall not incorporate the use of break-off bolts or nuts and pneumatic fasteners unless referenced in the OPM document.

6. Ceiling system shall not be used as a seismic restraint, sway brace and/or safety restraint material.

7. Non-seismic and/or safety restraints sway bracing shall meet or exceed that required for the attachment of seismic restraints to the building structure.

8. Seismic restraints shall be installed to provide a minimum of (2) two transverse and (1) one set of (2) two longitudinal braces per run and per the OPM document.

9. The accumulated load of multiple items at any given support (with or without seismic restraints) shall not overload the building structure and the support assembly.

10. Pipes, conduits, and other items attached to trapeze hangers shall be located uniformly along each individual trapeze hanger so that the accumulated load is evenly distributed.

11. Trapeze systems installed in a multi-layer configuration shall have seismic restraints designed and installed for each individual trapeze layer.

12. Design of supports, seismic restraints and anchorage to the structure shall consider all conditions that involve thermal, structural separation, relative displacement, building expansion and contraction.

13. SMACNA details shall not be used without prior approval by Structural Engineer

of Record (SEOR).

C. ACCEPTABLE MANUFACTURERS

1. HCAI Pre-approved Certified Manufacturer (OPM)

D. ANCHORS, INSERTS AND FASTENERS

1. All anchors, inserts, fasteners, or connections to the structure shall be submitted to the structural engineer of record for review and acceptance prior to installation.

2. Do not use any anchor or insert in concrete or metal decking with concrete fill, which does not have one of the following:

a. ICC evaluation report

b. HCAI pre-approval

3. Cast-in-place inserts that contain internal threads shall include the installation of a jam or lock nut to secure the connection of the vertical support rod to the cast-in-place insert.

4. Cast-in-place inserts that allow for horizontal adjustment shall not be allowed unless an engineered solution is provided to assure positive captured positioning and secured attachment.

5. Do not use powder driven and power driven (Shoot-In) fasteners, expansion nails or internally threaded anchors in concrete or metal decking with concrete fill without prior scanning of the slab and wall for clearances, and to prevent damages to embedded electrical conduits and/or mechanical piping and reinforcing steel.

6. All beam clamps shall be constructed of malleable iron or steel. All single flange mounted beam clamps shall include a retaining strap or J-hook and must be submitted to the project structural engineer of record of review and acceptance prior to installation. Beam clamps shall not be used to resist seismic loads.

E. FIELD QUALITY CONTROL

1. Inspection of seismic restraints by the Inspector of Record (IOR), and/or Authority Having Jurisdiction (AHJ).

2. Special inspection for special seismic certification per CBC 1705A.12.4.

PART III - EXECUTION

3.01 SEISMIC ANCHORING AND RESTRAINTS

A. Equipment anchors:

1. All equipment shall be anchored. Anchor equipment per details shown on the drawings where provided.

2. Anchor installation shall be in accordance with the current ICC report.

3. Anchor details provided are based on specific equipment information. Submit design for approval for anchoring of equipment which varies from design.

B. Conduit supports:

1. Conduits shall be supported and braced per CBC.

C. Lighting fixture supports:

1. Provide independent seismic support system per CBC.

D. Minimum clearance:

1. Diagonal braces and hanger supports shall maintain 6 inches minimum clearance from unbraced ducts and conduits, and 1-inch minimum clearance from braced ducts and conduits.

2. Except for sprinklers installed using flexible sprinkler hose, installed clearance shall be 3 inches between any sprinkler drop or sprig and permanently attached equipment and other distribution systems, including their structural supports and bracing.

3.02 INSTALLATION AND TESTING OF MECHANICAL ANCHORS:

A. Where permitted in other Sections of this specification, drilled-in expansion-type anchors or other post-installed concrete anchors may be used in hardened concrete.

B. All post-installed concrete anchors shall be tested. Testing shall be performed in the presence of the Inspector of Record. Number of anchors to be tested shall be as shown on the drawings with a minimum of 50% of anchors installed and at each support. Testing shall be performed by torque or pull test, and to the values noted on the drawings. Test loads, frequency, and acceptance criteria of post-installed anchors in concrete shall be in accordance with CBC 1910A.5.

C. Internally threaded shell-type anchors and displacement-controlled anchors (e.g., drop-in anchors, screw anchors, adhesive anchors, etc.) shall not be tested using a torque wrench.

D. Screw anchors shall be installed with a calibrated torque wrench and may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions.

E. Tension test of chemical/adhesive anchors and power actuated fasteners shall be in accordance with CBC and as noted on the drawings.

F. All testing procedures shall be in accordance with CBC 1910A.5, and as noted on the drawings.

G. Locate existing reinforcing steel and conduits in slabs and walls prior to drilling holes for the mechanical anchors.

END OF SECTION 01 45 10

SECTION 01 45 50

INSPECTION AND TESTING OF WORK

PART I - GENERAL

1.01 SECTION INCLUDES

A. Project Inspections and Procedures

B. Scheduling Inspectors – Notification requirements

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013200 – CONTRACT SCHEDULES

C. Section 013500 – SPECIAL PROCEDURES

D. Section 014100 – REGULATORY REQUIREMENTS

E. Section 014500 – QUALITY CONTROL

1.03 DEFINITIONS

A. IOR: Inspector-of-Record

B. ACO: Area Compliance Officer for HCAI

C. DSE: District Structural Engineer for HCAI

D. FM: Fire Marshal (may include both HCAI FM and State FM)

E. TL: Testing Laboratory

1.04 PROJECT INSPECTIONS AND TESTING PROCEDURES

A. Inspections: This Project (is) (is not) under the jurisdiction of the Department of Health Care Access and Information. The following inspections will be requested on this project, as appropriate. Also see Part 3 for non-HCAI inspection items or Part 3, Item 3.11 for HCAI requirements.

1. Inspections required by the California Building Code

2. Inspections listed on the Testing, Inspection and Observation (TIO) form

3. Final inspections

B. Procedures: University's Representative shall be the Contractor's contact for all inspection requests. Contractor shall fill out Inspection Request Form for all inspections.

1. Contractor shall properly plan and coordinate inspection requests. Schedule delays caused by Contractor's failure to plan and/or coordinate inspection requests will not be considered for adjustments to Contract Time or Contract Sum.

2. A complete set of HCAI/SFM stamped and approved Contract Drawings and Contract Specifications, including applicable shop drawings and building permit shall be available on site for review by the Inspector-of-Record. The Contractor, Subcontractors and other responsible parties shall be present during inspection walk-throughs. All areas of project scope shall be ready and accessible for inspection. Contractor shall provide access equipment as applicable for the inspector’s needs.

3. A complete set of codes referred to in the approved plans must be maintained on the job at all times.

4. Contractor shall submit verified compliance reports as outlined in the California Administrative Code, Section 7-151.

1.05 SCHEDULING INSPECTIONS –NOTIFICATION REQUIREMENTS

A. Advance Inspection Notification: University's Representative for this project requires the following advance notifications to schedule appropriate inspection agencies at the project site.

1. IOR Inspection Request Notification: Twenty-four (24) hours. Note: Inspection requests received by 2:00 PM will be scheduled for next day inspection. Inspection requests received after 2:00 PM will be scheduled for the following day; (example: Inspection request received at 2:01 PM on a Monday would be scheduled for inspection on Wednesday). Weekend and off-hours inspection requests will be scheduled on a case-by-case basis with a minimum of seventy-two (72) hour inspection request notification.

2. HCAI Field Compliance Inspectors: Fourteen (14) calendar days.

3. Testing Laboratory Inspections: Forty-eight (48) hours.

a. All testing laboratory and testing procedures must be scheduled by University's Representative. Inspections and/or testing directly scheduled by Contractor will not be accepted.

b. Contractor will bear all costs associated with unauthorized inspections and testing.

4. State Fire Marshal Inspection Request Notification: Seventy-two (72) hours.

B. Methods of Inspection Notification:

1. All inspection notifications shall be in writing using inspection forms located at back of this Section. Incomplete forms will be returned as non-compliant, and no inspection will be scheduled until all required inspection information is provided.

2. Emailed inspection requests will be accepted. University's Representative email address is lfuka@ucdavis.edu Notification time begins from the date and stamp of the email, provided it is sent during normal business hours. Emailed inspection requests sent after normal business hours and/or received on non-normal workdays, as defined in Specification Section 013100 – COORDINATION, paragraph 1.07.F.4.A will begin notification time starting at 7:00 AM the following normal business day.

C. Off-hours Inspection Requests: Contractor shall provide time windows for all off-hour or other than normal work hour inspections. University's Representative shall have final authority in setting times of off-hour inspections.

D. Re-inspections:

1. More than two (2) re-inspections: The cost of re-inspections of the same work, more than twice, shall be deducted from Contract Sum. IOR's hourly rates are $153.00 per hour during normal work hours and $229.50 per hour for all off-hour inspections. University will provide itemized invoice for Contractor's records.

2. Work unprepared for inspection: Re-inspections of the same work scheduled by Contractor, but not ready for inspection will be identified as a re-inspection.

PART II - PRODUCTS – Not Applicable to this Section.

PART III - EXECUTION

Note: Part 3 describes typical inspection requirements for each individual inspector's jurisdiction for non-HCAI projects. Part 3 is provided as a reference source for Contractor's use and Scheduling, as applicable. Part 3 is not intended to be all-inclusive and Contractor shall verify actual inspection requirements needed for this project. See Item 3.11 for Testing, Inspection Observation for HCAI.

3.01 FIRE DAMPERS (Title 24, Part 2, Chapter 43)

Note: Manufacturer's installation instructions shall be used for inspections and testing.

A. 1 Hour: IOR test 100%. State Fire Marshal tests 100% or as needed.

B. 2 Hour: IOR tests 100%. State Fire Marshal tests 100%.

C. Smoke: IOR tests 100%. State Fire Marshal tests 100%.

3.02 FIRE SPRINKLERS (Title 24, Part 2, Volume 1, Chapter 9; NFPA Bulletin 13)

A. Approved drawings shall be on jobsite from start to completion of project.

B. Underground pressure test @ 200 psi.

C. State Fire Marshal to witness installation of underground lines.

D. State Fire Marshal to witness underground flush prior to connection.

E. Hydro-test above ground piping @ 200 psi for two (2) hours.

F. Inspection of hangers, bracing, and seismic joint crossing(s).

G. Flow alarm test, tamper switch test.

H. Fire pump test.

I. Certification by installer (Title 24, Part 9, Article 1006.3.4.2).

J. Final inspection: signs in place, labeling, fire extinguishing system flow alarm test.

3.03 FIRE ALARM SYSTEM (Title 24; Part 9, Article 1006)

Note: Fire Sprinkler and Fire Alarm systems tests shall be performed in presence of State Fire Marshal.

A. Approved drawings shall be on jobsite from start to completion of project.

B. Verify Emergency Power source.

C. Activate all initiating devices.

D. Certification by installer (Title 24, Part 9, Article 1006.3.4.2).

E. Complete test of system per Title 24, Part 9, CFC, Article 1003.3.4.1).

3.04 MEANS OF EGRESS (Title 24, Part 2, Volume 1, Chapters 10)

A. Exit sign/light locations and connected to two (2) sources of power.

B. Normal Power.

C. Emergency Electrical System, Life Safety Branch.

D. Construction - floors, walls, ceilings, penetrations per listings.

E. Electrical boxes - no back to back, 24 inches horizontal separation (Section 709).

F. Electrical boxes - 100+ square inches to be wrapped/protected.

G. Flame Spread, Fuel Contribution and Smoke Density for finishes (Chapter 8).

3.05 EMERGENCY LIGHTING

A. Generator Test (Title 24, Part 3, Section 700-4; Section 701-5).

B. Emergency lights - locations (Title 24, Part 2, Volume 1, Chapter 10, Section 1003.2.8.5).

3.06 KITCHEN HOOD FIRE SUPPRESSION SYSTEM (Title 24, Part 9, Article 10, Section 1005; Part 9, Section 10.513)

A. Approved drawings shall be on jobsite from start to completion of project.

B. State Fire Marshal to witness system test.

3.07 MECHANICAL CHECKLIST FOR CLOSE-OUT (Title 24, Part 4)

A. Mechanical Equipment Requirements

1. Access to Equipment (Section 305, 405, 606.5, 815, 2.2.8, 903, 910.8, 1106.3).

2. Labeling of Equipment (Section 307).

3. Identification of Equipment - Area or Space Served (Section 304.5).

B. Mechanical Testing

1. Air balance completed and reviewed by Mechanical Engineer-of-Record.

2. Hospitals (Chapter 3, Section 314.1, Table 2110-A).

3. Skilled Nursing (Chapter 3, Section 314.2) [test to include humidity controls in required areas - Section 2102(a)].

4. Hydronic balance completed and reviewed by Mechanical Engineer-of-Record.

5. Air and Hydronic reports forwarded to Mechanical Engineer of Record.

6. Fuel Gas line inspection (Part 4, Section 1406 and Appendix B, Chapter 16).

7. Atrium and/or Building Smoke Evacuation System (State Fire Marshal to witness).

C. Boilers

1. Boiler – Operating Adjustments and Instructions (Section 1022).

2. Boiler – Inspections and Tests (Section 1023).

3. Boiler – Clearances/Permits (Section 1005.0).

D. Ducts

1. Installation - Bracing (Part 4, Section 604.1.4)

2. Fire Damper test log from IOR (Part 4, Section 606.2).

3. Fire Damper test by State Fire Marshal (Part 4, Chapter 6, Section 606.2).

4. Smoke Damper and Detector test log from IOR (Including Duct Detector tests).

5. Smoke Damper and Detector by State Fire Marshal.

E. HVAC Unit Testing

1. Verify correct filter types and efficiencies.

2. Motor Rotation.

3. Condensate drain tests (Section 310).

4. Equipment shut down by smoke detectors (duct or space).

3.08 PLUMBING CHECKLIST FOR CLOSE-OUT (Title 24; Part 2, Chapter 29; Part 5)

A. Piping Systems (Title 24, Part 5)

1. Domestic Water Line Sterilization Test (Title 24, Part 2, Section 609.9; Title 22, Division 4, Chapter 16, Article 5).

2. Domestic Water System (hot, cold) Pressure test (Title 24, Part 5, 609.4).

3. Natural Gas Pressure Test (Title 24, part 5, Chapter 12, Section 1204).

4. Vent & Waste System Pressure test (Title 24, Part 5, 712.0).

5. Hydronic Water Pressure test (Title 24, Part 4 1201.2.8).

B. Water Heater Testing

1. Water Heater Temperature Test (Domestic/Patient) (105-120°F).

2. Water Heater Temperature Test (Kitchen) (180°F).

3. Water Heater Temperature Test (Laundry) (169°F).

4. Water Heater Temperature Alarm Test (Patient) (125°F).

C. Medical Gas System Testing (NFPA 99, Chapter 4) (Witnessed by SFM).

1. Pressure test - 150 psig - Oxygen, Medical Air & Nitrous Oxide (4-3.4.1.2).

2. Pressure test - 200 psig - Nitrogen (4-5.1.3.4).

3. 24-hour pressure test - 60 psig - Vacuum system (4-10).

4. 24-hour pressure test - 20% over operating pressure [A-4.3.4.1.2 (b)(e)].

5. Alarm test for system [4-3.4.1.3 (d)].

6. Area Valves, location, labeled, alarms tested (4-4.1 & 4-5.1.4).

7. Laboratory testing affidavits - welding/brazing (4-6.2.3.3).

8. Verified Medical Air Quality - Installation and 24 hour later.

9. Certification of system (Purity, Cross Connection, Alarms, Etc.) [4.5].

10. Certification of Bulk System [NFPA 50 (Oxygen) & CGA G-8.1 (Nitrous Oxide)].

11. Approved drawings and documents for submittal to University's Representative for permanent records).

3.09 ELECTRICAL CHECKLIST FOR CLOSE-OUT (Title 24, Part 3, and Part 1, Chapter 7, Section 7-141, 7-149)

A. Main Panel/Service

1. Identification and Labeling of Equipment (110-21, 110-22, 230-70).

2. Grounding test and Certification (250, 250-56).

3. Ground fault interrupt test adjustment and certification [230-95(c); 517-17(c)].

4. Emergency power transfer switch test (700-4).

5. Panel load balance.

B. Emergency Power and Standby Systems (Article 700 & 701) [Test Logs from IOR]

1. Emergency Generator testing and certification (701-5).

2. Identification and Labeling of equipment (110-21, 110-22, 517-22).

3. Lighting and Lighting Levels (517-22).

4. Receptacles (410L, 517-13, 517-18, 517-19).

5. Exiting signs and lights [517-32(b), 517-42(b)].

6. Nurse and Staff Call [517-33(a)].

7. Fire Alarm (760).

C. General Electrical Requirements

1. Working space/Headroom [Table 110-26(a); 110-33; 110-34].

2. Circuits and lights tested (410-45).

3. Receptacle polarity and grounding [200-10(b)].

4. Isolated ground monitor test [517-160(b)].

5. Motor load current adjustment.

6. Identification and Labeling of equipment (110-21; 110-22).

7. Identify circuits (Critical Care Areas) (517-19).

D. Miscellaneous Electrical Requirements

1. Test logs from Contractor and Inspector-of- Record.

2. Electrical Engineer-of-Record acceptance of system.

3. Owner In-Service training on Equipment.

4. Equipment Manuals and Instruction to Owner.

5. Warrantees and Equipment Certification.

6. As Built/Record Drawings to Owner.

3.10 FIRE MARSHAL INSPECTION REQUIREMENTS

A. Framing Inspections

1. Structural members in fire-resistive construction.

2. Check fireproofing per approved design tested assembly description.

B. Fire-Rated Partition Locations

1. Check for stud and nailing/screwing spacing per approved design tested assembly description.

2. Check for fire blocking in combustible construction.

3. Check for rated door/window frame installation (manufacturer's installation instructions shall be available for review).

4. Check for electrical installation, for example, number and size of electrical boxes, panels, cabinets, etc.

5. Check hangers, seismic bracing for sprinkler piping installation, if applicable (this would be checked during overload pressure test inspection phase of sprinkler system).

C. Close-In Inspections

1. Check fire-blocking and draft stops in combustible construction.

2. Check gypsum board installation in accordance with approved design assembly description for rated assembly.

3. Check integrity of firewall construction where recessed cabinets, panels, excessive electrical/plumbing are installed.

4. Check fire damper installation (manufacturer's installation instructions shall be available for review). Fire Marshal will witness actuation of minimum 10% fire dampers installed and 100% in 2 hour or greater fire rated wall assemblies.

5. Check for through-penetrations and fire-stop systems in all walls or floor/ceiling assemblies.

    a. Check top of wall to structure fire stopping.

6. Check above ceiling areas and construction prior to installation of ceilings.

    b. Check access and serviceability for above ceiling to included but not limited to valves, mechanical equipment, electrical equipment and other components that require adjustment, access or service.

    c. Contractors hall move any items including but not limited to conduit, piping, braces and other obstructions that block access to equipment and components needing adjustment, access or service.

    d. Check bracing, anchorage, fasteners and installation.

D. Final Construction Inspections

1. Final project walk-through: Example, Emergency lighting will be tested to verify exit illumination of both interior and exterior, while generator (if applicable) is tested at same time.

3.11 HCAI – Testing, Inspection and Observation (TIO)

A. Refer to HCAI approved TIO.

3.12 Refer to the following attachment

A. Inspection Request

B. Non-conforming Work Notice

END OF SECTION 01 45 50

INSPECTION REQUEST

Project#: M052923 **HCAI #:**_____**UCDH IR #:**_____ **Contractor IR #:**_____**Date:**_____
Project Name: SESP Kitchen Remodel **Spec Section (s):**_____

To: UC Davis Health	**From:**
Facilities Design & Construction – Inspection Trailer	
4430 V Street, Building 35	
Sacramento, CA 95817	
P: 916-734-5060	**P:**
Email: lfuka@ucdavis.edu & Project IOR	**E-mail:**

Drawing Ref.: _____ **Detail:**_____ **Shop Drawing:**_____

Project Schedule Activity ID No.:_____ **Date of Inspection:**_____ **Time Requested:**_____

Type of Inspection: _____

Location of Inspection (i.e., Floor, Column Line, etc.): _____

***Re-inspection Requested for Previous UCDH IR #:** _____

All work Requested for Inspection has been reviewed for compliance with the contract documents by [Contractor's Superintendent prior to notification of Inspection Request.

Signed: _____ **Date:** _____

UNIVERSITY USE ONLY

Date Received:_____ **Time of Inspection:**_____

Date of Inspection:_____**Inspector:**_____☐ **Inspection Report Attached**

Inspector Arrival Time:_____ **Inspector Departure Time:**_____

Comments: _____

☐**Approved** ☐**Approved as Noted** ☐**Not Approved** ☐ **Cancelled**

Inspection Request Notes or Description of Items of Deficiency if needed below (Part 1, Chapter 7, Section 7-145, item 6)

Project Field Record of Construction Progress Summary of Work in Progress (Part 1, Chapter 7, Section 7-145, item 6)
Project Phase (Building Foundation, Structural, Wall Framing, Electrical Rough-In, Sprinkler Rough-In, etc.)
Project Phase Percentage Complete (% of the phase completed): **Overall Project Percentage Complete:**

NON-CONFORMING WORK NOTICE

PROJECT #: M05293 **HCAI #:**_____ **Notice #:**_____ **Date:**_____

To: [PROJECT MANAGER NAME/EMAIL]	**From: UC Davis Health IOR**
[DESIGN PROFESSIONAL NAME/EMAIL]	**Facilities Design & Construction – Inspection Trailer**
[IF HCAI PROJECT, AREA COMPLIANCE OFFICER/EMAIL]	**4430 V Street, Building 35-A**
	Sacramento, CA 95817
	P: 916-734-5060

Spec Section Ref.:_____ **Paragraph:**_____ **Drawing Ref.:**_____

Detail: _____

In accordance with Article 12 of the General Conditions, the following defective condition(s)has/have become apparent:

Reported by: _____

CORRECTIVE ACTION SHOULD BE TAKEN AS SOON AS POSSIBLE AND COMMENCE NO LATER THAN TEN (10) CALENDAR DAYS AFTER THIS NOTICE. COORDINATE THE VERIFICATION OF THE CORRECTIVE ACTIONS WITH THE INSPECTOR OF RECORD. IF FURTHER INFORMATION IS NEEDED, ADVICE UNIVERSITY'S REPRESENTATIVE IN ACCORDANCE WITH THE GENERAL CONDITIONS.

Description of corrective action taken: _____

Accepted by: _____ **Date:**_____

CC:

SECTION 01 51 00

TEMPORARY UTILITIES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Temporary Power and Lighting.

B. Temporary Heating, Cooling & Ventilation.

C. Temporary Water.

D. Temporary Fire Protection.

E. Temporary Telephone, Data, and WIFI.

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013500 – SPECIAL PROCEDURES: General requirements for temporary facilities and controls, to accommodate the University's occupancy and use of the areas and spaces adjacent to construction.

C. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

D. Section 017400 – CLEANING

E. Section 017700 – CLOSEOUT PROCEDURES

1.03 TEMPORARY UTILITIES

A. Temporary Connections: Temporary power, water, sewer, gas and other utility services necessary for the Work may be made to existing building systems. Connections shall be subject to University's review and written approval. Coordinate with utility companies and University's Plant Operations & Maintenance Department for locations and methods of connections.

B. Contractor shall provide and pay for installation, operation, maintenance, and removal of all utilities. The services will be provided at the current rates for each utility.

1.04 TEMPORARY POWER AND LIGHTING

A. Service Requirements:

1. Temporary Electrical Service: Contractor shall provide and pay for installation, operation, maintenance, and removal of temporary electrical service, lighting devices and restoration of existing and permanent equipment in accordance with applicable provisions of the Electrical Safety Orders of the State of California. Use of University's electrical power and lighting system is prohibited without University's written approval and will be considered only when an alternate electrical power source is unavailable.

a. Install initial services at time of site mobilization.

b. Modify and extend systems as Work requires.

c. Maintain electrical system to provide continuous service, including prompt restoration of interruptions to University systems when temporary service is connected.

d. Restore existing and permanent lighting used during construction to original condition. Replace defective fixtures, bulbs, and other component parts.

e. Clean existing and permanent lighting fixtures used during construction per Section 017400 – CLEANING.

2. Distribution: Contractor shall provide distribution network for temporary electrical power.

3. Power Source: Arrange for service with University's Plant Operations and Maintenance Department, or local utility company.

4. Conformance: All temporary wiring and electrical facilities shall be in accordance with applicable provisions of Electrical Safety Orders of the State of California.

5. Temporary Lighting: Construction lighting shall be supplied and maintained by Contractor at Contractor's expense. Sufficient lighting levels shall be provided to allow construction to be properly and safely performed. Contractor shall give special attention to adequate lighting for stairs, ladders, floor openings, basements and similar spaces. Promptly replace burnt out, worn or defective parts.

6. Lighting fixtures: Locate fixtures in areas of Work: One (1) lamped fixture in rooms, except closets and utility chases; one (1) lamped fixture for every 750 square feet in large areas.

7. Security Lighting: Contractor shall provide security lighting during hours of low visibility.

B. Distribution requirements:

1. Weatherproof distribution boxes with one (1) - 240-volt, three (3) phase power outlet and four (4) – 120-volt outlets consisting of 100 amperes fused switches with equipment ground, spaced so a 100-foot extension cord will reach all areas of building.

2. Wiring, connections and protection for temporary lighting.

3. Wiring connections and protection for temporary and permanent equipment, for environmental control, for temporary use of electricity operated equipment, and for testing.

C. Use of University System: If alternate electrical power and lighting sources are unavailable, University may permit Contractor to use existing, in-place electrical system. University does not guarantee availability of electrical power or adequate lighting levels through use of existing system. If power and lighting is insufficient or not available Contractor shall provide secondary source (i.e., generator) as approved by University.

1. It is expressly understood and agreed by Contractor that University existing power and lighting system's primary obligation is servicing patient care. The University system is not designed for purposes of construction activities.

2. Contractor should expect power and lighting interruptions during course of Work. Contractor will be required to cease use of University electrical-power and lighting systems, as required by the needs of University.

3. When use of University electrical system is approved in writing, Contractor is required to adhere to University's electrical lockout procedures. See Division 26–Electrical or Campus Design Guidelines.

a. Provide and maintain warning labels on energized equipment.

b. Replace plates, electrical devices or similar existing items or components damaged as a result of temporary usage.

1.05 TEMPORARY HEATING, COOLING AND VENTILATING

A. Service Requirements:

1. Contractor shall provide temporary heat as necessary for proper installation of all work and to protect all work and materials against injury from dampness and cold and to dry out building. Fuel, equipment and method shall be approved in writing by University’s Representative.

2. Install initial services at time of site mobilization. Modify and extend systems as Work requires.

3. Maintain systems to provide continuous service, including prompt restoration of interruptions to University systems when temporary service is connected.

4. Use of permanent heating system is preferred to any other system for maintaining temperature of building during installation of finish materials, but such use will not be permitted before clean-up after plastering and/or drywall work has been

completed. Contractor shall make every effort to complete permanent heating system in time for such use. Permanent fans shall not be used before filters are installed. Filters shall be cleaned and serviced by Contractor just prior to final acceptance.

a. Vent portable units to building exterior, complete with automatic controls. Direct-fired units are not allowed. Locate units and outlets to provide uniform distribution of heating, cooling and ventilating.

b. Operate and maintain existing equipment being used; clean or replace filters and install filters in duct extensions as necessary to maintain occupied areas, work areas and finished areas, in specified condition.

c. Prior to operation of permanent equipment, verify controls and safety devices are complete, equipment has been tested, and inspection made and approved for operation.

d. Remove temporary materials and equipment when permanent system is operational. Restore existing and permanent systems used for temporary purposes to original condition.

e. Install temporary filters in air handling units and ducts, replace as necessary to prevent dust in equipment and ducts, to avoid contaminants in Work or finished areas. After completion, replace temporary filters with new, clean, reusable filters.

5. Maintain temperature, humidity, and ventilation in enclosed areas to provide ambient conditions for storage, preparation and Work; to cure installed materials, to prevent condensation, to dry floor surfaces and to prevent accumulations of dust, fumes and gases.

6. During non-working hours maintain temperature in enclosed areas occupied solely by Contractor at a minimum of 50ºF., or higher as specified in individual Sections and by individual product suppliers and manufacturers. Areas occupied in whole or in part by University are to be maintained at normal temperatures.

7. Provide high efficiency particulate air (HEPA) filters as specified in SECTION 015610 – AIRBORNE CONTAMINANTS CONTROL, negative pressure ventilation, or special control of existing system as determined by University's Representative.

B. Utility Sources:

1. Electrical: As specified above in Item 1.04.

2. Existing mechanical systems may be used for temporary purposes. Coordinate use with University for conditions to be maintained in adjacent University occupied areas.

3. Contractor shall provide and pay for all installation, operation, maintenance and removal of equipment in accordance with applicable provisions of the Electrical Safety Orders of the State of California.

1.06 TEMPORARY WATER

A. Service Requirements:

1. Maintain systems to provide continuous service, including prompt restoration of interruptions to University's systems when temporary service is connected.

2. Water service, if necessary for construction, can be made available at no expense to the Contractor provided the water is not wasted. Contractor shall be responsible for distribution of water to points of use.

3. Certified reduced pressure type back-flow prevention device as submitted to and approved by University shall be installed before water is obtained from a University campus fire hydrant or interior building connection.

B. Plumbing: Maintain system to provide continuous service with adequate pressure to outlets, including University system when temporary service is connected. See also Division 1 Approvals and ILSM requirements.

1. Size piping to supply construction needs, temporary fire protection, and for University's needs when existing service is connected.

2. Disinfect piping used for drinking water. See Division 33 and 22 for requirements or Campus Design Guidelines

3. Source: University existing service, connect at locations as directed by University.

4. Provide valved outlets to control water pressure adequately for hoses.

5. Fire hydrants used for water supply for construction – Contractor must use only ⅞" square hydrant wrench on square operating nut and must use only pentagon wrench on pentagon operating nut. This is to prevent damage to the hydrant operating nut. Any damage caused by the use of an improper wrench or other misuse of the hydrant must be repaired at contractor expense. Contractor must inspect hydrant prior to use and make the University aware of any pre-existing damage.

C. Use of Existing System: Existing system may be used for temporary water. Monitor usage to prevent interference with University's normal operational requirements.

D. Use of Permanent System: Contractor shall obtain written agreement from University establishing start of warranty period and conditions of use.

E. Contractor shall pay for installation, operation maintenance and removal of system and restoration of existing and permanent equipment. University will pay costs of water consumed for normal construction operations. Contractor shall take measures to conserve usage.

1.07 TEMPORARY FIRE PROTECTION

A. Requirements:

1. Maintain systems to provide continuous service, including prompt restoration of interruptions to University systems when temporary service is connected.

2. Provide and maintain fire protection equipment including extinguishers, fire hoses and other equipment as necessary for proper fire protection during course of the Work.

3. Use fire protection equipment only for fighting fires.

4. Locate fire extinguishers in field offices, storage sheds, tool houses, other temporary buildings and throughout construction site. In area under construction, provide at least one (1) fire extinguisher for each 5,000 square feet of building floor area. Locate fire extinguishers so that a person never has to walk more that seventy-five (75) feet to obtain one.

5. Assign qualified person with authority to maintain fire protection equipment, institute fire prevention measures, and direct prompt removal of combustible and waste material. Submit ILSM requirements per Specification SECTION 013500 – SPECIAL PROCEDURES.

1.08 TEMPORARY TELEPHONE, DATA, INTERNET, and WIFI

A. Service Requirements:

1. Maintain systems to provide continuous service, including prompt restoration of interruptions to University systems when temporary service is connected.

2. Contractor shall select from the following options:

a. University shall provide conduit, cabling and dial tone to Contractor's location(s). Contractor shall pay University for cable, conduit installation and later removal of same and also pay University a monthly fee for use of University telephone, data internet, and WIFI system.

b. University shall provide conduit and cabling to Contractor's location(s). Contractor shall receive dial tone from local utility. Contractor shall pay University for cabling, conduit installation, maintenance of same and later removal of same. Contractor shall pay local utility for monthly telephone, data, internet and WIFI service.

3. Contractor shall select number of lines, instruments and other features.

4. Contractor shall prepare and submit to University an itemized request for telephone lines (according to option 2a or 2b above) and internet service. Project Manager will submit a service request to the IT department.

B. Use of Existing System: Existing University telephone system shall not be used for temporary telephone service.

C. Contractor Phone:

1. Contractor shall have telephone emergency number or other facility available at Contractor's business office for duration of contract where contractor and superintendent may be contacted within twenty-four (24) hours. Provide emergency numbers to University.

D. Telephones:

1. Contractor shall use, and only permit to be used, FCC approved communication devices on frequencies approved by FCC and University.

2. Contractor shall not use, or permit to be used, communication devices which interfere with existing University communication systems, including, but not limited to:

a. Life Flight or CHP helicopters.

b. Emergency Service vehicle communications.

c. Plant Operations & Maintenance communication devices.

d. Microwave transmission stations.

e. UC Davis Health closed-circuit television or radio signals.

f. Cellular or other mobile phone systems in main hospital.

g. UC Davis Health voice or digital paging systems.

E. Temporary Internet Service: Contractor to provide a high-speed internet connection (Min. 20 Mbps download, 10 Mbps upload) to Contractor's field personnel (e.g. mobile hot spot). The Contractor's field personnel shall be capable of sending and receiving e-mail and be able access the Internet.

1. University provided Guest WIFI coverage will be provided at the jobsite but shall not to be used as substitute for the above internet service.

PART II - PRODUCTS

2.01 MATERIALS

A. May be new or used, adequate to the purpose.

B. Devices and Equipment: Standard devices, meeting UL requirements.

C. Telephones: may be product of local service company or specialty devices compatible with service company requirements.

D. Modems compatible with internet service.

PART III - EXECUTION

3.01 INTERRUPTION OF EXISTING SERVICES

A. No existing utility services shall be interrupted at any time without prior written approval from the University. Required shutdowns shall be scheduled a minimum of fourteen calendar days prior to actual shutdown. The operation of valves, switches, etc. will be performed and paid for by University.

1. Prior to the outage, all possible Work shall have been completed which will minimize the length of the required outage. During the outage, the Work will be prosecuted with diligence by an adequate number of skilled personnel.

2. Provide and pay for all personnel required by the University to maintain safe conditions during the outage including but not limited to fire watch, safety monitors and/or traffic control. Coordinate Work with University's Representative.

3.02 REMOVAL OF TEMPORARY CONSTRUCTION

A. At the completion of the Work, the Contractor shall remove from the Project site all temporary utilities and services construction. Leave the Project site clean and free from debris, materials, or equipment.

END OF SECTION 01 51 00

SECTION 01 52 00

CONSTRUCTION FACILITIES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Field Offices and Sheds

B. Temporary Facilities

C. Temporary Sanitary Facilities

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013500 – SPECIAL PROCEDURES: General requirements for temporary facilities and temporary controls to accommodate University continued occupancy and use of the areas and spaces adjacent to construction.

C. Section 017400 – CLEANING

D. Section 017700 – CLOSEOUT PROCEDURES

1.03 FIELD “OFFICES”

A. Contract Documents: Complete set of Contract Drawings and Contract Specifications shall be kept continuously at the site. Copies of all Change Orders, letters, Shop Drawings, etc., shall be kept on the jobsite at all times and shall be available for inspector's use.

B. Contact numbers: Contractor shall provide telephone numbers where Contractor may be reached at all times during normal working hours and after normal working hours, if emergency problems develop that require Contractor's assistance.

C. There is no location on campus for contractor’s Storage Sheds or Containers for Materials, Tools and Equipment. Contractor to provide off-site storage for this project. Contractor shall be solely responsible for properly insuring offsite storage facilities.

D. Cleaning: Daily janitorial services for cleaning and maintenance of work areas. Contractor shall keep construction loading and parking areas clear of construction debris, especially debris that may cause slipping or tripping hazard that may injure vehicle tires, that may stain surfaces, and that may be tracked into existing buildings. Maintain approach walks free of mud and water.

E. Removal: Upon completion of the work, and before the final payment, Contractor shall remove all temporary work and facilities and return site to condition required by the General Conditions of the Contract and at no change to the Contract Sum or the Contract Time.

1.04 TEMPORARY FACILITIES

A. Contractor shall provide and maintain the following temporary facilities as required for execution of the Work:

1. Scaffolding, staging, runways and similar equipment.

2. Hoists or construction elevators, complete with operators, power and signals required.

3. Temporary rigging, rubbish chutes, barricades around openings, ladders between floors, and similar equipment.

4. Barricades, fencing, lights and similar safety precautions.

5. Security cameras for remote video surveillance of the project site and 24/7 monitoring services that records and reports incidents and alarms. Security cameras to provide full coverage of the construction and storage site area.

B. Maintenance: Use all means necessary to maintain temporary construction facilities and controls in proper and safe condition throughout progress of the Work.

C. Replacement: In event of loss or damage, promptly restore temporary construction facilities and controls by repair or replacement at no change to the Contract Sum or the Contract Time.

D. Conformance: All materials and equipment required to safely accomplish work under this Section shall be in conformance with requirements of CAL OSHA and other State and Federal Codes and regulations where applicable.

E. Codes: All temporary work and facilities shall conform to the above requirements that pertain to operation, safety and fire hazard.

F. Construction Site Security: Temporary barriers, doors and gates shall be keyed to University’s master lock system. Security hardware to be provided by Contractor. Keying to University master lock system will be provided by University.

1.05 TEMPORARY SANITARY FACILITIES

A. Use of existing facilities: Designated toilet facilities may be used by Contractor.

1. Assigned facilities: Location of assigned toilet facilities and maintenance of same are responsibility of University. Contractor shall not have exclusive use to these facilities and shall abide by health and safety criteria regarding their use and sanitary upkeep.

2. Unassigned facilities: Unassigned toilet facilities shall not be used without written authorization of University's Representative.

3. Contractor may use existing toilet facilities that are within the limits of the Work.

B. Portable units: [NOT USED]

PART II - PRODUCTS

2.01 MATERIALS

A. Serviceable, new or used, adequate for required purpose.

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 52 00

SECTION 01 55 00

VEHICULAR ACCESS AND PARKING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Construction Parking and Access Roads

B. Traffic Regulation

C. Project Informational Signs

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

C. Section 013500 – SPECIAL PROCEDURES: General requirements for temporary facilities and temporary controls to accommodate University's continued occupancy and use of the areas and spaces adjacent to construction.

D. Section 017400 – CLEANING

E. Section 017700 – CLOSEOUT PROCEDURES: Project Closeout.

1.03 PARKING AREAS AND ACCESS ROADS

A. Access Roads: Existing roads shall be used for construction access within limits defined herein. Temporary construction access roads shall not be permitted.

B. Parking: Parking is controlled and limited by University.

1. Parking of personal vehicles belonging to Contractor employees may be arranged with University's Parking Services, at 916-734-2687. Parking will be allowed in applicable permit areas, at the current permit rates. Parking is dependent upon space availability.

2. Delivery of materials may be made to the job-site as required. Contractor shall coordinate with University's Representative.

3. Debris Trailers or trucks shall be temporarily parked at the east bay of the Main Hospital Loading dock and only for as long as it takes to load-out debris.

C. Existing Pavements and Parking Areas: Refer to section 011400 Work Restrictions.

1. Vehicles with metal tracks will not be allowed. Do not allow heavy vehicles or construction equipment off of rated roads or parking lots.

2. Maintain traffic and loading areas in a sound condition, free of excavating material, construction equipment, products, dust, mud and debris.

3. Maintain existing and permanent paved areas used for construction. Repair existing facilities damaged by usage to original condition: promptly repair breaks, potholes, low areas, standing water and other deficiencies, to maintain paving and drainage in original or specified condition.

4. Remove temporary materials and construction at load-out/load-in areas.

1.04 TRAFFIC REGULATION

A. Schedule of Access Closing: Contractor shall adopt all practical means to minimize interference to traffic. Access to other facilities in the area shall be maintained at all times. Contractor shall provide schedule of planned closing of any street for approval by University and shall give minimum of fourteen (14) calendar days' notice before closing any street or access.

B. Use of Fire Lanes: Contractor shall notify University of all major pickups and deliveries that require use of controlled access fire lanes. Keys to gates or other barriers will be provided, as needed, to allow use of fire lanes. Vehicles parked in fire lanes for delivery of materials shall be continuously manned for immediate removal if required by the University.

1. Fire Lanes to remain open at all times and shall not be blocked without a Traffic Control Plan provided prior to work at the Fire Lane and approved by the University's Representative.

C. All major pick-up and delivery operations shall occur in total before or after normal working hours.

1. Drawings may indicate haul routes designated by University for use of construction traffic. Confine construction traffic to haul routes.

2. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

D. Post-mounted and wall-mounted traffic control and informational signs as specified herein.

1. Traffic Control Signs, Traffic Message Boards, Cones, Drums, Flares, Lights and Flag Control equipment: All as approved by California MUTCD requirements.

2. Contractor shall furnish at all barricades: Lights and flag control required to control traffic, and shall also provide and maintain suitable temporary barricades, fences, directional signs, or other structures as required for protection of the public; and maintain from the beginning of twilight throughout the whole of every night on or near the obstructions, sufficient lights and barricades to protect the public and/or the Work.

E. Construction Vehicle Parking: Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and University's operations. Prevent parking on or adjacent to roads or in non-designated areas.

F. Flag Control: Provide properly trained and equipped flagmen to regulate vehicular traffic when construction operations or traffic encroach on public traffic ways.

1. Provide properly trained and equipped personnel to regulate pedestrian traffic at all interior locations where construction traffic interfaces with University traffic.

2. Flag control personnel shall wear appropriate identifying clothing such as bright colored vests, clearly visible and identifiable as having responsibility for traffic control.

G. Lights: Use lights during hours of low visibility to delineate traffic lanes and to guide traffic.

H. Traffic Signs and Signals: At approaches to site and on site, install traffic signs and signals at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

1. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.

2. Relocate traffic signs and signals as Work progresses, to maintain effective traffic control.

3. Remove equipment and devices when no longer required. Repair damage caused by installation.

1.05 PROJECT INFORMATIONAL SIGNS [NOT USED]

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 55 00

SECTION 01 56 00

TEMPORARY BARRIERS, ENCLOSURES and CONTROLS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Barriers and Enclosures

B. Protected Walkways and Weather Closures

C. Tree and Plant Protection

D. Temporary Controls

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013500 – SPECIAL PROCEDURES

C. Section 016100 - PRODUCT REQUIREMENTS

D. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

E. Section 017400 – CLEANING

1.03 BARRIERS AND ENCLOSURES

A. Barricades: Provide to prevent public and employee entry, to protect existing building elements/finishes and existing adjacent facilities from damage during construction period. If required, all traffic control methods/materials shall comply with California MUTCD requirements.

B. Partitions and Ceiling Enclosures:

1. Fire Resistive Assemblies: provide, install and maintain Abatement Technologies Aire Guardian partitions system to comply with ICRA and ILSM requirements.

a. Provide non-stick at intersections of barriers and existing finishes (blue masking tape).

b. Provide Aire Guardian Panels (panels with vents) for negative air machines and for temporary routing of existing supply air registers from interior to exterior of containments. Provide adequate quantities of air panels to allow for existing CFM volumes at supply air registers and modify Air Panel Diffuser as required for existing supply air registers.

c. Provide Aire Guardian doors and door hardware with coded locks.

d. Access/egress: refer to 01400 Work Restrictions.

2. Temporary Containment Enclosures - Non-Rated Assemblies for Dust Control: Provide non-combustible dust-proof barriers framed with spring poles and covered on public side with Fire Retardant plastic sheathing material. Griffolyn or equal.

   a. Joints shall be taped and sealed over framing.

   b. Bracing shall be self-supporting without fastening to existing finishes.

   c. Provide gaskets of closed cell neoprene, or strips of painter tape between barriers and existing finishes.

   d. Provide non-staining taped seal to surrounding materials to insure seal.

   e. Small containments for localized Dust Control: Fire Retardant plastic sheathing material. Griffolyn or equal. Other detail similar to 1.03-B.2.c.&d. above.

   f. Mobil mini-cube containment. Abatement Technologies Aire Guardian AG8000 or equal.

3. Refer to Section 016100 for material and equipment substitution requirements.

C. Removal: Remove temporary materials, equipment and construction at completion; repair damage caused by installation or use of barricades and enclosures. Restore existing facilities used during construction to specified and/or to original condition.

1.04 DIESEL VEHICLE/EQUIPMENT IDLING PROCEDURES

A. When drivers of diesel powered on-road vehicles arrive at loading or unloading areas to drop-off or pick-up passengers, supplies, equipment, materials, etc., they shall turn off their vehicle’s engine as soon as possible but no later than five minutes after arrival.

B. Operators of off-road diesel-powered equipment shall turn off their engines when the equipment is not performing its primary function, but no later than five minutes after the equipment has come to a stop.

C. Idling for “warm-up” prior to diesel vehicle or equipment operations on University property shall be limited to a maximum of five minutes.

D. At end of work shift, or for the purpose of servicing, all diesel equipment shall be parked on site at furthest location away from Hospital air intake systems.

E. All diesel-powered equipment shall be maintained in good operating condition. University representative will direct Contractor to remove any equipment producing high amount of diesel fumes resulting from diesel equipment being old or in poor operating condition.

1.05 PROTECTED WALKWAYS AND WEATHER CLOSURES

A. Cover walkways to provide access to existing facilities for use by public and University personnel.

B. Provide temporary roofing and weather-tight insulated closures of openings in exterior wall surfaces, to maintain specified working conditions, to protect products and finished work from inclement weather.

C. Critical access and protected walkways shall comply with the CBC and CFC.

1.06 TREE AND PLANT PROTECTION

A. Tree Protection: All trees not marked for removal shall be protected against damage from construction operations. Where necessary, in the opinion of University's Representative, trees surrounding building footprint or in close proximity to construction operation shall be protected with barricades. No trees shall be cut or felled without approval of University's Representative. Trees cut and/or removed without explicit instruction shall be replaced by Contractor at no cost to the University.

B. Cutting and Pruning: Cutting and pruning of trees to accommodate construction shall be done only with approval and direction by University's Representative. Soil within the spread of tree branches (within drip line) shall not be disturbed except as directed by excavation or trenching drawings. Advance notice shall be given University if tree roots of 3" diameter or greater must be cut.

C. Drip line Protection: Cars, trucks, or equipment shall NOT be parked or set within the drip line of any tree; nor shall there be any stockpiling or temporary building erected within the drip line.

1.07 TEMPORARY CONTROLS

A. Dust Control: Contractor shall take appropriate steps throughout project to prohibit airborne dust due to work under this contract. Execute work by methods to minimize raising dust from construction operations. Water shall be applied wherever practical to settle and hold dust to minimum, particularly during demolition and moving of materials. No chemical dust prohibitor shall be used without written approval by University's Representative.

B. Noise Control: Control noise as directed by University's Representative.

C. Pollution Control: Use of noxious or toxic materials for all applications in alterations or work in buildings occupied by University personnel shall be done after proper notification and approval by University, this includes work performed on weekends or other unoccupied times.

1. 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.

D. Waste Control: All waste materials resulting from process of clearing and construction shall be disposed of as follows:

1. General Refuse: All refuse and debris, combustible and incombustible, resulting from construction process, shall be removed from University property as described in the General Conditions of the Contract. Contractor shall not use any refuse container belonging to University.

2. Hazardous Refuse: Solvents, oils and any other hazardous material shall be disposed of in containers and removed from site. At completion of work, any contaminated soil shall be removed and replaced with good soil by Contractor at no expense to University. Coordinate disposal with UC Davis Health EH&S department.

3. Building materials containing asbestos that are part of the project shall not be disturbed or removed by the contractor during the construction of temporary barriers, enclosures and controls. The contractor shall request from the University's Representative materials that have been identified on the project to contain asbestos so that these materials are not disturbed. The contractor shall refer to Section 013500 Special Procedures, 1.05 Hazardous Materials Procedures regarding materials impacted by construction of temporary barriers, enclosures and controls.

4. All material and equipment removed as part of the Project is property of University, unless specifically designated otherwise; such material and equipment shall be delivered to a location at the campus, as directed by University, to be selectively sorted by the University; remaining debris shall be disposed of by Contractor at no expense to University.

E. Drainage Control: All portions of Work shall be kept free of standing water at all times during construction. Where required, temporary drainage ditches, berms, or pumping systems shall be constructed to divert drainage water from construction site, and resultant water shall be carried to nearest natural water course and disposed of without erosion to surrounding area. Care shall be taken to prevent silting of existing sinkholes and watercourses. Silt deposited as a result of the Work shall be removed and disposed of by Contractor at no cost to the University.

1. Rough grade site to prevent standing water and to direct surface drainage away from excavations, trenches, adjoining properties and public rights-of-way/s.

2. Maintain excavations and trenches free of water. Provide and operate pumping equipment of a capacity to control water flow.

3. Provide de-watering system and pumping to maintain excavations dry and free of water inflow on a twenty-four (24) hour basis.

4. Provide piping to handle pumping outflow to discharge in manner to avoid erosion or deposit of silt. Provide settling basins to avoid silting; install erosion control at out-falls of system.

5. Winterize and stabilize site with Geotextile Fabric and gravel so that the site drains and avoids it becoming a quagmire. Maintain access roads on the site with Geotextile Fabric and gravel and make repairs to avoid furrow, ruts, or potholes.

6. Remove equipment and installation when no longer needed.

F. Sediment and Erosion Control: Contractor shall furnish, install and maintain means and methods to reduce excessive erosion, minimize sedimentation discharge, and prevent construction materials discharge from causing off-site and on-site contamination. Contractor shall coordinate with University.

1. Contractor shall pay for and maintain required permits.

2. Contractor shall furnish:

a. National Pollutant Discharge Elimination (NPDE) permit.

b. **[**Contractor shall file Notice of Intent to California State Water Resources Control Board (SWRCB) stating date construction will begin. Provide copy to University.

c. Contractor shall prepare, maintain and follow Storm Water prevention Plan. The Plan shall include Contractor's Best Management Practices (BMP) describing means and methods to control sediment, erosion and other pollutants.

d. Contractor shall keep BMP Program at jobsite.

PART II - PRODUCTS

2.01 Polyethylene: Polyethylene used for critical barriers and for sealing walls, floors or ceiling systems shall be a minimum of 6 mil thickness and fire-retardant type listed by Fire Underwriters Laboratories, Griffolyn #T55R with Griffolyn fire retardant tape, or equal.

PART III - EXECUTION

3.01 Infection Control Risk Assessment ICRA Requirements:

A.

1. Refer to Section 015610 Infection Control Risk Assessment (ICRA) and UC Davis Health Construction Dust & Hazardous Materials Inspection Worksheet.

a. These documents dictate minimum requirements for Class I and II containments and minimum requirements that must be completed to control dust during construction.

1) Mini containments (pop-up cubes) which are designed to have at most 1-2 people may be used in lieu of custom-built Class II Containments.

2. The outside of the work containment shall have present: ICRA Permit, Interim Life Safety Measure (ILSM) Permit, Daily ICRA Inspection Forms, entry warning sign, Containment Entry Log (provided by the contractor) that lists all persons who enter the containment regardless of affiliation, including all University employees, and an emergency telephone number of persons to call 24 hours.

3. Before any demolition or construction begins, all Protection Areas (infection control areas), control measures put in place and work plan by the Contractor will be

inspected by a designated University representative. Work cannot begin until the work containment has been inspected and approved.

3.02 Refer to the following Attachments:

A. Appendix A - Construction Dust & Hazardous Materials Inspection Worksheet

B. Appendix B - Initial Information and Benchmark Containment Inspections

C. Appendix C - Entry Warning Sign with Project Manager Contact Information

END OF SECTION 01 56 00

UC DAVIS HEALTH CONSTRUCTION DUST & HAZARDOUS MATERIALS INSPECTION WORKSHEET – APPENDIX A

ICRA Permit Number	ICRA Class
Job # and Name	Project Manager
Estimated Start	Estimated Completion

ACKNOWLEDGEMENT OF HAZARDOUS MATERIALS

Does the project contact hazardous materials (e.g., asbestos, lead, mold, PCBs, mercury)?	Yes / No
Verified How: (e.g., hazmat survey, personal knowledge)	
By Whom: (name & department)	

CONTAINMENT STRATEGIES

Enclosure Types [check all that apply]					
	Full Containment (poly over all surfaces not in SOW) ☐ Hard Barriers Required				
	Isolated Room – Critical Openings Only (seal doors, supply and return registers, etc)				
	Mini Containment Cube (only large enough for 1-2 people; aka pop up cube)				
	Shrouded Tool with HEPA filtered exhaust				
	Glove Box Containment with HEPA filtered exhaust				
	Other:				
Negative Pressure Requirements [check all that apply]					
	-0.020” wc at all times (24/7) as displayed on mounted manometer				
	-0.020” wc at setup with some negative pressure throughout project as displayed on manometer				
	Visual Verification of some negative room pressure throughout project				
	No negative room pressure required				
	Negative pressure in localized HEPA exhausted work area (e.g. shrouded tool, glove box)				
	Other:				
Negative Pressure Equipment [check all that apply]					
	Onsite Challenge Testing (DOP or particle counting) prior to setup				
	Challenge Tested within last 6 months; Equipment has remained onsite at University				
	Single HEPA Unit; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Two HEPA Units in Parallel; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Other:				
Additional Containment Requirements [check all that apply]					
	Ante Room		Masonite Floor Protection		Protective Clothing
	Walk off mats		Shoe Covers		Air Scrubber
	Other:				

VERIFICATION OF WORK

Type(s) of Inspection Required		Responsible Party
	HEPA Equipment Verification	□ EH&S □ Consultant □ Other:
	Pre-Work Approval Inspection	□ EH&S □ Consultant □ Other:
	Daily Onsite Oversight	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Air Sampling Type:_____ Frequency:_____	□ EH&S □ Consultant □ Other:
	Demolition Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:
	ICRA Downgrade	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Final Visual Approval Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:

INITIAL INFORMATION AND BENCHMARK CONTAINMENT INSPECTIONS – APPENDIX B

ICRA #	Location	Set Up Date	Electrical Shop Inspection	Pre-Start Inspection (Name, Date, Time)	Post-Demo Inspection (Name, Date, Time)	Downgrade Inspection (Name, Date, Time)	Final Inspection (Name, Date, Time)	Take Down Date

DAILY INSPECTION LOG

(Sheet _____ of _____)

Date & Time	Performed By(Name)	Pressure Reading (+/-)	Acceptable Negative Pressure? (Y/N)	ILSM conditions still met? (Y/N/*n/a*)	Tack Mat useable? (Y/N)	Interior free of dust/debris? (Y/N)	Containment Integrity Intact (no holes or breaches)? (Y/N)	All ICRA permit conditions met? (Y/N)	Other Issues? (Explain)	Corrective Actions
Example 7/4/16 – 0800	B. Clean	-0.025	Y	Y	Y	Y	Y	Y	N	closed entry door

ENTRY WARNING SIGN WITH PROJECT MANAGER CONTACT INFORMATION – APPENDIX C

CAUTION

CONSTRUCTION DUST PRECAUTIONS IN USE
DO NOT ENTER

For More Information Contact the Project Manager

_____

(Name)

_____

Phone Number

(THIS SIGN MUST BE POSTED IN COLOR)

SECTION 01 56 10

AIRBORNE CONTAMINANTS CONTROL

PART I - GENERAL

1.01 SUMMARY

A. Section Includes: University airborne contaminants control policy procedures and an Infection Control Risk Assessment (ICRA) and plan.

1.02 POLICY

A. Airborne contaminants control is critical in all hospital areas, as well as non-hospital areas. **Contractor** shall limit dissemination of airborne contaminants produced by construction-related activities, including dust, chalk, powders, aerosols, fumes, fibers and other similar materials, in order to provide protection of immuno-compromised and other patients, staff, diagnostic operations, or sensitive procedures or equipment, from possible undesirable effects of exposure to such contaminants.

1. Construction activities causing disturbance of existing dust, or creating new dust, or other airborne contaminants, must be conducted in tight enclosures cutting off any flow of particles into patient areas.

2. Ceilings, walls in Protection Areas and other areas in patient care areas as indicated on drawings must be secure at all times.

B. An Infection Control Risk Assessment (ICRA) and plan to mitigate dust is required for each project. The risk assessment identifies patient groups at risk for infection due to construction dust. The dust mitigation plan is designed to contain dust within the construction zone.

C. If visible mold is found during construction, renovation, or repairs, any ICRA in-hand is invalid and risk assessment shall be performed to reevaluate ICRA levels and the work plan prior to restart of the work. Upon discovering, seal any openings, stop work and notify the University’s Representative immediately. This includes projects that are already considered and operating under a Class IV.

D. Related Sections:

1. Section 017300 – CUTTING AND PATCHING: Removal of debris may be outside of normal work hours and shall be in tightly covered containers.

2. Section 013500 – SPECIAL PROCEDURES: Perform work in accordance with requirements of this section.

3. Section 013900 - GREEN BUILDING POLICY IMPLEMENTATION

4. Section 015100 – TEMPORARY UTILITIES: Provide high efficiency particulate air (HEPA) filters as specified in Section 015610, negative pressure ventilation, or special control of existing system as determined by University's Representative.

5. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS: Extend barriers above ceilings as required to seal off and contain airborne contaminants.

6. Section 015600 – TEMPORARY CONTROLS: Contain waste materials during removal; bagging, wrapping, and transporting.

7. Section 017400 – CLEANING: Use wet cleaning methods and HEPA filtered vacuum cleaners as required to minimize release of airborne contaminants. Contain waste materials, debris and rubbish as noted above. Disinfect Containment and Protection Areas as directed by University's Representative

E. Dust Mitigation Requirements

1. An ICRA Daily Inspection Log Compliance Survey is part of the UC Davis Health Construction Dust Infection Prevention Best Practice Standard. The **Contractor** must complete this daily checklist and leave posted for the duration of the project at the outside of the containment. Any areas of non-compliance must be specifically listed and addressed for corrective measures when identified. A copy of the daily ICRA inspections shall be submitted to the University's Representative at an agreed upon time between the **Contractor** and the Project Manager.

F. UC Davis Health Construction Dust Infection Prevention Best Practice Standard

a. The UC Davis Health Construction Dust Infection Prevention Best Practice Standard is attached at the end of this Section and augments information & requirements of Section 015610.

b. Refer to the UC Davis Health Construction Dust Infection Prevention Best Practice Standard per requirements for.

1) Responsibilities

2) Procedures

3) Training And Certifications

4) Containment Design & Construction

5) Materials And Equipment

6) Cleaning Procedures

7) Documentation

8) Containment Verification

9) Inspection Criteria

10) And other Dust Infection Prevention Measures

1.03 SUBMITTALS

A. Submit to Project Inspector or Post at Anteroom Daily ICRA Inspection Log.

B. Schedules: Submit work areas and procedure schedules for containment of airborne contaminants. Include this work in the Project Schedule per 013200.

C. Detailed Work Plan: Drawings including but not limited to Work Area/ Floor Plan, Path of Travel, Egress and Exiting, Rated Construction and details of construction of necessary temporary barriers, and description of procedures to be used to achieve and maintain control of construction-related airborne contaminants.

1. As applicable, the drawing should include the following: location of ante room(s), location of manometer, location of negative air units exhausting outside the building including number of negative air units and sizes (cfm), and location of sealed blocked off areas of corridors. Any impacts to corridors will need to be approved via ILSM (see specification section 013500 for details).

2. Identify the areas surrounding the project area, assessing potential impact of construction on the patient care area. Identify the specific uses (e.g., patient rooms, medication room, operating room, etc.)

3. Identify the potential impacts including but not limited to.

a. HVAC, Ventilation (outages, air flow directions, clean to dirty, air intakes/exhausts, air balance, disruptions, etc.).

b. Plumbing (outages, hand-washing access, work area, flushing/draining systems, charging systems, disinfecting systems, etc.).

c. Electricity (outages for critical equipment, special ventilation areas, monitoring).

d. Identify Airborne infection isolation rooms and patient rooms with immuno-compromised conditions that will require High-efficiency Particulate Air (HEPA) filters.

4. Identify containment measures including but not limited to types of barriers to be used. HEPA filtration to be used. Renovation/construction areas should be isolated from occupied areas during construction and provide clean-to-dirty airflow with respect to surrounding areas.

5. Assess preventive maintenance requirements. Will the service/maintenance frequency and level of service of systems need to be modified during construction (e.g., ventilation filters, air intake system, potable water, plumbing, doors). Work Hours: Can or will the work be done during non-patient care hours?

6. Include provisions for but not limited to traffic flow, entrance, egress, control, debris removal and housekeeping.

7. Work Hours: Identify areas of work that will be done during non-patient care hours. Refer to Sections 011100 Summary of Work and Section 011400 Work Restrictions

8. The Detailed Work Plan shall be reviewed and approved by the University's Representative prior to the start of Construction.

D. Project Experience and Training: In order to be considered qualified to work with negative pressure containments; **Contractor's** must demonstrate experience by providing either of the following:

1. Previously completed, documented negative pressure containment work in a healthcare facility along with an owner reference. Minimum documentation shall include project descriptions and photographs or containment schematics.

2. Documentation that the contactors' proposed foreman has successfully obtained one of the following from the American Society for Healthcare Engineering (ASHE):

a. Certified Healthcare Constructor (CHC) Certification

b. Health Care Construction (HCC) Certificate

c. Managing Infection Prevention During the Construction & Operation of Health Care Facilities Course Completion

1.04 QUALITY CONTROL

A. Pre-construction Meeting: Before any construction on site begins, **Contractor**'s Superintendent is required to attend a mandatory pre-construction orientation session held by University's Representative for a review on precautions to be taken.

B. Review by PO&M HVAC staff for possibility to disconnect air supply and return into the project area. Negative air machines shall be connected to separate electrical circuits.

C. Notification: A minimum of fourteen (14) calendar days written notification to University's Representative of possible construction activity causing airborne contaminants in Protection Areas.

1.05 DEFINITIONS

A. Containment Areas: As determined by University's Representative and if shown. Includes all areas of construction activities, adjacent staging and storage areas, and passage areas for workers, supplies and waste. The containment area includes ceiling spaces above and adjacent to construction activities.

B. Critical Openings – Include all potential paths for air and contaminants to move from the project area to outside of the project area and include: supply registers, return registers, exhaust registers, doors, windows, and other openings within the area where contaminants can escape. Sealing the critical openings can be accomplished with tape, plastic, hard barriers and a combination of these materials to seal airtight the critical opening.

C. HEPA System DOP Testing – An ANSI / ASTM recognized method to test the integrity of a High Efficiency Particulate filter which filters out 99.97% of particles 0.3 micrometers or larger. DOP testing is performed by specialty Contractor**'s**. The Health System requires that HEPA systems be tested to the ANSI / ASTM standard as delivered prior to their use onsite as further described in this Standard.

D. ICRA (ICRA) Infection Control Risk Assessment - An evaluation of patient risk based on a matrix of the patient population health in the work area and the invasiveness of the project. This assessment ultimately generates a permit (ICRA permit) issued by Infection Prevention requiring compliance with one of four precaution levels. The ICRA program is documented in Hospital P&P 2120. ICRAs apply to patient care areas and their adjoining contiguous areas. All ICRA evaluations are the sole responsibility of the Health System Infection Prevention Department based on an application by the Project Manager. ICRA Permits expire and can be extended subject to approval by the Infection Prevention Department.

1.06 PERFORMANCE REQUIREMENTS

A. University's Representative's Responsibilities:

1. Determination of the Containment and Protection Areas, as well as, the standard of limitations of the **Contractor**'s responsibilities, required for the project.

2. Statement of Requirements: Description in graphic and written form as required to communicate the above based on evaluation of the construction area and the impact of the project on patient care.

3. Coordinate any testing and monitoring as necessary with EH&S or a third party.

B. **Contractor** Responsibilities:

1. Provide specific means and methods of achieving and maintaining control of airborne contaminants during construction.

2. Implement all mitigation measures as listed in the UC Davis Health Construction Dust & Hazardous Materials Inspection Worksheet, which have been reviewed and approved by Infection Prevention and EH&S. The work shall be performed in accordance with the specific ICRA/Dust Mitigation Plan, Class (I, II, III or IV) and approved ICRA Permit. **Contractor** shall ensure that all workers are trained and adhere to the mitigation requirements including provisions indicated per UC Davis Health Construction Dust Infection Prevention Best Practice Standard attached at the end of this Section.

3. **Contractor** shall notify University's Representative in writing, a minimum of fourteen (14) calendar days prior to starting construction activity, which might be expected to produce excess levels of airborne contaminants in containment area so that additional precautions may be taken.

4. If project construction activities will occur beyond the expiration date identified in the ICRA Permit, **Contractor** shall coordinate with University's Representative to request extension of the ICRA Permit utilizing the ICRA Permit Extension Form.

PART II - PRODUCTS

2.01 MATERIALS

A. Polyethylene: Polyethylene used for critical barriers and for sealing walls, floors or ceiling systems shall be a minimum of 6 mil thickness and fire-retardant type listed by Fire Underwriters Laboratories, Griffolyn #T55R with Griffolyn fire retardant tape, or equal.

PART III - EXECUTION

3.01 PROJECT SPECIFIC REQUIREMENTS: The below criteria shall be applied on a case-by-case basis as outlined in the project specific requirements, ICRA Permit(s), and EH&S Worksheet(s)

A. Refer to attached ICRA permit for Aire Guardian containments.

B. Post- bid, additional ICRA permits will include product data from Contractor's submittals for mobile mini-cube containments and shrouded tools will be obtained post-bid

3.02 CONTAINMENT CRITERIA

A. The outside of the work containment shall have present: ICRA Permit, Interim Life Safety Measure (ILSM) Permit, Daily ICRA Inspection Forms, manometer, entry warning sign, Containment Entry Log (provided by the **Contractor**) that lists all persons who enter the containment regardless of affiliation, including all University employees, an emergency telephone number of person to call 24 hours a day in the event of a negative pressure alarm or other issue, and that an Environment of Care Incident Report under the category of "Construction Dust" must be filed by area nursing management in case of constant or annoying alarms.

B. The interior of the containment area shall be cleaned on a continual basis daily. Hard surface floors in work area, adjacent hallways and passage areas require vacuuming with HEPA-filtered vacuum cleaners and frequent wet-mopping during demolition and construction; protect adjacent carpeted areas with plastic and plywood and vacuum with HEPA-filtered vacuum cleaners. Only an EPA Listed Germicide approved by the UC Davis Health Infection Prevention shall be used on the project site.

C. Regardless of containment strategies, execute work by methods to minimize raising dust from construction operations. Water may be used to assist in controlling airborne dust.

D. Full containment

1. All surfaces in the containment area except surface where work is to occur must be covered in plastic unless they are non-porous, smooth, and accessible for cleaning.

2. Sealing of Openings: Use tape or other impenetrable sealant to seal barrier wall seams, cracks around window and door frames, exhaust system ductwork, pipes, joints and ducts. Use of spray glue is not acceptable to be used inside of the building.

3. **Contractor** must block off existing ventilation supply registers, return registers and exhaust registers in the construction area.

4. All polyethylene and other materials used for temporary enclosures shall be at least 6 mil thickness and fire-retardant type. Zip poles or other easily removable supports shall be used for projects extending beyond one work shift. Temporary walls with metal stud framing may be required for long term projects and must be approved by the Project Manager. All doors leading into the containment area shall utilize zippered doors for control of the air flow and closing the plastic doors.

E. Critical seal of areas

1. Use tape or other impenetrable sealant to seal barrier wall seams, cracks around window and door frames, exhaust system ductwork, pipes, joints and ducts. Use of spray glue is not acceptable to be used inside of the building.

F. Cubes

1. Mini-containments (pop-up cubes) which are designed to have at most 1-2 people are means of control to access attic spaces, wall spaces and subfloor spaces usually at defined entry points such as access hatches or above a drop-in ceiling system. Cubes are reviewed and approved by the University's Representative on a case-by-case basis.

G. Glove Boxes

1. A glove box can be used for some work where a HEPA filtered vacuum is attached to the glove box when a small area of work is to be performed. A glove bag is attached to the box enclosure to allow the worker to make small openings by drilling or cutting within the negative pressure glove box. Glove boxes are reviewed and approved by the University's Representative on a case-by-case basis.

H. Shrouded tools

1. Shrouded tools can be used for some work. A HEPA (DOP Tested) filtered vacuum is attached to the shroud. Shrouded tools are reviewed and approved by the University's Representative on a case-by-case basis.

3.03 NEGATIVE AIR CRITERIA

A. Under no circumstances shall the HEPA filtered air be discharged into existing HVAC returns, exhaust ducting or building plenum spaces.

B. When the air from the HEPA filtered negative air unit exhaust cannot be directed outside of the building due to no windows in the vicinity of the work or if impractical, all HEPA filtered negative air units shall be exhausted to a location agreeable to the PM. Each HEPA unit shall be plugged into a separate electrical circuit to provide temporary redundancy should one unit fail or due loss of electrical power. The PO&M Electrical shop shall inspect and test each circuit connected to the HEPA negative air unit prior to use.

C. When the air from the negative air units is exhausted inside of the building, the exhaust air from negative air unit shall be directed into a "diffusion cube" constructed of pleated filters to disperse the air in a manner that does not raise dust or blow air directly onto patients, staff or visitors. The **Contractor** shall consider and install charcoal filters in the negative air units to control smells/odors associated with the construction.

D. Negative air units shall be positioned as far from the entry ante room containment as possible for distribution of air flow throughout the project area. The number of negative air units shall be to provide sufficient negative pressure and for a minimum of at least four (4) air changes per hour of the volume of the entire work containment.

E. Dual HEPA Units operating in parallel may be required for redundancy in high-risk areas.

F. DOP testing of HEPA equipment

1. Negative air units and HEPA filtered vacuums are to be challenge tested onsite by the DOP test method by a third party prior to being placed in service, after a HEPA filter change, when dropped or damaged or moved from the project site. Only HEPA systems that pass the challenge DOP testing can be used on the project. All HEPA equipment shall be tested per ANSI/ASME N510 Section 10 to ensure 99.97% efficiency at 0.3 micrometer mean aerodynamic diameter.

2. The entire piece of HEPA equipment shall be challenge tested, not just the filter media. The University's Consultant or EH&S shall witness the HEPA challenge testing procedure in entirety. Once the HEPA system passes the challenge testing and passes, the HEPA equipment may be used at the location tested for a period not to exceed one year. The testing label shall remain on the HEPA equipment and remain legible. Re-testing of the HEPA equipment is required annually, if the piece of equipment is transported out of the building to another building location on the campus, if dropped, or otherwise subjected to forces that might unseat the HEPA filter, damaged by water or laceration of the filter or if HEPA filter maintenance or adjustments are performed.

3. When utilizing HEPA Filtered Vacuums for glove boxes or shrouded tools these HEPA Vacuums must be DOP tested.

3.04 NEGATIVE AIR MONITORING CRITERIA

A. Fully Monitored Negative Air Maintaining -0.020" Water Column (in-WC)

1. Build containment with negative air machines capable of maintaining a pressure differential of -0.020 in-WC across all critical barriers

2. Demonstrate negative pressure is achieved continuously (24/7) by means of an electronic manometer sensitive to measure down to -0.020" wp. An Omniguard IV recording manometer is recommended as the standard instrument for containment pressure monitoring, but other electronic manufactured models with similar sensitivities at low pressures and recording capabilities are acceptable.

B. Hybrid Monitoring and Visual Verification

1. Build containment with negative air machines capable of maintaining a pressure differential of -0.020 in-WC across all critical barriers.

2. During the course of construction, the scope of work may dictate removal of work (e.g., Ceilings or drywall) that would make it difficult to maintain -0.02 in-WC of negative pressure. During working hours Visual Verification of negative pressure may be used in lieu of the -0.02 in-WC requirement with electronic monitoring.

3. At the end of shift all openings must be sealed to bring the containment back to the -0.020 in-WC requirement.

C. Visual Verification

1. The containment shall be visually inspected to verify the plastic is bowed inward to the project area. Tell tail ribbon may also be used to confirm negative pressurization. Visual Verification of negative pressure without the use of a manometer shall be performed upon first entry to the work area, during the course of the work, especially if there are any changes to the workspace that may change the negative pressure, prior to taking any breaks and at the end of the work period.

3.05 ADDITIONAL CONTAINMENT CRITERIA

A. Ante Room

1. An ante room is a separate chamber attached to the containment area with zippered doors to allow entry and exit into the containment area. Entry into the containment area shall be only via the ante room. The ante room is commonly constructed of zip poles or equivalent, plastic and tape. The ante room is sized for each project to allow workers and equipment to be moved into and out of the containment area. A sticky mat is required in the ante room for workers and carts on wheels to use when existing the ante room from the containment area. The zippered doors are to remain closed or adjusted slightly open as necessary to allow negative pressure to be maintained at least -0.020 in-WC.

2. The ante room shall have a sticky mat present which is intended to remove any debris from the bottom of work shoes before leaving the ante room into the public area. The sticky mat is not intended to clean debris from the bottom of disposable coveralls or from booties. The sticky mat layers shall be replaced many times during a work shift when work involves movement of many workers and supplies out of the containment area. The **Contractor** is responsible for removing a dirty sticky mat and replacing it with a clean one when it is necessary.

3. Workers entering into the containment area will put on a full body disposable coverall with booties inside of the ante room before entering the containment area. Entry into the ante room requires one of the two zippered doors to be opened at one time to maintain the required negative pressure. After entering the ante room, the zipper shall be closed before leaving the ante room into the containment area.

B. Air Scrubbing

1. The **Contractor** shall place additional HEPA filtered fan units (negative air unit) inside of the project work area and operate them in recirculation mode or “scrub mode” near the final cleaning phase of the project to aide in additional particulate cleaning of the space. These units will circulate air internal to the containment area and scrub the air to reduce the total airborne particle concentrations inside of the containment area.

C. Disposable Coveralls and Booties are required in all Class IV containment areas and selected to provide protection of street clothes from particulates generated inside of the containment area. Disposable coveralls shall be changed if they become ripped and are no longer serviceable.

1. Proper use of the disposable coveralls, booties and use of the sticky mat shall be followed at all times for all workers and UC Davis Health employees, when it is required by the ICRA Permit. At no time shall workers leave the containment area

wearing disposable coveralls and booties. They are to be removed in the ante room or immediately in front of the ante room within the containment area if it is free and clean of debris. The workers shall remove all disposable coveralls and booties and place them in the plastic garbage bag and leave the ante room after walking on the sticky mat.

3.06 CONTAINMENT SET UP

A. Notify University's Representative forty-eight (48) hours prior to containment set up.

B. Build containment in compliance with ICRA, drawings and plans.

C. Notify University's Representative and EH&S for inspection prior to start of work. Before any demolition or construction begins, all Protection Areas (infection control areas), control measures put in place and work plan by the **Contractor** will be inspected by the University's Environmental Health & Safety Personnel, or by a designated representative of the University. Work cannot begin until the containment area has been inspected and approved, meeting all of the provisions of the ICRA Permit.

3.07 REMOVAL OF CONTAINMENT

A. Provide thorough cleaning of existing surfaces, which become exposed to dust, before leaving the containment area and before allowing staff and the public access to the project area.

B. Final cleaning of the containment area requires diligent HEPA vacuuming of all horizontal surfaces and wet wiping all surfaces. Clean towels, sponges, cloth rags or other means shall be used with clean water to effectively clean all surfaces within the containment area. Use of a measured solution of an EPA Listed Germicide is required as part of the final detail cleaning.

C. Additional HEPA filtered negative air units may be installed for scrubbing of particles (see 3.05 B).

D. Coordinate with the University's Representative to call for a final visual inspection of the containment area. The final visual inspection will be made after the **Contractor** has thoroughly cleaned the entire containment area. The **Contractor** will be allowed to remove the containment barriers after the interior has passed the visual inspection for cleanliness.

E. Particle count assessment may be made inside of the containment area by the University's Representative as part of the final visual inspection process in addition to the final visual inspection. Particle testing will include testing the airborne concentration of various particle sizes compared to the concentration outside of the containment area. If particle counts inside of the containment area are significantly greater than outside of the containment area, the Contractor shall continue to scrub the air inside of the project area with HEPA filtered negative air units and conduct additional surface cleaning until subsequent particle testing has demonstrated particle concentrations inside of the containment area are not significantly greater than particle concentrations immediately outside of the containment area.

3.08 ENTRY/EGRESS

A. Entry into the project containment area shall be through the ante room. Entry into the ante room requires one of the two zippered doors to be opened at one time to maintain the required negative pressure. After entering the ante room, the zipper shall be closed before leaving the ante room into the containment area. Equipment and supplies brought into the containment area shall be in sealed leak tight containers inside of rolling covered carts. Equipment, tools and supplies brought into the building shall be clean and free of dust, debris, mold and other contaminants. Cardboard products shall not be brought into the containment area if they are water damaged or have suspect mold growth.

B. All HEPA equipment when transported into and out of the containment area shall be cleaned of all debris on the surfaces and shall have the intake openings sealed with plastic and duct tape.

C. All workers leaving the containment area shall leave in clean clothes. At no time shall disposable coveralls or booties be worn when leaving the containment area through the anteroom into the public area. The workers shall clean all gross particulate debris from the coveralls using a HEPA filtered vacuum. Disposable coveralls can be taken off after gross debris has been removed from the disposable coveralls. The worker shall remove the disposable coverall inside of the ante room by rolling the disposable coverall inside out and then place it into a garbage container (plastic bag) located inside of the ante room or just inside of the project work area.

D. All equipment and supplies leaving the containment area shall be cleaned of all dust and debris before leaving the containment area. Removal of supplies, materials and waste debris from the containment area shall be using tightly covered containers/carts that contain the waste material. The wheels of carts shall be cleaned on a frequent schedule to minimize track-out of debris as they are removed from the containment area. All waste material shall be in sealed leak tight containers. If plastic bags are used, they shall be 6 mil thick at a minimum.

3.09 ENFORCEMENT

A. Failure to maintain required containment will result in issuance of written warning; if situation is not corrected within eight (8) hours of receipt of warning, University will have cause to stop the work as provided in Article 2.1 (if Brief Form) or 2.3 (if Long Form) of the General Conditions. Any egregious violation of safety requirements shall be grounds for Immediate Work Stoppage.

3.10 Refer to the following Attachments

A. Infection Control Risk Assessment (ICRA) with Matrix of Precautions for Construction & Renovation: 3 Pages.

B. Infection Control Construction Permit: 1 Page.

C. UCDH Construction Dust & Hazardous Materials Inspection Worksheet: 1 Page.

D. ICRA Permit Extension Request and Instructions: 2 Pages.

E. UC Davis Health Construction Dust Infection Prevention Best Practice Standard: 23 Pages including.

1. Appendix A: Inspection Documentation Form and Daily Inspection Log.

2. Appendix B: Entry Warning Sign with Project Manager Contact.

3. Appendix C: Staff Education Poster.

END OF SECTION 01 56 10

Infection Control Risk Assessment

ICRA Committee approval of an ICRA Permit is required for all Construction Activity

Fill-out form completely or indicate NA on individual items

Date: _____

Requested ICRA
(See Steps 1, 2 and 3)

Construction Type Type B
Risk Level Low Risk
Classification Class I

Submitted by: _____
Dept/Firm: _____
Cell Phone: _____

Project Location/Address: _____
Building name, Floor, Suite/Room: _____

FD&C Project Number or Other Identifying Number: _____

Type of Patient Care within Area of Work: _____
Type of Patient Care in Adjacent Areas: _____

Project Scope Description:

Describe Work Plan:

Required Documents

- Infection Control Risk Assessment
- Infection Control Construction Permit form
- UCDH Construction Dust & Hazardous Materials Inspection Worksheet form
- ICRA/Project Floor Plan (work area / floor plan, and path of travel plan)

Infection Control Risk Assessment

Matrix of Precautions for Construction & Renovation

STEP 1

Using the following table to *identify* the Construction Type A, B, C or D

TYPE A	**Inspection and Non-Invasive Activities**. Includes, but is not limited to: ƒ removal of ceiling tiles for visual inspection only, e.g., limited to 1 tile per 50 square feet ƒ painting (but not sanding) ƒ wallcovering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.
TYPE B	**Small scale, short duration activities which create minimal dust** Includes, but is not limited to: ƒ installation of telephone and computer cabling ƒ access to chase spaces ƒ cutting of walls or ceiling where dust migration can be controlled.
TYPE C	**Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies** Includes, but is not limited to: ƒ sanding of walls for painting or wall covering ƒ removal of floorcoverings, ceiling tiles and casework ƒ new wall construction ƒ minor duct work or electrical work above ceilings ƒ major cabling activities ƒ any activity which cannot be completed within a single work shift.
TYPE D	**Major demolition and construction projects** Includes, but is not limited to: ƒ activities which require consecutive work shifts ƒ requires heavy demolition or removal of a complete cabling system ƒ new construction.

Step 1 - Construction Type: Type B

STEP 2

Using the following table of **Patient Risk Groups,** identify the **Risk Level (Low, Medium, High, Highest)** posed by the project. Also provide further description of uses / risk groups as necessary that are not otherwise listed in the table. If more than one risk group will be affected, select the higher risk group:

Low Risk	Medium Risk	High Risk	Highest Risk
ƒ Office areas	ƒ Cardiology	ƒ CCU	ƒ Any area caring for immunocompromised patients
OTHER:	ƒ Echocardiography	ƒ Emergency Room	ƒ Burn Unit
	ƒ Endoscopy	ƒ Labor & Delivery	ƒ Cardiac Cath Lab
	ƒ Nuclear Medicine	ƒ Laboratories (specimen)	ƒ Central Sterile Supply
	ƒ Physical Therapy	ƒ Medical Units	ƒ Intensive Care Units
	ƒ Radiology/MRI	ƒ Newborn Nursery	ƒ Negative pressure isolation rooms
	ƒ Respiratory Therapy	ƒ Outpatient Surgery	ƒ Oncology
	OTHER:	ƒ Pediatrics	ƒ Operating rooms including C-section rooms
		ƒ Pharmacy	OTHER:
		ƒ Post Anesthesia Care Unit	
		ƒ Surgical Units	
		OTHER:	

Step 2 - Risk Level: Low Risk

STEP 3

Use the table below to determine the ICRA Classification.

Patient Risk Group (*Low, Medium, High, Highest*) with the planned **...**
Construction Project Type (*A, B, C, D*) on the following matrix, to find the
Class of Precautions (*I, II, III or IV*) or level of infection control activities required.
Class I-IV or Color-Coded Precautions are delineated on the following page.

	CONSTRUCTION PROJECT TYPE			
PATIENT RISK GROUP	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III / IV
MEDIUM Risk Group	I	II	III	IV
HIGH Risk Group	I	II	III / IV	IV
HIGHEST Risk Group	II	III / IV	III / IV	IV

Step 3 – Classification Determination: Class I

Infection Control Construction Permit (Post At Job Site)

ICRA Permit No:			**ICRA Class:**		
Location of Construction:				**Project Start Date:**	
Project Coordinator:				**Estimated Duration:**	
Contractor Performing Work:				**Permit Expiration Date:**	
Supervisor:				**Telephone:**	
YES	**NO**	**CONSTRUCTION ACTIVITY**	**YES**	**NO**	**INFECTION CONTROL RISK GROUP**
		TYPE A: Inspection, non-invasive activity			GROUP 1: Low Risk
		TYPE B: Small scale, short duration, moderate to high			GROUP 2: Medium Risk
		TYPE C: Activity generates moderate to high levels of dust, requires greater 1 work shift for completion			GROUP 3: Medium/High Risk
		TYPE D: Major duration and construction activities requiring consecutive work shifts			GROUP 4: Highest Risk

CLASS I	1. Execute work by methods to minimize raising dust from construction operations. 2. Immediately replace any ceiling tile displaced for visual inspection. 3. Clean work area upon completion of task
CLASS II	1. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 2. Complete all critical barriers or implement control cube method before construction begins. 3. Place dust mat at entrance and exit of work area. 4. Water mist work surfaces to control dust while cutting. 5. Contain construction waste before transport in tightly covered containers 6. Wipe surfaces with cleaner/disinfectant. 7. Remove barrier materials carefully to minimize spreading of dirt and debris.
CLASS III **Date** _____ **Initial** _____	1. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 2. Complete all critical barriers or implement control cube method before construction begins. Seal holes, pipes, conduits, and punctures appropriately. 3. Place dust mat at entrance and exit of work area. 4. Maintain negative air pressure utilizing HEPA equipped air filtration units to control dust. 5. Vacuum work with HEPA filtered vacuums. 6. Wipe surfaces with cleaner/disinfectant. 7. Contain construction waste before transport in tightly covered containers. 8. Do not remove barriers from work area until complete project is clean and checked by Environmental Health and Safety or its representative. 9. Remove barrier materials carefully to minimize spreading of dirt and debris.
CLASS IV **Date** _____ **Initial** _____	1. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 2. Complete all critical barriers or implement control cube method before construction begins. Seal holes, pipes, conduits, and punctures appropriately. 3. Place dust mat at entrance and exit of work area. 4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units. 5. Construct anteroom and require all personnel to pass through room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site, or personnel can wear cloth or paper coveralls that are removed each time they leave the worksite. 6. All personnel entering work site are required to wear shoe covers. 7. Contain construction waste before transport in tightly covered containers. Utilize tape coverings. 8. Vacuum work area with HEPA filtered vacuums. 9. Wipe surfaces with cleaner/disinfectant. 10. Do not remove barriers from work area until complete project is clean and checked by Environmental Health and Safety or their representative. 11. Remove barrier materials carefully to minimize spreading of dirt and debris.

Additional Requirements:	
Permit Requested By:	Permit Authorized By:
Date:	Date:

UCDH Construction Dust & Hazardous Materials Inspection Worksheet

ICRA Permit Number	**ICRA Class**
Job # and Name	**Project Manager**
Estimated Start	**Estimated Completion**

ACKNOWLEDGEMENT OF HAZARDOUS MATERIALS

Does the project contact hazardous materials (e.g., asbestos, lead, mold, PCBs, mercury)?	**Yes** ☐ **No** ☐
Verified How: (e.g., hazmat survey, personal knowledge)	
By Whom: (name & department)	

CONTAINMENT STRATEGIES

Enclosure Types [check all that apply]					
	Full Containment (poly over all surfaces not in SOW) ☐ Hard Barriers Required				
	Isolated Room – Critical Openings Only (seal doors, supply and return registers, etc)				
	Mini Containment Cube (only large enough for 1-2 people; aka pop up cube)				
	Shrouded Tool with HEPA filtered exhaust				
	Glove Box Containment with HEPA filtered exhaust				
	Other:				
Negative Pressure Requirements [check all that apply]					
	-0.020" wc at all times (24/7) as displayed on mounted manometer				
	-0.020" wc at setup with some negative pressure throughout project as displayed on manometer				
	Visual Verification of some negative room pressure throughout project				
	No negative room pressure required				
	Negative pressure in localized HEPA exhausted work area (e.g. shrouded tool, glove box)				
	Other:				
Negative Pressure Equipment [check all that apply]					
	Onsite Challenge Testing (DOP or particle counting) prior to setup				
	Challenge Tested within last 6 months; Equipment has remained onsite at UCDMC				
	Single HEPA Unit; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Two HEPA Units in Parallel; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Other:				
Additional Containment Requirements [check all that apply]					
	Ante Room		Masonite Floor Protection		Protective Clothing
	Walk Off Mats		Shoe Covers		Air Scrubber
	Other:				

VERIFICATION OF WORK

Type(s) of Inspection Required		Responsible Party
	HEPA Equipment Verification	□ EH&S □ Consultant □ Other:
	Pre-Work Approval Inspection	□ EH&S □ Consultant □ Other:
	Daily Onsite Oversight	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Air Sampling Type:_____ Frequency:_____	□ EH&S □ Consultant □ Other:
	Post Demolition or Abatement Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:
	ICRA Downgrade	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Final Visual Approval Containment Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:

ICRA Permit Extension Request

Date		
ICRA Permit No.		
Original ICRA Permit Approval Date		
Approved Permit Classification	Class ___ Type C, Medium Risk (Example)	
Requested Permit Expiration Date		
Project Location (Building & Floor/Room)		
Brief Description of Work		
Contact Information	Name:	
	Phone:	
	Email:	
Are there any current or planned changes in the project or work activities affecting the current ICRA Permit Classification? **Initial:** YES ____ NO ____		
Have any issues arisen during project activities affecting air quality requiring greater infection prevention controls or health safety measures not covered by the current ICRA Permit? **Initial:** YES ____ NO ____		
Project activities are occurring in accordance with the current ICRA Permit requirements. **Initial:** YES ____ NO ____		
Applicant Signature:		
Permit Extension Approved: (UCDH Infection Prevention)		**Date:**
Further Review Required *		**Date:**
***Please return to the ICRA Committee with the requested permit extension for further discussion and determination.		
NOTE: *Approved ICRA Documents required with Extension Request including –* Approved Project Risk Assessment and ICRA Permit, EH&S Worksheet, Project ICRA Plan(s)		

Procedure – ICRA Permit Extension

1. Submit Extension Request to UCDH Infection Prevention (IP):

   Colin McGlynn - ccmcglynn@ucdavis.edu

   Send email copies also to -

   James Dunbarr – jjdunbarr@ucdavis.edu
   Dave Daly – drdaly@ucdavis.edu

2. IP Review of Permit Extension –
   a. Request Approved – Go to Step 3;
   b. Refer to Applicant to re-submit to ICRA Committee for further review
3. Approved permit extension –
   a. ICRA Permit Log on One Drive updated and document uploaded to One Drive archive folder by IP
   b. Document emailed to Applicant

Infection Control Risk Assessment

ICRA Committee approval of an ICRA Permit is required for all Construction Activity

Fill-out form completely or indicate NA on individual items

Date: _____

Requested ICRA
(See Steps 1, 2 and 3)

Construction Type Type A
Risk Level Low Risk
Classification Class I

Submitted by: _____
Dept/Firm: _____
Cell Phone: _____

Project Location/Address: _____
Building name, Floor, Suite/Room: _____

FD&C Project Number or Other Identifying Number: _____

Type of Patient Care within Area of Work: _____
Type of Patient Care in Adjacent Areas: _____

Project Scope Description:

Describe Work Plan:

Required Documents

- Infection Control Risk Assessment
- Infection Control Construction Permit form
- UCDH Construction Dust & Hazardous Materials Inspection Worksheet form
- ICRA/Project Floor Plan (work area / floor plan, and path of travel plan)

Infection Control Risk Assessment

Matrix of Precautions for Construction & Renovation

STEP 1

Use the following table to identify the Construction Type A, B, C or D

TYPE A	**Inspection and Non-Invasive Activities**. Includes, but is not limited to: ƒ removal of ceiling tiles for visual inspection only, e.g., limited to 1 tile per 50 square feet ƒ painting (but not sanding) ƒ wallcovering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.
TYPE B	**Small scale, short duration activities which create minimal dust** Includes, but is not limited to: ƒ installation of telephone and computer cabling ƒ access to chase spaces ƒ cutting of walls or ceiling where dust migration can be controlled.
TYPE C	**Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies** Includes, but is not limited to: ƒ sanding of walls for painting or wall covering ƒ removal of floorcoverings, ceiling tiles and casework ƒ new wall construction ƒ minor duct work or electrical work above ceilings ƒ major cabling activities ƒ any activity which cannot be completed within a single work shift.
TYPE D	**Major demolition and construction projects** Includes, but is not limited to: ƒ activities which require consecutive work shifts ƒ requires heavy demolition or removal of a complete cabling system ƒ new construction.

Step 1 - Construction Type: Type A

STEP 2

Use the following table of **Patient Risk Groups** to identify the **Risk Level (Low, Medium, High, Highest)** posed by the project. Also, provide further description of uses /risk groups as necessary that are not otherwise listed in the table. If more than one risk group will be affected, select the higher risk group:

Low Risk	Medium Risk	High Risk	Highest Risk
➢ Office Areas ➢ Administrative Areas ➢ Unoccupied areas with no/minimal adjacent patient care activities OTHER:	➢ Cardiology ➢ Echocardiograpghy ➢ Nuclear Medicine ➢ Physical Therapy ➢ Radiology/MRI ➢ Respiratory Therapy ➢ all outpatient care sites not otherwise listed ➢ Public Corridors ➢ Lobbies & Waiting Rooms ➢ Cafeteria OTHER:	➢ CCU ➢ Emergency Room ➢ Labor & Delivery (non-OR) ➢ Laboratories (specimen) ➢ Medical Units ➢ Newborn Nursery ➢ Outpatient Surgery ➢ Pediatrics ➢ Pharmacy areas not listed otherwise ➢ Post Anesthesia Care Unit ➢ Surgical Units ➢ Food Preparation Areas OTHER:	➢ Any area caring for immunocompromised patients ➢ Burn Unit ➢ Cardiac Cath Lab ➢ Central Sterile Supply ➢ Intensive Care Units ➢ Negative pressure isolation rooms ➢ Oncology ➢ Operating rooms including C-sections rooms ➢ Endoscopy ➢ Pharmacy admixture areas ➢ Transplant units ➢ Dialysis ➢ Interventional Radiology ➢ OR support spaces including anything beyond "red line" OTHER:

Step 2 - Risk Level: Low Risk

STEP 3

Use the table below to determine the ICRA Classification.

Patient Risk Group (*Low, Medium, High, Highest*) with the planned **...**
Construction Project Type (*A, B, C, D*) on the following matrix, to find the
Class of Precautions (*I, II, III or IV*) or level of infection control activities required.
Class I-IV or Color-Coded Precautions are delineated on the following page.

	CONSTRUCTION PROJECT TYPE			
PATIENT RISK GROUP	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III / IV
MEDIUM Risk Group	I	II	III	IV
HIGH Risk Group	I	II	III / IV	IV
HIGHEST Risk Group	II	III / IV	III / IV	IV

Step 3 – Classification Determination: Class I

Infection Control Construction Permit (Post At Job Site)

ICRA Permit No:			**ICRA Class:**		
Location of Construction:				**Project Start Date:**	
Project Coordinator:				**Estimated Duration:**	
Contractor Performing Work:				**Permit Expiration Date:**	
Supervisor:				**Telephone:**	
YES	**NO**	**CONSTRUCTION ACTIVITY**	**YES**	**NO**	**INFECTION CONTROL RISK GROUP**
		TYPE A: Inspection, non-invasive activity			GROUP 1: Low Risk
		TYPE B: Small scale, short duration, moderate to high			GROUP 2: Medium Risk
		TYPE C: Activity generates moderate to high levels of dust, requires greater 1 work shift for completion			GROUP 3: Medium/High Risk
		TYPE D: Major duration and construction activities requiring consecutive work shifts			GROUP 4: Highest Risk

CLASS I	1. Execute work by methods to minimize raising dust from construction operations. 2. Immediately replace any ceiling tile displaced for visual inspection. 3. Clean work area upon completion of task
CLASS II	1. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 2. Complete all critical barriers or implement control cube method before construction begins. 3. Place dust mat at entrance and exit of work area. 4. Water mist work surfaces to control dust while cutting. 5. Contain construction waste before transport in tightly covered containers 6. Wipe surfaces with cleaner/disinfectant. 7. Remove barrier materials carefully to minimize spreading of dirt and debris.
CLASS III **Date** _____ **Initial** _____	1. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 2. Complete all critical barriers or implement control cube method before construction begins. Seal holes, pipes, conduits, and punctures appropriately. 3. Place dust mat at entrance and exit of work area. 4. Maintain negative air pressure utilizing HEPA equipped air filtration units to control dust. 5. Vacuum work with HEPA filtered vacuums. 6. Wipe surfaces with cleaner/disinfectant. 7. Contain construction waste before transport in tightly covered containers. 8. Do not remove barriers from work area until complete project is clean and checked by Environmental Health and Safety or its representative. 9. Remove barrier materials carefully to minimize spreading of dirt and debris.
CLASS IV **Date** _____ **Initial** _____	1. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 2. Complete all critical barriers or implement control cube method before construction begins. Seal holes, pipes, conduits, and punctures appropriately. 3. Place dust mat at entrance and exit of work area. 4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units. 5. Construct anteroom and require all personnel to pass through room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site, or personnel can wear cloth or paper coveralls that are removed each time they leave the worksite. 6. All personnel entering work site are required to wear shoe covers. 7. Contain construction waste before transport in tightly covered containers. Utilize tape coverings. 8. Vacuum work area with HEPA filtered vacuums. 9. Wipe surfaces with cleaner/disinfectant. 10. Do not remove barriers from work area until complete project is clean and checked by Environmental Health and Safety or their representative. 11. Remove barrier materials carefully to minimize spreading of dirt and debris.

Additional Requirements:	
Permit Requested By:	Permit Authorized By:
Date:	Date:

UCDH Construction Dust & Hazardous Materials Inspection Worksheet

ICRA Permit Number	**ICRA Class**
Job # and Name	**Project Manager**
Estimated Start	**Estimated Completion**

ACKNOWLEDGEMENT OF HAZARDOUS MATERIALS

Does the project contact hazardous materials (e.g., asbestos, lead, mold, PCBs, mercury)?	**Yes** ☐ **No** ☐
Verified How: (e.g., hazmat survey, personal knowledge)	
By Whom: (name & department)	

CONTAINMENT STRATEGIES

Enclosure Types [check all that apply]					
	Full Containment (poly over all surfaces not in SOW) ☐ Hard Barriers Required				
	Isolated Room – Critical Openings Only (seal doors, supply and return registers, etc)				
	Mini Containment Cube (only large enough for 1-2 people; aka pop up cube)				
	Shrouded Tool with HEPA filtered exhaust				
	Glove Box Containment with HEPA filtered exhaust				
	Other:				
Negative Pressure Requirements [check all that apply]					
	-0.020" wc at all times (24/7) as displayed on mounted manometer				
	-0.020" wc at setup with some negative pressure throughout project as displayed on manometer				
	Visual Verification of some negative room pressure throughout project				
	No negative room pressure required				
	Negative pressure in localized HEPA exhausted work area (e.g. shrouded tool, glove box)				
	Other:				
Negative Pressure Equipment [check all that apply]					
	Onsite Challenge Testing (DOP or particle counting) prior to setup				
	Challenge Tested within last 6 months; Equipment has remained onsite at UCDMC				
	Single HEPA Unit; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Two HEPA Units in Parallel; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Other:				
Additional Containment Requirements [check all that apply]					
	Ante Room		Masonite Floor Protection		Protective Clothing
	Walk Off Mats		Shoe Covers		Air Scrubber
	Other:				

VERIFICATION OF WORK

Type(s) of Inspection Required		Responsible Party
	HEPA Equipment Verification	□ EH&S □ Consultant □ Other:
	Pre-Work Approval Inspection	□ EH&S □ Consultant □ Other:
	Daily Onsite Oversight	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Air Sampling Type:_____ Frequency:_____	□ EH&S □ Consultant □ Other:
	Post Demolition or Abatement Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:
	ICRA Downgrade	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Final Visual Approval Containment Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:

ICRA Permit Extension Request

Date		
ICRA Permit No.		
Original ICRA Permit Approval Date		
Approved Permit Classification	Construction Type Type A Risk Level Low Risk Classification Class I	
Requested Permit Expiration Date		
Project Location (Building & Floor/Room)		
Brief Description of Work		
Contact Information	Name:	
	Phone:	
	Email:	
Are there any current or planned changes in the project or work activities affecting the current ICRA Permit Classification? **Initial:** YES ____ NO ____		
Have any issues arisen during project activities affecting air quality requiring greater infection prevention controls or health safety measures not covered by the current ICRA Permit? **Initial:** YES ____ NO ____		
Project activities are occurring in accordance with the current ICRA Permit requirements. **Initial:** YES ____ NO ____		
Applicant Signature:		
Permit Extension Approved: (UCDH Infection Prevention)		**Date:**_____ **Permit Expiration Date:**_____
Further Review Required *		**Date:** _____
***Please return to the ICRA Committee with the requested permit extension for further discussion and determination.		
NOTE: ICRA permits are extended only 6 months at a time Approved Project Risk Assessment and ICRA Permit, EH&S Worksheet, Project ICRA Plan(s)		

Procedure – ICRA Permit Extension

1. Submit Extension Request to UCDH Infection Prevention (IP):

   Colin McGlynn - ccmcglynn@ucdavis.edu

   Send email copies also to -

   James Dunbarr – jjdunbarr@ucdavis.edu
   Dave Daly – drdaly@ucdavis.edu

2. IP Review of Permit Extension –
   a. Request Approved – Go to Step 3;
   b. Refer to Applicant to re-submit to ICRA Committee for further review

3. Approved permit extension –
   a. ICRA Permit Log on Microsoft Teams updated and document uploaded to Microsoft Teams archive folder by IP
   b. Document emailed to Applicant

SECTION 01 56 20

REQUIREMENTS FOR CEILING ACCESS TO SPACES CONTAINING ASBESTOS

PART I - GENERAL

1.01 SECTION INCLUDES

A. This section outlines policy and procedures for access to ceiling spaces containing or suspected of containing asbestos fireproofing, thermal insulation, or other asbestos containing material.

B. Work that may disturb asbestos but is not intended to result in intentional asbestos removal shall be controlled in accordance with this section, as well as Cal/OSHA requirements for Class III asbestos work contained in California Code of Regulations, Title 8, Section 1529. Moving ceiling tiles or horizontal hatches to access ceiling spaces with asbestos fire proofing or containing debris from asbestos thermal insulation is Class III asbestos work. The University Representative may approve modifications to these procedures. This section outlines minimum requirements. Controls that exceed these requirements may be used.

PART II - Not applicable to this section

PART III - EXECUTION

3.01 Training

A. Personnel performing work in spaces containing or suspected of containing asbestos material shall have training which meets the requirements of Cal/OSHA Class III asbestos work that is specific to the work task to be completed. This training shall adhere to requirements as set forth in 40 CFR 763.92(a)(2).

3.02 Competent Person

A. During work in asbestos contaminated attic spaces, an asbestos Competent Person, as defined by 8 CCR 1529, shall be present at all times to oversee safe access and control measures. A Competent Person shall inspect the area to assure the controlled work area is properly established, and to determine that appropriate cleanup has occurred at the end of the work task. The Competent Person shall adhere to all requirements within their area of responsibility outlined in 8 CCR 1529.

3.03 Standard Access/Egress Procedures from Mini-Enclosure

A. Access into an attic space with asbestos shall be completed using a manufactured mini-enclosure, or an equivalent enclosure constructed on site. Use of a small HEPA filtered negative air unit attached or integrated with the mini-enclosure to create negative pressure in the enclosure is required. A HEPA filtered vacuum shall be present and available for use in the mini-enclosure. The mini-enclosure must be posted with the asbestos warning sign in accordance with Cal/OSHA Title 8 CCR 8 1529. Access into the enclosure must be restricted to trained personnel, who are required to wear full body coveralls and a respirator approved for asbestos. A sticky mat shall be present immediately outside of the mini-enclosure. Any debris generated by work activity must be cleaned up using a HEPA vacuum and wet wiping techniques. All mini-enclosures and HEPA vacuums must be re-certified by a third-party using DOP testing every 6 months.

B. Disposable full body coveralls are required in all ICRA Class III and IV containment areas dealing with asbestos or presumed asbestos and shall be selected to provide protection of street clothes from particulates generated inside of the containment area. All work inside a mini enclosure for asbestos related work is considered ICRA Class III or IV. Disposable coveralls shall be changed if they become ripped and are no longer serviceable.

C. Proper use of the disposable coveralls and use of the sticky mat shall be followed at all times for all workers and University employees, when it is required by the ICRA Permit. At no time shall workers leave the mini enclosure wearing soiled disposable coveralls and booties. At times, in select areas requiring sterile environments, it may be necessary to change from soiled disposable clothing into clean disposable clothing before exiting containment. Coveralls and booties are to be removed inside the mini-enclosure and placed into a labeled, secured, plastic asbestos waste bag before leaving the mini-enclosure.

3.04 Air Sampling

A. Air sampling is required per 8 CCR 1529 to assess asbestos exposures when the project requires workers to enter the attic space if there is a reasonable possibility that the permissible exposure limit (PEL) may be exceeded. The air sampling frequency shall be sufficient to assess all work activities in the mini-enclosure and in the attic space and may include both 30-minute Excursion sample periods and longer sampling periods.

3.05 Debris Clean-up

A. All debris inside of the mini-enclosure shall be cleaned up promptly by HEPA vacuuming and wet wiping techniques and before each time the mini-enclosure is moved. These techniques of minimizing asbestos fiber migration are outlined in 8 CCR 1529 and are to be strictly adhered to.

3.06 Personal Protective Equipment

A. All personnel entering the attic space with known or presumed asbestos containing materials shall wear full body disposable coveralls (e.g., Tyvek, Kleenguard or equivalent) and at a minimum, a half face, tight fitting, elastomeric respirator with HEPA (P-100) filter cartridges for asbestos protection (or a respirator offering greater protection). The individual wearing this respirator must have been fit tested, trained and had medical clearance, pursuant to 8 CCR 5144.

3.07 Entering ceiling spaces where asbestos fire proofing (contaminated with assumed or visible asbestos debris) is present (e.g., when personnel must enter the space and “crawl” in the attic space, but asbestos will likely not be disturbed).

A. Control of disturbance of asbestos debris during work inside of an attic space shall be followed in all cases, by using a HEPA vacuum to clean-up visible suspect asbestos containing debris in the immediate area of access and work. If practical, vacuum visible debris for the full path of travel. If this is not practical, use other procedures to ensure safe removal of visible debris in the path of travel that would be disturbed by the crawl. For example, wet paper towels and plastic bags may be used to pick up and contain visible debris. The top surface of the attic access panel shall be cleaned of all dust and debris using a wet paper towel before the access hatch panel is allowed to swing down into the suspended position. Other control methods may be used provided they meet the following criteria:

a. dry sweeping is not permitted
b. employees must not walk on, crawl on or otherwise crush visible suspect asbestos containing debris
c. the control method must not result in a release of airborne fibers.

B. If the coverall tears or rips during the work activity, repair or replacement is required. Use duct tape to repair tears or rips to the coverall if feasible or exit and replace the coverall. Remove and bag coverall in mini-enclosure as in ceiling access procedure. If coveralls were torn, vacuum any noticeable debris from underlying clothing. Use two disposable coveralls to minimize contamination of street clothes when tearing is likely or when crawling on rough surfaces.

3.08 HEPA Filter Challenge Testing and Certification

A. All HEPA filtered equipment (including negative air units and vacuums) used must have passed onsite DOP testing within the last 6 months and must be re-certified after filter replacement or if moved offsite, including to another University building.

3.09 Access for Inspection after Ceiling Tile has been Removed

A. Inspection above the ceiling, after a ceiling tile has been moved using a mini-enclosure containment, may be performed with asbestos awareness training. Access of this type is limited to visual inspection through the ceiling opening. Full entry to the space or ceiling crawl must meet the other requirements of this section. Personnel who perform this work must be notified that asbestos is present in the area and which materials in the area contain asbestos.

3.10 Asbestos Waste Management

A. Personnel are required to appropriately bag all asbestos debris, disposable personal protective equipment, and other materials potentially contaminated with asbestos. Bags shall be clear, 6 mil, imprinted with the required asbestos warning label. Appropriate packaging includes double-bagging and wetting the materials in the inner bag. Each bag shall be legibly marked with The Generator is UC Davis Health EPA ID No. CAD076124981. The Generator address is 2315 Stockton Blvd., FSSB 2500, Sacramento, CA 95817.

B. For those projects generating five (5) or fewer bags of asbestos-contaminated materials, University Environmental Health and Safety (EH&S) will manage the disposal of the bags; contact EH&S at 916-734-2740 for disposal with at least one week’s notice of the intent to dispose. Materials must be bagged and marked as described above prior to EH&S’ acceptance.

C. Asbestos disposal is the responsibility of the Contractor on those projects generating more than five (5) bags of asbestos-contaminated material. If a Uniform Hazardous Waste Manifest is required for transportation, such manifest must be signed by a representative of the University EH&S. Contact EH&S with at least one week’s notice of the intent to dispose.

END OF SECTION 01 56 20

SECTION 01 61 00

PRODUCT REQUIREMENTS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Product Options

B. Product Substitutions

C. Product Transportation and Handling Requirements

D. Product Storage and Protection

E. Product System Completeness

1.02 RELATED SECTIONS

A. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

B. Section 013900 - GREEN BUILDING POLICY IMPLEMENTATION

C. Section 014100 – REGULATORY REQUIREMENTS

D. Section 014500 – QUALITY CONTROL

1.03 PRODUCTS

A. Product Selection: Provide products that comply with Contract Documents, are undamaged and unused at installation.

B. Product Completeness: Provide products complete with all accessories, trim, finish, safety guards and other devices needed for complete installation and for intended use and effect.

C. Products: Items purchased for incorporation in Work, whether purchased for project or taken from previously purchased stock; this includes materials, equipment, assemblies, fabrications and systems.

1. Named Products: Items identified by manufacturer's product name, including make or model designation indicated in the manufacturer's published product data.

2. Materials: Products that are shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed or installed to form part of the Work.

3. Equipment: A product with operating parts, whether motorized or manually operated, requiring connections such as wiring or piping.

D. Specific Product requirements: Refer to requirements of Section 014500 – QUALITY CONTROL and other Sections in Division 2 through 49 for specific requirements for products.

E. Code Compliance: All products, other than commodity products prescribed by Code, shall have current listing service report or research report. Minimum Requirements: Specified requirements are minimum requirements.

F. Interchangeability: To fullest extent possible, provide products of the same kind from single source. Products supplied in quantity shall be same product and interchangeable throughout the Work. When options are specified for selection of any of two (2) or more products, product selected shall be compatible with products previously selected.

G. Nameplates: Except for required labels and operating data, do not attach manufacturer's name plates or trademarks on surfaces exposed to view in occupied spaces or on the exterior of building.

H. Equipment Nameplates: Provide permanent nameplate on each item or service-connected or power-operated equipment. Locate on inconspicuous accessible surface. Nameplate shall contain the following information and essential operating data:

1. Name of product and manufacturer

2. Model and serial number

3. Capacity and Speed

4. Ratings and other pertinent information

I. Listing Service: Products, for which listing service standards have been established and for which their service label is available, shall bear the appropriate listing service label.

1.04 PRODUCT OPTIONS

A. Products Specified Only by Description: Where the Contract Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that provides the appropriate characteristics and otherwise complies with the requirements.

B. Performance Specification: Where Contract Specifications require compliance with performance requirements, provide products that comply and are recommended for application. Manufacturer's recommendations may be contained in Product literature, or by certification of performance.

C. Compliance with Standards: Where Contract Specifications require compliance with a standard, select a product that complies with the standard specified.

1. Wherever catalog numbers and specific brands or trade names followed by the designation "to match existing” are used in conjunction with product(s) required by the Contract Specification, no substitution will be considered.

D. Products Specified by Naming One (1) or More Manufacturers:

1. Specified manufacturer(s): Provide specified product(s) of the specified manufacturer. Wherever more than one (1) manufacturer's product is specified, the first-named product is the basis for the design used in the Work and the use of alternative-named products or substitutes may require modifications in that design. If such alternatives are proposed by Contractor and are approved by University, Contractor shall assume all costs required to make necessary revisions and modifications to the design, including additional costs to University for evaluation of revisions and modifications of the design resulting from the substitutions submitted by Contractor

a. When materials and equipment are specified by first manufacturer's name and product number, second manufacturer's name and "or equal" supporting data for second manufacturer's product, if proposed by Contractor shall be submitted in accordance with the requirements for substitution.

2. Quality Standard: Products(s) of the specified manufacturer shall serve as standard by which the product(s) of other named manufacturers are evaluated.

E. "Or Equal" Provision: Catalog numbers and specific brands or trade names followed by the designation "or equal" are used in conjunction with material and equipment required by Contract Specification to establish standard of quality, utility, and appearance required.

1. "Or Equal" Products: Equivalent products of manufacturers other than the specified manufacturer may be provided if determined by University's Representative to be acceptable in accordance with substitution provisions following:

a. Contractor shall submit to University's Representative, within thirty-five (35) calendar days after the date of commencement of the Work specified in the Notice to Proceed, a list in excel format containing Specification Section number with extension i.e. 088000 2.B.1.a. with descriptions of each product proposed for substitution.

b. Contractor shall provide supporting data as required herein.

c. University will evaluate Contractor's proposal. The decision of University shall be final.

d. University will accept, in writing, proposed substitutions that are in University's opinion equal in quality, utility and appearance to the product specified. Such acceptance does not relieve Contractor from complying with requirement of the Contract Documents.

e. Contractor shall be responsible for all costs of any changes resulting for Contractor's proposed substitutions that affect other work, or the Work of Separate Contractor.

f. Failure to place orders for specified products sufficiently in advance of required date for incorporation into the Work will not be considered justification for Contractor to request a substitution or deviation from requirements of the Contract Documents. The sixty (60) calendar day submittal period does not excuse Contractor from completing the Work within the Contract Time.

2. Contractor's Determination: Prior to submitting "or equal" product(s) for consideration, Contractor shall review and determine product(s) meet or exceed the quality and warranty provisions of the specified product.

3. Late Substitution Requests: If a request for substitution occurs after the sixty (60) calendar day period, the substitution may be reviewed at the discretion of University and the costs of such review, as approved by University, shall be deducted from the Contract Sum.

a. Product Availability Waiver: Substitutions will be considered after the sixty (60) calendar day period only when a product becomes unavailable due to no fault of the Contractor.

F. Visual Matching: Where Contract Specifications require matching a sample, University's decision on proposed product match is final. If no product matches and complies with other requirements, comply with provisions for "substitutions" for selection of a matching product in another category.

G. Visual Selection: Where requirements include the phrase "….as selected from manufacturer's standard colors, patterns, textures…" or a similar phrase, select a product that complies with other requirements. University's Representative will select color, pattern and texture from the product line selected.

1.05 SUBSTITUTIONS

A. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract shall be considered "substitutions". The following are not considered substitutions:

1. Revisions to Contract Documents requested by University's Representative or University's Consultant.

2. Specified options of products and construction methods included in Contract Documents.

3. Compliance with governing regulations and orders issued by governing authorities.

B. Substitution Provisions: Requests for Substitutions will only be considered if Contractor submits the following data:

1. Furnish complete technical data including drawings, performance specifications, samples, test reports and any additional information required by University's Representative, for each product proposed for substitution.

   a. Submit ONE (1) PDF file with bookmarks.

   b. In reviewing supporting data for substitution, University will use, for purpose of comparison, all characteristics of Basis of Deign specified product as it appears in manufacturer's published data even though all characteristics may not have been particularly mentioned in the Contract Specifications. If more than two (2) substitutions of supporting data are required, University's costs of reviewing additional supporting data will be deducted from the Contract Sum.

   c. Submit statement indicating substitution's effect on the Construction Schedule, if any.

   d. Submit cost information, including proposal of net deduction, if any, from Contract Sum.

2. Furnish statement by Contractor that proposed substitution is in full compliance with requirements of Contract Documents and Applicable Codes.

3. Provide a Comparison Table as part of the substitution request listing the design and performance criteria of the Basis of Design specified product with the proposed substitution product side by side. The design and performance criteria shall include but not limited to; size, thickness, gauge, strength, function, ASTM rating, test report data, manufacturing association standards & data, technical properties & performance data, traffic or weather resistance, quality assurance data, warranty and other design and performance criteria list in Basis of Design manufactures specification and written material.

4. Furnish list of Subcontractors, if any, that may be affected by the substitution.

5. If proposed substitution requires portions of the Work to be redesigned or removed in order to accommodate substituted product, submit design and engineering calculations prepared by the licensed design professional of record.

6. Contract Document Revisions: Should Contractor-proposed or alternate sequence or method of construction require revision of Contract Documents, including revisions for purpose of determining feasibility, scope or cost, or revisions for the purpose of obtaining approval by governing authorities having jurisdiction, revisions will be made by University's Consultant who is the design professional of record.

   a. Services of University's Consultants, including time spent in researching and reporting on proposed substitutions or alternate sequences and methods of construction, shall be paid by Contractor when such activities are considered additional services to the design services contracts of University.

b. Cost of services by University's Consultants shall be paid on a time and material basis, based on current hourly fee schedules, with reproduction, long distance telephone and shipping costs reimbursable. Such fees shall be paid whether or not the proposed substitution or alternate sequence or method of construction is ultimately accepted by University and Change Order executed. Such fees owed shall be deducted from the Contract sum on the next Application for Payment.

7. Submit all proposed substitutions in writing to University using the Request for Substitution form provided at the back of this Section.

C. University may reject any substitution not proposed as described above and presented within the time prescribed.

D. Revisions to submittals: If University's Representative, in reviewing list of substitutions, requires revisions or corrections to previously accepted Shop Drawings and supplemental supporting data, Contractor shall promptly do so. If any proposed substitution is judged by University's Representative to be unacceptable, the specified product shall be provided at no cost to the University.

E. Samples: Samples may be required. Tests required by University's Representative for determination of quality and utility shall be made by Contractor's independent testing Laboratory, at expense of Contractor, with prior University acceptance of test procedure.

1.06 TRANSPORTATION, DELIVERY AND HANDLING

A. Transport products by methods to avoid product damage.

B. Schedule delivery to minimize long-term storage and prevent overcrowding construction spaces. Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

C. Deliver products in undamaged condition in manufacturer's original sealed container or packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

D. Provide equipment and personnel to handle products by methods to prevent soiling, marring or other damage.

E. Promptly inspect products on delivery to ensure products comply with Contract Documents, quantities are correct, and to ensure products are undamaged and properly protected. Promptly remove damaged or defective products from site and replace at no adjustment to the Contract Sum and/or Contract Time.

1.07 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store products to facilitate inspection and measurement of quantity or counting of units.

C. Store heavy materials away from structures in a manner that will not endanger supporting construction.

D. Store sensitive products in weather-tight enclosures. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation.

1. Maintain temperature and humidity within range required by manufacturer's instructions.

2. Exterior Storage:

a. Store products above ground on blocking or skids to prevent soiling, staining and damage.

b. Cover products that are subject to damage by the elements with impervious protective sheet coverings. Provide adequate ventilation to prevent condensation.

c. Store sand, rock, aggregate or other loose granular material in well-drained area on solid surfaces. Prevent mixing with foreign matter.

3. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and maintained under required conditions, free from damage and deterioration.

E. Protection After Installation: Provide barriers, substantial coverings, notices and other materials or methods as necessary to protect installed work from traffic, subsequent construction operations and weather.

1. Maintain temperature and humidity conditions in interior spaces for Work in accordance with manufacturers' instructions for materials and equipment being protected.

2. Remove protective measures when no longer required and prior to Acceptance of the Work.

1.08 SYSTEM COMPLETENESS

A. The Contract Drawings and Contract Specification are not intended to be comprehensive directions on how to produce the Work. Rather, the Drawings and Specifications are instruments of service prepared to describe the design intent for the completed Work.

B. It is intended that equipment, systems and assemblies be complete and fully functional even though not fully described. Provide all products and operations necessary to achieve the design intent described in the Contract Documents.

C. Contractor is urged to report to University's Representative immediately when elements essential to proper execution of the Work are discovered to be missing or misdescribed in the Contract Documents or if the design intent is unclear.

D. Should an essential element be discovered as missing or misdescribed prior to receipt of bids or establishing a negotiated Contract Sum, an Addendum or Clarification will be issued so that all cost may be accounted in the Contract Sum.

E. Should an obvious omission or misdescription of a necessary element be discovered and reported after execution of the Agreement, Contractor shall provide the element as though fully and correctly described.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products.

B. Anchor each product securely in place, accurately located and aligned with other Work. Clean exposed surfaces and protect to ensure freedom from damage and deterioration at time of Substantial Completion.

3.02 Refer to the following Attachment:

A. Request for Substitution Form.

END OF SECTION 01 61 00

REQUEST FOR SUBSTITUTION

Substitution #: _____ **Submittal #:** _____ **Date:** _____

Project#: _____ **HCAI#:** _____

PROJECT NAME: _____

TO: UC DAVIS HEALTH **Facilities Design & Construction** **4800 2ND Avenue, Suite 3010** **Sacramento, CA95817** **P: 916-734-7024** **Attn.: (Project Manager's Email Address)**	**FROM:** _____

Name of Party Submitting Request for Substitution: _____

Reason for Submitting Request for Submission: _____

Specification Section and Paragraph #: _____

Substitution Manufacturer name and address: _____

Proposed substitution (trade name of product, model or catalog #): _____

Fabricators and Suppliers (as appropriate): _____

PRODUCT DATA:
ATTACH PRODUCT DATA AS SPECIFIED IN SPECIFICATION SECTION 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

Similar projects using product (list dates of installation and names/phone numbers of Owners):

_____

_____

_____

_____

Similar comparison of proposed substitution with specified product (indicate variation(s), and reference each variation to appropriate Specification Section paragraphs):

-ATTACH COMPARISON SUMMARY-

(SUBSTITUTION REQUEST CONTINUES)

Quality and performance comparison between proposed substitution and specified product:

Availability of maintenance services and replacement materials:

Effect of proposed substitution on Construction Schedule:

Effect of proposed substitution on other work or products:

SECTION 01 72 00

PREPARATION

PART I - GENERAL

1.01 SECTION INCLUDES

A. Surveying and Field Engineering Services

1.02 RELATED SECTIONS

A. Section 014500 – QUALITY CONTROL

B. Section 017800- CLOSEOUT SUBMITTALS

1.03 REGISTRATION REQUIREMENT

A. Contractor shall employ civil engineers/land surveyors, which are registered and licensed in the state of California and acceptable to the University.

1.04 LINE AND GRADES

A. Contractor shall provide all construction survey work required for accurate location of the Work. Horizontal and vertical control for the Work shall be from project reference marks as shown on Contract Drawings. University's decision will be final in all questions regarding proper location of work.

B. Contractor shall verify final configuration of project during demolition work. Minor adjustments of work to accommodate existing field conditions shall be responsibility of Contractor.

C. For work that connects to existing structures with new floors or roofs that align with existing conditions; Contractor shall verify new and existing elevations prior to constructing the new floor or roof structure. Adjust elevations accordingly so that the new and existing floors are level and lineup.

1. University approval in writing is required for any deviations from the contract documents intent.

D. Replace control points that may be lost or destroyed, base requirements on original survey control, at no increase in the Contract Sum.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 INSPECTION

A. Verify locations of survey control points prior to starting work. Promptly notify University's Representative of any discrepancies discovered.

3.02 SURVEY REFERENCE POINTS

A. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Make no changes without prior written notice to University's Representative.

B. Promptly report loss or destruction of any reference point or relocation required to University's Representative. Replace dislocated survey points based on original survey control.

C. All control points established for the project must be clearly shown on the record documents.

3.03 SURVEY REQUIREMENTS

A. Establish minimum of three (3) permanent benchmarks on site, referenced to establish control points. Record locations, with horizontal and vertical data, on Project Record Documents.

B. Establish lines and levels, locate and lay out by instrumentation and similar appropriate means:

1. Site improvements, including pavements, stakes for grading, fill and topsoil placement, utility locations, slopes and invert elevations.

2. Grid or axis for structures.

3. Building foundation, column locations and ground floor elevations.

4. Controlling lines and levels required for mechanical and electrical work.

5. Verify layouts as Work proceeds to assure compliance with required lines, levels and tolerances.

C. Periodically certify layouts by same means.

3.04 RECORDS

A. Maintain complete and accurate log of all control and survey work as it progresses Including but not limited to items indicated in 3.03, B. and 3.04, B.

B. On completion of foundation walls, underground utilities and major site improvements, prepare certified survey showing all dimensions, locations, angles and elevations of construction. Provide as part of the As-Built Documents per Section 017800.

END OF SECTION 01 72 00

SECTION 01 73 00

CUTTING AND PATCHING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching Work.

B. Hazardous Conditions Permit requirements for brazing, welding and other hot work.

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013100 – COORDINATION

C. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

D. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

E. Section 016100 – PRODUCT REQUIREMENTS

F. Individual Specifications Sections.

1. Cutting and patching incidental to Work specified in this Section.

2. Coordination with work in other Sections for openings required to accommodate Work specified in those other Sections.

1.03 SUBMITTALS

A. Contractor shall complete and submit for review to University's Representative, a Coring/Sawcutting Form, included at the end of this Section, and obtain written authorization for University prior to the commencement of any dig activities. Contractor shall include all pertinent information with the Coring/Sawcutting Form and submit with detailed work plan fourteen (14) calendar days prior to desired coring/cutting activity.

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 University.

6. Utility supply, drains, fire alarm, communication.

B. Include in request:

1. Identification of Project, including University's Project Name and Project Number.

2. Location and description of affected Work.

3. Necessity for cutting and patching.

4. Description of proposed work, and products to be used.

5. Alternatives to cutting and patching.

6. Effect on work of University.

7. Written permission of University.

8. Date and time work will be executed.

1.04 NOTIFICATIONS

A. Before starting welding or cutting work involving the use of gas or electric welding equipment, or any brazing work involving gas or electric brazing equipment Contractor shall complete the online Hazardous Conditions Permit form at https://health.ucdavis.edu/fire/. Contractor shall allow seventy-two (72) Hours for Fire Marshal's approval and issuance of Hazardous Conditions Permit. This permit will be issued without cost to Contractor and may be applicable to more than one (1) building. Contractor shall be responsible for reporting to Fire Department either by telephone or in person at beginning and end of each day's work. Provide minimum written notice of fourteen (14) calendar days prior to such activities.

1. Welding and brazing personnel must be certified by a University or HCAI approved laboratory and must maintain this certification during the work of this Contract.

2. Contractor is responsible for notifying University of all apparent locations where suspect asbestos containing materials may be present or discovered during the course of the project such as cement pipes or other insulated material, which may be a result of newly excavated materials below grade or after building systems are opened such as within wall, ceiling or subfloor spaces. When any such location is discovered by Contractor, information relating thereto shall be immediately communicated to University's Representative.

3. Where welding and cutting activity is required and suspect painted surfaces are present that will be impacted by the welding or cutting activity, the contractor shall request from the University’s Representative information regarding laboratory analysis for lead or other hazardous metals in the painted metal components before any cutting or welding is performed. The contractor shall refer to Section 013500 Special Procedures, 1.05 Hazardous Materials Procedures regarding materials impacted by welding and cutting activity.

4. Contractor shall then follow any and all instructions as indicated by University's Representative.

PART II - PRODUCTS

2.01 MATERIALS

A. Product substitution: For any proposed change in materials, submit request for substitution under provision of SECTION 016100 – PRODUCT REQUIREMENTS. Use only materials for cutting, fitting, and patching which comply with the applicable Specification Sections, and which match adjacent materials. Use materials whose installed performance will equal or surpass that of existing materials.

PART III - EXECUTION

3.01 EXAMINATION

A. General: Execute cutting, fitting and patching including excavation and fill, to complete Work and:

1. Fit the several parts together, to integrate with other work.

2. Uncover work to install ill-timed work.

3. Remove and replace defective and non-conforming work.

4. Remove samples of installed work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical work.

B. Examination, General: Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

1. After uncovering existing Work, inspect conditions affecting proper accomplishment of Work.

2. Beginning of cutting or patching shall be interpreted to mean that existing conditions were found acceptable by Contractor

C. Ground Penetrating Radar: Determine by Ground Penetrating Radar all existing reinforcing, conduit and piping located in concrete walls and slabs prior to demolition. Clearly mark all locations and review with University Representative prior to demolition.

3.02 PREPARATION

A. Temporary Supports: Provide supports to assure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Weather Protection: Provide protection from elements in all areas that may be exposed by uncovering work. Maintain excavations free of water.

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

D. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Do not block required exit ways or stairs.

E. Protect rated floor, wall and ceiling assemblies. Prior to cutting opening in a rated assemblies review with University's Representative and get written approval form the Fire Marshal.

3.03 CUTTING AND PATCHING

A. Execute cutting, fitting, and patching to properly complete Work.

B. Coordinate installation or application of products for integrated Work.

C. Uncover completed Work as necessary to install or apply products out of sequence.

D. Remove and replace defective or non-conforming Work.

E. Provide openings in the Work for penetrations of mechanical and electrical Work.

F. Provide cutting and patching to accommodate all demolition work as part of this contract. Provide level and plumb cuts at locations that will be exposed or to provide smooth and even surface for patching to existing work or surfaces.

G. Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

3.04 PERFORMANCE

A. Execute cutting and patching by methods to avoid damage to adjoining Work, and that will provide appropriate surfaces to receive final finishing.

B. Execute cutting and patching of weather-exposed, moisture-resistant and sight-exposed surfaces by methods to preserve weather, moisture and visual integrity.

C. Restore work with new Products as specified in individual Sections of Contract Documents.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval from University. Coordinate timing of all sawing and cutting work with the University's Representative. Do not over saw cut corners and intersection unless written authorization is provided from the University Representative and the Structural Engineer of Record.

E. Fit work neat and tight allowing for expansion and contraction. Butt new finishes to existing exposed structure, pipes, ducts, conduit, and other penetrations through surfaces.

F. At penetrations of firewalls, partitions, ceiling, or floor construction, completely seal voids with UL approved fire-rated assembly. Provide temporary closures at the end of each workday. Closures shall be approved by the University Fire Marshal.

G. Refinish surface to match adjacent finish. For continuous surfaces, refinish to nearest intersection, corner or natural break and from floor to ceiling. For an assembly, refinish unit. All patched surfaces from new to existing shall provide a smooth and even transitions aligning with the adjacent surface with no visible marks, joints, seams, sheen, texture or color difference.

H. Where new construction is to join with or match existing work, it shall be finished exactly to

that work so as to form a complete unified and finished element.

I. Visual Requirements: Do not cut and patch operating elements or related components in a manner that would, in the University's Representative's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner, including by not limited to.

1. Repair and patch in areas where finishes have been visually disturbed by cutting and patching to the nearest intersections.

2. Processed concrete finishes

3. Firestopping

4. Acoustical ceilings

5. Flooring

6. Carpeting

3.05 Refer to the Following Attachment

A. Coring/Sawcutting Notification

END OF SECTION 01 73 00

CORING/SAWCUTTING NOTIFICATION

LOCATION: _____ PROJECT#: _____
TITLE: _____

TRACKING NUMBER:
(Provided by PO&M) _____

HCAI #: _____ DATE: _____

TO: **Facilities Design & Construction**
UC Davis Health
4800 2nd Avenue, Suite 3010
Sacramento, CA 95817
P: 916-734-7024
(Project Manager's email address)

FROM:

SCOPE:

HAS USA BEEN NOTIFIED? ☐ *YES* ☐ *NO* *When?* _____

ARE ALL KNOWN UTILITIES MARKED? ☐ *YES* ☐ *NO* *By Whom?* _____

LOCATION OF WORK SHOWN ON ATTACHED SITE PLANS? ☐ *YES* ☐ *NO* *Purpose:* _____

DATE(S) CORING OR SAWCUTTING WILL TAKE PLACE: Signed: _____

UC DAVIS HEALTH USE ONLY

DATE RECEIVED:

WHO FROM UNIVERSITY WILL AUTHORIZE, SUPERVISE AND VERIFY?
PHONE:

Utilities Verified by IOR? ☐ *YES* ☐ *NO*

Activities coordinated with: ☐ PO&M ☐ Fire ☐ Telecom ☐ Occ. Safety ☐ Other (Itemize):

COMMENTS:

DATE AUTHORIZED: _____ Signed: _____
University Representative
PO&M: _____

COMPLETION DATE: _____

COMMENTS:
(Unknown Utilities Encountered, Disruptions, Successes, Weather, etc.)

SIGNED: _____

Copies to: University Consultants, PO&M, Fire, Telecom, File, Others:

SECTION 01 74 00

CLEANING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Construction Cleaning.

B. Requirements for cleaning during progress of Work, at Substantial Completion of Work and at Acceptance of Work.

C. Disposal of waste materials, debris and rubbish during construction.

1.02 RELATED SECTIONS

A. General Conditions of the Contract: Cleanup.

B. Additional Requirements: Cleaning for specific products or elements of Work are described in Specification Sections describing that Work.

C. Section 015610 Airborne Contaminants Control have procedures and practices that shall be implemented and followed by the Contractor for this project.

D. Section 013900 Green Building Policy Implementation: Waste Management Program

PART II - PRODUCTS

2.01 MATERIALS

A. Use only those cleaning agents and materials that will not create hazards to health or property and that will not damage surfaces.

B. Use only those cleaning agents, materials and methods recommended by manufacturer of the material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning agent manufacturer.

2.02 EQUIPMENT

A. Provide covered containers for deposit of waste materials, debris, and rubbish.

B. Provide at each entry point to the Work, and at other areas as directed by University's Representative, a clean room sticky mat. Replace mats daily or as requested by University Representative.

PART III - EXECUTION

3.01 CLEANING

A. Construction Cleaning: During Construction, maintain buildings, premises and property free from waste materials and rubbish. Dispose of such waste and debris at reasonable intervals off of University property.

1. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.

2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to closing such spaces.

    a. All horizontal surfaces above ceilings shall be cleaned prior to ceiling closer.

3. After every concrete placement clean all wet concrete from all surfaces.

    a. Interior and exterior

4. Clean interior areas daily to provide suitable conditions for Work. Remove debris from areas of work on a daily basis at a minimum, or more often as required to provide suitable conditions for work.

5. Broom clean with sweeping compound or HEPA Vacuum interior areas prior to start of surface finishing, and continue cleaning on an as needed basis.

6. Control cleaning operations so that dust and other particles will not adhere to wet or newly coated surfaces.

7. Provide a mat, as specified above, for project entrances and exits. Item to be of sufficient size to allow personnel exiting project site to clean debris and dust from shoes. Tracking dust and debris through working areas of hospital and/or related buildings is not acceptable.

8. Any dust or debris tracked out of the construction site, either by foot traffic or by debris hauling vehicles shall be cleaned by the contractor. If the dirt or other debris is determined by the University’s Representative to from the contractor’s activities at the jobsite it shall be cleaned in a timely manner regardless of how far from the site it is.

B. Conduct cleaning and disposal operations in compliance with Waste Management Program per 013900 and all applicable codes, ordinances, regulations, including anti-pollution laws.

3.02 SUBSTANTIAL COMPLETION CLEANING

A. Execute a thorough cleaning prior to Substantial Completion review by University's Representative.

B. At roof areas remove all unused materials and construction waste including but not limited to screws, nails, fasteners, sheet metal cuttings, scrapes, oil, grease and adhesive. Wash down roof horizontal and vertical surfaces. Clean out all debris at roof drains.

C. Clean walkways, driveways and streets by thorough brooming and wash-down.

D. Clear debris from storm drainage lines and ways, leaving site ready for stormy weather.

E. Rake landscaped areas clean.

F. Remove waste and surplus materials, rubbish and temporary construction facilities, utilities and controls.

G. Disinfect containment and protection areas as directed by University Representative.

H. For Airborne Contamination areas: Construction cleaning use wet cleaning methods and HEPA-filtered vacuum cleaners are required to minimize release of airborne contaminants. Contain waste materials, debris and rubbish.

3.03 FINAL COMPLETION CLEANING

A. Complete final cleaning before submitting final Application for Payment.

B. Employ professional building cleaners to thoroughly clean building immediately prior to final inspection.

C. Remove the following but not limited to concrete splatters, paint splatters, pencil marks, pen marks, chalk-line marks, tape, protective films & coatings, grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from all sight-exposed interior and exterior surfaces.

D. Restore damaged or marred surfaces.

E. Remove dust from all horizontal surfaces not exposed to view, including light fixtures, ledges and fixture lenses.

F. Clean and polish all glass, mirrors, and bright metal work. Clean and disinfect all plumbing fixtures.

G. Damp wash all resilient flooring. Waxing of resilient flooring shall be done by the University.

H. Thoroughly sweep all floors and vacuum all carpets.

I. Cleaning of Work provided by University under separate contracts, will not be required except if soiled by construction activities under this Contract.

J. Thoroughly clean and polish all resilient flooring, metal and plastic surfaces; remove labels and protective coatings.

K. Replace filters and clean heating and ventilating equipment used for temporary heat and ventilation.

L. Remove waste material or equipment that has been damaged, touch up and /or repair

exposed areas; such repairs to be approved by University's Representative.

M. Should final cleaning be inadequate, as determined by University's Representative, and Contractor fails to correct conditions, University's Representative may order thorough cleaning and deduct the cost from Final Payment.

3.04 FINAL COMPLETION SITE CLEANING

A. Broom clean exterior paved surfaces. Rake clean other surfaces of the grounds.

B. Power Wash, Hose down and scrub where necessary all concrete and walks dirtied as a result of the construction work. Thoroughly remove mortar droppings from all walks and pavements.

C. Remove from the site all tools, equipment, construction waste, unused materials, excess earth, and all debris resulting from the Work.

3.05 DISPOSAL

A. Conduct cleaning and disposal operations in compliance with all applicable codes, ordinances, regulations, including anti-pollution laws.

B. Do not bury or burn rubbish or waste material on University premises.

C. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.

D. Remove waste materials, debris, and rubbish from site and dispose of off-site.

3.06 INSPECTION

A. Prior to Beneficial Occupancy, Substantial Completion or Final Completion; Contractor and University's Representative shall jointly conduct an inspection of sight-exposed interior and exterior surfaces to verify that entire Work is clean.

END OF SECTION 01 74 00

SECTION 01 75 00

STARTING AND ADJUSTING SYSTEMS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Procedures for Starting Systems

1.02 REALATED SECTIONS

A. Section 018100 – PLUMBING/HVAC TESTING PROCEDURES

B. Section 018200 – DEMONSTRATION AND TRAINING

C. Section 019100 - COMMISSIONING

D. Division 22 - PLUMBING

E. Division 26 – ELECTRICAL

1.03 SUBMITTAL REQUIREMENTS

A. Submit preliminary schedule listing times and dates for start-up of each item of equipment in sequence in writing, minimum of ninety (90) calendar days prior to any start-up.

1. Start up, testing and Commissioning of equipment shall be integrated and coordinated with the contract schedule.

a. Adjustments will be made as project progresses, but the sequencing will be maintained.

B. Submit manufacturer's representative reports within one (1) week after start-up, listing satisfactory start-up dates.

C. Provide information, manufacturer and model number of all testing equipment to be used and current certification that the testing equipment has been calibrated within the last 6 months.

D. Maintain log with dates and results of Starting and Adjustments, and provide electronic copy to University’s Representative.

1.04 PROJECT CONDITIONS

A. Building enclosure shall be complete and weather-tight.

B. Excess packing and shipping bolts shall be removed.

C. Interdependent systems shall have been checked and made operational.

D. Permanent Power is connected and operational to the building.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 INSPECTION

A. Verify Project conditions comply with requirements for start-up.

B. Verify status of Work meets requirements for starting equipment and systems.

3.02 PREPARATION

A. Coordination: Coordinate sequence for start-up of various item of equipment.

B. Notification: Notify University in writing, minimum of fourteen (14) calendar days prior to start-up of each item of equipment.

C. Contractor Quality Assurance Manager shall take the lead role for Starting and Adjusting the equipment; coordinate and work with the University's Representative and Inspectors throughout the entire process.

1. Coordinate all start-up with the Commissioning Agent for the project.

D. Information on hand: Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during entire start-up process.

E. Verify each piece of equipment is anchored correctly per the manufacturer's requirements and the Contract Documents prior to energizing or starting.

F. Verify each piece of equipment is connected to the correct power source, the breaker and conductors are the correct size. Overcurrent protection in place and required shut offs adjacent to the equipment are in place.

G. Verify each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, and other conditions that may cause damage prior to energizing or starting.

H. Verify control systems are fully operational in automatic mode.

I. Manufacturer's Criteria: Verify tests, meter readings and specific electrical characteristics agree with electrical equipment manufacturers' criteria.

J. Bearings: Inspect for cleanliness: clean and remove foreign matter, verify alignment. Take corrective action as required.

K. Drives: Inspect for tension on belt drives, adjustment of vari-pitch sheaves and drives, alignment, proper equipment speed, and cleanliness. Take corrective action as required. Verify shaft grounding protection is in place.

L. Motors: Verify motor amperage agrees with nameplate value. Inspect for conditions that produce excessive current flow and that exist due to equipment malfunction. Take corrective action as required. Verify shaft grounding protection is in place.

3.03 STARTING SYSTEMS

A. Execute start-up under supervision of responsible Contractor personnel.

B. Place equipment in operation in proper sequence in accordance with sequencing schedule and the contract schedule.

C. Follow manufacturer's requirements and recommendations for Starting and Adjusting, including any University requirements that may be listed in the Contract and Construction Documents.

D. Equipment manufacturers representatives shall be on site for Starting and Adjusting that equipment.

E. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

F. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

G. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 01 75 00

SECTION 01 76 00

PROTECTION of EXISTING and INSTALLED CONSTRUCTION

PART I - GENERAL

1.01 SECTION INCLUDES

A. Protection for Products Including University Provided Products, After Installation.

B. Protection of Existing Utilities, Interference and Underground Structures.

C. Protection of Existing Structures and Work adjacent to new construction and demolition.

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013900 – GREEN BUILDING POLICY IMPLEMENTATION

C. Section 015100 – TEMPORARY UTILITIES

1.03 EXISTING UTILITIES

A. Known Utilities: Known existing utilities are shown on Contract Drawings in approximate locations. Contractor shall exercise care in avoiding damage to existing facilities. Contractor shall be responsible for repair of same if damaged through Contractor's action. Hand excavation shall be utilized when digging in close proximity to existing utilities. University does not guarantee that all utilities or obstructions are shown, or that locations indicated are accurate.

B. As part of the Contract Work the investigation and excavation to locate existing utilities and underground structures shall be as follows, Contractor shall assume the existing known utility is within a 5 feet zone on either side of the location indicated on the Contract Documents. If the existing known utility is not located within a 5 feet zone on either side of the location indicated on the Contract Documents, the Contractor shall immediately notify the Universities Representative. The Contractor shall continue excavating until the existing utility is located. The Contractor shall be compensated for any additional excavation beyond the 5 feet zone on either side of the existing utility per 1.03D.

C. Electrical Equipment: No work shall be performed on energized electrical equipment unless scheduled with University's Representative. University reserves right to specify specific conditions for all work involving energized high voltage electrical equipment and its scheduled modification proposal.

D. Uncovering Facilities: Prior to any earthwork for new construction, Contractor shall uncover all existing piping where crossings, interferences or connections are shown on Contract Drawings, from one (1) foot below proposed construction limit to the existing ground surface. Any variation in actual elevations and indicated elevations shall be brought to University's Representative attention. If Contractor does not expose all existing utilities, Contractor shall not be entitled to additional compensation for work necessary to avoid unknown interferences.

E. Interferences: If interferences occur at locations other than general locations shown on Contract Drawings, and such utilities are damaged before such locations have been established, or create an interference, Contractor shall immediately notify University's Representative and a method for correcting said interference shall be supplied by University. Payment for additional work due to interferences not shown on Contract Drawings shall be in accordance with the General Conditions of the Contract. Cost of repair to damaged utilities shall be deducted from the Contract Sum.

F. Accuracy of Drawings: Drawings showing location of equipment, piping, etc. are diagrammatic and job conditions will not always permit installations in locations shown. When a conflict situation occurs, immediately bring to attention of University's Representative for determination of relocation.

G. Deviations from Drawings: Information shown relative to existing power and signal service is based upon available records and data but shall be regarded as approximate only. Minor deviations found necessary to conform with actual locations and conditions shall be made at no change to the Contract Sum.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 PROTECTION AFTER INSTALLATION

A. Installed Equipment and Materials: Adequately protect all installed equipment and materials until completion and acceptance by University's Representative.

B. Existing Facilities: All existing areas, improvements and facilities shall be protected from damage of any type resulting from operations, equipment or workers of Contractor during the construction process.

C. Subsequent Operations: Protect installed products and control traffic in immediate area to prevent damage from subsequent operations.

D. Traffic Areas: Provide protective coverings at walls, projections, corners, and jambs, sills, and soffits of openings in and adjacent to traffic areas.

E. Elevators: Cover walls and floors of elevator cabs, and jambs of cab doors, when elevators are used by construction personnel. Protect the elevator call buttons, switches, communication devices, lights, thresholds and other components.

F. Moisture and Humidity Protection: Protect all new installed work and existing work per the manufacturer’s requirements from moisture or humidity damage including but not limited

to stored materials, finishes, gypsum board, insulation, doors, casework, millwork, equipment and all other building components.

G. Finished Floors: Protect finished floors and stairs from dirt, wear, and damage:

1. Secure heavy sheet goods or similar protective materials in place, in areas subject to foot traffic.

2. At all transitions to adjacent areas not under construction.

3. Lay rigid materials in place in areas subject to movement of heavy objects and where storage of products will occur.

H. Waterproofed and Roofed Surfaces:

1. Restrict use of surfaces for traffic of any kind, and for storage of products.

2. When an activity is mandatory, obtain recommendations for protection of surfaces from manufacturer. Install protection and remove on completion of activity. Restrict use of adjacent unprotected areas.

3. No Construction work shall be conducted on any unprotected roof weather new or existing.

4. All pathways to work on the roof shall be protected.

I. Lawns and Landscaping: Restrict traffic of any kind across planted lawn and landscaped areas.

J. Adjacent Facilities: Care shall be exercised to prevent damage to adjacent facilities including walks, curbs, and gutters. Adequate protection shall be placed where equipment will pass over such obstructions, and facilities damaged by construction operations shall be removed and replaced at Contractor's expense.

3.02 Protection of Existing Structure and Work adjacent to new construction and demolition.

A. The Contractor shall protect existing in place work at the exterior and interior, including but not limited to finishes, materials, products, utilities, fixtures, and equipment adjacent to new construction and demolition. Any existing in place work at the exterior and interior that is damaged by the Contractor shall be repaired or replaced at no extra cost to the University.

B. Overloading: Contractor shall be responsible for overloading any part or parts of structures beyond the calculated capacities of the design. Placing materials, equipment, tools,

machinery, or any other item shall be done with care to avoid overloading. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

C. Damaged Work: All damaged work shall be replaced, repaired, and restored to its original condition without change to the Contract Sum. Repair or replace all damaged work promptly as directed by University's Representative.

D. Damaged Utilities: Where existing utilities are damaged or disrupted on account of any act, omission, neglect, or misconduct of the Contractor in the manner or method of executing the Work, or due to non-execution of work, such damage shall be immediately repaired to maintain operation regardless of the time of occurrence.

E. Temporary Construction: Provide temporary construction necessary for protection of building and its parts. Close in buildings as soon as possible to protect from weather and vandalism. Protect existing buildings and controlled temperature areas from damage.

F. Doors and Casework: Protect doors, millwork and mill counters and cases and hardware from damage, including abrading and scratching of finishes. Protect doors and frames and hardware from mechanical damage and damage to anodic coatings.

G. Protective Coatings: Remove protective coatings, etc., as required to leave work in condition for painting and finishing, final cleaning, etc.

H. Exterior Work: Protect all exterior work, including existing asphalt paving and landscaping and buildings.

END OF SECTION 01 76 00

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Project Closeout Procedures

B. Contract Closeout Procedures

C. Punch List of Incomplete Work or Corrections

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES: Administrative general requirements for submittals.

C. Section 013900 – GREEN BUILDING POLICY IMPLEMENTATION

D. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS: Removal of Controls.

E. Section 017400 – CLEANING: Final Cleaning.

F. Section 017800 – CLOSEOUT SUBMITTALS

1.03 FINAL COMPLETION ACTIONS

A. On Application for Payment that coincides with date Substantial Completion is claimed, show 100% completion for portion of Work claimed substantially complete.

B. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

C. Notify the University's Representative fourteen (14) calendar days prior to the Project being ready for permanent cores and keying.

D. Complete start-up testing and Commissioning of systems, and instruction of University personnel. Remove temporary facilities from site, along with construction tools, mock-ups, and similar elements.

1.04 SUBSTANTIAL COMPLETION REVIEW

A. Preliminary Punch List Review:

1. **Contractor** shall provide an electronic file as indicated in Item 1.04, C., (Preliminary Punch List) of items not installed, to be completed, not functioning correctly or to be corrected. The list shall include the anticipated dates of when the work is to be installed, completed or corrected.

2. Organize the List per Item 1.04, C.

3. List shall identify items by location (e.g., room number and name) and consecutive number (e.g., 307-5 might identify item 5 in room 307, Roof-4 would identify item 4 on Roof).

4. Segregate architectural, plumbing, HVAC and electrical Work on separate lists.

5. University's Representative and **Contractor** shall conduct a brief walk-through of Project to review scope and adequacy of list.

B. **Contractor**'s Certification: When determined by **Contractor** that Work is substantially complete, **Contractor** shall notify University's Consultant and University's Representative.

1. Submit to University's Representative written certification that:

a. Contract Documents have been reviewed.

b. All portions of Work have been carefully inspected.

c. Work is complete in accordance with Contract Documents.

d. Equipment and systems have been commissioned, tested, adjusted and balanced and are fully operational.

e. Indicate Operation of systems that have been demonstrated to University personnel and which systems have not been demonstrated to University personal.

f. Work is ready for University's Consultant's Substantial Completion review.

2. Provide minimum fourteen (14) calendar days' notice to University's Representative prior to desired date for Punch List review.

C. Organization of List (Punch List):

1. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by **Contractor** that are outside the limits of construction.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Format Requirements: Provide the following:

a. Organized electronic file that is able to be filtered or queried by the following categories:

1) Contractor or Subcontractor

2) Building Area/Floor if applicable

3) Room Number or specific interior or exterior area.

4) Photo Number if applicable

5) Open or Closed

6) Columns for use by University's Representative

a) Responsible Design Consultant

7) Comments

b. Other Punchlist Software may be used if approved by the University's Representative.

c. Include the following information at the top of each page:

1) Project name and Number.
2) Date.
3) Name of University's Representative.
4) Name of **Contractor**.
5) Page number.

D. Punch List Review: University's Representative and University's Consultants as may be required, will attend a Contract closeout review and conduct a walk-through of Project to review **Contractor**'s list of items to be completed and corrected (Punch List). **Contractor** and University's Consultant shall note deficiencies, if any.

1. **Contractor** shall prepare list and record additional items as University's Representative may determine require completion and correction from walk-through.

a. If deficiencies are noted University's Representative and University's Consultant shall promptly notify **Contractor** in writing, listing observed deficiencies.

b. If no deficiencies are noted, or when noted deficiencies are removed from the Punch List, University's Representative shall promptly notify **Contractor**.

2. **Contractor** shall edit the electronic file and distribute list with University's Representative and University's Consultant's additions.

3. **Contractor** shall remedy deficiencies.

4. Costs of additional visits to site by University's Consultants to review completion and correction of Work shall be deducted from the Contract Sum.

E. Uncorrected Work: Refer to requirements specified in SECTION 014500 – QUALITY CONTROL regarding Contract adjustments for non-conforming work.

F. Cleaning and Clearing: Prior to Substantial Completion review, execute cleaning and clearing site of temporary facilities and controls, as specified in SECTION 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS and SECTION 017400 CLEANING

G. Testing and Inspection: Prior to Substantial Completion review, complete all tests and inspections and submit applicable reports and approvals. Provide commissioning of building systems per Section 013900 GREEN BUILDING POLICY IMPLEMENTATION.

1. Complete materials tests and inspections.

2. Complete commissioning, testing, inspection, balancing, sterilization and cleaning of plumbing and HVAC systems.

3. Complete commissioning, testing and inspection of electrical system.

4. Complete commissioning and operational tests of equipment.

5. IF HCAI PROJECT: Submit electronic file of **Contractor**'s Final HCAI Verified Reports to University's Representative certifying completion of the Work in conformance with the Contract Documents. Report forms will be supplied by University's Representative.

H. Acceptance of the Work shall not relieve **Contractor** of any responsibility for defects that develop during the guarantee period and are caused by **Contractor**'s failure to perform work in accordance with requirements of Contract Documents.

1.05 FINAL COMPLETION SUBMITALS (See 017800 CLOSEOUT SUBMITTALS)

1.06 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit final statement reflecting adjustments to Contract Sum indicating:

1. Original Contract Sum
2. Previous Change Orders
3. Changes under allowances (Mark as NOT USED if not project applicable.)
4. Changes under unit prices (Mark as NOT USED if not project applicable.)
5. Deductions for uncorrected work
6. Penalties
7. Deductions for liquidated damages
8. Deductions for re-inspection fees
9. Other adjustments to Contract Sum
10. Total Contract Sum as adjusted
11. Previous payments
12. Sum remaining due

B. University will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.07 APPLICATION FOR FINAL PAYMENT

A. Final Payment: After completion of all items listed for completion and correction, after submission of all documents and products, and after final cleaning, submit final Application for Payment, identifying total adjusted Contract Sum, previous payments and sum remaining due. Refer to SECTION 012900 – MEASUREMENT AND PAYMENT and the General Conditions of the Contract.

B. Submit Record Documents to University's Representative with final Application for Payment.

PART II - PRODUCTS – Not Applicable to this Section

PART III - PART III - EXECUTION

3.01 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

   a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use.

3.02 REPAIR PERIOD (GUARANTEE OR WARRANTY PERIOD)

A. Upon acceptance of the project or a portion thereof from the **Contractor**, the "Guarantee to Repair Period" of one year or more will begin as described in Article 9 of the General Conditions. The University Representative will become responsible for receiving notices of Defective Work from building occupants and securing **Contractor** compliance where applicable. The University Representative shall have prime responsibility for follow-up & monitoring of **Contractor** activities. (Refer to Article 12 of General Conditions).

1. If the **Contractor** must "Shut-down" the fire and security alarms in an occupied building, then the **Contractor** shall be responsible to provide a fire and security watch until the system, at no additional cost to the University.

END OF SECTION 01 77 00

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Equipment Data

B. Operation and Maintenance Instructions

C. Instruction of University personnel

D. Schedule of Submittals

E. Spare Parts and Maintenance Materials

F. Guarantees, Warranties, Bonds, Service and Maintenance Contracts

G. Project Record Documents

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

C. Administrative general requirements for submittals.

D. Section 013900 – GREEN BUILDING POLICY IMPLEMENTATION

E. Section 014500 – QUALITY CONTROL: Manufacturer's tests and inspections as a condition of warranty.

F. Section 016100 – PRODUCT REQUIREMENTS

G. Section 017700 – CLOSEOUT PROCEDURES

1.03 FILE FORMATS

A. All printed documents submitted per this section shall be in PDF format

1. The PDF files will be unlocked and searchable.
2. All PDF documents will be bookmarked.
3. The exception to electronic format for As-Built drawings will be noted in the specific specification section where they are required.

B. Digital Photography

1. All files will be submitted in JPEG

1.04 EQUIPMENT DATA AND OPERATION AND MAINTENANCE (O&M) INSTRUCTIONS

A. Preparation of data shall be done by persons:

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of this Section.
3. Skilled in technical writing to extent required for communication of essential data.
4. Skilled as drafters competent to prepare required drawings

B. O&M Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at time of Section Submittals. Submit reviewed manual content formatted and organized as required by this Section. Prepare in the form of a data and instructional manual.

C. Submit PDF electronic files of operation and maintenance manuals. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to the University. The exception to electronic format will be indicated in the specific specification section requiring hard copies of the manual.

1. Name each indexed document file in composite electronic index with applicable item name. Include a completed electronically linked operation and maintenance directory.

a. List Project title and Project number and particular building as applicable.

b. Enable inserted reviewer comments on draft submittals.

2. Organization: Arrange content by systems under Section numbers and sequence in accordance with the Project Specifications Table of Contents.

D. Table of Contents, Each Volume: Provide title of Project, Project number, with names, addresses, and telephone numbers of University's Representative, as applicable, and Contractor including name of contact person. Provide schedule of products and systems, indexed to content of the volume.

1. For each Product or System: List names addresses and telephone numbers of subcontractor, original supplier and manufacturer, as applicable, including name of contact person. Include name and address of local source of supplies and replacement parts.
2. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete information not applicable.
3. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project As-Builts Documents as maintenance drawings.
4. Additional Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in SECTION 014500 – QUALITY CONTROL.
5. Warranties and Bonds: Include in each applicable section.

E. Manual for Materials and Finishes:

1. Building Products, applied Materials, and Finishes: Provide PDF composite electronically indexed file. Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.

2. Instruction for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

3. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

4. Additional Requirements: As specified in individual Specification Sections.

5. Table of Contents: Provide PDF electronic file with links to individual sections.

F. Manual for Equipment and Systems

1. Record Instructions: Forward to University's Representative, upon completion of work, and before work will be considered for acceptance, complete PDF composite electronically indexed file of instructions of entire plant and component parts, including manufacturer's certificates, warranty slips, parts lists, descriptive brochures, and maintenance and operating instructions, in quantities set forth in various Divisions. Submit drafts for review before preparing final PDF electronic file.

2. O & M Instructions: Provide and install, where directed, printed sheet under clear plastic cover, giving concise operating and maintenance instruction for equipment.

3. Each Item of Equipment and Each System: Inclusive description of unit or system, Model Number, Serial Number, and component parts. Identify function, normal characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts. Best to include all information provided in final approved equipment submittal. Design drawing shall be updated to reflect what was actually provided.

4. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.

5. Wiring Diagrams: Include color-coded wiring diagrams as installed.

6. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.

7. Maintenance Requirements: Include routine procedures and guide for troubleshooting; disassembly, repair, and re-assembly instructions; and alignment, adjusting, balancing, and checking instructions. Provide servicing and lubrication schedules, and list of lubricants required.

8. Instructions: Include manufacturer's printed operation and maintenance instructions. Include sequence of operation by controls manufacturer.

9. Parts Data: Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

10. Control Data: Provide as installed control diagrams by controls manufacturer.

11. Piping Data: Provide Contractor's coordination drawings, with color piping diagrams as installed. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

12. Design Data: Provide a listing in table of Contents for design data, with tabbed binder divider page and space for insertion of data.

13. Reports: Include test and balancing reports as specified.

14. Additional Requirements: As specified in individual Specification Sections.

G. Instruction of University's Personnel: Instruct University designated personnel to their full and complete understanding, procedures necessary to operate and maintain equipment and systems on continuing basis. Provide training of staff.

1. Schedule: Before final inspection, instruct University designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months of completion.

2. Basis of Information: Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

3. Instructional Material: Prepare and insert additional data in the manual when need for such data becomes apparent during instruction.

H. Equipment Data and Operation and Maintenance Instructions Submittals:

1. Submittals: Comply with administrative requirements specified in SECTION 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

2. Preliminary Draft O&M Submittal: Submit electronic files of each manual at least 90 calendar days before commencing demonstration and training. University's Representative will review draft and return with comments.

   a. The comments or corrections shall be incorporated into the Final O&M submittal.

   b. Correct or revise each manual to comply with the University’s Representatives comments. Submit electronic copies of each corrected manual within 14 calendar days of receipt of University’s Representative’s comments.

   c. University’s Representative will notify the **Contractor** when the edits have been accepted for incorporation into the final O&M submittal.

3. Advance Submittals: For equipment, or component parts of equipment to be put into service during construction and operated by University, submit documents within ten (10) calendar days after equipment approval.

4. Final O&M Submittal: After completion of instruction of University operation and

maintenance personnel and final inspection, revise content of documents to include additional information deemed necessary from instruction experience of University's personnel and any changes made during construction. Submit each manual in the final form prior to requesting inspection for Substantial Completion. The University's Representative will return comments electronically.

a. Submit electronic copies of each manual prior to requesting training.

1.05 SPARE PARTS, EXTRA STOCK AND MAINTENANCE MATERIALS

A. Products Required: Where called for in Contract Specifications, deliver to University's Representative, materials, etc., for use in maintenance work. Provide list of materials delivered to University's Representative, indicating date and acceptance by University's Representative.

1. Provide quantities of products, spare parts, maintenance tools, and maintenance materials specified in individual Sections to be provided to University's Representative, in addition to that required for completion of the Work.

2. Products supplied shall be identical to those installed in the Work. Include quantities in original purchase from supplier to avoid variations in manufacture.

3. Provide itemized list of all spare parts, materials and transmittal to the University's Representative for acceptance.

B. Storage, maintenance: Store products with products to be installed in the Work, as specified in SECTION 016100 – PRODUCT REQUIREMENTS: Product Storage and Protection.

C. Delivery to site: Prior to final payment, deliver and unload spare products to project site. Coordinate with University's Representative and obtain receipt. University will handle and store products.

1.06 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of Documents: Include a table of contents for each O&M and emergency, operations listed per CSI Specification number.

2. List of Systems and Subsystems: Include references to operation and maintenance manuals that contain information about each system.

3. List of Equipment: List equipment for each system, organized by system. For pieces of equipment not part of system, list separately.

4. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

5. This Directory shall be submitted to the University's Representative for review and acceptance.

1.07 MAINTENANCE AGREEMENTS

A. Prior to Closeout all Maintenance Agreements required by the Contract Documents shall be assembled and submitted electronically with the Closeout Submittal Requirements.

1. Provide all Maintenance Agreements in PDF form.

a. Submit individual files for each Maintenance Agreement with a directory assembled by CSI division.

1) Combine all project Maintenance Agreements including the directory into one PDF for record.

2) Files will be formatted for printing with a footer identifying the CSI number and UC Davis Health project number.

3) There will be a front cover to the file that contains all project information including the **Contractor** contact information.

1.08 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of University's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.09 WARRANTIES AND GUARANTEES

A. Warranties and Guarantees, general: Guarantees from subcontractors shall not limit Contractor's warranties and guarantees. Whenever possible, **Contractor** shall cause warranties of subcontractors to be made directly to University. If such warranties are made to Contractor. **Contractor** shall assign such warranties to University prior to final payment. When equipment and products, or components thereof, bear a manufacturer's warranty or guarantee that extends the time period of Contractor's warranty or guarantee, so state in the warranty or guarantee.

1. Standard Product Warranties: Preprinted written warranties published by individual manufacturers for particular products and specifically endorsed by manufacturer to University.
2. Special Warranties: Written warranties required by or incorporated in Contract Documents, to extend time limits provided by standard warranties or to provide greater rights for University.
3. Provisions for Special Warranties: Refer to General Conditions of the Contract for terms of Contractor's special warranty of workmanship and materials.
4. Specific Warranty Requirements: requirements are included in the individual Sections of Division 2 through 49 of the Contract Specifications, including content and limitations.
5. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve **Contractor** of warranty on work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractor’s requirement to countersign special warranties with Contractor.
6. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
7. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to original warranty with an equitable adjustment for depreciation.

8. Replacement Cost: On determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. **Contractor** shall be responsible for cost of replacing or rebuilding defective work regardless of whether University has benefited from use of the work through part of its useful service life.

9. University Recourse: Written warranties made to the University are in addition to implied warranties, and shall not limit duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which University can enforce such other duties, obligations, rights, or remedies.

10. Rejection of Warranties: University reserves right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

11. University reserves right to refuse to accept work where a special warranty, or similar commitment is required, until evidence is presented that entities required to countersign commitments are willing to do so.

12. When designated portion of Work is completed and occupied or used by separate agreement with **Contractor** during the construction period, submit properly executed warranties to University's Representative within fourteen (14) calendar days of completion of that designated portion of the Work.

13. Submit written guarantees, in the form contained at end of this Section.

B. Form of Warranty or Guarantee: All written warranties and guarantees, excepting manufacturers' standard printed warranties and guarantees, shall be submitted on Contractor's, subcontractor's, material supplier's, or manufacturer's own letterhead, addressed to University. Warranties and guarantees shall be submitted in duplicate and complying with the form letter following. Warranty and guarantee letters shall be signed by all responsible parties and by **Contractor** in every case, with modifications only as approved by University to suit the conditions pertaining to the warranty or guarantee.

C. Submission requirements:

1. **Contractor** shall collect and assemble required warranties, guarantees, bonds, and service and maintenance contracts. Provide PDF electronically signed or signed and scanned copies of each. Organize documents into an orderly sequence based on the table of contents of the Project Manual CSI divisions.

2. Table of Contents: Provide PDF electric file with links to individual warranty sections. Include the following information.

   a. Product or Work item.

   b. Product or work suppliers firm name, address, telephone number and name of principal.

   c. Scope of guarantee, bond, service or maintenance agreement.

   d. Date of beginning of guarantee, bond, service or maintenance contract.

   e. Duration of guarantee, bond, service or maintenance contract.

   f. Contractor's name, address, telephone number and name of principal.

g. Provide information for University personnel:

1) Proper procedure in case of failure.

2) Circumstances that might affect validity of guarantee or bond.

D. Warranty Submittal

1. Provide all warranties in PDF composite electronically indexed files.

a. Submit individual files for each warranty with a directory assembled by CSI division.

1) Combine all project warranties including the directory into one PDF for record

2) Files will be formatted for printing with a footer identifying the CSI Number and UC Davis Health Project Number.

3) There will be a front cover to the file that contains the title “WARRANTY, GUARANTEE AND BOND” as well as all project information including the **Contractor** contact information. Title of Project and UC Davis Health Project Name and Number.

4) Coordinate copies of each warranty to be included in operation and maintenance manuals.

5) Final Submittal shall be incorporated into one PDF, bookmarked and searchable document.

F. Time of Submittals: Submit [60] calendar days prior to request for final payment. When work activity is delayed materially beyond date of Substantial Completion, provide updated submittal within ten (10) calendar days after Final Completion, listing date of Final Completion as the start of the Guarantee period.

1.10 PROJECT AS-BUILT RECORD DOCUMENTS

A. Maintenance of As-Built Documents and Samples:

1. Provide complete set of As-Built Drawings and Specifications, showing every change from original Contract set, including all Addenda, Change Order, job decisions, etc. PDFs for this purpose may be obtained from University's Representative.

2. Refer to Section 017700 CLOSEOUT PROCEDURES for additional requirements for As-Built Documents.

3. When work is complete and prior to final payment, submit one (1) complete set of all As-Built documents, marked to show any deviation from the original Contract set. These documents are to be an accurate description of all work as constructed.

4. As-Built Schedule: **Contractor** shall provide As-Built Schedule of construction activities. Schedule shall be in same format as specified in SECTION 013200 – CONTRACT SCHEDULES.

B. As-Built Drawings: Comply with the following:

1. Number of Copies: Submit one PDF file bookmarked and searchable of marked-

up As-Builts.

a. Initial Submittal:

1) Submit PDF As-Built digital data files.

2) Submit digital data files per UC Davis Health Campus Design Guidelines.

3) University's Representative will indicate whether general scope of changes, additional information recorded, and quality of document are acceptable.

b. Final Submittal:

1) Submit PDF electronic files of digital As-Built.

2) Submit digital data files per UC Davis Health Campus Design Guidelines.

3) Final submittals of all formats will include all documents whether changes were made or not.

C. As-Built Specifications: Submit one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

D. As-Built Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. When As-Built Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

E. Miscellaneous As-Built Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

F. Submittals: At Contract closeout, deliver Record Documents and samples as required by SECTION 017700 – CLOSEOUT PROCEDURES.

1. Transmit with cover letter listing:

a. Date.

b. Project title and Project number.

c. Contractor's name, address and telephone number.

d. Number and title of each Record Document.

e. Signature of **Contractor** or authorized representative.

1.11 AS-BUILT SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, As-Built Product Data, and As-Built Drawings where applicable.
5. Format: Submit As-Built Specifications as annotated PDF electronic file.

1.12 AS-BUILT PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, As-Built Specifications, and As-Built Drawings where applicable.
4. Format: Submit As-Built Product Data as annotated PDF electronic file Include As-Built Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.13 AS-BUILT SAMPLES

A. Preparation: Mark Samples to identify the material and location or use on project; indicate finish designations of materials and products, where designations are indicated on Drawings. Cross-reference Samples with corresponding Product Data submitted.

1. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
2. Note related Change Orders, As-Built Specifications, and As-Built Drawings where applicable.
3. Format: Submit As-Built Samples in same size and format as indicated for each sample in the specification’s sections. Pack samples securely, with protective wrapping. Include As-Built Samples directory organized by Specification Section number and title.
4. Each Sample will be labeled with Manufacturer, Model, Product Number, CSI Section and UC Davis Health Project Name and Number.

1.14 MISCELLANEOUS AS-BUILT SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work.

1. Format: Submit miscellaneous As-Built submittals as PDF electronic file Include miscellaneous As-Built submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous As-Built submittals.

1.15 PHOTOGRAPHS

A. General: Prior to Closeout all photographic documentation required per 013220 Construction Progress Reporting shall be assembled and submitted with the Closeout Submittal Requirements.

1.16 CONSENT OF SURETY AND FINAL CERTIFICATES

A. General: Prior to closeout Consent of Surety and Final Certificates required by the Contract Documents shall be assembled and submitted with the Closeout Submittal Requirements.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 Refer to the following attachments

A. Guarantee

B. Report of Work Required by Warranty

END OF SECTION 017800

GUARANTEE

Project Title: SESP Kitchen Remodel / SESP Basement Food Kitchen Config for Room Service

Project Location: 2315 Stockton Blvd, Sacramento, CA 95817

Project Number:_____DATE: _____

GUARANTEE FOR_____ (the "Contract"),
(Specification SECTION and Contract No.)
between The Regents of the University of California ("University") and
_____("Contractor").
(Name of **Contractor** or Subcontractor)

hereby guarantees to University that the portion of the Work described as follows:

_____

_____

_____

which it has provided for the above referenced Project, is of good quality; free from defects; free from any liens, claims, and security interests; and has been completed in accordance with Specification SECTION_____ and the other requirements of the Contract.

The undersigned further agrees that, if at any time within months after the date of the guarantee the undersigned receives notice from University that the aforesaid portion of the Work is unsatisfactory, faulty, deficient, incomplete, or not in conformance with the requirements of the Contract, the undersigned will, within 10 days after receipt of such notice, correct, repair, or replace such portion of the Work, together with any other parts of the Work and any other property which is damaged or destroyed as a result of such defective portion of the Work or the correction, repair, or replacement thereof; and that it shall diligently and continuously prosecute such correction, repair, or replacement to completion.

In the event the undersigned fails to commence such correction, repair, or replacement within 10 days after such notice, or to diligently and continuously prosecute the same to completion, the undersigned, collectively and separately, do hereby authorize University to undertake such correction, repair, or replacement at the expense of the undersigned; and **Contractor** will pay to University promptly upon demand all costs and expenses incurred by University in connection therewith.

SUBCONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Classification & Number: _____

Address: _____

Telephone Number: _____

CONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Classification & Number: _____

Address: _____

Telephone Number: _____

REPORT OF WORK REQUIRED BY WARRANTY

To:	(PM's NAME), University Representative
From:	

On the date noted, the University identified the following work required under warranty:

Prepared by: _____ _____ _____
(Print Name) Signature Date

In accordance with the terms and conditions of the Contract, the **Contractor** has agreed that, if at any time within _____ months after the date of the guarantee the **Contractor** receives notice from University that the aforesaid portion of the Work is unsatisfactory, faulty, deficient, incomplete, or not in conformance with the requirements of the Contract, the **Contractor** will, within 10 days after receipt of such notice, correct, repair, or replace such portion of the Work, together with any other parts of the Work and any other property which is damaged or destroyed as a result of such defective portion of the Work or the correction, repair, or replacement thereof; and that it shall diligently and continuously prosecute such correction, repair, or replacement to completion.

Prompt notification to be provided by the University Representative to the appropriate Contractor.

SECTION 01 82 00

DEMONSTRATION AND TRAINING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Procedures for Demonstration of Equipment Operation and Instruction of University Personnel.

1.02 RELATED SECTIONS

A. Section 017800 – CLOSEOUT SUBMITTALS

B. Section 018100 – PLUMBING/HVAC TESTING PROCEDURES

1.03 SUBMITTALS

A. Contractor to submit preliminary schedule for University Representative approval, listing times and dates for demonstration of each item of equipment and each system, in writing, minimum of thirty (14) calendar days prior to training activities.

B. Submit reports and videos within (14) calendar days after completion of demonstrations and instructions. Give time and date of each training session, and hours devoted to training with a list of persons present and the corresponding video.

1.04 QUALITY ASSURANCE

A. Equipment installed under Contract shall operate quietly and free of vibration. Adjust, repair, balance properly, or replace equipment producing objectionable noise or vibration in occupied areas of building. Provide additional brackets, bracing, etc., to prevent such noise or vibration. Systems shall operate without humming, surging or rapid cycling.

B. University will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon time.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 PREPARATION

A. Verify equipment has been inspected, commissioned, and put into operation.

B. Send approved pdf version of completed operation and maintenance manual 7 calendar days prior to training.

3.02 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of equipment and systems to University two (2) weeks prior to date of final inspection. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months of completion.

B. Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance. Display on a video screen and demonstrate the use of bookmarks and searches to find information being sought.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.

D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

END OF SECTION 01 82 00

SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

B. Abandonment and removal of existing utilities and utility structures.

1.02 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2019.

B. CBC - California Building Code, California Code of Regulations, Title 24, Part 2, Chapter 33 Safeguards During Construction; Edition as indicated on Drawings.

1.03 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

PART 3 EXECUTION

2.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

1. Obtain required permits.

2. Comply with applicable requirements of NFPA 241.

3. Comply with applicable requirements of CBC, Chapter 33 Safeguards During Construction.

4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.

5. Provide, erect, and maintain temporary barriers and security devices.

6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.

7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.

8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.

1. Provide bracing and shoring.

2. Prevent movement or settlement of adjacent structures.

3. Stop work immediately if adjacent structures appear to be in danger.

E. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

F. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.

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

2.02 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 7 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

2.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as indicated.

2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.

1. Provide, erect, and maintain temporary dustproof partitions for areaconstruction

C. Remove existing work as indicated and as required to accomplish new work.

1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

3. Verify that abandoned services serve only abandoned facilities before removal.

4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.

1. Prevent movement of structure; provide shoring and bracing if necessary.

2. Perform cutting to accomplish removals neatly and as specified for cutting new work.

3. Repair adjacent construction and finishes damaged during removal work.

4. Patch as specified for patching new work. Where patching is required in existing construction, match exisitng construction type and finish.

2.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

A. END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Gypsum Board Suspension System

E. Acoustic insulation.

F. Cementitious backing board.

G. Gypsum wallboard.

H. Joint treatment and accessories. Caulk

I. Acoustic (sound-dampening) wall and ceiling board.

1.02 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members 2012.

B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.

C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 1999 (Reaffirmed 2016).

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

E. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.

F. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.

G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.

H. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.

I. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.

J. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.

K. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.

L. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2020.

M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.

N. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2021.

O. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.

P. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.

Q. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.

R. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

S. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.

T. ASTM E413 - Classification for Rating Sound Insulation 2016.

U. CBC - California Code of Regulations Title 24, Part 2, California Building Code; current edition.

V. GA-216 - Application and Finishing of Gypsum Panel Products 2018.

W. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association 2016.

X. ITS (DIR) - Directory of Listed Products current edition.

Y. UL 263 - Standard for Fire Tests of Building Construction and Materials Current Edition, Including All Revisions.

Z. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

AA. UL (FRD) - Fire Resistance Directory Current Edition.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of documented experience.

B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

1. See PART 3 for finishing requirements.

B. Interior Partitions, Indicated as Sound-Rated: Provide completed assemblies with the following characteristics:

1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:

1. Air Pressure Within Shaft: Sustained loads of 10 lbf/sq ft with maximum mid-span deflection of L/240.

2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

D. Fire Rated Assemblies: Provide completed assemblies with the inidicated fire-resistance rating that conforms with the fire exposure and acceptance criteria specified in ASTM E119. Fire-resistance ratings shall be established by any of the following methods or procedures:

1. Prescriptive deisgn of fire-resistance-rated building elements, components or assemblies per CBC Section 721.

2. Fire-resistance designs certified by an Approved Agency.

3. Fire-resistance designs having fire-resistance ratings as determined by the test procedure set forth in ASTM E119 or UL 263 and certified by an Approved Testing Laboratory.

a. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

b. Intertek Testing Services/Warnock Hersey International/Omega Point Laboratories Assembly Design Numbers: Provide construction equivalent to that listed for the particular assembly in the current ITS (DIR).

4. Engineering Judgements (EJ): Engineering analysis based on a comparison of building element, component or assemblies designs having fire-resistance ratings as determined by the test procedure set forth in ASTM E119 or UL 263. Requirements for Engineering Judgements:

    a. Prepared and signed by a registered Professional Engineer or Fire Protection Engineer who shall be knowledgeable regarding the elements of the construction to be protected, probably behavior of that construction and the recommended system protecting it. Provide documentation of Engineer's qualifications.

    b. Provide existing tested, listed systems that are comparable in application of cover equivalent conditions that shall be used as the basis for the EJ.

    c. The EJ shall apply only to the specific conditions and configurations for which it was produced and shall be based upon reasonable performance expectations for the recommended fire-resistive system for the specific application.

    d. EJs are approved for a specific condition on a project-by-project basis and shall not be used for another project or condition without thorough and appropriate review of all aspects of the EJ as it relates to that project’s circumstances.

    e. EJs shall be presented in a narrative format that clearly describes all aspects of the design, including, but not limited to the hourly rating required, a complete description of all critical elements for the fire-resistive system configuration, any non-standard conditions, clear directions for the installation of the recommended system and the fire-resistive design(s) that the EJ is based on. Detailed drawings shall be included when deemed necessary to clearly illustrate the assembly.

    f. EJs shall clearly state that the recommended system is an engineering judgment and is NOT a listed system.

    g. EJs shall indicate the facility name, address, title of project, AHJ project/permit number, and include the issuer’s name, title, address, telephone number and signature.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:

1. Basis of Design;

    a. CEMCO; www.cemcosteel.com

2. Acceptable Manufacturers:

    a. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 10 psf.

1. Studs: "C" shaped with flat or formed webs with knurled faces.

2. Runners: U shaped, sized to match studs.

3. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

4. Resilient Furring Channels: 1/2 inch depth, for attachment to substrate through both legs; both legs expanded metal mesh.

a. Products:

1) Same manufacturer as other framing materials.

C. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.

1. Products:

a. Same manufacturer as other framing materials.

D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.

1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.

2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.

3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems specified in this section.

4. Deflection and Firestop Track:

a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.

5. Products:

a. FireTrak Corporation; Posi Klip.

b. Metal-Lite, Inc; The System.

c. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 GYPSUM BOARD SUSPENSION SYSTEM

A. Gypsum board suspension system conforming to ASTM C635/C635M

1. Classification; Heavy Duty
2. Size: 1.6 x 1.5 inches.
3. Finish: G40 hot dip galvanized.

B. Basis of Design:

1. CertainTeed Corporation; HD-FR 1.5 inch system: www.certainteed.com/ceilings.

C. Acceptable Manufacturers:

1. USG Corporation: www.usg.com.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

1. Basis of Design:
   a. USG Corporation; www.usg.com.

B. Acceptable Manufacturers:

1. CertainTeed Corporation: www.certainteed.com.
2. Georgia-Pacific Gypsum: www.gpgypsum.com.
3. National Gypsum Company: www.nationalgypsum.com/#sle.
4. PABCO Gypsum: www.pabcogypsum.com.
5. Substitutions: See Section 01 60 00 - Product Requirements.

C. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   a. Mold resistant board is required at all locations.
3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
4. Thickness:
   a. Vertical Surfaces: 5/8 inch.

b. Ceilings: 1/2 inch.

D. Abuse Resistant Wallboard:

1. Application: High-traffic areas indicated.

2. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.

3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.

4. Soft Body Impact: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.

5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

6. Type: Fire resistance rated Type X, UL or WH listed.

a. Thickness: 5/8 inch.

b. Edges: Tapered.

7. Basis of Design

a. CertainTeed Corporation;ProRoc Abuse Resistant Gypsum Board: www.certainteed.com.

8. Acceptable Products:

a. Georgia-Pacific Gypsum; DensArmor Plus Abuse-Resistant.

b. National Gypsum Company; Gold Bond Hi-Abuse XP Gypsum Board.

c. USG Corporation; Sheetrock AR Abuse Resisitant Panels: www.usg.com.

d. Pabco Gypsum; Pabco Abuse Curb: www.pabco.com

e. Substitutions: See Section 01 60 00 - Product Requirements.

E. Backing Board For Wet Areas:

1. Application: Surfaces behind tile in wet areas including tub and shower surrounds and shower ceilings.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.

a. Thickness: 5/8 inch.

4. Basis of Design:

a. USG Corporation; Durock: www.usg.com.

5. Acceptable Products:

a. Custom Building Products;
Wonderboard: www.custombuildingproducts.com/#sle.

b. National Gypsum Company; PermaBase Cement
Board: www.nationalgypsum.com/#sle.

c. Substitutions: See Section 01 60 00 - Product Requirements.

F. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.

1. Application: Vertical surfaces behind thinset tile, except in wet areas.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

3. Type: Regular and Type X, in locations indicated.

4. Type X Thickness: 5/8 inch.

5. Regular Board Thickness: 5/8 inch.

6. Edges: Tapered.

7. Products:

a. Same manufacturer as board materials.

G. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Ceilings, unless otherwise indicated.

2. Thickness: 1/2 inch.

3. Edges: Tapered.

4. Products:

a. Same manufacturer as board materials.

H. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper faced, high density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.

1. Thickness: 5/8 inch.

2. Long Edges: Tapered.

3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

4. Basis of Design:

   a. Pabco Gypsum; QuitRock ES Mold Resistant: www.quietrock.com.

5. Acceptable Products:

   a. National Gypsum Company; Gold Bond SoundBreak XP Gypsum Board: www.nationalgypsum.com/#sle.

   b. CertainTeed; SilentFX

   c. Substitutions: See Section 01 60 00 - Product Requirements.

I. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.

1. Paper Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C1396/C1396M; water-resistant faces.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

3. Products:

   a. Same manufacturer as board materials.

   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 2 inch.

1. Flame spread index of not more than 25 per UL 723 Test for Surface Burning Characteristics.

2. Underwriters Laboratory (UL) Certification under category BKNV with designation FHC 25/50.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.

1. Types: As detailed or required for finished appearance.

2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.

2. Ready-mixed vinyl-based joint compound.

E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

1. Basis of Design:

a. USG Corporation; Tuff-Hide: www.usg.com.

2. Acceptable Products:

a. Hamilton Drywall Products; Hamilton Prep Coat.: www.hamiltonnw.com

b. Solid Products, Inc.: Fast 5 Drywall Surfacer: solidproductsinc.com.

c. Substitutions: See Section 01 60 00 - Product Requirements.

F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.

1. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.03 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs as indicated.

1. Extend partition framing as indicated on Drawings.

2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

D. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.

1. Orientation: Horizontal.

2. Spacing: As indicated.

E. Blocking: Install mechanically fastened steel channel blocking for support of:

1. Framed openings.

2. Wall mounted cabinets.

3. Plumbing fixtures.

4. Toilet partitions.

5. Toilet accessories.

6. Wall mounted door hardware.

7. Medical equipment.

3.04 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

1. Place one bead continuously on substrate before installation of perimeter framing members.

2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.05 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board parallel to framing, with ends and edges occurring over firm bearing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

F. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

G. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.07 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.

2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

3. Level 3: Not used.

4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.

5. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

6. Level 0: Temporary partitions.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

A. END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Cementitious backer board as tile substrate.

D. Coated glass mat backer board as tile substrate.

E. Ceramic trim.

F. Non-ceramic trim.

1.02 REFERENCE STANDARDS

A. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017.

B. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.

C. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).

D. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive 2019.

E. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2020.

F. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy 1999 (Reaffirmed 2019).

G. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2019).

H. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).

I. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017.

J. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.

K. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2019).

L. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).

M. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar 2019.

N. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2013 (Revised).

O. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation 2014.

P. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014.

Q. ANSI A118.13 - American National Standard Specifications for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation 2014.

R. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2012.

S. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2021.

T. ASTM C847 - Standard Specification for Metal Lath 2018.

U. ASTM E492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine 2009, with Editorial Revision (2016).

V. ASTM E2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors 2021.

W. ISO 13007 - Standards for Ceramic Tiles, Adhesives and Grouts; current edition

X. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2019.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.04 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 TILE

A. Acceptable Manufacturers:

1. Spec Ceramics: http://specceramics.com
2. Dal-Tile Corporation: www.daltile.com.
3. American Olean Corporation: www.americanolean.com.
4. Emser Tile, LLC: www.emser.com.

B. Porcelain Tile: ANSI A137.1, standard grade.

1. Abrasion Resistance: ISO 10545-7; PEI 5.
2. Thermal Schock Resistance: ISO 10545-9; Resistant.
3. Frost Resistance: ISO 10545-12; Resistant.
4. Chemical Resistance: ISO 10545-13; Resistant.
5. Pattern: As shown on the Drawings.

2.02 TRIM AND ACCESSORIES

A. Ceramic Trim: Matching bullnose ceramic shapes in sizes coordinated with field tile.

1. Applications:
   a. Open Edges: Bullnose.
   b. Inside Corners: Jointed.
   c. Floor to Wall Joints: Straight base.
2. Manufacturers: Same as for tile.

B. Non-Ceramic Trim: Satin brass anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.

1. Applications:
   a. Open edges of wall tile.
   b. Borders and other trim as indicated on drawings.

2. Basis of Bid Manufacturers:

   a. Schluter-Systems: www.schluter.com/#sle.

   b. Substitutions: See Section 01620 - Product Options and Substitutions.

3. Product: Jolly

2.03 SETTING MATERIALS

A. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15 and ISO 13007: C2ES2.

1. Basis of Design:

   a. Custom Building Products; MegaLite Ultimate Crack Prevention Large Format Tile Mortar: www.custombuildingproducts.com.

2. Other Accpetable Products:

   a. ARDEX Engineered Cements; ARDEX S 28 MICROTEC: www.ardexamericas.com.

   b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com/#sle.

   c. MAPEI Corporation; UltraFlex 3: www.mapei.com;

   d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.

1. Applications: Where indicated on drawings.

2. Acceptable Manufacturers:

   a. Custom Building Products; EBM-Lite Epoxy Bonding Mortar: www.custombuildingproducts.com/#sle.

   b. LATICRETE International, Inc; LATICRETE LATAPOXY 300 Adhesive: www.laticrete.com/#sle.

   c. MAPEI Corporation: http://www.Mapei.com; Kerapoxy 410.

C. Dry-Set Portland Cement Mortar Bond Coat: ANSI A118.1.

1. Acceptable Manufacturers:

   a. MAPEI Corporation: http://www.Mapei.com; Kerabond T.

D. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.

1. Basis of Design Product:

a. ARDEX Engineered Cements; A 38: www.ardexamericas.com/#sle.

2. Acceptable Manufacturers:

a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: www.laticrete.com/#sle.

b. Merkrete, by Parex USA, Inc; Merkrete Underlay C: www.merkrete.com/#sle.

c. MAPEI Corporation: Modified Mortar Bed; http://www.Mapei.com

d. Proflex Products, Inc; MSI - Mud Set Installation: www.proflex.us/#sle.

2.04 GROUTS

A. Manufacturers:

1. Acceptable Manufacturers:

a. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.

b. MAPEI Corporation: UltraColor Plus; http://www.Mapei.com

c. Merkrete, by Parex USA, Inc; Merkrete Duracolor Non-Sanded Color Grout: www.merkrete.com/#sle.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.

1. Applications: Where indicated.

2. Products:

a. ARDEX Engineered Cements; ARDEX WA: www.ardexamericas.com/#sle.

b. Custom Building Products; CEG-IG 100% Solids Industrial Grade Epoxy Grout: www.custombuildingproducts.com/#sle.

c. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com/#sle.

d. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: www.merkrete.com/#sle.

e. Stuart Dean Company, Inc; Marcoat GS: www.stuartdean.com/#sle.

f. TEC, an H.B. Fuller Construction Products Brand; TEC AccuColor EFX Epoxy Special Effects Grout: www.tecspecialty.com/#sle.

2.05 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.

1. Applications: Between tile and plumbing fixtures.

2. Color(s): As selected by Architect from manufacturer's full line.

3. Products:

   a. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.

   b. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.

B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.

1. Composition: Water-based colorless silicone.

2. Products:

2.06 ACCESSORY MATERIALS

A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.10 and A118.12.

1. Thickness: 30 mils, maximum.

2. Crack Resistance: No failure at 1/16 inch gap, minimum.

3. Products:

   a. Basis of Design:

      1) Custom Building Products; RedGard Waterproofing and Crack Isolation Prevention Membrane; http://www.custombuildingproducts.com

   b. Acceptable Manufacturers:

      1) LATICRETE International, Inc; LATICRETE Blue 92 Anti-Fracture Membrane: www.laticrete.com/#sle.

B. Reinforcing Mesh: 2 by 2 inch size weave of 16/16 wire size; welded fabric, galvanized.

C. Metal Lath: ASTM C847 Flat diamond mesh, of weight to suit application, galvanized finish.

D. Underlayment at Floors: Specifically designed for bonding to thin-set setting mortar; not primarily a waterproofing material and having the following characteristics:

1. Sound Reduction: Comply with ANSI A118.13 bonded membrane, ASTM E2179, ASTM E492, ANSI A118.13 bonded membrane, ASTM E2179, ASTM E492, ANSI A118.13 bonded membrane, ASTM E2179, and ASTM E492.

2. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.

3. Water Resistance: Comply with ANSI A118.10, bonded waterproofing.

4. Type: Fluid or Trowel Applied.

a. Products:

1) Custom Building Products; FractureFree Crack Prevention Memebrane; http://www.custombuildingproducts.com

E. Backer Board: Refer to Section 09 21 16 - Gypsum Board Assemblies.

F. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Shuffle tile boxes and box contents prior to installation for random color range dispersion.

C. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

D. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

F. Form internal angles square and external angles bullnosed.

G. Install non-ceramic trim in accordance with manufacturer's instructions.

H. Sound tile after setting. Replace hollow sounding units.

I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

J. Grout tile joints unless otherwise indicated.

K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

1. Use uncoupling membrane under all tile unless other underlayment is indicated.

2. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.05 INSTALLATION - WALL TILE

A. Over cementitious backer units over gypsum board on studs, install in accordance with TCNA (HB) Method W244C .

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

A. END OF SECTION

SECTION 09 96 00
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings.

B. Surface preparation.

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 10 years experience.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.04 FIELD CONDITIONS

A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.

C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.

D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

E. Restrict traffic from area where coating is being applied or is curing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 TOP COAT MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.

B. Epoxy Coating:

1. Number of coats: Two.

2. Top Coat(s): High Performance Institutional, Two-Component, Water Based Epoxy Coating; MPI #254.

a. Sheen: Eggshell.

b. Products:

1) PPG Paints; Pitt-Glaze WB Water-Borne Acrylic Epoxy 16-598 Series, Gloss/16-599 Series, Semi-Gloss: www.ppgpaints.com/#sle.

2) Sherwin-Williams; Pro Industrial Water Based Catalyzed Epoxy; MPI #254: www.protective.sherwin-williams.com/#sle.

C. Shellac: Pure, white type.

2.03 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.

1. Pre-Primer, Epoxy; [_____].

a. Products:

1) PPG Paints; Amerlock Sealer: www.ppgpaints.com/#sle.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Test shop-applied primer for compatibility with subsequent cover materials.

G. 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. Cementitious Substrates: Do not begin application until substrate has cured 28 days minimum and measured moisture content is not greater than 12 percent.

2. Plaster and Stucco: 12 percent.

H. Proceed with coating application only after unacceptable conditions have been corrected.

1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Existing Painted and Sealed Surfaces:

1. Strip existing paint and coatings from surface.

2. Remove loose, flaking, and peeling paint. Feather edge and sand smooth edges of chipped paint.

3. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.

E. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in "MPI Architectural Painting and Specification Manual".

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

A. Protect finished work from damage.

A. END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED: Foodservice Equipment Contractor will provide labor, equipment, appliances and materials, and perform all operations in connection with the execution of the Work as stated and as represented in the 100% Construction Document Drawings dated 2/18/22 to include Sheets FS100, FS101, FS102, FS103, FS104, FS200, FS300, FS400, FS401, FSE100, FSM100 and Section 11 40 00 Foodservice Equipment specifications dated 02/18/2022 including that which is reasonably inferred; install and coordinate all equipment in Section 11 40 00.

A. Equipment: Fabricate, deliver, unload, uncrate, assemble, set in place and level ready for final connection by mechanical and electrical trades.

B. Coordination: Coordinate mechanical and electrical rough in services, manufactured equipment and fabricated equipment construction, equipment bases, curbs, ceiling heights, depressed areas, sleeves, wall openings, refrigeration lines, service access, existing building conditions that affect equipment, and all other building conditions required to accommodate the Section 11 40 00 equipment including new, existing, Owner furnished, vendor furnished and future equipment with other trades; cut holes in equipment to accommodate pipes, drains, electrical conduit and outlets as required.

C. Schedule: Perform work in a timely manner consistent with the construction schedule, submit written notice of any manufacturer or construction related problems that are causing a delay in the equipment delivery or installation; substitutions for failure to order equipment in a timely manner are not acceptable. *This is a phased project, see plans for phasing*

D. Permits, Licenses and Inspections: Secure and pay for tests, permits and inspections required by authorized regulatory agencies and directly related to the construction and installation of the Section 11 40 00 foodservice equipment work.

E. Document Inconsistencies: When drawings and specifications contain conflicting requirements, request written clarification; provide the better quality or greater quantity of work or material; costs incurred by failure to clarify conflicting requirements are the equipment contractor's responsibility.

F. Model Number Changes and Manufacturer Sales or Bankruptcies: When equipment specified is no longer available, the Owner reserves the right to accept the manufacturer's replacement or equipment from a manufacturer specified as equal; the Owner reserves the right to reject equipment when a specified manufacturer is sold, when sale is pending, when filing for Chapter 7 or 11 status, and receive equipment from a specified equal manufacturer.

G. FSEC Qualifications: Must be able to provide references for two projects of similar size and complexity within the past five years. These must be consultant specified projects successfully completed to the Owner’s satisfaction.

1.02 RELATED WORK SPECIFIED IN MECHANICAL AND ELECTRICAL SECTIONS

A. Services and Connections: Extending utility lines from rough in locations to connection points on the equipment and final connections, including indirect wastes to floor drains and installation of faucets and backflow prevention devices, unless otherwise specified.

B. Interconnections: Between equipment and remote components.

C. Disconnection: Existing equipment that is relocated or removed.

1.03 DEFINITIONS

A. Equal: Must be comparable in critical dimensions, capacity, features, utilities and operation; if equal is submitted, pay all costs required to modify work of any trade affected to accommodate equal.

B. Exposed: All visible surfaces — includes surfaces behind cabinet doors when the doors are open.

C. Foodservice Equipment Contractor (FSEC): Person or organization identified as such in the Agreement as providing the Section 11 40 00 equipment

D. Fabricated Equipment: Equipment that is not a standard catalog item and must be constructed by a singular authorized fabricator from Article 2.01, Paragraph B at their shop or on the job site to conform to the Contract Documents.

E. Manufactured Equipment: Equipment offered as a catalog item, but which is built to size for each project and generally requires a shop drawing

F. Buy-out Equipment: Equipment offered as a catalog item by a manufacturer, including items requiring minor modifications.

1.04 REGULATORY REQUIREMENTS

A. Laws and Ordinances: Comply with laws, ordinances, rules, codes and regulations relating to the performance of the Work; rulings and interpretations of the enforcing agencies are considered a part of the regulations; no extra charge will be paid for furnishing items required by the enforcing agency.

B. Minimum Standards: Notify the Owner's Representative prior to equipment purchase and/or installation of any item that does not comply with the applicable regulations, including but not limited to the following:
1. National Sanitation Foundation (NSF): Equipment and installation; affix the NSF label to each equipment item
2. Underwriters Laboratory (UL): Electrical equipment and/or components
3. American Gas Association (AGA): Gas fired equipment and installation
4. American Institute of Electrical and Electronics Engineers: Electrical wiring and devices included with the equipment
5. American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE): Refrigeration systems
6. American Society of Mechanical Engineers (ASME): Boilers
7. National Electrical Code (NEC): Electrical wiring and devices included with the equipment
8. National Fire Protection Association (NFPA): Exhaust hood and fire protection systems
9. American Society of Tested Materials (ASTM): Metals
10. American National Standards Institute (ANSI): Materials
11. Occupational Safety and Health Agency (OSHA): Equipment and installation
12. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Equipment and installation where required
13. American Disabilities Act (ADA): Equipment and installation where required
14. International Building Code (IBC) and Standard Building Code (SBCC): Equipment and installation where required
15. Intertek Testing Services (ETL)
16. Safe Drinking Water Act: Lead-free plumbing fittings, faucets and fixtures or more stringent state/local codes where applicable
17. US Energy Independence Act 2007: Walk-in Refrigerator and Freezers and Refrigeration Systems

1.05 SUBMITTALS

A. General: Manufacturer or fabricator changes are not acceptable after submittal review and acceptance without written authorization from Owner's Representative.

B. Schedule: Submit within thirty (30) days from award of Contract; identify key dates and tasks that must be completed by others in order to meet the equipment installation schedule.

C. Review: Stamp and sign each submittal indicating it has been checked for conformance to the specifications, field dimensions, compatibility with other equipment, and coordination with other trades and services.

D. Revisions: Incorporate corrections noted by the Owner's Representative and resubmit new sets for review; repeat until corrections are incorporated.

E. Electronic shop drawings submittals - submit separate submittals per manufacturer
1. Submittal one to include:
   a. Equipment brochure
   b. Equipment plan and schedule, rough-in plans and schedules and special conditions plan
   c. Hood, walk-ins, floor troughs and refrigeration
   d. Remaining custom equipment shop drawings
2. Submittal two to include:
   a. Fabricated equipment shop drawings and protector shelves

F. Drawings
1. General
   a. Match the contract drawings sheet size
   b. Leave a 3” x 8” space for review stamps
   c. Lettering not less than 1/8” high
2. Floor Plan and Schedule
   a. Scale: ¼” = 1’ 0”
   b. Number equipment and include a schedule on the same sheet if possible
   c. Use Architect's dimensioned plans to prepare plan drawing; verify field dimensions
3. Rough in Plan
   a. General: Provide a utility symbol legend; list the utility requirements, along with the equipment item number on a line extending from the symbol; show exact rough in locations and heights; stub out of walls wherever possible; make allowances for valves, fittings and other required components specified under Mechanical and Electrical Sections; if utilities are already installed, field measure locations and indicate on plan, noting any objection to installed location.
   b. Scale: ¼” = 1’ 0”
   c. Equipment Included: Show requirements for specified, Owner furnished, existing and future equipment; include equipment layout on drawing
   d. Format: Provide separate drawings for mechanical and electrical rough-in plans and schedules.
   e. Dimensioning: Dimension utility rough ins installed under floor from either existing walls, exterior walls or from column line centers; dimension other rough ins from new walls
   f. Code Compliance: See Article 1.04
   g. Coordination: Refer to the architectural, electrical and mechanical engineering drawings for this submission; verify that the correct utility services are available for equipment ordered; verify existing building conditions; coordinate any changes required to accommodate equipment provided
   h. Interconnections: Include connection diagrams for equipment where one or more items are interconnected by Mechanical and Electrical Trades

i. Sleeves and Conduits: Include requirements for beverage lines, refrigeration lines and any other equipment interconnections

4. Special Conditions (building details): Show finished dimensions of bases, depressions, curbs, special height walls, wall backing, and wall openings for equipment; ¼" = 1' 0" scale; coordinate with other trades; include equipment layout on drawing
5. Equipment Shop Drawings
   a. Scale: Detail fabricated and manufactured equipment in plan, elevation and end view at ¾" = 1' 0" or larger; show sections at 1 ½" = 1' 0" or larger
   b. Detail: Show fabricated equipment dimensions and materials, manufacturer and type of hardware, and other pertinent data as specified and as required for construction; where fabricated equipment adjoins other equipment, indicate partial plans and elevations to illustrate the junction condition; show stone/solid surfacing dimensions, locations, dimensions of cutouts, and countertop seam locations, required locations of support and blocking members, edge profiles, and installation details and methods; identify colors and finishes
   c. Organization: Indicate equipment by item number and arrange on sheets in numerical sequence
   d. Built-in and Counter-mounted Equipment: Show on fabricated equipment elevation and section drawings; dot in countertop equipment on plans; detail built-in/drop-in equipment supports and relationship to quartz top
   e. Field Dimensions: Equipment dimensions are subject to adjustments required by field dimensions and understructure components; take measurements and coordinate with finished building conditions; field dimensions completed by a company/person approved by the custom fabricator; circle any dimensional changes on initial and subsequent submissions
   f. Hood Fire Protection System: Submit complete detailed shop drawings including system description, configuration and system component locations; after review by design team, incorporate comments and submit to fire authorities having jurisdiction for system approval prior to fabrication
   g. Walk-ins: Show ceiling panel lay-outs and all control and switch locations

G. Written Materials
1. Itemized Bid: If not required during bid submittal, provide itemized bid within 10 days of bid award date; include freight and installation within each item.
2. General: Submit two (2) bound copies for review; if submitted electronically, they are to follow the same format as the hard copy.
3. Equipment Brochure
   a. Equipment List: Include item number, quantity and manufacturer
   b. Cover Sheet: Submit a typewritten sheet — copies of project specification are not acceptable — for each item with item number and equipment description to include model number, quantity, optional features, special construction, installation and utility service requirements for manufacturer provided; include Owner furnished, existing and future equipment
   c. Manufacturer's Catalog Sheet: Circle relevant utility requirements, dimensions and accessories for each item; do not include advertising or sales sheets; mark item number and quantity required; mark out equipment not being supplied
   d. Organization: Arrange sheets in numerical sequence; tab every 25th item
4. Operation and Maintenance Manual – submit prior to equipment demonstrations
   a. Service Agents: List manufacturers alphabetically with tabs; list equipment type; identify local service agent; list the name, address and telephone number authorized to service the equipment; list FSEC when there is no other service agent
   b. Parts Catalog, Operating and Maintenance Instructions: Include manufacturer's original instructions for buy-out and manufactured equipment; organize alphabetically by manufacturer
   c. Certificate of Warranty: Provide for each piece of refrigeration equipment per Article 1.07 C & D
5. Utility Rebate Documents: For applicable equipment, provide and prepare manufacturer's rebate registration documents for submission by Owner to utility

company; include pertinent equipment model/serial numbers, utility data, installation dates and other information needed to complete application.

1.06 SUBSTITUTIONS

A. Procedure: Submit a written request to the Owner's Representative for approval not less than ten (10) days prior to the bid date; include a description of the proposed substitute, drawings, equipment cutsheets, performance test data and any other data or information necessary for complete evaluation; list separately construction and performance features that do not meet or exceed the specified item.

B. Approval: Approval or rejection of a proposed substitution is vested in the Owner's Representative whose decision is final and binding; determination may or may not express the reason for the decision; approval by Addendum or Change Order only; verbal approval is not binding.

C. Responsibility: If proposed substitution is approved, pay all costs required to modify work of any trade affected to accommodate substitution.

1.07 WARRANTY/CORRECTION PERIOD

A. General: Warranty equipment and installation with full parts and labor for one (1) calendar year from date of acceptance by Owner’s Representative; Owner’s acceptance is defined by first date of foodservice facility operation; inoperable equipment is not considered “accepted”; inoperable equipment includes, but is not limited to, inadequate training and demonstration, defective materials and improper installation.

B. Walk-in Refrigeration and Freezer Systems: One year full system parts and labor warranty to cover all components and installation; five (5) year compressor/condenser warranty to cover parts and materials only; service available 24 hours per day, seven (7) days per week; contract begins on date of acceptance by Owner's Representative.

C. Other Equipment: Compressors/Condensers: Five (5) year warranty; first year to include labor and materials without charge to Owner.

D. Fire Protection System: Warranty and required inspections for one (1) year; provide materials without charge to Owner.

E. Correction Period: When the complete breakdown of a piece of equipment occurs, perform service within 24 hours; make other repairs within one week.

F. Service Agreement: Service agents listed in the Operation and Maintenance Manual must perform service as described above; repairs and/or replacements not made within the specified time will be corrected by other means and the Section 11 40 00 contractor is responsible for reasonable costs incurred.

G. Defective Equipment: If within the first year of operation the piece of equipment has not been fully operational for 6 continuous months, the FSEC will replace the unit at their expense.

PART 2 PRODUCTS

2.01 QUALIFIED FABRICATORS

A. Qualifications: Minimum five years' experience in similar work; produce custom fabricated equipment in one shop.

B. Authorized Equipment Fabricators: The following companies are approved custom stainless steel equipment fabricators; request for substitutions can be made per Article 1.06. Must be NSF (or ETL Sanitation) listed for counter construction and UL (or ETL) listed fabricator. Fabricator must prewire counters to a single point connection; see Article 2.11C.

ACS Custom Fabrication
(651) 265-0603

FSF Manufacturing
(407) 971-8280

IEI Institutional Equipment Inc.
(630) 771-0990

Servco Companies
(314) 781-3189

C. Authorized Quartz Surface Fabricators: Minimum five years' experience fabricating quartz surface materials or granite using water-cooled cutting tools; certified fabricator/installer, certified in writing by the manufacturer.

D. Coordination Requirements: Field dimensions and installation must be done by a fabricator approved person/company.

2.02 MATERIALS

A. General: Furnish new materials free from faults and defects in materials and workmanship

B. Metals
1. Gauges: U.S. Standard Gauge; not more than 5% plus or minus from thickness indicated below:

Gauge	Thickness	Gauge	Thickness
10	0.1406	16	0.0625
12	0.1094	18	0.0500
14	0.0781	20	0.0375

2. Stainless Steel: ANSI Type 304, number 4 finish, 180 grit, extra low carbon, non-magnetic, 18% chrome, 8% nickel, corrosion resistant alloy steel; flat, first grade and free of buckles and surface imperfections
3. Galvanized Sheet Steel: Zinc coating, smooth, free of runs, blisters, excess spelter and uncoated spots or patches; recoat welded or damaged members; finish with two coats of epoxy based gray Hammertone paint
4. Aluminum Sheet Metal: ASTM sheet and plate; ASTM extrusions; 0.40 mil clear anodized finish unless otherwise specified
5. Stainless Steel Tubing: Type 304, number 4 finish 180 grit; seamless or welded; 16 gauge; annealed, ground smooth and polished; heat treated and properly quenched to eliminate precipitation; drawn true to size and roundness and polished with concentric grain
6. Black Iron Angle: Ductile in quality; free of hard spots, runs, checks, cracks and other surface defects; clean and properly prime with rust inhibiting primer; finish with two coats of epoxy based gray Hammertone paint

C. Sealant:
1. General: Dow Corning, Silastic or G.E. RTV 108 silver color; Type S Grade NS, Class 25; comply with Food and Drug Administration Regulation 21 CFR 177.2600 for food contact areas or equal by Kason 3700 Series Rubbaseal silicone
2. Walk-in Penetrations: Low expansion, closed cell polyurethane foam

D. Glass: Tempered 3/8" thick, unless noted otherwise

E. Plastics: Polycarbonate or acrylic as specified; ¼" thick

F. Cutting Board: Richlite R50 or equal by Paperstone leather or per item specification, ½" thick; size as specified; 1" diameter finger hole when used below drawers

G. Bolts, Screws and Nuts: Unacceptable on exposed surfaces; use same composition as the metal to which they are applied; space to insure suitable fastening and to prevent bulging of the metals fastened; cap threads with a zinc plated combination hexnut-lockwasher; cap screw threads that are not visible or readily accessible with a standard lock washer and nut; wherever bolts or screws are welded to the underside of trim or tops, neatly finish the reverse side; depressions at these points are not acceptable

H. Rivets: Unacceptable as a method of fastening

I. Sound Deadening
1. Tape Sealant: Schnee Morehead, Inc., Model SM5227 Tacky Tape or Component Hardware Model Q85-5225 Tacky Tape
2. Spray- On: Sink bottoms only; do not coat beyond sink front cove

2.03 FABRICATION - GENERAL

A. Final Coordination: After approved shop drawings are issued, communicate subsequent changes to the Owner's representative before fabrication begins.

B. Quality Standards: Include necessary reinforcing, bracing, welding, number and spacing of uprights and crossmembers for adequate strength; construct tops, shelves, exterior panels, doors and drainboards of a single metal sheet when possible; except where removable, secure flat surfaces to vertical and horizontal bracing members by welding or other approved means to eliminate buckle, warp, rattle and wobble; equipment subject to rattle or wobble is not acceptable; overlapping materials are not acceptable; unless specified, exposed joints on countertops, cabinet bases and overshelves are not acceptable.

C. Welding: Heliarc method; same composition as materials welded; complete welds, strong and ductile, with excess metal ground off and joints finished smooth to match adjoining surfaces; free of mechanical imperfections such as gas holes, pits, runs and cracks; same finish as adjoining surfaces.
1. Spot Welds: 3" maximum spacing
2. Tack Welds: Minimum ¼" welding material at 3" maximum spacing

D. Butt Joints: Unacceptable as a method of fastening on fabricated and manufactured equipment

E. Tops: 14 gauge seamless stainless steel; fully weld with edges as specified; pitch drainboards ¼" per foot; 1" maximum pitch
1. Edges: Detail SD-1 and as specified
2. Backsplash: Detail SD-2; continuously weld rolled edges abutting splashes

F. Sinks: Detail SD-9 & SD-10

G. Scrapping Trough – Not Used

H. Grain of Polishing: Run in the same direction on all horizontal and on all vertical surfaces; where table or sink tops join at right angles, terminate the finish in a mitered edge; polish grain consistent in direction throughout the length of the backsplash and sink compartment.

I. Framework
1. Draintables and Worktables: Detail SD-3
2. Serving Counters and Cabinet Bases: Detail SD-7, SD-8 & SD-71

J. Counter/Table Construction
1. Legs: Detail SD-4
2. Crossrails: Detail SD-4
3. Undershelves:
   a. Welded: Detail SD-5
   b. Removable: Detail SD-6

K. Cabinet Construction: Inaccessible open areas are not acceptable; no exposed shelf standard screws
1. Standard Construction: Detail SD-7, SD-26 & SD-28
2. Piece Construction: When specified, Detail SD- 8 & SD-27
3. General
   a. Sink Enclosure: Detail SD-12, SD-12a & SD-13
   b. Utility Curb: Detail SD-30
   c. Channel Base: Detail SD-77; coordinate recessed areas in bases; inaccessible open areas are not acceptable
   d. Access Panels: Detail SD-29

L. Doors
1. Hinged Solid: Detail SD-17; door face flush with cabinet body
2. Sliding: Detail SD-21; removable for cleaning
3. Hinged Louvered: Detail SD-19 or 20; door face flush with cabinet body
4. Hinged Perforated Panel: Detail SD-19A; door face flush with cabinet body

M. Drawers: Detail SD-14; drawer face flush with cabinet body

N. Elevated Shelves:
1. Wall Shelves: Detail SD-25
2. Table Mounted Shelves: Detail SD-22, SD-23 & SD-24

O. Protector Shelves – Not Used

P. Built In Equipment: Install per manufacturer's recommendations, Article 2.11 and project details.
1. General: Coordinate to provide adequate ventilation, service access and support structure; submit written notification of any design conditions that are likely to prevent proper operation or that void equipment warranty; provide supplemental fans if required for proper operation; equipment contractor is responsible for proper operation of equipment
2. Food Wells: Connect drainlines to ¾" diameter manifold and extend to a ball valve; provide chrome plated handle for drain valve and locate in stainless steel recessed cup in counter mullion; countertop temperature greater than 175°F within 2" of well opening is not acceptable

Q. Counter Mounted Equipment: Ferrule openings to accommodate cords, wiring, and/or piping.

2.04 FABRICATION – REFRIGERATION -Not Used

2.05 HARDWARE COMPONENTS

A. Cap Nuts: Component Hardware Model Q31 Series with lock washer

B. Casters: 5” diameter polyurethane tire swivel casters; grey tire; minimum 250# capacity; NSF approved; models as follows.
1. Stem Caster: Jarvis & Jarvis Model 5-40-213G-19A or Component Hardware Model CMS4-5RPB
2. Stem Caster with Brake: Jarvis & Jarvis Model 5-40-213G-VL-19A with Vertilok brake or Component Hardware Model CMS4-5RBB with brake
3. Plate Caster: Jarvis & Jarvis Model 5-30-213G-PLT2 or Component Hardware Model CMP1-5RPB
4. Plate Caster with Brake: Jarvis & Jarvis Model 5-30-213G-VL-PTL2 with Vertilok brake or Component Hardware Model CMP1-5RBB with brake

C. Drain Valve Recessed Cup: Vollrath, Model 47536.

D. Drain Valve Handle: Chicago, Model 634; 3” diameter, four arm metal cross handle.

E. Glass Capping: Component Hardware Model B70-1001; stainless steel.

F. Locks: Component Hardware Model P30 Series; stainless steel faced; master keyed

G. Pot Rack Hooks: Component Hardware, Model J79-4115, single prong; Model J77-4401, double prong; stainless steel.

H. Switch/Receptacle Housing
1. Recessed: Component Hardware Model R73 1210
2. Pedestal: Component Hardware Model R58-1010

I. Cash Drawer Assembly without Tray: Component Hardware Model S95-Y001

2.06 MILLWORK – Not Used

2.07 REFRIGERATION – Not Used

2.08 EXHAUST HOODS – Not Used

2.09 FIRE PROTECTION SYSTEMS – Not Used

2.10 CONVEYORS – Not Used

2.11 UTILITY SERVICE REQUIREMENTS

A. General
1. Interconnections: Interconnect equipment utility lines between equipment sections to single connection point; materials consistent with specifications
2. Performance: Install heated and motor operated equipment as required for efficient and stable operation; provide additional vents, guards, deflectors and other accessories as necessary whether or not such items are called for on the drawings or specifications; show additional modifications on the Shop Drawings; notify the Owner's representative in writing if design prevents proper operation prior to installation
3. All plumbing components must be lead-free to conform to Safe Water Drinking Act or more stringent state/local codes where applicable
4. Coordination: Verify incoming water pressure and temperature prior to equipment installation; provide written communication to Owner’s Representative if conditions will adversely affect equipment operation

B. Plumbing
1. Fabricated/Manufactured Equipment
a. Connection Access: Provide access openings for mechanical connections

b. Piping: Install horizontal piping at the highest possible elevation and not less than 6” above floor; conceal piping; no tool marks or more than one visible thread at exposed fittings; bright polished chrome plate exposed piping and fittings
c. Faucets: Available through Standard Plumbing Suppliers
   (1) General Use/Dump Sink (Splash Mounted):
      (a) Chicago 540-210664AB
      (b) T&S B-0331-CR MOD w/134X & B-0199-02
      (c) Component Hardware KL54-8101-SE1
   (2) General Use/Dump Sink (Deck Mounted):
      (a) Chicago 201-201289AB
      (b) T&S B-2854-134XA-CR
      (c) Component Hardware KL41-8101-SE1
   (3) Hand Sink (Electronic Eye, Splash Mounted):
      (a) Chicago 116.214.AB.1
      (b) T&S EC-3101TMVHGF10
      (c) Component Hardware KE19-1100-SD0
   (4) Hand Sink (Electronic Eye, Deck Mounted):
      (a) Chicago 116.213.AB.1
      (b) T&S EC-3100TMVHGF10
      (c) Component Hardware KE19-4100-SD0
d. Wastes: Adjust handle length when required
   (1) Drain: Component Hardware Encore QUIK-FLO Rotary Drain Model DBN-8000-SPI Capped Overflow Outlet with Flat Strainer; no equals.
   (2) Overflow: Component Hardware E50-1000; no equals
e. Accessories/Components: Chrome plate exposed fittings
   (1) Water Inlets: Locate above the positive water level to prevent siphoning
   (2) Backflow Prevention: Where conditions require a submerged inlet, provide a code approved check valve or backflow prevention device with the fixture to prevent siphoning; provide with T & S B-0461 angle slip flanges where plumbing penetrates backsplash; set flanges so top of vacuum breaker is 4” above splash or per local code; tighten set screws and silicone to backsplash.
   (3) Steam Valves: Provide with composition hand wheels
   (4) Steam Trap Assembly: Polished chrome plated steam trap assembly for equipment operated by direct steam to include gate valve, globe valve, "Y" strainer, thermostatic steam trap and required nipples, elbows and unions
   (5) Steam Pressure Gauges: Provide on inlet side of all steam equipment
f. Water Filters: Furnish 3M Water Filtration Products/Cuno or equal by Everpure complete filter assemblies for new and existing beverage and ice making equipment, steamers, combi ovens, proofers and rack ovens; individual filters for vendor furnished equipment provided by vendor; if item is not serviced through a central water filter furnish one additional set of filter cartridges with each filter system; install in an operator accessible location and indicate on rough in drawings; meet peak water flow requirements of equipment being furnished; test water quality at site and provide filter system to meet the equipment manufacturer requirements; if manufacturers quality requirement cannot be met, provide documentation to foodservice consultant; provide permanent label on filter system, indicating equipment name of item served.
g. Gas Quick Disconnect: Dormont, Series BPQ-2SR or equal by T&S Brass; 5’-0” long with suitable length restraint to facilitate cleaning; mount restraint to prevent it lying on floor; sized to accommodate connection on equipment
h. Water Quick Disconnect: Dormont CMB37BP2Q or equal by T&S Brass Series HW; 5'-0" long or required length; sized to accommodate connection on equipment; one hose per connection.
i. Gas Pressure Reducing Valves: Furnish appropriate models in 5” to 15” water column pressure limits for installation by Mechanical Trades if not factory installed
j. Gas Fired Ranges: Provide rear gas connection and stainless steel manifold end caps unless otherwise specified

k. Indirect Wastes: Extend the following indirect wastes/drainline: condensate hood, hot and/or cold well, fabricated counter/equipment, countertop ice machines, and specified beverage equipment; all sink waste lines are by plumbing trades

C. Electrical
1. General: Underwriters' Laboratories (UL) listed and comply with National Electrical Code, Standards of National Electrical Manufacturers' Association and American Institute of Electrical and Electronics Engineers; wire, wind or construct equipment to conform to available electrical services; furnish wiring and connection diagrams with equipment; provide equipment rigid and free from objectionable vibration and noise
2. Plug in Equipment: Furnish with cords attached; match plugs to receptacles; coordinating cords and plugs are the FSEC's responsibility; modify cord to a suitable length; on mobile equipment; provide suitable length restraint to facilitate cleaning; mount restraint to prevent it lying on floor.
3. Fabricated Equipment: Prewire internally; furnish and install electric outlets and receptacles; run lines to a junction box, load center panel, starter, or disconnect switch for one final power connection by Electrical Trades; neatly tag wires showing item number, voltage characteristics and load information; interconnections between sections of fabricated counters by FSEC; furnish transformers for equipment unavailable in building electrical characteristics
   a. Built In Equipment: Install and interconnect electric controls, switches, receptacles or other units furnished separately; wire in concealed conduit to accessible junction point
   b. Motor Driven Appliances and Electric Heating Units: UL listed control switch or starter; exposed fused disconnect at motors larger than ½ hp or per code requirements; furnish line switches, fittings and connections when not part of the equipment for installation by Electrical Trades
   c. Motors: Drip-proof, splash-proof or totally enclosed type, having a continuous-duty cycle; ball bearings except small motors which may have sleeve bearings; windings impregnated to resist moisture; enclose when exposed to dust, lint, water or other matter; mount on vibration elimination pads
   d. Conduit: Code approved; conceal from view
   e. Switches and Controls: Internally wire equipment to a thermostatic control and/or on/off switch with red indicator light; locate where shown; label function with plastic nameplates with not less than ¼" high white recessed lettering, and glue to adjacent surface
   f. Cover Plates: Stainless steel
   g. Outlets and Receptacles: Commercial grade ground fault interrupt outlets mounted where shown; wire to separate j-box; Commercial grade surge suppression receptacles for point of sale equipment
   h. Light Fixtures: Provide ballasts and 3500° Kelvin lamps at 82 CRI (Color Rendering Index); install non-breakable sleeves or coated lamps over food areas
   i. Load Center: Locate in a separate compartment; prewire electrical components built into or set on the counter to panel; conceal conduit; UL listed, three phase, four-wire with grounded copper buss; individual ground fault interrupt breakers for each service load; identify equipment serviced on each breaker; snap-in type circuit breakers with thermo magnetic quick make/quick break trip; provide circuit breakers rated at 10,000 KAIC interrupting capacity; size each breaker for 125% of the connected load; minimum of two spare 20 amp circuits; balance the loads on each phase; shunt trip breakers for items under hood; install panel in accordance with electrical codes and regulatory requirements.

PART 3 EXECUTION

3.01 SITE INSPECTION

A. Field Measurements: Field measure foodservice space prior to equipment construction; conform to finished building conditions; submit written notification to Owners Representative if building conditions prevent equipment from functioning properly.

B. Site Conditions: Verify that surfaces, prepared openings, finished building dimensions, and roughed in utilities are ready for equipment; coordinate equipment with building openings and dimensions; construct and deliver equipment in sections sized to site limitations.

C. Utilities: Verify that voltages, air volumes, water temperature and water, steam, and gas pressures are as required for equipment; coordinate changes to ensure that equipment operates properly

D. Acceptance: Beginning of installation means acceptance of site conditions.

E. Responsibility: Assume the expense of changes to equipment and/or cutting and patching walls, partitions, ceilings and floors necessary to receive and successfully operate equipment, caused by failure to coordinate with site conditions.

3.02 INSTALLATION

A. Qualifications: Minimum five years' experience in similar work, including field welding.

B. Code Compliance: Conform to current Standards and Revisions established by the National Sanitation Foundation, Ann Arbor, Michigan, and to prevailing local codes and regulations.

C. Sealing: Seal equipment that abuts a wall or other fixed equipment with silicone sealant per Article 2.02, para. C; ¼" maximum width.

D. Trim: Material to match equipment surface; trim equipment in wall openings, recesses or abutting a wall that cannot be effectively sealed with silicone; exposed fasteners are not acceptable; unacceptable as a substitute for accuracy and neatness.

E. Schedule: Comply with the Owner's construction schedule; notify the Owner's Representative in writing, not less than thirty (30) days prior to the scheduled deadline if there is a reason the schedule cannot be met.

F. Cutting and Patching: Cut and drill tops, backs, or other elements for service outlets, fixtures, and fittings; cut and patch foodservice equipment as required for equipment installation or service

G. Protection: Protect equipment from damage.

H. Damage and/or Loss: Replace or repair items that are lost or damaged prior to Owner acceptance

I. Factory Supervision: Provide factory authorized service agent supervision for installation of job-site assembled conveyors, flight-type dishmachines and pulpers; include a thorough check of utility connections, pressures and overall installation.

J. Custom Fabrication: The fabricator must conduct or approve the person/company responsible for taking field dimensions and installing their equipment.

3.03 EXISTING EQUIPMENT

A. Disconnection: By appropriate trade; specified in other sections of these specifications.

B. Reused: Disassemble, if required, remove and store equipment until ready for installation; reassemble and set existing equipment in place ready for final connection; install in the same working order as when removed from service; prepare and submit a packing list identifying each piece of equipment removed and any attachments or accessories removed with it; equipment that is not in good working order should be noted; submit packing list signed by the Owner's Representative and the Section 11 40 00 Contractor.

C. Not Reused: Owner's Representative has the option to retain existing equipment; authorized demolition contractor will remove and dispose; obtain written authorization from Owner's Representative to remove equipment from site.

3.04 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces; wash, clean and polish equipment; polish glass, plastic, hardware, accessories, fixtures and fittings prior to the inspection and acceptance of the Work. Install existing equipment in the same state as when it was removed from service.

3.05 DEMONSTRATION AND TESTING

A. Demonstration: Schedule times with the Owner's Representative to provide instruction on the maintenance and use of each item; conveyor authorized service agent to demonstrate adjustment and maintenance procedures to Owner's maintenance staff and dishroom supervisor and demonstrate pump adjustment to detergent supplier; demonstrate operation to appropriate inspectors if required; verify that copies of all instructional, operational, maintenance manuals, charts and audio and video media have been provided at least two weeks prior to demonstration as required in Article 1.05, para. G.4.

B. Testing: Test, regulate and put into proper operating condition; calibrate controls, including thermostats; coordinate dishmachine testing with detergent supplier; properly activate water filters per manufacturer's recommendations.

C. Chart of Completion: Provide separate charts for demonstration and testing; include item number, description of equipment, date, person/firm responsible, and Owner’s initials; provide charts to Owner, Owner’s Representative, and Consultant prior to Owner’s acceptance.

3.06 ITEM SPECIFICATIONS

A. NOTE: Provide like equipment items and items that directly interface from same manufacturer. Provide common locks (when specified) on all equipment from same manufacturer.

B. NOTE: Field dimensions and installation must be completed by a person/company approved by the custom fabricator.

1 EXHAUST HOOD (TYPE I)
One
Existing/no change

2 UTILITY DISTRIBUTION SYSTEM
One
Existing; modify to accommodate new equipment layout; neatly finish utility openings with escutcheon covers; cap unused connections.

3 FIRE PROTECTION SYSTEM
One

Existing/no change

4 COMBI OVEN, 2-SEC.
Two
Existing; relocate to position shown on plan; include utility requirements on rough-in drawings

5 WATER FILTRATION SYSTEM
Two
Existing; relocate to position shown on plan; include utility requirements on rough-in drawings

6 OPEN NUMBER

7 REFRIGERATED PREP TABLE
One
Randell Model NPR2X354 *R103
A. Features: Fabricate per Plan and Elevation; provide shop drawing prior to fabricating; NSF-7 Listed; length per plan; 33" depth; stainless steel exterior, including sides and back; stainless steel interior including thresholds and door liners; three refrigerated compartments below with doors, sized and hinged per Plan and Elevation; two epoxy-coated wire shelves per refrigerated compartment; stainless steel louvered compressor housing positioned to left; common door locks on refrigerated sections; 1/2" thick removable Richlite cutting board to extend length of rail; 4” high low profile swivel casters, front with brakes; 34" high working height.
B. Self-contained dual refrigeration system; size compressor to maintain health department approved temperatures in both refrigeration units; automatic hot gas condensate evaporator; evaporator blower coil with expansion valve; separate thermostatic controls for base and rail located in easily accessible location; Bloomington style wrapped raised refrigerated rail, sized per plan to accommodate a full complement of (1/3) size pans; stainless steel adaptor bars to accommodate a variety of pan sizes; completely removable stainless steel hinged slide back covers; digital thermometer
C. Electrical: 120V, 1 phase; cord and plug

8 OPEN NUMBER

9 MOBILE WARMING CABINET
One
Metro Industries Model C599-SDS-U or equal by Food Warming Equipment
A. Features: Proofing and holding cabinet; stainless steel exterior and interior; insulated holding cabinet; double-hinged insulated dutch doors; dual magnetic door latches with mechanical release; continuous door gaskets; 1950 watt heating system; 80-200 degree F operating temperature; humidity controls; ducted heating system; adjustable thermostatic controls; indicator lights; digital thermometer; top mounted controls; polymer bumper and drip trough; low water sensor; water pan; four swivel casters, front with brakes; 18 adjustable universal angle slides to accommodate 18" x 26" sheet pans and 12" x 20" steam pans
B. Electrical: 120V, 1 phase; cord and plug

10 FILL FAUCET
One
T&S Model B-0268 or equal by Chicago or T&S *R103
Features: Deck mounted fill faucet; 24" double jointed swing spout; polished chrome finish; ceramic disc cartridge; position to reach both Existing Hot Wells, Item #26 and Hot Wells, Item #27

11A HEATED PLATE DISPENSER

Four
Carter Hoffman PH2S *R103
A. Features: Stainless steel exterior; fully insulated; two adjustable dispensing mechanisms; 150 plate capacity; thermostatically controlled convected air heating system; two rigid casters and two swivel casters with brakes; corner bumpers; fully removable lids with lids holders; verify and obtain sample of Owner's plate size prior to ordering; minimum of 6’-0” long cord.
B. Electrical: 208V, 1 phase; cord and plug

11B HEATED PLATE DISPENSER
Two
Existing; Owner to relocate to position shown on Plan; include utility requirements on rough-in drawings

12 ROLL-IN COMBI OVEN
One
This item is future equipment and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings for Rational Model ICP 20-FULL NG (208V, 1 phase)

13 OPEN NUMBER

14 EXHAUST HOOD (TYPE I)
One
Existing/no change

15 TICKET RAIL
Five
Carlisle Slide Order Rack *R103
Features: Stainless steel construction; length per Plan

16 FIRE PROTECTION SYSTEM
One
Existing/no change

17 UTILITY DISTRIBUTION SYSTEM
One
Existing; modify if required to accommodate new equipment layout; neatly finish utility openings with escutcheon covers; cap unused connections.

18A BASE HEATER STAND
One
Aladdin Model SP4983 Stand w/Overshelf *R103
Features: Double stacked table; stainless steel construction; perforated overshelf; undershelf; 4" diameter polyurethane swivel casters, two with brakes; accommodate two base heaters, Item #24

18B BASE HEATER STAND - SINGLE
One
This item is future equipment and is not in the 11 40 00 Contract

19 TIPPER TIE
One
Existing; relocate to position shown on Plan; FSEC to verify utilities and include utility requirements on rough-in drawings

20 COMBI OVEN, 2-SEC.
Two

This item is future equipment and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings for Rational Model ICP 6-FULL/6-FULL NG (208V, 1 phase)

21A POWER POLE
One
Avtec Model EP06 or equal by Gaylord *R103
A. Features: Multi-circuit electrical pole and ceiling receptacle assembly box; stainless steel pole; four connection plates to service Item# (2) 11A, 30A & Empty Conduit for Data Connections; point of use breakers provided for each item; prewired to final connection point; angle supports; verify floor material and finished ceiling height in field and provide required foot/base assembly; provide all components necessary for complete installation
B. Electrical: 120/208V, 1 phase

21B POWER POLE
One
Avtec Model EP07 or equal by Gaylord *R103
A. Features: Multi-circuit electrical pole and ceiling receptacle assembly box; stainless steel pole; four connection plates to service Item #(2) 24A and (2) convenience duplex receptacles (120V, 1 phase) ; point of use breakers provided for each item; prewired to final connection point; angle supports; verify floor material and finished ceiling height in field and provide required foot/base assembly; provide all components necessary for complete installation
B. Electrical: 120/208V, 3 phase

21C POWER POLE
One
Avtec Model EP07 or equal by Gaylord *R103
A. Features: Multi-circuit electrical pole and ceiling receptacle assembly box; stainless steel pole; four connection plates to service Item # (2) 49, 24B and (1) convenience duplex receptacle (120V, 1 phase) ; point of use breakers provided for each item; prewired to final connection point; angle supports; verify floor material and finished ceiling height in field and provide required foot/base assembly; provide all components necessary for complete installation
B. Electrical: 120/208V, 3 phase

22 OPEN NUMBER

23 BASE/DOME RACK
Four
Dinex Model DX1173X100 *R103
Features: Stainless steel construction; cradle inserts to accommodates both domes and bases; 100 dome capacity; 200 base capacity; polyurethane swivel casters with brakes; verify and obtain sample of Owner's base and dome prior to ordering

24A BASE HEATER
Two
Existing; Owner to relocate to position shown on Plan; include utility requirements on rough-in drawings

24B BASE HEATER
One
This item is future equipment and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings for Dinex Model DX2011208

25 MOBILE WORKTABLE
One

Advance Tabco Model SS-242 w/ODS-12-24 or equal by Eagle Group or Custom Fabricate *R103
Features: Length and width per Plan; 36" high; 14 gauge stainless steel top and understructure; stainless steel adjustable undershelf; stainless steel legs and underbracing; paint on sound deadening under top; four 5" diameter polyurethane swivel casters, two with brakes; double deck table mounted shelves mounted to top rear.

26 COOKS' WORKCOUNTER W/SINK & TRAY ASSEMBLY COUNTER
One
Existing; modify per Plan and Elevations: modify load center panel to accommodate Item #27 & 30; ~~rotate load center panel to position shown on plan~~; modify edge of trayslide to be flat flush with adjacent counter, Item #52; Electrical Trades to install Owner furnished LCP in position shown on plan; FSEC to modify cabinet base to accommodate larger sized Owner-furnished LCP; add door per SD-17 and provide structure for seismic anchorage.

27 HOT FOOD COUNTER
One
Piper Products Model 4HF (501-4) or equal by Custom Fabricate *R103
A. Features: Size per Plan; 36" high to match adjacent counters; full stainless steel construction including front and end panels; 4 hot wells, minimum 6" deep; individually thermostatically controlled wells; manifold wells to a single accessible drain valve, coordinate location with floor drain; full stainless steel bottom shelf; 8" rear stainless steel work ledge (SCB) mounted flush with top; polyurethane swivel casters, two with brakes; 8'-0" cord and plug set, FSEC to coordinate NEMA configuration to match existing counter outlet
B. Installation: FSEC to extend drain line and elbow into floor drain
C. Electrical: 208V, 1 phase; cord and plug

28A TRAY DISPENSER
Four
Existing; Owner to relocate to position shown on plan

28B TRAY DISPENSER
Two
This item is future equipment and is not in the 11 40 00 Contract

29A STARTER STATION
One
Existing; Owner to relocate to position shown on plan

29B STARTER STATION
Two
This item is future equipment and is not in the 11 40 00 Contract

29C STARTER STATION
One
Lakeside Model SP-13131 Custom Starter Station
Features: Stainless steel construction; two adjustable slanted overshelves, one solid top shelf; one intermediate shelf to hold increments of 12” x 20” pans; swivel casters, two with brakes.

30A PRINTER
Five
This item is by Owner and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings

30B PRINTER
One

This item is future equipment and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings (120V, 1 phase; 5.0 amp)

31 REACH-IN FREEZER, 1-SEC.
One
Traulsen Model RLT132WUT-HHS or equal by Victory Ultra Spec Series or True Spec Series *R103
A. Features: Stainless steel exterior including finished back; stainless steel interior; stainless steel door liner and thermal break; 20 gauge stainless steel, self-closing, half-height doors, hinged per Plan; built-in digital thermometer; automatically activated interior lights; self-contained refrigeration; automatic hot gas condensate evaporator; automatic defrost; common door locks with other upright refrigeration on this project; 6” high casters, front two with brakes; five coated wire shelves
B. Electrical: 120V, 1 phase; cord and plug

32 CONVEYOR TOASTER
One
Existing; Owner to relocate to position shown on Plan; include utility requirements on rough-in drawings

33 4-SLOT TOASTER
One
Existing; Owner to relocate to position shown on Plan; include utility requirements on rough-in drawings

34 AIRPOT DISPENSER
Two
This item is by Owner's Vendor and is not in the 11 40 00 Contract

35 OPEN NUMBER

36 MOBILE AIR SCREEN REFRIGERATOR
Three
Food Warming Equipment Model ASU-10 *R103
A. Features: Stainless steel exterior and interior including backside; bottom mounted self-contained refrigeration; digital display; automatic defrost; removable stainless steel slides to accommodate ten 18" x 26" sheet pans; door lock; perimeter bumper; rear push bar handle; heavy-duty swivel casters, two with brakes; space-saver sliding door, hinged per plan; cord winding bracket
B. Electrical: 120V, 1 phase; cord and plug

37 ICE CREAM CABINET
One
This item is by Owner's Vendor and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings

38 DESSERT RACK
One
Existing; Owner to relocate to position shown on plan

39 PATIENT TRAY DELIVERY CART
~~Thirty-four~~ Seven
Dinex Model ~~DXPTQ1T2D18~~ DXPTQC1T2D14
Features: Stainless steel construction; two-compartments; full height handles; magnetic door catch on top and bottom; 270 degree door swing with hold open latch; accommodates ~~eighteen~~ fourteen trays; one tray per slide; must accommodate Owner's tray, verify and obtain sample of tray prior to ordering; full perimeter bumper; floor drain; ~~stainless steel~~

~~top rail on three sides;~~ Performa quiet casters, two with brakes; provide shop drawing prior to fabricating

PATIENT TRAY DELIVERY CART
Ten
Dinex Model DXPICT8S
Features: Stainless steel construction; one-compartment; magnetic door catch and transport latch; 270 degree door swing with hold open latch; accommodates eight trays; one tray per slide; must accommodate Owner's tray, verify and obtain sample of tray prior to ordering; full perimeter bumper; floor drain; two-sided top rail; 6” casters, two with brakes; provide shop drawing prior to fabricating

40 WALL SHELF
Two
Metro Industries Super Erecta Shelving or equal by Eagle Group
A. Features: Chrome wire shelves and components; two shelves per section, length and width per Plan; two-tier posts and brackets; post-type wall mounting; single and double shelf supports where necessary; adjustable shelf height
B. Installation: Coordinate wall support requirements with Architectural trades; mount bottom post height 1" above backsplash below;

41 HEAT LAMP
Three
Hatco Model GRAH *R103
A. Features: Length as shown on plan; aluminum construction; high wattage; infrared heat lamp; remote control enclosure with infinite control and indicator light; position as shown on Elevation; install with air gap to underside of shelf per manufacturer's instructions
B. Electrical: 208V, 1 phase

42 HOT FOOD WELL
Six
Hatco Model HWBHIB-FULD *R103
A. Features: Bottom mount; high wattage 1650 watt heating system; stainless steel well pan; fully insulated sides and bottom; drain; manifold adjacent hot food well drains to one accessible drain valve; FSEC to extend to floor drain; U.L. listed; wet or dry usage; electrical code kit including flexible conduit, bezel, and optional larger recessed thermostatic control
B. Electrical: 208V, 1 phase

43 FILL FAUCET
Two
Chicago Faucets Model 349-206098AB or equal by T&S B-0208-CR or Component Hardware KL64-9106-TE1
Features: Deck mounted fill faucet; swing spout; hot water indexed handle; polished chrome finish; E1 outlet; ceramic disc cartridge; position to reach hot food well, Item #42

44 PANINI GRILL
One
Existing; Owner to relocate to position shown on Plan; include utility requirements on rough-in drawings

45 WORKCOUNTER W/HAND SINK & TRAY ASSEMBLY COUNTER
One
A. Fabricate; construct per Plan, Part 2-Products, Elevations, Sections and Standard Details
B. Features: Hand sink faucet per 2.11.B; provide stainless steel chase at LCP
C. Electrical: 120/208V, 3 phase; load center panel

46 OPEN NUMBER

47 OPEN NUMBER

48 OPEN NUMBER

49 MOBILE AIR SCREEN REFRIGERATOR
Two
Existing; Owner to relocate to position shown on Plan; include utility requirements on rough-in drawings

50 OPEN NUMBER

51 REFRIGERATED PREP TABLE
One
Existing; relocate to position shown on Plan; include utility requirements on rough-in drawings

52 TRAY ASSEMBLY COUNTER
One
A. Fabricate; construct per Plan, Part 2-Products, Elevations and Standard Details; coordinate with Item #26, flat flush trayslide
B. Electrical: 120/208V, 3 phase; load center panel

53 COFFEE CARAFE SHELVING
One
Existing; Owner to relocate to position shown on plan

54 CUP/GLASS RACK DISPENSER
Two
Existing; Owner to relocate to position shown on plan

55 OPEN NUMBER

56 COFFEE BREWER
One
This item is by Owner's Vendor and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings

57 OPEN NUMBER

58 DIGITAL DISPLAY
One
This item is by Owner and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings

59 SCANNER/IPAD
One
This item is by Owner and is not in the 11 40 00 Contract; include utility requirements on rough-in drawings

60 WORKCOUNTER
One
Fabricate; construct per Plan, Part 2-Products, Elevation and Standard Details

61 ICE MAKER/DISPENSER
One

Existing; relocate to position shown on Plan; FSEC to verify utilities and include utility requirements on rough-in drawings; furnish cord and plug set for connections by electrical trades.

END OF SECTION 11 40 00

SECTION 22 05 00
PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. The intent of Division 22 specifications and drawings is to provide complete and workable mechanical and plumbing systems as shown, specified and required by applicable codes. Include all work specified in Division 22 and shown on the drawings, including appurtenances, connections, demolition, appliances, and incidental accessories to make work complete and ready for operation.
B. The drawings that accompany the Division 22 specifications are diagrammatic. They do not show every offset, pipe/duct fitting, or elbow that may be required to install work in the space provided and avoid conflicts. Locations of all items not definitely fixed by dimensions are approximate only.
C. Coordinate Division 22 work with other work.
D. Provide minor work and materials not usually shown, specified or detailed, but necessary for proper installation and operation of a system or piece of equipment. Include such work and materials in bid price as if shown, specified or detailed.
E. Provide all labor, materials, services, apparatus, and drawings (in addition to contract documents) for the work to comply with applicable laws, ordinances, rules, and regulations.

1.2 CODES, STANDARDS, AND REFERENCES

Where the requirements of the contract documents for materials and/or workmanship are more stringent than the requirements of the codes, standards, and references cited below, the drawings and specifications shall take precedence.

A. The following industry standards, specifications, and codes establish the minimum acceptable requirements for the work. Comply with the latest or enforced issue as adopted by Authority Having Jurisdiction as of date of contract documents, unless otherwise noted on the drawings.

1. The California Building Standards Code (Title 24, 2019 Edition)
2. Applicable municipal, county, and state mechanical, electrical, gas, plumbing, health and sanitary codes, laws, and ordinances.
3. Occupational Safety and Health Act. (OSHA)
4. Standards and requirements of local utility companies.
5. Commercial and industrial insulation standards.
6. American Gas Association. (AGA)
7. Air-Conditioning and Refrigeration Institute Standards. (ARI)
8. American National Standards Institute. (ANSI)
9. American Society of Heating, Refrigerating And Air-Conditioning Engineers. (ASHRAE)
10. American Society of Mechanical Engineers Boiler and Pressure Vessel Codes. (ASME)
11. American Society for Testing Materials Standards. (ASTM)
12. American Water Works Association. (AWWA)
13. American Welding Society. (AWS)
14. National Electrical Manufacturer’s Association Standards. (NECA)
15. National Electrical Safety Code. (NESC)
16. National Electrical Testing Association. (NECA)
17. National Fire Protection Association Standards. (NFPA)
18. Sheet Metal and Air Conditioning Contractor’s National Association Standards. (SMACNA)
19. Underwriter’s Laboratories, Inc. Standards. (UL)

1.3 SUBMITTALS

A. Comply with requirements of individual Division 22 sections.

B. Unless otherwise noted in individual Division 22 sections, submit electronic copy of required shop drawings, product data, samples, schedules, reports, warranties, certifications, etc.

1. Provide one electronic file for each specification section. Use the section number and description for the file name. Provide complete submittals for each section.

1.4 QUALITY ASSURANCE

A. Provide work in accordance with applicable codes, rules, regulations, standards and building and safety laws relating to construction and public health and safety.
B. Provide materials and apparatus that bear the UL label where such label is required, or applicable.
C. Provide a complete and properly operating system for each item of equipment called for under this work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect materials from damage by the elements, contamination, corrosion and breakage. Provide appropriate covering. Cap or seal all piping and ductwork to prevent entrance or contamination by foreign substances,
B. Replace any materials which are damaged or degraded by improper storage with new.

1.6 SITE VISITATION

A. Visit the site prior to bidding and become familiar with existing conditions and other factors which may affect the execution of the work. Include all costs related to the work and existing conditions in the bid proposal.

1.7 WARRANTY

A. Each system shall be free of defects in materials and workmanship, and shall perform satisfactorily under all conditions of load or service. Replace or repair faulty materials or workmanship at no additional cost to the University.
B. Each complete system shall be warranted for a period of one year from the date of substantial completion, unless otherwise noted in individual Division 22 sections.
C. Provide manufacturer’s written warranties covering defects in materials and workmanship of products and equipment utilized for this project.
D. The warranties shall provide that all additional controls, protective devices, or equipment be provided as necessary for operation of the system or equipment.
E. Provide additional warranty requirements as required by individual Division 22 sections.

1.8 SYSTEM MANUAL AND OPERATING INSTRUCTIONS

A. Provide 2 copies of complete manual, bound in booklet form, plus an electronic copy on permanent storage media. Each manual shall contain the following information:

1. List of all equipment with manufacturer’s name, model number, and local representative, service facilities, and the normal channel of supply for each item.
2. Manufacturer’s literature describing each item of equipment with detailed parts list.
3. Equipment service schedules and instruction manuals.
4. Equipment warranties.
5. Certificates of inspection.
6. Record drawing and related shop drawings.
7. Air and water systems balance reports.

1.9 RECORD DRAWINGS

A. Maintain at the site an up to date set of the contract drawings which clearly indicate (by shading, coloring or some other acceptable method) the daily extent of work installed.
B. Indicate on the drawings changes in elevation, location, or size of material deviating from original design, including adjustments and offsets for valves.
C. At conclusion of contract work, provide the University's Representative with a complete set of reproducible drawings with all changes clearly marked to reflect as-built conditions. These drawings shall be labeled "as-builts". Updated coordination drawings can be used as the contract "as-built" drawings at project completion.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN

A. Manufacturer's names and model numbers used for materials, processes, or equipment in the contract documents provide the Basis of Design and are the minimum required standards of quality, performance, utility, features and appearance.

2.2 ACCEPTABLE MANUFACTURERS

A. As allowed, acceptable manufacturers are listed in the individual Division 22 specifications as an indication of general quality only. The contractor is responsible for matching the quality, performance, utility, features and appearance for any substitution to the Basis of Design.

2.3 SUBSTITUTIONS

A. No substitutions of any Basis of Design are allowed without first obtaining approval from the University's Representative.
B. Equipment Substitution

1. If acceptable manufacturers are listed in the individual Division 22 specification, any proposed substitution must be from one of the manufacturers listed.
2. Performance features and construction of any proposed substitution shall meet or exceed the Basis of Design.
3. Proposed substitution must match the physical configuration and requirements of the Basis of Design including overall dimensions, inlet and outlet configuration, required clearances, access and power requirements
4. Proposed substitution must meet the seismic certification requirements mandated by the Authority Having Jurisdiction.
5. The contractor will be responsible for all modifications to the design including engaging a licensed structural engineer to prepare any structural engineering calculations and details for support and anchorage of the substitution.
6. Substitutions requiring changes to the contract documents by means of a change order to the approved permit documents are not allowed.

PART 3 - EXECUTION

3.1 CONNECTIONS TO EXISTING WORK

A. Install new work and connect to existing work with minimum interference to existing facilities. Schedule any interference or interruption of the facility's operation with University's Representative.

B. Shutdown existing facility services, utilities, alarms and emergency systems only with written consent of University's Representative.

1. A request must be submitted for any shutdown a minimum 72 hours in advance. The request is to identify the service, utility, alarm or emergency system to be shutdown, the location of the control or break to be used for the shutdown, the area of the facility affected, the time, date and duration of the shutdown, and any other pertinent information; e.g., contingency in the event the shutdown must be extended.
2. Provide a formal Method Of Procedure report for all shutdowns which will be disruptive to normal building operations or involve life safety or health matters.
3. Perform the shutdown and associated work at times that do not interfere with normal operation of existing facilities at no additional charges.
4. Provide continuous live inspection and observation of the facility during the shutdown where required to protect the facility occupants, structure or equipment.

C. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
D. Where connections or disruptions are made to existing systems, reactivate, refill and recharge all components and restore systems to the same operating conditions prior to the time of disruption.

3.2 DEMOLITION

A. Remove ductwork, piping, controls, fixtures and equipment not to remain in service as shown on drawings or as required. This includes the removal of associated appurtenances and supports.
B. All removed equipment and material is the property of University and is to be handled as directed by the University's Representative.

1. Deliver removed equipment or materials to be retained by the University for storage on-site as directed by the University's Representative.
2. Properly dispose of all other removed material off site.

C. Patch, cap, or repair existing work affected by this demolition in concealed spaces; under floor, behind wall or above ceiling.

1. Remove piping and ductwork that is no longer in service and cap within six (6) inches of a live main or branch.
   a. Piping and ductwork is not to be abandoned in place unless indicated in the contract documents, or with written consent of the University's Representative.

D. Where hazardous and carcinogenic materials are encountered, stop the work immediately and notify the University's Representative.

3.3 GENERAL INSTALLATION METHOD:

A. Examine site related work and surfaces before starting work of any section:
1. Report in writing to University's Representative conditions which will prevent proper execution of this work. Report at the earliest possible date, in order to minimize effects to project schedule.
2. Beginning work of any section without reporting unsuitable conditions to University's Representative constitutes acceptance of conditions by contractor.
3. Perform any required removal, repair, or replacement of any unacceptable work caused by unsuitable conditions at no additional cost.

B. Install all materials and equipment in accordance with manufacturer's written instructions, other required or recommended procedures, published standards, the best industry practices, and the contract documents.
C. Make complete installations in a neat, safe and professional manner.

D. Verify all dimensions by field measurements.
E. Install all equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations. Maintain all manufacturer required service clearances.
F. Install all equipment to allow for piping installed at required slope.
G. Install systems, materials, and equipment to comply with approved submittal data. Comply with arrangements indicated by the drawings, recognizing that portions of the work are shown only in diagrammatic form.
H. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

3.4 COORDINATION

A. Arrange for pipe spaces, chases, slots, sleeves and openings in building structure and components during progress of construction, to allow for installation of the project work.
B. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.
C. Coordinate all equipment, ductwork, and piping layout with other trades. Review shop drawings for work done by other trades.

3.5 SUPPORTS, ANCHORS AND SEALS:

A. Attach all piping, ductwork and equipment to the structure, seismically braced and supported to meet the requirements of the California Building Code and the Authority Having Jurisdiction.
   1. Use as a basis for restraint the following OSHPD pre-approved seismic restraint system: Mason Industries OPM-0043-13.
   2. Refer to General Requirements, sheet P0.01.

3.6 PIPE EXPANSION, CONTRACTION, VIBRATION

A. Install pipe connections to allow for movement of piping during expansion, contraction, or vibration. Provide expansion loops, flex connections, and expansion joints with proper anchors and guides as required, or where shown on drawings. Anchors and guides shall be subject to review.

3.7 SCAFFOLDING, RIGGING, AND HOISTING

A. Contractor is responsible for all scaffolding, rigging, and hoisting equipment required for the installation of materials and equipment. Coordinate rigging and scaffolding with other trades.
B. Where access openings must be cut in the structure or additional bracing must be added to the structure, contractor is responsible for all work required to repair and reconstruct the structure back to original conditions. See “Cutting and Patching”.
C. Protect all roofs, walls, floors, and other finished surfaces from damage when installing large equipment.

3.8 CUTTING AND PATCHING

A. Unless shown on drawings, cut completed work only where necessary, and only with written consent of the University’s Representative. In no case shall reinforcing steel be cut without specific written permission of the University’s Representative and Structural Engineer of Record.
B. Patching and finish materials and workmanship are to match the existing condition.
C. Provide sleeves, caps, plates, escutcheons, flashing, and similar items required to fill or close the openings.
D. Maintain the smoke and fire rating integrity of all fire and smoke rated partitions and barriers.
E. Provide final grouting, concrete, asphalt, masonry, painting, and other materials as required to complete patch work.

3.9 OPERATION BY UNIVERSITY

A. Provide operation of part or all of respective installations prior to final acceptance where required by University. Provide startup and testing where required prior to placing in service.

3.10 TEST AND ADJUSTMENTS

A. Labor, materials, instruments, and power required for testing provided under respective sections for work under that section.
B. Test shall be performed as indicated in the contract documents or as required by the Authority Having Jurisdiction. Submit to University's Representative certification that tests have been performed in accordance with contract documents.
C. Perform testing procedure in the presence of the University's Representative and/or the Authority Having Jurisdiction. Provide minimum 72 hour notice for all testing.
D. Pressure test piping before connection to equipment as required by the contract documents or the Authority Having Jurisdiction. No piping, equipment, or accessories shall be subjected to pressures exceeding their indicated rating.
E. Repair or replace defective work and repeat tests until particular systems, and component parts thereof, receive approval of University's Representative and the Authority Having Jurisdiction.
F. Any damages resulting from test shall be repaired and damaged materials replaced at no cost to University.
G. Equipment and systems which normally operate during certain seasons of the year shall be tested during the appropriate season.
H. No piping or ductwork shall be closed up, furred in, insulated, or otherwise covered before testing.
I. Refer to individual Division 22 sections for additional test requirements, including test and balancing of air and hydronic systems.

3.11 TERMINATIONS AND CLEANING

A. The work includes removing tools, scaffolding, surplus materials, barricades, temporary walks, debris, and rubbish from the project promptly upon completion of that portion of the work. Leave the area of operations completely clean and free of these items.
B. During the course of construction, cap all ducts, pipes, and electrical conduits in approved manner to insure adequate protection against entrance of foreign substances.
C. Disconnect, clean, and reconnect, whenever necessary, to locate and remove obstructions from any system. Repair or replace any work damaged in the course of removing said obstructions at no additional cost to the University.

3.12 PROJECT CLOSEOUT

A. Special tools or safety equipment: Provide one of each tool or piece of safety equipment required for proper operation and maintenance of equipment installed under this work.
B. Provide system manual, operating instructions and record drawings.
C. Replace all filter media, strainer screens, consumables and similar material used or in place during construction with new unused materials.

END OF SECTION

SECTION 22 05 29
HANGERS AND SUPPORTS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Metal pipe hangers and supports.
   2. Fastener systems.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers using performance requirements and design criteria by the manufacturer.

1.5 SUBMITTALS

A. Product Data: For each type as applicable.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

   1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
   2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
   3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
   4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
   5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

C. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

E. Install lateral bracing with pipe hangers per California Building Code seismic requirements.

F. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

G. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

I. Insulated Piping:

1. Attach clamps and spacers to piping.
   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches or less.

3.3 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and attachments for general service applications.

F. Isolate hangers from copper piping and tubing with felt lined hangers or 2 layers of 10 mil tape.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel “J” Hangers (MSS type 5) or Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18, or Tolco Fig. 109A): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.

9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION

SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipe labels.

1.3 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1 inch high.

2.2 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.
B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Pipe Label Color Schedule per ANSI Standard A31.1-2007:

1. Compressed Air Piping:
   a. Background Color: Blue.
   b. Letter Color: White.
2. Domestic Water Piping:
   a. Background Color: Safety Green
   b. Letter Color: White.

END OF SECTION

SECTION 22 11 16
DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aboveground copper domestic water pipes, fittings, and joining materials inside buildings.
2. Dielectric fittings.
3. Domestic water valves.
4. Equipment drain piping.

1.2 ACTION SUBMITTALS

A. Product Data: For pipe materials and specialty fittings.

1.3 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.
B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. All plumbing fixtures, accessories and methods are to be compliant with California AB 1953 Low Lead requirements, and the Safe Drinking Water Act.

1.5 FIELD CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by University or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of water service.
2. Do not interrupt water service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER PIPE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) and ASTM B 88, Type K (ASTM B 88M, Type A) water tube, drawn temper.
B. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, lead-free alloys.
B. Flux: ASTM B 813, water flushable.
C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
B. Dielectric Unions:

1. Standard: ASSE 1079.
2. Pressure Rating: 150 psig (1035 kPa).
3. End Connections: Solder-joint copper alloy and threaded ferrous.

2.5 VALVES

A. Two-piece full port bronze body with stainless steel trim. MSS SP-110

1. PTFE or TFE seat, threaded or sweat ends. Stainless steel ball and stem.
2. Handle extension to clear insulation where required.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
B. Install shutoff valve at all main to branch connections, and immediately upstream of each dielectric fitting.
C. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
D. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
F. Install piping to permit valve and equipment servicing.
G. Install piping free of sags and bends.
H. Install fittings for changes in direction and branch connections.
I. Install escutcheons for piping penetrations of walls, ceilings, and floors. Chrome plated brass in exposed locations.

3.2 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in “Hangers and Supports for Plumbing Piping”.
B. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting and coupling.

C. Support vertical piping and tubing at base and at each floor, not to exceed 10 feet.
D. Install hangers/supports for horizontal domestic water piping every 6 feet for 1-1/2” pipe and smalled, and every 10 feet for pipe 2” and larger.
E. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
B. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

C. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.
D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

3.4 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.
B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

3.6 IDENTIFICATION

A. Identify system components. Label all valves with identifying number and purpose.

3.7 FIELD QUALITY CONTROL

A. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction. Notify authorities having jurisdiction at least one day before inspection must be made.
B. Testing: Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, not to exceed 125psi, for a period of 8 hours.

3.8 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Prior to utilization of newly constructed or altered potable water piping systems, all affected potable water piping shall be disinfected using procedures prescribed in California Plumbing Code Sections 609.9.1 through 609.9.4.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652.

3.9 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
B. Aboveground domestic water and industrial water piping shall be the following:

1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); cast- or wrought-copper, solder-joint fittings; and lead free solder joints. See Common Work Results for Insulation section for hot water insulation requirements

C. Aboveground equipment drain piping shall be the following:

1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B or C); cast- or wrought-copper, solder-joint fittings; and soldered joints.

END OF SECTION

SECTION 22 13 16
SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hubless, cast-iron soil pipe and fittings.

1.2 SUBMITTALS

A. Product Data: For each type of product.

1.3 FIELD CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

   1. Notify Construction Manager or Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
   2. Do not proceed with interruption of sanitary waste service without written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 PIPING MATERIALS

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A888 or CISPI 301.
B. Heavy-Duty, Hubless-Piping Couplings:

   1. Standards: FM 1680 Class 1 and ASTM C1540.
   2. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on coordination drawings.
B. Install piping at a minimum ¼" per foot slope, and free of sags and bends.
C. Make changes in direction for soil and waste drainage using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.

D. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
E. Do not route waste piping above electrical cabinets, over sensitive equipment, or above hospital special procedure and surgery rooms.
F. Install sleeve seals for piping penetrations of exterior concrete walls and slabs.
G. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in "Hangers and Supports for Plumbing Piping".
B. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting and coupling.
C. Support vertical piping and tubing at base and at each floor.
D. Install hangers/supports for horizontal hubless cast-iron to support every other joint, unless that distance is over 4 ft, than support every joint.
E. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).
F. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.3 CONNECTIONS

A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
B. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Install wall cleanouts in conductors near floor and floor cleanouts with cover flush with floor.

3.4 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

   a. Water test: 10’ standing head of water at highest point in system for 15 minutes.
   b. Air test: 5 psi air pressure for 15 minutes.

3.5 PIPING SCHEDULE

A. Aboveground, waste piping:
   1. Hubless, cast-iron pipe and fittings.

B. Aboveground, vent piping:
   1. Hubless, cast-iron pipe and fittings.

END OF SECTION

SECTION 221513
GENERAL-SERVICE COMPRESSED-AIR PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes piping and related specialties for general-service compressed-air systems, as follows:

1. Pipes, tubes, and fittings.
2. Joining materials.
3. Valves.

1.2 DEFINITIONS

A. Low-Pressure, Compressed-Air Piping: System of compressed-air piping and specialties operating at pressures of 150 psig or less.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Pipe, fittings, and valves.
2. Dielectric fittings.

1.4 PROJECT CONDITIONS

A. Interruption of Existing Compressed-Air Service: Do not interrupt compressed-air service to facilities occupied by University or others unless permitted under the following conditions and then only after arranging to provide temporary compressed-air service according to requirements indicated:

1. Notify University no fewer than 5 days in advance of proposed interruption of compressed-air service.
2. Do not proceed with interruption of compressed-air service without Construction Managers written permission.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Copper Tube: Type K seamless, drawn-temper, water tube.

1. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type or MSS SP-73, wrought copper with dimensions for brazed joints.
2. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300.

3. Copper Unions: ASME B16.22 or MSS SP-123.

B. Transition Couplings for Metal Piping: Metal coupling or other manufactured fitting same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.2 JOINING MATERIALS

A. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.3 VALVES

A. Metal Ball: Comply with requirements in Section 220500 suitable for compressed air up to 150 psig.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Low-Pressure Compressed-Air Distribution Piping: Use the following piping materials for each size range:

1. NPS 2 and Smaller, Brazed: Type K, copper tube; wrought-copper fittings; and brazed joints.

3.2 INSTALLATION OF PIPING, GENERAL

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of compressed-air piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping concealed from view and protected from physical contact by building occupants, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless otherwise indicated.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and to coordinate with other services occupying that space.

E. Where installing piping adjacent to equipment and machines, allow space for service and maintenance.

F. Install air and drain piping with 1 percent slope downward in direction of flow.

G. Install nipples, flanges, unions, transition and special fittings, and valves with pressure ratings same as or higher than system pressure rating unless otherwise indicated.

H. Equipment and Specialty Flanged Connections:

1. Use steel companion flange with gasket for connection to steel pipe.
2. Use cast-copper-alloy companion flange with gasket and brazed or soldered joint for connection to copper tube. Do not use soldered joints for connection to air compressors or to equipment or machines producing shock or vibration.

I. Extended-tee outlets with brazed branch connection may be used for copper tubing, within extruded-tee connection diameter to run tube diameter ratio for tube type, in accordance with Extruded Tee Connections Sizes and Wall Thickness for Copper Tube (Inches) Table in ASTM F2014.

J. Install eccentric reducers where compressed-air piping is reduced in direction of flow, with bottoms of both pipes and reducer fitting flush.

K. Install branch connections to compressed-air mains from top of main. Provide drain leg and drain trap at end of each main and branch and at low points.

L. Install piping to permit valve servicing.

M. Install piping free of sags and bends.

N. Install fittings for changes in direction and branch connections.

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Brazed Joints for Copper Tubing: Join in accordance with AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

E. Dissimilar Metal Piping Material Joints: Use dielectric fittings.

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. NPS 2 and Smaller: Use dielectric unions.

3.5 PIPING CONNECTIONS

A. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for pipe hanger and support devices and installation specified in “Hangers and Supports for Plumbing Piping”.
B. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting and coupling.
C. Support vertical piping and tubing at base and at each floor, not to exceed 10 feet.
D. Install hangers/supports for horizontal domestic water piping every 6 feet for 1-1/2” pipe and smalled, and every 10 feet for pipe 2” and larger.
E. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.7 LABELING AND IDENTIFICATION

A. Install identifying labels and devices for general-service compressed-air piping, valves, and specialties. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

A. Perform field tests and inspections.

B. Tests and Inspections:

1. Piping Leak Tests for Metal Compressed-Air Piping: Test new and modified parts of existing piping. Cap and fill general-service compressed-air piping with oil-free dry air or gaseous nitrogen to pressure of 50 psig above system operating pressure, but not less than 150 psig. Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
2. Repair leaks and retest until no leaks exist.

END OF SECTION

SECTION 26 05 00

ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED SECTIONS

A.019113 – Commissioning

B.011813 – Sustainable Design Requirements

1.2 WORK INCLUDED

A. Furnish and install all necessary labor, materials, tools and equipment to perform and completely finish the work according to the intent of this specification, and the accompanying drawings.

B. Provide conduit, wires and other miscellaneous materials, equipment and devices, not specifically mentioned in other sections of Division 26, but necessary and/or required for equipment or system operation of function.

C. Review all specification sections and drawings for equipment requiring electrical service. Provide service to and make connections to all such equipment requiring electrical service. Refer to Section 260519 of these specifications for connection requirements.

D. Drawings indicate design loads and voltages and corresponding control equipment, feeders, and overcurrent devices. If equipment actually furnished, other than for equipment provided by the University, have loads or voltages other than those indicated on the drawings or specified herein, control equipment, feeders, and overcurrent devices shall be adjusted in size accordingly at no additional cost to the University. Such adjustment shall be subject to the review of the University's Representative.

E. Provide connections of all equipment specified under this section and any other section and Division 22 and 23 including installation and connection of all relays, remote starters, etc. and the connection of all motors and controllers. Control wiring for Division 22 and 23 systems shall be provided by Division 23. Review Division 23 specifications and shop drawings for control systems to assure compatibility between equipment furnished under Division 26 and wiring furnished under Division 22

and 23. Motor controllers (starters) shall be furnished and installed under Division 26, unless specified to be furnished as an integral component of the equipment or unless controller is variable frequency drive type. Provide the number and type of auxiliary contacts necessary to interlock the equipment and provide the control sequence in Division 22 and 23.

1.3 LOCAL CONDITIONS

A. Examine site; verify dimensions and locations against drawings and become informed of all conditions under which work is to be done before submitting proposal. No allowance will be made for extra expenses because of omission on Contractor's part to include cost of work under prevailing conditions.

B. Information shown relative to services is based upon available records and data shall be regarded as approximate only. Minor deviations found necessary to conform with actual locations and conditions shall be made without extra cost.

C. Extreme care shall be exercised in excavating near existing utilities to avoid any damage thereto; be responsible for any damage caused by such operations.

D. Request any utility shutdown, dig permit or road closure through the University's Representative, 14 days in advance. Include detailed procedure and proposed schedule. In each case approval must be obtained from the University's Representative for the requested shutdown time and work involved. Shutdown work shall be performed on overtime hours if so directed by the University.

E. Protect premise and work of other trades from damage arising out of installation of work of this division. If damage has occurred, repair or replace materials and parts of premises as directed by University's Representative at no cost to the University.

1.4 CODES AND STANDARDS

A. Applicable codes are those specified in Section 01 41 00 – Regulatory Requirements. Nothing in the Drawings or Specifications shall be construed to permit work not conforming to these codes, latest edition as adopted by authority having jurisdiction.

B. Material Standards: All material shall be new and shall conform to the standards where such have been established for the particular material in question. Publications and Standards of the organization listed are applicable to materials specified herein. Also refer to Division of these specifications: Insulated Cable Engineers Association (ICEA), Institute of Electrical and Electronic Engineers (IEEE), Edison Electric Institute (EEI), American Wood Preservers Association (AWPA),

National Board of Fire Underwriters (NBFU), Illuminating Engineering Society (IES), Electrical Testing Laboratory (ETL).

C. Code compliance is mandatory - no information or details on the drawings or specifications permits work not conforming to code. Where work is shown to exceed minimum code requirements perform work per drawings and specifications.

1.5 DRAWINGS

A. The drawings indicate the arrangements of electrical equipment. Review architectural drawings and details for door swings, cabinets, counters and built-in equipment; conditions indicated on architectural plans shall govern. Coordinate installation of electrical equipment with structural system and mechanical equipment and access thereto. Coordinate installation of recessed electrical equipment with concealed ductwork and piping, and wall thickness.

B. Do not scale drawings. Obtain dimensions for layout of equipment from Architectural plans and details unless indicated on Electrical plans. Field measurements take precedence over dimensioned drawings.

C. Bring all discrepancies shown on different drawings, between drawings and specifications or between documents and field conditions to the immediate attention of the University's Representative.

D. Equipment layout is based on one manufacturer's product or from composite dimensions from multiple manufacturers. Where equipment selected for use on the job differs from layout, coordinate space requirements and connection arrangements with Engineer. Equipment which exceeds specified maximum dimensions or which reduces required clearances shall not be accepted.

1.6 RECORD DRAWINGS

A. Upon completion of all Work, but before final acceptance, the Contractor shall furnish the University's Representative with complete sets of reproducible drawings updated and corrected to "as-built" conditions as specified. The contract documents drawings issued for bid shall be revised for "as-built" conditions. Include electronic panelboard files in Excel format updated to "as-built" conditions, copies of all submittal data, shop drawings, control Panel layout, point to point wiring diagram, conduit routing, underground duct banks, site lighting and any other detailed drawings.

B. All symbols, designations, and layers used in preparing Record Drawing shall match those used in Contract Drawings and electronic files.

C. Show all buried and concealed conduit, stub-outs, etc. Locate all buried conduit and stub-outs by dimensions from permanent, easily located and identifiable portions of structure; also, dimension ends of stub-outs, etc. Note depth of buried items below grade.

1.7 SUBMITTALS

A. Shop Drawings and Product Data:

1. Submit for review by the University's Representative data of materials and equipment to be incorporated in the work. Submittals shall be supported by descriptive material, catalogs, cuts, diagrams, performance curves, and charts published by the manufacturer to show conformance to specification and drawing requirements; model numbers alone will not be acceptable. Provide complete electrical characteristics for all equipment. Submittals for lighting fixtures shall include Photometric data.

2. Refer to the individual sections for identified equipment and materials for which submittals are required.

3. Refer to Division 1 for required procedures.

B. Operation and Maintenance Data and Instruction:

1. Refer to Division 1 for detail requirements.

2. Printed Material: Provide required printed material for binding in operation and maintenance manuals.

3. Instructions of University Personnel:

a. Before final inspection, as designated by the University's Representative provide a competent representative to instruct University's designated personnel in systems under this division of the specifications. For equipment requiring seasonal operation, perform instructions for other season within six months unless requested otherwise.

b. Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

c. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials mentioned herein or on drawings require that each item listed be provided and of quality noted, or an approved equal. All material shall be new, full weight and standard in all respects and in first-class conditions. Materials and equipment shall be uniform throughout the installation. Where possible, all materials used shall be of the same brand or manufacturer throughout for each class of material or equipment.

B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein. Substitutions will be also be evaluated on maintenance track record and parts availability for previous installations that have been installed a minimum of five years. Refer to Specification Section 01 33 23. Dimensions, sizes and capacities shown are a minimum and shall not be changed without permission of Engineer.

C. All electrical equipment and materials shall satisfy minimum requirements of NEMA, IEEE and ANSI standards. All materials must be UL approved, or if not covered by UL testing standards, shall be test and approved by a Nationally Recognized Testing Laboratory (NRTL).

D. Work such as painting, patching, welding or carpentry related to the work of this Division shall be performed by the appropriate trade experienced in that work, but shall be provided for under this Division.

E. The following systems will be purchased and installed separately by the University. Provide all the conduit and outlet boxes required for complete installation under this contract. Provide input to and coordination with the University's Representative during the preparation of the shop drawings. Review shop drawings provided by University's Representative for installation information and provide comments as required. Installation of conduit and outlet boxes shall be governed by shop drawing requirements. All special system conductors will be provided and installed by the contractor; all conductors required for 120-volt power shall be provided under this contract. Notify the University's Representative of required dates for shop drawing completion and material delivery to coordinate with overall construction schedule. Specification sections contained herein are based on a complete system - individual components to be provided by the University are not identified other than by the requirements of this paragraph.

1. Security Cameras and camera mounts.

PART 3 - EXECUTION

3.1 ELECTRICAL SYSTEMS OPERATIONAL TESTS, MANUFACTURERS SYSTEMS CERTIFICATION AND DESIGN AUTHORITY ASSISTANCE

A. Commissioning The project will have selected building systems commissioned. The equipment and systems to be commissioned are specified in Section 01 91 13. The commissioning process is described in Section 01 91 13.

3.2 GENERAL

A. All electricians to be state certified and apprentices in an approved training program.

B. When changes in location of any work are required, obtain approval of University's Representative before making changes.

1. Make changes at no extra cost.

C. Do not change indicated sizes without written approval of University's Representative.

D. Provide all necessary offsets and crossovers in conduits, raceways, cabletrays and ducts.

E. Provide flexible connections of short length to installations or equipment subject to vibration or movement and to all motors. Provide a separate bonding conductor across all flexible connections.

F. Install exposed conduits parallel to walls and ceilings and vertically plumb, unless otherwise indicated.

G. Existing equipment or electrical wiring which is to remain, but has been removed to facilitate the installation of the new equipment, shall be restored to its original operating condition.

H. Where electrical items penetrate fire or smoke rated walls, ceilings and floors, comply with Section Division 7.

I. Before any cutting, burning, heating or other work that will emit smoke, dust or other products of combustion that may set off the fire alarm system, request a fire alarm system shutdown from the University's inspector. This request shall be made at least 14 days prior to the date the shutdown is required. If this requirement is ignored and triggers the fire alarm system the offending party shall be responsible for all false alarm charges from the fire department. Instruct all personnel of this requirement before they are permitted on the job site. If the job site has a portable fire alarm system installed for the construction period, turn the system on and off each working day.

J. Provide concrete foundations or pads as follows for floor mounted electrical equipment where indicated on the drawings:

1. Install minimum 4” high concrete pads or as indicated. Other pad dimensions shall be as required to accommodate the equipment installed.

2. Use 3,000 PSI (14 Kg/s/mm) concrete.

3. Reinforce with 6” x 6” W2.9 x W2.9, 10GA (3.4mm) mesh, with short dowels into floor at 12” OC around perimeter.

4. Chamfer top edges ¾” (18mm).

5. Make all faces smooth.

6. Set anchor bolts for equipment. Consult with user.

7. Coordinate the size of all pads, the location of all anchor bolts, and the location of all vibration isolators.

3.3 QUALITY ASSURANCE AND PROJECT SAFETY

A. Provide quality assurance and project safety programs. Satisfy the minimum acceptable requirements provided in the specifications.

3.4 PREPARATION

A. Examine Drawings and Site; be familiar with types of construction where electrical installation is involved.

1. Work shall be neatly installed in a professional manner in accordance with NECA Standard of Installation. Work shall be coordinated with other trades to avoid conflicts. Clarifications will be made by University's Representative and minor adjustments shall be made without additional cost to University. Obtain clarification from University's Representative concerning any obvious discrepancies or omissions in work before bidding. All work involved in correcting obvious errors or omissions after award of Contract shall be performed as directed by University's Representative without additional cost to University.

B. Layouts of equipment, accessories and wiring systems are diagrammatic (not pictorial), but shall be followed as closely as possible. Drawings and Specifications are for assistance and guidance, and exact locations, distances, levels, etc., will be governed by Site.

C. Schedule of Values:

1. Refer to Division 1 for submittal requirements.

2. Provide a schedule of values for the electrical work specified under Division 26. Include separate labor and material itemization for each line item requested. The itemized schedule of values will be used to determine project completion and progress for payment requests, including overhead and profit for each itemization. Schedule of values must be submitted and

approved prior to first pay request. Provide the following line items as a minimum level of itemization:

a. Electrical service and distribution (include all power equipment, i.e., panelboards, transformers, feeders, motor controllers, etc.).

b. Lighting systems (include all fixtures, lamps, branch circuiting, and lighting controls).

c. Devices (include all power outlets and branch circuit wiring not associated with lighting, motors, or equipment connections).

d. Equipment connections (include all wiring and connection to HVAC, elevators, etc., including controlling devices and feeders).

e. Basic work and materials (include work common to all systems, i.e., backboards, cutting and patching, demolition, temporary services, record drawings, permits, etc.).

f. Special systems (itemize separately, including emergency power supply system, grounding system, UPS equipment, etc.).

g. Communications/signaling systems (include all low voltage systems, itemized separately, i.e., fire alarm, sound paging, security, etc.).

3.5 WORKING SPACE

A. Provide adequate working space around electrical equipment in compliance with Article 4 of Electrical Safety Orders. In general, provide 36” minimum clear workspace in front of panelboards and controls.

1. 36" @ 250V and less.

2. 42" @ 250V to 600V.

3.6 PRODUCT DELIVERY, STORAGE, HANDLING, AND PROTECTION

A. Inspect materials upon arrival at Project and verify conformance to Contract Documents. Prevent unloading of unsatisfactory material including University furnished material. Handle materials in accordance with manufacturer's applicable standards and suppliers recommendations, and in a manner to prevent damage to materials. Store packed materials in original undamaged condition with manufacturer's labels and seals intact. Containers which are broken, opened, damaged, or watermarked are unacceptable and shall be removed from the premises and replaced at no additional cost to the University.

B. All material, except items specifically designed to be installed outdoors, shall be stored in an enclosed, dry building or trailer. Areas for general storage shall be provided. Provide temperature and humidity

control where applicable. No material for interior installation, including conductors, shall be stored other than in an enclosed weathertight structure. Equipment stored other than as specified above shall be removed from the premises and replaced at no additional cost to the University.

C. Equipment and materials shall not be installed until such time as the environmental conditions of the job site are suitable to protect the equipment or materials. Conditions shall be those for which the equipment or materials are designed to be installed. Equipment and materials shall be protected from water, direct sunlight, cold or heat. Equipment or materials damaged or which are subjected to these elements are unacceptable and shall be removed from the premises and replaced at no additional cost to the University.

3.7 CARE AND CLEANING

A. Remove oil, dirt, grease and foreign materials from all raceways, fittings, boxes, panelboard trims and cabinets to provide a clean surface for painting. Touch-up scratched or marred surfaces of lighting fixtures, panelboard and cabinet trim, motor control center, switchboard or equipment enclosures with paint furnished by the equipment manufacturers specifically for that purpose.

B. Accessible elements of disconnecting and protective devices of equipment, coils of dry type transformers and the like shall be cleaned with compressed air (less than 15 PSI) and the enclosures vacuum cleaned prior to being energized.

C. Clean light fixtures and lamps thoroughly, just prior to final inspection. Fixture enclosures, shielding, etc., shall be cleaned by an approved method.

D. Do not paint trim covers for flush mounted panelboards, telephone cabinets, pull boxes, junction boxes and control cabinets unless required by the University's Representative. Remove trim covers before painting. Under no conditions shall locks or exposed trim clamps be painted.

E. Unless indicated on the drawings or specified herein to the contrary, all painting shall be done under the PAINTING Section of these Specifications.

F. Where plywood backboards are used to mount electrical equipment provided under Division 26, paint backboards with two coats of light gray semi-gloss fire retardant paint under Division 26.

G. Plywood, Mounting Backboard for Communications Equipment - Plywood mounting backboard shall extend ceiling-to-floor (10’), unless otherwise specified. Mount plywood to cover the entire area on which connecting hardware and cable management hardware may be mounted. Mounting board shall be AC-grade or better, void-free plywood, with a minimum thickness of 19 mm (¾”).

1. Two-coats of FR-S fire-retardant rated paint shall be applied to all exposed surfaces. The plywood-rating stamp shall be left exposed for inspection purposes.

2. Securely fasten plywood to wall-framing members. Use flush hardware and supports to mount plywood.

3. Ensure that the strength and placement of the hardware are sufficient to handle the total anticipated load (static and dynamic) and mounting of cabling components.

4 Color of paint shall be **WHITE**.

H. All broken, damaged or otherwise defective parts shall be repaired or replaced without additional cost to the University. Work shall be left in a condition satisfactory to University's Representative. At completion, carefully clean and adjust all equipment, fixtures and trim installed as part of this work. Systems and equipment shall be left in a satisfactory operating condition.

I. All surplus materials and debris resulting from this work shall be periodically cleaned out and removed from site; this includes surplus excavated material.

3.8 EXCAVATING AND BACKFILLING

A. Excavate and backfill as required for installation of electrical work. Restore all surfaces, roadways, sod, walks, curbs, walls, existing underground installation, etc., cut by installations to original condition in an acceptable manner. Maintain all warning signs, barricades, flares and lanterns as required by the Safety Orders and local ordinances.

B. Excavation: Dig trenches straight and true to line and grade, with bottom clear of any rock points. Support conduit for entire length on undisturbed original earth. Minimum conduit depth of crown shall be 2’ below finished grade.

C. Backfill: All backfill material shall be local material free of rubble, rubbish or vegetation. Trenches shall be backfilled and compacted to 90% of maximum dry density at optimum moisture content in layers not to exceed 6" when compacted.

3.9 CUTTING AND PATCHING

A. Provide necessary cutting and patching required to accomplish the work of Division 26.

B. Do not endanger the stability of the structure by cutting, drilling or otherwise modifying the structural members of the building. Direct all requests for structural modifications to the University's

Representative for approval. Proceed with these modifications only as directed by the University's Representative.

C. Cutting and patching requirements will be modified only if General Construction Specifications and drawings specifically state that certain portions or all cutting and patching required for each of the various trades is to be performed.

D. Refer to General Construction Specifications for execution and requirements for patching and painting and comply with applicable provisions as to materials and quality of installation.

3.10 PROTECTION

A. In performance of work, protect work from damage. Protect electrical equipment, stored and installed, from dust, water or other damage.

3.11 EQUIPMENT IDENTIFICATION

A. Panelboards, remote control switches, terminal boxes, etc., shall be properly identified according to section 260553 of these specifications.

3.12 RUST INHIBITER

A. Channels, joiners, hangers, caps, nuts and bolts and associated parts shall be plated electrolytically with zinc followed immediately thereafter by treating freshly deposited zinc surfaces with chromic acid to obtain a surface which will not form a white deposit on surface for an average of one hundred twenty (120) hours when subjected to a standard salt spray cabinet test, or shall be hot dipped galvanized.

3.13 ELECTRICAL SYSTEMS OPERATIONAL TESTS, MANUFACTURERS SYSTEMS CERTIFICATION AND DESIGN AUTHORITY ASSISTANCE

A. Testing:

1. Provide tests specified in other sections. Test all wiring and connections for continuity and grounds; where such test indicate faulty insulation or other defects, locate, repair and retest. Balance loads at panelboards. Furnish all testing equipment.

2. Refer to the individual specification sections and Section ~~26960~~ 26 90 90 of the specifications for test requirements.

3. Prior to the final inspection, the systems or equipment shall be tested and reported as therein specified. Five (5) typewritten copies of the tests shall be submitted to the University's Representative for approval. Testing does not replace the requirement for final inspection of the project work.

4. All electrical systems shall be tested for compliance with the specifications.

3.14 CLOSING OF AN UNINSPECTED WORK

A. Do not allow or cause any of work installed hereunder to be covered up or enclosed before it has been inspected and approved.

B. Should any work be enclosed or covered up before it has been approved, uncover such work and after it has been inspected and approved, make all repairs necessary to restore work of others to conditions in which it was found at time of cutting, all without additional cost to the University.

3.15 TEMPORARY FACILITIES

A. Provide temporary shop office and storage space on site only at locations approved by the University's Representative. Remove these facilities upon completion of work.

3.16 NOISE AND VIBRATION

A. Cooperate in reducing objectionable noise or vibration. If noise or vibration occurs as a result of the use of improper material or installation, correct these conditions at no cost to the University.

END OF SECTION 26 05 00

SECTION 26 05 05 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removal of existing electrical equipment, wiring, and conduit in areas to be remodeled; removal of designated construction; dismantling, cutting and alterations for completion of the Work.
2. Disposal of materials.
3. Storage of removed materials.
4. Identification of utilities.
5. Salvaged items.
6. Protection of items to remain as indicated on Drawings.
7. Relocate existing equipment to accommodate construction.

1.2 SUBMITTALS

A. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of temporary work. Describe demolition removal procedures and schedule.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of capped utilities, conduits, and equipment abandoned in place.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State, Municipality, Highways, and Public Work's standard.

1.5 SCHEDULING

A. Schedule work to coincide with new construction.

B. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

1.6 COORDINATION

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Coordinate demolition work with Owner’s representative and all other disciplines.

C. Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.

D. Shut-down Periods:

1. Arrange timing of shut-down periods of in-service panels with Owner's representative. Do not shut down any utility without prior written approval and submitting a "Method of Procedure" for review.
2. Keep shut-down period to minimum or use intermittent period as directed by Owner's representative.
3. Maintain life-safety systems in full operation in occupied facilities, or provide notice minimum 72 hours in advance and fire watch.

E. Identify salvage items in cooperation with Owner.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify field measurements and circuiting arrangements are as indicated in the Contract Documents.

B. Verify wiring and equipment indicated to be demolished serve only abandoned facilities.

C. Verify termination points for demolished services.

D. Demolition drawings are based on casual field observation and existing record documents.

E. Report discrepancies to Owner's representative before disturbing existing installation.

F. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

A. Take care to ensure that there will be no damage to structural elements or portions there-of-which are not to be removed. Erect and maintain temporary shoring, bracing, and other means to safeguard the structural integrity of the existing buildings and structures.

B. Erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, Owner, Contractor's employees, and existing improvements to remain.

C. Protect existing structures, facilities, and plant life from damage. Items damaged because of demolition operations shall be repaired or replaced, at no cost to the Owner.

D. Temporary egress signage and emergency lighting.

E. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

F. Coordinate utility service outages as directed in the Contract documents.

G. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

1. Permitting prior to initiating an outage or interruption of service.
2. Make temporary connections to maintain service in areas adjacent to work area.

H. Existing Fire Alarm System: Maintain existing system in service. Disable system only to make switchovers and connections. Make temporary connections to maintain service in areas adjacent to work area. Minimize outage duration.

1. Notify Owner's representative before partially or completely disabling system.
2. Make notifications at least 72 hours in advance.
3. Make temporary connections to maintain service in areas adjacent to work area.

I. Existing Telephone System: Maintain existing system in service. Disable system only to make switchovers and connections. Make temporary connections to maintain service in areas adjacent to work area. Minimize outage duration.

1. Notify Owner's representative before partially or completely disabling system.
2. Make notifications at least 72 hours in advance.
3. Make temporary connections to maintain service in areas adjacent to work area.

J. Existing Public Address System: Maintain existing system in service. Disable system only to make switchovers and connections. Make temporary connections to maintain service in areas adjacent to work area. Minimize outage duration.

1. Notify Owner's representative before partially or completely disabling system.
2. Make notifications at least 72 hours in advance.
3. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner or Architect/Engineer before disturbing existing installation.

B. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

C. Remove conduit, wire, boxes, and fastening devices to avoid any interference with new installation.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit and wiring servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

E. Disconnect and remove abandoned panelboards and distribution equipment.

F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

H. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

I. Remaining Circuits and Equipment: Reinstall existing electrical installations disturbed or damaged during demolition. Certain existing electrical installations may be in walls, ceilings or floors that are to be removed or damaged during demolitions and are essential for the operation of other remaining installations. Where this condition occurs provide a new extension of original circuits, raceways, equipment, and outlets to retain service continuity. Installations shall be concealed in finished areas.

J. Reconnect equipment being disturbed by renovation work and required for continue service to or nearest available panel.

K. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit, and wiring which are not part of final project.

L. Install temporary wiring and connections to maintain existing systems in service during construction.

M. Perform work on energized equipment or circuits with experienced and trained personnel.

N. Remove, relocate, and extend existing installations to accommodate new construction.

O. Repair adjacent construction and finishes damaged during demolition and extension work.

P. Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finishes. Cut embedded support elements flush with walls and floors.

Q. Clean and repair existing equipment to remain or to be reinstalled.

R. Protect and retain power to existing active equipment remaining.

S. Cap abandoned empty conduit at both ends.

T. Jackhammering

1. Jackhammering will be permitted only to a limited degree, and only with the prior written approval of the Owner.
2. Do not jack-hammer within 2-inches of reinforcing or structural steel to remain; remove final 2-inches of material with chipping gun.

3.4 EXISTING PANELBOARDS

A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.

B. Tag unused circuits as spare.

C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.

D. Remove existing wire no longer in use from panel to equipment.

E. Provide new updated directories where more than three circuits have been modified or rewired.

3.5 SALVAGE ITEMS

A. Remove and protect items indicated on Drawings to be salvaged and turn over to Owner.

B. Items of salvageable value may be removed as work progresses. Transport salvaged items from site as they are removed.

3.6 REUSABLE ELECTRICAL EQUIPMENT

A. Carefully remove equipment, materials, or fixtures which are to be reused.

B. Disconnect, remove, or relocate existing electrical material and equipment interfering with new installation.

C. Relocate existing lighting fixtures as indicated on Drawings. Clean fixtures and re-lamp. Test fixture to see if it is in good working condition before installation at new location.

3.7 CUTTING AND PATCHING

A. Make new openings neat, as close as possible to profiles indicated, and only to extent necessary for new work.

B. Do not cut or alter structural members unless specifically indicated or approved, and do not damage reinforcing or structural steel to remain.

C. At concrete, masonry, paving, and other materials where edges of cuts and holes will remain exposed in the completed work, make cuts using power-sawing and coring equipment. Do not over cut at corners of cut openings – saw overruns will not be permitted. Core hole at corner of proposed openings to insert blade and chip square.

D. Upon completion of cutting and coring, clean remaining surfaces of loose particles and dust.

E. Repair and patch all holes and openings from the removed electrical equipment, outlet boxes, etc. Coordinate with the General Contractor and the Architect to include and provide finished to match adjacent area.

3.8 CLEANING

A. Remove demolished materials as work progresses. Legally dispose.

B. Keep workplace neat.

C. Clean surfaces on which new materials will be applied, removing adhesives, bitumen, and other adhering materials, as necessary to furnish acceptable substrates for new materials.

D. Perform sandblasting, chipping, grinding, acid washing, etching, and other work as required by conditions encountered and new materials involved

E. Use of acids or other cleaning agents shall include neutralizing, washing, rinsing, and drying, as applicable.

F. Determine substrate requirements for reconditions surfaces in cooperation with the manufacturer's representative and installer of each new installer involved.

G. Clean surfaces on which new materials will be applied, removing adhesives, bitumen, and other adhering materials, as necessary to furnish acceptable substrates for new materials.

3.9 PROTECTION OF FINISHED WORK

A. Do not permit traffic over unprotected floor surface.

END OF SECTION 26 05 05

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

GENERAL

1.1 DESCRIPTION

A. The work required under this section of the specifications consists of furnishing, installing and connecting the building wiring system, 600 volts and below. Exterior branch circuit wiring and feeder conductors extended beyond the building are included. Wiring systems for communication and alarm systems are not included in this section unless specified to be included, by reference, in the respective specification sections for alarm and communication systems.

1.2 RELATED WORK

A. Section 260533 – Raceways

B. Section 260520 – Electrical Connections for Equipment

1.3 QUALITY ASSURANCE

A. Industry Reference Standards. The following specifications and standards are incorporated into and become a part of this Specification by Reference.

1. Underwriters' Laboratories, Inc. (UL) Publications:

a. No. 83 Thermoplastic - Insulated Wires

b. No. 486 Wire Connectors and Soldering Lugs

c. No. 493 Thermoplastic - Insulated Underground Feeder and Branch Circuit Cables

d. No. 854 Service Entrance Cables

2. Insulated Cable Engineers Association Standards (ICEA):

a. S-61-402 Thermoplastic Insulated Wire and Cable

3. National Electrical Manufacturer's Standards (NEMA):
    a. WC-5 Thermoplastic Insulated Wire and Cable
    b. WC-26 Wire and Cable Packaging
4. UBC Standard 4-1 for non-combustible materials for wires and cables above non-sprinklered ceilings.

B. Acceptable Manufacturers: Products produced by the following manufacturers which conform to this specification are acceptable.

1. Hydraulically applied conductor terminations:
    a. Scotch (3M)
    b. Thomas and Betts (T&B)
    c. or equal
2. Mechanically applied (crimp) conductor terminations:
    a. Scotch (3M)
    b. Thomas and Betts (T&B)
    c. or equal
3. Vinyl electrical insulating tape:
    a. Scotch (3M)
    b. Tomic
    c. or equal
4. Twist-On Wire Connectors:
    a. Buchanan
    b. Ideal
    c. or equal
5. Encapsulated insulating kits:
    a. Essex Group, Inc.
    b. Raychem

c. Scotch (3M)

d. or equal

6. Portable cable fittings:

a. Crouse Hinds

b. T & B

c. or equal

7. Insulated cable:

a. Pirelli Cable Corp.

b. Southwire Co.

c. or equal

C. Performance: Conductors shall be electrically continuous and free from short circuits or grounds. All open, shorted or grounded conductors and any other damaged insulation shall be removed and replaced with new material free from defects.

D. Delivery, Storage and Handling: Deliver wire and cable in accordance with NEMA WC-26. Wires and cables shall not be stored in an exterior or unprotected location. Material subject to direct exposure to the elements shall be replaced and removed from the project. Bring wire to job in original unbroken packages. Obtain approval of University's Representative before installation of wires.

1.4 SUBMITTALS

A. Submit shop drawings in accordance with the Conditions of the Contract and Division One Specifications Sections for the conductors, terminations, connectors, insulating tape, and insulating kits.

B. Submit field test reports indicating and interpreting test results required by the "Electrical Equipment Acceptance Testing" section of these specifications.

PRODUCTS

1.5 GENERAL MATERIALS REQUIREMENTS

A. Provide all materials under this section of the specifications.

B. All wire and cable shall be UL listed and shall bear a UL label along the conductor length at intervals not exceeding 24 inches.

C. All conductors shall have size, grade of insulation, voltage and manufacturer's name permanently marked on the outer cover at intervals not exceeding 24 inches.

D. Conductor size shall be a minimum of No. 12 AWG. Conductor size shall not be less than indicated on the drawings. The minimum size of emergency systems conductors shall be No. 10 AWG.

E. Insulation voltage level rating shall be 600 volts.

F. All conduit and conductor sizes indicated on the drawings are based upon copper conductors. 60C ampacities shall be used for sizing of all wire and cable for branch circuits and feeders rated below 125 amps. 75C ampacities shall be used for sizing of all wire and cables for feeders rated 125 amps and above.

G. Use 10 AWG conductor for 20 amperes, 120 volt branch circuit home runs longer than 75 feet, and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.

1.6 PRODUCT/MATERIALS DESCRIPTION - CONDUCTORS

A. Conductors shall be stranded copper, 90°C, type THHN/THWN or XHHW unless otherwise indicated on the drawings, required by the California Electrical Code, or specified herein.

B. Fixture wire shall be No. 16 AWG silicone rubber insulated, stranded fixture wire, type SFF-2 (150°C), or No. 16 AWG thermoplastic, nylon jacketed stranded fixture wire, type TFFN (90°C). Color code as specified herein shall not be required for fixture wire; however, neutral conductor shall be identified distinctly from phase conductors. Conductors connected to vaportight fixtures shall be type AF.

C. Control conductors for use on 120 volt control wiring systems shall be No. 12 AWG stranded type THHN/THWN, where properly protected, unless indicated otherwise on the drawings. Switch legs are not considered control wiring.

D. Portable power cables and outlets shall be provided where indicated on the drawings. Cables shall be sized as indicated on the drawings with equal size green equipment ground. Cables shall be jacketed 600 volt SO type. Cable connectors shall be steel case liquid tight sized for cable diameter and shall use strain relief gland fitting to prevent tension on conductor terminals. Where cable drops are indicated on the drawings, use wire mesh strain relief cable grips at both ends of cable. Use cast type outlet device box for device cable drops.

E. Wire shall be 1991 Code type copper wire of not less than 98% conductivity. All wires shall be stranded. Wires shall bear the Underwriters' label, be color coded and be marked with gauge, type and manufacturer's name on 24" centers.

1.7 SPLICES, TAPS, AND CONNECTORS

A. Splices, taps and connectors (No. 10 AWG and smaller) - Splices and joints shall be twisted together electrically and mechanically strong and insulated with approved type insulated electrical spring connectors.

B. Splices, taps and connectors (No. 8 and larger) - Joints and connections shall be made with Burndy, T & B, or equal, solderless tool applied pressure lugs and connectors. Uninsulated lugs and wire ends shall be insulated with layers of plastic tape equal to insulation of wire and with all irregular surfaces properly padded with "Scotchfil", 2nd product or equal putty prior to application of tape. Tape shall be equal to Scotch #33, General Electric #AW-1, or equal. Feeder splicing, where permitted, shall be made with high compression sleeve type connector followed by manufactured splicing kit utilizing as insulators, resins poured into a ready-to-use plastic mold to provide a uniform, moisture-proof tough, impact-resistant insulation. Hydraulically applied crimping sleeve or tap connector sized for the conductor. Insulate the hydraulically applied connector with 90^{o}C, 600 volt insulating cover provided by the connector manufacturer. Insulator materials and installation shall be approved for the specific application, location, voltage and temperature and shall not have an insulation value less than the conductor being joined.

C. Electrical insulating tape shall be 600 volt, flame retardant, cold and weather resistant, minimally .85 mil thick plastic vinyl material; Scotch No. 88, Tomic No. 85, Permacel No. 295, or equal.

1.8 EXECUTION

A. Install all wiring in raceway system, except where conductors are indicated or specified not to be installed in raceway. Any conductors found to be damaged or defective, including insulation damaged during installation, shall be removed and replaced at no expense to the University.

1. Pull conductors into raceway simultaneously where more than one is being installed in the same raceway.

2. Use UL listed pulling compound or lubricant where necessary to reduce cable pulling tension below the manufacturer's recommended levels. Compound used shall not deteriorate conductor or insulation.

3. Use pulling means, including fish tape, cable rope, or basket-weave wire/cable grips that will not damage cable or raceway.

B. Connect all conductors. Torque each terminal connection to the manufacturers recommended torque value. A calibrated torquing tool shall be used to insure proper torque application.

C. Do not install more conductors in a raceway than indicated on the drawings. A maximum of three branch circuits are to be installed in any one conduit, on 3 phase 4 wire system, unless specifically indicated otherwise on the drawings. No two branch circuits of the same phase are to be installed in the same conduit, unless specifically indicated on the drawings.

D. Conductors shall be tested to be continuous and free of short circuits and grounds.

E. Maintain phase rotation established at service equipment throughout entire project.

F. Group and lace with waxed linen lacing cord (T & B "Ty-Rap", Holub "Quik-Wrap" or equal) all conductors within all enclosures, i.e., panels, motor controllers, equipment cabinets, switchboards, etc.

G. Splices in homerun conductors to panelboards, switchboards, switchgear, motor control centers, motor control enclosures, and other panels shall be kept to the minimum practicable and shall only be made as necessary to support pulling of the conductors. Make splices in conductors only within junction boxes, wiring troughs and other enclosures as permitted by the California Electrical Code. Do not splice conductors in pull boxes, panelboards, safety switches, switchboard, switchgear, motor control center, or motor control enclosures.

H. Splices in conductors installed below grades are not permitted, unless approved in writing by the University's Representative. For taps indicated on the drawings and approved splices below grades,

connections shall be made in flush mounted watertight junction box with crimp connectors and watertight resin encapsulating insulating kit. Service entrance conductors shall not be spliced.

I. Support conductors installed in vertical raceways at intervals not exceeding those distances indicated in the California Electrical Code. Support conductors in pull boxes with bakelite wedge type supports or "Kellem" grips or equal, provided for the size and number of conductors in the raceway. Do not splice conductors in pull boxes used for vertical cable supports unless written permission for splicing is obtained. Where splicing is permitted, make splice with hydraulically applied splicing sleeve.

J. Terminate conductors No. 10 AWG and smaller specified in Division 26 to be stranded, with crimp type lug or stud. Direct termination of stranded conductors without crimp terminator to terminal screws, lugs, or other points is not permitted even if terminal is rated for stranded conductors. Crimp terminal shall be the configuration type suitable for terminal point.

K. Make connections between fixture junction box and fixture with fixture wire.

L. Control, communications or signal conductors shall be installed in separate raceway systems from branch circuit or feeder raceway, unless indicated otherwise on the drawings.

M. Conductor lengths for parallel circuits shall be equal. Do not configure isolated phasing in separate conduits for parallel conductors.

N. Install a minimum of twelve inches (300 mm) of slack conductor at each outlet.

O. Thoroughly clean conductors prior to installing lugs and connectors.

P. Secure portable cables in accordance with the CEC. Install strain relief devices to prevent tension on terminations if cable is pulled. Install cable grips on drops and connect to outlet box or structure. Leave slack cable loop at drop point.

Q. All cables and wires passing through manholes and handholes shall be full looped inside the manhole and handhole and supported on galvanized steel racks.

1.9 IDENTIFICATION

A. Color Code Conductors:

1. Color code all secondary service, feeder and branch circuit conductors. Control and signal system conductors need not be color coded.

2. Coding shall be as follows:

a. 208Y/120 volt three phase four wire wye system - Phase A: Black, Phase B: Red, Phase C: Blue, Neutral: White, Travellers: Orange.

b. 480Y/277 volt three phase four wire system - Phase A: Brown, Phase B: Violet, Phase C: Yellow, Neutral: Gray, Travellers: Pink.

c. Grounding conductors shall be green. Grounding conductors for isolated ground circuits shall be green with a yellow trace.

3. Phase conductors No. 10 and smaller shall have solid color compound insulation or color coating. Phase conductors No. 8 and larger shall have solid color compound, color coating or colored phase tape. Colored tape shall be installed on conductors in every box, at each terminal point, cabinet, through manhole or other enclosure.

B. Conductors within pull boxes shall be grouped and identified with nylon tie straps with circuit identification tag.

C. Identify each control conductor at its terminal points with wrap around tape wire markers. I.D. to indicate terminal block and point designation, or other appropriate identifying indication.

D. Refer to ELECTRICAL IDENTIFICATION section of these specifications for additional identification requirements.

1.10 TESTING

A. Refer to Electrical Equipment Acceptance Testing section of this specification for testing requirements.

END OF SECTION

26 05 19

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART I - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Power System Grounding.

2. Communications System Grounding.

3. Electrical Equipment and Raceway Grounding and bonding.

1.02 SUBMITTALS

A. Submit a complete set of marked-up record drawings to indicate installed location of system grounding electrode connections, and routing of grounding electrode conductor.

B. Submit certified test results stating ground resistance from service neutral at service entrance.

1.03 REFERENCE STANDARDS

A. National Electrical Manufacturers Association (NEMA).

B. American National Standards Institute (ANSI).

PART II - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

~~A.~~ Erico

B. Oz Gedney.

C. or equal

2.02 MATERIALS

A. Ground Rods: Copper encased steel 1” diameter, minimum length – 10’.

B. Ground Clamp: Water pipe connection, bronze two-piece with serrated jaws, lug sized for grounding electrode conductor.

C. Connectors, Compression Type: Bronze or Copper, pretreated with conductive paste, sized for conductor to which applied.

D. Connectors, Exothermic Weld Type: Powder actuated weld. Bond made through exothermic reaction producing molten copper from premixed copper oxide and aluminum powder. Form bond in mold or crucible.

2.03 SECONDARY GROUNDING SYSTEM

A. The main grounding system shall consist of bare copper ground wires connected to a UFER ground placed below the bottom of the structural slab. The grounding system shall include, but is not limited to ground cables, fittings, connectors and all other devices and material as required to render the system complete and meet the requirements of CEC Article 250. Connect grounding system to all building columns.

B. Except where specifically indicated otherwise, all exposed noncurrent carrying metallic parts of electrical equipment, metallic raceways systems, grounding conductor in nonmetallic raceways and neutral conductor of the wiring system shall be grounded. The ground connection shall be made at the main service equipment of each service and shall be extended to all required components of CEC Article 250.

2.04 GENERAL BRANCH CIRCUITS GROUNDING

A. All grounding conductor wire shall be insulated green copper conductors.

B. All conduit bushings shall be grounding type.

C. All grounding connections shall be made with solderless lugs and nonferrous hardware.

2.05 CONDUIT BANK GROUNDING

A. Provide a size 4 /0 bare copper grounding conductor for each of the campus utility distribution conduit banks shown on drawings. Install this grounding conductor within the ground floor slab and parallel to the respective conduit bank.

PART III - EXECUTION

3.01 INSTALLATION OF THE MAIN SERVICE ENTRANCE GROUND

A. Provide a main service entrance grounding system with cables, connections, and ground buses as shown on the drawings and specified. Provide all necessary materials and testing of the grounding system.

B. Where available the incoming water service, sprinkler system piping, building steel, UFER ground mat, footing electrode ground rod, and grounding ring encircling the building shall all be bonded together to form a grounding electrode system per CEC Section 250.

C. Install the grounding system to obtain a ground resistance of the grounding grid not to exceed 5 ohms. Provide testing of the ground grid to obtain a ground resistance rating. If the resistance exceeds 5 ohms, contact the University's Representative for review of installation and additional procedures.

3.02 UFER GROUND SYSTEM

A. UFER Ground System shall consist of a bare service ground copper ground conductor connected to a UFER ground placed within the structural slab in contact with the earth.

B. UFER Ground Mat: Form a continuous conductor mat by serpentining bare copper conductor of minimum length 60' in the bottom of the structure foundation footing. The maximum resistance of the ground mat shall not exceed 5 ohms under normally dry

conditions. If this ground resistance cannot be obtained with the 60' of mat conductor, additional mat shall be installed in contact with the earth in the bottom of the structural foundation.

3.03 GENERAL BRANCH CIRCUITS AND FEEDERS

A. All conduit systems, equipment housings, material housings, junction boxes, cabinets, motors, ducts, wireways, cable trays, light fixtures, portable equipment and all other conductive surfaces shall be solidly grounded in accordance with the California Electrical Code to form a continuous, permanent and effective grounding system.

B. Install a separate green grounding conductor in all conduits, including feeder, branch circuit, and flexible; both metallic and non-metallic. The conduit systems shall not be relied upon as the system equipment grounds. Size all grounding conductors per CEC 250 unless a larger ground is indicated on the drawings. Secure grounding conductors using approved methods to each pull box, junction box, and equipment housing.

C. All panelboards, junction boxes, pullboxes, wireways and equipment enclosures shall be bonded to the conduit systems.

D. All building expansion joints shall be bonded.

E. Isolated ground receptacles shall have both an isolated ground conductor and a separate equipment grounding conductor.

3.04 MOTOR CIRCUITS

A. All motor circuits shall have a ground wire pulled with the phase conductors. The ground wire shall be extended from the panel ground bus and shall be bonded at all junction boxes, pullboxes, disconnect switches, controllers, motor connection boxes, and motor frames. Each motor with a Variable Frequency Drive controller shall have a dedicated grounding conductor. Ground these motors back through the VFD controller as recommended by the drive manufacturer to eliminate radio frequency interference. Also, the wiring between the VFD controller and the motor shall be in a dedicated conduit.

3.05 SEPARATELY DERIVED SOURCES

A. All secondary neutrals for the 120/208-volt wye services of dry type transformers and UPS equipment shall be grounded to building steel. Connection shall be made with cable sized according to Table 250.102(C)(1) of the California Electrical Code. Extend separately derived insulated ground to the transformer in rigid steel conduit.

3.06 EQUIPMENT ROOM GROUND TERMINAL BAR

A. Mount bar by anchors and bolts using 1-½” long segments of ½” rigid conduit as spacer between bar and wall. Use a minimum of two supports, 18” on center. Connect all grounding electrode system conductors, system enclosure ground bus, and other indicated electrode systems to the terminal bar. Each telecom/his room shall have a ground bar with a minimum of six lugs or screws. Interconnect telecom/his ground bars to building steel with No. 6 AWG insulated copper conductor.

3.07 FLEXIBLE RACEWAY GROUNDING

A. Install a ground conductor inside all flexible raceways (e.g. flexible steel, liquid tight). Bond the conductor to the enclosure or ground bus in the nearest box or access on either side of the flexible section. Size conductor as specified, indicated or required by code, whichever is larger.

3.08 SECTIONAL RACEWAY

A. Install a ground conductor in all sectional raceways with removable covers for access (e.g., plug-in strips, surface raceways systems, and wireways). Size conductor in accordance with the CEC for the largest phase conductor size installed in raceway, or as indicated. Bond all sections of the raceway to the ground conductor. Connect all receptacle ground terminals in the raceway to the ground conductor, and make other ground connections indicated. This also includes all sectional raceways installed in or on University provided furniture. All surface metal raceways shall be UL listed as an equipment grounding conductor.

3.09 GENERAL GROUNDING REQUIREMENTS

A. All ground connectors shall be bronze of the clamp type. All clamp accessories such as bolts, nuts, and washers shall also bronze to assure a permanent corrosion-resistant assembly. Connector shall be as manufactured by Burndy Engineering Company, Ilsco Corporation, or equal. Make connections easily accessible for inspection, underground or concealed in floors or walls.

B. All ground cable splices, joints, and connections to ground rods shall be made with an exothermic welding process which shall provide a weld with current-carrying capacity not less than that of the conductors welded. Soldered connections shall not be used.

C. All ground wire shall be insulated, unless otherwise indicated on the Drawings, extra flexible stranded copper cables. Grounding cables installed in earth shall be laid slack.

D. Lighting and power panelboards shall be grounded by connecting a grounding conductor to the grounding stud and to the incoming and outgoing feeder conduits grounding bushings. Each grounding-type bushing shall have the maximum ground wire accommodation available in standard manufacturer for the particular conduit size. Connection to the bushing shall be with wire of this maximum size.

E. The equipment for the fire protection alarm system shall have its grounding terminal connected to the ground lug on the panelboard serving the system by means of a #6 green coded insulated conductor, run in ¾" steel conduit, utilizing a ground clamp.

END OF SECTION 26 05 26

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART I - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Conduit and equipment supports.

2. Fastening hardware.

3. Vibration Isolation.

1.02 SUBMITTALS

A. Submit for each isolator, complete manufacturer's description including quantity loading and static deflection.

1.03 REFERENCE STANDARDS

A. American Plywood Association. (APA)

B. Underwriters Laboratories. (UL) "Building Materials Directory".

1.04 QUALITY ASSURANCE

A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART II - PRODUCTS

2.01 SUPPORT CHANNELS

A. Acceptable Manufacturers – Support Channels

1. Unistrut

2. Super Strut

3. Or Equal

B. Support Channel: 12-gauge galvanized or painted steel, "U" section, 1-½" square nominal in section.

C. Hardware: Manufacturer's standard as required to support equipment. Provide corrosion resistant finish.

2.02 CONDUIT SUPPORTS

A. Conduit clamps, straps, and supports shall be steel or malleable iron for all exposed individual conduit runs. Clip type hangers may be used in concealed areas on individual

conduit runs. Group mounted, exposed or concealed shall be supported by trapeze hangers constructed of formed steel channels and threaded rods.

2.03 VIBRATION ISOLATION

A. Provide vibration isolation in all supporting hardware for vibrating electrical equipment, (e.g., transformers). Isolators shall be as recommended by manufacturer to maximize their effect. Isolators shall be as manufactured by Mason Industries, or equal.

PART III - EXECUTION

3.01 INSTALLATION

A. Fasten hanger rods, conduit clamps, outlet and junction boxes to building structure using bolts, beam clamps, and spring steel clips.

B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

C. Do not fasten supports to piping, ductwork, mechanical equipment, other conduit, or roof deck.

D. Install all support devices according to manufacturers guidelines and recommendations.

E. Do not drill through structural framing members.

F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

G. Install freestanding electrical equipment on concrete pads four inches high and overlapping equipment footprint by two inches on all sides.

H. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall, or on ¾” plywood backboards.

I. Install plywood backboards over gypsum board or directly to stud framing as indicated. Fasten to studs with self-tapping screws according to APA recommendations.

J. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls with #10 S.M.S. at 12" o.c., 4 minimum, typical unless otherwise noted.

K. Do not support equipment or fixtures from the roof deck. Provide necessary framing and joist hangers to span between structural members to locate hangers properly.

L. Do not exceed a maximum point load of 100 lbs. to any member. Locate point loads at least 4’ from any other point load on the same member.

M. All equipment shall be installed in full compliance with all applicable seismic requirements of Title 24, Part 2, CBC.

END OF SECTION 26 05 29

SECTION 26 05 33
RACEWAYS

PART I - GENERAL

1.01 DESCRIPTION

A. This section covers the complete interior and exterior raceway system.

B. Definition: The term conduit, as used in this Specification, shall mean any or all of the raceway types specified.

1.02 QUALITY ASSURANCE

A. Referenced Industry Standard: The following specifications and standards are incorporated into and become a part of this Specification by reference.

1. Underwriters' Laboratories, Inc. (UL) Publications:

a. No. 1 Flexible Metal Electrical Conduit

b. No. 1242 Rigid Galvanized Conduit

c. No. 467 Electrical Grounding and Bonding

d. No. 797 Electrical Metallic Tubing

e. No. 1242 Intermediate Metal Conduit

2. American National Standards Institute (ANSI):

a. C-80.1 Rigid Galvanized Conduit

b. C-80.3 Electrical Metallic Tubing

B. Acceptable Manufacturers: Products of the following manufacturers, which comply with these specifications, are acceptable.

1. Metallic Conduit Fittings:

a. RACO

b. Thomas and Betts

c. or equal

2. Support Channel:

a. Powers

b. Unistrut

c. or equal

C. Coordination

1. Coordinate conduit installation with electrical equipment furnished.

2. Coordinate conduit installation with contract documents. Adjust installation to eliminate conflicts. Review all shop drawings submitted under this and other sections to insure coordination with all equipment requiring electrical service and to avoid conflict interferences. Coordinate installation sequence to avoid conflicts including equipment access and provide the fastest overall installation schedule.

1.03 STORAGE AND HANDLING

A. Refer to the Basic Electrical Requirements section of the specifications for storage and handling requirements.

B. Damaged, oxidized, warped, improperly stored material or material with excessive amounts of foreign debris will be removed from the project and replaced with new materials, at no cost to the University.

PART II - PRODUCTS

2.01 GENERAL MATERIALS REQUIREMENTS

A. Furnish all materials specified herein.

B. All conduit and fittings shall be listed and bear a label by Underwriters' Laboratories (UL) for use as raceway system for electrical conductors.

C. Raceway is required for all wiring, unless specifically indicated or specified otherwise.

D. Size: The minimum size of conduit shall be ¾". The size of all conduits shall be in accordance with the CEC using 30% fill, but not less than indicated on the drawings.

E. Bushings shall be metallic insulated type. Weatherproof or dust-tight installations shall be liquid-tight with sealing ring and insulated throat. Bushing shall be OZ/Gedney type KR, or equal (Or equal, no known equal.)

F. Expansion and deflection fittings shall be OZ/Gedney, type DX, or equal

G. All under floor/ground raceways will be cleaned and mandrilled before wire is installed.

2.02 EMT CONDUIT AND FITTINGS

A. Electrical Metallic Tubing shall conform to UL 797, cold rolled steel tubing with zinc coating on outside and protective enamel coating on inside.

B. Electrical Metallic Tubing (EMT) couplings and connectors shall be steel compression "concretetight" type. Malleable iron, die cast or pressure cast fittings are not permitted. All connectors shall be nylon insulated throat type. Fittings shall meet same requirements for finish and material as EMT conduit. Box connectors shall be equipped with insulated throat.

C. Connectors at cabinets, boxes, and gutters shall be metallic nylon grounding type with insulated bushings.

2.03 RIGID AND IMC CONDUIT and FITTINGS

A. Intermediate metallic conduit and rigid steel conduit shall conform to UL 6, standard weight, mild steel pipe, zinc coated on both inside and outside by a hot dipping or sherardizing process. Inside and outside of conduit shall be finished with a protective coating.

B. Fittings for rigid steel and IMC shall be standard threaded couplings, locknuts, bushings and elbows. Fittings shall be assembled with anti-corrosion, conductive anti-seize compound at joints made absolutely tight to exclude water. All materials shall be steel or malleable iron only. Setscrew or non-thread fittings are not permitted.

C. Bushings shall be metallic insulating type consisting of insulating insert molded or locked into the metallic body of the fittings.

D. Erickson-type couplings may be used to complete a conduit run. IMC couplings may be the integral retractable (Uni-Couple) type.

E. Connectors at cabinets, boxes, and gutters shall be metallic nylon grounding type with insulated bushings.

2.04 CONDUIT SUPPORTS

A. All parts and hardware shall be zinc-coated or have equivalent corrosion protection.

B. Conduit straps shall be single hole cast metal type or two hole galvanized metal type. Conduit clamps shall be spring steel type for use with exposed structural steel.

C. Conduit support channels shall be 1.5" x 1.5" x 14 gauge galvanized (or with equivalent treatment) channel. Channel suspension shall be minimum ¼" threaded steel rods. Spring steel clips are not acceptable. Conduit straps shall be spring steel conduit straps compatible with channel. Wire or chain is not acceptable for conduit hangers. All installations shall meet applicable seismic requirements.

D. Individual conduit hangers shall be galvanized spring steel specifically designed for the purpose, sized appropriately for the conduit type and diameter, and have pre-assembled closure bolt and nut and provisions for receiving threaded hanger rod. Support with ¼" threaded steel rod for individual conduits 1.5" and smaller and ⅜" rod for individual conduits 2.0" and larger. All installations shall meet applicable seismic requirements.

E. Individual conduit straps on metal studs shall be spring steel and should wrap around entire face of stud securely biting into both edges and have provisions for screwing into stud. Size for conduit to be support. Tie wraps are not acceptable.

F. Support multiple conduits from metal studs using pre-assembled bar hanger assembly consisting of hanger bar, retaining clips and conduit straps.

G. Refer to Section 16190 of these specifications for additional material requirements. Refer to Seismic Control for additional seismic requirements.

2.05 FLEXIBLE CONDUIT AND FITTINGS

A. Flexible conduit shall be steel metallic type, zinc coated on both inside and outside by hot dipping or sherardizing process.

B. Where specified herein, indicated on the drawings, or when used in damp or wet locations, as classified by the California Electrical Code, flexible conduit shall be liquid tight. Liquid-tight conduit shall be galvanized with extruded polyvinyl covering and with water-tight connectors.

C. All flexible conduit shall be classified as suitable for system grounding.

D. Connectors for flexible conduit shall be steel insulated throat type rated as suitable for system ground continuity. Connectors for liquid tight flexible conduit shall be screw-in ground cone type.

E. Flexible conduit shall not be less than ¾" trade size and in no case shall flexible conduit size be less than permitted by the California Electrical Code for the number and size of conductors to be installed herein.

F. No aluminum flexible conduit shall be used.

2.06 MISCELLANEOUS CONDUIT FITTINGS AND ACCESSORIES

A. Vinyl all weather electrical tape for corrosion protection shall be Scotch #88, Tomic #85, Permacel #295 or equal.

B. Expansion and deflection couplings shall be in accordance with UL 467 and UL 514. They shall accommodate ¾" deflection, expansion, or contraction in any direction and shall allow 30º angular deflections. Couplings shall contain an internal flexible metal braid to maintain raceway system ground continuity.

C. Fire and smoke stop materials shall be UL rated to maintain the fire floor or firewall partition rating.

PART III - EXECUTION

3.01 INSTALLATION

A. General

1. Conceal all conduits, except in unfinished spaces such as equipment rooms or where indicated by symbol on the drawings or as approved by the University's Representative. Run concealed in areas having finished ceilings and furred walls. Run all cross conduits and vertical risers or drops concealed in wall and/or partitions. Run vertical risers or drops up or down between wall studs. Should it be necessary to notch any framing members, notch only at locations in a location and manner approved by University's Representative.

2. Exposed conduit below 8'-0" shall be rigid type.

3. Provide flexible connections of short length to equipment subject to vibration or movement and to all motors. Provide a separate bonding conductor in all flexible connections.

4. Support conduits per seismic guidelines outlined in section 16012.

5. Maintain a minimum of 6" clearance from conduit to steam or hot water pipes.

6. Leave all empty conduits with a galvanized pull wire or nylon pull rope.

7. Install as complete raceway runs prior to installation of cables or wires.

8. Flattened, dented, or deformed conduits are not permitted and shall be removed and replaced.

9. Secure rigid conduit i.e., rigid galvanized conduit and intermediate metal conduit, to sheet metal enclosures with two (2) locknuts and insulated bushing. Secure EMT to sheet metal enclosures with insulated throat connectors.

10. Fasten conduit support device to structure with wood screws on wood, toggle bolts on hollow masonry, anchors as specified on solid masonry or concrete, and machine bolts, clamps, or spring steel clips, on steel. Nails are not acceptable.

11. Protect conduits against dirt, plaster, and foreign debris with conduit plugs. Plugs shall remain in place until all masonry is complete. Protect conduit stud-ups during construction from damage; any damaged conduits shall not be used.

12. Install conduit with wiring, including homeruns as indicated on the drawings. Any change resulting in a savings in labor or materials is to be made only in accordance with a contract change. Deviations shall be made only where necessary to avoid interferences and when approved by University's Representative by written authorization.

13. Where conduit passes through finished walls or ceilings, provide steel escutcheon chrome plates or paint as directed.

14. Provide sleeves for conduit passing through floor slabs and/or concrete masonry walls.

15. Separate raceway systems are to be installed for power systems and for control, signal and communications systems. Do not install control, signal or communications cables in the same raceways as branch circuit or feeder cables, unless indicated otherwise on the drawings.

16. Provide expansion fitting in all conduits where length of run exceeds 200’ or where conduits pass building expansion joints.

17. Telephone, and data, and all service entrance conduits shall be installed with wide sweep 90º bends; minimum radius shall be 60”.

B. Uses Permitted

1. Galvanized rigid conduit or IMC shall be used as follows:

   a. For primary and secondary service (except when installed below the ground floor slab and above the building mat slab) and for secondary unit substations, switchboard, motor control center, dry-type transformer and panelboard feeders.

   b. Buried in or in contact with earth to be half-lapped with omic pipe wrapping tape with sealant applied to all joints.

c. In poured concrete walls or block walls, in concrete vaults, floor and roof construction, provided a minimum of 2" of cover is maintained.

d. In all walls up to the first outlet box where fed from rigid conduit in damp locations or locations exposed to the weather.

e. In exposed locations below 8’ above the floor, including all mechanical rooms.

f. All elbows for underground plastic conduit.

g. All conduits for interior wiring systems whose voltage is above 600 volts.

h. All conduits entering refrigerated spaces.

i. Elsewhere where indicated on the drawings.

j. For emergency branch feeders and circuits installed outside of building.

2. Electrical metallic tubing (EMT) shall be used as follows:

a. Concealed in stud partitions and hollow masonry walls.

b. For connections from junction box to lighting fixtures except in accessible ceilings.

c. Above In

d. suspended or accessible ceilings above 8’.

e. Exposed in dry locations above 8 feet where not subjected to mechanical damage.

f. In furred ceiling spaces.

g. For fire alarms system conduit. Paint red 6" wide every eight feet.

3. Rigid non-metallic conduit shall be used as follows:

a. For the branch circuit wiring for exterior lighting pole bases and bollards (horizontal runs only).

b. All elbows, both vertical and horizontal, shall be GRC.

c. Any non-metallic PVC conduit used for emergency power systems shall be schedule 80 PVC.

d. The communications conduit shall be schedule 40 PVC.

4. All other conduit, unless excluded herein, not permitted in accordance with the California Electrical Code, or otherwise indicated on the drawings, shall be electrical metallic tubing (EMT).

5. Conduit types shall not be mixed indiscriminately with other types in the same run, unless specified herein or required by the CEC.

6. Use flexible conduit for connections to motors, dry type transformers, electrical duct heaters, unit heaters, expansion joints, and flush mounted lighting fixtures. Conduit must be secured.

    a. Flexible conduit used for connection of motor, dry type transformers, electric duct heaters, and unit heaters, shall not exceed 18" in length.

    b. Flexible conduit from outlet box to flush mounted lighting fixture shall not exceed 3 feet in length.

    c. Maintain ground continuity through flexible conduit with green equipment grounding conductor; do not use flexible conduit for ground continuity.

    d. Liquid tight conduit shall be used to connect equipment in mechanical equipment rooms and exterior installations, and for final connections to all equipment containing water or other liquid service.

7. Service entrance conduits shall be installed "outside" of the building as defined by the CEC. Provide concrete encasement where required.

8. No conduit requiring cutting of cross-webs of concrete masonry units is permitted. Conduit shall be threaded through cells or concrete masonry units lowered around conduit. Neither horizontal joint reinforcement nor bond beam reinforcement shall be cut for conduit installation.

9. Where hazardous locations, as classified by the California Electrical Code, exist, all conduits and fittings and the installation of these materials shall comply with Article 500 of the California Electrical Code.

10. LB condulets for conduits larger than 1-½" I.D. shall not be used unless of the mogul design and secured to the building structure within 6" below and along the side of the condulet.

C. Concealed (Above Ceilings and in Walls) and Exposed Raceway Installation

1. Conduit shall be run parallel or at right angles to walls, ceilings, and structural members.

2. Support branch circuit conduits at intervals not exceeding 10’ and within 3’ of each outlet, junction box, cabinet or fitting. Attach individual branch circuit conduits to structural steel members with spring steel type or beam conduit clamps and to non-metallic structural members with one hole conduit straps. For exposed conduits and where conduits must be suspended below structure, single conduit runs shall be supported from structure by hangar rod and conduit clamp assembly. Multiple conduits shall be supported by trapeze type support suspended from structure. Do not attach conduits to ceiling suspension system channels or suspension wires.

3. Attach feeder conduits larger than 1" trade diameter to or from structure on intervals not exceeding 10’ with conduit beam clamps, one hole conduit straps or trapeze type support in accordance with support systems described for branch circuit conduits.

4. Single-flange clamps are unacceptable

5. Exposed conduits shall be painted, see Section 09900 of the specifications.

6. For fire alarms system conduit. Paint red 6" wide every eight feet.

7. Install conduit sleeves in slabs where conduits 2.0" and larger pass through. Sleeves shall extent 1" minimum above finished slab. Seal all spare sleeves and between conduits and sleeves to maintain fire rating and to make watertight and smoketight.

8. Install all conduits or sleeves penetrating rated firewalls or fire floors to maintain fire rating of wall or floor.

9. Conduits rigidly secured to building construction on opposite sides of a building expansion joint shall be provided with an expansion and deflection coupling. In lieu of an expansion coupling, conduits 2-½" and smaller may be provided with

junction boxes on both sides of the expansion joint connected by 15" of slack flexible conduit with bonding jumper.

3.02 ADJUSTMENT, CLEANING AND PROTECTION

A. Clean: Upon completion, clean all installed materials of paint, dirt, and construction debris. All conduit systems shall be cleaned of water and debris prior to the installation of any conductors.

END OF SECTION 26 05 33

SECTION 260535
ELECTRICAL BOXES AND FITTINGS

PART I - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pressed Steel Boxes and Fittings.

2. FS and FD Boxes.

1.02 SUBMITTALS

A. None required.

1.03 REFERENCE STANDARDS

A. Underwriters Laboratories (UL).

B. National Electrical Manufacturers Association (NEMA) #250 - Enclosures for Electrical Equipment.

C. NEMA 051 - Sheet steel outlet boxes, device boxes, covers and box supports.

D. NEMA 052 - Non-metallic outlet boxes, covers and box supports.

PART II - PRODUCTS

2.01 STEEL BOXES AND FITTINGS

A. Acceptable Manufacturers:

1. Midwest Electric

2. RACO

3. or equal

B. Boxes to be non-gangable, having knockouts as required and compatible covers or extension rings suitable for installed devices.

C. Boxes to be galvanized stamped steel, with grounding lug tapped hole.

D. Provide ⅜" fixture studs in ceiling outlet boxes where required.

2.02 FS AND FD BOXES

A. Acceptable Manufacturers:

1. Appleton

2. Crouse - Hinds

3. or equal

B. Provide cast iron alloy boxes with epoxy paint or galvanized finish. Aluminum or pot metal boxes are not acceptable. Boxes shall have threaded hubs sized for conduit without adapters and threaded holes for securing cover. Device boxes shall be provided with proper weatherproof, gasketed cover assemblies, junction and pull boxes shall be provided with flat gasketed covers. Fixture boxes shall be 4" round or as required for the fixture. Junction and pull boxes requiring more than one gang shall be multi-gang FS or FD or dimensioned cast boxes with cast covers.

PART III - EXECUTION

3.01 GENERAL

A. Install all boxes so they are completely covered by the wall plate or fixture.

B. Provide galvanized one-piece or welded pressed steel boxes and fittings unless indicated otherwise. Provide galvanized steel outlet box covers for surface mounted galvanized steel boxes in unfinished areas. Boxes in unfinished areas, installed exposed, shall be cast type "conduit" for switches and convenience outlets. Exposed boxes mounted below 8' from finished floor shall be cast type. Provide blank cover for all boxes without fixture or device.

C. Provide FS and FD boxes and required covers surface mounted in damp or wet locations and as indicated on plans. Boxes shall be securely mounted using mounting lugs or other method made in a way so as not to degrade the weatherproof nature of the system.

D. Install all outlet boxes rigidly, plumb, and level. Secure outlet boxes to ceiling system support members and wires using only clips designed and approved for the purpose. Do not cut insulation in outside walls to install outlet boxes. Do not use through-the-wall boxes unless specifically noted. Do not install boxes back-to-back in adjoining rooms. Offset outlet boxes installed back-to-back in fire-rated walls and partitions a minimum of 24 inches horizontally. Protect boxes during construction to prevent entrance of foreign materials such as concrete, mortar, plaster, paint, etc.

E. Flush mounted boxes shall be installed with opening edge flush with finish surface.

F. Pull boxes shall be provided in all runs of 90' or more in length or such that not more than four 90^{o} bends occur between boxes. Junction and pull boxes shall be located in accessible locations and shall be concealed in finished work and shall be permanently identified with system label. Where concealed accessible space is not available in finished areas, boxes shall be flush mounted with rings and blank plates at standard boxes, flanges and plaster stops at large boxes. Flush boxes shall be carefully aligned to be plumb. Locations to be coordinated with University's Representative prior to installation.

G. 4" octagonal boxes or square boxes with plaster rings shall be used for ceiling or wall light fixture outlets. Boxes for fixtures shall be equipped with fixture studs. Boxes shall be supported as required to carry loads as required by code. Other ceiling outlets shall be 4" square or larger with plaster rings unless indicated otherwise on drawings. Boxes shall be flush mounted or concealed in finished construction.

H. Provide minimum of ¾" plaster rings designed for the purpose for outlet boxes in plaster or gypsum board walls.

I. Provide masonry boxes and extension rings for boxes in concrete block, brick, and glazed tile walls. Secure with auxiliary plates, bars or clips and grout in place.

J. Install outlet device mounting rings such that they extend no more than $^{1}/_{16}$", or are recessed no more than $^{3}/_{16}$" from wall surface.

K. Support all outlet boxes independently from the raceway systems. Securely support by adequate wood backing or by manufactured adjustable channel type heavy-duty box hangers. Boxes with metal box hangers shall be attached to metal studs. Box hangers shall be securely tied or welded (where permitted) to metal studs. Paint weld with rest inhibitor.

L. Install outlet boxes for electric water coolers concealed inside cooler cabinets. Locate outlet boxes as recommended by equipment supplier.

M. For dimensional locations of the actual installed location shall not vary from the dimensioned location by more than plus or minus one-half inch, unless otherwise noted.

N. Boxes for local switches shall be at least 1-½" deep 4" square for 1 or 2 gang switches, with switch plaster rings and gang box with gang cover.

O. Boxes for telephone and data shall be minimum 2-⅛" deep.

P. Use screws and not nails to support outlet boxes.

Q. Nails shall not be used to support outlet boxes. Boxes must be accurately placed for finish, independently and securely supported by adequate wood backing or by manufactured adjustable channel type heavy-duty box hangers. Boxes with metal box hangers shall be attached to metal studs. Box hangers shall be securely tied or welded (where permitted) to metal studs. Paint weld with rust inhibitor. Boxes installed in masonry, tile, or concrete block construction shall be secured with auxiliary plates, bars or clips and be grouted in place.

END OF SECTION 260535

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART I - GENERAL

1.01 DESCRIPTION

A. Extent of electrical identification work is as outlined by this specification.

B. Types of electrical identification work specified in this section include the following:

1. Buried cable warnings.

2. Electrical power, control and communication conductors.

3. Operational instructions and warnings.

4. Danger signs.

5. Equipment/system identification signs.

1.02 QUALITY ASSURANCE

A. CEC Compliance: Comply with CEC as applicable to installation of identifying labels and markers for wiring and equipment.

B. UL Compliance: Comply with applicable requirements of UL Std 969, "Marking and Labeling Systems", pertaining to electrical identification systems.

C. ANSI Compliance: Comply with applicable requirements of ANSI Std A13.1, "Scheme for the Identification of Piping Systems".

D. NEMA Compliance: Comply with applicable requirements of NEMA Std No's WC-1 and WC-2 pertaining to identification of power and control conductors.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical identification materials and products.

B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.

PART II - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide electrical identification products of one of the following (for each type marker):

1. Brady, W.H. Company

2. Panduit Corporation

3. or equal

2.02 ELECTRICAL IDENTIFICATION MATERIALS

A. Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, provide single selection for each application.

B. Color-Coded Plastic Tape:

1. Provide manufacturer's standard self-adhesive vinyl tape not less than 3 mils thick by 1-½" wide.

a. Colors: Unless otherwise indicated or required by governing regulations, provide orange tape.

C. Underground-Type Plastic Line Marker:

1. Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried cable.

D. Cable/Conductor Identification Bands:

1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type, either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification.

E. Plasticized Tags:

1. Manufacturer's standard pre-printed or partially pre-printed accident-prevention and operational tags, of plasticized card stock with matte finish suitable for writing, approximately 3-¼" x 5-⅝", with brass grommets and wire fasteners, and with appropriate pre-printed wording including large-size primary wording, e.g., DANGER, CAUTION, DO NOT OPERATE.

F. Self-Adhesive Plastic Signs:

1. Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application, e.g., 208V, EXHAUST FAN, RECTIFIER.

2. Colors: Unless otherwise indicated, or required by governing regulations, provide white signs with black lettering.

3. Baked Enamel Danger Signs:

4. General: Provide manufacturer's standard DANGER signs of baked enamel finish on 20-gauge steel; of standard red, black and white graphics; 14" x 10" size except where 10" x 7" is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with

recognized standard explanation wording, e.g., HIGH VOLTAGE, KEEP AWAY, BURIED CABLE, DO NOT TOUCH SWITCH.

G. Engraved Plastic-Laminate Signs:

1. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, black face and white core plies (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2. Thickness: ⅛", except as otherwise indicated.

3. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

2.03 LETTERING AND GRAPHICS

A. General: Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturer or as required for proper identification and operation/maintenance of electrical systems and equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

PART III - EXECUTION

3.01 APPLICATION AND INSTALLATION

A. General Installation Requirements:

1. Install electrical identification products as indicated, in accordance with manufacturer's written instructions, and requirements of CEC and OSHA.

2. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

3. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

B. Conduit Identification:

1. Where electrical conduit is exposed in spaces with exposed mechanical piping which is identified by color-coded method, apply color-coded identification on electrical conduit in manner similar to piping identification. Except as otherwise indicated, use white as coded color for conduit.

C. Box Identification:

1. After completion, using an indelible wide tip marker, indicate on the cover of each junction and pull box the designation of the circuits contained therein, i.e., A-1, 3, 5. Use a black marker for normal power circuits a red marker for critical circuits, an orange marker for life safety circuits, and a green marker for equipment circuits.

2. All junction and pull boxes for wiring systems above 600V shall be identified with high voltage warning labels installed every 20 linear feet in accordance with OSHA standards. All boxes shall also be painted red, see Section 09 91 23 of the specifications.

3. All junction and pull boxes for the fire alarm system shall be painted red. All raceway for the fire alarm system shall be labeled "Fire Alarm" in red letters on intervals not to exceed ten feet.

D. Underground Cable Identification:

1. During back-filling/top-soiling of each exterior underground electrical, signal or communication conduits, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished grade. Where multiple small lines are buried in a common trench and do not exceed an overall width of 16", install a single line marker.

2. Install line marker for every buried conduit.

E. Cable/Conductor Identification:

1. Apply cable/conductor identification, including voltage, phase and feeder number, on each cable/conductor in each box/enclosure/cabinet where wires of more than one circuit or communication/signal system are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panel boards, shop drawings, contract documents, and similar previously established identification for project's electrical work. Refer to Section─26 05 19 of these specifications for color-coding requirements.

F. Operational Identification and Warnings:

1. Wherever required by OSHA or directed by the University, to ensure safe and efficient operation and maintenance of electrical systems, including prevention of misuse of electrical facilities equipment by unauthorized personnel, install self-adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls, devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for intended purposed. Request a meeting with the University prior to substantial completion to coordinate warning requirements.

G. Danger Signs:

1. In addition to installation of danger signs required by governing regulations and authorities, install appropriate danger signs at locations identified by the University as constituting similar dangers for persons in or about project. Request a meeting with the University prior to substantial completion to coordinate danger sign requirements.

a. High Voltage: Install danger signs wherever it is possible, under any circumstances, for persons to come into contact with electrical power of voltages higher than 110-120 volts.

b. Critical Switches/Controls: Install danger signs on switches and similar controls, regardless of whether concealed or locked up, where untimely or inadvertent operation (by anyone) could result in significant danger to persons, or damage to or loss of property.

H. Equipment/System Identification:

1. Install engraved plastic-laminate sign on each major unit of electrical equipment in building; including central or master unit of each electrical system including communication/control/signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, ½" high lettering, on 1-½" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for each unit of the following categories of electrical work:

   a. Electrical cabinets and enclosures.

   b. Access panel/doors to electrical facilities.

   c. Fire alarm control panel, battery cabinets, voice alarm system cabinets, and transponders.

2. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate substrate. Identification of flush mounted cabinets and panel boards shall be on the inside of the device.

3. Panel boards, individually mounted circuit breakers, and each breaker in the switchboards, secondary unit substations, and distribution panels shall be identified with an engraved plastic laminate sign. Plastic nameplates shall be multicolored laminated plastic with faceplate and core as scheduled. Lettering shall be engraved minimum ¼" high letters.

   a. 480/277-volt normal power equipment shall be identified with white faceplate with green core.

   b. 480/277-volt critical branch power equipment shall be identified with white faceplate with yellow core.

   c. 480/277-volt life safety branch power equipment shall be identified with white faceplate with red core.

   d. 480/277-volt equipment branch power equipment shall be identified with white faceplate with blue core.

   e. 208/120-volt normal power equipment shall be identified with green faceplate with white core.

   f. 208/120-volt critical branch power equipment shall be identified with yellow faceplate with white core.

g. 208/120-volt life safety branch power equipment shall be identified with red faceplate with white core.

h. 208/120-volt equipment branch power equipment shall be identified with blue faceplate with white core.

i. Equipment identification is to indicate the following:

1) Equipment ID abbreviation.

2) Voltage, phase, wires and frequency.

3) Emergency or other system.

4) Power source origination.

Example: Panel SLGHA1
480/277V, 3 Ø, 4 W
Life Safety System
Fed by EM1

j. Submit complete schedule with the shop drawings listing all nameplates and information contained thereon.

END OF SECTION 26 05 53

SECTION 26 05 83 - WIRING CONNECTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes electrical connections to equipment.

1.2 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA WD 1 - General Requirements for Wiring Devices.
2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

A. Product Data: Provide wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.4 COORDINATION

A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation of equipment.

D. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Disconnect Switches: As specified in Section 26 28 16.16 and in individual equipment sections.

B. Wiring Devices: As specified in Section 26 27 26.

C. Conduit: As specified in Section 26 05 33.

D. Wire and Cable: As specified in Section 26 05 19.

E. Boxes: As specified in Section 26 05 33.

2.2 CORD AND PLUGS

A. Attachment Plug Construction: Conform to NEMA WD 1.

B. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.

C. Cord Construction: Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 EXISTING WORK

A. Remove exposed abandoned equipment wiring connections, including abandoned connections above accessible ceiling finishes.

B. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for abandoned boxes and enclosures not removed.

C. Extend existing equipment connections using materials and methods as specified.

3.3 INSTALLATION

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquid tight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Install receptacle outlet to accommodate connection with attachment plug.

E. Do not field-supply cord and plugs; use manufacturer-provided only if equipment is NRTL listed and required to have one.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

3.4 ADJUSTING

A. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

END OF SECTION 26 05 83

SECTION 26 27 26
WIRING DEVICES

PART I - GENERAL

1.01 SUMMARY

A. Section includes:

1. Wall Switches
2. Receptacles
3. Device Plates
4. GFI Receptacles

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Division 1.

B. Provide manufacturers product specification sheets for all specified devices.

1. Include specific color, material and finish.
2. Include manufacturers catalog device number.
3. Include manufacturers spec data to specifically indicate conformance with these specifications.

C. Samples: Provide device and plate samples if indicated or requested by the University's Representative.

1.03 REFERENCE STANDARDS

A. National Electrical Manufacturers Association.

1. NEMA WD-1 - General Purpose Wiring Devices.
2. NEMA WD-5 - Specific Purpose Wiring Devices.

PART II - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Leviton

B. Pass and Seymour/Sierra

C. or equal

2.02 WALL SWITCHES

A. Type: Quiet toggle AC heavy-duty rated 20 ampere at 120/277 volt. Provide the configuration listed in the table below or as indicated.

B. Grade: Heavy-duty industrial grade. Refer to reference manufacturer below.

C. Construction: Back and side wired, with silver alloy contacts and screw down wire termination clamps. Switch shall be self-grounding and include a grounding screw terminal.

D. Color: Toggles shall be ivory color finish. Switches on critical or equipment branch power shall be red. Verify color with University's Representative prior to order.

E. Key Switch: Provide locking type switch with key where indicated. Provide key with each switch.

F. Pilot switches: Lighted handle type with red pilot illuminated when switch is in "On" position.

G. Reference Manufacturer: Leviton catalog numbers are used in the following table to identify specific switches and grade:

Poles	Amps	Volts-AC	Cat. No.	Remarks
Single	20	277	1221-2	Toggle-Quiet
Double	20	277	1222-2	Toggle-Quiet
Three Way	20	277	1223-2	Toggle-Quiet
Four Way	20	277	1224-2	Toggle-Quiet
SPDT	20	277	1257	Momentary Contact
Single	20	120/277	1221PLR	Pilot
Single	20	277	1221-2L	Locking Type
Single	20	277	1221 w/cover	Weather Proof

2.03 RECEPTACLES

A. Type: Standard straight blade or locking as indicated. Convenience outlets shall be rated at 20 amperes at 125 volts, composition base with slots to accommodate parallel plug caps with grounding peg unless indicated otherwise on drawings.

B. Grade: UL listed Hospital grade unless specification grade is indicated as acceptable on drawings. Refer to reference manufacturer below.

C. Construction: Back and side wired with screw down wire termination clamps of the voltage and configuration indicated. Body constructed of thermoplastic, nylon or urea with wrap-around steel strap. Face construction of a polycarbonate or nylon. Self-grounding with a grounding screw terminal.

D. Color: Face shall be ivory. Receptacles with special configurations not available in specified color shall be black. Receptacles on critical, life safety, or equipment branch power shall be red.

E. Configuration: NEMA 5-20R, unless identified on the drawings by another NEMA configuration number.

F. Isolated Ground Type: Provide only where indicated. Color of receptacle face shall match other 5-20R receptacles. Receptacle shall have orange dot isolated ground identification.

G. Reference Manufacturer: Leviton catalog numbers, unless otherwise noted are used in the following table to identify specific receptacles

Poles/ Wires	Volts	Amps	NEMA Configuration	Cat. No.	Use
2P-3W	125	20	5-20R	8300	General Duplex
2P-3W	125	20	5-20R	7899-HG	General GFI Duplex
2P-3W	125	30	5-30R	5371	Equipment Single
2P-3W	250	20	6-20R	5461	Equipment Single
2P-3W	250	30	6-30R	5372	Equipment Single
2P-3W	125	20	5-20R	P& S. TR63-H	Tamper Resistant
2P-3W	125	20	5-20R	8300-IG	Isolated Ground

2.04 G.F.I. RECEPTACLES

A. Type: 120 volt 20 ampere duplex feed through type.

B. Color: Face color to match other 5-20R receptacles.

C. Grade: Hospital Grade

D. Operation: Differential current sensing device capable of detecting ground fault currents of 5 milliamps, plus or minus 1 milliamp and interrupt the supply circuit within the UL trip time curve.

E. Test and Reset: Provide a test and reset button on the receptacle.

F. Exterior Installation: Install in FS box with weatherproof cover as specified.

G. All receptacles in restrooms within 6' of sink, outdoors, roof tops, indoor wet locations, kitchens, locker rooms with associated showering facilities, garages, and at water fountains shall be ground fault interrupter type.

2.05 DEVICE PLATES

A. Scope: Switches, receptacles, telephones and all other outlets (including signal systems and blank outlet boxes) shall be covered with specified plate. All plates shall match and be of the same manufacturer.

B. Type: Smooth no-line with rounded edges and corners. Standard size.

C. Color, Material and Locations:

1. Stainless Steel: Brushed stainless steel with stainless steel screws at all locations, except as indicated below.

2. Unfinished Areas: In tunnels, above ceilings and in unfinished areas, device plates shall be galvanized steel utility type.

3. Weatherproof Outlets: Provide cast aluminum plate with a hinged backing double lift cover and gasket allowing either surface or recessed mounting. Plate shall allow horizontal mounting of a duplex receptacle with a horizontal hinge. Hubbell #5205 or equal for standard boxes or Hubbell #5206 or equal for FS boxes. GFI outlets shall be provided with an appropriate cover.

4. Clock outlets: Provide 302 stainless steel with a hanging bracket and regressed receptacle. P&S #S3733-SS, or equal.

D. Engraving:

1. All device plates shall be engraved on the face with ¼" high black letters. Special purpose device plates, including fan motor controls, special voltages, sound system outlet identification, and special signal system identification, shall be engraved identifying use. Special receptacles shall be identified with voltage, amperage, and phase. All other devices, including receptacles and light switches, shall have panel number and circuit number engraved.

2. All critical and life safety branch outlet plates shall be engraved with red letters.

3. All device plates shall be of the same manufacturer.

PART III - EXECUTION

3.01 INSTALLATION

A. Light Switches:

1. Install all outlet boxes for light switches flush in wall where possible. Where more than one switch appears at the same location, they shall be installed in a ganged box with a single plate.

2. Verify with the University's Representative the correct room numbers and terminology before engraving plates.

3. Install all single pole switches with "on" in the up position and "off" in the down position.

4. Mount switches at the elevation indicated on the drawings. Dimensions are to the center of the box. For masonry walls, adjust height as required to install end of device at the nearest mortar joint.

B. Receptacles:

1. Where receptacles are shown adjacent to other devices, the boxes shall be installed with 2" between devices of other systems.

2. Mount receptacles at the elevation indicated on the drawings. Mounting heights are to the center of the outlet. For masonry walls, adjust height as required to install end of device at the nearest mortar joint.

3. Mount receptacle vertically with the grounding U at the top.

C. G.F.I. Receptacles:

1. Install ground fault receptacles at all receptacle locations indicated on the plan as G.F.I.

2. Where a number of receptacles in sequence are marked G.F.I, the first receptacle shall contain the sensing interrupting device and the remainder shall be standard receptacles served from the protected feed through connection.

D. Plates:

1. Coordinate multiple gang plates for proper arrangement, openings and engraving.

2. Provide blank plates mounted on the outlet box for all empty conduit systems.

3. Plates shall match and shall be mounted square with the building structure.

4. Provide cadmium plated cover plates for surface boxes in unfinished spaces.

5. Secure plates to device or box with proper attachment screws.

3.02 WIRING AND CONNECTIONS

A. Terminate ground wire at device where ground wire is provided within the raceway system.

B. Carefully strip thermoplastic wire to length and make-up terminal connection as recommended by the device manufacturer.

C. Secure device to outlet box with proper screws.

3.03 TESTING AND INSPECTION

A. Test all receptacles for ground continuity and polarity.

B. Test all GFI interrupting receptacles.

C. Inspect all devices for defective operation or breakage, cracks or chips. Replace defective devices or devices damaged during construction.

3.04 TELECOMMUNICATIONS SPACE (TS) ELECTRICAL REQUIREMENTS

A. Convenience duplex receptacles shall be:

1. Mounted in each room at +18 inches AFF and horizontally spaced not to exceed 6-feet around the perimeter of the room.

2. Non-switched, 120VAC 20 Amp duplex, and divided equally on branch circuits, (i.e. all receptacles in the same room shall not all be on the same circuit). Minimum of 2 circuits shall be provided per room, alternating duplexes around room, with no more than four (4) receptacles on the same circuit.

3. Each receptacle shall be clearly marked with its respective circuit number.

B. Equipment Rack and Cabinet Electrical Requirements:

1. Equipment racks identified for electronic equipment shall have the following installed:

a. One (1) quad device box containing two (2) duplex 20 amp, 120VAC NEMA 5-20R-spade receptacles located on separate dedicated circuits in the room sub-power panel.

b. Device box shall be mounted on the backside of each rack 15-inches Above the Finished Floor (AFF). The placement of this device box and its EMT conduit shall not block or interfere with the equipment mounting area (rails) on either side of the rack.

c. A minimum of 24-inches of flexible conduit shall be used to attach electrical service to the equipment rack. Flexible conduit is required to prevent the shearing of the conduit during a seismic event.

d. Reference Division 27 11 13, Communications Cabinets, Racks, Frames and Enclosures, Fig. 31.

2. Enclosed cabinets identified for electronic equipment shall have the following installed:

a. Two (2) quad device boxes containing two (2) duplex 20 amp, 120VAC NEMA 5-20R-spade receptacles to separate dedicated circuits located in the room sub-power panel.

b. One (1) device box shall be mounted toward the back of the cabinet near the top inside area of the cabinet to provide electrical power to the cooling fan(s). The second device box shall be located 15-inches above the floor toward the back of the cabinet.

c. The device boxes and EMT conduit shall not block or interfere with the equipment mounting area (inside and outside mounting rails) within the cabinet.

d. Reference Division 27 11 13, Communications Cabinets, Racks, Frames and Enclosures, Fig. 30.

3. Special considerations:

a. ADF equipment racks and cabinets shall have 30 Amp,120VAC NEMA 5-30R-spade receptacles in place of the 20 amp, 120VAC NEMA 5-20R-spade receptacles.

3.05 b. Provide a duplex 20 Amp, 240 VAC NEMA 6-20R receptacle for a DLC cabinet

END OF SECTION 26 27 26

SECTION 27 05 00 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes, but is not necessarily limited to, common standards and procedures for the Communications Work.

B. This Section outlines areas of responsibility between Owner, Architect, and Contractor.

C. Owner will assist with a collaborative process to determine the most cost effective and efficient means to reach the common goal of providing communications within the facility for the project, including assessing user needs and assessing required pathways. The Owner is available upon request to assist at no additional cost to the project. It is incumbent upon the construction team management to approach and engage the Owner at the appropriate times for collaboration.

D. As part of the project, the construction team must design, engineer, and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter “support") of the Communications Systems; and provide engineering of such support by parties licensed to perform work of this type in the project jurisdiction.

1.2 ITEMS PROVIDED BY OWNER

A. Registered Communications Distribution Designer (RCDD) support services

B. IT project management

C. Submittal approvals

D. Network equipment

E. 802.11 Wireless Access Point hardware

1. Installation by construction team when wireless access point mounting requires seismic support or a construction activity such as screwing, drilling, or welding
2. Owner will provide 802.11 design services

F. Racks for mounting cabling and equipment (installation by construction team)

G. Rack and Stack

H. Plug Pack Distribution (Pre-terminated switch port cabling provided and installed by the Owner)

I. Patch Cords and Patching

J. Vertical Wire Managers (installation by construction team)

K. PDU Power distribution Equipment

L. VOIP Router, Voice Gateway, VOIP equipment

M. Camera NVR/Server

N. Closet Cleaning post production

1.3 ITEMS PROVIDED BY CONSTRUCTION TEAM

A. Building Drawings and Floor Plans

B. Furniture Plans

C. As-Built Drawing Submittals
   1. Cabling Schedule

D. Attachments to structure

E. In wall cabling

F. In wall cabling supports

G. Wireless Access point installation

H. Cabling test results

I. Patch Panels

J. Horizontal Wire Managers

K. Horizontal cable, jacks, faceplates, surface mount boxes, cable trays, termination hardware, and all materials needed for a complete horizontal cabling plant as defined in the Section and associated Sections and the construction documents not otherwise listed for provision by the Owner.

L. Construction Clean Closet Cleaning

1.4 RELATED SECTIONS

A. 27 05 29 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

B. 27 05 33 CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

C. 27 05 53 IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

D. 27 15 00 COMMUNICATIONS HORIZONTAL CABLING

1.5 REFERENCES AND STANDARDS

A. UC Davis Health Telecommunications Standards

B. American National Standards Institute (ANSI)

C. Telecommunications Industry Association (TIA)

D. Building Industry Consulting Services International (BICSI)

E. American Society for Testing and Materials (ASTM)

F. Institute of Electrical and Electronic Engineers (IEEE)

G. National Electrical Manufacturers Association (NEMA)

H. National Fire Protection Association (NFPA)

I. NFPA 70 National Electrical Code

J. Underwriters Laboratories, Inc. (UL)

K. Local Authorities Having Jurisdiction (AHJ)

1.6 ABBREVIATIONS

A. ADA Americans with Disabilities Act

B. AFC Above Finished Ceiling

C. AFF Above the Finished Floor

D. BDF Building Distribution Frame – See Telecommunications Room (TR)

E. BLDG Building

F. CAT Category (Related to network cable types)

G. DIV Division

H. (E) Existing

I. ER IT Equipment Room – See Telecommunications Room (TR)

J. GE Grounding Equalizer – Part of the Telecom Grounding System

K. HR Homerun

L. ID Inside Diameter

M. IDF Intermediate Distribution Frame – See Telecommunications Room (TR)

N. IT UC Davis Health IT Department (also UC, UCDH, UCD IT, IT Facilities)

O. LAN Local Area Network

P. MAX Maximum

Q. NIC Not in Contract

R. OD Outside Diameter

S. TBB Telecom Bonding Backbone – Part of the Telecom Grounding System

T. TGB Telecommunications Ground Busbar

U. TMGB Telecommunications Main Ground Busbar

V. TR Telecommunications Room, TR may also be used interchangeably with ER, IDF, MDF, or Communications Room

W. TYP Typical

X. UCD UC Davis Health IT Department (also UC, UCDH, UCD IT, IT Facilities)

Y. UFE University Furnished Equipment

Z. UON Unless Otherwise Noted

1.7 DEFINITIONS

A. Telecommunications Room (TR) – An enclosed space for housing telecommunications equipment, cable, terminations, and cross-connects. The room is the recognized cross-connect between the backbone cable and the horizontal cabling.

B. Intermediate Distribution Frame (IDF) – See Telecommunications Room (TR)

C. Entrance Facility (EF) (Telecommunications) – An entrance to the building for both private and public network service cables (including antennae) including the entrance point at the building wall and continuing to the entrance room or space.

D. Pathway – A physical infrastructure utilized for the placement and routing of telecommunications cable.

1.8 QUALITY ASSURANCE

A. Contractor Firm Qualifications:

1. All work for the Communications (low voltage) Infrastructure installation shall be self-performed by the Communications Contractor; subcontractors shall not be allowed under the Communications Contractor.

B. Communications Contractor shall:

1. Be a Panduit Corp. PCI (Panduit Certified Installer) Design and Installation Contractor or approved equal.
2. Be a firm which is regularly and professionally engaged in the installation and testing of the specified communications equipment and infrastructure.
3. Be licensed to install low voltage electronic cabling systems in the State of California where applicable (C7 License).

C. Communications Contractor shall demonstrate experience in providing successful installation of data infrastructure systems:

1. Submit documentation for a minimum of three and a maximum of five successful low voltage communications infrastructure system installation projects completed within the past three years.

D. Contractor Key Personnel Qualifications:

1. Provide key personnel who are regularly and professionally engaged in the business of the application, installation and testing of the specified low voltage communications systems, equipment and infrastructure. There may be one key person or more key persons proposed for this project depending upon how many of the key roles each has successfully provided.
2. Each of the key personnel shall demonstrate experience in providing successful low voltage communications systems, equipment and infrastructure within the past three years.

E. A Registered Communications Distribution Designer (RCDD) shall be employed by the Design Builder and directly engaged in the project for all Communications Infrastructure design and installation efforts.

1. The RCDD shall be a direct employee of the Communications Contractor, within the Design Build team structure.
2. The RCDD shall be required to have oversight and supervision of the entire Communications Infrastructure installation process and quality control.
3. The RCDD shall be the Design Builder's Designer of Record for the Communications Infrastructure scope of work.
4. RCDD direct responsibilities shall include but may not be limited to: Thorough coordination with Owner regarding all design and installation efforts related to the project. A Pre-construction coordination meeting and site inspection with Owner prior to beginning any work. Oversight of Communications installation efforts, development of shop drawings and assembly of product data submittals. Quality control review and stamping of finalized Communications as-built drawings for submittal to Owner. Quality control review of Communications systems installation throughout the entire construction phase, to ensure all work is performed in compliance with approved construction drawings.

F. Critical on-site quality control installation reviews to be conducted in conjunction with Owner technical staff shall include but may not be limited to:

1. Verifying proper installation of all Communications cable tray, backbone conduits, device back boxes, conduit infrastructure and cabling pathways. Site inspection and sign-off must be performed prior to concealing conduit infrastructure and prior to the installation of any low-volt cabling.
2. Verifying proper installation of all Communications cabling. Site inspection and sign-off must be performed prior to closing-up associated accessible ceilings.
3. Verifying the layout and installation of all equipment and cabling within the Telecom Rooms, throughout the duration of the construction phase.

G. Supervisors and installers assigned to the installation of this system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. Submit documentation for a minimum of three and a maximum of five successful cabling system installations for each of the key personnel in an environment resembling that which is being bid upon.

1. In lieu of BICSI certification, supervisors and installers assigned to the installation of this system or any of its components shall have a minimum of three years' experience in the installation of the specified copper and fiber optic cable and components. The personnel

on site performing work pertaining to this job shall be certified on the system being installed. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

2. Submit documentation for a minimum of three and a maximum of five successful cabling system installations for each of the key personnel in an environment resembling that which is being bid upon. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the telecommunications system proposed for this project. Include specific experience in installing and testing telecommunications systems and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications cabling systems.

3. All of the existing telecommunications system installations offered by the key persons as successful experience shall have been in successful full-time service for at least 18 months prior to the issuance date for this project.

4. Provide the name and role of the key person, the title, location, and completed installation date of the referenced project, the referenced project Owner point of contact information including name, organization, title, and telephone number, and generally, the referenced project description including system size and construction complexity.

H. Indicate that all key persons are currently employed by the Communications Contractor or have a commitment to the Communications Contractor to work on this project. All key persons shall be employed by the Communications Contractor at the date of issuance of this project, or if not, have a commitment to the Communications Contractor to work on this project by the date that the bid was due to the Owner's Representative.

1. Note that only the key personnel approved by the Owner's Representative in the successful proposal shall perform work on this project's low voltage systems, equipment and infrastructure. Key personnel shall function in the same roles in this contract, as they functioned in the offered successful experience. Any substitutions for the Communications Contractor's key personnel require approval from the Owner's Representative.

I. Designated Supervisor: Designate which key person will serve as a designated supervisor for the project. This supervisor shall be present and responsible for the project site during all phases of installation and testing of the Work in this Section. This supervisor shall be the same individual through the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.

J. Submit documentation for a minimum of three and a maximum of five successful low voltage systems, equipment and infrastructure installations for each of the key personnel.

K. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the low voltage communications systems, equipment and infrastructure proposed for this project. Include specific experience in installing and testing communications systems and provide the names and locations of at least two project installations successfully completed using systems and equipment substantially similar to those specified for this project.

L. All of the existing low voltage communications systems, equipment and infrastructure installations offered by the key persons as successful experience shall have been in successful full-time service for at least 18 months prior to the issuance date for this project.

M. Provide the name and role of the key person, the title, location, and completed installation date of the referenced project, the referenced project Owner point of contact information including

name, organization, title, and telephone number, and generally, the referenced project description including system size and construction complexity.

1.9 SUBMITTALS

A. All Submittals shall be provided electronically in PDF format. All Drawing Submittals shall be provided in PDF and AutoCAD (latest version) .DWG format.

B. Submittals shall be organized in a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.

C. Contractor shall submit the following items:

1. Contractor Key Personnel and Certifications
2. Complete Bill of Materials (BOM) List
3. Manufacturer Product Data Sheets, as defined below
4. Shop Drawings, as defined below
5. Proposed Installation Schedule
6. Cabling Certification Test Plan and proposed test equipment

D. Manufacturer Product Data Submittals shall include:

1. Submit product data sheets for all equipment being provided
2. Collate in sequence by Section Number, and clearly mark proposed product on data sheet. Include Safety Data Sheet, where applicable.
3. Clearly identify any proposed product substitutions or known deviations.

E. Precede each submittal book with a summary TOC. per example schedule below:

1. Specification Section
2. Drawing Reference
3. Manufacturers Model No.

F. The following is a general summary list of Submittal items required to be delivered at 30-day burn-in period.

1. As part of project close-out activities, Contractor shall submit Record Documents for review and approval by the Owner.
2. All Record Documents shall be provided electronically in PDF format. All Record Document Drawings shall be provided in PDF and AutoCAD (latest version) DWG format.

1.10 CLOSEOUT SUBMITTALS

A. Contractor shall submit the following items:

1. Record As-Built Shop Drawings indicating the final, 'as-built' condition of all associated equipment, infrastructure, and work.

B. Shop Drawing Submittals shall include:

1. Drawing index/symbol/schedule sheet.
2. Clearly indicate all new work versus existing work.

3. Site Plans, Floor Plans, and Reflected Ceiling (work 7' AFF+) Plans
4. Drawings shall be developed in AutoCAD .DWG format, utilizing most current architectural backgrounds available for the project.
5. All drawings shall be properly scaled.
6. Indicate all device locations and types. Include addressing for all network outlets (as
7. Indicate all cabling routes, types and quantities.
8. Indicate all conduit routing, quantities, sizes, and wire fill. Indicate basket tray and J-hook routes.
9. Indicate fire stopping requirements for all penetrations.
10. Indicate 'cable bundle groups' no larger than:
    a. CAT5e – 52
    b. CAT6 – 64
    c. CAT6A – 74
11. When bundling low voltage cabling together the lowest common denominator determines the largest cable group allowed unless the cable is LP listed.

C. Riser Diagrams indicating:
1. Termination locations. Associated cabling pathways, sizes and cable fill. Telecommunications Grounding System.

D. Enlarged Room Plans and Elevations indicating:

E. Provide dimensioned drawings for all telecommunications rooms. Complete, dimensioned rack and wall elevations of all equipment. Consideration must be given to equipment heights within. Plywood backboards and grounding equipment.

F. Racks, cabinets, cable tray, ladder rack, wire management. Termination equipment for all copper cabling. Conduit and cable entrance points and fire stopping.

G. Ensure coordinated arrangement of equipment with other trades. Typical Device Installation Details indicating: J-hooks, conduit, cable tray, and associated support systems. Network outlet faceplate layout and wiring terminations. Device back box and conduit rough-in requirements.

H. Details of other associated devices and equipment.

I. The shop drawing package must be stamped and signed by a Registered Communications Distribution Designer (RCDD) and by a Professional Engineer (PE) licensed in the project jurisdiction for work of this type.

J. Cable Certification Test Results. Submit electronically and include associated software license as applicable.

K. Completed punch list reports.

L. Manufacturer Operation and Maintenance (O&M) Manuals.

M. Warranty information.

N. Keys and any portable equipment.

1.11 WARRANTY SERVICE

A. Closeout Submittals, Warranties and Guarantees, provide the following.

1. Response Time: Provide a qualified technician familiar with the work at the project site within four hours after receipt of a notice of malfunction. Provide the Owner's Representative with telephone number attended 10 hours a day, five days a week, to be called in the event of a malfunction.

2. Provide all Warrantees as defined in each Communication Systems Section.

B. PanGen Structured Cabling Solutions System Warranty

1. Contractor shall provide a Panduit Certification Plus System Warranty on all installed copper and fiber permanent links. Such warranty shall provide a complete system warranty to guarantee high end-to-end performance for all applications designed to operate over the class of cabling installed. The guarantee shall include all connectivity components and cable within the permanent link and cover the system for duration of 25 years.

PART 2 - MATERIALS

2.1 COMMUNICATIONS SYSTEMS PRODUCTS SUMMARY

A. The following is a general summary list of Communications Systems equipment, components, and cabling required for the project. This is not intended to be a comprehensive list of materials. See additional Sections for complete materials requirements.

B. Racks: Cooper B-line SB85219084FB (seismic) I SB556084XUFB (Standard) Optional eight-foot racks where applicable.

C. Wire Managers: Panduit PEV Series full height vertical cable manager.

1. Panduit PEV10 10" Wide Front/Back unless otherwise noted on plans

2. Panduit PED Series dual hinged metal door installed at front face of vertical wire manage

D. Telecommunications Ground Bar (TGB) CPI_Mfg.Part:40153-012

E. Data Patch Panels: Panduit CP48WSBLY

F. Fiber Terminations: LC

G. Modular Jack CAT6A

1. Panduit Mini-Com CL6X88TGVL

2. Colored Icons as needed per UC service designation

3. Icons are Panduit PAN_CID(XX) (gray for cables in ceiling)

H. Copper cabling, Category 6A (Data)

1. High Speed, TIA Category 6A cabling, Plenum Rated

2. General Cable GenSpeed 6A Part No. 7141877 Purple

I. Copper cabling, Category 6A Shielded [JOV Paging)

1. High Speed, TIA Category 6A Shielded cabling, Plenum Rated

2. General cable GenSpeed 6A Part No. 7131789

J. Telecommunications Outlets (Workstation side)

1. Modular Furniture Surface Mount Box, Black
2. Panduit CBXQxBL-A Where x =number of ports
3. Modular Surface Mount Box Attachment System - Mini-Com CBM-X magnetic
4. Modular Surface Mount Box Blank Insert - Panduit CMB(BL)

K. Faceplate (Workstation side)

1. Panduit Mini-Com Stainless Steel Faceplates Single Gang CFP {2,4,6} SY or Double Gang CFP {4,8,10} S-2GY
2. Faceplate Blank Insert – Panduit CMB(WH)

PART 3 - EXECUTION

3.1 RACK COMPONENTS AND ELEVATIONS

A. Owner will develop an equipment layout and rack elevation including the Telecom Room (TR) layouts. Typical components within the TR include, but not limited to:

1. Network Equipment
2. Fiber Termination Unit
3. UPS/ PDU I Power distribution
4. NM2/ NM4/ Horizontal wire management
5. VOIP Router/Voice Gateway
6. VOIP transition equipment
7. Voice cabling
8. Distribution Patch Panels
9. Clinical Engineering Equipment
10. Plug Pack Distribution

B. See related Sections for materials provided by the Owner and those furnished by the Contractor.

END OF SECTION

SECTION 27 05 29 - HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the provision of communications supports and cable hook system as described in this specification, including but not limited to:

1. Strut supports
2. Cable hooks (J-hooks)
3. Beam clamps
4. Concrete fasteners
5. Touch-up materials
6. Conduit supports
7. Equipment supports
8. Fastening hardware

1.2 SYSTEM DESCRIPTION

A. Provide devices specified in this Section and related Sections for support of communications equipment specified for this project.

B. Provide support systems that are adequate for the weight of equipment, conduit and wiring to be supported.

1.3 SEISMIC REQUIREMENTS

A. Seismic design requirements criteria, as shown on all drawings related to the project, including architectural and structural, as defined below shall apply to all work defined within the following specification sections:

1. SECTION 27 05 15 COMMUNICATIONS HORIZONTAL CABLING
2. SECTION 27 05 26 GROUNDING AND BONDING OF COMMUNICATIONS SYSTEMS
3. SECTION 27 05 36 CABLE TRAYS FOR COMMUNICATIONS SYSTEMS
4. SECTION 27 11 16 COMMUNICATIONS CABINETS RACKS FRAMES AND ENCLOSURES
5. All support systems and termination apparatus associated with the telecommunications system.

B. Contractor to install seismic restraints for all telecommunications racks and UPS systems. In accordance with construction documents. Include floor mounted items weighing more than 400 pounds and wall mounted or suspended items weighing more than 20 pounds.

C. Installation according to engineered drawings and anchorage calculations provided by the structural engineer in accordance with California Code of Regulations, Title 24, 2007 California Building Code.

D. Supports for such items, including racks, conduit, cable trays and similar shall provide support, bracing, and anchorage, designed by the structural engineer in accordance with CBC Chapter 16A.

E. Supports to be sized to suit load and selected to match mounting conditions

1.4 RELATED SECTIONS

A. 27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS

B. 27 05 33 CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

C. 27 05 53 IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

D. 27 15 00 COMMUNICATIONS HORIZONTAL CABLING

PART 2 - PRODUCTS

2.1 FASTENERS, STRAPS, AND BEAM CLAMPS

A. Equal products by the following manufacturers will be considered providing that all features of the specified product are provided:

1. Concrete fasteners
    a. Hilti
    b. Phillips "Red-Head"
    c. Remington
    d. Ramset
    e. Simpson Strong-Tie
    f. Or approved equal.
2. Concrete inserts and construction channel:
    a. Unistrut Corp.
    b. GS Metals "Globe Strut."
    c. Thomas & Betts
    d. "Kindorf" Corp.
    e. Or approved equal.
3. Conduit straps:
    a. 0-Z/Gedney
    b. Erico "caddy" Fastening Products
    c. Thomas & Betts
    d. "Kindorf" Corp.

e. Or approved equal.

4. Beam Clamps
   a. Cooper B-line.
   b. SuperStrut.
   c. Unistrut.
   d. Or approved equal.

2.2 CABLE HANGERS

A. Ceiling Hung J-Hooks
   1. Specifically intended to carry the load of up to 74 communications cables without applying excess forces to cables at bottom of bundle.
   2. Integral broad bottom edge to spread cable load with flat bottom and provide a minimum of 1-5/8" cable bearing surface.
   3. Integral hanger rod attachment hardware at top. Load rated for application.
   4. Incorporates smooth 90-degree radius edges to prevent snagging cable jackets on installation.
   5. Designed so the mounting hardware is recessed to prevent cable damage.
   6. Integral mechanical cable latch retainer to provide containment of cables within the hook. The retainer shall be removable and reusable.
   7. Suitable for direct attachment to walls, hanger rods, beam flanges, purlins, strut, floor posts, etc.to meet job conditions.
   8. Multi-tiered cable hooks to be used where required to provide separate cabling compartments, or where additional capacity is needed.
   9. Finishes: cable hooks for non-corrosive areas shall be pre-galvanized steel, ASTM A653. Where additional strength is required, cable hooks shall be spring steel with a zinc-plated finish, ASTM B633, SC3.
   10. Cable hooks for corrosive areas shall be stainless steel, AISI Type 304.
   11. Manufacturer:
      a. Cooper B-Line series BCH21, BCH32, BCH64.
      b. Caddy/Erico cablecat.
      c. or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Thoroughly examine site conditions for acceptance of supporting device installation to verify conformance with manufacturer and specification tolerances.

B. The University's Representative reserves the right to request additional supports where in their sole opinion said supports are required. Any additional supports shall be installed at no additional cost to the University.

3.2 PREPARATION

A. Prepare and maintain the following clearances from EMI sources (per BICSI Standards).
   1. Power cable (in grounded conduit) = 6 inches
   2. Power cable (unshielded) = 24 inches
   3. Fluorescent lights = 5 inches
   4. Transformers = 48 inches

B. Provide all low voltage Communications Systems Pathways and Electronic Security and Safety System Pathways.

3.3 DISTRIBUTION PATHWAY VIA CEILING HUNG CABLE HOOKS (J-HOOKS)

A. The cabling support system shall be installed in accordance with the manufacturer's instructions and as indicated on Contractor's submittal documentation, prior to final acceptance/approval by the University.

B. Cable Tray cables are not to exceed a 25% fill when the project is complete. 25% fill is a visual fill of 50% of the cable tray.

3.4 CONDUIT

A. Conduit used for pathway is to be designed with a maximum 40% visual fill.

B. EZ path retrofit EZDR-400 or EZDR-200 will be provided on all conduits when required for compliance.

3.5 FIRE PENETRATIONS

A. Install UL listed fire-stop system whenever a raceway penetrates a firewall in conformance with the manufacturer's directions, the published systems assembly requirements, CBC Section 709 and 710 and CEC 300-21, whichever is the most restrictive. At cable tray penetrations, provide pillow type removable fire stop per CBC Section 709 and 710, the published systems assembly requirements and the manufacturer's directions, whichever is the most restrictive.

B. EZ path retrofit EZDR-400 shall be provided where applicable as fire stop materials on all conduits.

C. All communications systems cabling pathway openings in walls and floors are the responsibility of the Contractor.

D. Install only EZ-Path products for all horizontal and vertical cabling pathway openings within TR rooms. Conduit sleeves are not acceptable.

E. The communications conduit pathway/box system shall be installed in accordance with the manufacturer's instructions and as indicated on Contractor's submittal documentation, prior to final acceptance/approval by the University.

END OF SECTION

SECTION 27 05 33 - CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide telecommunications pathways in accordance with EIA TIA/EIA-569-B, as shown on the plans or as designed by an RCDD.

B. Provide conduits as required by fire code and where wall cavities are obstructed.

C. Provide Ring and String where allowed in wall cavities and locations are accessible.

D. Provide a minimum of a 1 ¼ “conduit for wall drops as needed.

E. All junction boxes shall be sized and designed by a registered RCDD communications designer

F. Conduit for communications is to NOT adhere to the parallel to the exterior wall configuration required by the electrical specification. Cable Distance is priority for communications cabling and dictates path taken.

1.2 RELATED SECTIONS

A. 27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS

B. 27 05 29 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

C. 27 05 53 IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

D. 27 15 00 COMMUNICATIONS HORIZONTAL CABLING

1.3 SUBMITTALS

A. Submittals are to be approved by IT Facilities

B. Submit conduit shop drawings for cable path other than wall drops.

C. Confirm low voltage pathway quantity and fill ratio expected.

D. Include junction box locations and sizes.

PART 2 - PRODUCTS

2.1 WORK AREA OUTLET BOX

A. Work area outlet box

1. 5 square deep boxes on wall drops where required

2.2 JUNCTION BOXES

A. Junction Boxes

1. Sized to accommodate bend radius of cabling being installed.

2.3 WIRELESS, SECURITY AND OTHER PERIPHERAL CABING INSTALLATIONS

A. Conduit and/or electrical outlet box shall not be installed for wireless access point installations unless required by AHJ or physical conditions of the area.

B. Consider the device being installed when calling out conduit and housings for security and peripheral devices due to differing requirements.

2.4 FIRE PENETRATIONS

A. EZ path retrofit EZDR-400 shall be provided where applicable as fire stop materials on all conduits.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Distribution Pathway via EMT Raceway:

1. Structured cabling installation is to meet BICSI cable distance limitations. Remaining parallel to the building structure is not a requirement.
2. All ends of conduits shall be cut square, reamed and fitted with insulated bushing.
3. All conduit which passes through firewalls shall adhere to applicable fire code.

3.2 PREPARATION

A. Fill ratios are to be calculated by the designer and installer during their respective design and installation phases of the project.

B. Cable Tray cables are not to exceed a 25% fill when the project is complete. 25% fill is a visual fill of 50% of the cable tray.

C. Conduit used for pathway is to be designed with a maximum 40% visual fill.

D. EZ path retrofit EZDR-400 or EZDR-200 will be provided on all conduits when required for compliance.

3.3 MOUNTING AND INSTALLATION – WORK AREA OUTLET BOX

A. Provide back boxes at all wall phones and employee time clocks.

B. The distance between pull boxes shall not exceed 100 feet

C. Conduits exceeding two 90-degree bends shall be upsized to the next trade size and never exceed 240 degrees.

D. Support and fasten pathway and pull boxes as defined in the electrical specifications.

3.4 PENETRATIONS

A. Provide EZ path fire penetrations where applicable.

B. Provide conduit penetrations per electrical Specifications.

3.5 STATION CABLE PATHWAY INSTALLATION

A. Work Area Outlet Boxes:

1. Unless otherwise noted on the plans, all cut in boxes and surface station outlet boxes are to be installed at a height of 18" A.F.F. (above finished floor) to center, except for those otherwise called out.
2. Those plates or boxes that are to be used for telephone wall jacks shall be installed according to ADA requirements.
3. All cabling outlets shall be installed so that their edges are parallel to the vertical and horizontal edges of the surface on which they are mounted.

END OF SECTION

SECTION 27 05 53 - IDENTIFICATION AND LABELING OF COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, tools, and equipment required for permanent intelligible labeling for items including but not limited to communications cabling (structured and non-structured) innerduct, connectors, faceplates, jacks, receptacles, patch panels, and racks.

B. All labels will be preprinted, or computer printed type. Handwritten labels are not acceptable

C. This section includes minimum labeling requirements for the following:
   1. Room designations
   2. Communications cabling
   3. Closet Hardware including patch panels, terminal blocks, protectors and racks
   4. Work Area Outlets
   5. Wireless Access Points
   6. Pathways and Spaces
   7. Grounding and Bonding

1.2 VISUAL APPEARANCE

A. Clear plastic covers over faceplate labels **are not permitted**

B. Shall be preprinted or computer printed type

C. Black SMB's are to be labeled with white on black

D. Stainless will be labeled with black on white

E. White (if required) will be labeled with black on white

1.3 LABELING STANDARDS AND REQUIREMENTS

A. All new labeling is to reflect UCD labeling standards

B. Contact the University's Representative for a copy of the current standards prior to proceeding.

C. Bring to the University Representative’s attention any project conditions not described in these specifications and the University's current standards and conform to the direction received.

1.4 RELATED SECTIONS

A. 27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS

B. 27 05 29 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

C. 27 05 33 CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

D. 27 15 00 COMMUNICATIONS HORIZONTAL CABLING

PART 2 - PRODUCTS

2.1 COMMUNICATION CABLING LABELS, GENERAL

A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

B. Shall be preprinted or computer printed type. Handwritten labels are not acceptable.

2.2 COMMUNICATION CABLING LABELS, INTERIOR

A. Provide vinyl substrate with a white printing area and black print.

B. If cable jacket is white, provide cable label with printing area which is either orange or yellow, such that the labels are easily distinguishable.

C. Shall be flexible vinyl or other substrates to apply easy and flex as cables are bent.

D. Shall use aggressive adhesives that stay attached even to the most difficult to adhere to jacketing.

E. Manufacturers:

1. Cable Type- 4 pair UTP /4 pair UTP Zero Skew - Panduit S100X125VAC or approved equal.
2. Cable Type- 4 pair STP - Panduit S100X125VAC or approved equal.
3. Cable Type- 25 to 100 pair copper - Panduit S100X650VAC or approved equal.
4. Cable Type- 2 strand fiber - Panduit F100X300AJT or approved equal.
5. Cable Type- 4-12 strand fiber - Panduit S100X125VAC or approved equal.
6. Cable Type- RG-6 and RG-59 Coax - Panduit S100X125VAC or approved equal.
7. Cable Bundles - Panduit UIHL12-XO or approved equal.
8. Other Interior cabling - Panduit S100X650VAC or approved equal.

2.3 CLOSET HARDWARE LABELS

A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

B. Shall be preprinted or computer printed type. Handwritten labels are not acceptable.

C. Location ID:

1. Panduit - White C061X030FJC
2. Panduit - White C750XOSOYIJ
3. Or approved equal.

D. Non-keystone-based fiber patch panels:

1. Panduit - White C061X030FJC
2. Panduit - White C750XOSOYIJ
3. or approved equal.

E. 110 blocks
1. Panduit C750XOSOYIC
2. Panduit S White C750XOSOYIJ
3. Or approved equal.

2.4 GROUNDING AND BONDING, PATHWAY, AND SPACE LABELS

A. Panduit C200X100FJC or approved equal.

2.5 WORKSTATION LABELS

A. Panduit - White C061X030FJC

B. Panduit - White C750X050YIJ or approved equal.

2.6 LOCATION NAMEPLATES

A. Provide laminated plastic nameplates for each equipment enclosure, rack, switch, and device, as specified.

B. Comply with ASTM D 709.

C. Each nameplate inscription shall identify the function and, when applicable, the position.

D. Nameplates shall be melamine plastic, 0.125-inch thick, black with white center core.

E. Surface shall be matte finish. Corners shall be square.

F. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by three inches.

G. Lettering shall be a minimum of 0.25-inch high normal block style for location nameplates or a minimum of 1-inch high normal block style for rack nameplates.

H. Panduit C300X100APT or approved equal

PART 3 - EXECUTION

3.1 GENERAL

A. Verify all room numbers, racks, conduits, cable tray, cables, equipment housing, vaults and items within this document have been labeled.

B. Contractor applied labeling shall reflect final space and Telecommunications structure designations.

C. Accurate labeling shall be provided on the as-built shop drawing submittals.

3.2 IDENTIFICATION AND LABELING

A. Telecommunications Rooms

1. Labels shall be affixed at the entry to all telecommunications rooms and spaces (Includes entrance facilities, telecommunications equipment rooms, communication equipment spaces and work areas).
2. All IT rooms are numbered but not designated “equipment” due to security concerns.

B. Cable Tray and Conduits

1. Cable tray structured versus AV or analog systems pathway labeling and designations are the responsibility of the installer to designate the services that are to use the pathway or what portion of the pathway.
2. Any permanent label that is clearly visible is acceptable.

C. Rack and Cabinet Labeling

1. Provide laminated plastic nameplates for each equipment enclosure, row and rack designations as shown on elevations provided by UCD IT.

D. Copper Patch Panels – Horizontal

1. Label with Jack numbers.

E. Tie Cable Patch Panels

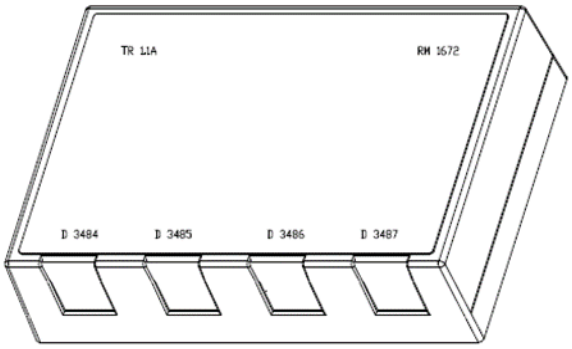
1. Label the pair count at the top of the patch panel, separated from all others.
2. Place the cable's identification text centered on the top label strip. (example:18CA75, TIE 1672A).

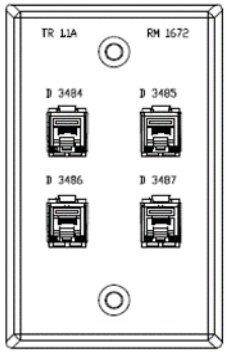
F. 110 Blocks

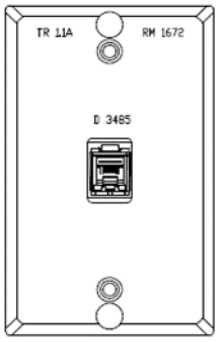
1. Not used other than MPOE, OSP installation.
2. Label with University provided designation.

G. Workstations

1. Use adhesive type labels and affix labels to faceplate per diagram provided.
2. Provide sequential 4 or (Occasionally 5 digit) jack number (starting dependent on the floor designation) beginning with an X such as X056, X being floor# followed by the closet sequenced cable number.
3. All faceplate labels shall contain the following items:
    a. Building and Closet Designation such as 34-1100 (building#, IT closet#)
    b. TR Designation such as TR1.1 or TR 1A (University established designation)
4. Under no circumstances are jacks to be installed with a drop/name or location number as a label or a matrix identifier.
5. See diagram below:







H. Wireless Access Point (WAP) Labeling

1. The University's Representative will provide locations for Wireless Access Point installations with the University's assigned designated identifiers adhered to the Access Point itself.
2. Building Designation / room or area designation – AP / a,b,c (if multiple AP’s within room).
3. WAP labeling consists of the Icon being a designated color at the device, Icon being a designated color in the patch panel, and a band being installed on both ends of the patch cord that connects the cable in the TR room.

I. Grounding and Bonding

1. Label the TMGB (telecommunications main ground busbar) with an adhesive label.
2. Label the TGB(s) (telecommunications ground busbar) with an adhesive type label(s).

J. Other Cable Numbering

1. Other cabling types, such as Coax installed in a TR shall be numbered uniquely, such as C=Coax.
2. Cameras and AP’s are Data Cabling, which falls into the Data Cabling labeling scheme.
3. Point to point Data Cables require independent numbering such as A1001 for items such as in room video distribution such as N-stream equipment.

K. Fiber Patch Panels

1. Fiber patch panels shall be marked using adhesive labels indicating the range of circuits installed to it. All fiber optic cable patch panels shall be labeled with the pair count of every fiber pair, the cable’s assigned identifier, and the patch panel's assigned identifier.
2. All labels shall consist of the following:
    a. Provide the respective FTU # next in sequence in the data room.
    b. Provide and label each bulkhead in the fiber panel per the following: Fiber Cable #, "FROM" Building / "FROM" Room / "FROM" FTU / Fiber Type / Strand # to Location / Telecom Cable # / "TO" Building / "TO" Room / "TO" FTU / / Strand # / Fiber Type.
    c. Coordinate with IT before applying any labels.

L. Fire stopping

1. Each fire stopping location shall be labeled at each location where fire stopping is installed, on each side of the penetrated fire barrier, within 12 in. of the fire stopping material.
2. Labels shall adhere to the requirements set forth by the authority having jurisdiction (AHJ).

M. Indoor Communications Cables

1. Horizontal and Indoor Backbone cables shall be marked within 12 inches of each endpoint or to innerduct in which the cable is installed.
2. Label each end of each riser cable where the cable terminates.
3. Backbone cables shall be marked at each endpoint and at all intermediate locations, pull/access point or junction boxes through which the cable passes, as well as on each floor and in each room the cable is openly visible in.

N. Copper Riser Cabling.

1. Label all copper backbone cables of at least 25 pair construction to contain the following information:
   a. Installation Date
   b. University Assigned Cable ID: (Example: 70 Tie 0P609).

O. Fiber Riser cabling.

1. Label all fiber backbone cables to contain the following information:
   a. Installation Date
   b. University Assigned cable ID:(Example: IFA134).

END OF SECTION

SECTION 27 15 00 - COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Provisioning, installation, termination, and testing and of twisted pair, horizontal cabling in modular furniture and hard wall workstations located throughout the project area. Work under this section will include:

1. Wireless Access Point cabling
2. Printer Stations
3. All workstation cabling as defined on the construction documents

1.2 TYPICAL WORK AREA OUTLETS

A. A typical work area outlet (per chair) or (Drop) shall consist of two (2) (Purple end to end) Category 6A Data cables, unless otherwise indicated.

B. A typical work area outlet shall have a slack loop of 10 feet at the field end of the run.

1.3 OTHER OUTLET CONFIGURATIONS

A. Wireless Access Points

1. A typical wireless access point (WAP) Outlet shall consist of two (2) (Purple end to end) Category 6A Data cables, unless otherwise indicated.

B. Timeclock Outlet

1. A typical time cock outlet shall consist of one (1) (Purple end to end) Category 6A Data cable, unless otherwise indicated.

C. Other outlet configurations as defined by and coordinated with Owner IT.

D. All Outlet types listed above shall have a slack loop of 10 feet at the field end of the run.

1.4 RELATED SECTIONS

A. 27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS

B. 27 05 29 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

C. 27 05 33 CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

D. 27 05 53 IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 2 - PRODUCTS

2.1 MODULAR JACK COMPONENTS, GENERAL

A. Modular Jacks rated Category 6A
   1. Panduit Mini-Com CL6X88TGVL
   2. Colored Icons as needed per UCDM service designation
   3. Panduit PAN_CID(XX)

2.2 COPPER CABLING, CATEGORY 6A

A. High Speed, TIA category 6A Cabling, Plenum Rated
   1. General cable GenSpeed 6A Part No.7141877 Purple

2.3 TELECOMMUNICATIONS OUTLET COMPONENTS

A. Modular Furniture Surface Mount Box, Black
   1. Panduit CBXQxBL-A Where x = number of ports
   2. Modular Surface Mount Box Attachment System Mini-Com CBM-X
   3. Modular Surface Mount Box Blank Insert Panduit CMB(BL)

B. Faceplate
   1. Panduit- Mini-Com Faceplates (CFP (2,4,6)SY I CFP (4,8,10) S-2GY
   2. Coordinate finish with Architect prior to submittals.

C. Faceplate Blank Insert
   1. Panduit CMB(WH)

D. Stainless Wall Telephone Outlet
   1. Leviton 40223-S (where specified)

E. One Hole Wall Plate
   1. Leviton 84004-40 Stainless where requested
   2. Leviton 80720-W White where requested
   3. Coordinate finish with Architect prior to submittals.

F. Black Loom
   1. Panduit loom CLT100F/CLT150F (choose size appropriate for cable installation quantity)
   2. Thomas & Betts black liquid tight EFC150

G. Duplex In-Line Jack frame, one to four jacks (only where required, NOT standard installation)
   1. Panduit Mini-Com 106 Duplex Module Frame

PART 3 - EXECUTION

3.1 CABLING RUN LENGTHS

A. Distance limitation of the in-wall cabling shall be thoroughly reviewed and calculated to be less than 275' when including the anticipated plug pack cabling length in the telecommunications room (TR).

B. Contractor to field verify the performance including cable length of the proposed installation in a mockup using the proposed cabling, jacks, raceway and test equipment prior to proceeding.

1. Locate proposed cable pathway drawing for the upcoming cable run.
2. Contractor to install One (1) typical copper work area outlet complete with jacks at both ends.
3. Use the proposed pathway and cabling to the furthest location from the TR.
4. Install a cable simulating the cable length of the Plug Pack configuration.
5. The cabling contractor is to perform testing of these cables patched together to determine the true length of this mockup.
6. Test Results are to be inspected and reviewed by the University's Representative prior to proceeding with the rest of the installation.
7. Any deficiencies in the installation of the mockup are to be corrected by the Contractor and re-inspected by the University's Representative prior to proceeding with the rest of the installation.

3.2 MODULAR JACK COMPONENTS

A. Category 6A Data Jacks performance shall meet requirements as defined in TIA standards.

B. Follow manufacture's Installation procedures.

3.3 TELECOMMUNICATIONS OUTLET EXECUTION

A. Modular Furniture Surface Mount Box, One to Four Jacks

1. Surface mount box magnetically attached to furniture
2. Removing knockouts in the base of the furniture shall be avoided.

B. Telecommunications Outlets. New, Copper Jacks, Wall Mount, Flush Mount Assembly.

1. Complete outlet assembly, including but not limited to:
2. Faceplate with manufacturer's standard jack openings
3. Blank connector modules at faceplate openings not filled with connector modules.
4. Features: Single gang with openings for the required number of cables. Provide flat stainless steel.
5. Features: Double gang with openings for the required number of cables. Provide flat stainless steel

C. Voice Telephone Station Plates and Jacks (special provision)

1. Wall Mounted Analog Telephone

2. Wall mounted IP Telephone Station
3. Single outlet wall plate w/ 8P8C data Jack

3.4 COPPER CABLING DATA VOICE/DISTRIBUTION

A. Maintain the following clearances from EMI sources (Per BICSI Standards)
   1. Power cable - 6 in.
   2. Fluorescent Lights - 12 in.
   3. Transformers- 48 in.

B. Monitor cable length limitations
   1. All cable installations shall be continuous, unspliced runs
   2. All wiring above ceilings shall be installed in cable tray or cable hangers.
   3. Cable in accessible ceilings shall be supported 5' on center (min) attached to building structure.
   4. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket.
   5. Cables jackets that are chaffed or burned exposing internal conductor insulation or have any bare copper ("shiners") shall be replaced.
   6. Limit cable bends to a minimum radius of 4 times cable diameter except where otherwise noted herein.
   7. Refrain from exceeding fill ratio on horizontal cabling installations
   8. Service loop at ALL TERMINATIONS
   9. Provide slack, which is to be no less than 2.5" and no greater than 5.0", in the station cable at the station outlet end. The Work Area Outlet shall provide enough slack to be serviceable without excess.
   10. Service loop at outlet locations: Provide a (10') Ten Foot Slack Loop for all horizontal cabling.
   11. All data and voice station cable shall be terminated at the individual receptacle modules in accordance with ANSI/TIA-568-C, assignment T568B.

3.5 TESTING

A. All system cabling and terminations shall be installed in accordance with manufacturer's instructions and as indicated on Contractor's submittal documentation, prior to final acceptance/approval by the University.

B. Installation shall be performed and accomplished in a professional manner, by qualified personnel.

3.6 PERFORMANCE STANDARDS

A. Horizontal (Station) category 6A Copper cabling - Permanent Link
   1. Testing shall commence while the University's equipment in the area of service is operational and creating worst case emissions associated with its operation while in good working order. Every effort shall be made to include worst case influence on the materials installed shall be taken.

2. In accordance with the field test specifications defined in TIA-568-C.2 "Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard", every horizontal station cabling link in the project shall be tested for:
    a. Wire Map Length Insertion Loss NEXT Loss
    b. PS NEXT Loss
    c. ACR-F Loss
    d. PS ACR-F Loss
    e. Return Loss
    f. Propagation Delay
    g. Delay Skew

B. Using the listed category 6A cable test set, test installed cabling using Permanent Link procedure and submit report demonstrating that the link meets the following:
    1. Each permanent link shall demonstrate a positive PSACR beyond 350 MHz to meet and exceed the bandwidth requirements of TIA-568-C.2 Category 6A standards.
    2. Each permanent link shall demonstrate 2 dB of cross talk headroom over TIA -568-C.2 Category 6A standard for NEXT, PSNEXT, ELFEXT and PSELFEXT bit error rate.
    3. Report whether tested link passes or fails.
    4. Note exceptions to required Category standards. Remedy and retest.
    5. Test and report on each intermediate cabling segment separately, including station cabling, horizontal distribution (each segment, if multiple) and telecommunications room wiring.
    6. Test each end to end cable link
    7. Submit machine-generated documentation and raw data of all test results on Contractor-provided, and University's Representative approved, forms; and in electronic format approved by the University's Representative.
    8. Test station wire only after all pairs of station wire in a work area have been terminated at both ends, and no work of this Section or other Sections may cause physical disturbance to the wiring.
    9. Correct any and all transpositions found. Retest.
    10. If any conductor in a station wire tests either open or short, then the entire station wire is to be removed, replaced, and re-tested.
    11. The Contractor shall test all cables and submit all horizontal copper cable test result data in electronic format, with the resulting file formatted with one test result per 8.5"x 11" page. Export or Download the test results from the cable tester to a •.txt format or other accepted proprietary format for submission.
    12. Data found to be altered from the manufacturers recommended settings may result in retention by the University of a 3rd Party Test Company to retest the installed cabling at the expense of the Contractor.
    13. Events exceeding industry standards will cause the test result to be rejected. Direct review by UCD IT will be required to allow for an exception of a test result.
    14. Data found to be incomplete may result in retention by the University of a 3rd Party Test Company to retest the installed cabling at the expense of the Contractor.
    15. Contractor shall submit (1) copy of software capable of viewing the electronic test result files. Testing Results shall be reviewed and verified by the University before payments are remitted.

C. Test Equipment

1. Contractor shall provide all test equipment as required to perform the scope of work.
2. Test the communication systems cabling using at least one (1) each of the following test measurement devices or their functional equivalents:
    a. Level III field testers as defined in TIA-1152 - Fluke DSX-5000, or equal.
    b. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table 4 of TIA-1152
    c. The RJ45 test plug shall fall within the values specified in TIA-568-C Annex C for NEXT, FEXT and Return Loss.
    d. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters.
    e. In order to deliver optimum accuracy, permanent link interface adapter for the tester shall be used, which can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface.
    f. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor.
    g. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
    h. Site portable communications systems (walkie-talkie, cell phone, or similar to aid in communications between test device locations)

END OF SECTION