

ADDENDUM NO. 6

January 29, 2021

REQUEST FOR PROPOSALS (PROPOSAL DOCUMENTS)

FOR

**SCHOOL OF MEDICINE EDUCATION BUILDING II
PROJECT NO. 954045**



The following changes, additions, or deletions shall be made to the following documents as indicated for this Project; and all other terms and conditions shall remain the same. Each Proposer (Design Builder) is responsible for transmitting this information to all affected subcontractors and suppliers before the Proposal Deadline.

1. **REQUEST FOR PROPOSALS**

A. Proposal Schedule

Delete the "Proposal Schedule" and **replace** with the one issued in this Addendum.

Note: Oral Presentation times have been assigned to the Design Build Team.

B. Technical Proposal

Delete the "Technical Proposal" and **replace** with the one issued in this Addendum.

Note: Revisions were made to Tab 8.

C. Basis of Design

Delete the following page in the Basis of Design and **replace** with the one issued in this Addendum:

1. Page 5.0-29 of the 5.5 Plumbing Design Criteria.

D. General Requirements (Division 01)

1. Section 01 1400, Design Builder's Use of the Project Site

Delete "Section 01 1400, Design Builder's Use of the Project Site" and **replace** with the one issued in this Addendum.

2. Section 01 4000, Quality Requirements

Delete "Section 01 4000, Quality Requirements" and **replace** with the one issued in this Addendum.

3. Section 01 4100, Regulatory Requirements


Delete "Section 01 4100, Regulatory Requirements" and **replace** with the one issued in this Addendum.

E. Specifications (Divisions 02-33)

1. Section 220719, Plumbing Piping Insulation

Delete "Section 220719, Plumbing Piping Insulation" and **replace** with the one issued in this Addendum

2. DESIGN BUILDER QUESTIONS & ANSWERS

<p>Q76</p>	<p>During the walk with the Electrical shop, DB1 in the generator yard was opened. It notes "DP1" and "DP2". Please clarify where the DP1 and DP2 panelboards are located.</p> 
<p>A76</p>	<p>Per coordination with Facilities Services, DP1 panel feeds portion of the Arabidopsis building (west of existing cell tower- Lot 41) and Greenhouses 7 through 10 and is located in a vault at the north east corner of Greenhouse/ headhouse 10.</p> <p>DP2 panel feeds Greenhouses 15 through 17 and is located on the exterior east wall of Greenhouse/ headhouse 17.</p>
<p>Q77</p>	<p>Campus Standards Div 14 - Conveying Systems Section 1.1A.1 states, "Passenger elevators shall only be non-hydraulic, energy efficient machine-room-less style unless otherwise approved". Spec section 142100 - Electric Traction Elevators Section 2.3A states, "provide non-proprietary (generic) SCR-DC Processor." It is not possible to purchase a Machine-Room-Less (MRL) Elevator with with a non-proprietary controller. This is due to the complexity of the MRL equipment. Please advise if it is acceptable to provide a standard elevator with a machine room. Note that there are Campus Standards specs for Machine Room Elevators in Campus Standards Div 14 - Conveying Systems Section 1.1F Machine Room Equipment, but it requires approval.</p>
<p>A77</p>	<p>Machine room elevators are acceptable.</p>
<p>Q78</p>	<p>Please clarify the following regarding underground piping and soil settlement.</p> <ol style="list-style-type: none"> 1. The requirement for trace wire is indicated in the BOD, Section 5.5.3.3 "Piping in Ground Below On-Grade Structural Floor Slabs" and is noted to be installed to locate piping and indicate pipe depths to determine if there has been any settlement issues. If there is no concern with settlement in this area, can the tracer wire be removed from the scope?

	<p>2. Per Addendum 03, question 03 response, there is no need for installation of pipe hangers and supports for underground piping if settlement is confirmed to not be a concern. Please confirm if flex joints will also not be required.</p>
A78	<p>1. If there are no settlement concerns, tracer wire may be removed for “Piping in Ground Below On-Grade Structural Floor Slabs” per BOD section 5.5.3.3. Tracer wire will be required in all other applications.</p> <p>2. If there are no settlement concerns, flex joints are not required for “Piping in Ground Below On-Grade Structural Floor Slabs” per BOD section 5.5.3.3.</p>
Q79	<p>1. Section 5.5.3.2 of the BOD indicates that only domestic hot water supply and return piping shall be insulated, but specification section 22 0719 -Plumbing Piping Insulation (sections 1.1 - Summery and 2.15 Indoor Piping Insulation Subsection A) indicates for cold water piping to be insulated. Please clarify which document to follow.</p> <p>2. Specification section 22 0719 also indicates in section 3.15 to insulate stormwater drain piping including the overflow piping and roof drain bodies. It is not standard practice to insulate these items (other than where AHU condensate is drained) and is also not indicated in section 5.5.3.2 in the BOD to require insulation. Please clarify if the stormwater drain system requires insulation.</p>
A79	<p>1. Domestic cold-water pipes do not need to be insulated. See specification section 220719, Plumbing Piping Insulation reissued as part of Addendum No. 6.</p> <p>2. Stormwater pipes do not need to be insulated. See specification section 220719, Plumbing Piping Insulation reissued as part of Addendum No. 6.</p>
Q80	<p>BOD Section 5.5.3.3 "Piping in Ground Below On-Grade Structural Floor Slabs" indicates a requirement for shut-off valves in a yard box for underground connection to street or underground service at any new POC. Please clarify if this requirement includes storm drainage and sanitary sewer piping as this is not standard practice. For domestic cold water to the building, a SOV is included at the POC in the street and at the backflow devices and pressure reducing valves before the domestic water enters the building. Please confirm if another SOV in a yard box is required prior to the line entering the building.</p>
A80	<p>Stormwater pipes and sanitary sewer pipes do not need shut off valves.</p> <p>An additional Shut off valve in a yard box for domestic cold water prior to the line entering the building is not required.</p>
Q81	<p>BOD Section 5.6.2.4 notes that ten 65" min. flat display panels displays are required for the Active Learning Classroom. The Room Data Sheet on page 6.0-19 indicates that the displays are to be retractable at the tables. A 65" display seems rather large for people sitting directly in front of it. Please confirm it is UCR's intent to have 65" displays at each table and that they are to be retractable.</p>

	<p>The diagram illustrates a room layout with the following components labeled:</p> <ul style="list-style-type: none"> CEILING MOUNTED PROJECTORS AND SCREENS (GROUP 2): Two projectors are shown at the top, with dashed lines indicating their projection areas onto the tables below. LECTERN WITH DATA CONNECTION (GROUP 2): A lectern is positioned at the top center of the room. WALL MOUNTED WRITABLE SURFACE (GROUP 1): Two rectangular surfaces are mounted on the right wall. RETRACTABLE DISPLAY (GROUP 1): Two small rectangular displays are shown on the right side of the room, one near each wall-mounted surface. MOVABLE TABLES WITH MICROPHONES AND CHAIRS (GROUP 1): Ten tables are arranged in two rows of five. Each table is equipped with a microphone and several chairs.
<p>A81</p>	<p>The intent is for display panels to be retractable at the table. A minimum size of 32” display panels at the table are acceptable.</p>
<p>Q82</p>	<p>What is the procedure to drop off the technical proposal submittal (presentation boards, models etc.) and the lump sum-based price proposal?</p>
<p>A82</p>	<p>Technical Proposal submittal and Lump Sum Base Price Proposal submittal will be received only at University of California, Riverside, Planning, Design & Construction, 1223 University Avenue, Suite 240, Riverside, CA 92507. Proposers are to email Betty Osuna, betty.osuna@ucr.edu to set up a time to drop off the Technical Proposal submittal and the Lump Sum Base Price Proposal submittal. Please refer to the Proposal Schedule for submittal due dates and times issued with Addendum No. 6.</p>

END OF ADDENDUM

PROPOSAL SCHEDULE

	ACTIVITY	DATE	TIME
A	The RFP will be available to Prequalified Proposers, subcontractors and design consultants.	Tuesday, November 10, 2020	2:00 PM
B	<p>Pre-Proposal Conference – Mandatory for all Prequalified Proposers. Only Proposers (Design Builders) who participate in the pre-proposal Zoom conference in its entirety, will be allowed to propose on the project.</p> <p>Participants shall meet via Zoom: https://ucr.zoom.us/j/93778516293 Meeting ID: 937 7851 6293 (669) 900-6833</p>	Friday, November 13, 2020	10:00 AM
B1	Optional Site Visit - Participants must arrive at University of California, Riverside, School of Medicine Education Building I, Modular Building Area, Riverside, CA 92507 at or before the established time.	Tuesday, December 8, 2020	10:00 AM – 1:00 PM
C	The University will hold confidential One-on-One meetings with each Proposer prior to the Technical Proposal Submittal for the purpose of answering questions, clarifying RFP and program requirements, reviewing and validating preliminary designs etc. The meeting will be conducted via Zoom. Proposers will be assigned a Zoom Meeting ID to their One-on-One Zoom meetings.	Monday, November 23, 2020	7:30 AM – 10:00 AM (Hathaway Dinwiddie) 11:15 AM - 1:45 PM (Hensel Phelps) 3:00 PM – 5:30 PM (Swinerton Builders)
		Wednesday, December 16, 2020	8:30 AM – 11:00 AM (Hensel Phelps) 1:30 PM - 4:00 PM (Swinerton Builders)
		Thursday, December 17, 2020	8:30 AM – 11:00 AM (Hathaway Dinwiddie)
		Wednesday, January 13, 2021	8:30 AM – 11:30 AM (Swinerton Builders) 1:30 PM - 4:30 PM (Hathaway Dinwiddie)
		Thursday, January 14, 2021	8:30 AM – 11:30 AM (Hensel Phelps)

D	<p>Technical Proposal Submittal is due from Proposers and will be received only at University of California, Riverside, Planning, Design, & Construction, 1223 University Avenue, Suite 240, Riverside, CA 92507. Proposers are to email Betty Osuna, betty.osuna@ucr.edu to setup a time to drop off proposal. The Technical Proposal Submittal is defined in the <i>Technical Proposal</i>.</p>	<p>Thursday, February 4, 2021</p>	<p>2:00 PM</p>
E	<p>Lump Sum Base Price Proposal Submittal is due from Proposers and will be received only at University of California, Riverside, Planning, Design & Construction, 1223 University Avenue, Suite 240, Riverside, CA 92507. Proposers are to email Betty Osuna, betty.osuna@ucr.edu to setup a time to drop off proposal. The Lump Sum Base Price Proposal Submittal is defined in the <i>Lump Sum Base Price Proposal</i>.</p>	<p>Friday, February 5, 2021</p>	<p>2:00 PM</p>
F	<p>The University's Technical Review Committee will meet to review timely submitted Technical Proposals as described in the Proposal Evaluation Process document.</p>	<p>Tuesday, February 16, 2021 Wednesday, February 17, 2021 and Thursday, February 18, 2021</p>	<p>8:00 AM – 5:00 PM</p>
G	<p>Proposers shall make an Oral Presentation and describe the best value aspects of their proposals. Cost shall not be discussed during the Oral Presentation.</p>	<p>Friday, February 19, 2021</p>	<p>7:30 AM – 10:00 AM (TBD) (<u>Swinerton Builders</u>) 10:30 AM – 1:00 PM (TBD) (<u>Hathaway Dinwiddie</u>) 2:00 PM – 4:30 PM (TBD) (<u>Hensel Phelps</u>)</p>
H	<p>Timely submitted Lump Sum Base Price Proposals shall be publicly opened via Zoom call (Pending COVID-19 protocols)</p> <p style="text-align: center;">https://ucr.zoom.us/j/94523824846 Meeting ID: 945 2382 4846 (669)900-6833</p> <p>The University will acknowledge the timely receipt of submittals and whether or not the submittals appear to be responsive. No cost or point scoring information will be disclosed to the public at this time.</p>	<p>Monday, February 22, 2021</p>	<p>2:00 PM</p>
I	<p>The University will issue Notice to Proceed - Phase 1 to the successful Proposer.</p>	<p>Monday, March 22, 2021</p>	

Late Proposals: Any proposal, modification, or revision that is received at the designated University of California, Riverside, Planning, Design & Construction location after the exact time specified for receipt of proposals is “late” and will not be considered unless it was the only proposal received. Late proposals and modifications that are not considered will be held unopened, unless opened for identification, and then returned to the Proposer after award.

TECHNICAL PROPOSAL

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TECHNICAL PROPOSAL SUBMITTAL CHECKLIST

- Submittal in a separate sealed container identifies the: Project Name & Number, Submittal Date, Technical Proposal Submittal, and Identification Number. Submittal is properly addressed and delivered.
- One (1) original and fifteen (15) copies of the written portion of the TECHNICAL PROPOSAL. Include:
 - Electronic copy in PDF format on a Memory Stick
- One (1) set of up to no more than fifteen (15) PRESENTATION BOARDS, not larger than 30" x 42". Include:
 - Copies of boards within the Technical Proposal binder as 11" x 17" sheets
 - Electronic copy in PDF format on a Memory Stick
- One (1) bound set of the SCHEMATIC DESIGN SUBMITTAL shall be submitted not smaller than 30" x 42". Include:
 - Within the Technical Proposal binder as 11" x 17" sheets
 - Electronic copy in PDF format on a Memory Stick
- One (1) study model - Sized according to Attachment A (Model Site Extents)

1. TECHNICAL PROPOSAL SUBMITTAL

Proposers shall submit a Technical Proposal conforming to the format outlined herein and shall provide all requested information. **FAILURE TO COMPLY WITH THE REQUIRED FORMAT AND/OR PROVIDE THE INFORMATION REQUESTED MAY RESULT IN A NON-RESPONSIVE SUBMITTAL.**

Technical Proposals may be comprised of design narratives, drawings (no larger than 30" x 42"), presentation boards, study model to illustrate integration with existing buildings and site (no larger than 36"L x 30"W x 24"H (Scaled to fit site extents outlined in Attachment A) outline specifications, preliminary sizing calculations, catalog cut sheets, and other information as required and appropriate. **ALL REFERENCES THAT MAY IDENTIFY THE DESIGN BUILD TEAM SHALL BE REMOVED.**

1.1 *Technical Proposal Delivery*

.1 Proposal Delivery Date:

Refer to the Proposal Schedule for the Technical Proposal Submittal due date and time.

.2 Marking and Identification of Submittals

Proposer shall clearly mark the outside of each package to identify the following:

Project Name: **School of Medicine Education Building II**

Project Number: 954045

Marked: "Technical Proposal Submittal"

Date of Submittal:

Design Builder Identification Number:

If the Proposals are sent by mail, courier or delivery service, the sealed package shall be marked with the notation "SEALED PROPOSAL ENCLOSED" on the face thereof.

.3 Designated Location for Receipt of Technical Proposals

Proposer shall assume full responsibility for timely delivery of proposals. Proposals shall be properly addressed to be received at:

University of California, Riverside
Planning, Design & Construction Department
1223 University Ave, Suite 240
Riverside, CA 92507
Attention: Betty Osuna

Proposers are to email Betty Osuna, betty.osuna@ucr.edu to setup a time to drop off Technical Proposal.

LATE PROPOSALS: ANY PROPOSAL, MODIFICATION, OR REVISION, THAT IS RECEIVED AT THE DESIGNATED UCR PLANNING, DESIGN & CONSTRUCTION LOCATION AFTER THE EXACT TIME SPECIFIED FOR RECEIPT OF PROPOSALS IS "LATE" AND WILL NOT BE CONSIDERED UNLESS IT WAS THE ONLY PROPOSAL RECEIVED. LATE PROPOSALS AND MODIFICATIONS THAT ARE NOT CONSIDERED WILL BE HELD UNOPENED, UNLESS OPENED FOR IDENTIFICATION, AND THEN RETURNED TO THE PROPOSER AFTER AWARD.

.4 Technical Proposal Delivery Methods (*See marking instructions in 1.1.2 above*)

- a. Mail
- b. Courier (Hand Delivery)
- c. Delivery service

- .5 Unacceptable Delivery Methods
 - a. Oral
 - b. Telephonic
 - c. Facsimile
 - d. Email or other electronic means

1.2 **Technical Proposal Submittal Instructions**

.1 Required Copies

One (1) original and fifteen (15) copies of the written portion of the Technical Proposal shall be submitted in sealed boxes, envelopes, or other appropriate sealed containers. Include **one (1) electronic copy** of the written portion of the Technical Proposal and presentation boards (**in PDF format saved on a memory stick**).

.2 Technical Proposal Format

All Technical Proposals shall be submitted in 11" x 17" 3-ring or spiral bound binders. Items not physically suitable for inclusion may be submitted separately with a clear proposal reference to the separately furnished items.

ALL NARRATIVES WITHIN THE TECHNICAL PROPOSAL SHALL BE TYPED IN TIMES NEW ROMAN OR A COMPARABLE FONT THAT IS EASY TO READ UTILIZING 11 POINT FONT OR LARGER.

.3 Design Builder Identification Number

Prior to the Technical Proposal submittal, the University will assign a Design Builder Identification Number to each Proposer. The Design Builder Identification Number shall be used by each Proposer to identify its Technical Proposal submittal.

Blind Evaluation: To provide an impartial review of each Proposer's Technical Proposal submittal, the Technical Evaluation Committee will conduct a Blind Evaluation. Therefore, **the entire contents of the Technical Proposal submittal shall have all references to the Proposer's identity removed**. All references that may identify the Design Build Team including, but not limited to, firm or team names, staff identification, consultant identification, addresses, telephone numbers, logos, photographs or renderings (depicting persons on the team or logos) letterhead, stationary, binders, or business cards or specifics about the firm or its size and history shall be removed.

1.3 **Presentation Boards Submittal Requirements**

- .1 Submit **one (1)** set of up to, but **no more than fifteen (15)** presentation boards, not larger than 30" x 42" with the following:
 - a. Construction Site Logistics – Indicate staging, colocation, tree protection, fencing, parking, fire access, vehicular and pedestrian access/patterns, pedestrian safety accommodations, acoustic barriers, and camera locations during all phases of construction.
 - b. Vicinity Plan - Color rendered showing proposed building in relation adjacent campus spaces.
 - c. Site Plan – Color rendered indicating landscape/hardscape around building and showing:
 - i. Landscape features shall include trees, shrubs, ground covers, special fill areas and lawns, if any.
 - ii. Hardscape features shall include roadway, service and loading dock parking, plazas, retaining and landscape walls, and site lighting. Include access/patterns for ADA, pedestrian circulation, bike paths, public transportation, emergency vehicle access, and fire hydrants.
 - iii. Include all above-grade utilities, if any.

- d. Perspectives:
 - i. Two (2) color rendered perspectives of building exterior.
 - a) Facing South West
 - b) Facing North East
 - ii. One (1) color rendered perspective outdoor plaza demonstrating spatial relationship between existing buildings and School of Medicine Education Building II.
 - iii. One (1) color rendered perspective of main entrance lobby interior.
 - iv. One (1) color rendered perspective to demonstrate key academic program spaces.
 - v. One (1) color rendered perspective to demonstrate open study program spaces.
 - vi. One (1) color rendered perspective to demonstrate the loading dock and service access.
 - vii. One (1) color rendered perspective chosen by the Design Builder to demonstrate key features of their design.
 - e. Floor Plans, Sections and Elevations – Color rendered plans indicating program elements such as circulation, spatial relationships.
 - f. Material Board – Provide samples of actual interior and exterior materials.
 - g. All design elements depicted in the Technical Proposal, renderings, schematic drawings and presentation boards shall be considered to be included in the Proposal and the Lump Sum Base Price Proposal.
 - h. A fly-through is not required for the project.
- .2 Include copies of boards not smaller than ½ size scale drawings within the Technical Proposal binder **AND ELECTRONICALLY ON A MEMORY STICK (in PDF format)**.

1.4 Study Model

Each Proposer shall provide a study model of their proposed project design with the content and format as described:

- .1 Study Model
 - a. Approximate Size = 36”L x 30”W x 24”H.
 - b. Model to illustrate integration and relationships with existing buildings with spaces. All buildings and spaces within this area shall be included.
 - c. Model sized and scaled to fit site extents identified per Attachment A.

1.5 Technical Proposal Scoring

The Technical Proposal will be scored as follows:

Description	Points Available
Executive Summary	0
TAB 1 – Architectural Design	95
TAB 2 – Program Functionality	55
TAB 3 – Project Program Compliance	Pass/Fail
TAB 4 – Site, Civil, and Circulation Design	45
TAB 5 – Mechanical, Electrical, AV-IT, and Plumbing Systems Design	40
TAB 6 – Sustainability Features Incorporated into Design and LEED Gold Scorecard	15
TAB 7 – Structural Design	Pass/Fail
TAB 8 – Group 2 <u>1</u> & 3 <u>2</u> Furniture Design and Selections	15
TAB 9 – Enhancements and Added Value	20
TAB 10 – Alternates	25
TAB 11 – Project Schedule & Work Plan	20
TAB 12 – Mitigation of Subsurface Conditions and Negative Construction Impacts	20
TAB 13 – Co-Location and Staffing Plan	15
TAB 14 – Quality Control Plan	15
TAB 15 – Deviations from Request for Proposal	Pass/Fail
Oral Presentation	20
Subtotal:	400
Best and Final Offer (if necessary)	40
Total:	440

2. TECHNICAL PROPOSAL SUBMITTAL

Each Proposer shall provide the following information in the content and format as described. Proposal shall be indexed with tabs numbered and labeled in **bold type** denoting the sections. Narratives may incorporate graphic information and/or presentation boards.

EXECUTIVE SUMMARY

0 POINTS

Suggested Text Length: 1 – 2 pages

The Executive Summary should stand on its own to convey the primary design, program and technical elements of your proposal that clearly and collectively demonstrate why your project approach represents the overall **best value** to the University.

TAB 1

95 POINTS

Suggested Text Length: 1 – 10 pages

ARCHITECTURAL DESIGN

Proposer shall:

- A. Identify the design context and philosophical design intent.
- B. Demonstrate how the proposed design:
 - 1. Achieves the architectural goals outlined in the Basis of Design and is consistent with the *UC Riverside Physical Design Framework*.
 - 2. Provides building spaces that integrate and expand innovative learning into the medical student experience.
 - 3. Incorporates the following elements:
 - i. Architectural themes and materials consistent with the contextual design principles of the campus.
 - ii. A clear and identifiable building entrance with a usable entry/lobby space to create a distinctive presence for student and faculty
 - iii. The use of architectural elements and space to create way finding in and around the building without complete dependence on signage.
 - iv. The use of architectural planning to create integrated accessways, introducing dynamic activity in underutilized pathways and creating a consistent architectural vocabulary with the building's surroundings.
 - v. Building siting and design that will integrate the natural topography of the site with the design of the adjacent buildings and campus surroundings.
 - vi. Development of a central quad that connects different buildings of scientific disciplines to foster informal interaction between disciplines, and offers flexibility for formal events and ceremonies
 - vii. Incorporate indoor/outdoor connections that create spatial relationships between the campus context and the building program.
 - viii. The use of natural light for building occupant comfort and connection with the environment.
 - ix. Functional and inviting exterior public spaces, plazas, courtyards, (solar orientation, wind, and engagement with adjacent buildings).
 - x. Durability and extended deferred maintenance with quality construction.
 - xi. Building facades that are an expression of basic structure with evident organizing principles and a lack of gratuitous ornament.
 - xii. Other architectural design and aesthetic considerations.

TAB 2

55 POINTS

Suggested Text Length: 1 – 5 pages

PROGRAM FUNCTIONALITY

Proposer shall demonstrate how space and functional configurations, adjacencies, and room layouts:

- A. Achieves the desired space, performance and outcomes referenced in the Basis of Design.
- B. Enable the school to create new educational pathways and partnerships to expand its undergraduate medical student enrollment.
- C. Integrate innovative teaching and learning technologies to adapt to evolving pedagogies of the medical sciences.
- D. Seamlessly connect the offices for faculty with the spaces for academic interaction in a manner that supports small group interactions and informal interactions between students and faculty.

- E. Allow for an environment that provides a flexible framework for future programmatic adjustments.
- F. Facilitate high quality lifelong learning for the evolving public health professional and meets the needs of the wider campus community.
- G. Optimize building circulation, program adjacencies and space utilization to create an efficient programmatic layout that is simple, intuitive and minimizes congestion.
- H. Create efficient and highly functional service access corridor and loading dock that conceals itself within the building architecture.
- I. Create a universal design that has equitable access to all the programmatic functions of the building.
- J. Enhance considerations for building systems including acoustical, audio/visual, conveying systems, etc., and other technical challenges.

TAB 3

PASS/FAIL

Suggested Text Length: 1 page (excluding matrix)

PROJECT PROGRAM COMPLIANCE

Proposer shall demonstrate compliance with the School of Medicine Education Building II Program by submitting the required Basis of Design Compliance Matrix and specifying the assignable square footage for each space and unit.

A REDUCTION GREATER THAN 5% OF THE ASSIGNABLE SQUARE FOOTAGE FOR EACH SPACE WILL RENDER THE PROPOSAL NON-RESPONSIVE

TAB 4

45 POINTS

Suggested Text Length: 1 – 6 pages

SITE, CIVIL AND CIRCULATION DESIGN

Proposer shall:

- A. Demonstrate how the proposed site, civil and circulation designs are responsive to the Project Site Analysis and consistent with the Site Plan Concept.
- B. Demonstrate that the proposed **site design** includes:
 - 1. Innovative and cost-effective solutions to design and construct the site, building, and systems.
 - 2. Optimum use of outdoor spaces to take advantage of the southern California climate.
 - 3. Enhance campus pedestrian and visual connections with adjacent buildings & induce activity in to underutilized open spaces.
 - 4. Create a highly functional and efficient loading dock, service access corridor and back-of-house access that are screened from view with minimal visual impact to adjacent public plazas and walkways.
 - 5. Site design that (a) promotes an environment of health and well-being for the campus community, (b) creates a collegiate spirit of place and (c) integrates with campus connections.
 - 6. Creates flexible interaction spaces for faculty and students that can be adopted for formal events.
 - 7. Landscape design that is efficient in irrigation, conducive to Riverside's climate, low maintenance and sustainable.
 - 8. Other architectural, landscape, hardscape, circulation design and aesthetic considerations.
- C. Demonstrate that the proposed **civil design** includes:
 - 1. Innovative use of the existing topography, drainage, and soil.

2. An efficient site utility design that includes considerations to mitigate negative impacts on existing utilities, campus grounds, adjacent buildings, and communities.
- D. Demonstrate that the proposed **circulation design** is consistent with the UC Riverside Physical Design Framework and includes:
1. Efficient interface with existing campus circulation pathways, vehicular access, building services and emergency access.
 2. Compliance with all accessibility codes and other applicable documents referenced in the Request for Proposal.

TAB 5

40 POINTS

Suggested Text Length: 1 – 4 pages

MECHANICAL, ELECTRICAL, AV-IT AND PLUMBING SYSTEMS DESIGN

Proposer shall include a description of the proposed mechanical, electrical, AV-IT, and plumbing designs and identify their features and system advantages; and demonstrate that they will:

- A. Meet or exceed the requirements of the Basis of Design, Specifications, campus energy goals for net zero carbon emissions, and campus Building Energy Efficiency Standards.
- B. Provide durability, ease of maintenance, aesthetic, and energy efficiency/conservation considerations.
- C. Support the acoustic and sustainable requirements of the project.
- D. Provide future flexibility of systems as the building program requirements and needs changes.

TAB 6

15 POINTS

Suggested Text Length: 1 – 5 pages (excluding scorecard)

SUSTAINABILITY FEATURES INCORPORATED INTO DESIGN AND LEED GOLD SCORECARD

Proposer shall:

- A. Demonstrate how the proposed design incorporates sustainability features outlined in the RFP, including:
 1. Reduction of the carbon footprint.
 2. Achievement of LEED v4 Gold certification or higher.
 3. Alternative means and methods to provide the required building(s) energy performance.
- B. Submit LEED scorecards indicating which credits would be pursued for LEED v4 Gold, or higher certification.

TAB 7

PASS/FAIL

Suggested Text Length: 1 – 4 pages

STRUCTURAL DESIGN

Proposer shall:

- A. Include a description of the proposed structural design and identify proposed materials and system advantages.
- B. Demonstrate that the proposed structural design:
 1. Will meet or exceed the requirements of the Request for Proposal requirements, including, but not limited to the California Building Code and University of California Seismic Safety Policy.
 2. Includes considerations for wind, vibration, and deflection control.

TAB 8

15 POINTS

Suggested Text Length: 1 – 5 pages

GROUP 2 1 & 3 2 FURNITURE DESIGN AND SELECTIONS

Proposer shall demonstrate how design, selections, and functional configurations:

- A. Achieve the desired performance, capacity and outcomes referenced in the Basis of Design.
- B. Furniture selections are cohesive to the architectural design of the spaces.
- C. Furniture selection and performance has been designed with due consideration for the required interfaces (if any) with electrical, AV and data infrastructure and equipment.
- D. Selections are durable, low maintenance and conform to all ADA and building code requirements.

TAB 9

20 POINTS

Suggested Text Length: 1 – 4 pages (excluding matrix)

ENHANCEMENTS AND ADDED VALUE

Proposer shall:

- A. Project Enhancements and Added Value Matrix listing project enhancements. Project enhancements provide the University with added value to the base bid requirements, at no additional cost.
- B. Demonstrate that the proposed design, materials, and construction quality exceed the requirements of the base bid. Include details on proposed manufacturers or products, their advantages, and all associated materials and applications, if applicable.

ENHANCEMENTS AND ADDED VALUE	
ITEMIZED LIST OF ENHANCEMENTS	DESCRIPTION

TAB 10

25 POINTS

Suggested Text Length: 1 – 4 pages (excluding matrix)

ALTERNATES

Proposer shall:

- A. Submit the Alternates. Indicate whether project alternates are included in the base bid at no additional cost.
- B. For each alternate description, include details on proposed manufacturers or products, their advantages, and all associated materials and applications, if applicable.

PROJECT ALTERNATES MATRIX ¹ (TAB 10)		
ALTERNATES		
ALTERNATE No.	ALTERNATE DESCRIPTION	INCLUDED IN BASE BID?
1	Inclusion of Additional Small and Medium Study Rooms (Individual or Small Group Use)	YES <input type="checkbox"/> NO <input type="checkbox"/>

¹ Suggested Format

2	Solar Electrical Power	YES <input type="checkbox"/>	NO <input type="checkbox"/>
3	Inclusion of Additional Academic Private Offices, Workstations, and Conference Room	YES <input type="checkbox"/>	NO <input type="checkbox"/>
4	Warranty Management Program	YES <input type="checkbox"/>	NO <input type="checkbox"/>
5	LEED Platinum Certification	YES <input type="checkbox"/>	NO <input type="checkbox"/>

TAB 11

20 POINTS

Suggested Text Length: 1 – 5 pages (excluding schedule)

PROJECT SCHEDULE & WORK PLAN

Proposer shall:

- A. Submit a **Work Plan** demonstrating how it intends to staff and manage tasks and resources necessary to accomplish the work, commencing with the Notice to Proceed and ending with the Completion of Construction by **June 10, 2023**.
 - 1. Identify the project approach and address:
 - i. Key elements of project management and administration (staffing plan - **BY TITLE ONLY**).
 - ii. Strategies for addressing and overcoming potential project constraints and challenges associated with each project phase including mobilization, parking, sequencing of activities with other concurrent campus projects and the university calendar.
 - iii. Strategy to minimize construction impact on the surrounding site. Sequence of Work with minimal interruption for the surrounding community, specifically the occupied facilities immediately adjacent to the site.
 - iv. Strategy to minimize impact of utility shutdowns to research facilities with sensitive equipment.
 - v. Maintaining security of spaces during construction.
 - vi. Adopting safety precautions throughout the project duration for building and construction staff safety.
 - vii. Adopting a safety strategy and precautions for pedestrian traffic to the occupied surrounding buildings.
 - viii. Environmental mitigation measures around laydown area.
- B. Submit a **Preliminary Schedule** that is consistent with the Work Plan and identifies:
 - 1. The approach to the fast-track design and construction of the project.
 - 2. Significant contract activities including shoulder-to-shoulder sessions, and procurement activities and durations, including the activities required to complete the Construction Documents and obtain required approvals.
 - 3. The division of work by construction drawing packages (up to six (6) Construction Document Packages) with a breakdown of drawings and specification sections to be included in each package. Specify how the design package strategy contributes to successful schedule implementation.

TAB 12

20 POINTS

Suggested Text Length: 1 – 2 pages

MITIGATION OF SUBSURFACE CONDITIONS AND NEGATIVE CONSTRUCTION IMPACTS

Proposer shall demonstrate that it will minimize or eliminate the risk of increased costs or adjustments to the Contract Time with consideration of the following:

- A. Excavation and grading requirements including proposed shoring and monitoring of existing structures.

- B. Underground utility identification, relocation, and/or removal.
- C. Electrical connection to existing tunnel and vault system.
- D. Existing groundwater conditions. Description includes discussion of potential mitigation of shallow groundwater conditions including the need for dewatering and the potential use of excavated soils as backfill.
- E. Existing geotechnical conditions including the presence of groundwater, rock, or fill.
- F. Subsurface contamination.
- G. Mitigation of construction noise, vibration, dust, etc. affecting surrounding community.
- H. Minimize or mitigate site impacts (access and visual impacts) to surrounding campus, and to occupied adjacent facilities.

TAB 13

15 POINTS

Suggested Text Length: 1 – 4 pages

CO-LOCATION AND STAFFING PLAN

The Proposer shall:

- A. Demonstrate compliance with Division 01, Section 01 4900 Co-Location Requirements and include descriptions of:
 - 1. Location of the temporary co-location facility.
 - 2. A diagram of the physical layout of the temporary co-location facility including identification of assigned spaces.
 - 3. Layout and space assignments shall facilitate efficient partnering and placement of project planning, design, engineering, construction, and inspection staff.
- B. A list of all staff personnel (**by title/position and discipline only**), duties, and project assignment durations for which they will participate in the co-location program.
- C. Plans and strategy to meet compliance of federal, state and local ordinances for social distancing and safety guidelines.

TAB 14

15 POINTS

Suggested Text Length: 1 – 3 pages

QUALITY CONTROL PLAN

The Proposer shall:

- A. Demonstrate compliance with Division 01, Section 01 4000 Quality Requirements and include descriptions of:
 - 1. The organizational and reporting relationships of the project team members responsible for quality control. Submit a table indicating quality control resource loading through completion of the Project.
 - 2. Quality control procedures during design and construction document development (include internal QC and CDA processes) to assure compliance with program requirements and avoid scope expansion.
 - 3. Quality control procedures to facilitate a campus permit review process for design and construction drawings, including multiple reviewers (campus stakeholders, peer reviewers, and Authorities Having Jurisdiction).
 - 4. Quality control procedures for mock-ups for the University to make final materials selections and establish the quality of construction that will be incorporated into the Work.

B. Submit a Tracking and Compliance Log that includes the incorporation of University comments during the review and approval process.

TAB 15

PASS/FAIL

DEVIATIONS FROM REQUEST FOR PROPOSAL

Proposers shall submit the Deviations Matrix, (located at the end of *Tab 15*, to summarize each instance where the Lump Sum Base Price Proposal, or Alternate Pricing deviates from the requirements established in the Proposal Documents. Absent an appropriate reference in the Deviations Matrix, the University will assume that the Design Builder will comply with all the specific requirements of the Proposal Documents during both the design and construction phases of the project.

The Lump Sum Base Price Proposal and Alternate Prices shall include the cost of all proposed deviations from the Proposal Documents. Deviations from the Proposal Documents will not be allowed without prior written approval from Planning, Design and Construction. After the Award of Contract, proposed product substitutions shall be made according to Division 01 Section 01 6000, Product Requirements.

DEVIATIONS MATRIX² (TAB 15)

(Deviations from Specifications and/or Request for Proposal)

SPECIFICATION SECTION/CAMPUS STANDARDS AND BASIS OF DESIGN		
ITEM DESCRIPTION	DESCRIPTIVE DETAILS	IMPACT OR EFFECT ON PROJECT DESIGN

² Suggested format

ORAL PRESENTATION

20 POINTS

Proposer shall make an oral presentation of its proposal following the University's evaluation of Technical Proposals and prior to the public opening of the Lump Sum Base Price Proposals. However, if at the conclusion of the evaluation of Technical Proposals, the University determines that requesting a BAFO would be in its best interests, the University will defer the oral presentation and proceed directly to a BAFO process. The University may elect to request written proposal clarifications from the Proposers prior to holding BAFO discussions.

During the oral presentation, Proposers will be allowed 30 minutes to present the most important aspects of their proposals and 1 hour and 30 minutes to answer questions and provide clarifications requested by the Technical Evaluation Committee. Discussions may cover any of the requirements described in the Request for Proposal.

Proposed cost shall not be discussed during the oral presentation. The University's summation of Proposal Clarifications shall be accepted by signature of selected Proposer and incorporated into their Proposal by reference.

BEST AND FINAL OFFER (BAFO)

40 POINTS

The University may determine that clarifications to the initial proposals and additional discussions with the Proposers are necessary to obtain proposals that are responsive with respect to program and cost requirements, and to optimize the ability to obtain best value for this project. In this case, the University will conduct discussions with each Proposer following the technical evaluation with the intent of allowing the Proposers to submit a BAFO. The University will request BAFO submittals from the Proposers to clarify and document understandings reached during discussions. Instructions for the BAFO submittals including the deadline, format, and content requirements will be issued in writing by the University.

The BAFO submittal will consist of two components:

- A. A revised Technical Proposal or Technical Proposal supplement covering all additions, changes, or clarifications to the original technical submittal. Revised drawings, presentation boards and other supplements may also be submitted as appropriate and in accordance with the University's written instructions for the BAFO submittal.
- B. A revised Lump Sum Base Price Proposal, Lump Sum Base Price Proposal Spreadsheet, and a new Proposal Security, in accordance with the University's written instructions for the BAFO submittal.

3. SCHEMATIC DESIGN SUBMITTAL REQUIREMENTS

The following drawings shall be submitted; 1) as **one (1)** bound set not smaller than 30" x 42", 2) within the Technical Proposal binder as 11" x 17" sheets, and 3) **ELECTRONICALLY ON A Memory Stick (in PDF format)**:

Drawings shall be collated using the University Furnished Title Block.

SHEET	SCALE
.1 Demolition Plan	None
.2 Grading and Drainage Plan	None
.3 Site Plan	1" = 20'
.4 Landscape and Hardscape Construction Plan	1" = 20'
.5 Conceptual Structural Plan	1/16" = 1'
.6 Architectural	
1) Code Information Plans (All Levels and Roof)	1/16" = 1'
2) Floor Plans (All Levels and Roof)	1/8" = 1'
3) Roof Plan	1/8" = 1'
4) Conceptual Reflected Ceiling Plans	1/16" = 1'
5) Exterior Elevations	1/8" = 1'
6) Building Sections	1/8" = 1'
7) Enlarged Partial Exterior Building Elevations	1/4" = 1'
8) Typical Exterior Details	1/2" = 1'
9) FF&E	1/8" = 1'
.7 Mechanical Conceptual Floor Plans and Roof Plans	1/8" = 1'
.8 Electrical Conceptual Floor Plans, Roof Plans, and Single Line Diagrams	1/8" = 1'
.9 Audio- Visual Conceptual Floor Plans, Equipment Lists and Schematics	1/8" = 1'
.10 Telecommunication, Security, and Access Control Floor Plans, Equipment Lists and Schematics	1/8" = 1'
.11 Group 2 & 3 Furniture layouts and selection (included in the base bid)	1/8" = 1'

.1 Demolition Plans:

- a. Sequence for demolition; including locating, identifying, disconnecting, sealing / capping / safeing-off, and protecting utility services.
- b. Locations of temporary dust and noise control partitions and means of egress relative to adjacent communities.
- c. Path of hazardous and non-hazardous waste removal.

.2 Grading and Drainage Plan:

Storm Water Pollution Prevention Plan (SWPPP) compliance and other environmental mitigation measures, including:

- a. Locations of drain inlets used to capture sheet flows. Include inlet protection measures, if required.
- b. Finished ground contours and spot grade elevations as required for ridge lines, flow lines, or grade breaks.
- c. Best Management Practices required for limiting erosion of graded slopes and controlling sediment entering storm drain inlets. Show gravel bags, straw wattles, silt fencing, or other devices, if any.

.3 Site Plan

Illustrate relationships with existing site elements and buildings, and include:

- a. Location of proposed building and pedestrian walkways in relation to adjacent buildings.
- b. Location and descriptions of proposed hardscape design elements in relation to existing facilities and site amenities.
- c. Location of proposed surface parking, roads, service areas, walks, plaza(s), tree groupings, landscape screening, retaining walls, and other various site/building features, including appropriate descriptions.
- d. Building(s) and site (ADA) accessibility.
- e. Location of existing and proposed site lighting.
- f. Location of existing and proposed site electrical equipment.

.4 Landscape and Hardscape Construction Plan

Show all new and existing landscape and hardscape features, including plaza and/or courtyard elements:

- a. Landscape features shall include trees, tree-protection, shrubs, planters, ground covers, special fill areas, and other amenities, if any.
- b. Hardscape features shall include paving; ramps; retaining, landscape, and seat walls; stairs; and site/integral lighting. Include access/patterns for ADA, pedestrian circulation, bike paths, emergency vehicle access, fire hydrants, if any.

.5 Conceptual Structural Plan

All levels, typical floor plan shall include:

- a. Conceptual foundation plans illustrating structural design concept.
- b. Dimensioned structural grid.
- c. Conceptual Structural Floor/Roof Framing Plan illustrating structural design concept:
 1. Dimensioned and structural grid.
 2. Concept and location of lateral bracing system.
 3. Location and size of structural columns.

.6 Architectural (All Levels and Roof)

- a. Code Information Plans to include the following:
 1. Identification of fire and smoke rated walls and openings.
 2. Identification of all exits.
 3. Identification of all room names.
 4. Identification, location, and fire rating of building(s) or occupancy separations.
 5. Identification and limits of building(s) occupancies.
 6. Description of summarized code review, including exit calculations.
- b. Floor Plans shall include:
 1. Dimensioned structural grid.
 2. Exterior walls, doors, frames, and openings.
 3. Interior walls, doors, frames, and openings.
 4. Room names.
 5. Applicable equipment and furnishings.

6. Fixture locations.
7. Appropriate descriptions.
- c. Roof Plan(s) shall include:
 1. Dimensioned structural grid.
 2. Screen walls, roof system and openings.
 3. Roof top equipment.
 4. Appropriate descriptions.
4. Conceptual Reflected Ceiling Plans shall include:
 1. Exterior and interior walls, doors, and openings.
 2. Ceiling height designations.
 3. Room names.
 4. Reflected ceiling grids.
 5. Interior and exterior soffits and bulkheads.
 6. Light fixtures.
 7. Item and material designations.
 8. Ceiling mounted equipment.
 9. Appropriate descriptions.
5. Architectural Exterior Elevations shall include:
 - a. All major building elevations.
 - b. Structural grid designations.
 - c. Vertical floor elevation designations.
 - d. Perspectives.
 - e. Material designations.
 - f. Include appropriate descriptions.
- f. Architectural Building Sections shall include:
 1. Longitudinal (Minimum 2).
 2. Latitudinal (Minimum 2).
- g. Architectural Enlarged Partial Exterior Building Elevations (All Elevations) shall include:
 1. Building(s) entrances.
 2. Structural grid designations.
 3. Vertical floor elevation designations.
 4. Material designations.
 5. Include appropriate descriptions.
- h. Architectural Typical Exterior Details (All Exterior Details) shall include:
 1. Illustration of building systems relationship.
 2. Typical exterior details.

3. Structural grid designations.
4. Vertical floor elevation designations.
5. Grid to exterior wall dimensions.
6. Item and material designations.
7. Include appropriate descriptions.

.7 Mechanical Conceptual Floor Plans and Roof Plans (All Levels and Roof)

- a. Place over architectural background.
- b. HVAC and plumbing information may be combined for all levels.
- c. Conceptual HVAC and plumbing floor plans shall include:
 1. Single line HVAC main ducts and risers.
 2. Single line exhaust ducts and risers.
 3. HVAC and exhaust equipment and associated system components layout in mechanical room and/or on roof.
 4. Identification and location of main plumbing lines, equipment and valves.
 5. Identification of plumbing fixtures.
 6. Identification and location of floor drains and sinks.
 7. Location and identification of mechanical equipment and HVAC temperature control zones.
 8. Overall dimensions of mechanical equipment and service clearance dimensions to be provided.

.8 Electrical Conceptual Floor Plans, Roof Plans, and Single Line Diagrams (All Levels and Roof)

- a. Place over architectural background.
- b. Lighting and power information may be combined for all levels. Typical spaces do not need to be repeated.
- c. Conceptual floor plans shall include:
 1. Location and identification of light fixtures.
 2. Location and identification of exit lighting.
 3. Location and identification of emergency lighting.
 4. Location and identification of electrical panels.
 5. Location and identification of electrical equipment.
 6. Location of transformers and generators.
 7. Conceptual single line power diagram.

.9 Audio- Visual Conceptual Floor Plans, Equipment Lists and Schematics (All Levels and Roof)

- a. Place over architectural background.
- b. Audio visual information may be combined for all levels. Typical spaces do not need to be repeated.
- c. Conceptual floor plans and ceiling plans shall include:
 1. Location and identification of audio-visual equipment.
 2. Room elevations demonstrating clearances for sightlines and maintenance

3. Conceptual single line diagrams and schedules.
4. Equipment designations.
5. Include appropriate descriptions.

.10 Telecommunication, Security, and Access Control Floor Plans, Equipment Lists and Schematics (All Levels and Roof)

- a. Place over architectural background.
- b. Telecommunication, security, and access control information may be combined for all levels. Typical spaces do not need to be repeated.
- c. Conceptual floor plans shall include:
 1. Location and identification of telecommunication equipment. (WAPs, phones etc.)
 2. Location and identification security equipment (CCTV security cameras, emergency phones, panic buttons etc.)
 3. Location and identification access control equipment.
 4. Location and identification equipment racks.
 5. Conceptual single line diagrams and schedules.
 6. Equipment designations.
 7. Include appropriate descriptions.

.11 Group 2 & 3 Furniture Floor Plans (All Levels and Roof)

- a. Place over architectural background.
- b. Typical spaces do not need to be repeated.
- c. Conceptual floor plans shall include:
 1. Location and identification of furniture.
 2. Conceptual schedules.
 3. Item and material designations.
 4. Include appropriate descriptions.

END OF SECTION

Attachment A: Model Site Extents



Table 5.5-1: Noise Level Criteria	
Room/Area Type	NC Level
Conference Rooms/Meeting Rooms	25
Executive Offices (Department Heads)	30-35
Offices	35
Instructional & Teaching Labs less than 750SF	30
Instructional & Teaching Labs greater than 750SF	25
Study Rooms	30
Open Study	35
Open-Plan Offices	35-45
Wellness Room/Meditation Room	25
Student and Staff Lounges, Lobbies, Restrooms	40
Circulation Spaces, Stairwells and Support Areas	40

requirements and the written recommendations of the final DB geotechnical and soil corrosion reports.

- Each below ground piping utility entering or leaving the building shall utilize below ground flexible expansion joint connections to protect piping from ground settlement. Flexible expansion joints shall be Ebaa Iron Inc. "Flex-Tend" force balance type. All below piping shall be installed per the locale jurisdictions requirements and the written recommendations of the final DB geotechnical and soil corrosion reports.
- Each above ground piping utility entering or leaving the building shall utilize above ground stainless steel braided flexible expansion joint connections to protect piping from ground settlement. Flexible hose joints shall be by FH Flex-Hose Company Inc. or equal.
- Provide a shut-off valve with valve box for underground connection to street or underground service at any new connection point. ***Stormwater and sanitary sewer systems are excluded from this requirement.***
- Provide tracer wire for all underground piping. ***Tracer wire is not required for piping in ground below on-grade structural floor slabs in areas where settlement is not a concern.***

5.5.3.4 Seismic Criteria

- Seismic design shall be based on the National Uniform Seismic Installation Guidelines (NUSIG), University of California Seismic Safety Policy, and the 2019 California Plumbing Code.
- The following piping shall be braced:
 - All piping, unless hanger length is 6" or less.
 - All pipe racks and vertical risers.
 - Insulated and/or non-insulated system as applicable.
- A seismic brace shall be provided at a minimum of every second hanger where the hanger length exceeds 6".
- Equipment, mounted on isolators shall be seismically braced using loose cables, telescoping pipes or box sections, angles or flat plates used as limit stops or snubbers, either integral to or separate from the isolators.

Non-rotating, fixed equipment shall be bolted directly to the floor or structure.

- The seismic importance factor for this project is 1.0 as per ASCE 7, Section 13.1.3. This shall be verified during final design by the structural engineer.

5.5.3.5 Plumbing Quality Level

The intended quality level of this project shall be:

- Commercial high-level quality equipment and materials shall be provided, which meet the requirement of the Campus Standards. The installation shall be performed to facilitate maintenance and serviceability.

5.5.3.6 Proposed Manufacturers

- Table 5.5-2 represents the expected quality level by manufacturer of several major equipment categories.

5.5.3.7 Redundancy, Reliability and Future Expansion Capability

- The Redundancy levels are described in terms of system capacity or equipment quantity versus the actual loads. Redundancy also includes spare or reserve capacity included in the base design estimates to hedge against changes late in the design phase, or future University renovations.
- The Reliability level is described in terms of Continuous Availability, or percent availability of capacity designed into the system. This is achieved by providing additional pathways for water, supplemental isolation valves, and head equipment to allow for unexpected failures or unplanned maintenance to occur in parts of the system while the other parts of the system continue to operate and meet the loads.
- Redundancy Definitions:
 - N = Base capacity meeting the expected peak load
 - N+1 = Quantity of equipment needed for base capacity plus one extra unit
 - Firm Capacity = Resulting system capacity (at peak load) if one piece of equipment failed or was down for maintenance. Example: A 80% Firm Capacity would equate to the system capacity being able to meet 80% of the load with one piece of equipment down.
 - Table 5.5-3 provides a preliminary indication of expected levels of redundancy in the various project systems.

5.5.3.8 Sustainability and Energy Efficiency

Plumbing / Water Energy Efficient Technologies to be evaluated:

- Due to recent enhancements to energy code requirements, this project shall have systems with energy efficient features.
- This section outlines three Categories of energy efficient and sustainable strategies of increasing cost and

SECTION 01 1400 – DESIGN BUILDER’S USE OF THE PROJECT SITE

PART 1 - GENERAL

1.1 USE OF PUBLIC THOROUGHFARES AND UNIVERSITY ROADS

- A. Design Builder shall make its own investigation of the condition of available public thoroughfares and University roads, and of the clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the Project site.
- B. Where materials are transported in the prosecution of the Work, do not load vehicles beyond the capacity recommended by manufacturer of the vehicles or prescribed by any applicable state or local law or regulation.
- C. Use only established roads on the campus; provided, however, that such temporary haul roads as may be required in the Work shall be constructed and maintained by Design Builder, subject to the approval of University’s Representative. Refer to Division 01 Sections, “Environmental Mitigation” and “Construction Waste Management” for descriptions of the Design Builder’s requirements for providing an approved haul route plan to and from the campus.
- D. Provide protection against damage whenever it is necessary to cross existing sidewalks, curbs, and gutters in entering upon the University roads and public thoroughfares. Repair and make good immediately at the expense of Design Builder all damages thereto, including damage to existing utilities and paving, arising from the operations under the Contract.
- E. ***Contractor shall maintain all existing campus roads, streets, sidewalks, curbs, gutters, and any other infrastructure items that are affected by campus construction activities, clear, clean and maintained while construction is ongoing on campus.***
- F. Truck staging is not allowed on campus or on any residential street surrounding the campus.

1.2 WATCHPERSON'S SERVICES

- A. The University will not be providing security services for the Project.
- B. During all hours that Work is not being prosecuted including weekends and holidays, furnish such watch person's services as Design Builder may consider necessary to safeguard materials and equipment in storage on the Project site, including Work in place or in process of fabrication, against theft, acts of malicious mischief, vandalism, and other losses or damages.
- C. The University will not be liable for any loss or damage.

1.3 SERVICE CONTINUITY

- A. Within the areas of the Work, investigate and uncover all drainage lines, sewers, electrical ducts, and other piping in use or forming continuations or utility systems required for other buildings or improvements upon the campus, and maintain such services in operation during performance of the Work of the Contract.
- B. Maintain continuous services to all existing facilities during the period of construction except for the following conditions:
 - 1. Perform Work that involves "shut-down" of existing facilities at such times as will cause the least inconvenience to the University activities, performing at night, on Saturdays, Sundays, holidays and at the discretion of University's Representative. Furnish University's Representative written notice of exact date and time of "shut-down" at least thirty (30) working days in advance unless a longer period is specified or agreed upon by the University. On jobs with short performance time, Design Builder shall verify with University's Representative the number of days required in advance for shutdown.
 - 2. The Design Builder shall include in the base bid all costs related to overtime necessary for the Work. No extra payment will be allowed for overtime to meet this requirement or the Contract Schedule.

1.4 SITE DECORUM

- A. Design Builder shall control the conduct of its employees (including subcontractor's employees) so as to prevent unwanted interaction initiated by Design Builder's employees with University of California, Riverside (UCR) students, UCR staff, UCR Faculty or other individuals (except those associated with the Project), adjacent to the Project site. Without limitation, unwanted interaction by Design Builder employees would include whistling at or initiating conversations with passersby. In the event that any Design Builder employee initiates such unwanted interaction, or utilizes profanity, Design Builder 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.
- B. No recreational/music radio sounds, other than two-way communication type, shall be audible outside the physical structure under construction.
- C. No smoking is allowed on the UCR Campus.

1.5 STORAGE

- A. Design Builder's use of the Project site for the Work and storage is restricted to the areas required for the performance of the Contract or as approved by University's Representative.

1.6 TEMPORARY STAIRS, SCAFFOLD AND RUNWAYS

- A. Provide all scaffolds, stairs, hoist plant, runways, platforms, and similar temporary construction as may be necessary for the performance of the Contract. Such facilities

shall be of the type and arrangement as required for their specific use, substantially constructed throughout and strongly supported, well secured and complying with all applicable rules and regulations of the Industrial Accident Commission of the State of California and all applicable laws and ordinances. Refer to Division 01 Section, "Regulatory Requirements".

- B. Arrange for construction equipment access to areas which may be partly blocked by existing obstructions.

1.7 CONTROL OF CONSTRUCTION WATER

- A. Provide impermeable floor coverings and suitable dams to prevent damage by water used for the Work. Immediately clean up and remove all surplus water and water spilled in non-working areas. Do not allow water to overflow gutters, flood streets or parking lots.

1.8 DUST CONTROL, AIR POLLUTION AND ODOR CONTROL

- A. The Design Builder shall employ measures to prevent the creation of dust, air pollution and odors.
 - 1. Unpaved areas where vehicles are operated shall be periodically wetted down or given an equivalent form of treatment as defined in South Coast Air Quality Management District (SCAQMD) Rule 403 to eliminate dust formation.
 - 2. All volatile liquids including fuels or solvents shall be stored in closed containers.
 - 3. No open burning of debris, lumber or other scrap will be permitted.
 - 4. Equipment shall be maintained in a manner to reduce gaseous emission.
 - 5. Low sulfur fuel shall be used for construction equipment.
 - 6. Stockpiles of excavated materials shall be protected and covered with material to prevent airborne transmission.
 - 7. Design Builder shall provide street sweeping whenever silt from construction site is carried over to adjacent streets.

1.9 NOISE CONTROL

- A. Noise control shall be maintained by the Design Builder in all areas of construction, guarding against any undue noise which may impair proper use of adjacent facilities. Activities with the highest noise potential shall be scheduled for times when background ambient noise levels are highest (i.e., during peak commute hours). Design Builder shall use noise suppressed equipment available and/or shall muffle/control noise on equipment to the maximum extent possible. Noisy construction-related operations (e.g. mixing concrete) shall be accomplished off-site to the extent feasible. Those operations which cannot be performed off-site shall be done on those areas of the site furthest from noise sensitive receptors.
- B. The following noise control procedures shall be employed:
 - 1. **Maximum Noise:** The Design Builder shall use equipment and methods during the course of this Work that are least disruptive to adjacent offices or residences.

Noise levels for trenchers, graders, trucks, and pile drivers shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions or as stipulated for the University during periods of operation. For all other equipment, noise levels shall not exceed 85 dBA at 50 feet or as stipulated for the University during periods of operation.

2. Equipment: Jack hammers shall be equipped with exhaust mufflers and steel muffling sleeves. All diesel equipment shall have exhaust muffled. Air compressors shall be of a quiet type such as a "whisperized" compressor.
3. Operations: Machines shall not be left idling. Electric power shall be used in lieu of internal combustion engine power wherever possible. Equipment shall be maintained to reduce noise from vibration, faulty mufflers, or other sources.
4. Scheduling: Noisy operations shall be scheduled so as to minimize the disturbance and duration to adjacent neighborhoods, nearby student housing complexes and residences.

1.10 EROSION CONTROL

- A. Exposed earth surfaces shall be watered to minimize dust generation as necessary according to weather conditions.
- B. During winter construction, an erosion and sediment-transport control plan incorporating standard erosion control practices shall be implemented prior to the first day of earth moving activities.
 1. Erosion control shall include retaining sediments within Project site by the use of catch basins; using interceptor ditches and benches to prevent gulying of slopes; and preparing and implementing erosion control plans.
- C. Storm Water Pollution Prevention Plan (SWPPP):
 1. Design Builder to obtain all necessary SWPPP permits and designate a Qualified SWPPP Practitioner (QSP) to oversee the Project. The Design Builder shall retain and oversee the QSP for the duration of the schedule until Substantial Completion of phase 3.

1.11 TRENCHING SHORING:

- A. Protection: Pursuant to Labor Code Sections 6705 and 6707, Design Builder shall include in its base bid all costs incident to the provision of adequate sheeting, shoring, bracing or equivalent method for the protection of Life and Limb which shall conform to the applicable Federal and State Safety Orders.
- B. Before beginning excavation five feet or more in depth, Design Builder shall provide to University's Representative a detailed plan showing the design or shoring, bracing, sloping, or other provisions to be made for worker protection from the hazards of caving ground during the excavation. The proposed plan shall comply with the State of California Construction Safety Orders, Title 8, and Title 24 of the California Code of Regulations. (CCR). The detailed plan shall be prepared by a registered civil or structural engineer registered in the State of California. The cost of required

engineering services shall be borne by Design Builder and shall be deemed to have been included in the base bid for the Work.

- C. The receipt of any plan showing the design of shoring, bracing, sloping, or other provisions for worker protection shall not relieve Design Builder from its obligation to comply with Construction Safety Orders Standards, OSHA and Title 24 CCR for the design and construction of such protective Work, and Design Builder shall indemnify University and University's Representative from any and all claims, liability, costs, action and causes of action arising out of or related to the failure of such protective systems. Design Builder shall defend University and its Regents, officers, employees, agents, and representatives in any litigation of proceeding brought with respect to the failure of such protective systems.
- D. Comply with State of California Construction Safety Orders, Article 6 - Excavations, Trenches, Earthwork - whether or not the excavation, trench, or earthwork is five feet or more in depth.

END OF SECTION 01 1400

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
1. Quality-Assurance and Quality-Control.
 2. Quality-Control Plan.
 3. Inspection
 4. Special Inspection and Testing.
 5. Mockups.
- B. Testing, inspections and ~~inspecting~~ special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Design Builder of responsibility for compliance with the Contract Documents requirements.
1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the sections that specify those activities. Requirements in those sections may also cover production of standard products.
 2. Specified tests, inspections, and related actions do not limit Design Builder's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Documents requirements.
 3. Requirements for Design Builder to provide quality-assurance and quality-control services required by University's Representative, or Authorities Having Jurisdiction are not limited by provisions of this section.
 4. **Special inspections shall be coordinated with the project Inspector of Record for the IOR to accompany the special inspector. Special inspections may be required in addition to the regular daily IOR inspections which are required by California Building Standards Codes and the Authorities Having Jurisdiction.**
- C. Related Sections include the following:
1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 2. Divisions 02 - 33 Specification Sections for specific test and inspection requirements.

1.2 DEFINITIONS

- A. Inspector of Record: (IOR) Employed by the University to observe, inspect and conduct tests required or deemed necessary to confirm Work is in accordance with the Contract Documents, California Code of Regulations, or other applicable regulatory requirements.

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- B. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- C. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by University's Representative.
- D. Mockups: Full-size, physical assemblies that are constructed on-site to illustrate finish and materials. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
 - 1. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
 - a. The intent is to verify the quality level, installation and placement of devices in the wall so a review of the locations can take place for validation of all elements and systems. The components of each mock-up shall include but shall not be limited to communications, electrical, drywall, door and sidelight, ceiling and finishes, headwall, millwork and/or casework, communications devices, headwalls, piping, above-ceiling ductwork, waterproofing systems and all elements required to complete the space.
 - b. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building built on the Project site, consisting of multiple products, assemblies and subassemblies.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria. Special Inspection and Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct special inspection and testing and acceptable to University's Representative, to establish performance and compliance with industry standards.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Design Builder or another entity engaged by Design Builder as an employee, subcontractor, or sub-subcontractor, to perform a particular

construction operation, including installation, erection, application, and similar operations.

- J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of California Code of Regulations to work in California.
- K. Inspection Request: Electronic request submitted, as specified by the University's Building and Safety Department, by the Design Builder to the University's Representative for inspection of completed Work.

1.3 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to University's Representative for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to University's Representative for a decision before proceeding.

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality-Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written inspection and testing reports that include the following:
 - 1. Date of issue.
 - 2. University's project title and number.

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3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and specification section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Documents requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For University's records, submit copies of permit drawings, permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- E. Quality-Control Plan: Prepare and submit a plan describing responsibilities, procedures and methods for quality-assurance and quality-control activities the Design Builder will utilize to control the quality of the Work specified.
- F. Mockup Shop Drawings: For integrated exterior and interior mockups, provide plans, sections, and elevations, indicating materials, size, and details of mockup construction.
1. Indicate manufacturer and model number of individual components.
 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- G. Mockup Schedule: submit a schedule of mockups with shop drawings that adequately illustrates build quality, details, size and character to the University's Representative at the onset of the mockup review process. The schedule of mockups to include type of mockup (Type 1 or Type 2), size of mockup, associated specification, anticipated construction date, and installer/ subcontractor responsible for construction.

1.5 QUALITY- ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual specification sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Approved Fabricator Qualifications: Special inspections required by this section are not required where off-site fabrications are done on the premises of a fabricator approved by the University. The firm shall comply with the requirements of the California Building Code Section 1701.7.
- F. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in California and who is experienced in providing engineering services of the kind indicated. engineering services are defined as those performed for installations of the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent.
- G. Specialists: Certain sections of the specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- H. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated,
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Design Builder's responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory(reject) mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.

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- e. Build laboratory(reject) mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, Type 2 mockups, and laboratory(reject)mockups; do not reuse products on Project.
2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Design Builder, with copy to University's Representative. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. **Mockups:** Before installing portions of the Work requiring mockups, submit a mockup schedule and drawings for approval. Upon University's approval of a mockup schedule-build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by University's Representative.
 2. Notify University's Representative fourteen (14) days in advance of dates and times when mockups will be constructed and ready for review
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain University's Representative's written approval of mockups before starting work, fabrication, or construction.
 5. Rejected mockups that do not establish an adequate standard of aesthetic, quality of workmanship and/or durability as required by the Contract Documents to either be remedied or demolished and re-constructed for approval by the University's Representative.
 6. Coordinate sequence of activities to accommodate construction and review of mockups, with adequate float for remedial measures.
 7. **Type 1 Mockups:** An in-place review of items, areas, materials, and systems prior to execution, with approval by University's Representative. It is not the intent to modify materials or installation but to verify quality-control expectations of the Design Builder. The mockups shall include all materials, finishes, outlets, fixtures, structural elements, and construction details to complete the finished appearance of a room or area. The exact location shall be verified with the Design Builder's sequencing and the University's Representative.
 - a. **Room Mockups (Type 1):** Construct room mockups incorporating required materials and assemblies, finished in accordance with requirements. Provide required lighting and additional lighting where required to enable University's Representative to evaluate quality of the Work. Provide sequencing plan and schedule showing how mockups can be reviewed and approved after design approval and prior to build out of rooms. Provide room mockups as required by the University's Representative.
 8. **Type 2 Mockups:** The Type 2 mock-up is an independent structure and is not intended to be a part of the completed building or system within the building. It is the intent to verify material, interface of systems, and to establish the minimum

quality that is required. The Type 2 mock-up is not intended to replace product samples required by individual sections in Divisions 02 through 33.

- a. Types of Type 2 mockups at minimum to includes, but not limited to:
 - 1) Exterior Building Façade Systems.
 - 2) Exposed Hardscape (concrete hardscape, pavers, benches, shade structures etc.).
 - 3) Exposed Architectural Concrete.
 - 4) Exposed Masonry and Brick.
 - 5) Exposed Structural Elements.
 - 6) Assemblies of Major Architectural Elements.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed, unless otherwise indicated.
- L. Mockups: Comply with requirements of preconstruction testing and those specified in individual sections in Divisions 02 - 33.
- M. Special Inspector Qualifications: An individual with the demonstrated experience and capability to conduct special testing and inspecting of the particular type of construction or operation requiring special inspection.

1.6 QUALITY-CONTROL

- A. University Responsibilities: Where quality-control services are indicated as University's responsibility, University will engage a qualified testing agency to perform these services.
 1. All Work performed by the Design Builder shall be observed and inspected by the University's Inspector of Record for compliance with the Contract Documents, applicable codes, and regulatory requirements.
 2. All materials, products, equipment, off-site fabrications, and assemblies shall be inspected by the University's Representative or Inspector of Record for compliance upon delivery to the Project site and prior to installation.
 3. University will furnish Design Builder with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 4. Coordinate all activities associated with University's consultants and other University departments.
 5. Payment for these services will be by the University, except for transportation and daily living expenses outside of Riverside County shall be reimbursed by the Design Builder in order to comply with the Design Builder's off-site fabrication or construction.
 6. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Design Builder, and the Contract Sum will be adjusted by change order.

- B. Design Builder's Responsibilities: Tests and inspections not explicitly assigned to the University are the Design Builder's responsibility. Perform quality-control services required of Design Builder by California Codes to verify and confirm quality of materials, off-site fabrication, prefabricated assemblies, pre-assembled equipment, and systems whether specified or not.
1. Where services are indicated as Design Builder's responsibility, or where quality standards for materials can not be verified, engage a qualified testing agency to perform these quality-control services.
 - a. Design Builder shall not employ same entity engaged by University, unless agreed to in writing by University.
 2. Notify testing agencies and the University's Representative at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Design Builder's responsibility, submit a certified written report, in duplicate, of each quality-control service to the University's Representative.
 4. Testing and inspecting requested by Design Builder and not required by the Contract Documents are Design Builder's responsibility.
 5. Additional tests or special inspections required to establish that such portion of the Work complies with the Contract Documents.
 6. Do not cover any piping, wiring, ducts, or other installations until they have been inspected and approved by the University's Representative.
 7. In addition, the Design Builder shall be responsible for reimbursement to the University for:
 - a. Reimbursement for travel and daily living expenses which are beyond normal inspection costs when the University's testing laboratory or inspector is required to conduct inspections outside of the Riverside County area.
 - b. Cost of retesting construction revised or replaced construction by the Design Builder, where required tests were performed on original construction.
 - c. Cost of retesting construction used as temporary facilities by the Design Builder.
 - d. Costs of testing construction required by the Design Builder's substitutions.
 8. Submit additional copies of each written report when they so direct by the University's Representative.
 9. **Responsibilities and Duties of the Quality Control Staff:**
 - a. **The Quality Control Manager shall have the authority to stop Work, reject Work, order Work removed, initiate remedial Work, propose solutions, and reject material not in compliance with the Contract Documents.**
 - b. **Responsibilities of the Quality Control Manager shall include, but are not limited to the following:**
 - 1) **Present on-site during all working hours and assigned "full time" to this Project. Design Builder shall designate alternate**

individual(s) to assume responsibilities in the temporary absence of the Quality Control Manager or when overtime Work is being performed.

- 2) Have complete familiarity with the Drawings and Specifications.
- 3) Establish and implement Quality Control Programs for the Design Builder and with the various Subcontractors and monitor their conformance.
- 4) Present samples, mock-ups and test panels to be used as standards of quality for review by the University and their Consultants.
- 5) Inspect existing conditions prior to the start of new Work segments.
- 6) Perform in-progress and follow-up inspections on each Work segment to ensure compliance with the Contract Documents. Accompany the University and their Consultants on such inspections.
- 7) Coordinate required tests, inspections, and demonstrations with the University's IOR inspectors, consultants and any other Authority Having Jurisdiction.
- 8) Inspect all materials and equipment arriving at the job site to ensure conformance to the provisions of the Contract Documents. Prepare and submit to the University written reports as required by the Contract Documents.
- 9) Identify, report and reject defective Work or Work not in conformance with the Contract Documents. Monitor the repair or reconstruction of rejected Work.
- 10) Develop checklists to be used for the inspection of each Division of the Work.
- 11) Retain specialists or outside firms for inspection of Work in areas where additional technical knowledge is required (mechanical, electrical, electronics, controls, communications, security, welding, structural, security hardware, etc.).
- 12) Schedule additional site visits where appropriate.
- 13) Verify and report that all materials and equipment manufactured off-site are in conformance with the Contract Documents.
- 14) Prior to the start of each Division, Section and/or major item of Work required by the Contract Documents, conduct a preconstruction Quality Control meeting with responsible field and office representative and the University and their Consultants. Provide the University and their Consultants minutes of these meetings within forty-eight (48) hours.
- 15) Work closely with the University to ensure optimum Quality Control. Attend Project meetings as required by the University.

- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Design Builder's responsibility, provide dedicated quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
1. If such additional tests or inspections establish that such portion of the Work fails to comply with the Contract Documents, all costs of such additional tests and inspections, and all other costs resulting from such failure, including compensation for University's Representative and University's consultants, shall be deducted from the Contract Sum by change order
- E. Testing Agency Responsibilities: Cooperate with University's Representative and Design Builder in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify University's Representative and Design Builder promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Design Builder.
 5. Do not release, revoke, alter, or increase the Contract Documents requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Design Builder.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for review of mockups, tests, inspections, obtaining samples, and similar activities.

2. Do not cover any piping, wiring, ducts, or other installations until they have been inspected and approved by the University's Representative or certified if certification is required.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within sixty (60) days of date established for the Notice to Proceed.
1. Distribution: Distribute schedule to University's Representative, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.7 SPECIAL INSPECTION AND TESTING

- A. Special Inspection and Tests: University will engage a qualified special inspector to conduct special inspection and tests required by the California Building Codes as the responsibility of the University, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying University's Representative promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to University's Representative with copy to Design Builder.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected Work. **If initial tests or special inspections made by University's Testing Laboratory's reveal that any portion of the Work does not comply with Contract Documents, or if University's Representative determines that any portion of the Work requires additional testing or inspection, additional tests and inspections shall be made as directed.**
 7. **If such additional tests or inspections establish that such portion of the Work fails to comply with the Contract Documents, all costs of such additional tests and special inspections, and all other costs resulting from such failure, including compensation for University's Representative and University Representative's Consultants shall be deducted from the Contract Sum.**
 8. **Fixtures, equipment, materials, and other items removed, demolished, abandoned, or capped and left in place, shall be tested to verify that there is no damage caused after the items have been covered by construction.**
- B. **Certain portions of the Work will be tested, inspected, or both, at various stages. Nothing in any prior acceptance or satisfactory test result shall govern, if at any subsequent time the Work, or portion thereof, is found not to conform to the requirements of the Contract Documents.**

1.8 UNIVERSITY'S INSPECTORS

- A. The IOR shall ~~report~~ *work in close coordination with the* ~~to~~ University's Representative, *and shall report all findings of completed inspections to the University's Representative. The IOR is a direct report to the Director of Building, Safety and Emergency Management.* The IOR shall observe construction in progress and shall have the following responsibilities and limitations on authority.
1. Act ~~under the direction of~~ *in coordination with the* University's Representative *on each project.*
 2. Observe installation and Work in progress as a basis for determining conformance of the Work, materials, and equipment with the Contract Documents. IOR will *document and* report any discrepancies observed to University's Representative and Design Builder. Only University's Representative has the final authority to make approvals or rejections.
 3. Only University's Representative shall interpret the requirements of the Contract Documents. If any item is ambiguous, University's Representative shall make a written interpretation. If Design Builder requests changes or modifications to the Contract Documents, University's Representative shall make a written determination on the requested changes or modifications.
 4. *Upon receipt of an inspection request, and after conducting the requested inspection, IOR shall* ~~prepare and submit~~ *provide* an *electronic* inspection *disposition* report to University's Representative for each inspection performed *using the UC Riverside Inspection request software.*
 5. Review application for payments.
 6. Assist University's Representative in reviewing the test and *special* inspection results *and any reporting documents* of testing laboratories *prepared for this project.*
 7. The IOR is not authorized to permit deviations from the requirements of the Contract Documents unless such deviation has been approved by University's Representative in writing. *IOR shall not approve any changes that are not in compliance with the California Building Standards Code.*
 8. The IOR shall not supervise, coordinate, or direct the Work. The IOR has no responsibility or control over Design Builder's construction means, methods, techniques, sequences, procedures, or coordination of any portions of the Work, or over any safety programs in connection with the Project
- B. The failure of University, University's Representative and its representatives and consultants, or University's IOR to observe or inspect the Work, or to detect deficiencies in the Work, or to inform Design Builder of any deficiencies which may be discovered, shall not relieve Design Builder, its subcontractors regardless of tier, or suppliers from their responsibility for construction means, methods, techniques, sequences and procedures, construction safety, code compliances, nor from their responsibilities to carry out the Work in accordance with the Contract Documents and *or minimum California Building Standards Code requirements* to detect and correct defective Work as defined in the General Conditions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Samples of materials and finishes shall be submitted to the University's Representative for approval a minimum of twenty-one (21) days ahead of mockup reviews for the specified material.
- B. Materials and finishes for mockups shall comply with the requirements specified in the various applicable sections of the specifications and shall match previously submitted and approved samples.
- C. Mockups shall incorporate all related construction materials and finishes upon the completed Work.

PART 3 EXECUTION

3.1 INSPECTION REQUESTS:

- A. **Submit inspection request to the University's Representative at least 48 hours in advance of time when Work that requires testing or inspecting will be performed Design Builder shall request inspection of completed portions of the Work through University's Representative, using the University's Department of Building and Safety Inspection Request Software. Design Builder shall submit a request for inspection using University's Inspection Request Software, with instructions for using that software attached to the end of this Section.**
 - 1. **Design Builder shall submit an Inspection Request at least 2 working days prior to the time the work will be ready for inspection.**
 - 2. **For work to be inspected by a third party testing laboratory, whether Design Builder's or University's, Design Builders shall submit an Inspection Request at least 2 working days prior to the time the work will be ready for inspection.**
 - 3. **For work not in conformance with the Contract Documents, the IOR shall submit to the Design Builder's a Nonconforming Work Notice.**
- B. All Work performed by the Design Builder or subcontractors shall be reviewed and approved for compliance with the Contract Documents by the Design Builder prior to submittal of the Inspection Request.
- C. Design Builder's responsibility on the day on inspection:
 - 1. Have plans that are stamped "Reviewed for Conformance" by the University available at the construction site.
 - 2. Have product, material or equipment submittals marked "NET or MCN" to show approval by the University available at the construction site.

3. Submit Inspection Request 48 hours in advance of inspections and material and equipment deliveries.
4. Provide equipment, utilities, lighting, and access necessary for University's Representative to conduct inspections.

3.2 INSPECTION REQUEST SOFTWARE INSTRUCTIONS

- A. Citizenserve-For new Campus Permit Inspection Requests, create an account and log into the Campus Building Permit Citizenserve System. This can be found on the Planning Design and Construction website <https://citizenserve.com/ucr> and then follow the instructions provided.
1. Complete Automated Inspection Request Form
 2. Select your Permit # from the drop-down menu and request the inspection needed.
 3. A notification will be issued to the inspector on the project., advising them that there is an inspection request pending their review.
 4. Once requested inspection is conducted, the IOR will input the disposition into Inspection Request system (approved, disapproved, corrections, etc.). There may be other attachments such as reports, photos, notes, etc., added to the inspection request disposition as well.
 5. Results of the inspection is input after the inspection in real-time and it can be viewed by all parties real-time. Inspectors may also upload photos and other documents and attach them to the inspection file in the Inspection Request System
 6. Completed "As-Built" plans of project shall be provided to Inspector of Record (IOR) prior to final inspection.
 7. Once the work is completed, request a final inspection. If approved, the permit will be signed as approved and complete.
- B. If not already associated with a permit, a request to be added to that specific permit must be completed prior to an inspection request being submitted. Access to Specific Permits must be granted by the Building and Safety Division.

3.3 QUALITY - CONTROL PLAN

- A. Prepare a plan describing procedures and methods the Design Builder will utilize to control the quality of the Work. At a minimum, the quality-control plan shall include:
1. An organizational structure description, including quality-control supervision and inspection reporting structure. Delineate personnel training and qualification activities.
 2. Plans, procedures and responsibilities for quality-control of drawings, specifications, and permit packages, including verification of compliance to Contract Documents. Include procedures for drawing resubmittals to verify comments from University's Representatives, subject matter experts, peer reviewers and Authorities Having Jurisdiction are addressed prior to resubmittal.

3. Plans and procedures for testing and inspections to verify attributes delineated in the Contract Documents, including those specified in referenced Codes and Standards. Include documents that identify individual inspection or testing points and acceptance criteria and include provisions for recording results and the responsible inspection/test personnel. This documentation shall be traceable to the particular material, items, processes, or systems evaluated, including notification requirements.
4. Procedures for identifying and contractually invoking the applicable technical and quality requirements delineated in the specifications on vendors supplying materials, parts, and services.
5. Plans and procedures for receiving, inspecting, and accepting material and items. These shall include examination of physical condition and compliance with purchasing requirements, including markings for class type and grade, and conformance of supplied documentation. These shall also include provisions for:
 - a. Identifying, controlling, and processing non-conforming items, including notification of the University's Representative.
 - b. Inspection of materials for authenticity to preclude counterfeit parts, for items and attributes of concern identified by University's Representative.
 - c. Verifying for compliance and traceability, maintaining, and turnover to the University, certificates of conformance and mill certificates required by Contract Documents or codes or standards invoked, for materials received.
6. Provisions for identifying defective Work. Bring to University Representative's attention, for consultation and possible relief, those cases where correction within the specified requirements may introduce a significant schedule penalty, personnel hazard, or compromise the quality of installed items, or is otherwise impractical.
7. Controls to assure that only the "Reviewed for Conformance" construction documents are utilized in the Work.
 - a. This includes provisions for removing superceded versions from the work area, except where explicitly and prominently marked "Void For information Only"; such as to retain annotated installation data.
8. Detailed formal procedures or instructions for the performance of special processes, such as welding or concrete placement. These procedures/instructions and personnel performing special processes shall be qualified and certified as required by codes and standards invoked in the Contract Documents.
9. Controls providing for periodic calibration of testing and measurement equipment, including unique equipment identification and calibration tracking.
10. Maintain records documenting the implementation of the above activities, including tests inspections, special process qualification and execution, vendor documentation and defective Work resolution. These records shall be indexed, protected and retrievable for final submission to University's Representative.
11. Identify all test and inspections that the Design Builder proposes to be conducted by the University.

3.4 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to University's Representative.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for University Representative's reference during normal working hours.

3.5 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other specification sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Documents requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service and special inspection and testing activities.
- C. Repair and protection are Design Builder's responsibility, regardless of the assignment of responsibility for quality-control services or special inspection and testing activities.
- D. Maintain and protect the mockups during construction to serve as a standard for approving Work incorporated into the Project. Do not alter, remove, or destroy mockups until University's Representative authorizes their removal.

3.6 MOCKUP INSTALLATION

- A. Mockups shall be constructed in accordance with the approved construction drawings, specific mock-up drawings, and approved shop drawings and product data. If changes are required, the Design Builder shall complete modifications to all documents.
- B. Type 1 mockups shall be revised as required to achieve proper quality-control standards that shall be achieved by the Design Builder.
- C. Type 2 mockups shall be located where directed and shall not be built "in place" as part of the permanent construction. Periodic inspections by the University and Design Builder will be given during the construction process to review the installation.
 - 1. Insofar as possible, mockups shall illustrate contiguous materials and finishes, and be arranged in the same relationship, as they will appear in the finish construction.

2. Each kind of material shall be fabricated, installed, and finished by the various subcontractors or others who will be furnishing and performing the Work in the permanent construction.
3. Protect and clean as required to leave the mock-up and adjacent areas in proper condition, upon completion of the Work.
4. Remedial measures, which may be necessary on mockups, shall maintain standards of quality and durability required by the Contract Documents, and shall be subject to approval by the University's Representative.
5. When so directed by the University's Representative, Type 2 mockups shall be dismantled, and the materials disposed of by the Design Builder.
6. Type 2 mockups shall be approved by the University's Representative, before materials are ordered for the Project.

3.7 MOCKUP INSPECTION

- A. Notify University's Representative at the start of construction of mockups and provide progress reports to allow the University's Representative to schedule inspections.
- B. After approximately 50 percent of each mockup has been built, request University Representative's preliminary review before completion. Incorporate visual and technical changes or variations requested by the University's Representative into mockups during their construction and prior to their completion, insofar as possible.
- C. Obtain University Representative's acceptance of visual and technical qualities of mockups before commencing the corresponding Work for the Project.
- D. Should the Type 1 or Type 2 mockups fail to meet the University Representative's approval, they shall be taken down or dismantled, and reconstructed to the extent necessary, until acceptance has been obtained.
- E. Time the completion and reworking of mockups necessary to obtain acceptance to avoid delay in the construction schedule of the Project. Update the Construction Schedule to reflect required revisions to mockups.

INSPECTION REQUEST SOFTWARE INSTRUCTIONS

INSPECTION REQUEST INSTRUCTIONS USING THE CFORMS and/or new Campus Building Permit Citizenserve Inspection Request Process.

NOTE: The CForms Inspection Request Process is to be used only for Campus Building Permit numbers B21-510 and lower. The new Campus Building Permit Citizenserve Portal is required to be used for all Campus Building Permit numbers B21-511 and above.

1. **CForms-For inspection requests using the older CForms Inspection Request System, log into <http://ucr.cforms.net>. Follow instructions.**
2. **Citizenserve-For newer Campus Permit Inspection Requests, Create an account and log into the new Campus Building Permit Citizenserve System. This can now be found on the PD&C website or "Copy and paste" <https://citizenserve.com/ucr> and then follow the instructions provided.**
3. **Complete Automated Inspection Request Form**
4. **Select your Permit # from the drop-down menu and request the inspection you need.**
5. **In either system, a notification will go out to the inspector on the project., advising them that there is an inspection request pending their review.**
6. **Once requested inspection is conducted, the IOR will input the disposition into Inspection Request system (approved, disapproved, corrections, etc.). There may be other attachments such as reports, photos, notes, etc., added to the inspection request disposition as well.**
7. **Results of the inspection is input after the inspection in real-time and it can be viewed by all parties real-time. . Inspectors may also upload photos and other documents and attach them to the inspection file in the Inspection Request System**
8. **Completed "As-Built" plans of project shall be provided to Inspector of Record (IOR) prior to final inspection signature is allowed.**
9. **Once the work is completed, request a final inspection and a final inspection will be conducted. If approved, the permit will be signed as approved and complete., and a Certificate of Occupancy will be prepared for signature by the Campus Fire Marshal and Campus Building Official**

NOTE: If you are not already associated with a permit, a request to be added to that specific permit must be completed prior to an inspection request being submitted. *Access to Specific Permits must be granted by the Building and Safety Division. Contact Lezlie Howard at the Building and Safety Division for authorization and assistance in gaining access to these specific permits.

NONCONFORMING WORK NOTICE

NUMBER: _____

DATE: _____

TO:

FROM:

SPEC. SEC. REF.: _____ PARA: _____ DWG REF: _____ DETAIL: _____

DESCRIPTION OF DEFECTIVE CONDITION (IOR): _____

REPORTED BY (IOR): _____

CORRECTIVE ACTION SHOULD BE TAKEN AS SOON AS POSSIBLE AND COORDINATED WITH THE INSPECTOR OF RECORD (IOR). IF FURTHER INFORMATION IS NEEDED, ADVISE THE UNIVERSITY'S REPRESENTATIVE IMMEDIATELY.

DESCRIPTION OF CORRECTIVE ACTION TAKEN (CONTRACTOR): _____

ACCEPTED BY (CONTRACTOR): _____ **DATE:** _____

UCR USE ONLY

ACCEPTANCE OF CORRECTED DEFECTIVE CONDITION (IOR): _____

ACCEPTED BY (IOR): _____ **DATE:** _____

COPIES: UNIVERSITY CONSULTANT CONTRACTOR

INSPECTION REQUEST

TO: _____ NUMBER: _____

FROM: _____ DATE: _____

DWG REF: _____ DETAIL: _____

SHOP DWG: _____

PROJECT SCHEDULE ACTIVITY ID NO. _____

DATE OF INSPECTION: _____ TIME OF INSPECTION: _____

TYPE OF INSPECTION: _____

SPECIFIC LOCATION OF INSPECTION (IE. FLOOR, COL LINE, ETC.):

ALL WORK REQUESTED FOR INSPECTION HAS BEEN REVIEWED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS BY DESIGN BUILDER'S SUPERINTENDENT PRIOR TO NOTIFICATION OF INSPECTION REQUEST.

SIGNED: _____ DATE: _____

_____ UCR USE ONLY

DATE REC'D: _____

DATE OF INSPECTION: _____ TIME OF INSPECTION: _____

INSPECTOR: _____ INSPECTION REPORT

ATTACHED

COMMENTS:

COPIES: UNIVERSITY CONSULTANTS _____ _____
 FILE

NONCONFORMING WORK NOTICE

TO: _____ NUMBER: _____

FROM: _____ DATE: _____

SPEC. SEC. REF.: _____ PARA: _____ DWG REF: _____ DETAIL: _____

DESCRIPTION OF DEFECTIVE CONDITION: _____

REPORTED BY: _____

CORRECTIVE ACTION SHOULD BE TAKEN AS SOON AS POSSIBLE AND COORDINATED WITH THE INSPECTOR OF RECORD. IF FURTHER INFORMATION IS NEEDED, ADVISE THE UNIVERSITY'S REPRESENTATIVE.

DESCRIPTION OF CORRECTIVE ACTION TAKEN: _____

ACCEPTED BY: _____ DATE: _____

cc:

END OF SECTION 01 4000

SECTION 01 4100 – REGULATORY REQUIREMENTS

1.1 SUMMARY

A. Section Includes:

1. The standards and codes applicable to the Work.
2. Regulatory notifications
3. **Plan Review and Permit Issuance Requirements, Notifications, and Certificates**

B. Related Requirements:

1. Division 01 Section, “Design Builder’s Use of Site.”
2. Division 01 Section, “Reference Standards.”

1.2 APPLICABLE CODES AND STANDARDS

A. Codes which apply to this Project include, but are not limited to, the following including additions, changes, and interpretations adopted by the enforcing agency in effect as of the date of these Contract Documents.

1. California Code of Regulations (CCR) (2019)

- a. Title 8, Industrial Relations
- b. Title 13, Hazardous Materials Transportation
- c. Title 17, Public Health
- d. Title 19, Public Safety
- e. Title 20, Public Utilities and Energy
- f. Title 21, Public Works
- g. Title 23, Underground Storage Tank Regulations
- h. Title 24: Building Standards Code (2019)
 - 1) Part 1, ~~Building Standards~~ **California** and Administrative Code
 - 2) Part 2, California Building Code **(Volume 1 and 2)**
 - 2) Part 3, California Electric Code
 - 3) Part 4, California Mechanical Code
 - 4) Part 5, California Plumbing Code
 - 5) Part 6, California Energy Code
 - 6) ~~Part 7, California Elevator Safety Construction Code~~
 - 7) Part 9, California Fire Code
 - 8) Part 11, California Green Building Standards Code
 - 9) Part 12, California State Referenced Standards **Code**
- i. Title 25, Housing and Community Development
- j. Title 26, Toxics
- k. Title 27, Environmental Protection

- B. In addition to the above codes, Work shall comply with the following:
1. South Coast Air Quality Management District Regulations (SCAQMD) California Environmental Quality Act (CEQA).
 2. California Health and Safety Code.
 - a. California Retail Food Code
 3. California Occupational Safety and Health Act Standards (Cal-OSHA).
 4. California Department of Transportation (Caltrans): Standard Specifications, latest edition.
 5. National Fire Protection Association (NFPA): Standards 13, 24, 72, and 80.
 6. Americans with Disabilities Act - Title II (ADA).
 7. Federal Occupational Safety and Health Act (OSHA).
 8. Federal Environmental Protection Agency – Clean Air Act.
 9. Storm Water Pollution Prevention Act.
 10. American Society of Heating, Refrigerating and Air-conditioning Engineers
 - a. ASHRAE 2015 Handbook, HVAC Applications.
 - b. ASHRAE 2016 Handbook, HVAC Systems and Equipment
 - c. ASHRAE 2017 Handbook, Fundamentals
 - d. ASHRAE 2018 Handbook, Refrigeration
 - e. ASHRAE 55-2016 Thermal Environmental Conditions for Human Occupancy.
 - f. ASHRAE 62.1-2016 Ventilation for Acceptable Indoor Air Quality.
 - g. ASHRAE 90.1- 2010 Energy Standard for Buildings except Low-Rise Residential Buildings
- ~~C. All Work shall meet or exceed code requirements.~~
- C. **Where other regulatory requirements are referenced in these Specifications, the affected work shall meet or exceed the applicable requirements of such references.**
- D. References in the specifications to "code" or to "building code," not otherwise identified, shall mean the foregoing specified codes, together with the additions, changes, amendments, and interpretations adopted by the enforcing agency and in effect on the date of these Contract Documents.
- E. Where other regulatory requirements are referenced in these specifications, the affected Work shall meet or exceed the applicable requirements of such references.
- F. **Nothing stated in this Section of the Specifications or other Sections of the Specifications, the other Contract Documents or shown on the Drawings shall be construed as allowing Work that is not in strict compliance with all applicable Federal, State, regional, and local statutes, laws, regulations, rules, ordinances, codes and standards**
- F.G.** Regulatory requirements referred to shall have full force and effect as though printed in these specifications.

H. Discrepancies between these codes/rules/etc. and the Contract Documents shall be brought to the attention of the University's Representative for resolution. Unless otherwise directed by the University's Representative, if a conflict exists between referenced regulatory requirements and the Contract Documents, comply with the one establishing the more stringent requirements, but which shall not be less than minimum code requirements

1.3 OTHER APPLICABLE LAWS AND REGULATIONS

A. All applicable federal, state, and local laws and the rules and regulations of governing utility districts and the various other Authorities Having Jurisdiction over the construction and completion of the Project, including the latest rules and regulations of the **Campus Building Official, State Fire Marshal, Designated ~~state~~-Campus** fire marshal (**DCFM**), OSHA, and the California Labor Code, shall apply to the Contract throughout, and they shall be deemed to be included in the Contract the same as though printed in these specifications.

1.4 CONFLICTS

A. Nothing stated in this section of the specifications or other sections of the specifications, the other Contract Documents shall be construed as allowing Work that is not in strict compliance with all applicable federal, state, regional, and local statutes, laws, regulations, rules, ordinances, codes and standards.

B. Unless otherwise directed by the University's Representative, if a conflict exists between referenced regulatory requirements and the Contract Documents, comply with the one establishing the more stringent requirements.

1.5 TRENCHING AND SHORING

A. All Work shall be in full accordance, but not necessarily limited to the following codes and regulations: Titles 8, 19, 21, 22, & 24, State of California, California Code of Regulations (CCR), California Occupational Safety and Health Administration (OSHA). For Additional requirements refer to Division 01 Section, "Design Builder's Use of Site."

1.6 REGULATORY NOTIFICATIONS

A. Submit all required notifications to Federal, State of California, State in which disposal facility is located if not in California, regional, and local agencies with regulatory responsibilities associated with the Work activities that are included in the Contract. All notifications shall be served in writing, in the form required by the agency requiring notification, and in a timely manner so as not to negatively impact the Project schedule. Serve notifications at least ten (10) business days in advance (or earlier if required by agency) of activity requiring notice. The Design Builder shall serve all required notifications in writing to all governmental and quasi- government agencies having notification requirements pertaining to any portion of the Work included in the Project.

B. **Using the "SMARTS" Website: <https://smarts.waterboards.ca.gov>, the** Design Builder shall file a Notice of Intent for coverage under State General Construction Activity Storm Water Permit National Pollutant Discharge Eliminate System (NPDES). Design Builder shall com-

ply with applicable permit requirements including the Project Storm Water Pollution Prevention Plan.

1.7 CAMPUS BUILDING PERMITS PROCESS REQUIREMENTS.

- A. Prior to commencement of construction and permit issuance by the University's Department of Building and Safety, a permit application shall be entered into the Building and Safety Departments portal along with completed project construction documents for review, approval and permit issuance. The portal address is found at the PD&C Webpage, <https://pdc.ucr.edu/>**
- B. Building and Safety staff will distribute all submitted Project Construction Documents to all campus reviewers for their respective review and approval.**
- C. Once all campus reviewers have approved their respective plan reviews and returned them to Building and Safety, the Permit Program Manager will issue the Campus Building Permit and stamped approved construction documents for the project. Once this process is completed, construction and inspections may commence.**
- D. Inspections may then be requested through the same portal found at the PD&C webpage. (Contact Lezlie Howard, Permit Program Manager, for assistance with the Inspection request process).**
- E. Outside agency Permits, Licenses, and Certificates: For the University's records, submit copies of permits, licenses, certifications, Special inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgment, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.**

1.8 NOTIFICATIONS, AND CERTIFICATES

- A. Underground Service Alert (USA) Notifications:** Prior to commencing clearing, excavation and trenching, coordinate with Underground Service Alert of Southern California for field verification and marking of utilities within the limits of Project site. Design Builder shall be responsible for outlining limits of excavation with white chalk paint prior to coordination with USA. Coordination shall require two (2) business days advance notification prior to start of excavation work. Provide USA notification permit number to the University's Representative prior to starting site Work.
- B. In no event, shall the Design Builder install materials that contain asbestos, PCB, lead or other known hazardous materials unless prior written approval is obtained from the University.**
- C. Regulated Carcinogens by Title 8 California Code of Regulations (CCR), Subchapter 7, Group 16 (Control of Hazardous Substances), Article 110 (Regulated Carcinogens).**
 - 1. Products containing chemicals regulated as carcinogens by the State of California are not allowed for use on University projects.**
 - 2. Case-by-case exceptions may be considered for products containing the following Cal/OSHA recognized carcinogens:**

- a. Methylene Chloride, 5202
 - b. Cadmium, 1532, 5207
 - c. Inorganic Arsenic, 5214
 - d. Formaldehyde, 5217
 - e. Benzene, 5218
3. Case-by-case exceptions may only be made when suitable alternative products are not available. Such exceptions are subject to written approval by the University's Representative.
 4. Exceptions require that the Design Builder shall have an established carcinogen program as required by Cal/OSHA (§5203. Carcinogen Report of Use Requirements) and shall submit to University's Representative, a copy of the Cal/OSHA Confirmation of Report for Cal/OSHA carcinogens.
 5. When exceptions are granted, the Design Builder is responsible for providing to the University's Representative a copy of the semi-annual Confirmation of Report received from Cal/OSHA or, in lieu of that, a copy of the Design Builder's semi-annual report as submitted to Cal/OSHA at periods not to exceed 6 months, or at project closeout, whichever occurs first.
- G. Fire Department and Additional Notifications, Manifests, and Requirements: As required by University and coordinated by Design Builder with the University's Representative.

END OF SECTION 01 4100

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following plumbing piping services:
1. Domestic cold-water piping.
 2. Domestic hot-water piping.
 3. Domestic recirculating hot-water piping.
 4. Domestic chilled-water piping for drinking fountains.
 5. Sanitary waste piping exposed to freezing conditions.
 6. Storm-water piping exposed to freezing conditions.
 7. Roof drains and rainwater leaders.
 8. Supplies and drains for handicap-accessible lavatories and sinks.

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less and smoke-developed index of 50 or less.
 2. Insulation Installed Outdoors: Flame-spread index of 75 or less and smoke-developed index of 150 or less.
- C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Architect. Use materials indicated for the completed Work.
1. Piping Mockups:
 - a. One 10-foot section of NPS 2 straight pipe.
 - b. One each of a 90 degree threaded, welded, and flanged elbow.
 - c. One each of a threaded, welded, and flanged tee fitting.
 - d. One NPS 2 or smaller valve and one NPS 2-1/2 or larger valve.
 - e. Four support hangers, including hanger shield and insert.
 - f. One threaded strainer and one flanged strainer with removable portion of insulation.
 - g. One threaded reducer and one welded reducer.
 - h. One pressure temperature tap.
 - i. One mechanical coupling.

- j. One union.
 - 2. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
 - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 4. Obtain Architect's approval of mockups before starting insulation application.
 - 5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 7. Demolish and remove mockups when directed.
- D. Comply with the following applicable standards and other requirements specified for miscellaneous components:
- 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.4 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.5 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Comply with ASTM C552.
 - 1. Preformed Pipe Insulation: Type II, Class 1, without jacket.
 - 2. Preformed Pipe Insulation: Type II, Class 2, with factory-applied ASJ jacket.
 - 3. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C534/C534M, Type I for tubular materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA.
 - b. Armacell LLC.
 - c. K-Flex USA.
- H. Mineral-Fiber, Preformed Pipe: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knaf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.
 - 2. Preformed Pipe Insulation: Type I, Grade A, without factory-applied jacket.
 - 3. 850 deg F.
 - 4. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 5. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

- I. Phenolic: Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C1126.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. Resolco Inc.
 - 2. Preformed Pipe Insulation: Type III, without factory-applied jacket.
 - 3. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- J. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C534/C534M or ASTM C1427, Type I, Grade 1, for tubular materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Armacell LLC.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C195.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Ramco Insulation, Inc.
- B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C196.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Ramco Insulation, Inc.
- C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Ramco Insulation, Inc.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Foster Brand; H. B. Fuller Construction Products.
- C. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA.
 - b. Armacell LLC.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. K-Flex USA.
 2. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less as tested in accordance with ASTM E84.
 3. Wet Flash Point: Below 0 deg F.
 4. Service Temperature Range: 40 to 200 deg F.
 5. Color: Black.
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
- E. Phenolic Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
- F. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
- G. PVC Jacket Adhesive: Compatible with PVC jacket.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Consumer Solutions.

- b. Johns Manville; a Berkshire Hathaway company.
- c. P.I.C. Plastics, Inc.
- d. Speedline Corporation.

2.4 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Vimasco Corporation.
 - 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 3. Service Temperature Range: 0 to plus 180 deg F.
 - 4. Comply with MIL-PRF-19565C, Type II, for permeance requirements, with supplier listing on DOD QPD - Qualified Products Database.
 - 5. Color: White.
- C. Vapor-Retarder Mastic, Solvent Based, Indoor Use: Suitable for indoor use on below-ambient services.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
 - 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 3. Service Temperature Range: 0 to 180 deg F.
 - 4. Color: White.
- D. Vapor-Retarder Mastic, Solvent Based, Outdoor Use: Suitable for outdoor use on below-ambient services.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
 - 4. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Mon-Eco Industries, Inc.
 - e. Vimasco Corporation.
2. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.
3. Service Temperature Range: 0 to plus 180 deg F.
4. Color: White.

2.5 LAGGING ADHESIVES

- A. Adhesives shall comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Vimasco Corporation.
 2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
 3. Service Temperature Range: 20 to plus 180 deg F.
 4. Color: White.

2.6 SEALANTS

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.
- B. Joint Sealants:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
 - d. Pittsburgh Corning Corporation.
 2. Permanently flexible, elastomeric sealant.
 3. Service Temperature Range: Minus 58 to plus 176 deg F.
 4. Color: White or gray.
- C. FSK and Metal Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.

D. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.

2.7 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
- B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Foster Brand; H. B. Fuller Construction Products.

- b. Vimasco Corporation.

2.9 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Alpha Associates, Inc.

2.10 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
 - 2. Adhesive: As recommended by jacket material manufacturer.
 - 3. Color: White.
 - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- D. Metal Jacket:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
 - 2. Aluminum Jacket: Comply with ASTM B209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.

- d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
3. Stainless-Steel Jacket: ASTM A240/A240M.
- a. Sheet and roll stock ready for shop or field sizing.
 - b. Material, finish, and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- E. Underground Direct-Buried Jacket: 125-mil-thick vapor barrier and waterproofing membrane, consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pittsburgh Corning Corporation.
 - b. Polyguard Products, Inc.
- F. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross-laminated polyethylene film covered with white aluminum-foil facing.
- 1. Manufacturers: Subject to compliance with requirements, provide products by the following:

- a. Polyguard Products, Inc.

2.11 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - 2. Width: 3 inches.
 - 3. Thickness: 11.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - 2. Width: 3 inches.
 - 3. Thickness: 6.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Ideal Tape Co., Inc., an American Biltrite Company.
 - 2. Width: 2 inches.
 - 3. Thickness: 6 mils.
 - 4. Adhesion: 64 ounces force/inch in width.
 - 5. Elongation: 500 percent.

6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Bilrite Company.
 - d. Knauf Insulation.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.12 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
2. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.
3. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

C. Wire: 0.080-inch nickel-copper alloy.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. C & F Wire.

2.13 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers,:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Plumberex Specialty Products, Inc.
 - b. Truebro.
 - c. Zurn Industries, LLC.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.
- B. Protective Shielding Piping Enclosures,:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Truebro.
 - b. Zurn Industries, LLC.
 2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range of between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.

- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 - 6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for

- above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF CELLULAR-GLASS INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
 4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
1. Install preformed pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as that of pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as that of pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.9 INSTALLATION OF PHENOLIC INSULATION

A. General Installation Requirements:

1. Secure single-layer insulation with stainless steel bands at 12-inch intervals, and tighten bands without deforming insulation materials.
2. Install two-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with 0.062-inch wire spaced at 12-inch intervals. Secure outer layer with stainless steel bands at 12-inch intervals.

B. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets with vapor retarders on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as that of pipe insulation.

D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as that of straight segments of pipe insulation. Secure according to manufacturer's written instructions.

E. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed insulation sections of same material as that of straight segments of pipe insulation. Secure according to manufacturer's written instructions.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.10 INSTALLATION OF POLYOLEFIN INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.11 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant

recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.12 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless steel jackets.

3.13 FIELD QUALITY CONTROL

- A. University Representative will engage a qualified testing agency to perform tests and inspections.
- B. Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections with the assistance of a factory-authorized service representative.
- E. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- F. All insulation applications will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports.

3.14 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
1. Drainage piping located in crawl spaces.
 2. Underground piping.
 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.15 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

- ~~1. NPS 1 and Smaller: Insulation shall be one of the following:~~
 - ~~a. Cellular Glass: 1-1/2 inches thick.~~
 - ~~b. Flexible Elastomeric: 1/2 inch thick.~~
 - ~~c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.~~
 - ~~d. Phenolic: 1 inch thick.~~
 - ~~e. Polyolefin: 1/2 inch thick.~~
- ~~2. NPS 1-1/4 and Larger: Insulation shall be one of the following:~~
 - ~~a. Cellular Glass: 1-1/2 inches thick.~~
 - ~~b. Flexible Elastomeric: 1 inch thick.~~
 - ~~c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.~~
 - ~~d. Phenolic: 1 inch thick.~~
 - ~~e. Polyolefin: 1 inch thick.~~

B. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
 - a. Cellular Glass: 1-1/2 inches thick.
 - b. Flexible Elastomeric: 3/4 inch thick.
 - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
 - d. Phenolic: 1 inch thick.
 - e. Polyolefin: 3/4 inch thick.
2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
 - a. Cellular Glass: 1-1/2 inches thick.
 - b. Flexible Elastomeric: 1 inch thick.
 - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - d. Phenolic: 1 inch thick.
 - e. Polyolefin: 1 inch thick.

C. Domestic Chilled Water (Potable):

1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Cellular Glass: 1-1/2 inches thick.
 - b. Flexible Elastomeric: 1 inch thick.
 - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - d. Phenolic: 1 inch thick.

- e. Polyolefin: 1 inch thick.

~~D. Stormwater and Overflow:~~

- ~~1. All Pipe Sizes: Insulation shall be one of the following:~~

- ~~a. Cellular Glass: 1-1/2 inches thick.~~
- ~~b. Flexible Elastomeric: 1 inch thick.~~
- ~~c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.~~
- ~~d. Phenolic: 1 inch thick.~~
- ~~e. Polyolefin: 1 inch thick.~~

~~E. Roof Drain and Overflow Drain Bodies:~~

- ~~1. All Pipe Sizes: Insulation shall be one of the following:~~

- ~~a. Cellular Glass: 1-1/2 inches thick.~~
- ~~b. Flexible Elastomeric: 1 inch thick.~~
- ~~c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.~~
- ~~d. Phenolic: 1 inch thick.~~
- ~~e. Polyolefin: 1 inch thick.~~

F. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

- 1. All Pipe Sizes: Insulation shall be one of the following:

- a. Flexible Elastomeric: 1/2 inch thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
- c. Polyolefin: 1/2 inch thick.

G. Sanitary Waste Piping Where Heat Tracing Is Installed:

- 1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 2 inches thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inches thick.
- c. Phenolic: 1-1/2 inches thick.

H. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:

- 1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 1-1/2 inches thick.
- b. Flexible Elastomeric: 3/4 inch thick.
- c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
- d. Phenolic: 1 inch thick.
- e. Polyolefin: 3/4 inch thick.

I. Hot Service Drains:

- 1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 1-1/2 inches thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

J. Hot Service Vents:

1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 1-1/2 inches thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.16 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Domestic Water Piping:

1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 2 inches thick.
- b. Flexible Elastomeric: 2 inches thick.
- c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.
- d. Phenolic: 2 inches thick.
- e. Polyolefin: 2 inches thick.

B. Domestic Hot and Recirculated Hot Water:

1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 2 inches thick.
- b. Flexible Elastomeric: 2 inches thick.
- c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.
- d. Phenolic: 2 inches thick.
- e. Polyolefin: 2 inches thick.

C. Sanitary Waste Piping Where Heat Tracing Is Installed:

1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 2 inches thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.
- c. Phenolic: 2 inches thick.

D. Hot Service Drains:

1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 1-1/2 inches thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

E. Hot Service Vents:

1. All Pipe Sizes: Insulation shall be one of the following:

- a. Cellular Glass: 1-1/2 inches thick.

- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.17 OUTDOOR, UNDERGROUND PIPING INSULATION SCHEDULE

- A. Sanitary Waste Piping, All Sizes, Where Heat Tracing Is Installed: Cellular glass, 2 inches thick.
- B. Chilled Water, All Sizes: Cellular glass, 2 inches thick.

3.18 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:

- 1. None.
- 2. PVC: 20 mils thick.
- 3. Aluminum, Smooth: 0.016 inch thick.
- 4. Painted Aluminum, Smooth: 0.016 inch thick.
- 5. Stainless Steel, Type 304 or Type 316, Smooth No. 2B Finish: 0.010 inch thick.

- D. Piping, Exposed:

- 1. None.
- 2. PVC: 20 mils thick.
- 3. Aluminum, Smooth: 0.016 inch thick.
- 4. Painted Aluminum, Smooth: 0.016 inch thick.
- 5. Stainless Steel, Type 304 or Type 316, Smooth No. 2B Finish: 0.010 inch thick.

3.19 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:

- 1. None.
- 2. PVC: 20 mils thick.
- 3. Aluminum, Smooth: 0.016 inch thick.
- 4. Painted Aluminum, Smooth: 0.016 inch thick.
- 5. Stainless Steel, Type 304 or Type 316, Smooth No. 2B Finish: 0.010 inch thick.

- D. Piping, Exposed:

- 1. PVC: 20 mils thick.
- 2. Painted Aluminum, Smooth: 0.016 inch thick.

3. Stainless Steel, Type 304 or Type 316, Smooth No. 2B Finish: 0.010 inch thick.

3.20 UNDERGROUND, FIELD-APPLIED INSULATION JACKET

- A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

END OF SECTION 220719